

Owner's Manual

SOLID STATE INTEGRATED AMPLIFIER

L-100

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

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Thank you for purchasing one of our quality products, the LUXMAN L-100. With natural care, it will give you many years of outstanding performance and personal delight. Please read this Owner's Manual carefully before operating the unit. The first section diagrams the various controls, connections and summarizes their operation; Keep it handy for quick and convenient reference. The second section gives detailed descriptions and operating procedures for the electronic and mechanical components of the L-100. Again, thank you for your selection, and may "good listening" be your daily pleasure.



Switches & Controls

1. Input Selector Switch

This switch allows to select desired programme source: you may select either of 5 positions (aux-1, tuner, phono-1, phono-2, aux-2).

2. Linear Equalizer

This is a new tone control which provides a total compensation specially intended for subtly augmenting regular tone controls. With the control in its mid-position, flat frequency response is achieved. When switched to either of the 2 "up-tilt" positions, the entire response curve is rotated so as to linearly increase treble response while simultaneously decreasing bass response. Conversely selection of a "down-tilt" position rotates the response curve in a clockwise direction and provides a gradual decrease of treble and a simultaneous increase of bass.

This equalizer is not released even when the Tone Control Switch (7) is set at the "off" position. For further details, refer to the Operation of Linear Equalizer (Page 14).

3. Bass Level Control (BASS)

A clockwise turn of the control boosts the bass response, and a counter-clockwise turn decreases and cuts the bass. This control has a click stopper of 10 points for both increase and decrease respectively. It yields a flat frequency response when set at the center of rotation.

4. Bass Frequency Selector Switch

Bass turnover (roll-off) frequencies are selected with this switch. When the desired frequency (150Hz, 300Hz or 600Hz) is set by this switch, tone control operates below the selected frequency.

5. Treble Level Control (TREBLE)

A clockwise turn of this knob boosts the treble response, while a counter-clockwise turn decreases the treble. This control has a click stopper of 10 points for both increase and decrease respectively. It yields flat frequency response when set

at the center of rotation.

6. Treble Frequency Selector Switch

Treble turnover (roll-off) frequencies are selected with this switch. When the desired frequency (1.5KHz, 3KHz or 6KHz) is set by this switch, tone control operates above the selected frequency.

7. Tone Control Switch & Low-Boost Switch

This switch functions both as tone control switch which operates tone control function (3) (4) (5) (6) and low-booster. If this switch is set at "tone cont." position tone control is put into operation, while at "off" position tone control circuit is by-passed. And when this switch is set at "tone cont. & low-boost" tone control circuit and low boost circuit operate simultaneously; you may adjust the tone control freely together with operation of low-boost circuit which boosts the low frequency below 70Hz. Please note that the maximum increase point of this low-boost circuit is set at 8dB, therefore this has a shelf below 15Hz.

8. Low Cut Filter

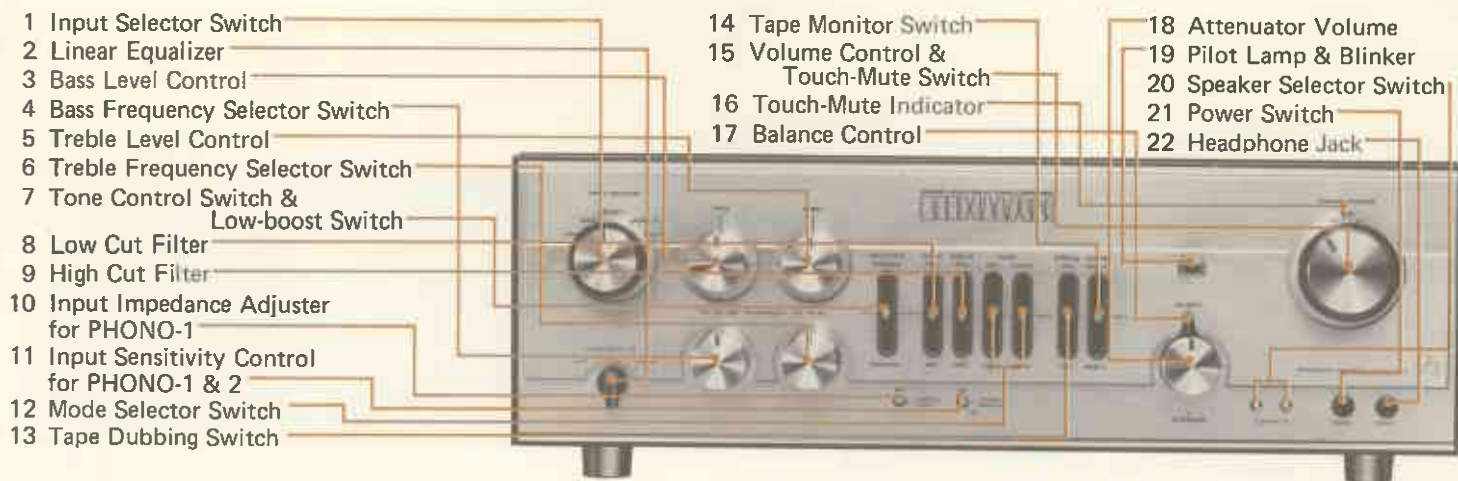
When this switch is set at the upper position low frequency range below 70Hz can be cut off at the rate of -12dB/oct., while at the lower position below 10Hz also at the rate of -12dB/oct. At the center point the filter function is by-passed to have flat frequency response; the signal will override this circuit.

9. High Cut Filter

When this switch is set at the upper position high frequency range above 7KHz can be cut off at the rate of -12dB/oct., while at the lower position above 12KHz also at the rate of -12dB/oct. At the center point the filter function is by-passed to have flat frequency response; the signal will override this circuit.

10. Input Impedance Adjuster for PHONO-1

You may set this input Impedance Adjuster for PHONO-1



(34) at any impedance you desire between 30Kohms — 100Kohms. Click stoppers are provided at 30Kohms, 50 Kohms and 100Kohms, and approximate impedance is known by the slit of the screw. Adjustment to obtain the appropriate load resistance for cartridge is easily made by turning the screw with a small \ominus driver.

11. Input Sensitivity Control for PHONO-1 & 2

This is to control the input of the equalizer stage in compliance with the output voltage of pick-up cartridges connected to PHONO-1 and PHONO-2 terminals. This adjustment may be operated both on PHONO-1 and PHONO-2 terminals due to the method of varying the quantity of NF in equalizer circuitry. Adjustment of ± 5 dB is possible at an input sensitivity of 3mV. Therefore the input sensitivity is adjustable between 1.7mV — 5mV approximately. The 0dB point is easily found by means of the click stopper. Adjustment should be done with a small — driver. And approximate input sensitivity is known by the position of the slit of the screw.

12. Mode Selector Switch

Reproduction mode can be selected by these two switches and 9 combinations are feasible. The right switch provides "stereo reverse" "stereo" and "monaural", while the left one provides "left channel only", "stereo" and "right channel only". Various reproduction mode are obtainable by these two switches. For the normal reproduction both of these switches should be set at the center "stereo" position.

13. Tape Reprint Switch (DUBBING)

Tape dubbing is possible with this switch. When the lever is set at the "1 to 2" position, the playback signals of the DECK-1 terminals can be copied on DECK-2, and vice versa when set at the "2 to 1" position. While in the dubbing process, it is possible to monitor with the Tape Monitor Switch (14). Except when reprinting a tape, it is recommended that this switch be set at the center "source" position. This tape reprinting circuit is independent and reproduction of other sources such as record or tuner is possible while the operation of tape dubbing.

14. Tape Monitor Switch

By this switch this set is divided into two separate sections; from each input terminal such as PHONO, TUNER or AUX to the REC. OUT terminals and the amplifier section annexed to MONITOR terminals. At the position of "deck-1", reproduction by tape deck is feasible from "DECK-1 MONI" (36). While at "deck-2" position reproduction by tape deck is feasible either from "DECK-2 MONI" (38) or from "DECK-2 TAPE CONNECTOR" (39).

In case 3-head tape deck is used, simultaneous playback monitoring is possible while recording. In this case the amplifier receives the playback signals from either of DECK-1/DECK-2 MONITOR terminals (36) or (38). Bear in mind that when the Monitor switch is set either at "DECK-1" or "DECK-2" position, playback is not possible from other sources than tape-recorder.

15. Volume Control and Touch Mute Switch

This knob controls both volume and Touch Mute Circuit which reduces volume by 20dB.

Volume Control

A precision detent-volume of high-grade attenuator type which enables an accurate adjustment of attenuation of both the right and left channels. A clockwise turn of this control increases volume, while a counter-clockwise turn decrease and finally cuts off volume.

Please note that time-delay circuitry is incorporated in the output stage to prevent noises caused by the operation of switches right after the power ON or the thumps at the ON/OFF operation of the power switch. And the output circuitry will be kept isolated for several seconds after the power switch is turned ON.

If this volume control is left increased, by the operation of this time-delay circuitry, loud sound level may be reproduced suddenly, therefore it is advisable to set the volume control at the extreme counter-clockwise position at first.

Touch Mute Switch

Most of the current amplifiers are equipped with Audio Muting Circuitry, with which instantaneous attenuation of main volume is feasible for such an urgent occasion as the phone-call during reproduction.

Usual case is to do ON-OFF operation mechanically by a switch, while this model has adopted new electronic Touch-Mute system. A slight touch on this knob ensures operation. To operate this muting circuitry touch by hand the center metal part of the main volume and the gain may be reduced by 20dB and the volume is reduced to 1/10. Cancellation is possible by touching the outer metal part of the knob just like the case of normal operation of the main volume. Please note that this circuitry may not operate under a special condition, for instance, that this set is placed in the perfectly shielded room with the GND terminal (34) grounded. In such occasion, operate in the same way as described above while touching the front panel by other hand, and the touch-mute switch will operate perfectly.

16. Touch-Mute Indicator

This indicator lights up when the touch-mute function is ON, and goes out when OFF.

17. Balance Control

The volume balance on right and left channels can be adjusted with this control. Turn it clockwise, and the volume of the left channel will decrease (max:-14dB); counter-clockwise turn causes decrease of the right channel. When the volume of both channels is balanced, monaural reproduction sound comes from the center of both right and left speakers. This point is easily found by the click-stopper at its center point.

18. Attenuator Volume

Occasionally a fine adjustment of volume control may not be easy when low level reproduction is needed; in case of over-rated input at the input terminals or the mid-night listening. In such cases, the adjustment by the attenuator volume makes it easy when it is operated after the rough level is set by the volume control (15).

Full clockwise turn is equivalent to 0dB, that is, not attenuated, the position of which may be used for measurement or full-gain operation. While a counter-clockwise turn decreases level, and the full turn attains -20dB attenuation.

Thus free preset of the maximum point of the volume is feasible between 0dB and -20dB by the adjustment of this attenuator volume.

19. Pilot Lamp and Blinker

A time-delay circuitry to mute the PRE. OUT terminals and REC. OUT terminals is provided to prevent the thump noises at the time of the operation of switches right after the power on or at the ON-OFF operation of the power switch. Therefore, output terminals are muted by this time-delay circuitry for several seconds after the power switch is ON. The pilot lamp keeps blinking while the time-delay circuitry is under operation, and will light on and stop blinking when normal operation is allowed.

20. Speaker Selector Switch

This amplifier offers convenient use of 2 speaker systems. You can choose independent or simultaneous driving of 1 or 2

systems. When the A button is pressed in, the speaker terminals A (26) will operate and the B button is for the terminals B (27). When both of the A and B buttons are pressed in, the A and B terminals will operate at the same time. In this case, make sure that the overall impedance is not less than 4 ohms.

21. Power Switch

Mains power is turned on when this switch is pushed, and the pilot lamp begins to blink for a several seconds until this set is in perfect operational condition. And the next push shuts off the mains power.

22. Headphone Jack

Connection of a stereophonic headphone to this jack allows private listening. Output signals are always available regardless of the position of the Speaker Selector Switch (20). For stereophonic reproduction, however, it is recommended to set the speaker switch at the OFF position.

Input & Output Terminals

23. 24. Extra Mains Outlet

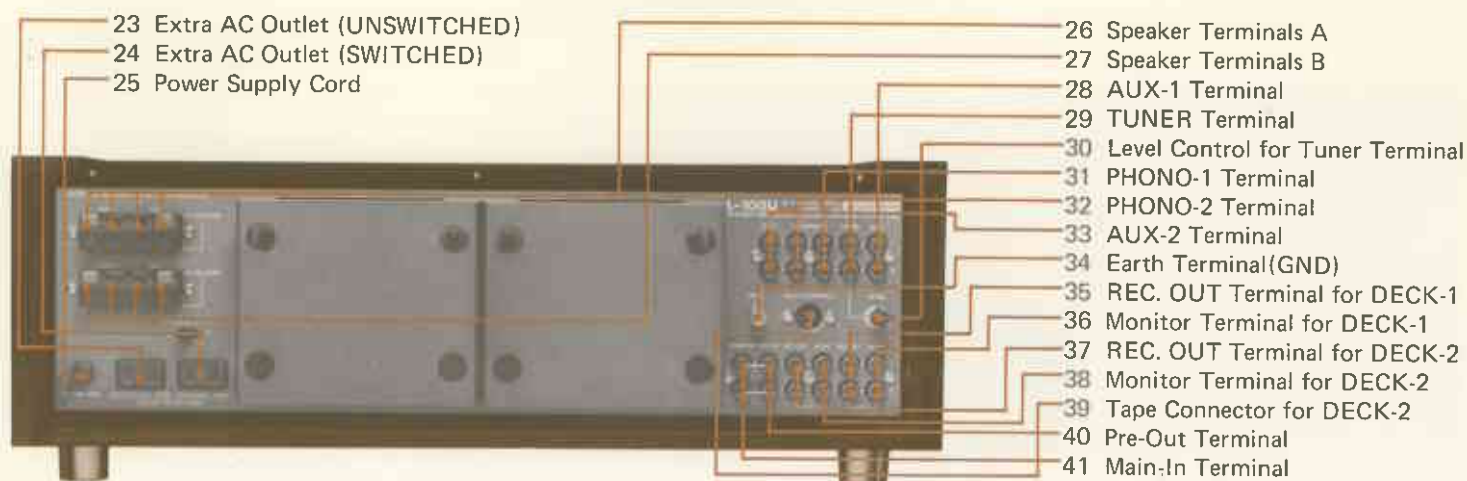
Convenient for supplying mains power to outer equipment such as AM/FM tuner or record player. The terminals (24 SWITCHED) are independent of the mains switch of the amplifier, while the other (23 UNSWITCHED) is coupled with the mains switch (21). The supply of the mains power depends on the mains switch. The total capacity for the UNSWITCHED terminals is 200W, and the SWITCHED is 100W.

25. Power Supply Cord

Plug in the end of this cord to the wall socket of 120 V A.C.

26. 27. Speaker Terminals(A and B)

The speaker systems should be connected to these terminals. These terminals are coupled with the speaker switches, and the speaker switch must be set at the position corresponding to the terminal to which the speaker systems are connected. (26)



is for the A speakers, and (27) is for the B speakers. The red terminal is for (+) and the black for (-). For further details, refer to Connection of Speakers.

28. AUX-1 Terminal

This is an auxiliary input terminals for playback of flat frequency response such as AM/FM stereo tuner, line output of a tape recorder, or the audio output of a television receiver. Input sensitivity is 180mV. Input impedance is 50Kohms.

29. Tuner Terminals

For reproduction of tuner (AM/FM/LW/SW). The input level can be adjusted by the Level Control for Tuner terminal (30). Max sensitivity, 180mV. Input impedance 25Kohms.

30. Level Control for Tuner Terminal

This is a variable resistor to set an input level of the Tuner terminals (29). It can be used to adjust possible volume level deviation at the time of the Input Selector Switch operation.

31. PHONO-1 Terminal

For playback through magnetic cartridges (MM, MI, MC type). The input sensitivity can be adjusted freely in the range of 3mV (0dB) \pm 5dB, that is, 1.7mV – 5mV. Input impedance can also be adjusted freely between 30Kohms and 100Kohms. For such MC type cartridge of very low output level, it is necessary to boost voltage up to the specified level by use of a step-up transformer or a head-amplifier.

32. PHONO-2 Terminal

Same as PHONO-1 Terminal, except that the input impedance is fixed at 50Kohms. Input Sensitivity can also be adjusted by Input Level Control (11).

33. AUX-2 Terminal

This is an auxiliary input terminal for playback of flat frequency response such as AM/FM stereo-tuner, line output of a tape recorder, or the audio output of a television receiver. Input sensitivity, 180mV. Input impedance 50Kohms. Input level is not controllable.

34. Earth Terminal (GND)

Connect the earth lead wire of the record player (from motor or pick-up arm) to ground to the amplifier.

35. DECK-1 REC. OUT Terminal

A signal for recording is taken out from this terminal (always available when input signals are given to any of the input terminals). In case the Dubbing Switch (13) is set at the "2

to 1' position, the recording signals come from the DECK-2 recording output terminals.

36. DECK-1 Monitor Terminal

Playback of the line output of a tape recorder is possible from this terminals. It is put into operation when the Monitor Switch (14) is set at "deck-1" position. In case a 3-head tape deck is used, simultaneous playback monitoring is possible.

37. DECK-2 REC. OUT Terminal

Offers the same function as the DECK-1 REC. OUT Terminal (35). If the Dubbing Switch is set at the "1 to 2" position, the signal from the DECK-1 terminals is available.

38. DECK-2 Monitor Terminal

Offers the same function as the DECK-1 Monitor Terminal. It is put into operation when the Monitor Switch is set at the "deck-2" position.

39. Tape Connector for DECK-2

This connector is of DIN standard. With the recording output terminal (REC. OUT) and the tape monitor terminal in it, connection for recording and playback is feasible with a single lead-wire with DIN plug – providing the tape recorder has the same connector. For playback through this connector, the Monitor Switch (14) must be at the "DECK-2" position, and the Dubbing Switch (13) at the "SOURCE" position. Recording output signal is always available from this connector, except when the dubbing switch is set at the "1 to 2" position.

40 Pre Amplifier Section Output Terminal (PRE OUT)

The whole output in the pre-amplifier section, including the tone controls and the linear equalizer, can be taken out from this terminal. Output voltage is 910mV against the standard input. When using a shield wire, there is no attenuation in the high frequencies because this terminal has sufficiently low output impedance of about 100 ohms. This terminal is for independent use of the pre-amplifier, as well as for a multi-amplifier system using a channel divider. Usually, this terminal and the Main-Amplifier Input Terminal (41) are coupled by a jumper cord.

41 Main-Amplifier Section Input Terminal (MAIN IN)

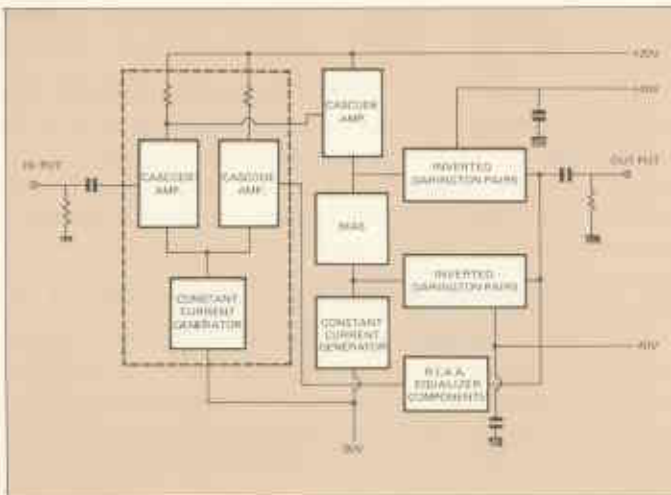
The Main-Amplifier section can function independently when the signal is passed through this terminal. The input sensitivity is 910mV, and the input impedance is 33 ohms. The variable Attenuator (18) is inserted just after this terminal, permitting adjustment of the input level in case of the independent use of the main-amplifier section.

Circuitry

*Equalizer Stage

A Cascoded Differential Direct Coupled Amplifier is adopted. This differential circuitry at the top stage stabilizes the direct coupled stage and helps obtain better linearity. Also this shields the NF amp immune from the exterior effects such as cartridges to be connected to the input. Good linearity, stability and SN ratio are ensured thanks to the Cascoded Amplifier adopted for this differential stage and the following stage. As for the output stage, the adoption of the transistor of TO-5 type at the final stage together with the push-pull circuitry by Class A Inverted Darlington Configuration permits to accept the low impedance loads. This is designed for the professional use because current standard control amps cannot stand the severe load condition at equalizer stage when a lot of lines of recording output is used frequently with professional equipment. Constant Current Circuits are adopted at important points to improve the linearity of the transistor itself, the open loop gain and the differential function, all of which

BLOCK DIAGRAM for EQUALIZER STAGE



contribute to lower the distortion.

The permissible input voltage at PHONO terminals is 420mV at 1KHz (R.M.S. Input Sensitivity 0dB). R.I.A.A. equalization is within ± 0.2 dB, which is realized by careful selection of the components used in this equalizer stage. Other functions related to this stage are Input Sensitivity Adjuster, Input Impedance Adjuster and Linear Equalizer.

*Intermediate Amp & Tone Control Circuitry

These two stages adopt cascaded direct-coupled amp to improve linearity especially at high frequency range, and stability and SN ratio are just the same with that of the equalizer stage.

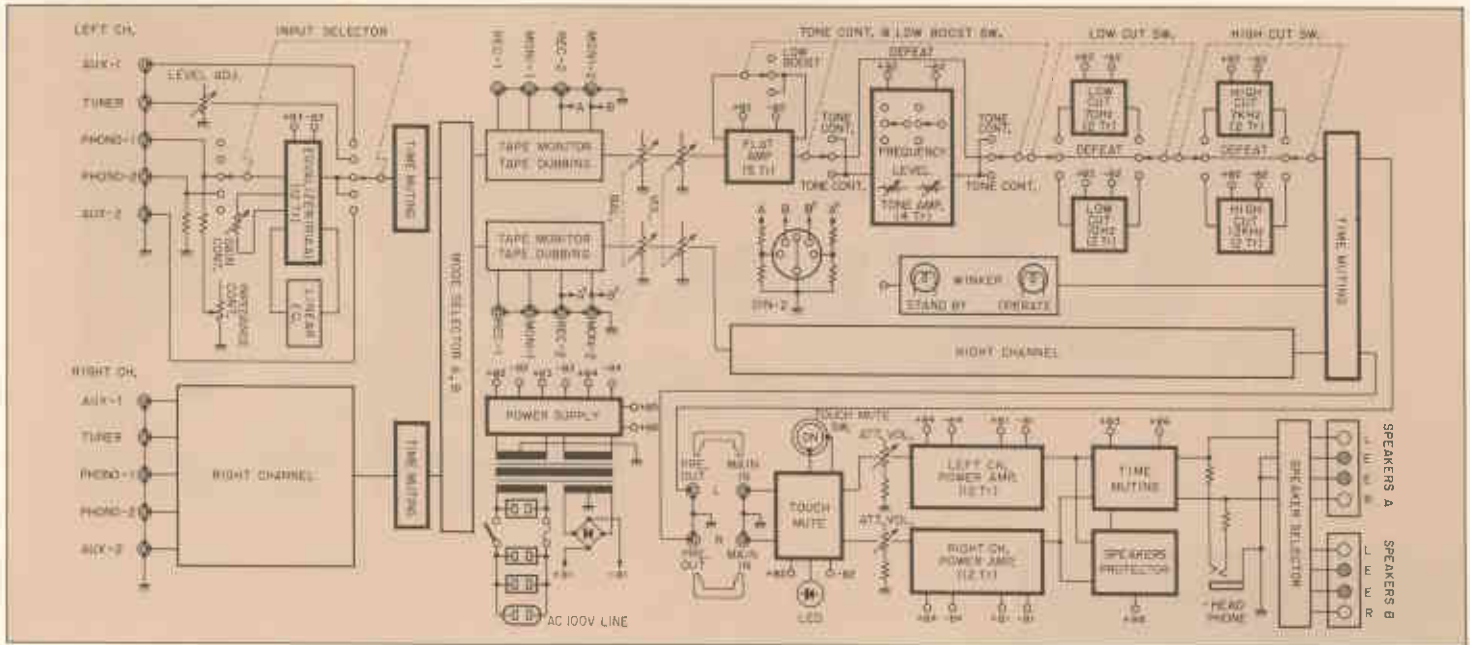
Constant Current Circuitry is adopted in the output stage to improve linearity of the transistor itself and the open loop gain. Phase compensation for NF stabilization is just one, and the aggravation of the distortion at high frequency range is almost nil.

Tone control circuitry of LUX original NF type improves the distortion together with the above mentioned amplifying circuitry. Tone Control function is provided with independent frequency selector with 3 points for both bass (150Hz, 300Hz, 600Hz) and treble (1.5KHz, 3KHz, 6KHz) together with the tone defeat switch. This circuitry allows low boost at the same time. Thus a wider tonal adjustment is feasible.

Further a detent-volume of 21 points is adopted for both bass and treble level controls. This is just the same type with the high-grade attenuator, which prevents gang error between right and left channels.

*Buffer Circuitry

Emitter follower circuitry is adopted for this stage. But this is somewhat different from the ordinary one. Here two transistors are used; one is for the emitter follower and the other for the constant current circuitry to the emitter follower stage. This constant current driving circuitry ensures not only keeps good linearity of the transistor itself but suppress the



distortion lowest for wide frequency range by means of its high open loop gain.

*Filter Circuit

This stage is an NF type utilizing emitter follower, 2 transistors are used for this circuitry; one is for emitter follower and the other is for the constant current driver circuitry. Cut off frequency can be selected either at 10Hz (-18dB/oct.) or 70Hz (-12dB/oct.) for Bass cut and 7KHz (-12dB/oct.) or 12KHz (-12dB/oct.) for Treble cut. Independent filter circuits for each cut off frequency are provided, and these cut off points can be selected by the whole switching of the circuitry. Of course no signals will go through these circuitries when the filter switch is off.

Power Amplifier Section:

This section adopts direct coupled pure complementary OCL circuitry which is composed by cascoded differential amplifier stage, emitter follower stage, complementary driver stage, and final stage.

The signals supplied to the MAIN IN terminals flow to the cascoded differential amplifier which is a kind of the balanced DC amplifying circuit, where voltage amplification is made. This differential amplifier is designed to be quite stable against the fluctuation of the mains voltage or the ambient temperature. The two transistors for the first differential stage are arranged quite symmetrically; one is for the input signals and the other is for the feedback signals. When some potential happens to appear at the output terminals, this is lead back into the first differential stage via the feedback circuit to keep the balanced 0 potential condition together with the second differential amplifier. The second differential amp is designed not to be perfectly symmetrical but its operation is the same with the first stage. The second stage is driven by constant current for the voltage amplification.

In between the cascoded differential amp stage of Class A operation, and the output stage (the complementary driver

stage and the final stage) of Class B, the emitter follower stage made up of 2 transistors (one is for the emitter follower and the other is for the constant current driver for the emitter follower circuit) is arranged to prevent the pre-driver stage from the impedance fluctuation caused by speaker loads by insulating the differential amplifier stage from the output stage. Therefore, flat negative feedback is possible from low frequency range to high frequency range, and stable undistorted driving is made feasible with a slight phase compensation.

For the output stage, a pure complementary push-pull circuitry composed by NPN power transistors and PNP ones, which are of symmetrical characteristics. In order to obtain a big power of 110W per channel into 8-ohm loads, both channels driven, 4 power transistors designed for big-output use are arranged at the final stage to set up the parallel push-pull connection to the driver stage. This improves the distortion characteristics by means of the margin obtained by the increase of instantaneous collector dissipation and the effective usage of the good linearity portion in the hfe-1c characteristics of each power transistor. Of course transistors of superior linearity are selected for the complementary driver stage. Therefore the power amplifier section ensures good stability and exceedingly fine characteristics throughout all the stages.

Mains Power Supply Section:

It is probable that the fluctuation of the operation of both the pre-amplifier section of the Class A operation and the differential amplifier stage in the main amplifier section tends to produce I.M. distortion. To prevent this, this amp adopts real Automatic Voltage Regulator (AVR) to supply mains power to the Class A operation stage, and perfectly separates the windings in the power transformer for the Class A operation and for the Class B operation. Further the electrolytic capacitors of 15,000uF x 2 are used in the power supply circuitry for the output stage in the main amplifier section to achieve the best performance.

Connection Procedure

Connection to Input Terminals:

Connect the outputs of player, tuner, or tape-recorder to the relevant input terminals of this amplifier. As to the details, see the section on Playback of Disc, Tuner and Tape recorder.

Connection Cable (Cord Wire):

For connection of the record-player, tuner, and tape-recorder, shield wire is advisable to use for protection from external noise or inductance noise. Usually, this shield wire has the capacitance of approx. 200pF/m, and even so called low capacitance shield wire has 100pF/m, i.e., the adoption of a connection cable gives the same effect as that of the insertion of a capacitor in parallel with input sources or output load equipment (which composes a kind of high-cut filter circuit). For instance 2 meters of this shield wire has 400pF capacitance, and if this cord is used at the point where parallel composite value of input and output impedance is 500Kohms, it means an insertion of a high-cut filter with cut-off frequency at about 10KHz, which causes unnecessary attenuation of the high frequency range. Use of the shortest wire is, therefore, recommended, especially for high impedance equipment.

Choose a shield wire of good quality and make it as short as possible for connection of this amplifier (at PHONO, AUX, Tape-monitor, tape jacks etc.) with the high impedance equipment. In case input or output impedance is sufficiently low, the effect is not much, since parallel composite impedance becomes lower and cut-off frequency will be shifted out of the audible range. It does not matter if relatively long cable is used for terminals, since their impedances are so designed as to be sufficiently low (approx. 100 ohms).

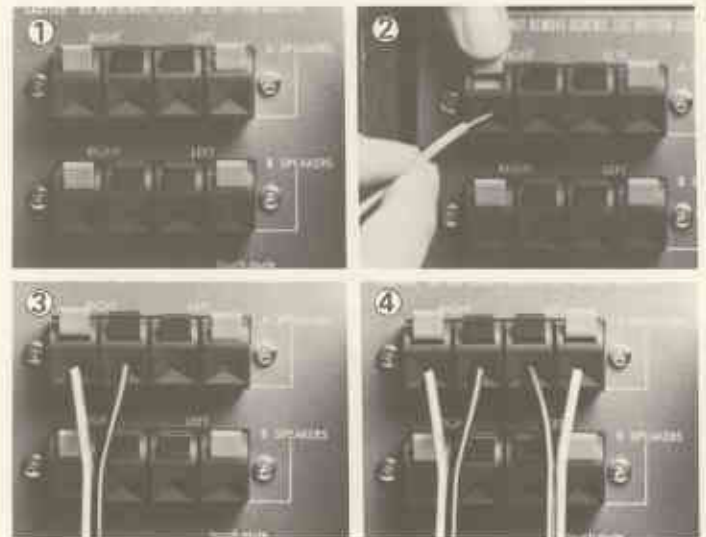
Connection of Speakers:

Stereophonic playback is made with a pair of speaker systems for right and left channels. The right speaker system should be connected to the right speaker terminals, and the left speaker system to the left terminals.

Note that perfect sound reproduction cannot be expected if

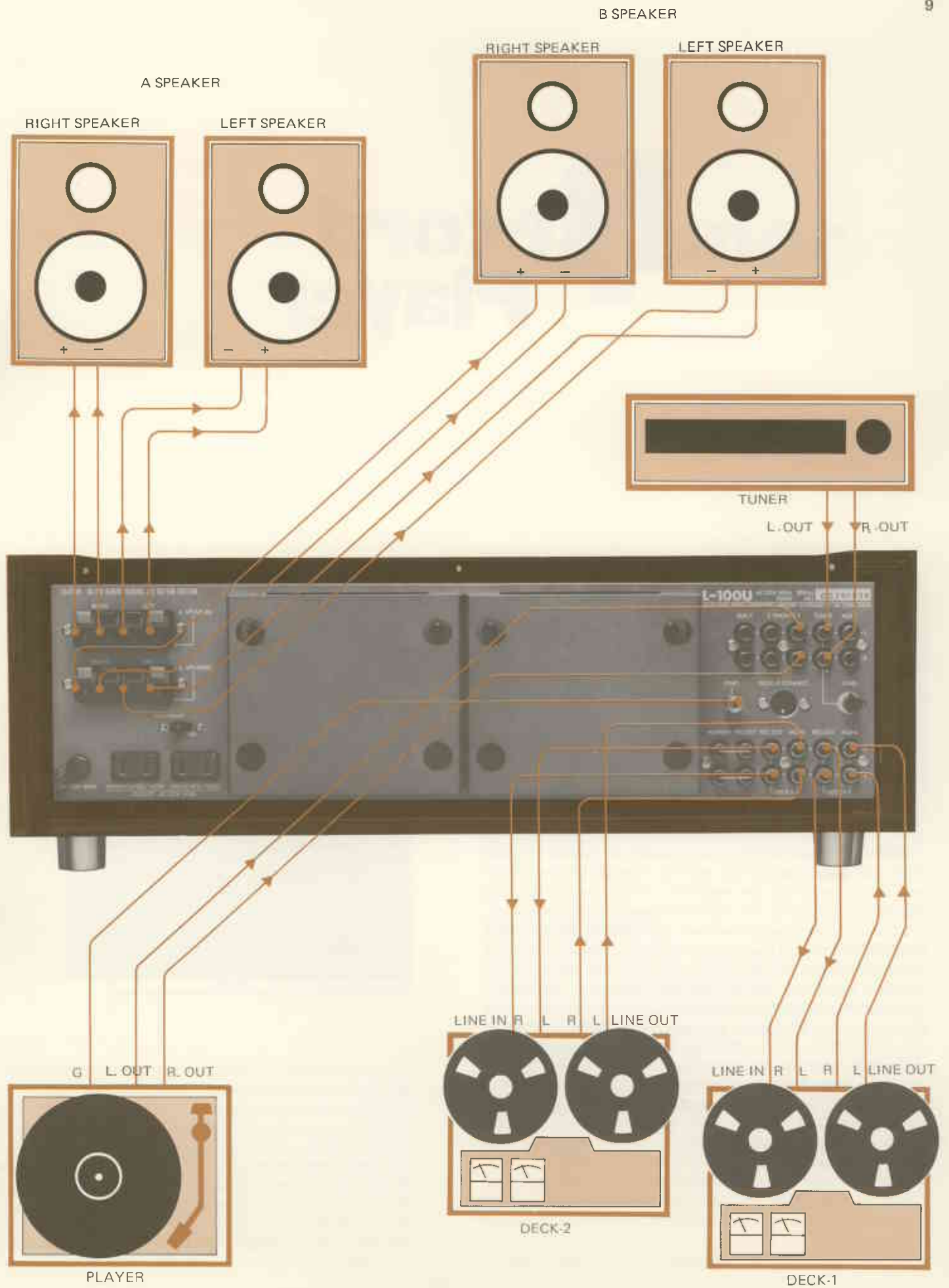
the phase is not matched between both channels. To match the phase is to connect the (+) terminal of the right speaker to the (+) terminal (red cap) in the right channel of power amplifier, and the (-) terminal to the (-) one (black cap). Do the same with the left speaker. If mismatched for some reason (e.g., mis-connection of speakers), the low frequency range is subdued and stable playback cannot be realized.

To firmly connect the speaker terminals, strip off the end of the shield wire by 10mm and insert it into the terminal hole by pressing the terminal head, and then releasing it.



Connection of Mains Power Supply Source:

As the final step of preparation, connect the amplifier to the mains power supply source. Connect the power cord (25) to the power supply outlet. Then press the power switch (21). The pilot lamp (19) begins to blink for several seconds and light up finally when all the circuitry is put into operational condition.



Record Player

Connections:

The player has 2 cords with pin-plugs at their ends for both right and left channels. Connect the pin-plugs to the input terminals of this amplifier [PHONO-1 (31), PHONO-2 (32)]. The player's earth lead can be connected to the GND terminal (34). The player's powerflex can be connected to the extra power outlet (23) (24) of the amplifier.

This amplifier is provided with 2 input terminals (PHONO-1 & PHONO-2) to be selected by the input selector switch (1). This is useful for comparison or using two record players. For use of one player, either of the two input terminals can be selected. But in case MM-type cartridge (Moving Magnet) is used, its impedance can be varied (using the impedance adjuster) to give a proper load to the cartridge.

Signal Paths:

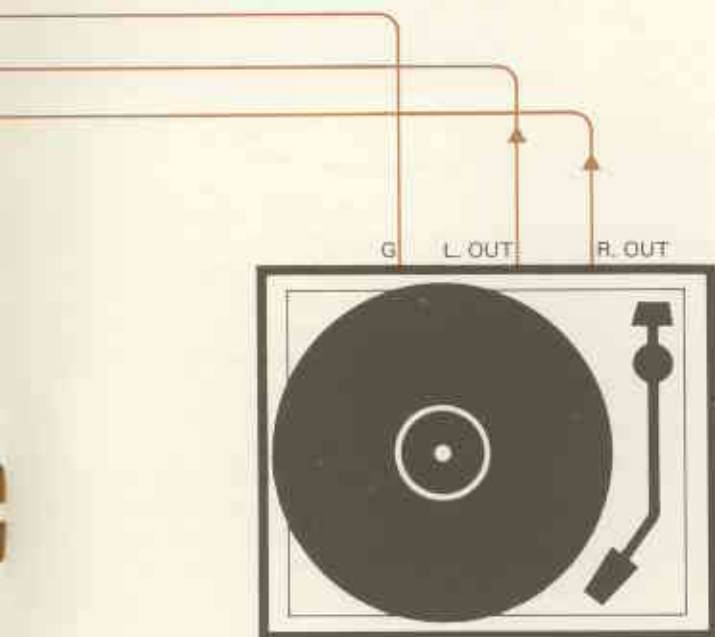
First, the signals fed to the amplifier through PHONO terminals are brought to the equalizer section, where recorded signals are restored to the original frequency curve. Incidentally, this equalizer curve has been standardized to the RIAA curve. The equalized signals are then fed to the input selector switch (function switch) via Linear Equalizer stage. If this switch is not set at PHONO position, the signals are blocked here and no amplification is possible. After input selector, one line goes to the REC. OUT terminal, and the other to the tape monitor switch. If the Monitor Switch (14) is set at the "SOURCE" position, the signals are sent to the mode selector switch, balance and volume controls, but if at the "DECK-1" or "DECK-2" position, the signals are stopped at the tape monitor terminals. Except during tape playback the monitor switch must be kept at the "SOURCE" position. But when the input signals are fed to PHONO or AUX terminals, recording output is always obtainable regardless of the position of the monitor switch. Then the signals are sent to the volume control through the mode selector and balance control.

Such controls as Linear Equalizer, Low-cut filter, High-cut



filter, Attenuator, Low booster, and Tone Controls are for flexible and diversified adjustment of playback sound and do not block the signals completely. When the PRE. OUT terminals and the MAIN IN terminals are connected by use of the jumper metals, signals, via attenuator are voltage-amplified at the main amplifier section and flow to the Speaker Selector Switch. When this switch is set at the corresponding position to the terminals the speaker systems are connected to, the signals can be reproduced through the speaker systems. As for the easy understanding of the signals paths, please refer to the block diagram on P.7.

Tuner



Playback:

Put a disc on the turn-table for playback. As the volume control is turned clockwise, playback sound comes from the speakers. As explained above, playback is possible regardless of the position of the Mode Selector, etc. Input Selector Switch (1), Monitor Switch (14), Speaker Switch (20) and Volume Control (15) should be set at the correct positions. After all preparations are completed, check if the volume levels on both right and left speakers are identical. If different, adjust them with the Balance Control. For Stereophonic playback, set the Mode Selector Switch (12) to the STEREO position.

Playback from Tuner:

Connect the tuner's output terminals (left and right) to the amplifier's TUNER terminals (31). The Input Selector Switch (1) must be set at the TUNER position. As shown in the block diagramme, the input signals from the tuner are fed directly to the input selector circuit. Afterwards, the signals trace the same blocks as are explained in the TAPE DECK section and are reproduced from the speaker systems. Both for FM stereophonic and monaural broadcasting, the Mode Selector Switch should be set at the STEREO position, for such accommodation to the input source can be made in the tuner. Modulation hum in the AM programme can be eliminated by varying the distance and angle of these components.



Input Level Control:

Each terminal of TUNER, AUX-1 and AUX-2 is the input terminals of flat frequency response. For the TUNER terminals (29), the Input Level Control (30) is provided. Input sensitivity of 180mV is obtained by the extreme clockwise turn of this control. This is variable in the range below 180mV by turning this control to counter-clockwise direction. To obtain the matching level between the TUNER terminals and the phono terminals, this control is useful. When 2 tuners or a tuner and one set of any other audio equipment are desired, the level between those two equipments may easily be adjusted by using TUNER terminals and AUX-1 terminals.

Tape Deck

Playback from Tape Monitor Terminals:

Almost all tape-recorders and tape-decks currently marketed include an equalizer amplifier in their circuitry, and some tape-players are made exclusively for playback.

Connect the output terminal (LINE OUT) to the Tape Monitor terminals (36) & (38). Then set the Monitor Switch (14) at the corresponding position to which the tape-recorder is connected. If two tape-recorders are connected to the terminals (36) and (38), selection between either of two units is possible by the Tape Monitor Switch (14).



When the Tape Monitor Switch (14) is set at "SOURCE" position, signals before recording are reproduced, and at "DECK-1" or "DECK-2" position the signals recorded on each tape deck can be reproduced. Therefore, a 3-head tape deck makes it feasible to have playback while recording.

Note that a normal function cannot be expected if 2 sets of tape-recorders for playback are connected to the terminals of DECK-2 (38), and Tape Connector (39) at the same time, since these two are coupled in the inside circuit and affect each other. Therefore, if the Tape Monitor terminals and the Tape Connector are used, the tape-recorders should be connected to the terminals of DECK-1 MONITOR terminals (36) (with the Monitor Switch at the Deck-1 position) and to the Tape Connector for DECK-2 (39).

Playback from AUX Terminals:

Playback of tape is possible if the line output of the tape-recorder or tape-deck is connected to the AUX terminals of this amplifier by use of a pin-jack lead, and the Input Selector Switch (1) is set at the position corresponding to the AUX terminals. All operations in this case are the same as those for

the playback from tuner (P.11).

Note that when tape playback is made through the AUX terminals or TUNER terminals, the line input or AUX input terminals of the tape-deck 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 is a connector of DIN standards and is convenient for simple connection with a patch cord between the tape-recorder and recording playback connectors of this amplifier. Playback of deck from the Tape Connector is possible if the Monitor Switch is set at the DECK-2 position when the DIN connector on the tape deck is connected to the DECK-2 tape Connector (39) on this set.

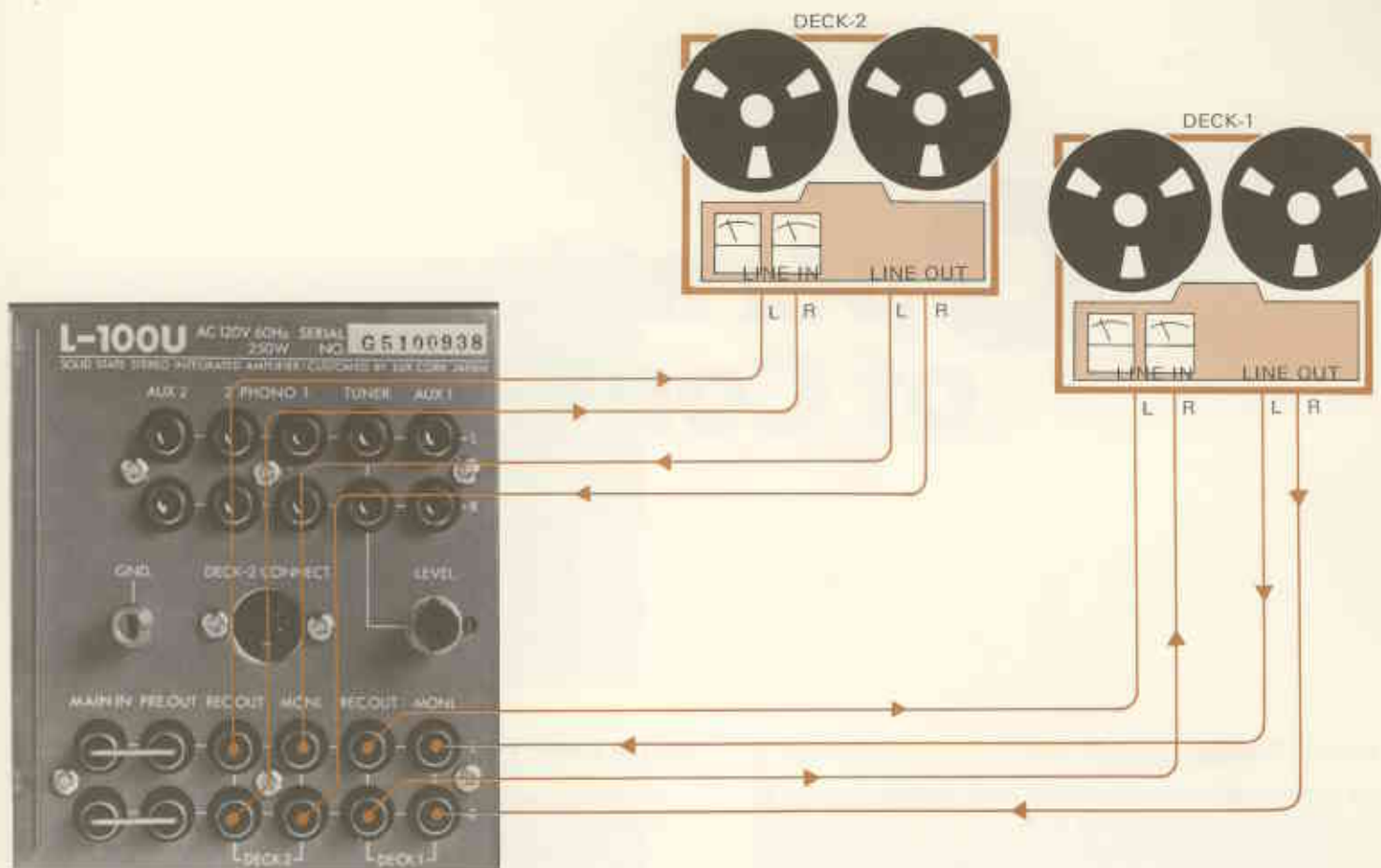
Recording on Tape:

In case of playback of various programme sources through input terminals of this amplifier, the same signals as those reproduced in the speakers are always available at the REC. OUT terminals (35, 37) and the Tape Connector (39). But please note that no signal may be available on the REC. OUT terminals according to the position of Tape Dubbing SW (13), e.g., when the Tape Dubbing switch is set at "1 to 2" position, no signal is at DECK-2 REC. OUT Terminals.

By connecting these terminals to the input terminals (AUX or LINE IN) of the tape-recorder, you can enjoy simultaneous recording and playback. (It is recommended that the Dubbing Switch can be kept at the SOURCE position). These recording signals are taken out before the tape monitoring stage, and there is no influence from the Filter, Volume or Tone Controls, etc. as far as the quality of the recorded signal is concerned.

Tape Dubbing (REPRINTING):

With this amplifier, it is possible to reprint from one tape-recorder to another. Connect the line output terminals and the line input (or AUX) terminals of one tape-recorder to the



DECK-1 Monitor and REC. OUT terminals of the amplifier respectively. Likewise, connect the line input and output of the other tape-recorder to the DECK-2 terminals. Dubbing is now possible by use of the Dubbing Switch. At the "1 to 2" position, the tape of DECK-1 terminals can be reprinted on the tape of the DECK-2 terminals, and vice versa at the "2 to 1" position. In this way, repetition of switching between "SOURCE" and "1 to 2" or "2 to 1" makes it possible to compare the master tape and the reprinted tape. Except when actually dubbing, it is recommended to set the Dubbing Switch at the SOURCE position.



The Tape Dubbing circuitry is independent from the main signal paths, and record or tuner reproduction is feasible in the course of Tape dubbing operation when the tape Monitor switch is set at "SOURCE" position.

Simultaneous Playback Monitoring:

A 3-head tape-recorder ensures simultaneous playback monitoring and recording. In this case, recording on tape and playback of the recorded sound is done at the same time, and connection must be made for both functions. It is necessary to connect the REC. OUT terminals (35, 37) to the line input terminals (AUX input) of the tape-recorder, and the Tape Monitor terminals (36, 38) to the output terminals (LINE OUT) of the tape-recorder.

The Tape Monitor Switch (14) should be set at the position corresponding to the terminals to which the tape-recorder is connected, and repetition of switching between SOURCE and DECK-1 or DECK-2 allows a comparison to be made between the original and the recorded sound. Possible recording errors can thus be prevented. Incidentally, note that reproduction of recorded sound becomes a little delayed as compared with that of original sound since there is a gap between the recording head and the playback head.

Simultaneous playback monitoring can be made through the Tape Connector (39) as well. A single piece of DIN cord ensures connection for recording and playback on the Tape Connector, and simple operation of switching between SOURCE and DECK-2 is sufficient.

Simultaneous Recording:

Output for recording can be taken out from either of the two REC. OUT terminals (35, 37), and the simultaneous recording is feasible when two tape decks are connected. When the Tape Dubbing Switch (13) is set at "SOURCE" position under the same connection with Tape Dubbing, repetition of switching of Tape Monitor Switch (14) between "SOURCE" and DECK-1 or DECK-2 allows a comparison to be made between the original and either of the recorded sound of two tape decks under simultaneous recording.

Playback from Other Sources:

The signals of flat frequency response from such sources as TV receivers do not need an equalizer stage. For playback of such audio equipment, either of the AUX terminals or the TUNER terminal can be used. Connection and operation is the same as that of a tuner.

Operation of Controls

Volume Control:

The variable resistor of this control has a logarithmic curve. In the attenuation characteristics of A type, the turning angle is proportionate to the attenuation degree (dB), the dB value and the volume audible to human ears are in the proportionate relation. In other words, the rotation of the control is in proportion to the sound volume felt by human ears. The increasing degree of volume is felt quite natural as the control is turned in the clockwise direction. A precision detent-volume of high-grade attenuator type ensures a precise adjustment of volume on both right and left channels. The special detent-volume with 22 points of contact may not allow a fine volume control in case of the mid-night listening at extreme low level or the over-rated input at each input terminal. In such occasion, firstly set the main volume at an appropriate level, then control with the attenuator volume (18).

Usually, it may be unnecessary to operate this set at its maximum gain, and if the index of this attenuator is set at its center position (-10dB), fine adjustment is easy for compensation of the main volume (15). Any position between 0dB and -20dB is obtainable by this attenuator volume.

Position (clockwise)
vs. Attenuation in dB's

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Attenuation	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22

Balance Control:

In case deviation is felt between the volume levels of right and left channels, adjust the unbalanced volume level with this control (17). A complete turn of the control to either the clockwise or counter-clockwise direction causes a cut-off of the volume of the other speaker. The volume balance of both channels can be adjusted so that monaural disc sound reproduced by the stereo cartridge comes from the center of the right and left speakers. At mid position, the volume of both channels is adjusted to the same level. Thus, a proper balance is established throughout all playback stages. If a programme source is unbalanced (or the speakers are placed in an oblique position), establish the correct balance with this control.

The Linear Equalizer:

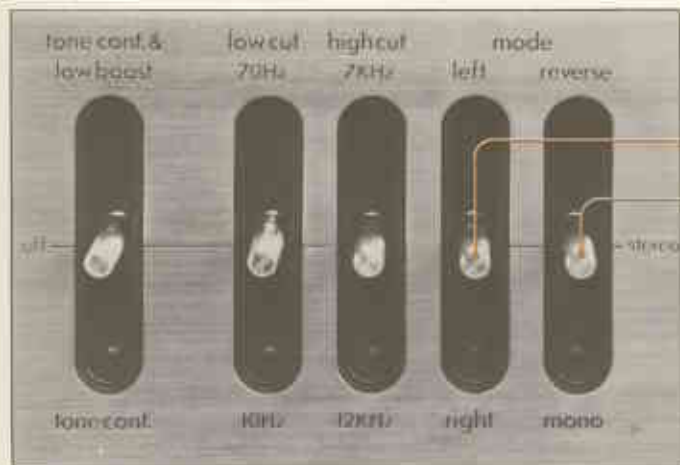
Although recordings are equalized in accordance with RIAA standards, it is quite common to encounter variations in overall tonal balance from one recording to the next. In addition, differences in listening environment and room acoustics often require subtle degrees of tonal compensation that conventional tone controls cannot correct because of their wide range and overlapping crossover characteristics.

The Linear Equalizer control provides a new form of tonal compensation specifically intended for subtly augmenting regular tone controls. With the control in its mid-position, flat frequency response is achieved. Switched to either of the two "up-tilt" positions, the entire response curve is rotated about a 1KHz fixed axis so as to linearly increase treble response while simultaneously decreasing bass response.

Conversely, selection of one of the "down-tilt" positions rotates the response curve in a clockwise direction, providing a gradual decrease of treble response and simultaneous increase of bass response. Degree of slope for either positive or negative settings has been carefully preset, and the overall response curve maintains complete linearity from 50Hz to above 10KHz, unlike the curvature in response normally associated with ordinary tone controls.

Specifically, when the control is turned to the first "up-tilt" position, it will decrease bass and increase treble by 1dB at 100Hz and 10KHz respectively, while selection of the second "up-tilt" position will result in a 2 dB cut and boost at these same frequencies. Selection of the first "down-tilt" position will decrease treble and increase bass by 1 dB at the same reference frequencies, while the second "down-tilt" position provides 2dB of boost (at 100Hz) and cut (at 10KHz).

Combined use of the Linear Equalizer and conventional tone controls provides a degree of tonal flexibility which cannot be achieved with any other tone control arrangement presently available. Because of the inherently linear nature of this new circuit, it introduces no increase of harmonic distortion at any of its settings.



Mode Selector Switch A

Mode Selector Switch B

Operation of Low Booster:

The Tone Control Switch (7) has three positions; "tone cont. & low boost", "off" and "tone cont.". When this switch is set at "tone cont. & low boost", low boost function and tone control function operate at the same time, and the low frequency range below 70Hz is boosted up to +8dB at 15Hz in addition to other tone controls. This circuit, effective only on the extreme low frequency range, allows flexible and versatile tone adjustment. For instance, probable rise-up in a small room of approximately 10m² in the neighbourhood of 150 to 200Hz can be subdued with this control together with slight attenuation of bass level by Bass Level Control selecting the 300Hz position on the Bass Frequency Selector. This process can suppress such unnecessary raise-up without spoiling the response at the extreme low frequency range. Moreover, when the human voice sounds unnaturally stout, it can be adjusted to a clear, natural voice by switching on this booster and cutting the low frequency range to a small extent with the Bass Level Control.

Low Cut Filter:

When this filter (8) is moved up from the center "off" position, the low frequencies you hear are cut off below 70Hz at the rate of -12dB/oct. When it is moved down, the low frequencies are cut off below 10Hz at the rate of -12dB/Oct. Thus, it is useful for removing low frequency noise such as rumbling of the phono motor. It can also be used as an auxiliary control for Bass Level Control. At "off" position, signals will by-pass this circuitry.

High Cut Filter:

When this filter (9) is moved up from the center "off" position, the high frequency range over 7KHz is cut off at the attenuation rate of -12dB/Oct. When moved down, the high frequencies over 12KHz are cut off at the rate of -12dB/Oct. Thus, it is useful for removing scratch or hissing noise and can also be used as an auxiliary control for Treble Level Control.

At "off" position, signal will by-pass this circuitry.

Mode Selector:

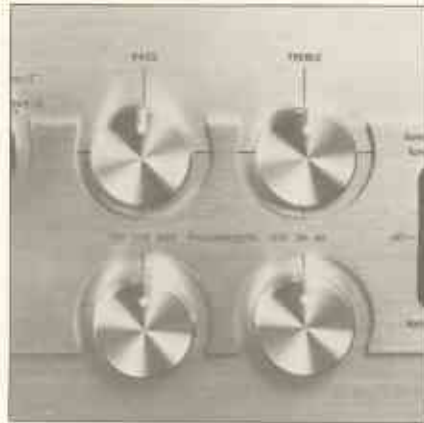
This amplifier is for stereophonic reproduction and incorporates independent amplifiers for two channels (right and left). Without the Mode Selector the signals fed to the right channel terminals are reproduced at the right channel speaker only. The Mode Selector is placed between the two amplifiers to change the mode of reproduction. The Mode Selector (12) is composed of two switches; the right switch is to select "reverse", "stereo" and "mono", while the left one selects "left", "stereo" and "right". The combination of these two switches offers various Mode selection. Please refer to the following chart for the details.

Mode Selector Chart

Mode Selector A	Mode Selector B	Connection input output	Use
stereo	stereo	L → L R → R	for normal stereo playback
reverse	stereo	L → R R → L	when program source is reversely connected
mono	stereo	L → L R → R	for playback of monaural record with a stereo pick-up
stereo	left	L → L R → R	for check
reverse	left	L → R R → L	for check
mono	left	L → L R → R	for check
stereo	right	L → L R → R	for check
reverse	right	L → R R → L	for check
mono	right	L → L R → R	for check

Tone Controls:

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



good sound from an 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 a facility to permit flexible controls for creation of the best sound.

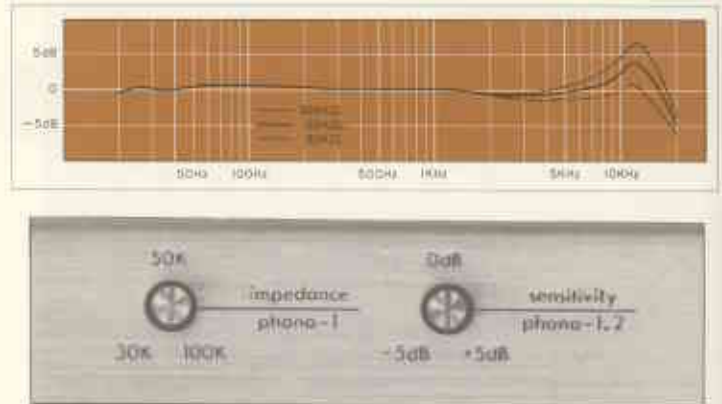
This amplifier is equipped with the LUX original NF type tone controls with turn-over (roll-off) frequency selector for subtle and minute control of the reproduced sound. As for the Level Controls, the detent-volume of the same type as the high-grade attenuator is used which yields negligible gang error between both R & L channels. Tone controls include Bass Level Control (3), Bass Frequency Selector (4), Treble Level Control (5), Treble Frequency Selector (6) and Tone Control Switch (7).

If the Tone Control Switch is set at the "off" position, the tone control circuitry is thoroughly by-passed, that is, regardless of the position of the Level Control or the Frequency Selector, flat frequency response is obtained. To operate the tone control circuitry, it is necessary to set the Tone Control Switch at the "tone cont." position.

The Bass Frequency Selector has three positions: 150Hz, 300Hz and 600Hz. From the position selected, Bass Level Control begins to function. In other words, turn-over (roll-off) of a lower frequency range below the frequency which has been selected can be controlled by the Bass Level Control. The controllable range is wider by 150Hz, 300Hz and 600Hz respectively. The Bass Level Control, which functions in conjunction with the Bass Frequency Selector, is a tone control of the lower range of the frequency response. It is designed so that response may be flat at the mid-position. A clockwise turn intensifies the low frequency range, while a counter-clockwise turn yields attenuation.

These same descriptions are applicable to the Treble Level Control (5) and the Treble Frequency Selector (6). The Treble Frequency Selector has 3 positions: 6KHz, 3KHz and 1.5KHz (controllable range is wider in the respective order). Treble control begins to function from the position that is selected. A clockwise turn boosts the high frequency range.

Effect of the Load Impedance on the frequency response on a typical cartridge



Input Sensitivity Adjustment:

There are various types of cartridges: magnetic type, photo-electric type, electro-static type and piezo-electric type. Most predominant is the magnetic type which includes MM (Moving Magnet), MI (Moving Iron), IM (Induced Magnet) and MC (Moving Coil). The PHONO terminals of this amplifier are designed to match with these types of magnetic cartridges, but a cartridge of low output level (output voltage 0.01 to 0.1mV) cannot be directly connected.

Input Sensitivity adjustment is feasible both at PHONO-1 terminals (31) and PHONO-2 terminals (32). Free adjustment of ± 5 dB is possible in case the input sensitivity of 3mV is regarded as 0dB. That is, the most suitable sensitivity to the cartridge can be obtained between some 1.7mV and 5mV in view of the fact that the sensitivity at +5dB is some 1.7mV and at -5dB is 5mV.

For the adjustment work, use a small driver and 0dB point can be easily found by the click stopper.

Input Impedance Adjustment:

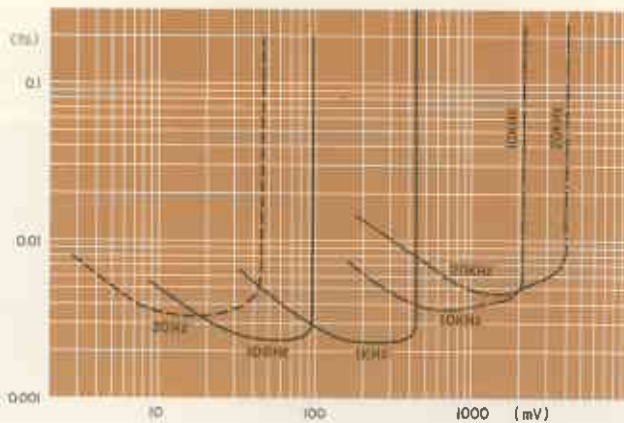
The PHONO-1 input terminals (31) are coupled with Impedance Adjustor (10). Except for a special low impedance type cartridge, almost all currently marketed cartridges of MM-type specify recommended load impedance of about 50Kohms. It is known that variation of the load impedance value affects the frequency response to a great extent.

Note that a low load impedance cuts treble output, while a high load impedance causes a peak in the treble range. The degree of such effect is not the same with different cartridges, but generally a cartridge having a higher output impedance tends to be more delicately influenced. It is therefore necessary that selection of a proper input impedance is made with this adjustor.

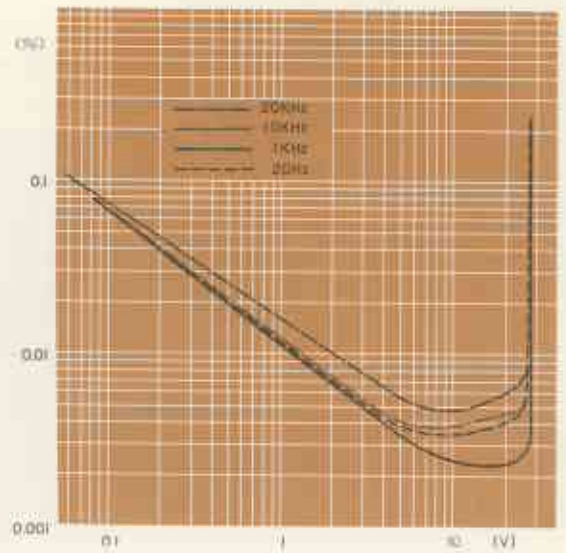
The adjustment of Input Sensitivity is done by a potentiometer, and free adjustment is feasible between 30Kohms to 100Kohms. Each position of the 30Kohms, 50Kohms and 100Kohms has click stopper for easy identification.

Standard Curves

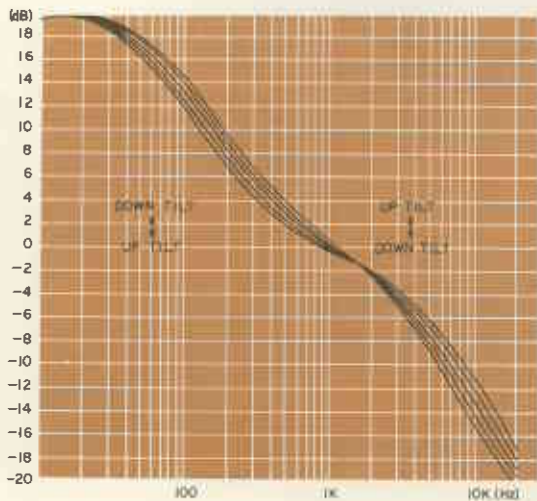
PHONO Input Voltage vs. Distortion
(Output: REC. OUT)



PHONO Output Voltage vs. Distortion
(Output: PRE. OUT)

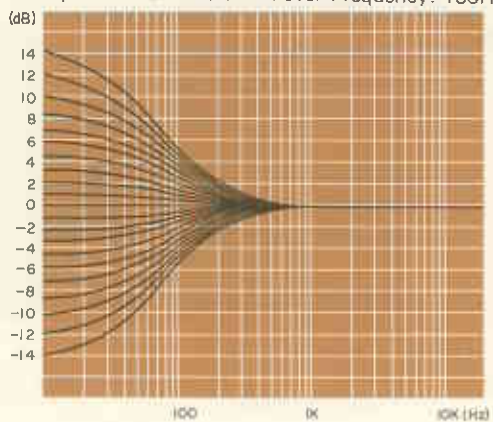


LINEAR EQUALIZER
(Output: PRE. OUT)



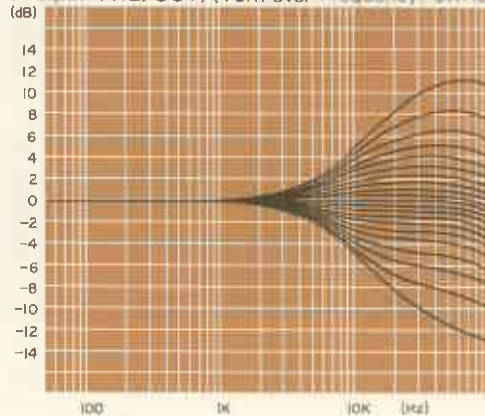
BASS TONE CONTROL

(Output: PRE. OUT) (Turn-over Frequency: 150Hz)



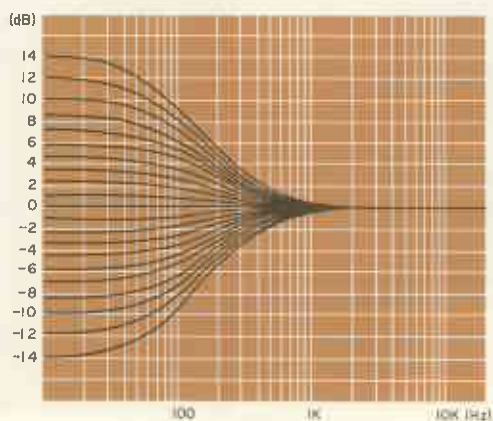
TREBLE TONE CONTROL

(Output: PRE. OUT) (Turn-over Frequency: 6KHz)



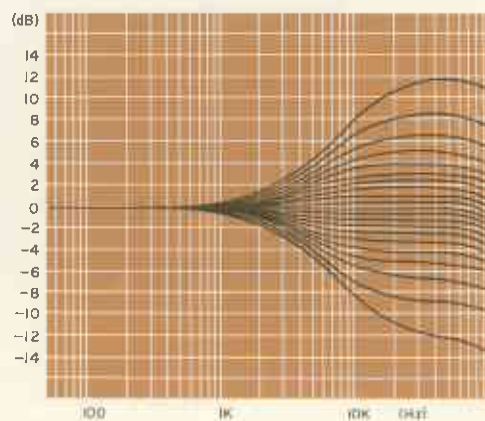
BASS TONE CONTROL

(Output: PRE. OUT) (Turn-over Frequency: 300Hz)



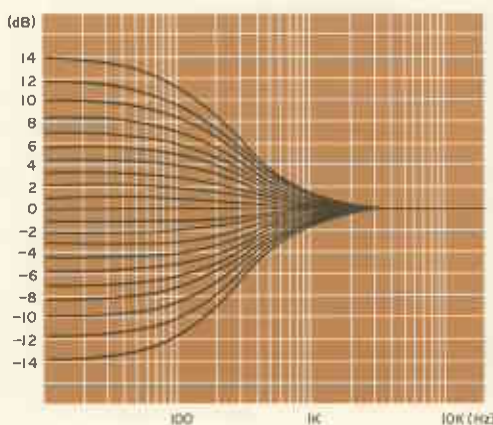
TREBLE TONE CONTROL

(Output: PRE. OUT) (Turn-over Frequency: 3KHz)



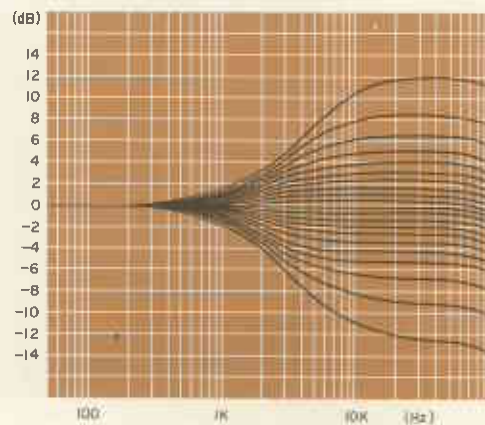
BASS TONE CONTROL

(Output: PRE. OUT) (Turn-over Frequency: 600Hz)

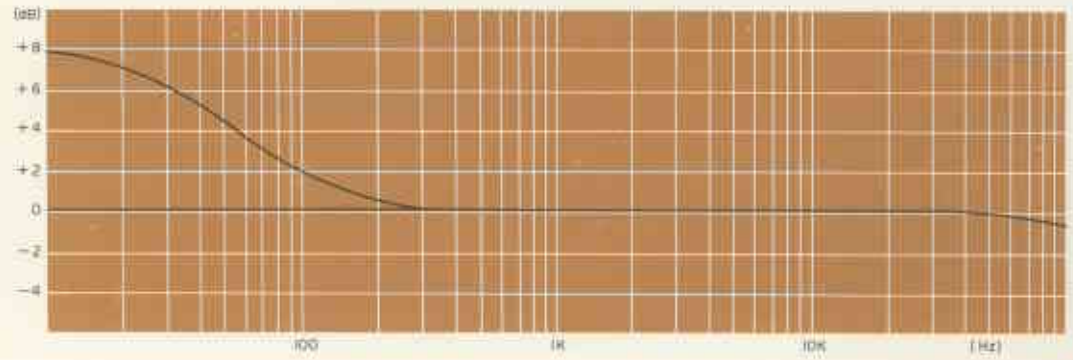


TREBLE TONE CONTROL

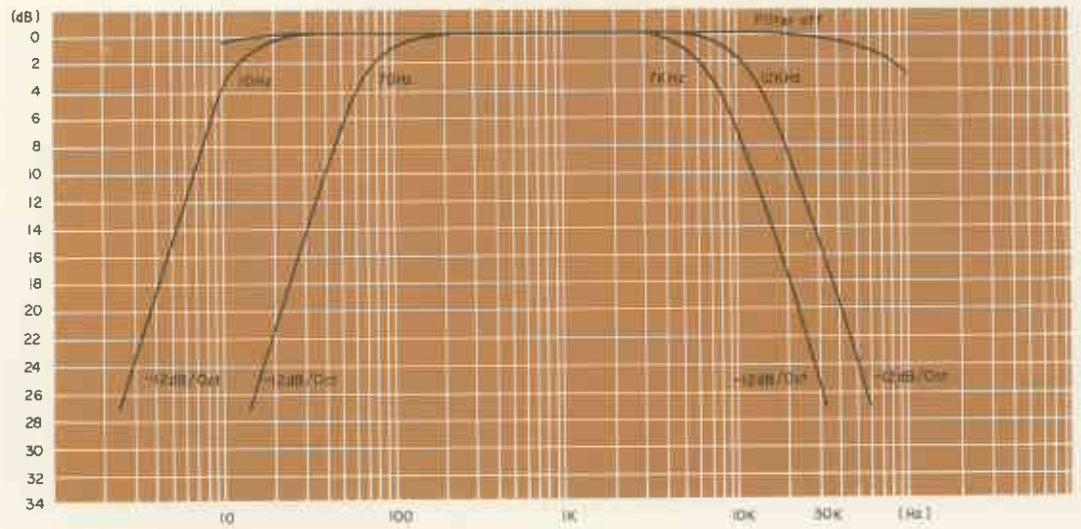
(Output: PRE. OUT) (Turn-over Frequency: 1.5KHz)



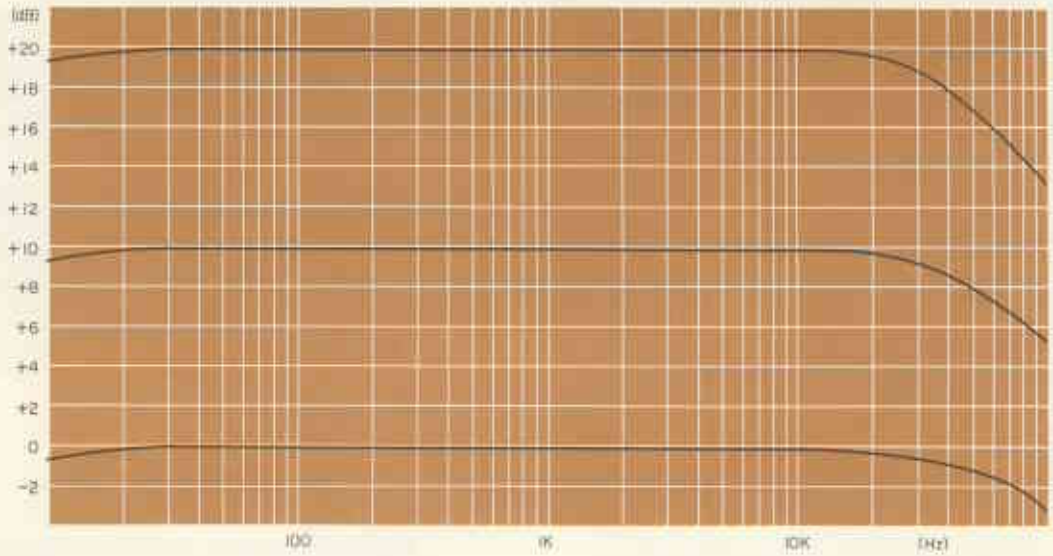
LOW-BOOST (Output: PRE. OUT)



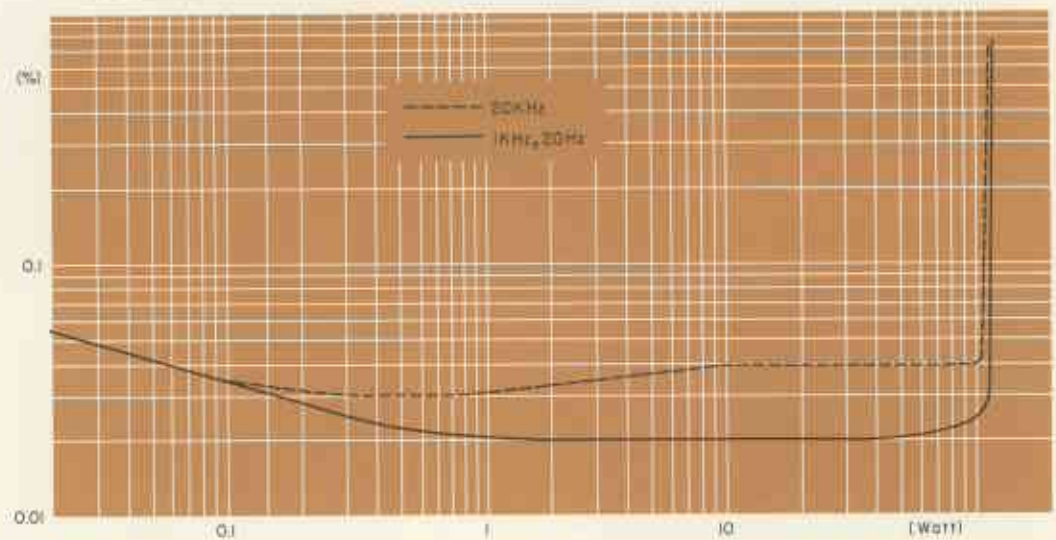
FILTERS (Output: PRE. OUT, TONE: DEFEAT)



MAIN AMP: FREQUENCY RESPONSE (8-ohm loads, 0dB = 1W)



MAIN AMP: POWER vs. TOTAL HARMONIC DISTORTION (8-ohm loads)



L-100 Owner's Manual

SPECIFICATIONS AND APPEARANCE DIFFER BY THE MODELS AS FOLLOWS, WHICH ARE CLASSIFIED BY ADDING U, E OR S TO THE L-100 ON THE BACK PANEL.

*U-type (For U.S.A. and CANADA)

AC Mains Power 120V
Equipped with Power Cord (25) of UL standards.

*E-type (For Europe)

AC Mains Power 220V
Equipped with Interchangeable Connector for AC Mains Power and Power Cord of Europe type (25)

*S-type (For Northern Europe)

AC Mains Power 220V
Equipped with Power Cord of Europe type (25)
Extra AC outlets (23) (24) are not available.

THE EXPLANATION STATED IN THIS MANUAL IS BASED ON THE U-TYPE, BUT E-TYPE AND S-TYPE ARE THE SAME EXCEPT THE ABOVE ITEMS.

SPECIFICATIONS

<MAIN AMPLIFIER SECTION>

Power Output:	110 watts minimum continuous per channel, into 8-ohm loads, at any frequency from 20Hz to 20,000Hz, at no more than 0.05% total harmonic distortion
Rated I.M.:	0.05% 8-ohm load, 110W/ch, 60-7KHz = 4:1
Frequency Response:	5 - 50,000Hz (-1dB)
Input Sensitivity:	910mV, Bohms, 110W
Input Impedance:	33 Kohms
Residual Hum & Noise:	-97dB
Damping Factor:	50 (8-ohm loads)

<PRE AMPLIFIER SECTION>

Output Voltage:	Typ. 910mV, Max. 12V
Frequency Response:	5 - 50,000Hz (-1dB)
Total Harmonic Distortion:	No more than 0.007% (1 KHz, 1V)
Input Sensitivity:	3mV (phono-1 & 2, Gain 0dB) 180mV (tuner), 180mV (aux-1 & 2)
Input Impedance:	30 Kohms - 100 Kohms (variable)
S/N Ratio:	No less than 65dB (phono)
Phono Overload Voltage:	450mV (1KHz, RMS)
R.I.A.A. Equalization:	± 0.2 dB
Residual Hum & Noise:	No more than 40 μ V
Cross Talk:	No more than -60dB
Power Consumption:	400W at Max. power output
Additional Features:	Touch mute function, Linear equalizer etc.
Dimensions:	485(W) x 350(D) x 175(H)mm (19-1/8" x 13-3/4" x 6-7/8")
Weight:	Net. 19kgs (42 lbs.) Gross 21 kgs (46 lbs.)

Specifications and appearance design subject to possible change without notice.



LUX CORPORATION, JAPAN

1-5-31 NAGAHASHI, NISHINARI-KU, OSAKA

PHONE: 832-0031 CABLE: LUXELECT OSAKA TELEX: J83884