

SONY®

STEREO TAPE DECK

TC-399



OPERATING INSTRUCTIONS

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

FEATURES

- Large-sized VU meters which indicate the average level of complex musical waveforms.
- High performance F & F (Ferrite and Ferrite) heads.
- Tape bias and equalization switches to obtain the maximum characteristics according to the type of tapes ; Sony Ferri-Chrome Tape, Sony SLH tape and regular tape.
- Tape tension regulator to reduce wow and flutter.

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.

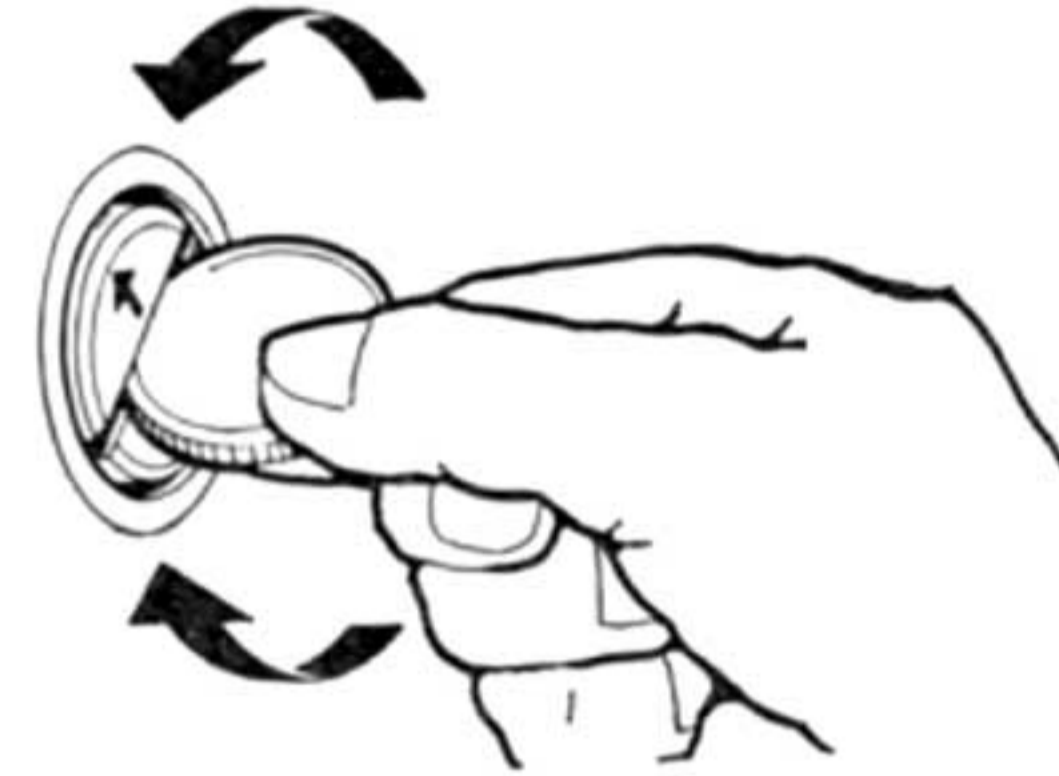
OPERATING VOLTAGE

Before connecting the unit to the power source, check that the voltage selector setting is correct for your power supply. (The voltage selector is located on the rear panel.)
If the selector must be reset, refer to the steps below.

WARNING

Check that the ac power cord is disconnected.

Turn the selector with a coin so that the arrow mark of the selector points to the proper voltage figure.



Note on PX model purchased in non-European countries

This model (factory-set at 120 V ac) includes no user-serviceable voltage selector inside. Consult your nearest Sony dealer for different voltage adaptation.

For the customers in the United Kingdom

WARNING

This apparatus must be earthed at the terminals in your 3-pin plug as follows :

Important

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

Green-and-yellow	Earth (safety earth)
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 green-and-yellow must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol ⏏ or coloured green or green-and-yellow. 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.

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PRECAUTIONS

On safety

- Before operating, be sure the operating voltage of your unit is identical with that of your local power supply.
- Should any liquid or solid object 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 adequate air circulation.
- Do not install the unit in a location near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust or mechanical vibration.

On operation

- Thread the tape without slack. If there is slack in the tape, the function selector does not lock.
- The record/playback (DIN) inputs are common to the microphone signal path. So if you connect the input source to the REC/PB jack, use MIC REC LEVEL controls. If the MIC and REC/PB jacks are simultaneously connected, the REC/PB input is automatically cut off.
- The microphone inputs and line inputs can be used simultaneously for mixing. To record only through microphone or line inputs, turn the unused REC LEVEL controls (MIC or LINE) fully to 0.
- Usually set the PB LEVEL control at center-detent position.

On head cleaning

The best performance of your unit depends on the periodic cleaning of the heads and all surfaces over which the tape travels. Dirty heads and tape path cause :

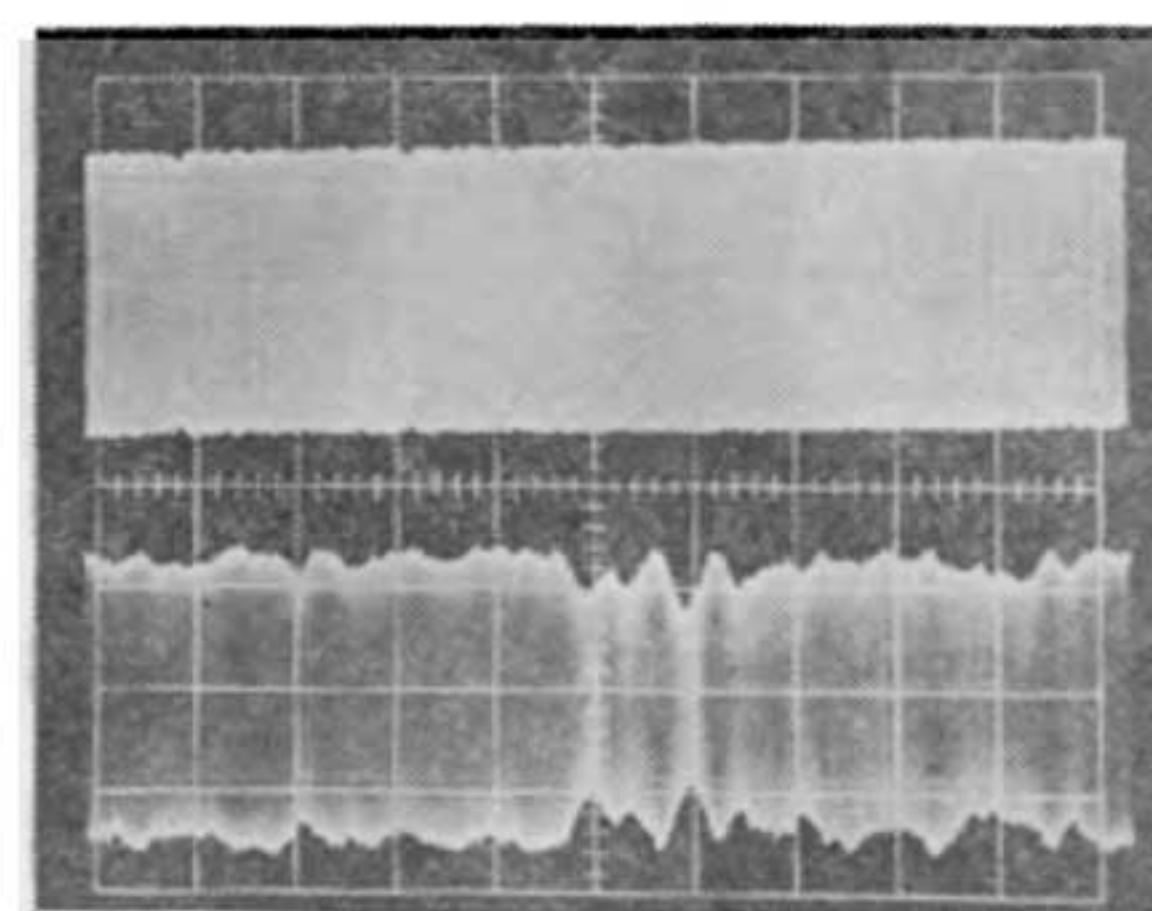
- Loss of high frequency response
- Loss of sound volume
- Sound drop-out, etc.

Cleaning should be done every after 10 hours of operation. For details, see "Maintenance"

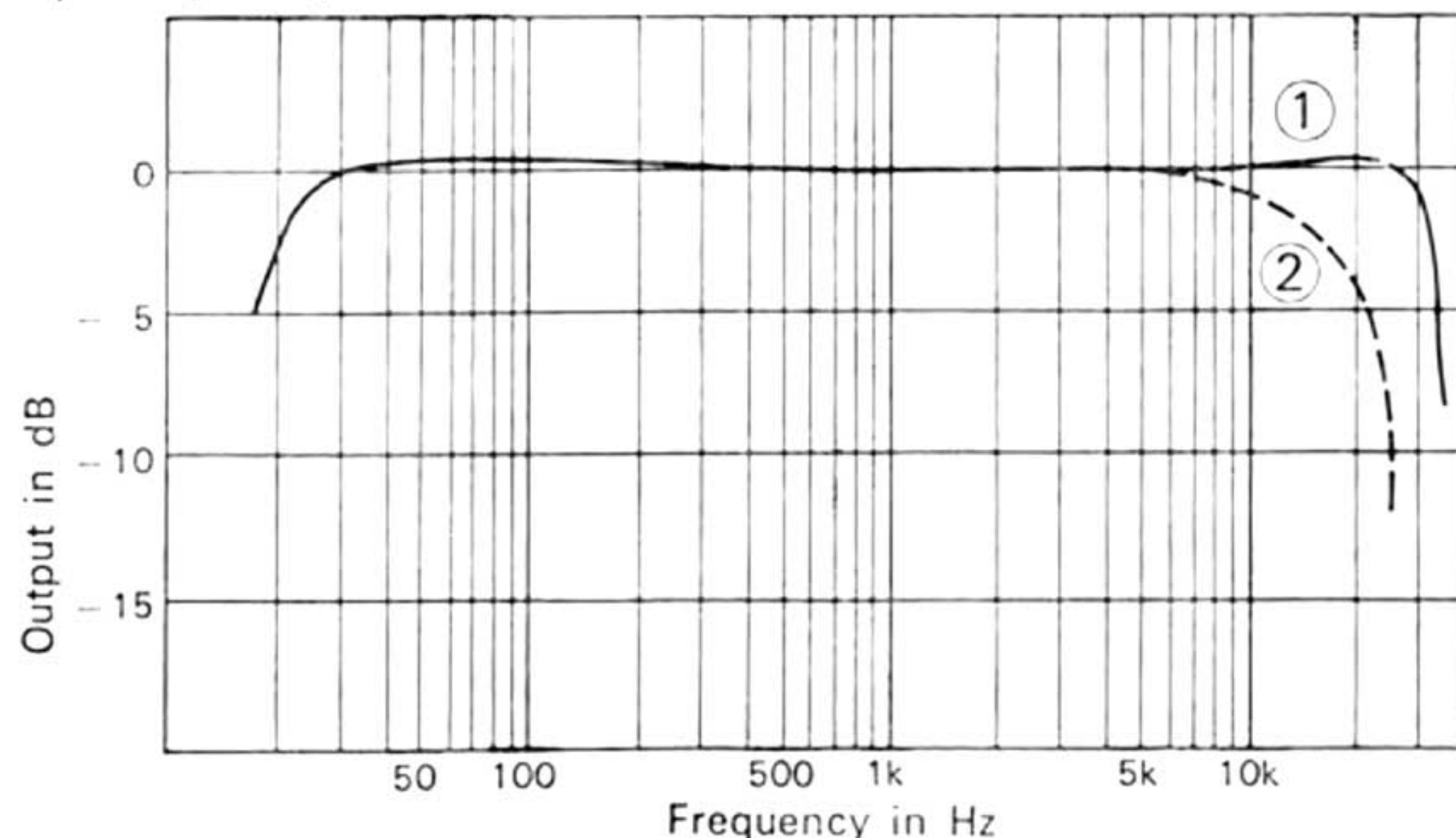
Playback waveform at 10 kHz

With a clean head

With a dirty head
(The output level fluctuates.)



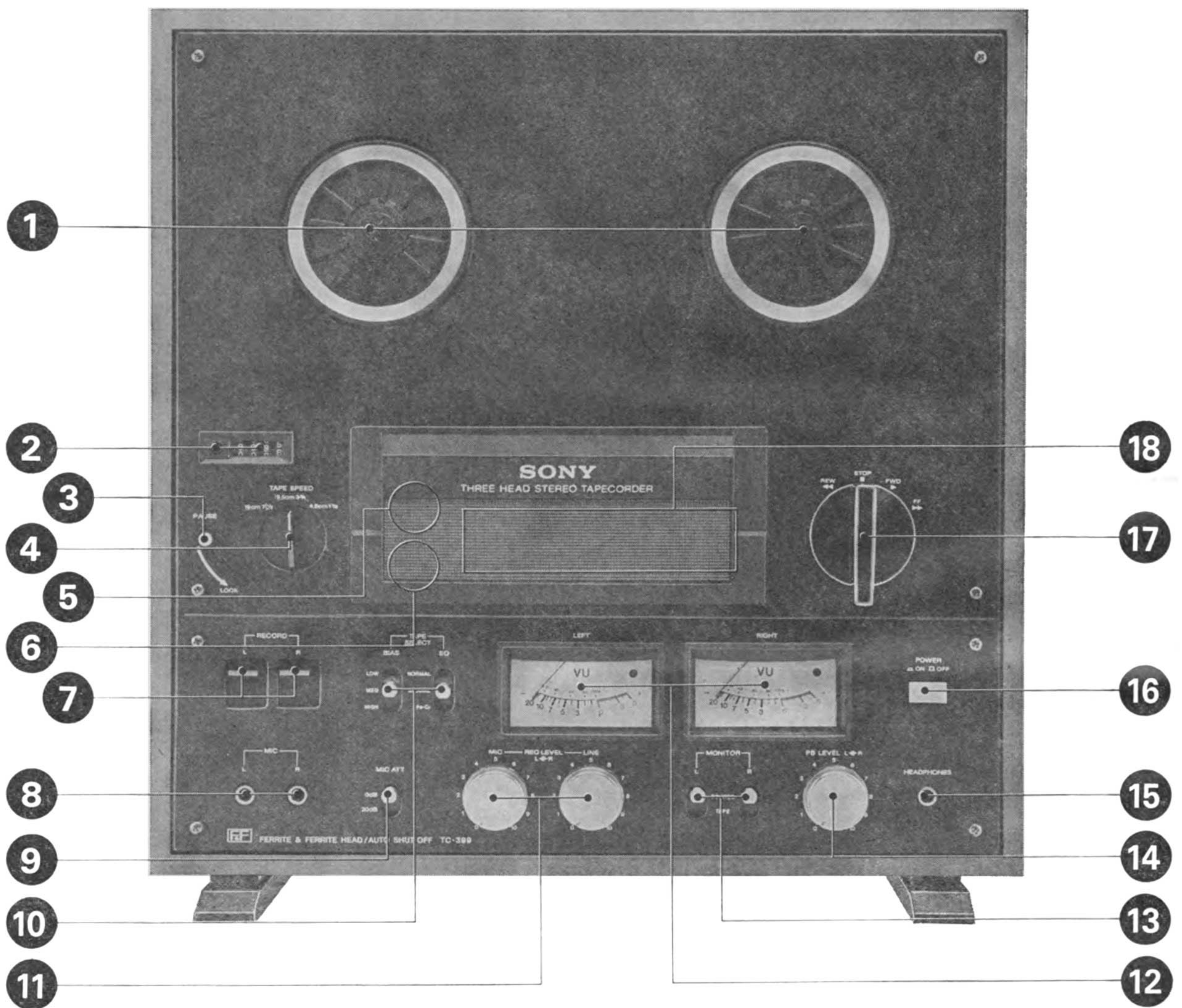
Frequency response



① By clean head

② By dirty head

FUNCTION OF CONTROLS



① Reel spindles with reel locks

② Tape counter and reset button

Use the counter for indexing tape contents. Once a reel is threaded, set the counter to [0000] by pushing the reset button. The figures on the counter change as the tape passes. Make a note of the figures and the recorded program for later reference.

③ PAUSE lever

To pause momentarily in playback or recording (to eliminate undesired portions), slide down the PAUSE lever.

Tape will stop (tape-and-head contact remains). To restart, move it up. This lever is also used for proper timing of the recording

● When the function selector is turned to ■ (STOP), the PAUSE lever will also be released.

④ TAPE SPEED selector

19 cm/s (7 1/2 ips) and 9.5 cm/s (3 3/4 ips) are ideal for recording music when best sound quality is desired. 4.8 cm/s (1 7/8 ips) is ideal for speech, especially when longer recording time is desired. Change the speed only in stop mode.

⑤ Tape tension regulator

The guide pin quickly responds to any subtle change of tape tension so that a smooth, even flow of tape past the head assembly is assured.

⑥ Automatic Shut-off lever

When the tape is threaded, the tape contacts the lever and holds it in operating position. If the tape runs out or breaks, the lever will fall forward and activate the shut-off mechanism which stops the tape transport and returns the function selector to ■ (STOP).

⑦ RECORD levers

While holding these levers down, set the function selector to ► (FWD) position to start recording.

⑧ MIC input jacks

Any high-quality low-impedance microphone equipped with a phone plug may be used. If your microphone is equipped with a mini plug, a plug adaptor for converting to phone plug is required.

⑨ MIC ATTenuation switch

Usually this switch should be at 0 dB. When recording an excessively high level sound source with a microphone, use the switch for easier level adjustment, to prevent overloading the mic amp of the recorder. 20 dB position attenuates the microphone input by 20 dB.

⑩ TAPE SELECT switches

BIAS: Select the optimum bias current for the tape to be used in recording mode.

EQ: Select the correct equalization characteristics for the tape to be used in recording mode.

These two switches have no effect on playback.

⑪ REC LEVEL controls

Adjust the record input levels of the LINE IN and MIC jacks: MIC controls for MIC and REC/PB jacks; LINE controls for LINE IN jacks. The outer knob is for L channel and the inner for R channel. Turn the unused controls fully to 0

⑫ VU meters

With MONITOR selectors set at SOURCE, the meters show the recording level adjusted by the REC LEVEL controls.

With the MONITOR selectors set at TAPE, the meters show the output level adjusted by the PB LEVEL controls. 0 VU reading corresponds to 0.435 V.

⑬ MONITOR selectors

For playback of tapes, set the selectors to TAPE. While recording, the TAPE position monitors the recorded sounds and SOURCE position monitors the sounds to be recorded (source material). Record level adjustment can be made with these selectors at SOURCE.

⑭ PB LEVEL control

These controls adjust the playback signal level of LINE OUT and HEADPHONES jacks. Generally, set the controls at center-detented position. For further information, refer to page 9.

⑮ HEADPHONES jack

Insert low-impedance headphones to monitor the input and recorded signals.

⑯ POWER switch

This turns the power on or off. The VU meters will light up when the unit is turned on.

⑰ Function selector

This selector is locked at ◀◀, ▶ or ▶▶ only when the tape is threaded.

◀◀ (REW) . . . to rewind the tape

■ (STOP) . . . to stop the tape

▶ (FWD) . . . to start the tape in either record or playback mode

▶▶ (FF) . . . for fast forward tape motion

⑱ Head portion

Always keep this section clean for optimum performance. Refer to page 12.

CONNECTIONS

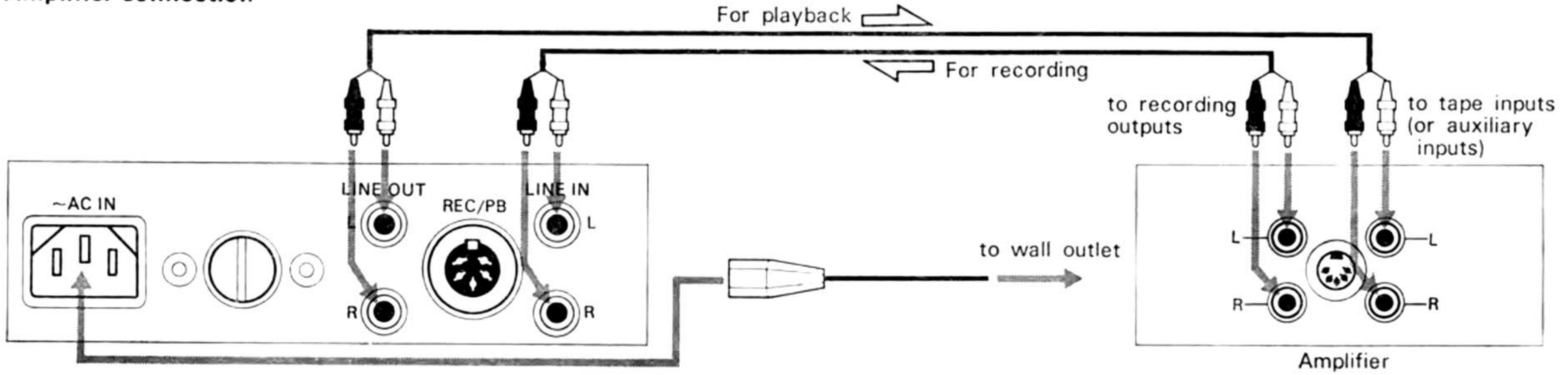
- Turn off the amplifier before making connections.
- Insert the cable connectors completely into jacks. Loose connections may cause hum and noise.
- The red plug of the supplied connecting cord should be connected to the red jack (right channel) and the gray plug to the white jack (left channel).
- Connect the tape deck to an AC outlet with the power cord: First plug the cord into the tape deck AC IN socket, then into a wall outlet.

REC/PB (DIN) connector

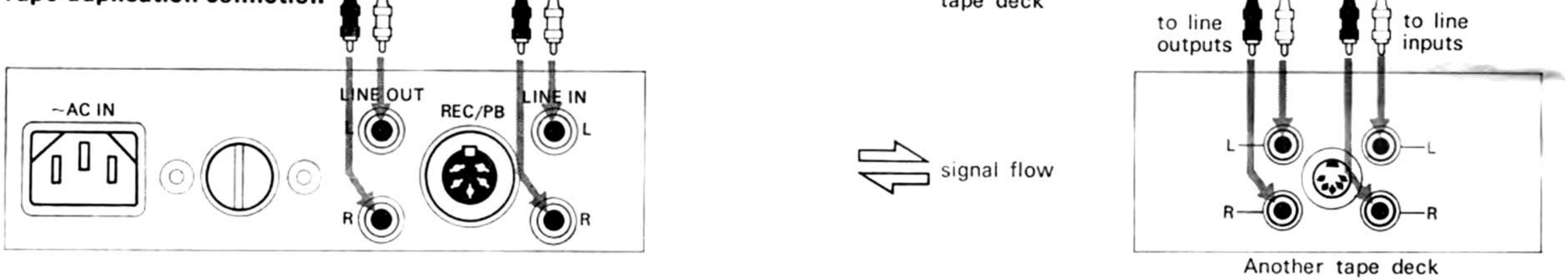
There are two possibilities of the amplifier connection, by supplied phono (RCA) connecting cords and a single 5-pin DIN connecting cable. Note the following points.

- The phono cord connections are recommended, since it will result in better signal-to-noise ratio.
- Connection between amplifier DIN connector and phono jacks of the tape deck is not recommended, since their input and output sensitivity and impedance are not correctly matched.
- To directly connect both tape deck DIN connectors, a DIN cable for tape duplication is required.

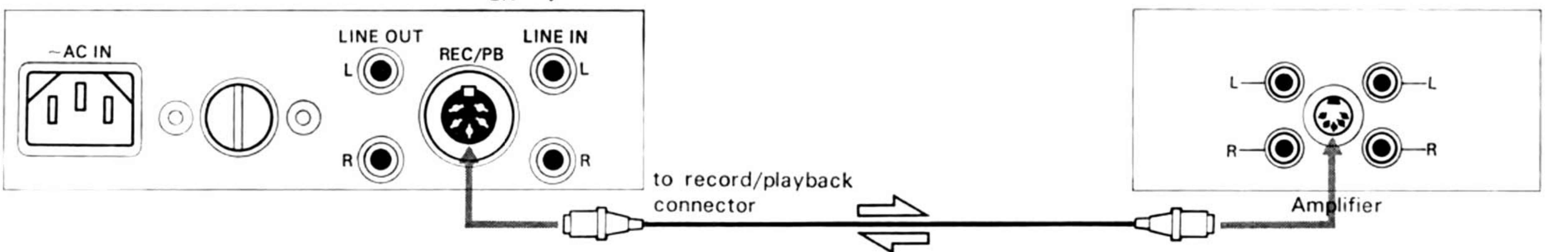
Amplifier connection



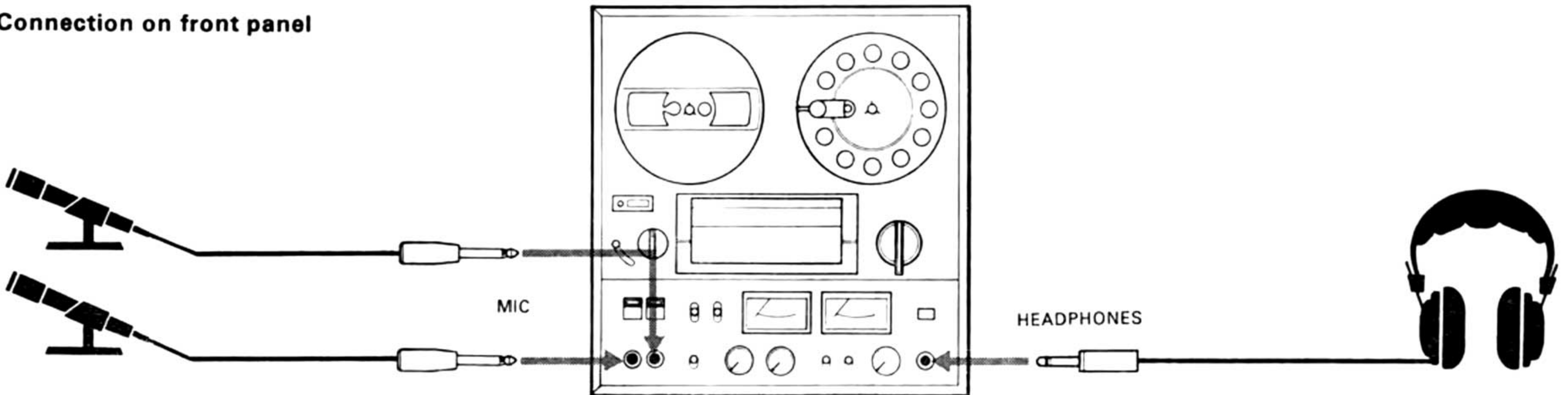
Tape duplication connection



Single DIN cable connection for recording/playback



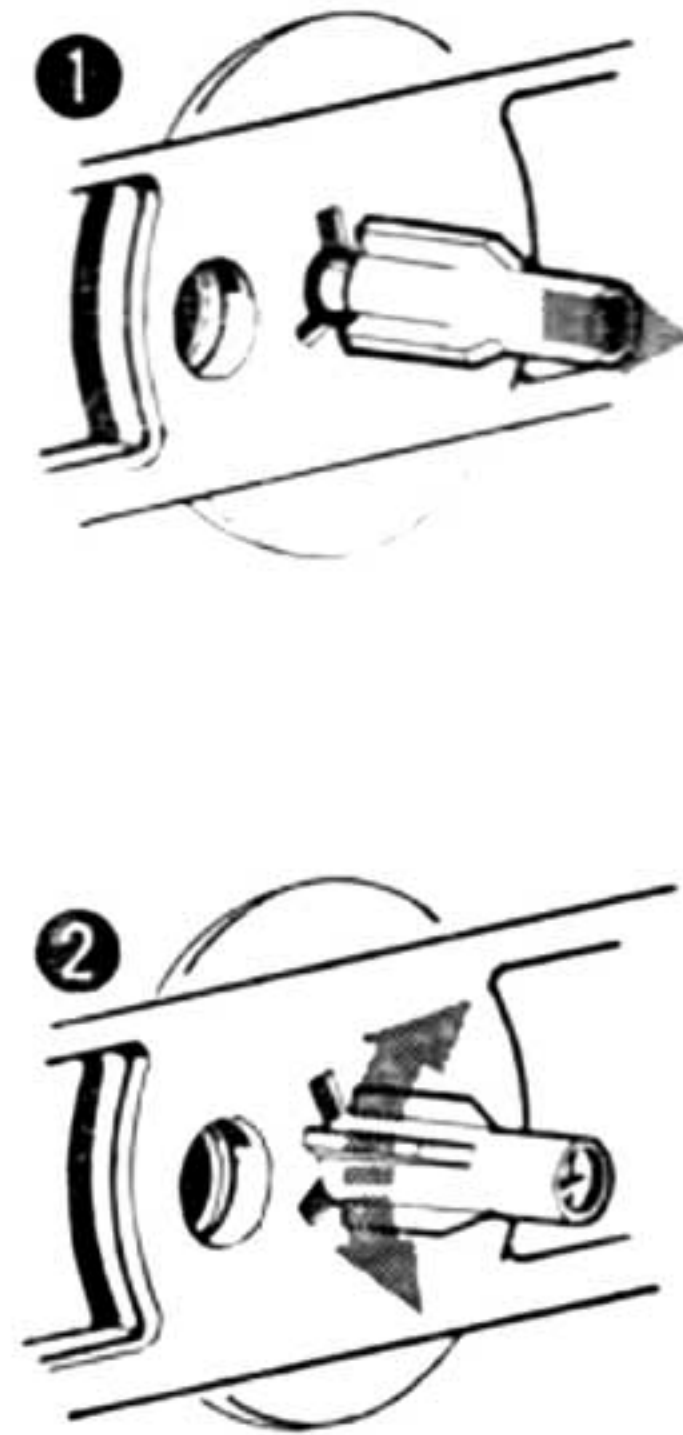
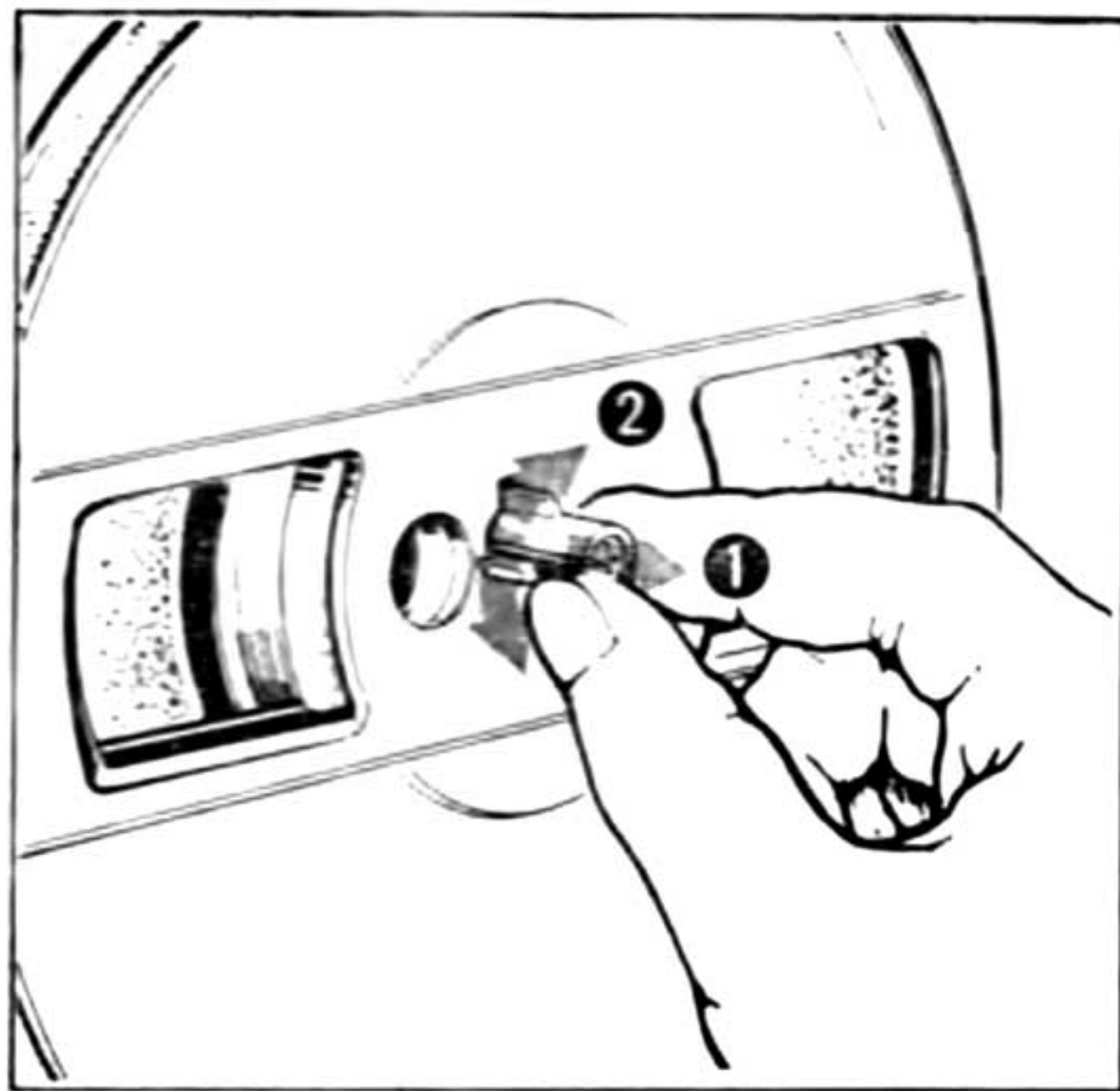
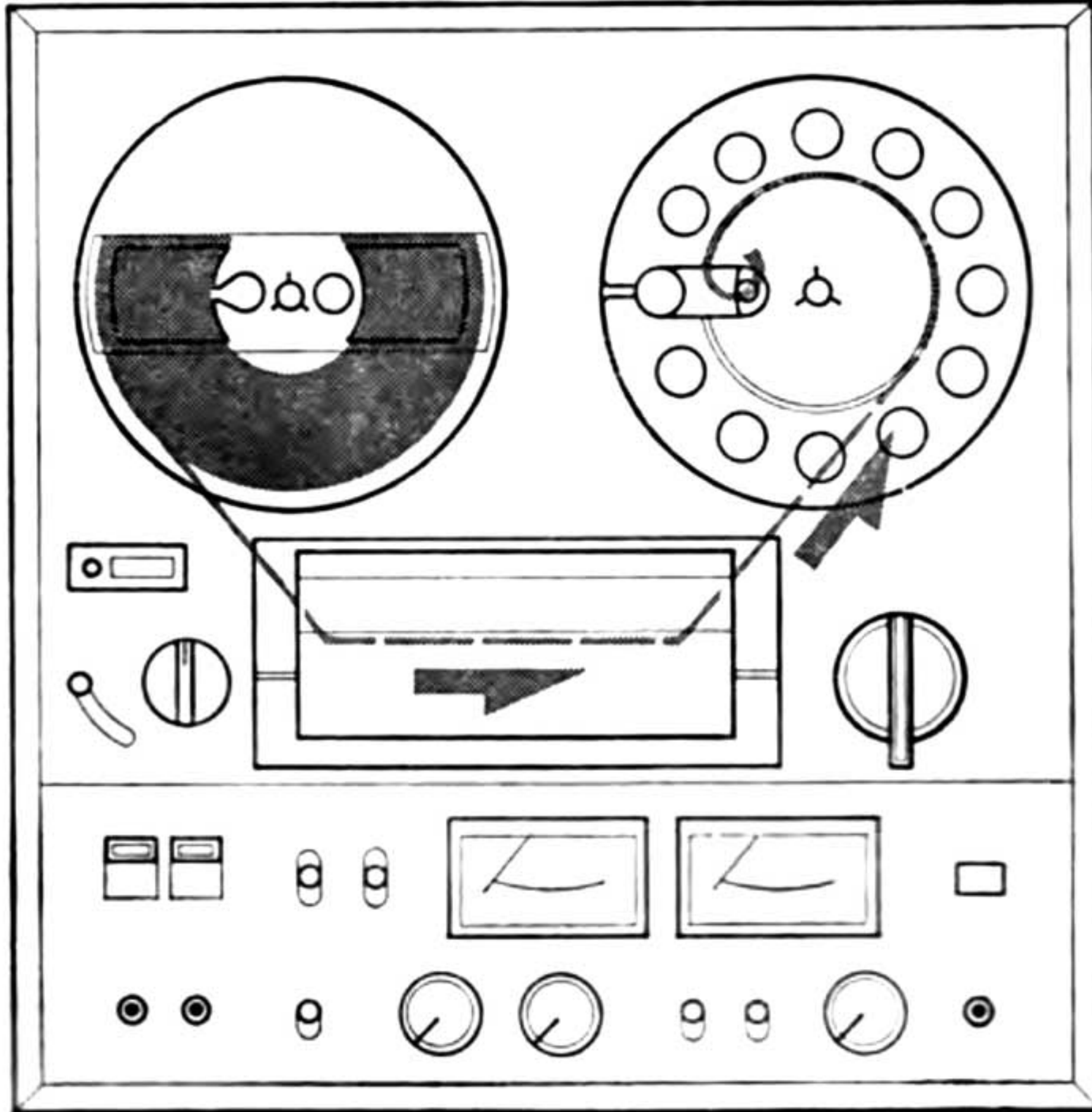
Connection on front panel



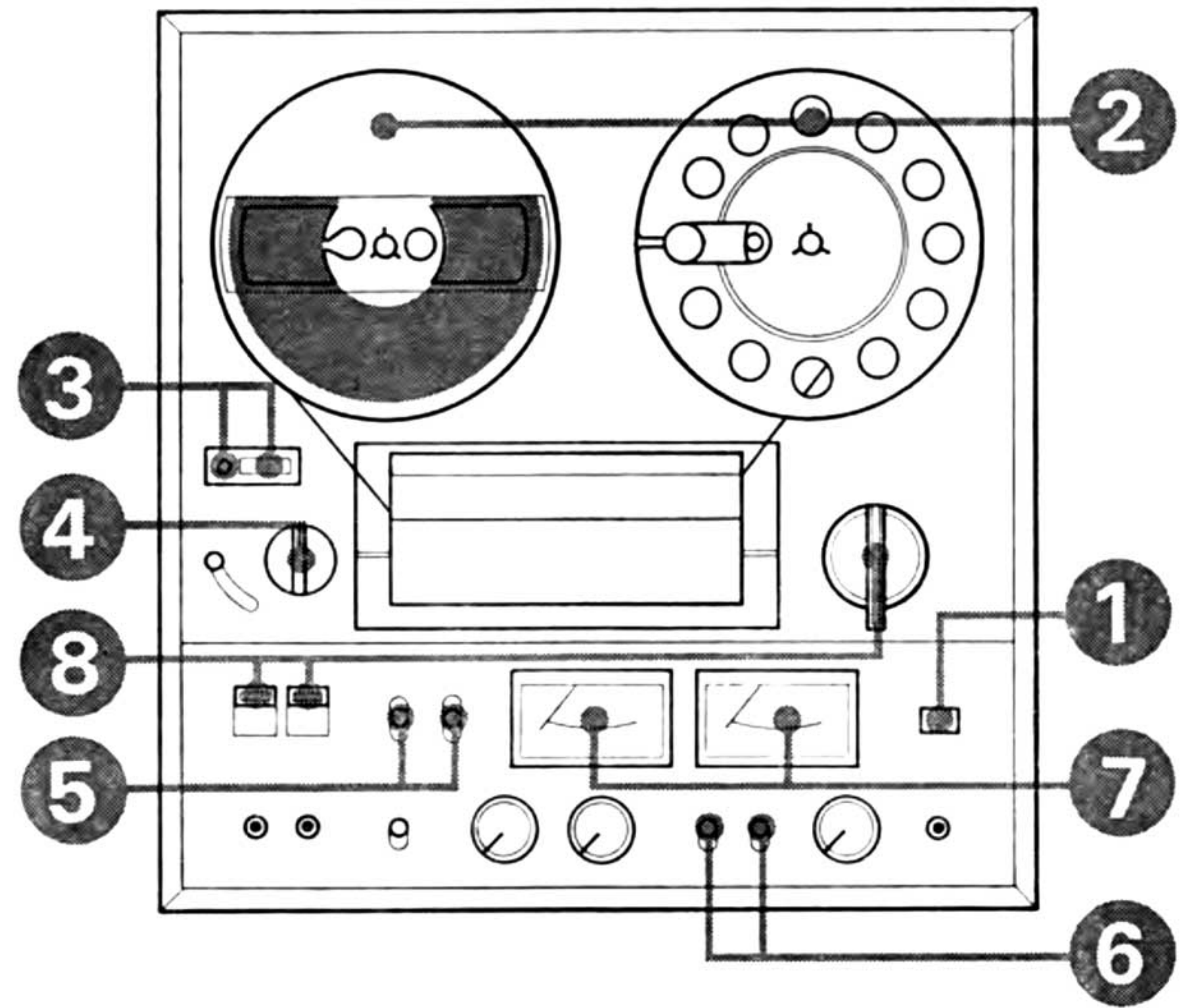
TAPE THREADING

Use the same kind of reels (size and hub diameter) for both supply and take-up.

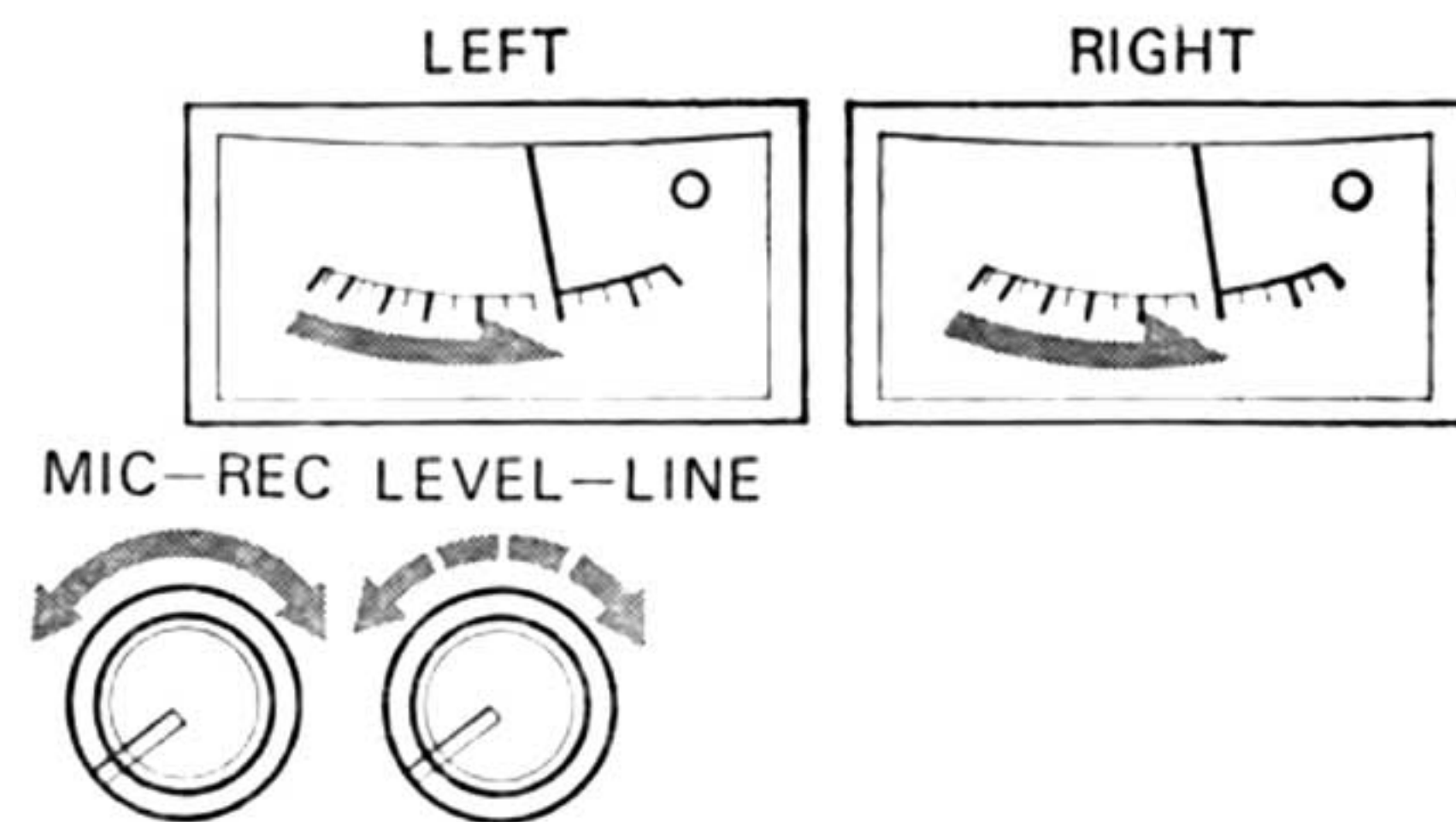
- 1 Secure the reels.
- 2 Pass the tape.
- 3 Wrap the tape around the hub of the right reel or insert the end of the tape into the reel slot.
- 4 Rotate the reels a few times by hand until the slack in the tape is eliminated.



STEREO RECORDING



- 1 Turn on the recorder and the source equipment.
- 2 Thread a tape. Ensure that both take-up and supply reels are placed with side "1" up.
- 3 Set the counter to "0000".
- 4 Set the TAPE SPEED selector as desired.
- 5 Set the BIAS and EQ switches according to the tape used.
- 6 Set the MONITOR selectors to SOURCE.
- 7 Temporarily reproduce the program to be recorded, and adjust the record level with respective MIC or LINE REC LEVEL controls while watching the VU meters. Be sure to turn the unused level control fully to 0. For microphone recording, use the MIC ATT switch if necessary.



- 8 While holding the RECORD levers down, set the function selector at ►. Now recording on tracks 1 and 3 starts.
 - When recording completes, return the function selector to ■. To record on side 2 (tracks 4 and 2), do not rewind the tape, but reverse reel positions.

Tape BIAS/EQ recommendations

The following list shows our recommended settings, which have been determined through critical listening tests and electrical characteristic measurements on commercially available tapes. The setting could be changed to your preference. For Sony tapes, be sure to use the recommended settings to obtain the optimum tape characteristics.

	NORMAL	SPECIAL	Fe-Cr
LOW	SONY PR	BASF LH, LHS AGFA PE, PEM MEMOREX	SCOTCH #211, #212, #213 AMPEX 406, 407
MED	SCOTCH #218	SONY SLH SCOTCH CLASSIC TDK AUDUA	SONY Ferri-Chrome SCOTCH #206, #207 MAXELL UD
HIGH			SCOTCH #250

Record monitoring

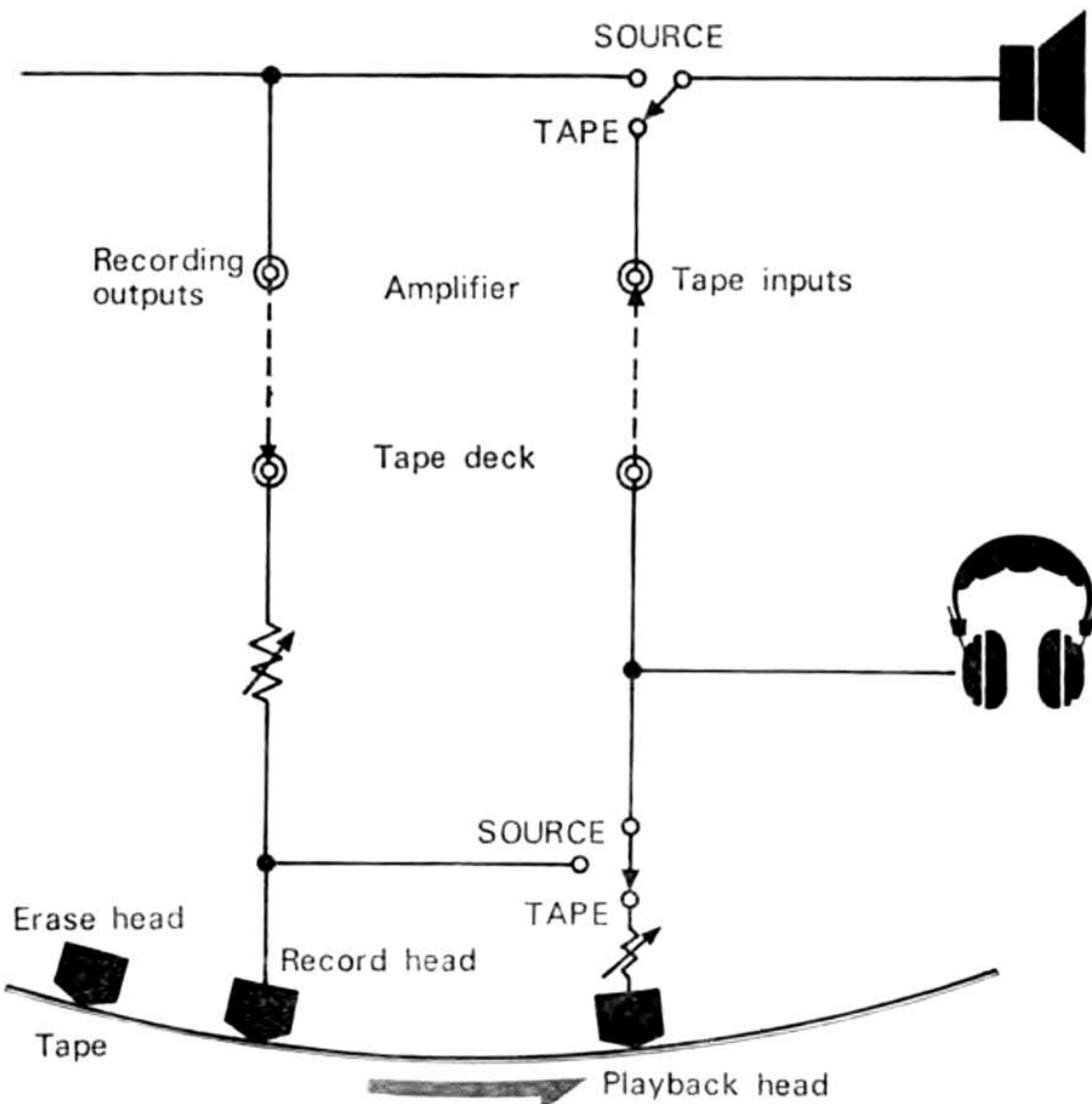
As this tape deck has separate record and playback heads, instantaneous tape-source comparison is possible with the MONITOR selectors.

SOURCE : Source sound is heard.

TAPE : Recorded sound is heard.

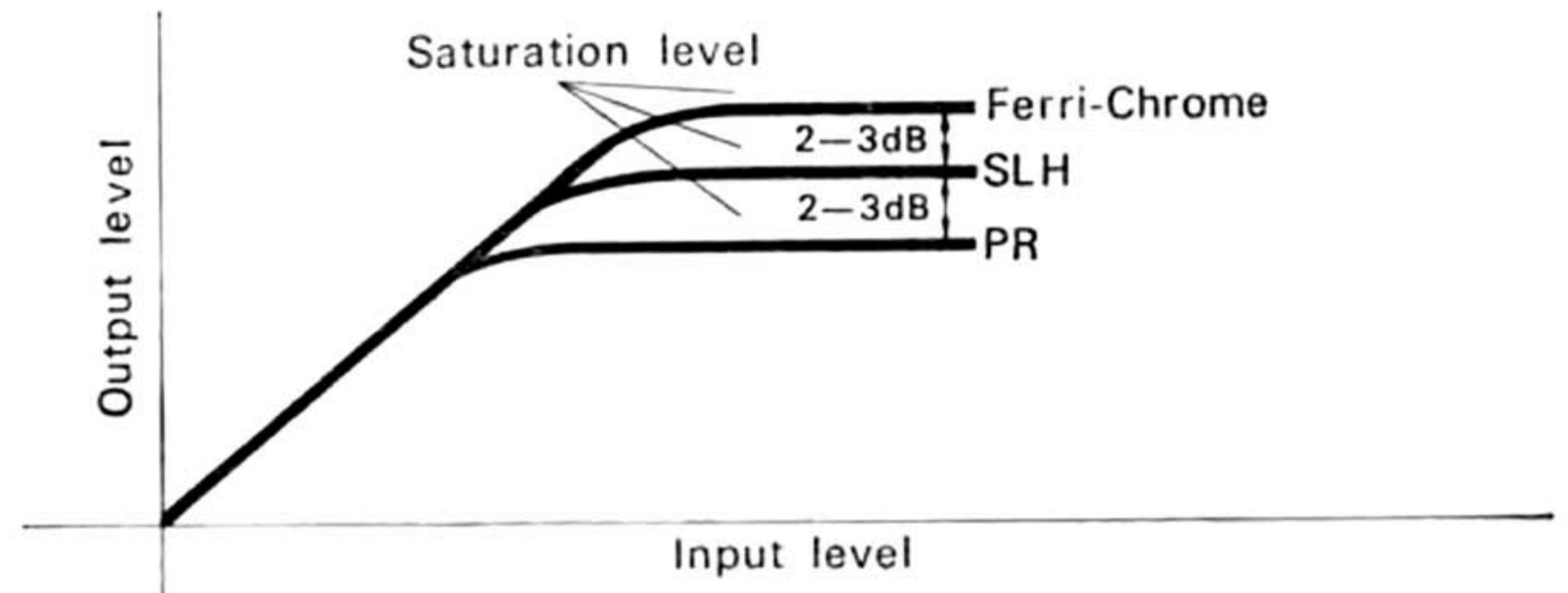
● If the amplifier has a tape-monitor selector and if connection is made through tape deck LINE IN and LINE OUT jacks, source/tape comparison is possible with the amplifier monitor selector. In this case, the tape deck MONITOR selectors should be set at TAPE.

● While recording with a microphone, headphone monitoring is advisable because speaker monitoring may cause a howling effect.



Recording level adjustment

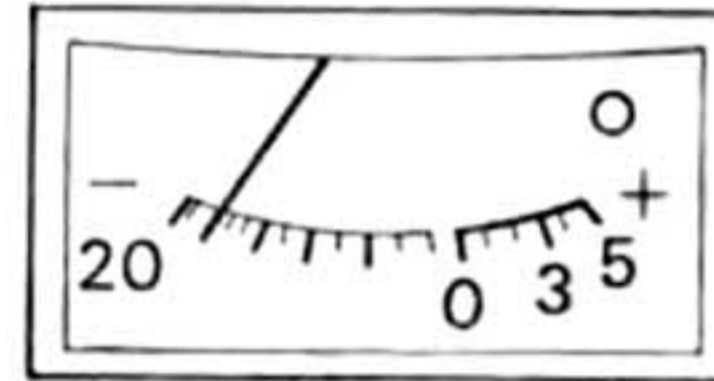
Tape saturation levels differ between the types of tape. Recording level should be adjusted according to the tape to be used in order to utilize it to the utmost permissible level. This is the knack not only for deriving the possible characteristics from the tape but also assuring good recording result.



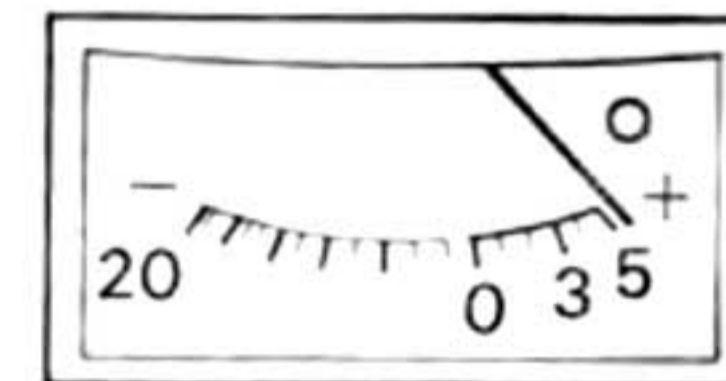
High recording level is recommended to reduce annoying tape noise, but overloaded and distorted tape could result if the level is too high.

When using a Sony SLH tape, for example :

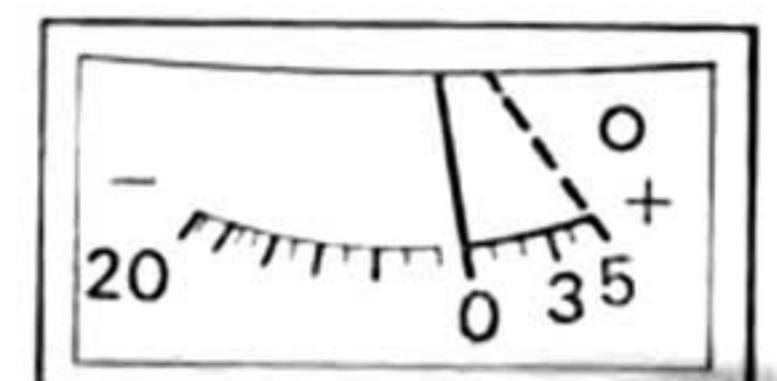
Adjust the recording level so that the needles of the VU meters swing around the 0 VU reading and sometimes swing within red zone. Continuous deflection within red zone will lead to distortion.



Too low level
(S/N ratio will be poor.)



Too high level
(Sound will be distorted.)



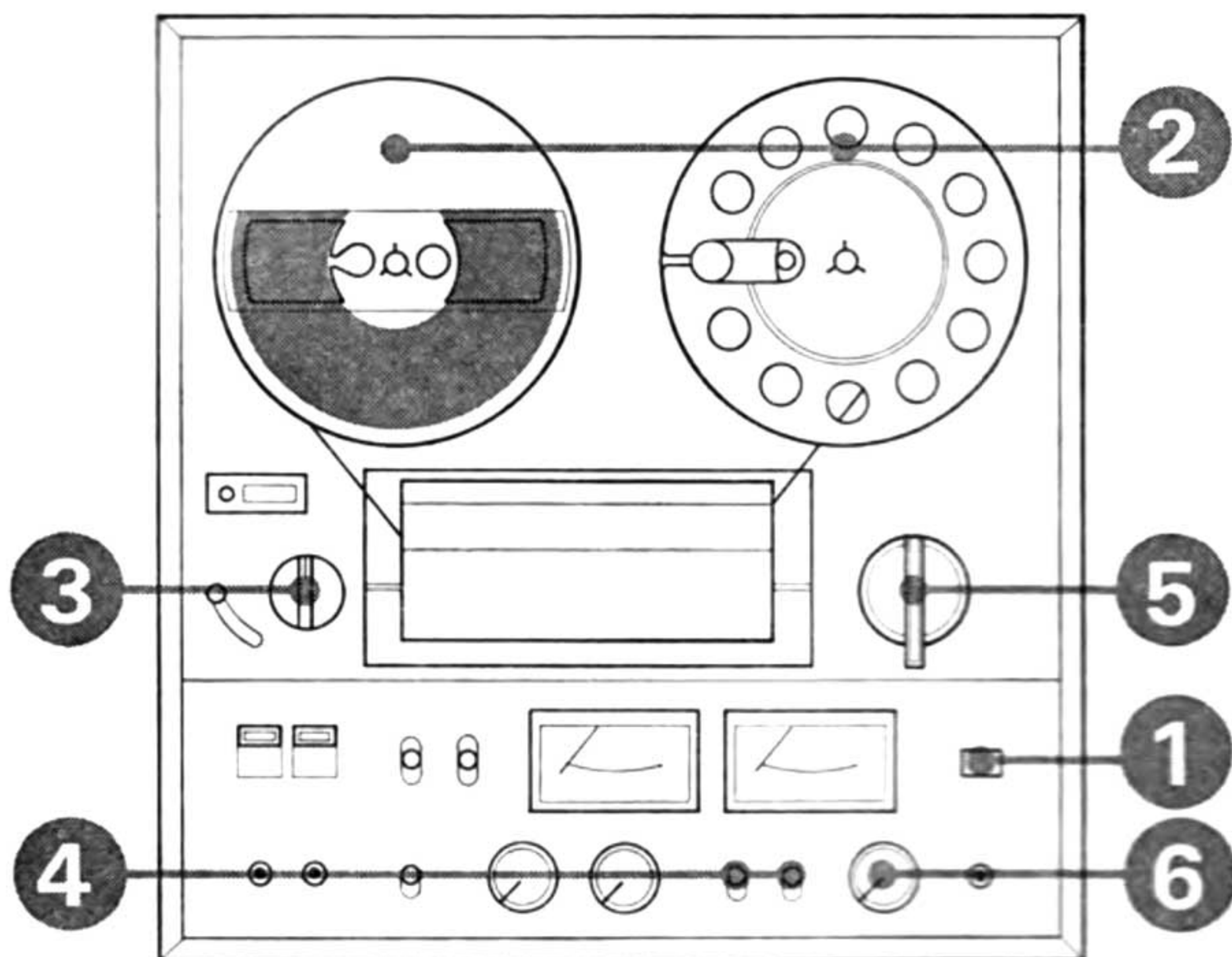
Proper level

Recording of FM broadcasts or discs is relatively simple because broadcast stations and disc companies use standardized limiters to reduce the dynamic range of the original sound source.

More care has to be taken in case of live recordings. The dynamic range is undiminished by any limiter, and a small movement may change the distance between sound source and microphone, thus changing the signal level even when repeating an identical passage. Above all consideration has to be given to the fact that tape saturation and distortion at higher frequencies occur at lower levels, which may be especially troublesome in case of piano recordings, etc. To make things even more complicated, microphone amplifiers may overload. Using the MIC ATT switch is an effective method. In any way, having acquired a little bit of experience, you will be quite successful.

Do not change the recording level once the recording starts, as this will easily be audible during playback, especially when the stereo balance is changed. If adjustment becomes necessary, it is advisable to wait until a break or a pause between movements occurs or a soloist has finished his turn.

STEREO PLAYBACK



- 1 Turn on the recoder.
- 2 Thread a prerecorded tape.
- 3 Set the TAPE SPEED selector to match the prerecorded tape
- 4 Set the MONITOR selectors to TAPE.
- 5 Turn the function selector to ►. Playback will begin.
- 6 Use the PB LEVEL controls, if necessary.

PB LEVEL controls

These controls adjust the playback signal level at the LINE OUT and HEADPHONES jacks. The adjusted level is indicated on the VU meters, with a 0 VU reading corresponding to 0.435 V output, which appears when the control is halfway up (with the indicator at "5"). Full clockwise rotation of the PB LEVEL control beyond midpoint will provide a 5 dB boost, and full counterclockwise rotation will bring the volume down to zero. Generally, set these controls at center position. The usages are as follows:

During record monitoring, the setting of these controls at center position provides nearly equal levels on both SOURCE and TAPE positions of the MONITOR selectors.

During playback, adjust the tape deck to match other sources. If the tape deck playback level differs from that of other sources connected to the amplifier, such as a tuner, record player etc., the sound may become suddenly louder or softer when the amplifier input selector is switched back and forth between tape and some other source.

During duplication on another tape deck, adjust these controls so that the sound is not distorted.

ERASING

When the tape deck functions in record mode, the erase head operates and any previous material is erased automatically. To erase the recorded contents without recording:

- Turn the REC LEVEL controls (both MIC and LINE) full counterclockwise to "0".
 - Set the BIAS switch at the position appointed in page 8 or at the HIGH position.
- And start the tape deck in record mode.
- For quick erasure, use a commercially available eraser.

MONO RECORDING AND PLAYBACK

Proceed in the following order.

At the end of each track, do not rewind the tape but reverse reel positions.

● In mono playback, set the amplifier mode selector to MONO and reduce the unused left or right channel volume control.

Track sequence	Reel side	Operating track	For recording		
			RECORD lever	MIC or LINE level controls	Input connection
Track ①	①				Left input
Track ④	②				Left input
Track ③	①				Right input
Track ②	②				Right input

SPECIAL RECORDING

Mic-and-Line Mixing

Connect microphones to MIC jacks and line source to LINE IN jacks (with REC/PB jack mic mixing cannot be done). While listening through headphones, adjust the mixing level by turning the respective REC LEVEL controls. The VU meters indicate the composite record level of line and microphone inputs. Fade-in/fade-out techniques will provide more creative and professional recordings.

Sound-on-Sound Recording

The TC-399 can make a composite recording from the left channel to the right channel and vice versa. This enables you to record a duet with your favorite singer or create other special effects. Sound-on-Sound recording on the right channel [L→R]

① Record the basic program on the track 1 of the left channel according to "MONO RECORDING AND PLAYBACK", and rewind the tape to the beginning.

② Connect the L LINE OUT jack and R LINE IN jack by using the supplied connecting cord.

Be sure to use the plugs of the same color at both ends of the connecting cord.

③ Connect a microphone into the R MIC jack.

④ Connect stereo headphones for monitoring.

⑤ Set the L MONITOR selector to TAPE and the R MONITOR selector to SOURCE. Set the L PB LEVEL control to a higher setting.

⑥ Adjust the record level: Temporarily play back the tape and adjust the R LINE and R MIC REC LEVEL controls while watching the right VU meter.

⑦ Rewind the tape to the beginning.

⑧ While depressing the R RECORD lever, set the function selector at ►. Recording will begin.

Through the left headphone, the playback of the basic recording on the track 1 is heard; through the right headphone, the composite recording on the track 3 is heard.

⑨ When recording is finished, rewind the tape to the beginning. To play back track 3, set the R MONITOR selector to TAPE and L MONITOR selector to SOURCE.

For recording on the left channel [R→L], use the R LINE OUT jack and L LINE IN jack. Other recording procedures are the same as described above except for the channel used.

Echo Recording (more resonant microphone recording)

Stereo echo recording

① Insert two microphones into the MIC jacks.

② Turn the L LINE, R LINE, L MIC and R MIC REC LEVEL controls fully counterclockwise.

③ Connect the LINE IN jacks and LINE OUT jacks by using the supplied connecting cord.

④ Insert stereo headphones into the HEADPHONES jack.

⑤ Set the MONITOR selectors to TAPE.

⑥ While depressing the RECORD levers, set the function selector at ► and start recording.

⑦ While listening through the headphones, adjust the L and R MIC controls. Then slowly turn the the L and R LINE controls clockwise for desired echo through the microphone input source. Be careful not to excessively increase the record volume. Otherwise oscillation may occur as a rumbling sound.

⑧ Rewind the tape to the beginning.

⑨ Now, echo recording preparation is complete. Start a formal recording. In this case, disconnect the stereo headphones, since headphone monitoring may disturb your tempo because of the time-lag between original sound and headphone sound.

Now, echo recording preparation is complete. Start a formal recording. In this case, disconnect the stereo headphones, since headphone monitoring may disturb your tempo because of the time-lag between original sound and headphone sound.

Monophonic echo recording

Recording procedure is almost the same as described above except for the use of one microphone.

EDITING

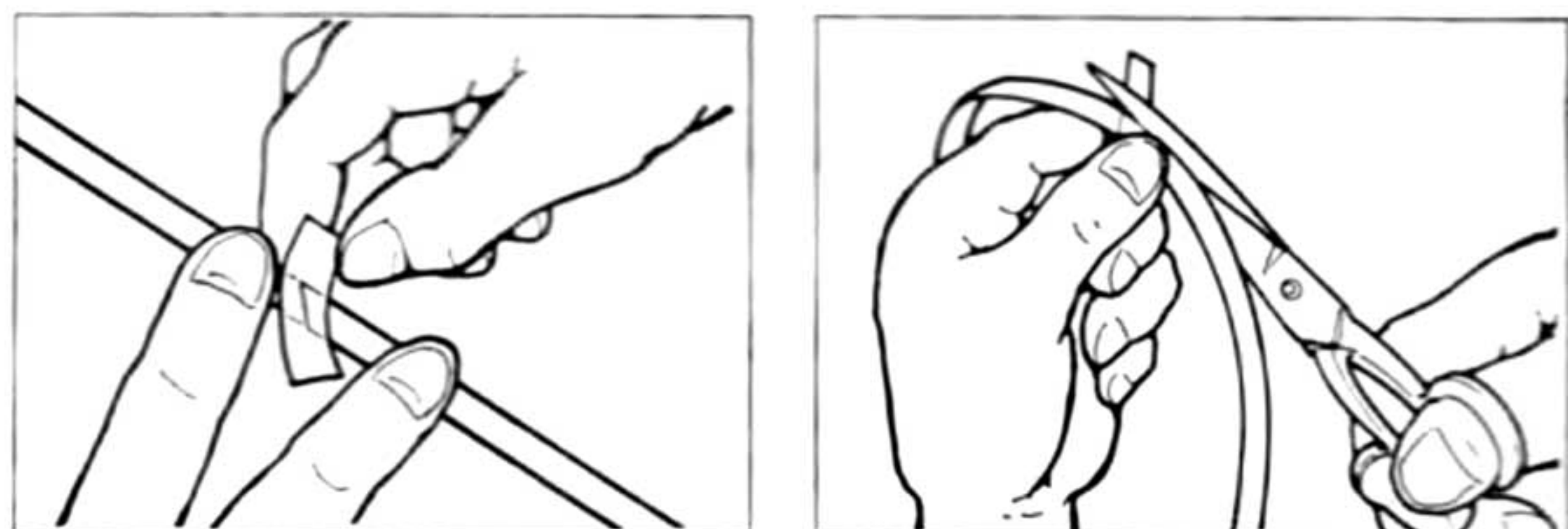
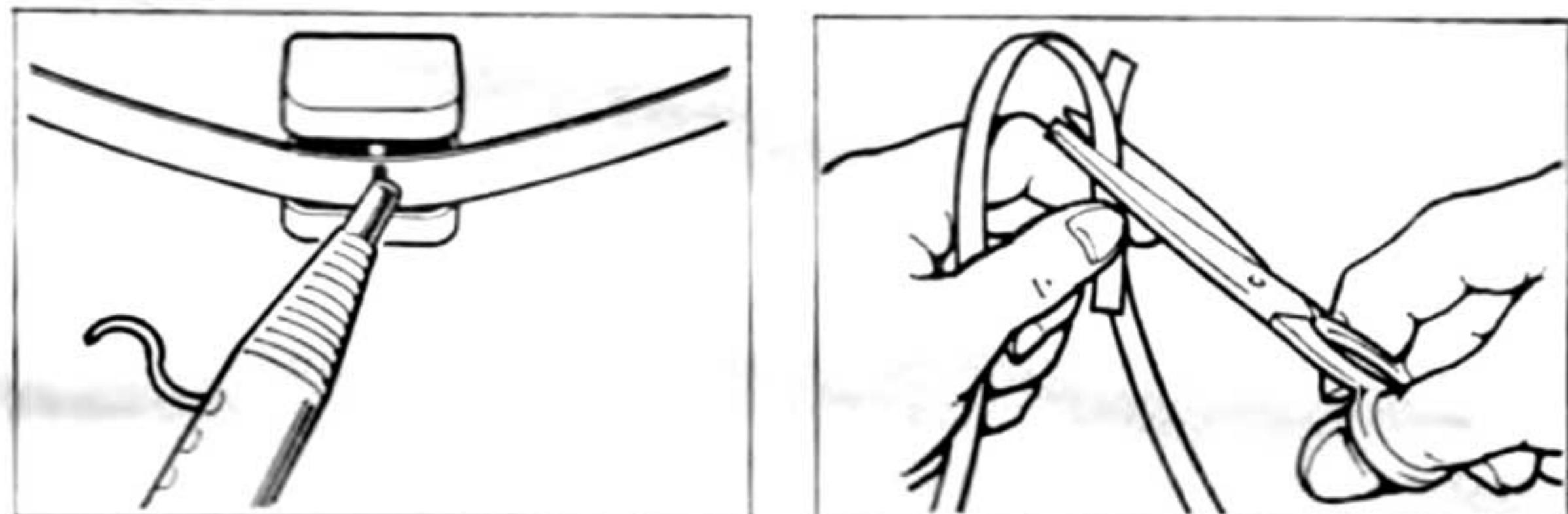
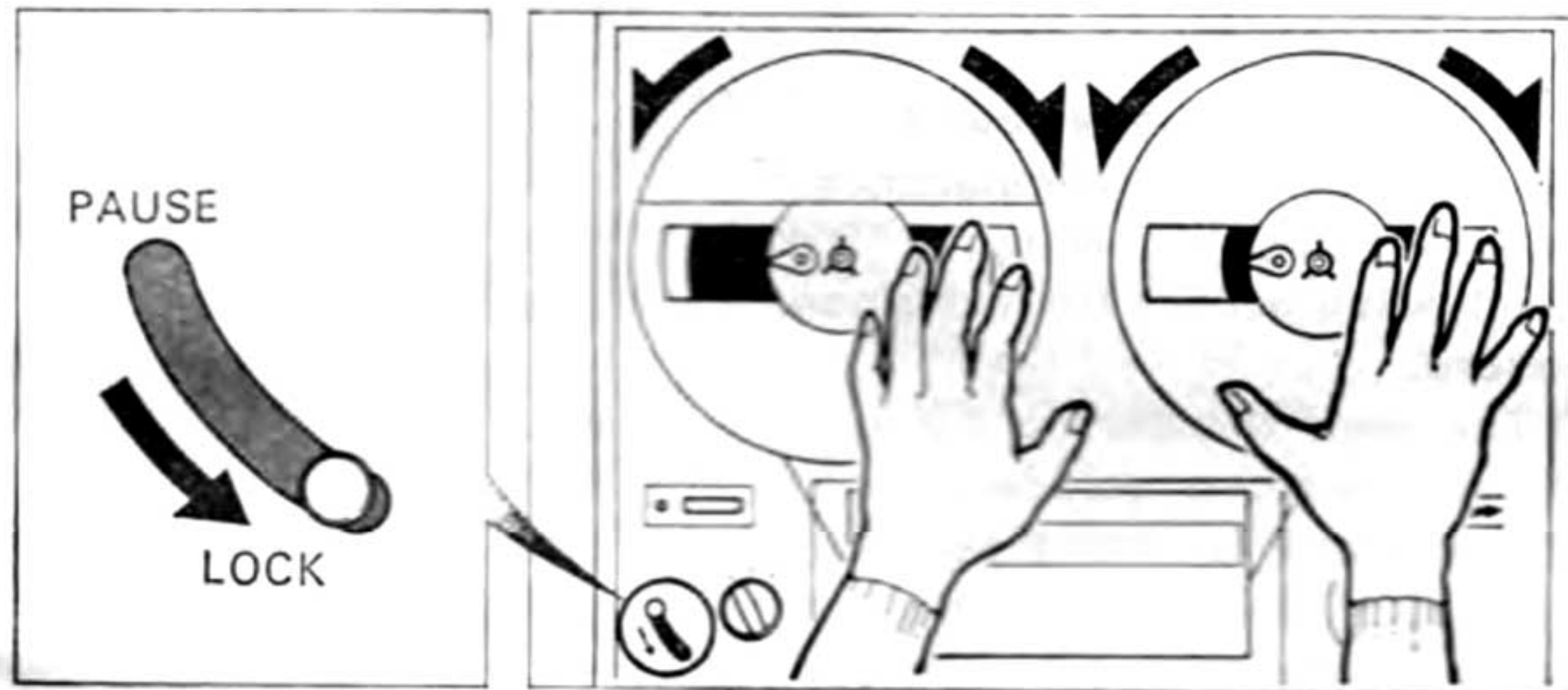
There are two ways of tape editing: editing by tape duplication and by splicing. Before editing, play the original tape thoroughly, and notes the tape counter number where the unwanted sounds (narration or commercials, pop noise, etc.) are located. Then go back and proceed with editing in either way.

Editing by Duplication

For connection, see page 6.

If one recorder is inferior to the other in quality, use the better one as a master recorder for the playback process, to obtain better S/N.

Editing by Splicing



Cueing

① Stop the tape with the PAUSE lever in playback mode at the portion to be spliced.

② Move the tape across the playback head back and forth by turning both reels by hand.

③ While listening to cue sound, find the correct portion to be spliced, and carefully mark it at the position of the playback head on the outer side of the tape with soft colored pencil. Yellow will be most distinctive.

Note

Take care not to get excessive marking material on the heads. Any stain on the heads will cause contamination and impair tape-and-head contact.

Splicing

Use splicing tape and a demagnetized pair of scissors.

① Neatly overlap the tapes to be spliced and cut diagonally.

② Place the two diagonal tape ends together, outer side up, on a flat surface. Be careful to make ends meet but not overlap.

③ Apply a piece of splicing tape diagonally over the aligned ends, and press it firmly.

④ Trim off the excessive splicing tape, slightly cutting into the tape.

Note

Do not use ordinary cellophane tape as it tends to spoil recording tapes. Also avoid using magnetized scissors or razor blades. Magnetized instruments will cause a "click" or "pop" at the spliced portion.

Take care not to unnecessarily touch the tape. Even invisible traces of grease and sweat from your fingers will hinder a good sticking.

MAINTENANCE

Cleaning Heads and Tape Path

Generally cleaning heads after every 10 hours operation will be sufficient. However, all surfaces over which tape travels should be cleaned before making high quality recordings.

Dirty heads and tape path will cause :

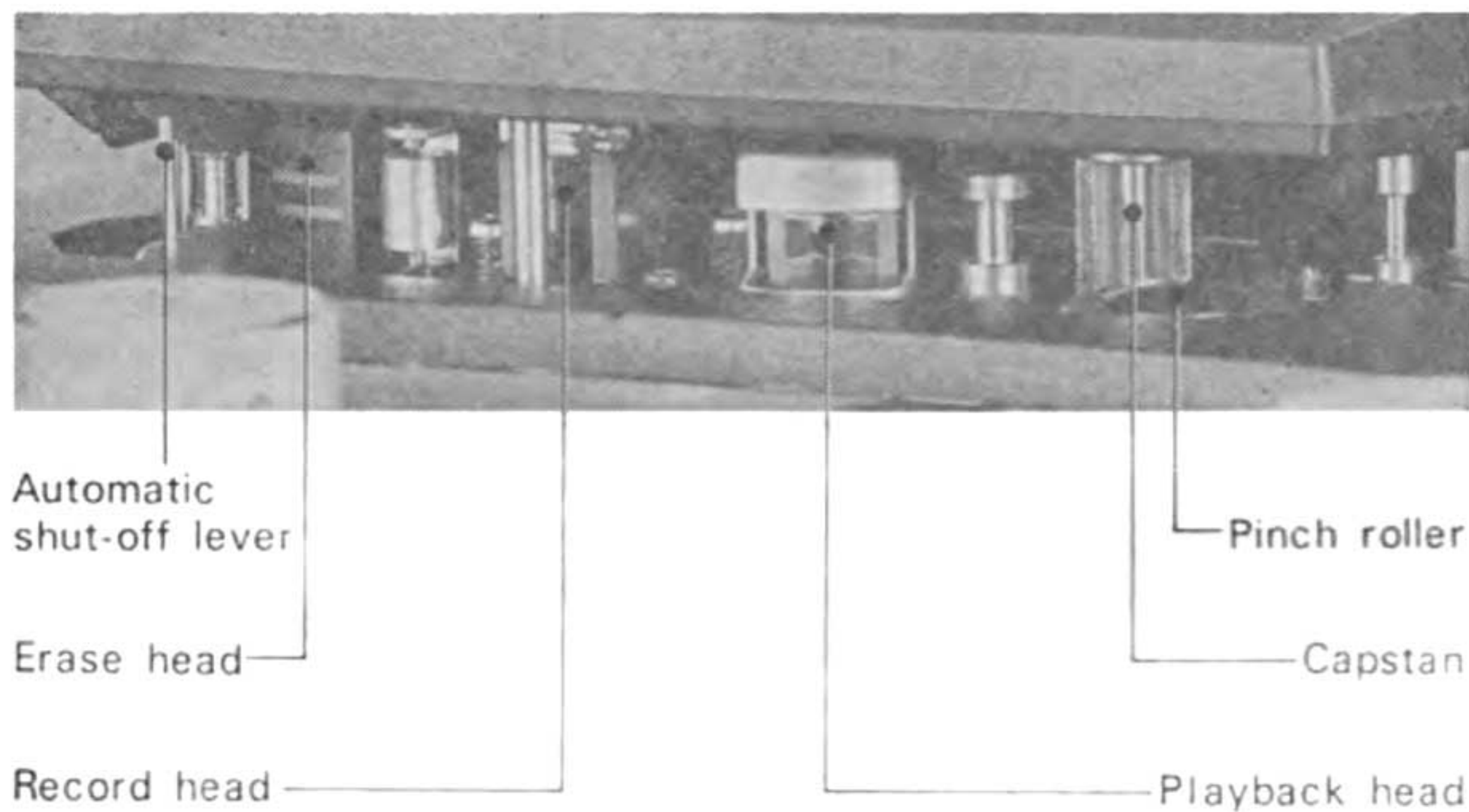
- Loss of high frequency response which results in poor sound quality
- Loss of sound volume in recording and playback
- Dropout
- Unsatisfactory results in tape erasing
- Increase of wow and flutter

Take the head cleaning aid (tips or ribbon supplied) and wipe the heads and tape path. If the deposits are difficult to remove, moisten the cleaning aid with denatured alcohol or head cleaning solution.

● For easier cleaning of the pinch roller, push in the automatic shut-off lever and set the function selector to ►. For the capstan, set the function selector to ►►.

● Be careful not to scratch the head surface.

● Be careful not to jam the cleaning aid between pinch roller and capstan.



Demagnetizing Heads

Residual magnetism will gradually build up on the heads through continuous use and cause an increase of tape noise while recording, and erasure of high frequencies or hiss build-up on your pre-recorded tape. The heads and metallic parts of the tape path should be demagnetized after 20-30 hours of operation with a commercially available head demagnetizer.

Before proceeding, be sure to turn off the recorder.

Cleaning Cabinet

Periodically clean the cabinet, panel and knobs with a soft cloth. If finger prints, food and beverage stains, etc. are difficult to remove, use a cloth barely moistened with a mild soap solution. Do not use any type of scouring powder, abrasive pad, or solvent.

Inside Check

Consult your nearest Sony dealer to maintain optimum performance.

TROUBLE CHECKS

The following chart will help correct any trouble which could occur with the recorder. If the trouble persists after you have made these checks, consult your Sony dealer.

The function selector does not move.

- Thread the tape without slack.

No sound during playback

- Set the MONITOR selectors at TAPE.
- Check amplifier input setting.
- Check amplifier volume control.

Unclear or distorted record or excessive wow and flutter

- Clean heads and tape path.
- Check if the reels are warped.

Severe hum or noise

- Use shielded connecting cables.
- Ensure that cables are not near transformers, generators or ac power cord.

Too low microphone sound

- Check microphone impedance.
- Set the MIC ATT switch at "0 dB".

Oscillation occurs from the connected speaker when trying to record.

- The input selector on the amplifier should be set according to the source being recorded.

If the amplifier input selector is set at AUX when recorder LINE OUT jacks and the amplifier AUX input jacks are connected, oscillation may occur.

- Keep the microphone away from the speaker or reduce the volume of the amplifier.

SPECIFICATIONS

Power requirements	110, 120, 220 or 240 V ac, 50 or 60 Hz 120 V ac, 50 or 60 Hz (Non-European PX model)
Power consumption	35 watts
Simiconductors	33 transistors, 7 diodes, 1 FET
Tape speeds	19 cm/s (7 1/2 ips), 9.5 cm/s (3 3/4 ips), 4.8 cm/s (1 7/8 ips)
Recording time	With 550 m tape, 18 cm reel Stereo recording 90 min. at 19 cm/s Mono recording 360 min. at 9.5 cm/s
Fast winding time	Approx. 120 sec. with 370 m tape
Reel	18 cm or smaller
Track system	4-track 2-channel stereo
Heads	1 record head, 1 playback head, 1 erase head
Bias frequency	160 kHz
Equalization	JIS standard 19 cm/s: 3,180 μ s +50 μ s 9.5 cm/s: 3,180 μ s +90 μ s
Signal-to-noise ratio	With Sony Ferri-Chrome Tape 58 dB (DIN, 1975 rev.) 61 dB at peak level (NAB)
Total harmonic distortion	0.8%
Frequency response	With Sony Ferri-Chrome tape or SLH tape 30-25,000 Hz \pm 3 dB at 19 cm/s 30-18,000 Hz \pm 3 dB at 9.5 cm/s With regular tape 30-18,000 Hz \pm 3 dB at 19 cm/s 30-15,000 Hz \pm 3 dB at 9.5 cm/s
Wow and flutter	0.06% at 19 cm/s (NAB) \pm 0.09% at 19 cm/s (DIN) 0.09% at 9.5 cm/s (NAB) \pm 0.12% at 9.5 cm/s (DIN)
Inputs	Microphone inputs (phone jack) 2 sensitivity 0.25 mV (-70 dB) for low impedance microphone Line inputs (phono jack) 2 sensitivity 77.5 mV (-20 dB) input impedance 100 k ohms
Outputs	Line outputs (phono jack) 2 output level 0.435 V (-5 dB) at load impedance of 100 k ohms, with PB LEVEL controls set to center-detent position ; 0.775 V (0 dB) with the PB LEVEL controls set to "10" Suitable load impedance more than 10 k ohms Headphone output 1 output level 38.8 mV (-26 dB) at load impedance 8 ohms with PB LEVEL controls set to center- detent position
Record/playback (DIN) connector	Input impedance less than 10 k ohms Output impedance less than 10 k ohms
Dimensions	Approx. 415 x 435 x 190 mm (w/h/d) (16 3/8 x 17 1/4 x 7 1/2 inches) Including projecting parts and controls
Weight	Approx. 12.9 kg (28 lb 7 oz)
Supplied accessories	Reel (1) Connecting cord RK-74H (2) Head cleaning aid Power cord (1)

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 the specifications. We please ask you to check with your appointed Sony dealer if clarification on any points is required.

