



# ***TA-RW490***

**Stereo Cassette Tape Deck**

- *Congratulations on your purchase of the ONKYO TA-RW490 Cassette Tape Deck.*
- *Please read this manual thoroughly before making connections and turning power on.*
- *Follow these instructions to obtain optimum performance and maximum listening enjoyment from your new TA-RW490.*
- *Please retain this manual for future reference.*

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## Features

- **Computer Controlled Double Recording and Playback Quick Auto-Reverse Cassette Drives**  
Both cassette drives on the TA-RW490 provide quick auto-reverse operation for both recording and playback. You can record on each drive independently, record the same source on both drives at once, record from a single source on one cassette after the other, or copy from one cassette to the other.
- **Double Real Time Counters**  
Each of these real time counters is capable of elapsed time and remaining time indications, displayed in minutes and seconds.
- **Full Synchro Dubbing**  
A microcomputer coordinates operation of the two cassette drives when transferring material from one tape to another.
- **Dolby B-C and HX PRO for Superior Sound Quality**  
In addition to the Dolby B and C noise reduction systems, the TA-RW490 is equipped with Dolby HX PRO, a system that helps prevent tape saturation and allows a tape to record a wider dynamic range.
- **Direct Music Search on Both Drives A and B**  
This convenient feature lets you skip directly to any selection up to 15 ahead or 14 behind current location.
- **Single Repeat**
- **Mic Mixing Dubbing**
- **Full Repeat Play of Both Sides of Both Cassettes**
- **Integrates with Onkyo Remote Controlled Hi-Fi Systems**

### “WARNING”

“TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.”

### “CAUTION”

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



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

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

## Important safeguards

1. **Read Instructions** — All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** — The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** — All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions** — All operating and use instructions should be followed.
5. **Water and Moisture** — The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. **Carts and Stands** — The appliance should be used only with a cart or stand that is recommended by the manufacturer.
7. **Wall or Ceiling Mounting** — The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation** — The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat** — The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that 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 the 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 the 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 instructions. All other servicing should be referred to qualified service personnel.

## Precautions

### 1. Warranty card

The serial number is written on the rear panel of this unit. Copy the serial number and model number onto your warranty card and keep it in a safe place.

### 2. Deck location

- Do not use or leave in direct sunlight or in other places subject to high temperature and humidity. The unit should also not be left in potentially hot places such as near heating appliances. Excessive heat and moisture can lead to internal damage and serious malfunctions (this also applies to cassette tapes). The recommended ambient temperature range is 5° C to 35° C.
- Avoid damp and dusty places and locations prone to vibrations.
- Be extremely careful with the recording/playback heads. Clean and demagnetize them regularly but under no circumstances should magnets or other metals be used anywhere near the heads.
- This unit is extremely sensitive to magnetic fields, so do not use near large speakers or other devices which generate magnetic fields.
- Hum may even be induced by magnetic flux leakage from the power transformer in certain amplifiers. Therefore, this unit should also be kept clear of the amplifier.

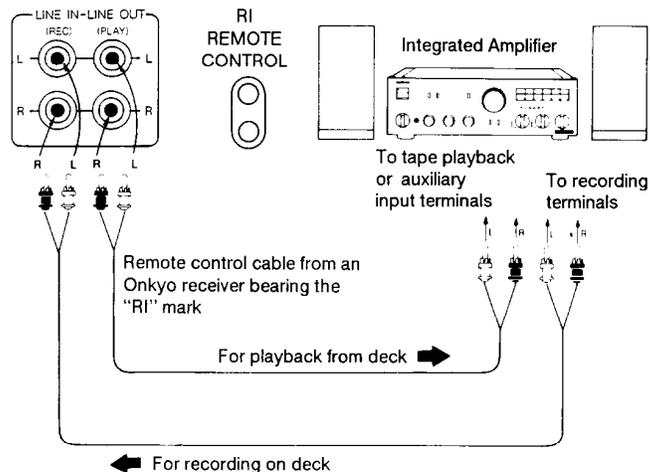
- Do not remove the cabinet case. If any of the internal parts are handled, there is a considerable danger of electric shock.

### 3. Cassettes to avoid:

- Cassettes with poorly formed cases that rattle during rewind and fast forward.
- Low cost cassettes with no guide roller or pressure pad spring should never be used for stereo.
- C-120 cassettes — because the tape and the coating are extremely thin, distortion levels are high and the auto-reverse function may not operate properly. Also, even a slight stretching of the tape will make it susceptible to being caught up in the pinch roller and capstan.
- Endless tapes, if used for a long period of time, can overheat.
- Dolby noise reduction and HX PRO headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX PRO originated by Bang and Olufsen. "Dolby," the double-D symbol and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.
- Recording of copyrighted material for other than personal use is illegal without permission of the copyright holder.

## System connections

All connections should be made with the power OFF. Hook up to the amplifier:



### Microphone jack

Although microphones in the 200 ohm—10 kohm impedance range are quite acceptable, those in the 600 ohm—10 kohm range will give the best results.

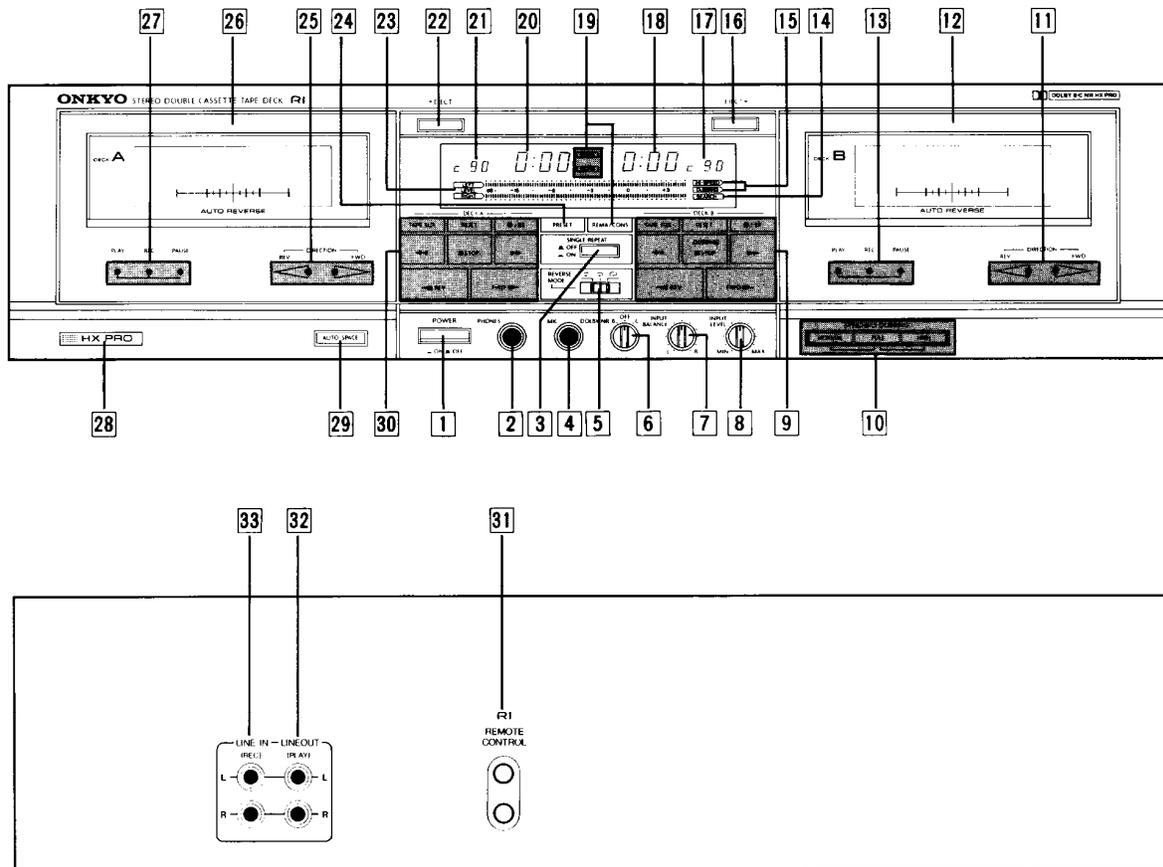
### Headphone jack

Dynamic type headphones with a rated impedance in the 8 to 200 ohm range are recommended.

### Remote control jack

For remote control operation, connect this jack and any Onkyo receiver bearing the "RI" mark using the remote control cable included with the receiver. (Record/pause, forward play, reverse play, stop, fast-forward and rewind operations can be accomplished via remote control.)

## Front and rear panel facilities



- |  |   |
|--|---|
| <p>1 Power Switch (POWER — ON/ ■ OFF)</p> <p>2 Headphone Jack (PHONES)</p> <p>3 Single Repeat Switch (SINGLE REPEAT ■ OFF/ — ON)</p> <p>4 Microphone Jack (MIC)</p> <p>5 Reverse Mode Switch (REVERSE MODE = / &gt; / &lt; )</p> <p>6 Dolby NR Switch (DOLBY NR B/OFF/C)</p> <p>7 Input Balance Control Knob (INPUT BALANCE L/R)</p> <p>8 Input Level Control Knob (INPUT LEVEL MIN/MAX)</p> <p>9 Deck B Operation Buttons (DECK B)<br/>           TAPE SIZE : Tape Size Selector Button<br/>           RESET : Elapsed Time Reset Button<br/>           ●/   : Rec/Pause Button<br/>           ◀ : Rewind Button<br/>           ■ STOP : Stop Button (Dubbing Stop)<br/>           ▶▶ : Fast Forward Button<br/>           ◀ REV : Reverse Play Button<br/>           ▶ FWD : Forward Play Button</p> <p>10 Synchro Dubbing Buttons (SYNCHRO DUBBING)<br/>           NORMAL : Normal Speed Dubbing Button<br/>           FULL : Full Synchro Dubbing Button<br/>           HIGH : High Speed Dubbing Button</p> <p>11 Deck B Direction Indicators (DIRECTION REV/FWD)</p> | <p>12 Deck B Cassette Holder</p> <p>13 Deck B Operation Indicators<br/>           ● PLAY : Play Indicator<br/>           ● REC : Recording Indicator<br/>           ● PAUSE : Pause Indicator</p> <p>14 Music Search Indicator (SEARCH)</p> <p>15 Dubbing Indicators (HI-SPEED/DUBBING)</p> <p>16 Deck B Eject Button (EJECT ▶ )</p> <p>17 Deck B Tape Size Indicator (c90/120/46/60)</p> <p>18 Deck B Real Time Counter</p> <p>19 Deck A/B Counter Mode Button and Indicators (REMA/CONS)</p> <p>20 Deck A Real Time Counter</p> <p>21 Deck A Tape Size Indicator (c90/120/46/60)</p> <p>22 Deck A Eject Button (◀ EJECT)</p> <p>23 Peak Level Indicators (LEVEL LEFT/RIGHT)</p> <p>24 Music Search Preset Button (PRESET)</p> <p>25 Deck A Direction Indicators (DIRECTION REV/FWD)</p> <p>26 Deck A Cassette Holder</p> <p>27 Deck A Operation Indicators<br/>           ● PLAY : Play Indicator<br/>           ● REC : Recording Indicator<br/>           ● PAUSE : Pause Indicator</p> <p>28 Dolby HX PRO Indicator (HX PRO)</p> <p>29 Auto Space Button (AUTO SPACE)</p> <p>30 Deck A Operation Buttons (DECK A)<br/>           TAPE SIZE : Tape Size Selector Button</p> |
|--|---|

- RESET** : Elapsed Time Reset Button  
**●/||** : Rec/Pause Button  
**◀** : Rewind Button  
**■ STOP** : Stop Button  
**▶** : Fast Forward Button  
**◀ REV** : Reverse Play Button  
**▶ FWD** : Forward Play Button

**31 Remote Control Jack (RI REMOTE CONTROL)**

**32 Line Out Jack (LINE OUT (PLAY))**

**33 Line In Jack (LINE IN (REC))**

## Common modes of operation

Check once again that all connections have been completed exactly as indicated in the connections diagram and then turn the power on. After turning power on, no operations are possible until the ● PAUSE indicator has stopped flashing on and off. This deck holds two cassettes at once. Both Deck A and Deck B are capable of quick auto-reverse playback and recording.

### Inserting Cassettes

- Depress EJECT button **22** to open the Deck A cassette holder **26** and EJECT button **16** to open the Deck B cassette holder **12**.
- Insert cassettes with the exposed tape facing down and the side to be played facing outward.
- Close the cassette holder.

### Tape Playback

Tapes can be played back using either Deck A or Deck B.

- Set the DOLBY NR switch **6** to the proper position for the tape to be used. Tapes recorded using Dolby B or C NR should be played back with the DOLBY NR switch in the B or C position, as appropriate. Tapes recorded without Dolby NR should be played back with the DOLBY NR switch in the OFF position.
- Set the REVERSE MODE switch **5** to the desired tape transport mode. See the "Reverse mode switch" section on page 9 for details.
- Press the ▶ FWD or ◀ REV play button depending on which side of the cassette you wish to listen to. The ● PLAY indicator will light. The Peak Level indicators **23** will light during playback showing the strength of the recorded signal.
- The auto-stop mechanism will automatically stop tape transport (depending on the tape transport mode) if a tape is played through to the end. To stop playback at any other time, press the ■ STOP button. After tape transport has stopped and the Peak Level indicators **23** have gone out, press the EJECT button to open the cassette holder and remove the cassette.

### Fast Forward and Rewind

Press the ▶▶ button to wind the tape rapidly from left to right and the ◀◀ button to wind it from right to left. The tape will stop when the ■ STOP button is pressed or when the end of the tape is reached (via the auto-stop mechanism).

### Recording

Both Deck A and Deck B are equipped for recording. The following three recording arrangements are possible.

- Recording a single cassette using either Deck A or Deck B.
- Recording the same program on two cassettes simultaneously using both Deck A and Deck B.
- Recording on two cassettes consecutively using first Deck A then Deck B.

### (A) Recording a Single Cassette Using Either Deck A or Deck B.

The following instructions assume that Deck A is being used.

- Insert a cassette with the side to be recorded facing out. Before inserting the cassette, confirm that the erasure prevention tabs are intact (see page 10). If one or both of the tabs is broken off, recording on the sides with the missing tabs will not be possible.
- Set the REVERSE MODE switch **5** to the desired (( ◯ ) or ( ◯ )) tape transport mode. See the "Reverse mode switch" section on page 9 for details.
- Set the DOLBY NR switch **6** to the B or C position if you want to make a Dolby NR encoded recording.
- Press the elapsed time RESET button **30** to return the tape counter to [0:00] so you can index the recording for future reference. (The REMA mode cannot be reset.)
- Set the INPUT LEVEL control knob **8** to the center position. Press the ●/|| button. The tape will not move, but the Peak Level indicators **23** will show the level of the signal being received through the LINE IN jack **33**.
- While watching the Peak Level indicators, adjust the INPUT LEVEL control knob to the proper position. (The input levels for the left and right channels are adjusted simultaneously.) Use the L/R INPUT BALANCE control knob **7** to adjust the balance between the left and right channels. Refer to the "Setting the Proper Recording Level" section for instructions.
- Confirm again that an input signal is being received (the Peak Level indicators should light) and then press the ▶ FWD or ◀ REV play button to begin recording.
- The auto-stop mechanism will stop tape transport automatically when the end of the tape is reached (depending on the tape transport mode — see page 9). To stop recording before the end of the tape, press the ■ STOP button. To interrupt recording briefly, press the ●/|| button.

### Notes:

- This deck will not commence recording if you press the ●/|| and ▶ FWD or ◀ REV buttons at the same time. To begin recording, first press the ●/|| button to put the deck into the rec/pause mode, then press either the ▶ FWD or ◀ REV play button as appropriate.
- Do not switch off power while recording (or dubbing). If the power is switched off, the cassettes cannot be removed from the holders.

### (B) Recording the Same Program on Two Cassettes Simultaneously Using Both Deck A and Deck B.

The signal received through the LINE IN jack **33** is recorded on both cassettes.

- Insert the cassettes with the sides to be recorded facing out. Before inserting the cassettes, confirm that the erasure prevention tabs are intact (see page 10). If one or both of the tabs is broken off, recording on the sides with the missing tabs will not be possible.
- Set the REVERSE MODE switch **5** to the desired (( ◯ ) or ( ◯ )) tape transport mode. See the "Reverse mode switch" section on page 9 for details.
- Set the DOLBY NR switch **6** to the B or C position if you want to make a Dolby NR encoded recording.
- Press the elapsed time RESET buttons **9** and **30** to return the tape counters to [0:00] so you can index the recording for future reference. (The REMA mode cannot be reset.)
- Set the INPUT LEVEL control knob **8** to the center position. Press the ●/|| button. The tape will not move, but the Peak Level indicators **23** will show the level of the signal being received through the LINE IN jack **33**.
- While watching the Peak Level indicators, adjust the INPUT LEVEL control knob to the proper position. (The input levels for the left and right channels are adjusted simultaneously.) Use the L/R INPUT BALANCE control knob **7** to adjust the

balance between the left and right channels. Refer to the "Setting the Proper Recording Level" section for instructions.

7. Confirm again that an input signal is being received (the Peak Level indicators should light) and then press the Deck A and Deck B ► FWD or ◀ REV play buttons to begin recording.
8. The auto-stop mechanism will stop tape transport automatically when the ends of the tapes are reached (depending on the tape transport mode — see page 9). To stop recording before the end of the tapes, press the ■ STOP button. To briefly interrupt recording, press the ●/|| button.

#### Notes:

- 1) Set the REVERSE MODE switch to either ( ⇐ ) or ( ⇒ ). Both Deck A and Deck B will be set to the mode selected.
- 2) The DOLBY NR switch also affects both Deck A and Deck B.
- 3) The INPUT LEVEL control knob and the Peak Level indicators are shared by both Deck A and Deck B.
- 4) To stop or pause recording on Deck A or Deck B only, press the appropriate operation button on the side of the deck to be stopped or paused.

### (C) Recording on Two Cassettes Consecutively Using First Deck A then Deck B

The signal received through the LINE IN jack [33] is recorded first on the cassette in Deck A, then on the cassette in Deck B when the first cassette is full. A maximum continuous recording time of three hours is possible if you use two C90 cassettes.

1. Insert the cassettes with the sides to be recorded facing out. Before inserting the cassettes, confirm that the erasure prevention tabs are intact (see page 10). If one or both of the tabs is broken off, recording on the sides with the missing tabs will not be possible.
2. Set the REVERSE MODE switch [5] to the ( ⇐ ) tape transport mode. See the "Reverse mode switch" section on page 9 for details.
3. Set the Deck B DIRECTION indicator to FWD. (While holding down the ●/|| button, press the Deck B ► FWD play button. Then press the ■ STOP button.)
4. Set the DOLBY NR switch [6] to the B or C position if you want to make a Dolby NR encoded recording.
5. Press the elapsed time RESET buttons [9] and [30] to return the tape counters to [0:00] so you can index the recording for future reference. (The REMA mode cannot be reset.)
6. Set the INPUT LEVEL control knob [8] to the center position. Press the Deck A ●/|| button. The tape will not move, but the Peak Level indicators [23] will show the level of the signal being received through the LINE IN jack [33].
7. While watching the Peak Level indicators, adjust the INPUT LEVEL control knob to the proper position. (The input levels for the left and right channels are adjusted simultaneously.) Use the L/R INPUT BALANCE control knob [7] to adjust the balance between the left and right channels. Refer to the "Setting the Proper Recording Level" section for instructions.
8. Confirm again that an input signal is being received (the Peak Level indicators should light) and then press the Deck A ► FWD play button to begin recording.
9. The auto-stop mechanism will stop tape transport automatically when the ends of the tape is reached (depending on the tape transport mode — see page 9). To stop recording before the end of the tapes, press the ■ STOP button of the deck which is currently recording. To briefly interrupt recording, press the ●/|| button.

#### Notes:

- 1) Sequential recording in the opposite direction to the one described above (beginning with Deck B and then switching to Deck A) is not possible.
- 2) If the Deck B REV DIRECTION indicator is lit when you begin, the tape will be recorded in the reverse direction.
- 3) If a cassette side with its erasure prevention tab broken off is encountered in the during the recording sequence, recording will cease at that point. For example, if the erasure prevention tab for, say, side B of the cassette in Deck A has been broken off, that side will not be recorded and neither will either side of the cassette in Deck B.

### Recording with a Microphone

When a microphone is connected to the front panel microphone jack [4], the LINE IN jacks [33] on the rear panel are automatically deactivated. Only the monaural signal from the microphone will be recorded and the input level is adjusted with the INPUT LEVEL control knob [8]. A microphone with an impedance of 600 ohms to 10 kohms should be used. To perform mic mixing recording with a record or other audio source, a separate mixing amplifier or amplifier with a mixing capability must be used. Refer to the amplifier instruction manual for directions on mic mixing recording.

### Setting the Proper Recording Level

The recording level has a very important effect on the sound quality of a tape when it is played back. A recording level that is too high will cause distortion while a low recording level will lower the signal-to-noise ratio resulting in a tape in which the background "hiss noise" is prominent. Setting the proper recording level is particularly important with cassette tapes since they have a much thinner magnetic coating than open reel tapes. The thin coating gives the tape a rather low saturation level which can easily be surpassed if the recording level is set too high. To obtain the best results with this deck, the INPUT LEVEL control knob [8] should be adjusted so that the +3dB indicator lights up only occasionally.

### Tape Dubbing

This deck has two cassette holders so that dubbing (copying) operations can be performed without using a second cassette deck. To save time, it is also equipped with a high-speed dubbing function that records tapes in about half the time normally required. Tape dubbing can only be performed from Deck A to Deck B. Dubbing in the opposite direction is not possible.

1. Insert the prerecorded cassette in the Deck A holder [26] and the cassette to be recorded on the Deck B holder [12].
2. Set the REVERSE MODE switch [5] to the desired tape transfer mode.  
( ⇐ ) one side: Only one side of the tape is copied after which tape transport stops automatically.  
( ⇐ ) both sides, ( ⇐ ) repeat: Both sides of the tape are copied after which tape transport stops automatically.  
To perform auto-reverse dubbing using either the ( ⇐ ) or ( ⇐ ) mode, copying must begin in the forward direction. If it is initiated in the reverse direction instead, tape transport will stop automatically after only one side.
3. Set the INPUT LEVEL control knob to zero. The recording level is automatically set to the optimum point when the dubbing mode is used.
4. Check the Deck A and Deck B DIRECTION indicators to be sure that tape transport will start in the desired direction. To change the setting of one of the DIRECTION indicators to FWD, press the appropriate FWD play button followed by the STOP button.

5. For normal speed dubbing, press the NORMAL button [10]. The DUBBING indicator [15] will light and normal speed dubbing will commence. (Deck A playback and Deck B recording will begin simultaneously.)  
For high speed dubbing, press the HIGH button [10]. The HI-SPEED and DUBBING indicators will light and high speed dubbing will commence.
  - To perform mic mixing dubbing (only possible with normal speed dubbing) in which the microphone input signal and the signal from the prerecorded cassette are recorded together on the blank cassette, connect a microphone to the MIC jack [4] and set the INPUT LEVEL control knob [8] to the appropriate level. (Press the NORMAL button [10] to prepare the unit for dubbing and then the Deck B ●/|| button to put it into the rec/pause mode. Begin playback of the cassette in Deck A and adjust the microphone input level.)
  - Pressing the Deck B ●/|| button during dubbing returns deck to the rec/pause mode. It is then possible to use the direct music search function on Deck A. (See "The Direct Music Search Function" below for details.)
6. To discontinue dubbing before the end of either tape has been reached, press the Deck B ■ DUBBING STOP button.
  - The position of the DOLBY NR switch [6] has no effect on the signal being recorded. In any case, the recording will be an exact copy of the cassette in Deck A. Therefore, the recording will include the same NR encoding as the original (or none at all). If you wish to monitor the signal from a Dolby NR encoded tape during dubbing, be sure to set the DOLBY NR switch [6] to match the type of Dolby NR with which the cassette was recorded. Then you can monitor the decoded signal while the encoded signal is copied to the cassette in Deck B. It is also possible to monitor the speeded up signal during high speed dubbing.

### The Dolby Noise Reduction Systems

Dolby B NR is the system that most cassette tape decks use to reduce the background tape noise that is inherent in all cassette tapes. Dolby Laboratories then developed an even more effective noise reduction system, Dolby C NR, in response to the demand for increasingly better sound quality from cassette tapes.

Both Dolby noise reduction systems operate by boosting signals during recording that fall below a certain input level. Dolby B and C NR operate on the higher portions of the frequency spectrum using what is called a "sliding band" technique. That's because tape hiss is most prominent during quiet, high frequency portions of a recording. These same signals are then reduced back to their original strength during playback thereby reducing the background noise by the same amount. In order to operate only when necessary, the Dolby NR system has a varying effect depending on the input level and frequency of the material being recorded.

Dolby C NR is capable of reducing tape hiss by an additional 10dB as compared with Dolby B NR. In addition to its noise reduction function, Dolby C NR has an antisaturation network that lowers high input levels before recording them and returns the signals to their original strength during playback. This raises the high frequency saturation level of cassette tapes to allow you to record signals that would normally cause distortion. The maximum output level of cassette tapes is increased by more than 4dB at 10kHz by this system.

### The Dolby HX PRO System

Tape sensitivity is constantly changing as recordings are made due to the biasing effect of high frequency audio signals. Dolby HX PRO is a system that compensates for these undesirable fluctuations during recording. It does not operate during playback, so cassettes recorded with Dolby HX PRO can be played back on decks not equipped with the system.

#### Notes:

- 1) Dolby HX PRO operates independently of Dolby B and C NR and only during recording.
- 2) The HX PRO indicator [28] lights when the power is turned on.

## Special modes of operation

### Continuous Tape Playback

Insert the cassettes you wish to play in the Deck A and Deck B cassette holders. Set the REVERSE MODE switch [5] to the (↔) position. Press the ► FWD or ◀ REV play button of either Deck A or Deck B. Both sides of both cassettes will be played back, one after the other, and then the process is repeated. After four complete playback cycles tape transport stops automatically.

- Set the DOLBY NR switch [6] to the proper position for the tapes about to be used.
  - Since the DOLBY NR switch affects both Deck A and Deck B, both cassettes used for continuous playback should have been recorded using the same type of Dolby NR (B or C) or none at all. If the two cassettes were recorded using different types (e.g. one Dolby B and the other Dolby C), you will have to change the DOLBY NR switch setting each time tape play switches from one tape to the other in order to obtain optimum sound quality.
- Set the REVERSE MODE switch to the (↔) position.
  - If you use the (↔) position, both sides of both cassettes will be played only once.
- Press the ► FWD or ◀ REV of Deck A or Deck B depending on the point from which you wish to initiate continuous playback.

### The Direct Music Search Function

Both Deck A and Deck B are equipped with a direct music search function that winds the tape directly to the beginning of the selection of your choice in either the forward or reverse direction (forward or reverse in relation to the current direction of tape travel). Up to 15 selections in the forward direction and 14 in the reverse direction are accessible. This function can be used during tape transport in either direction.

- Set the DOLBY NR switch [6] to the proper position for the tape about to be used.
- Set the REVERSE MODE switch [5] to the desired mode.
- Press the PRESET button [24] and confirm that the SEARCH indicator [14] begins flashing on and off. To move ahead, say, three selections (see diagram below), press the PRESET button three times and then the appropriate ►► button (assuming that the FWD DIRECTION indicator is lit). The tape will move ahead and play will resume after three silent gaps (between selections) have been detected. To move back three selections, press the PRESET button four times (SEARCH indicator flashes four times). Then press the ◀◀ button. An extra press is required in the reverse direction because the current selection is included in the count.
  - When the beginning of the specified selection is located, the SEARCH indicator goes out and the deck returns to the normal playback mode.
  - If direct music search is performed on Deck A while Deck B is in the dubbing pause mode, the deck halts Deck A tape transport at the beginning of the specified selection instead of resuming play. This is very convenient when using the music search and dubbing functions together.
  - If the PRESET button is pressed more than 15 times, the SEARCH indicator will stop flashing and the setting will remain at 15.

### Using the Single Repeat Mode

This mode allows you to repeat a single selection on the cassette in Deck A up to five times.

- Set the SINGLE REPEAT switch [3] to the (—) ON position.
- Press the Deck A ► FWD or REV play button depending on which side of the cassette you wish to listen to.
  - The single repeat switch can be used during normal play. Simply press it while the selection you wish to repeat is playing. The selection being played will be repeated up to five times, then tape transport will stop. To repeat the same selection additional times, first press the SINGLE REPEAT button once to cancel the repeat mode and then once again to turn it back on.

#### Note:

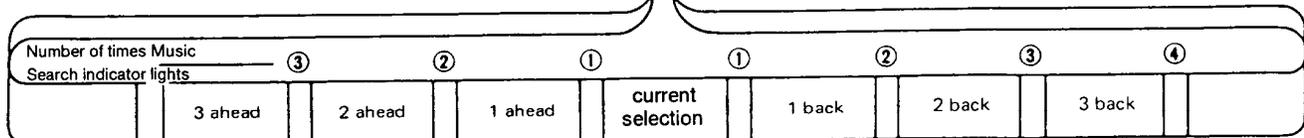
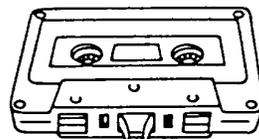
If the gap between adjacent selections is too short or noisy, the single repeat mode may not function properly.

### Using the AUTO SPACE Button

Press the AUTO SPACE button [29] at any point during a recording where you want to enter a blank section about five seconds long. (The AUTO SPACE button works in both the record and record/pause modes.) When the AUTO SPACE button is pressed, the ● PLAY indicator flashes on and off and tape transport continues for about five seconds during which no signal is recorded. After the blank section has been inserted, tape transport stops automatically and the deck returns to the rec/pause standby mode. To continue recording, press the PLAY button corresponding to whichever DIRECTION indicator is lit. To insert a blank section of tape less than five seconds long, press the appropriate PLAY button before the five second period has elapsed or press the ●/|| button to return to the rec/pause standby mode. To insert a blank section of tape more than five seconds long, hold the AUTO SPACE button down for as long as you want the blank section to be. The deck will return to the rec/pause standby mode immediately when the button is released. This button is useful not only for making recordings from radio broadcasts but also to eliminate the noise of the stylus making contact with a record and the noise between selections on a record. AUTO SPACE also comes in handy for making blank spaces when re-recording and editing cassette tapes. When recording over an old recording, switch to the rec/pause standby mode first and then press the AUTO SPACE button to insert a blank section about five seconds long before starting the new recording. This assures that none of the previous recording will remain in the section of tape immediately preceding the start of the new recording.

#### Note:

- Pressing the AUTO SPACE button during dubbing causes Deck A playback to pause while a blank section is inserted onto Deck B. Then the deck reverts to the Dubbing Pause mode. To continue dubbing, press the NORMAL or HIGH SYNCHRO DUBBING button.
- Pressing the AUTO SPACE button while simultaneously recording the same signal on Deck A and Deck B causes a blank section to be inserted onto both cassettes.



Direction of tape travel

## Full Synchro Dubbing

In order to copy side A of the cassette in Deck A to side A of the cassette in Deck B full synchro dubbing operates as follows: The Deck A and Deck B DIRECTION indicators automatically switch to FWD. The cassette in Deck A is rewound and the beginning of the first selection is located, after which the tape stops. A five-second silent space is inserted on the cassette in Deck B in the high speed mode. Then copying from Deck A to Deck B commences.

1. Follow steps 1 — 3 of the directions in the "Tape Dubbing" section on page 5.
  - Step 4 can be omitted.
2. For normal speed full synchro dubbing, press the FULL **[10]** and NORMAL buttons simultaneously. For high speed full synchro dubbing, press the FULL button, then the HIGH button.
  - Except for step 2 above, the procedure is the same as that described in the "Tape Dubbing" section on page 5.

### Note:

Mic mixing dubbing is not possible during full synchro dubbing.

## Real Time Counters

The real time counters can be used in two ways:

1. Elapsed Time Indication (CONS)  
The Deck A and B counters read [0:00] "CONS" and the Tape Size indicators (**[21]** and **[17]**) read "C90" when the power is first turned on. After inserting a cassette, press the TAPE SIZE selector button (**[30]** or **[9]**) for the deck(s) you wish to use. Each press advances the corresponding Tape Size indicator from C90 to C120, C46, C60 and then back to C90. Set the size of the cassette(s) to be used before starting playback or recording. When tape transport begins in the record or play mode, the counter(s) will begin counting the elapsed time. (If you turn a cassette over without resetting the counter, the total time including the first side will be displayed.) The two digits on the left side display minutes and the two digits on the right display seconds. To return the counter to [0:00], press the appropriate RESET button (**[30]** or **[9]**).

2. Remaining Time Indication (REMA)

The real time counters can also be used to show the amount of time remaining on a cassette as it is being recorded or played back. (The time remaining on the side of the cassette being played or recorded is displayed.)

- 1) Set the proper tape length using the appropriate TAPE SIZE selector button (**[30]** or **[9]**).
- 2) Press the REMA/CONS button **[19]** to switch the real time counter to the "REMA" (remaining) time mode. The counter will then read [----].
- 3) Begin playback or recording. The real time counter will first read [CALC] for a few seconds and then show the time remaining on that side of the cassette.
- 4) If you accidentally set the wrong tape length, press the appropriate TAPE SIZE selector button again to set the correct length (without stopping playback or recording) to obtain the correct remaining time reading.

3. To Obtain the Most Accurate Time Indications Possible:

The real time counters are not clocks, so there may be slight differences between the tape transport time as shown by the counters and the actual time that has elapsed over that period. Small differences in tape lengths between different manufacturers can also cause slight errors. To obtain a more precise reading of remaining time near the end of a cassette, repeat the remaining time calculation procedure. If you insert a cassette of a different length, use the TAPE SIZE selector button to set the new length.

- The remaining time is automatically recalculated when the remaining time counter reaches [6:00]. The display changes briefly to [CALC], then the new (more accurate) remaining time is displayed.

### Notes:

- 1) The REMA/CONS button affects both Deck A and Deck B.
- 2) If the wrong tape size has been selected, the remaining time reading will differ significantly from the actual time remaining on the cassette.
- 3) The correct elapsed time is maintained even when the deck is in the remaining time mode.
- 4) The RESET button is used to reset the elapsed time reading.
- 5) When using a tape size other than those included in the Tape Size indicator settings, set the Tape Size indicator to the size closest to that of the cassette being used. In such cases there will be a certain discrepancy between the actual elapsed and remaining times and the values displayed. Slight differences in the time displayed can also be caused by variations in the internal construction of different cassettes.

## Automatic Tape Selection System

This deck automatically detects the type of cassette in the cassette holder and sets the bias and equalization to the correct settings. Tape selection is performed by detecting the presence or absence of identification pits on the back of the cassette shell. Cassettes manufactured before this identification system was adopted and bargain cassettes that do not incorporate these pits can not be used with this deck.

## Auto-Reverse Operation

This deck's auto-reverse function automatically reverses the direction of tape travel in the playback or recording modes when the end of the magnetic tape is reached. Tape travel is reversed as soon as a photo sensor detects the presence of the clear leader at the end of the tape. In other words, as soon as the sensor's light ray passes through the tape, the direction of tape travel reverses. Reversal takes place extremely quickly so the gap between sides during playback is barely noticeable. If the cassette tape does not have a clear leader section, tape travel is reversed the instant the end of the tape (including the leader) is reached.

Auto-reverse may be activated prematurely with defective cassette tapes with pin holes or other damage which allows light to pass through the tape. To prevent this from happening, play and record such tapes using the one side tape transport mode in which auto-reverse is not activated.

### Notes:

- 1) Because of slight physical differences between cassette shell halves, cassettes recorded in the forward direction should be played back in the forward direction to obtain the best results.
- 2) When recording, the direction of tape travel only switches from forward to reverse. To keep track of which side is being recorded so that you do not mistakenly use an already recorded side, it is a good idea to always begin recordings with side A.

## Reverse mode switch

- Recheck the tape travel direction settings (shown by the DIRECTION indicators [11] and [25]) before beginning playback or recording.
- The following explanation assumes that cassette side A is facing outward.
- Due to the location of the photo sensor, the transparent leader must go by the heads before being detected for reverse-to-forward switching. As a result, the silent gap is about one second longer than the forward-to-reverse switching gap.

Reverse Mode		Direction of Tape Travel	Playback	Recording
One side		Forward only 	Press the ► FWD play button. Only side A (front) is played (once).	Press the ●   button followed by the ► FWD play button. Only side A (front) is recorded.
		Reverse Only 	Press the ◄ REV play button. Only side B (rear) is played (once).	Press the ●   button followed by the ◄ REV play button. Only side B (rear) is recorded.
Both sides			Press the ► FWD play button to begin playback in the forward direction. Side A and then B are played after which tape travel automatically stops.	Press the ●   button followed by the ► FWD play button. Side A and then B are recorded after which tape travel automatically stops.
			Press the ◄ REV play button to begin playback in the reverse direction. Side B is played after which tape travel automatically stops. <ul style="list-style-type: none"> <li>■ If cassettes are loaded in both Deck A and Deck B, both sides of the cassette in Deck A are played followed by both sides of the cassette in Deck B.</li> </ul>	If recording is started in the reverse direction, only side B is recorded after which tape travel stops automatically.
Repeat			Press the ► FWD play button. Sides A and B are played eight times or until the appropriate <ul style="list-style-type: none"> <li>■ STOP button is pressed.</li> <li>■ If cassettes are loaded in both Deck A and Deck B, both sides of the cassette in Deck A are played followed by both sides of the cassette in Deck B. Then the process begins again from side A of the cassette in Deck A and continues until four complete cycles have been completed.</li> </ul>	When the repeat mode is used to record both sides of a cassette in either Deck A or Deck B, the effect is the same if both sides (◄) had been selected. <ul style="list-style-type: none"> <li>■ If cassettes are loaded in both Deck A and Deck B, both sides of the cassette in Deck A will be recorded followed by both sides of the cassette in Deck B. Then tape transport stops. (The Deck B direction should be set to FWD.)</li> </ul>

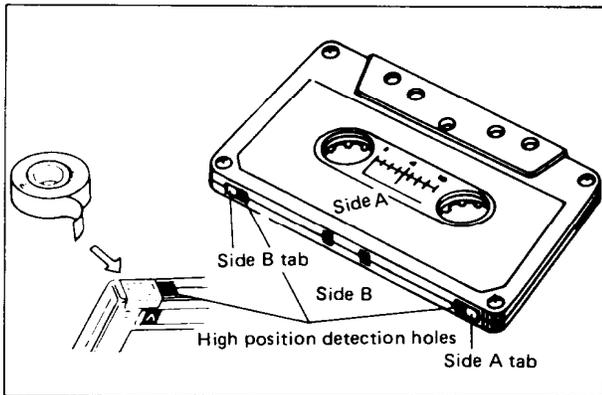
### Notes:

- In order to prevent detection of the leader tape immediately after playback or recording begins, the photo sensor does not operate for the first 20 seconds of playback or recording operation. However, if the end of the tape is reached during the initial 20-second period, the direction of tape travel will still be reversed provided the REVERSE MODE selector is set to "both sides" or "repeat."
- Auto-reverse may not function properly in the following cases:
  - If the tape is extremely thin (C-120 cassettes, for example).
  - If there are markings (letters, designs, etc.) on the leader.
  - If a strong light is directed at or near the recording/playback head.
  - If the cassette has no leader.
  - If the cassette has a leader which is not completely transparent.
- Note that even if the leader is not detected, the direction of tape travel will still be reversed (provided the deck is set to one of the reverse modes) when the end of the tape (including the leader) is reached. If the deck is set to the "one side" mode, tape travel will stop when the end of the tape is reached.

## Handling cassette tapes

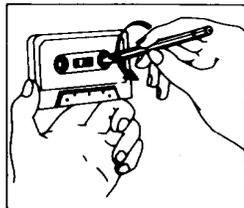
### Erase Prevention

Cassette tapes are constructed with erasure prevention niches along the back edge that are initially covered by break-off tabs. Once a recording has been completed, break off the tab(s) of the appropriate side(s). This will protect you against accidentally recording on that cassette. If at some later date you wish to re-record the cassette, simply cover the openings with small pieces of cellophane tape.



### Tape Slack

Slack in the tape (tape not stretched tightly) can cause tangling around the pinch roller and capstan, jamming the mechanism. Remove the tape slack with a pencil or similar device as shown in the diagram.



## Owner maintenance

This deck requires no lubrication.

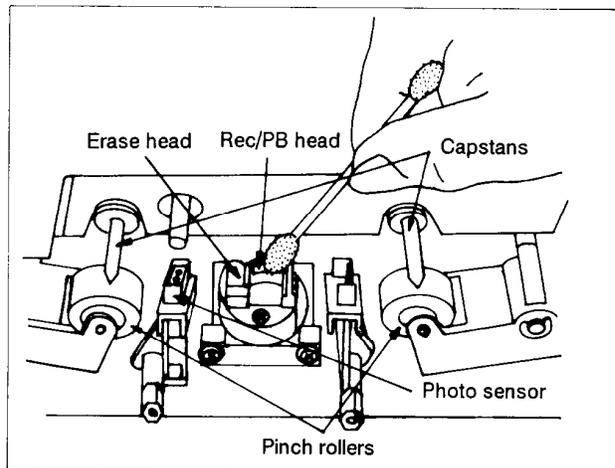
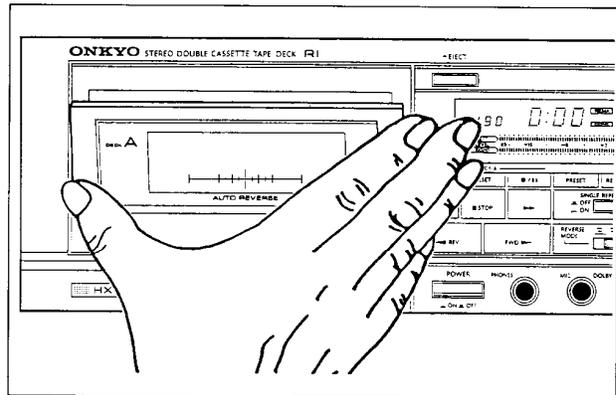
### Head, Pinch Roller and Capstan Cleaning

Playback sound quality can be greatly diminished if magnetic particles are allowed to accumulate on the recording/playback heads. Be sure to clean the heads periodically, normally 2 – 3 times a month, to maintain your deck's original performance. Dirty heads will cause:

- Poor sound quality (loss of high frequency response)
- Decreased volume
- Skipping
- Incomplete erasure of previous recordings

If the pinch rollers and capstan are dirty, the tape may become tangled and damaged by wrapping around the pinch roller and capstan.

To prevent these problems, clean the heads, pinch rollers and capstans with a cotton swab dipped in cleaning fluid.



### Photo Sensor Cleaning

The auto-reverse function may not operate properly if the photo sensors are dirty. To insure proper auto-reverse operation, periodically clean the photo sensors with a cotton swab.

### Demagnetizing

Residual magnetism builds up in the heads after the cassette deck has been used for an extended period of time. This buildup introduces noise and static into tapes and impairs high frequency response. To prevent this, demagnetize the heads and the other metal parts in the area (like the capstan shafts) once every 50 hours of use. Keep the deck power off while using the demagnetizer. Also place tapes far away from the work area.

## Troubleshooting guide

The following guide lists problems which do not require professional servicing. If, however, the problem can not be remedied using this guide, contact your Onkyo dealer for assistance.

Problem	Cause	Remedy
No power.	<ul style="list-style-type: none"> <li>● Power cord plug is loose.</li> </ul>	<ul style="list-style-type: none"> <li>● Insert plug properly into outlet.</li> </ul>
Playback but no sound.	<ul style="list-style-type: none"> <li>● Hook-up incorrect.</li> <li>● Stereo amplifier input selector switch is set to wrong position.</li> </ul>	<ul style="list-style-type: none"> <li>● Check and hook up correctly according to page 2.</li> <li>● Change switch position.</li> </ul>
Tape does not move.	<ul style="list-style-type: none"> <li>● Slack tape wound around pinch roller.</li> </ul>	<ul style="list-style-type: none"> <li>● Take up slack with a pencil (see page 10).</li> </ul>
Recording button does not engage.	<ul style="list-style-type: none"> <li>● No tape in cassette holder.</li> <li>● Erasure prevention tab(s) removed.</li> </ul>	<ul style="list-style-type: none"> <li>● Load cassette tape.</li> <li>● Change cassette or cover tab hole with cellophane tape.</li> </ul>
Hoarse sound, balance unstable.	<ul style="list-style-type: none"> <li>● Playback head dirty.</li> <li>● Tape is stretched.</li> </ul>	<ul style="list-style-type: none"> <li>● Clean head (see page 10).</li> <li>● Replace cassette.</li> </ul>
Excessive noise and tape hiss.	<ul style="list-style-type: none"> <li>● Head has become magnetized.</li> <li>● Tape with high noise level.</li> </ul>	<ul style="list-style-type: none"> <li>● Demagnetize (see page 10).</li> <li>● Replace cassette.</li> </ul>
Distorted sound.	<ul style="list-style-type: none"> <li>● Distortion in tape.</li> </ul>	<ul style="list-style-type: none"> <li>● Tape is probably bad but confirm by listening to another.</li> </ul>
Recordings are distorted.	<ul style="list-style-type: none"> <li>● Recording was done at too high a level.</li> </ul>	<ul style="list-style-type: none"> <li>● Readjust INPUT LEVEL control knob according to the directions on page 5.</li> </ul>
Tape squeal/skipping.	<ul style="list-style-type: none"> <li>● Dirty head, pinch roller or capstan shaft.</li> <li>● Cassette shell is binding tape or tape is stretched.</li> </ul>	<ul style="list-style-type: none"> <li>● Clean (see page 10).</li> <li>● Change cassette or try correcting with fast forward and rewind.</li> </ul>
Excessive hum during playback.	<ul style="list-style-type: none"> <li>● Connecting cables not inserted firmly.</li> <li>● External flux leakage from nearby amplifier.</li> </ul>	<ul style="list-style-type: none"> <li>● Insert plugs firmly.</li> <li>● Move deck away from hum source.</li> </ul>
High frequencies too strong.	<ul style="list-style-type: none"> <li>● Dolby NR encoded tape played back with NR off.</li> </ul>	<ul style="list-style-type: none"> <li>● Set the DOLBY NR switch to the proper position for the tape being played back.</li> </ul>
No high frequency sounds.	<ul style="list-style-type: none"> <li>● Non-Dolby NR encoded tape played back with Dolby B or C NR on.</li> <li>● Record/playback head has become dirty.</li> </ul>	<ul style="list-style-type: none"> <li>● Set the DOLBY NR switch to the proper position for the tape being played back.</li> <li>● Clean (see page 10).</li> </ul>
Direct music search function does not operate properly.	<ul style="list-style-type: none"> <li>● The blank sections between selections are too short or contain too much noise.</li> </ul>	<ul style="list-style-type: none"> <li>● Use a cassette with completely blank sections of sufficient length between selections.</li> </ul>
Quick reverse does not operate.	<ul style="list-style-type: none"> <li>● The REVERSE MODE switch is set incorrectly.</li> <li>● The cassette has no leader or the leader is transparent.</li> <li>● The photo sensor is dirty.</li> </ul>	<ul style="list-style-type: none"> <li>● Set to <math>\Rightarrow</math> or <math>\Leftarrow</math>.</li> <li>● Use a cassette with a suitable leader.</li> <li>● Clean (see page 10).</li> </ul>
Direction of tape travel reverses before end of tape is reached.	<ul style="list-style-type: none"> <li>● Tape is creased, wrinkled or scratched.</li> </ul>	<ul style="list-style-type: none"> <li>● Change cassette.</li> <li>● Set reverse mode switch to <math>\Leftarrow</math>.</li> </ul>
Deck does not operate properly.	<ul style="list-style-type: none"> <li>● Tape transport control microcomputer has been exposed to interference (from power supply or static electricity).</li> </ul>	<ul style="list-style-type: none"> <li>● Switch power off for about ten seconds.</li> </ul>

## Specifications

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Track System:	4-tracks, 2-channels
Erasing System:	AC erase
Tape Speed:	4.8 cm/sec. (1-7/8 i.p.s.) 9.6 cm/sec. (3-3/4 i.p.s.) (high speed dubbing)
Wow and Flutter:	0.06% (WRMS)
Frequency Response:	20—15,000Hz (Normal) (30—14,000Hz $\pm$ 3dB) 20—16,000Hz (High) (30—15,000Hz $\pm$ 3dB) 20—17,000Hz (Metal) (30—16,000Hz $\pm$ 3dB)
S/N Ratio:	Dolby NR off: 58dB (metal position tape) A noise reduction of 10dB above 5kHz and 5dB at 1kHz is possible with Dolby B NR. A noise reduction of 20dB at 5kHz is possible with Dolby C NR.
Input Jacks:	Microphone jack: 1 Input sensitivity: 1mV/600 ohms Input impedance: 5.6 kohms Line IN: 2 Input sensitivity: 60mV Input impedance: 50 kohms
Outputs:	Headphone jack: 1 Optimum load impedance: 8 to 200 ohms Line OUT: 2 Standard output level: 500mV (0dB) Optimum load impedance: over 50 kohms
Motors:	DC servo motor x 2; DC motor x 2
Heads:	REC/PB: special hard permalloy x 2; Erase head: ferrite x 2
Power Supply:	AC 120V, 60Hz
Power Consumption:	37 watts
Dimensions:	435(W) x 115(H) x 334(D)mm (17-1/8" x 4-1/2" x 13-1/8")
Weight:	6.2 kg. (13.6 lbs.)

Specifications and external appearance are subject to change without notice because of product improvements.