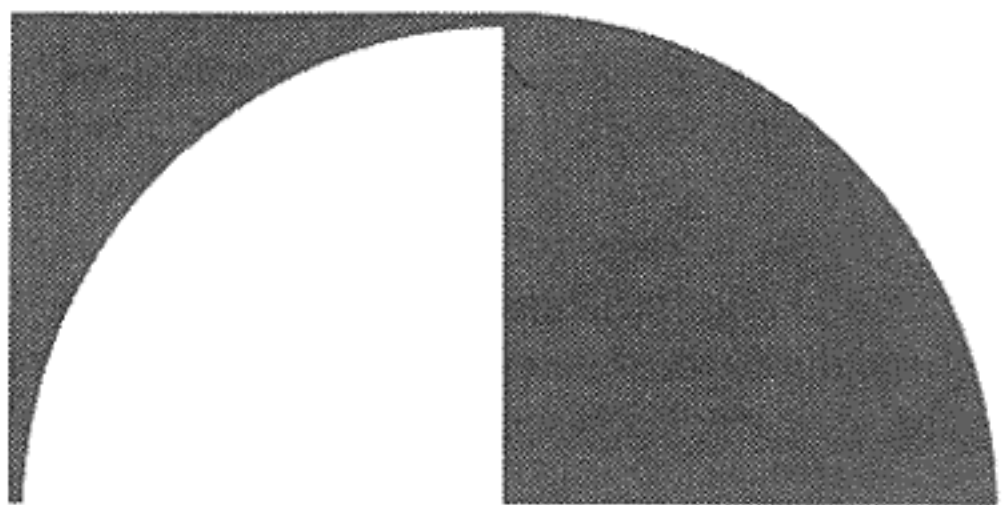




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# Nakamichi

## CR-7A/CR-5A

## CR-7/CR-5

### Discrete Head Cassette Deck

## Owner's Manual

#### Congratulations!

You have chosen an exceptional cassette deck. The Nakamichi CR-7A/CR-5A boasts superb head and transport design, incorporating such highly refined original features as the Discrete 3-Head system and a direct-drive dual capstan transport. This approach assures the ultimate in vital cassette performance. Ample use of innovative Nakamichi technology thoroughly lets you explore the full potential of every tape, to complement any program source and to achieve virtually perfect recording and playback. 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.

Nakamichi is producing Hi-Fi equipment for 52 countries of the world.

Many countries have safety regulations, to which Nakamichi has to comply during production.

The additional mentioning of "A" on your model means that this product has been produced according to the requirements in the United States of the Underwriters Laboratories (UL), as well as other applicable state and Federal safety standards.

Within the United States, Nakamichi has authorized its local distributors to offer warranties only on products which have been produced for the United States market in accordance with the foregoing standards.

**Notice to Purchasers of the Model CR-7/CR-5:**

Reference in the illustrations and the text is made to "CR-7A/CR-5A", but operation and functions are completely identical to your model.



## 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.

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: CR-7A/CR-5A

CR-7/CR-5

Serial Number: \_\_\_\_\_

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## Safety Instructions

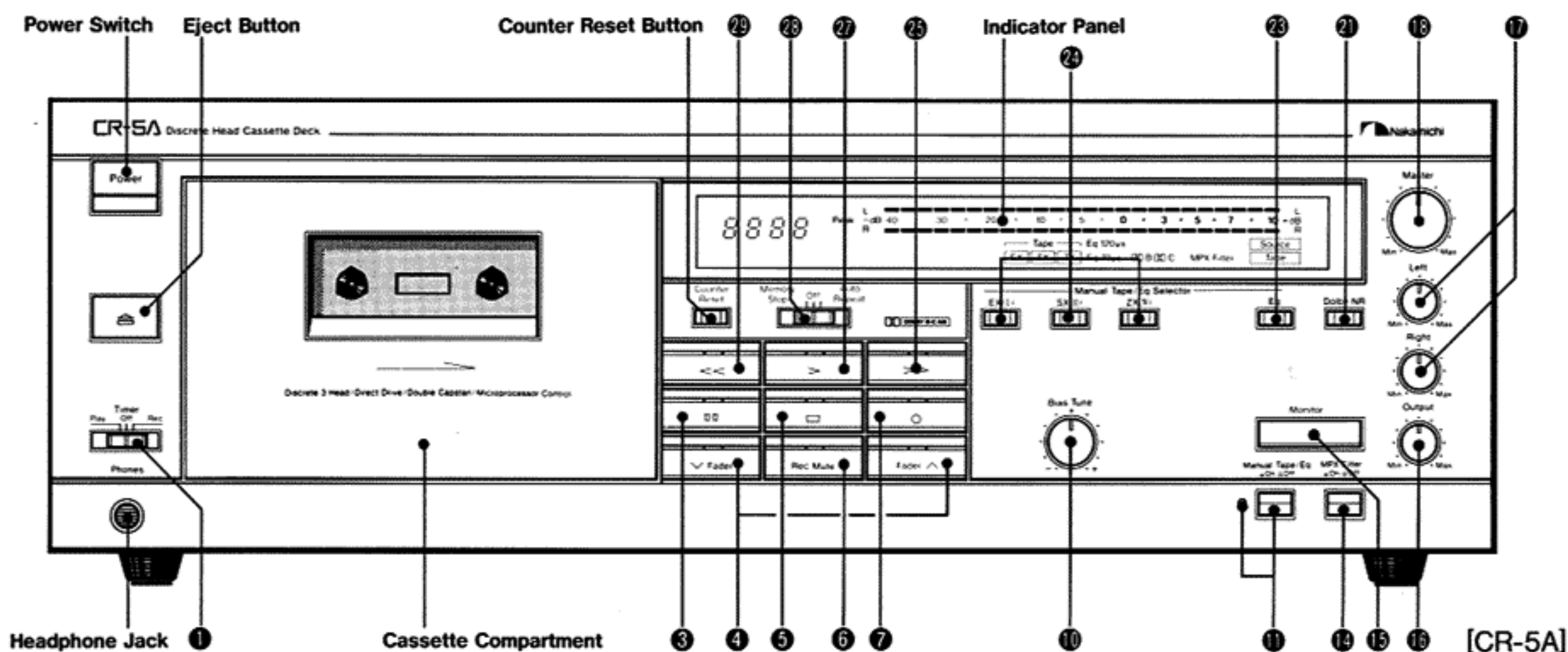
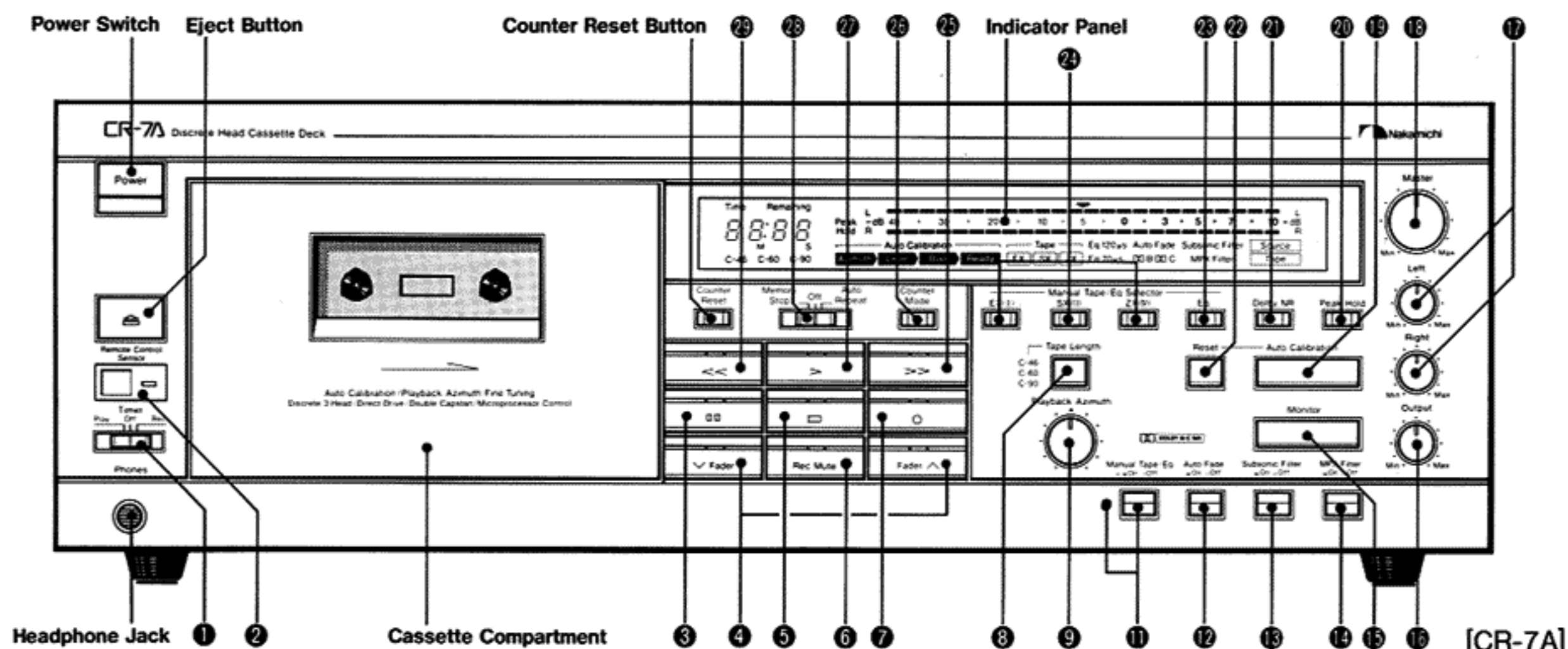
The following safety instructions have been included in compliance with safety standard regulations. Please read them carefully.

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.

# Controls and Features



## (1) Timer Switch

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

## (2) Remote Control Sensor

The signals from the supplied wireless remote control unit are detected by this sensor. When a command is received, the indicator lights up. (→ p.10)

## (3) Pause Button

When this button is pressed, tape travel during recording or playback is temporarily interrupted and the indicator lights up. To start the tape again, press the Play button.

## (4) Master Fader Buttons "∧" (Up), "∨" (Down)

These buttons serve to perform fade-in and fade-out during recording. (→ p.11)

## (5) Stop Button

Press this button to completely stop the tape transport from any mode. When the button is activated, the indicator lights up.

## (6) Rec Mute Button

By pressing this button during recording, the recording signal is cut off for as long as the button is kept depressed, and the indicator lights up. The indicator also lights in the record/pause mode, during auto fade, and in

the "∨" condition of the master fader. (→ p.11)

## (7) Record Button

Press this button to set the deck to the record mode. When the button is activated, the indicator lights up.

## (8) Tape Length Button (CR-7A)

Serves to set the tape length (C-46/C-60/C90) for the real-time tape counter. The selected position is displayed by the Tape Length indicator. (→ p.9)

## (9) Playback Azimuth Control (CR-7A)

This control is used for adjustment of the playback head azimuth. (→ p.8)

**(10) Bias Tune Control (CR-5A)**

This control serves for fine adjustment of the recording bias current. (→ p.11)

**(11) Manual Tape/Eq Switch**

When this switch is set to "On", the auto tape selector is defeated and the indicator of the switch lights up. In ordinary operation, set this switch to "Off". (→ p.7)

**(12) Auto Fade Switch (CR-7A)**

If this switch is set to "On" during recording, automatic fade-out is initiated when the remaining tape time indication reaches "0:00". (→ p.10)

**(13) Subsonic Filter Switch (CR-7A)**

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

**(14) 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".

**(15) Monitor Button**

For tape playback and for off-the-tape monitoring during recording, the "Tape" position ( [Tape] indicator lit) should be selected. For record level setting etc., the "Source" position ( [Source] indicator lit) is used.

**(16) Output Level Control**

Serves to adjust the line output level and the headphones listening level.

**(17) Input Level Controls (Left, Right)**

These controls serve to adjust the input (record) level to the deck as well as the left/right channel balance.

**(18) Master Level Control**

After the Master Level control has been turned up to a certain degree, the left/right channel balance can be adjusted with the Left and Right Input Level controls. Then use the Master Level control for the final record level setting.

**(19) Auto Calibration Button (CR-7A)**

Serves to initiate the auto calibration process. (→ p.8)

**(20) Peak Hold Button (CR-7A)**

This button is used to switch the peak hold function of the level meters on and off. When the function is selected, the Peak Hold indicator lights up.

**(21) Dolby NR Button**

With each push of this button, the deck's noise reduction mode is switched between **Dolby B-Type NR** ⇄ **Dolby C-Type NR** ⇄ **Dolby NR Off** ⇄ .... The respective mode is shown by the Dolby NR indicator.

**(22) Reset Button (CR-7A)**

This button must be pressed when an error has occurred during auto calibration or if you wish to terminate the auto calibration process. (→ p.9)

**(23) Manual Eq Selector****(24) Manual Tape Selector**

After the auto tape selector was defeated by setting the Manual Tape/Eq switch to "On", the desired settings can be selected with these buttons. (→ p.7)

**(25) Fast-Forward Button**

Used to fast-forward the tape. During operation, the indicator lights up.

**(26) Counter Mode Button (CR-7A)**

With each push of this button, the counter's indication mode is switched between **elapsed-time indication** ⇄ **remaining-time indication** ⇄ **4-digit tape counter** ⇄ .... (→ p.9)

**(27) Play Button**

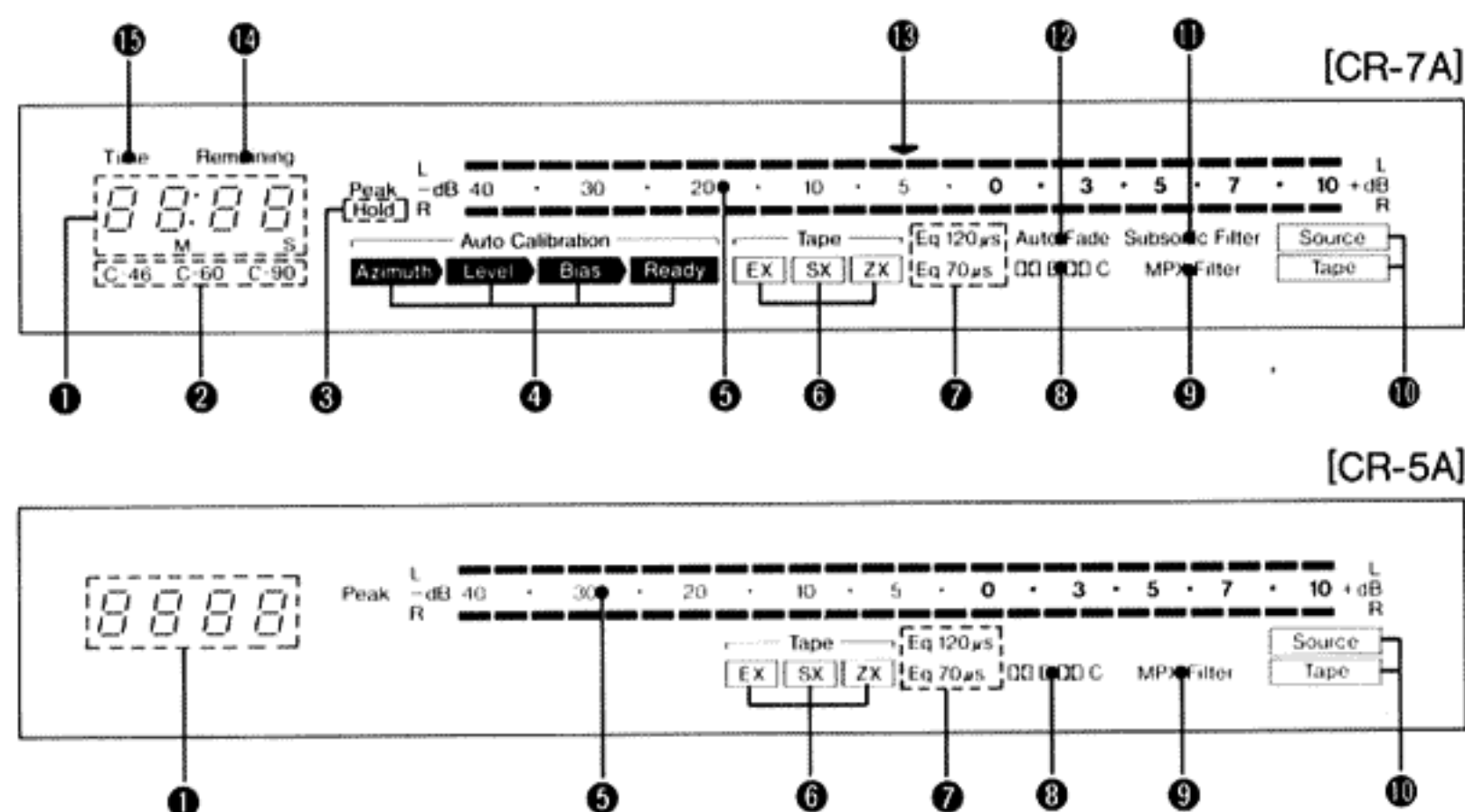
Used to start playback or to start recording from the record/pause mode. During operation, the indicator lights up.

**(28) Memory Stop/Auto Repeat Switch**

If the switch is set to "Memory Stop", the tape is stopped when the tape counter reset point ("0000") is reached during fast-forward or rewind. If the switch is set to "Auto Repeat", playback of the whole cassette side is automatically repeated. (→ p.11)

**(29) Rewind Button**

Used to rewind the tape. During operation, the indicator lights up.

**Indicator Panel**

- (1) Tape Counter
- (2) Tape Length Indicators
- (3) Peak Hold Indicator
- (4) Auto Calibration Indicators
- (5) Peak Level Meters
- (6) Tape Position Indicators
- (7) Eq Indicators
- (8) Dolby NR Indicators
- (9) MPX Filter Indicator
- (10) Source/Tape Indicators
- (11) Subsonic Filter Indicator
- (12) Auto Fade Indicator
- (13) Azimuth Center Position Indicator
- (14) Remaining Indicator
- (15) Time Indicator

# Connections

Refer to the instructions for your amplifier or receiver and use the supplied shielded cables with RCA-type plugs to establish connections as shown in the chart. Take care not to mix up left and right channels.

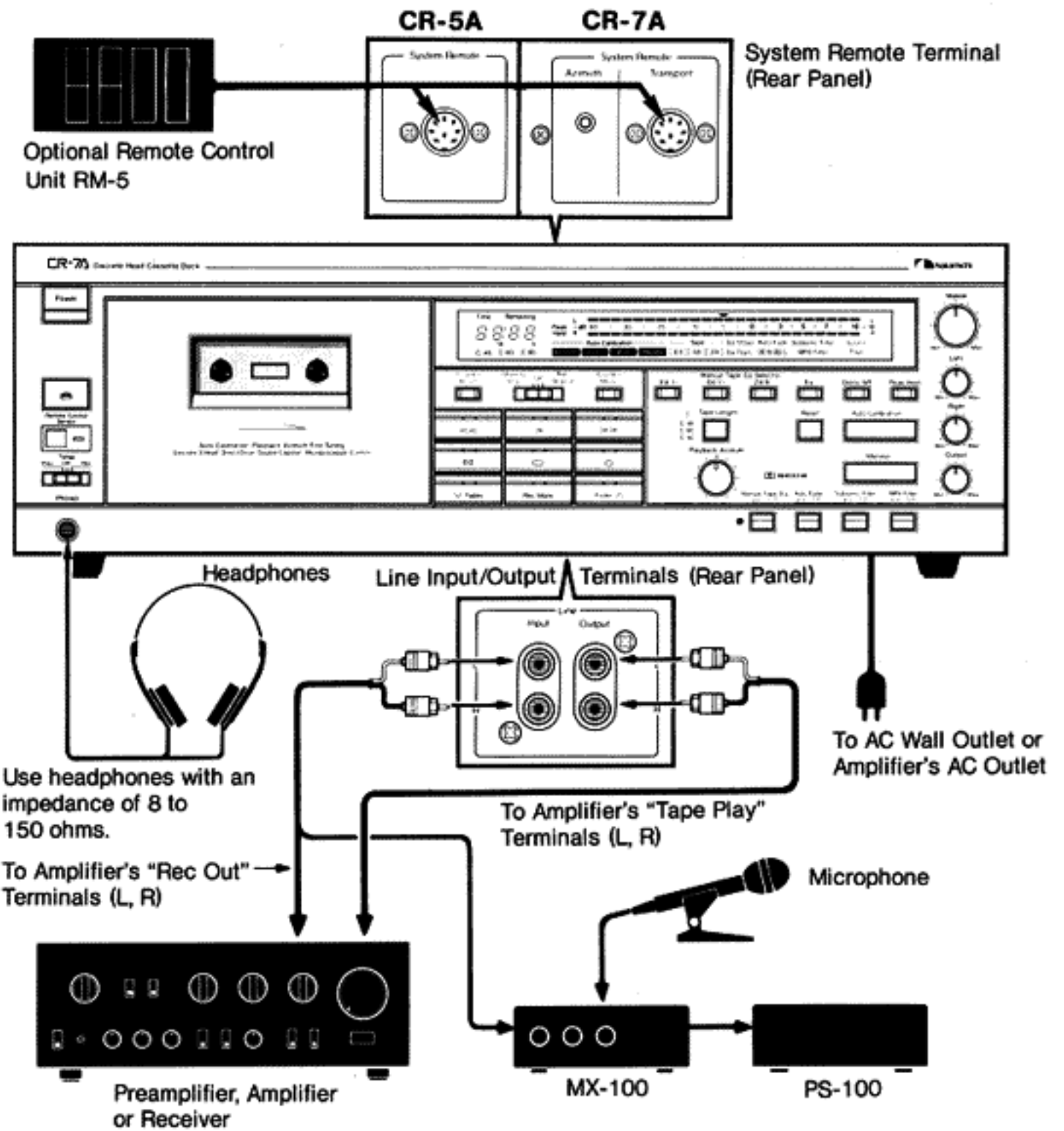
While making connections, all power switches should be OFF.

## System Remote Terminal

By connecting the optional wired remote control unit RM-5 to this terminal, the deck's tape transport functions can be operated from a convenient location. (However, the RM-5 does not permit adjustment of playback head azimuth for the CR-7A.) When this terminal is connected to a Nakamichi component equipped to serve as center component of an entire audio system (such as the CA-7A), integrated remote control of the entire system is possible. For details, please refer to the Owner's Manual of the center component.

## Microphone Connections

As this deck has only line input facilities, a separate microphone mixer with line-level outputs must be used for microphone recordings. Connect the output of the mixer to the deck's "Line Input" jacks. Nakamichi offers the optional MX-100 Microphone Mixer, which provides three inputs for left, right, and center blend (L+R). To power the MX-100, the separate PS-100 Power Supply is required.



# On Cassette Tapes

## Precautions

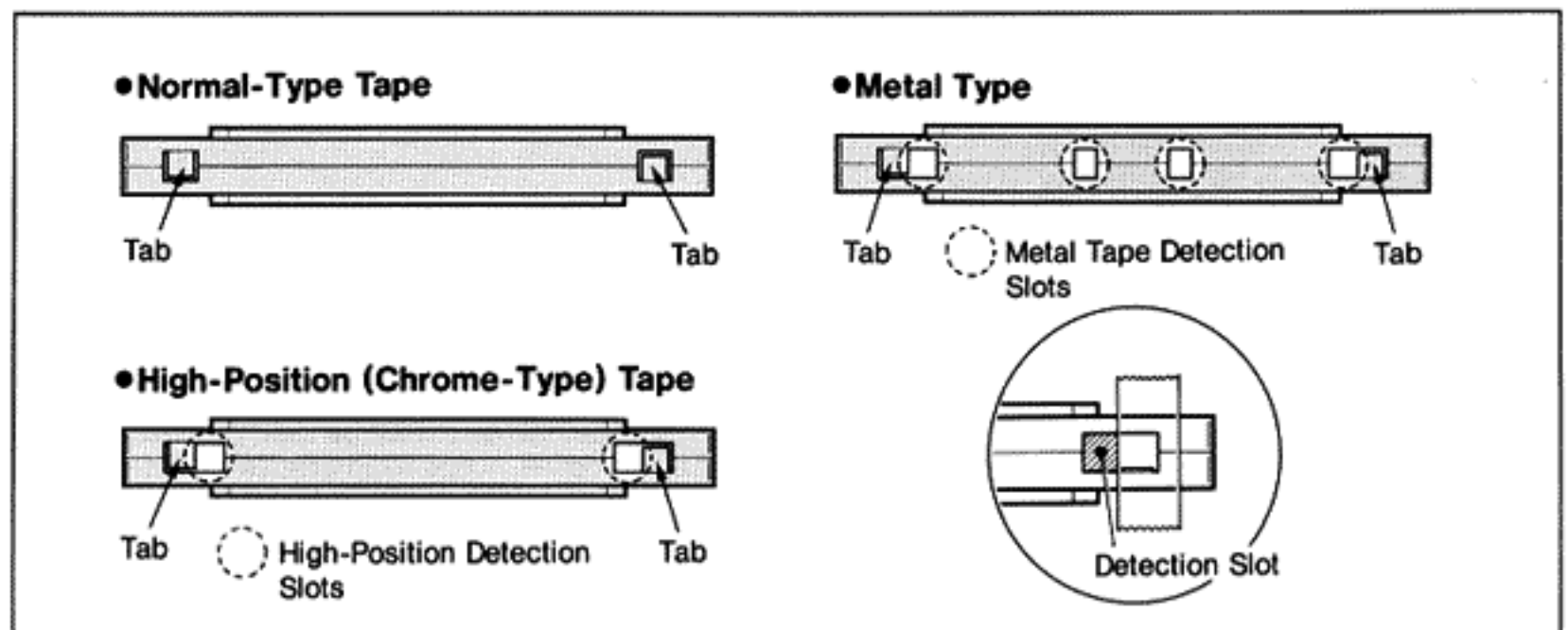
- (1) C-120 cassettes (playing time one hour per side) contain extremely thin tape which breaks or snarls easily, is sometimes subject to stretching and also is of low sensitivity. Therefore, C-120 cassettes are not recommended for high-fidelity recording.
- (2) Do not pull out the tape from the cassette housing.
- (3) Be careful not to turn the cassette reels with the fingers, to avoid tape slackening.
- (4) Store cassettes 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 end 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. At this time, be careful not to cover the detection slots for high-position and metal tapes which serve to trigger the auto tape selector.



# Operation

## Precautions Before Operation

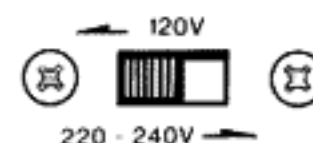
1. This deck incorporates a muting circuit which is active for about 4 seconds after the power was switched on, until all circuits have become stable. (With the CR-7A, the "Ready" indicator and with the CR-5A, the Stop button indicator flashes.) During the muting interval, the tape transport buttons cannot be operated.
2. If the power is turned on while the Timer switch is set to "Rec" or "Play", recording or playback will start automatically. 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.



## Preparations

- (1) Set the Manual Tape/Eq switch to "Off" and insert a cassette.
- (2) The auto tape selector determines the type of tape inserted and automatically sets the tape position and equalization accordingly.

(Refer also to the paragraph "Auto Tape Selector" on page 7.) The respective Tape Position and Eq indicators light up.

- (3) **For CR-7A users:** When wanting to display the elapsed or remaining time on the

real-time tape counter, select the tape length (C-46/C-60/C-90) with the Tape Length button. (Refer to the paragraph "Real-Time Tape Counter" on page 9.)

## Playback

- (1) Select the "Tape" position with the Monitor button ( [Tape] indicator lit).
  - (2) Use the Dolby NR button to select the same noise reduction system as utilized during recording.
  - (3) Press the Play button.
  - (4) **For CR-7A users:** Perform azimuth adjustment if required. (Refer to the paragraph "Playback Head Azimuth Adjustment" on page 8.)
  - (5) Adjust the desired listening level with the Output Level control.
- The logic-controlled transport of this deck permits going from any mode into any other (i.e. from play to rewind, from rewind to fast-forward, etc.) without having to use the Stop button.

## Recording

- (1) **For CR-7A users:** Perform auto calibration. (Refer to the paragraph "Auto Calibration" on page 8.)
  - (2) Use the Dolby NR button to select the desired noise reduction system: "Dolby B-Type NR", "Dolby C-Type NR" or "Dolby NR Off".
  - (3) When recording from FM broadcasts, set the MPX Filter switch to "On" (MPX Filter indicator lit).
- For CR-7A users:** When recording from records, set the Subsonic Filter switch to "On" if required (Subsonic Filter indicator lit).
- (4) By pressing the Record button, the deck enters the record/pause (recording standby) mode.
  - (5) Select the "Source" position with the Monitor button ( [Source] indicator lit).
  - (6) Adjust the recording level, referring to the

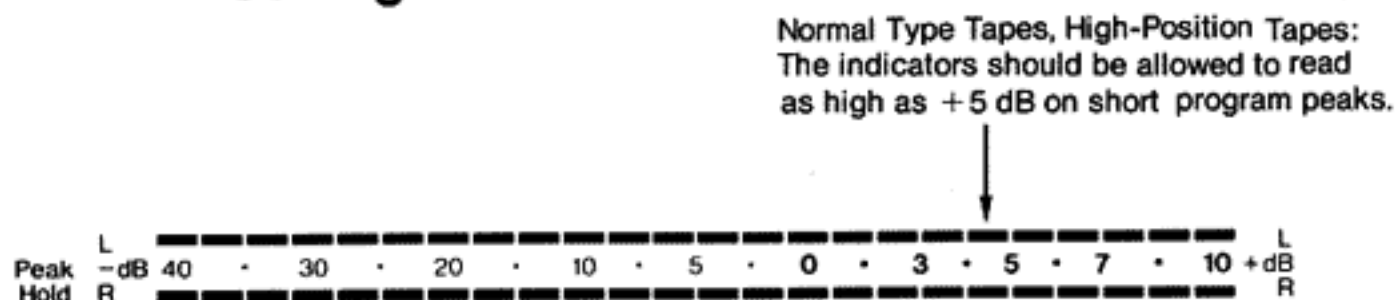
chart below. First open up the Master Level control to a certain degree. Then, while watching the indication of the Peak Level meters, gradually turn up the Left and Right Input Level controls to achieve the proper recording level and left/right channel balance. For final adjustments of the overall recording level, the Master Level control can again be used.

- (7) Press the Play button to start recording.
- (8) For short-term interruption of recording, press the Pause button. To resume recording, press the Play button again.
- (9) To check the quality of the recording in progress, you can monitor the playback signal by selecting the "Tape" position with the Monitor button. In the "Source" position, the input signal before recording is heard.

### ■ Dolby NR System

This cassette deck provides a choice between the Dolby B-Type and the Dolby C-Type noise reduction systems. The Dolby B-Type NR yields 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, select the "B" position and for playback of a tape recorded with Dolby C-type NR, select the "C" position with the Dolby NR button.

## Record Level Setting



- These values should be used as a general guideline. Actual requirements may vary to a certain degree, depending on the tape in use and the recording source.

Metal Tapes:  
The indicators should be allowed to read as high as +8 dB on short program peaks.

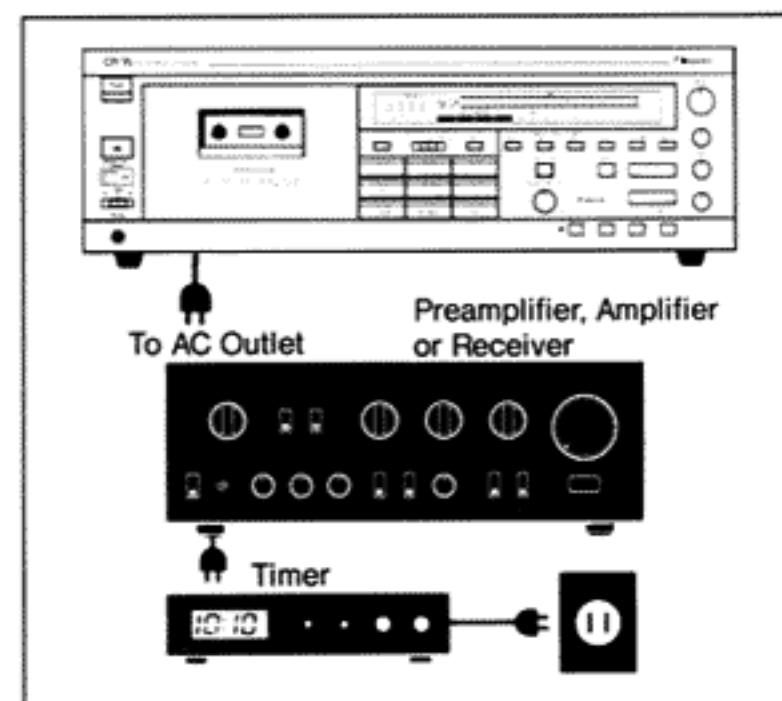
## Timer Recording or Playback

- (1) Establish connections as shown in the chart and switch on the power to all components.
- (2) Confirm that the appropriate tape position, equalization and Dolby NR settings are selected.
- (3) For timer-activated recording, set the recording level to suit the expected signal and activate the MPX filter if required. For timer-activated playback, set the line output to the desired level.
- (4) For timer-activated recording, set the deck's Timer switch to "Rec". For timer-activated playback, set the switch to "Play".

- (5) Set the timer to the desired switch-on and switch-off time.
- (6) At the pre-selected time, the timer will supply power to the components and recording or playback will start automatically.

### Note:

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



## Peak Level Meters

The level meters of this deck cover a full 50-dB range and accurately indicate even short signal peaks. The CR-7A also incorporates a **peak hold function** which can be switched on and off with the Peak Hold button. During playback, the meters display the level as recorded on the tape. Readings are not affected by turning the Output Level control.

## Auto Tape Selector

► This deck incorporates an **Auto Tape Selector** which detects the inserted tape type and accordingly selects the required tape position and equalization settings (refer to the chart below). The auto tape selector operates when the Manual Tape/Eq switch is set to "Off" (indicator out).

► When wishing to manually select the tape position and equalization, first set the Manual Tape/Eq switch to "On" (indicator lit) to defeat the auto tape selector. Now the desired tape position can be chosen by pressing the appropriate button of the Manual Tape selector. The equalization setting still changes automatically depending on which button is pushed. A different equalization setting can be selected by pressing the Eq button. The manual setting option for bias and equalization permits recording on older metal or high-position tapes lacking detection slots.

► Another advantage of the manual setting option for the experienced recordist is the possibility to use the 70-microsecond equalization for EX (normal) type tapes, or the 120-microsecond equalization for SX (high-position) or ZX (metal) type tapes. When recording normal type tapes at the "Eq 70  $\mu$ s" setting, the MOL (maximum output level) in the medium to low frequency range increases and

tape noise is reduced. This may be preferable for music which contains relatively little high-frequency energy. On the other hand, if high-position or metal tapes are recorded at the "Eq 120  $\mu$ s" setting, the tape noise will increase somewhat, but upper-range MOL is extended, so that even strong high-frequency peaks can be easily accommodated. **Be sure to set the equalization in playback to the same position as used in recording.**

- When selecting a non-standard equalization setting manually with the CR-7A, operate the Eq button only after the auto calibration process was completed. Otherwise the equalization will be reset during calibration to the standard setting shown in the chart below.

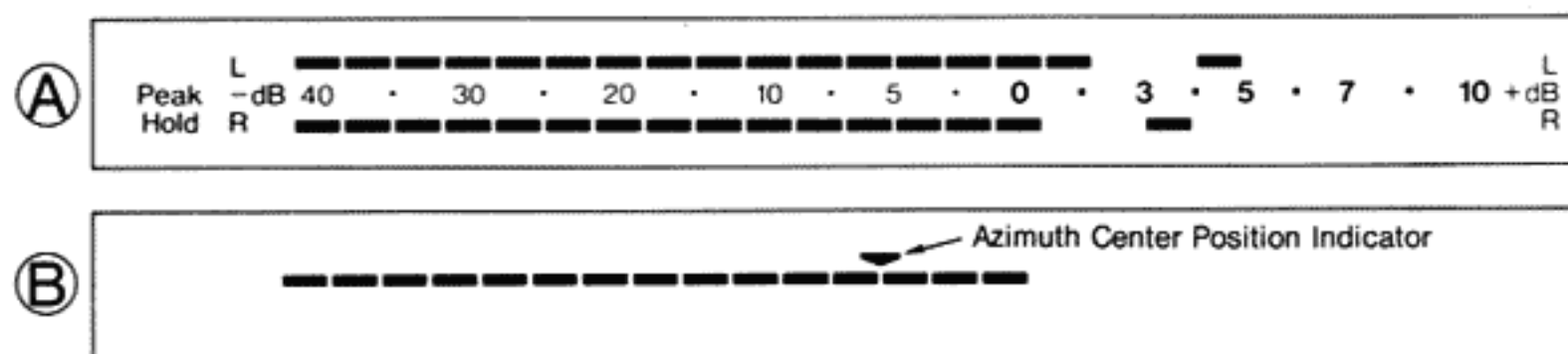
| Auto Tape Selector Setting                                   |                |
|--------------------------------------------------------------|----------------|
| Tape Position Indicator                                      | Eq Indicator   |
| <div>EX</div> <div>TYPE (I)</div> <div>Normal Position</div> | Eq 120 $\mu$ s |
| <div>SX</div> <div>TYPE (II)</div> <div>High Position</div>  | Eq 70 $\mu$ s  |
| <div>ZX</div> <div>TYPE (IV)</div> <div>Metal Position</div> | Eq 70 $\mu$ s  |

## Playback Head Azimuth Adjustment

In order to ensure perfect playback also of commercially available music tapes or cassettes recorded on another machine, this deck incorporates an **Azimuth Fine Tuning System**. The azimuth angle (perpendicularity of the magnetic head vs. the tape) can be adjusted either with the Playback Azimuth control on the deck's front panel or while seated at the listening position, using the supplied wireless remote control unit.

### Azimuth Adjustment Procedure

- (1) Insert a recorded cassette and set the deck to the playback mode. (Fig. A)
- (2) While listening to the playback sound, operate the Playback Azimuth control (or the Azimuth Adjustment buttons on the remote control) until the best high-frequency response (brightest sound quality) is achieved. This adjustment is facilitated by first dislocating the azimuth drastically until upper-range sound quality clearly deteriorates, and then 'backing up' gradually to the optimum setting. (Quick push-and-release of a button on the remote control serves for fine adjustment, while continuous adjustment is performed by keeping a button depressed.)



- While the adjustment is performed, the deck's Peak Level meters are automatically switched to the azimuth display mode (Fig. B) and the Azimuth Center Position indicator lights up. The upper row of indicator segments now shows the actual azimuth position relative to the Center Position indicator. This indicator corresponds to the standard azimuth position as adjusted at the factory by means of a test tape, and it also coincides with the center position of the Playback Azimuth control. The indication can serve as a visual clue to the present setting when performing azimuth adjustment from the listening position by means of the remote control.
- (3) Approximately 3 seconds after the adjustment was terminated, the Peak Level meters revert to normal operation.

- As the optimum azimuth point differs with each cassette, it is recommended to perform the azimuth adjustment every time a tape is played back.
- It is also possible to adjust the playback head azimuth during off-the-tape monitoring in recording. The change of sound quality caused by altering the azimuth setting does not affect the actual recorded sound.
- The Azimuth Adjustment buttons on the remote control unit operate independently from the Playback Azimuth control on the deck. However, if the power to the deck was switched off and on again, or if a tape was ejected, the playback head azimuth reverts to the position determined by the setting of the Playback Azimuth control on the deck's front panel.

## Auto Calibration

In order to extract maximum performance from every tape, this deck incorporates an **Auto Calibration System** which automatically performs the following three vital functions: adjustment of playback head azimuth, separate level calibration for left and right channel, and bias current adjustment for each channel. It is highly recommended to perform auto calibration before every recording, to assure optimum results.

### Auto Calibration Procedure

- (1) Confirm that the Timer switch is set to "Off", then switch on the power to the cassette deck.
- (2) Insert the cassette tape.
- (3) If an older high-position or metal tape without detection slots is used, set the Manual Tape/Eq switch to "On" and then select the correct tape position with the Manual Tape selector.
- (4) When the Auto Calibration button is pressed, the Azimuth indicator begins to flash and the function sequence listed below is performed almost instantaneously, after which the deck goes into the

recording mode and the calibration process starts.

- ▶ The line input and output are cut off (muted).
  - ▶ The calibration starting point is memorized, and the tape counter reverts to "0000" if it is in the 4-digit indication mode.
  - ▶ If the Manual Tape/Eq switch is set to "On" and the Eq setting does not correspond to the tape position, the standard Eq setting for that tape is selected automatically (for example: EX tape/Eq 70μs ⇔ EX tape/Eq 120μs).
  - ▶ If the deck is set to "Source", the "Tape" position is selected.
  - ▶ Regardless of the selected Dolby NR position, the Dolby NR system is set to "Off".
  - ▶ The tape is fast-forwarded for 1 second.
- (5) First, azimuth calibration is performed. During the adjustment, the Azimuth indicator flashes.
  - (6) When the azimuth adjustment is completed, level calibration begins (the Azimuth indicator goes out and the Level indicator lights up). After level calibration, the bias

calibration is initiated (Level indicator goes out, Bias indicator starts flashing).

- (7) After one bias adjustment cycle was performed, level calibration and bias calibration are repeated.
  - (8) When the second bias adjustment cycle is completed, the Bias indicator goes out, the Ready indicator starts flashing, and the following functions are performed.
    - ▶ The deck reverts to the monitor mode and Dolby NR settings that were selected prior to calibration.
    - ▶ The tape is rewound to the calibration starting point.
  - (9) When the starting point is reached, the deck enters the record/pause mode and the line input and output muting is terminated. (The Ready indicator is now constantly lit.) This concludes the auto calibration process.
- The highly precise level and bias data for each channel are automatically stored in the memory for each tape position after auto calibration. These data are retained until renewed calibration is performed at that position. While the deck is switched off, the memory

is backed up by a built-in lithium battery. (No battery replacement is needed for about 7 years.) The memory feature is helpful for example in timer recording, because calibration can be carried out beforehand and the data are then used for the actual recording.

- If the tape was ejected after auto calibration or if the power to the deck was switched off and on again, the azimuth position reverts to the setting determined by the Playback Azimuth control.

### ■ Error Indication

If an error occurs during auto calibration, the Azimuth, Level and Bias indicators flash simultaneously. This can be caused by one of the following conditions:

- Azimuth, level or bias cannot be adjusted to optimum settings because an inferior tape with substandard characteristics or cassette housing of low quality is used.
- Fade-out was performed by pressing the Rec Mute or one of the Master Fader buttons during auto calibration.
- The Manual Tape selector was used and the chosen tape position setting does not correspond to the inserted cassette.

To cancel the error condition, press the Reset button. The tape is then rewound to the calibration starting point and stops there. The error condition can also be cancelled by ejecting the cassette. When wanting to stop the auto calibration process halfway, press the Reset button or the Stop button. If an error has occurred or the auto calibration process was interrupted, the data gained so far are cancelled and the data from the previous calibration remain stored in the memory.

## Real-Time Tape Counter

The tape counter of this deck works not only as a 4-digit counter but it also incorporates a **Real-Time display function** which shows the elapsed or remaining tape time. The correct time indication will be displayed after an 8-second playback (or recording) run, even if the inserted cassette was not fully rewound to the beginning. Once the time reading has been established, the calibration is retained also when fast-winding the tape.

### Use of the Real-Time Tape Counter

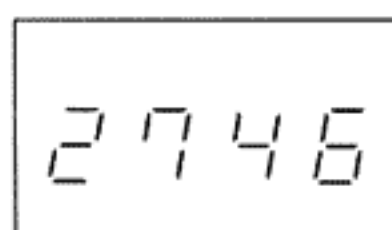
- (1) Select the position (C-46/C-60/C-90) corresponding to the inserted cassette with the Tape Length button.
- (2) Choose the desired indication setting. When the power to the cassette deck is switched on, the counter operates as **4-digit tape counter**. By pressing the Counter Mode button, the counter indication mode can be switched consecutively between **elapsed time** ("Time" indicator lit) ⇌ **remaining time** ("Time Remaining" indicator lit) ⇌ **4-digit tape counter** ⇌ .....
- (3) After the tape has run for 8 seconds in playback or recording, the time display comes on.

- When the elapsed-time indication mode was activated from the very beginning of a cassette, the time display at first shows a negative reading between 5—30 seconds (depending on the cassette), counting up to "0:00" and then continuing to run with positive indication. When the "0:00" point is reached in the remaining-time mode, this indication is retained for approx. 5—30 seconds (depending on the cassette) until the actual tape end.

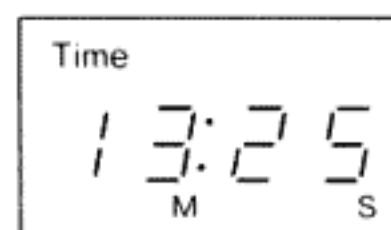
### Note:

- The indication of this deck's real-time tape counter will be most accurate when using C-46, C-60 or C-90 tapes. As the counter does not operate according to the stopwatch principle, the reading may run at a slightly different pace than an actual clock.
- When the playback (or recording) mode was re-entered after fast-forward or rewind, the second digits may flash for 1—2 seconds. This indicates that the built-in microprocessor is performing automatic time display compensation. It should not be mistaken for a malfunction.

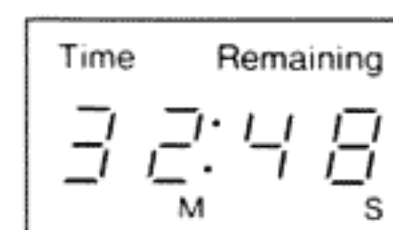
- If tapes of other than C-46, C-60 or C-90 length or cassettes with special (non-standard) hub diameters as shown in the illustration below are used, the time indication will be incorrect. The 4-digit tape counter should be used in such cases. Commercially available music tapes have varying lengths depending on their playing time. During playback of such tapes, the real-time tape counter will also not operate correctly and the 4-digit tape counter mode should be used.



4-Digit Tape Counter Mode



Elapsed-Time Mode



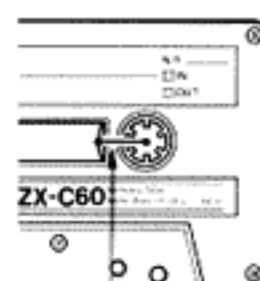
Remaining-Time Mode

### < Standard Hub Size (Example) >

Real-time tape counter can be used.



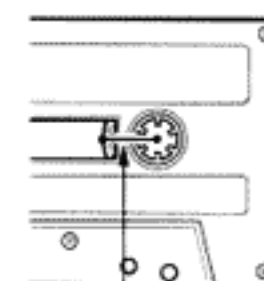
Large Hub Size  
(reel hub radius 15 mm)



Regular Hub Size  
(reel hub radius 11 mm)

### < Special Hub Size (Example) >

Use the 4-digit tape counter.



Intermediate Hub Size  
(reel hub radius between 11 and 15 mm)

## Auto Fade

When the deck is in the recording mode and the Auto Fade switch is set to "On", the following functions are performed after reaching the "0:00" point of the remaining tape time count: **automatic fade-out in 4 seconds** ⇒ **no-signal recording continues until tape end** ⇒ **auto shut-off** (record mode is terminated).

- When the Auto Fade switch is set to "On", the Auto Fade indicator lights up.
- When the fade-out process starts, the Master Fader button indication gradually

changes from "∧" to "∨".  
After the fade-out is completed, the indicator of the Rec Mute button lights up.

### Note:

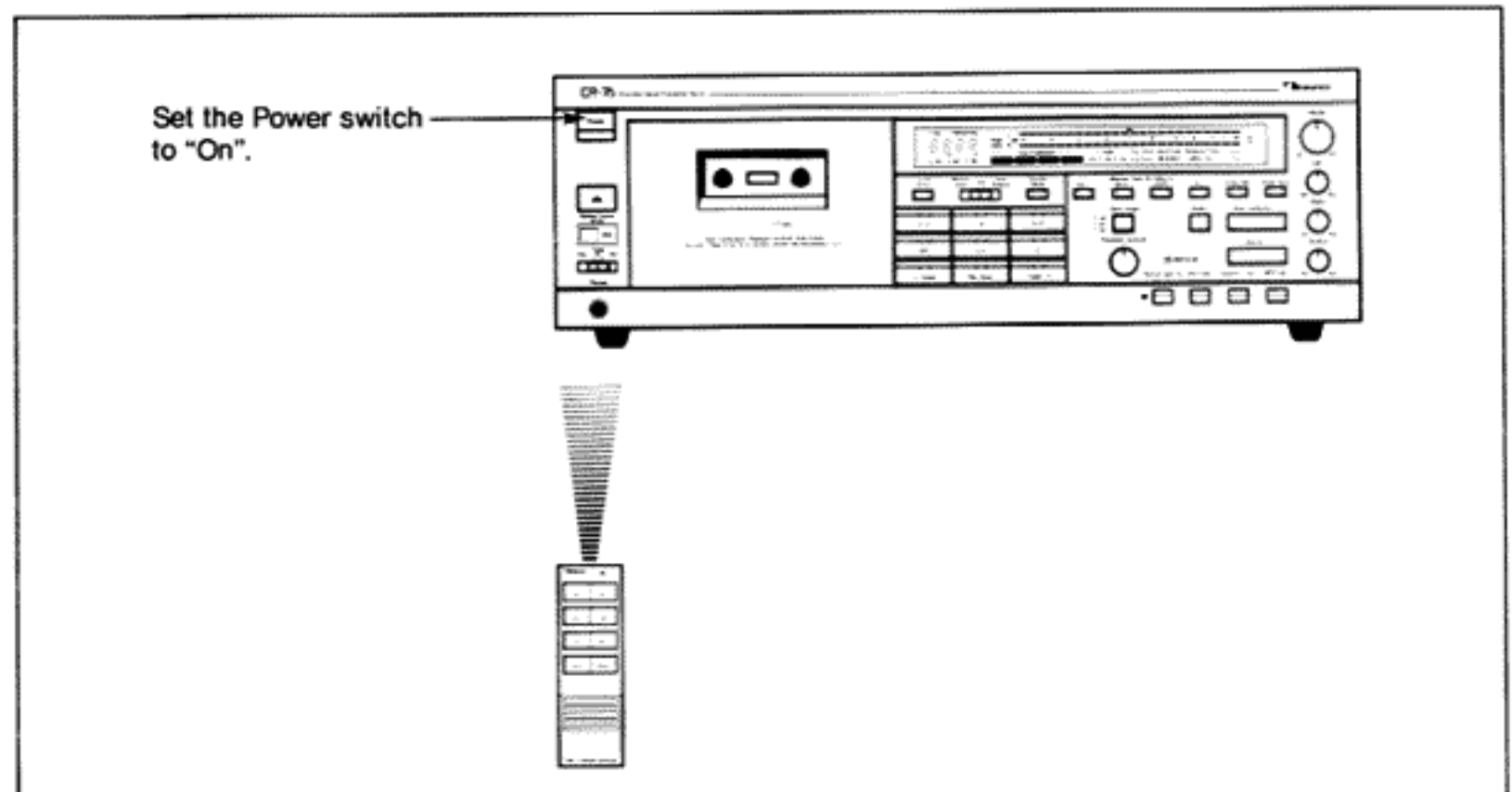
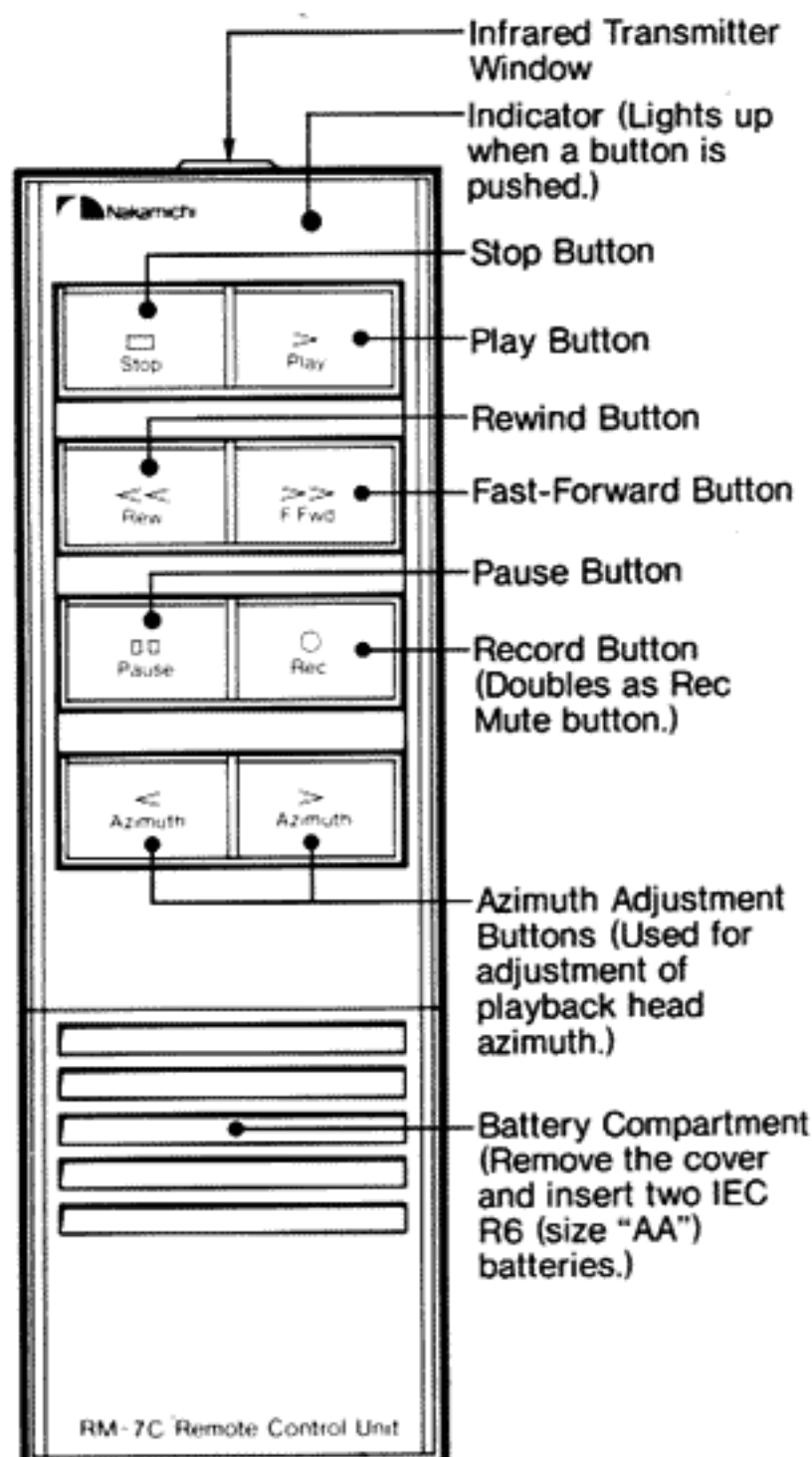
- To use the auto fade feature, it is necessary to first correctly set the tape length with the Tape Length button. When a cassette of different length than C-46, C-60 or C-90 is used, the auto fade function may not operate properly.

- When the power to the deck is switched on, the tape length is automatically set to "C-60". Therefore a C-60 type cassette should be chosen if the auto fade function is to be used in conjunction with timer recording.
- When using a cassette with special hub diameter which differs from ordinary tapes, the auto fade feature will not function properly. (Refer to the illustration "Special Hub Size" on page 9.)

## Use of the Remote Control Unit

The supplied wireless remote control unit (RM-7C) permits operation of the tape transport and playback head azimuth adjustment from a convenient location. Point the infrared transmitter window of the remote control towards the Remote Control Sensor on the deck when operating a button.

### ■ Controls and Functions



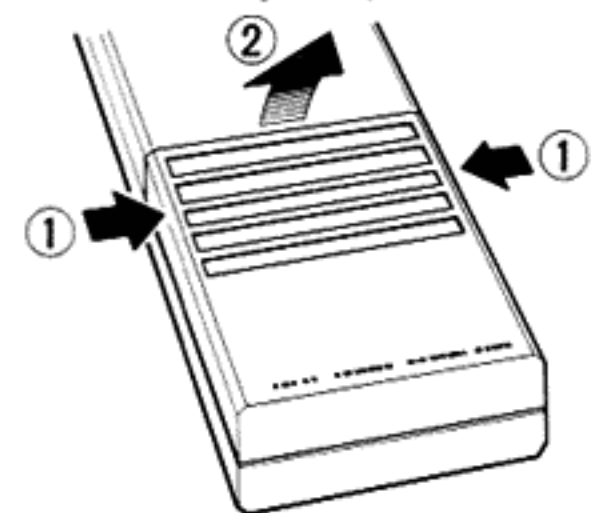
### ■ Batteries

Remove the battery compartment cover of the remote control as shown in the illustration and insert the supplied IEC R6 (size "AA") batteries, taking care to observe correct (+) (-) polarity. When the batteries are nearing exhaustion, the effective range of the remote control decreases or the remote control fails to operate. In such a case, replace both batteries with fresh ones.  
(A good indication that the batteries need replacing is when the indicator on the remote control begins to grow dim.)

### Note:

- Do not use a mixture of old and new batteries, and make sure that both batteries are of the same type.
- Only batteries specially designed and clearly marked as such are rechargeable. Carefully read and observe the instructions printed on the batteries.

### Removal of Battery Compartment Cover



- To prevent damage caused by possible battery leakage, remove the batteries from the remote control unit if it is not to be used for an extended period of time.
- Never dismantle batteries or dispose of them in fire, as they may explode. Dispose of batteries only in an appropriate way as indicated by your community.

# Bias Fine Tuning (CR-5A)

This deck provides a Bias Tune control which permits fine adjustment of the recording bias current for the tape in use.

## (1) Adjustment for Optimum Bias Point

When using tapes from the list on page 7, the Bias Tune control should be left in the center click-stop position.

When using other tapes, adjust the bias while comparing the sound of the input signal to the recorded signal. This comparison can best be done by recording FM interstation noise or a similar signal at about  $-30$  to  $-20$  dB and switching the Monitor button back and forth between "Source" and "Tape".

- 1) If the recorded signal sounds brighter than the original source, turn the Bias Tune control to the right (+).

- 2) If the recorded signal sounds duller than the original source, turn the Bias Tune control to the left (–).
- 3) By repeating steps (1) and (2) and monitoring the results, adjust the Bias Tune control to minimize any sound quality differences.

## (2) Adjustment for Preferred Sound Character

The Bias Tune control can also be used to slightly alter the high-frequency response characteristics of a tape and thereby adjust the tonal quality as desired.

By turning the Bias Tune control to the left (–), the bias current decreases, which will lead to slightly higher distortion but permits recording with extended high-frequency

response.

Turning the Bias Tune control to the right (+) increases the bias current. This curtails high-frequency response somewhat, but distortion and noise are reduced.

### Note:

- Make sure that the Tape Position indicator corresponds to the tape in use before performing the bias adjustment.

# More Convenient Features

## ■ Master Fader

This feature permits smooth and easy fades during recording without having to move the Input Level or Master Level controls.

By pressing the Master Fader " $\vee$ " button, the recording level is gradually reduced to zero. After the level was reduced by pressing " $\vee$ ", pressing the " $\wedge$ " button will automatically raise it again to the previous setting.

You can choose between two fading speeds. If you keep the button depressed, the fading is comparatively fast. If you release the button immediately after pressing it, the fading is slower.

The respective fading mode is indicated by the brightness of the " $\wedge$ " and " $\vee$ " indicators. After complete fade-out, the indicator of the Rec Mute button lights up.

### Note:

- The operation of the master fader can be changed from " $\wedge$ " to " $\vee$ " or from " $\vee$ " to " $\wedge$ ", but it cannot be stopped midway.
- The master fader is operative only in the record and record/pause modes. When these modes are released, the setting automatically becomes " $\vee$ ".

## ■ Rec Mute

By pressing the Rec Mute button during recording, the recording signal is cut off for as long as the button is kept depressed. (The rec mute function can also be activated with the remote control of the CR-7A by pressing the Record button once more while a recording is in progress.)

When the Monitor button is set to "Source" ( Source indicator lit), the line output and headphone output are not muted, so that it is possible to continuously monitor the input signal.

## ■ Auto Repeat

With the Memory Stop/Auto Repeat switch set to "Auto Repeat", the following operating sequence is repeated when the tape end is reached during recording, playback or fast-forward: **automatic rewind to the tape start ⇔ playback from the beginning ⇔ automatic rewind when tape end is reached ⇔ playback from the beginning..**

Repeat playback will also be performed if the beginning of the tape is reached in rewind.

- When the Timer switch is set to "Rec" or "Play", the auto repeat function is inoperative.

## ■ Memory Stop

When the Memory Stop/Auto Repeat switch is set to "Memory Stop", the tape automatically stops at the tape counter reset point during fast-forward or rewind.

- **For CR-7A users:** The memory stop function also operates in the two real-time tape counter modes at the point where the Reset button was pushed.

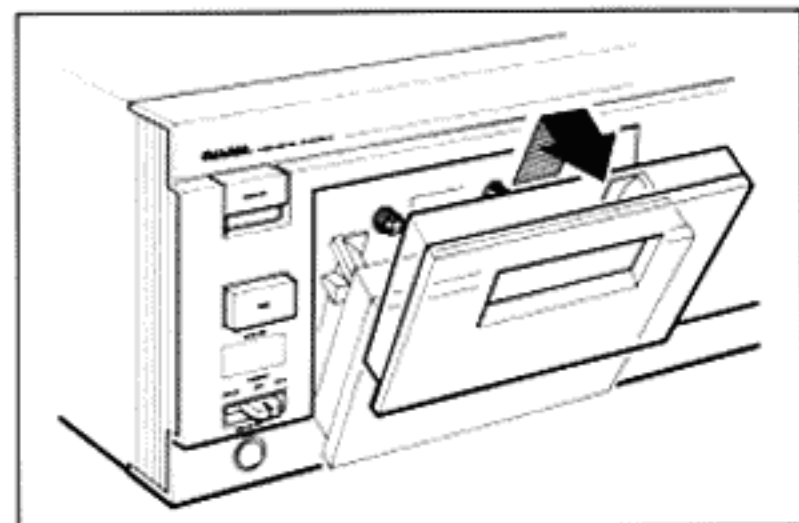
# Maintenance

## 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.

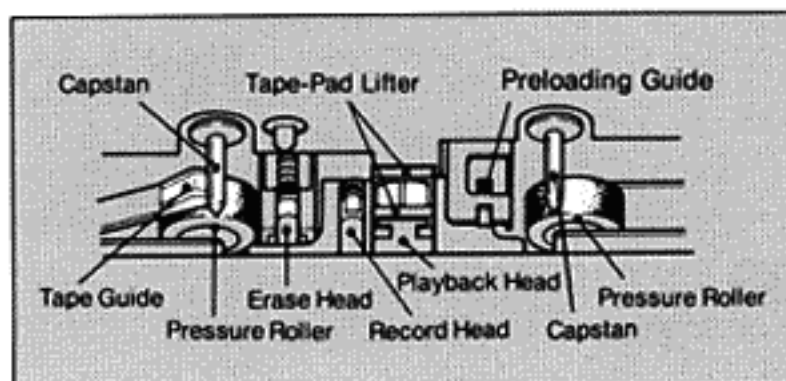


- (2) Press the Play button and clean the revolving pressure rollers by holding a cotton-tipped stick lightly against the roller on the side turning away from the capstan.

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 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 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.



## Demagnetization

After a longer period of use, there can be 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.

## Lubrication

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

## Caring for the Exterior Panels

Clean the unit only by wiping it with the supplied polishing cloth. Avoid using solvents or alcohol-based cleaners.

# Specifications

## << Main Unit >>

|                               |                                                                                                                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Track Configuration.....      | 4 tracks/2-channel stereo                                                                                                                                                                                                                      |
| Heads.....                    | 3 (erase head × 1, record head × 1, playback head × 1)                                                                                                                                                                                         |
| Motors.....                   | < <b>Tape Transport</b> ><br>FG servo brushless, slotless, coreless DD motor (capstan drive) × 1<br>DC motor (reel drive) × 1<br>< <b>Mechanism</b> ><br>DC motor (cam drive) × 1<br>DC motor (playback head azimuth control) × 1 (CR-7A only) |
| Power Source.....             | 100, 120, 120/220-240, 220 or 240 V AC, 50/60 Hz (According to country of sale)                                                                                                                                                                |
| Power Consumption.....        | <b>CR-7A:</b> 55 W max.<br><b>CR-5A:</b> 45 W max.                                                                                                                                                                                             |
| Tape Speed.....               | 1-7/8 ips. (4.8 cm/sec.) ± 0.5%                                                                                                                                                                                                                |
| Wow-and-Flutter.....          | Less than ± 0.048% WTD Peak<br>Less than 0.027% WTD RMS                                                                                                                                                                                        |
| Frequency Response.....       | <b>CR-7A:</b> 20 Hz—20,000 Hz ± 2 dB<br>18 Hz—21,000 Hz ± 3 dB<br><b>CR-5A:</b> 20 Hz—20,000 Hz ± 3 dB<br>(recording level - 20 dB, ZX, SX, EXII tape)                                                                                         |
| Signal-to-Noise Ratio.....    | <b>Dolby C-Type NR on</b> < 70 μs, ZX tape ><br>Better than 72 dB (400 Hz, 3% THD, IHF A-WTD RMS)<br><b>Dolby B-Type NR on</b> < 70 μs, ZX tape ><br>Better than 66 dB (400 Hz, 3% THD, IHF A-WTD RMS)                                         |
| Total Harmonic Distortion.... | Less than 0.8% (400 Hz, 0 dB, ZX tape)<br>Less than 1.0% (400 Hz, 0 dB, SX, EXII tape)                                                                                                                                                         |

|                         |                                                                            |
|-------------------------|----------------------------------------------------------------------------|
| Erase.....              | Better than 60 dB (100 Hz, + 10 dB)                                        |
| Separation.....         | Better than 37 dB (1 kHz, 0 dB)                                            |
| Crosstalk.....          | Better than 60 dB (1 kHz, 0 dB)                                            |
| Bias Frequency.....     | 105 kHz                                                                    |
| Input (Line).....       | 50 mV/40k ohms                                                             |
| Output (Line).....      | 1.0 V (400 Hz, 0 dB, output level control at max.) 2.2k ohms               |
| (Headphones).....       | 12 mW into 8 ohms (400 Hz, 0 dB, output level control at max.)             |
| Fast-Wind Time.....     | Approx. 80 seconds (with C-60 cassette)                                    |
| Dimensions.....         | 435 (W) × 135 (H) × 306 (D) mm<br>17-1/8 (W) × 5-5/16 (H) × 12 (D) inches  |
| Approximate Weight..... | <b>CR-7A:</b> 9.0 kg, 19 lbs. 13 oz<br><b>CR-5A:</b> 8.5 kg, 18 lbs. 12 oz |

## << Remote Control Unit RM-7C >> (supplied with CR-7A)

|                         |                                                                        |
|-------------------------|------------------------------------------------------------------------|
| System.....             | Infrared pulse system                                                  |
| Power Supply.....       | DC 3 V (1.5 V × 2)                                                     |
| Dimensions.....         | 57 (W) × 19 (H) × 175 (D) mm<br>2-1/4 (W) × 3/4 (H) × 6-7/8 (D) inches |
| Approximate Weight..... | 140 g, 5 oz                                                            |

- 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.

# Troubleshooting

| Condition                                              | Probable Cause                                                                                                                                                                                                                                                                                                                              | Remedy                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tape does not run.                                     | 1. Cassette holder is not firmly closed.                                                                                                                                                                                                                                                                                                    | 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. Heads are magnetized.                                                                                                                                                                                                                                                                                                                    | 3. Demagnetize heads.                                                                                                                                                                                                                                                    |
| Uneven sound levels, drop-outs, excessive wow/flutter. | 4. Heads/capstans/pressure rollers are dirty.<br>5. Faulty cassette.                                                                                                                                                                                                                                                                        | 4. Clean these parts.<br>5. Replace cassette.                                                                                                                                                                                                                            |
| Incomplete erasure.                                    | 6. Erase head is dirty.                                                                                                                                                                                                                                                                                                                     | 6. Clean heads and pressure rollers.                                                                                                                                                                                                                                     |
| Distorted record/playback sound.                       | 7. Program material itself is distorted.<br>8. Recording levels are too high.<br><br>9. Heads are dirty.<br>10. Manual Tape selector is not set correctly.<br>11. Cassette without detection slots is used.                                                                                                                                 | 7. Check program material.<br>8. Wide dynamic range permits some short-term overload, but excessive recording levels will cause distortion.<br>9. Clean heads.<br>10. Select correct position for tape in use.<br>11. Select correct position with Manual Tape selector. |
| Record mode is entered, but cannot record.             | 12. Input is disconnected.<br>13. Heads are dirty.                                                                                                                                                                                                                                                                                          | 12. Check connections.<br>13. Clean heads.                                                                                                                                                                                                                               |
| Cannot playback.                                       | 14. Output is disconnected.<br>15. Heads are dirty.                                                                                                                                                                                                                                                                                         | 14. Check connections.<br>15. Clean heads.                                                                                                                                                                                                                               |
| Dull high frequencies.                                 | 16. Heads are dirty.<br>17. Dolby NR not set correctly.<br>18. Manual Tape/Eq selector is not set correctly.<br>19. Cassette without detection slots is used.<br>20. Playback head azimuth is not set correctly (CR-7A).                                                                                                                    | 16. Clean heads.<br>17. Select same position as used for recording.<br>18. Select correct position for tape in use.<br>19. Select correct position with Manual Tape selector.<br>20. Perform playback head azimuth adjustment.                                           |
| Hum heard during recording or playback.                | 21. Strong induction fields near deck.<br>22. Signal cable or connector grounding faulty.                                                                                                                                                                                                                                                   | 21. Keep deck away from amplifiers, transformers, fluorescent lamps, etc.<br>22. Replace signal cables.                                                                                                                                                                  |
| Remote control does not operate (CR-7A).               | 23. Power switch of cassette deck is set to "Off".<br>24. Batteries are inserted with wrong polarity.<br>25. Batteries are exhausted.<br>26. Remote control unit is outside of effective range.<br>27. An obstacle is placed between remote control and cassette deck.<br>28. Another wireless remote control is operated at the same time. | 23. Set Power switch to "On".<br>24. Insert batteries correctly.<br>25. Replace both batteries with fresh ones.<br>26. Operate unit within effective range.<br>27. Remove obstacle.<br><br>28. Avoid simultaneous use of several remote control devices.                 |

## Optional Accessories

### ZX Metalloy Cassette Tape

C-60, C-90

### SX II Super Ferricobalt Cassette Tape

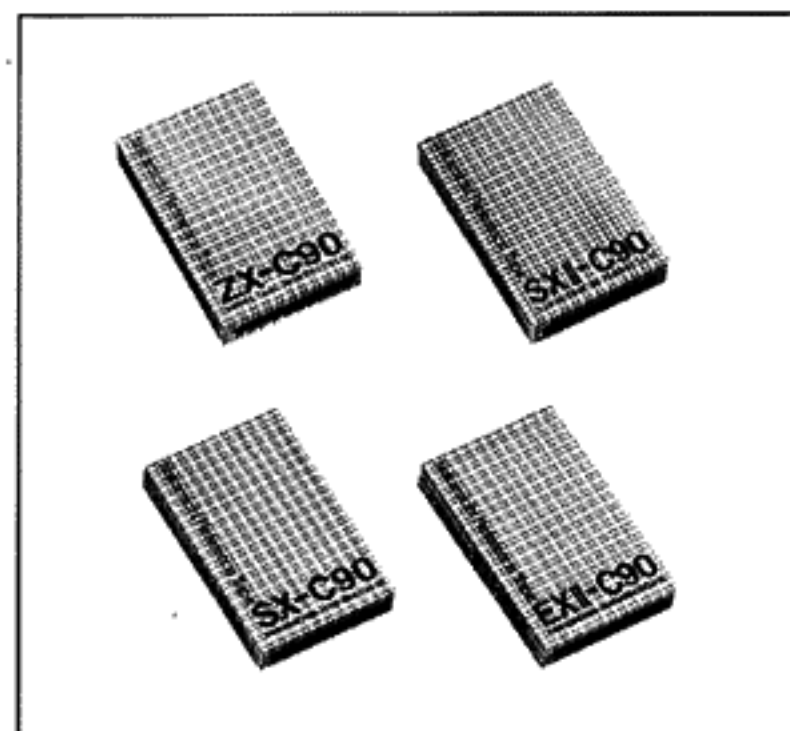
C-60, C-90

### SX Ferricobalt Cassette Tape

C-60, C-90

### EX II Ferricrystal Cassette Tape

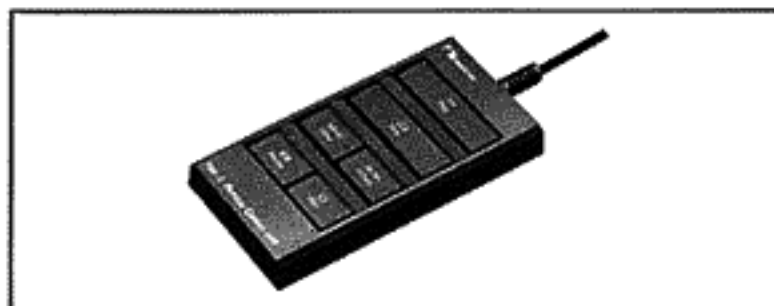
C-60, C-90



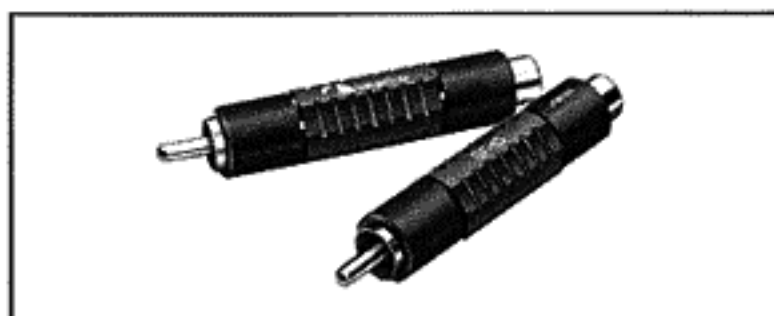
### DM-10 Head Demagnetizer



### RM-5 Remote Control Unit



### SF-10 Subsonic Filter



### SP-7 Stereo Headphones

