

SONY

STEREO CASSETTE DECK

TC-K666ES

OPERATING INSTRUCTIONS Page 2

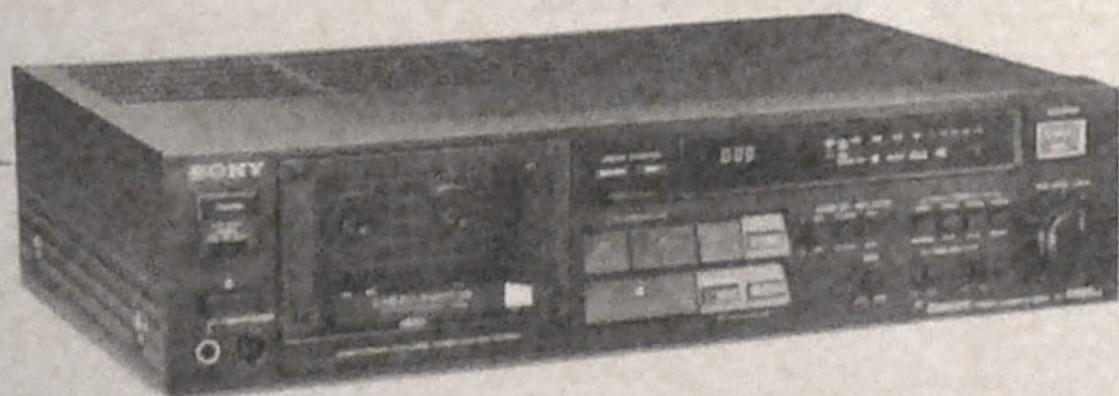
Before operating the unit, please read this manual thoroughly.
This manual should be retained for future reference.

MODE D'EMPLOI Page 20

Avant la mise en service de l'appareil, lire attentivement ce mode
d'emploi. Conserver ce manuel pour toute référence ultérieure.

MANUAL DE INSTRUCCIONES Página 38

Antes de manipular el aparato, lea usted este manual detenida-
mente. Consérvelo para futuras referencias.



FEATURES

WARNING

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

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

For the Customers in the United Kingdom

Important

The wires in the 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.

TABLE OF CONTENTS

Features	2
Operating voltage	3
Precautions	3
Function of controls	4
Connections	6
Notes on cassettes	7
Recording	8
To record	8
Recommended settings for the TAPE select buttons	9
Bias/recording level calibration	9
Recording level adjustment	10
Record monitoring	10
To record material onto a specific portion of tape	10
Playback	11
Cueing	11
Dual-speed rewind and fast-forward	12
Using the digital linear counter	13
Auto play and memory play/stop	14
Record muting	14
Erasing	15
Timer-activated recording and playback	15
Maintenance	16
Dolby NR system	17
Specifications	18
Trouble checks	19

Three-head system

Separate record and playback heads allow optimum gap settings and impedance ratings for distortion-free recording and greatly extended frequency response. For good tape-to-head contact, the heads are mounted in one block and each head is separately adjusted for precise azimuth alignment. The three-head system also enables you to monitor the recorded tape while actually recording.

Newly-developed LA (LaserAmorphous) head

The record and playback heads are made of a special amorphous magnetic alloy developed by Sony, and their cores are solidly welded by laser. This new highly-durable head provides a wider dynamic range and a more extended frequency response, especially in the high-frequency range. The head is designed to take full advantage of the potential of the metal tapes.

Closed-loop dual-capstan tape drive system

Two pairs of capstans and pinch rollers ensure uniform tape tension and stable tape-to-head contact. As a result, wow and flutter and modulation noise are greatly reduced.

Three motor drive

The three-motor drive system assures accurate and stable tape transport. The motors for the capstan and reel drives are linear torque BSL (brushless and slotless) motors with an extremely smooth torque. The speed of the capstan motor is regulated by a crystal oscillator. The shaft of the capstan motor drives the tape directly to eliminate any fluctuation in the tape speed which might be caused by belts or idlers.

Bias and recording level calibration

Bias current can be precisely adjusted to the optimum level for any tape on the market, assuring the flattest possible frequency response. Furthermore, the sensitivity of the tape can be compensated for, permitting optimum performance of the Dolby NR system.

Electronic back-tension control

The electronic back-tension control system detects the reel motor rotations and adjusts the torque to the motor properly at all times during tape transport in order to obtain even back-tension. Stable and optimum tape-to-head contact is ensured with this system.

Vibration-free diecast chassis

The chassis of the tape transport mechanism is diecast in aluminum and zinc alloy, which suppresses resonance of the chassis and greatly reduces the transmission of vibration to the tape.

High-quality amplifier section

The recording section and the playback section of the right and left channels are physically separated with the signal paths of the right and left channels parallel, using the symmetric Dolby NR ICs. The channel circuits themselves are well separated by a busbar to eliminate interference.

Useful functions

- The automatic monitor system automatically selects the source sound when recording, or the recorded sound when the tape is played back.
- The cueing function facilitates locating the very beginning of the selection while the recorded sound is being heard in rewind or fast-forward mode.
- The dual-speed rewind and fast-forward functions allows you to rewind and advance the tape more rapidly than by the normal rewind and fast-forward speed.
- A digital linear counter indicates the elapsed recording or playback time in minutes and seconds, and also indicates the remaining recording time with a minus sign.
- The pre-end winker system gives warning that the tape is nearing the end during recording, in which case the digits displayed on the tape counter flash on and off.
- The FL-display peak program meters follow the transient peaks of the music and maintain the peak readings for about 4 seconds.

OPERATING VOLTAGE

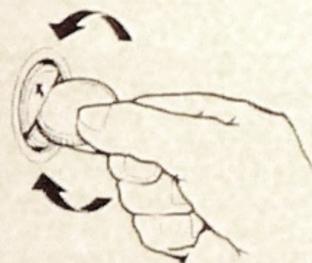
Before connecting the unit to the power source, check that the operating voltage of your unit is the same as the local power line voltage.

The Continental European model (Type 1) operates on 220 V ac (or 240 V ac adjustable by authorized Sony personnel).

The United Kingdom model (Type 2) operates on 240 V ac (or 220 V ac adjustable by authorized Sony personnel).

The Canadian model (Type 3) operates on 120 V ac.

The model for other countries (Type 4) operates on either 110, 120, 220 or 240 V ac. The voltage selector is located on the rear panel. If the selector must be reset, disconnect the ac power cord and turn the selector with a coin so that the arrow on the selector points to the appropriate voltage.



PRECAUTIONS

On safety

- Before operating the unit, check that the operating voltage of your unit is identical with that of your local power supply.
- 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 is not to be used for an extended period of time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.

On installation

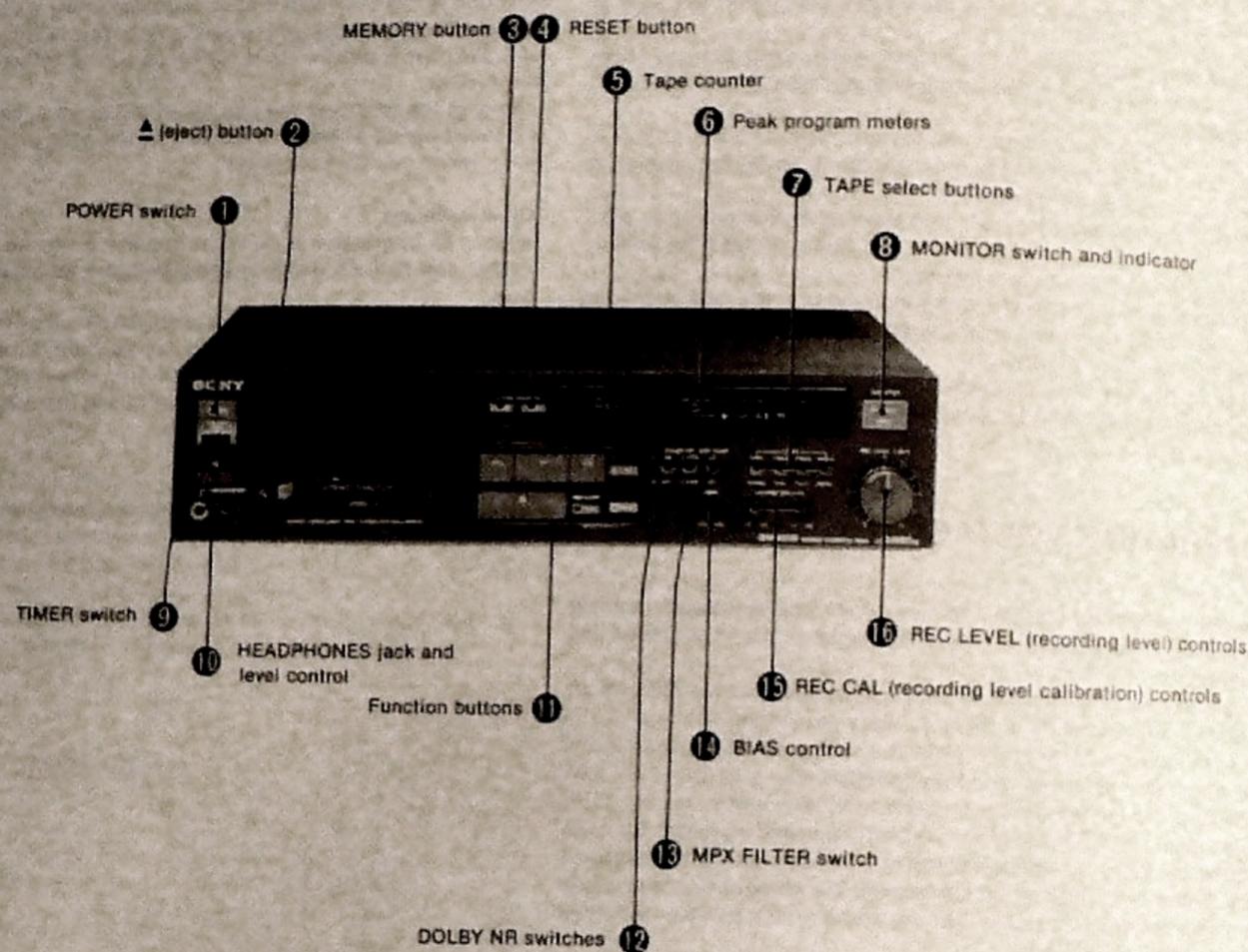
- Good air circulation is essential to prevent internal heat build-up in the unit. Place the unit in a location with sufficient air circulation.
- Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust or mechanical vibration.
- Install the unit with the front panel facing toward you. Do not install the unit in an inclined position.

On operation

If the cassette holder is not closed completely, the function buttons will not operate.

FUNCTION OF CONTROLS

The numbers in the photo are keyed to the following explanations.



- **POWER switch**
Depress this switch to turn on the power. The lamp in the cassette holder, the display of the peak program meters and the tape counter will light up. The indicator lamp of the PAUSE button will blink for about 4 seconds, indicating that the function buttons are inoperative during this period. Press this switch again to turn the power off.
- **(eject) button**
Press this button to open the cassette holder.
- **MEMORY button**
Press to rewind the tape to the "0.00" point on the tape counter. The word "MEMORY" is displayed below the tape counter. Pressing the ► button together with the ◀◀ button automatically starts playback from "0.00." When you do not use the memory function, press this button again. The word "MEMORY" will disappear.
- **RESET button**
Press this button to reset the tape counter to "0.00"
- **Tape counter**
This counter indicates the tape running time. See "Using the digital linear counter" on page 13.

- **Peak program meters**
With the SOURCE indicator illuminated, the meters show the peak input level of each channel, and with the TAPE indicator illuminated the meters show recorded levels. They follow the transient peaks of high-level inputs that are too brief to be followed by conventional VU meters so that the optimum recording level can be accurately set. The highest input of each channel is held about 4 seconds on the scale, except when a higher peak occurs before 4 seconds have passed, in which case that peak is immediately indicated.
- **TAPE select buttons**
Depress one of the TAPE select buttons according to the type of tape to be used. When the appropriate button is depressed, the optimum equalization and bias current settings are obtained for recording, and the optimum equalization setting is obtained for playback.
- **MONITOR switch and indicator**
This cassette deck's automatic monitor system automatically selects the source sound when the ● REC button is pressed to start recording, and the "SOURCE" indicator is illuminated on the MONITOR switch. When the ► button is pressed to start playback, the recorded sound will be selected automatically and the "TAPE" indicator will be illuminated. During recording you can change the monitor sound manually by pressing the MONITOR switch.

● **TIMER switch**
You can set the unit to record or play back at a predetermined time by connecting any commercially available timer. To record, set this switch to REC. To play back, set it to PLAY. See "Timer-activated recording and playback" on page 15.

● **HEADPHONES jack and level control**
Headphones may be inserted either to monitor the input signals to be recorded or to listen to a recording in the playback mode. Headphone volume is adjustable with the level control. The HEADPHONES level control setting does not affect the peak program meters or the output level of the LINE OUT jacks at the rear.

● **Function buttons**
It is possible to switch directly from one mode to another.

- ◀◀ **(rewind) button**: Press this button to rewind the tape. This button is also used for "Auto play" (page 14) and "Cueing" (page 11).
- **(stop) button**: To stop the tape, press this button. The tape will stop automatically when it is completely wound in either direction.
- ▶ **(forward) button**: Press this button to play the tape back. To record, press this button while holding the ● REC button down.
- ▶▶ **(fast-forward) button**: Press this button to advance the tape rapidly. This button is also used for "Cueing". See page 11.
- **REC (record) button**: Press this button together with the ▶ button to start recording.
- || **PAUSE (pause) button**: To pause for a moment during recording or playback, press this button. This button is also used to control more precisely the start of recording, to release the record muting mode and to initiate the cueing.
- **REC MUTE (record muting) button**: Press this button to eliminate unwanted material and to insert a blank space during recording. See "Record muting" on page 14.

● **DOLBY NR switches**
The left switch turns the Dolby NR* (Noise Reduction) system on and off and the right switch selects either the B-type or C-type Dolby NR system. To record with the Dolby NR process, depress the ON/OFF switch to the ON position and choose between B-TYPE (□) and C-TYPE (▢). To record without the Dolby NR process, press the ON/OFF switch again to release it. When playing back, set these switches to the same position used in recording. For details about the Dolby NR system, see page 17.

* "Dolby" and the double-D symbol are trade marks of the Dolby Laboratories Licensing Corporation. Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

● **MPX FILTER switch**
Normally set this switch to OFF (□). When recording FM stereo broadcasts with the Dolby NR system, set it to ON (▢) if the 19 kHz pilot signal and the 38 kHz subcarrier have not been adequately suppressed by the FM tuner or receiver. If the tuner or the receiver suppresses such signals adequately (most high-quality tuners and receivers will), you do not have to set this switch to ON.

● **BIAS control**
When recording, turn this control to adjust the bias current precisely depending on the characteristics of the tape being used.

● **REC CAL (recording level calibration) controls**
When recording, turn these controls to adjust the recording level depending on the sensitivity of the tape being used.

● **REC LEVEL (recording level) controls**
These controls adjust the recording level. The knob nearest the panel is for the left channel and the other knob for the right channel. To adjust the level of the left or right channel only, turn the appropriate knob while holding the other knob.

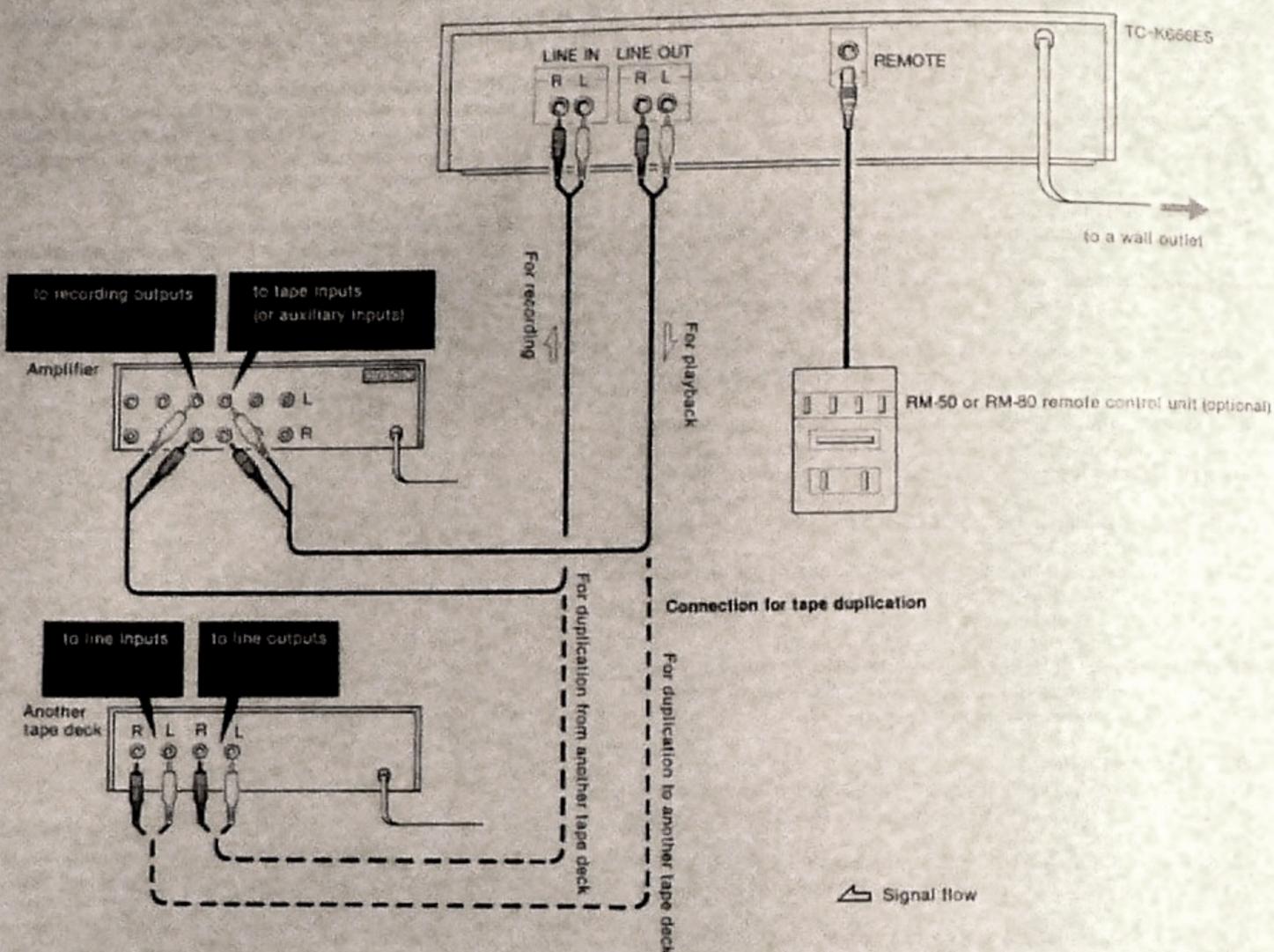
REMOTE control connector (on the rear panel)
Connect the optional RM-50 (wired) or RM-80 (wireless) remote control unit to operate the tape transport functions from a distance. Synchronized operation is also possible with selected Sony turntables, using the optional RM-65 synchro remote control unit. Read the instruction manual of your remote control unit before operating it.

CONNECTIONS

Notes

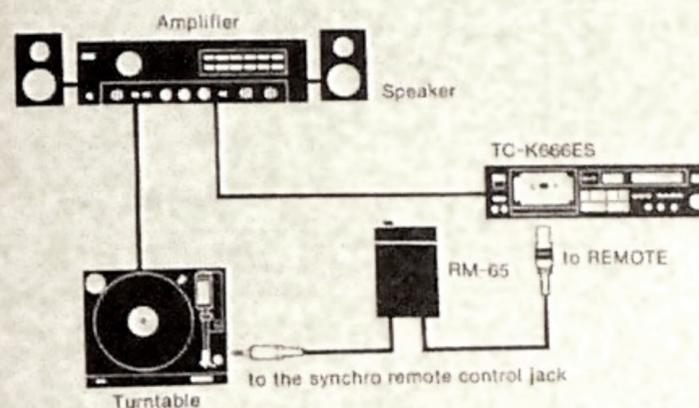
- Turn the amplifier off before making any connection.
- Be sure to insert the plugs firmly into the jacks. Loose connections may cause hum and noise.

● The red plug of the supplied connecting cord should be connected to the red jack (R: right channel) and the other plug to the white jack (L: left channel).



Synchronized operation using the optional RM-65 synchro remote control unit

When this cassette deck is connected to a turntable equipped with a synchro remote control jack using the RM-65, the operation of the cassette deck and the turntable will be synchronized. For more details refer to the instruction manuals of the RM-65 and the turntable.



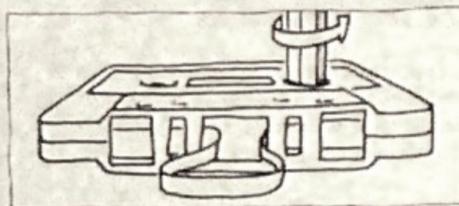
Power cord

A white mark is visible on one lead of the power cord. This will help you drive the cassette deck and other components in the system "in phase" by aligning the ac power cord polarities with ac outlet polarities. In most cases, the marked plug of the cassette deck's power cord should be inserted into the negative potential of the ac outlet.

NOTES ON CASSETTES

Cassette insertion

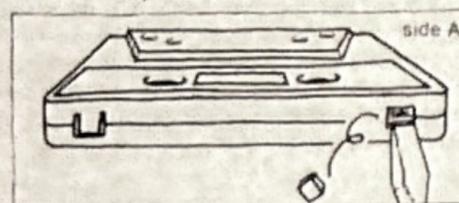
Before inserting a cassette, take up any slack in the tape to prevent it from becoming tangled around the capstan.



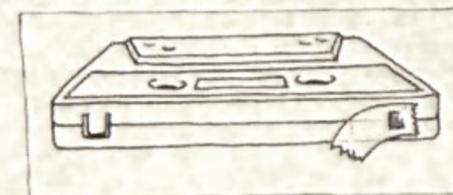
To protect cassettes from accidental erasure

Remove the tab as illustrated so that the record mode does not function when the record button is pressed.

To protect side A recording



To record on a cassette once tabs have been removed, simply cover the slot with plastic tape.

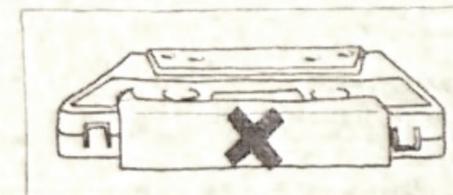


Cassette care

● Avoid touching the tape surface of a cassette, as any dirt or dust will contaminate the heads.



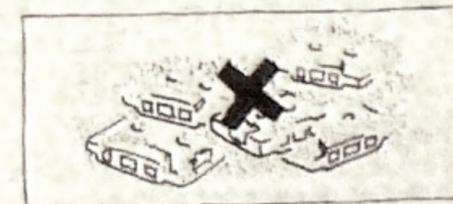
● Do not stick thick labels or tape on the cassette, as this may affect proper cassette alignment and prevent the tape from making proper contact with the heads.



● Keep cassettes away from equipment with magnets, such as speakers and amplifiers, because their magnets could cause erasures or distortions of your recorded tapes.



● Protect cassettes from dust by storing them in their cases. Even minor dirt or dust could contaminate the heads, resulting in noise and sound drop-outs.



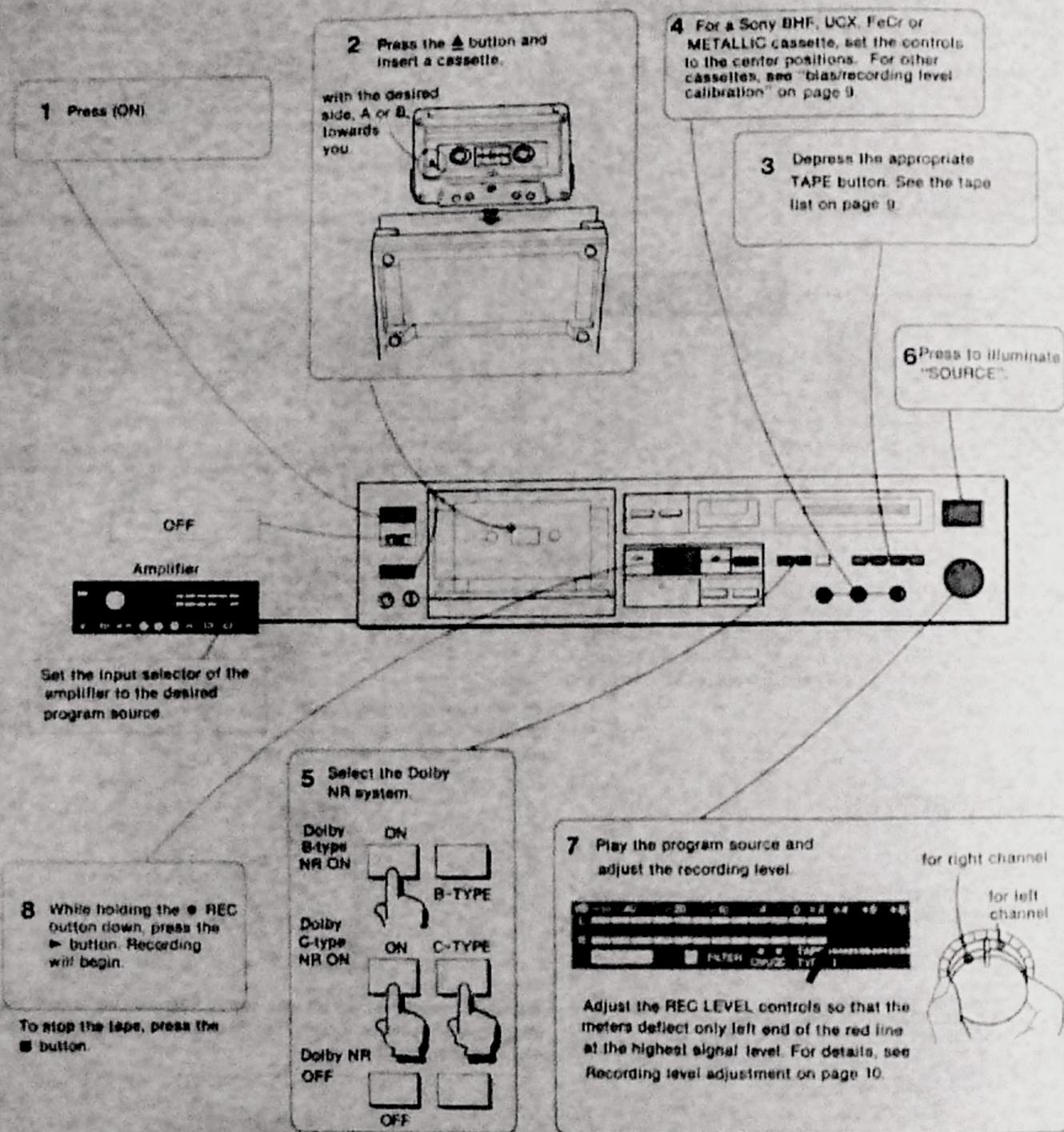
● Do not expose cassettes to direct sunlight, extremely cold temperature or moisture.

● Avoid fast-winding just before storing cassettes, as this may stretch the tape edge if the cassettes are left unused over a period of time.

RECORDING

TO RECORD

The numbers in this diagram indicate the sequence to be followed.



Note on the TIMER switch

If the power is turned on when this switch is set to the REC or PLAY position, recording or playback will start automatically after 4 seconds. To avoid accidental erasure of previously-recorded material, check that the TIMER switch is set to OFF before turning on the POWER switch.

To cancel the recording or playback, press the **■** button within 4 seconds after the power is turned on.

Pre-end winker

When the tape approaches the end during recording, the digits on the counter will blink, warning that the tape is about to run out (We call this function the pre-end winker.) The blinking will begin 2 to 3 minutes before the end of the tape for a C-46 or C-60 cassette, and 3 to 5 minutes before the end of the tape for a C-90 cassette. Note that the pre-end winker may not function if a cassette with very thick hub is being used.

RECOMMENDED SETTINGS FOR THE TAPE SELECT BUTTONS

Press the appropriate TAPE select button referring to the recommended settings listed below.

While the settings are optimum for Sony cassettes, you may want to change them when using cassettes produced by other manufacturers.

Tape list (for Canada)

Tapes (C-46 - C-90)		Type of tape
SONY: BHF, HFX	AMPEX: GRAND MASTER I	TYPE I (NORMAL)
MAXELL: UD, UD-XL I, XL I-S	FUJI: FX I MEMOREX: MPH I	
SCOTCH: MASTER I	TDK: AD, AD-X	
SONY: UCX-S, UCX	AMPEX: GRAND MASTER II	TYPE II (CrO ₂)
MAXELL: XL II, XL II-S	FUJI: FX II MEMOREX: HIGH BIAS II	
SCOTCH: MASTER II	TDK: SA, SA-X	
SONY: FeCr	BASF: PROFESSIONAL III	TYPE III (Fe-Cr)
SCOTCH: MASTER III		
SONY: METALLIC	Other metal tapes	TYPE IV (METAL)

Tape list (for other countries)

Tapes (C-46 - C-90)		Type of tape
SONY: AHF, BHF	AGFA: SUPER FERRO DYNAMIC	TYPE I (NORMAL)
BASF: LH-X, Professional I	FUJI: FX I	
MAXELL: UD, XL I, XL I-S	PHILIPS: SUPER FERRO I	
SCOTCH: MASTER I	TDK: AD, AD-X	
SONY: UCX-S, UCX	AGFA: STEREO CHROM	TYPE II (CrO ₂)
BASF: Professional II	FUJI: FX II	
MAXELL: XL II, XL II-S	PHILIPS: CHROMIUM	
SCOTCH: MASTER II	TDK: SA, SA-X	
SONY: FeCr	AGFA: CARAT	TYPE III (Fe-Cr)
BASF: Professional III	PHILIPS: FERRO CHROMIUM	
SCOTCH: MASTER III		
SONY: METALLIC	Other metal tapes	TYPE IV (METAL)

BIAS/RECORDING LEVEL CALIBRATION

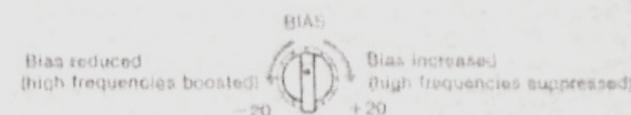
There are many different cassettes on the market and their characteristics vary. The proper equalization characteristics and bias current will be obtained when the appropriate TAPE button is pressed. With this cassette deck you can adjust the recording characteristics much more precisely using the bias and recording level calibrating function.

Bias calibration

Too high a bias level gives a rolled-off high-frequency response, and too little bias reduces the signal-to-noise ratio and increases distortion.

To adjust the bias current to the level which gives the best possible frequency response, proceed as follows:

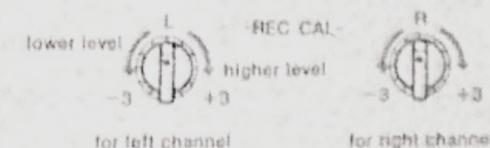
- 1 Insert the cassette to be recorded.
- 2 Press the appropriate TAPE button according to the type of tape.
- 3 Play the program source.
For easier bias calibration, choose a monotone as a source program, such as the calibration tone generated by the oscillator built in the FM/AM tuner, if provided.
- 4 Press the **●** REC and **▶** buttons to start recording.
- 5 While recording, press the MONITOR switch to TAPE and adjust the BIAS control so that the recorded sound heard is as identical as possible to the source sound.



Recording level calibration

The Dolby NR function is most effective when the recording level and the playback level are the same. After completing the bias calibration, calibrate the recording level as follows. Tape sensitivity will be compensated for automatically.

- 6 Adjust the REC CAL controls so that the peak program meters deflect to the same point and the recorded sound heard is as close as possible to the sound heard when the MONITOR switch is pressed to SOURCE.

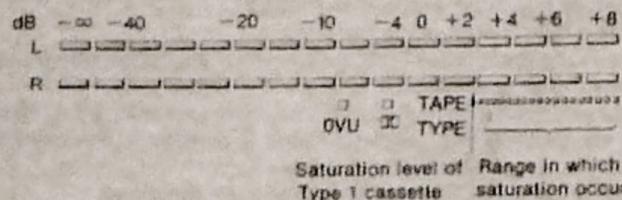


The bias current is now adjusted to the optimum level and the tape sensitivity is compensated for.

In order to erase the recorded program, rewind the tape and start recording.

RECORDING LEVEL ADJUSTMENT

Adjust the recording level while monitoring on the peak program meters the input level of the program source to be recorded. If the recording level setting is too high, the recording will be distorted, and if the setting is too low, the recording will be noisy. The recording level should be set as high as possible while still avoiding distortion. This level will depend on the type of tape being used. When the TAPE button is pressed, the range above the saturation level of the selected type of tape is indicated by the red line. Generally speaking, adjust the recording level by making sure that the meters deflect only to the left end of the red line at the highest signal level.



Since the saturation level of any tape is lower in the higher frequencies than in the lower frequencies, the recording level may still be too high if adjusted in this way if the program to be recorded contains many high frequency signals. Consideration has to be given to the program source to be recorded as well as to the characteristics of the cassette to be used, since each cassette, even cassettes using the same type of tape, may have different characteristics. The following table will provide you with a starting point in setting the recording level of various kinds of programs when using Sony cassettes.

Type of tape	Sony cassettes	Low and mid freq range programs (vocal, etc.)	Mid and high freq range programs (piano, guitar, etc.)
I	BHF	+ 3 dB	+ 1 dB
	AHF	+ 4 dB	+ 2 dB
II	UCX	+ 3 dB	+ 2 dB
III	FeCr	+ 5 dB	+ 1 dB
IV	METALLIC	+ 6 dB	+ 6 dB

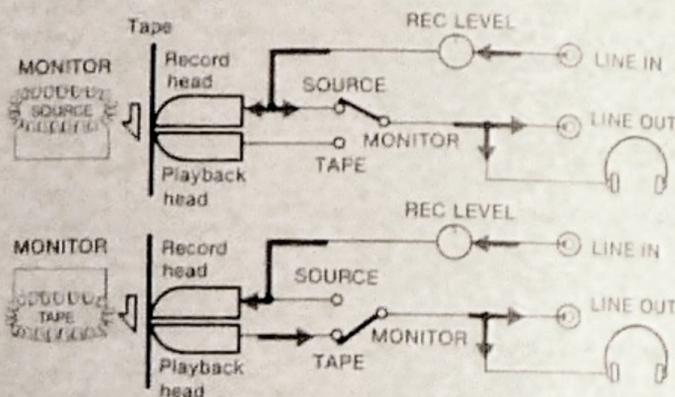
RECORD MONITORING

As this cassette deck has separate record and playback heads, you can easily compare the source and the recorded sounds in the recording mode by using the MONITOR switch. You can check the recording level and whether there is any contamination on the heads that is affecting the recording.

This cassette deck's automatic monitor system automatically selects the source sound (SOURCE) when the ● REC button is pressed to start recording. To monitor the recorded sounds in the recording mode, press the MONITOR switch or the ● REC button to illuminate the "TAPE" indicator.

● If the connected amplifier has a tape monitor selector, source/tape comparison is possible with the amplifier monitor selector. In this case, set the cassette deck MONITOR switch to TAPE.

MONITOR switch setting and signal flow

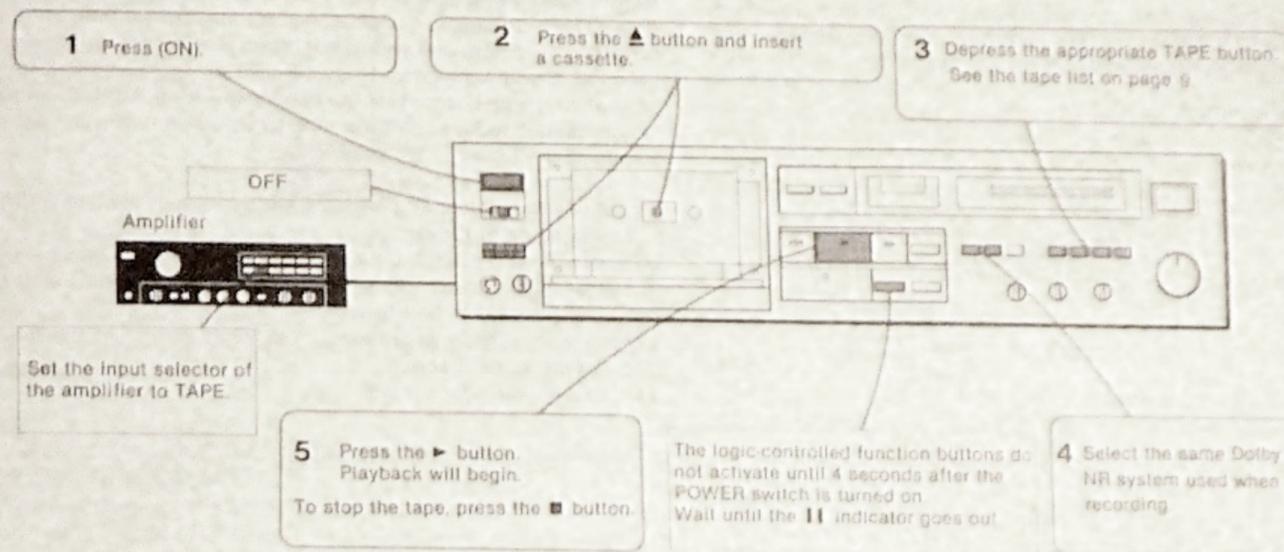


TO RECORD MATERIAL ONTO A SPECIFIC PORTION OF TAPE

When you want to re-record a specific portion of tape or to insert new material between two points on a tape you will find it handy to be able to change directly from the playback to the record mode by pressing the ● REC button while holding the ► button down.

PLAYBACK

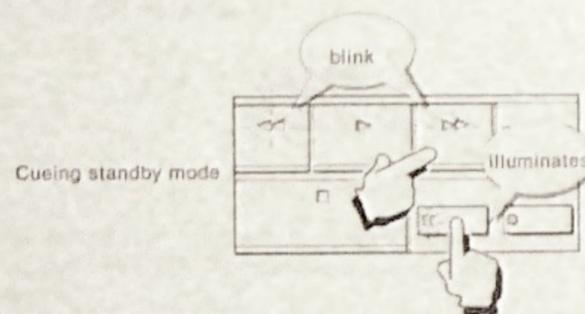
The numbers in this diagram indicate the sequence to be followed.



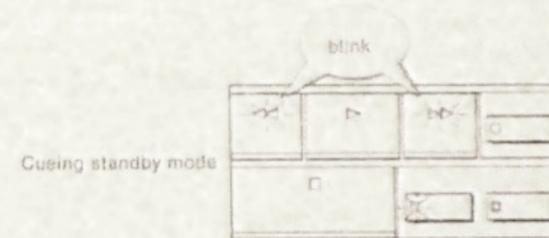
CUEING

You can accurately locate the beginning of the selection using this cueing function.

- 1 Rewind the tape or move it "fast-forward" to a position approximate to the beginning of the selection you wish to play.
- 2 While holding the II PAUSE button down, press the ◀◀ or ▶▶ button. (cueing standby mode)

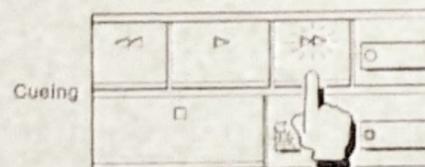


- 3 Press the ◀◀ and ▶▶ buttons alternately and locate the exact beginning of the selection while carefully listening to the chattering sound. When the button is released, the deck will revert to the cueing standby mode.



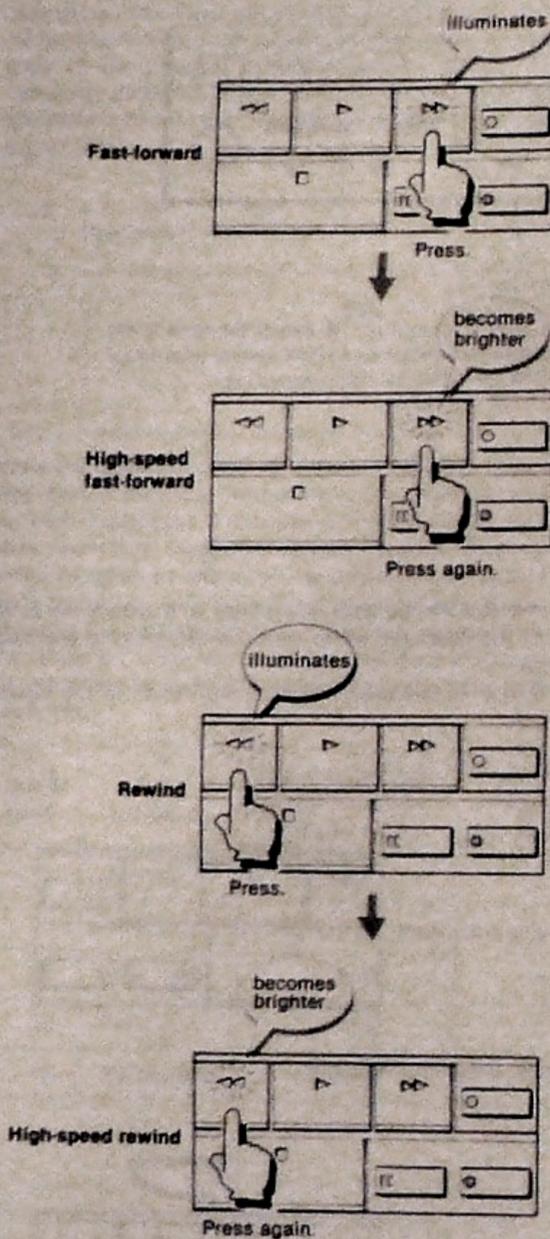
- 4 To play back, press the ► button.

If the ◀◀ or ▶▶ button is kept depressed, the tape will rewind or move forward slowly, while a chattering sound will be heard, caused by the recorded section.



DUAL-SPEED REWIND AND FAST-FORWARD

With this cassette deck, you can rewind the tape or run it "fast-forward" at two different speeds, that is, at normal speed also and at a speed which is twice that of normal speed.



Note

High-speed rewind and fast-forward actions require only half the time as for normal-speed rewind and fast-forward actions, when the tape is wound from one end to the other. However, near the end of the tape, it will slow down to avoid causing excessive jerk to the tape when it stops. Note that the high-speed rewind or fast-forward action cannot reduce the time effectively when it starts from the middle of the tape.

Do not use the high-speed rewind or fast-forward function with the following types of tapes:

- Those with a playback time of less than 5 minutes on one side. (The tape might break when it is wound to the end by using the high-speed rewind or fast-forward action.)
- Those which make excessive noise when using the normal rewind or fast-forward action.
- Those with very thick hubs.

USING THE DIGITAL LINEAR COUNTER

The first two digits of this tape counter show the approximate recording or playback time in minutes, and the last two digits show the seconds.

TO INDEX THE WHOLE TAPE

0.00

Before recording or playback, set the counter to "0.00" by pressing the RESET button.

As the tape runs, the figures of the counter change. Note the numbers and the program being recorded or played back. Any point of the tape can thus be readily located later by reference to these numbers.

TO VERIFY THE AMOUNT OF RECORDING TIME POSSIBLE ON ONE SIDE OF A CASSETTE

At the beginning of the tape, set the counter to "0.00" and run the tape "fast-forward" to the end. The digits on the counter will show the approximate available recording time.

30.15

30 min. 15 sec.

TO DETERMINE THE REMAINING RECORDING TIME

Stop the tape at the point at which you wish to begin recording later. Set the counter to "0.00" and run the tape "fast-forward" to the end. The digits on the counter will show the approximate recording time still remaining.

2.30

2 min. 30 sec. remain.

- To rewind the tape to "0.00" and start recording automatically, use the "memory stop" function described on page 14.

TO MONITOR THE REMAINING RECORDING TIME WHILE RECORDING—Using the minus display

This counter shows the recording or playback time from the "0.00" point with a minus sign in front of the digits when the tape is rewound beyond "0.00."

Before recording, move the tape "fast-forward" to the end, then set the counter to "0.00" and rewind the tape to the beginning. The digits on the counter will show the approximate recording time on one side of the cassette.

-30.00

30 min. available

The digits will change from -30.00 to -29.59, -29.58... as the recording goes on, and you can monitor the remaining recording time at any point on the tape.

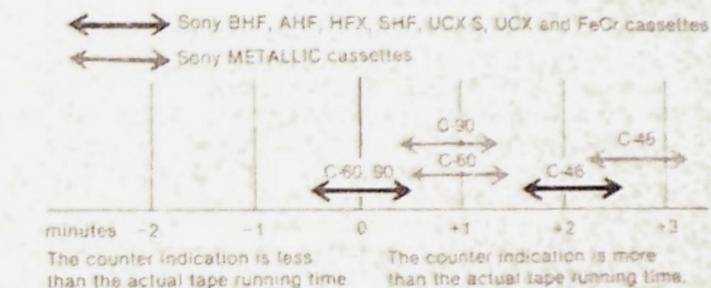
Note

Do not turn off the power while measuring the time because the numbers will return to "0.00" when the power is turned on again.

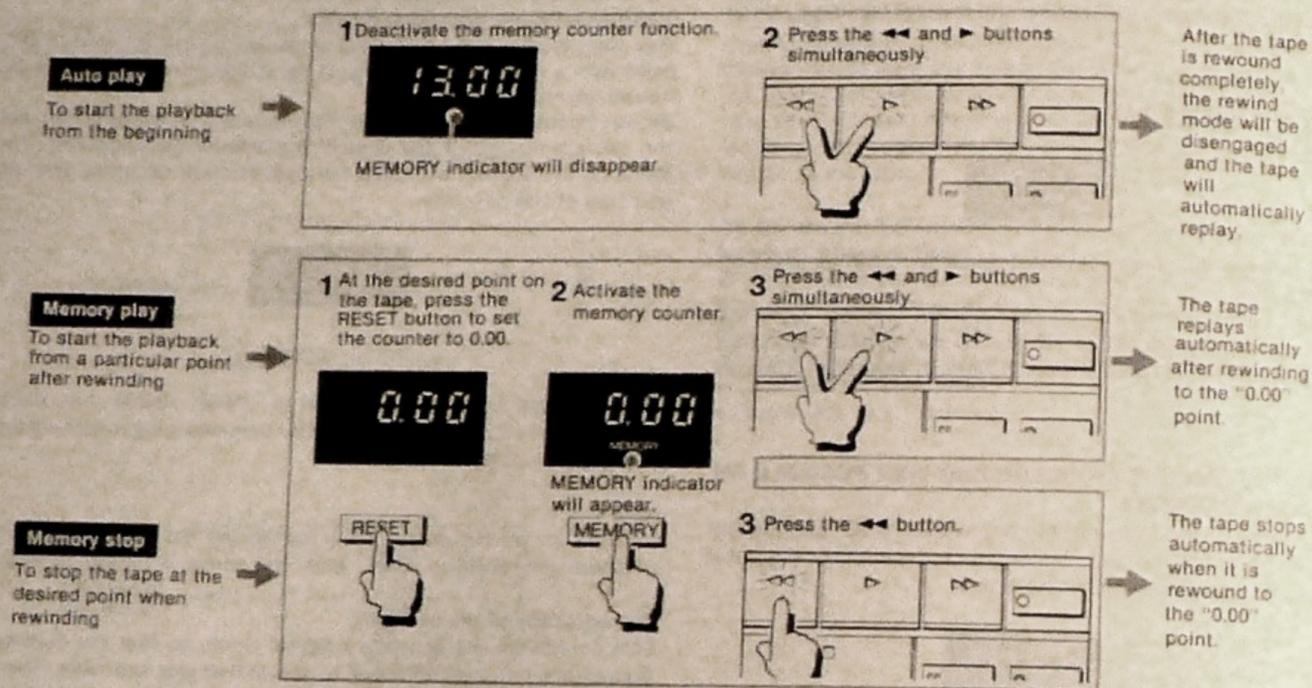
The accuracy of the counter

This counter is not actually a digital clock, so that the displayed figures are not exactly equal to the actual elapsed time. The accuracy will vary depending on the type of tape being used. This counter has been designed using C-60 cassettes as the standard. Make sure that the displayed time is greater than the time required, when using a C-46 cassette.

Difference between the counter indication and actual running time on one side of a cassette



AUTO PLAY AND MEMORY PLAY/STOP



Why does the tape stop around -0.01?
In order to avoid any chance of cutting off the starting point.

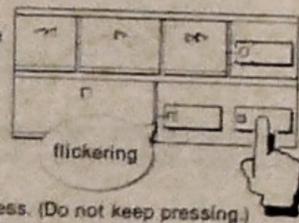
How can the tape be rewound further than 0.00?
Press the ◀ button again.

RECORD MUTING

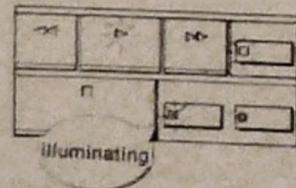
By pressing the ● REC MUTE button during recording, four seconds interspacing is provided automatically, eliminating unwanted program material such as broadcasting commercials. While the record muting is operating, the incoming signal is not recorded on the tape but it continues to register on the meters and feed to the monitor so that you know exactly what is going on.

1 Press the ● REC MUTE button when the segment you do not want to record begins. The || indicator will blink, and the tape path will pause automatically after four seconds.

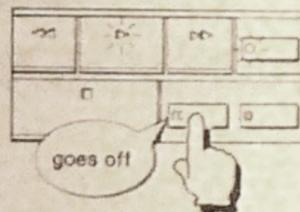
A blank is made while the tape continues to run.



The tape pauses after 4 seconds.



2 When you want to resume recording, press the || PAUSE button.



To insert a blank less than four seconds long

Press the ● REC MUTE button to mute recording. Press the || PAUSE button when you want to resume recording.

To insert a blank over four seconds long

Hold down the ● REC MUTE button for as long as you want the blank segment on the tape to be. After four seconds, the || indicator will blink more rapidly. When you release the ● REC MUTE button, the tape deck will be in the pause mode. When you want to resume recording, press the || PAUSE button to release the pause mode.

ERASING

When the tape deck functions in recording mode, the erase head automatically erases any previously recorded material.

To erase without recording:

- 1 Make sure that the safety tab of the cassette is in place, or that the tab slot is covered with plastic tape.
- 2 Set the REC LEVEL controls fully to "0" (Disconnecting all inputs will result in a more complete erasure.)
- 3 Press the appropriate TAPE select button according to the type of tape to be erased. (The TYPE IV button assures good erasing for any type of tape.)
- 4 While holding the ● REC button down, press the ▶ button.

TIMER-ACTIVATED RECORDING AND PLAYBACK

By connecting any commercially available timer to the tape deck, the deck can be set to play back or record automatically at any desired time. As timers work in different ways, be sure to read the timer's instruction manual carefully.

To record a broadcast using a timer

- 1 Connect the tape deck, amplifier, tuner and timer. Set the timer so that power is supplied to the connected equipment.
- 2 Turn on the amplifier and tuner and tune in the station which will broadcast the program you want to record.
- 3 Set the tape deck's TIMER switch to OFF.
- 4 Insert a cassette. Make sure that the tab is intact or that plastic tape covers the tab slot.
- 5 Turn on the tape deck and adjust the recording level.
- 6 Set the timer for the desired time. (At this point power to the connected equipment will be cut off.)
- 7 Set the tape deck's TIMER switch to REC. The tape deck is now ready to start recording at the time set on the timer.

To play back using a timer

The connections between equipment are the same as for recording using a timer.

- 1 Set the tape deck's TIMER switch to OFF.
- 2 Turn on the amplifier and set the appropriate switches for playback.
- 3 Turn on the tape deck and insert the recorded cassette.
- 4 Set the timer for the desired time. (At this point power to the connected equipment will be cut off.)
- 5 Set the tape deck's TIMER switch to PLAY. The tape deck is now ready to start playback at the time set on the timer.

Notes

- The tape deck's TIMER switch will function properly only if the tape deck is turned on **after** the switch is set to REC or PLAY. If you want to change the setting of the switch, turn the power off first.
- After a timer-activated recording or playback, be sure to set the TIMER switch to OFF. If the switch is still set to REC, recording will start automatically when the deck is turned on the next time. In this case you can cancel the recording by pressing the ■ button within 4 seconds after the power is turned on.

MAINTENANCE

Cleaning of heads and tape path

The performance of your unit is dependent on the periodic cleaning of the heads and all surfaces over which the tape travels.

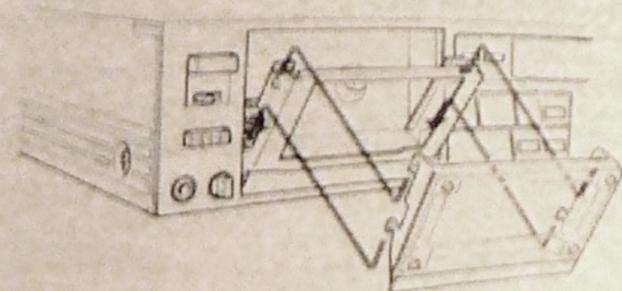
Dirty heads and a dirty tape path cause:

- Loss of high frequency response
- Loss of sound volume
- Sound drop-outs

The heads and tape path should be cleaned after 10 hours of operation.



4 Press the ▲ button to open the frame, and replace the window.



After cleaning the heads and tape path, do not insert a cassette until the areas cleaned are completely dry.

Demagnetizing heads

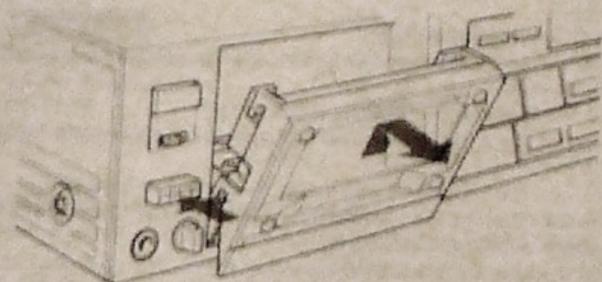
After 20 to 30 hours of use, enough residual magnetism will have built up on the heads to begin to cause hiss and a loss of high frequency. At this time you should demagnetize the heads and all metal parts in the tape path with a commercially available head demagnetizer. Be sure that the tape deck is turned off while you demagnetize.

Cleaning the cabinet

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

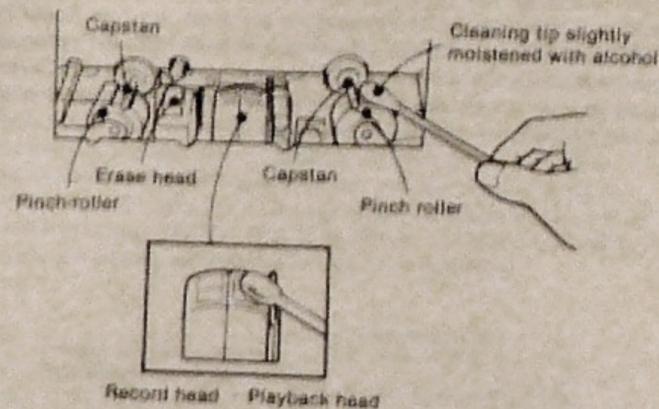
We recommend cleaning after every 10 hours of operation. To make the best possible recordings, however, you should clean all surfaces over which the tape travels before every recording.

1 Press the ▲ button to open the cassette holder. Remove the window as illustrated.



2 Push the frame in.

3 Wipe the heads, the pinch-rollers and the capstans with a cleaning tip slightly moistened with the cleaning fluid or alcohol.



DOLBY NR (NOISE REDUCTION) SYSTEM

There have been until recently just two types of Dolby NR system: the A-type for professional use, and the B-type, a simplified version of the A-type, employed by most consumer-grade cassette decks. Now, a third type of Dolby NR system is available, the C-type. The C-type system reduces tape noise much more effectively than the B-type system.

The basis of the Dolby NR system

During recording, low-level high frequency signals, which tend to be obscured by tape hiss, are boosted so that they are substantially higher in level than any tape noise. When these signals are played back, the level is lowered to the original input level, while simultaneously the level of any tape noise is reduced to the same extent.

The Dolby B-type NR system thus reduces tape noise by 10 dB at 5 kHz. The C-type system reduces noise by 20 dB at 5 kHz. The Dolby C-type NR system also begins to take effect at frequencies lower than the B-type system.

Anti-saturation network

Normally, recording tape will saturate more easily at the higher frequencies. The Dolby C-type NR system incorporates a high frequency anti-saturation network. During recording, the anti-saturation network automatically reduces high-level high-frequency signals. When these signals are played back, the level is automatically boosted to the original input level. At 10 kHz, the tendency of the tape to saturate is reduced by 4 dB by the use of this network.

Playback of Dolby NR encoded tapes

For the best sound, lowest distortion, and most effective noise reduction, it is essential that a tape recorded using either the B-type or the C-type Dolby NR system be played back using the same system that was used during the recording process. We recommend that you label the cassettes you record as being either non-Dolby NR, Dolby B NR, or Dolby C NR.

Fig. 1 Encoding characteristics

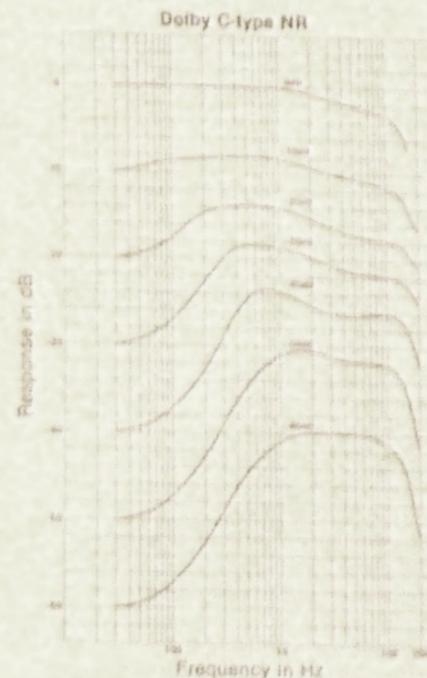
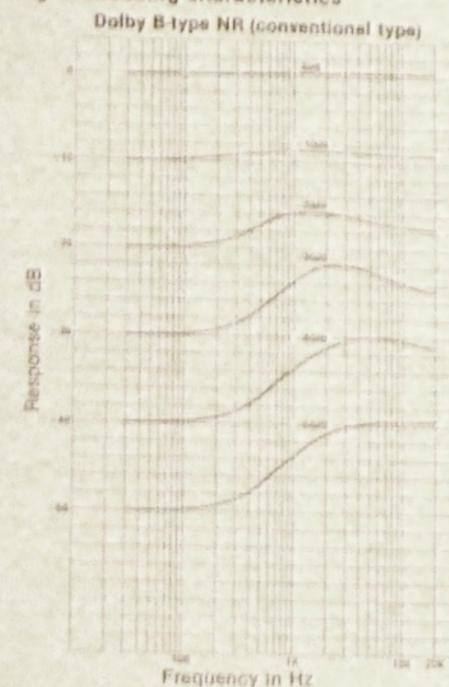


Fig. 2 Noise improvement

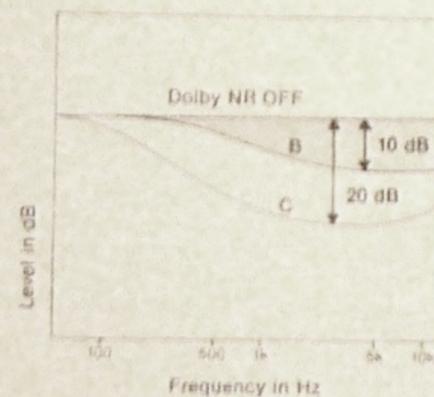
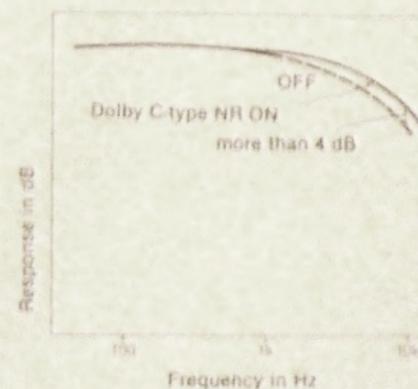


Fig. 3 Saturation level improvement



SPECIFICATIONS

Recording system 4-track 2-channel stereo
Fast-forward and rewind time (with C-60 cassette)
Approx. 60 sec. at normal speed
Approx. 35 sec. at high speed
Bias frequency 105 kHz
Signal-to-noise ratio (NAB, at peak level)

Cassette	Dolby NR switch		
	OFF	B-TYPE ON	C-TYPE ON
TYPE IV (Sony METALLIC)	60 dB	67 dB	73 dB
TYPE III (Sony FeCr)	62 dB	69 dB	75 dB
TYPE II (Sony UCX)	59 dB	66 dB	72 dB
TYPE I (Sony BHF or HFX)	56 dB	63 dB	69 dB

Total harmonic distortion

0.8% (with Sony METALLIC and FeCr cassettes)

Frequency response

- DOLBY NR OFF
- With TYPE IV cassette (Sony METALLIC)
20 - 20,000 Hz
25 - 19,000 Hz (± 3 dB)
25 - 14,000 Hz (± 3 dB, 0 VU recording)
25 - 19,000 Hz (DIN)
 - With TYPE III cassette (Sony FeCr)
20 - 20,000 Hz
25 - 19,000 Hz (± 3 dB)
25 - 19,000 Hz (DIN)
 - With TYPE II cassette (Sony UCX)
20 - 19,000 Hz
25 - 18,000 Hz (± 3 dB)
25 - 18,000 Hz (DIN)
 - With TYPE I cassette (Sony BHF or HFX)
20 - 19,000 Hz
25 - 17,000 Hz (DIN)

Wow and flutter

0.025% WRMS (NAB)
 ± 0.07 % (DIN)

Inputs

Line inputs (phono jacks)
Sensitivity 77.5 mV (-20 dB)
Input impedance 50 k ohms

Outputs

Line outputs (phono jacks)
Output level 0.435 V (-5 dB) at a load impedance of 50 k ohms
Load impedance over 10 k ohms
Headphone output
Output level, variable from 0.3 to 0.003 mW at a load impedance of 8 ohms

General

Power requirements Type 1: 220 V ac, 50/60 Hz (240 V ac adjustable by authorized Sony personnel)
Type 2: 240 V ac, 50/60 Hz (220 V ac adjustable by authorized Sony personnel)
Type 3: 120 V ac, 60 Hz
Type 4: 110, 120, 220 or 240 V ac adjustable, 50/60 Hz

Power consumption 50 watts

Dimensions

Approx. 430 x 105 x 285 mm (w/h/d)
(17 x 4 $\frac{1}{4}$ x 11 $\frac{1}{4}$ inches)
including projecting parts and controls
Approx. 6.5 kg (14 lbs 6 oz)

Weight

Supplied accessories

Connecting cord (2)
Head cleaning tips (1 set)

While the information given is correct at the time of printing, small production changes in the course of our company's policy of improvement through research and design might not necessarily be indicated in these specifications. We ask you to check with your appointed Sony dealer if clarification on any point is required.

Note

Appliance conforms with EEC Directive 76/889 regarding interference suppression.

TROUBLE CHECKS

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

Before proceeding with these trouble checks, first check these basic points:

- The power cord must be firmly connected.
- Amplifier connections must be firmly made.
- Heads, capstans and pinch rollers should be clean.
- The amplifier controls and switches should be set correctly.

FUNCTION BUTTONS AND TAPE TRANSPORT PROBLEMS

The function buttons do not activate right after the POWER switch is turned on.

- Logic-controlled function buttons operate approximately 4 seconds after the POWER switch is turned on.

Recording or playback begins as soon as the POWER switch is turned on.

- The TIMER switch is set at either REC or PLAY.

The ● REC button and the ► button do not activate.

- The cassette holder is not fully closed.

The ● REC button does not activate.

- No cassette in the holder.
- The tab has been removed from the cassette.

The automatic shut-off mechanism activates before the end of the tape.

- The tape is slack.
- The memory counter function is in operation.
- This situation may also be caused by a deformed cassette shell.

Tape transport noise seems excessively loud in rewind or fast-forward mode.

- This situation depends upon the cassette used and is not a problem.

RECORDING AND PLAYBACK PROBLEMS

Recording or playback cannot be made or there is a decrease in sound level.

- Contamination or magnetic build-up on the record and playback heads.
- Improper connection.
- Improper setting of the amplifier controls.
- The tape is played back with the MONITOR switch set to SOURCE.

Excessive wow or flutter or drop out

- Contamination of the capstans or pinch rollers.

Incomplete erasure

- Contamination of the erase head.

Increase of noise or erasure of high frequencies

- Magnetic build-up on the heads.

Unbalanced tone in higher frequencies

- Improper setting of the DOLBY NR switches. When playing back, set the switches to the same position used in recording.
- Improper setting of the TAPE select buttons. If recorded with the wrong button pressed, adjust the tone controls of the amplifier in playback.

NOISE

Hum noise

- The tape deck is stacked on or under the amplifier. Separate the units.