

ULTIMATE HIGH FIDELITY STEREO COMPONENT

LUXMAN

R-1120

▶ **OWNER'S MANUAL** ◀
AM/FM STEREO TUNER-AMPLIFIER

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

Thank you for purchasing one of our quality products, the LUXMAN R-1120. 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, which gives detailed descriptions and operating procedures for the electronic and mechanical components of the R-1120. Again, thank you for your selection, and may "good listening" be your daily pleasure.



SWITCHES & CONTROLS

1. DOLBY^{*} FM SWITCH

When this switch is pressed in, Dolbyized FM broadcasting can be received, and the Dolby indicator lights up. Note that this is an additional feature to be made available only when the Dolby Printed Circuit Board is inserted into the chassis which is on optional sale.

2. FM MUTING SWITCH

Annoying interstation noise which is possible when the exact tuning point is not obtained can be eliminated by this switch in the case of FM reception. Keep this switch unpressed to remove interstation noises or other impracticably weak signals. Such FM signals as can be received at the "normal" position can be practised for stereo FM reception. It is recommended to set this switch always at the "protruded" position except when weak signals are received.

3. TAPE MONITOR SWITCH

When this switch is pressed in, tape playback is possible either from the DECK-1 Monitor terminal or DECK-1/TAPE CONNECTOR. In the case of 3-head tape-recorder which has a playback head simultaneous playback monitoring is possible while recording. In this case this receiver receives playback signals from either of DECK-1 or DECK-2 Monitor Terminals or Tape Connector while feeding recording signals to DECK-1, DECK-2 Rec. Out Terminals or Tape Connector. For tape playback the Tape Selector Switch (4) has to be set at the corresponding position to which the tape recorder is connected. Caution: Only tape playback is possible if this switch is pressed in, and therefore except for tape playback this switch should be kept released, i.e., unpressed.

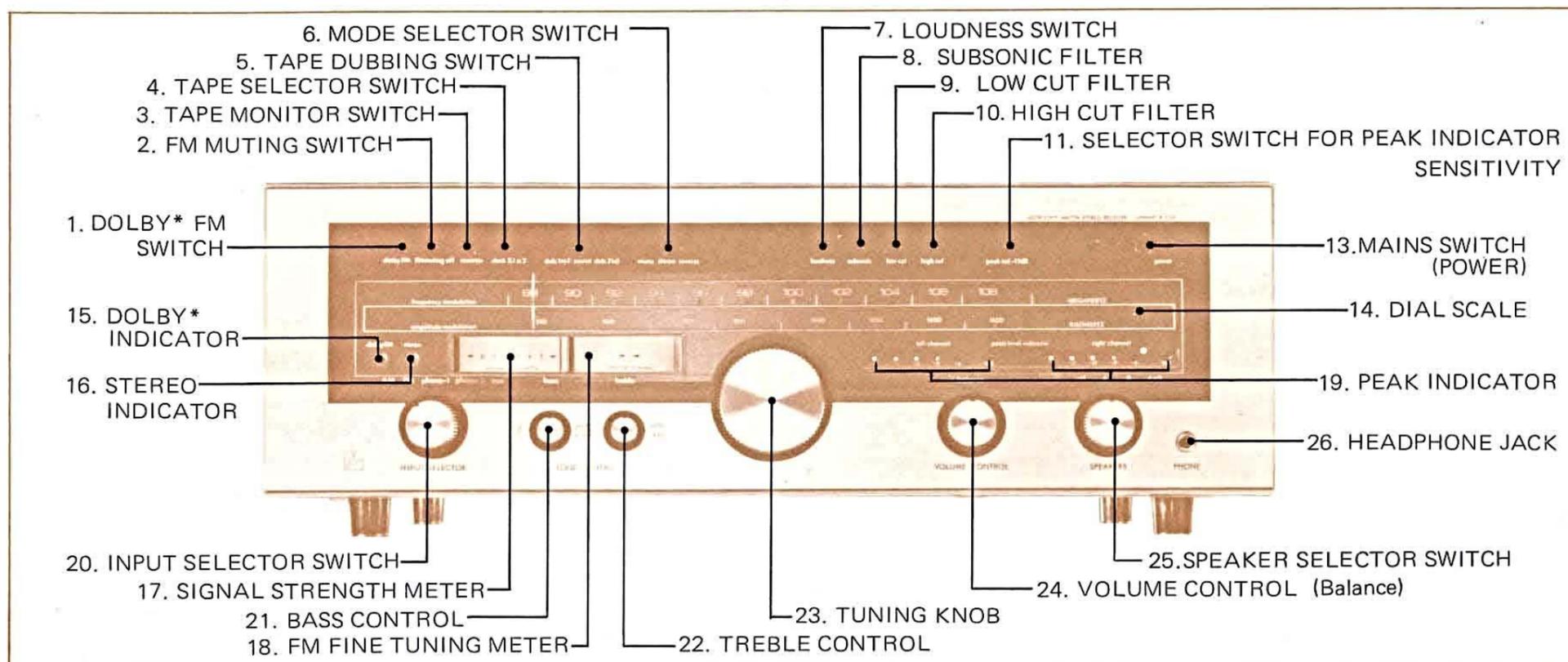
4. TAPE SELECTOR SWITCH

This allows to select tape playback terminals. When this is kept unpressed at the normal position tape playback is feasible from the DECK-2 Monitor Terminal, while when pressed in, the DECK-1 Monitor Terminal and Tape Connector are simultaneously put into function. As these 2 are coupled inside and affect each other, connection of 2 tape recorders to DECK-1 Monitor Terminal and Tape Connector should be avoided for normal playback.

5. TAPE DUBBING SWITCH

The dubbing switch is provided with 3 positions; at the center "source" position such programme source as is selected by the Input Selector Switch is available for playback.

When set at the "dub 1 to 2" position the output of tape recorder 1 is fed to the input of tape recorder 2 for dubbing (reprint), while the "dub 2 to 1" position offers tape dubbing from "DECK-2" to "DECK-1". As this Dubbing Switch is independent of the signal path you can enjoy playback of other programme sources even during tape dubbing.



6. MODE SELECTOR SWITCH

This allows to select sound reproduction modes such as Stereophonic and Monaural. At the center position, normal stereophonic playback mode is ensured. For further details refer to the "Mode Selection".

7. LOUDNESS SWITCH

When pressed in this switch, Loudness control starts to function. This may be useful when you listen to music at low volume level. Refer to the details in the "Operation of Loudness".

8. SUBSONIC FILTER

This switch allows to reduce the amount of ultra low frequency range below 15Hz at the rate of -12dB . See the details in the "Operation of Subsonic Filter".

9. LOW CUT FILTER

When this switch is pressed in, the amount of low frequency range you hear is reduced at the rate of -12dB/oct. below 70Hz. See the details in the "Operation of Low Cut Filter".

10. HIGH CUT FILTER

With this filter switch you can cut off the high frequency range above 7KHz at the rate of -12dB/oct. See the details in the "Operation of High Cut Filter".

11. SELECTOR SWITCH FOR PEAK INDICATOR SENSITIVITY

This is useful to activate the peak indicators at the low output level. See further details in the "Peak Indicator".

12. STAND-BY LAMP

When the AC Power is switched on, this lamp starts to blink and will go off in about a few seconds, which shows that the entire circuitry is in perfect operational condition. This lamp is coupled with the time-delay muting circuit (the protection circuit as well) and if abnormal DC drift is sensed, the lamp starts to blink again. When the relay circuit is turned off, no output is available at the speaker terminal. But when the blinking lasts over one minute, plug out the mains cord from the power supply socket and consult with your dealer.

13. AC MAINS SWITCH (POWER)

Repetition of pressing this knob ensures alternate switch-on and -off.

14. DIAL SCALE

Turn the tuning knob according to the frequencies marked on this dial and the desired station can be received. Receivable frequency range for FM is from 88MHz to 108MHz, while for AM from 525KHz to 1605KHz. When a stereo FM is being received the "Stereo" indicator lights up. In case the FM Dolby Switch is pressed in, the "Dolby*" indicator will light up if the exclusive Dolby* Circuit Board is provided.

15. DOLBY* INDICATOR

When the Input Selector Switch is set at the "FM" position and Dolby Switch is pressed in with the exclusive Dolby Circuit Board provided, this Dolby Indicator lights up.

16. STEREO INDICATOR

When the Input Selector Switch is set at the "FM" position this Stereo Indicator lights up in case the FM stereo signals are being received, while it does not function against the mono signal. Further when mono FM on reception changes into stereo this lights up automatically to indicate stereo reception. On the contrary if receiving signals change from stereo to mono this indicator goes off. In case mono playback of stereo signals is desired, set the Mode Selector Switch at the "mono" position.

17. SIGNAL STRENGTH METER

The exact tuning point can be obtained when the needle of this meter shows its maximum swing. The movement of the needle depends on the strength of the receiving signal. Even if the needle swings to the extreme right end of the meter scale it does not impair the meter. For perfect reception of stereo FM it is recommended to have the needle swung above "4" on the meter calibration. In case of FM reception such signals as cannot be cut off with the FM Muting Switch can be utilized as stereo playback.

18. FM FINE TUNING METER

When no FM signal is received this pointer rests in the vicinity of the centre position. When the Tuning Knob is turned the needle of the Fine Tuning Meter starts to swing out of the centre, and as the accurate tuning point is getting closer the needle begins to come back to the centre. Thus the exact tuning point can be obtained with the needle at the dead centre position. This meter is exclusively effective on FM, and in case of AM reception it does not move from its centre point.

19. PEAK INDICATOR

An instantaneous peak level of output power can be read on this LED indicator. The sensitivity of this indicator is interchangeable by the Selector Switch for Peak Indicator Sensitivity. 0dB point is equivalent to 120W with normal condition, while when the Selector Switch is pressed in, it means 7.5W. Refer to the details in the "Peak Indicator".

20. INPUT SELECTOR SWITCH

This switch permits proper selection of desired programme sources. You may set either of the positions provided (AM, FM, PHONO-1, PHONO-2, AUX).

21. BASS CONTROL

This is a level control of bass range. A clockwise turn of the control boosts the bass response, and a counter-clockwise turn decreases and finally cuts the bass. This yields a flat frequency response when set at the centre rotation angle with click-stop. The turnover (roll-off) frequency can be selected between 200 Hz and 400Hz by depressing the knob (200Hz) or by pulling it out (400Hz).

22. TREBLE CONTROL

A clockwise turn of this knob boosts the treble response, while counter-clockwise turn decreases the treble level. This control is of the same construction as that of the Bass Tone Control, and you can choose the turn-over (roll-off) frequency at either of 2 kHz and 4 kHz. Selection is same to (21).

23. TUNING KNOB

Use this knob to tune in your desired station. When the desired programme is received, make accurate tuning slowly so that the pointer of Signal Strength Meter shows the maximum swing and that that of the Fine Tuning Meter comes to its centre position. For AM reception the centre tuning meter does not operate.

24. VOLUME CONTROL (BALANCE)

A clockwise turn of this control increases volume, while a counter-clockwise turn decreases and finally cuts out volume. Time muting circuits are designed to delay operation of the amplifier. And if sound volume is set at remarkably increased level before switching on, loud sound comes out suddenly. Therefore sound volume should be preset at a reduced level before operation. When sound is reproduced from speakers, adjust sound volume at an appropriate level. This knob is of dual concentric structure and the inner part permits control of the volume, while the outer part controls the balance of the right and the left channels. See the further details in the "Control of Volume Balance".

25. SPEAKER SELECTOR SWITCH

This receiver offers convenience to use 3 pairs of loudspeakers. You can choose independent or simultaneous driving of up to 3 systems as per the indication on the panel. When the knob is set at the "A" position the "A" speaker terminal starts to function, and likewise at the "A + B" position both "A" and "B" speaker terminals operate.

The 3rd terminal is provided for an exclusive use of electrostatic loudspeakers, which have of late become popular among audiophiles.

Note that the overall impedance should exceed 4 ohms at the time of simultaneous driving of 2 pairs of loudspeakers. Normally speaker systems with 8-ohm impedance are recommended to be connected to two of three Speaker Terminals.

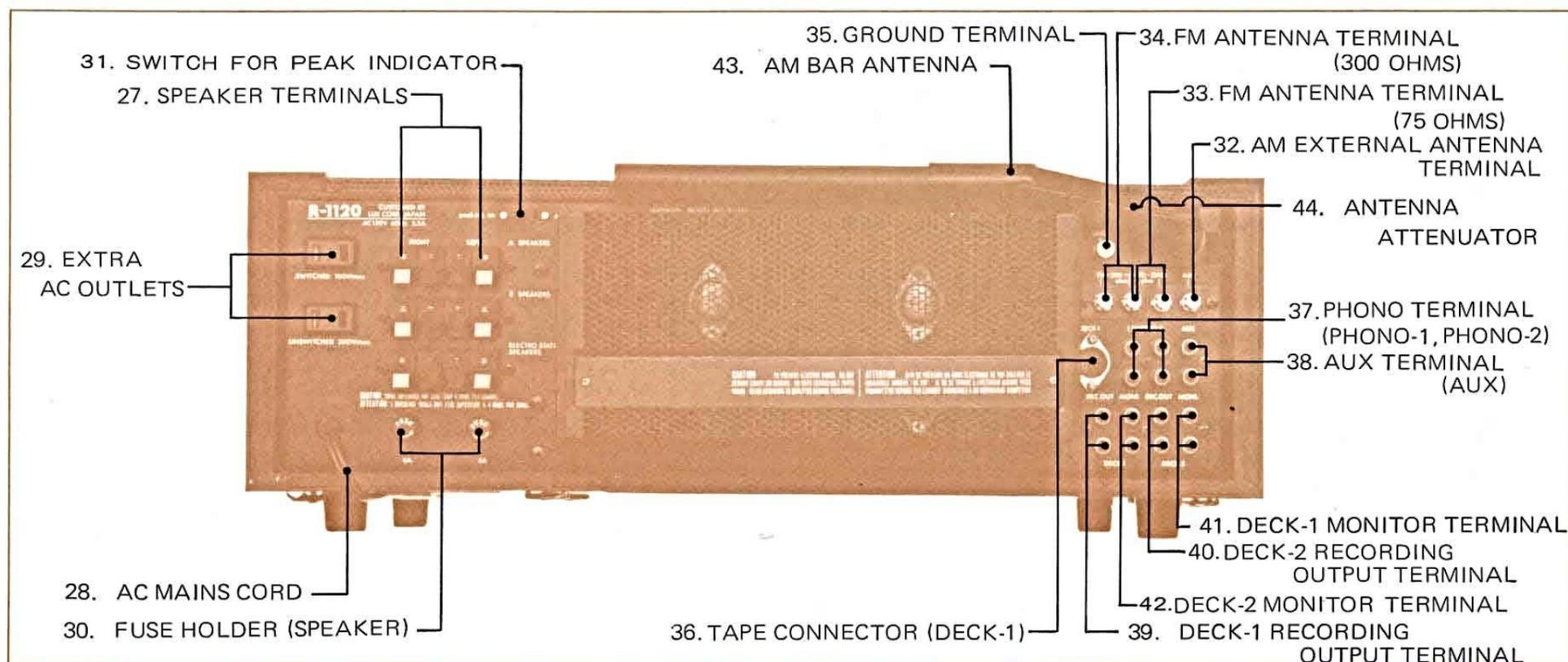
26. HEADPHONE JACK

This is provided for private listening by stereo headphone. Output signals are always available irrespective of the position of the Speaker Selector Switch. For use of headphone, however, it is recommended to set the Speaker Switch to the "off" position.

* DOLBY is the Trademark of Dolby Laboratories, Inc.



INPUT & OUTPUT TERMINALS



27. SPEAKER TERMINALS

Speaker systems are to be connected to these terminals. These are coupled with the Speaker Selector Switch, which has to be set at the very position corresponding to the terminals to which the speaker systems are connected. Red terminal is for \oplus , while black for \ominus . At the terminal marked "ELECTROSTATIC", you can connect electrostatic speakers.

28. AC MAINS CORD

For operation of this receiver the AC mains plug attached to this cord should be connected to the AC mains power supply socket in your listening room.

29. EXTRA AC OUTLETS (US & CANADIAN VERSION)

These are convenient for supply of the mains power to other annexed audio components such as record player, tape recorder.

The UNSWITCHED terminal is independent of the Mains Switch of this receiver where the mains power is always available, while the SWITCHED one is coupled with the Mains Switch and supply of the mains power depends on the Mains Switch. The maximum capacity of the SWITCHED and UNSWITCHED terminals is 100W and 200W respectively.

Note that in some countries in Europe, e.g., Scandinavian countries, it is prohibited by law to make use of the extra AC outlets. Therefore no AC outlet is available with the European version.

30. FUSE HOLDER (SPEAKER)

Replace the inside fuse if blown, ascertaining the cause and giving the necessary remedy. With the European version, this fuse is placed inside the receiver.

31. SWITCH FOR PEAK INDICATOR

In the "peak ind. on" position the peak indicator operates, while in the "off" position it is turned off.

32. AM EXTERNAL ANTENNA TERMINAL

In case normal reception is possible with the built-in bar antenna, it is not necessary to use this terminal. But when reception of weak signals is desired, connect the exclusive outdoor antenna to this terminal. When simple wire antenna is used for this terminal, it is not always necessary to have a ground connection which sometimes deteriorates sensitivity. The exclusive outdoor antenna is effective to reduce undesired noises.

33. FM ANTENNA TERMINAL (75 OHMS)

Use this connector for FM antenna with 75 ohms coaxial cable as lead-in wire. A coaxial cable can be easily connected — a core wire to the 75 ohms terminal and the sheathing wire to the GND terminal.

34. FM ANTENNA TERMINAL (300 OHMS)

Connect to this terminal a T-type (di-pole) antenna or antenna feeder cable for TV (impedance 300 ohms) or FM antenna with TV feeder cable used as a lead-in wire. Do not use short wire on this terminal in place of the antenna, and always connect the exclusive FM antenna.

35. GROUND TERMINAL

Connect the earth lead-wire of record player (from tonearm or motor). This terminal may be used as an earthing terminal of this receiver, which is, however, not always necessary.

36. TAPE CONNECTOR (DECK-1)

This 5-pin connector is of DIN standard. With recording output (REC. OUT) and tape monitor (MONITOR) terminals in it, connection for recording and playback is possible with a single lead-wire of DIN plug if the tape recorder has the same connector. For playback through this Connector both the Monitor and Selector Switches have to be pressed in.

37. PHONO TERMINALS (PHONO-1, PHONO-2)

This terminal is for playback of a magnetic pick-up (MM, MI, MC types). Input sensitivity 2.6mV with impedance 50K ohms. Almost all pick-ups can be used except MC type of very low output (0.01 - 0.1mV). For such MC type cartridges of extremely low output level, it is needed to boost the voltage up to the specified level by use of step-up transformers or head-amplifier.

38. AUX TERMINALS (AUX)

This is an auxiliary input terminal for playback of such programme source of flat frequency response as SW/LW tuner, line output of tape recorder, and audio output of TV receiver. Input sensitivity 160mV and input impedance 50K ohms.

39. DECK-1 RECORDING OUTPUT TERMINAL

Signal for recording is taken out from this terminal, which is always available as long as an input signal is given to any of the Input Terminals (Phono, Aux, AM, FM) and the Input Selector Switch is set at the corresponding position, except when the Tape Dubbing Switch is set at the "dub 2 to 1" position. In this case recording signals come from the DECK-2 Terminal.

40. DECK-2 RECORDING OUTPUT TERMINAL

This functions in the same way as the DECK-1 Recording Output Terminal. With the Tape Dubbing Switch at the "dub 1 to 2" position recording signals are given from the DECK-1 terminal.

41. DECK-1 MONITOR TERMINAL

Playback of line-output of tape recorder is possible from this terminal. For playback through this terminal press in the Tape Monitor Switch. A 3-head tape recorder makes it possible to monitor playback sound while recording.

42. DECK-2 MONITOR TERMINAL

This terminal offers the same function as the DECK-1 Monitor Terminal. For playback through this terminal press in both the Tape Monitor and Tape Selector Switches.

43. AM BAR ANTENNA

Normally, good reception of AM broadcasting is possible with this antenna. Rotate this antenna to ensure the optimum reproduction.

44. ANTENNA ATTENUATOR

Since the front end of this tuner adopts dual gate MOS EFT's normally, this attenuator should be left at the "OUT" position. When very close to a broadcasting station, where problems occur, use this attenuator – to slide it to the "IN" position.



INSTALLATION

While the R-1120 Receiver has been designed for maximum ease of installation and operation, we strongly suggest you read this section through before proceeding to connect and operate the unit. Because the R-1120 incorporates many technical and operating refinements, it may be a bit different from equipment you have used in the past.

PLACEMENT AND MOUNTING

The R-1120 may be placed in virtually any convenient location, keeping in mind the necessity of connecting cables to your speakers and an antenna for FM. Because of its advanced solid-state construction, the unit produces little heat. But certain minimum ventilation requirements are still necessary to provide optimum operation:

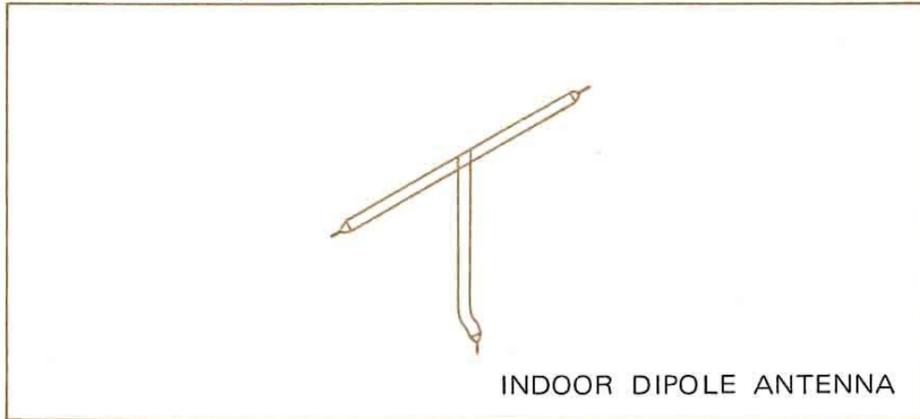
When the R-1120 is placed on an open shelf in a bookcase or cabinet (mounted in its integral metal case or with the accessory furniture case) about 10 (3") cm of free space should be allowed above it.

ANTENNAS

Except in fringe areas no additional AM antenna is required with the R-1120. For FM, a folded dipole, available from your dealer, is generally adequate. This section will tell you how to connect them.

AM ANTENNA

In all but remote rural locations, the special fold out ferrite core antenna mounted inside of the receiver provides excellent AM reception. If an external antenna is required, connect a length of wire (any type will do) to the AM ANTENNA terminal on the rear panel.

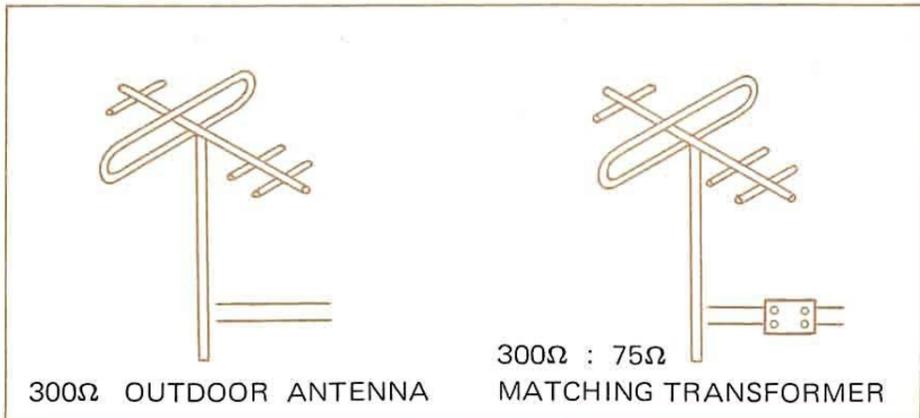


FM ANTENNA

Connect the antenna lugs to the 300-ohm ANTENNA terminals on the rear panel. Rotation of the FM antenna will be needed for best reception.

FM OUTSIDE ANTENNA

If you live in a remote fringe area, or in a metropolitan area with reception problems, it may be necessary to use an outside antenna. If you require a separate FM antenna, purchase a quality FM unit from your dealer. Connect the cable from the antenna to the 300-ohm ANTENNA terminals on the rear of the R-1120.



MASTER ANTENNA AND OTHER 75-OHM SYSTEMS

Some buildings have master antenna systems that carry FM. Connect to the 75-ohm ANTENNA terminal on the rear of the unit.

Note: For clarification, if necessary, see your dealer, who can advise you concerning the best antenna installations.

LOUDSPEAKER

The R-1120 Receiver is designed to drive 3 pairs of speakers, used either separately or 2 together.

Because of its high output power, two pairs of even the lowest-efficiency speaker systems may be used together without fear of placing too heavy a demand upon the unit.

Although almost any type of wire may be used to connect speakers to the receiver, it is recommended that you use standard gauge rip cord. For runs over 15m (50ft), heavier gauge rip cord should be used if possible. Whatever thickness of wire you choose, pick the type where you can distinguish one lead from another, either by conductor color, a ridge running along the insulation of one conductor, or by a colored cord under the insulation. This will help you hook up the

speakers correctly.

PLEASE NOTE

- (1) No more than 1.5cm (1/2") of wire should be bared for hookup, since longer bared lengths may produce a short circuit.
- (2) Twist all strands of exposed wire tightly. Loose strands may cause shorts.

CONNECTING SPEAKERS

Look at your speakers. You will note that one terminal is unmarked. The other will be designated 'COM', 'COMMON', 'GND', 'GROUND', or Black. Connect the 'COM' terminal of each speaker to the appropriate black SPEAKERS terminal on the rear of the receiver by pushing on the terminal and inserting the bare wire in the hole thus exposed. Make sure the wire does not contact the chassis or another terminal, to prevent shorts. Then connect the other speaker terminal to the appropriate red SPEAKERS terminal of the receiver. To connect a single pair of speakers, connect the wires from the left speaker (as viewed from the listening position) to the "L" A SPEAKERS terminals. Similarly, connect the right speaker to the "R" A SPEAKERS terminals of the receiver. The 2nd pairs of speakers and the 3rd ones of electrostatic type can be connected similarly to B and ELECTROSTATIC SPEAKERS terminals respectively.

SPEAKER PHASING

To enjoy good stereo reproduction, it is necessary that the two stereo speakers in any location work as a team, 'pushing' and 'pulling' the air in unison. Otherwise, low-pitched sounds will sound weaker than they should, and the stereo effect at higher frequencies will become indistinct. To connect your speakers for proper stereo effect (this is called "phasing"), proceed as follows:

Play an FM program with the Mode Switch in MONO position. If the low bass notes sound normal, the speakers are properly phased. If they sound thin, or weak, the speakers are out of phase. Should this occur, turn off the receiver and carefully check the connections at either one of the speaker.

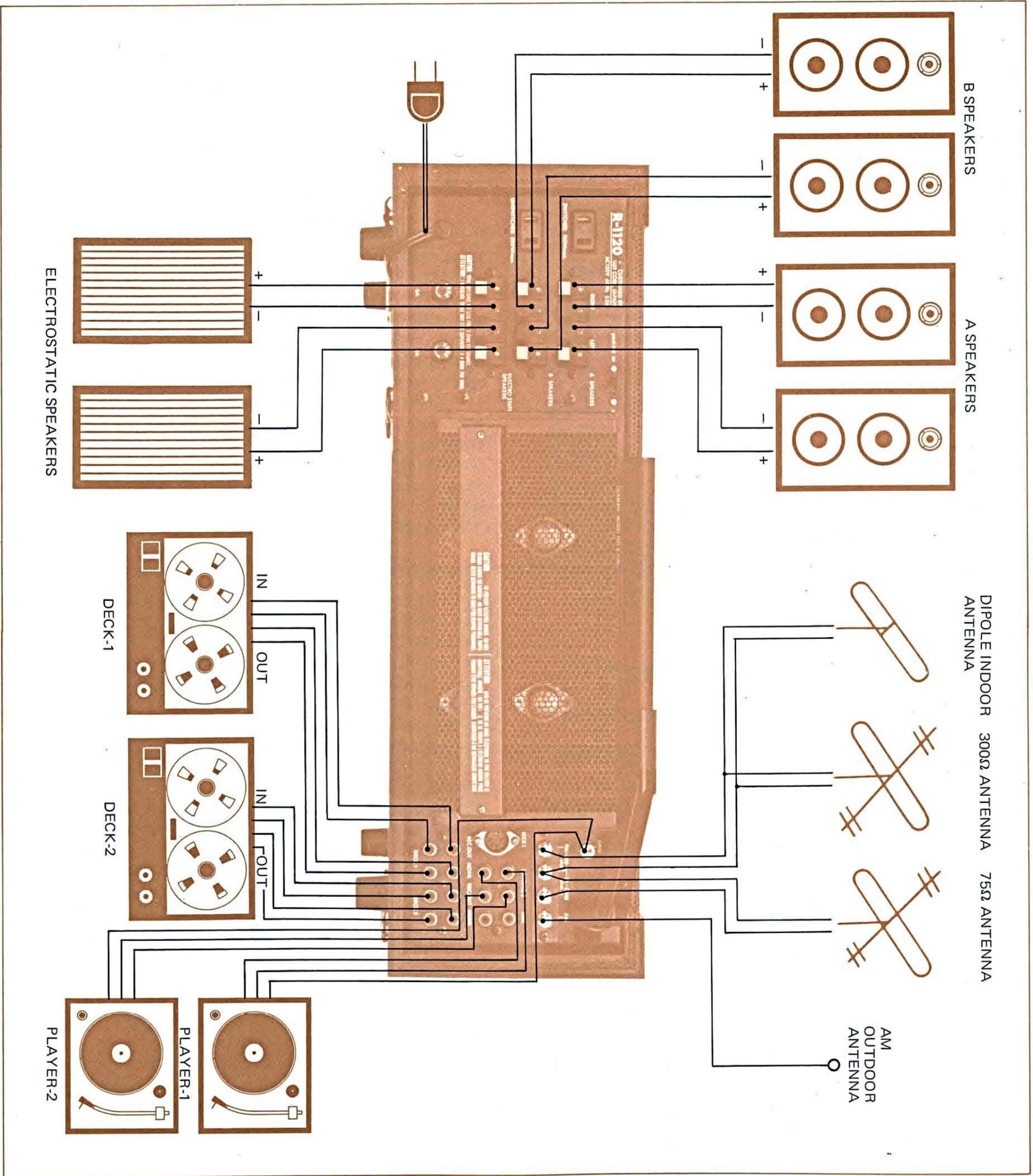
TURNTABLES/TAPE RECORDERS/DECKS

AUTOMATIC AND MANUAL TURNTABLES

The R-1120 has 2 provisions for connection of two turntables. Check the cartridge manual or your dealer, if in doubt about the proper input for the particular cartridge in your turntable. The turntable's mains cord can be connected to the extra AC outlet on the rear of the R-1120, if it is provided.

TAPE RECORDERS AND DECKS

Tape recorders can be connected to record and playback through the R-1120 by two methods: standard jacks and special DIN type connector on the rear panel. See page 12 for tape connections of all types. For additional information see the manual of your tape machine or consult your dealer.





FOR CORRECT PLAYBACK

INPUTS (CONNECTION OF INPUT EQUIPMENTS)

Check firm connection to the receiver's input terminals of output terminals of record players, tape-recorders etc. If no playback sound comes from speaker systems, the receiver may be, at first, suspected to be defective, so be sure about firm connection between arm and cartridge and also firm fixture of cartridge to the shell.

OUTPUTS (CONNECTION OF SPEAKER SYSTEMS)

Check firm connection between receiver and speakers. The right-hand speaker viewed from the listener's position must be connected to the "RIGHT" terminals of the receiver, while the left speaker to the "LEFT" terminals. Be careful about the matching phase of left and right speakers. If mismatched, playback sound does not come from the centre of both speakers even if the mode selector is set at the "MONO" position, and in the case of stereophonic playback, faithful reproduction in low frequency range cannot be expected. Be sure that the speaker selector switch corresponds to the speaker terminals to which the speaker is connected.

AC MAINS SOURCE

Check whether the AC mains plug of receiver is firmly connected to the AC mains power source, and whether the dial scale lights up when switched on.

INPUT SELECTOR SWITCH

Check whether the AC mains plug of receiver is firmly connected to the AC mains power source, and whether the dial scale lights up when switched on.

TAPE DUBBING SWITCH

Except for tape dubbing (reprint) it is recommended to set this switch at the "source" position.

TAPE MONITOR SWITCH

For normal playback never press in this switch. Playback with tape-recorder is feasible when this switch is pressed in.

TAPE SELECTOR SWITCH

After the Tape Monitor Switch is pressed in, choose the tape playback terminal with this switch. When this switch is kept unpressed the DECK-1 Monitor Terminal starts to function, while when pressed in the DECK-2 Monitor Terminal functions. For playback through the Tape Connector this switch has to be kept unpressed.

VOLUME CONTROL

Full turn of this knob in the counter-clockwise direction yields no sound. Turn to the clockwise direction and enjoy playback at an appropriate volume. Also adjust unbalanced volumes with the Balance Control between right and left channels. Usually at the centre rotation angle the same volume is obtained for stereophonic reproduction.

ANTENNA

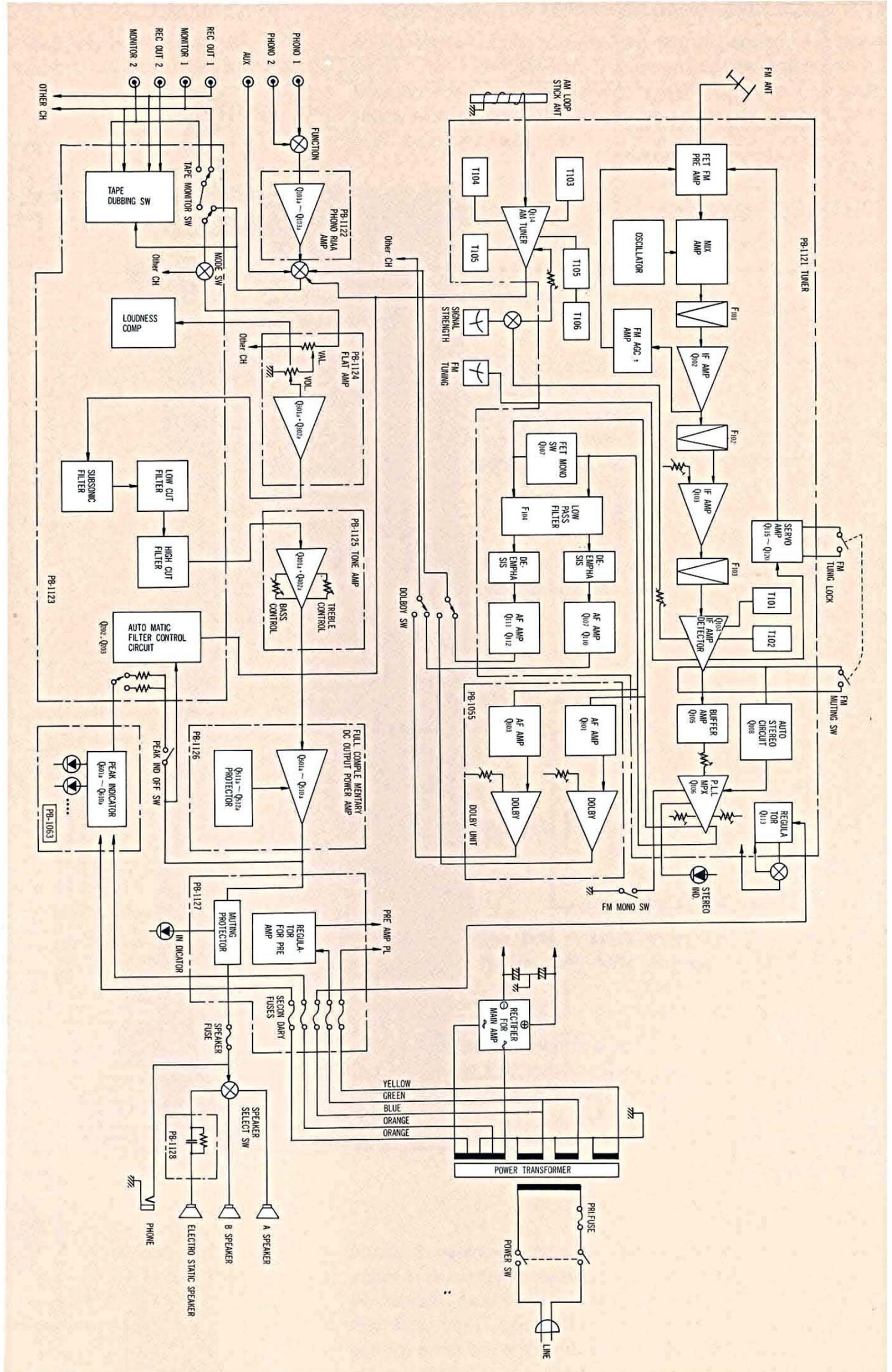
For satisfactory playback of FM and AM, connect an appropriate antenna to the antenna terminal.

MODE SELECTOR

This switch is to select the mode of reproduction. For stereophonic reproduction, set this selector at the centre "stereo" position, otherwise stereophonic reproduction cannot be obtained even if input signal is stereophonic.



BLOCK DIAGRAM





OPERATION PROCEDURE

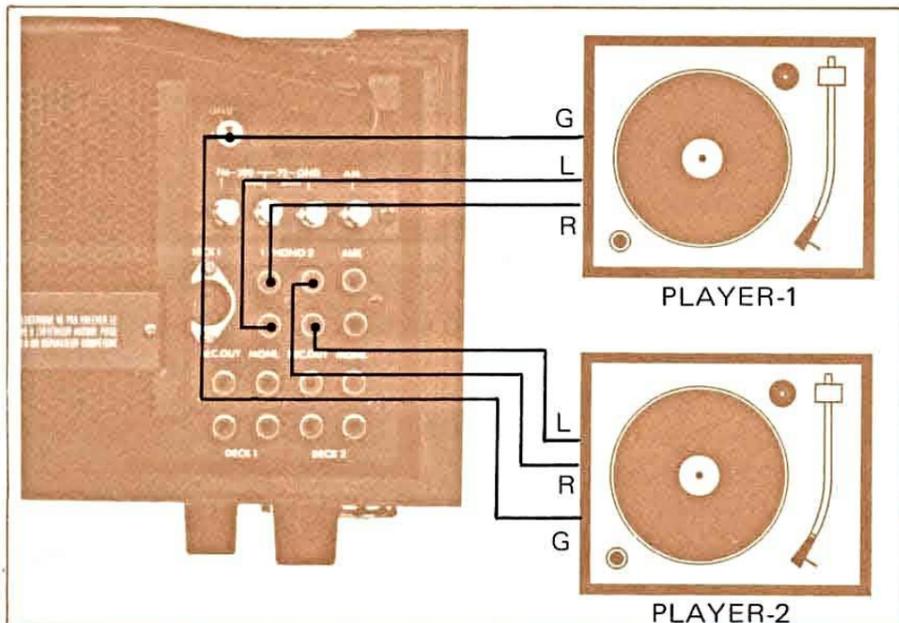
PLAYBACK FROM RECORD DISC

CONNECTIONS

Generally a record player consists of a turntable 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 record 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 receiver [PHONO-1/2].

A probable earth lead of player may be connected to the GND terminal of this receiver. A mains cord of the player to drive its motor may be connected to the extra AC outlet, if available.

This receiver is provided with 2 input terminals (PHONO-1 and PHONO-2) to be selected by the input selector switch (20), which is useful for comparison test of 2 pick-ups or using 2 record players. For use of 1 player either of 2 input terminals can be selected.



SIGNAL PATHS

Put the disc on the turntable, switch on the phono motor, and set the stylus on the groove of disc. Then recorded signals begin to be fed to the receiver. First, signals fed to the receiver 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 to 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 divided into 2 channels, one line to the recording output terminal, and the other to the tape monitor switch. Then to the tape reprint switch which is effective on both channels. If the monitor switch is not pressed in, the signals are sent to the mode selector switch, and volume control, but if pressed in, the tape monitor terminals start to function and the signals are stopped at this

point. Except when the tape playback is made by tape monitor terminals, the monitor switch must be kept unpressed at the normal 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, filters, and loudness 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 subsonic filter, loudness, and tone controls are for flexible and diversified adjustment of playback sound and do not block the signals completely. Then the signals reach the speaker switches amplified by the main amplifier. Sound playback from speaker systems is thus realized, if the speaker switch is set at the very position corresponding to the speaker terminals to which the speakers are connected. The above is the feeding path of PHONO signals starting from input terminals to the speaker systems. Difficult as it may sound, you can easily understand it from the attached block diagram. For your pleasant command of this receiver, we recommend you to bear the block diagram in your mind.

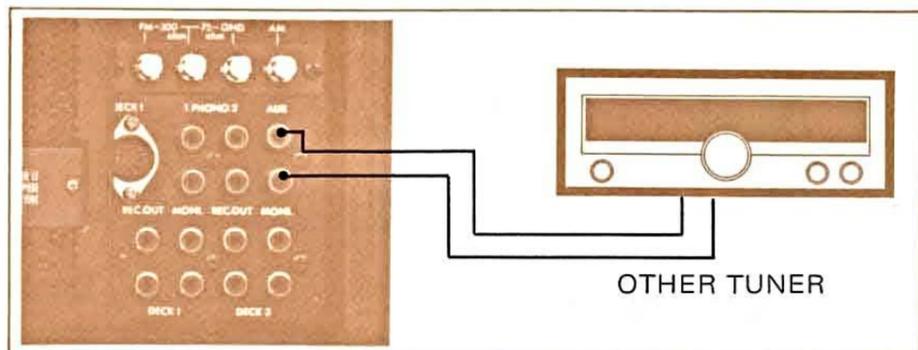
PLAYBACK PERFORMANCE

Now put a disc on the turntable 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 (20), Monitor Switch (3), Speaker Selector Switch (25) and Volume Control (24). 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 correct stereophonic playback is not feasible.

PLAYBACK OF AM/FM BROADCASTING PROGRAMME

Selection of the input selector at the AM or FM position ensures playback of AM or FM broadcasting programme. If you want, you can connect other tuner (AM, FM, LW or SW etc.) to the AUX terminal of this receiver. In this case the selector must be set at the corresponding position. As shown in the block diagram the input signals from the tuner section on AUX terminals 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. Both for FM stereophonic and monaural broadcasting the Mode Selector Switch can be set at the position of "FM", for such accommodation to the input source can be made in the tuner section. In case weak FM stereo is received and you feel it noisy, set the Mode Selector Switch (6) to the "mono" position for better reproduction.

In case of AM/LW programme from other tuner, there is possible trouble of modulation hum, which can be eliminated by varying the distance and angle of these components.



OTHER PLAYBACK

The signals of flat frequency response from such sources as TV receivers do not need an equalizer stage, and for playback of such audio equipments the AUX terminal can be used. Connection and operation is same with that of AM/FM broadcasting programme.

PLAYBACK FROM TAPE

PLAYBACK FROM TAPE MONITOR TERMINALS

Almost all of tape-recorders, and tape-decks currently marketed integrate audio pre-amplifiers in their circuit. Also there is a tape-player exclusively for playback. Connect the output terminal (LINE OUT) to the DECK-1 Tape Monitor Terminal. Then press in the Monitor switch and the playback from the DECK-1 Monitor Terminal is realized. If 2 tape-recorders are connected to the Terminals, selection between 2 tape-recorders is possible by the Tape Selector Switch (4). This amplifier section can be divided into 2 sections – one before the Recording Output Terminals (REC. OUT) and the other after the Tape Monitor Switch, 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 DECK-1 MONITOR and Tape Connector at the same time, since these 2 are coupled in the inside circuit and effect each other. Therefore if Tape Monitor Terminals and Tape Connector are used the tape-recorders should be connected to the terminals of DECK-2 MONITOR 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 terminal of this receiver by use of pin-jack lead and the Input Selector Switch is set at the "aux" position. 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 the tape-recorder should not be connected. If connected to the Recording Output Terminals (REC. OUT) of the receiver 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 patch cord between the tape-recorder and recording/playback connectors of this receiver. A DIN cord should be connected between DIN connector of the tape-recorder and Tape Connector of this receiver. Playback from Tape Connector is possible if the Tape Monitor Switch is pressed in.

RECORDING ON TAPE

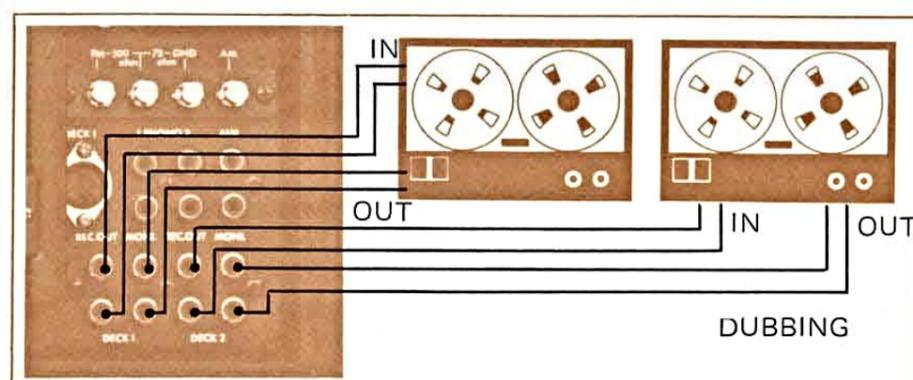
In case of playback of various programme sources through input terminals of this amplifier, the same signals to these reproduced in speakers are available at the Recording Output Terminals and Tape Connector if the Tape Dubbing Switch is set at the "source" position. By connection of these terminals 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 Control, Tone Controls and Filters etc.

TAPE DUBBING (REPRINTING)

So called tape dubbing – tape-to-tape reprinting is possible with the Tape Dubbing Switch, when the switch is set at the "dub 1 to 2" or "dub 2 to 1" position. In the "dub 1 to 2" position connect the LINE-OUT terminals of the tape-recorder with recorded tape to the DECK-1 TAPE MONITOR while the LINE-IN (AUX) terminals of the second tape-recorder to the "DECK-2 REC. OUT", and the tape dubbing is possible from the 1st to 2nd tape-recorder: vise versa at the "2 to 1" position.

Similarly tape dubbing is possible between the DECK-1 TAPE MONITOR and the Tape Connector. In the dubbing process if the LINE-IN terminals of the 1st tape-recorder is connected to the "DECK-1 REC. OUT" and the LINE-OUT of the 2nd tape-recorder to the "DECK-2 TAPE MONITOR" simple operation of the Tape Selector Switch between "deck-1" and "deck-2" allows comparison between the original sound and newly recorded one. Remember that for reproduction of other programme sources than tape, the Tape Monitor Switch must be kept unpressed.

If there are 2 tape-recorders reprinting of tape is feasible also by other method; Connect the tape-recorder of better recording performance to the Recording Output Terminals and other one to the AUX terminals exclusively for playback setting the Input Selector Switch to the relevant "aux" position.

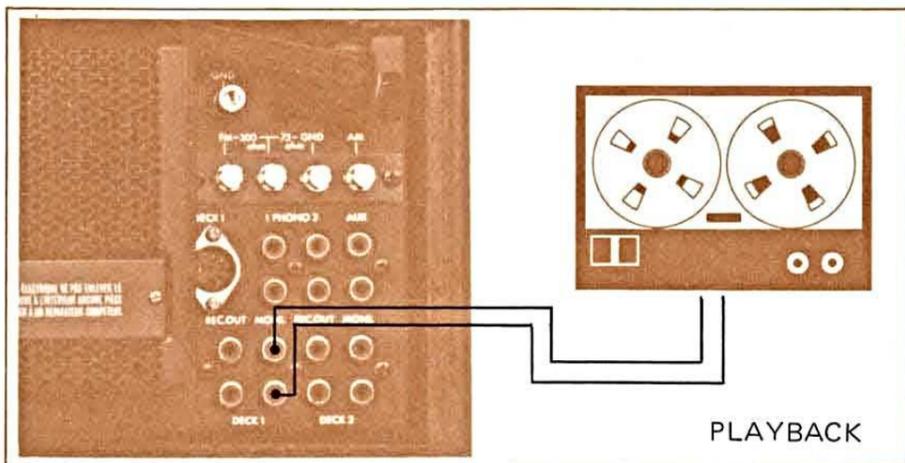


SIMULTANEOUS PLAYBACK MONITORING

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 DECK-1 Recording Output Terminal to the Line Input Terminals (AUX Input) of tape-recorder, and the DECK-1 Monitor Terminal to the Output Terminals (LINE OUT) of the tape-recorder and to set the Tape Dubbing Switch at the "source" position. The Monitor Switch has to be pressed in, and select by the Tape Selector Switch the position corresponding to the terminals to which the tape-recorder is connected. Now repetition of pressing the Monitor Switch makes it feasible to compare the original sound with recorded one.

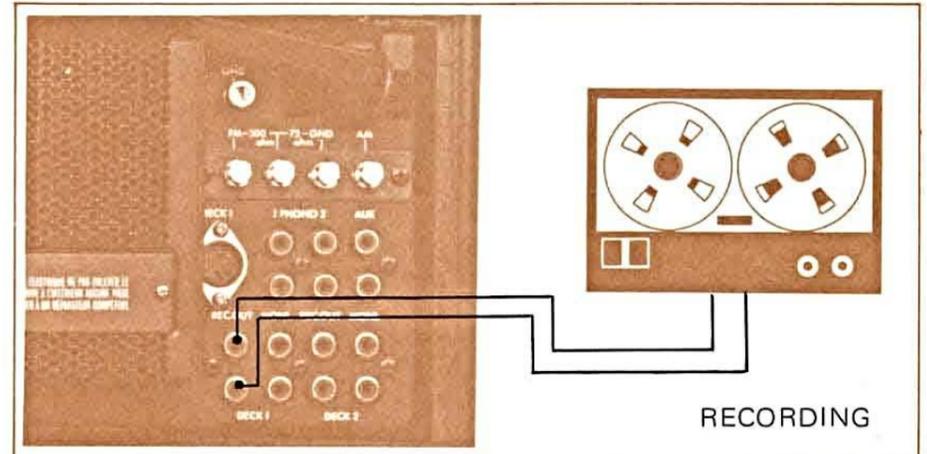
Thus possible recording error can be prevented in case of 3-head tape-recorder. Incidentally note that reproduction of recorded sound becomes a little bit delayed as compared with that of original sound since there is a gap between recording head and playback head. Simultaneous Playback Monitoring can be made through the Tape Connector as well. A single DIN patch cord ensures connection for recording and playback, and simple operation of pressing the Monitor Switch will do when the Tape Selector Switch is kept unpressed.



SIMULTANEOUS RECORDING

This receiver is provided with 2 sets of Recording Output Terminals (REC. OUT) enabling to record simultaneously on 2 tape-recorders. 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. Remember that the Tape Dubbing Switch (5) must be set at the "source" position.

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



ABOUT DIN TAPE CONNECTOR

The Tape Connector of this receiver is provided at the rear panel for convenient connection. 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 DIN patch cord suffices for recording and playback. See to it that this connection is practised only by DIN CORD since the impedance at Recording Output Terminals is kept relatively high at 80K ohms \pm 20K ohms.

OPERATION OF 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 are 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	R → R L → L	normal stereo playback	for normal stereo playback
MONO	R → R L → L	right and left input signals are integrated	for monaural playback of stereo program
REVERSE	R → L L → R	reversed stereo playback	to reverse right and left signal sources

CONTROL OF VOLUME

Sound volume can be properly adjusted by volume control. In the attenuation characteristics 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 provided at the rear position of the Volume Control. 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 is adjusted identical at the centre rotation position on the knob. If a programme source had deviation of the volume level between 2 channels, establish correct balance with this control.

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 receiver is equipped with various tone controls for subtle and minute control of the reproduced sound such as Bass Control (21) and Treble Control (22). Also the turnover (roll-off) frequency can be selected between 200Hz and 400Hz for the bass, and similarly between 2kHz and 4kHz for the treble.

Bass Control 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 counterclockwise turn yields attenuation.

OPERATION OF LOW CUT FILTER

When this filter (9) is switched on the amount of low frequencies you hear is reduced at the attenuation rate of 12dB/oct. below 70Hz. Useful for removal of low frequency noise such as rumbling of phono motor. Also this can be used as an auxiliary control for Bass Control.

OPERATION OF HIGH CUT FILTER

When this filter (10) is switched on the amount of high frequency range over 7KHz is cut off at the attenuation rate of 12dB/oct. Useful for removal of scratch noise, hissing noise of tape etc. Also this can be used as an auxiliary control for Treble Control.

OPERATION OF SUBSONIC FILTER

The ultra low frequency noises caused by warping of disc, resonance of tonearm, wow and flutter, rumbling of phono motor and howling etc. mainly appear below 20Hz. Even they are out of audible frequency, they move the speaker cone to cause harmful distortion.

The subsonic filter eliminates such noises quite effectively by reducing the amount of ultra low frequency range below 15Hz at the rate of -12dB/oct.

OPERATION OF LOUDNESS

Because loudspeakers and ears generally respond less to extreme high and low (treble and bass) frequencies as volume levels are reduced, the LOUDNESS switch is included to boost these frequencies and thereby provides tonal compensation. Whether or not you use this switch depends upon the levels at which you generally listen, the kind of speakers you have, the room acoustics and a number of other variables. Experimentation is the best guide to using the LOUDNESS switch.

PEAK INDICATOR

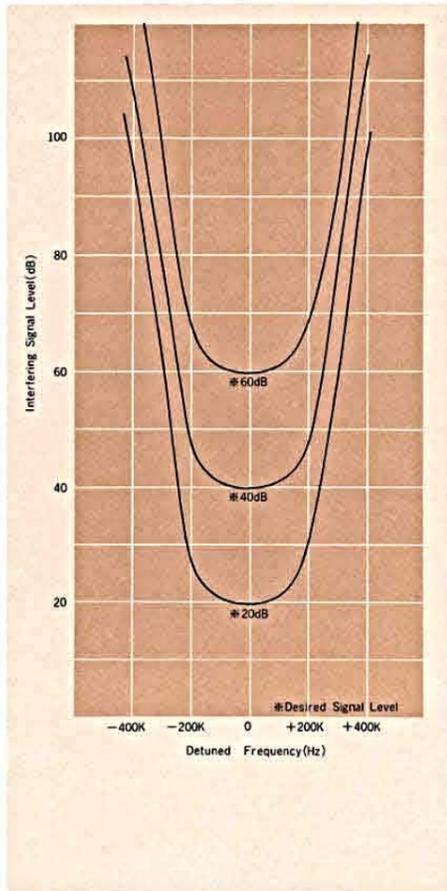
The Peak Indicator does not light up at low output level. Therefore this receiver is equipped with the Selector Switch for Peak Indicator Sensitivity so that these Peak Indicators may be utilized even at low output level by increasing only the indicator's sensitivity by 12dB independent of the gain of the power output circuit itself. When this Selector Switch is kept unpressed at the normal position 0dB indication is equivalent to 120W/ch, while at the status of "pressed in" 0dB means 7.5W/ch (8 ohms).

Indication	UNPRESSED ()	PRESSED ()
0 dB	120.0 W	7.5W (-12dB)
- 6	30.0W	1.9W (-18dB)
- 9	15.0W	950mW (-21dB)
-12	7.5W	480mW (-24dB)
-15	3.8W	240mW (-27dB)
-18	1.9W	120mW (-30dB)

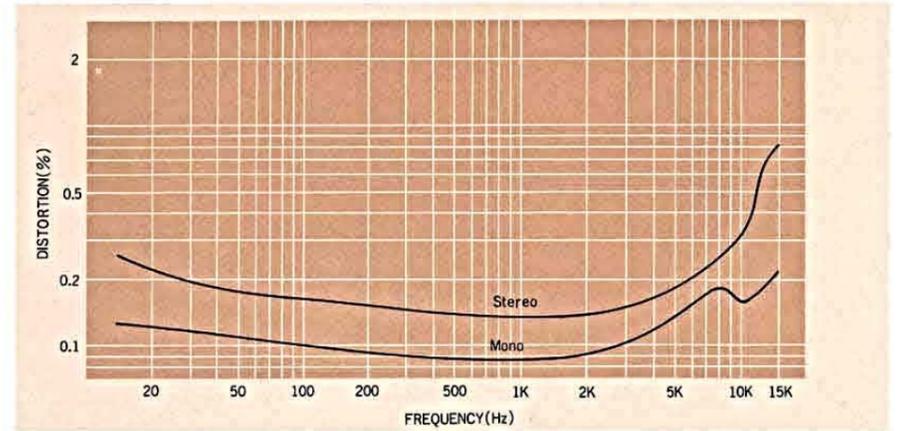


STANDARD CURVES

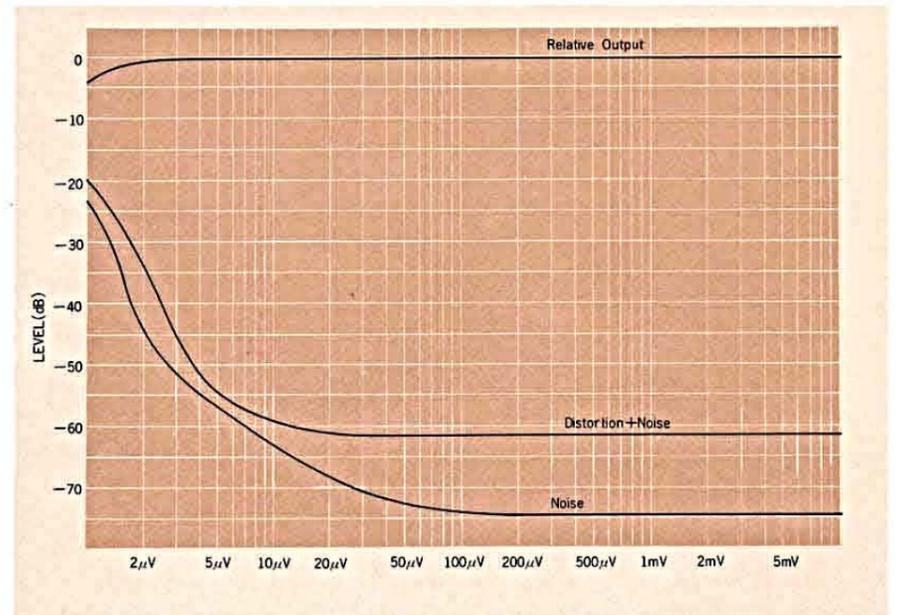
Signal Selectivity



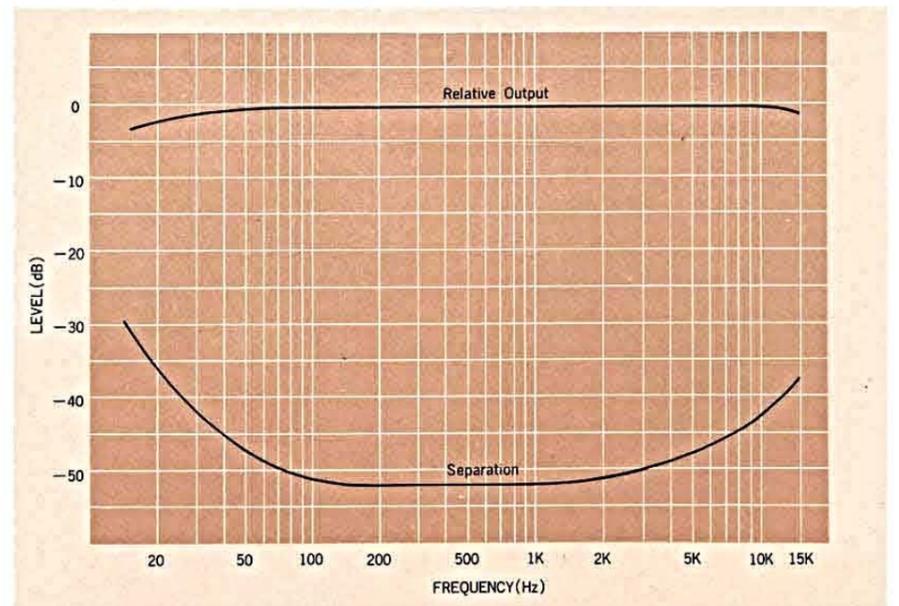
FM Distortion



Distortion, Noise Response

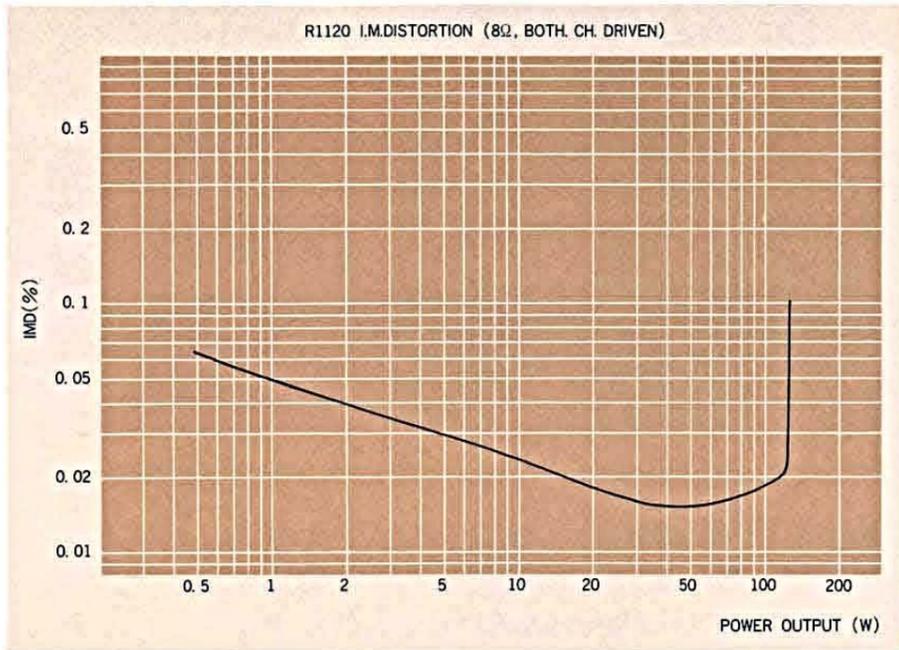


FM Frequency, Channel Separation



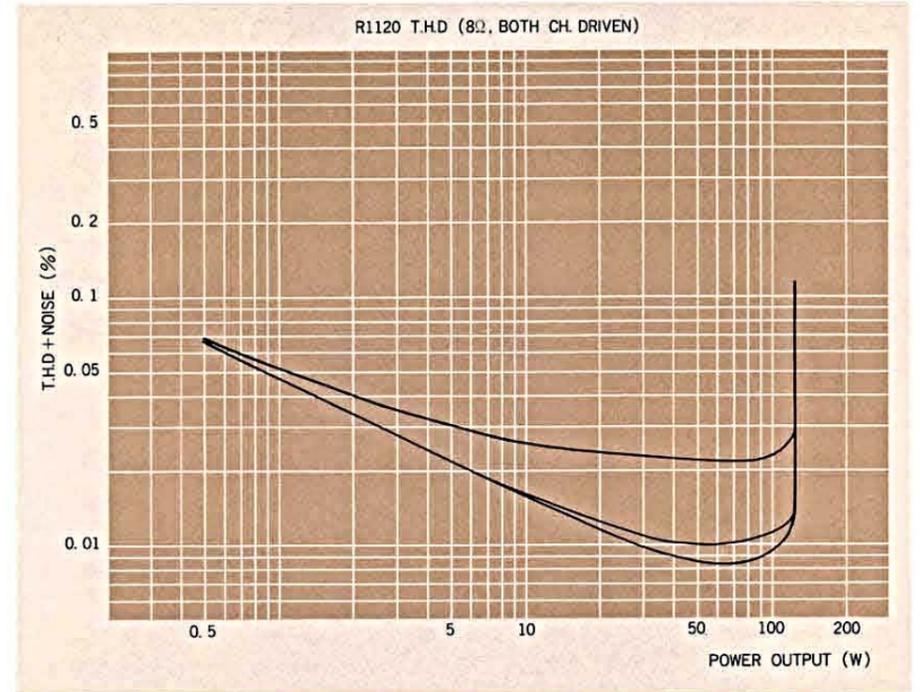
I.M. Distortion VS. Power

Input; Aux, Output; 8Ω Load Both CH Driven, Volume; Max.
Tone; Flat, Frequency 60Hz; 7kHz = 4 : 1

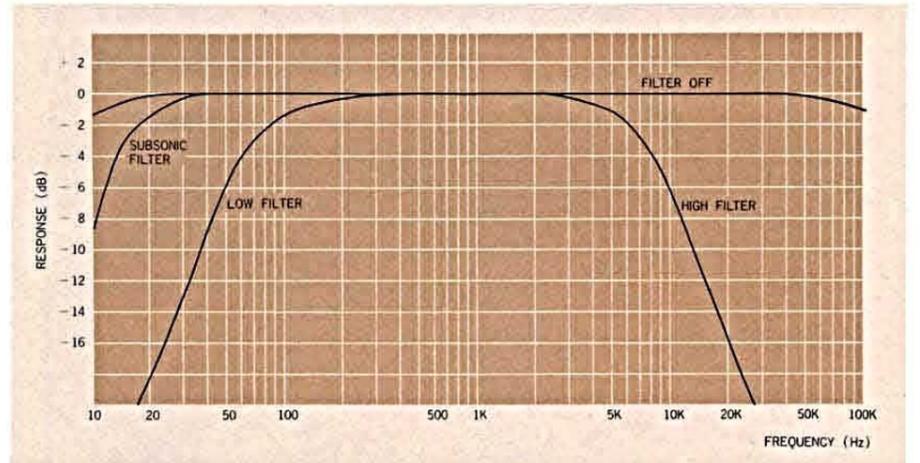


T.H. Distortion VS. Power

Input; Aux, Output; 8Ω Load Both CH. Driven, Volume; Max
Tone; Flat

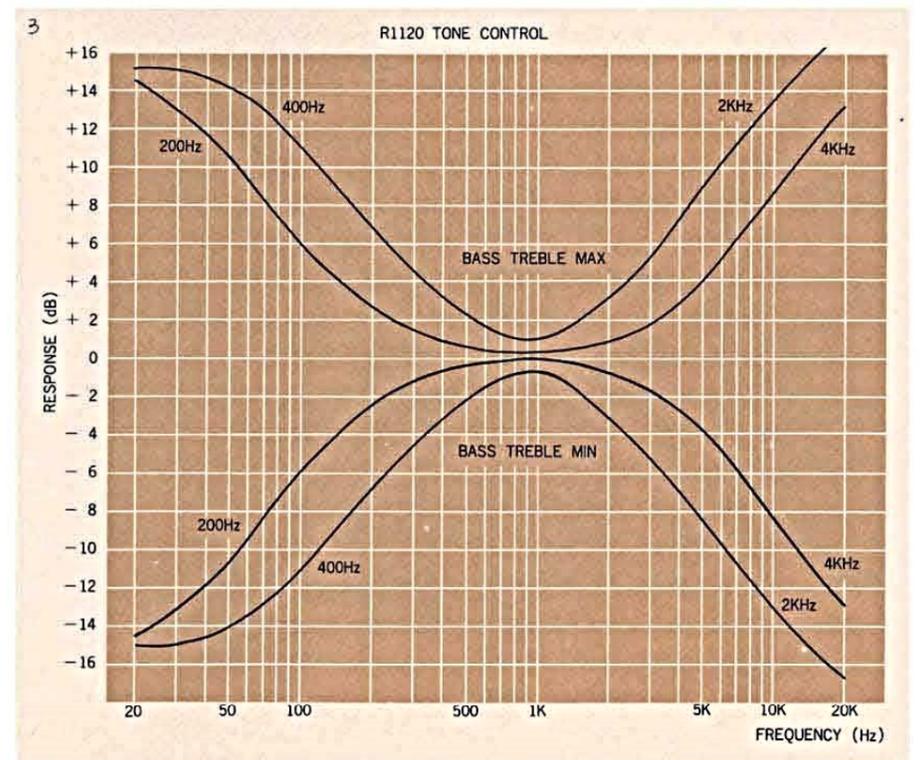


Filter Response vs. Frequency



Tone Control

Input; Aux-1, Output; 8Ω Load Filter; Off





SPECIFICATION

[AUDIO SECTION]

- * Power Output: 120 watts minimum continuous per channel
both channels driven into 8 ohms load, from
20Hz to 20,000Hz with no more than 0.03%
total harmonic distortion.
- * Rated I.M.: no more than 0.03%
(8 ohms, both ch driven, 60Hz : 7kHz=4:1)
- * Frequency Response: 15Hz — 60kHz (−1dB)
- * Input Sensitivity: 2.6mV (phono—1/2), 160mV (tuner, aux, moni.)
- * Phono Overload Voltage: 160mV
(at 1kHz)
- * Signal to Noise Ratio: 72dB (phono—1/2)
94dB (phono—1/2, IHF A weighted, 10mV)
88dB (tuner, aux, monitor)
95dB (tuner, aux, monitor, IHF A weighted)
- * Residual Noise: no more than 1.3mV
- * Crosstalk at 1kHz: −73dB (aux, monitor)
- * Tone Control: TREBLE 2kHz, 10kHz (±13dB)
4kHz, 10kHz (±8dB)
BASS 200Hz, 100Hz (±6dB)
400Hz, 100Hz (±11dB)
- * Filters: Subsonic 15Hz (−12dB/oct.)
Low Cut 70Hz (−12dB/oct.)
High Cut 7kHz (−12dB/oct.)
- * Loudness Control (VR:−30dB): 100Hz +10dB
10kHz +7dB
- * Peak Indicators: 0, −6, −9, −12, −15, −18dB
- * Additional Features: Loudness Control, Peak Indicators, Speaker
Switch, Headphone Jack, Tape Dubbing
Switch, etc.

[FM SECTION]

- | | [mono] | [stereo] |
|--|----------------|----------------|
| * IHF usable sensitivity at 98MHz, 400Hz, 100% mod.: | 10.3dBf(1.8μV) | 17.2dBf(4.0μV) |
| * 50dB Quieting Sensitivity: | 14.1dBf(2.8μV) | 36.8dBf(38μV) |
| * Selectivity at 98MHz, 100μV ±400kHz: | 80dB | |
| * Signal to Noise Ratio at 65dBf: | 74dB | 70dB |
| * Frequency Response at 98MHz, 1mV: | | |
| 50Hz — 10kHz | +0.2, −0.5dB | +0.2, −1.5dB |
| 20Hz — 15kHz | +0.2, −1.5dB | +0.2, −1.5dB |
| * Distortion at 65dBf: 100Hz | 0.1% | 0.2% |
| 1kHz | 0.1% | 0.2% |
| 6kHz | 0.3% | 0.4% |
| * Capture Ratio at 65dBf: | 1.3dB | |
| * Image Response Ratio: | 80dB | |
| * IF Response Ratio: | 85dB | |
| * AM Suppression Ratio: | 55dB | |
| * Stereo Separation: 100Hz | — | 45dB |
| 1kHz | — | 48dB |
| 6kHz | — | 42dB |
| * Subcarrier Product Ratio: | — | 60dB |
| * SCA Rejection: | — | 60dB |
| * Muting Range: | 50kHz | |

[AM SECTION]

- * IHF usable sensitivity at 1000kHz, 400Hz, 30% mod.: 200μV/m
- * Image Ratio at 1000kHz, EXT. ANT.: 75dB
- * IF Rejection at 1000kHz, EXT. ANT.: 80dB
- * S/N at 1000kHz, 10mV, 400Hz, 30% mod.: 52dB
- * Distortion at 1000kHz, 10mV, 400Hz, 30% mod.: 0.5%
- * Output Level at 1000kHz, 3mV/m, 400Hz, 30% mod.: 0.15V
- * Selectivity at 1000kHz: 32dB

[GENERAL]

- * Power Consumption: 500W (at full power, 8 ohms)
120V 5.5A (CSA rated)
- * Dimensions: 490(W) x 415(D) x 180(H) mm
(19-5/16" x 16-21/32" x 7-3/32")
- * Weight: Net 17kgs. (37.4 lbs.)
Gross 19kgs. (41.8 lbs.)

Specifications and appearance design are subject to possible change without notice.



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