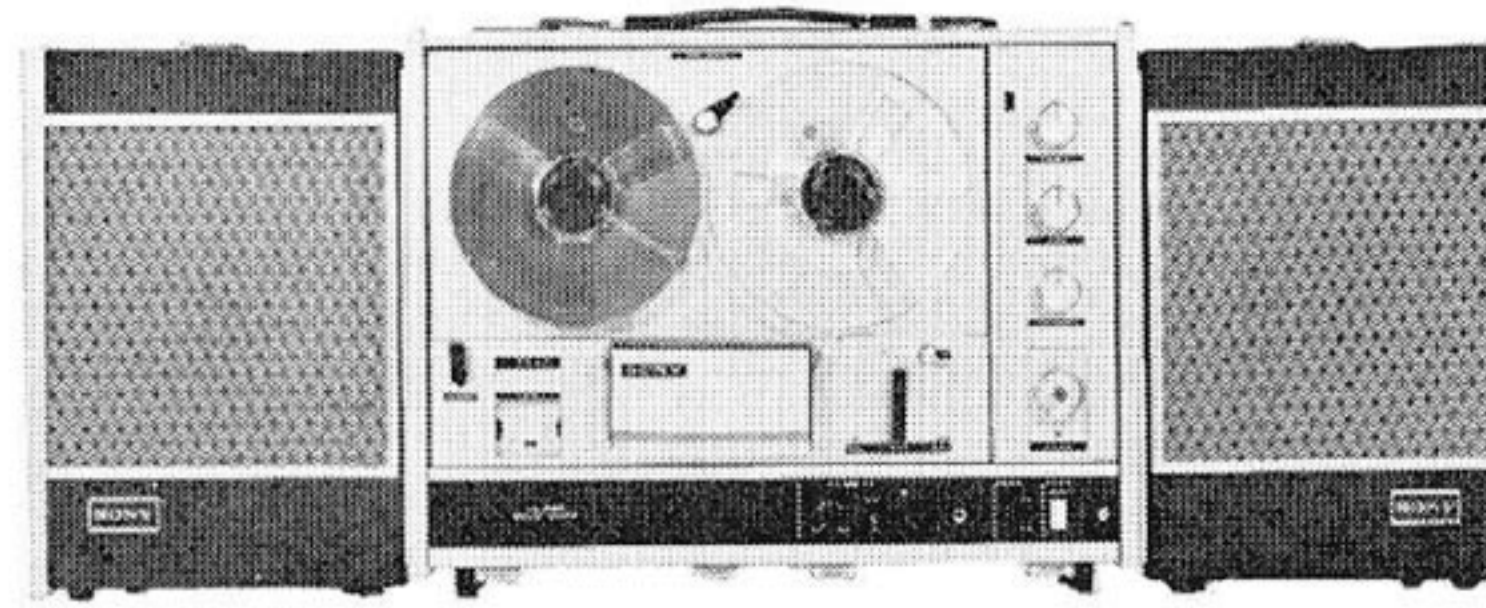


SONY®

STEREO TAPECORDER TC-540

Owner's Instruction Manual





SONY Model TC-540 is a precision solid state 4-track stereo tape recorder developed by advanced SONY electronic engineering SONY XL-4 Quadradiial Sound System* and operates with maximum performance in either vertical or horizontal position.

Special features of Model TC-540 are:

*XL-4 Quadradiial Sound System:

The exclusive 4-way loudspeaker system consists of two self-contained high compliance woofers and two lid-integrated satellite speakers for middle and high tones, thereby faithfully reproducing the entire frequency range while providing a surrounding stereo effect. Solid state stereo amplifiers produce 20 watts total dynamic power. Retractable pinch roller allows remarkably easy tape threading.

Other features.....

Three speed operation, Automatic Sentinel Shut-Off Switch, Professional VU Meters, Separate Bass and Treble Controls, Digital Tape Counter, Scrape Flutter Filter, Noise Suppressor, S.O.S. facilities and many more.

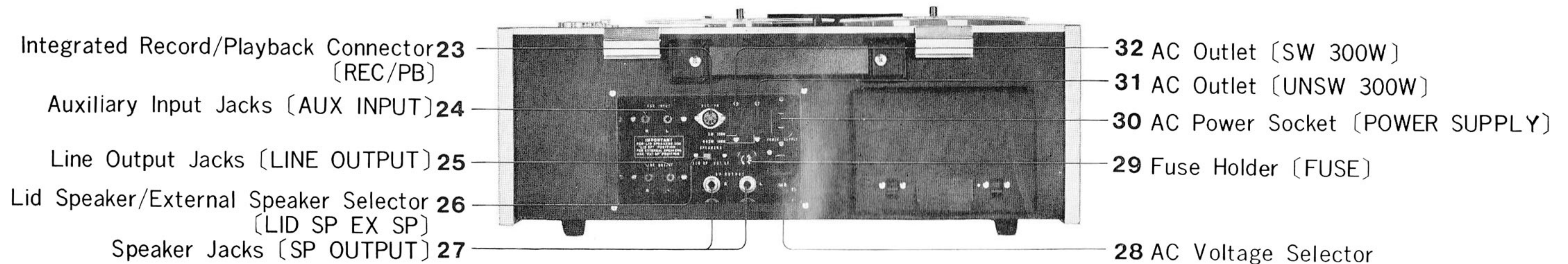
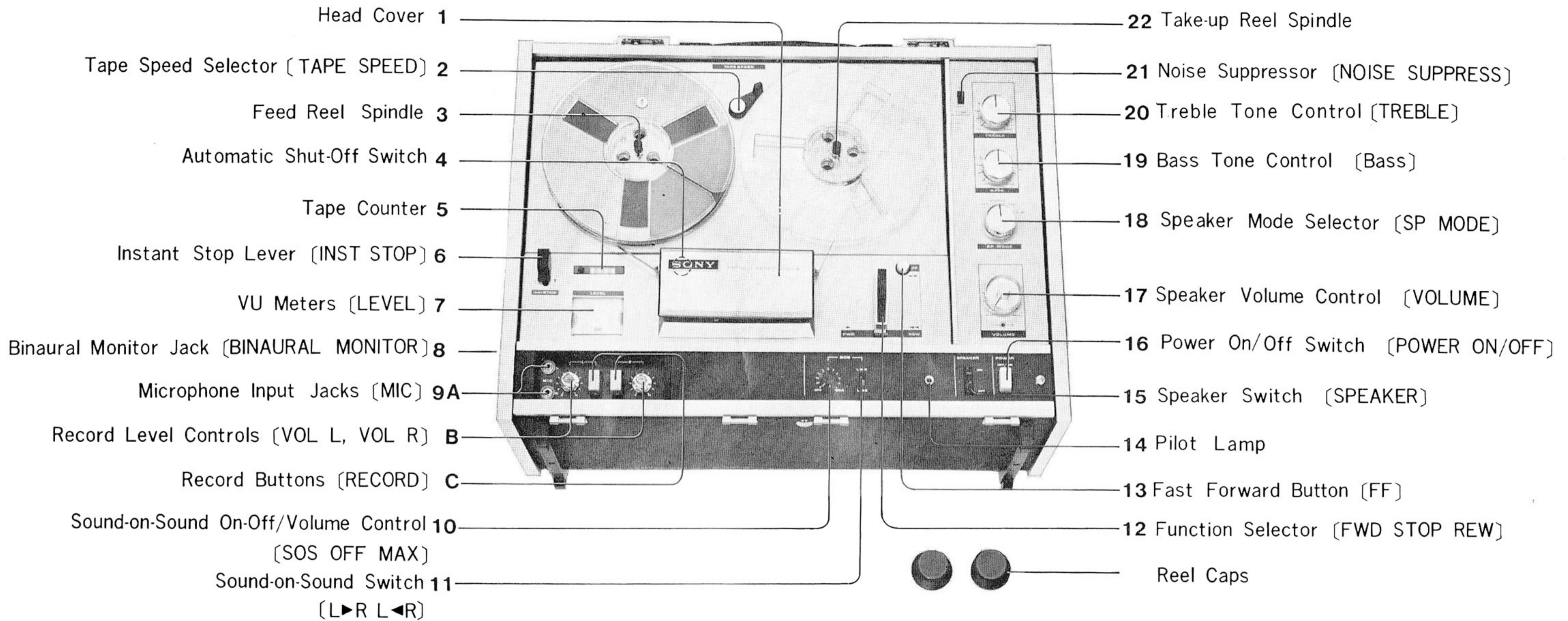
Read this manual carefully before operating and save the manual for future reference.

Your SONY Tape Recorder can be set for operating on AC voltage of either 100, 110, 117, 125, 220 or 240 volts, and line frequency of either 50 or 60 Hz. Before connecting the recorder to the power line, be sure to check whether the recorder is set for operating AC voltage and line frequency in your area. Simple instructions for this adjustment are contained on page 13, "Adaptation to the Local Power Line".

Table of Contents

Location of Controls and Connectors	1
Operation of Controls	2
Input and Output Connectors	4
Threading Tape	7
Playing Tape	7
To Play 4-Track Stereo Tape	
To Play 4-Track Monophonic Tape	
Notes on Connecting Speakers	
Recording	9
4-Track Stereo Recording	
4-Track Monophonic Recording	
To Monitor While Recording	
Erasing Tape	11
Sound-on-Sound Recording	11
Sound-with-Sound Recording	12
Public Address	12
Adaptation to the Local Power Line	13
Splicing Tape	14
Maintenance	14
Cleaning Tape Path	14
Demagnetizing Head	14
Lubricating Capstan, Pinch Roller and Idler Shafts	15
Technical Specifications	16
Schematic Diagram	17
Recommended Accessories	18

Location of Controls and Connectors



Operation of Controls

The numbers of the following paragraphs correspond to the numbers on the illustration on page 1.

1. Head Cover

This cover protects the heads. When cleaning the tape path, demagnetizing head or lubricating capstan or pinch roller, etc. remove the head cover by loosening the screws located at the rear side of the cover.

2. Tape Speed Selector [TAPE SPEED]

This knob selects the desired tape speed of 19 cm/sec (7-1/2 ips), 9.5 cm/sec (3-3/4 ips) or 4.8 cm/sec (1-7/8 ips) and automatically sets the proper recording and play back characteristics for each speed.

19 cm/sec and 9.5 cm/sec are ideal when recordings of the best sound quality are desired.

4.8 cm/sec is ideal when longer recording time is desired.

In playback mode, set the tape speed to the recommended speed of the pre-recorded tape.

NOTE: Change tape speed only when the FUNCTION SELECTOR is in [STOP] position.

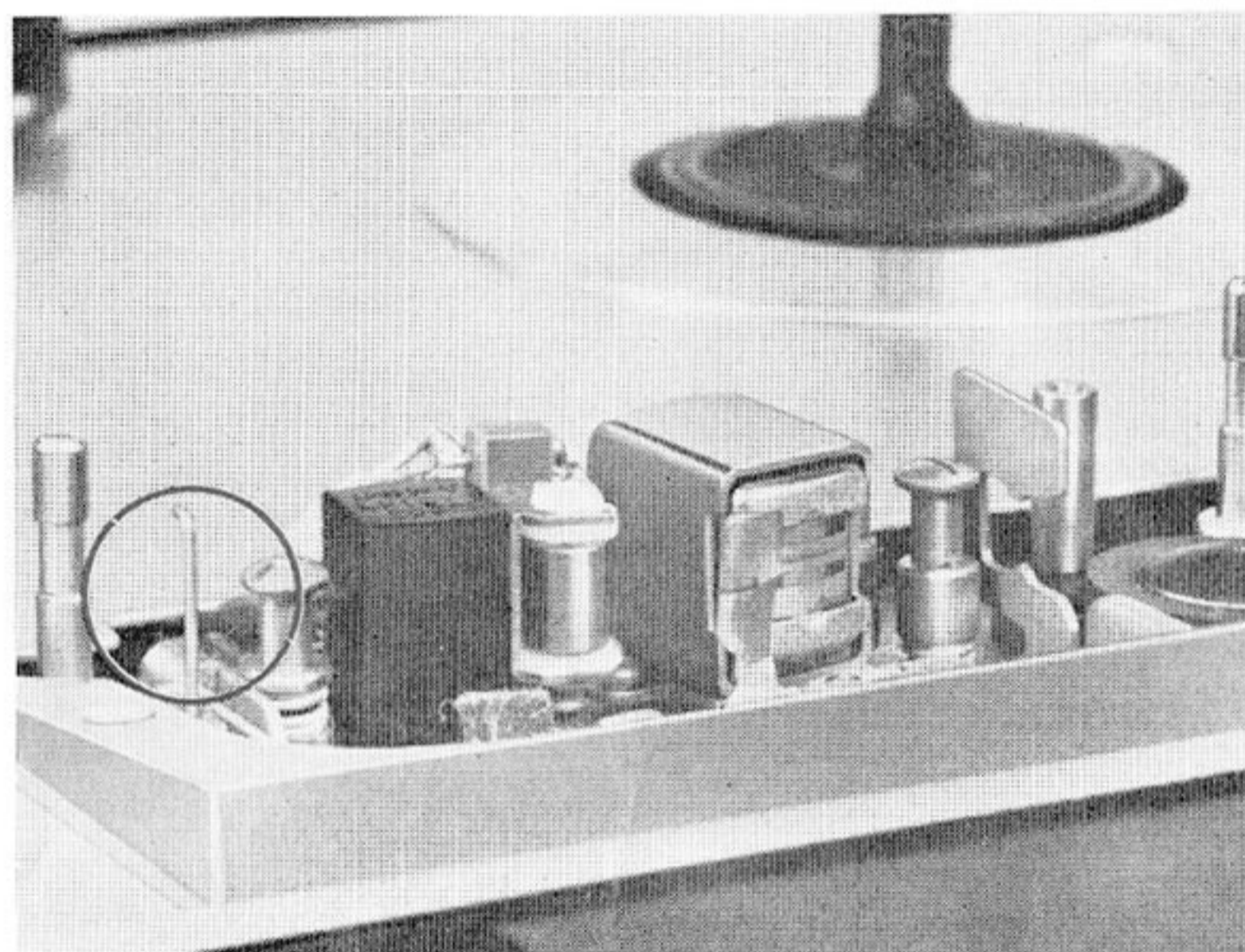
3. Feed Reel Spindle

Place a full reel of tape on this spindle.

4. Automatic Shut-Off Switch

This switch is controlled by a wire lever located under the HEAD COVER. In [STOP] position, the shut-off lever recedes into a slot to facilitate easy tape threading. After tape is threaded and the mechanism is placed in [FWD], [REW] or [FF] modes, the shut-off lever contacts the tape and is held in this position. At such time as the tape runs

out, the lever will automatically fall forward and activate a micro switch which stops tape motion. However, the amplifiers are still ON.



5. Tape Counter

The digital counter indexes the tape used in record or playback. At the start of a tape, press the reset button; four zeros [0000] will appear in the window.

6. Instant Stop Lever [INST STOP]

This lever instantly stops tape motion while the recorder is in either record or playback mode. Pull the lever forward (toward you) until it locks into position. To release, push the lever down, the tape will immediately pick up normal forward speed.

7. VU Meters [LEVEL]

These meters indicate the level of the signal being recorded are calibrated to NAB standard. Deflection of the meter needle to the boundary of the red and black zones provides normal recording

level. However, occasional transient peaks should swing the needle into the red zone. The red lamp in the VU METERS will be illuminated when the recorder is in RECORD mode.

9. Recording Facilities

The recording facilities: (A) Microphone Input Jacks, (B) Record Level Controls, (C) Record Buttons are located inside the compartment on the front panel. Slide the lid toward the right to use these facilities.

(A) Microphone Input Jacks [MIC]

See page 4, "Input and Output Connectors".

(B) Record Level Controls [VOL L, VOL R]

These knobs control the record level. Turn clockwise to increase and counterclockwise to decrease recording level. The left knob marked [L] controls left channel and the right knob marked [R] controls right channel. The recording level for both channels is indicated on the VU METERS.

(C) Record Buttons [RECORD]

Two red push buttons activate the RECORD mode switch.

These buttons will be locked in place when they are pressed, and allow record volume adjustment even when the FUNCTION SELECTOR is set in [STOP] position. With this special feature, the recorder is to be used as public address system. See page 12, "Public Address". To record, press the desired record button [L] for left channel [R] for right channel, or both for stereophonic recording, and turn FUNCTION SELECTOR to [FWD] position. The record buttons are locked and the red lamps in the VU METERS are illuminated indicate that the recorder is in record mode.

To release locked record buttons;

When one of the buttons is down, slightly press

the other button. The depressed button will rise. When both buttons are down, firmly press the one button down, the other will be released. Then slightly press the released button, both buttons are now released.

When tape is not threaded on the recorder, turn FUNCTION SELECTOR to either [FWD] or [REW] position to release locked record buttons.

NOTE: If the FUNCTION SELECTOR is turned to [STOP] position while recording, the RECORD BUTTONS will be released and the recorder will automatically switch from record to playback mode.

10. Sound-on-Sound On-Off/Volume Control [SOS OFF MAX]

The switch activates sound-on-sound record mode. For sound-on-sound recording, turn the knob clockwise from OFF position and adjust the volume level.

NOTE: Be sure the SOUND-ON-SOUND ON-OFF/VOLUME CONTROL is turned off when sound-on-sound recording is not being made.

11. Sound-on-Sound Switch

The switch has two positions: [L►R] and [L◄R]. The sound-on-sound recording is possible from left channel to right channel or vice versa.

12. Function Selector [FWD STOP REW]

This knob controls all tape motions Forward [FWD], Stop [STOP] and Rewind [REW]. Fast Forward [FF] tape motion is also activated by this knob when it is used in conjunction with FAST FORWARD BUTTON marked [FF].

To play tape turn FUNCTION SELECTOR to [FWD] position. To stop tape motion, turn FUNCTION SELECTOR to [STOP] position.

NOTE: While the recorder is in record mode if this selector is turned to [STOP] position, the recorder will automatically switch from record to playback mode.

To rewind tape, turn FUNCTION SELECTOR to [REW] position. For fast forward tape motion, turn FUNCTION SELECTOR to [STOP]. While pressing FAST FORWARD BUTTON, turn this selector to [FWD] position. To stop tape motion in rewind or fast forward, turn FUNCTION SELECTOR to [STOP] position.

13. Fast Forward Button [FF]

This push button is used for fast forward tape motion. Pressing this button turn FUNCTION SELECTOR to [FWD] position. This button is locked and the tape will rapidly move forward. To stop tape motion, turn FUNCTION SELECTOR to [STOP] position.

14. Pilot Lamp

This lamp will be illuminated when the recorder is turned ON.

15. Speaker Switch [SPEAKER]

This switch turns the speaker ON or OFF. It controls the self-contained speakers and lid-speakers or external full range speakers which are connected to SPEAKER JACKS and operates in either record or playback mode.

When monitoring through the BINAURAL MONITOR JACK located at the left side of the recorder, turn SPEAKER SWITCH OFF.

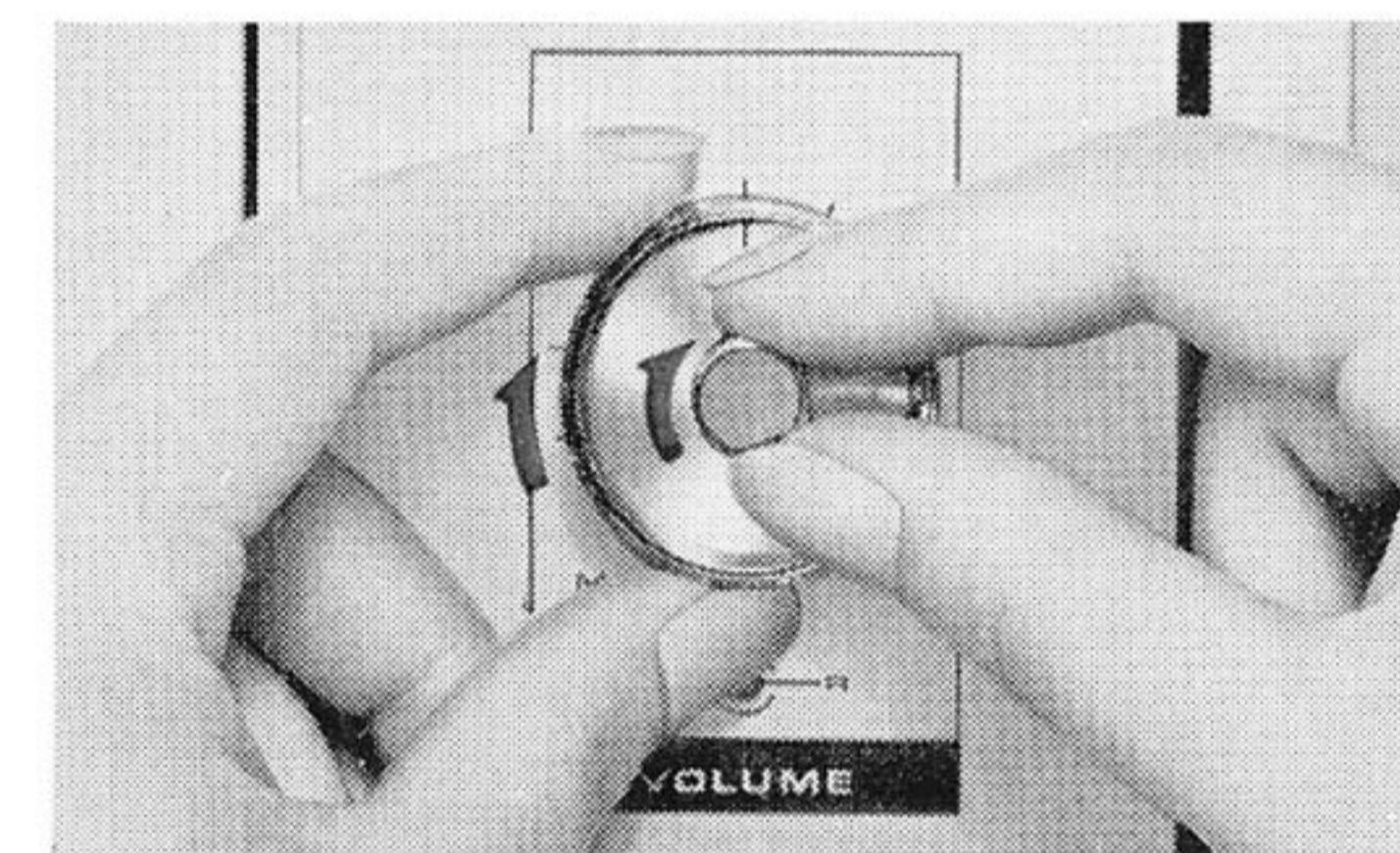
16. Power On/Off Switch [POWER ON OFF]

This switch turns the recorder ON or OFF. Press the button to turn ON, press again to turn OFF.

17. Speaker Volume Control [VOLUME]

These coaxially mounted dual knobs control the volume of both left and right channels through the self-contained speakers and either lid speakers or external speakers connected to SPEAKER JACKS.

The knobs also control the volume of a stereo headset connected to BINAURAL MONITOR JACK. Both knobs will rotate simultaneously when adjusting speaker volume. They can be moved separately to adjust stereo balance by turning one knob while holding the other stationary. The outer knob controls the left channel and the inner controls the right channel.



18. Speaker Mode Selector [SP MODE]

This selector has four position [LEFT], [STEREO], [RIGHT] and [L+R] and will connect the speakers and headset to the selected position.

This selector has no effect upon the recordings being made on the tape.

The [STEREO] position delivers stereo sound from left channel and right channel speakers or stereo headset.

The [LEFT] position provides left channel sound from both left and right speakers or stereo headset.

The [RIGHT] position provides right channel sound from both left and right speakers or stereo headset.

The [L+R] position provides the sound from both channels simultaneously.

19. Bass Tone Control [BASS]

This knob simultaneously adjusts bass loudness of both left and right channels through either the speakers or headset.

Turn clockwise to increase the amount of bass tones. Turn counterclockwise to decrease the prominence of bass tones.

For flat response both tone control knobs [BASS] and [TREBLE] should be set in the mid-position.

20. Treble Tone Control [TREBLE]

This knobs simultaneously control treble loudness of left and right channels through either the speakers or headset.

Turn clockwise to increase treble tones, turn counterclockwise to decrease treble tones.

For flat response both Tone Control Knobs [BASS] and [TREBLE] should be set in the mid-position.

21. Noise Suppressor [NOISE SUPPRESS]

Cuts off signals above 9 kHz.

With the setting of this switch to [ON], objectionable high-frequency noise such as record scratch or tape hiss is removed from the program

material.

This suppressor does not affect response to frequencies below 9 kHz allowing full pass-band for the major part of the audio frequency range.

22. Take-up Reel Spindle

Place an empty reel on this spindle.

26. Lid Speaker/External Speaker Selector [LID SP EXT SP]

This slide selector located on the rear side has two positions [LID SP] and [EXT SP]. When lid speakers are connected to SPEAKER JACKS, set this selector to [LID SP] position to operate SONY XL-4 QUADRADIAL Sound System. Connection of the lid-speakers will automatically eliminates high frequencies (approximately 350 Hz and over) from the self-contained speakers allowing them to act as woofers while the lid speakers act as tweeters for reproducing the full frequency range of sound. When external full range speakers are connected to SPEAKER JACKS, set this selector to [EXT SP] position disconnecting the self-contained speakers. When SPEAKER JACKS are not used, the self-contained speakers act as full range speakers and this selector switch will not function.

28. AC Voltage Selector

This selector located on the rear side is used for selecting the operating AC power line voltage of either 100V, 110V, 117V, 125V, 220V or 240V. For details, refer to "Adaptation to the Local Power Line", on page 13.

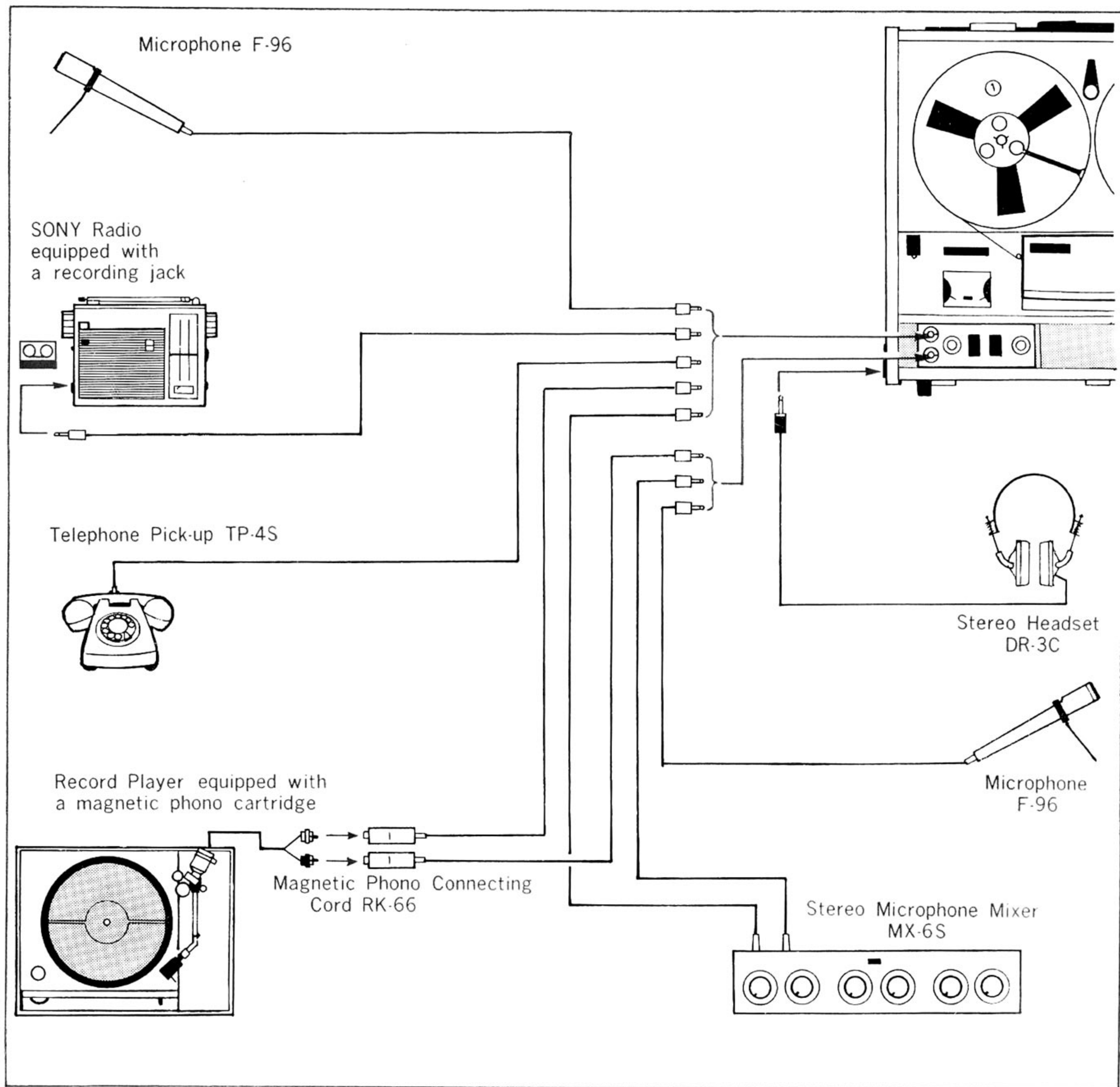
9-A Microphone Input Jacks [MIC]

Two mini type jacks are located inside the small compartment on the front panel together with the other recording facilities.

These inputs accept dynamic microphone SONY F-96 (supplied) or any high quality low impedance microphone. The jack marked [L] is for left channel and jack marked [R] is for right channel.

NOTE: When recording with a microphone (or microphones), howling sound (acoustic feedback) may occur if the microphone is too near the speaker. In this case, reduce the speaker volume or turn the SPEAKER SWITCH OFF.

These inputs can also be used with a telephone pick-up SONY TP-4S (optional), microphone mixer SONY MX-6S (optional), SONY radio equipped with a recording jack and a record player equipped with a crystal or ceramic cartridge for direct recording. If you have a record player equipped with a magnetic phono cartridge, use the optional accessory SONY magnetic phono connecting cord RK-66.



8. Binaural Monitor Jack [BINAURAL MONITOR]

A standard binaural phone jack is located at the left side of the recorder. This output connects to any stereo headset (higher than 8 ohms) which is equipped with a standard binaural phone plug. Recommended headset is the SONY DR-3A (8Ω) which is available as an optional accessory.

When monitoring, turn the SPEAKER SWITCH OFF. Set the SPEAKER MODE SELECTOR to the desired position and adjust SPEAKER VOLUME CONTROL, BASS and TREBLE tone controls as to obtain the desired sound quality.

23. Integrated Record/Playback Connector [REC/PB]

The 5-pin socket is used for interconnection of inputs and outputs of the recorder to an amplifier that incorporates a matching socket. Use the single cable SONY REC/PB connector cable model RC-2 (optional) for connection. No additional connection is required.

24. Auxiliary Input Jacks [AUX INPUT]

These phono type jack inputs accept outputs of an integrated amplifier (recording outputs) FM/AM tuner, tape recorder (monitor outputs or line outputs), record player equipped with a crystal cartridge, etc. for recording programs directly from the connected components. These inputs have an impedance of 100 k ohms and sensitivity of 0.078 volts.

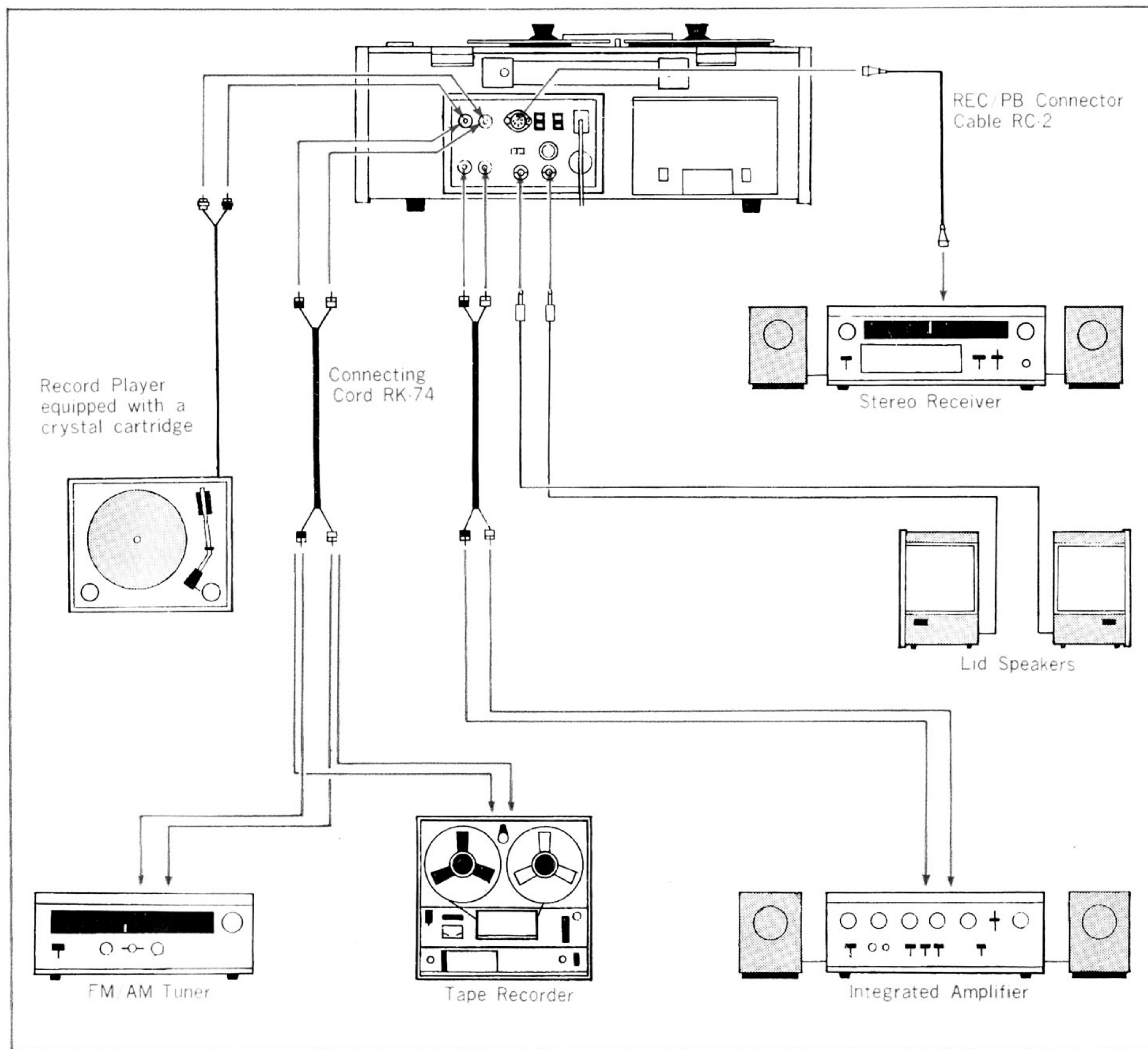
25. Line Output Jacks [LINE OUTPUT]

These phono type jack outputs connect to tape recorder inputs (or auxiliary inputs or line inputs) of an integrated amplifier or pre-amplifier having an input sensitivity of 0.775 volts and impedance of 100 k ohms.

27. Speaker Jacks [SP OUTPUT]

These phone type jack outputs are for connection of the lid integrating recorder speakers or any 8 ohm external full range speakers. Connect the left speaker to [L] jack and the right speaker to [R] jack, respectively.

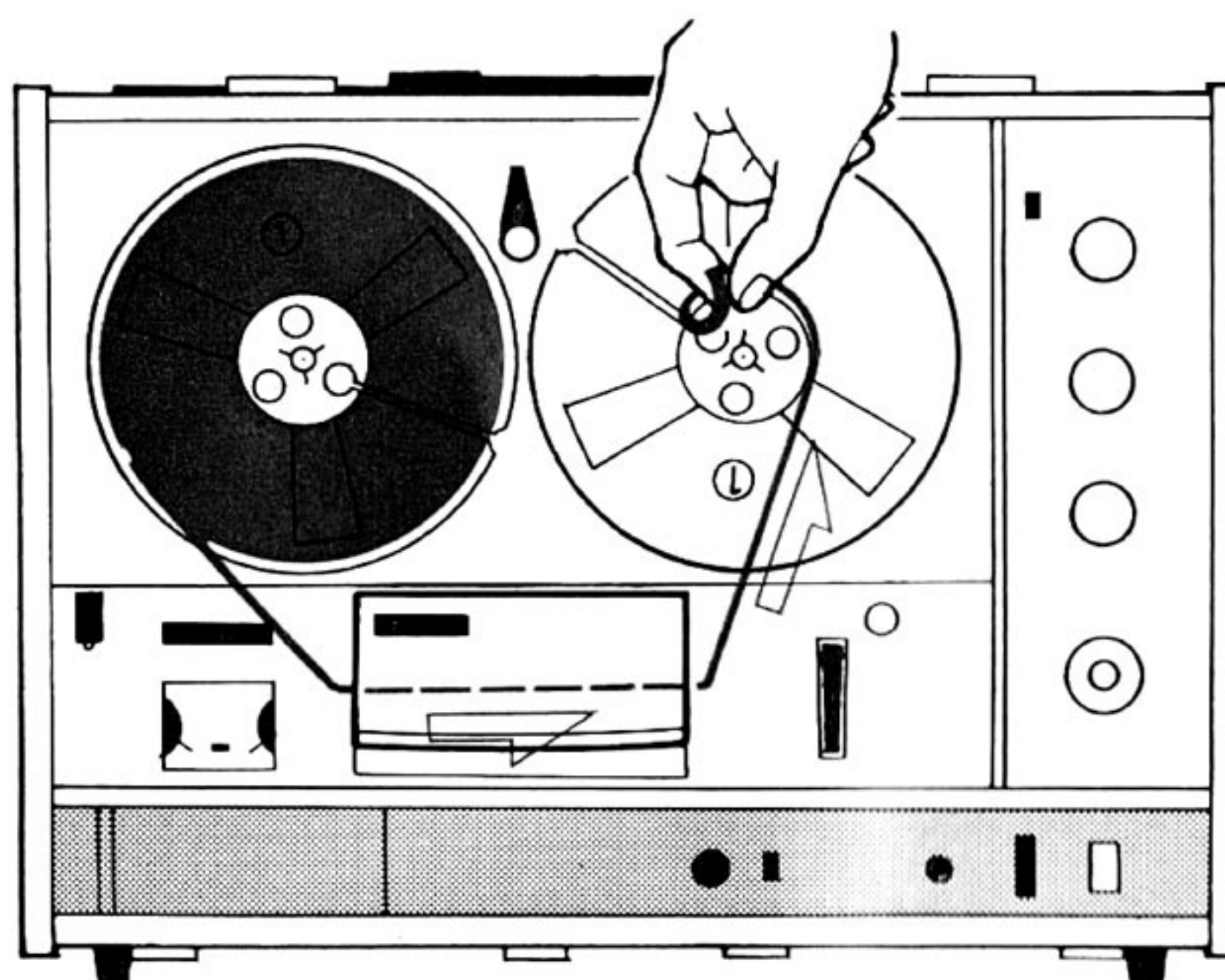
The lid speakers can be separated up to 3.2 m (15 feet) for optimum stereo effect.



Threading Tape

Reel sizes from 7.5 to 18 cm (3~7 inch) diameter are accommodated. Threading procedure is the same for all reel sizes.

1. Place a full reel of tape on the FEED REEL SPINDLE (left). Rotate until the slot of the reel engages the spindle.
2. Place an empty reel on the TAKE-UP REEL SPINDLE (right) and engage as described in Step 1.
3. Unwind approximately 45 cm (18 inches) of tape or leader from the full reel of tape.
4. Keep unwound portion of tape or leader slightly taut with shiny surface to the outside. Bring leader from left to right through the tape path under HEAD COVER. The retractable pinch roller allows an easy tape threading.
5. Wrap it around hub of the empty reel, or insert the end into the slot of the reel. Tape is now ready for playing or recording.
*When the tape recorder is operated vertically, use supplied rubber reel caps to retain reels on the recorder.



Playing Tape

When playing tapes, refer to "Operation of Controls" (page 2) and "Input and Output Connectors" (page 4) for your proper operation of the recorder controls.

To Play 4-Track Stereo Tape

1. Connect the recorder to an AC outlet and press the POWER ON/OFF SWITCH to turn the recorder ON.
2. Connect the lid speakers to SPEAKER JACKS and set the LID SPEAKER/EXTERNAL SPEAKER SELECTOR to [LID SP] position.
3. Place a 4-track stereo recorded tape with side 1 of the tape (tracks 1 and 3) up on the FEED REEL SPINDLE (left) and thread the tape.
4. Select tape speed by turning TAPE SPEED SELECTOR.
5. Set SPEAKER MODE SELECTOR to [STEREO] position.
6. Turn SPEAKER SWITCH [ON].
*For listening through the headset connected to BINAURAL MONITOR JACK, turn SPEAKER SWITCH [OFF].
7. Turn FUNCTION SELECTOR to [FWD] position.
8. Adjust SPEAKER VOLUME CONTROL, BASS and TREBLE tone controls for the desired volume and sound quality.
9. When Side 1 (tracks 1 and 3) is complete, turn FUNCTION SELECTOR to [STOP] position.
10. To play side 2 (tracks 4 and 2), do not rewind the tape, simply reverse and invert the tape reels: place the full reel on the FEED REEL SPINDLE (left) and the empty reel on the TAKE-UP REEL SPINDLE (right). Repeat Steps 7 and 8.
11. When tracks 4 and 2 are complete, the recorder will automatically shut off. Turn FUNCTION SELECTOR to [STOP] position.

29. Fuse Holder [FUSE]

The fuse holder contains a 1.5 ampere fuse.

To replace the fuse turn the holder counterclockwise. Be sure to disconnect the AC power cord from the tape recorder. Replace with a 1.5 ampere fuse only.

30. AC Power Socket [POWER SUPPLY]

This socket is used for connection to AC power line. Insert the AC power cord (supplied) into the socket and plug the other end of the cord into the AC outlet.

31. AC Outlet [UNSW 300W]

This outlet supplies AC power at a maximum of 300 watts to other components. The outlet is not switched off by the POWER ON/OFF SWITCH.

32. AC Outlet [SW 300W]

This outlet supplies AC power at a maximum of 300 watts to other components. The outlet operates only when the POWER ON/OFF SWITCH is ON.

To Play 4-Track Monophonic Tape

The following playback procedure is recommended for a monophonic tape whose sequence of recording is: Track 1—track 4—track 3—track 2.

1. Connect the recorder to an AC outlet and press the POWER ON/OFF SWITCH to turn the recorder ON.
2. Connect the lid speakers to SPEAKER JACKS and set the LID SPEAKER/EXTERNAL SPEAKER SELECTOR to [LID SP] position.
3. Place a 4-track monophonic tape with side 1 up on the FEED REEL SPINDLE (left) and thread the tape.
4. Select tape speed by turning TAPE SPEED SELECTOR.
5. Set SPEAKER MODE SELECTOR to [LEFT] position.
6. Turn SPEAKER SWITCH ON.
*For listening through the headset connected to BINAURAL MONITOR JACK, turn SPEAKER SWITCH OFF.
7. Turn FUNCTION SELECTOR to [FWD] position.
8. Adjust SPEAKER VOLUME CONTROL, BASS TREBLE tone controls to the desired sound quality.
9. When track 1 is complete, turn FUNCTION SELECTOR to [STOP] position.
10. To play track 4, do not rewind tape, simply reverse and invert the tape reels; place the full reel on the FEED REEL SPINDLE (left) and the empty reel on the TAKE-UP REEL SPINDLE (right). Repeat Steps 7 and 8.
11. When track 4 is complete, do not rewind the tape, simply reverse and invert the tape reels.
12. To play tracks 3 and 2, set SPEAKER MODE SELECTOR to [RIGHT] position. Adjust SPEAKER VOLUME CONTROL, BASS and

TREBLE tone controls.

13. When track 3 is complete, reverse and invert the tape reels to play track 2.
14. When the end of tape is reached the recorder will automatically shut off.
Turn FUNCTION SELECTOR to [STOP] position.

Notes on Connecting Speakers

1. Self-contained speakers:

- a) Speaker Jacks are not used.
- b) LID SPEAKER/EXTERNAL SPEAKER SELECTOR does not function. The setting of this selector in either [LID SP] or [EXT SP] has no effect when the self-contained full range speakers are used.
- c) Turn SPEAKER SWITCH ON.

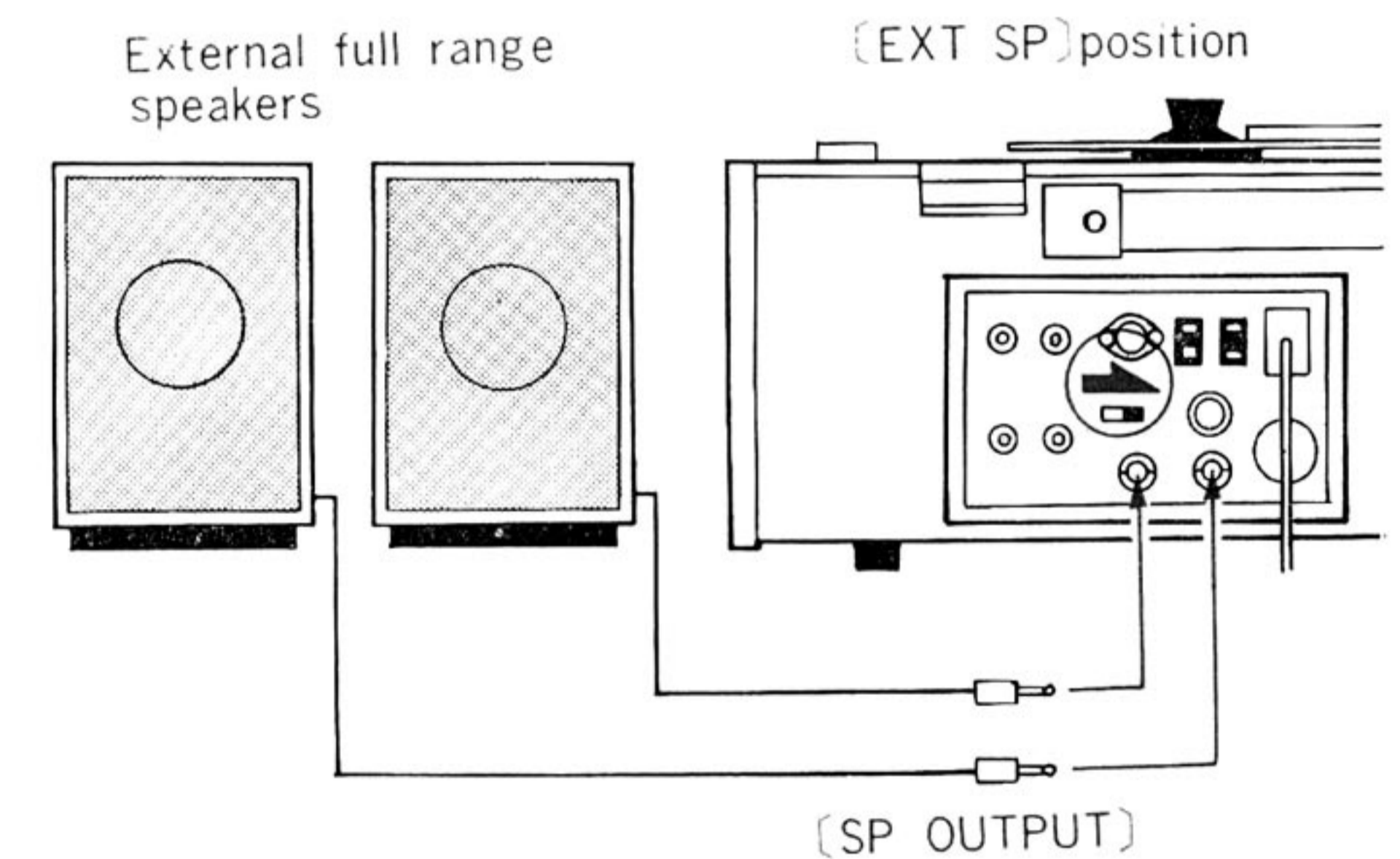
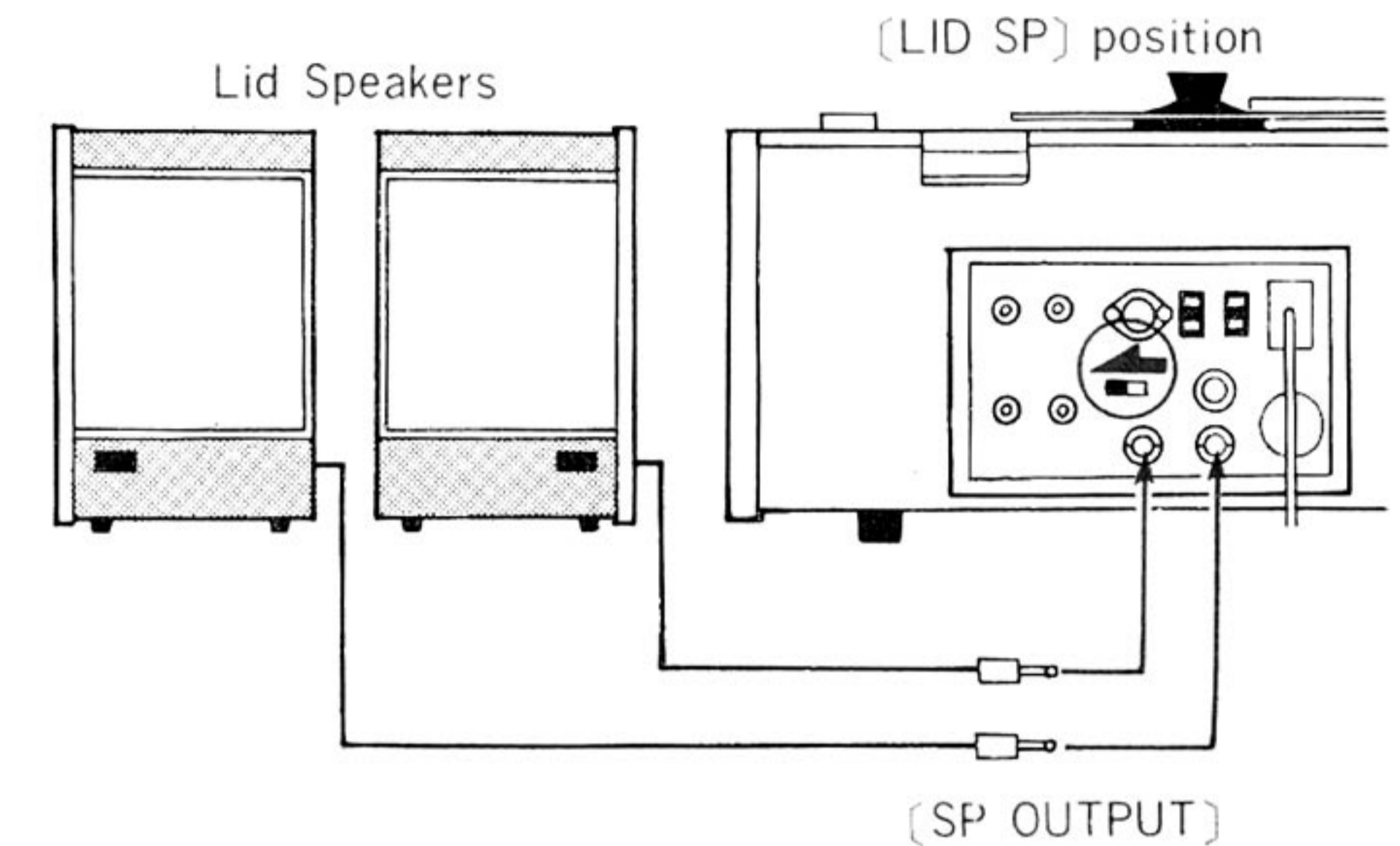
2. XL-4 Quadradial Sound System:

- a) Connect Lid Speaker to SPEAKER JACKS.
- b) Set LID SPEAKER/EXTERNAL SPEAKER SELECTOR to [LID SP] position. The [LID SP] position setting will automatically eliminate high frequencies (approximately 350 Hz and higher) from the self-contained speakers allowing them to act as woofers while the Lid Speakers act as tweeters for reproducing the full frequency range of sound.
- c) Turn SPEAKER SWITCH ON.

3. External full range speakers:

- a) Connect external full range speakers to SPEAKER JACKS.

- b) Set LID SPEAKER/EXTERNAL SPEAKER SELECTOR to [EXT SP] position.
- c) Turn SPEAKER SWITCH ON.



Stereo headset:

- a) Connect a stereo headset to the BINAURAL MONITOR JACK.
- b) The setting of LID SPEAKER/EXTERNAL SPEAKER SELECTOR has no effect upon BINAURAL MONITOR JACK.
- c) Turn SPEAKER SWITCH OFF.

Recording

Before recording, try to estimate the input program's playing time and provide more tape on the recorder than you think you will actually need.

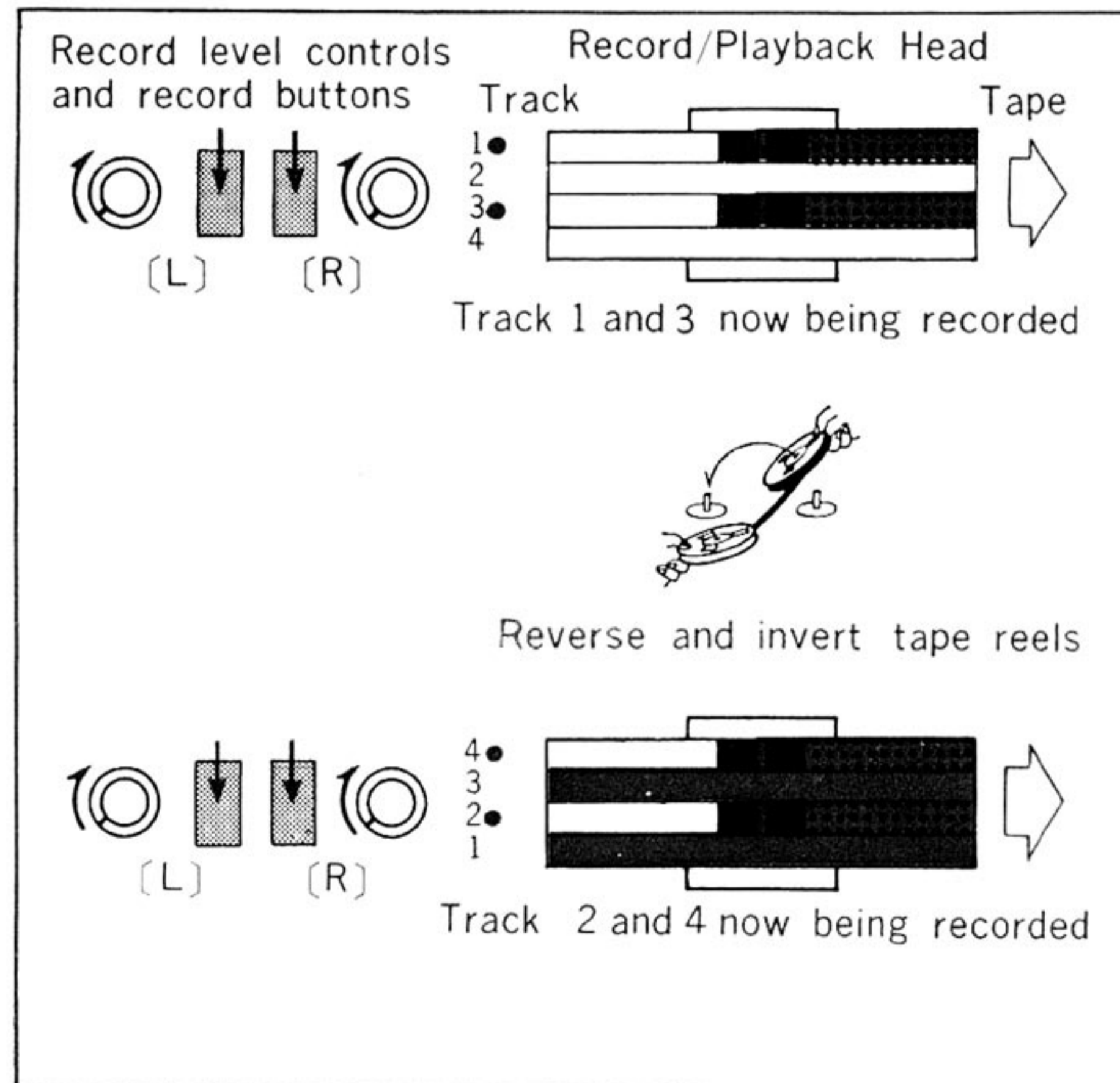
4-Track Stereo Recording

1. Connect the recorder to an AC outlet and press the POWER ON/OFF SWITCH to turn the recorder ON.
2. Thread tape on the recorder and reset TAPE COUNTER.
3. Select desired tape speed by turning TAPE SPEED SELECTOR.
4. Connect stereo source to proper inputs. See page 4, "Input and Output Connectors".
5. Press RECORD BUTTONS and adjust RECORD LEVEL CONTROLS for proper recording level. See VU METERS.

6. Hold RECORD BUTTONS in, turn FUNCTION SELECTOR to [FWD] position. RECORD BUTTONS are locked and stereo recording (tracks 1 and 3) has started.
7. When the end of tape is reached, do not rewind. Turn FUNCTION SELECTOR to STOP position.
8. Reverse and invert tape reels: place the full reel of tape on the FEED REEL SPINDLE (left) and the empty reel on the TAKE-UP REEL SPINDLE (right).
9. Repeat Step 6 to record side 2 (tracks 4 and 2) on the tape.
10. When recording is complete, turn FUNCTION SELECTOR to [STOP] position. The tape can be immediately played back by reversing and inverting the tape reels. See page 7, "To Play 4-Track Stereo Tape".

4-Track Monophonic Recording

1. Connect the recorder to an AC outlet and press POWER ON/OFF SWITCH to turn the recorder ON.
2. Thread tape on the recorder and reset TAPE COUNTER.
3. Select desired tape speed by turning TAPE SPEED SELECTOR.
4. Connect monophonic source to left input [L] for source used. See page 4, "Input and output Connectors".
5. Press LEFT RECORD BUTTON and adjust LEFT RECORD LEVEL CONTROL for proper recording level. See LEFT VU METER.
6. Hold LEFT RECORD BUTTON in, turn FUNCTION SELECTOR to [FWD] position. LEFT RECORD BUTTON is locked and recording on track 1 has started.
7. When the end of tape is reached, do not rewind. Turn FUNCTION SELECTOR to [STOP] position.
8. Reverse and invert tape reels: place the full reel of tape on the FEED REEL SPINDLE (left) and the empty reel on the TAKE-UP REEL SPINDLE (right).
9. Repeat Step 6 to record track 4.
10. When the end of tape is reached, turn FUNCTION SELECTOR to [STOP] position.
11. To record tracks 3 and 2, reverse and invert tape reels.
12. Change the connection on input program from left to right input jack [R].
13. Press RIGHT RECORD BUTTON and adjust RIGHT RECORD LEVEL CONTROL. See RIGHT VU METER.
14. Hold RIGHT RECORD BUTTON in, turn FUNCTION SELECTOR to [FWD] position. RIGHT RECORD BUTTON is locked and recording on



track 3 has started.

15. When the end of tape is reached, do not rewind.
16. Reverse and invert tape reels to record track 2.
17. When the end of track 2 is reached, do not rewind.

The tape can be immediately played back following the playback procedure on page 8, "To Play 4-Track Monophonic Tape".

To Monitor While Recording

While recording, monitoring through either speakers or stereo headset connected to BINAURAL MONITOR JACK is possible.

Speaker Monitoring

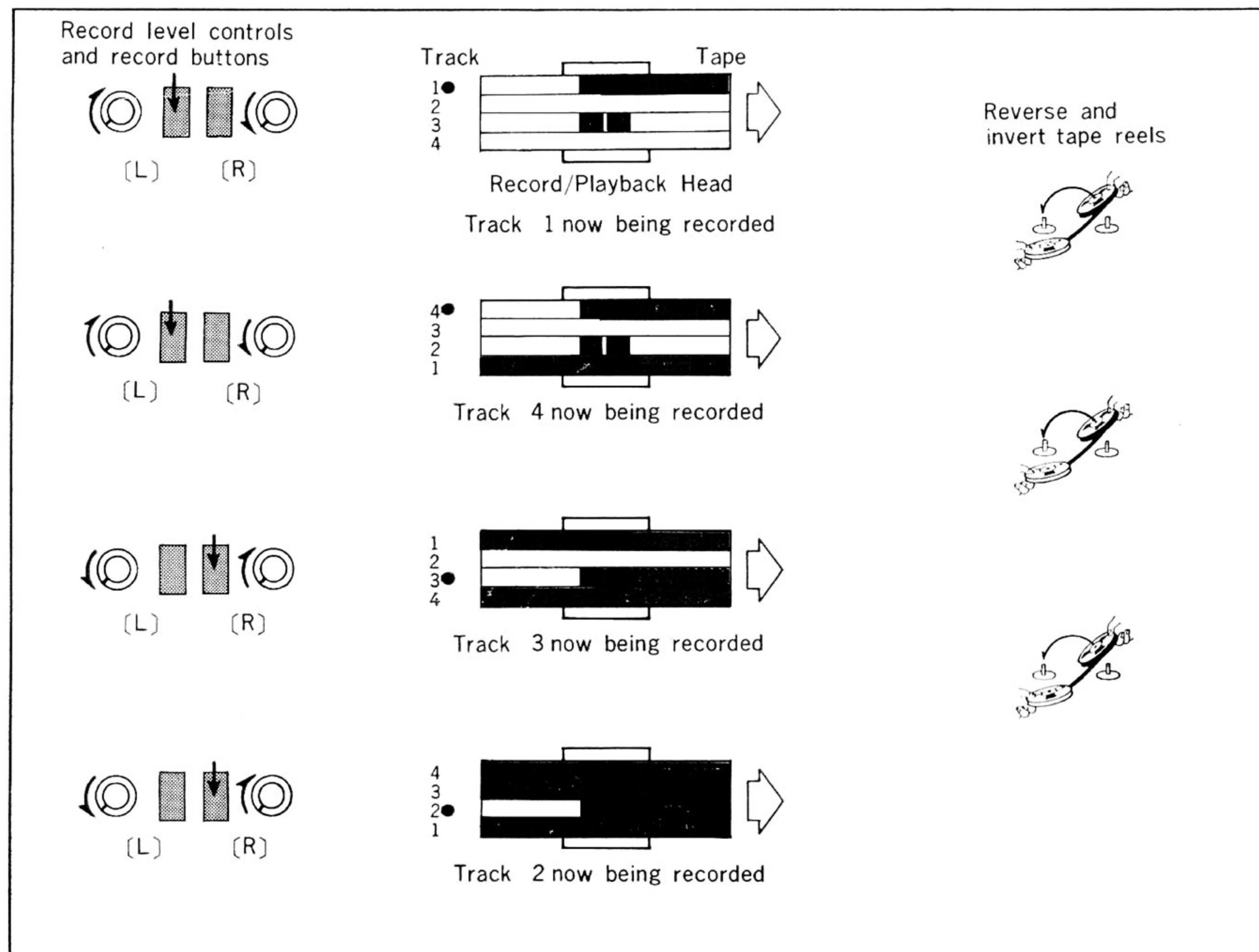
1. Turn SPEAKER SWITCH ON.
2. Set SPEAKER MODE SELECTOR to desired position according to the source connected.
3. Adjust SPEAKER VOLUME CONTROLS, BASS and TREBLE tone controls for your listening preference.

NOTE: While recording with a microphone, howling sound (acoustic feedback) may occur if the microphone is too near the speaker. If this occurs;

- a) Move the microphone away from the speaker.
- b) Reduce speaker volume by adjusting SPEAKER VOLUME CONTROLS.
- c) Turn SPEAKER SWITCH OFF and monitor with a stereo headset.

Stereo Headset Monitoring

1. Connect the stereo headset to BINAURAL MONITOR JACK. Turn SPEAKER SWITCH OFF.
 2. Adjust SPEAKER VOLUME CONTROLS, BASS and TREBLE tone controls for your listening preference.
- SPEAKER VOLUME CONTROLS, BASS and TREBLE tone controls can be adjusted independently of recording level.
 - While recording on track 1 or 4 (left record mode), you can listen to pre-recorded tracks 3 and 2 through speakers or headset by switching SPEAKER MODE SELECTOR from [LEFT] to [RIGHT] position.



Erasing Tape

When the recorder is set in the record mode, the Erase Head will erase the track (or tracks) of the tape for the corresponding traces of the Recording Head. Therefore, when you start a new recording, any previous recordings are automatically erased as the tape passes the Erase Head. You can also erase a tape without adding a new recording. Simply place the recorder in record mode by turning LEFT and RIGHT RECORD LEVEL CONTROLS fully counterclockwise to [0], and run the tape through. The tape will be erased more quickly at the tape speed of 19 cm/sec (7-1/2 ips.) or by use of a bulk eraser.

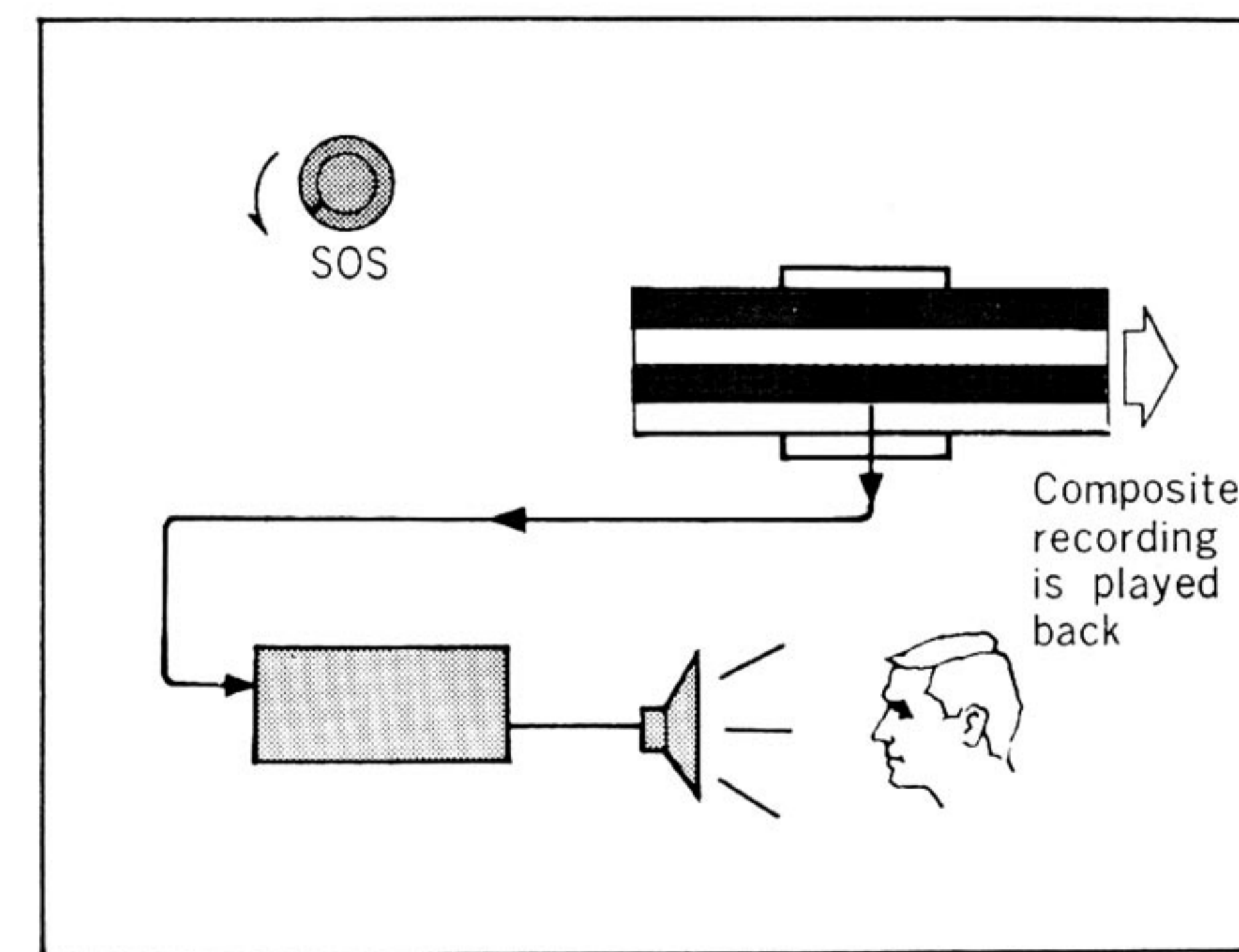
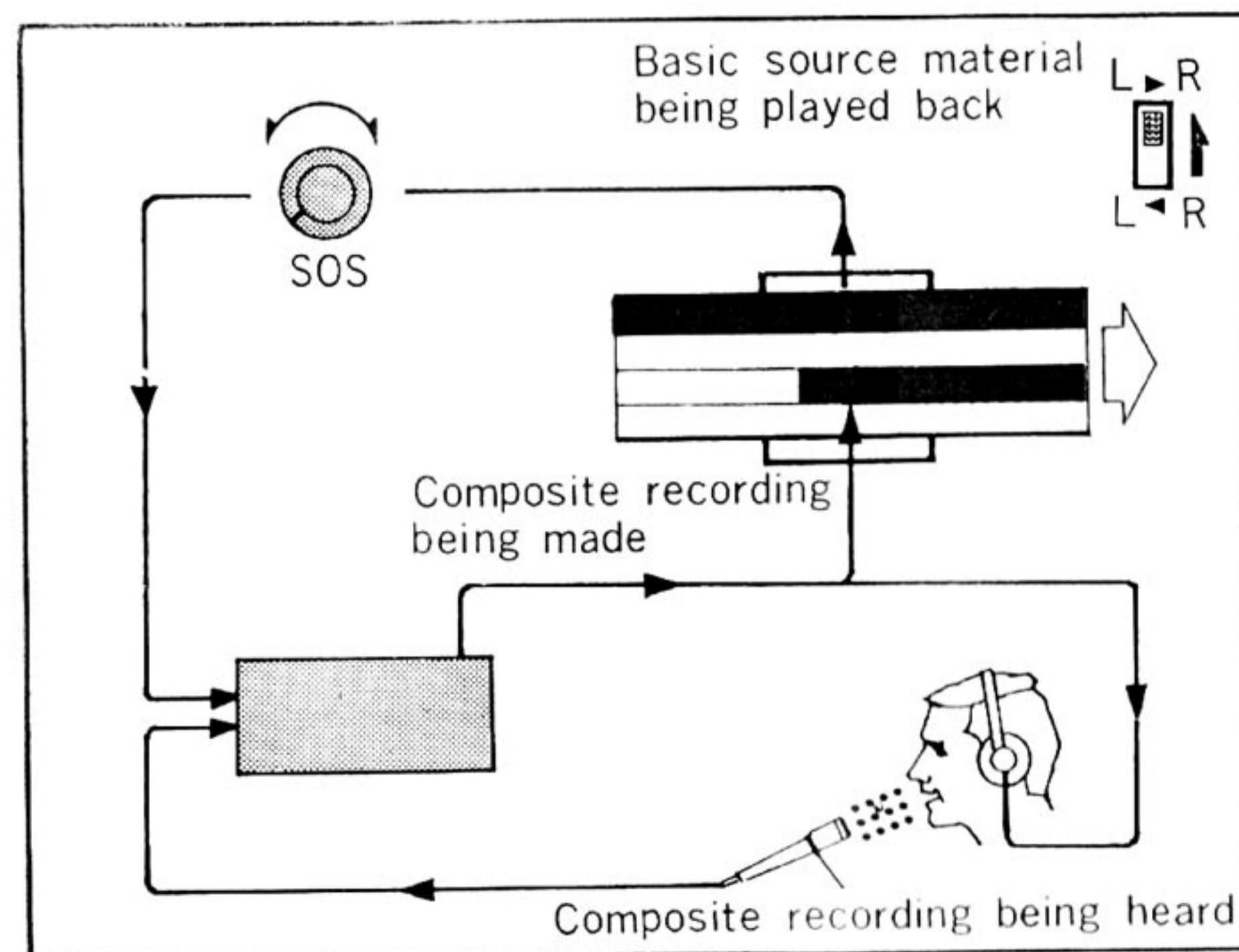
Sound-on-Sound Recording

This recorder is equipped with facilities to produce high quality sound-on-sound recording from left channel to right channel or vice versa.

1. When you make a recording from left channel to right channel, set SOUND-ON-SOUND SWITCH to [L►R] ([L◄R])* position.
2. Record basic source material on track 1 of the left channel (track 3 of the right channel)* according to 4-Track Monophonic Recording on page 9, and rewind the tape back to the beginning.
3. Plug any high quality microphone (low impedance) into the RIGHT (LEFT)* MICROPHONE INPUT JACK.
4. Insert the stereo headset into BINAURAL MONITOR JACK. (Speaker monitoring is also possible).
5. Turn the SPEAKER MODE SWITCH to RIGHT (LEFT)* position.
6. Turn on SOUND-ON-SOUND ON-OFF/VOLUME CONTROL.

7. Push the RIGHT (LEFT)* RECORD BUTTON and turn FUNCTION SELECTOR LEVER to [FWD] position simultaneously. The composite recording being made is heard from the headset or speaker. Hearing the sound and watching right (left)* VU METER, adjust the level of source material by rotating the SOUND-ON-SOUND ON-OFF/VOLUME CONTROL, and the right (left)* microphone recording level by turning the RIGHT (LEFT)* RECORD LEVEL CONTROL. Right (left)* VU METER shows the composite recording level being made.
8. Turn off the SOUND-ON-SOUND ON-OFF/VOLUME CONTROL when the composite recording is completed.
9. Rewind the tape to the beginning and playback composite recording on right (left)* channel according to 4-Track Monophonic Playback on page 8.

*When you make a recording from right channel to left channel, follow the parenthesized operations.



Sound-with-Sound Recording

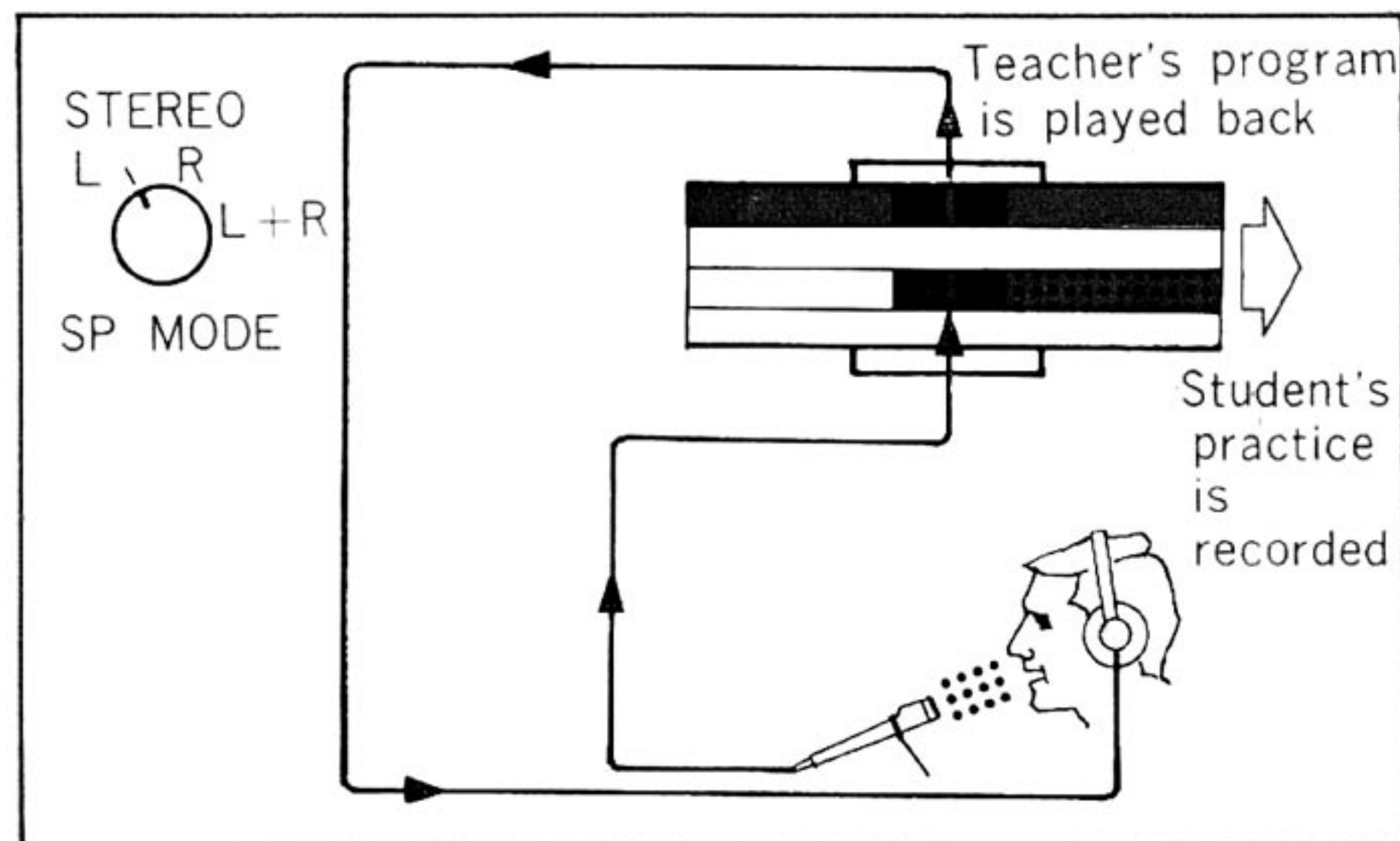
The recorder provides facilities to playback one track while the other track is being recorded. This exclusive feature is ideal for language students who wish to listen to a prerecorded lesson on one track while recording the answers or repetitions on the other track. Both tracks can later be played back separately or simultaneously for comparison.

Master Recording

1. Record teacher's program on track 1 (left channel) as outlined under 4-Track Monophonic Recording on page 9.

Practice Recording

2. Rewind the tape back to the beginning of the master recording.
3. Plug a stereo headset into BINAURAL MONITOR JACK.
Turn SPEAKER SWITCH OFF.
4. Plug microphone into RIGHT MICROPHONE INPUT JACK.

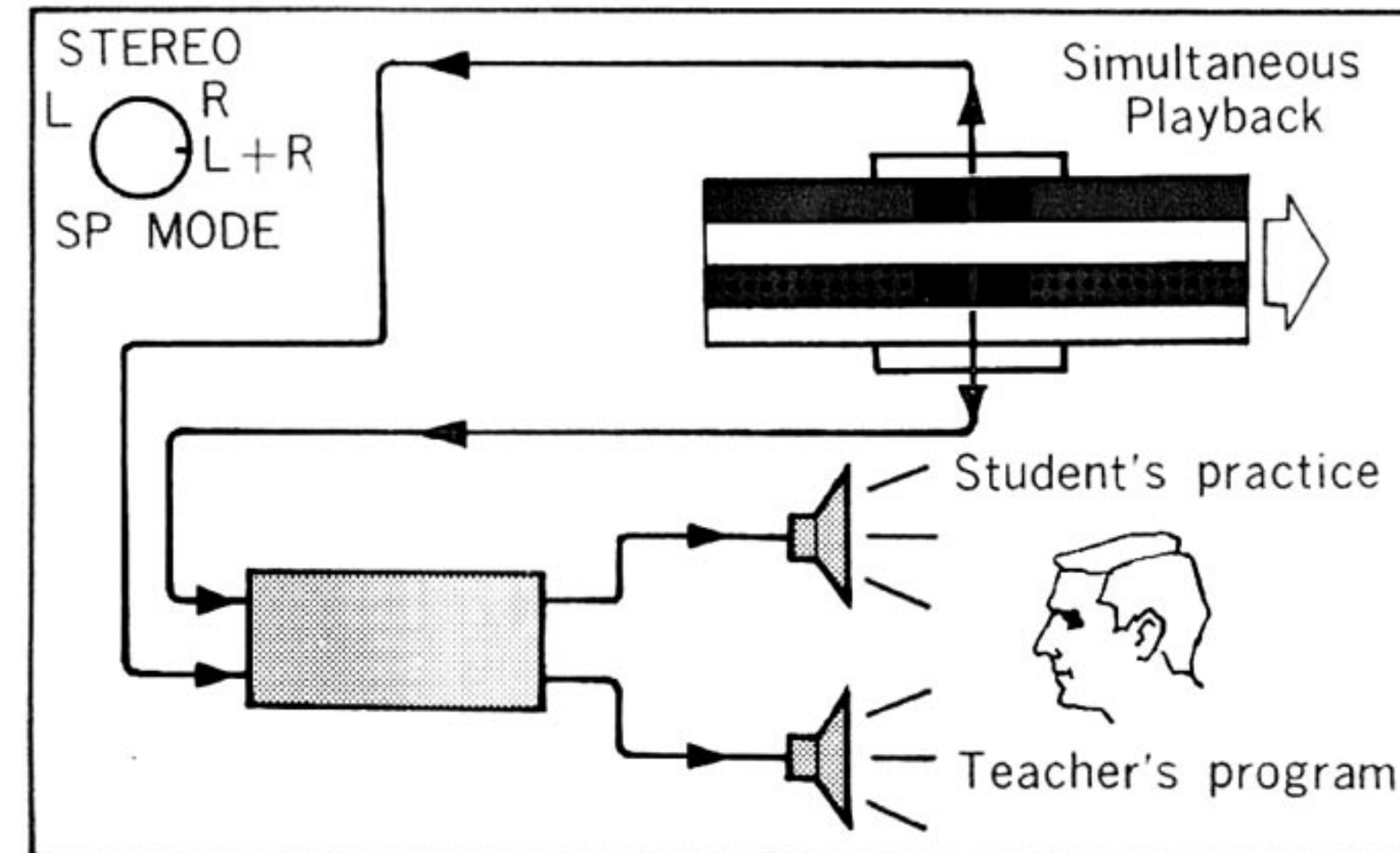


5. Using RIGHT RECORD BUTTON record your practice on track 3 (right channel) by repeating or answering the master recording which is heard through the headset.

Simultaneous Playback

6. Rewind the tape back to the beginning. Set SPEAKER MODE SELECTOR to [L+R] position and playback the tape: then the master track and the practice track are simultaneously reproduced. When you wish to hear the master recording only, set SPEAKER MODE SELECTOR to [LEFT] position and to hear the practice recording only, set SPEAKER MODE SELECTOR to [RIGHT] position.

In the above method, and the practice recordings are made separately on different channels, so that the practice track can be repeatedly recorded without erasing the master track.



Public Address

This recorder can be used as public address system for microphone, phonograph, FM/AM tuner, etc.

This advanced feature is accomplished by the special RECORD BUTTONS, which permit the use of the speakers (self-contained and/or lid speakers or external full range speakers connected to SPEAKER JACKS) independent of tape motion.

1. Connect proper input program source to the proper input jack. For stereophonic application, connect both [L] (left) and [R] (right) jacks. See page 4, "Input and Output Connectors".
2. Set the recorder in RECORD mode without threading tape. Adjust volume level in the same procedure as recording level adjustments.
•The volume should not be increased to the point where VU METER needle goes beyond the red zone.
3. Press SPEAKER SWITCH to turn the speakers ON.
4. Adjust sound volume by turning SPEAKER VOLUME CONTROLS.

NOTE: The howling sound (acoustic feedback) may occur when the microphone is too near the speaker. If it occurs, keep the microphone away from the speaker, or use external speakers.

5. When you are finished with the public address facility, release RECORD BUTTONS. See page 2, "Operation of Controls".

Adaptation to the Local Power Line

AC VOLTAGE

The recorder can be set for operating on an AC power line voltage of either 100V, 110V, 117V, 125V, 220V or 240V by re-setting the AC VOLTAGE SELECTOR PLUG located at the rear panel.

To change the voltage setting, pull out the AC VOLTAGE SELECTOR PLUG and firmly re-insert it to the VOLTAGE SELECTOR with the proper voltage figure appearing in the cutout of the selector plug.

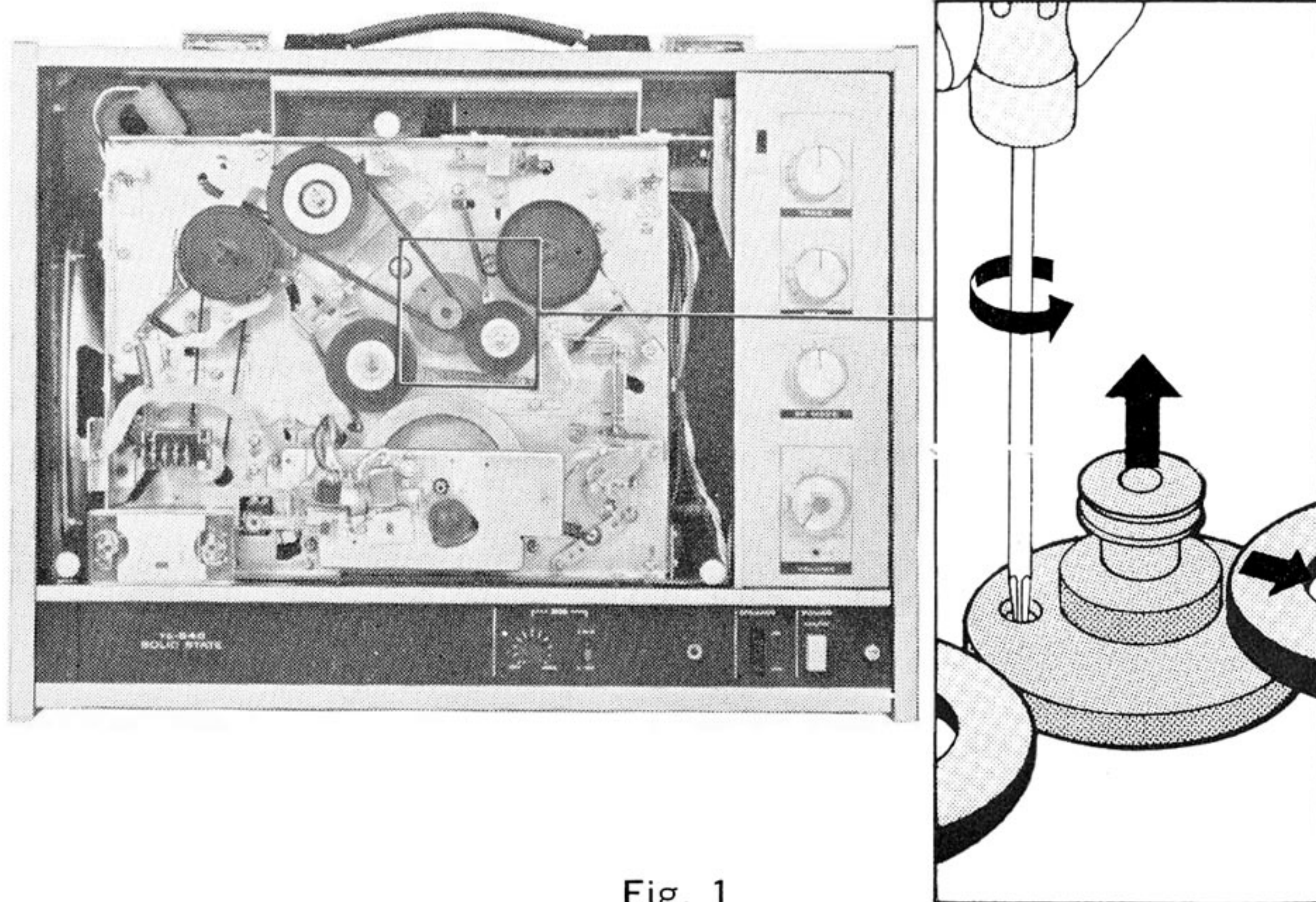


Fig. 1

LINE FREQUENCY

The MOTOR PULLEY and tapping of the MOTOR CAPACITOR TERMINALS must be altered if the line frequency differs from what the recorder is adjusted for.

To Change MOTOR PULLEY (Fig. 1)

Remove the top cover panel as described in "Maintenance" on page 14. The MOTOR PULLEY is located at the center of the drive mechanism. Remove the rubber belt from the idler wheel and the MOTOR PULLEY. Loosen the screw on the MOTOR PULLEY and remove it by holding the idler wheel on one side. Replace the other MOTOR

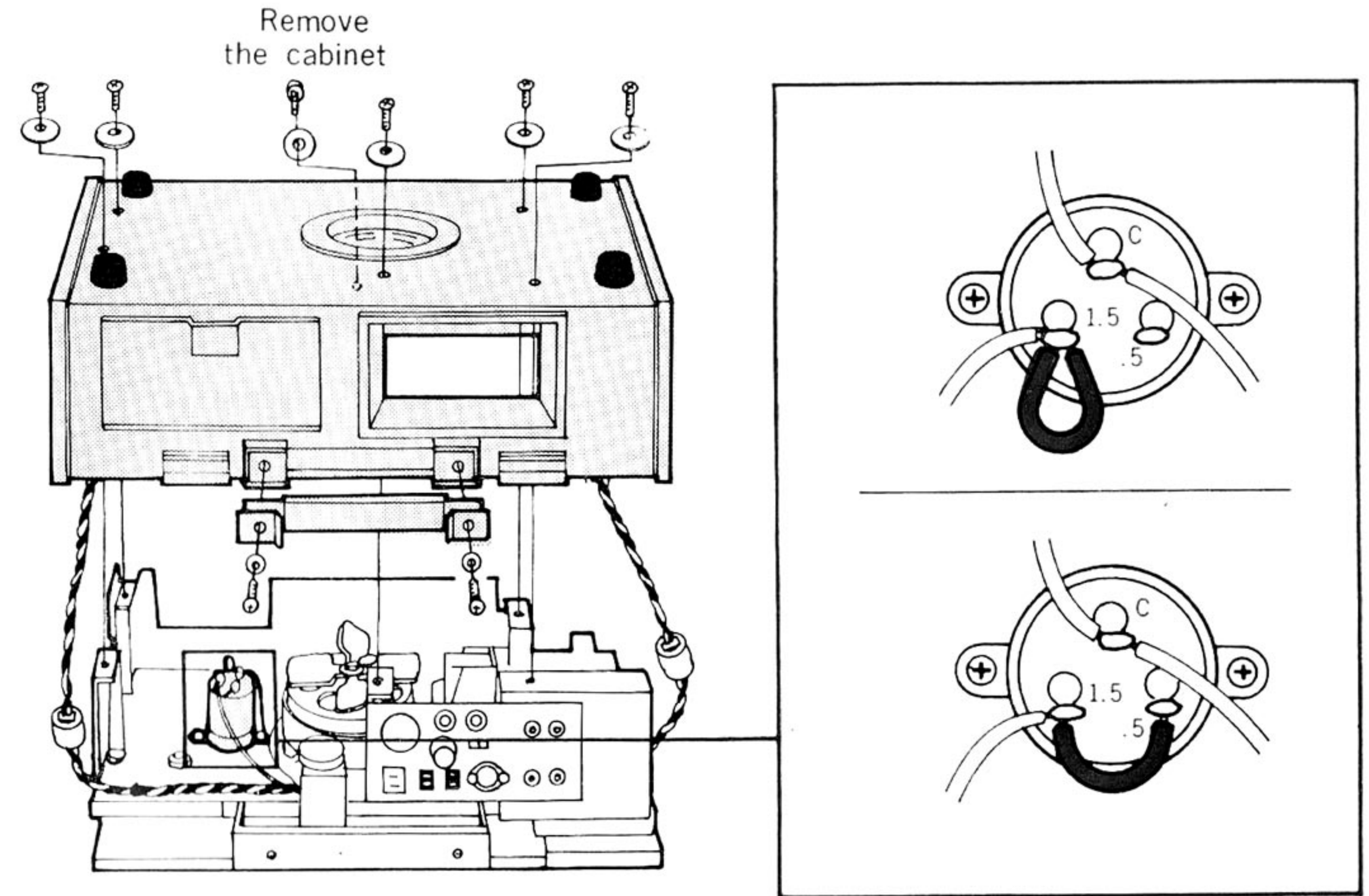


Fig. 2

PULLEY supplied with the recorder and tighten the screw. Thread the rubber belt on the MOTOR PULLEY and the idler wheel and then, place the top cover panel.

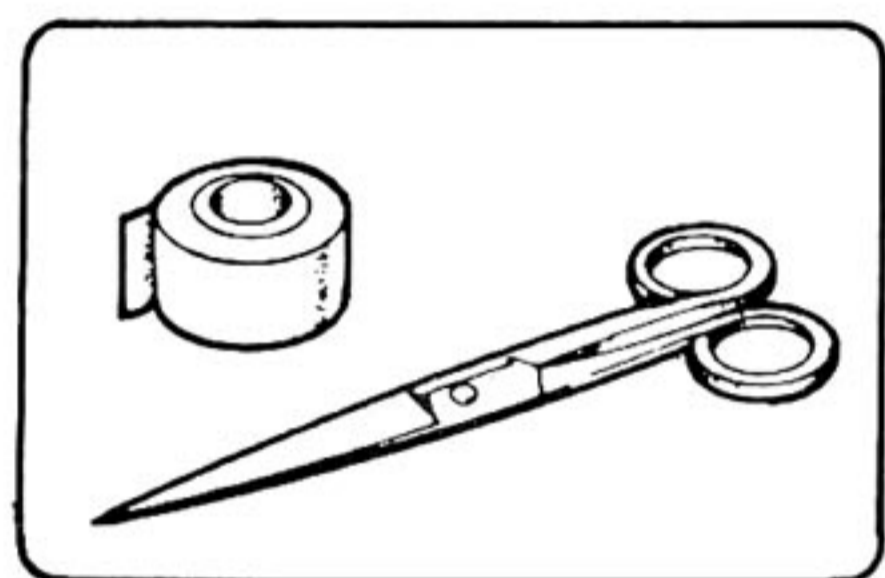
To change tapping of the MOTOR CAPACITOR TERMINALS (Fig. 2)

The MOTOR CAPACITOR is located at the rear side of the drive mechanism. Loosen 5 screws located at the bottom, 1 screw at the rear panel and 2 screws on the grip.

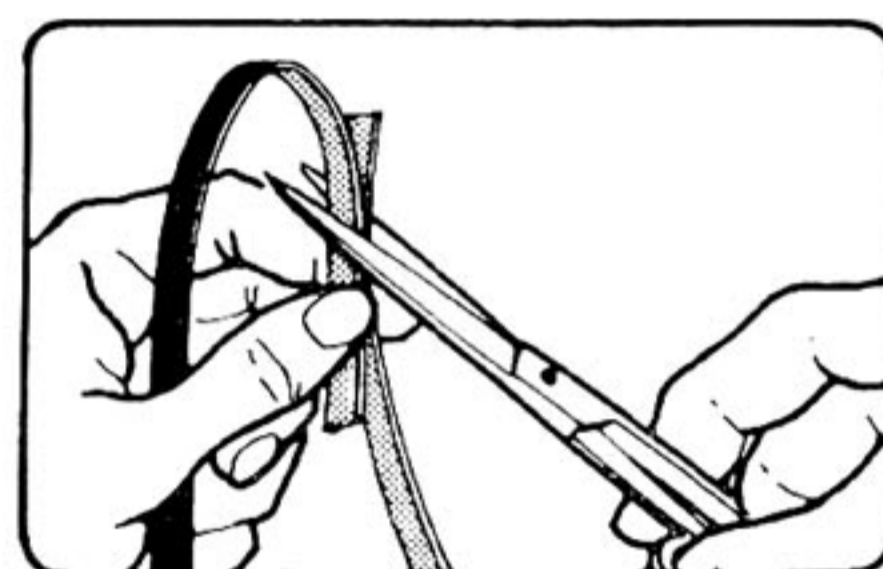
Remove the cabinet. Change the tapping of the terminals by soldering as illustrated.

Splicing Tape

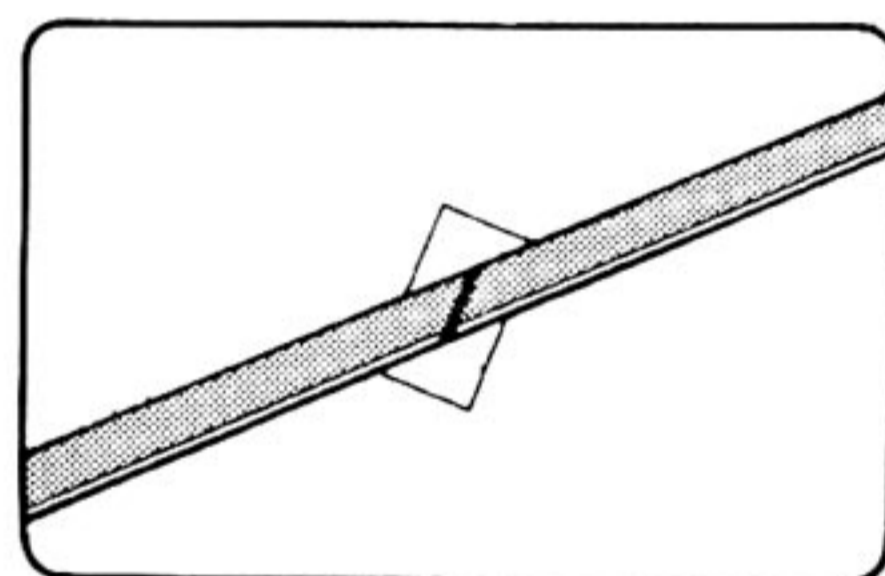
1. Use splicing tape (supplied) and a pair of scissors.
2. Overlap the recording tapes and make a diagonal cut across both tapes.
3. Place a piece of splicing tape on a flat surface. Then put the both ends of the tape with dull side up on it. Be sure to make the ends meet without overlapping.
4. Trim off the excess splicing tape.



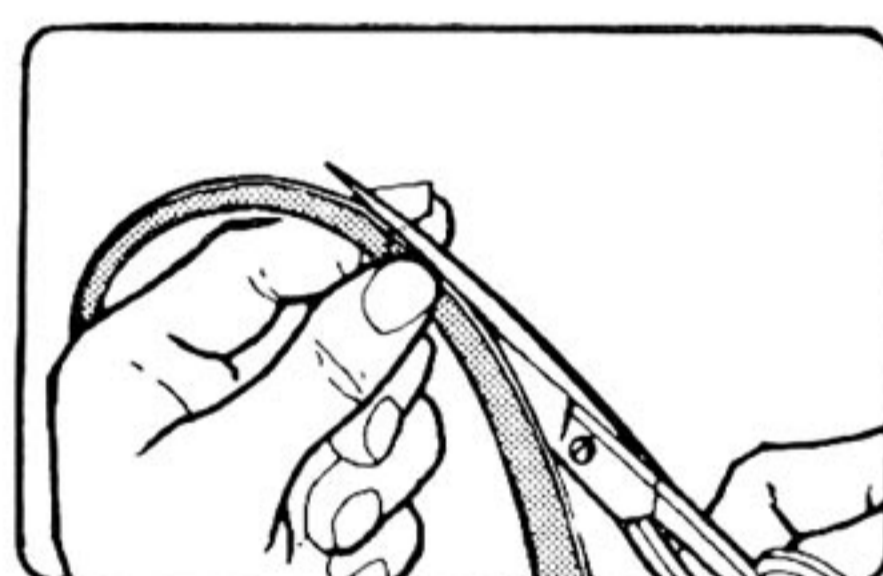
(1)



(2)



(3)



(4)

Maintenance

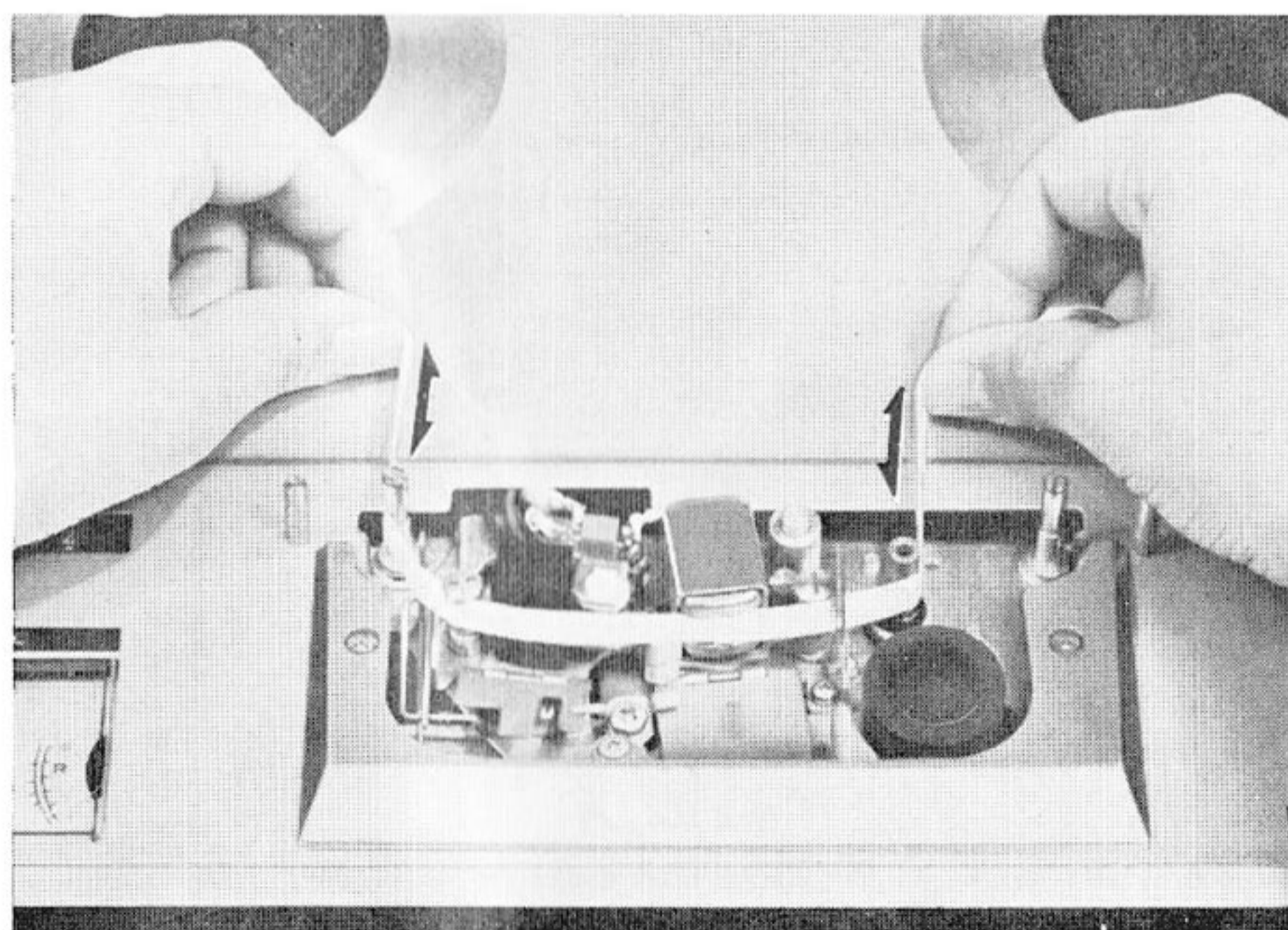
Cleaning Tape Path

Intimate contact between heads and tape is important for optimum performance: dirty and contaminated heads will impair head contact. Therefore, clean heads after every ten hours of use or when necessary. Also, clean the capstan, pinch roller surface and tape guide. This protects heads from oxide deposits causing flutter and wow.

Remove the HEAD COVER by loosening the screws located at the back of the head cover with a small screw driver. Use the head cleaning ribbon (supplied) or a piece of soft cloth and carefully wipe the portion of the heads over which the tape travels.

*In the case the deposits of the head cannot be removed, dampen the ribbon or cloth with denatured alcohol.

NOTE: Do not place magnet or piece of steel near the heads to avoid head from magnetizing.

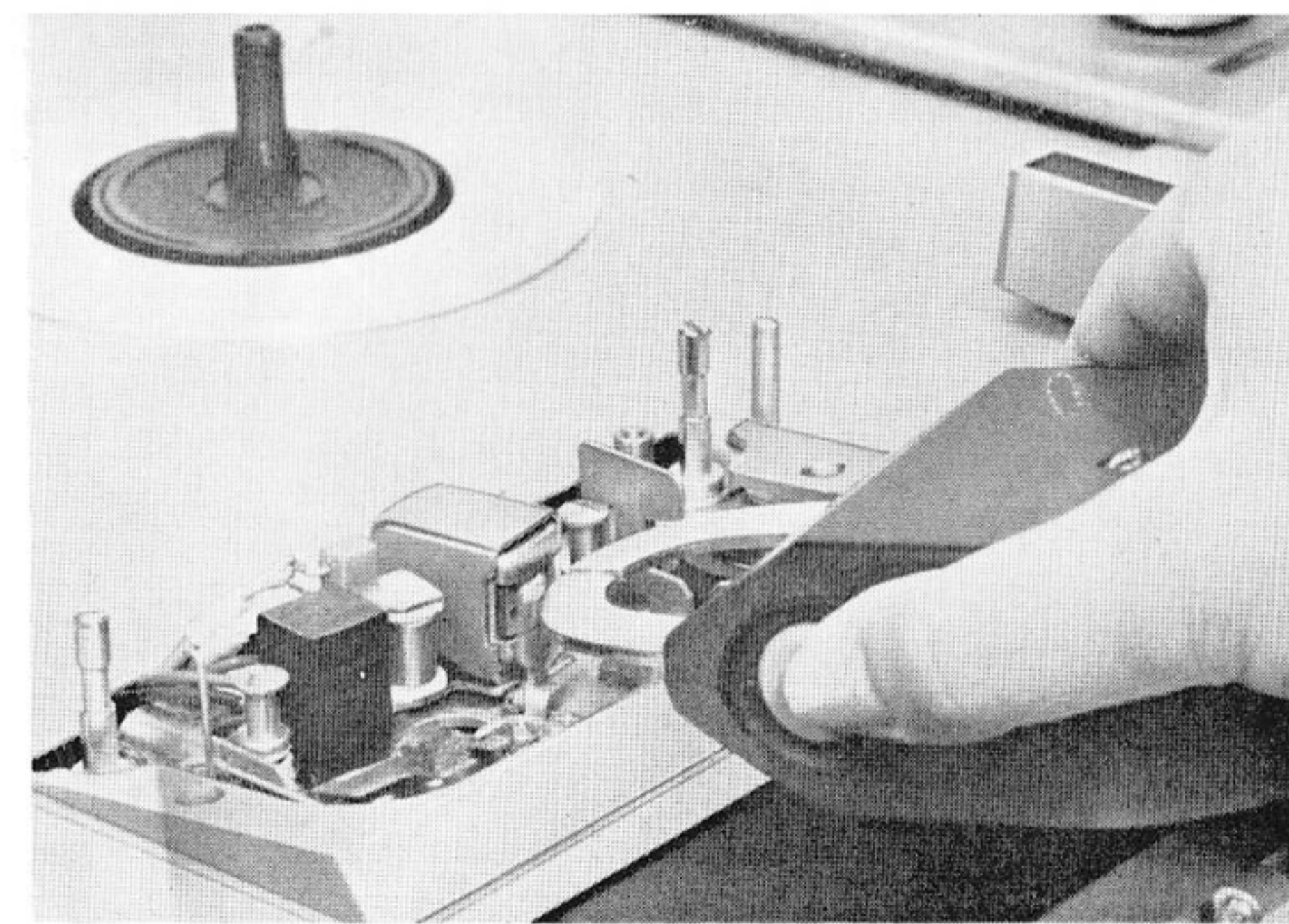


Demagnetizing Head

Through continuous use, residual magnetism will be gradually built up on the head and this excessive residual magnetism will produce noise while the tape is being played. Therefore, periodic use of the SONY head demagnetizer HE-2 or equivalent is recommended for best possible performance.

Turn the recorder OFF and remove the HEAD COVER by loosening screws located at the rear side of the head cover. Plug the demagnetizer into an AC outlet. Pressing on/off switch of the demagnetizer to turn on and bring its tips close to the playback head. Do not touch the surface of the head with tips of the demagnetizer. Run the tips up and down the head several times and slowly remove the demagnetizer from the head.

NOTE: Demagnetizing is not required for Erase Head.



Lubricating Capstan, Pinch Roller and Idler Shafts

Use the supplied SONY oil or any light machine oil and lubricate (1) Capstan, (2) Pinch Roller and (3) Idler Shafts every 6 months. Avoid excessive lubrication. It may cause slippage in the mechanism and contamination of your tape.

(1) Capstan bearing

Remove the HEAD COVER by loosening the screws located at the rear side of the head cover. Lubricate with 3 drops of oil. Do not stain capstan surface.

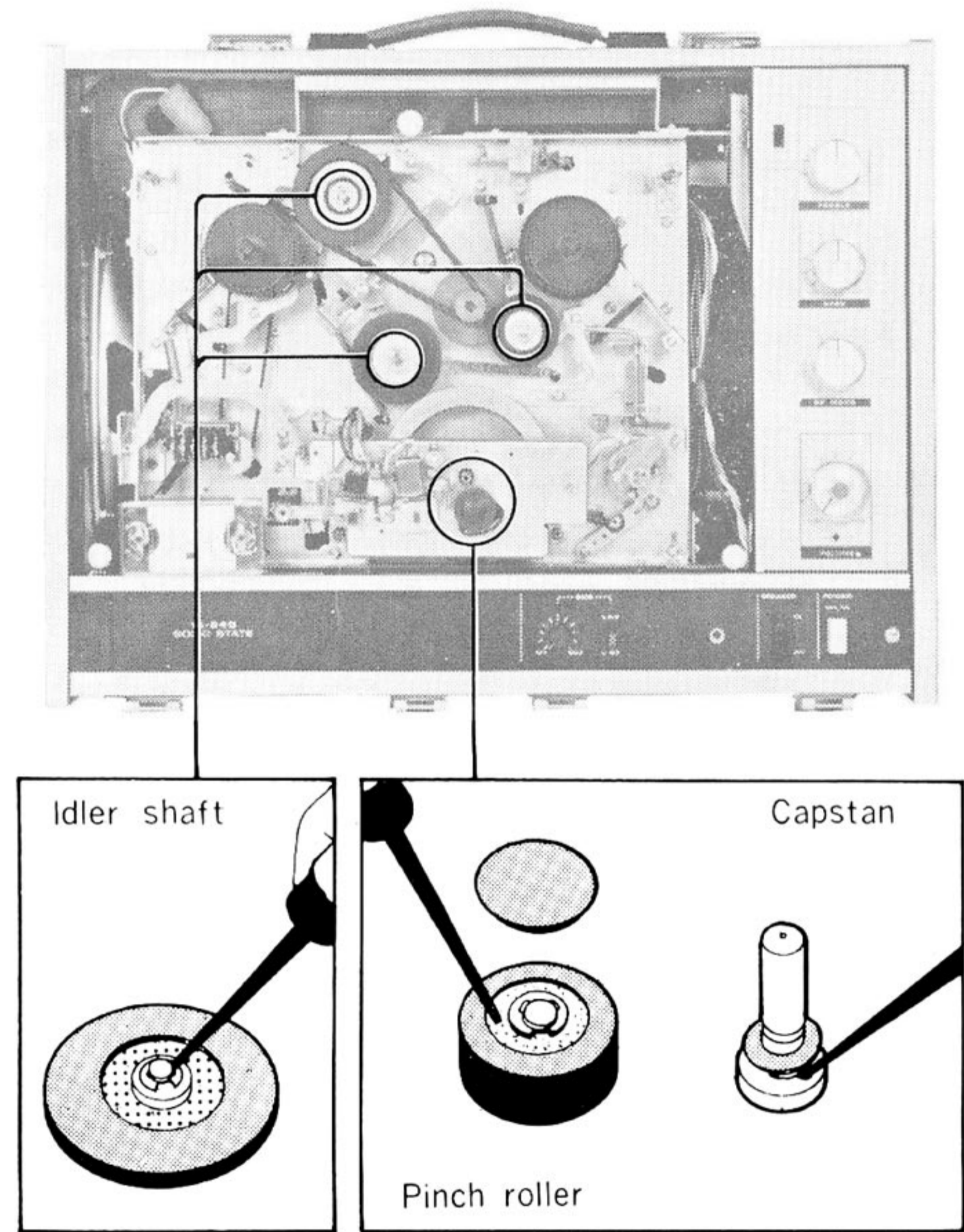
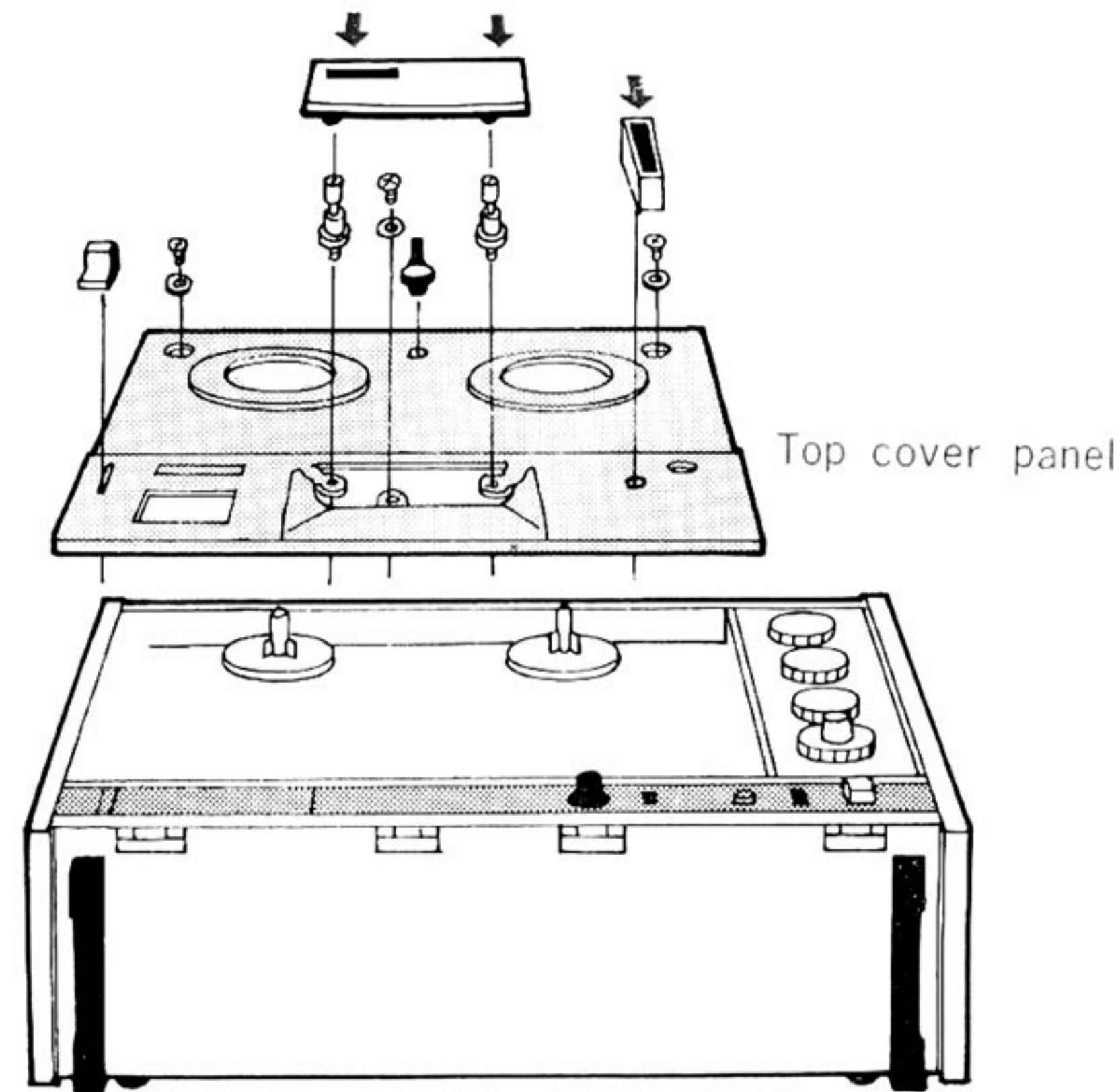
(2) Pinch Roller bearing

Remove the HEAD COVER by loosening the screws located at the rear side of the head cover. Lubricate with 1 drop. Do not stain rubber surface.

(3) Idler Shafts

Remove the HEAD COVER, TAPE SPEED SELECTOR KNOB, INSTANT STOP LEVER, FUNCTION SELECTOR KNOB by loosening retaining screws. Then remove the top cover panel by loosening 5 screws as illustrated. Lift the top cover panel raising the rear side first.

Lubricate 3 idler shafts with 1 drop each of oil. Remove shaft covers for lubricating two shafts.



Technical Specifications

Power requirements: 65 watts (70 VA), AC 100, 110, 117, 125, 220 or 240 volts, 50/60 Hz

Tape speed: 19 cm/sec (7-1/2 ips), 9.5 cm/sec (3-3/4 ips)
4.8 cm/sec (1-7/8 ips)

Reels: 18 cm (7 inches) or smaller

Recording system: 4-track stereophonic or monophonic

Frequency response: 30~20,000 Hz at 19 cm/sec (7-1/2 ips)
30~13,000 Hz at 9.5 cm/sec (3-3/4 ips)
30~10,000 Hz at 4.8 cm/sec (1-7/8 ips)

Wow and flutter: 19 cm/sec (7-1/2 ips) 0.09%
9.5 cm/sec (3-3/4 ips) 0.12%
4.8 cm/sec (1-7/8 ips) 0.16%

Signal-to-noise ratio: 50 dB

Harmonic distortion: 2%

Level indicator: VU Meters calibrated to NAB standard

Tone controls: Two separate controls for bass and treble

Inputs: Microphone inputs: will accommodate any microphone of 600 ohm impedance
Sensitivity -72 dB (0.19 mV)
Auxiliary inputs:
Sensitivity -20 dB (0.078 V)
Impedance approx. 100 k ohms

Outputs: Line outputs: 0 dB (0.775 V)
Load impedance 100 k ohms
Speaker outputs: Load impedance 8 ohms
Binaural monitor output: will accommodate stereo headset (Higher than 8 ohms).

**Integrated record/
playback connector:** Input sensitivity -40 dB (7.8 mV)
Input impedance 10 k ohms
Output sensitivity 0 dB (0.775 V)

Output impedance 10 k ohms

Recording time: 4-track stereo 4 track monophonic
1 hr. 30 min. 3 hrs.
3 hrs. 6 hrs.
6 hrs. 12 hrs.
at 19 cm/sec (7-1/2 ips)
at 9.5 cm/sec (3-3/4 ips)
at 4.8 cm/sec (1-7/8 ips)

Power output: 20 watts total (dynamic power)
10 watts total (undistorted)

Transistors: 24 pieces

Diodes: 8 pieces

Record/playback head: PP30-4202N

Erase head: EF-18-2902H

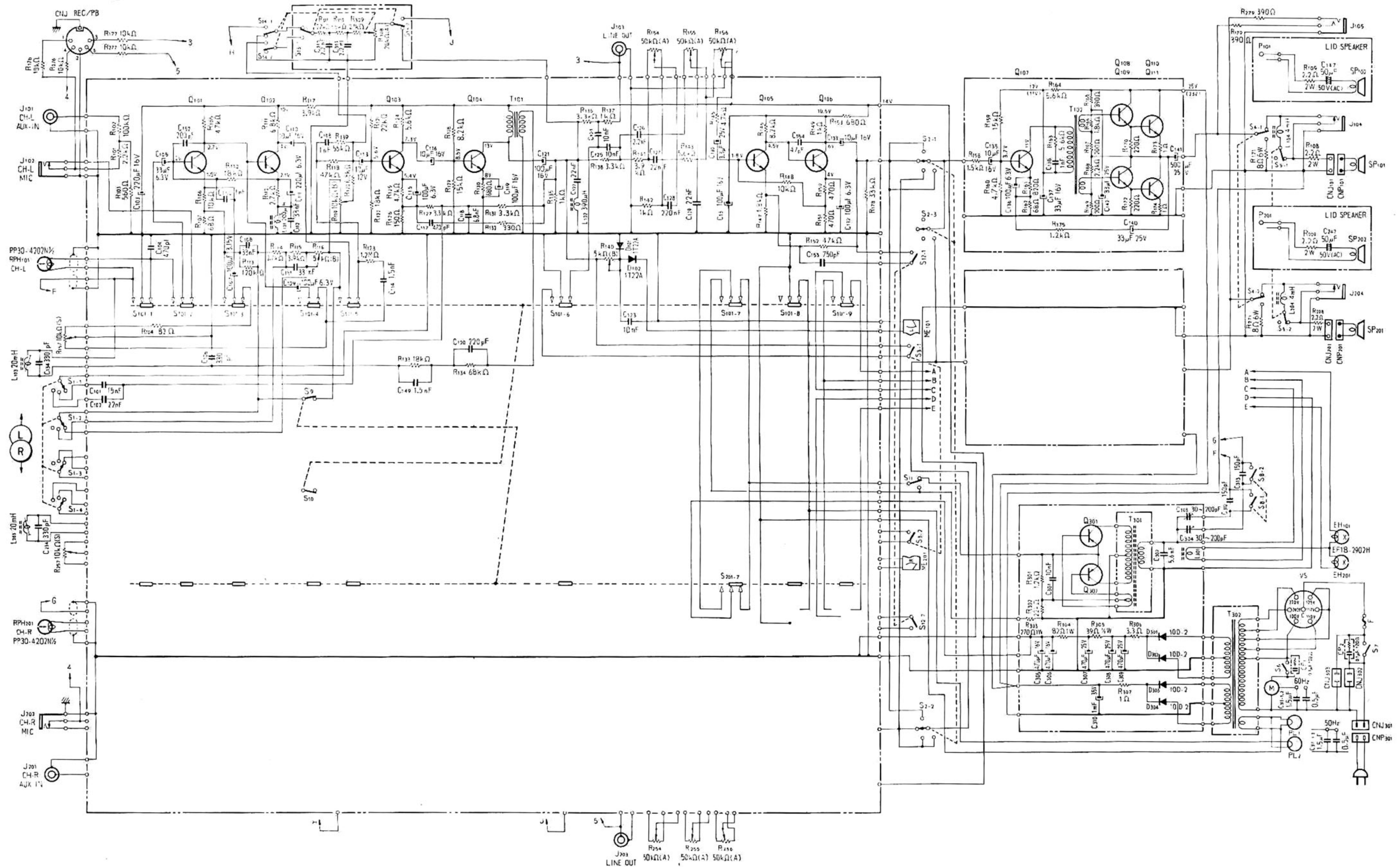
Dimensions: 500 (w) × 252 (h) × 391 (d) mm
(19-11/16 × 9-15/16 × 15-7/16")

Weight: 19 kg (41 lb 10 oz)

Supplied accessories: Microphones F-96 2
Demonstration tape super 5 1
SONY Reel R-7A 1
Connecting cord RK-74 1
SONY oil OL-1K 1
Motor pulley 1
Splicing tape PS-2 1
Reel caps 2
AC power cord 1
Head cleaning ribbon 1

Hz (Hertz): Cycles per second
Design and specifications subject to change without notice

Schematic Diagram



Q101, 201	2SC 631	Q108, 208	2SC 634
Q102, 202	2SC 631	Q109, 209	2SC 634
Q103, 230	2SC 631	Q110, 210	2SD 28
Q104, 204	2SC 318	Q111, 211	2SD 28
Q105, 205	2SC 634	Q301	2SB 383
Q106, 206	2SC 634	Q302	2SB 383
Q107 207	2SC 633		

- S_{101, 201} : RECORD PLAYBACK SWITCH (IN RECORD MODE)
- S₁ : EQUALIZER SWITCH (19 cm/sec POSITION)
- S₂ : SPEAKER MODE SWITCH (STEREO POSITION)
- S₃ : MUTING SWITCH
- S₄ : SPEAKER ON/OFF SWITCH
- S₅ : EXT SP/LID SP SWITCH
- S₆ : AUTOMATIC SHUT-OFF SWITCH
- S₇ : POWER ON/OFF SWITCH

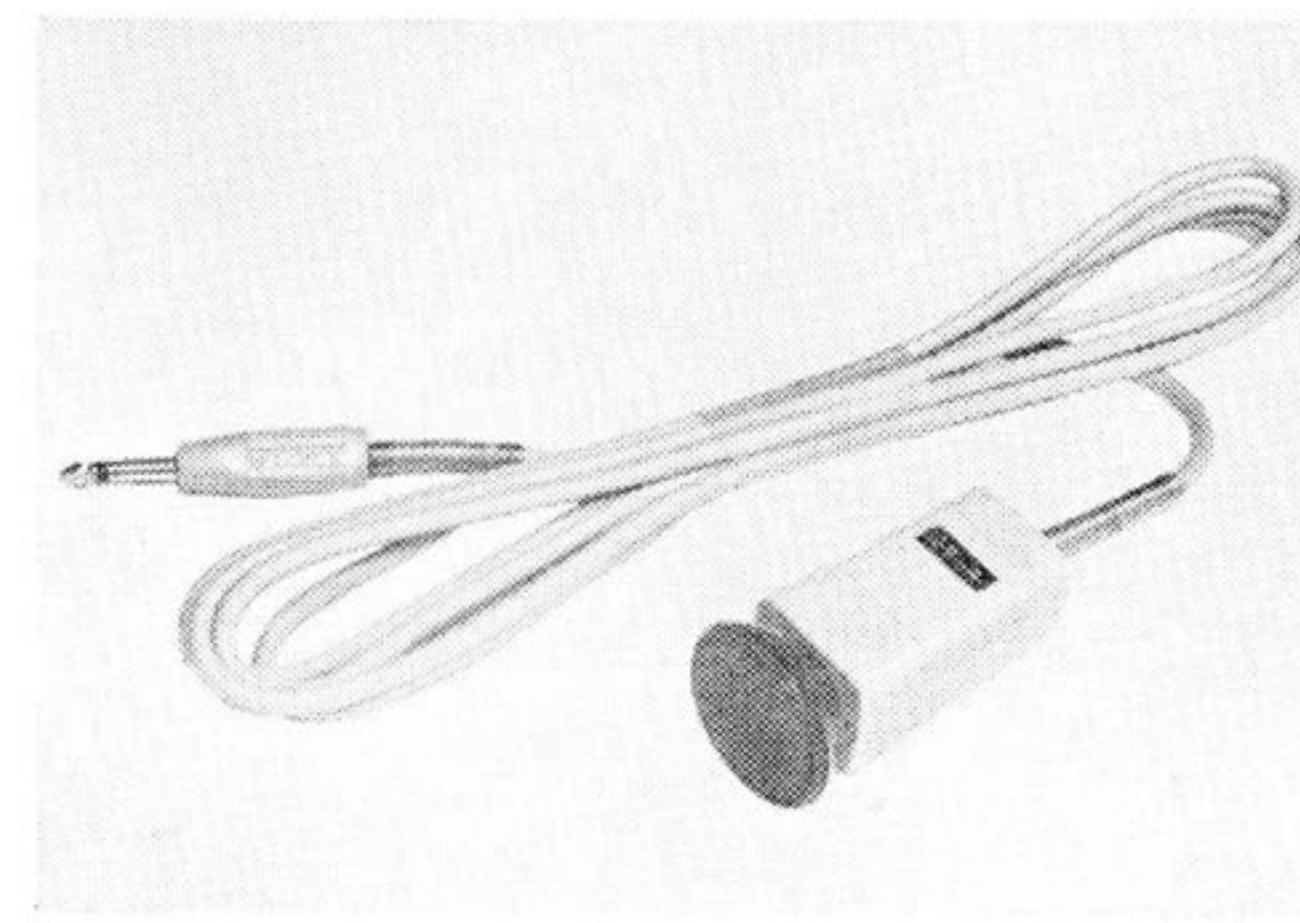
- S₈ : BIAS CONTROL SWITCH (OFF IN 19, ON IN 9.5 and 4.8 cm/sec)
 - S_{9,10} : MONAURAL RECORD SWITCH
 - S₁₁ : BIAS ON/OFF SWITCH (FORWARD POSITION)
 - S₁₂ : NOISE SUPPRESSOR ON/OFF SWITCH
 - S₁₃ : SOUND-ON-SOUND CH. SELECT SWITCH
 - S₁₄ : SOUND-ON-SOUND DEFEAT SWITCH
- VOLTAGE INDICATIONS IN () ARE WHEN DELIVERING 1Wx2 POWER OUTPUT

Recommended Accessories



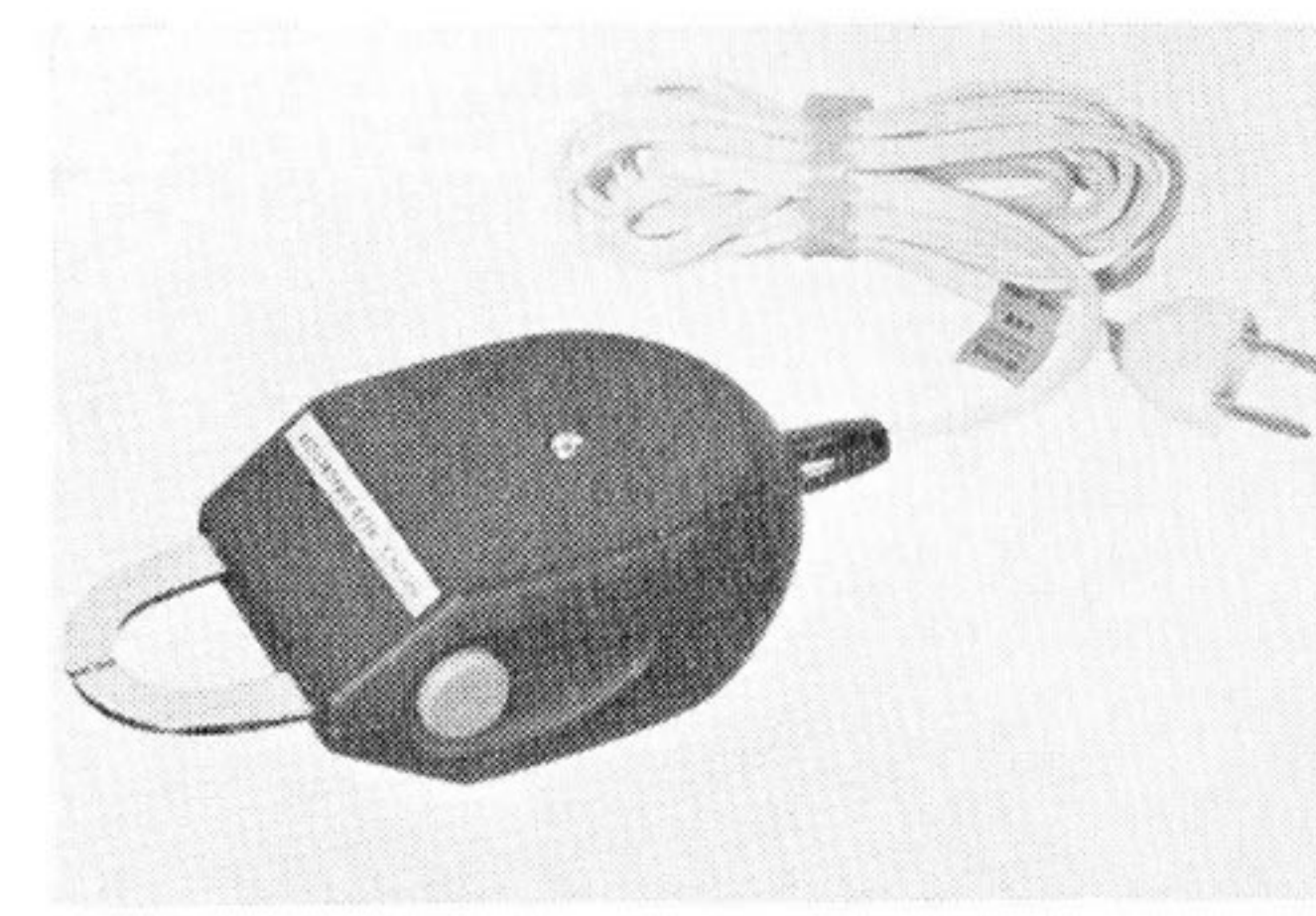
Stereo Headset DR-3A (8Ω)

High quality dynamic headset with a standard phone plug for private stereo listening or monitoring while recording. Stereo Headset DR-3C (10 kΩ) is also available.



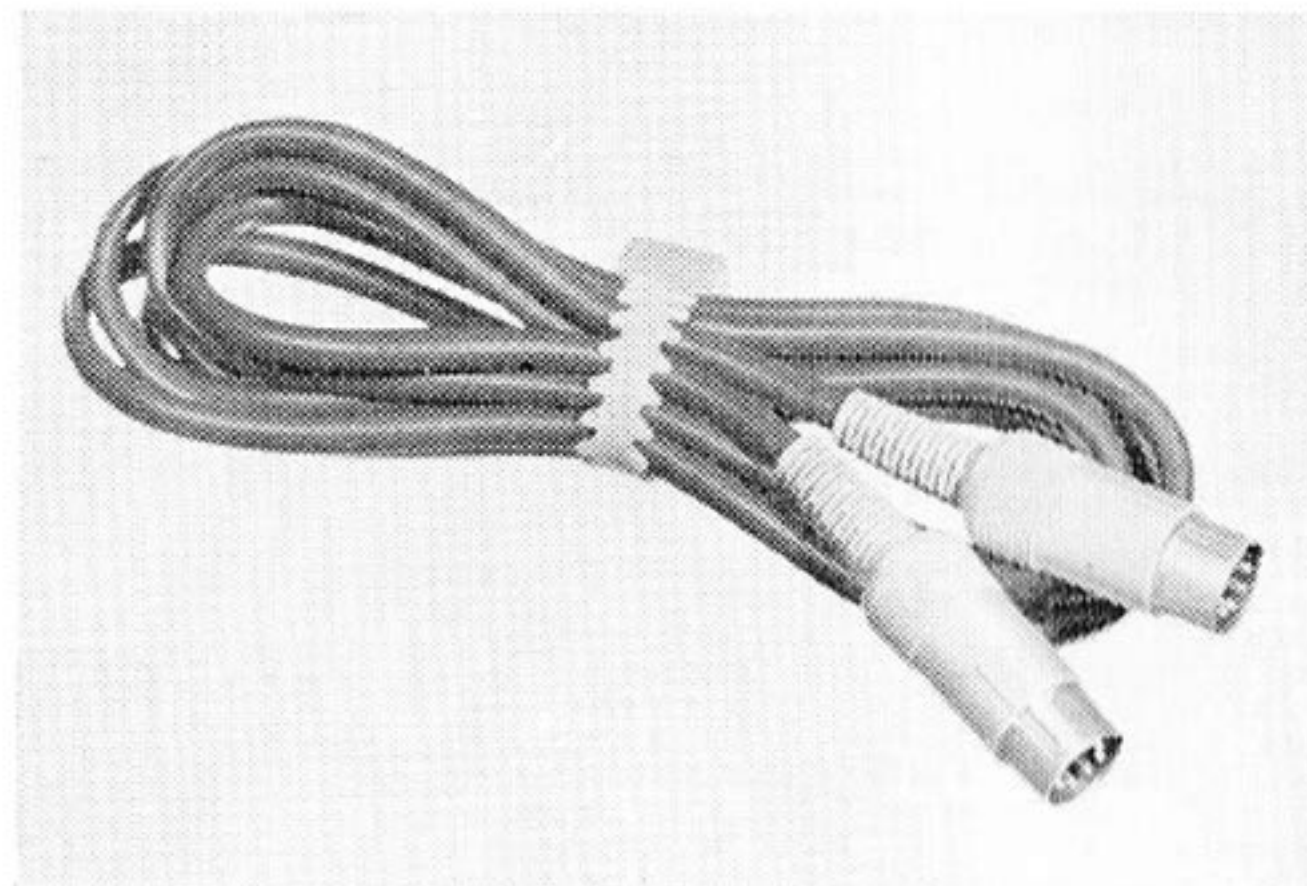
Telephone Pick-up TP-4S

For recording of telephone conversation on tape.



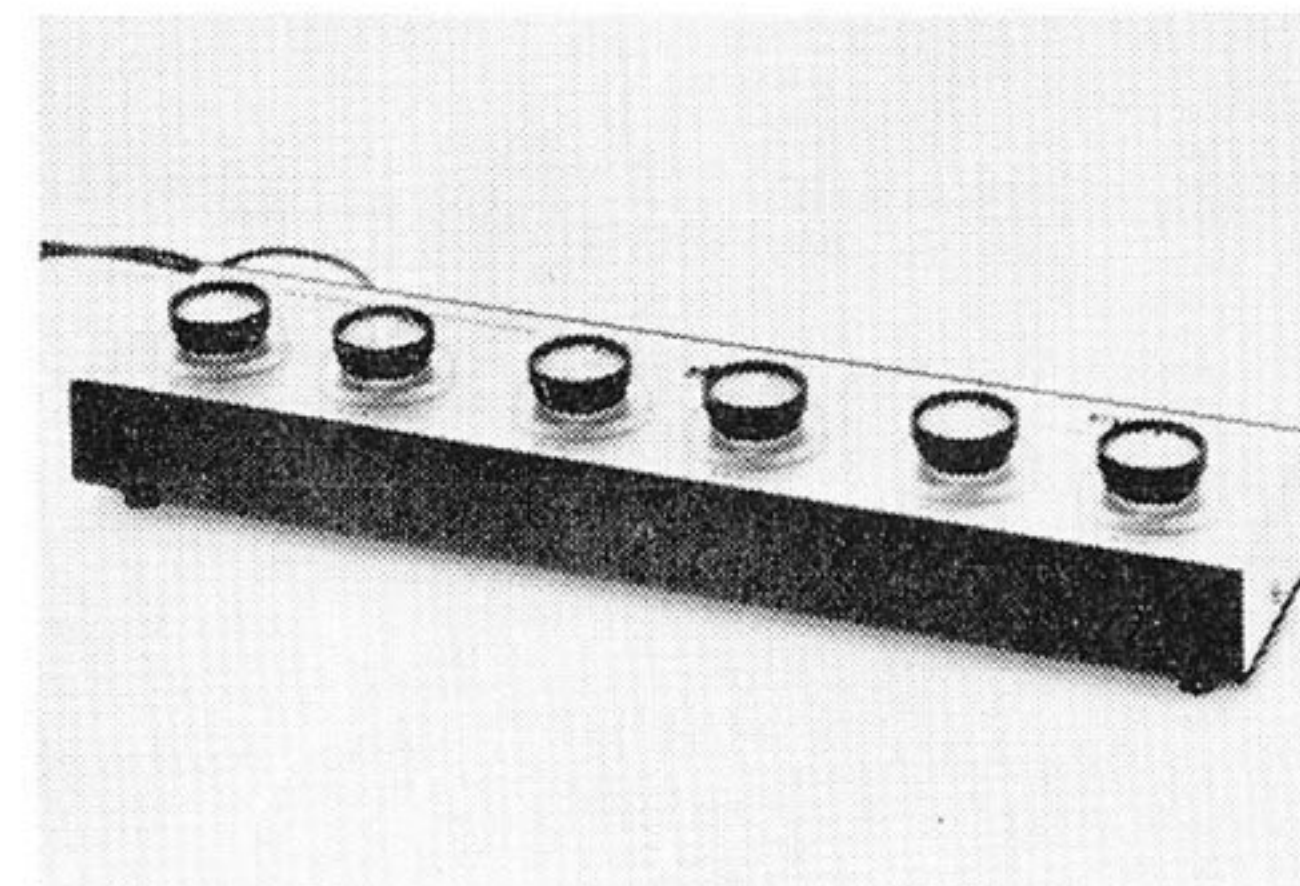
Head Demagnetizer HE-2

For quick and easy demagnetizing of the magnetic head to keep the recorder in the best reproducing condition.



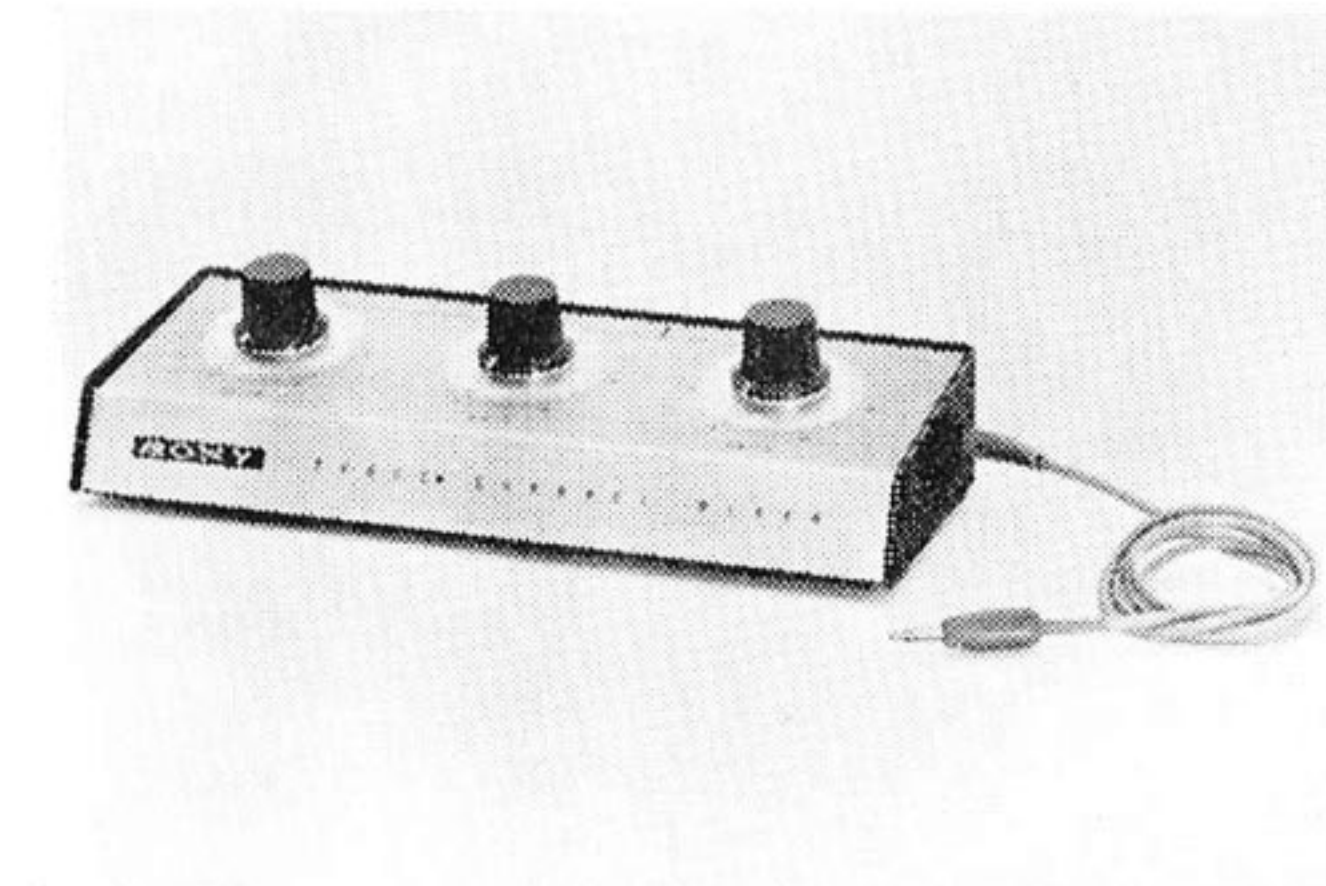
REC/PB Connector Cable RC-2

Connector cable with 5-pin connector for recording from or reproducing through an integrated amplifier (pre-amp/amplifier).



Stereo Microphone Mixer MX-6S

Provides professional mixing facilities for 3 microphones (600 ohm input impedance) or high level (approx. 100k ohm input impedance) sources such as tape recorders. It may be connected stereophonically or monophonically.



Microphone Mixer MX-600M

3-channel low impedance microphone and/or line input mixer with independent volume controls for each channel.

