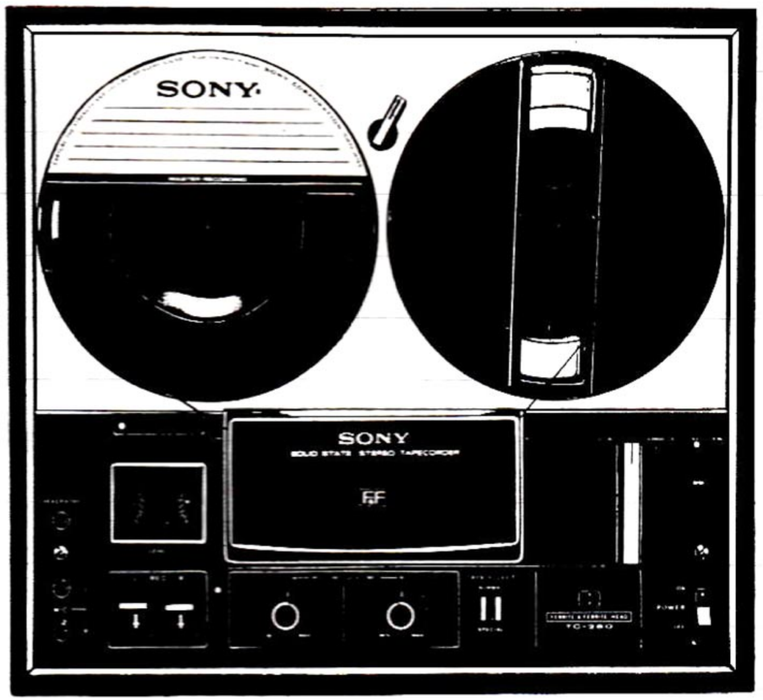


STEREO TAPECORDER

TC-280

Owner's Instruction Manual

The Sony TC-280 is a two-head, four-track stereo tape deck for quality-conscious stereo enthusiasts.

The TC-280 features:

- F & F (Ferrite & Ferrite) head for exceptionally smooth tape-to-head contact and extended durability.
- Tape select switch for use with standard or low-noise high-output tape.
- Automatic shut-off switch for stopping the tape transport in any operating mode when the tape runs out or breaks.
- Scrape filter for greatly reducing tape modulation noise.
- Vertical or horizontal operation.

In addition to these features, the TC-280 is also designed to record and play back encoded SQ (Stereo/Quadraphonic) signals with true fidelity. Refer to "SQ RECORDING" on page 11.

Before operating TC-280, read this manual carefully to become familiar with all features and operating procedures, and thereby realize the full capabilities of the TC-280.
Keep this manual handy for future reference.

TABLE OF CONTENTS

PRECAUTIONS

- Thread the tape correctly. If the threaded tape is slack or bypasses the correct tape path, automatic shut-off switch will activate. The tape will not move, even when the Function selector is shifted.
- Turn the Function selector to ■ and switch the power off when the recorder is not to be used or tape runs out.
- Do not connect any input source to the Microphone inputs when either the Line inputs or the Record/Playback connector is used for recording. Otherwise, the signal through the microphone inputs will be recorded.
- Keep the recorder in a well ventilated area and away from any excessive heat.
- Do not block the ventilation grille at the back of the recorder as this may stop ventilation and cause excessive heat inside the recorder.
- Keep the heads and all surfaces over which the tape travels clean in order to assure optimum performance. For cleaning information, refer to "MAINTENANCE" on page 7.
- If you have any questions concerning your unit, consult your nearest Sony dealer.

MAINS SUPPLY

The TC-280 operates on AC 110, 127, 220 or 240 V, 50/60 Hz mains supply. (AC 240 V, 50 Hz factory preset)
When changing the setting voltage and frequency, be sure to consult your Sony dealer.
The serial number plate is located at the right side of the recorder.

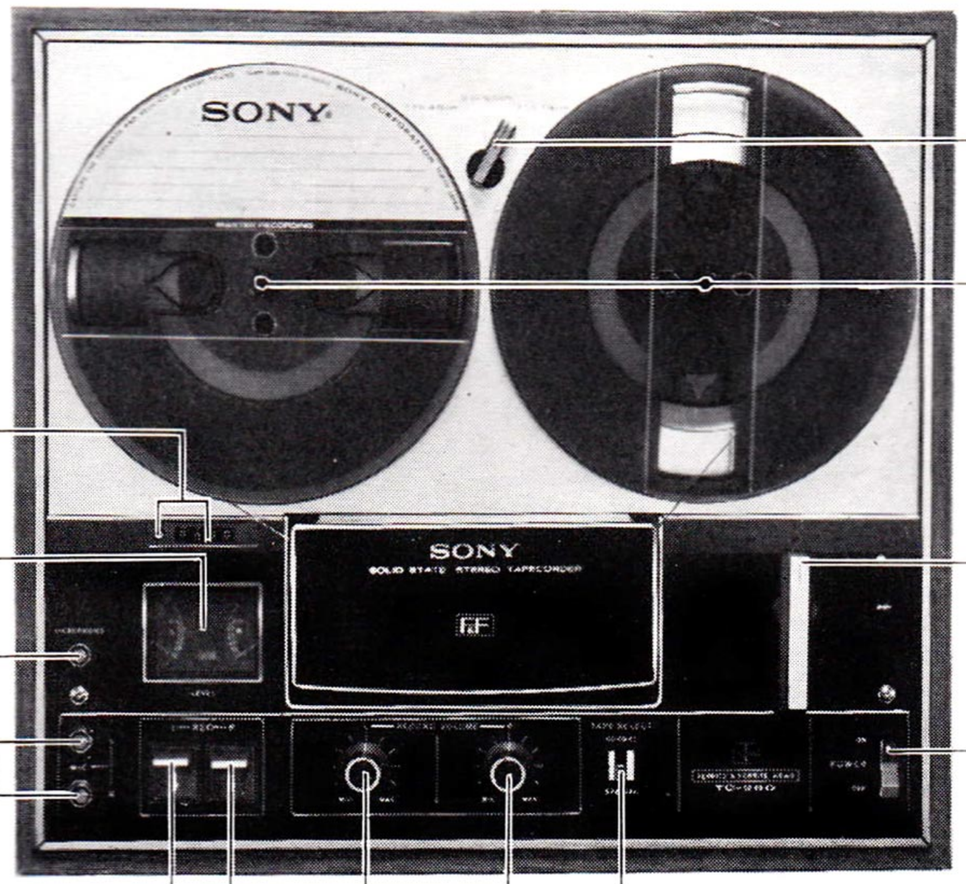
WARNING

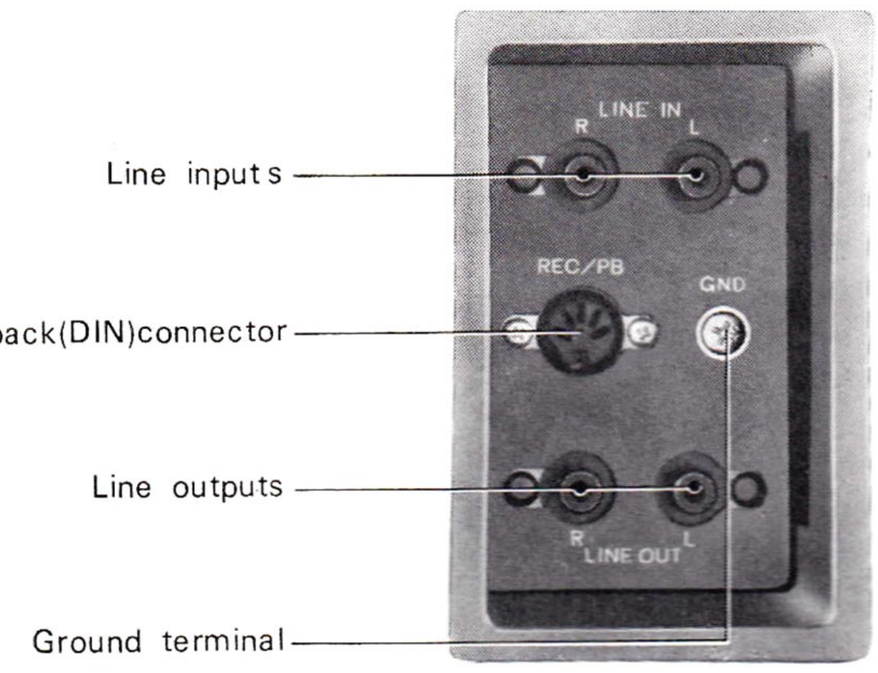
This apparatus must be earthed to your 3-pin plug in accordance with following instructions.

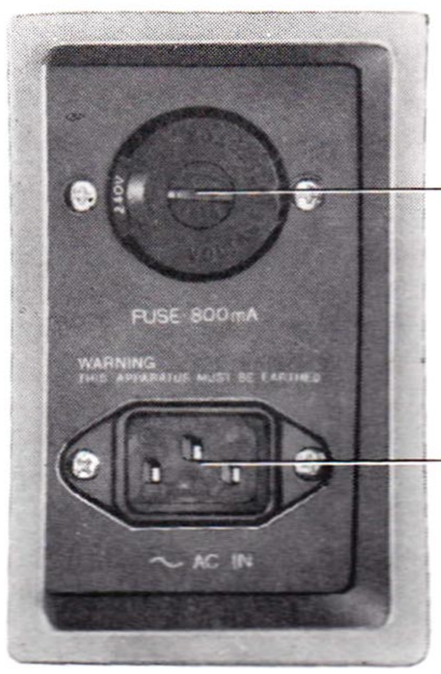
Important

The wires in the 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.

LOCATION OF CONTROLS AND CONNECTORS







CONNECTIONS

The TC-280 can be connected to high-quality audio components. The connections described in this booklet are for connecting the TC-280 and other Sony components. When using other manufacturer's components, the connections will be the same as the Sony products in almost all cases.
To assure correct matching of the input and output terminals of your sound system, refer to the specifications of the TC-280 (on page 9) and the instruction manual provided with the components to be connected.

- The red pin of the supplied Connecting Cord RK-74 should be connected to the right channel, and the grey pin to the left channel.

Caution . . . Connection with an amplifier

Amplifiers without tape monitor switch:
When the tape recorder is connected to an amplifier which does not have a tape monitor switch, do not turn the input selector of the amplifier to the same input source to which the tape recorder is connected.
Amplifiers with tape monitor switch:
When more than one tape recorder is connected to an amplifier equipped with a tape monitor switch, only one can operate the tape monitor. When recording on other tape recorders connected to the regular auxiliary inputs of the amplifier, do not turn the input selector to the auxiliary input position.
If these precautions are not followed, oscillation may occur while recording. The cause of this oscillation is recorder output feedback to its own input through the input selector of the connected amplifier. This occurs when that selector is accidentally set to the same auxiliary input. This oscillation could be detrimental to the amplifier or speakers.
It is recommended that the amplifier volume control be turned down when changing the position of the input selector switch.

Line inputs
Connect the recording outputs of the amplifier or component system to the LINE INputs of the TC-280.

Line outputs
Connect the LINE OUTputs of the TC-280 to the tape inputs or auxiliary inputs of the amplifier or component system.

Microphone inputs
These inputs will accept any high quality low impedance microphones equipped with a phone plug.
Sony ECM-19B or ECM-21 is recommended.

Headphone outputs
This output will accept headphones of 8 ohms equipped with a standard binaural headphone plug.
Sony Stereo Headphone DR-4A or DR-5A is recommended.

Ground terminal
If a humming noise occurs, connect the GND terminal to an appropriate external ground.

Record/Playback (DIN) connector
If an amplifier or receiver has the same type connector as this, the record/playback connections can be made with a single cable, Sony Connector Cable RC-2 (optional).
When using the Line inputs and Line outputs, disconnect the cable from this connector.

AC input
Connect the TC-280 to a mains outlet by using the supplied mains lead.

OPERATION OF CONTROLS

Tape Transport Section

Tape speed selector

7 1/2 ips and 3 3/4 ips are ideal for recording music when best sound quality is desired. 1 7/8 ips is ideal for speech, especially when longer recording time is needed.
In playback mode, set the Tape speed selector corresponding to the tape speed of the recorded tape.

- Change the tape speed only when the Function selector is at ■ position.

Tape counter

Indicates a numerical reference for tape indexing.
To reset the Tape counter to [0000], depress the Reset button at the left side of the counter.

Function selector

Controls all tape motion.

◀◀ position.....to rewind the tape
■ position.....to stop the tape
▶ position.....to start the tape in either record or playback mode
● position.....to stop the tape momentarily in either record or playback mode
▶▶ position.....for fast forward tape motion.

Record Amplifier Section

Record levers

To record a stereo program, simultaneously depress both Record levers and turn the Function selector to ▶ position.
The lamp in the Level meter will illuminate in red, indicating that the recorder is in record mode.

- When a monophonic program is desired, simultaneously depress either L or R Lever and turn the Function selector to ▶ position.

Level meter

While recording, the swing of the needles indicates the level of input signals. During playback, the meter indicates the output level at Line outputs.

Record volume controls

For proper recording level, adjust the Record volume controls so that the meter does not swing in the red area except on program peaks.

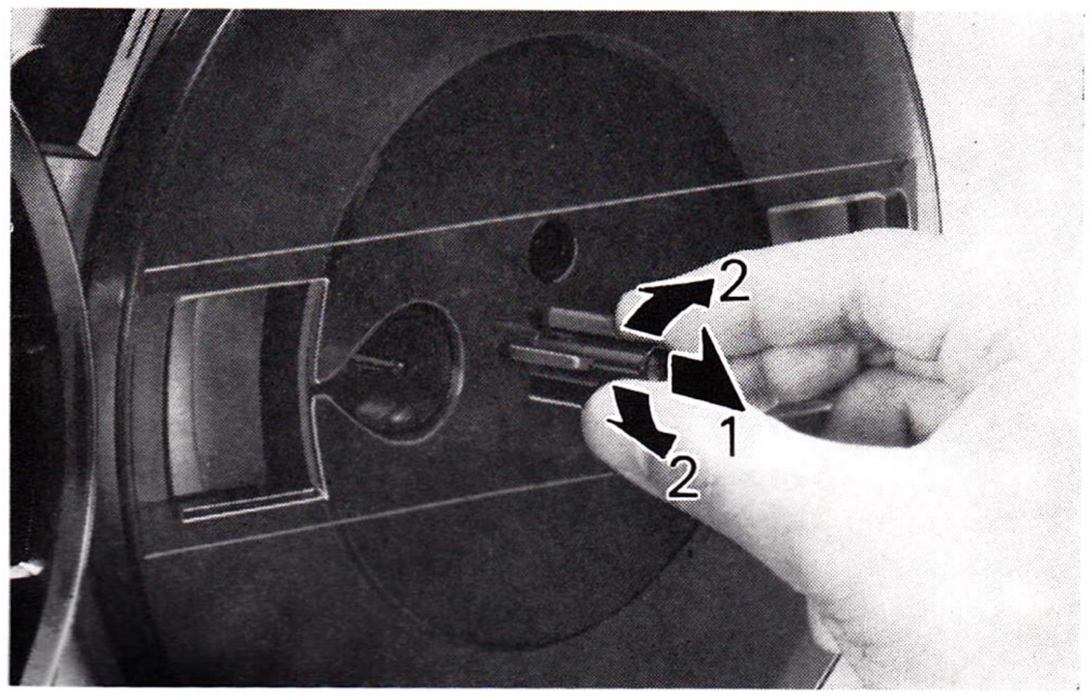
Tape select switch

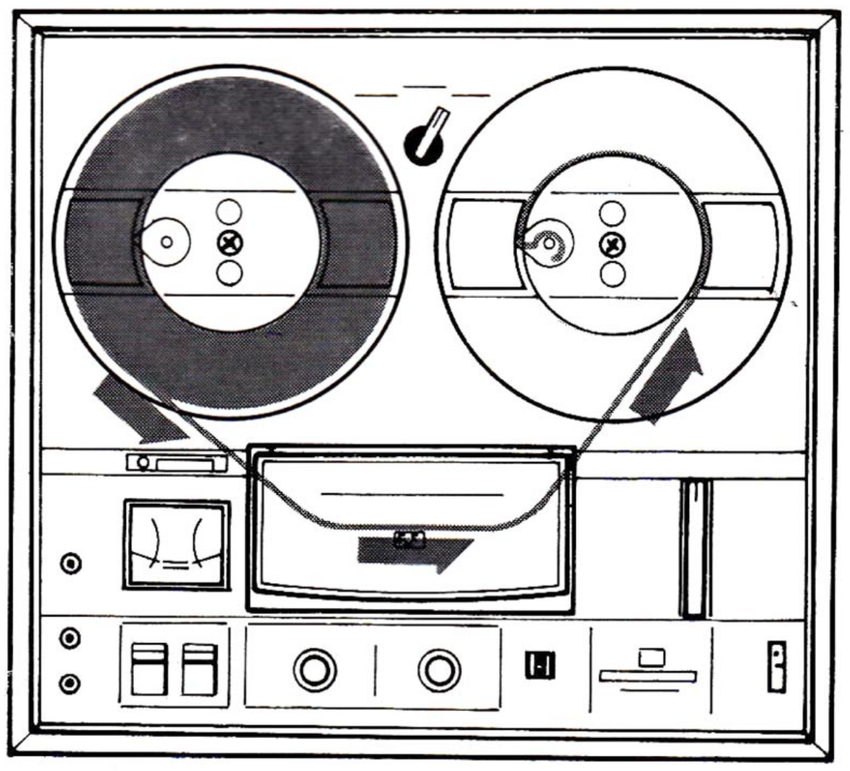
When using SLH (Sony Low-noise High-output) tape or equivalent, set this switch to SPECIAL. For standard tape, set the switch to NORMAL.

TAPE THREADING

Place an empty reel on the take-up (right) reel spindle and a full reel on the supply (left) reel spindle. Lock the reels with the built-in reel locks: Pull out the three-pronged guide which protrudes through the reel and lock by turning slightly.
Thread the tape from left to right by passing it under the head cover and wrapping it around the hub of the right reel or inserting the end of tape into the reel slot. Rotate the reels a few times to take up the slack so that the automatic shut-off switch assumes playing position.

- It is recommended that the same size reels be used for both supply and take-up.
- When the recorder is used verticall, be sure to use the built-in reel locks to secure the reels in place.



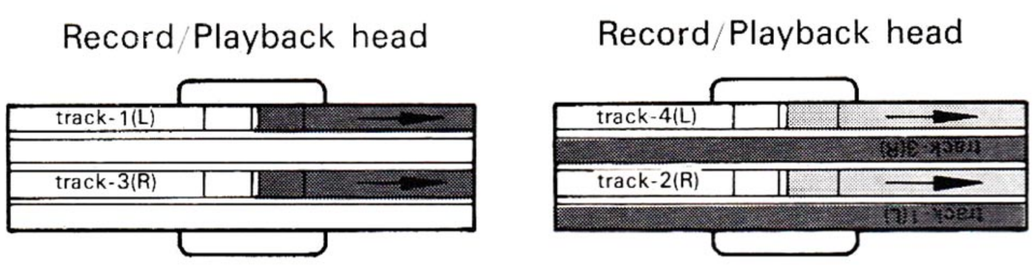


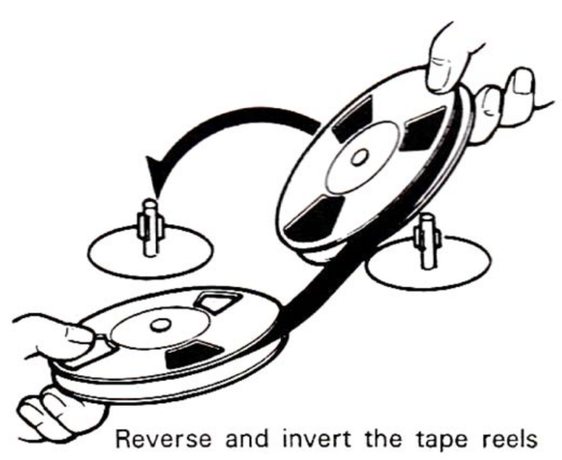
STEREO RECORDING

Connect the desired program source to the Line inputs or Microphone inputs. Refer to "CONNECTIONS" on page 3.

1. Turn on the TC-280 (and source equipment): The LEVEL meter will illuminate. Thread the tape with side 1 up.
2. Set the TAPE SELECT switch to either the SPECIAL or NORMAL: Set it to SPECIAL when Sony Low-noise High-output tape or equivalent is used and to NORMAL when standard tape is used.
3. Select the tape speed.
4. Depress both the L and R RECord levers.
5. Turn the RECORD VOLUME controls to adjust the level.
   The needles of the LEVEL meter should not go into the red area except on program peaks.
6. Set the Tape counter reset button for quick relocation.
7. While depressing the RECord levers, turn the Function selector to ▶.
   Recording of side 1 (tracks 1 and 3) begins. The lamp in the LEVEL meter will illuminate in red, indicating that the recorder is in record mode.
8. When the recording is finished, turn the Function selector to ■.

To record on side 2 (tracks 4 and 2), do not rewind the tape. Reverse reel positions and repeat step 7.
When side 2 recording is finished, do not rewind the tape but reverse reel positions. Then the tape will be ready for playback of tracks 1 and 3.




Reverse and invert the tape reels

Automatic shut-off switch
This feature is activated by a wire lever underneath the head cover. When the tape is properly threaded, the tape contacts the lever and holds it in operating position. If the tape, in any operating mode, runs out or breaks, the lever will fall forward and activate the shut-off switch which stops the tape transport.

Headphone monitoring while recording
Insert low impedance (8Ω) stereo headphone such as Sony DR-4A (optional) in the HEADPHONE output to monitor the program being recorded and also check the balance of L- and R-channel recording levels.

To stop the tape momentarily during recording
Turn the Function selector to ●, thus eliminating unwanted program material during that time.
To re-start the recording, turn the Function selector to ▶. This pause device is also useful in playback.

STEREO PLAYBACK

Connect the Model TC-280 to a stereo playback system and turn the power of each component on. For connection information, refer to page 3.

1. Thread a 4-track stereo recorded tape with side 1 up.
2. Set the TAPE SELECT switch to either the SPECIAL or NORMAL according to the type of tape.
3. Set the Tape speed selector to the required speed of the recorded tape.
4. Turn the Function selector to ▶.
5. At the end of playback, turn the Function selector to ■.

To play back side 2 (tracks 4 and 2), do not rewind the tape, but reverse the reel positions. Then, turn the Function selector to ▶.
Playback sound volume and tone quality are controlled by the connected amplifier.

For private listening
Connect Sony Stereo Headphone DR-4A or any 8-ohm stereo headphone to the HEADPHONE output.

MONOPHONIC RECORDING AND PLAYBACK

Recording
The monophonic recording procedure is the same as with stereo recording except only one RECord lever is used.
For recording on track-1 and track-4, use the left channel input and left record volume control; for recording on track-3 and track-2, use the right channel input and right record volume control.

Sequence of recording track	Input connection	Record volume control	Use RECord lever
Track-1	to L input	L	L
Track-4			
Track-3	to R input	R	R
Track-2			

Playback
Playback sequence of the tape should conform to the sequence of recording, i.e. track-1, track-4, track-3 and track-2.
For playback of track-1 and track-4, set the mode selector and/or other controls of the amplifier to reproduce the left channel only; for playback of track-3 and track-2, set the amplifier to reproduce the right channel only.

SOUND-ON-SOUND RECORDING

Sound-on-sound recording is a special recording method which can make composite recording from left to right channel and vice versa. This enables you to record a duet with your favorite singer or create other special effects.
The followings are needed for sound-on-sound recording:
Sony Microphone Mixer MX-6S (or MX-12), a low impedance microphone, Connecting Cord RK-74, and Plug Adaptor PC-2.

Sound-on-sound recording on the right channel [L→R]

1. Record the basic program on track-1 (left channel), according to "MONOPHONIC RECORDING" and rewind the tape to the beginning.
2. Connect the L LINE OUTput of the TC-280 and auxiliary input of the microphone mixer by using Connecting Cord RK-74.
   - Be sure to use the plugs of the same colour at both ends of the connecting cord.
3. Insert a microphone in the microphone input of the microphone mixer. (Use the Plug Adaptor PC-1 if the microphone has a phone plug.)
4. Connect the microphone mixer plug into the R MICROPHONE input of the TC-280. (Attach the Plug Adaptor PC-2 to the mini plug of the microphone mixer.)
5. Insert a stereo headphone in the HEADPHONE output.
6. Depress the R RECord lever and adjust the microphone input level correctly.
7. While depressing the R RECord lever and turn the Function selector to ▶, and adjust the auxiliary input level correctly. (Through left headphone, the playback of basic recording on track-1 of the left channel is heard; through the right headphone, the composite recording is heard. The composite signals will be recorded on track-3 of the right channel.)
8. Now, sound-on-sound recording preparation is complete. Rewind the tape to the beginning.
9. Start formal sound-on-sound recording.
10. When the recording is finished, rewind the tape to the beginning and play back track-3.

Sound-on-sound recording on the left channel [R→L]

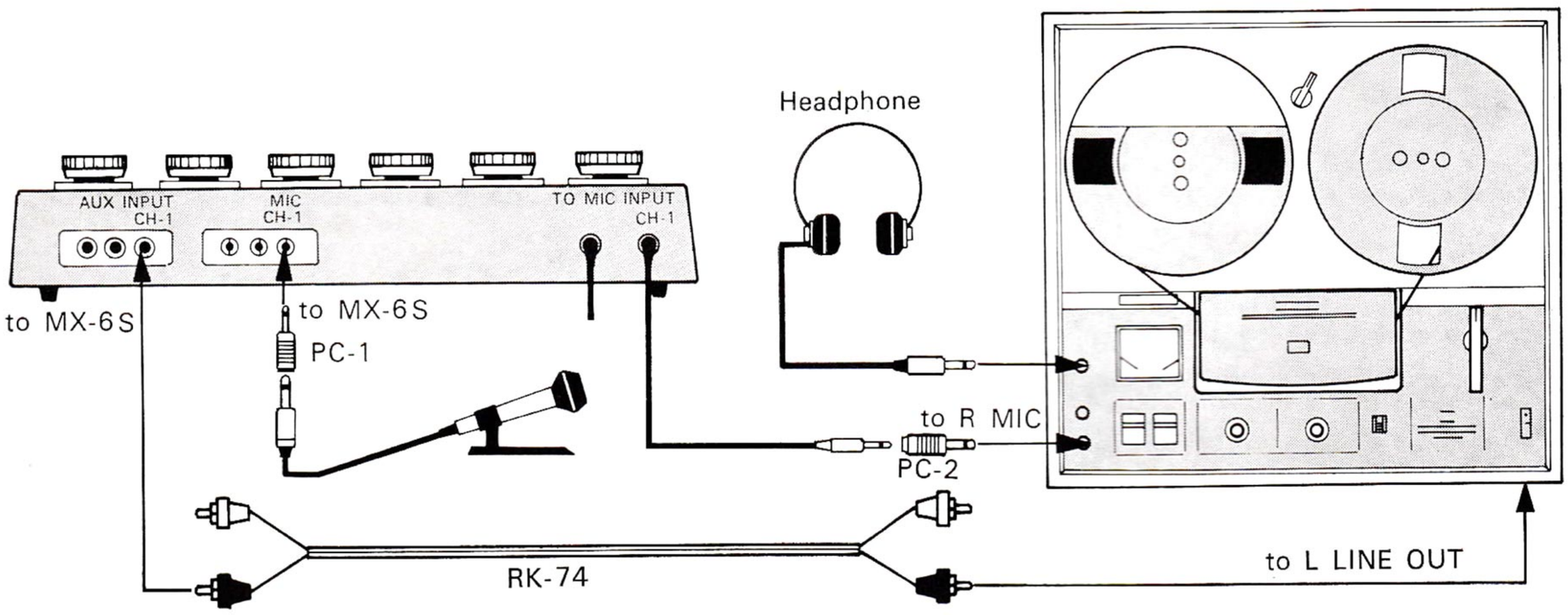
Record the basic program on track-3 (right channel). The rest of the recording procedure is the same as described above except for the use of opposite channels in each step.

- For detailed operation and level adjustment for microphone mixer, refer to its instruction manual.

SOUND-WITH-SOUND RECORDING

This recorder provides facilities to play back one track while the other track is being recorded. This feature is ideal for students who wish to listen to a prerecorded program on one track while recording a response onto the other track. Both tracks can later be played back.

1. Record the master program on the left channel.
2. Rewind the tape to the beginning of the master program.
3. Insert a microphone in the R MICROPHONE input.
4. Insert Sony Stereo Headphone DR-4A (optional) in the Headphone output, if private monitoring of master program is required.
5. While depressing R RECord lever, turn the Function selector to ▶. The master program will be heard through the left headphone (or speaker) and your response can be recorded on the right channel track.
6. To play back these programs simultaneously, rewind the tape to the beginning and follow the instructions for stereo playback on page 5.

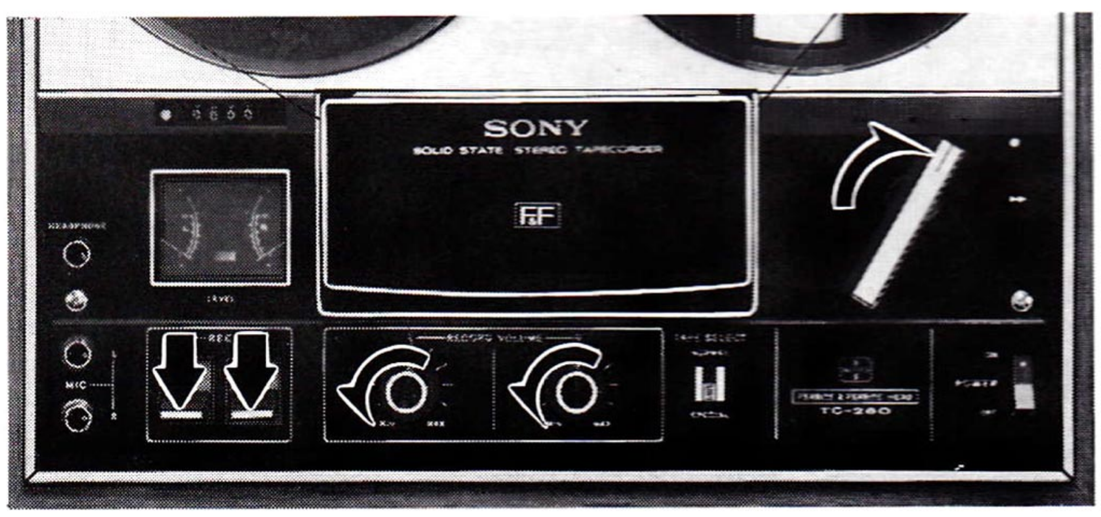


ERASING TAPE

The erase head operates in record mode. Therefore, every time a recording is made, any previous recording on the tape is automatically erased. A tape can also be erased without adding a new recording as follows :

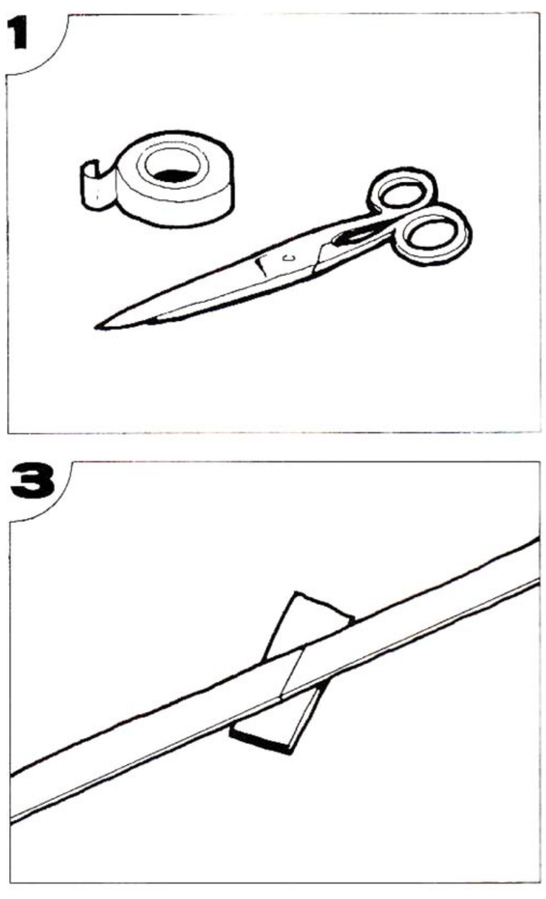
1. Thread the tape to be erased.
2. Disconnect any input source from the microphone and turn both the L and R RECORD VOLUME controls fully counter-clockwise.
3. Set the recorder in record mode and run the tape. Now the tape is being erased. Tape speed of 7 1/2 ips is recommended.

● For faster erasure, use a bulk eraser.



SPLICING TAPE

1. Use splicing tape and a pair of scissors.
   - ● Do not use ordinary cellophane tape as it tends to deteriorate recording tapes.
   - ● Also avoid using magnetized scissors or razor blades. Magnetized instruments will cause a "click" or "pop" at the splice during playback.
2. Neatly overlap the tapes to be spliced and cut diagonally at the position of splice.
3. Place a piece of splicing tape on a flat surface. Then place the two diagonal tape ends together on the splicing tape, shiny side down. Be careful to make ends meet but not overlap.
4. Trim off the excess splicing tape.



MAINTENANCE

Do make sure the mains plug is disconnected before starting maintenance procedure. Live parts may become accessible by removing the top panel.

Cleaning Heads and Tape Path

Dirty heads and tape path will cause :

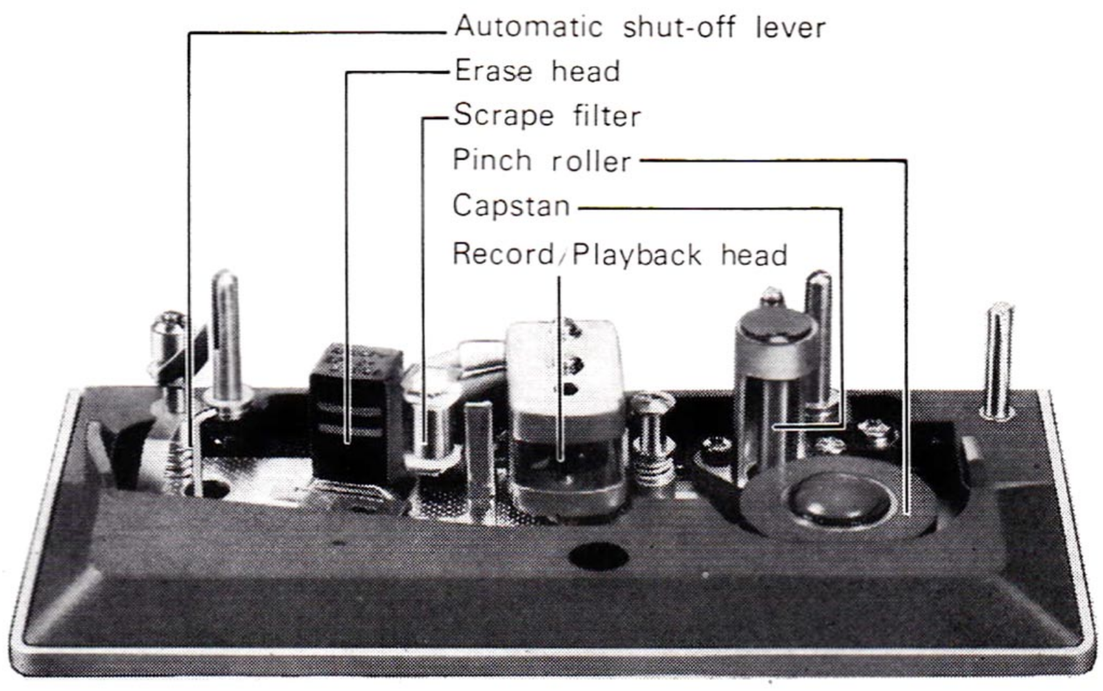
- ● loss of high frequency response which results in poor sound quality
- ● Loss of sound volume in recording and playback (drop-outs)
- ● Unsatisfactory results in tape erasing
- ● Increase of wow and flutter

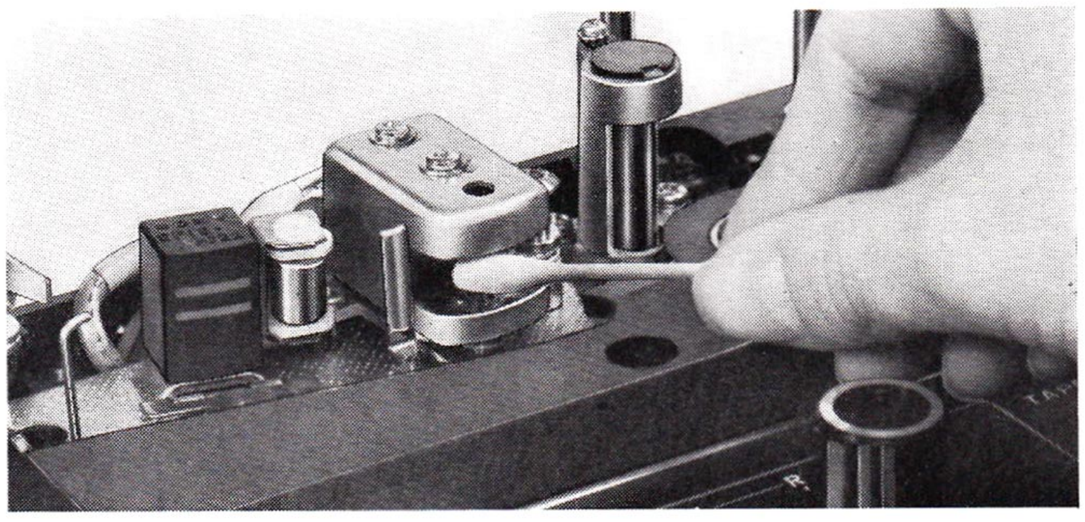
Therefore, the mirror-like finish on the face of all heads and tape path must be preserved to insure optimum performance. Generally, cleaning heads after every 8 hours will be surfficient. But it is recommended to clean the heads and tape path carefully before starting a valuable recording.

1. Remove the head cover by pulling it up.
2. Take the Head cleaning tip (supplied) or a soft cloth and carefully wipe the heads capstan, pinch roller, scrape filter and other surfaces upon which the tape travels.

If the deposits are hard to remove, moisten the tip or the cloth with a head cleaning solution or denatured alcohol and repeat cleaning.

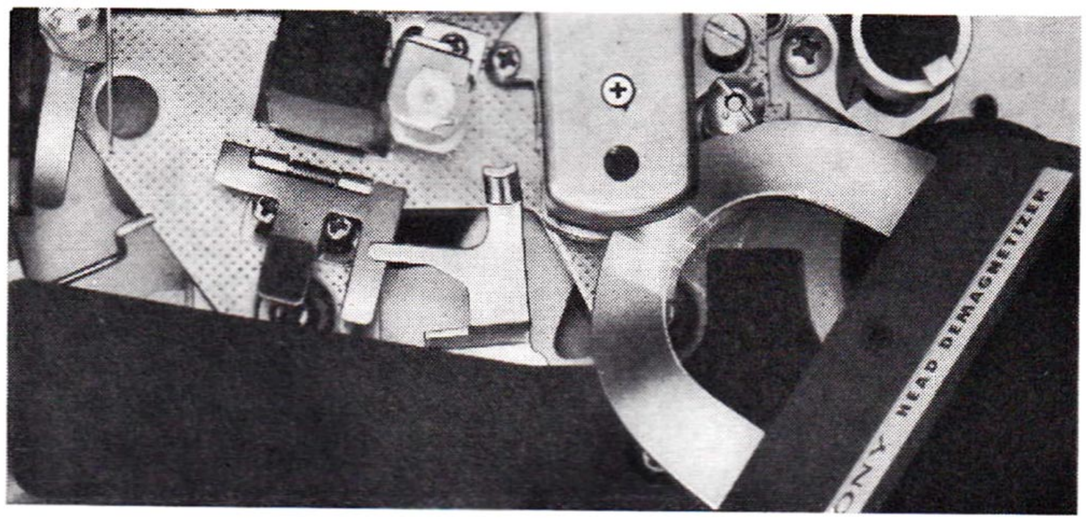
- ● Do not allow metallic materials near the heads.





Demagnetizing Heads

Continuous use, or the accidental touch of a piece of magnetized steel (screwdriver, etc.), will magnetize the heads, causing an increase in tape noise. It is recommended that the heads be demagnetized periodically to maintain optimum performance. The Sony Head Demagnetizer HE-2 (optional) is recommended.

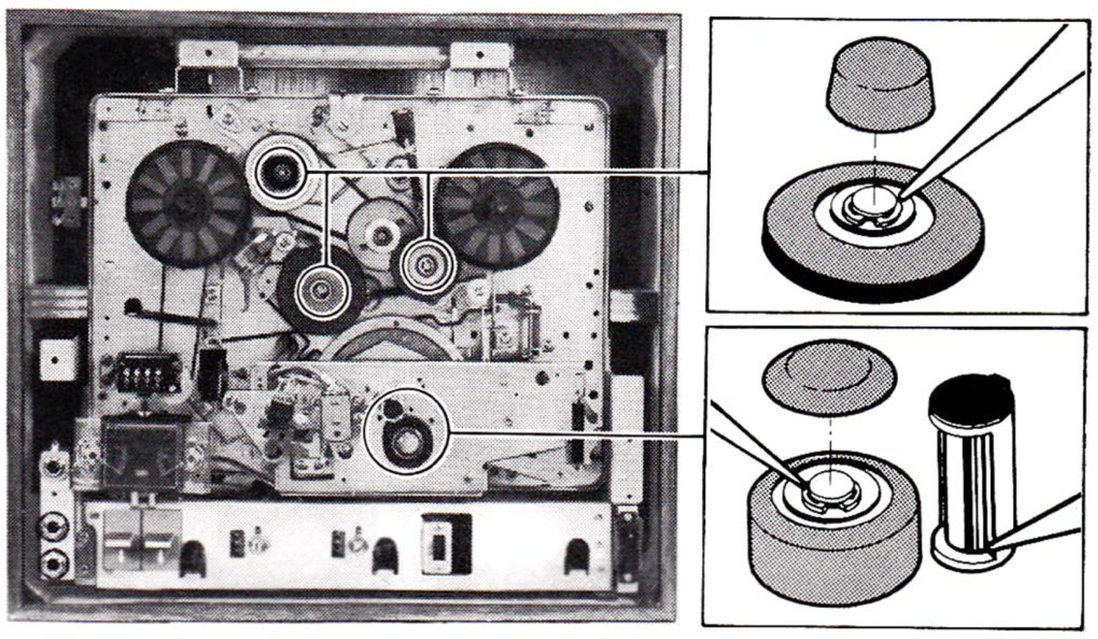


Cleaning Cabinet

Clean the cabinet with a soft cloth and mild detergent.
Do not use solvents such as alcohol, benzine or thinner as they could mar the finish of the recorder.

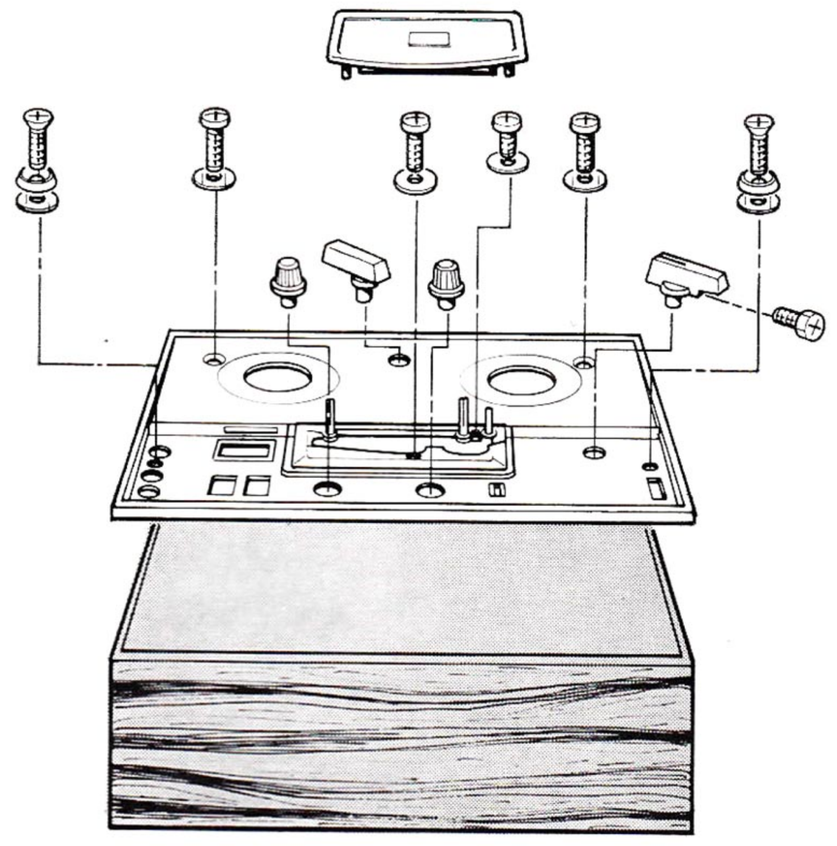
Lubrication

To maintain the optimum performance of the recorder, lubrication is required every 6 months.
Use light machine oil and lubricate the capstan, pinch roller shaft and idler shafts. Avoid excessive lubrication. It will cause slippage of the mechanism and contamination of your tape. Make sure all excess oil is wiped off completely. Remove the top panel and take out the cap of pinch roller. Lubricate the pinch roller shaft, capstan, and idler shafts with 1 drop each of light machine oil.



How to Remove the Top Panel

1. Remove the head cover, Function selector and two Record volume controls.
2. Remove the four screws on the top panel and two screws under the head cover.



SPECIFICATIONS

Power requirements	AC (~) 110, 127, 220 or 240 V, 50/60 Hz (AC 240 V, 50 Hz factory preset)
Power consumption	52 W
Tape speed	7 1/2 ips, 3 3/4 ips, 1 7/8 ips (19 cm/s, 9.5 cm/s, 4.8 cm/s)
Recording time	1.5 hours total at 7 1/2 ips (19 cm/s), stereo recording with 1800 ft (550 m) tape
Reels	7″ (18 cm) or smaller
Semiconductors	14 transistors, 4 diodes
Recording system	4 track stereo or monaural
Heads	Record/playback head ..... 1 Erase head 1
Signal-to-noise ratio	55 dB with SLH tape 52 dB with standard tape
Frequency response	Sony SLH tape NAB: 20–24,000 Hz; 40–21 000 Hz ±3 dB at 7 1/2 ips (19 cm/s); 20–17,000 Hz; 20–8,000 kHz at 1 7/8 ips (4.8 cm/s) DIN: 30–20,000 Hz at 7 1/2 ips (19 cm/s); 40–14,000 Hz at 3 3/4 ips (9.5 cm/s) Standard tape NAB: 20–20,000 Hz; 40–18,000 Hz ±3 dB at 7 1/2 ips (19 cm/s); 20–15,000 Hz; 20–7,000 Hz at 1 7/8 ips (4.8 cm/s) DIN: 30–18,000 Hz at 7 1/2 ips (19 cm/s); 40–12,500 Hz at 3 3/4 ips (9.5 cm/s)
Wow and flutter	0.1% at 7 1/2 ips (19 cm/s) (DIN ±0.15%) 0.15% at 3 3/4 ips (9.5 cm/s) (DIN ±0.22%) 0.2% at 1 7/8 ips (4.8 cm/s)
Distortion	1.5%
Inputs	Microphone inputs ..... 2 Sensitivity 0.2 mV (−72 dB) Accept low impedance microphones Line inputs ..... 2 Sensitivity 0.06 V (−22 dB) Input impedance 100 kΩ
Outputs	Line outputs ..... 2 Output level 0.775 V (0 dB) at load impedance of 100 kΩ Load impedance more than 10 kΩ Headphone output ..... 1 Accepts an 8-ohm stereo headphone
Record/Playback connector	Input impedance less than 10 kΩ Output impedance less than 10 kΩ
Dimensions	Approx 15 3/4 (W) × 7 3/8 (H) × 14 1/8 (D)″ (400 × 187 × 358) including projecting parts and controls
Weight	Approx. 21 lb 3 oz (9.6 kg)
Supplied accessories	Reel ..... 1 Connecting Cord RK-74 ..... 2 Mains lead ..... 1 Head cleaning tips 1set
Optional accessories	Electret Condenser Microphone ECM-21, ECM-19B Stereo Headphone DR-4A, DR-5A Stereo Microphone Mixer MX-6S, MX-12 Head Demagnetizer HE-2 Head Cleaning Kit KK-1

Whilst the information given is true 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 would ask you to check with your appointed Sony dealer if clarification on any point is required.

Sony tape for best recording.

GUIDE FOR CHECKING TROUBLES

If trouble with the TC-280 occurs, make the following simple test to determine whether or not the trouble requires a professional engineer's skill. If the trouble persists after you have made these tests, consult your nearest Sony dealer for further instructions.

TROUBLE	PROBABLE CAUSES	WHAT TO DO ABOUT IT
Tape does not move.	● Automatic shut-off switch is activated. ● The mains lead is not connected or the power switch is not turned ON.	● Take up the slack of tape. ● Connect the mains lead or depress the dot-side of the power switch.
No sound from recorded tape.	● Improper connections. ● Malfunction of the amplifier or receiver connected.	● Check connections. (Refer to page 3.) ● Check whether the related controls of the amplifier or receiver are correctly set.
Recording cannot be made.	● Improper connections. ● Record levers not locked. ● Dirty record head.	● Check connections and check LEVEL meter to see that signal is reaching recorder. ● Depress the RECord levers. ● Clean the Record/Playback head. (Refer to page 7.)
Slippage of tape; wow or flutter	● Dirty or oily capstan and pinch roller. ● Warped reel. ● Different size reels for supply and take-up. ● Uneven pinch roller.	● Clean capstan, pinch roller and other tape path components. ● Replace the warped reel. ● Use same size reels. ● Check pinch roller for perfect roundness.
Loss of high frequencies	● Dirty heads. ● Tape threaded improperly. (Shiny side contacts the heads.) ● Tape twisted or damaged.	● Clean heads and tape path. (Refer to page 7.) ● Thread tape properly. ● Check the tape.
Distortion	● High recording level.	● 0 (zero) reading of the LEVEL meter at maximum input signal is recommended.
Noise	● Magnetism on the heads. ● Contamination of the heads.	● Demagnetize the heads. (Refer to page 8.) ● Clean the heads. (Refer to page 7.)
Low hum on tape	● Input (record player or tuner) or recorder not properly grounded. ● Recorder operating in electrical field.	● Check whether hum occurs on prerecorded tapes as well as those made on the recorder. ● Check ground terminal connections of input or recorder. ● Try reversing the mains plug of the recorder in the wall outlet.
Unsatisfactory erasing	● Dirty erase head.	● Clean the erase head. (Refer to page 7.)

SQ RECORDING

The new Stereo/Quadraphonic record system (SQ), introduced by Sony and CBS, is a matrix 4-channel system which allows 4 channels of sound to be reproduced from any SQ records or to be broadcast through FM-multiplex radio system.

The Model TC-280 uses mirror-smooth F & F head and assures precise tape-to-head contact. These advantages make your recorder more suitable for SQ recording than any other tape recorder. The Model TC-280 can record matrix-encoded 4-channel programs (such as SQ records) on tracks 1 and 3 or tracks 4 and 2 . . . just the same as a conventional stereo recording.
For playback, the Model TC-280 can reproduce 4 distinct channels of sound with your present stereo system plus a decoder and additional audio equipment, available at your local dealer with complete instructions.

F & F (Ferrite & Ferrite) Head

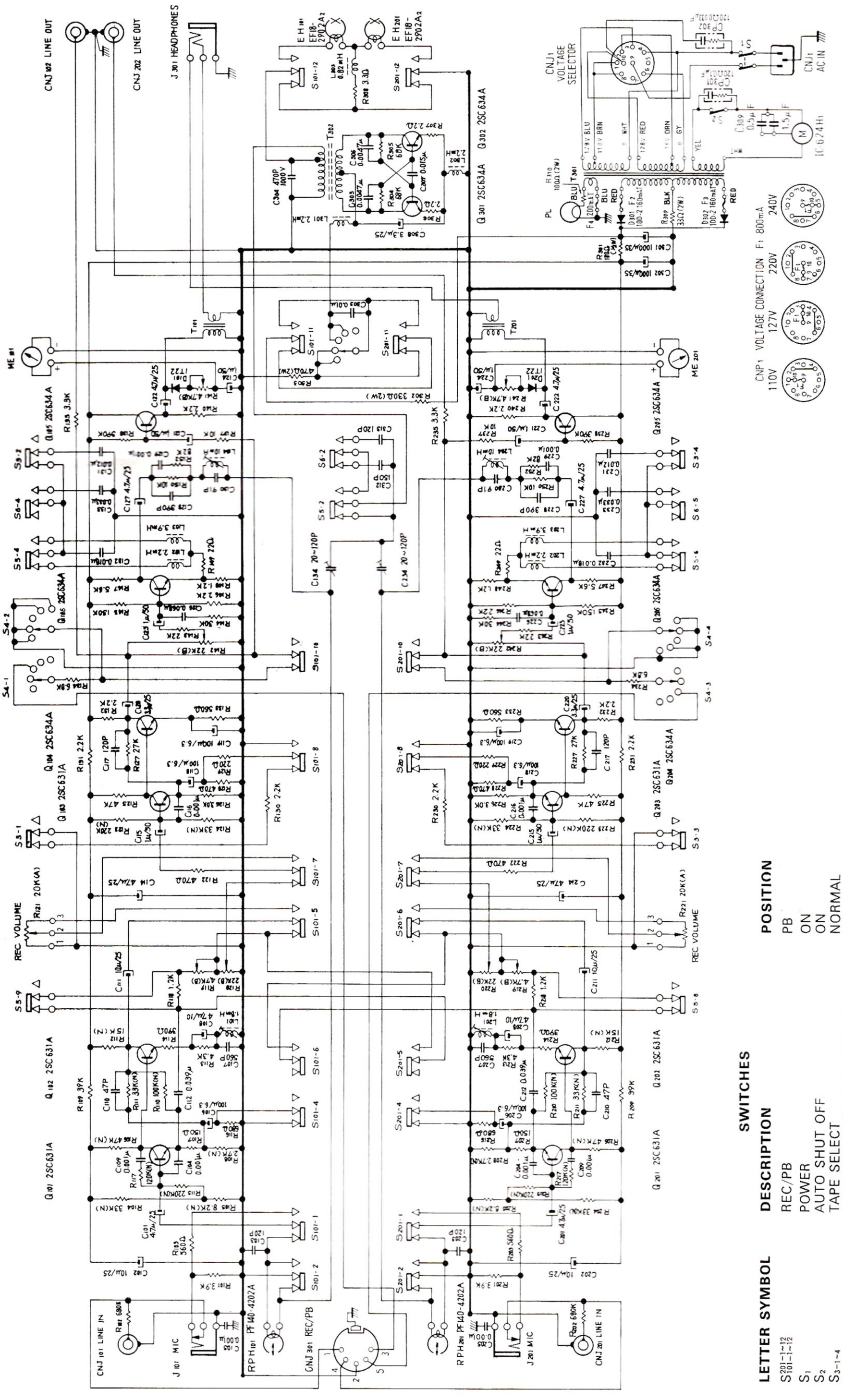
Sony high performance F & F head features: (1) greatly extended frequency response and remarkable reduction of high frequency losses, (2) higher reliability . . . 1/200 the wear of a conventional head, (3) highly polished, mirror-smooth surface contact with the tape.

The symbol F & F means the core material plus the guard portion of the head are all ferrite. This prevents uneven head wear and maintains a precisely parallel head gap for a more extended period.

UNI-PHASE

UNI-PHASE is a new Sony development which allows a Sony two-channel stereo tape recorder to record and reproduce matrix-encoded 4-channel sound.
Units bearing the UNI-PHASE symbol employ Sony's precision-molded F & F (Ferrite & Ferrite) head to maintain accurate phasing and thus assure perfect recording and playback of any SQ or regular matrix discs.

CIRCUIT DIAGRAM



POSITION

SWITCHES	DESCRIPTION	
LETTER SYMBOL		
$S^{201-1\sim12}_{101-1\sim12}$	REC/PB	PB
S_1	POWER	ON
S_2	AUTO SHUT OFF	ON
$S_{3-1\sim4}$	TAPE SELECT	NORMAL
$S_{4-1,3}$	REC/PB CONNECTOR ON/OFF	OFF
$S_{4-2,4}$	MUTING	ON
S_{4-5}	BIAS OSC	OFF
$S_{5-1\sim9}$	TAPE SPEED 19/9.5, 4.8cm/s	19cm/s
$S_{6-1\sim6}$	TAPE SPEED 19,9.5/4.8cm/s	19, 9.5cm/s

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SONY CORPORATION

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