

# **Nakamichi MR-1**

Discrete Head

Professional Cassette Deck

Owner's Manual

Congratulations!

You have chosen an excellent cassette deck. The Nakamichi MR-1 is designed for professional applications in recording studios etc. It delivers outstanding performance in every basic aspect, thanks to original Nakamichi technology such as the Discrete 3-Head system and the direct-drive dual capstan transport. Connection to professional audio equipment with balanced lines is made easy by the versatile input/output configuration providing balanced XLR connectors for input and output as well as balanced 1/4-inch type input jacks.

In order to take full advantage of this unit's superior performance, please read this manual in its entirety and retain it for future reference.

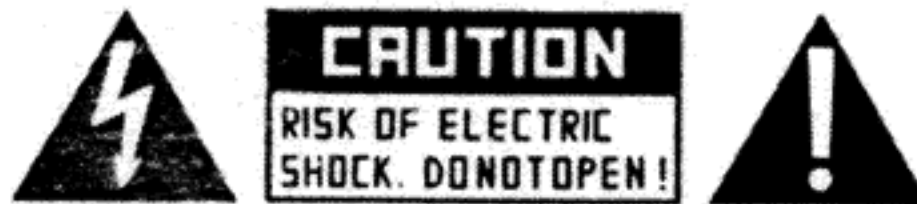
Thank you.

Nakamichi Corporation.

Please record the Model Number and Serial Number in the space provided below and retain these numbers.


Model Number and Serial Number are located on the rear panel of the unit.


Model Number: Nakamichi MR-1  
Serial Number: \_\_\_\_\_



**CAUTION**

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

 The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure; that may be of sufficient magnitude to constitute a risk of electric shock to persons.

 The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions, in the literature accompanying the appliance.

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

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate this equipment with respect to the receiver
- move this equipment away from the receiver
- plug this equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

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# Safety Instructions

The following safety instructions have been included in compliance with safety standard regulations. Please read them carefully.

1. **Read Instructions**—All the safety and operating instructions should be read before the appliance is operated.
2. **Retain instructions**—The safety and operating instructions should be retained for future reference.
3. **Heed Warnings**—All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions**—All operating and use instructions should be followed.
5. **Water and Moisture**—The appliance should not be used near water—for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
6. **Carts and Stands**—The appliance should be used only with a cart or stand that is recommended by the manufacturer.
7. **Wall or Ceiling Mounting**—The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation**—The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug or similar surface that may block the ventilation openings; or placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat**—The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) which produce heat.
10. **Power Sources**—The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Grounding or Polarization**—Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.
12. **Power-Cord Protection**—Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Cleaning**—The appliance should be cleaned only as recommended by the manufacturer.
14. **Nonuse Periods**—The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
15. **Object and Liquid Entry**—Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
16. **Damage Requiring Service**—The appliance should be serviced by qualified service personnel when:
  - A. The power-supply cord or the plug has been damaged; or,
  - B. Objects have fallen, or liquid has been spilled into the appliance; or,
  - C. The appliance has been exposed to rain; or,
  - D. The appliance does not appear to operate normally or exhibits a marked change in performance; or,
  - E. The appliance has been dropped, or the enclosure damaged.
17. **Servicing**—The user should not attempt to service the appliance beyond that described in the operating instruction. All other servicing should be referred to qualified service personnel.

## On Cassette Tapes

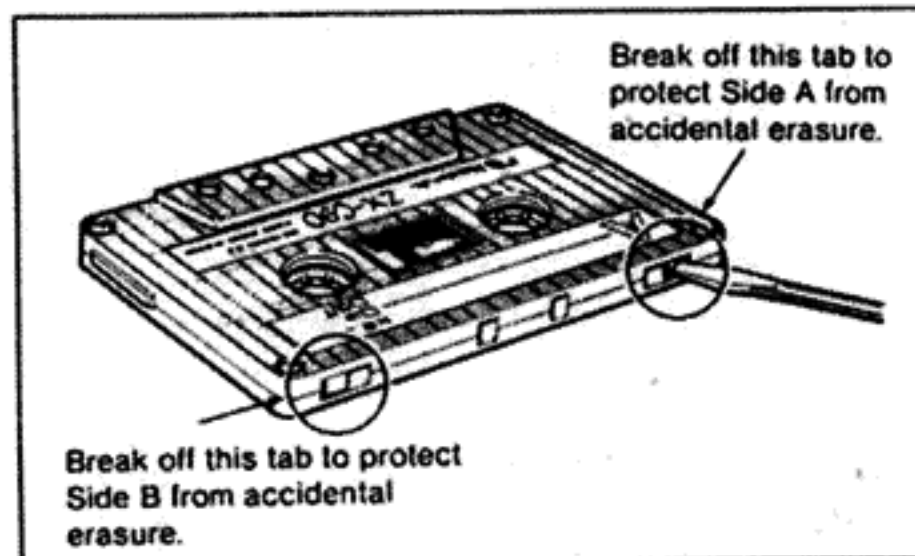
### Precautions

1. C-120 cassettes (playing time one hour per side) contain extremely thin tape which breaks or snarls easily, is sometimes subject to stretching and also is of low sensitivity. Therefore, C-120 cassettes are not recommended for high-fidelity recording.
2. Do not pull out the tape from the cassette housing.
3. Be careful not to turn the cassette reels with the fingers, causing tape slackening.
4. Store cassette tapes away from heat, high humidity, dust, and magnetic fields such as caused by speakers, TV sets etc.

### Cassette Tabs

You can protect valuable recordings from accidental erasure and re-recording by completely removing the appropriate tab on the top edge of the cassette. The tab for each side is located on the top left-hand corner as you face the side. Use a small screwdriver, and push the tab down to break it off. Do not leave the broken tab in the recess. If you wish at a later date to record over a side for which the

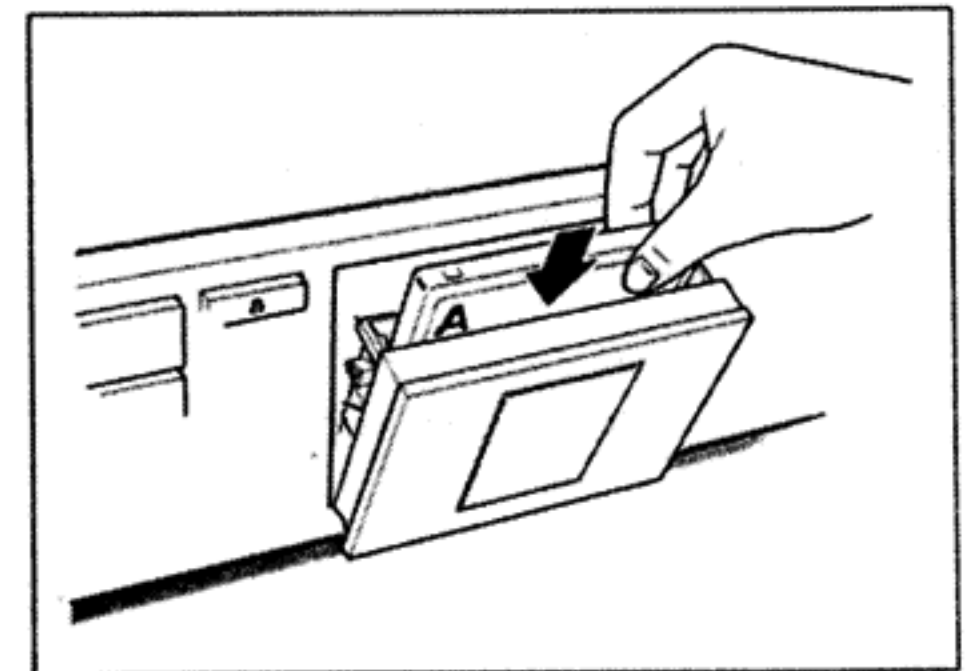
tab has been removed, cover the tab opening with a piece of adhesive tape.



### Cassette Insertion and Removal

#### (1) Insertion of a Cassette

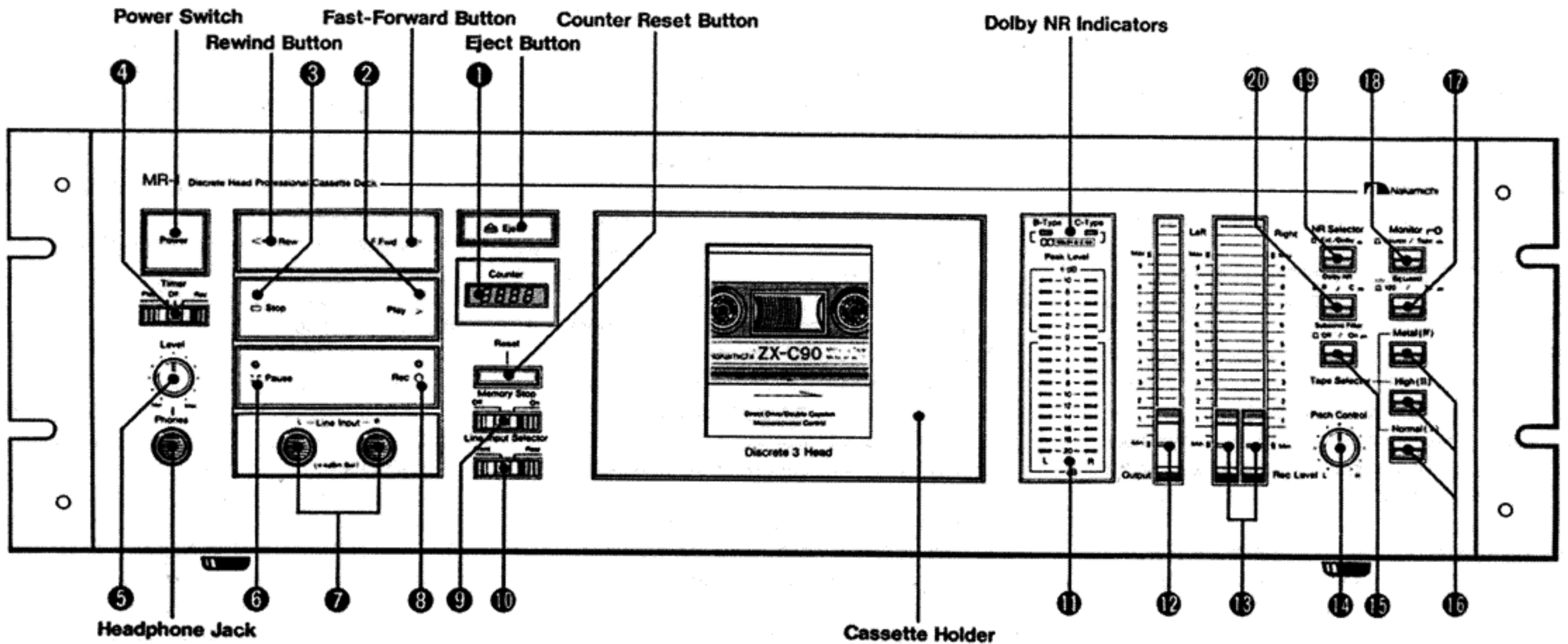
1. When the Eject button is pushed in the stop mode, the cassette holder opens.
  2. Insert the cassette into the holder with the exposed tape facing down and the label of the desired side facing you.
  3. Gently push the cassette holder back into the panel.
- For protection of the tape and tape transport, do not press the Eject button in any mode other than the stop mode.



#### (2) Removal of a Cassette

1. Press the Stop button.
2. When the eject button is pushed, the cassette holder opens.
3. Remove the cassette.

# Controls and Features



## (1) Tape Counter

Starting from "0000", tape travel is indicated in the range from "9999" to "-999". To reset the counter indication to "0000", press the Counter Reset button.

## (2) Play Button

Press the section marked with > to start playback or to start recording from the record-standby mode. During operation, the indicator lights up.

## (3) Stop Button

Press the section marked with □ to completely stop the tape transport from any mode. The indicator lights up.

## (4) Timer Switch

This switch is used for timer-activated recording or playback. In ordinary operation, it must be set to "Off" (→p. 7).

## (5) Headphone Level Control

This control permits adjustment of headphone listening level, independent from the line output level.

## (6) Pause Button

Press the section marked with || to temporarily interrupt tape travel during recording or playback. During operation, the indicator lights up. To start the tape again, press the Play button.

## (7) 1/4-Inch Line Input Jacks (Balanced)

The nominal input level of these jacks is +4 dBm (1.228 V) and nominal input impedance 600 ohms.

## (8) Record Button

Simply by pressing the section marked with ○, the deck enters the record-standby mode (record/pause) and the recording indicator lights up. When the button is pressed once

more during recording, the Rec Mute function is activated for as long as the button is kept depressed (→p. 7).

## (9) Memory Switch

With this switch set to "On", the tape stops automatically when the counter indication "0000" is reached during rewind or fast-forward.

## (10) Line Input Selector Switch

This switch serves to select either the front or rear panel inputs of the deck.

## (11) Peak Level Meters

Provide exact indication of peak levels in the range of -20 to +10 dB.

## (12) Line Output Level Control

Serves to adjust the line output level.

## (13) Input Level Controls

Serve to adjust the recording level for left and right channel.

## (14) Pitch Control

Serves to alter tape speed during playback over a range of approx. ±6% (one semitone).

## (15) Subsonic Filter Switch

Used to cut off low-frequency noise such as turntable rumble etc. during recording from phonograph records. At other times, the switch should be set to "Off".

## (16) Tape Selector Switches

In recording, the correct switch must be selected for the tape in use (→p. 8).

## (17) Equalizer Switch

Serves to select correct equalization in recording and playback for the tape in use (→p. 8).

## (18) Monitor Switch

For playback of a tape and for off-the-tape monitoring during recording, this switch must be set to "Tape" (indicator lit). For record level setting etc., the switch must be set to "Source".

## (19) NR Selector Switch

To use the built-in Dolby B/C NR system, this switch must be set to "Dolby". When an externally connected NR unit or no noise reduction is to be used, the switch must be set to "Ext".

## (20) Dolby B/C NR Selector Switch

This switch serves to select either the B-type or C-type NR system when the built-in Dolby noise reduction is used. The respective indicator lights up.

## (21) Ext. NR Jacks

An external noise reduction unit can be connected to these terminals. If no external unit is to be used, do not remove the jumper plugs from these jacks. Otherwise recording or playback cannot be carried out when the NR Selector switch is set to "Ext".

## (22) XLR (3-31) Line Input Jacks (Balanced)

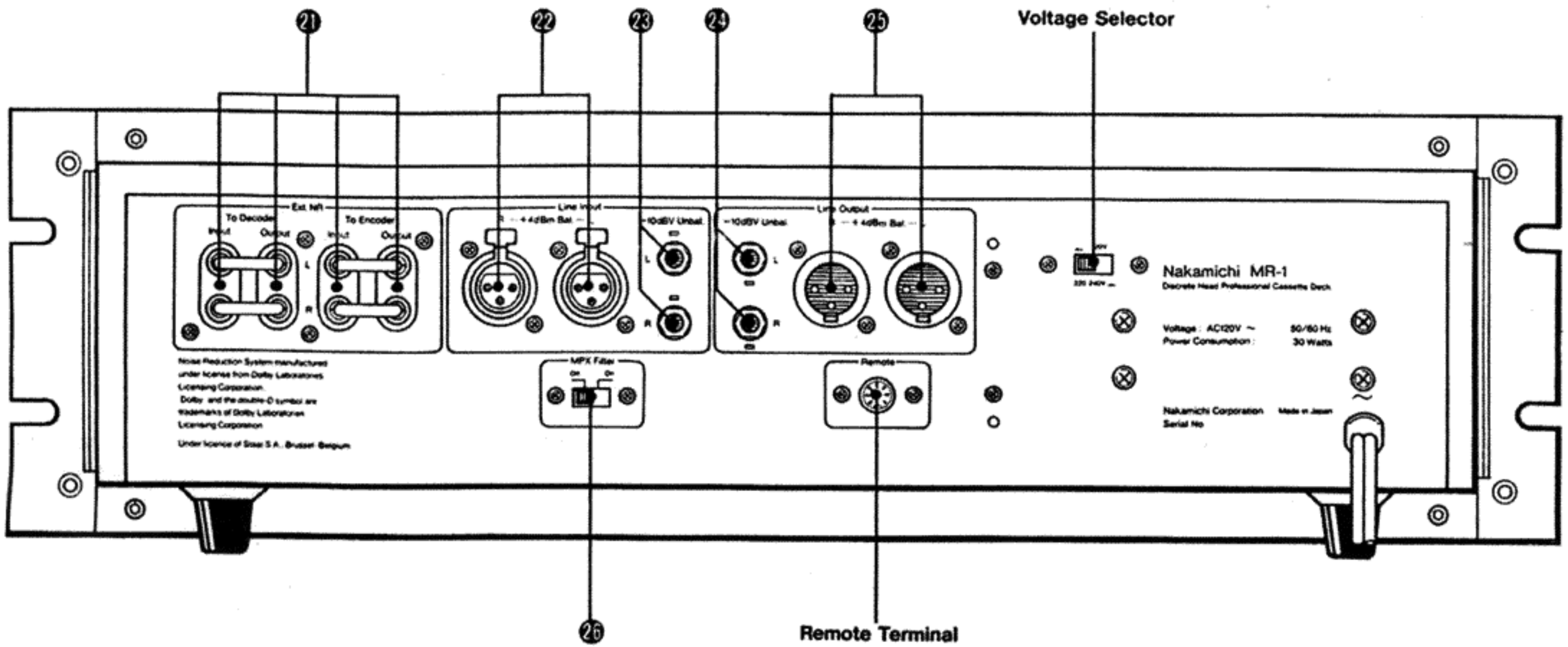
The nominal input level of these jacks is +4 dBm (1.228 V) and nominal input impedance 600 ohms.

## (23) 1/4-Inch Line Input Jacks (Unbalanced)

The nominal input level of these jacks is -10 dBV (0.316 V) and nominal input impedance 100 kohms.

## (24) 1/4-Inch Line Output Jacks (Unbalanced)

The nominal output level of these jacks is -10 dBV (0.316 V) and nominal load impedance 25 kohms.



**(25) XLR (3-32) Line Output Jacks (Balanced)**

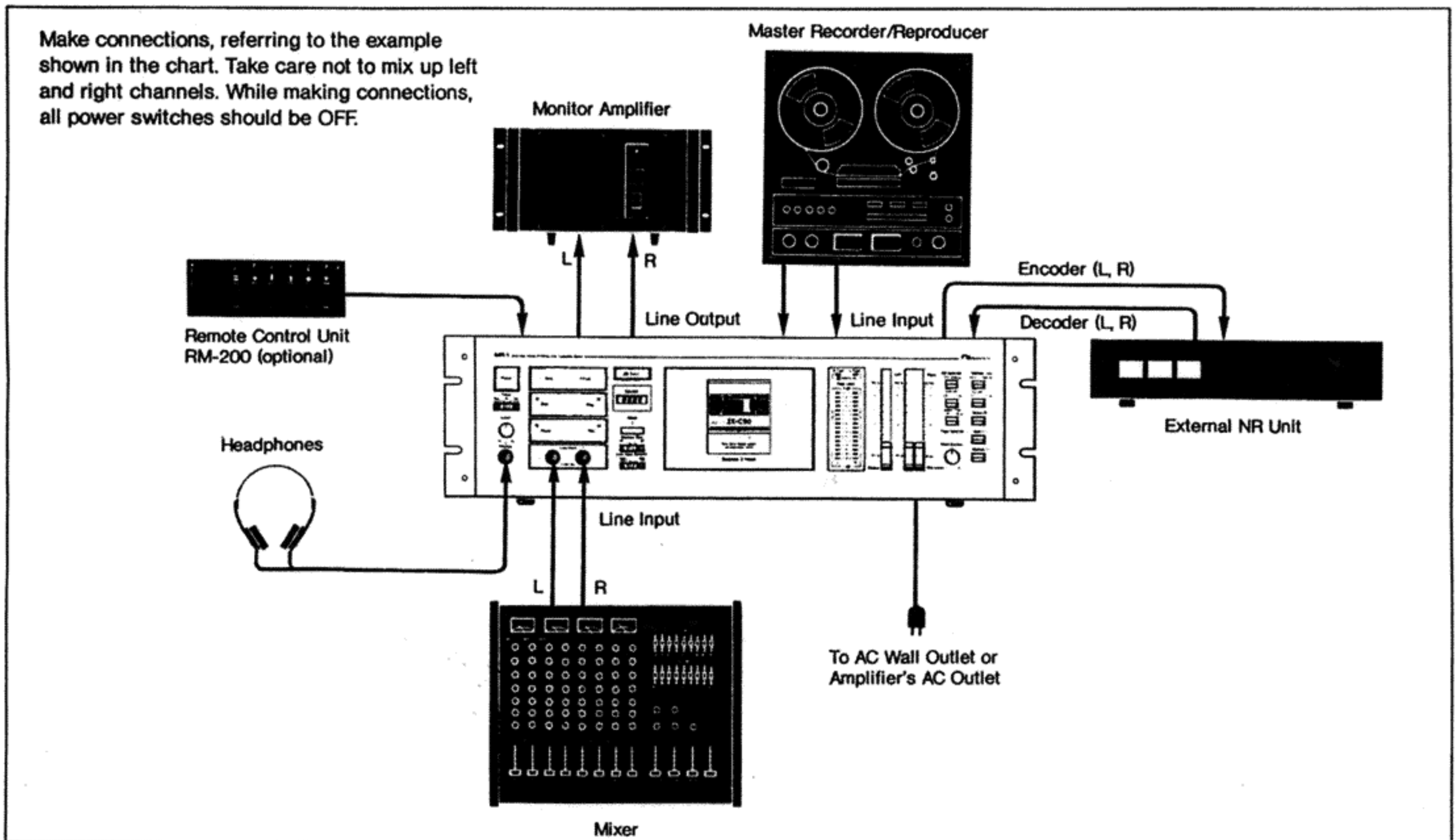
The nominal output level of these jacks is +4 dBm (1.228 V) and nominal load impedance 600 ohms.

**(26) MPX Filter Switch**

Used to suppress the 19-kHz multiplex carrier signal, which could interfere with proper Dolby NR operation when recording from FM stereo broadcasts. At other times, the switch should be set to "Off".

- If equipment is connected to both sets of line input terminals on the rear panel of this unit, the 1/4-inch input jacks will be given priority.

## Connections



### Headphones

Standard stereo headphones with an impedance of 4–150 ohms may be connected to the headphone jack.

### Remote Control

The optional remote control unit RM-200 permits operation of the deck's tape transport functions from any convenient location.

### ■ Balanced/Unbalanced Converter Cable

When preparing a balanced-to-unbalanced converter cable, use the GND (pin 1) and HOT (pin 2 or 3) terminals of the XLR connector and leave the COLD terminal unconnected.

### External Noise Reduction Unit

An external noise reduction unit can be used in conjunction with this cassette deck. For details, refer to the instructions supplied with the noise reduction unit.

### ■ Line Input Selection

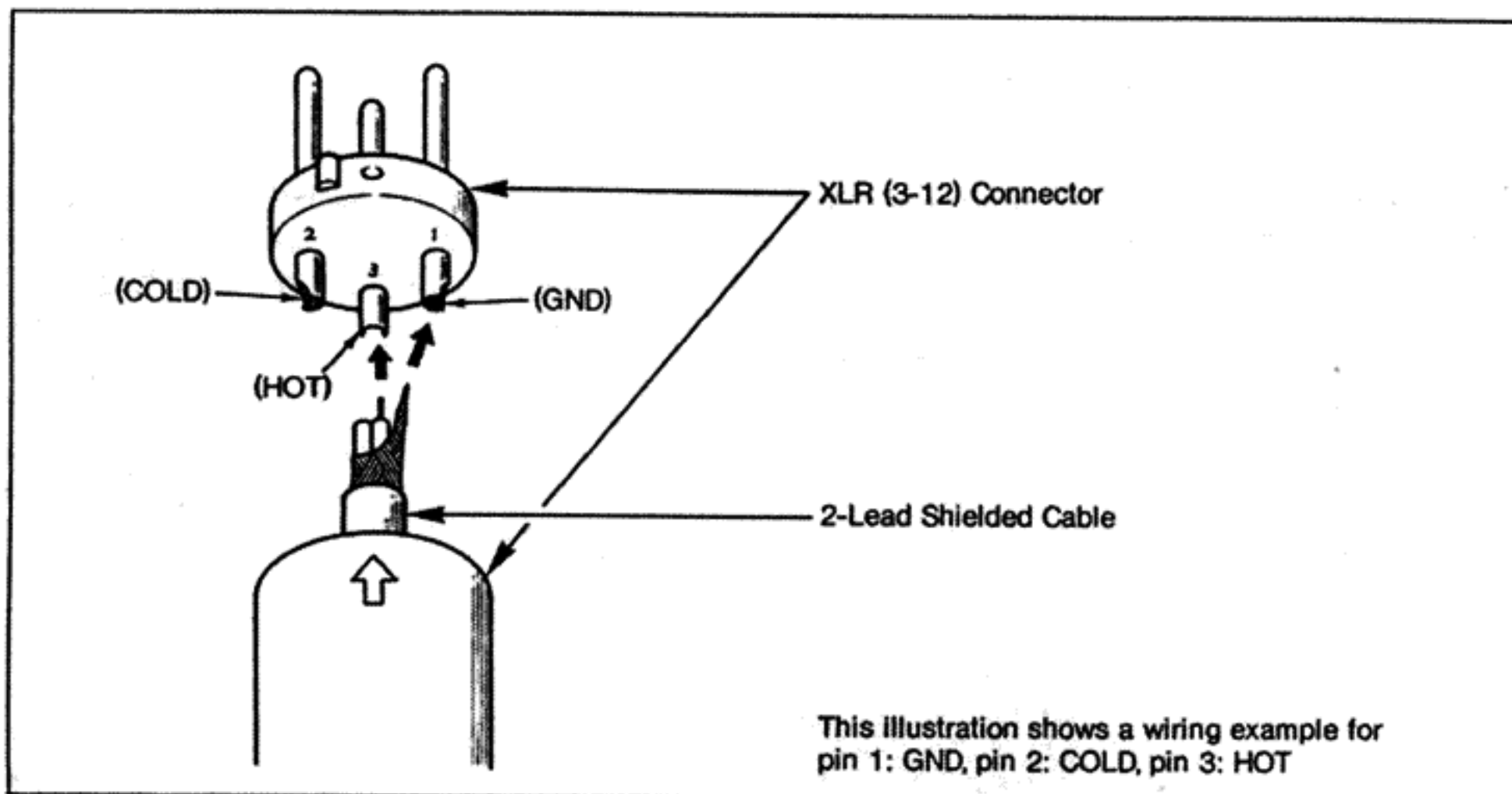
This unit provides a total of three line input terminals, one on the front panel and two on the rear. To choose between front and rear inputs, use the Line Input Selector switch. Of the rear inputs, the 1/4-inch type is given priority. Therefore only the signal present at these jacks will be fed in when both sets of terminals on the rear are used simultaneously.

### ■ On Impedance

All electrical components as well as connector cables etc. have a certain resistance. The amount of resistance against alternating current is called impedance. If input and output impedance do not match, a loss in signal level occurs and sound quality may deteriorate. In extreme cases, overheating and even damage to connected equipment may result. Therefore it is important to carefully consider input and output impedances when connecting this cassette deck to other devices.

It is generally accepted that output impedance should be as low as possible to keep voltage losses and signal deterioration with multiple equipment connections to a minimum. Reversely, input impedance can be said to be the higher the better, because audio components are usually designed in such a way that their internal circuits are driven correctly by low currents. Ideally, the input impedance on the receiving end should be at least 50 times higher than the output impedance of the source. In actual applications, this figure can serve only as a rough guideline, but it is **absolutely imperative that the impedance on the input side always be higher than that of the source.**

The unbalanced output level of such a cable will be approximately 6 dB lower than the balanced standard output level. The illustration below shows a wiring example.



## Precautions Before Operation

- (1) This deck incorporates a muting circuit which is active for about 4 seconds after the power was switched on, until all circuits have become stable.
- (2) If the power is switched on while the Timer switch is set to "Rec" or "Play", recording or playback will start automatically. In order to prevent accidental erasure of a tape, be sure to set the Timer switch to "Off" when the timer function is not desired.
- (3) If during playback or recording the power to the deck was switched off by an external timer or the like, it may

afterwards not be possible to depress the Eject button. Do not apply excessive force in such a case. Set the Timer switch of the deck to "Off", and then switch the power to the deck back on. The cassette can now be removed.

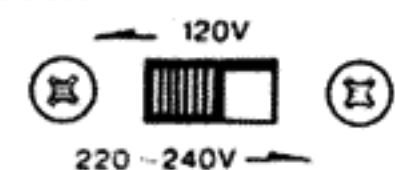
- (4) This cassette deck incorporates a special circuit designed to take up any tape slack when a cassette is inserted. Upon closing the cassette compartment or switching on the power, the left spindle will rotate and the tape counter indication may change slightly. This behavior is normal and not a fault with the deck.

### (5) Voltage Selector

AC voltage is factory-set for the country in which you purchased your cassette deck. The voltage selector permits re-setting of mains voltage in case the deck is to be used in a different country.

#### Note:

Safety regulations in certain countries prohibit inclusion of a voltage selector. This feature, therefore, may be absent from your deck.



# Operation

## Playback

- (1) Set the Equalizer switch to the required position for the tape in use.
  - (2) Select the same noise reduction system as used for recording.
  - (3) Set the Monitor switch to "Tape".
  - (4) Press the Play button to start playback.
  - (5) Adjust the desired listening level with the Line Output or Headphone Level control.
- During playback, this deck's Peak Level meters display the level recorded on the tape. Readings are not affected by turning the Line Output or Headphone Level control.
  - With this deck you can go from any mode into any other (for example from playback to rewind, from rewind to fast-forward, etc.) without having to press the Stop button.

## Recording

- (1) Set the Tape Selector switches and the Equalizer switch to the required positions for the tape in use.
- (2) Select the desired noise reduction system.
- (3) Simply press the Record button to put the deck into the record-standby (record/pause) mode.
- (4) Set the Monitor switch to "Source" and adjust the recording level with the Rec Level controls while watching the indication of the Peak Level meters.
- (5) Press the Play button to start recording.
- (6) To check the quality of the recording in progress, you can monitor the playback signal by setting the Monitor switch to "Tape". In the "Source" position, the input signal before recording is heard. For short-term interruption of recording, press the Pause button to set the deck to the record-standby mode. To resume recording, press the Play button again.

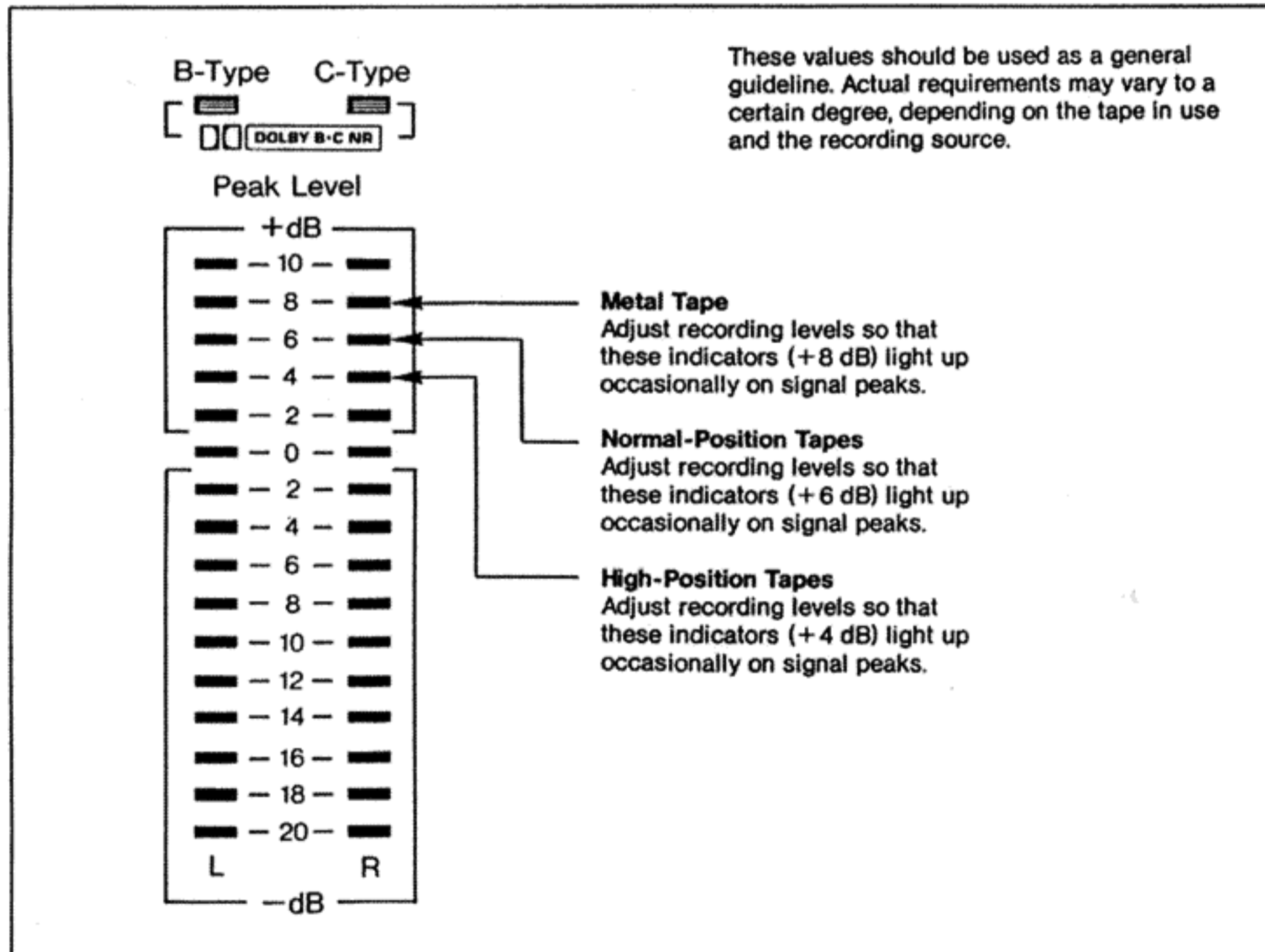
### ■ Rec Mute

By pressing the Record button once more during recording, the recording signal is muted for as long as the button is kept depressed. When the Monitor switch is set to "Source", the line and headphone output are not muted, so that it is possible to continuously monitor the input signal.

### ■ Record Level Setting

For good recordings, it is essential to maintain a high signal-to-noise ratio. If the record level is set too low, tape hiss will impair the

playback sound quality. If it is set too high, the tape will be driven into distortion. Refer to the chart below to set recording levels.

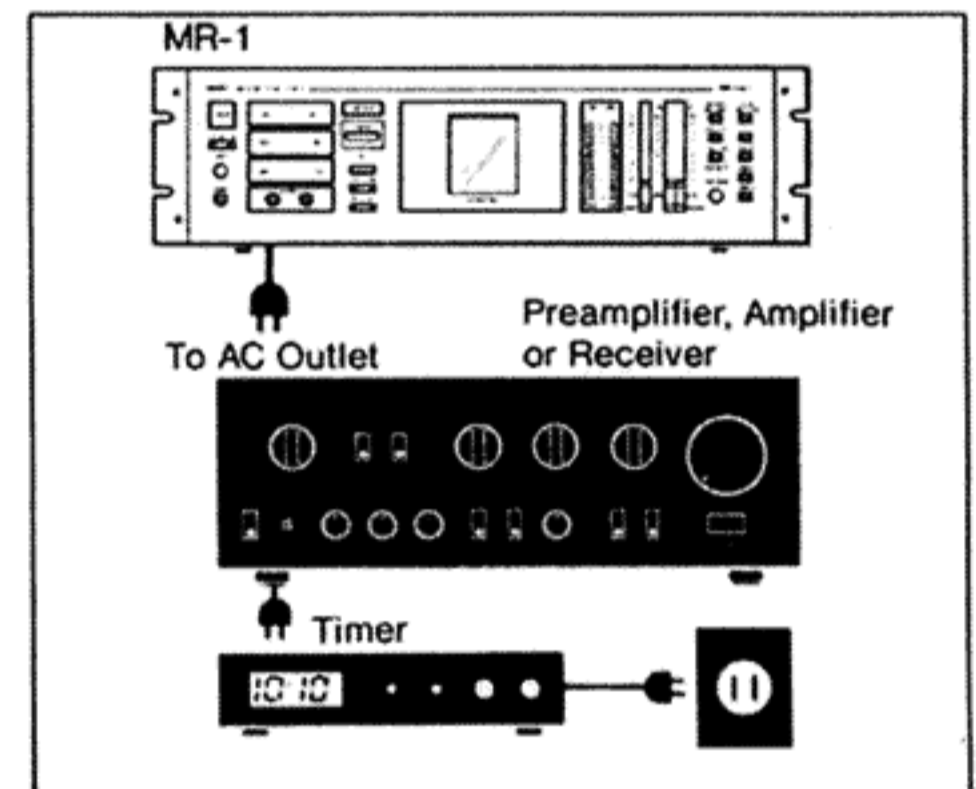


## Timer Recording or Playback

- (1) Establish connections as shown in the chart and switch on the power to all components.
- (2) For timer-activated recording, set the recording level to suit the expected signal. For timer-activated playback, set the line output to the desired level.
- (3) For timer-activated recording, set the deck's Timer switch to "Rec". For timer-activated playback, set the switch to "Play".
- (4) Set the timer to the desired operation time.
- (5) At the pre-selected time, the timer will supply power to the components, and recording or playback will start automatically.

### Notes:

- Be sure to set the deck's Timer switch to "Off" when timer recording or playback is not to be carried out.
- If the record-protection tabs of the inserted cassette are removed, timer-activated recording is not possible and the deck will go into the stop mode.



### ■ Dolby NR System

This cassette deck possesses a built-in Dolby B/C noise reduction system. The Dolby B-type NR provides approximately 10 dB of noise reduction in the high frequencies. The Dolby C-type NR is a further refined system, which achieves a S/N ratio improvement of about 20 dB in the range from 2 kHz to 8 kHz, where noise is most readily audible. For playback of a tape which was recorded with Dolby B-type NR, set the NR Selector switch to "Dolby" and the Dolby B/C NR Selector switch to "B". For playback of a tape recorded with Dolby C-type NR, set the Dolby B/C Selector to "C".

## ■ Recommended Tapes

This cassette deck was calibrated at the factory with Nakamichi reference tapes. To obtain optimum results and fully realize this deck's potential, the use of Nakamichi tapes is

recommended. When using other brands, you should choose tapes from the list whenever possible.

Tape Selector	Eq ( $\mu\text{sec}$ )	Brand/Designation
Normal Position <b>Normal</b>	120 $\mu\text{SEC}$	Nakamichi EX, EX II Fuji FR I Maxell UD, UD-XL I, XL I-S TDK AD, AD-X
Chrome (Cobalt) Position <b>High</b>	70 $\mu\text{SEC}$	Nakamichi SX, SX II Fuji FR II Maxell UD-XL II, XL II-S TDK SA, SA-X
Metal Position <b>Metal</b>	70 $\mu\text{SEC}$	Nakamichi ZX Fuji FR Metal Maxell MX TDK MA, MA-R

## ■ Rack Mount

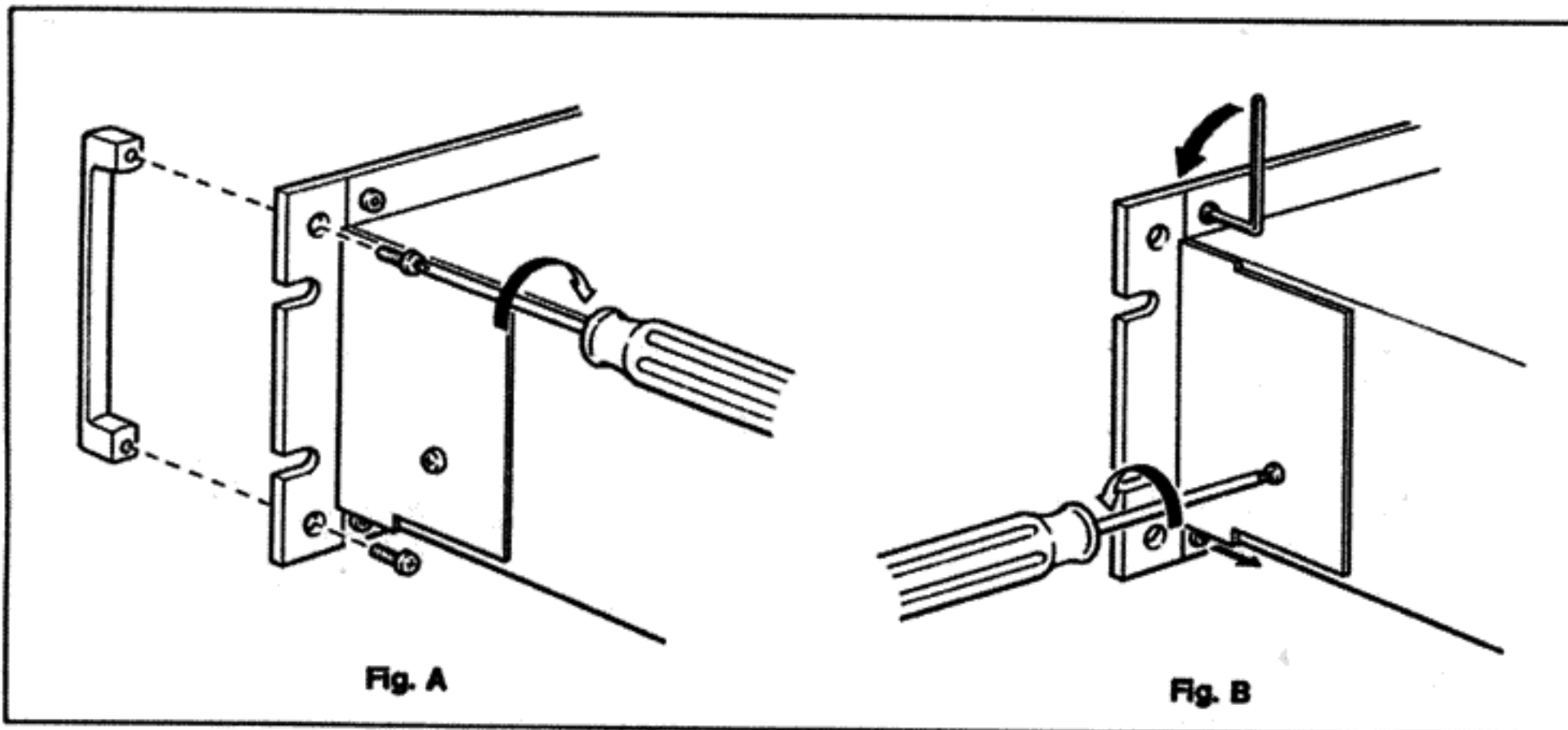
This cassette deck provides rack-mount flanges on both sides of the front panel, which permit installation of the unit in a standard EIA 19-inch rack.

### Handle Installation

If desired, fasten the supplied handles securely to the front-panel flanges by using the supplied screws as shown in Fig. A.

### Removal of Rack-Mount Flanges

The rack-mount flanges can also be detached if not needed. Remove the cross-recess screws with a Phillips screwdriver and the hex socket screws with the supplied hex wrench, as shown in Fig. B.



# Systems Calibration

In order to make full use of this cassette deck's potential, level calibration should be performed to match the standard levels of connected equipment. The following is a description of calibration procedure when a mixer conforming to IEC standards (1 V=0 dB or 0 dBV) is used.

The VU meters of an IEC-standard mixer will read 0 VU with an unbalanced input of -10 dB (=0.316 V). Use the built-in oscillator of the mixer or an external test tone oscillator to produce the standard reference signal and adjust the mixer's VU meters to 0 VU. In this condition, the balanced output of the mixer is 1.228 V and the unbalanced output 0.316 V. As the voltage/dB conversion table shows, 1.228 V corresponds to +4 dB (balanced) and 0.316 V to -10 dB (unbalanced). If cassette deck and mixer are connected with balanced cable, the deck's controls should be adjusted for a meter reading of +4 dB when the mixer's VU meters show 0 VU. If an unbalanced connection is used, the deck should be adjusted to read -10 dB for a mixer indication of 0 VU.

For level calibration with a mixer not conforming to IEC standards, refer to the voltage/dB conversion table below to match level indications.

### ● Voltage/dB Conversion Table

Unbalanced Lines	Voltage	Balanced Lines
0 dBV=1 V		0 dBm=0.775V/ 600 $\Omega$ 0 dBu=0 dBv= 0.775 V/higher than 600 $\Omega$
+6 dB	2 V	+8.2 dB
+1.78 dB	1.228 V	+4 dB
0 dB	1 V	+2.2 dB
-2.2 dB	0.775 V	0 dB
-6 dB	0.5 V	-3.8 dB
-8.2 dB	0.388 V	-6 dB
-10 dB	0.316 V	-7.8 dB
-12 dB	0.250 V	-9.8 dB
-12.2 dB	0.245 V	-10 dB
-20 dB	0.1 V	-17.8 dB



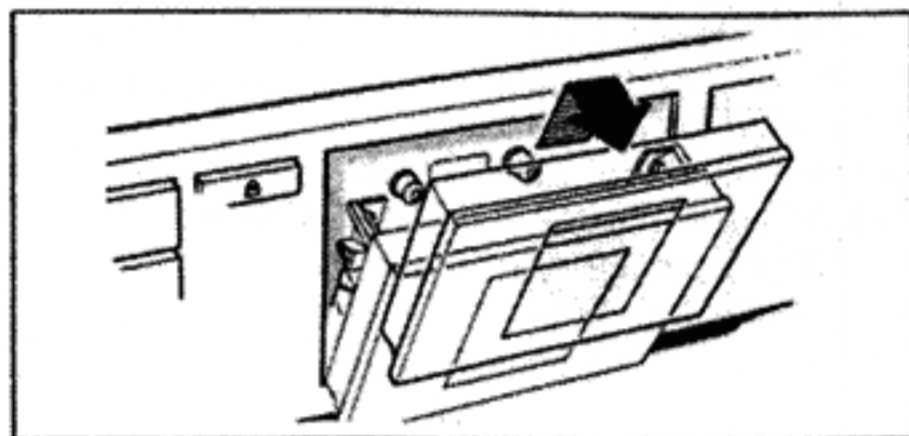
# Maintenance

## Cleaning

It is very important to regularly clean the head surfaces and transport section, etc.

Contamination caused by tiny particles shedded from the tape onto these parts can become the cause of drop-outs and severely degrade high-frequency response and wow-and-flutter characteristics. Perform cleaning about once every 10 hours of use.

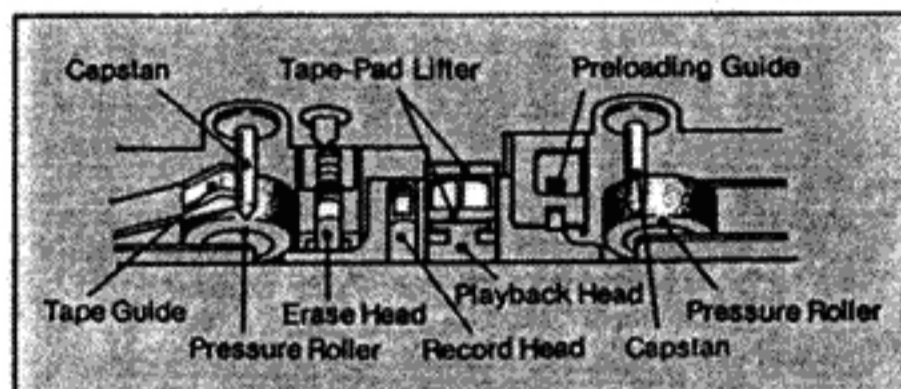
- (1) Remove the cassette holder cover and push the cassette holder back in.



- (2) Press the Play button and clean the revolving pressure rollers by holding a cotton-tipped stick lightly against the roller on the side turning away from the capstan.

Be careful that the cotton tip does not get caught between the roller and the capstan.

- (3) Press the Pause button to release the pressure rollers from the capstans. Now clean the capstans and the surfaces of the heads and tape guides with a cotton-tipped stick. Be careful not to apply too much force. Take special care not to damage the tape and preloading guides and the tape-pad lifter.
  - After cleaning, make sure that no cotton strands are left on any of the cleaned parts.
  - In case of severe contamination, moisten the cotton tip with a small amount of commercially available cleaning fluid designed especially for this purpose. After cleaning with a cleaning fluid, wait until any residue has completely dried off before playing a tape.



## Demagnetizing

After a longer period of use, there can be a build-up of residual magnetism in the heads and capstans. Such residual magnetism can induce noise and partially erase the high frequencies of a tape being played. To prevent this, you should demagnetize these parts about once every 50 hours of use with the Nakamichi DM-10 Demagnetizer (optional) or any other properly designed demagnetizer. For details, refer to the instruction manual of the demagnetizer. Always switch the power to the deck off before using the demagnetizer.

## Lubrication

All important moving parts of this cassette deck are fitted with long-life, oil-less bearings. Periodic lubrication is therefore not necessary.

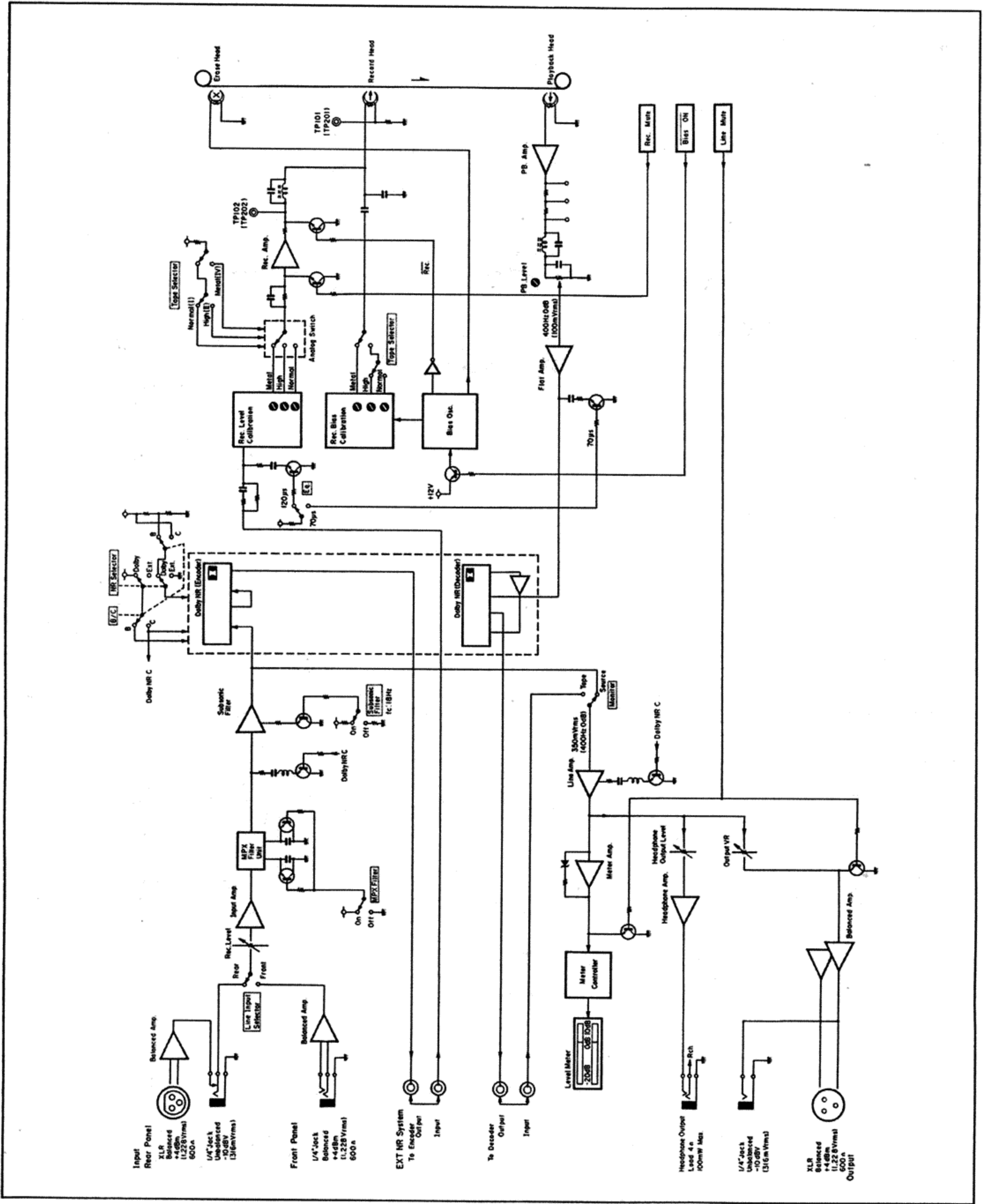
## Cleaning the Faceplate

Clean the faceplate only by wiping it with a soft, dry cloth. Never use alcohol, solvents, ammonia or abrasive cleaning agents.

# Troubleshooting

Condition	Probable Cause	Remedy
Tapes does not run.	1. Cassette holder not completely locked.	1. Press Eject button and then close cassette holder firmly.
Record mode cannot be entered.	2. Cassette tabs have been removed.	2. Place adhesive tape over tab opening or use new cassette.
Excessive playback hiss.	3. Head is magnetized.	3. Demagnetize head.
Uneven sound levels, drop-outs, excessive wow/flutter.	4. Heads and/or capstans and pressure rollers dirty. 5. Faulty cassette.	4. Clean these parts. 5. Replace cassette.
Incomplete erasure.	6. Erase head dirty.	6. Clean head and pressure rollers.
Distorted record/playback sound.	7. Program material itself is distorted. 8. Recording levels are too high. 9. Heads dirty. 10. Wrong setting of Tape Selector switches.	7. Check program material. 8. Wide dynamic range permits some short-term overload, but excessive recording levels will cause distortion. Adjust recording levels. 9. Clean heads. 10. Select correct setting for the tape in use.
Record mode is entered, but cannot record.	11. Input disconnected. 12. Heads dirty. 13. Shorting plugs not connected to Ext NR jacks on rear panel.	11. Check connections. 12. Clean heads. 13. Insert shorting plugs.
Cannot playback.	14. Output disconnected. 15. Heads dirty. 16. Shorting plugs not connected to Ext NR jacks on rear panel.	14. Check connections. 15. Clean heads. 16. Insert shorting plugs.
Dull high frequencies.	17. Heads dirty. 18. Tape Selector switches and/or Equalizer switch not set correctly.	17. Clean heads. 18. Select correct positions for tape in use.
Hum heard during recording or playback.	19. Strong induction fields near deck. 20. Signal cable or connector grounding faulty.	19. Keep deck away from amplifiers, transformers, fluorescent lamps, etc. 20. Replace signal cables.

# Block Diagram



# Specifications

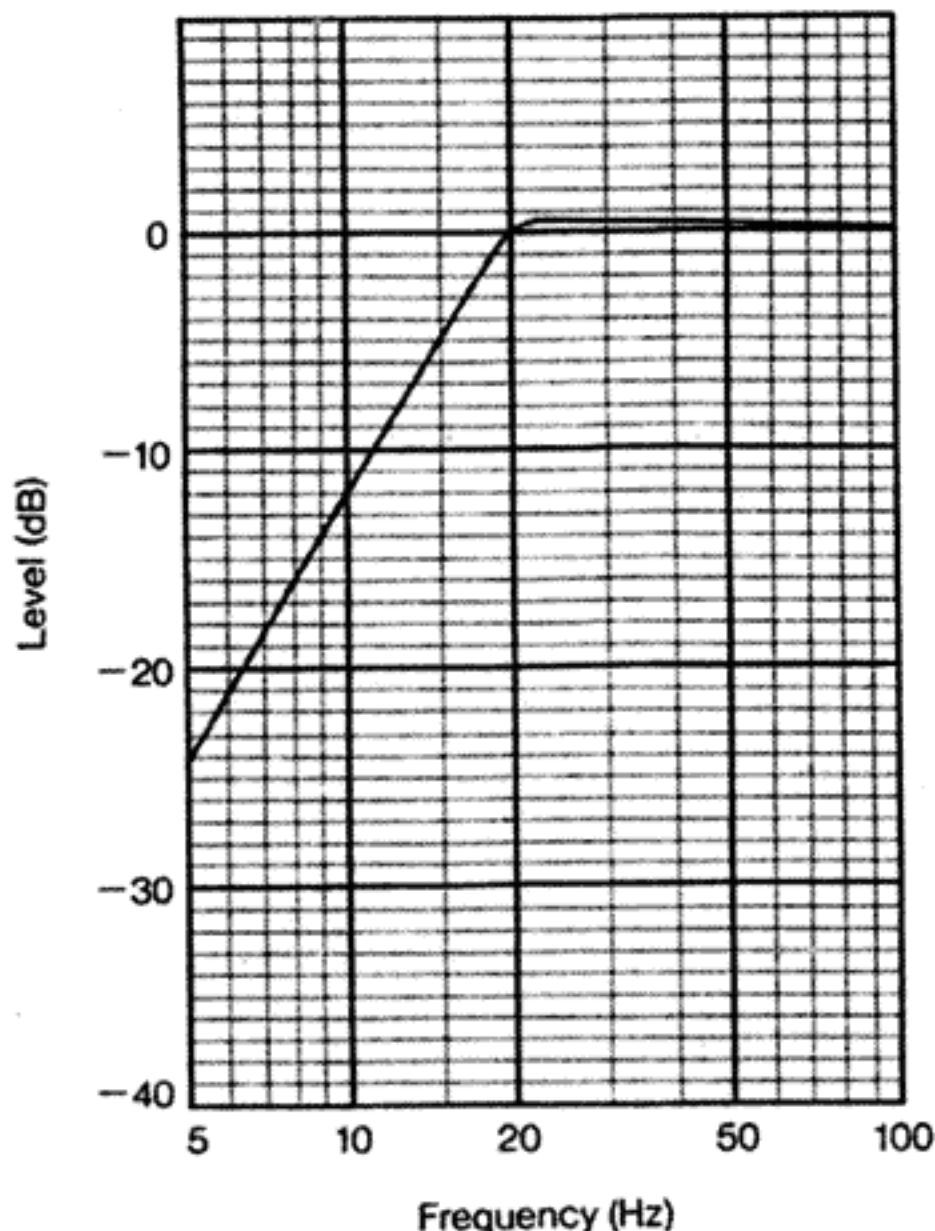
Track Configuration	4 tracks/2-channel stereo
Heads	3 (erase head × 1, record head × 1, playback head × 1)
Motors	< Tape Transport > FG servo brushless, slotless, coreless DD motor (capstan drive) × 1 DC motor (reel drive) × 1 < Mechanism > DC motor (cam drive) × 1
Power Source	100, 120, 120/220-240, 220 or 240 V AC, 50/60 Hz (According to country of sale)
Power Consumption	30 W max.
Tape Speed	1-7/8 ips. (4.8 cm/sec.) ± 0.5%
Wow-and-Flutter	Less than ± 0.048% WTD Peak Less than 0.027% WTD RMS
Frequency Response	20 Hz—20,000 Hz ± 3 dB (recording level - 20 dB)
Signal-to-Noise Ratio	<b>Dolby C-Type NR on</b> < 70 μs, ZX tape > Better than 70 dB (400 Hz, 3% THD, IHF A-WTD RMS) <b>Dolby B-Type NR on</b> < 70 μs, ZX tape > Better than 64 dB (400 Hz, 3% THD, IHF A-WTD RMS)
Total Harmonic Distortion	Less than 0.9% (400 Hz, 0 dB, ZX tape) Less than 1.0% (400 Hz, 0 dB, SX, EXII tape)
Erasure	Better than 60 dB (100 Hz, 10 dB)
Separation	Better than 36 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Line Input (XLR (3-31) Type)	
Input Impedance	600 ohms (balanced)
Nominal Input Level	+ 4 dBm (1.228 V)
Minimum Input Level	- 6 dBm (0.388 V)
Maximum Input Level	+ 20 dBm (7.75 V)

Line Input (1/4-Inch Type, Front Panel)	
Input Impedance	600 ohms (balanced)
Nominal Input Level	+ 4 dBm (1.228 V)
Minimum Input Level	- 6 dBm (0.388 V)
Maximum Input Level	+ 20 dBm (7.75 V)
Line Input (1/4-Inch Type, Rear Panel)	
Input Impedance	100 kohms (unbalanced)
Nominal Input Level	- 10 dBV (0.316 V)
Minimum Input Level	- 20 dBV (0.1 V)
Line Output (XLR (3-32) Type)	
Output Impedance	100 ohms (balanced)
Nominal Load Impedance	600 ohms
Nominal Output Level	+ 4 dBm (1.228 V)
Output Saturation Level	+ 20 dBm (7.75 V)
Line Output (1/4-Inch Type)	
Output Impedance	2.2 kohms (unbalanced)
Nominal Load Impedance	25 kohms
Nominal Output Level	- 10 dBV (0.316 V)
Output Saturation Level	+ 8 dBV (2.51 V)
Headphone Output	Max. 100 mW (with 4-ohm load)
Equalization (Switchable)	
Normal	3180 μs + 120 μs
High, Metal	3180 μs + 70 μs
Fast-Wind Time	Approx. 80 seconds (with C-60 cassette)
Dimensions	483 (W) × 132 (H) × 250 (D) millimetres 19 (W) × 5-3/16 (H) × 9-13/16 (D) inches
Approximate Weight	6.3 kg, 13 lb 14 oz

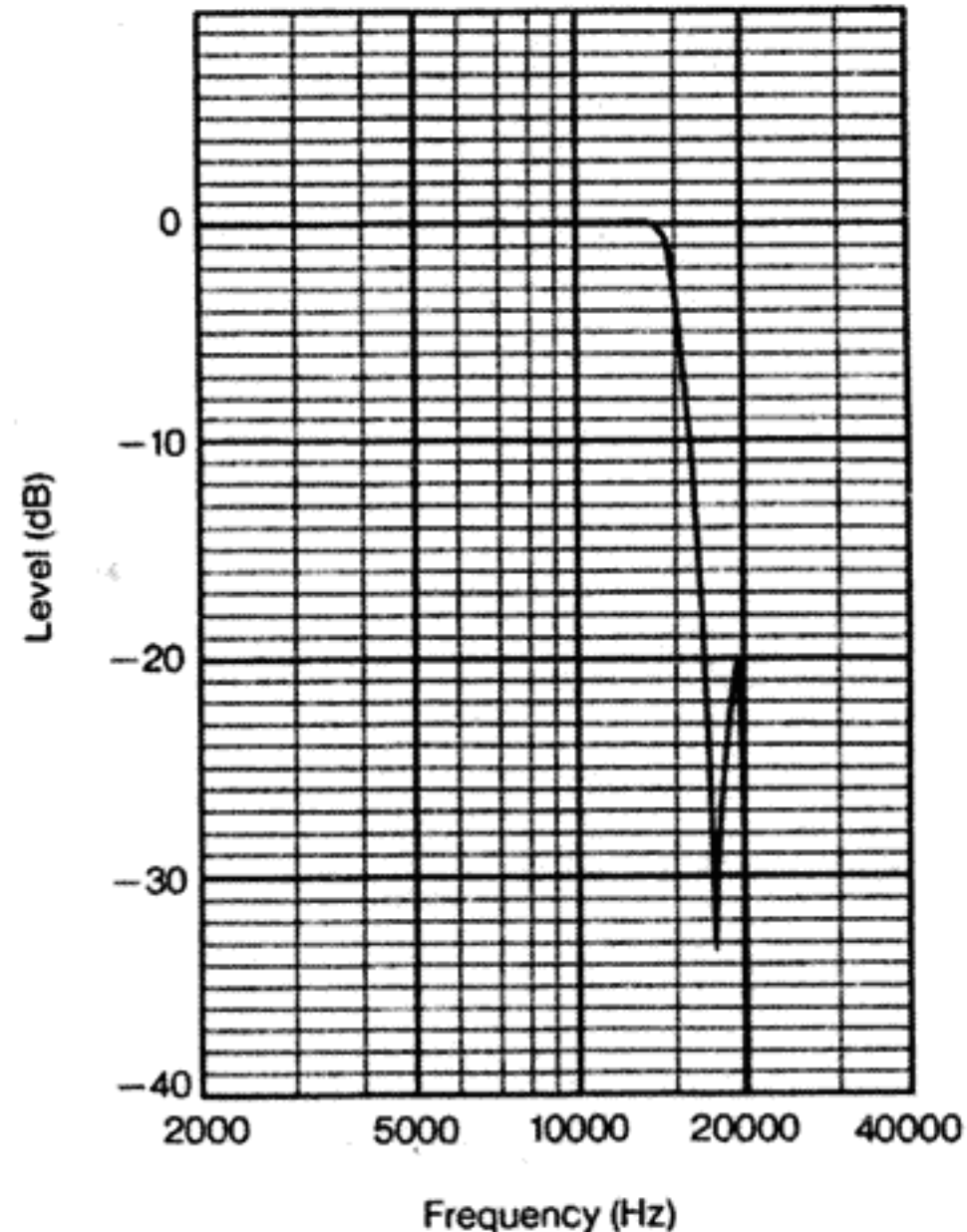
- In these specifications, 0 dBV is referenced to 1.0 volt. Actual voltage levels are given in parenthesis. To calculate the 0 dB = 0.775 volt reference level (i.e. 0 dBm in a 600-ohm circuit), add 2.2 dB to the listed dB value; for example, - 10 dB re 1 V = - 7.8 dB re 0.775 V.
- Specifications and design are subject to change for further improvement without notice.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
- The word "DOLBY" and the Double-D-Symbol are trademarks of Dolby Laboratories Licensing Corporation.

## ■ Filter Characteristics

### Subsonic Filter



### MPX Filter



# Optional Accessories

ZX Metalloy Cassette Tape

C-60, C-90

SX II Super Ferricobalt Cassette Tape

C-60, C-90

SX Ferricobalt Cassette Tape

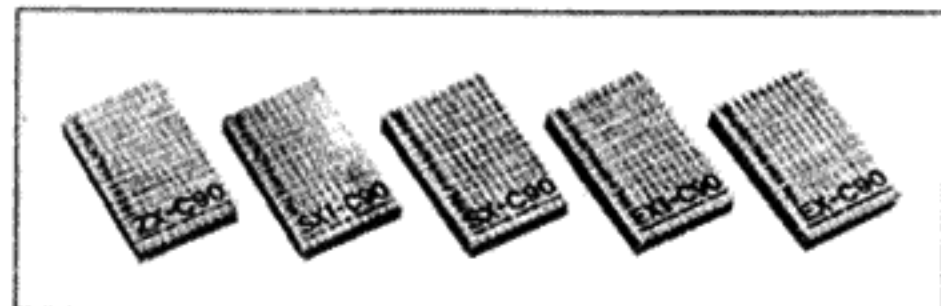
C-60, C-90

EX II Ferricrystal Cassette Tape

C-60, C-90

EX Ferrioxide Cassette Tape

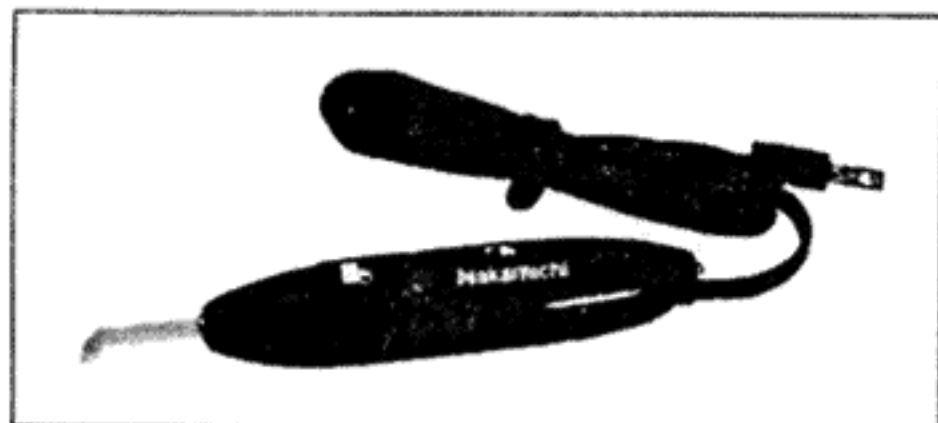
C-60, C-90



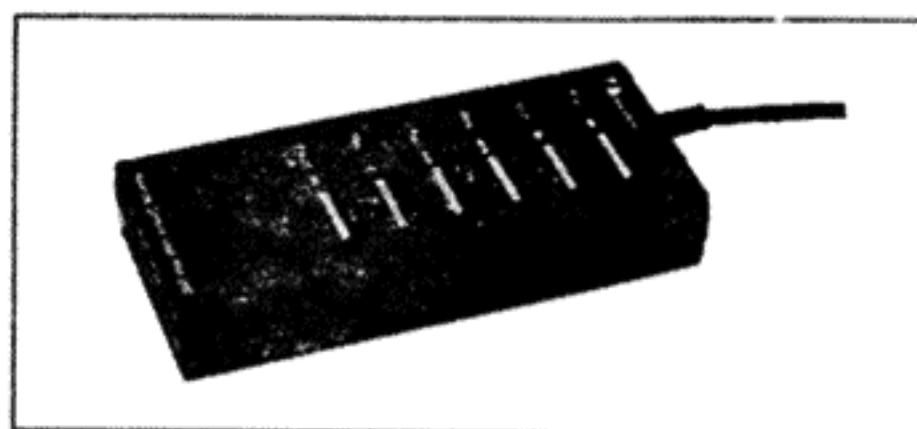
SP-7 Stereo Headphones



DM-10 Head Demagnetizer



RM-200 Remote Control Unit



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