

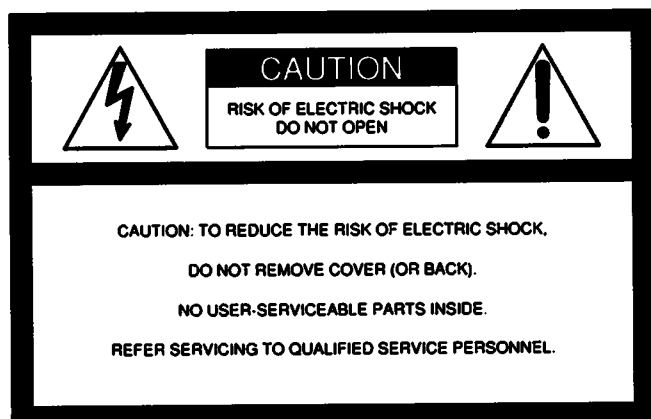
Stereo Cassette Deck

Operating Instructions

TC-WR445

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



This symbol 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.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Owner's Record

The model and serial numbers are located on the rear of the unit. Record the serial number in the space provided below. Refer to them whenever you call upon your Sony dealer regarding this product.

Model No. TC-WR445 Serial No. _____

INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

For the customers in Canada

CAUTION

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED AC PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

NOTICE FOR CUSTOMERS IN THE UNITED KINGDOM

A moulded plug complying with BS 1363 is fitted to this equipment for your safety and convenience.

Should the fuse in the plug supplied need to be replaced, a 5 AMP fuse approved by ASTA or BSI to BS 1362, (i.e. marked with ⬡ or ♥ mark) must be used.

If the plug supplied with this equipment has a detachable fuse cover, be sure to attach the fuse cover after you change the fuse. Never use the plug without the fuse cover. If you should lose the fuse cover, please contact your nearest Sony service station.

IMPORTANT

If the plug supplied is not suitable for the socket outlets in your home, it should be cut off and an appropriate plug fitted in accordance with the following instructions.

The wires in this mains lead are coloured in accordance with the following code:

Blue: Neutral

Brown: Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows: The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black. The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red. Do not connect either wire to the earth terminal in the plug which is marked by the letter E or by the safety earth symbol \perp or coloured green or green-and-yellow.

WARNING

To prevent shock hazard, do not insert the plug cut off from the mains lead into a socket outlet. This plug cannot be used and should be destroyed.

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Chapter 1 Getting Started

Features

For higher quality recording/playback

- **B and C type Dolby* NR systems** which reduce tape noise.
- **Dolby HX PRO* system** for higher linearity in the tape's high-range response during recording.

For your convenience

- **Automatic tape type detection** during playback and recording.
- **A relay function** for long playback.
- **Synchronized dubbing** at normal or high speed.

For easier operation

- **Twin easy-to-read digital counters** showing the elapsed recording or playing time on each deck.

* Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen.

"DOLBY", the double-D symbol  and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

Precautions

On safety

- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it will not be used for a long time. To disconnect the cord, pull it out by grasping the plug. Never pull the cord itself.
- The unit is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the unit itself has been turned off.

On operation

- When the unit is not used, turn the power off to conserve energy and to extend the useful life of your unit.
- Because of a safety mechanism, the function buttons will not operate if the cassette holder is not completely closed, if there is no cassette in the cassette holder, or if a cassette has been incorrectly inserted into the cassette holder.

On head cleaning

The head and tape path should be cleaned after every ten hours of operation. Dirty heads and a dirty tape path may cause:

- loss of high-frequency response
- loss of sound volume
- sound drop-out

If you have any questions or problems concerning your unit, please contact your nearest Sony dealer.

For the customers in the U. S. A.

For detailed safety precautions, see the leaflet "IMPORTANT SAFEGUARDS".

Unpacking

Checking the Supplied Accessories

Make sure that the following supplied accessories are included with your unit.

- Audio connecting cords (2)

Notes on Installation

- Place the unit with the front panel facing you in a location with adequate air circulation to prevent overheating of the unit.
- Do not place the unit:
 - near heat sources such as radiators or air ducts.
 - in places subject to direct sunlight, excessive dust, mechanical vibration or shock.
 - in an inclined position.
 - on a rug or other soft surfaces that would block the ventilation holes on the bottom of the unit.

Do not throw away the carton and the packing material

They will come in handy when transporting the unit or shipping it for servicing.

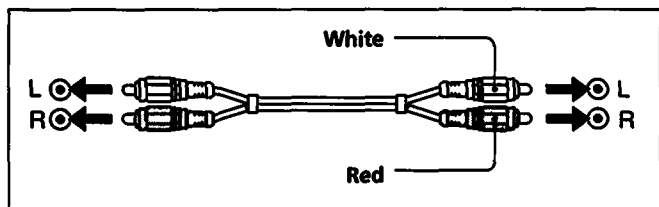
Checking the Operating Voltage

- Operate the unit only on 120 V AC, 60 Hz (U.S.A. and Canada models), 240 V AC, 50 Hz (U.K. model) or 240 V AC, 50/60 Hz (Australia model).
- Before connecting the unit to an AC outlet, be sure that the operating voltage of your unit is identical with that of your local power supply.

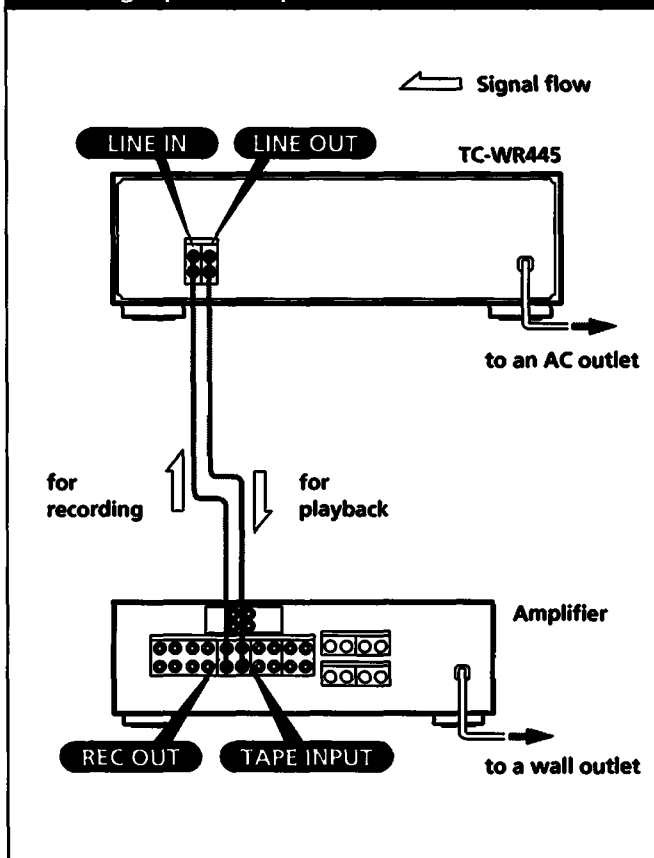
Hooking Up the System

Before You Begin

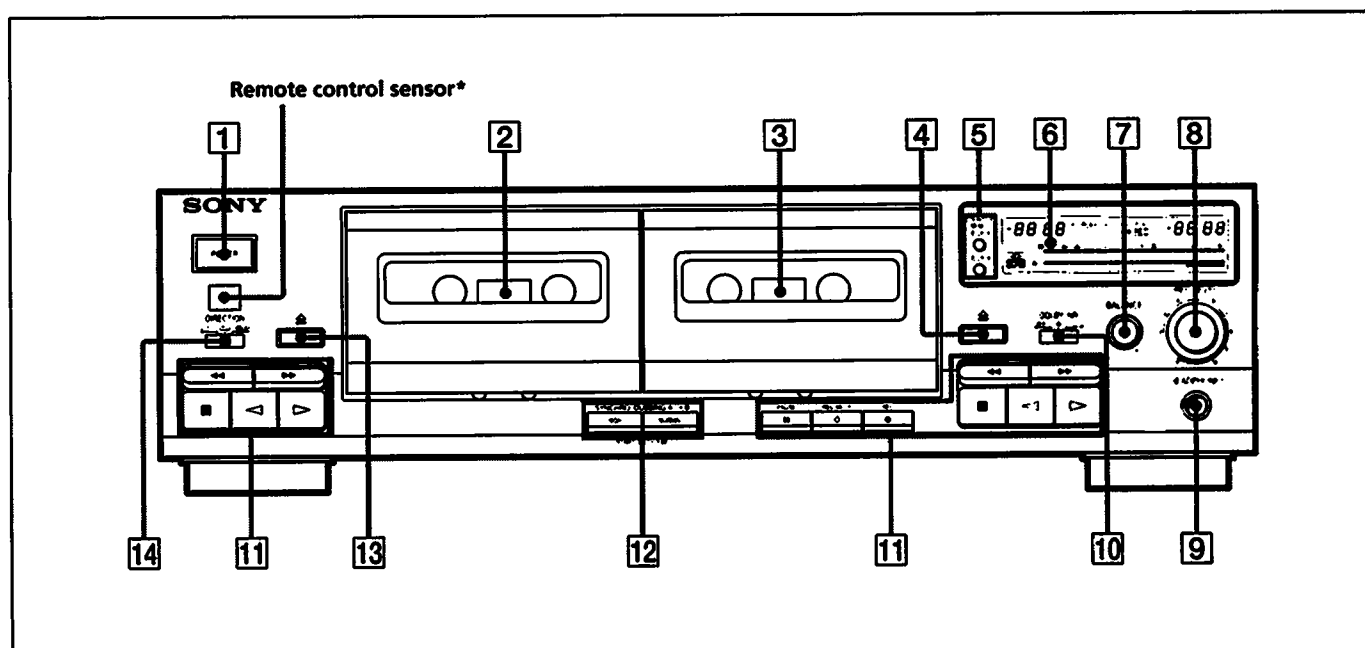
- Turn off the power to all equipment to be connected before making any connection.
- Note that the red plug of the supplied connecting cord is for right-channel (R) connection and the white plug for left-channel (L) connection.
- The connecting cords should be fully inserted into the jacks. A loose connection may cause hum pickup.



Hooking Up an Amplifier



Identifying the Parts on the Front Panel



For details, refer to the page number(s) indicated in parentheses.

- 1** POWER switch
- 2** Deck A
- 3** Deck B
- 4** (eject) button (deck B)
- 5** COUNTER RESET buttons (DECK A and B)
- 6** Display panel
- 7** BALANCE control (page 9)
- 8** REC (recording) LEVEL control (pages 9 and 10)
- 9** HEADPHONES jack (stereo phone jack)
- 10** DOLBY NR (Dolby noise reduction) switch (pages 7 and 9)
- 11** Tape operation buttons
 - PAUSE button (deck B only)
 - REC MUTE (record muting) button (deck B only) (page 12)
 - REC (recording) button (deck B only)
 - (leftward fastwinding) button
 - (rightward fastwinding) button
 - (stop) button
 - (reverse play) button
 - (forward play) button

- 12** SYNCHRO DUBBING buttons (page 11)
 - HIGH button
 - NORMAL button
- 13** (eject) button (deck A)
- 14** DIRECTION mode switch (pages 7, 8, 9 and 11)

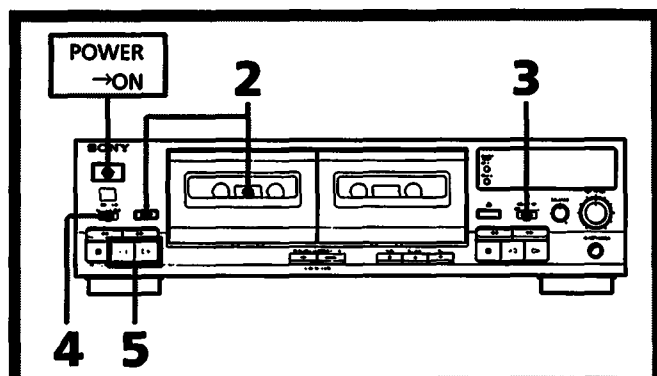
*Remote control sensor

You can remotely control this cassette deck with:

- A remote commander that came with a Sony amplifier or receiver if it has the mark and cassette deck control capability.
- Any optional Sony remote commander with the mark and cassette deck control capability.

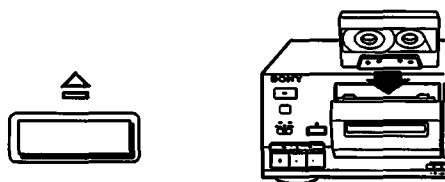
Playing Back

Follow the procedure below to play back a cassette on deck A or B.

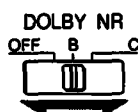


1 Turn on the amplifier and select the tape function.

2 Insert a cassette.



3 Set DOLBY NR to the same position that was used when the cassette was recorded.



4 Set DIRECTION.

To play back to the end of one side only	
To play back both sides continuously*	

* After playing back five times, the deck automatically stops.

5 Press \triangleright or \triangleleft to start playback.

To play back from the front side, press \triangleright .

To play back from the reverse side, press \triangleleft .

The tape direction lights up to show the side you are listening.

To stop playback, press the \blacksquare button.

To stop playback momentarily, press the \equiv button (only on deck B).

To restart play, press the \equiv , \triangleleft or \triangleright button.

To fastwind a tape rightward, press the $\triangleright\triangleright$ button.

To fastwind a tape leftward, press the $\triangleleft\triangleleft$ button.

Specifying the tape type is unnecessary

The deck has an automatic tape type detection system.

To begin recording during playback

While holding down the \triangleleft or \triangleright button, press the \bullet button.

The unit immediately begins recording without stopping the tape. This function is useful when editing previously recorded material.

When both decks A and B are in playback mode

Only playback from deck A will be audible. However, a short break in sound output will occur after the activation of the second deck.

What is the Dolby NR system?

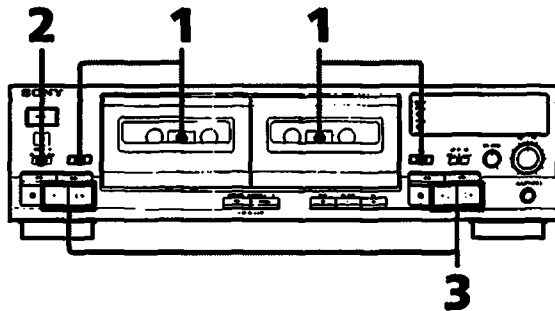
The Dolby NR (noise reduction) system reduces tape hiss noise in low-level, high-frequency signals by boosting the signals during recording and lowering them during playback.

Note

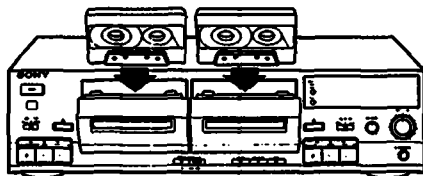
The Dolby HX PRO system works only during recording, not during playback.

Playing Back Both Decks in Succession — Relay Play

The Relay Play function plays back cassettes in deck A and deck B continuously and in consecutive order.



1 Insert cassettes into both decks.



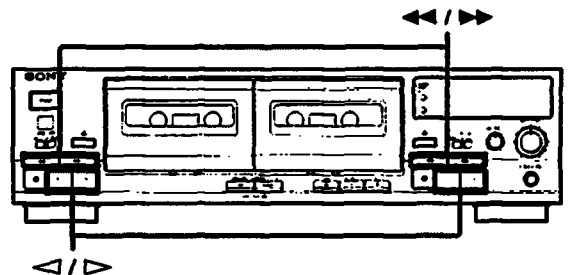
2 Set **DIRECTION** to **RELAY**.

3 Press **>** or **<** to start playback of the cassette to be listened to first.

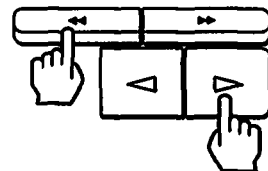
To play back from the front side, press **>**.
To play back from the reverse side, press **<**.

Playing Back Automatically After Rewinding — Auto Play

The Auto Play function automatically starts playing back a cassette after fastwinding it to the beginning.



While holding down **>** or **<**, press **<<** or **>>**.



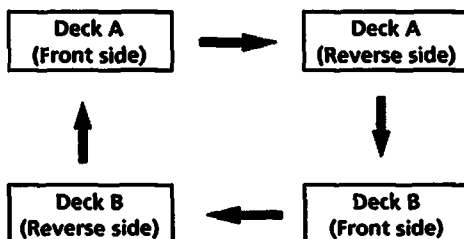
From the beginning of...	While pressing...
front side	> , press << .
reverse side	< , press >> .

To stop Relay Play

Press the **■** button of the deck playing.

Playback sequence of Relay Play

Relay Play always follows the sequence below regardless of where playback starts. After playing back five times, Relay Play automatically stops.

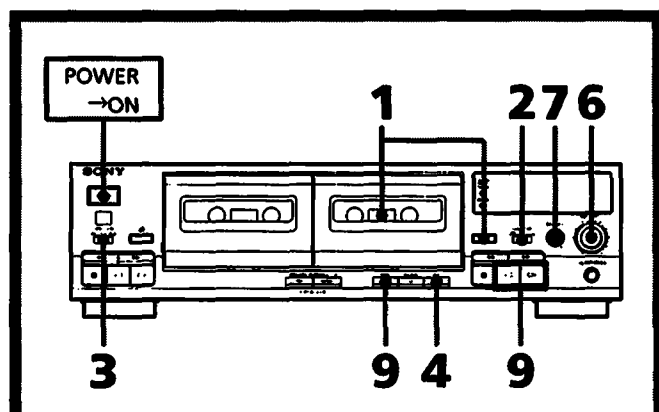


Playing back more than two cassettes in succession

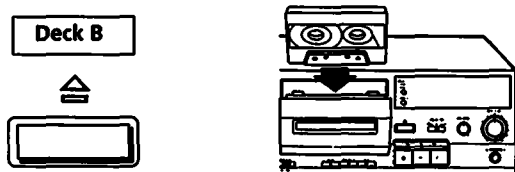
Replacing cassettes that have finished playing with new ones allows you to play back two or more cassettes alternately on each deck.

Recording (Only on Deck B)

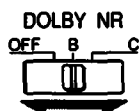
Follow this procedure to record a source on a cassette (deck B only).



- 1** Insert a cassette into deck B. Wind the tape to the desired starting position if necessary.



- 2** Set DOLBY NR.



- 3** Select the side(s) to be recorded.

To record on one side	
To record on both sides	

Note

Even at the position, recording automatically stops when the tape reaches the end of reverse side.

- 4** Press to enter the recording pause mode.

Note

The direction indicator for the side opposite the specified one will flash for three seconds to indicate that recording is possible on that side also. If, however, the tab for that side has been removed to prevent recording, the indicator will not flash.

If the tab has been removed from either side A or B, recording is impossible on the side(s). To record on a cassette that is protected, cover the respective hole with tape. See "Protecting a Recording" on page 10.

- 5** Play the program source to be recorded.

- 6** Turn REC LEVEL to adjust the recording level.

See "Adjusting the Recording Level" on page 10.

- 7** Turn BALANCE to adjust the balance.

- 8** Restart the program source, if required.

- 9** Start recording.

To record on the front side of the cassette

When is on	Press once or .
When is on	Press twice.

To record on the reverse side of the cassette

When is on	Press once or .
When is on	Press twice.

Note

Pressing or twice will cause the unit first to change tape direction and then start recording in that direction.

To stop recording

Press the button.

When deck B is in recording or recording pause mode

All buttons on deck A are disabled.

Pressing any button on deck A causes the REC indicator to flash.

When pressing the button during playback, fast-forwarding or rewinding on deck A

Deck A stops and deck B enters recording pause mode.

Recording (Only on Deck B)

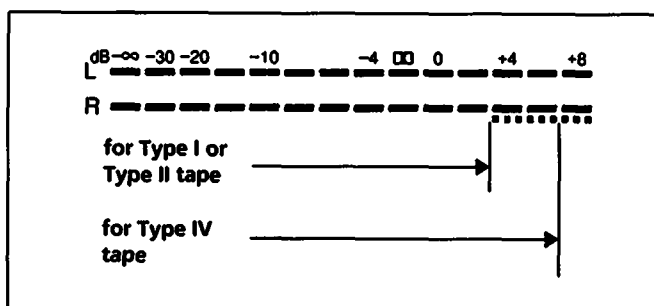
Adjusting the Recording Level

The proper recording level, which differs according to the tape type, is indicated on the peak level meter for each tape type.

Adjust the REC LEVEL control as high as possible without exceeding the recommended range for the inserted tape.

Peak level meter readings by tape type

Recommended maximum peak level meter readings.



Tips on recording level adjustment

Setting the recording level too low will produce a hissing sound, while setting it too high will produce distortion.

Generally, the proper recording level for high and low frequencies is lower than that for middle frequencies.

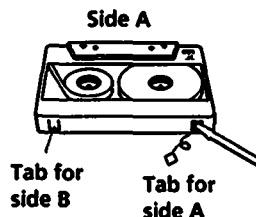
When recording program sources with many high and low frequencies, set the level to a relatively low position, then make adjustments according to the recording results.

What Is the Dolby HX PRO System?

The Dolby HX PRO system provides precise bias control during recording to reduce distortion and improve linearity in the high-frequency range. The result is recorded sound that is highly faithful to the original. Since the HX PRO system operates only during recording, the same high-quality sound is produced even during playback on other tape decks. The HX PRO system is independent from the Dolby NR system and is unaffected by the Dolby NR setting.

Protecting a Recording

To protect a recording on side A or B
Break out the respective tab.



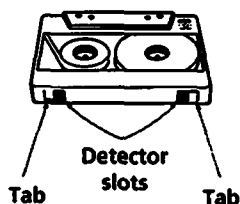
To record on a cassette that is protected
Cover the respective hole with tape.



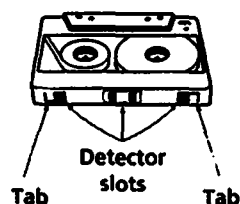
When using Type II or Type IV cassettes

Be careful not to cover the detector slots which are necessary for automatic tape-type detection.

Type II cassette



Type IV cassette



Cassette care

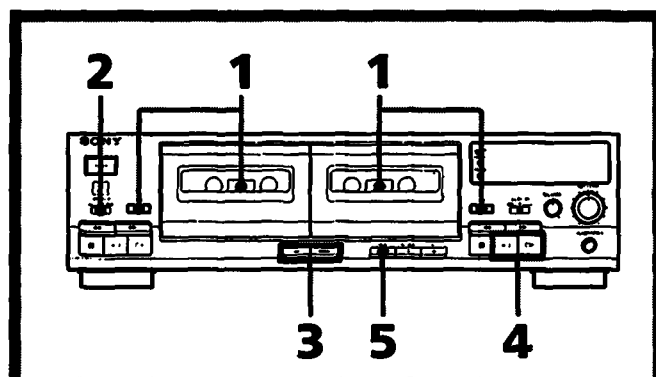
- Avoid touching the tape surface of a cassette to prevent contamination of the heads by dirt, dust, or oil on the skin.
- Keep cassettes away from equipment with magnets, such as speakers and amplifiers, as erasure or distortion of the recorded tape could occur.
- Do not expose cassettes to direct sunlight, extremely cold temperatures, or moisture.

Note on cassettes longer than 90 minutes

We do not recommend the use of cassettes longer than 90 minutes except for long continuous playback.

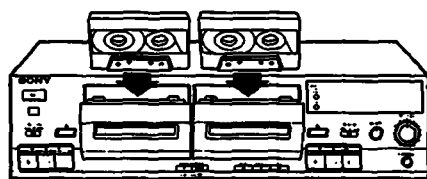
Dubbing a Tape

Use the dubbing function to copy a tape in deck A to a tape in deck B. High-speed dubbing is convenient for dubbing entire tapes while normal-speed dubbing is handy for tape editing.



1 Insert cassettes into both tape decks.

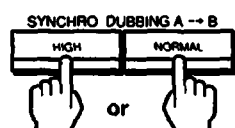
Recorded tape into deck A Blank tape into deck B



2 Select the direction mode.

One side		
Both sides		Dubbing of the reverse side starts independently of deck A.
		Dubbing of the reverse side starts simultaneously with deck A.

3 Press HIGH or NORMAL to select the dubbing speed.

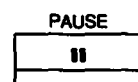


4 Select the side on which to start dubbing.

To dub from the front side, press \triangleright .

To dub from the reverse side, press \triangleleft .

5 Press II on deck B to start dubbing.



To stop dubbing

During normal-speed dubbing, press the ■ button on deck B.

During high-speed dubbing, press the ■ button on either deck A or B.

During high-speed dubbing

Only the ■ button is operative.

If the NORM or HIGH speed indicator flashes three times

Either one or both tabs of the cassette inserted into deck B have been removed, making dubbing impossible for that side. Cover the hole(s) with tape (see page 10).

It is unnecessary to adjust the recording level and select the Dolby NR system

The tape in deck B is automatically recorded with the same recording level and Dolby noise reduction system as the original in deck A.

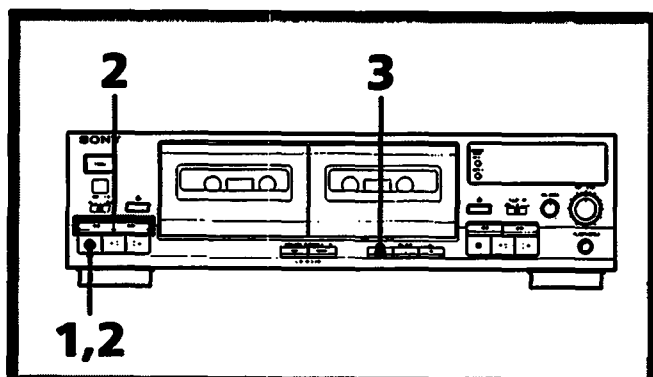
The Dolby system must, however, be set to match the tape in deck A when the sound is monitored during normal-speed dubbing.

Note on tape dubbing

If the sound is affected by the proximity of a television set during high-speed dubbing, turn the television set off or move it away from the deck.

Dubbing Only Specific Portions

Follow this procedure to dub only specific portions of selections. Note that this is only possible in the normal-speed dubbing mode.

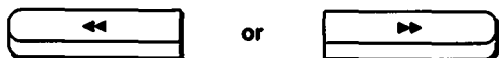


- 1 During dubbing, press ■ on deck A at the start of a selection to be skipped.

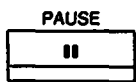
Deck A enters the stop mode and deck B enters the recording pause mode.



- 2 Locate the starting position of the portion to be dubbed on deck A.

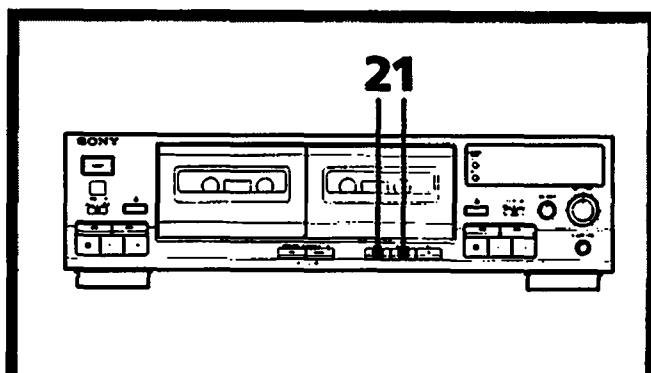


- 3 Press II on deck B to resume dubbing.



Inserting a Blank Space during Recording — Record Muting

The Record Muting function allows you to insert a four-second blank between selections or to replace unwanted recorded material with a blank of any length.

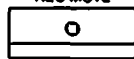


- 1 While recording, press and release O.

The REC indicator starts to flash. During this time, no incoming signals are recorded on the tape.

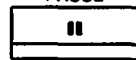
After four seconds, the ■ indicator lights up and the unit enters recording pause mode.

REC MUTE



- 2 Press II to resume recording.

PAUSE



Note

Pressing the O button during normal-speed dubbing (see page 11) does not affect playback on deck A.

To create a blank longer than four seconds

Press the O button for the specified length of time. After four seconds, the REC indicator flashes at a faster rate. When you release the O button, the ■ indicator lights up and the unit enters recording pause mode.

Press the II button to resume recording.

Maintenance

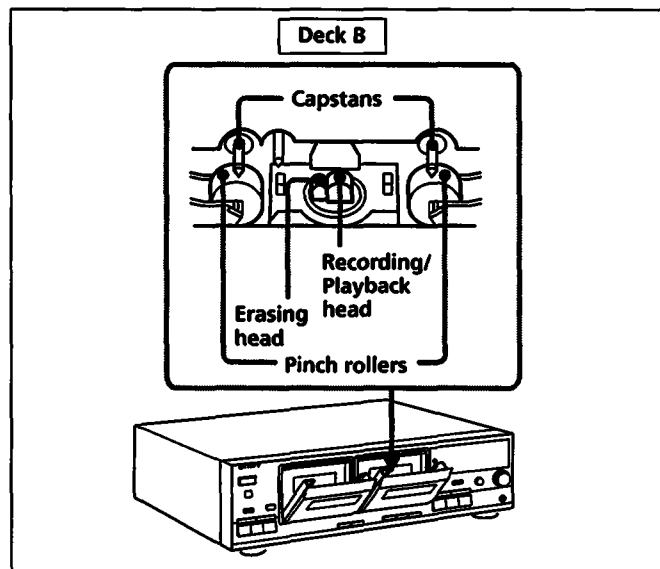
Cleaning the Heads and Tape Path

Clean all surfaces over which the tape travels after every ten hours of operation to guard against:

- low-quality sound
- a decrease in sound level
- excessive wow, flutter or drop-out
- incomplete erasure
- impairment of recording function

To obtain high-quality recorded sound, we recommend cleaning before every recording.

- 1 Press \triangle to open the cassette holder. Grasp the front holder on both sides and gently lift to remove it.**
- 2 With the unit turned off, wipe the heads, the pinch rollers and the capstans with a cotton swab slightly moistened with alcohol or a commercially available cleaning fluid for tape decks.**
- 3 Replace the cassette holder.**



Do not insert a cassette until the cleaned areas are completely dry.

Demagnetizing the Heads

After 20 to 30 hours of use, or when you notice hiss and/or loss of high frequencies, the residual magnetism built up on the heads should be removed.

- 1 Turn off the power.**
- 2 Demagnetize the heads with any commercially available demagnetizer. Refer to the instruction manual of the demagnetizer for detailed instructions.**

Cleaning the Cabinet

Clean the cabinet, panel and controls with a soft cloth slightly moistened with a mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvents such as alcohol or benzine.

Specifications

Recording system	4-track 2-channel stereo
Fast winding time	Approx. 150 sec. (with Sony C-60 cassette)
Bias	AC bias

Signal-to-noise ratio (at peak level and weighted)

Cassette (Dolby NR OFF)	Type IV	Type II	Type I
	58 dB	57 dB	55 dB

S/N ratio improved (approximate values)

with Dolby B NR on: 5 dB at 1 kHz; 10 dB at 5 kHz

with Dolby C NR on: 15 dB at 500 Hz; 20 dB at 1 kHz

Harmonic distortion

0.4% (with Sony Type I, 160 nWb/m, 315 Hz, 3rd H.D.)

1.8% (with Sony Type IV, 250 nWb/m, 315 Hz, 3rd H.D.)

Frequency response (Dolby NR OFF)

Cassette Model	Type IV cassette	Type II cassette	Type I cassette
TC- WR445	30 - 18,000 Hz (± 3 dB, IEC) 30 - 13,000 Hz [± 3 dB (-4 dB) recording]	30 - 17,000 Hz (± 3 dB, IEC)	30 - 15,000 Hz (± 3 dB, IEC)

Type IV: Sony Type IV (METAL)

Type II: Sony Type II (HIGH)

Type I: Sony Type I (NORMAL)

Wow and flutter	$\pm 0.15\%$ W.Peak (IEC)
	0.1% W.RMS (NAB)
	$\pm 0.2\%$ W.Peak (DIN)

Inputs

Line inputs (phono jacks)	Sensitivity	0.16 V
	Input impedance	47 k ohms

Outputs

Line outputs (phono jacks)	Rated output level	0.5 V at a load impedance of 47 k ohms
	Load impedance	Over 10 k ohms
Headphones (stereo phone jack)	Output level	1 mW at a load impedance of 32 ohms

General

Power requirements	Model for U.S.A. and Canada: 120 V AC, 60 Hz Model for the United Kingdom: 240 V AC, 50 Hz Model for Australia: 240 V AC, 50/60 Hz
Power consumption	19 W
Dimensions	Approx. 430 x 123 x 305 mm (w/h/d) (17 x 4 7/8 x 12 1/4 inches) including projecting parts and controls
Mass	Approx. 4.0 kg (8 lbs 14 oz)

Supplied accessories

Audio connecting cords (2)

Optional accessories

Wireless remote commander RM-J902

Design and specifications are subject to change without notice.

Troubleshooting Guide

The following trouble checks will help you correct the most common problems encountered with your tape deck. Should any problems persist after you have made these checks, consult your nearest Sony dealer.

Before proceeding with these trouble checks, verify that:

- The power cord is firmly connected.
- The amplifier connections are firmly made.
- The heads, capstans and pinch rollers are clean.
- The amplifier controls and switches are correctly set.

Function Buttons and Tape Transport Problems

Symptom	Cause	Remedy
The function buttons do not work.	The cassette holder is not fully closed.	Close the holder completely.
	The cassette is not properly inserted.	Insert the cassette correctly.
	You pressed the button immediately after turning on the power.	Wait until the ■■ indicator stops flashing.
The ● button does not work.	There is no cassette in the holder.	Insert a cassette.
	The record-protect tab has been removed from the cassette.	Cover the hole with tape. (See page 10).
The automatic shut-off mechanism operates before the end of the tape.	The tape is slack.	Take up the tape slack.
	The cassette shell is deformed.	Use another cassette.
Excessively loud tape transport noise during fastwinding.	This noise is caused by the cassette and is not a mechanical problem.	—
The ⏮ button does not work.	There has been a power failure or the power cord has been disconnected.	Reconnect the power.

(Continued on next page)

Troubleshooting Guide

(Continued from previous page)

Recording and Playback Problems

Symptom	Cause	Remedy
Recording or playback cannot be made or there is a decrease in sound level.	The recording/playback and erasing heads are either dirty or magnetized.	Clean or demagnetize the heads.
	Improper connection.	Make connections properly. (See page 5.)
	Improper setting of the amplifier controls.	Set the amplifier controls to the appropriate positions
Excessive wow, flutter or dropout.	The head, capstan or pinch roller is dirty.	Clean in accordance with instructions. (See page 13.)
Incomplete erasure.	The erasing head is dirty.	Clean the erasing head.
Increased noise or poor reproduction in high frequencies.	The head is magnetized.	Demagnetize the head.
Unbalanced tone in high frequencies.	Improper setting of the DOLBY NR switch.	During playing back, set the switch to the same position used in recording.
	The unit is placed near a television set.	Move the deck away from the television set.

Noise

Symptom	Cause	Remedy
Hum noise.	The unit is stacked on or under the amplifier.	Separate the unit.
Noise is recorded.	The recording was made near equipment such as a television set or a color monitor, and interference has affected the recording on the tape and the Dolby NR system.	Move the unit away from the television set or color monitor.