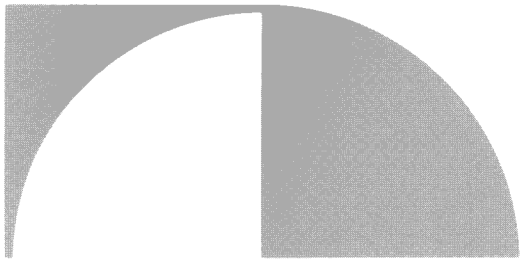


Nakamichi 682ZX

Discrete Head Cassette Deck

Owner's Manual

WARNING

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

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 682ZX
Serial Number: _____

CONTENTS

Congratulations!
You have chosen an extremely advanced cassette deck which incorporates latest Nakamichi technology. Starting with the "discrete" head configuration, "diffused-resonance" double-capstan transport and DC recording amplifier section, the 682ZX also boasts such revolutionary features as automatic level calibration and automatic azimuth alignment. Finally, in addition to Dolby-B, this cassette deck also possesses a Dolby-C noise reduction circuit which makes possible a 20dB improvement in high frequency S/N ratio.

Nakamichi products are internationally famous for state-of-the-art engineering and manufacture—assurance that your 682ZX will bring you many years of reliable service and enjoyment.

Some of the 682ZX's controls and features may be unfamiliar to you at the moment. This manual has been designed to acquaint you with the 682ZX in the shortest possible time. Please take the time to read it in its entirety.

Thank you.

Nakamichi Corporation.

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.

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, snarls or stretches easily. The magnetical properties of these cassettes, such as low sensitivity etc., also make them not recommendable for high-fidelity recording.

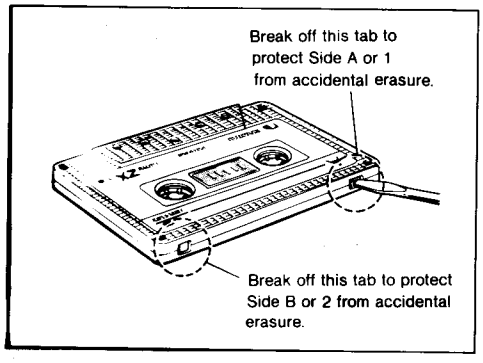
2. Do not pull out the tape from the cassette housing.

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 by completely removing the appropriate tab on the top edge of the cassette. Use a small screwdriver and push the tab down to break it off. Do not leave the broken tab in the recess. When the tab is removed, the deck will not record or erase this side of the cassette, even if the record button is pushed. When wanting to record again on this side at a later date, simply cover the tab opening with a piece of adhesive tape.

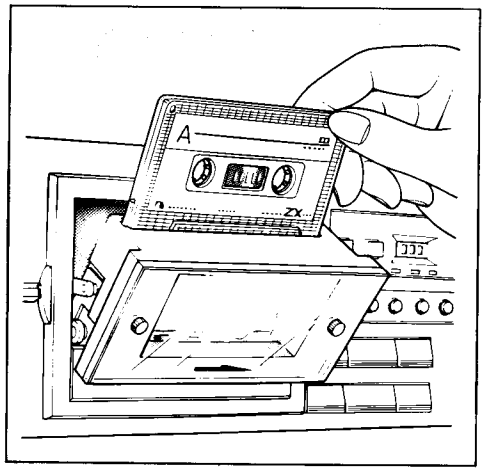


Insertion and Removal

(1) Insertion of a Cassette

1. Press down the eject lever in the direction indicated by the arrow. The cassette compartment opens.

2. Insert the cassette into the cassette holder from the top. Make sure that the exposed tape is facing down and the label of the desired side is facing you.



3. Gently push the cassette holder back into the panel.

(2) Removal of a Cassette

1. Press the stop button

2. Open the cassette compartment by pressing down the eject lever.

3. Remove the cassette.

Precautions

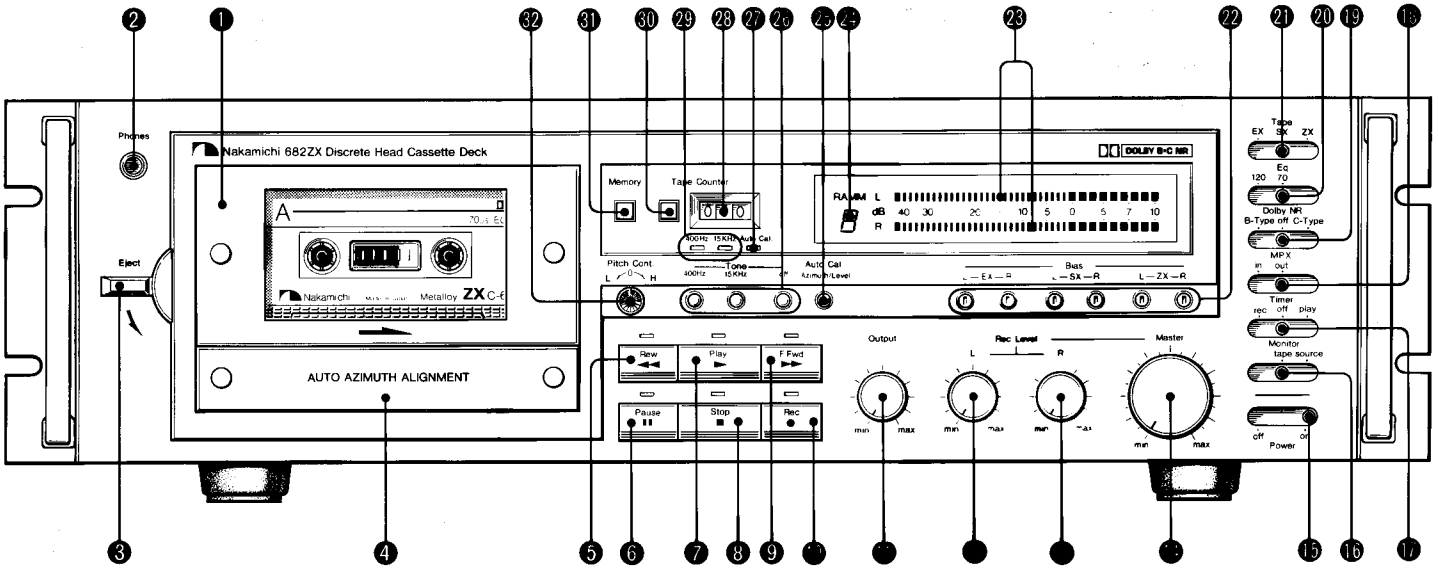
1. Make sure that the timer switch (17) is set to "off" when you do not desire the self-start feature.

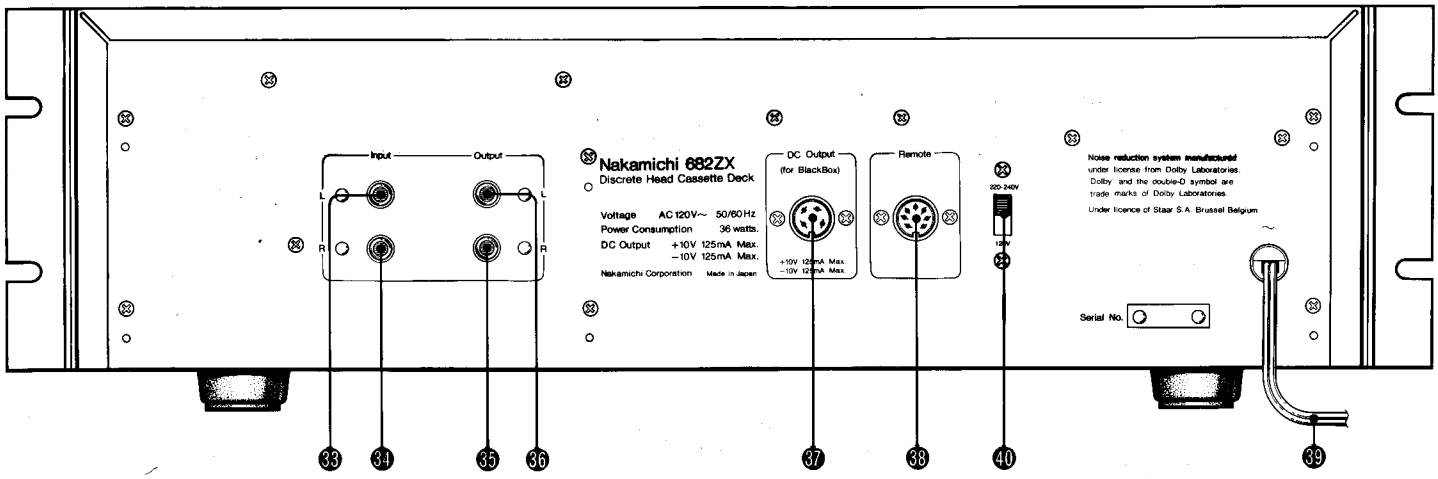
2. Be sure to push to "off" button of the test tone switch (26) or the stop button (8) after having used the test tone. If a tape is played back with the switch at the "15 kHz" position, playback levels are not indicated corretly.

3. This deck incorporates a special circuit designed to take up any loose tape inside the cassette. When a tape is inserted, the take-up spindle (right-hand spindle) will make a few rotations.
   Therefore, if a cassette containing loose tape is inserted or the cassette holder is closed without a cassette inserted, and also if the power to the deck is switched on with the cassette holder closed and no cassette inserted, the take-up spindle will rotate several times and the tape counter advance by a few digits. This behavior is normal and not a fault with the deck.

4. This deck incorporates a muting circuit to prevent the generation of spurious noise when switching on the power. While the muting circuit is active, the light above the stop button flashes and the tape transport buttons ("Play", "F.Fwd", "Rew", "Pause") are inoperative.

Controls and Features





(1) Cassette Holder
See-thru cover permits an unobstructed view of the cassette. The cover can be easily removed for routine maintenance, such as head, capstan and pressure roller cleaning, etc. (→p. 17).

(2) Headphone Jack
Accepts standard stereophone plug.

(3) Eject Lever
Press down in the arrow direction to open the cassette compartment for insertion and removal of a cassette.

(4) Alignment Screw Cover
This cover is not to be removed in ordinary use. Beneath this cover are alignment screws for heads and tape guides, etc. These critical parameters have been finely adjusted at the factory for optimum performance. Do not attempt re-adjustment!

(5) Rewind Button

(6) Pause Button

(7) Play Button

(8) Stop Button

(9) Fast-Forward Button

(10) Record Button

(11) Output Level Control
Adjusts the deck's output level and the headphones listening level. (Controls both channels simultaneously.)

(12) Input Level Control (Left Channel)

(13) Input Level Control (Right Channel)

(14) Master Input Level Control
After this control has been turned up to an appropriate level, the individual channel balance and fine adjustments are performed with the input level controls (12) and (13). The master level control can be used to "fade in" or "fade out" the program source.

(15) Power Switch
Activates the 682ZX. When the power is "on", the fluorescent indicator scale and the cassette compartment will illuminate.

(16) Monitor Switch
For playback of a tape and for monitoring during record, this switch must be in the "tape" position. For level setting and checking the input signal during record, the "source" position is used.

(17) Timer Switch
Permits unattended recording or automatic playback in conjunction with an external timer. When the timer function is not to be used, the switch must be in the "off" position. (→p. 16).

(18) MPX Filter Switch
Engages a 19-kHz filter to remove any residual FM multiplex carrier signal which could cause malfunction of the Dolby circuits when recording from FM stereo broadcasts. This switch should be set to "out" when recording anything other than FM broadcasts.

(19) Dolby NR Switch
Selects either Dolby B-Type noise reduction for a 10dB improvement in high frequency S/N ratio, or Dolby C-Type noise reduction for a 20dB improvement. (→p. 12).

(20) Equalizer Switch
Selects either 70 μs or 120 μs equalization.

(21) Tape Switch
Must be set to the appropriate position according to the tape used: "EX" (Nakamichi EX, EX II or other low-noise/high-output ferric oxide tapes). "SX" (Nakamichi SX or other chrome-equivalent tapes) or "ZX" (Nakamichi ZX or other metal particle tapes). (→p. 9).

(22) Bias Adjustment Controls
Screwdriver adjustments for fine tuning of the bias current at each tape-type position: LH tapes ("EX"), chrome-equivalent tapes ("SX") and metal tapes ("ZX"). (→p. 11).

(23) Fluorescent Level Indicators
High-accuracy indicators display peak levels in the wide range of −40 dB to +10 dB.

(24) RAMM Display
Indicates the number of selections to be passed by, when the RAMM function to locate a selection several counts earlier or ahead is used. (→p. 15).

(25) Auto Calibration Button
Activates the auto calibration function to automatically adjust recording head azimuth and recording sensitivity (level) to perfectly fit the tape in use (→p. 8).

(26) Test Tone Switch
These buttons activate the built-in test tone oscillators for 400 Hz or 15 kHz. The 400-Hz test tone is used for level calibration with other components (→p. 16) and the 15-kHz test tone for bias adjustments (→p. 11).

(27) Auto Calibration Indicator
While auto calibration (→p. 8) is performed, this indicator flashes and the "400 Hz" segment of the test tone indicator (29) is lit.

(28) Tape Counter

(29) Test Tone Indicator
When the 400-Hz or 15-kHz test tone is switched on by means of the test tone switch (26), the respective segment lights up. Also, during auto calibration the "400 Hz" segment is lit.

(30) Counter Reset Button
Push to reset the tape counter (28) to "000".

(31) Tape Start Memory Switch
If the tape counter is reset to "000" at the beginning of a recording or playback, the tape will automatically stop from rewind near this point when the memory switch is engaged.

(32) Pitch Control
Controls tape speed during playback over a range of appr. ±6% (one half-tone), for use during music lessons, etc. Leave this control in the center dented position when standard speed is desired. Has no effect on tape speed during record.

(33) Input Jack (Left Channel)

(34) Input Jack (Right Channel)

(35) Output Jack (Right Channel)

(36) Output Jack (Left Channel)

(37) DC Output Jack (Only For BlackBox Series Components)
Provides a DC voltage to power components from Nakamichi's BlackBox Series (MX-100 Microphone Mixer, etc.).
As the maximum capacity of this outlet is 125 mA, total current consumption of units connected to this jack must not exceed 125 mA.

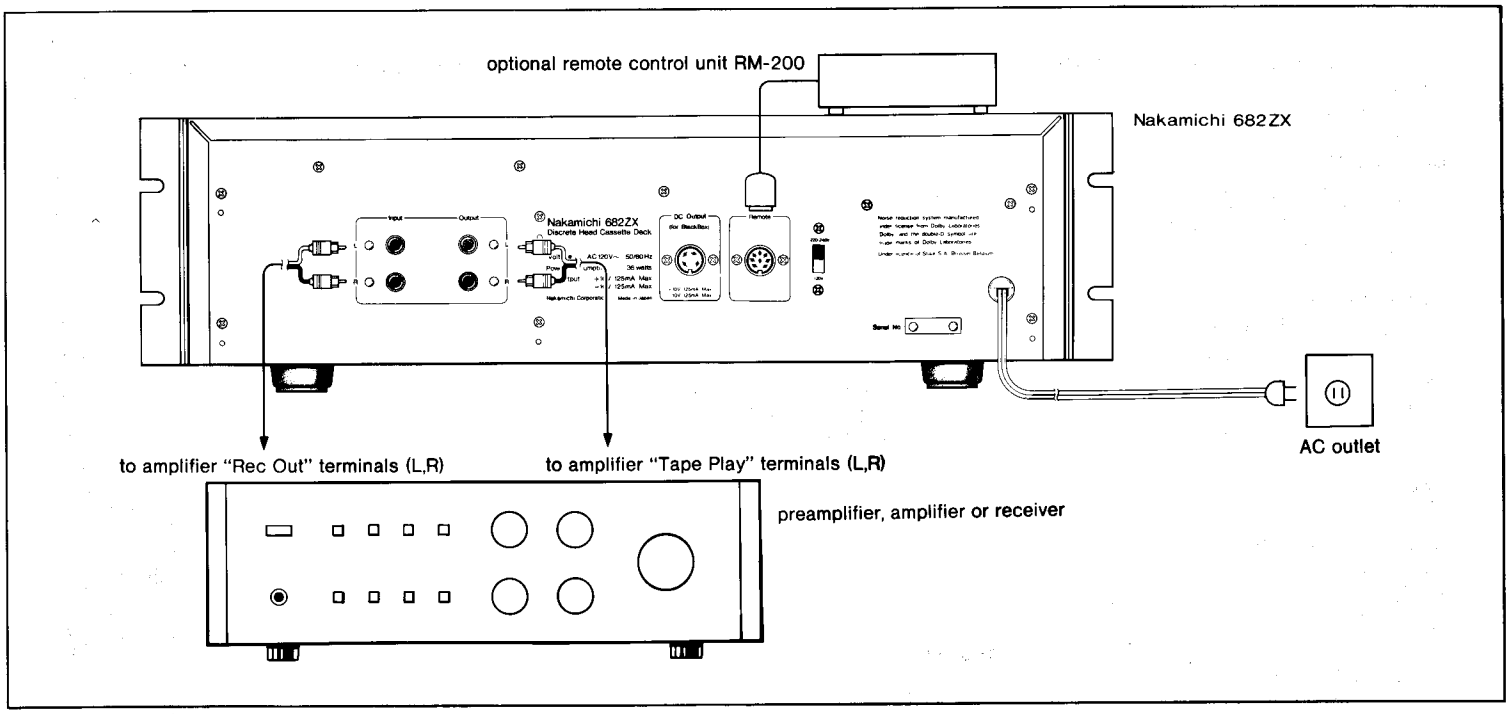
(38) Remote Control Jack
Accepts the respective plug of an optional remote control unit for operation of the tape transport and RAMM functions.

(39) Power Cord

(40) Voltage Selector
AC voltage is factory-set for the country in which you purchased your 682ZX. 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.

Connections

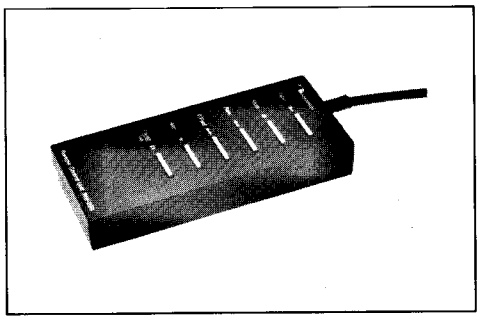
Connections of Amplifier and Remote Control



After checking the instructions for your amplifier or receiver, use the shielded cables with RCA plugs (provided with the deck) to securely connect this deck's input jacks (33) and (34) with the "Rec Out" terminals on the amplifier and this deck's output jacks (35) and (36) with the "Tape Play" terminals on the amplifier. Be careful not to mix up left and right channels. While making connections, the power to the amplifier and to the deck should be switched off.

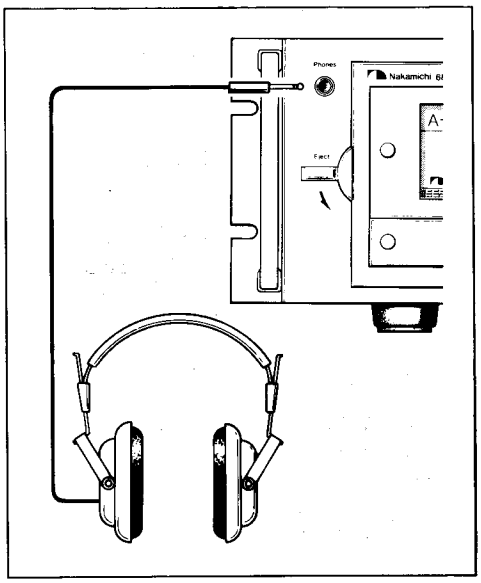
Remote Control

The optional remote control unit RM-200 permits operation of the deck's tape transport as well as the RAMM and Rec Mute functions.



Headphones

Standard stereo headphones may be connected to the headphone jack on the 682ZX. Low impedance headphones with 8 or 16 ohms are recommended.



Connection of Microphone Amplifier

As the 682ZX possesses only line input jacks, it is not possible to directly connect microphones to this deck. When microphones are to be used, a separate microphone amplifier such as the optionally available MX-100 Microphone Mixer from the Nakamichi BlackBox Series is necessary. As this deck provides a DC output jack (37) on the rear panel to power the MX-100, the power supply unit (PS-100) is not required.

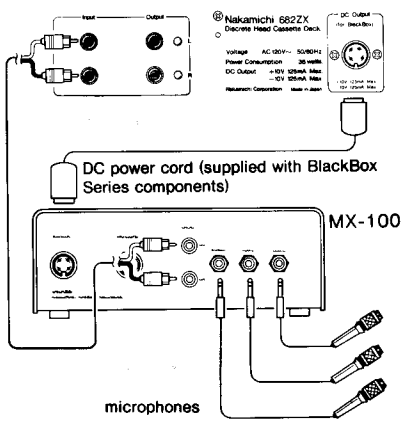
MX-100 Microphone Mixer
For microphone recordings, we recommend the use of the MX-100 Microphone Mixer. This unit provides three inputs (left, right and center "blend") which can be mixed freely. For detailed instructions, please consult the instruction booklet supplied with the MX-100.

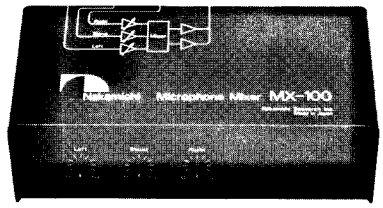
Note:

- The DC output jack on this deck's rear panel is designed for use with components from Nakamichi's BlackBox Series only. Do not connect any other units to this jack. As the maximum capacity of this outlet is 125 mA, be careful that the total rated current consumption of units connected to this jack does not exceed 125 mA. If you wish to operate multiple BlackBox components which exceed 125 mA in total current consumption, a PS-100 Power Supply unit (rated capacity 200 mA) must be used.

BlackBox Component	Current Rating
EC-100 Electronic Crossover	100mA
MX-100 Microphone Mixer	50mA

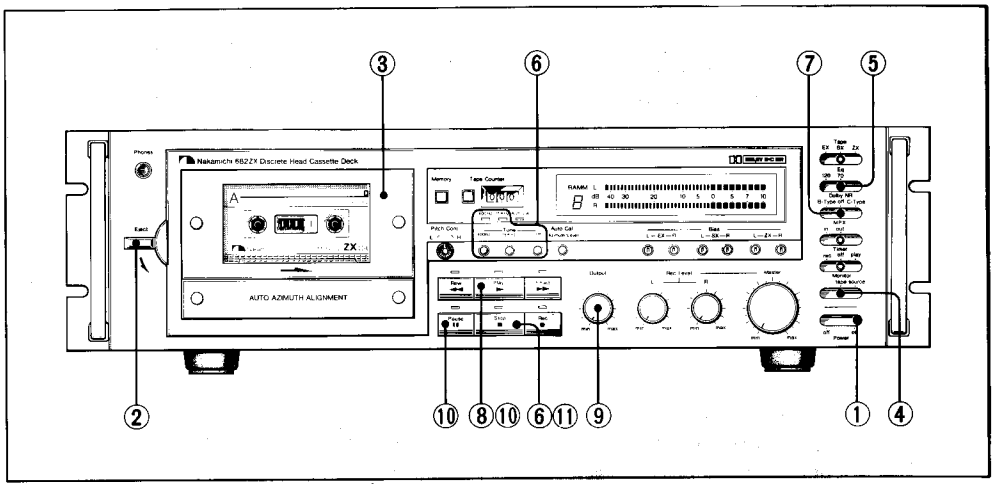
Connection of the MX-100





MX-100

Playback



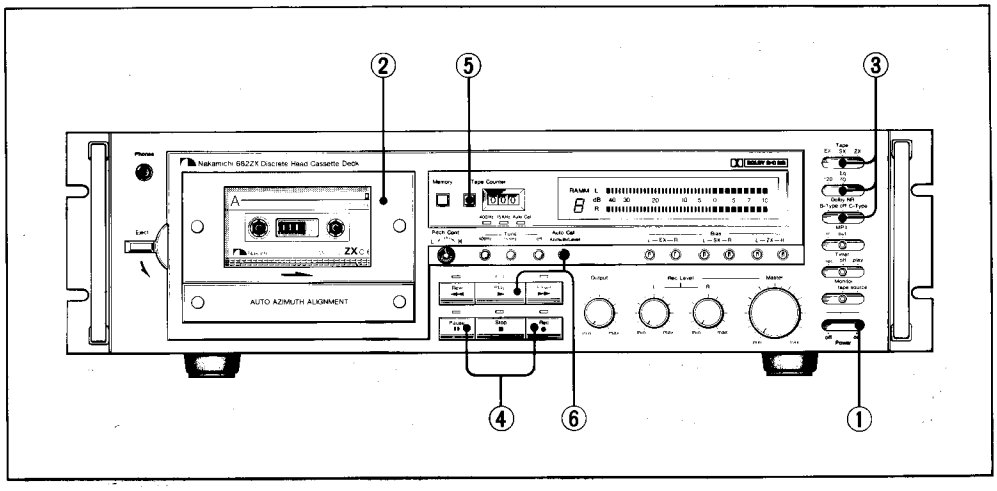
① After confirming that the timer switch (17) is set to "off", turn on the power with the power switch (15).
② Open the cassette compartment (1) by pressing down the eject lever (3).
③ Insert a cassette into the cassette holder with the exposed tape facing down. Close the cassette compartment by pushing the holder gently back until it locks into the panel.
④ Set the monitor switch (16) to "tape".
⑤ Set the equalizer switch (20) to the required position according to the tape used: either 70 μs or 120 μs. (→p. 9)
⑥ Confirm that the test tone indicator (29) is out. If an indicator is lit, push the "off" button of the test tone switch (26) or the stop button (8). If the "15 kHz" test tone is set to "on", the sensitivity of the fluorescent level indicators (23) is increased and playback levels are not indicated corretly.
⑦ When playing back a tape which was recorded with Dolby-B noise reduction, set the Dolby NR switch (19) to "B-Type"; when playing back a tape which was recorded with Dolby-C noise reduction, set the switch to "C-Type".
⑧ Press the play button (7) to start the tape.
⑨ Adjust the output level control (11) to the desired volume.
⑩ For short-term interruption of playback, press the pause button (6). To resume playback, press the play button (7) again.
⑪ To stop the tape altogether, press the stop button (8).
⑫ When the tape end is reached, the tape transport is shut off automatically.

Note:
- The logic-controlled transport of this deck permits going from any transport mode into any other (i.e. from play to rewind, from rewind to fast-forward, etc.) without having to use the stop button.
- While the tape is in motion or in the pause mode, the eject lever is inoperative and the cassette compartment does not open even if the lever is depressed. While the cassette holder is open, logic circuitry prevents operation of all transport modes.
- During playback, this deck's fluorescent level indicators display the level recorded on the tape. Readings are not affected by turning the output level control.

Be sure to read this paragraph and perform the respective adjustments before starting to record.

Matching the Cassette Deck to Various Cassette Tapes

There are many brands of cassette tapes available, which can be generally classified into three types: "chrome" type tapes (chrome or chrome-equivalent formulations), "normal" type tapes (ferric oxide formulations), and "metal" type tapes (metal particle formulations). In order to extract the best in performance from each tape type, this deck permits automatic calibration of recording head azimuth and record level (sensitivity) and manual adjustment of bias current.



Auto Calibration

The auto calibration feature built into this deck serves to adjust optimum recording head azimuth and level (sensitivity) for the tape being used. As there are cassette housing variations and differences in sensitivity even between tapes of the same brand or type, be sure to perform auto calibration every time before starting to record. For auto calibration, the built-in test tone of 400 Hz, 0 dB is switched on and used automatically.

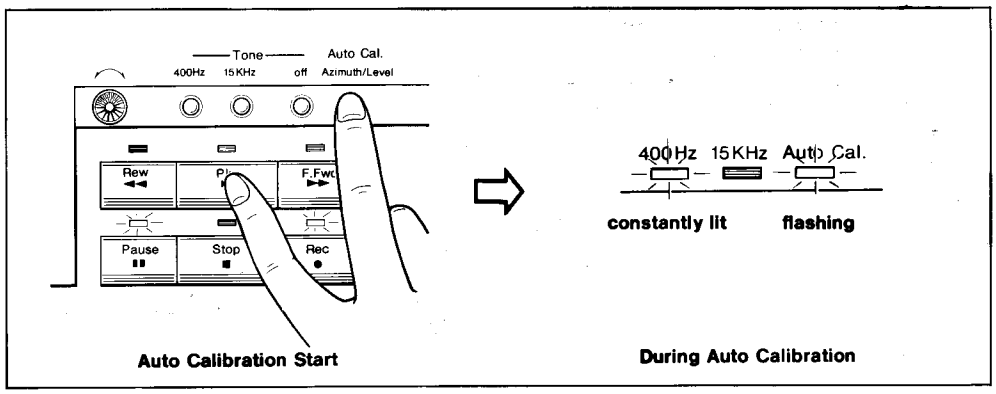
Azimuth: The degree to which the gap of a magnetic head is perpendicular to the path of tape of tape travel. Azimuth misalignment, for example due to cassette housing variations, causes degradation of high frequency response and phase characteristics. In this deck, the playback head azimuth is fixed and the recording head azimuth alignment is performed automatically.

Bias: An inaudible high-frequency current used in the recording process. Increasing the bias current reduces distortion but curtails high-frequency response. Reversely, decreasing the bias current increases distortion, but extends high-frequency response.

Level (Sensitivity): Different kinds of tapes have slightly different sensitivities which—if uncorrected—would lead to different levels for recording and playback. When recording with a noise reduction system, such level differences can affect frequency response and impair sound quality.

Auto Calibration Procedure

① After confirming that the timer switch (17) is set to "off", turn on the power to the deck.
② Insert the cassette to be used for recording.
③ Set the Dolby NR switch (19) to "off" and select the appropriate positions of the tape switch (21) and equalizer switch (20) for the tape in use, according to the chart on page 9.
④ Put the deck into the record-standby mode by pressing the pause button (6) while holding the record button (10).
⑤ Press the counter reset button (30) to return the tape counter (28) indcation to "000".
⑥ Push the play button (7) while depressing the auto calibration button (25). This starts the auto calibration procedure, during which the auto calibration indicator (27) flashes and the "400 Hz" segment of the test tone indicator (29) is lit.
⑦ When auto calibration is completed, the tape is automatically rewound and stops approximately at the starting point (tape counter indication "000").



Auto Calibration With Tapes Other Than Those Recommended

When other tapes than those recommended in the list below are used, it is possible that the required bias amount differs greatly from the pre-set bias point of this cassette deck. (For example, even when using a "normal" type tape, the "EX" position of this deck's tape switch may not give the optimum bias amount).
If auto calibration is attempted with such a tape, the level adjustment may not be performed correctly or the alarm indication (→p. 10) may come on.
Therefore, when using a tape which is not listed in the chart below, you should first perform a rough bias adjustment as described in the following and then perform auto calibration. (This also applies if for example the settings of the bias adjustment controls have been upset by mistake).

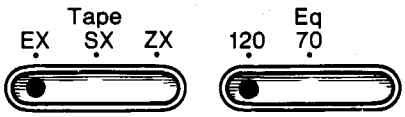
(1) Insert the cassette to be used for recording, set the tape switch and equalizer switch to the appropriate positions and set the Dolby NR switch to "off".
(2) In the record-standby mode (pause button and record button depressed), push the "15 kHz" button of the test tone switch (the "15 kHz" segment of the test tone indicator lights up).
(3) Press the play button to start recording the test tone and set the monitor switch to "tape".
(4) Using the small screwdriver supplied with the deck, slowly turn the bias adjustment controls corresponding to the selected tape switch position, until the level indicator readings become aprr. 0 dB for both channels.

This completes the rough bias adjustment. You should now perform auto calibration as described in the preceding paragraph. When repeated bias adjustment is to be performed afterwards, start from step ⑤ as described on page 11.

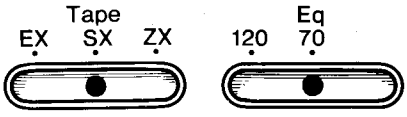
Note:
- The data for azimuth and level gained from auto calibration are retained until the next auto calibration is performed. These data are also preserved when the power is switched off, permitting them to be used in unattended (timer) recording.
- If a wrong position of the tape switch is chosen (for example the switch is set to "EX" although a metal particle tape is used), the tape is stopped during auto calibration and the light above the stop button (8) and the auto calibration indicator (27) are flashing simultaneously, as an alarm indication to warn that calibration cannot be performed properly. Regarding the alarm indication, please refer to the next paragraph.
- If the tape counter (28) was not returned to "000" at the beginning of auto calibration, the tape will not be stopped at the starting point while it is being automatically rewound after auto calibration.

Tape Switch and Equalizer Switch Settings (Recommended Tapes)

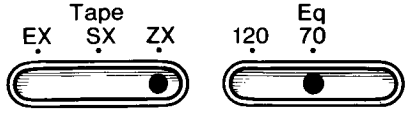
■ EX/120 μs Position

Tape Switch, Equalizer Switch	Brand Name	
	**Nakamichi** **TDK** **Maxell** **Fuji** **AMPEX**	EX, EXII AD, OD UD, UDXL-I FX-I GM-I

■ SX/70 μs Position

Tape Switch, Equalizer Switch	Brand Name	
	**Nakamichi** **TDK** **Maxell** **Fuji** **AMPEX**	SX SA UDXL-II FX-II GM-II

■ ZX/70 μs Position

Tape Switch, Equalizer Switch	Brand Name	
	**Nakamichi** **TDK** **Maxell** **Fuji** **AMPEX**	ZX MA, MA-R MX Metal MPT

Alarm Indication

When a problem is encountered during auto calibration, the tape is stopped and the light above the stop button (8) and the auto calibration indicator (27) start flashing simultaneously as an alarm indication. A problem could be caused by one of the following conditions:

1. The recording or playback function is impaired for some reason during auto calibration.
2. The tape switch (21) was set to an inappropriate position (for example to "EX" although Nakamichi ZX tape is used).

Note:

— When the tape switch is set to a wrong position as described in 2., depending on the tape it is possible that the recorded test tone level is far too low, which manifests itself as follows:
The auto calibration indicator which is supposed to flash, at first is constantly lit as soon as the auto calibration is started, and then the alarm indication comes on. Also, it is possible that a clicking sound is heard before the alarm indication comes on. This is caused by the calibration mechanism becoming disengaged and idling due to off-standard parameters; it does not consist a fault with the deck.

The alarm can be released by pressing the stop button (8).

Tape Switch and Equalizer Switch

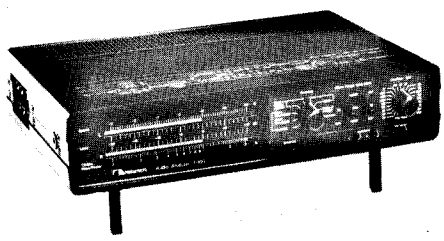
The tape switch (21) serves to select the appropriate bias amount for each tape type in recording. When the bias current is too low, high-frequency response and distortion rise. If it is too high, high-frequency response and distortion decline. This deck is adjusted to give best results with Nakamichi SX, EX II and ZX tapes.
The equalizer switch (20) changes the equalization characteristics to match the deck to the cassette tape. It gives a choice between two characteristics: 3180 μs - 70 μs and 3180 μs - 120 μs. Equalization is applied in recording as well as in playback. Therefore, when playing back a tape, this switch must be set to the same position as was used in recording.

Head Configuration

In order to obtain the best parameters for each function, this deck possesses a wide-gap recording head and a narrow-gap playback head. Erase head, record head and playback head are arranged in Nakamichi's unique completely discrete 3 head configuration which permits simultaneous record/playback. This makes possible easy manual bias adjustment using the built-in test tone, and permits off-the-tape monitoring during recording.

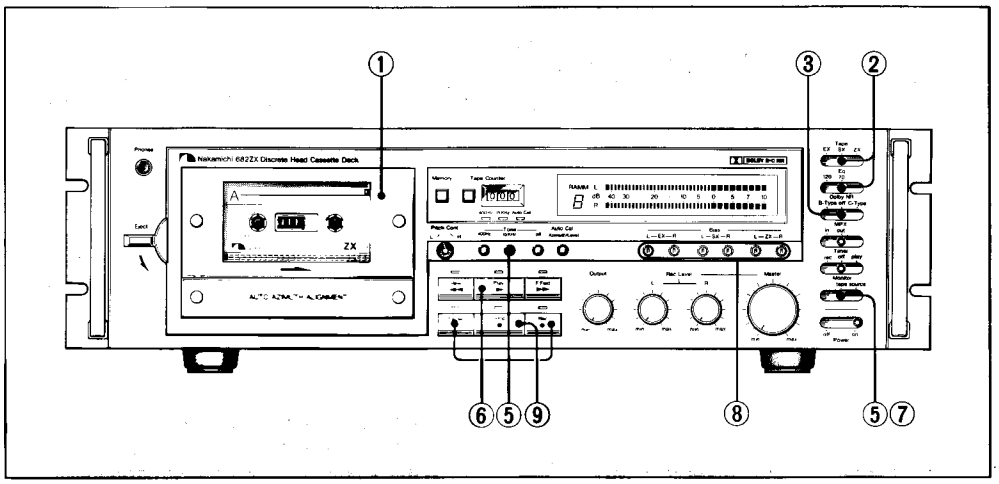
The Nakamichi T-100 Audio Analyzer (optional) is a most useful tool for all kinds of tape deck adjustments and measurements. With one T-100 it is possible to perform measurement and adjustment of frequency response, distortion, wow-and-flutter, etc.

T-100 Audio Analyzer



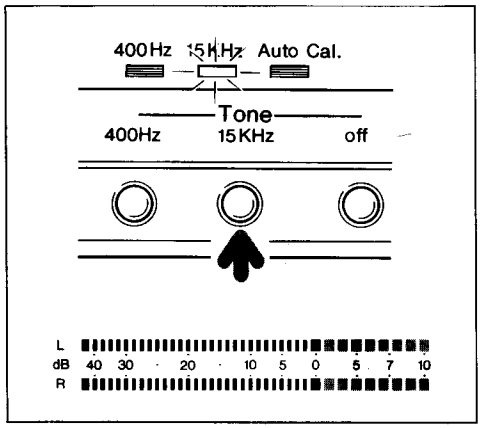
Manual Bias Adjustment

This deck provides bias adjustment controls, but as the tapes from the list on page 9 can be used without adjustment, we suggest that you do so. However, when wishing to perfectly match the bias current to the tape in use, you can perform the adjustment according to the following procedure.
For adjustment, this deck's built-in 15-kHz (−20 dB) test tone is used.
This test tone is produced at a level of −20 dB and it is recorded on the tape at this level, but the fluorescent level indicators read 0 dB at this time. To make for easier readings and permit accurate bias adjustment, the sensitivity of the level indicators is increased by 20 dB during use of the 15-kHz test tone. When using tapes which are not included in the list on page 9, before performing step ④ of the instructions below first consult the paragraph "Auto Calibration With Tapes Other Than Those Recommended" on page 9.

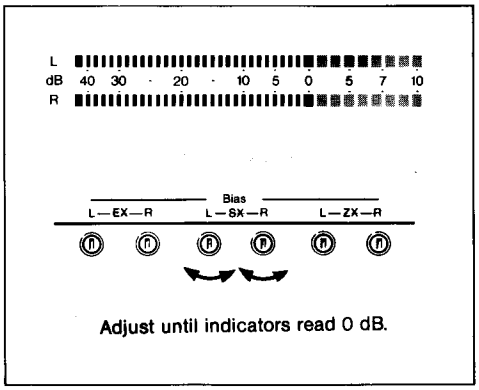


Adjustment Procedure

① Insert the cassette to be used for recording.
② Select the appropriate positions of the tape switch (21) and equalizer switch (20) for the tape in use, according to the chart on p. 9.
③ Set the Dolby NR switch (19) to "off".
④ First perform the automatic calibration of recording head azimuth and level (sensitivity) as described in the paragraph "Auto Calibration" on page 8.
⑤ After auto calibration is completed, proceed to the bias adjustment. In the record-standby mode, set the monitor switch (16) to "source" and push the "15 kHz" button of the test tone switch (26).



This lights the "15 kHz" segment of the test tone indicator (29), and the fluorescent level indicators now read 0 dB for left and right channels. (The indicator reading is 0 dB, but the actual recording level is −20 dB).
⑥ Press the play button (7) to start recording the test tone.
⑦ In this condition, set the monitor switch (16) to "tape". The 15-kHz (−20 dB) test tone which is being recorded on the tape, is played back simultaneously and displayed on the level indicators (23).
⑧ Using the small screwdriver supplied with the deck, slowly turn the bias adjustment controls (22) corresponding to the selected tape switch position (EX, SX or ZX), until the fluorescent level indicators (23) read 0 dB for both channels.



Adjust until indicators read 0 dB.

⑨ This completes the bias adjustment. Push the stop button (8) to stop the tape. By pushing the stop button (8), the test tone is also switched off automatically.

Note:

- The effects of turning the bias adjustment controls (22) are displayed on the level indicators only when the test tone is being recorded and the monitor switch is set to "tape", not when the monitor switch is set to "source" or during ordinary playback.
- If tapes of inferior quality are used, the high-frequency output may not increase even if the bias current is reduced (the adjustment controls are turned counterclockwise), rather distortion only will increase. Therefore, it is recommended to choose tapes from the list on page 9.
- Turn down the volume on your amplifier while using the test tone, because excessive high-frequency signals could cause damage to the speakers.
- When using the test tone (400 Hz or 15 kHz), it is possible that the level indicators do not read exactly 0 dB even when the monitor switch is set to "source". This is due to the influence of temperature changes on the built-in oscillator and does not consist a fault with the deck. In such a case,perform the bias adjustment in such a way that the indicator readings in the "tape" position become the same as in the "source" position.

This deck uses the Dolby noise reduction (NR) system, but with a difference: In addition to the Dolby B-Type noise reduction built into conventional cassette decks, it incorporates the newly developed Dolby C-Type noise reduction system.

Whereas the Dolby B-Type NR reduced noise in the high frequencies by about 10 dB, the Dolby C-Type NR with new characteristics achieves an improvement of about 20 dB in the range from 2 kHz to 8 kHz, where noise is most readily audible.

The operating principle of the Dolby C-Type NR is similar to the B-Type, in that it does not affect high-level signals in recording, but processes only low-level signals in the mid and higher frequency range. However, the operation of the C-Type system starts at a point 2 octaves lower than with the B-Type system, and it incorporates new circuits to prevent encode/decode errors or high frequency loss due to tape saturation. By using the Dolby C-Type NR, dynamic range is greatly enhanced and the setting of record levels becomes easy and trouble-free.
This deck incorporates both the Dolby B-Type and the Dolby C-Type noise reduction systems. When playing back a tape from your collection which was recorded with the B-Type NR "on", the NR switch should be set to the "B-Type" position. When playing a tape recorded with the C-Type NR, the switch should be set to the "C-Type" position.

Note:

- This system does not reduce any noise already contained in the incoming input signal. You should therefore strive to use signals as noise-free as possible as a recording source.

To the ear, the Dolby C-Type NR system provides a constant noise reduction with any type of music, during signal as well as during silent passages. Modulation or breathing noise has been suppressed past audibility, and the tape's saturation level is increased by the action of the so-called "spectral skewing circuit" to determine pre-emphasis and de-emphasis, and the "Anti-Saturation Network (ASN)", etc.

Chart A illustrates the low-level encoding characteristics for the B-Type NR and the C-Type NR. Decoding is done with exactly opposite characteristics, thus achieving flat overall frequency response. As can be seen from the chart, the operation threshold of the C-Type is two octaves lower than that of the B-Type, and in the high frequency range, noise reduction is by 20 dB.

Chart B shows an example of actual frequency response and noise spectrum analysis as recorded on a cassette deck. It is evident from the noise spectrum analysis that with the C-Type NR noise is considerably lower than with the B-Type and that it is reduced by about 20 dB in the range from 2 kHz to 8 kHz. In addition, with the C-Type NR the ANS and skewing features etc. serve to increase high frequency MOL during high-level recording.

Low-level Encoding Characteristics (−60 dB)

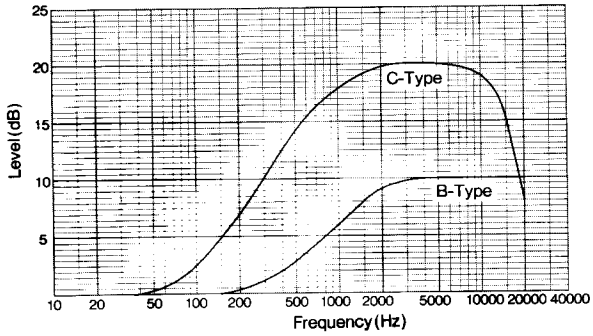


Chart A

Frequency Response and Noise Spectrum Analysis (Representative Sample)

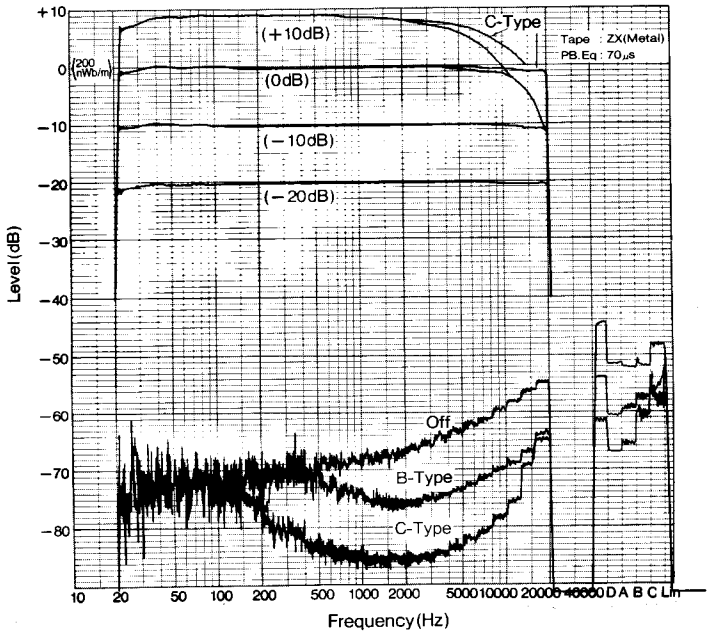
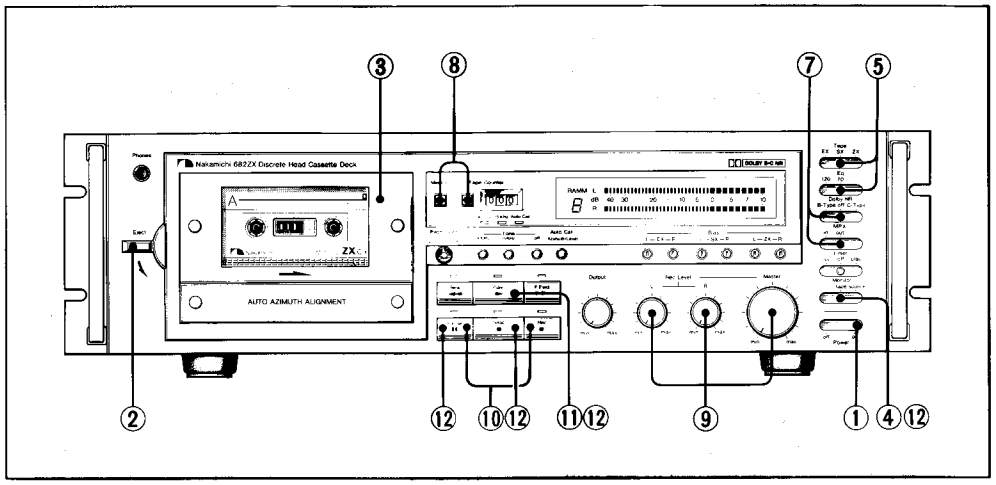


Chart B

Recording

① After confirming that the timer switch (17) is set to "off", turn on the power with the power switch (15)
② Open the cassette compartment by pressing down the eject lever (3).
③ Insert a cassette into the cassette holder with the exposed tape facing down. Close the cassette compartment by pushing the holder gently back until it locks into the panel.
④ Set the monitor switch (16) to "source".
⑤ Select the appropriate positions of the tape switch (21) and the equalizer switch (20) for the tape in use. (→p. 9)
⑥ Has auto calibration been performed for the cassette in use? If not, follow the instructions in the paragraph "Before Recording" on page 8.
⑦ If the Dolby noise reduction system is to be used for recording, select the desired position of the Dolby NR switch (19): either "B-Type" or "C-Type". If no Dolby noise reduction is to be used, set the switch to "off".
When recording from FM broadcasts, set the MPX filter switch (18) to "in".
Note:
— When recording from other program sources than FM broadcasts, the MPX filter switch should be set to "out".
⑧ To easily re-locate the starting point of the recording afterwards, press the counter reset button (30). If the tape start memory switch (31) is engaged, the tape will then stop from rewind at a point near the beginning of the recording.
⑨ You are now ready to set the record levels. First, turn the master input level control (14) to approximately 12 o'clock. Then turn up the input level controls (12) and (13) and adjust the proper record level for each channel. If the recording level is too low, turn the master input level control further up and then repeat the individual channel adjustmets.
⑩ Put the deck into the record-standby mode by pushing the pause button (6) while holding the record button (10) depressed. The red light above the record button and the green light above the pause button come on to indicate record-standby.
⑪ Press the play button (7) to start recording.
⑫ To check the quality of the recording in progress, you can monitor the playback signal by setting the monitor switch (16) to "tape". In the "source" position, the input signal before recording is heard.

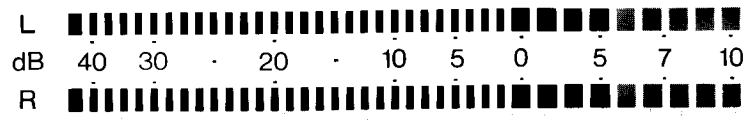


To stop the tape for short intervals during recording, press the pause button (6).
To resume recording, press the play button (7) again.
If the stop button (8) is pressed, the recording mode is released and the transport comes to a full stop.

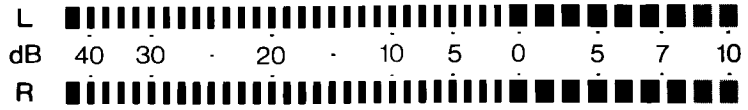
Tips on Setting Record Levels

The fluorescent level indicators of this cassette deck are free of "overshoot" problems and display peak levels with a high degree of accuracy.
For good recordings, it is essential to maintain a high signal-to-noise ratio. This is achieved by putting as much signal on the tape as is possible without producing distortion. Setting record levels too low will result in noisy recordings, while too high recording levels cause distortion. Finding the proper level between these two extremes is what good recording is all about. This task is facilitated by this deck's level indicators which cover a wide 50dB range and accurately display even very short signal peaks. Refer to the chart as a guideline to set recording levels.

"Normal" (LH) position tape formulations,
"Chrome" position tape formulations:
The indicators should be allowed to read as high as +5 dB on short program peaks.



"Metal" position tape formulations:
The indicators should be allowed to read as high as +8 dB on short program peaks.

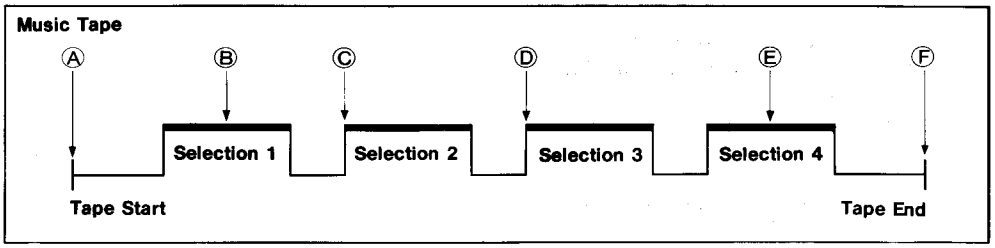


As different tape formulations have slightly different overload (headroom) characteristics, the requirements may vary to a certain degree when using different tapes.

Special Features

Random Access Music Memory (RAMM)

The RAMM system built into the 682ZX works by sensing and counting silent spaces of more than 5 seconds which are located between musical selections on a tape. This system makes it possible to go to the beginning of any selection at the touch of a button. It does not matter if the selection you want to hear lies several counts before or after the one you are listening to at present: the RAMM system will easily find it according to your commands and play it back automatically. (Up to 9 selections can be skipped.)



Operation

1. Skipping Selections in the Forward Direction

Program	RAMM Display Setting	
Selection 1	0	selection now playing
Selection 2	1	⇩
Selection 3	2	desired selection
Selection 4	3	

The above example illustrates the following case: While listening to selection 1 (at point Ⓑ in the chart), you want to proceed directly to selection 3 (point Ⓓ in the chart). This is achieved by the following steps.

(1) Press the fast-forward button (9) and then promptly press the pause button (6). This will activate the cueing mode.

(2) Press the pause button (6) again for as many times as there are selections you want to skip (including the one you are listening to at present).
This will light the RAMM display (24) which changes count accordingly. In the above example, the required count is "2". Pushing the pause button once in the cueing mode will light the "RAMM" letters and the numeral "1". The number display changes to "2", "3", "4" etc. up to "9" at each further push of the pause button.

(3) The program search system now takes over and the tape is wound to the beginning of the programmed selection. The RAMM number display decreases by one digit every time a selection is passed by.

(4) When the system arrives at the beginning of the desired selection, the RAMM count will be "0". The "RAMM" letters and the numeral "0" will go out and playback is resumed automatically from this point.

2. Listening to an Earlier Selection

Program	RAMM Display Setting	
Selection 1	4	
Selection 2	3	desired selection
Selection 3	2	⇧
Selection 4	1	selection now playing

The above example illustrates the following case: While listening to selection 4 (at point Ⓔ in the chart), you wish to jump back and listen to selection 2 (point Ⓒ in the chart). This is achieved by the following steps.

(1) Press the rewind button (5) and then promptly press the pause button (6). This will activate the cueing mode.

(2) Press the pause button (6) again for as many times as there are selections you want to skip (including the one you were listening to and the one you want to listen to from the beginning). This will light the RAMM display (24) which changes count accordingly. In the above example, the required count is "3". Pushing the pause button once in the cueing mode will light the "RAMM" letters and the numeral "1". The number display changes to "2", "3", "4" etc. up to "9" at each further push of the pause button.

(3) The program search system now takes over and the tape is wound to the beginning of the programmed selection. The RAMM number display decreases by one digit every time a selection is passed by.

(4) When the system arrives at the beginning of the desired selection, the RAMM count will be "0". The "RAMM" letters and the numeral "0" will go out and playback is resumed automatically from this point.

Note:

- Always confirm your RAMM entries by observing the RAMM display and push the buttons firmly to prevent RAMM malfunction.
- In one operation, you can skip up to 9 selections. After the tape has wound and passed a few selections (i.e. the display indication is less than "9"), you can increase the count again to pass an additional number of selections.
- "9" is the maximum RAMM count. The RAMM display will not indicate anything higher even if the pause button is pushed repeatedly.
- If you want to decrease the RAMM count, you can do so by pushing the record button (10) after the RAMM mode has been entered and the tape is winding. The count will decrease by one digit at each push of the button.
- If the tape is set at a point between two selections (silent passage) when entering the RAMM mode, it is possible that playback starts one selection after (in forward search) or one selection before (in rewind search) the programmed selection. This does not consist a fault with the deck.
- The RAMM functions can also be performed via the optional RM-200 remote control unit.

■ **A Note on Tapes**

The RAMM system works by sensing blank spaces of at least 5 seconds which usually lie between musical selections on a tape. Using tapes which exhibit one of the following conditions can introduce erratic behavior of the RAMM system which is not due to any fault with the deck.

1. An interval of less than five seconds between selections.
2. An extended pianissimo (low-level) passage in the music.
3. Low overall record level.
4. Extraneous information, such as noise, turntable rumble or hum, recorded between selections.

— **To ensure proper RAMM operation, be sure to leave at least 5~6 seconds of silence between selections when making a recording. The Rec Mute function can be used effectively for this purpose.**

Rec Mute

This feature provides a handy method to insert silent spaces between selections for correct RAMM operation or it can be used to cut off unwanted portions when recording from FM broadcasts, etc. By pushing the record button (10) once more during recording, the recording signal is muted as long as the button is being depressed. When the monitor switch is set to "source", the line output is not affected and it is possible to continuously monitor the input signal during the muting operation.

Cueing

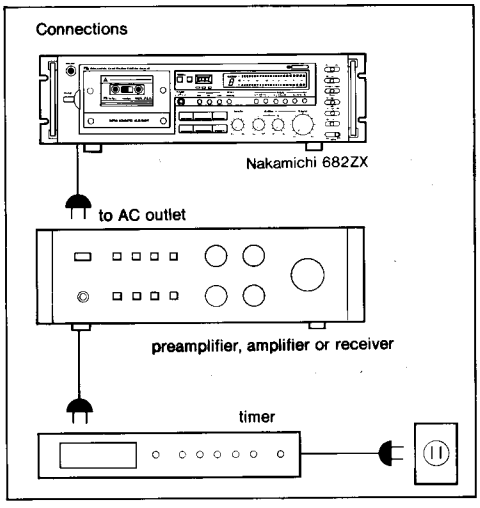
When the tape is shuttling during rewind or fast-forward, the head assembly is normally retracted and the output muted so that you do not hear the unwanted, high-pitched sounds that would otherwise result. But these high-pitched signals, if somewhat reduced in speed, can be used to locate the blank spots which mark the end of one selection and the beginning of the next. Most professional open-reel tape decks offer just such a feature. It is called cueing. The 682ZX provides a unique feature quite similar to cueing systems found on professional equipment. While you are in rewind or fast-forward, you can hear the tape in high-speed motion by pressing the pause button (6). Pressing this button while the deck is fast-winding will move the playback head closer to the tape and reduce winding speed to one-third. You can further reduce winding speed to approximately one-fifth by pressing and holding the rewind button or the fast-forward button. If you have moved the tape too far in one direction, you can change the direction of tape travel while remaining in the cueing mode simply by pressing the opposite fast-winding button. Pressing both the rewind and fast-forward buttons simultaneously will stop the tape with the deck remaining in the cueing mode. By making use of these features, you can easily locate any starting point on the tape. Pressing the stop button (8) or the play button (7) will release the cueing mode.

Timer Operation

The 682ZX has a built-in self-start feature which enables you to make unattended recordings or to start playback at a pre-selected time with the use of a timer.

■ **Operation**

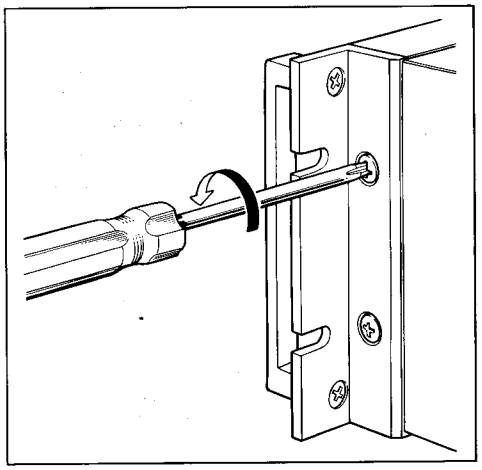
1. Make connections as shown in the chart.
2. Insert the tape for recording or playback and turn on the power to all components.
3. For unattended recordings, perform auto calibration (→p. 8) and set the input level controls to suit the expected recording level. For automatic playback adjust the output level control to the desired level. Check if all components are set up properly.
4. For unattended recordings, set the timer switch (17) to "rec", for automatic playback set it to "play".
5. Set the desired starting time at the timer.
6. At the pre-selected time, the timer will supply power to the components and the 682ZX will start recording or playing.



Rack Mount Adaptor

A rack mount adaptor with carrying handle is attached to each side of the 682ZX. The cassette deck can thus be fitted into any 19" EIA standard rack.

The adaptors can be easily detached by removing the two screws which affix them to the 682ZX. When the adaptors are removed, affix the supplied side panels in their place, using the same screws.



400-Hz Test Tone

Besides the 15-kHz test tone used for bias adjustments, this deck also incorporates a 400-Hz, 0dB test tone. This test tone can be used for level calibration with other components, etc. Setting the monitor switch to "source" and pushing the "400 Hz" button of the test tone switch (26) activates the test tone. To switch it off, push the "off" button of the test tone switch or the stop button (8).

Maintenance

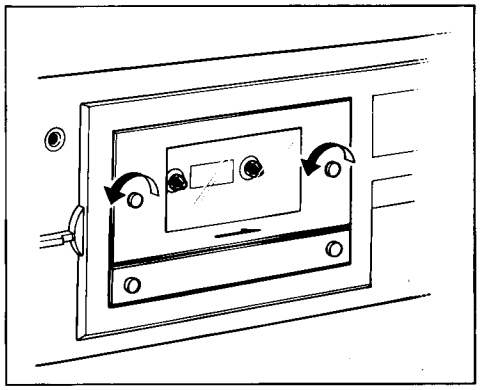
Head and Transport Cleaning

To maintain the Nakamichi 682ZX's superior performance and to prolong the life of the heads and pressure rollers, all parts that come into contact with the tape should be cleaned frequently and thoroughly. Dirty heads, capstans or pressure rollers may result in any of the following symptoms:
- Uneven sound levels.
- Loss of high frequencies.
- Wow and flutter.
- Damage to cassette tapes.
- Tape squeal caused by excess friction.

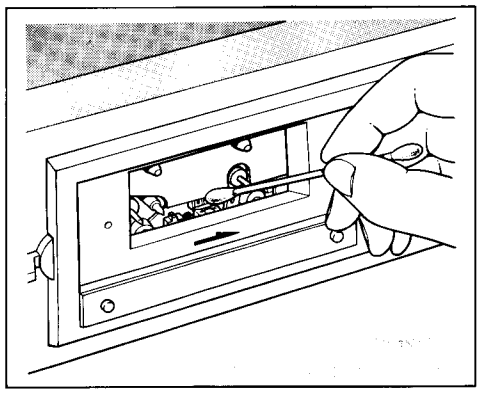
Even the best cassettes shed particles onto the heads, capstans and pressure rollers. Clean a minimum of once every ten hours of use, even if you use premium tapes. If you must use inferior brands of tape, you may need to clean after each playing. By observing the amount of contamination accumulated on the cleaning stick pad or cotton tip, you will be able to judge whether you are cleaning the 682ZX frequently enough. Repeated cleanings, if properly done, will not harm the deck. Hence, it is impossible to clean too often.

A Cleaning Kit consisting of cotton-tipped sticks and a container of alcohol is supplied with your Nakamichi 682ZX. When the alcohol runs out, use commercially available isopropyl alcohol (preferably undiluted). "Q-tips" and other cotton swabs may also be used. Do not, however, rely on head-cleaning cassettes. Some head-cleaning cassettes are unduly abrasive and may damage the heads. None of them clean the capstans and pressure rollers properly.
Perform all cleaning with alcohol. Use the plastic stick with a sponge tip screwed onto its end. A cotton-tipped stick is equally effective, but be careful not to leave strands of cotton on any of the cleaned parts.

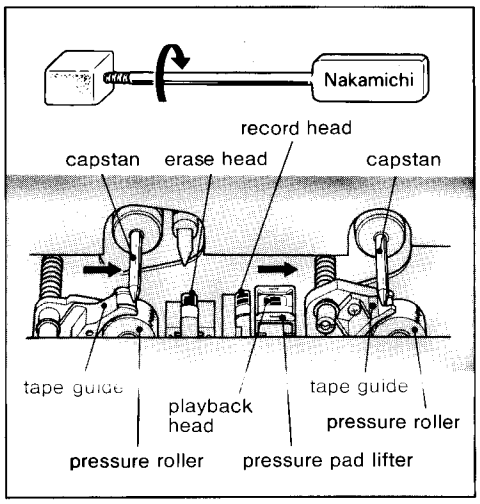
(A) Turn the power switch (15) on.
Remove the acrylic cassette holder cover by unscrewing the two hand-screws on the front of the holder (1).



(B) With a cleaning stick dipped in alcohol, clean the surfaces of the record, playback and erase heads. Clean with short, firm back-and-forth strokes along the path of tape travel. Also be sure to clean the tape guide on the far left.



(C) Press the play button (7). Carefully apply the cleaning stick to one pressure roller as it turns. Use light pressure and an up-and-down stroke to cover the entire width of the roller. Repeat with the other pressure roller. If you are using a cotton-tipped stick, make sure to apply the tip to the side of the roller rotating away from the capstan; the cotton may otherwise get caught between the capstan and the roller. (If this should happen, simply press the stop button and remove the cotton.)



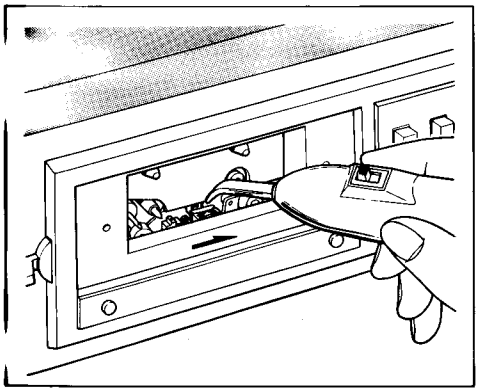
(D) With the transport in the stop mode, apply a clean section of the cleaning stick pad to one capstan. Move the pad up and down the capstan shift as it turns. Repeat with the other capstan.
(E) Press the eject button, and carefully replace the acrylic cover.

Cleaning is now completed, but give the cleaned surfaces a minute or two to dry off completely before playing a tape.

CAUTION:
- Tape guides and heads are critically aligned at the factory. Do not exert too much pressure on these parts. It is better to stroke repeatedly than to stroke forcefully.
- Do not flood various parts with cleaning alcohol. After dipping the stick into alcohol, squeeze off any excess.
- Be sure to remove any cotton strands from the cleaned parts.

Demagnetizing

All metal parts that come into contact with the tape must be occasionally demagnetized to prevent the build-up of residual magnetism. Such magnetism can add hiss to a tape being played and partially erase the high frequencies. Although the heads and capstans of Nakamichi cassette decks require demagnetizing less frequently than those of most other cassette decks, you should nevertheless demagnetize once every 50 hours of use to be on the safe side. The Nakamichi DM-10 Demagnetizer is recommended since it has been specifically designed for cassette decks, but any properly designed demagnetizer will do.



Lubrication

The moving parts of the Nakamichi 682ZX's transport are fitted with oil-less bearings. Periodic lubrication is not necessary.

Cleaning the Faceplate

Remove dust or smudges with diluted detergent applied with a soft cloth. Never use solvents, ammonia, or abrasive cleaning agents.

Troubleshooting

Condition	Probable Cause	Remedy
Tape does not run.	1. Power cord is unplugged. 2. Cassette holder not firmly closed.	Plug in cord firmly. Press eject lever and then close cassette holder firmly.
Record mode cannot be entered.	1. No cassette inserted. 2. Cassette tabs have been removed.	Place adhesive tape over tab opening or use new cassette.
Excessive playback hiss.	Head is magnetized.	Demagnetize head.
Uneven sound levels, drop-outs, excessive wow/flutter	1. Heads and/or capstans and pressure rollers dirty. 2. Faulty cassette.	Clean these parts. Replace cassette.
Incomplete erasure.	Erase head dirty.	Clean head and pressure roller.
Distorted record/playback sound.	1. Program material itself is distorted. 2. Recording levels are too high. 3. Excessive FM carrier leak.	Check program material. Wide dynamic range permits some short-term overload, but excessive recording levels will cause distortion. Adjust recording levels. Set the MPX filter switch to "in" when the Dolby system is used.
Record mode is entered, but cannot record.	1. Input disconnected. 2. Head dirty	Check connections. Clean head
Cannot playback.	1. Output disconnected. 2. Head dirty.	Check connections. Clean head.
Dull high frequencies.	1. Heads dirty. 2. Tape switch and/or equalizer switch not set correctly. 3. Bias amount dose not fit tape in use. 4. Record head azimuth misalignment.	Clean heads. Select correct positions for tape in use. Perform bias adjustment. Perform auto calibration.
Hum heard during recording or playback.	1. Strong induction fields near deck. 2. Signal cable or connector grounding faulty.	Keep deck away from amplifier, transformers, fluorescent lamps, etc. Replace signal cables.

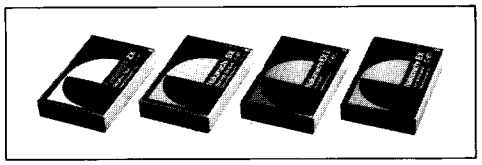
Specifications

Power Source	100, 120, 120/220-240 or 240V AC; 50/60Hz (According to country of sale)
Power Consumption	36 W max.
Tape Speed	4.8 cm/sec
Wow-and-Flutter	Less than 0.04% wtd rms Less than 0.08% wtd peak
Frequency Response	20-22,000 Hz ±3 dB (recording level −20 dB, ZX tape) 20-20,000 Hz ±3 dB (recording level −20 dB, SX, EX II tape)
Signal-to-Noise Ratio	**Dolby C-Type NR on** <70μs, ZX tape> Better than 72 dB (400 Hz, 3% THD, IHF A-wtd rms) **Dolb B-Type NR on** <70μs, ZX tape> 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) Less than 1.0% (400 Hz, 0 dB, SX, EX II tape)
Erasure	Better than 60 dB (below saturation level, 1 kHz, ZX tape)
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, 50 kΩ
Output (Line)	1V (400 Hz, 0 dB, output level control at max.), 2.2 kΩ
(Headphones)	45 mW (400 Hz, 0 dB, output level control at max.), 8 Ω load
BlackBox Series DC Output	±10V, 125 mA max.
Dimensions	482(W) × 143(H) × 340(D) millimeters 19(W) × 5-5/8(H) × 13-3/8(D) inches
Approximate Weight	9 kg 19 lb. 13 oz

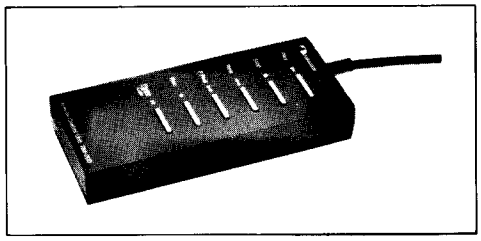
- Specifications and appearance design are subject to change for further improvement without notice.
- Dolby NR under license from Dolby Laboratories.
- The word "DOLBY" and the Double-D-Symbol are trademarks of Dolby Laboratories.

Optional Accessories

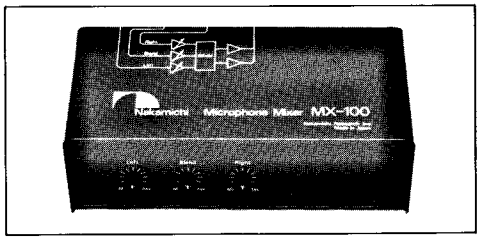
ZX Cassette Tape C-60, C-90
SX Cassette Tape C-60, C-90
EX II Cassette Tape C-60, C-90
EX Cassette Tape C-60, C-90



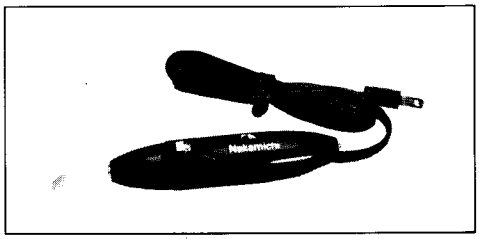
RM-200 Remote Control



MX-100 Microphone Mixer



DM-10 Head Demagnetizer



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