Nakamichi 1000ZXL

Computing 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 1000ZXL
Serial Number: _____

CONTENTS

Congratulations!
You have chosen the most sophisticated cassette deck on the market today.
The 1000ZXL is the latest in a long line of Nakamichi audio components designed and built to deliver the utmost in quality and performance.
It continues the tradition of the Nakamichi 1000 and 1000 II models, which were generally considered as the 'ultimate cassette decks'.
The 1000ZXL of course is capable of taking full advantage of the pure metal particle tape and provides three-head monitoring capability using Nakamichi's unique "Discrete" head configuration and "Auto Azimuth Alignment" feature.
Beyond that, a newly developed micro-processor automatically calibrates the 1000ZXL for any kind of tape with incredible precision, and the test data including information about noise reduction and playback equalization can be stored in its memory.
The 1000ZXL also boasts improved random access capability with previously unthought-of versatility and precision. These and a host of other features make the 1000ZXL a milestone in cassette deck technology.

Nakamichi products are internationally famous for state-of-the-art engineering and manufacture—assurance that your 1000ZXL will bring you many years of reliable service and enjoyment.

Many of the 1000ZXL's controls and features will be unfamiliar to you at the moment. This manual has been designed to acquaint you with the 1000ZXL 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, kichen 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 appliance (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.

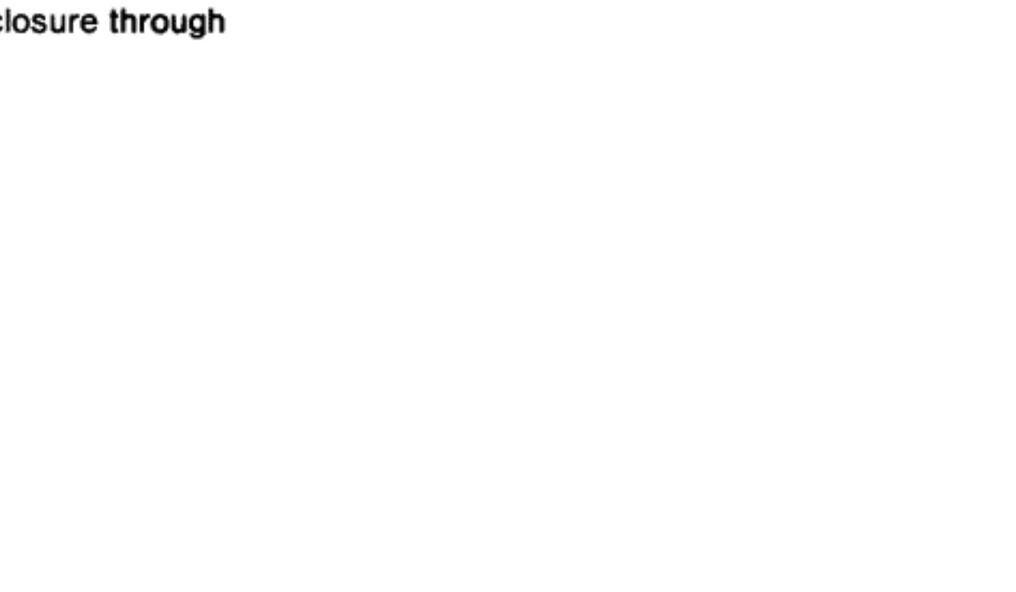
15. Object and Liquid Entry-Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

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.

IMPORTANT: MEMORY-BACKUP BATTERIES

For correct operation of this deck's memory feature, two memory-backup batteries are necessary.
Before using the deck, please insert the two included batteries as shown.



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.

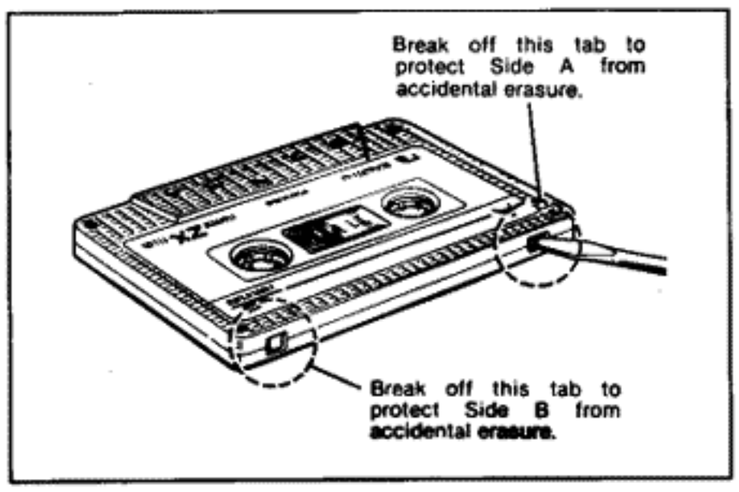
2. Do not pull out the tape from the cassette housing.

3. Be careful not to turn the cassette tape reels with the fingers, causing tape slackening.

4. Store cassette tapes away from heat, high humidity, dust and magnetic fields such as caused by speakers, TV sets etc.

Cassette Tabs

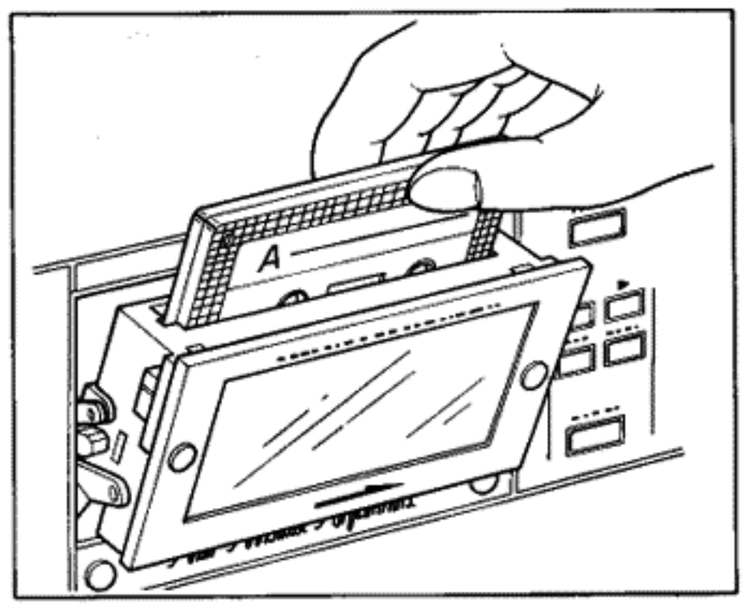
You can protect valuable recordings from accidental erasure and re-recording by completely removing the appropriate tab on the top edge of the cassette. The tab for each side is located on the top-left-hand corner as you face the side. Use a small screwdriver, and push the tab down to break it off. Do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



Insertion and Removal

(1) Insertion of a Cassette

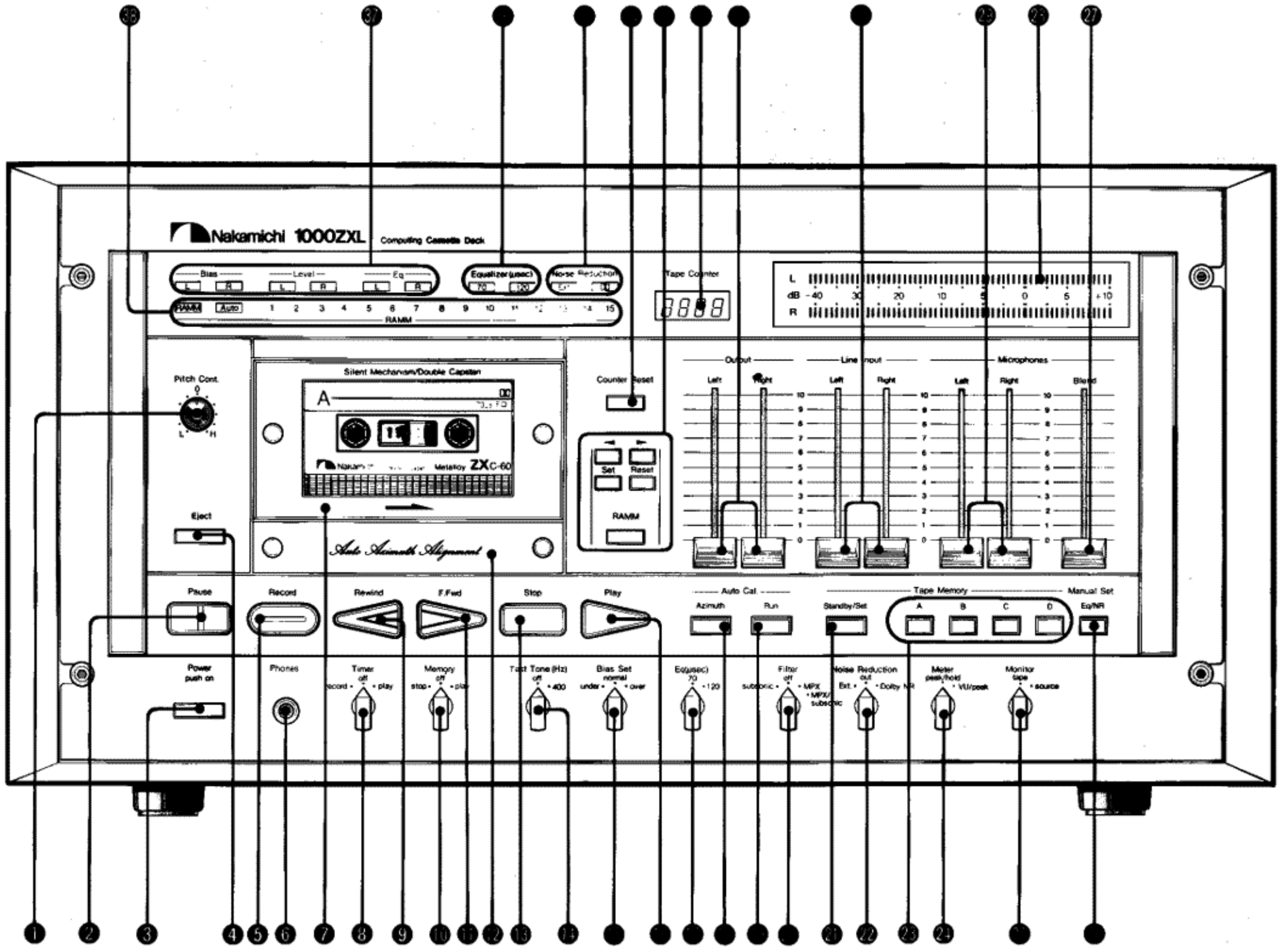
1. Push the eject button to open the cassette compartment.
2. Load the cassette into the holder from the top. Make sure that the exposed tape is facing down and the label of the desired side is facing you.
3. Close the cassette compartment by gently pushing the holder back into the panel.



(2) Removal of a Cassette

1. Push the stop button.
2. Push the eject button to open the cassette compartment.
3. Remove the cassette.

Controls and Features



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

(2) Pause Button
Used for noise-free, short-term interruption of the tape transport and to activate the cueing feature (→p. 7). When activated, the outer segment of the button lights up.

(3) Power Switch
Push to activate the 1000ZXL.

(4) Eject Button
Push to open the cassette compartment. Operates only when the transport is in the "stop" mode.

(5) Record Button
Puts the 1000ZXL in the record mode. When activated, the outer segment of the button lights up.

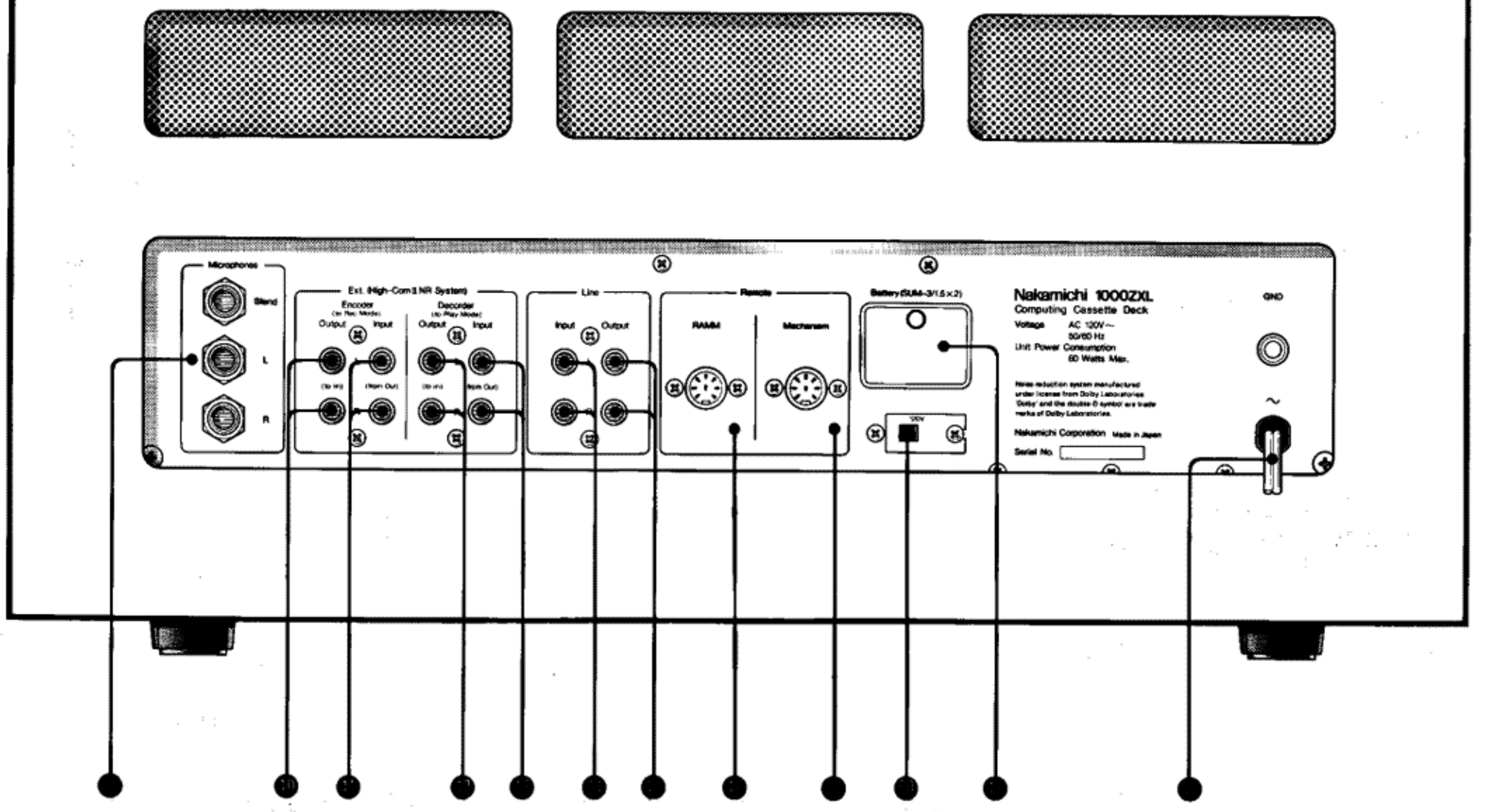
(6) Headphone Jack
Accepts standard stereophone plug.

(7) Cassette Holder
See-thru cover provides an unobstructed view of the cassette. The cover can be easily removed for routine maintenance.

(8) Timer Switch
Permits unattended recording or playback in conjunction with an external timer. (→p. 15)

(9) Rewind Button
For rapid tape-winding in the reverse direction. When activated, the outer segment of the button lights up.

(10) Memory Switch
When set to the "stop" position, the tape stops at the tape counter indication of "0000" during fast-forward or rewind. When set to "play", the tape automatically is put into the play mode at "0000". (→p. 7)



(11) Fast-Forward Button
For rapid tape-winding in the forward direction. When activated, the outer segment of the button lights up.

(12) Adjustment Screw Cover
Beneath this cover are screws for adjustment of head height, azimuth alignment, etc. These screws have been finely adjusted at the factory for optimum performance. In ordinary use, DO NOT ATTEMPT RE-ADJUSTMENT.

(13) Stop Button
Brings all tape motion to a full stop from any mode. When activated, the outer segment of the button lights up.

(14) Test Tone Switch
Activates the test tone of 400 Hz, 0 dB (200 nWb/m), which can be used for level calibration with other audio components etc.

(15) Bias Set Switch
Ordinarily to be used in the "normal" position. Depending on the tape in use and the source to be recorded, the "under" and "over" positions can be selected. (→p. 9)

(16) Play Button
Starts forward tape motion for recording or playback. When activated, the outer segment of the button lights up.

(17) Playback Equalization Switch
Selects either 70 μsec or 120 μsec equalization for playback. This selection can also be stored for activation by the RAMM (→p. 16) or Tape Memory (→p. 10) features.

(18) Auto Azimuth Alignment Button
Used to automatically align the record head azimuth to the tape. (→p.12)

(19) Auto Calibration Button
Used to automatically adjust bias, sensitivity and record equalization as well as record head azimuth to fit the tape in use. (→p. 9)

(20) Filter Switch
Selects either separate or simultaneous use of the MPX filter (to cut off any residual 19 kHz FM multiplex carrier signal) and the subsonic filter (to remove low frequency signals resulting from turntable rumble or tonearm resonances). (→p. 7)

(21) Standby/Set Button
When auto calibration (→p. 9) is completed, this button lights up. The test data for the tape in use can now be stored in the Tape Memory A,B,C or D.

(22) Noise Reduction Switch
Used to activate the built-in Dolby Noise Reduction circuitry or to switch an external noise reduction system, such as High-Com II. The position of this switch is displayed by the noise reduction indicator panel (35).

(23) Tape Memory Buttons
Data about bias, sensitivity, record equalization etc. for a given tape can be stored in A,B,C or D. (→p. 10)

(24) Meter Switch
Used to select the display characteristics of the level indicators (28).

(25) Monitor Switch
Selects either the input signal ("source") or the play-back signal ("tape") for monitoring during record.

(26) Manual Set Button
Used when setting the equalization or noise reduction independently from the tape memory function or when wanting to change the information on playback equalization or noise reduction contained in the tape memory.

(27) Blend Mike Level Control
Adjusts the level of a monaural center microphone. Can be mixed with controls (29) and (30).

(28) Fluorescent Level Indicators
Massless tape level indicators providing a high degree of accuracy and versatility. Can be set to show peak or VU levels with the meter switch (24).

(29) Mike Level Controls (L,R)
Adjust the levels of a left and right channel microphone, respectively. Can be mixed with controls (27) and (30).

(30) Line Input Level Controls (L,R)
Adjust the line input levels for left and right channels, respectively. Can be mixed with controls (27) and (29).

(31) Output Level Controls (L,R)
Adjust the deck's output level as well as the headphones listening volume for left and right channels, respectively.

(32) Tape Counter
Digital counter with a display range from "9999" to "-999". Works in conjunction with the memory switch (10).

(33) RAMM Control Buttons
Used to operate the RAMM functions. (→p. 16)

(34) Counter Reset Button
Push to reset the tape counter to "0000".

(35) Noise Reduction Indicator Panel
When the noise reduction switch (22) is set to "Dolby NR", the ▯▯ indicator lights up; when it is set to "Ext.", the Ext. indicator lights up. Also, when the tape memory function (→p. 10) or the RAMM funtion (→p. 16) is used, the stored information regarding noise reduction for the tape is displayed on this panel.

(36) Playback Equalization Indicator Panel
The position selected by switch (17) is displayed on this panel. Also, when the tape memory function (→p. 10) or the RAMM function (→p. 16) is used, the stored information regarding playback equalization for the tape is displayed on this panel.

(37) Auto Calibration Indicator Panel
When performing auto calibration (→p. 9), the adjustment stages are displayed on this panel.

(38) RAMM Indicator Panel
Displays RAMM functions selected by the RAMM control buttons (33). (→p. 16)

(39) Microphone Jacks
Accept up to three microphones for left, right and center ("blend") channels.

(40) Encoder Output Jacks
When using an external noise reduction system such as High-Com II, the "input" terminals of the encode (record) system are to be connected to these jacks. (→p. 23)

(41) Encoder Input Jacks
The "output" terminals of an external noise reduction system for encoding are to be connected to these jacks. (→p. 23)

(42) Decoder Output Jacks
When using an external noise reduction system such as High-Com II, the "input" terminals of the decode (play-back) system are to be connected to these jacks. (→p. 23)

(43) Decoder Input Jacks
The "output" terminals of an external noise reduction system for decoding are to be connected to these jacks. (→p. 23)

(44) Line Input Jacks
The "Rec Out" terminals of a preamplifier, integrated amplifier or receiver are to be connected to these jacks.

(45) Line Output Jacks
The "Tape Play" ("Play In") terminals of a preamplifier, integrated amplifier or receiver are to be connected to these jacks.

(46) RAMM Remote Control Socket
Accepts the respective plug of the optional remote control unit.

(47) Transport Remote Control Socket
Accepts the respective plug of the optional remote control unit.
For remote control of the tape transport buttons only, this socket accepts the plug of the Remote Control RM-200 (cable length 5 m). (→p. 7)

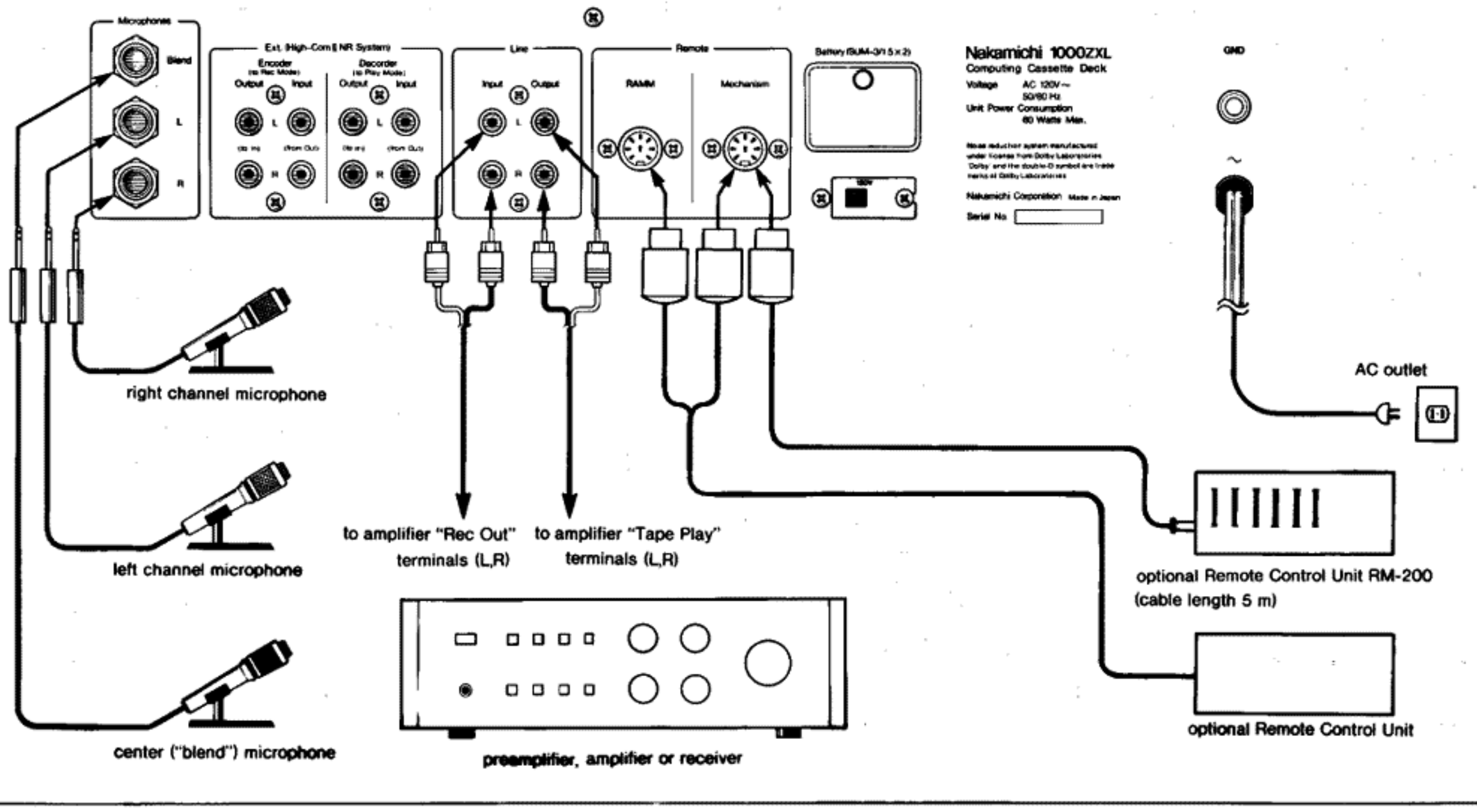
(48) Battery Compartment
Two SUM-3 batteries are necessary for memory-backup during power "off". These batteries are inserted here. (→p. 1)

(49) Power Cord

(50) Voltage Selector
AC Voltage is factory set for the country in which you purchased your 1000ZXL. 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, microphones and remote control.



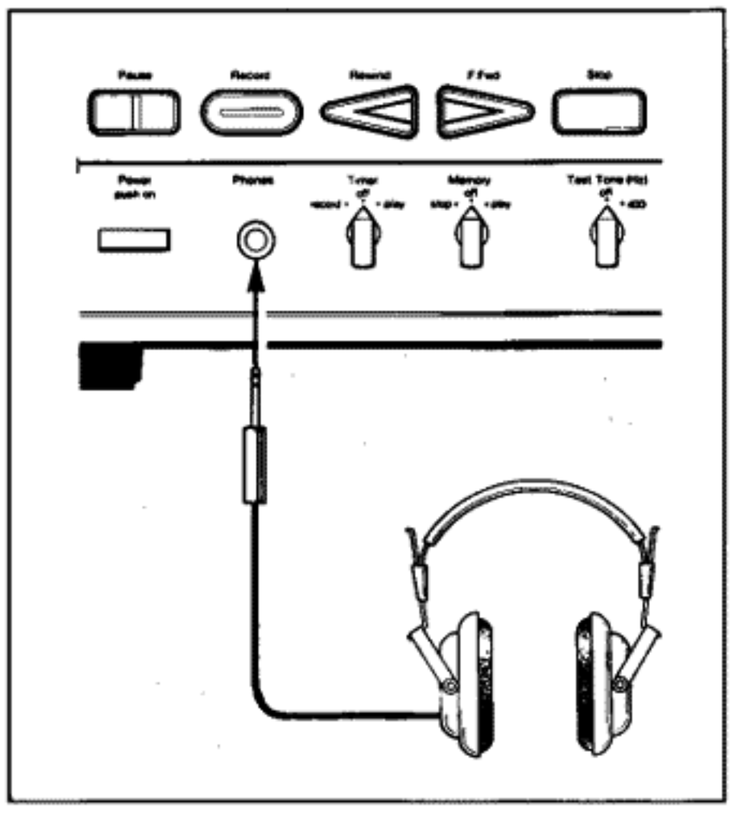
After checking the respective instructions for your amplifier or receiver, use the shielded cables with RCA plugs (provided with the deck) to securely connect the deck's line input jacks to the "Rec Out" terminals on the amplifier and the deck's line output jacks to the "Tape Play" terminals on the amplifier. 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.

Microphones
Use microphones of 600 ohms to 10 kohms impedance.

External Noise Reduction System
For instructions on how to connect an external noise reduction system such as High-Com II, please refer to page 23, "How to Use an External High-Com II System Via the Ext. Jacks".

Connections for Tape Dubbing
Recent amplifiers or receivers often have connections for two or three tape decks with the possibility of dubbing from one deck to the other merely by activating a switch. By making use of this feature, easy tape dubbing without having to change connections is possible. However, when wishing to dub directly, connecting this deck's line input jacks to the output jacks on another tape deck permits tape dubbing with the other deck as a source. Reversely, connecting this deck's line output jacks to another tape deck's input jacks permits tape dubbing with the 1000ZXL as a source.

Headphones
Standard stereo headphones may be connected to the headphone jack on the 1000ZXL. Low impedance headphones with 8 or 16 ohms nominal are recommended.



Special Features

Memory

This feature provides a handy method of re-locating any starting point on the tape and it can also be used to automatically replay a section on the tape just recorded or played. Push the counter reset button (34) to bring the counter reading to "0000" at any point on the tape you think you will want to return to. Then, if the memory switch (10) is set to "stop", the tape will automatically stop from the fast-forward or rewind modes when the counter reading "0000" is reached. If the memory switch (10) is set to "play", the tape will automatically be put into the play mode at that point.

Test Tone

By setting the test tone switch (14) to "400", a test tone signal of 400 Hz, 0 dB (200 nWb/m) is generated. This can be used for level adjustment when dubbing to another tape deck, calibration of an external noise reduction unit such as High-Com II, etc. For example, when wanting to use the 1000ZXL as a source to dub a tape with exactly the same level to another deck, proceed as follows.

1. Set the monitor swtich (25) to "source".
2. Set the test tone switch (14) to "400". Now the level indicators on the 1000ZXL read 0 dB.
3. Set the output level controls L and R (31) to maximum.
4. Put the receiving deck into the record mode.
5. Adjust the record level on the receiving deck so that its level meters read 0 dB.

For instructions on calibration of an external High-Com II system, please refer to page 23.

MPX and Subsonic Filter

In the transmission of FM broadcast signals, a 19 kHz multiplex carrier signal is used. When recording FM broadcasts while using the Dolby noise reduction system, residues of this 19 kHz signal can be detected by the noise reduction circuitry and cause it to malfunction. To prevent this, the MPX filter cuts off any remaining carrier signal. Therefore, when recording from FM broadcasts, set the filter switch (20) to "MPX". When recording from disks, very low frequency signals (around 10 Hz) produced by turntable rumble, record warps, tonearm resonances etc. can cause increased harmonic distortion in the tape deck. In such a case, set the filter switch (20) to "subsonic". This switch should also always be set to "subsonic" when recording from disks while using the RAMM function (→p. 16). In special cases, when the source to be recorded contains unwanted signals in the very low as well as very high frequency range, the "MPX/subsonic" position can be used.

Tape Slack Prevention

The 1000ZXL incorporates a special circuit designed to take up any loose tape inside the cassette when it is inserted. The moment you push the cassette holder into the compartment, the take-up spindle will rotate several times and the tape counter will advance by a few digits while the supply spindle is held stationary. This behavior is normal and not a fault with the deck.

Remote Control

An optional remote control unit will be made available for the 1000ZXL, which will permit operation of the RAMM control buttons (33) and the transport control buttons ((2), (5), (9), (11), (13), (16)). For operation of the transport controls only, the optional Remote Control RM-200 (cable length 5 m) can also be used.

Rec Mute

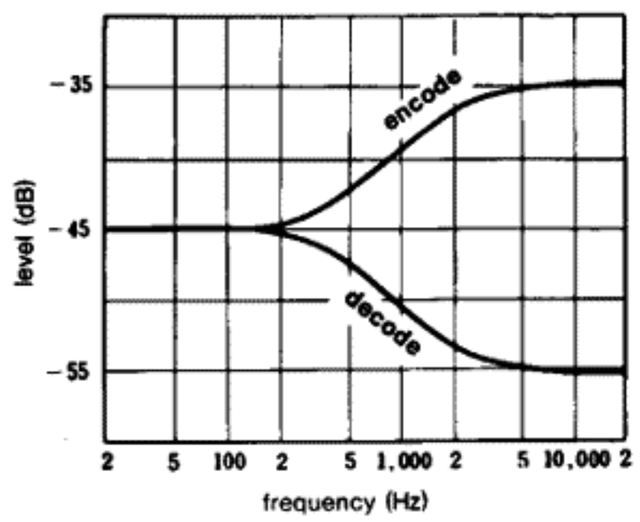
By pushing record button (5) once more during recording, the recording signal is muted as long as the button is kept depressed. This can be used to cut off unwanted portions while recording from FM broadcasts, etc. As the line output is not affected, it is possible to monitor the signal during the mute operation.

Cueing

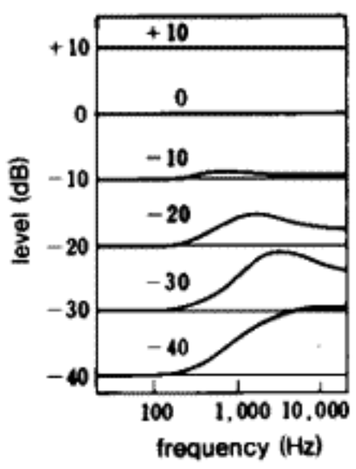
When the tape is shuttling during rewind or fast-forward, the head assembly is normally retracted and the output muted so that you do not hear the unwanted, high-pitched sounds that would otherwise result. But these high-pitched signals, if somewhat reduced in speed, can be used to locate the blank spots 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 1000ZXL 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 (2). 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 (9) or the fast forward button (11). 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 the 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 desired starting point on the tape. Pressing the stop button (13) or the play button (16) will release the cueing mode.

Noise Reduction

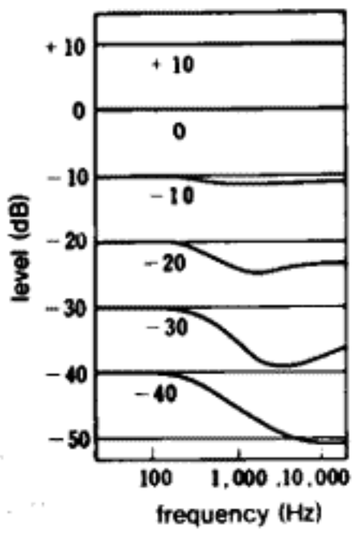
The 1000ZXL has a built-in Dolby noise reduction system with separate circuits for recording and playback, which makes possible instant monitoring during recording. The Dolby system works to reduce the tape-inherent hiss noise by boosting low-level high-frequency signals during recording (which leaves the tape hiss unaffected) and reducing these signals to the original level during playback (thereby reducing the tape hiss in turn). This improves the high frequency S/N ratio by about 10 dB. When wanting to make use of this system, the noise reduction switch (22) must be set to "Dolby NR" during recording (encoding) as well as during playback (decoding).



encode/decode characteristics for low-level signals

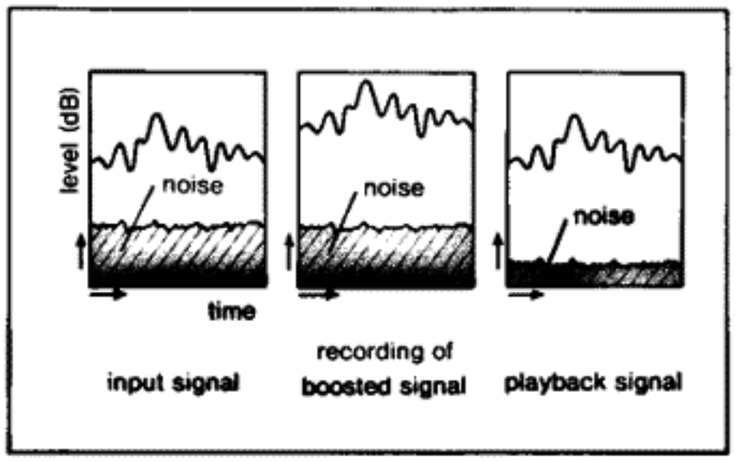


record (encode)



playback (decode)

The 1000ZXL also provides rear panel jacks (40)~(43) for the connection of an external noise reduction system such as High-Com II, which can then be used in the same way as the built-in Dolby system. For detailed instructions, please refer to page 23. In such a case, set the noise reduction switch (22) to "Ext.".



- For information on the RAMM feature, please refer to page 17; for the auto calibration and tape memory features to pages 9~10.

Before Recording

Auto Calibration

Today, a great variety of different cassette tapes are available, which are generally classified as "normal" position, "chrome" position, "metal" position etc. The 1000ZXL incorporates a micro-processor which automatically calibrates the deck for any given kind of tape. Calibration includes correct adjustment of the necessary bias, level (sensitivity) and recording equalization to achieve a frequency response of 20~20,000 Hz with any tape. For perfect recordings, be sure to perform auto calibration before starting to record.

Azimuth: The degree to which the gap of a magnetic head is perpendicular to the path of tape travel. Azimuth misalignment, for example due to cassette housing variations, causes degradation of high-frequency response and of phase characteristics. In the 1000ZXL, the play head is fixed and the record head azimuth alignment is performed automatically.

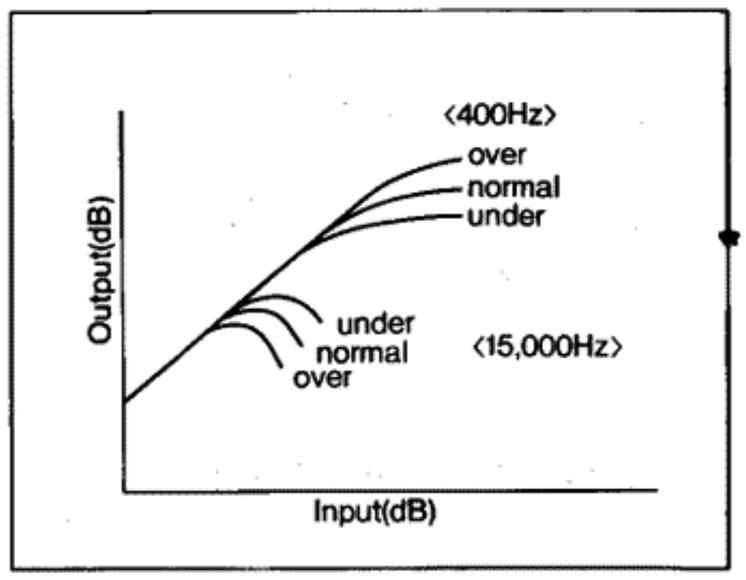
Bias: An inaudible high-frequency current used to reduce the non-linearities and distortions inherent in the recording process. Bias is applied only during record and has no effect during playback. To increase the bias current reduces distortion, but curtails high-frequency response. Reversely, to decrease the bias current increases distortion, but extends high-frequency response.

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

Equalization: In order to match the tape characteristics to the deck, besides bias it is necessary to adjust the equalizer curves. Equalization is applied in record and playback to achieve optimum signal-to-noise and head-room performance. Playback equalization for cassettes is fixed at 120 μsec for "normal" type tapes, and at 70 μsec for "chrome", "cobalt" and "metal" type tapes. When recording with the 1000 ZXL, you first set the desired playback equalization to "70" or "120", and then the record equalization curve is determined automatically to achieve flat response at that position. Therefore, in playback the equalization switch should be set to the same position as selected before recording.

1. After confirming that the timer switch (8) is set to "off", turn on the power.
2. Push the eject button (4) and insert a cassette.
3. Put the deck into the record-standby mode by pressing both the record button (5) and the pause button (2).
*4. Set the bias set switch (15) to "normal".
5. While depressing the auto calibration button "Run" (19), push the play button (16). This starts the auto calibration procedure. First, the tape counter (32) becomes "0000" and the noise reduction indicator lights (35) go out, regardless of the position of the noise reduction switch (22).
6. Now the automatic azimuth alignment is performed, which is indicated by the flashing of the auto azimuth alignment button light (18).
7. When the azimuth alignment is completed, the auto calibration proceeds to adjust the bias, level (sensitivity) and equalization for the left and right channels with the corresponding stages being displayed on the auto calibration indicator panel (37). During this time, the playback equalization panel (36) indicates [70] regardless of the position of the playback equalization switch (17).
8. When the calibration is completed, all lights on the auto calibration indicator panel (37) are lit, the tape is automatically rewound to the "0000" point, and the lights on the standby/set button (21) and the manual set button (26) come on.
**9. Choose the positions of the playback equalization switch (17) and the noise reduction switch (22). These two switches have no effect during the auto calibration procedure. In general, choose the "120" position for "normal" or "LH" type tapes and the "70" position for "chrome" and "metal" type tapes.
10. It is possible to start recording (or playback) now, but we recommend the use of the tape memory function as described below.

* Regardless of the position of the bias set switch (15), the frequency response will be flat at a recording level of −20 dB. However, depending on the position of the switch, the MOL (maximum undistorted output, or overload margin) in the high and low frequency range will change as shown in the diagram below.



The 1000 ZXL achieves best MOL balance with the bias set switch (15) at "normal", and this is the position which should generally be used. If the source to be recorded contains unusually much energy in the high frequencies and little energy at low frequencies, the "under" position can be selected. If there is a great amount of energy at low frequencies, the "over" position can be selected. However, the "under" and "over" positions should only be used when recording on markedly inferior or non-standard tapes.

** As the playback equalization switch (17) on the 1000 ZXL permits independent settings, it is possible to use "normal" or "LH" type tapes at "70" and "chrome" or "metal" type tapes at "120" while still achieving flat frequency response. If a "normal type tape is used with 70 μsec equalization, a lower noise level can be achieved while giving up a certain amount of high-frequency overload margin (slightly lower MOL). If a "chrome" or "metal" type tape is used with 120 μsec equalization, the noise level somewhat increases but a greater high-frequency overload margin (increased MOL) is achieved.
The positions of the playback equalization switch (17) and the noise reduction switch (22) can be selected either before or after auto calibration.

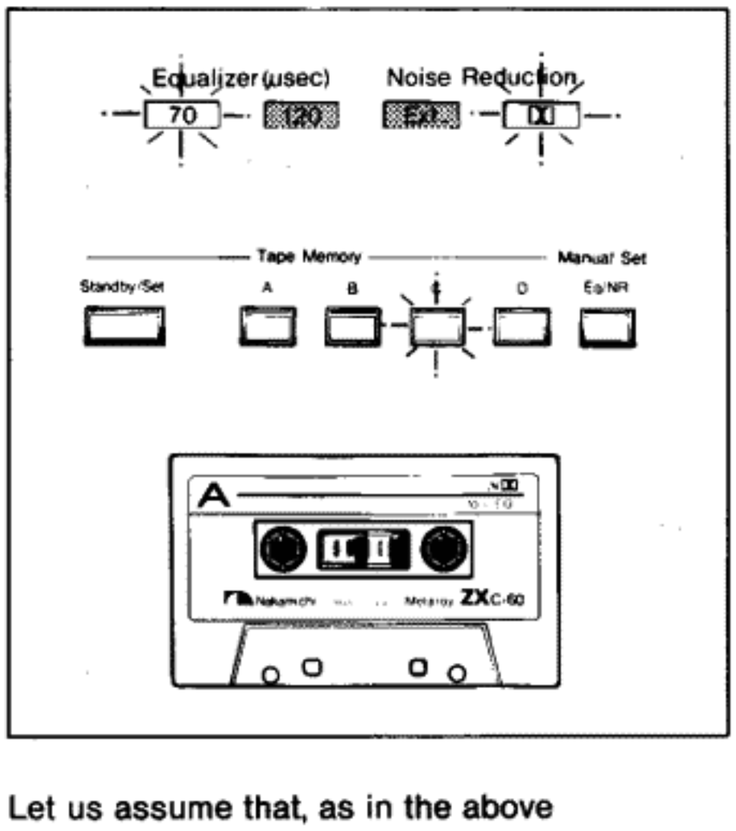
Tape Memory

The 1000 ZXL provides a tape memory in which the test data of the preceding auto calibration (bias, level, recording equalization) as well as the selected playback equalization and noise reduction can be stored. Therefore, when using a tape of the same kind, it is not necessary to perform auto calibration again. However, as even tapes of the same kind often show variations in cassette housing etc., the azimuth alignment should be performed every time by pressing the auto azimuth alignment button (18). Please refer to page 12, "Recording" for details.

1 How to Use the Tape Memory

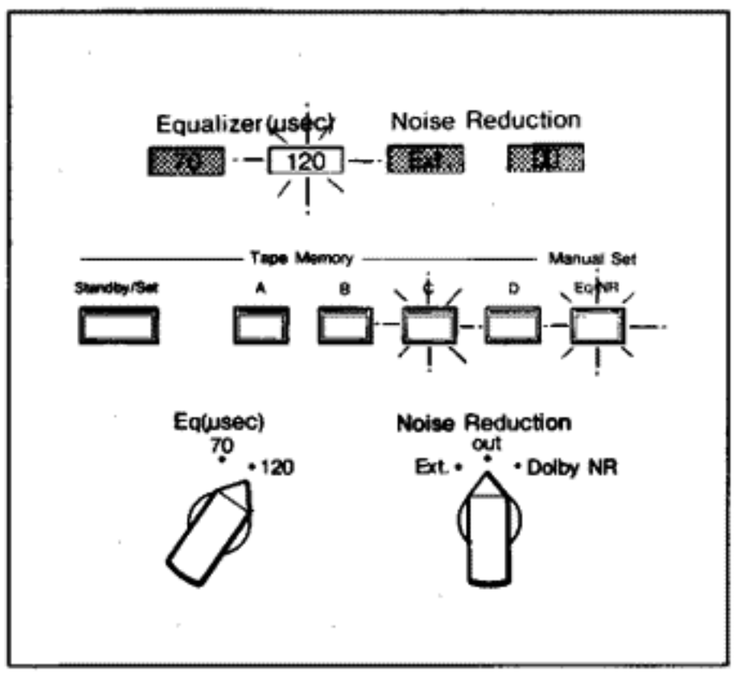
1. When auto calibration is completed, the lights on the standby/set button (21) and the manual set button (26) are on and the lights on all four tape memory buttons A,B,C,D (23) are out.
2. While depressing the standby/set button (21), push one out of the four tape memory buttons A,B,C, or D (23). The standby/set button (21) and the manual set button (26) go out and the selected tape memory button lights up, indicating that the bias, level, and recording equalization data as well as the positions of the playback equalization switch (17) and the noise reduction switch (22) selected at that point have been stored in the selected tape memory.
3. In this way, data for four different kinds of tapes and information on playback equalization and noise reduction can be stored and assigned to the four tape memories A,B,C and D. For example, if data for Nakamichi ZX tape with playback equalization "70" and "Dolby NR" are stored in tape memory C, pressing the tape memory button C before recording will provide the proper bias, level and recording equalization for this tape and put the deck into the record-standby mode with the playback equalization set at "70" and the noise reduction to "Dolby NR". The selected playback equalization and noise reduction are displayed on panels (36) and (35).

2 How to Change Tape Memory Data



Let us assume that, as in the above illustration, data for Nakamichi ZX tape with playback equalization "70" and "Dolby NR" noise reduction are stored in tape memory C (indicated by the lighting-up of the 70 and DOLBY indicators on panels (36) and (35) when pressing tape memory button C). If wanting to record on ZX tape, but with playback equalization "120" and without noise reduction, the data for playback equalization and noise reduction only can be changed by taking the following steps, without having to perform renewed auto calibration.

1. Press the manual set button (26). The button lights up.
2. Now set the playback equalization switch (17) to "120" and the noise reduction switch (22) to "out". Panel (36) displays 120 and panel (35) goes out.



3. It is possible to perform recording (or playback) in this condition, but if wanting to store the new data (ZX tape with "120" playback equalization and noise reduction "out") in a free tape memory, confirm that the manual set button (26) is lit, while pressing and holding the standby/set button (21), push one of the tape memory buttons A,B or D (23). If tape memory button B is pushed, for example, the information for playback equalization "120" and noise reduction "out" is stored in tape memory B along with the ZX tape data for bias, level and recording equalization copied from tape memory C. Tape memory C itself js left unchanged. If instead of tape memory buttons A,B or D tape memory button C is pushed, the playback equalization and noise reduction data in tape memory C are changed to the new information.

3 Use of the Tape memory in Playback

Out of the data stored in the tape memory, two parameters are necessary for playback: playback equalization and noise reduction. When wanting to play a tape which requires playback equalization of "70 µsec" and "Dolby NR", for example, searching for a tape memory which contains this information and pushing the respective tape memory button A,B,C, or D (23) (which lights the 70 and DOLBY indicators of panels (36) and (35)) will provide correct playback regardless of the tape type. If there is no suitable information contained in either of the four tape memories, push the manual set button (26) and then select the appropriate positions of the playback equalization switch (17) and the noise reduction switch (22) manually.

Note:

- Data stored in the tape memory are preserved also when the power to the deck is turned off, by means of the memory-backup batteries.
- Data stored in a tape memory are automatically erased when new data are fed into the same memory.
- Data are fed always into one memory only, even if more than one of the tape memory buttons A,B,C,D, (23) are pressed at the same time.

— When playing back a tape with recorded RAMM information on playback equalization and noise reduction, the RAMM information is given priority. (→p. 16)
— We suggest that you mark the cassette label with "A", "B", "C", "D", according to the tape memory used.

■Alarm Sign

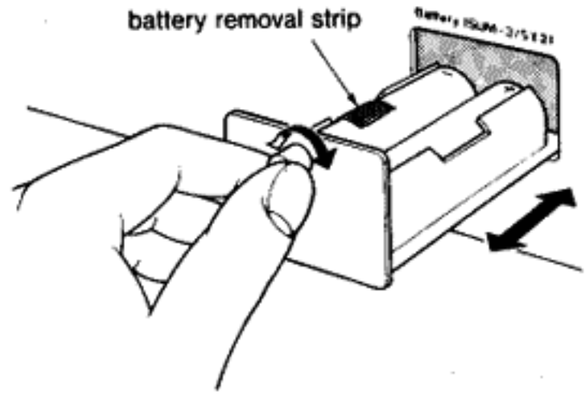
When a problem is encountered during the auto calibration process, the auto calibration indicator panel (37) starts to flash. A problem could be caused for example by one of the following conditions.

1. The tape end is reached during auto calibration.
2. The recording or playback function is impaired for some reason during auto calibration.
3. The stop button (13) is momentarily touched during auto calibration.

The alarm can be released by pressing the stop button (13).

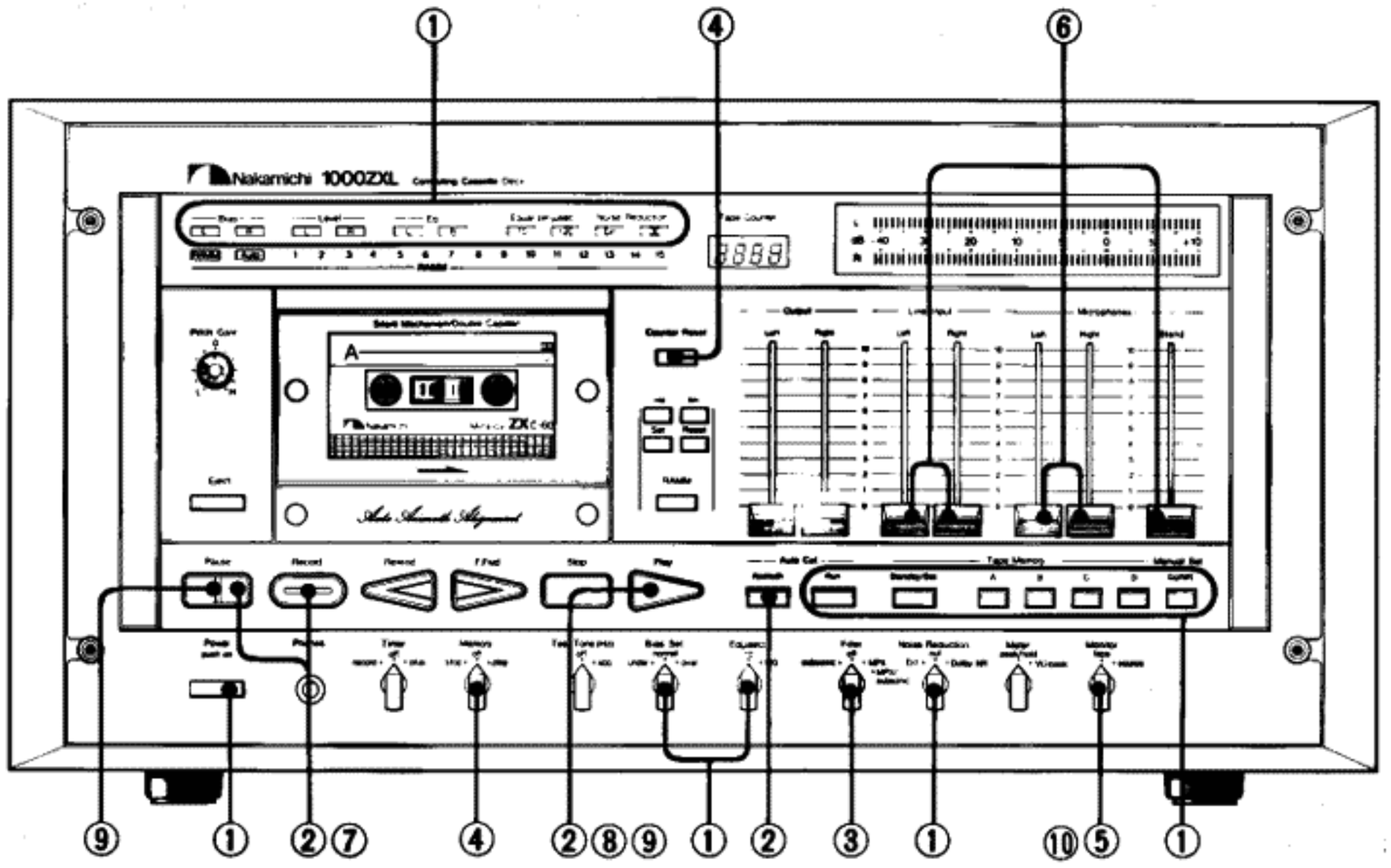
■Memory-Backup Batteries

1. When the memory-backup batteries are nearing the end of their useful life, one of the tape memory buttons A,B,C,D (23), which was lit before, will start flashing. In such a case, replace both batteries with fresh ones.
2. Be sure to replace the batteries with the deck's power switch (3) turned "on", so as not to lose the data stored in the tape memory.
3. Replace the batteries as illustrated below.



Be careful to insert the batteries with correct polarity as indicated in the battery case.
Do not use fresh and old batteries together.
Use only batteries of the same type and voltage as specified.

Recording



As this deck incorporates features such as "auto calibration" and "tape memory" which are vital to the recording function, be sure to consult the section "Before Recording" (p. 9).

① Perform steps 1~10 of the auto calibration as described on page 9. If data for the tape to be used have already been stored in one of the tape memories, you need only press the appropriate tape memory button (23). Check whether the indicator panels (36) and (35) display the desired playback equalization and noise reduction. If wanting to change these Memory parameters, refer to "How to Change Tape Data" on page 10.

② In case the tape data were selected using a tape memory button (23), put the deck into the record-standby mode by pressing the record button (5) and the pause button (2), and then push the play button (16) while depressing the auto azimuth alignment button (18). This causes the tape counter to become "0000" and starts the automatic azimuth alignment process, during which the button (18) flashes. When alignment is completed, the button light goes out and the tape is automatically rewound to the "0000" point.

③ When recording from FM broadcasts, set the filter switch (20) to "MPX", when recording from disks to "subsonic".

④ Push the counter reset button (34) to bring the counter reading to "0000". If the memory switch (10) is set to "stop", the tape can be easily rewound to the starting point of the recording; if it is set to "play", the tape can be rewound to automatically play back the recording immediately.

⑤ Set the monitor switch (25) to "source".

⑥ Adjust the recording level with the line input level controls (30) or the mike level controls (27), (29) or a combination of these. Refer to the next paragraph "Tips on Setting Record Levels".

⑦ While depressing the record button (5), push the pause button (2) to put the deck into the record-standby mode.

⑧ Push the play button (16) to start recording.

⑨ To stop the tape for short intervals during recording, press the pause button (2). To resume recording, press the play button (16) again.

⑩ To check the quality of the recording in process, you can monitor the playback signal by setting the monitor switch (25) to "tape". Turning this switch does not affect the recorded sound.

⑪ When the tape end is reached, the transport is shut off automatically.

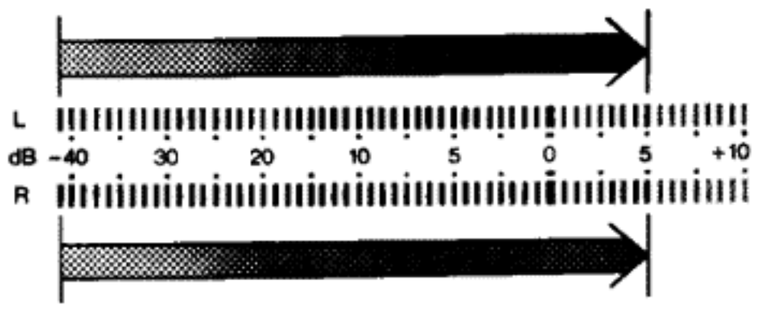
Note:

- The logic-controlled transport of the 1000 ZXL 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 (13).
- While the tape is in motion, the eject button (4) is inoperative and the cassette compartment does not open even if the button is pushed.

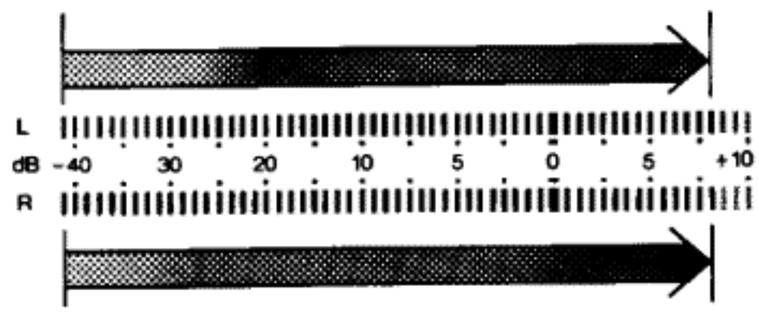
Tips on Setting Record Levels

The level indicators on the 1000 ZXL are of the fluorescent display, bar-graph type. As they do not suffer from "overshoot" and have carefully controlled display characteristics, they permit easy and correct signal monitoring.
The proper setting of record levels, however, requires some practice and patience. Too high record levels will result in tape saturation and produce distorted recordings. Too low recording levels degrade the S/N ratio and result in noisy recordings. Refer to the charts on the right as a guideline to set recording levels.

Note:
- With single continuous signals such as a test tone, the "peak" and "VU" modes give the same readings.
- When the monitor switch (25) is set to "source", the indicators display the source levels, when it is set to "tape", the levels recorded on the tape.



"Normal" type LH tapes, "Chrome" type tapes:
In the "peak" mode, the indicators should be allowed to read as high as +5 dB on short program peaks.

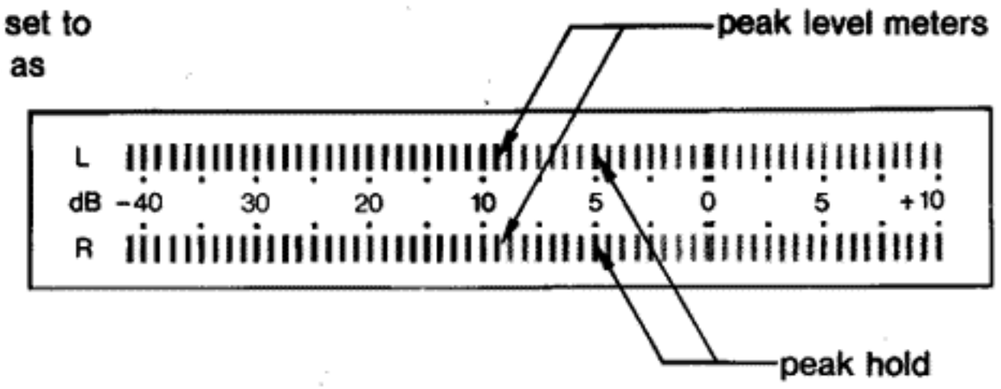


"Metal" type tapes:
In the "peak" mode, the indicators should be allowed to read as high as +8 dB on short program peaks.

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

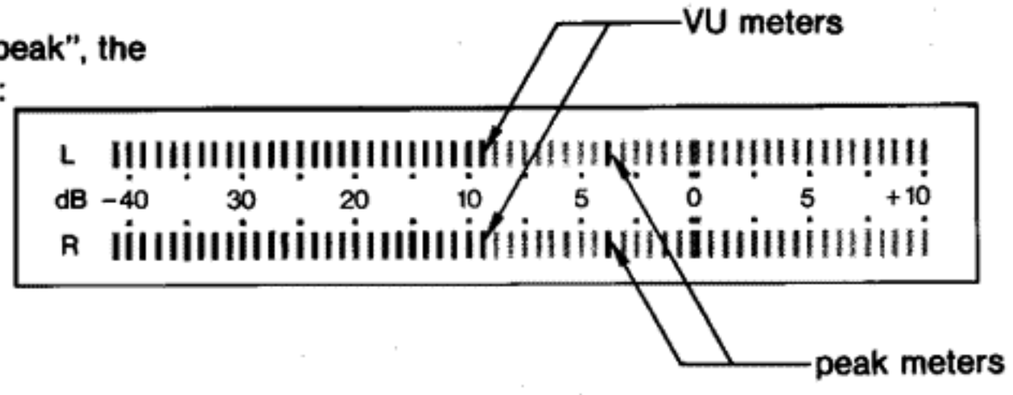
Level Indicator Display Characteristics

When the meter switch (24) is set to "peak/hold", the display works as follows:

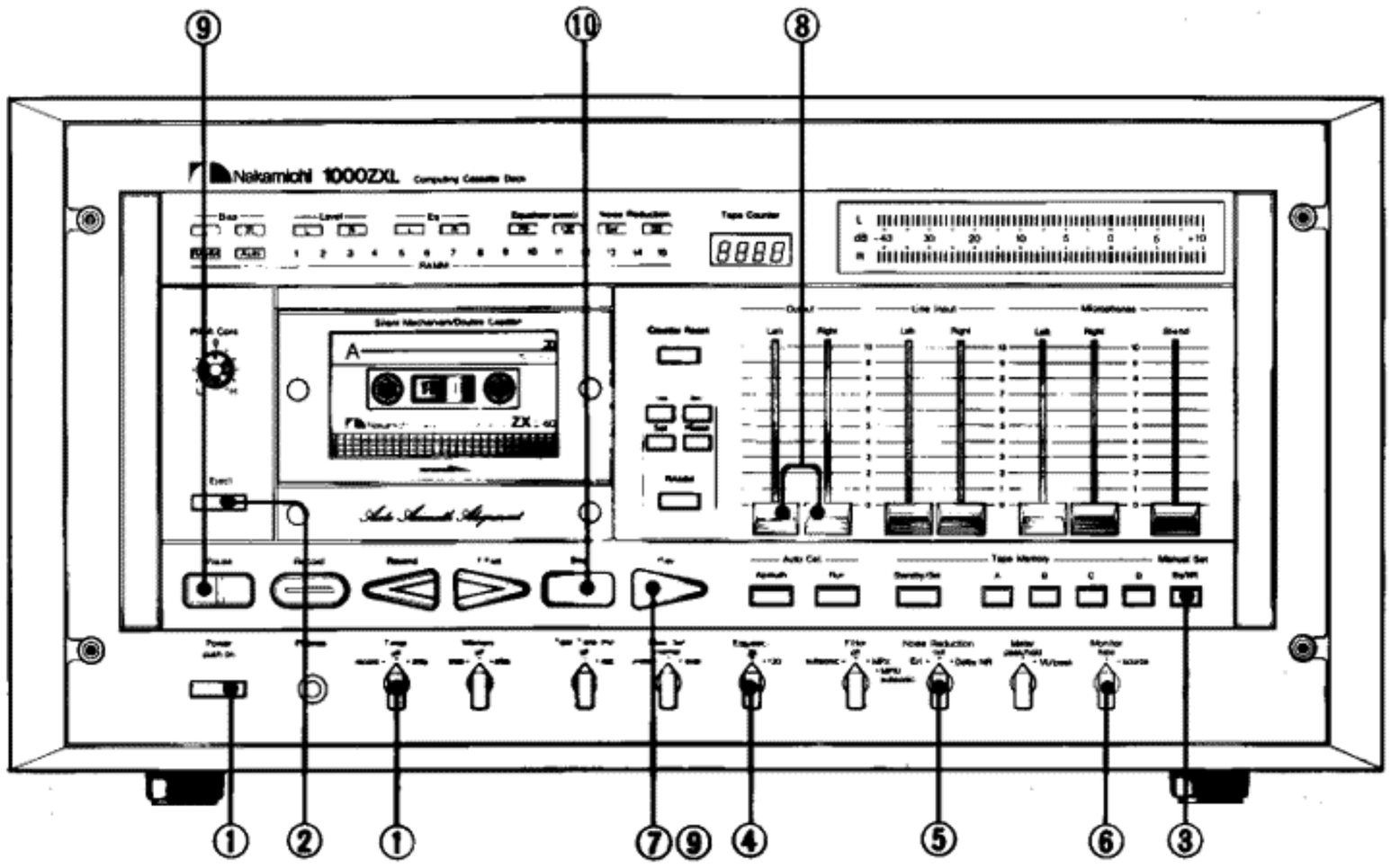


VU meters provide a measure of the average signal level and their readings are approximately equal to the loudness perceived by the human ear. However, they cannot display brief signal peaks; whereas it is often just such short-duration peaks which drive the tape into saturation and produce distortion. Peak level meters are able to display these short high-level signals and thus usually provide a safer means to determine record levels for cassettes. In addition, the indicators on the 1000ZXL also incorporate a peak-hold function, which makes for still easier and correct reading of levels.

When the switch is set to "VU/peak", the indicators have these functions:



Playback



① After confirming that the timer switch (8) is set to "off", turn on the power.
② Push the eject button (4)and insert a cassette.
③ Press the manual set button (26).
④ Set the playback equalization switch (17) to "70" or "120" according to the tape used. (→p. 9)
⑤ When using a tape which was recorded with Dolby noise reduction, set the noise reduction switch (22) to "Dolby NR"; when using a tape recorded with an external noise reduction system such as High-Com II connected to the rear panel jacks (40)~(43) of the 1000ZXL, set the noise reduction switch (22) to "Ext."; when using a tape which was recorded without noise reduction, set the switch to "out".
⑥ Set the monitor switch (25) to "tape".
⑦ Press the play button (16) to start playback.
⑧ Use the output level controls (31) to adjust the desired level.
⑨ For short-term interruption of playback, press the pause button (2). To resume playback, press the play button (16) again.
⑩ To stop the tape altogether, press the stop button (13). After the tape has stopped, you may eject it by pushing the eject button (4).
⑪ When the tape end is reached, the transport is shut off automatically.

Note:
- The level indicators (28) on the 1000ZXL display the level recorded on the tape and are not affected by altering the output level controls (31).
- Steps ③~⑤ of the playback procedure can be replaced by using a tape memory button (23). (→p. 10)

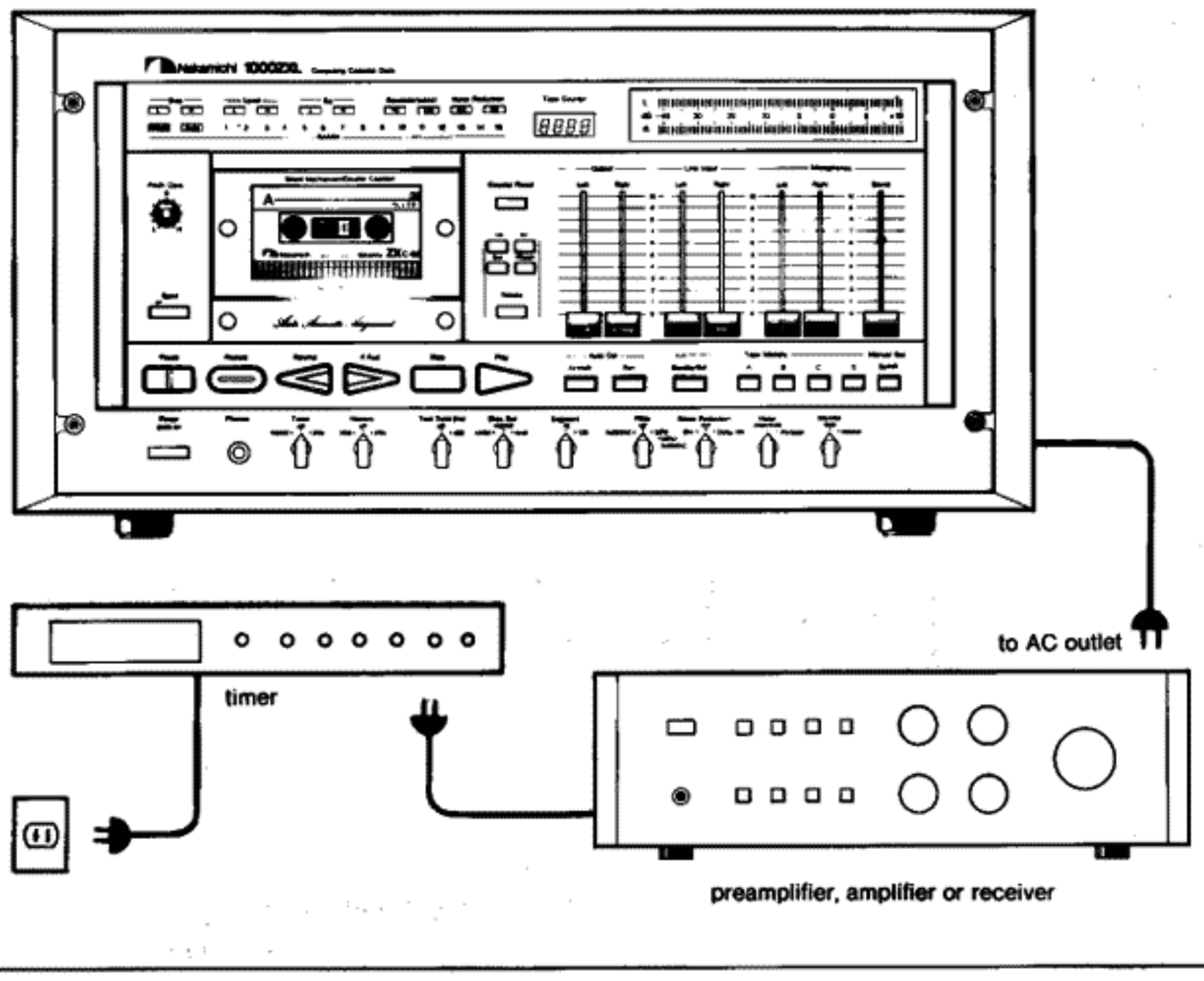
Timer Operation

The 1000ZXL 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 to be recorded or played and turn on the power to all components.
3. For unattended recording, be sure to use the tape memory function (→p. 10) and depress one of the tape memory buttons A, B, C or D (23).
4. For unattended recording, adjust the line input level controls (30) to suit the expected recording level; for playback adjust the output level controls (31) to the desired level.
5. For unattended recording, set the timer switch (8) to "record"; for playback set it to "play".
6. Set the timer for the desired starting time.
7. At the pre-selected time, the timer will supply power to the components and the 1000ZXL will begin recording or playing.

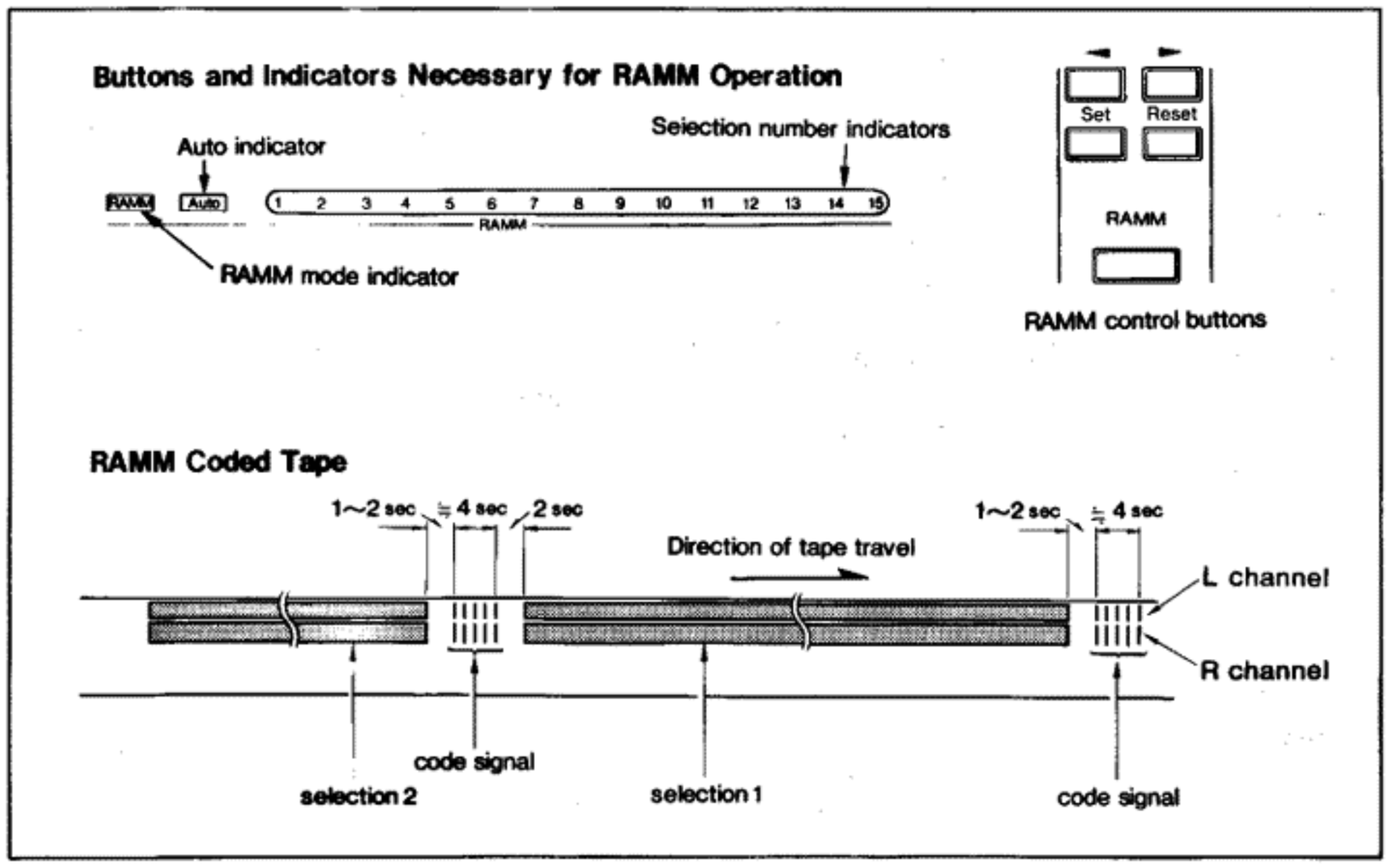
Connections



Random Access Music Memory (RAMM)

The Random Access Music Memory (abbreviated RAMM) is a system to easily locate and play any desired music selection on a tape. The system works by recording an inaudible code signal (5 Hz) on the blank space between selections on a tape (it is even possible to record a code signal during a selection). These code signals can then be used to freely program the order selections are to be played, choose repeated playings, etc.

A tape containing these 5 Hz RAMM code signals will be referred to as a RAMM coded tape. Besides information on the respective number of the selection, which is used for the operation of the RAMM feature, the code signals also contain information regarding noise reduction and playback equalization for the tape.



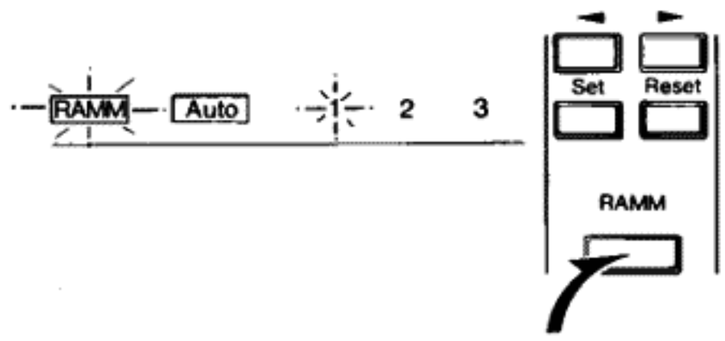
How to Produce a RAMM Coded Tape

It is possible to record the code signals on a tape either automatically or manually.

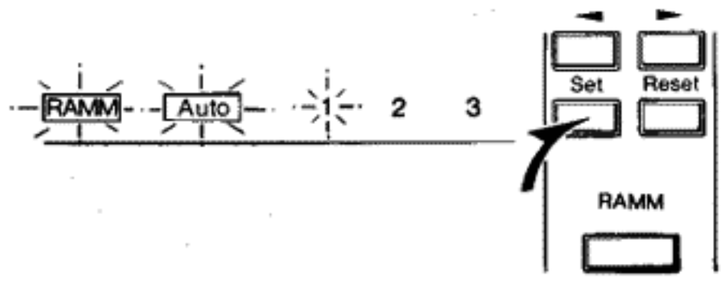
■Automatic Coding

In the automatic mode, a code signal is recorded automatically on a tape when there is a blank space (a silent passage in the source signal) of more than 2 seconds. This method is especially suited for dubbing disks on tape.

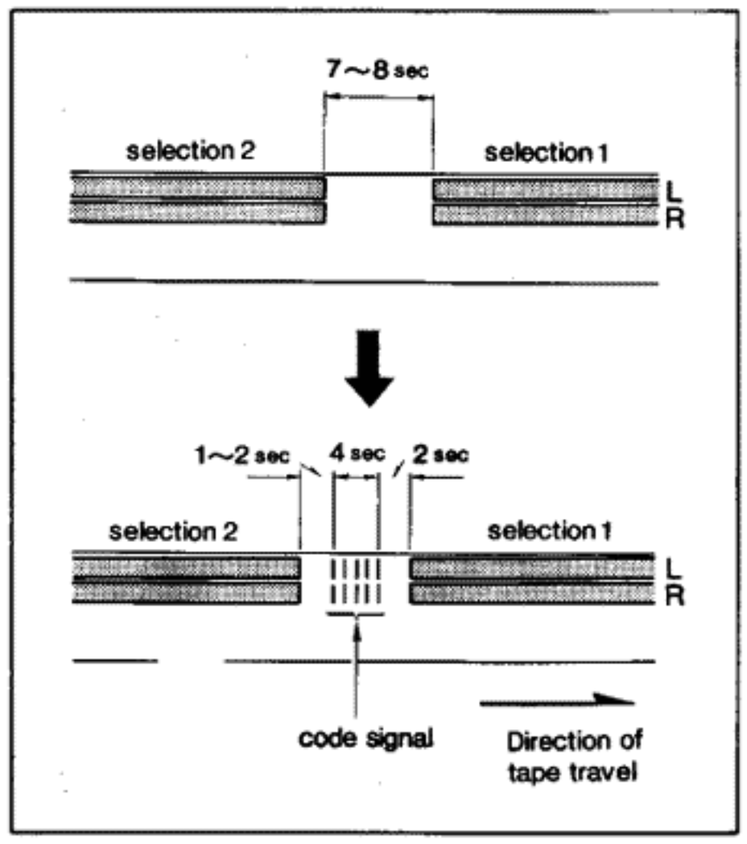
1. Prepare the tape to be recorded and perform steps ① and ② of the paragraph "Recording" on page 12. The playback equalization and noise reduction selected at this point will be stored by the code signal.
2. If the cassette is set at the leader tape portion, push the play button (16) and advance the tape for about 5 seconds. When the recording tape is reached, push the stop button (13).
3. While depressing the record button (5), push the pause button (2).
4. Press the "RAMM" button. The RAMM indicator and the selection number indicator "1" on the RAMM indicator panel (38) light up.



5. Press the "Set" button.
   The Auto indicator on the RAMM indicator panel (38) lights up.

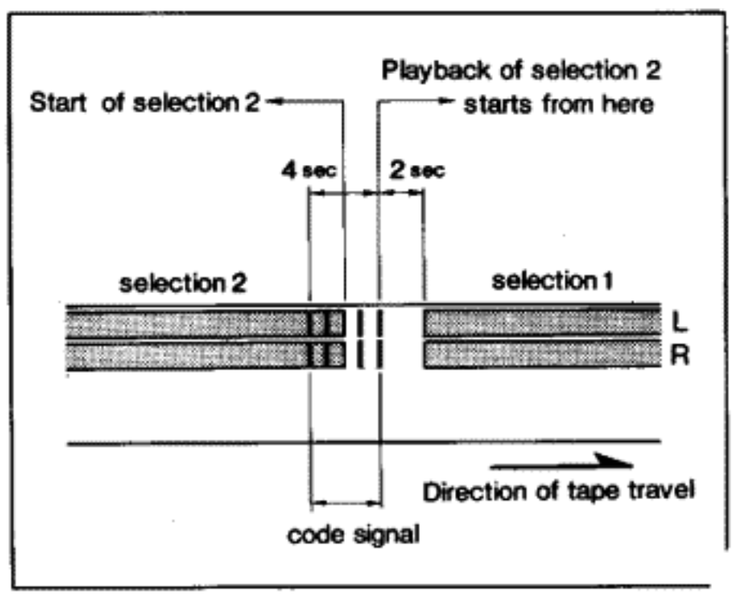


6. Press the play button (16) to start recording. This will cause the code signal for the selection number "1" to be recorded. While the code signal is being recorded, the RAMM indicator on panel (38) flashes. After approximately 4 seconds, the selection number indicator "1" will go out and the number "2" will light up, indicating that coding for selection "1" is completed.
7. Start the first selection of the source to be recorded.
8. When the first selection is finished and there is a silent passage of more than 2 seconds, the code signal for selection number "2" is automatically recorded. After this is completed, the selection number indicator "2" will go out and the number "3" will light up.



9. In this way, as the selections are being recorded, they are assigned their respective code signals "3" "4" "5", and so on up to "15", while the respective numbers are being displayed on the RAMM indicator panel (38). After number "15" has been recorded, the RAMM indicator and the Auto indicator on panel (38) go out and it is not possible to record any code signals for higher numbers.

Note:
- Keep in mind that the selection number indicators on panel (38) show the selection to be coded next, not the selection just being recorded (i.e. "2" while selection "1" is being recorded, etc.).
- After a RAMM code signal has been recorded, if there is no program section of at least 5 seconds and a blank space of at least 2 seconds, it is not possible to record the next code signal.
- Always set the filter switch (20) to "subsonic" when recording from disks, to prevent malfunction of the RAMM circuit. (also in manual operation)
- When producing a RAMM coded tape with disks etc. as a source, and the silent passage between selections is more than 2 but less than 6 seconds in duration, the code signal and the beginning of the next selection overlap, as shown in the chart below. This does not pose a problem, however, as the tape, if programmed for the latter selection, will start at the beginning of the code signal. There will also be no deterioration of sound quality. If the space between selections is less than 2 seconds, a code signal is not being recorded automatically, but it can be recorded manually by referring to the next paragraph.

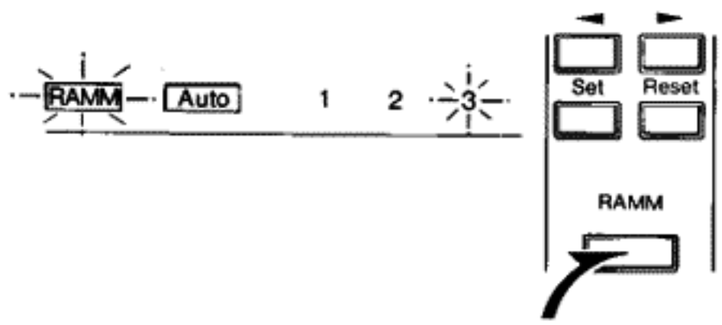


- If the pause button (2) was pushed during recording, the code signal for the next selection number is automatically recorded as soon as the play button (16) is pressed again to resume recording. After that, automatic coding continues, advancing the selection numbers at every silent interval of more than 2 seconds between selections. When the stop button (13) is pressed, automatic RAMM coding ceases. Be careful not to press the stop or pause buttons while a code signal is being recorded, as this would shorten the duration of the code signal which can cause malfunction of the RAMM operation.

■Manual Coding

Manual operation permits recording of RAMM code signals not only between selections, but also at the very beginning of a selection or at any point during the selection. The information stored by the code signals is the same as in automatic operation, i.e. the selection number and data about playback equalization and noise reduction as set during recording.

1. Prepare the tape to be recorded and perform steps 1~4 of "Automatic Coding" on page 16.
2. Press the play button (16) to start recording.
3. The code signal for selection number "1" will be recorded automatically. After approximately 4 seconds the selection number indicator "1" will go out and the number "2" will light up, indicating that coding for selection "1" is completed.
4. After the number "2" light has come on, wait for one or two seconds and then start the recording of selection "1".
5. When selection "1" is completed, press the "RAMM" button again. This will cause a code signal of about 4 seconds to be recorded on the tape and the selection number indicator will change from "2" to "3".



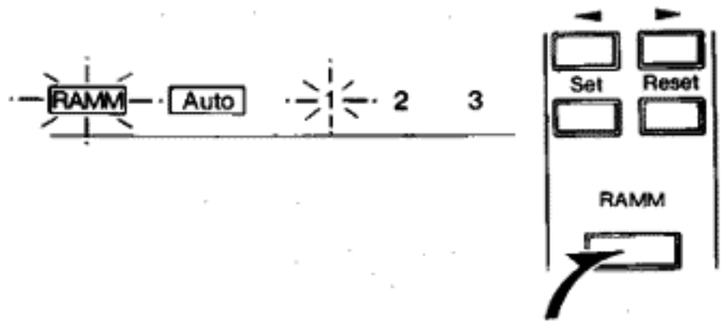
6. In this way, record the respective code signals before the selections "3", "4", "5", and so on up to "15".
7. After the code signal for selection number "15" has been recorded, the RAMM mode indicator RAMM and the selection number indicators will go out.

Note:
- Always start the recording of code signals with number "1".
- To prevent malfunction of the RAMM operation, leave at least 60 seconds between one code signal and the next.
- For correct operation, it is necessary that the numbers of the code signals do not overlap and that the code signals are recorded in subsequent order.
- While performing automatic coding, it is also possible to manually insert a code signal by pressing the "RAMM" button. For example, if automatic coding has been performed up to selection number "5", and selection number "6" is to be coded manually before continuing with automatic coding from selection "7", push the "RAMM" button at any desired point while the selection number indicator "6" is lit. This will cause the code signal for selection "6" to be recorded at this point. After that, any silent passage of more than 2 seconds will cause the automatic coding to record "7", "8", and so on.

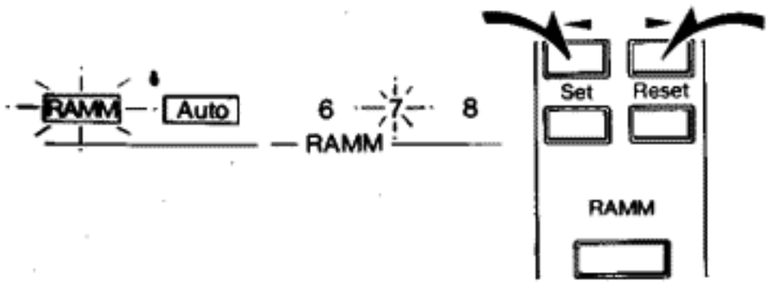
■Coding a Tape From Halfway

Let us assume that you have a tape with 6 selections recorded on it which are already coded from "1" to "6". If you want to add further selections to this tape and code these, too, please proceed as follows.

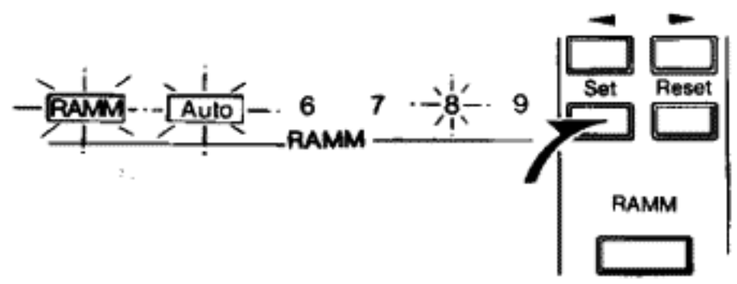
1. Set the tape at the end of selection number 6.
2. Perform steps ① and ② of "Recording" on page 12.
3. While depressing the record button (5), push the pause button (2).
4. Press the "RAMM" button. The RAMM indicator on the RAMM indicator panel (38) will light up.



5. Push the "►" (up) or "◄" (down) button to change the selection number indicators until the desired number "7" is lit. The numbers advance or decrease by one digit at each push of the buttons.



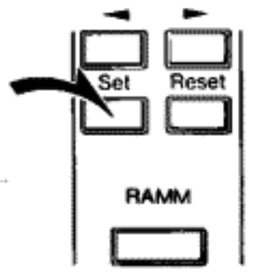
6. If you want to perform the coding from number "7" on automatically, press the "Set" button. Subsequently pushing the play button (16) will cause the code signal for selection "7" to be recorded automatically, and after appr. 4 seconds the selection number indicator will change to "8". About one or two seconds after "8" is lit, you should start the selection "7" for recording. Afterwards, if there is a silent passage of more than 2 seconds, the subsequent code signals will automatically be recorded.



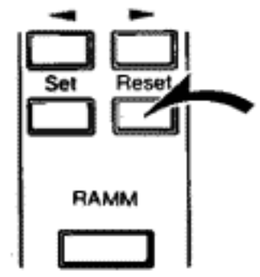
7. If you want to record the code signal for selection "7" manually, just push the play button (16) (without pressing the "Set" button). The code signal for selection "7" will be recorded. Further coding should be performed as described in "Manual Coding".

■Switching Between Automatic and Manual Coding

1. When wanting to switch from manual to automatic coding, just press the "Set" button. The Auto indicator on the RAMM indicator panel (38) will light up and recording of code signals will be performed automatically.



2. When wanting to switch from automatic to manual coding, press the "Reset" button. The Auto indicator on the RAMM indicator panel (38) will go out and recording of code signals can be performed manually.



Note

– For example, when dubbing a disk in the automatic coding mode, switch over to manual coding just before reaching the end of side A, and then push the pause button. Before starting to record side B, you should then switch back to automatic coding.

Playback of a RAMM Coded Tape

When a RAMM coded tape has been produced as described in the preceding paragraph, the 1000ZXL can be programmed to automatically play back selections on such a tape in any desired sequence or repetition. First, determine the sequence in which you want to listen to the selections, for example as follows:

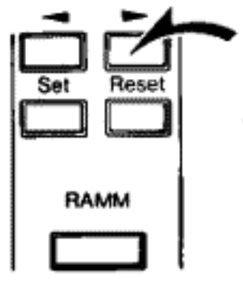
Playing Sequence: 1 2 3 4 5 6 7..... 30
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
Selection Number; 1 4 2 5 3 1 4..... 3

The playing sequence can be programmed up to a count of 30. Within this sequence, the same selection can appear several times at various positions or can be immediately repeated. Also, it is not necessary that the first selection in the playing sequence be the selection number "1".

■How to Program the Playing Sequence

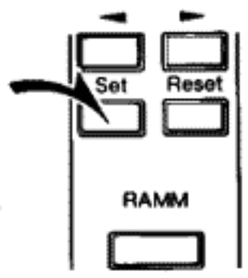
In the following, the programming procedure is described, using the above playing sequence as an example.

1. Push the "►" (up) button once, which causes the number display "1" to start flashing.

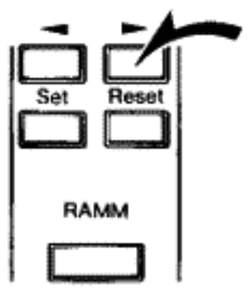


For details on the operation of the "►" (up) and "◄" (down) buttons, refer to "How to Use the "►" (Up) and "◄" (Down) Buttons in Playback" on page 22.

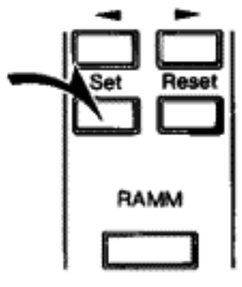
2. Press the "Set" button. The number display "1" changes from flashing to being lit constantly. This shows that the first selection has been programmed.



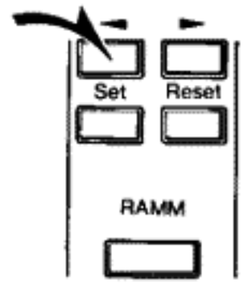
3. As the second selection to be played is the selection number "4", push the "►" (up) button to advance the numbers. When number "4" is flashing, release the button.



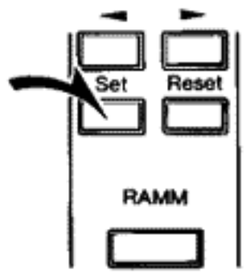
4. Press the "Set" button. The number display "4" changes from flashing to being lit constantly. This shows that the second selection has been programmed.



5. As the next selection to be played is the selection number "2", push the "◄" (down) button to gradually decrease the numbers on the display. When number "2" is flashing, release the button.



6. Press the "Set" button. As before, the number display "2" changes from flashing to being lit constantly, to indicate that the selection has been programmed.



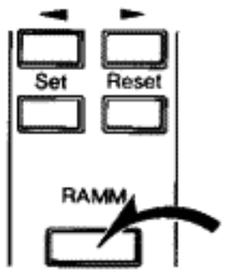
7. In this way, program all further selections by using the "►" (up), "◄" (down) and "Set" buttons.

Note:

- For correction or erasure of programmed sequences, please refer to page 21.
- For repeated programming of the same selection, proceed as follows: After the selection has been programmed once by pushing the "Set" button, use the "►" (up) or "◄"(down) button to move the number display away from its present position and then use the opposite button to return again to the number of the desired selection. This will set the number flashing again, and the same selection can be entered once more into the program by pressing the "Set" switch. By repeating this procedure, it is possible to program the same selection up to 30 times.

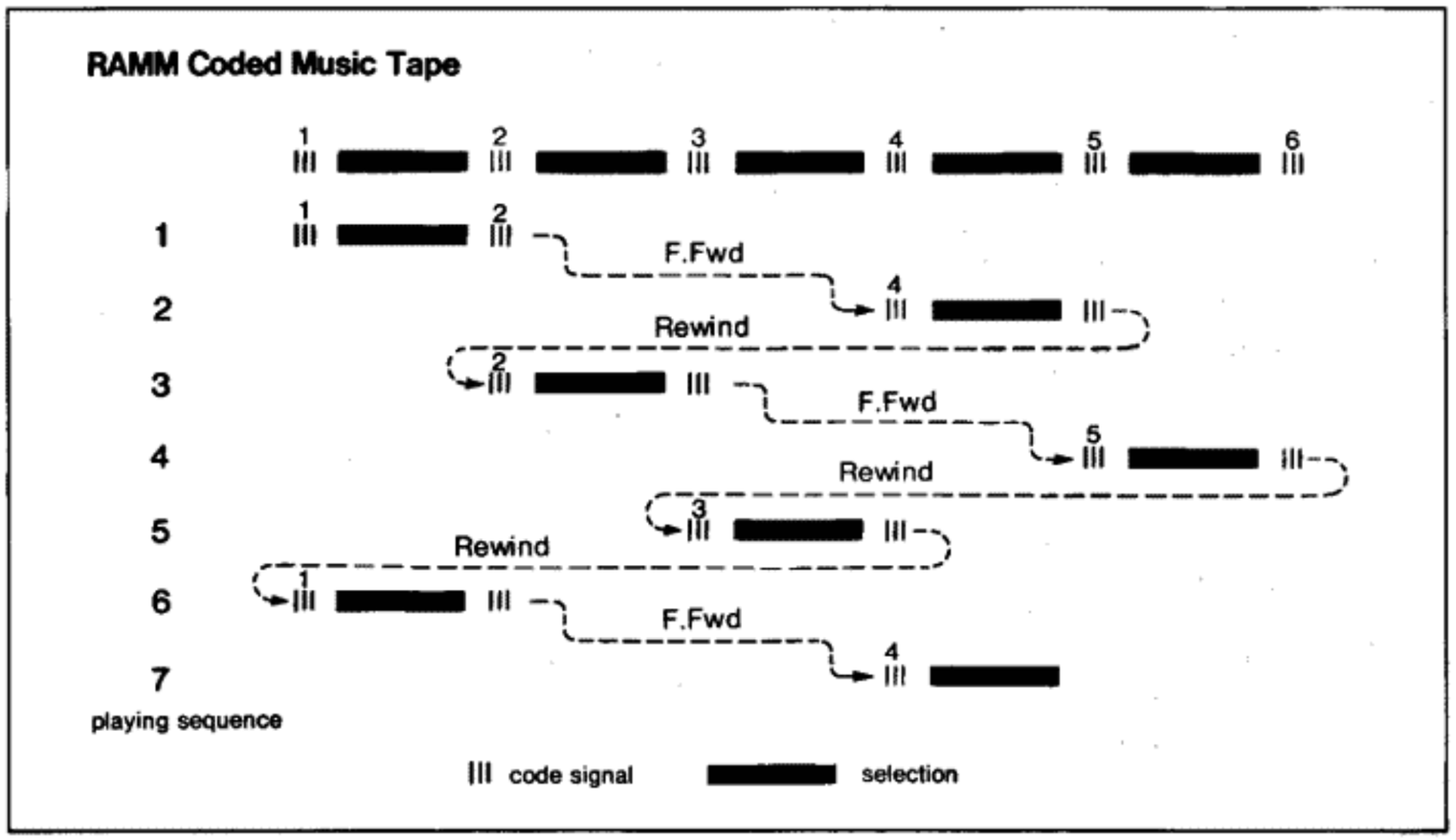
■Playback Procedure

1. Program a playing sequence as described in the preceding paragraph and insert the RAMM coded tape into the deck.
2. Press the "RAMM" button.
   The RAMM indicator on the RAMM indicator panel (38) and the number display of the first programmed selection will light up. At the same time, the deck will automatically be put into the fast-forward or rewind mode and it will search for the code signal belonging to the first programmed selection. During search, the numbers of the selections being passed by will flash on the display panel (38).



3. When the code signal of the first programmed selection is detected, the deck will automatically be put into the play mode. At the same time, the information stored in the code signal regarding playback equalization and noise reduction will be displayed on the respective panels (36) and (35).
4. When the end of the first programmed selection is reached, the deck will search for the code signal of the next programmed selection, and the above process is repeated.
5. In this way, all programmed selections are played in the pre-selected order. When the end of the program is reached, the tape transport stops and the program is erased.

The chart illustrates the playing sequence of the above example.



Note:

— When playing back a RAMM coded tape in the RAMM mode, the playback equalization and noise reduction are determined by the information stored in the code signals. Therefore the positions of the playback equalization switch (17), the noise reduction switch (22), and the tape memory buttons (23) have no effect in this mode. It is thus possible to determine varying playback equalization and noise reduction for different selections on the same tape. However, when playing back such selections in the order 1→2→3 etc., playback equalization and noise reduction for the subsequent selections will be the same as for selection 1.

— When the stop button (13) is pushed during playback in the RAMM mode, the RAMM indicator on the RAMM indicator panel (38) goes out, but the numbers indicating the program selections to follow stay on. When the "RAMM" button is pressed, the RAMM indicator comes on again and the deck automatically searches for the code signal immediately preceding the selection which was being played when the stop button (13) was pushed. The deck then resumes play at this point (i.e. at the beginning of the selection that was in progress when the stop button (13) was pushed).
   The same applies when the fast-forward button (11) or the rewind button (9) is pushed.

— If a selection number was programmed in the playing sequence which is not included on the RAMM coded tape, this number will be exempted from the program. For example, if a RAMM coded tape containing only code signals for selections "1"~"10" is being played but in the course of the playing sequence the number "11" has been entered, the deck will search for the code signal "11", but as this is not detected, will exempt number "11" from the program.

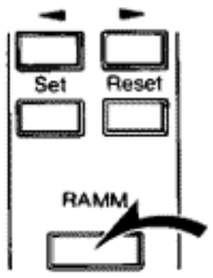
— If the deck is put into the RAMM playback mode but the tape inserted in the deck is not a RAMM coded tape (i.e. does not contain RAMM code signals), the deck will search in the fast-forward or rewind mode for code signals and as these are not detected, the tape transport will stop, the RAMM mode will be released (the RAMM indicators goes out) and the entered playback sequence program will be erased.

— If during playback in the RAMM mode a coded selection is followed by more than 4.5 seconds of silence (blank space on the tape), the RAMM judges this to be the end of the selection even if there is no new code signal recorded on this space. Therefore, according to the program, it proceeds to play the next selection in sequence or stops the tape if the preceding selection was the last one in the program.

— If during playback in the RAMM mode an incompletely recorded code signal is encountered or the code signal could not be detected clearly, the deck reads the preceding and following code signal numbers and determines the selection number accordingly. In such a case, the playback equalization and noise reduction is determined by the position of the tape memory buttons (23) or the playback equalization switch (17) and the noise reduction switch (22).

■Reject During Playback

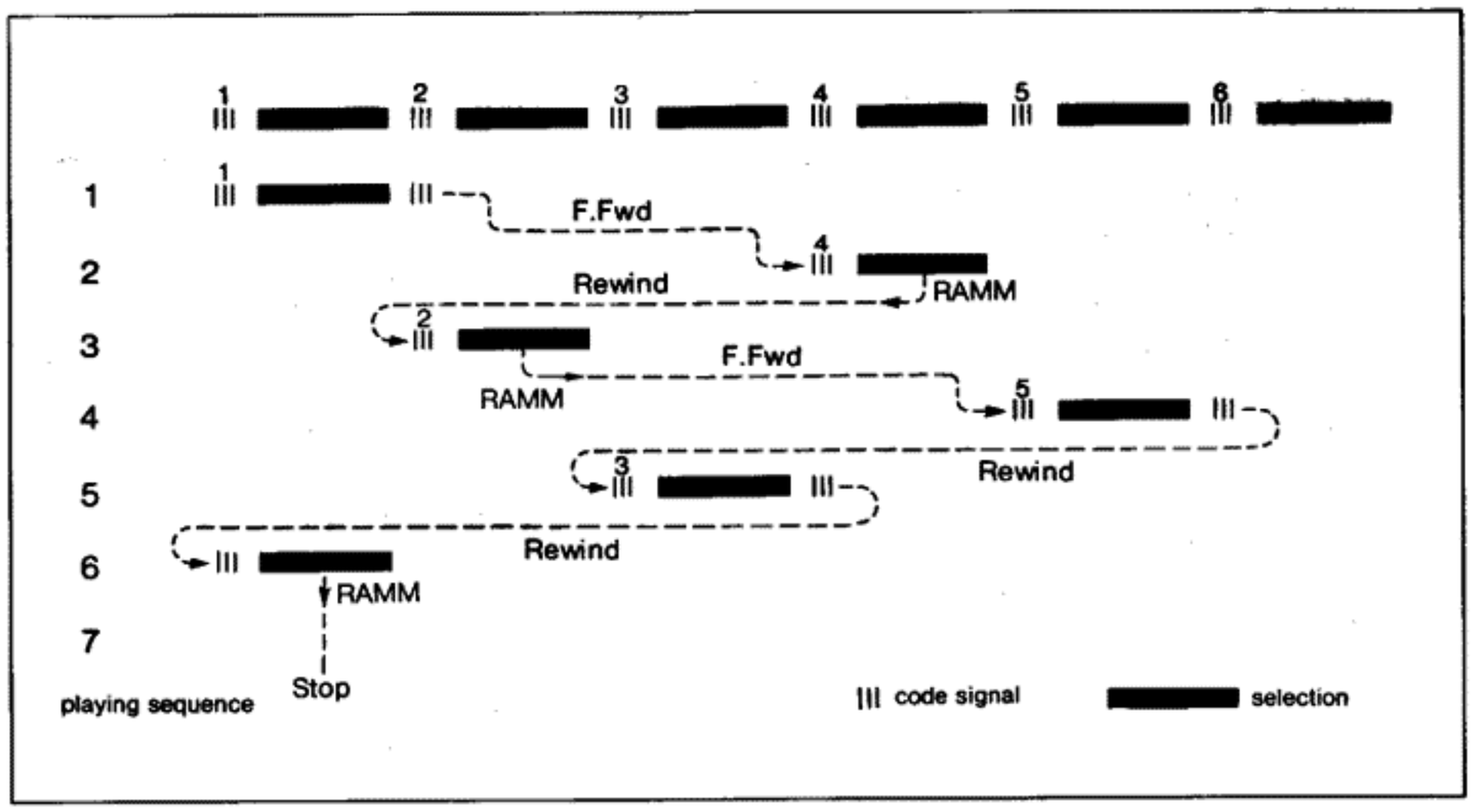
When, during playback in the RAMM mode, you want to reject the selection just being played and proceed directly to the next selection in the program, press the "RAMM" button. This should be done only after a selection has already been playing for more than 10 seconds.



When the "RAMM" button is pushed during the last selection in a program, the tape stops at that point.
For example, when during the program

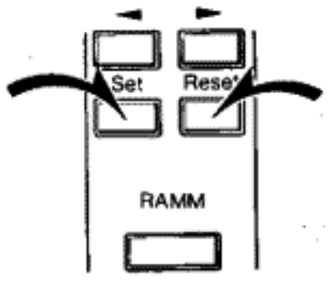
playing sequence 1 2 3 4 5 6
selection number 1 4 2 5 3 1

the selections are rejected during the sequence 2, 3, and 6, the program proceeds as illustrated in the chart above.



■Correction and Erasure of a Program

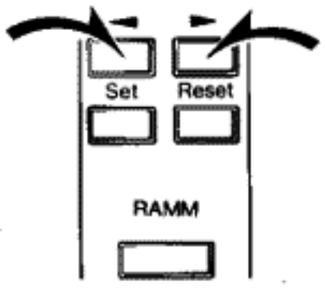
To erase a complete program which has been entered, put the deck in the "stop" mode and then press the "Set" button and the "Reset" button simultaneously.



When wanting to cancel only one selection out of a program which has been entered, for example selection number "5" (playing sequence 3 and 5) out of the following program, proceed according to the steps described below.

playing sequence 1 2 3 4 5 6 7
selection number 6 1 5 3 5 4 2

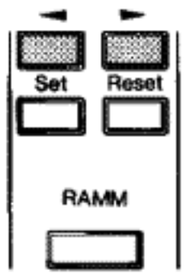
1. With the help of the "►" (up) or "◄" (down) button, scan the selection number indicators on panel (38) and bring number "5" to flash.



2. Press the "Reset" button.
   Number "5" which was flashing will go out and the selection "5" will be erased from the program. The resulting program becomes as follows.

playing sequence 1 2 3 4 5 6 7
selection number 6 1 3 4 2

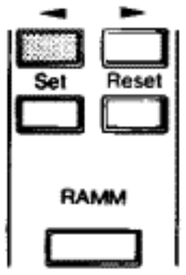
■ How to Use the "►" (Up) and "◄" (Down) Buttons in Playback



These buttons are used to scan the selection number indicators and to bring the desired number to flash.

"◄" (Down) Button

(1) If pushed for one second or less

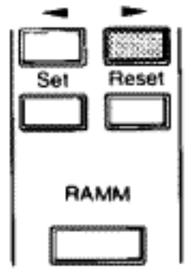


When the complete panel was off, pushing this button once will bring the number "15" to flash. If there was a number flashing, it will go out and the next lower number will start flashing. If number "1" was flashing, it will go out and "15" will start flashing. If there is a number constantly on, this number will stay on and the next lower number will start flashing.

(2) If pushed continuously (for longer than one second)

While the button is being kept depressed, gradually decreasing numbers will flash in turn. When it is released, the number at that point will keep flashing. Otherwise same as (1).

"►" (Up) Button

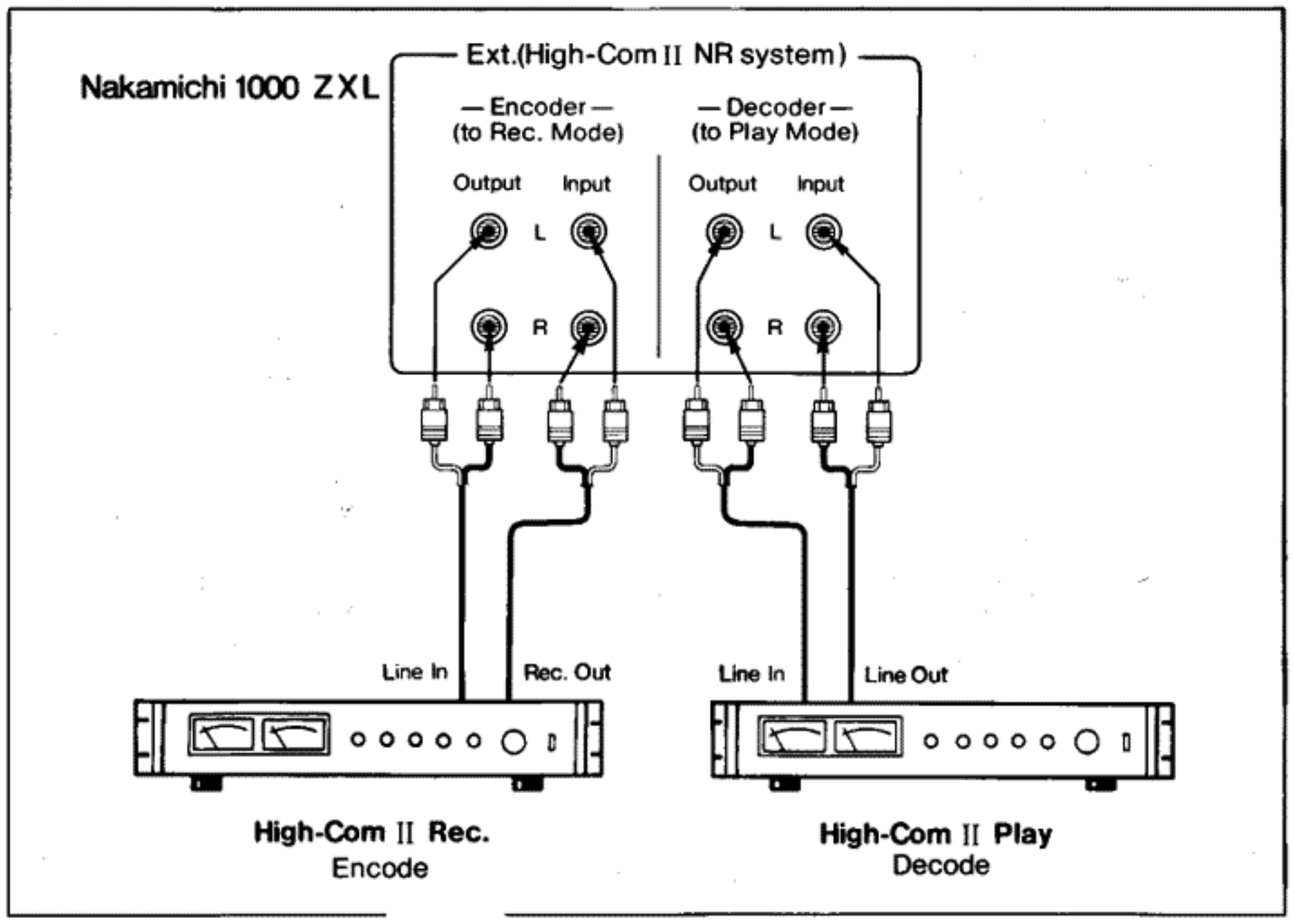


This button is used in the same way as the "◄" (down) button, but the numbers are moving in the opposite direction (increasing).

How to Use an External High-Com II System (Via the Ext. Jacks)

As the 1000ZXL provides a separate "Ext." position on the noise reduction switch (22) and the necessary jacks (40)~(43) on the rear panel, it is possible to connect two optional High-Com II units and use these in the same way as the built-in Dolby noise reduction.
Of the High-Com II units, one is used for recording (encoding) only, and the other one for playback (decoding) only. As this differs somewhat from the conditions described in the High-Com II owner's manual, please read the following instructions carefully before use.

Set the "Mode" switch of the High-Com II unit used for encoding to the "Rec" position and the "Mode" switch of the unit used for decoding to the "Disk" position. The "Filter/Tone" switch on both units should be set to "off".



■Calibration

Calibrate the 1000ZXL and the two High-Com II units according to the following procedure.

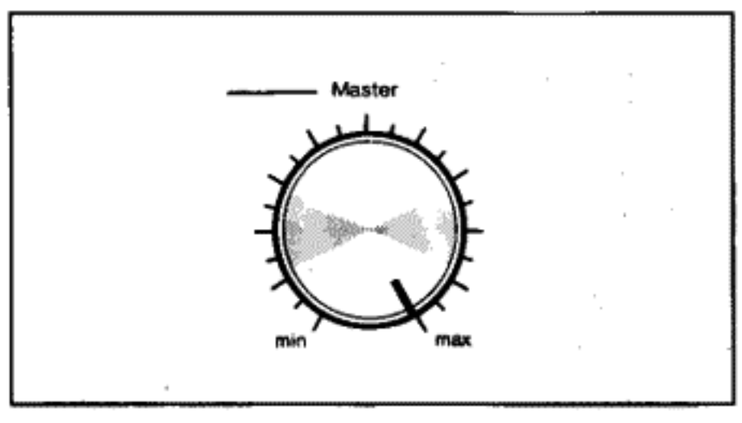
(1) Test Tape for Calibration
First, it is necessary to produce a test tape with 400 Hz, 0 dB (200 nWb/m) to be used for calibration.

1. Choose a blank cassette to be used as test tape and perform auto calibration as described on page 9 .
2. Set the test tone switch (14) to "400".
3. Set the noise reduction switch (22) to "out".
4. Press the record button (5) and the play button (16) and record the 400 Hz, 0 dB test tone on the tape for one minute.
5. Confirm that the level indicators (28) read 0 dB.
6. After recording, rewind the tape.
7. Keep this tape as test tape for calibration purposes.

Note:
— Be sure to use a high quality tape for making the test tape.

(2) Input Level Adjustment of Playback (Decoding) Unit

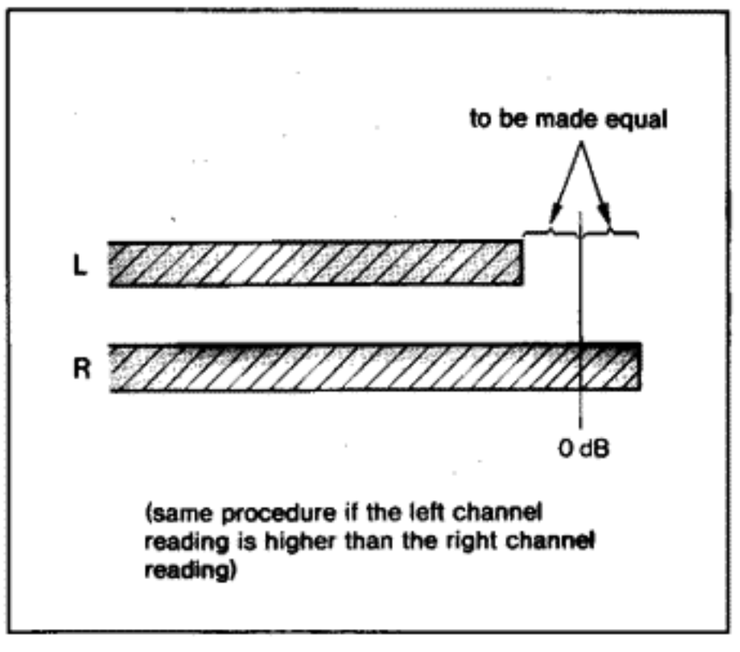
1. Set the noise reduction switch (22) on the 1000ZXL to "Ext."
2. Confirm that the "Mode" switch on the High-Com II unit used for decoding is set to "Disk".
3. Adjust the "Master Volume" control on the decoding High-Com II unit to maximum.



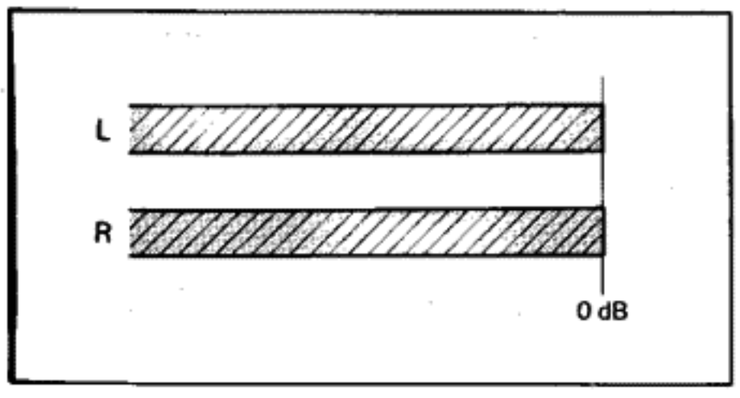
4. Press the play button (16) on the 1000ZXL and play back the test tape.
5. Adjust the "Record Level" controls (L, R) on the decoding High-Com II unit so that the High-Com II's level meters read 0 dB.

(3) Output Level Adjustment of Playback (Decoding) Unit
In the condition as described in paragraph (2), adjust the "Output Volume" on the High-Com II unit decoding until the level indicators on the 1000ZXL read 0 dB. If there is a different reading for left and right channels on the level indicators of the 1000ZXL, perform the following adjustment.

1. Adjust the "Output Volume" on the decoding High-Com II unit to achieve the condition of the level indicators shown in the chart below.

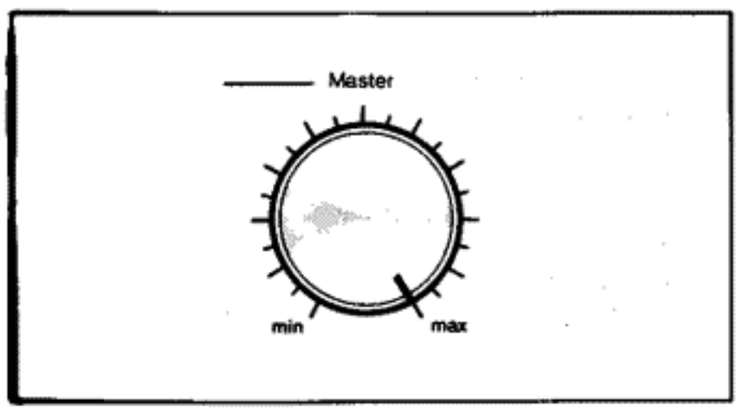


2. Adjust the "Record Level" controls (L,R) on the decoding High-Com II unit for left and right channels separately to achieve equal reading.



(4) Input Level Adjustment of Recording (Encoding) Unit

1. Set the monitor switch (25) to "source".
2. Set the test tone swtich (14) to "400".
3. Confirm that the "Mode" switch on the encoding High-Com II unit is set to "Rec".
4. Adjust the "Master Volume" control on the encoding High-Com II unit to maximum.



5. Adjust the "Record Level" controls (L,R) on the encoding High-Com II unit so that the unit's level meters read 0 dB.

(5) Output Level Adjustment of Recording (Encoding) Unit

1. Set the monitor switch (25) to "tape".
2. Insert a tape for which auto calibration (→p. 9) has been performed.
3. Press the record button (5) and the play button (16) and put the deck into the record mode.
4. Set the test tone switch (14) to "400".
5. Adjust the "Calibration Volume" (Rec Out) controls on the rear panel of the encoding High-Com II unit so that the level indicators on the 1000ZXL indicate 0 dB.

This concludes the calibration procedure, which has to be performed only once (not before every recording). The High-Com II system can now be used in exactly the same way as the built-in Dolby noise reduction system. However, take care not to alter the positions of the controls on both High-Com II units.

Note:

— When using the 1000ZXL with an external noise reduction system other than High-Com II connected to the "Ext." jacks, always leave the power to the external system ON while the 1000ZXL is operating, even if the noise reduction switch (22) is not set to "Ext.". Otherwise the sound quality from the 1000ZXL may be impaired. If using the High-Com II system, there is no such problem.

Maintenance

Head and Transport Cleaning

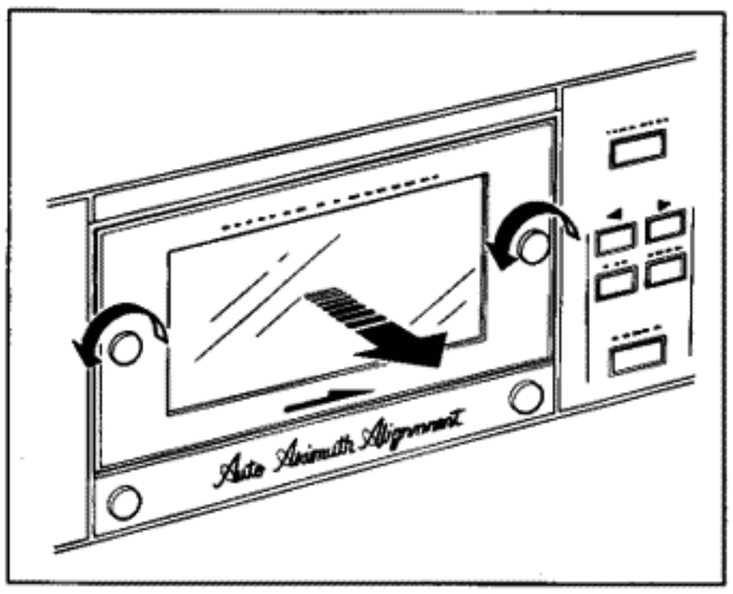
To maintain the Nakamichi 1000ZXL's superior performance and to prolong the life of the heads and pressure rollers, all parts that come into contact with the tape should be cleaned frequently and thoroughly. Dirty heads, capstans or pressure rollers may result in any of the following symptoms:

- Uneven sound levels.
- Loss of high frequencies.
- Wow and flutter.
- Damage to cassette tapes.
- Tape squeal caused by excess friction.

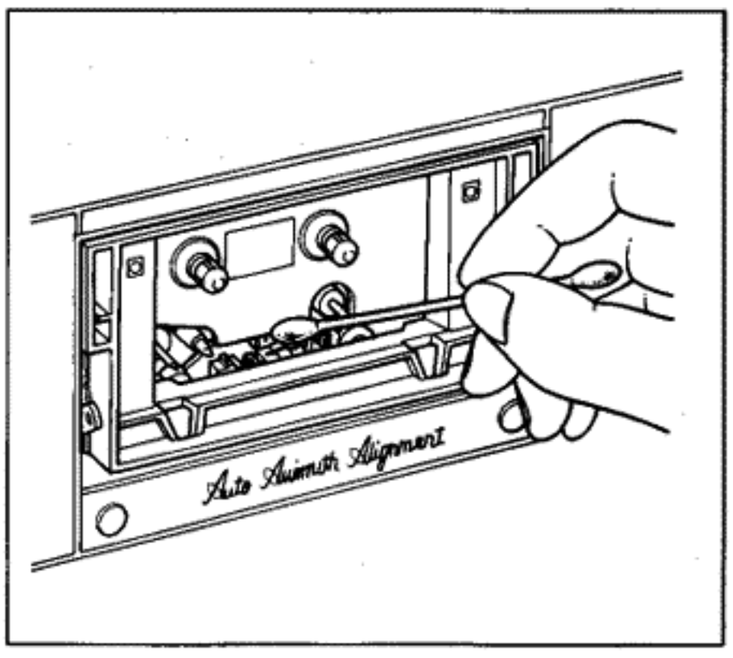
Even the best cassettes shed particles onto the heads, capstans and pressure rollers. Clean a minimum of once every ten hours of use, even if you use premium tapes. If you must use inferior brands of tape, you may need to clean after each playing. By observing the amount of contamination accumulated on the cleaning stick pad or cotton tip, you will be able to judge whether you are cleaning the 1000ZXL 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 1000ZXL. When the alcohol runs out, use commercially available isopropyl alcohol (preferably undiluted). "Q-tips" and other cotton swabs may be used in the place of the sponge tips. 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 (3) on. Remove the acrylic cassette holder cover by unscrewing the two hand-screws on the front of the holder (7).



(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.

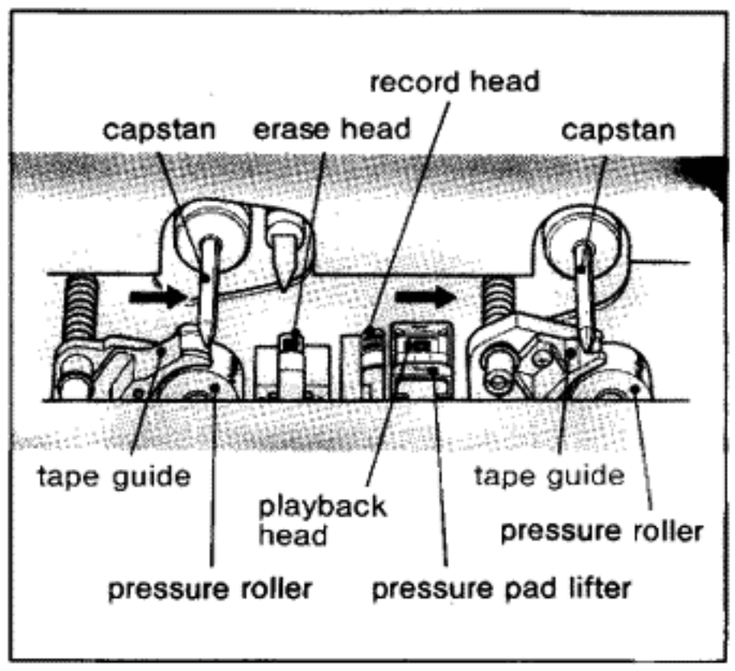


(C) Press the play button (16). Carefully apply the cleaning stick to one pressure roller as it turns. Use light pressure and an up-and-down stroke to cover the entire width of the roller. Repeat with the other pressure roller. If you are using a cotton-tipped stick, make sure to apply the tip to the 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 shaft 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:

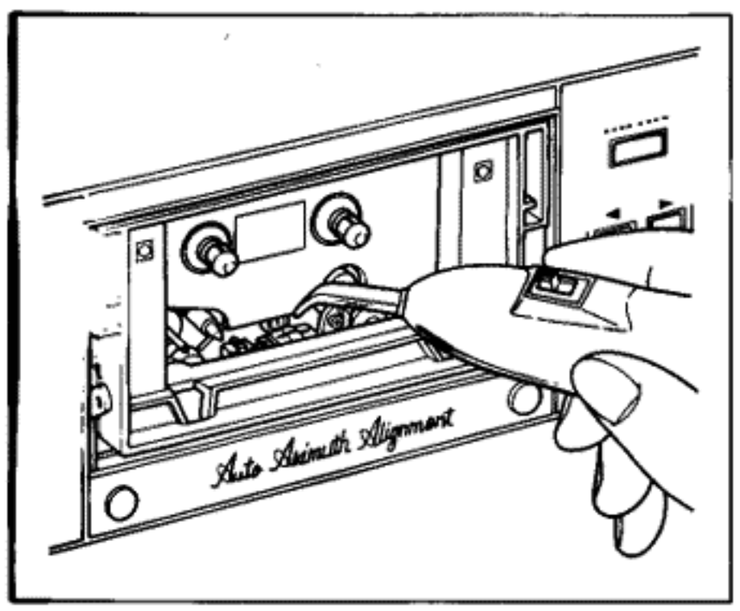
- Tape guides and heads are critically aligned at the factory. Do not exert too much pressure on these parts. It is better to stroke repeatedly than to stroke forcefully.
- Do not flood various parts with cleaning alcohol. After dipping the stick into alcohol, squeeze off any excess.
- Be sure to remove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

(A) Remove all tape from the vicinity of the tape deck before proceeding. Make sure the 1000ZXL's power switch (3) is off. Remove the cassette holder cover (7).

(B) Turn the demagnetizer on while it is at least two feet away from the deck. Slowly bring the tip as close as possible to the playback head. Do not make contact with the head unless the tip of the demagnetizer is covered with vinyl or rubber to prevent scratching the head's surface. A piece of vinyl tape may be used to cover the tip if it is not already covered.



(C) Move the demagnetizer slowly in a random pattern about the surface of the head for at least 10 seconds. Move it slowly to the record head and repeat the random pattern. Then, move the demagnetizer to one capstan then the other, repeating the random pattern for 10 seconds. (It is not necessary to demagnetize the erase head.)

(D) After demagnetizing the capstans, slowly withdraw the demagnetizer from the deck. Wait until the demagnetizer is at least two feet from the deck before turning the demagnetizer off. Never turn it off while it is close to a head or capstan as this may semi-permanently magnetize the part.

Lubrication

The moving parts of the Nakamichi 1000ZXL 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.

Head Height and Azimuth

The head height and azimuth adjustments of the Nakamichi 1000ZXL are calibrated at the factory for optimum performance. Readjustment should only be done by qualified service technicians. The only exception to this is the automatic record head azimuth alignment.

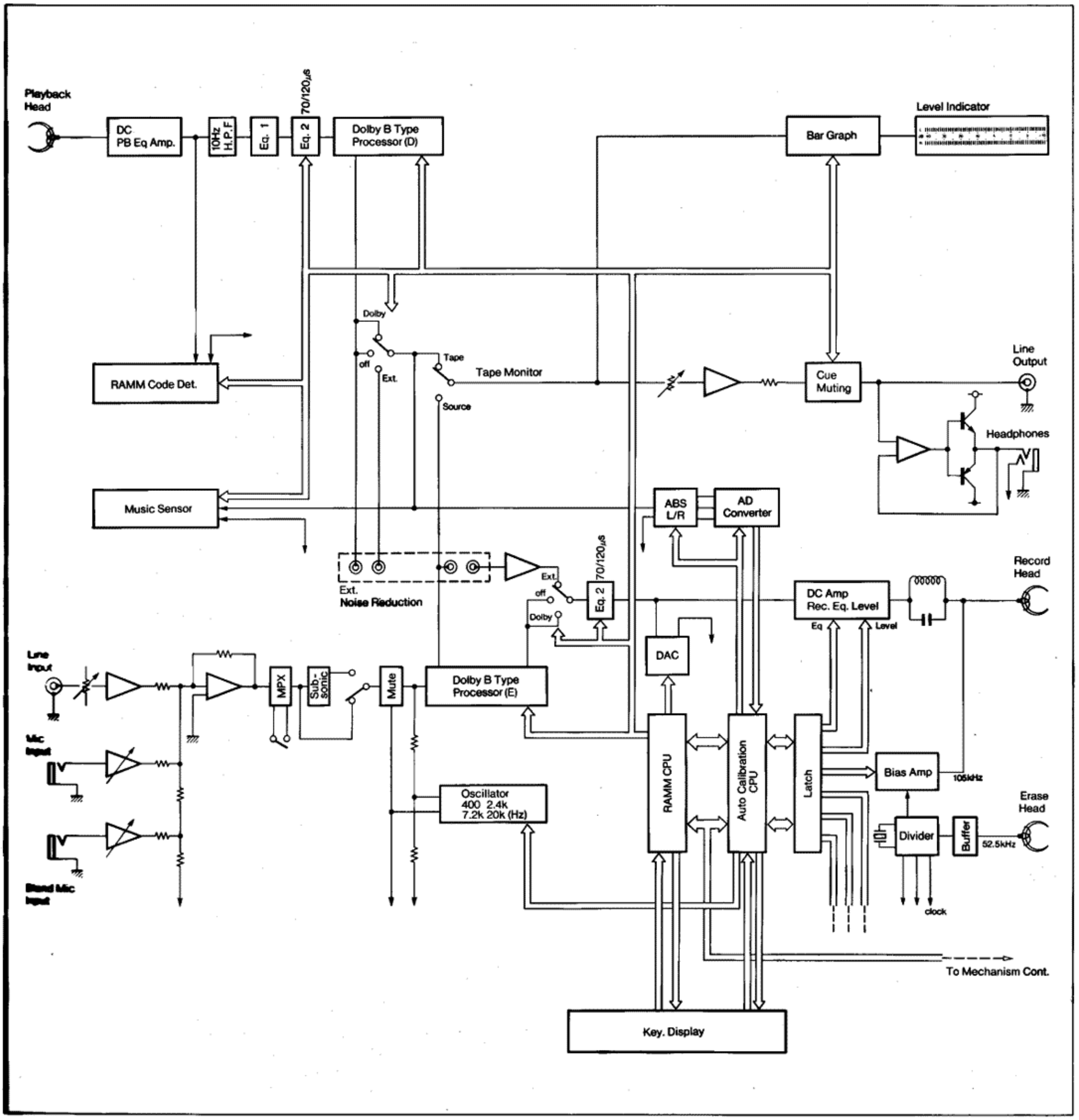
Repairs

Your Nakamichi 1000ZXL has been designed for long service life. Should your 1000ZXL require servicing, please consult your Nakamichi dealer or the Nakamichi dealer nearest you. As there are no user-serviceable parts inside the unit, please do not attempt your own repairs.

Troubleshooting

Condition	Probable Cause	Remedy
Tape does not run.	1. Power cord is unplugged. 2. Cassette is not properly inserted.	Plug in cord firmly. Eject and re-insert cassette.
Cannot record.	1. Input disconnected. 2. Head dirty. 3. Cassette tabs have been removed. 4. Auto calibration or use of tape memory has not been performed.	Check connections. Clean head. Place adhesive tape over tab opening or use new cassette. Refer to page 9.
Cannot playback.	1. Output disconnected. 2. Dirty head.	Check connections. Clean head.
Excessive playback hiss.	1. Head is magnetized. 2. Recording volume is too low.	Demagnetize head. Adjust recording levels.
Distorted record/playback sound.	1. Program material itself is distorted. 2. Recording levels are too high. 3. Excessive FM carrier leak. 4. Wrong tape memory button (23) is pushed.	Check program material. Adjust recording levels. Set the filter switch to the "MPX" position when Dolby system is used. Select correct button.
Excessive wow/flutter	1. Capstan and/or pressure roller dirty. 2. Tape packing inside cassette faulty.	Clean these parts. Replace cassette.
Incomplete erasure.	Erase head is dirty.	Clean head.
Dull high frequencies.	1. Dirty heads. 2. Wrong tape memory button (23) is pushed. 3. Auto azimuth alignment not performed before recording.	Clean heads. Select correct button. Perform auto calibration or auto azimuth alignment before recording.
Hum heard during record or playback.	1. Induction fields near deck. 2. Signal cable grounding faulty.	Keep deck away from amplifier, transformers, fluorescent lamps, etc. Replace signal cables.
One of tape memory buttons A~D (23) flashes.	Memory-backup batteries not inserted or exhausted.	Insert or replace batteries.

Block Diagram



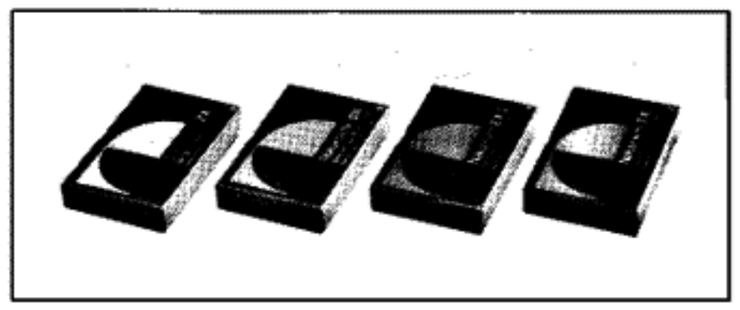
Specifications

Specifications

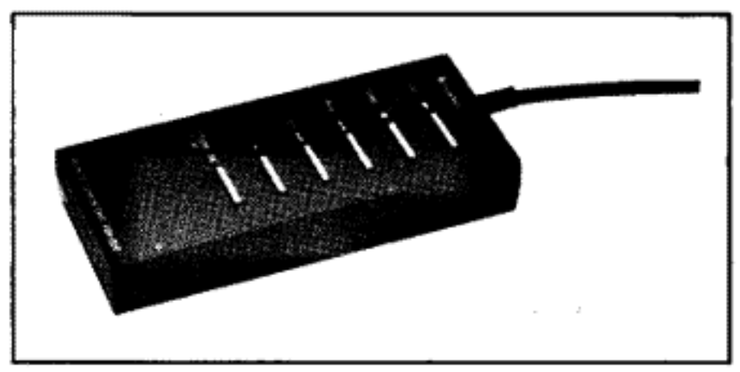
Power Source	100, 120, 120/220-240, 220 or 240 V AC ; 50/60 Hz (According to country of sale)
Power Consumption	60 W max.
Tape Speed	4.8 cm/sec
Wow-and-Flutter	Less than 0.04% Wrms Less than 0.08% Wpeak
Frequency Response (w. auto calibration)	20~20,000 Hz ± 0.75 dB (18~25,000 Hz ± 3 dB) Nakamichi EX, EX II, SX, ZX tape Recording level −20 dB
Signal-to-Noise Ratio	Better than 66 dB (3% THD) Better than 60 dB (0 dB) (IHF-A, Wrms, 400 Hz, w. Dolby NR, ZX tape, 70 μsec)
Total Harmonic Distortion	Less than 0.8% (ZX tape) Less than 1.0% (SX, EX II tape) (400 Hz, 0 dB)
Erasure	Better than 60 dB (100 Hz)
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, 50k ohms
(Microphone)	0.2 mV, 10k ohms
(Noise Reduction)	100 mV, 50k ohms
Output (Line)	1 V (400 Hz, 0 dB, output control at max.)
(Headphone)	45 mW (400 Hz, 0 dB, output control at max.)
(Noise Reduction)	100 mV, 2.2k ohms
Dimensions	527 (W) × 258 (H) × 322 (D) millimeteres 20-3/4 (W) × 10-5/32 (H) × 12-43/64 (D) inches
Approximate Weight	19 kg 41 lb. 14 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.
- The High-Com has been manufactured under license from AEG-TELEFUNKEN.
- Hihg-Com is the trademark of AEG-TELEFUNKEN.
- Nakamichi Corporation has the right to manufacture and sell High-Com II throughout the world.

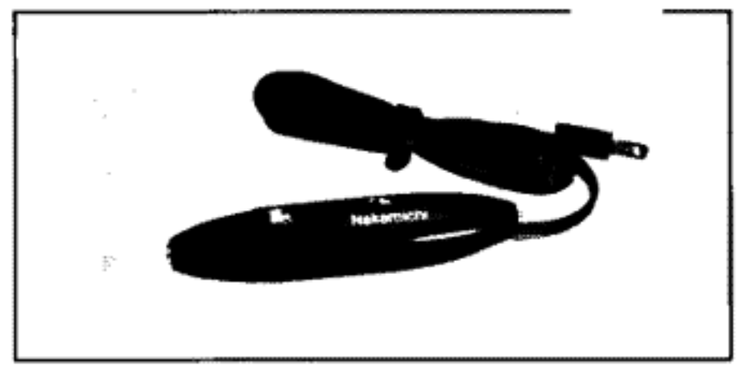
Optional Accessories



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



RM-200 Remote Control



DM-10 Head Demagnetizer

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