Nakamichi 700

Tri-Tracer
3 Head Cassette System
Operating Instructions

We thank you very much for your purchase of the "Tri-Tracer Nakamichi 700".
This recorder is designed especially for the most critical audiophile and maintains almost same high performance as the Nakamichi 1000.
Before using this recorder please read this instruction manual very carefully so that all functions and features will fully be used with the highest performance.

Contents:

Control Functions

❶ Cassette Lid:
The Lid will open when the Eject Button is pushed.

❷ Playback Button:
Tape runs at the standard speed and when the button is pressed, playback of the pre-recorded tapes will commence.

❸ Stop Button

❹ Rewind Button:
Causes tape to move rapidly from left to right reel. Press the "Stop" button or allow auto-stop to function.

❺ Fast Forward Button:
Causes tape to move rapidly from right to left reel. When tape reaches the end, press the "Stop" or allow auto-stop function.

❻ Record Button:
Recording will be commenced when pushed simultaneously with the "PLAY" Button.

❼ Pause Button:
Used to momentarily stop the tape in recording or playback mode. During recording, the recording circuits remain operative, and capstan remains in motion but pinch roller is retracted.

❽ Eject Button

❾ Headphone Jack:
The headphones should have an impedance of 8 ohm.

❿ Peak Level Meters:
The Meters indicate a wide range from −40 dB to +5 dB, the 0 dB of which conforms to the Dolby NR Standard Level.

⓫ Tape Start Memory Switch:
If you set the tape counter to "000" at the start of each recording, and set the Memory Switch to "ON" then the tape will be rewound at the touch of the Rewind Button to the preset point and will stop.

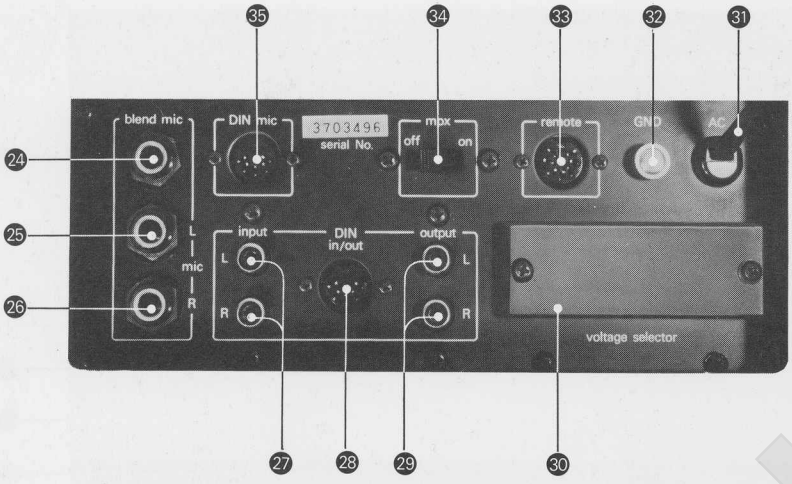
⓬ Index Tape Counter

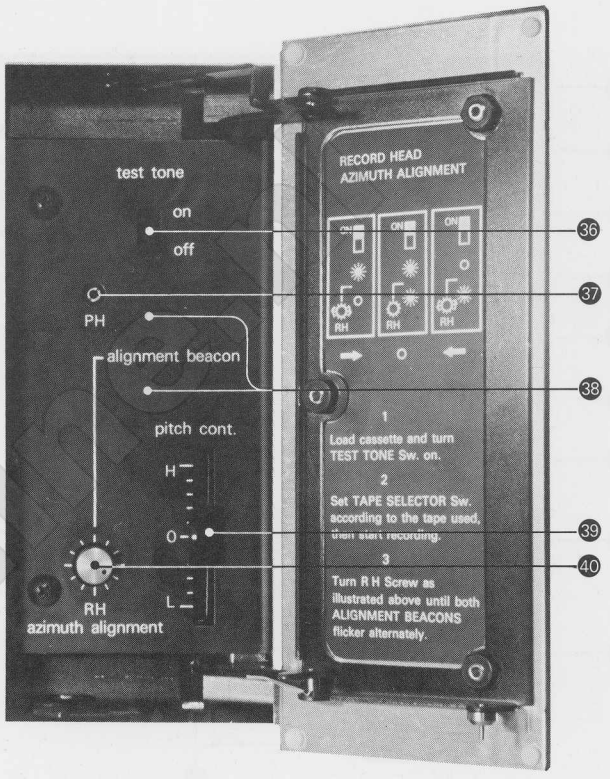
⓭ Adjustment Lid Button:
When the Lid is opened, you will find the adjustment functions for Azimuth Alignment, Test Tone, and Pitch Control.

⓮ Tape Selector Switch:
Set to "Normal" for high Density Low-noise tape, and to "CrO2" for chromium dioxide tape. Be sure to use tapes having proper bias level and equalizaiton.

⓯ Dolby NR Switch:
Set the DOLBY NR switch to "IN" when you playback a recorded tape made under the Dolby system, or when you make recording under it.
This system is international, and recordings made under it can be reproduced by any cassette tape deck equipped with the same system, regardless of its make.

⓰ Limiter Switch:
After recorded level setting has been made, the Peak Limiter prevents distortion from sudden transient peaks in live recording.





⑰ Monitor Switch:

"Source"

The input signals from the sound source can be directly monitored by adjusting the sound volume with the LINE OUTPUT controls. Adjust volume to the proper recording level with the LINE INPUT/MIC INPUT controls.

"Tape"

To playback a recorded tape, set the switch to "tape". In recording, instantaneous off-the-tape monitoring is possible so that it permits instant comparision of the recording with the input signal.

⑱ Power Switch:

When you turn the Power Switch "ON", the level meters, tape run indicator and "Stop" Button Lamp will illuminate to show the power is being supplied to the deck.

⑲ Line Output Level Controls:

The output level of monitoring sound from the tape or sound source can be controlled during recording and playback.

⑳ Line Input Level Controls

㉑ Mic Input Level Controls

㉒ Blend Mic Level Control

㉓ Adjustment Lid

㉔ Blend Mic Input Jack

㉕ Mic Input Jack L

㉖ Mic Input Jack R

㉗ Line Input Jacks

㉘ DIN IN/OUT Socket

㉙ Line Output Jacks

㉚ Voltage Selector:

You can change over either to 100, 117, 220 or 240V.

㉛ Power Supply Cord

㉜ Ground Terminal

㉝ Remote Control Socket

㉞ 19 KHz MPX Filter Switch

㉟ DIN Mic Input

㊱ Test Tone Switch

㊲ Playback Head Azimuth Alignment Screw

㊳ Alignment Beacon:

Serves to adjust the azimuth alignment of a recording head according to each tape.

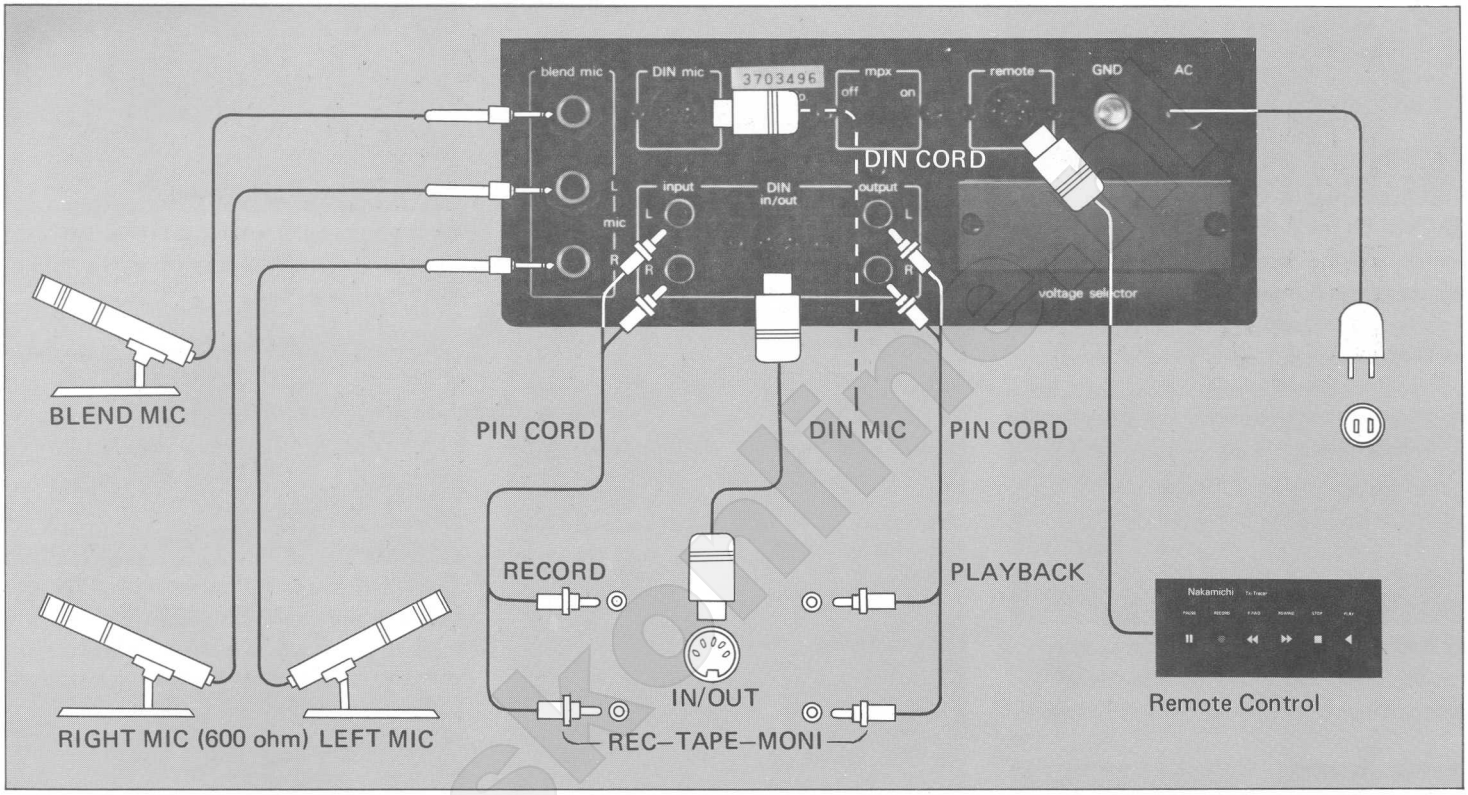
㊴ Pitch Control:

Standard tape speed of 1-7/8 ips. is set at click position at the center. Any speed within the range of ±6% (half tone) can be selected by turning the knob to "L" direction for lower pitch and "H" direction for higher pitch.

The tape speed of 1-7/8 ips. will be always maintained in recording, regardless of the position of the Pitch Control Knob.

㊵ Record Head Azimuth Alignment Screw

Connections



Connecting the Line Output Line Input and Output Connections:

1. Connect the accompanying pin plug cords between the Line Output terminals of your Nakamichi Tri-Tracer and the Tape Monitor terminals of your stereo amplifier.
2. Connect another pair of the pin plug cords between the Line Input terminals of your Nakamichi Tri-Tracer and the tape recording terminals of your stereo amplifier.
3. If your stereo amplifier or music system has a DIN connector socket, connect a single DIN cable between the DIN Connector socket on the rear panel of the Nakamichi Tri-Tracer and its counter part on the amplifier or music system.

⊙ Caution:

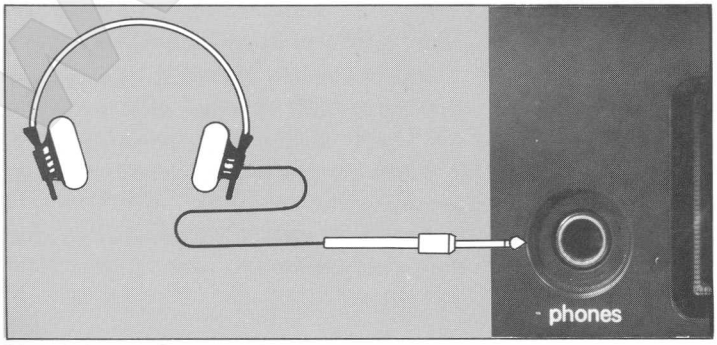
Do not use the LINE INPUT/OUTPUT terminals and DIN Connector socket simultaneously.

Microphone Connection:

Microphone should be of low impedance type of 600 ohms.

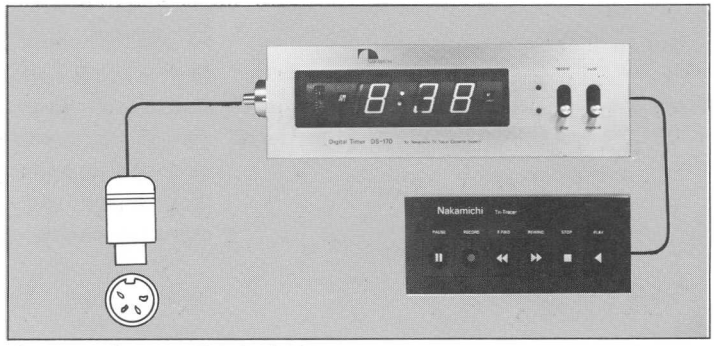
Connection for the Microphones with DIN Connectors:

DIN Connector must be of SM type.



Headphone Connection:

The headphones should have an impedance of 8 ohms.

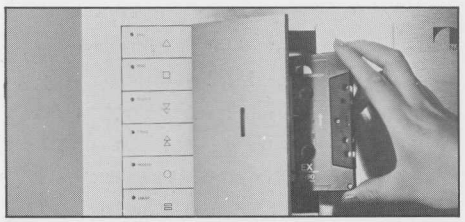


Connection to Digital Timer:

Set the socket of a timer to "Remote". If you use a Remote Control, connect to the Remote Socket of the timer.

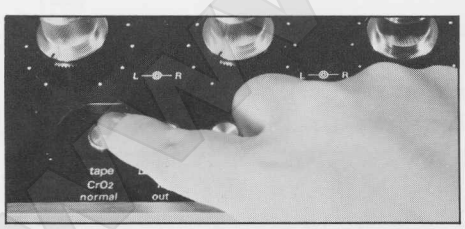
Playback Procedures

❶ Turn on the Power Switch. The level meters and the cassette compartment window will illuminate to indicate power supply to the deck. Also the "Stop" Button will light.

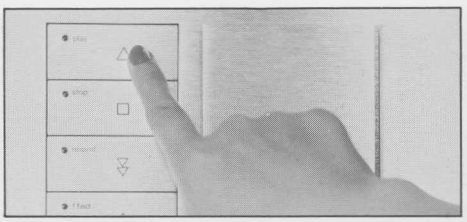


❷ Push the "Eject" Button and load a cassette, then close the cassette compartment lid.

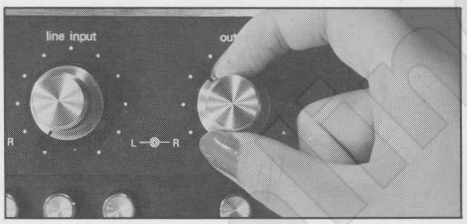
❸ Set the "Monitor" switch to "Tape".



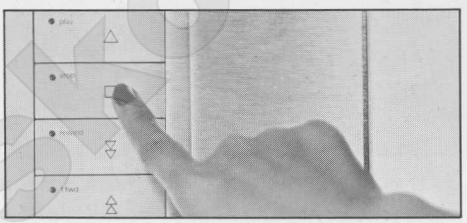
❹ Set the Tape Selector Switch to "Normal" or "CrO2" according to the type of the tape in use.



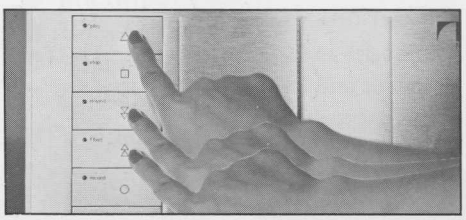
❺ Touch the "Play" Button to start the tape.



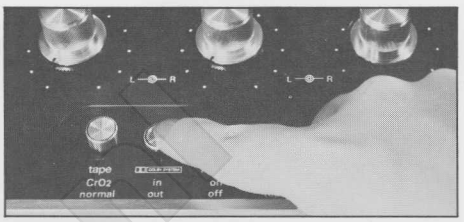
❻ Adjust the sound volume with the output level controls



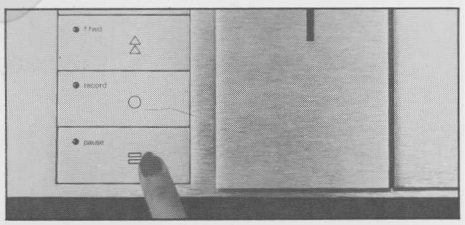
❼ To stop the tape, touch the "Stop" Button. If you push the "Eject" Button, the cassette compartment lid will open to expose the cassette inside.



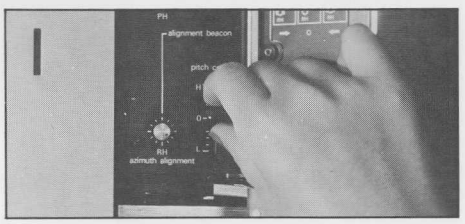
❽ It is not necessary to touch the "Stop" Button each time you rewind or fast forward the tape during playback.
Also you can change to the playback mode directly from the rewind or fast forward mode without causing damages to the tape.



❾ If you playback the tape recorded under "Dolby System", be sure to set the "Dolby NR" Switch to 'in'.



❿ When you push "pause button", the tape run will stop momentarily.



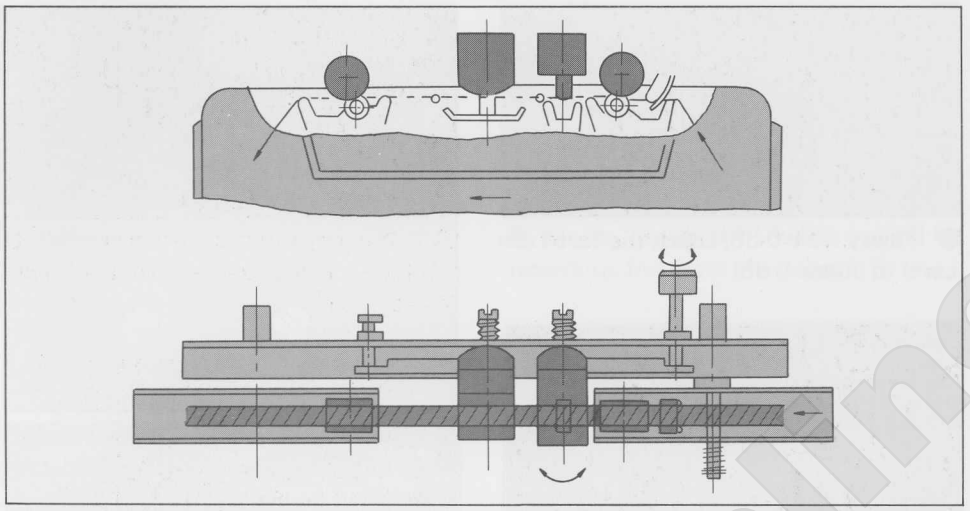
Pitch Control

The standard tape speed of 1-7/8 ips is set at click position in the center. Speed within a range of ± 6% (half tone) can be selected by turning the knob to "L" direction for lower pitch and "H" direction for higher pitch. The tape speed of 1-7/8 ips will be always maintained in recording, regardless of the position of the "Pitch Control" knob.

Note:

* The Nakamichi Tri-Tracer is so designed that the Lid will not open, even if you push the "Eject" Button while the tape is running.
* When the tape reaches its end, it will stop automatically.
* The "Peak Limiter" Switch has no effect during playback.

Before Recording

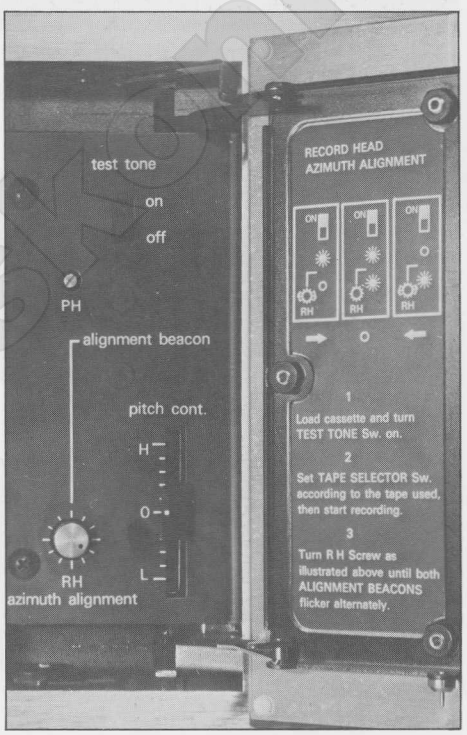


As shown in the above Fig, the Nakamichi Tri-Tracer 700 is of a 3-head type wherein each of erase, recording and playback heads is individually installed. A part of a cassette housing in which a tape runs serves as a guide for tape run. As a case may be according to each plastic moulding, high frequency part may be lowered because of the unfavourable azimuth alignment of head slit between recording and playback heads.
Accordingly, it is recommended that you perform an accurate azimuth alignment when you change a tape to another.

Head Azimuth Alignment

Record Head

❶ Load a cassette into the cassette compartment.
❷ Turn the Test Tone Switch on.
❸ Touch the Record Button and then the Play Button to start the tape.
❹ Set the Monitor Switch to "Tape".
❺ Adjust the Pecord Head Azimuth Alignment (RH) Screw so that the both Alignment Beacons flicker alternately. If only the upper Alignment Beacon flickers, turn the RH Screw clockwise.
But if only the lower Alignment Beacon flickers, turn it counter-clockwise.



⊙ Caution

(1) It takes about 0.3 second until the Alignment Beacon responds to the turning of RH Screw. It is necessary to turn the RH Screw little by little with a reasonable interval. If you turn it to the wrong direction, the Alignment Beacons will not flicker. Turning direction must be carefully determined according to the above instructions.

(2) Playback Head

No adjustment is necessary with respect to the playback head azimuth, since it is adjusted prior to delivery from our factory.

⊙ Caution

It is not a fault of the deck!

Anti-Tape Spill Device:

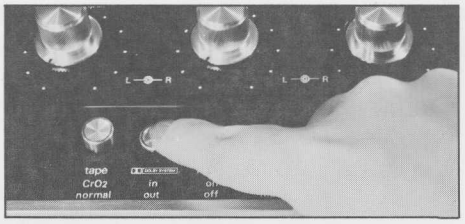
The Nakamichi Tri-Tracer is equipped with the tape spill sensing system which stops all the functions of the unit instantaneously when spill of the tape is about to start. In case the functions of the unit stop automatically, please check the cassette first. The tape spill usually occurs with a second class cassette tape the housing of which is being moulded with less precision, and physical property of tape itself is rather poor. Also a thinner tape such as C-120 cassette often causes heavy friction inside the cassette housing which will also be sensed by the said device.

Level Calibration

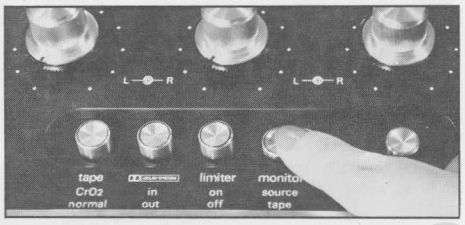
Dolby NR Level Calibration

The Dolby NR standard level (200 pw/mm) of the Nakamichi Tri-Tracer is set to 0dB. Particularly, when you record with Dolby NR "in", adjust the 0dB signal of the built-in 400 Hz test tone to 0dB according to type of the tapes to be used.

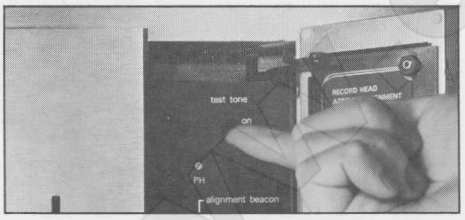
Open the Adjustment Lid by pushing the Cal. Button positioned next to the Eject button.



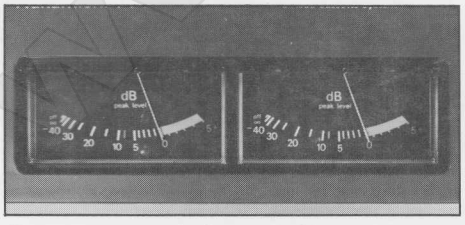
❶ Set the "Dolby NR" Switch to "in".



❷ Set the "Monitor" Switch to "Source".

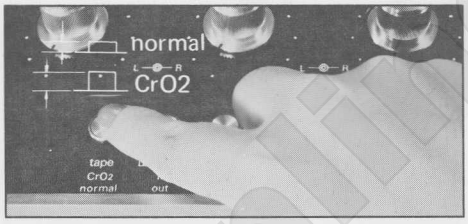


❸ Set the "Test Tone Switch" to "on".

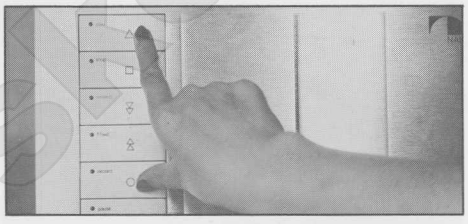


❹ Level Meters indicate 0 dB.

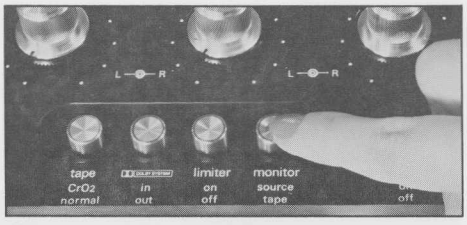
❺ If away from 0 dB, adjust the Test Tone Level to obtain 0 dB.



❻ According to each tape to be recorded, set the Tape Selector Switch to "Normal" or "CrO2".



❼ Start the tape and record 400Hz.



❽ Set the "Monitor" Switch to "Tape".

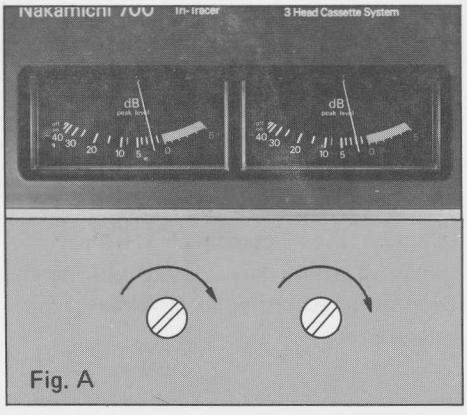


Fig. A

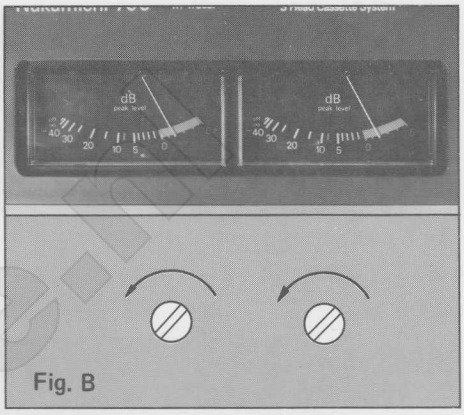
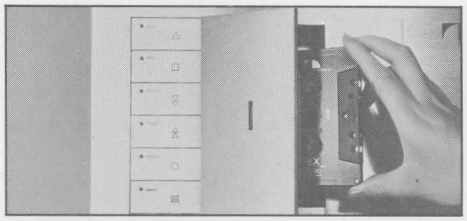


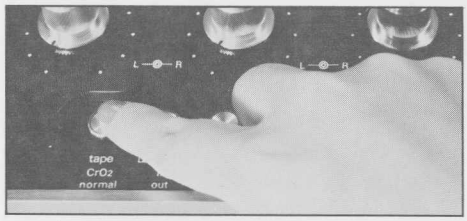
Fig. B

❾ If the level shows minus when played back, turn the calibration volume clockwise as shown in the Fig A.
In case of plus, counter-clockwise as shown in the Fig B.

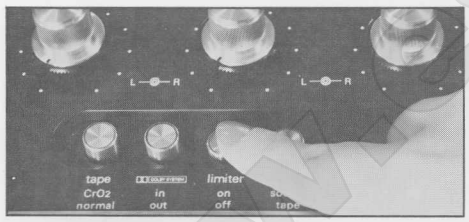
Record Procedures



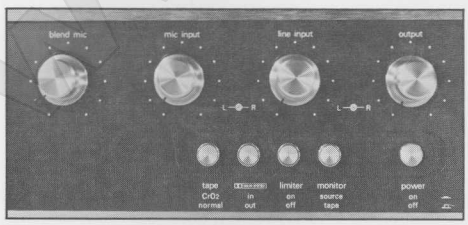
❶ Push the "Eject" Button and load a cassette, then close the cassette compartment lid.
(Refer Azimuth Alignment, Level Calibration on pages 5, 6)



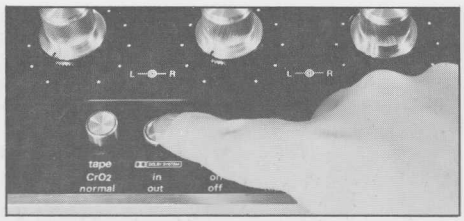
❷ Set the "Tape Selector" Switch according to the type of the tapes used, to CrO2 for chromium dioxide and Normal for other tapes such as high output, low noise (EX) tapes.



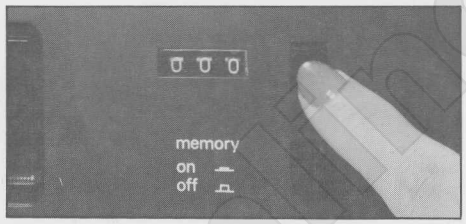
❸ For recordings of sound with wide dynamic range, set the limiter switch to "on", then the peak limiter prevents distortion from sudden transient peaks.



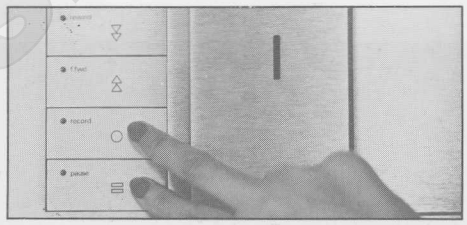
❹ Set the "Monitor" Switch to "Source" and adjust the recording volume levels with the "Line Input", mic input level controls.



❺ Set the "Dolby NR" Switch to "in" for recordings free from hiss noise.



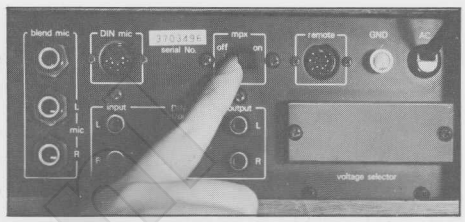
❻ Push the reset button to reset the tape counter to "000". If you set the tape counter to "000" at the start of each recording and set the "memory switch" to "on", then the tape will be rewound to the preset point and stop at the touch of the "rewind" button.



❼ Touch the "record" button and then touch the "pause" button while keeping your finger tip on the former. The red lamp will light to show the deck is in the recording mode. At another touch on the "play" button, the tape will instantly start running to record. Touch the "pause" button whenever you want to stop the tape without cancelling the recording mode.

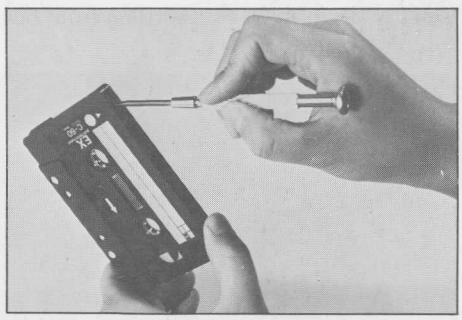
❽ Touch the "stop" button to release the recording mode and the tape will stop.

❾ The "monitor" switch can be switched over to "tape" or "source" at any time during recording.



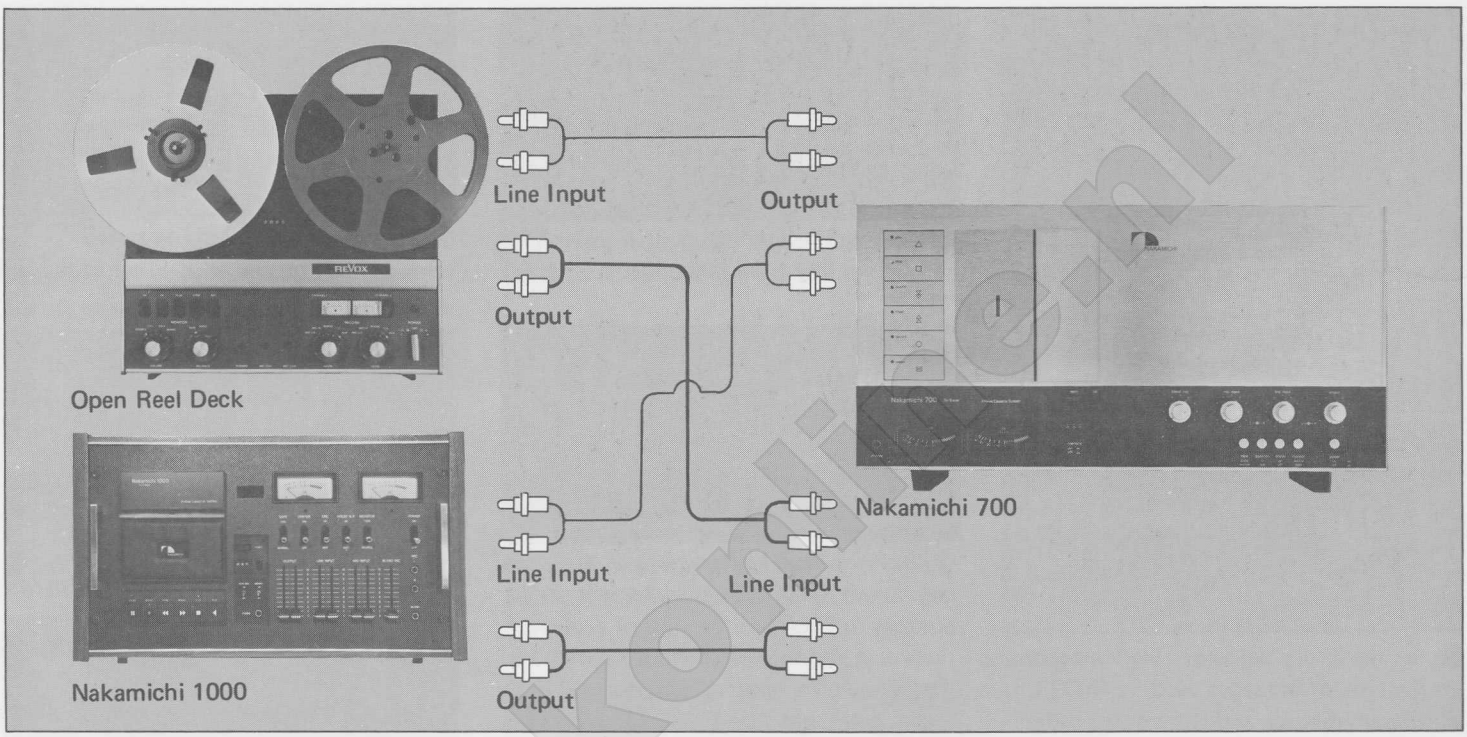
❿ When recording from FM stereo broadcasting, set the MPX Filter at the jack panel to "on".

A cassette has "tabs" as shown below on the side opposite to that exposing the bare tape. If you break them off with a screwdriver or the likes, the cassette will prevent the depression of the Record Button, thus eliminating the possibility of erasing a valuable recorded cassette by mistake. Take advantage of this feature when you want to preserve a cassette into which you have made important recordings. If you wish to preserve the recording in only one side, break only one of the tabs, referring to the Fig below.

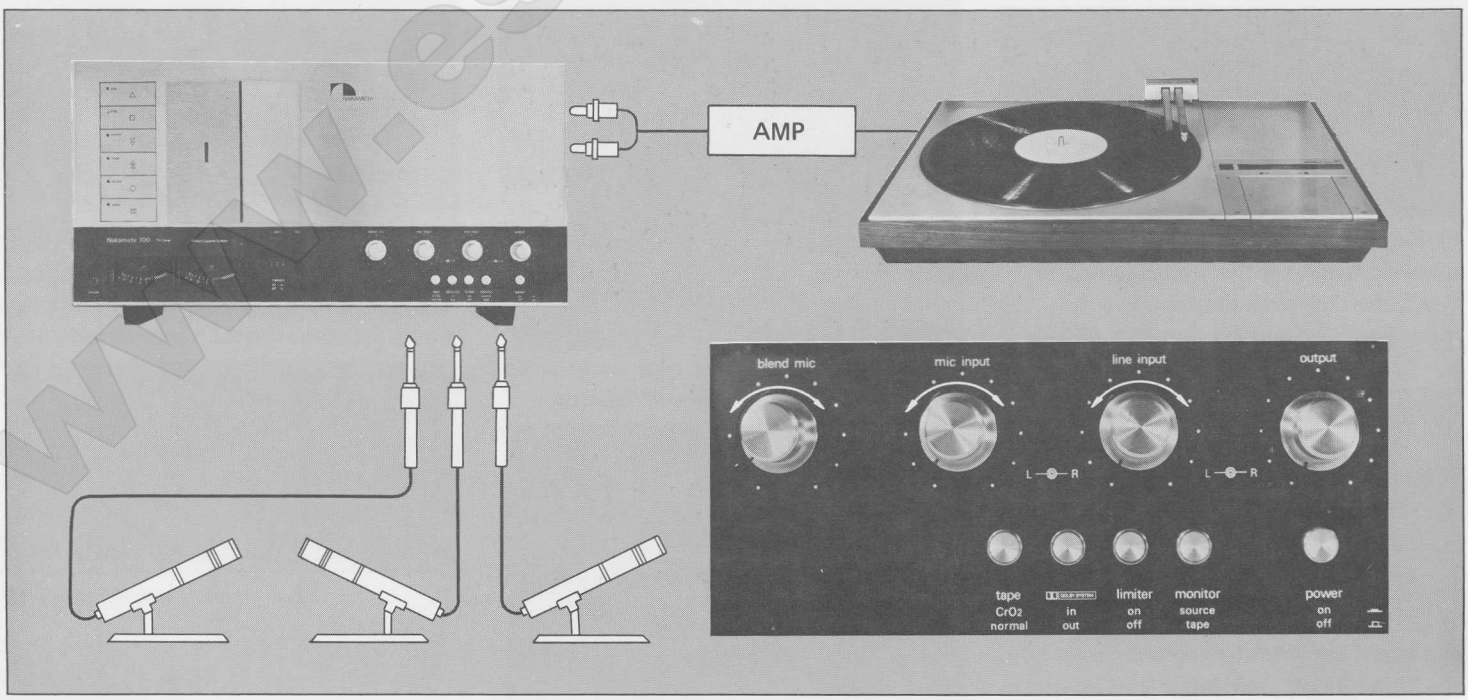


Note:
Should you ever want to make a recording into a cassette with such tabs already broken, seal the tab openings with masking tape or plug it with eraser rubber, etc.

Additional Recording and Playback Techniques

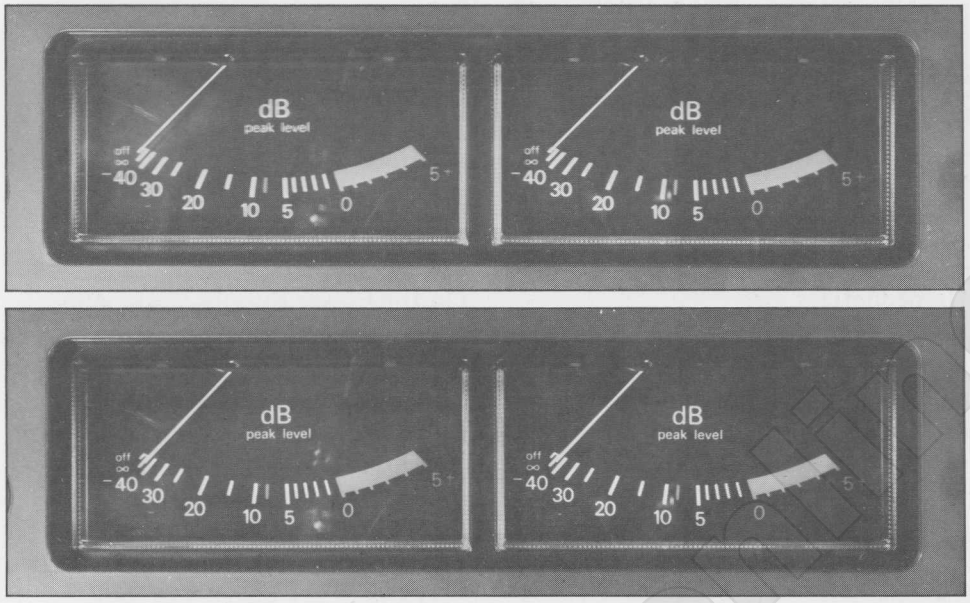


Direct Copying from Tape to Tape:
You can perform Hi-Fi recording from open reels and high quality cassette decks, alike the original source.

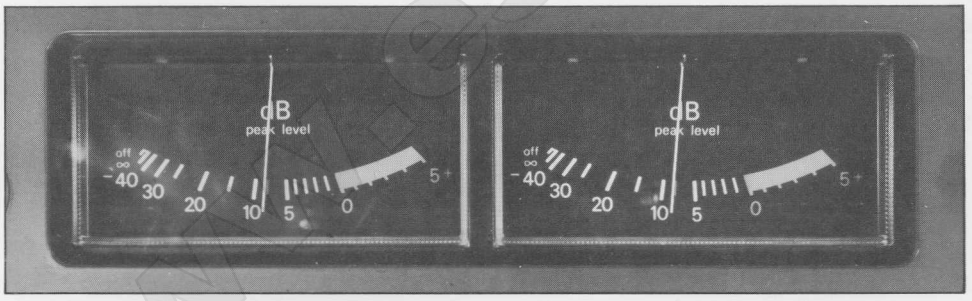


Record Mixing
The Nakamichi Tri-Tracer 700 serves also as a small type mixer through 5 different individual volume controls, namely Line Inputs Left and Right, Microphone Inputs Left and Right, and the Blend Microphones. As shown in the Fig below, the mixing of a disc record with microphones and also microphones L, R with Blend (L + R) microphone, can be conducted.

Peak Level dB Meter

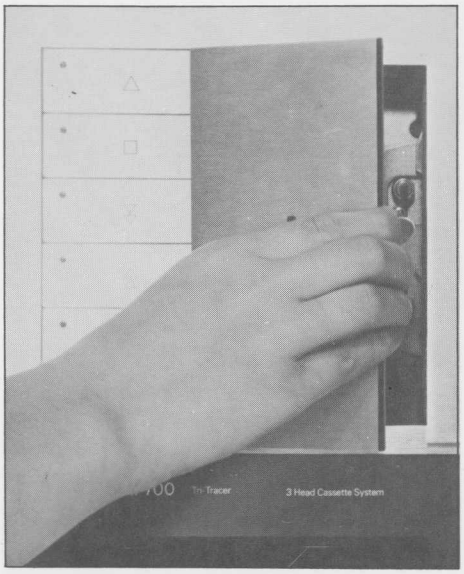


The Nakamichi Tri-Tracer 700 incorporates a genuine Peak Level Meter which covers a wide range of −40db to +5dB. While the power switch is off, the indicators are in the state of OFF. But when the power switch is set to ON, the Meters illuminate and the indicators thereof will flutter to the position of ∞. Being different from other indicators used in the conventional type meters, the indicators of Nakamichi Tri-Tracer 700 can also correspond to a sudden peak input.



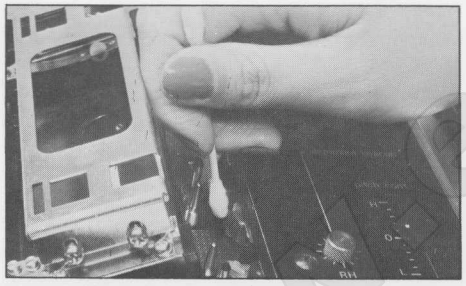
As can be noted from the above Fig. there provided at −8dB is a red mark, to which please position 0dB of the 15 ips 2 track open reel tape recorder when you wish to perform direct copying therefrom, and by doing so, you can conduct desirable recording without saturation even though there comes in a sudden strong peak input. The saturation point of 15 ips 2 track open reel tape recorder is generally said to be at about +15dB, however the saturation point of the cassette is lower than that of 15 ips 2 track. Accordingly, if you set to the value in the neighbourhood of −8dB, it will become about +7dB while 15 ips shows +15dB. This prevents increase of distortion. Depending upon a level of signal source, there may be a case in which S/N becomes lowered because of too low levels of signal source, and therefore please make selection of a level referring to the said mark.

Maintenance



Removing the Cassette Lid

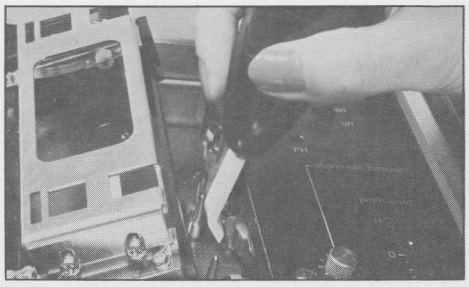
Push the Eject Button. Pull the lid to the right until it gets unlocked. To fix it on, push the lid to the left until it gets locked.



Head Cleaning:

The binder and oxide from magnetic tape as well as dust and other impurities accumulated on the heads, capstan shaft and pinch roller would result in 'drop-outs' of sound. Also it would cause bad wow and flutter and deterioration of frequency response. To remove these particles, use the head cleaning pen, cleaning stick or Q-tip provided as the accessories with the unit, and wipe softly. For cleaning pinch rollers, use the cleaning stick. Turn the stick clockwise, then put a felt tip on it and dip it in the liquid.
This stick can also be used for cleaning the capstan and heads.

Note: Please do not touch with hard materials such as metals.

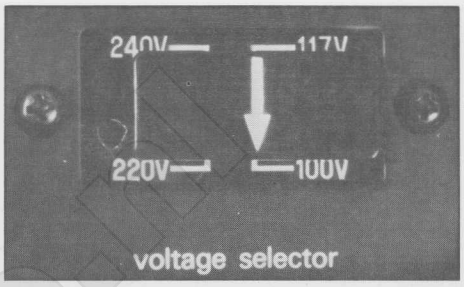


Demagnetizer

Depeding on your long time usage, the metal parts such as Recording/Playback Heads and capstan may be magnetized in which case noise will be generated resulting in deterioration of S/N Ratio and the high frequency may be lowered when a pre-recorded tape is played back.
To previously avoid such occurrance, we suggest you demagnetize the said parts about every 50 hours.

Lubrication

Oil feeding is not particularly required for this Nakamichi Tri-Tracer 700, as it employs the oilless metals for the entire rotation parts that can withstand long time use.



On the Power Supply Voltage:

While your Nakamichi Tri-Tracer is adjusted to the power supply voltage of your country prior to shipment from our factory, it may be readjusted to one of the four voltages. 100, 117, 220 and 240V .. should you ever move to an area where the power supply voltage is different. No adjustment is necessary with respect to the frequency of the power.

The Dolby Noise Reduction System

Your Tri-Tracer 700 incorporates the Dolby Noise Reduction System (Under license from Dolby Laboratories, Inc.), originally developed to produce a master tape from which to cut records wth a high signal-to-noise ratio.

Noise heard from a recorded cassette primarily comprises tape noise and the noise produced by the playback equalizer amplifier of the cassette tape deck, and is largely distributed over a 2KHz to 10KHz range. Such noise can be effectively reduced by amplifying signals within this range at the time of recording, then attenuating them in playback, through a process as illustrated in Fig. 1.

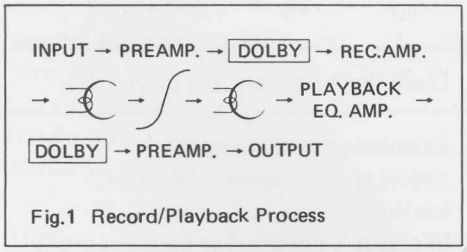


Fig.1 Record/Playback Process

If this treatment is given to such signals regardless of their strengths, however, strong high-frequency signals cannot be recorded. So it is necessary to change the gain of this special circuit with respect to the strength of the high-frequency signals. The Dolby circuit makes this possible.

For instance, if high-frequency signals of −30dB enter the Dolby circuit from input terminals, it delivers signals of −20dB for recording on to the tape. Conversely, if high-frequency signals of −20dB enter the same circuit from the playback head (Fig.2), it delivers signals of −30dB for reproduction from the stereo amplifier. Thus input/output signals are attenuated by 10dB, with equivalent reduction in the level of tape noise and equalizer amplifier noise. The circuit is designed so that it does not affect signals of −5dB or greater.

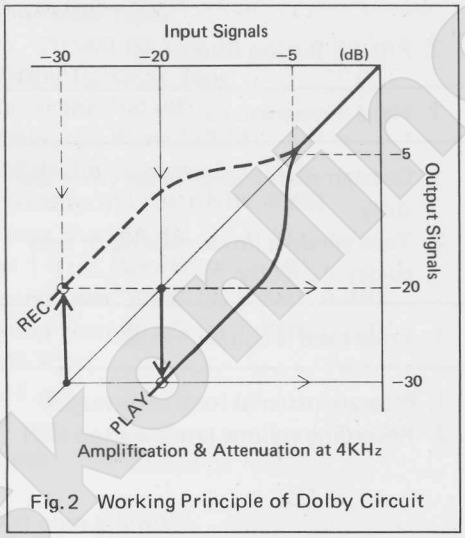
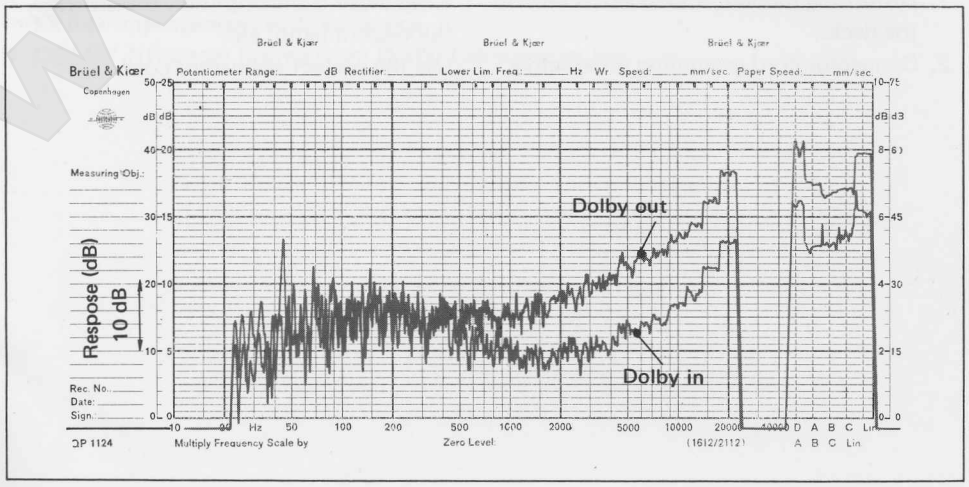


Fig. 2 Working Principle of Dolby Circuit

As is clear from the foregoing explanation, the signal-to-noise ratio of sound improves by about 10dB if it is recorded and reproduced through the Dolby circuit, enabling you to enjoy clean, transparent hi-fi stereo sound. This system is international, and recordings made under it can be reproduced by any cassette or reel-to-reel tape decks equipped with the same system, regardless of their makes.



Trouble Shooting Chart

CONDITION	PROBABLE CAUSE	REMEDY
Tape does not run.	1. Power cord is unplugged. 2. Tape is loose inside cassette. 3. Cassette lid is not firmly closed.	Plug in power cord firmly. Wind tape up. Take out cassette and reset it carefully.
RECORD Lamp does not light.	1. Cassette is not loaded. 2. Cassette tabs are broken off. 3. PAUSE Button is touched.	Load cassette. Place a piece of adhesive tape over the tab opening. Release PAUSE mode.
Hissing sound is heard in playback.	1. Head is magnetized.	Demagnetize head with head demagnetizer.
Tape travel is unsteady.	1. Capstan shaft and/or pinch roller are dirty. 2. Tape winding inside cassette or tape guides are faulty.	Clean those parts. Replace cassette.
Previously recorded sound remains.	1. Erase head is contaminated.	Clean the erase head and pinch roller.
Reproduced sound is distorted.	1. Program material itself is distorted. 2. Recording volume levels are too high.	Examine program material. Adjust appropriate recording level controls. In case it is distorted at transient peaks, turn on the Peak Limiter Switch.
Cannot record.	1. Connection to each part is incorrect. 2. Record head is contaminated.	Check connections. Clean head.
Cannot reproduce.	1. Connection to each part is incorrect. 2. Monitor switch is set to 'SOURCE'. 3. Playback head is contaminated.	Check connections. Switch over to 'TAPE'. Clean head.
Treble tones are weak.	1. Record head azimuth is not adjusted precisely.	Adjust azimuth to match the cassette used.
Large hum noise is heard in recording or playback.	1. Disturbing induction field exists nearby the deck. 2. Connector cord grounding is defective.	Keep away from amplifier, transformer, fluorescent lamp, etc. Use the perfect connector cord.

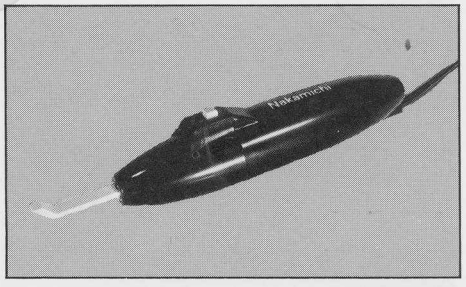
Specifications

Power Supply	100, 117, 220, 240V 50/60 Hz
Power Consumption	60W Max.
Tape Speed	1-7/8 ips. ± 1%
Wow & Flutter	Less than 0.1% (DIN 45507 Weighted Peak)
Frequency Response	35 - 18,000 Hz ± 3 dB (Dolby In, High Density Low Noise Tape) 35 - 20,000 Hz ± 3 dB (Dolby In, CrO2 Tape)
Signal to Noise Ratio	Better than 60 dB (Dolby In, Wrms CCITT 400Hz 3% Distortion)
Total Harmonic Distortion	Less than 2% (at 1 KHz, 0 dB)
Erasure	Better than 60 dB (at 1 KHz, Saturation Level)
Channel Separation	Better than 35 dB (at 1 KHz, 0 dB)
Cross Talk	Better than 60 dB (at 1 KHz, 0 dB)
Bias Frequency	105 KHz
Transistors	115 pcs
Diodes	51 pcs
ICs	9 pcs
Input:	
Mic Input	600 ohm 0.5 mV
Blend Mic	600 ohm 0.5 mV
DIN Mic Input	600 ohm 0.5 mV
Line	100 K ohm 100 mV
DIN Radio	26 K ohm 25 mV
Output:	
Line	1.0 V (Max.) Variable
DIN Line Output	1.0V (Max.) Variable
Headphones	1 mW 0 dB
Dimensions	20-1/2" (W) x 10-11/16" (H) x 5-1/8" (D)
Weight	28 lbs.

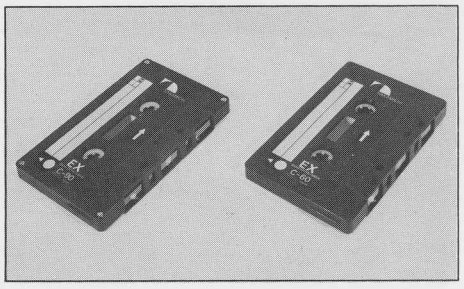
- Specifications and appearance design are subject to change for further improvement without notice.
- DOLBY NR under license from Dolby Laboratories Inc.

Optional Accessories

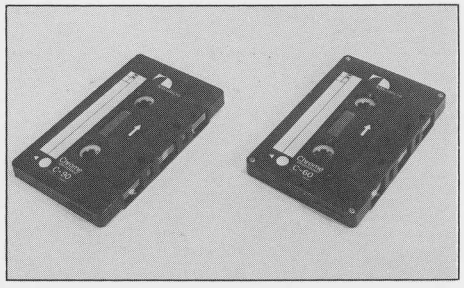
Remote Controller



Demagnetizer



EX Tape
C-60, C-90

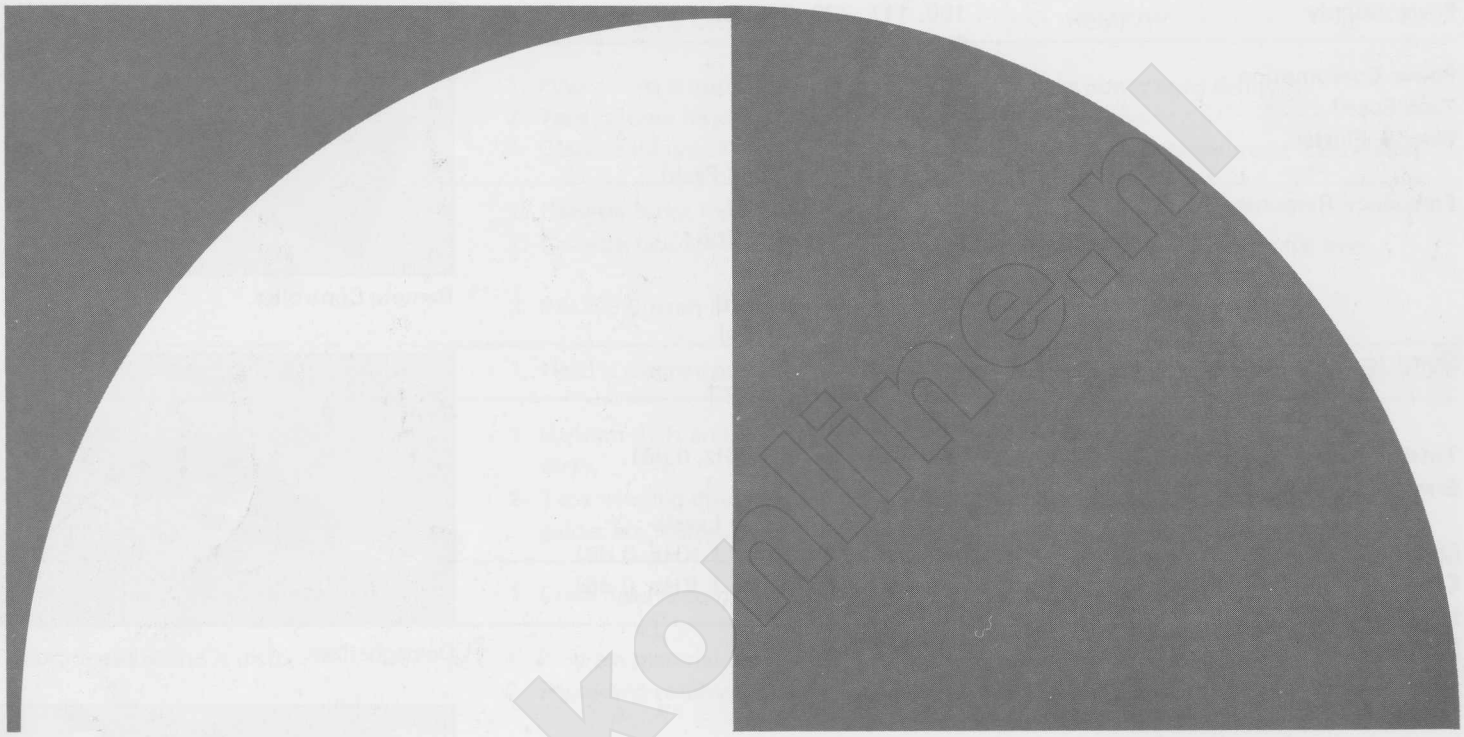


CrO2 Tape
C-60, C-90

NAKAMICHI RESEARCH (U.S.A.) INC.
West Coast Office
1101 Colorado Avenue,
Santa Monica, Calif. 90404
Phone: (213) 451-5901
Telex: 652429 (NAKREI SNM)

NAKAMICHI RESEARCH (U.S.A.) INC.
New York Office
220 Westbury Avenue,
Carle Place, N.Y. 11514
Phone: (516) 333-5440
Telex: 144513 (NAKREI CAPL)

NAKAMICHI



NAKAMICHI RESEARCH INC.
1-153 Suzukicho, Kodaira, Tokyo
Phone: (0423) 42-1111
Telex: 2832610 (NAKREI J)
Cable: NAKREI KKB

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West Coast Office
1101 Colorado Avenue,
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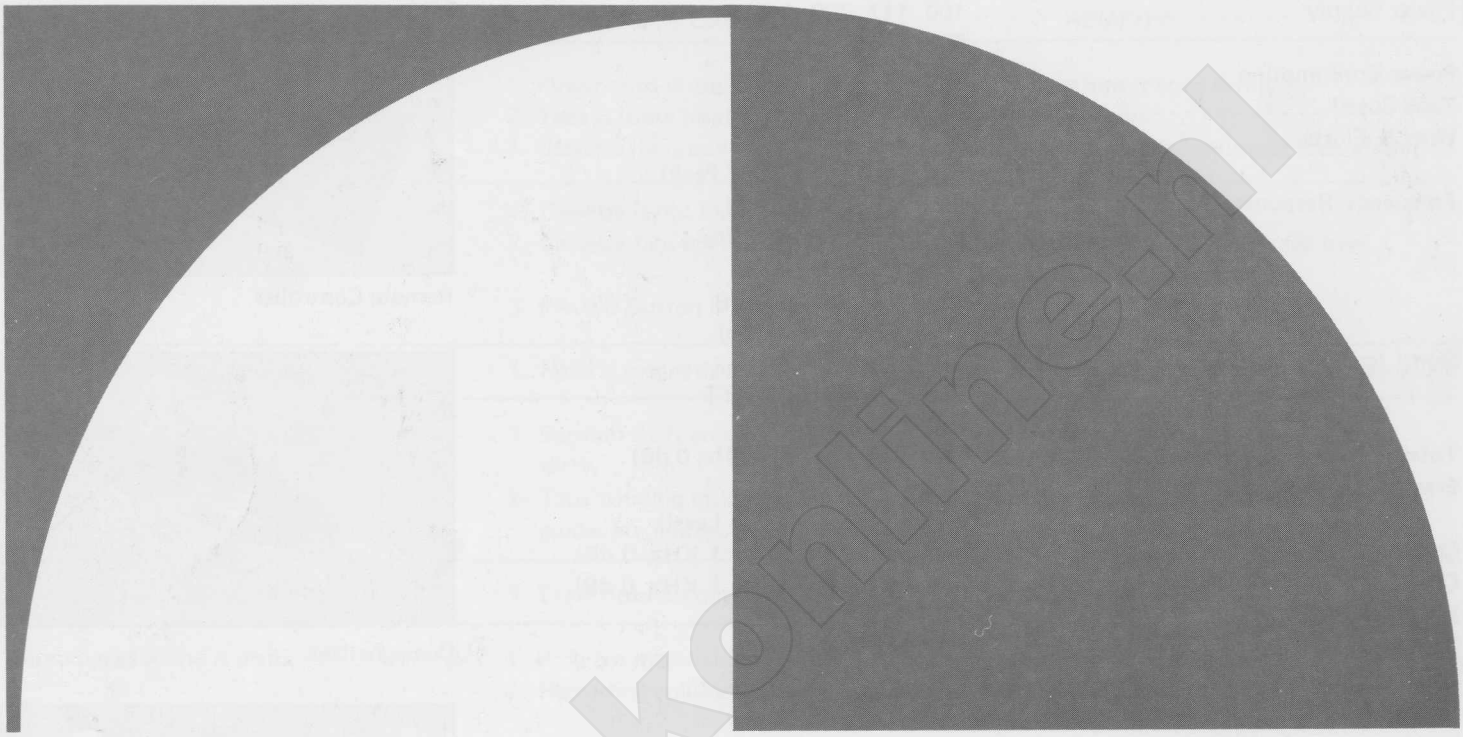

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