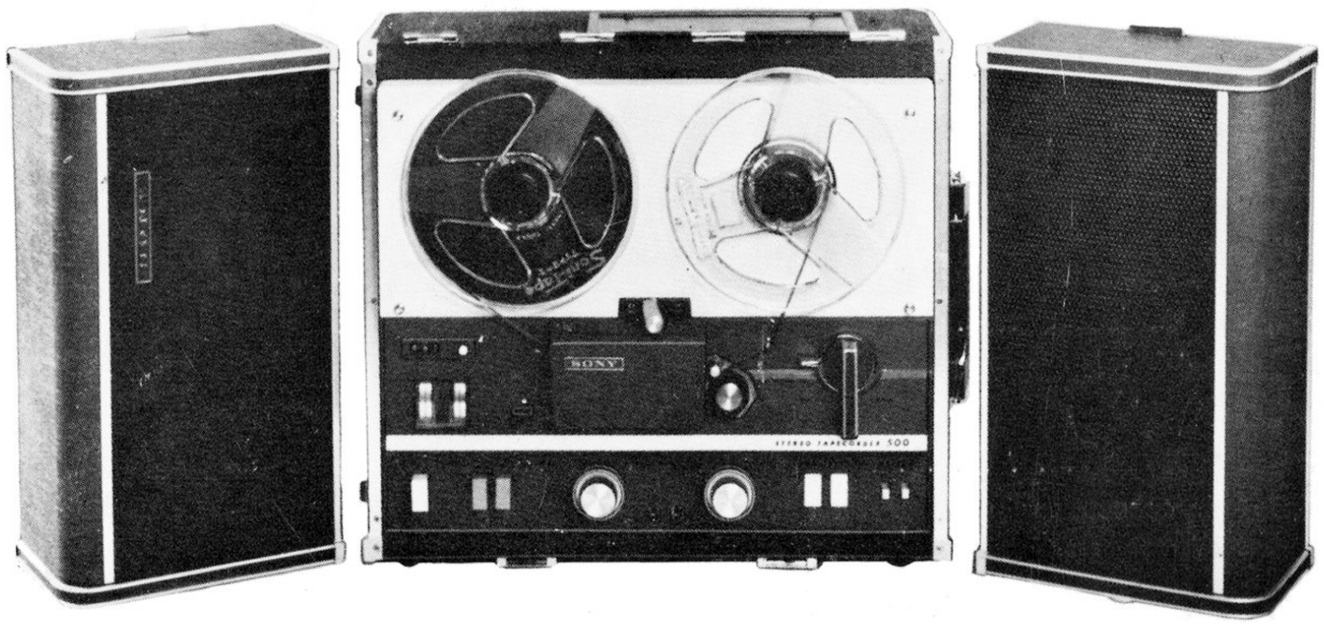
SONY®

TAPECORDER TC-500A

OWNER'S INSTRUCTION MANUAL



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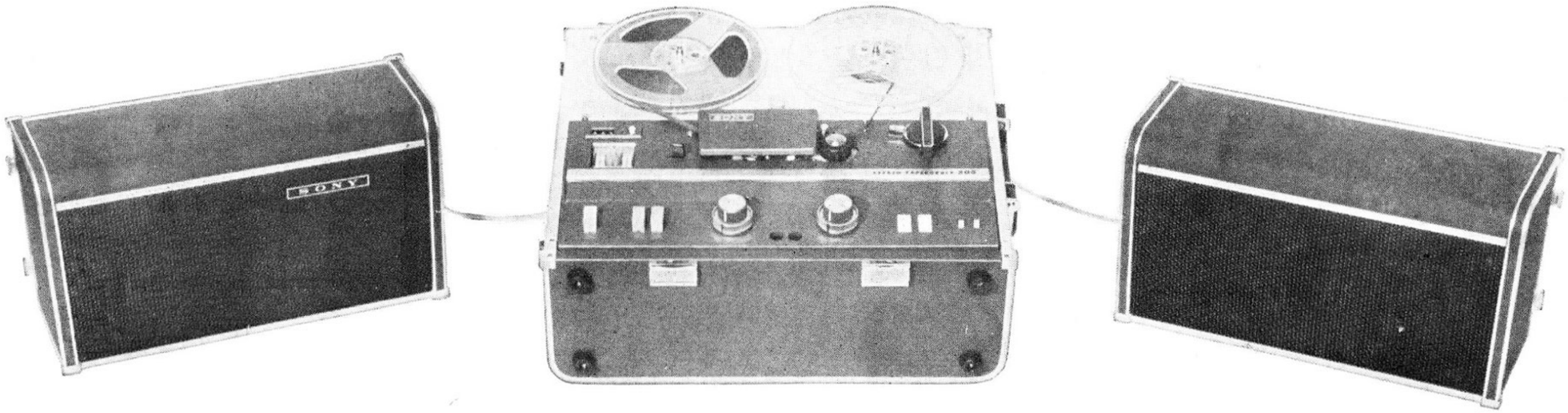

You are now the owner of a complete music system that both records and plays 4-Track Stereophonic tapes.
The precision performance and professional features of the Model 500A will introduce you to an exciting new world of "living sound". This owner's manual will explain the controls, operation and maintenance of your new Model 500A. Read this information carefully before operating.
Save this manual for future reference.

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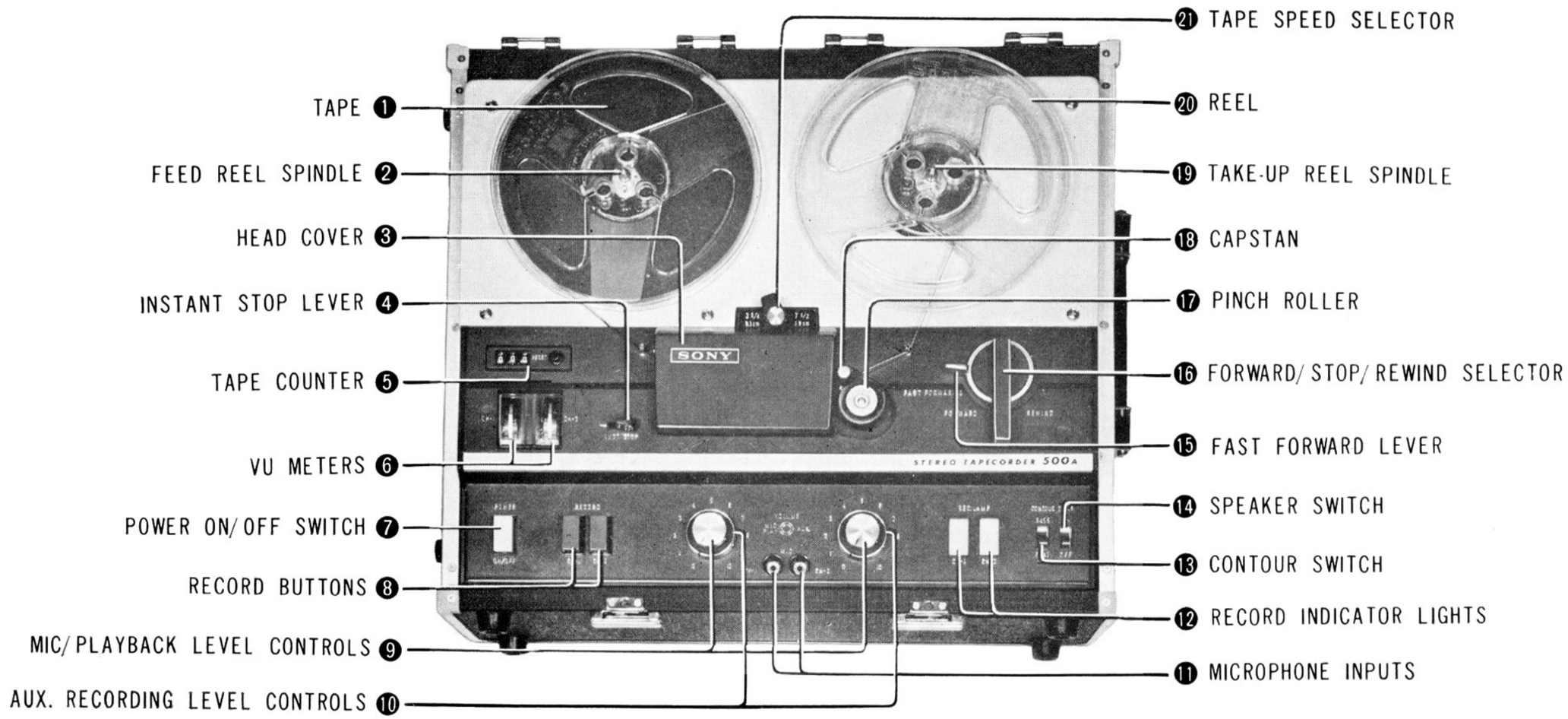
Diagram of Controls



REEL CAPS

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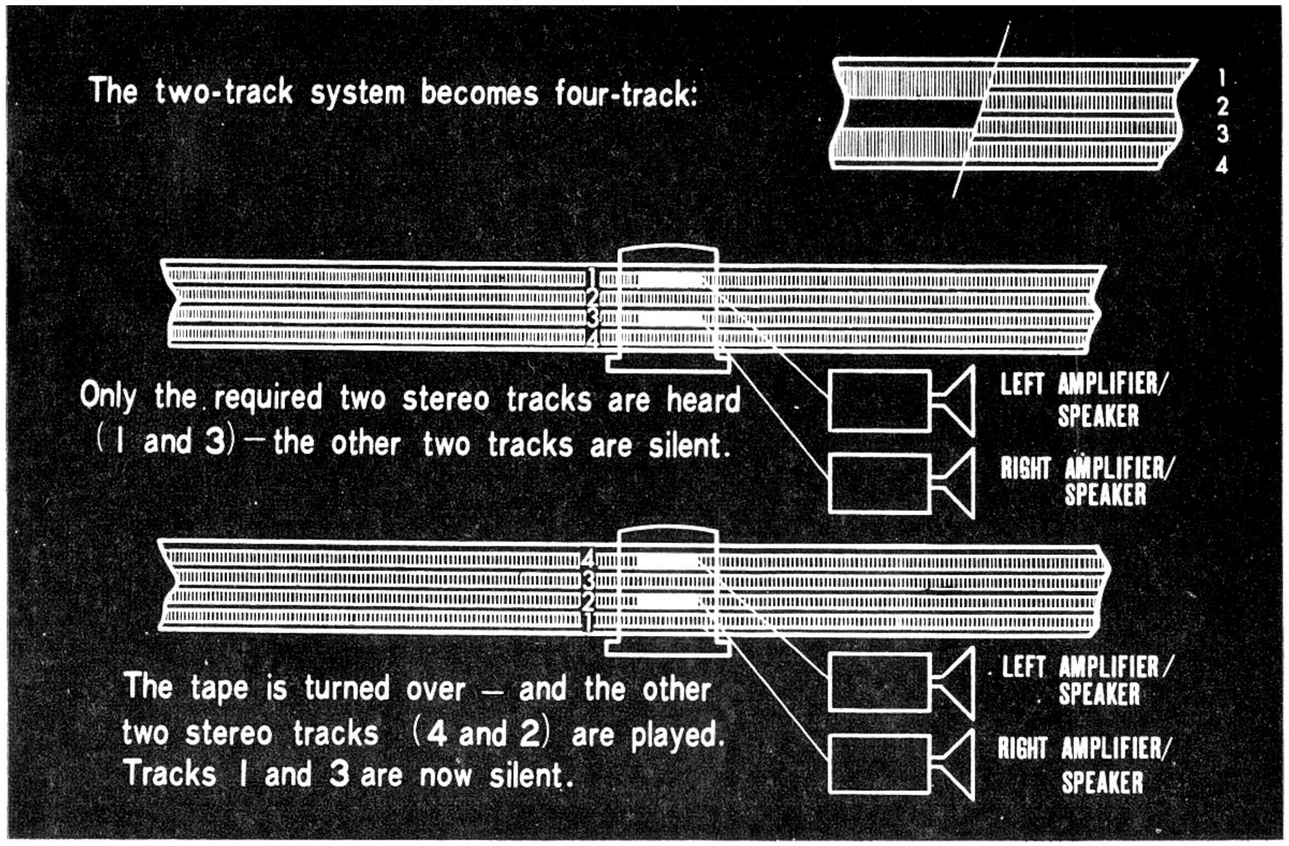

HOW FOUR-TRACK WORKS

Chart courtesy of

MAGNETIC RECORDING INDUSTRY ASSOCIATION

What is 4-Track Stereo

4-Track Stereo is the method in which twice as much recorded material can be obtained on ¼" magnetic tape by recording 2 separate pairs of stereo tracks on the tape.

In order to accomplish this, the size and spacing of the magnetic head poles had to be changed to conform with the placement of 4-Tracks within the area of ¼" tape.

The above diagram shows the comparison of track placement between 2-Track stereo and 4-Track stereo.

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Operation of Controls

1. DRIVE MECHANISM CONTROLS

All controls for complete operation of tape drive mechanism and speed selection are located on the upper control panel.

a. FORWARD/STOP/REWIND SELECTOR ⑯

This three position selector is controlled by the large black knob located on the right of the upper control panel.

FORWARD/STOP/REWIND functions are indicated in raised letters directly below the knob.

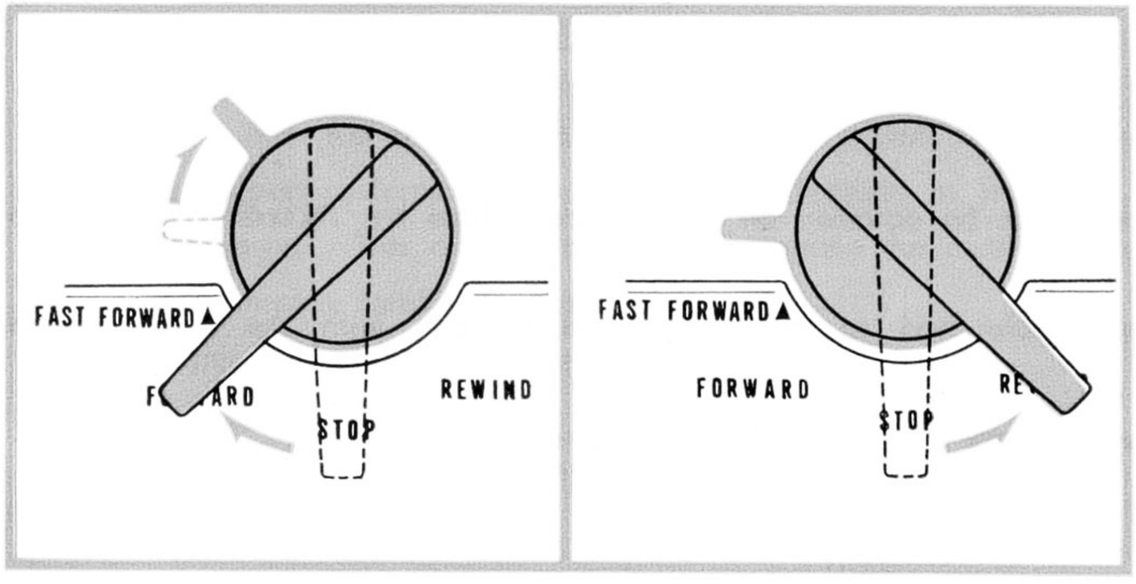
TO OPERATE

For forward function turn the knob CLOCKWISE.

For rewind function turn the knob COUNTERCLOCKWISE.

NOTE: Selection of FORWARD or REWIND must be made from CENTER or STOP position of the knob.

Do not change from FORWARD to REWIND (or vice versa) until tape comes to a complete stop.



b. FAST FORWARD LEVER ⑮

Fast forward selection is controlled by the spring loaded lever located at the immediate left of the FORWARD/STOP/REWIND Selector Knob ⑯. It is indicated in raised letters [FAST FORWARD] with a small arrow pointing upward.

The FAST FORWARD LEVER ⑮ operates in both 3¾ and 7½ ips.

TO OPERATE

After the recorder is placed in normal forward motion at either speed, push FAST FORWARD LEVER ⑮ upwards, with a smooth quick movement until the lever clicks into position... then release the lever. To stop FAST FORWARD motion, turn the FORWARD/STOP/REWIND Selector Knob ⑯ to STOP position.

c. INSTANT STOP LEVER ④

This control is the plastic capped lever located on the left of the upper control panel. It is designated in raised letters [INST. STOP] with a small raised arrow pointing to the left, indicating direction of application.

When applied, this lever instantly and safely stops normal forward motion of the tape for editing and cueing. Both reels can still be rotated by hand in either direction while the lever is applied.

TO OPERATE

Push lever to the left and slightly upwards with the thumb untill it clicks into position. To release simply push the lever down, then the tape will immediately pick up normal forward speed.

NOTE : Do not apply Instant Stop while operating in Fast Forward or Rewind mode.

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d. TAPE SPEED SELECTOR ㉑

Speed selection is controlled by the small knob located in the center of the upper control panel directly behind the head cover. This knob selects the desired speeds of either 3¾ ips or 7½ ips (9.5 or 19 centimeters per second), and automatically sets the proper recording and playback equalization characteristics for each speed.

TO OPERATE

Your Model 500A is shipped with the TAPE SPEED SELECTOR ㉑ in 3¾ ips position. To change from 3¾ ips to 7½ ips, press down SPEED SELECTOR Knob ㉑ and turn clockwise to 7½ ips position.

NOTE : Do not turn the speed selector knob clockwise from 3¾ ips to 7½ ips without first pressing the knob down.

To change from 7½ ips to 3¾ ips simply turn SPEED SELECTOR Knob ㉑ counterclockwise from 7½ ips position to 3¾ ips position and allow the knob to rise.

NOTE : DO NOT CHANGE SPEED WHILE THE TAPE IS IN MOTION.

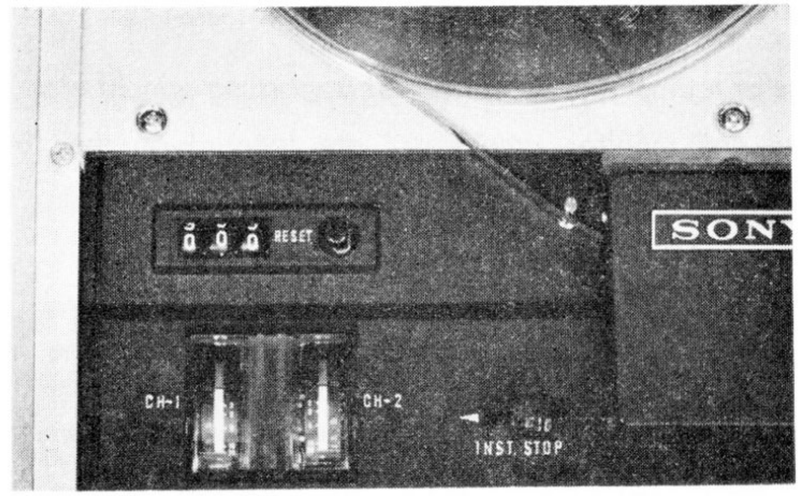
e. TAPE COUNTER ❺

Located at the left of the upper control panel and is equipped with a small RESET button adjacent to the numerals.

TO OPERATE

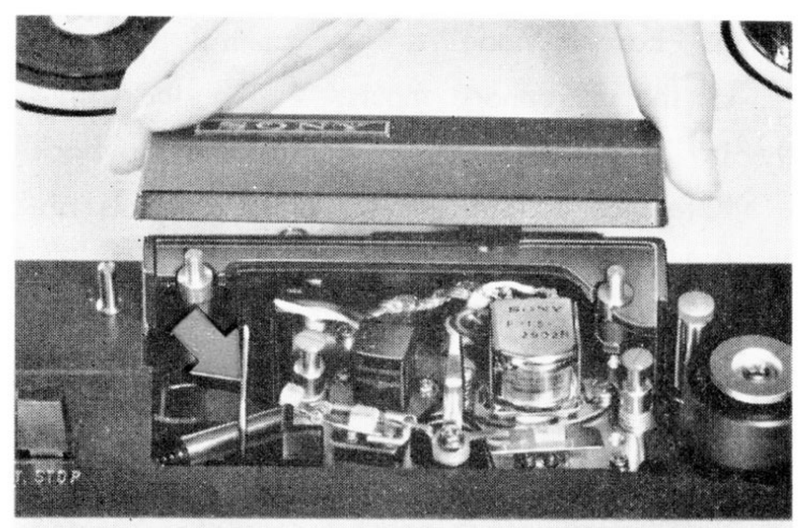
Press the RESET button when a full reel of tape is loaded. This will set the Counter to Zero so that it is in position to start indicating the amount of tape used in either record or playback.

NOTE : Do not press RESET button while the tape is in motion.



f. AUTOMATIC SHUT-OFF SWITCH

This switch is activated by the wire lever adjacent to the left tape guide under the head cover. In STOP position, the wire lever recedes into a slot to facilitate easy tape threading. After tape is threaded and the mechanism is placed in either FORWARD or REWIND mode, the wire lever contacts the tape and is held in this position. At such time as the tape either runs out or breaks, the wire lever will automatically fall forward and activate a micro switch, which shuts off the AC current to the recorder.



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2. ELECTRONIC CONTROLS

All controls for complete operation of recording amplifiers, playback pre-amplifiers and monitor amplifiers, are located on the lower front control panel.

a. POWER ON/OFF SWITCH ❼

Operated by the push button and located at the extreme left of the lower panel. It is designated [POWER ON/OFF].

TO OPERATE

Push the button down to turn the recorder on or off.

b. LEVEL CONTROLS ❾ ❿

Each channel is equipped with 2 level controls to increase or decrease recording and playback levels. These controls are operated by the round knobs mounted coaxially on the left and right center of the lower control panel. They are designated respectively [CH-1] and [CH-2].

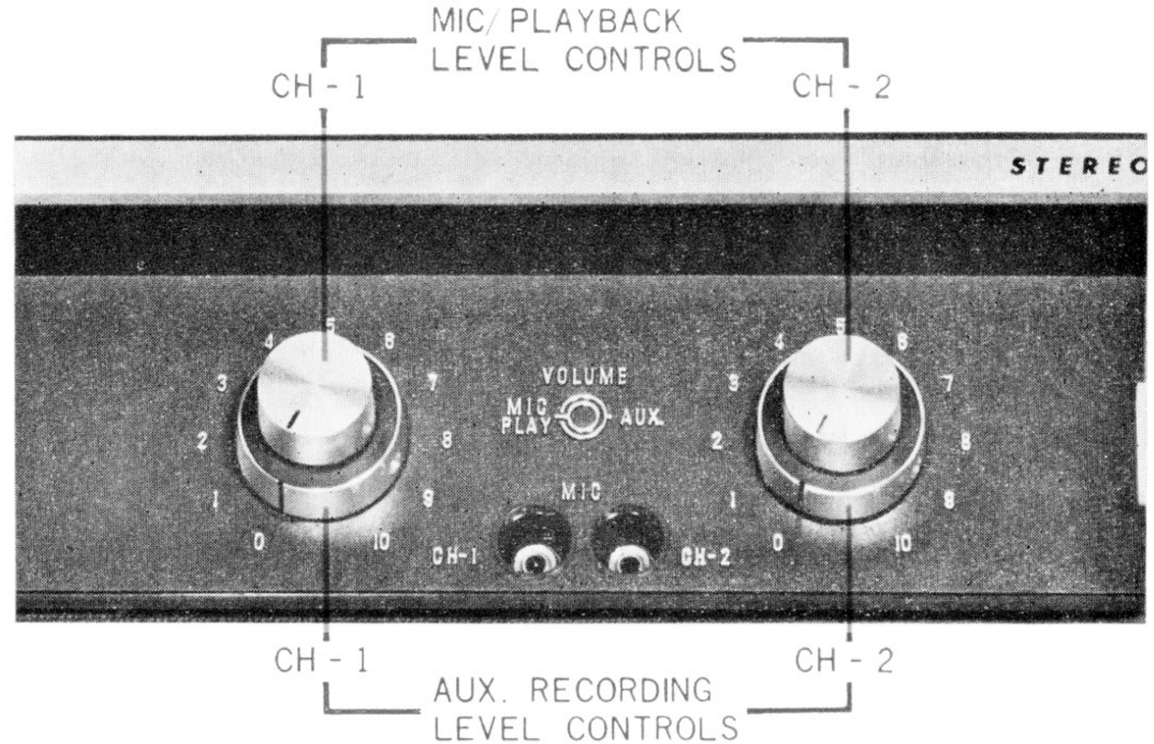
The lower knob on each channel is operative only in recording mode and controls the recording level of the auxiliary inputs.

The upper knob on each channel serves a dual purpose :

(1) In "Record Mode" : They control the recording level of the microphone inputs.

(2) In "Play Mode": They control the playback level. Reference calibrations for level controls are numbered 0-10.

NOTE : The feature of separate level controls for microphone and auxiliary inputs provides the facilities to mix "live" microphone recording simultaneously with recordings made from stereo tuners, stereo discs or any other auxiliary source (see page 11).



c. RECORD BUTTONS ❽

Activated by the two buttons located at the left of the lower control panel and designated in raised letters [RECORD] directly above the buttons, and [CH-1] — [CH-2] directly below.

TO OPERATE

Press the desired button (CH-1 for Channel 1, CH-2 for Channel 2, or both for stereophonic recording). Recording levels may then be adjusted before the mechanism is set in motion.

To start recording, keep the desired record button depressed until the mechanism is placed in FORWARD motion; otherwise it will automatically return to Playback mode.

These buttons are furnished with automatic mechanical safety interlocks to prevent accidental erasure of prerecorded tapes.

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d. CONTOUR SWITCH (Bass Boost) ⓭

This 2-position slide switch is controlled by the slide button designated in raised letters 〔CONTOUR-BASS-FLAT〕 and is located on the far right of the lower control panel.

With the slide button in 〔BASS〕 position, there is a preset boost in the lowest frequencies of approximately 8 db to compensate for the lack of bass response at low level listening or of small monitor speakers. With the slide button in 〔FLAT〕 position, the frequency response of the recorder is flat within the quoted specifications.

It is suggested that when the recorder is used in connection with external pre-amplifiers and power amplifiers the CONTOUR SWITCH ⓭ be placed in 〔FLAT〕 position.

e. SPEAKER SWITCH ⓮

This 2-position slide switch is controlled by the slide button designated in raised letters 〔SPKR-ON-OFF〕 and is located on the extreme right of the lower control panel.

This switch controls the output of the external speaker jacks and the monitor speakers in the portable case in record and in playback modes. It is used to turn on or off the monitor speakers and speaker or earphones that are connected to the external speaker output jacks.

NOTE : When connected to external pre-amplifiers and amplifiers through Line Output, the SPEAKER SWITCH ⓮ must be in 〔OFF〕 position.

f. VU METERS ❻

Two VU meters are provided with the recorder for extremely accurate recording and line output playback level indication.

1. In record mode, these meters are calibrated to NAB standards to allow the maximum recording level without distortion. For best recording results, the level controls should be adjusted so that the deflection of the VU indicator needle does not exceed 100 %.

It is normal for transient peaks to deflect the needle into the red zone; however, the level should be lowered slightly if these peaks cause the needle to hit against the stop pin beyond the red zone.

2. For playback through the LINE OUTPUTS, these meters are calibrated so that the needle points at 0 (100 %) on the scale when the output level, with load impedance of more than 10K ohms, is approx. 0 db (0.775 V).

When the monitor (or external) speakers are connected to SPEAKER OUTPUTS and the speaker switch is in ON position, the meters do not operate in playback mode.

g. RECORD INDICATOR LIGHTS ⓬

Located at the right of the lower control panel and designated in raised letters 〔REC. LAMP〕 directly above the lamps, and 〔CH-1〕 — 〔CH-2〕 directly below. When the desired RECORD BUTTON is pressed, the respective red LAMP will light up indicating which Channel of the recorder is in recording mode. (RECORD BUTTON CH-1 and CH-2 for RECORD LAMP CH-1 and CH-2 respectively, or both BUTTONS for both LAMPS.)

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Input and Output Connectors

All input and output facilities, with the exception of microphone inputs and binaural monitor jack, are located on the rear of the chassis.

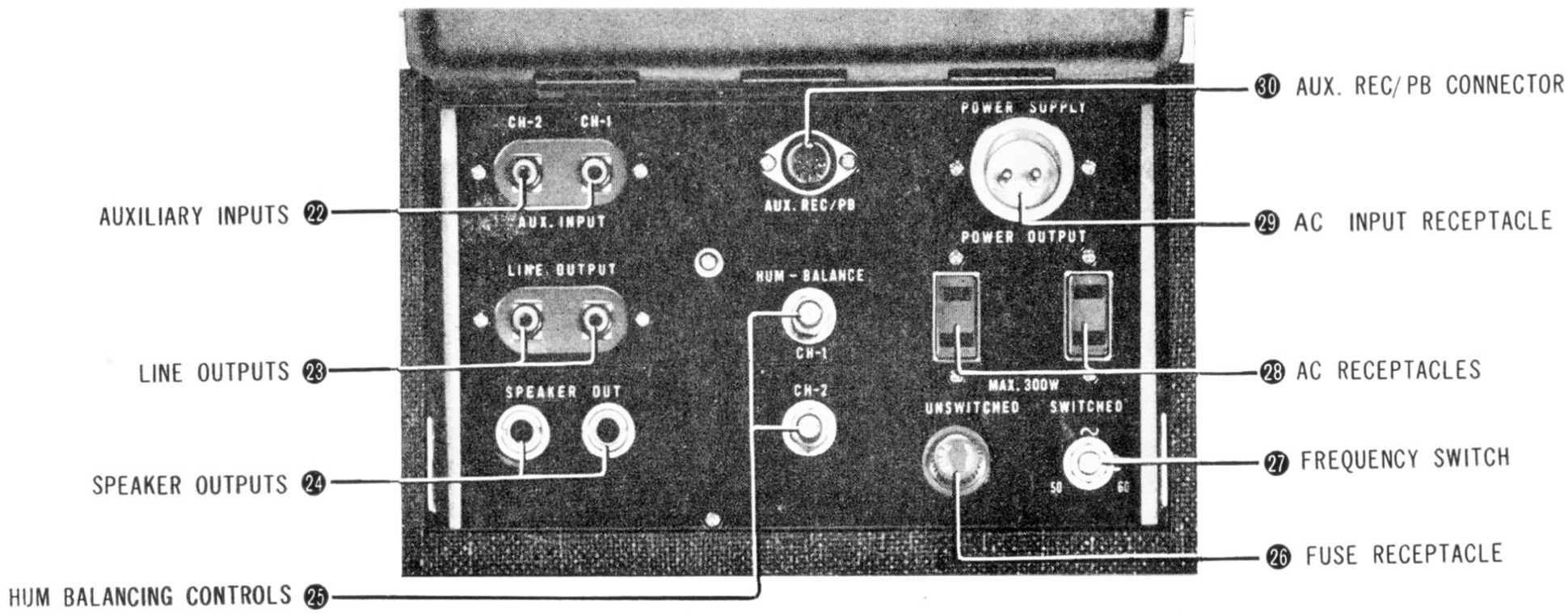
1. MICROPHONE INPUTS ⓫

There are two microphone inputs located in the center of the lower front panel and designated 〔MIC〕 in raised letters. CH-1 and CH-2 are designated respectively to the left and right of each input. These input jacks are of the "Mini-jack" variety and accept the standard 5/8" tip "Mini" type plug. The microphone input impedance is engineered for the Sony F-96 Microphone furnished or any high quality dynamic microphone of the high impedance variety.

2. AUXILIARY INPUTS ㉒

The two auxiliary inputs are located on the upper left rear of the chassis, and designated 〔AUX. INPUT〕.

These inputs are high impedance and are used for recording from any components that deliver a signal of not less than 0.15 volt, such as ; AM/FM tuners, TV, tape recorders or pre-amplifier "recorder" outputs. Direct connection of tape heads or magnetic phono cartridge without the use of external pre-amplifiers is not recommended.



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3. LINE OUTPUTS ㉓

The two Line Outputs are located on the center left rear of the chassis, and are designated 〔LINE OUTPUT〕.

These outputs are high level (1.5K ohm impedance) and are used to connect the recorder to external pre-amplifiers.

PROPER CONNECTION TO EXTERNAL AMPLIFICATION

It is important when using external pre-amplifiers and power amplifiers from LINE OUTPUTS that the playback level controls of the recorder be properly adjusted. It is recommended that these level controls be adjusted at a point below Digit 5 on the dial. Control of volume can then be accomplished with the volume controls of the external pre-amplifiers.

Keeping the output level of the recorder relatively low avoids the possibility of overloading the input capacities of the external pre-amplifier, thereby avoiding distortion and hum.

4. SPEAKER OUTPUTS ㉔

The two Speaker Outputs are located on the lower left rear of the chassis and are designated 〔SPEAKER OUT〕.

These outputs are for connection to the attached speakers or external speakers from the built-in amplifiers. They are of 8 ohm impedance and deliver approximately 3 watts of peak power per channel.

5. AC RECEPTACLES ㉘ ㉙

There are three AC receptacles located on the rear of the chassis.

The large round receptacle ㉙ is for connection of the main power cord.

The two other rectangular receptacles ㉘ below the main power receptacle are for convenient power connection of other components.

The left receptacle, designated in white letters 〔UNSWITCHED〕, is a direct connector and is "hot" even though the power switch is OFF.

The right receptacle, designated 〔SWITCHED〕, is for convenient connection of large power consuming units such as a power amplifier. This receptacle will handle an AC load of up to 300 watts consumption. It is operative only when the power switch and automatic shut-off switch of the recorder are ON.

6. FUSE RECEPTACLE ㉖

Located below the AC receptacles, the fuse holder accommodates 1.5 amp. fuse of the normal or "slow blow" variety.

7. HUM BALANCE CONTROLS ㉕

Located to the right of the input and output connections on the chassis. These controls are factory adjusted for optimum filament balance of all tubes other than the rectifier. These controls should not be readjusted unless it becomes necessary after a tube replacement.

TO ADJUST

Each channel should be adjusted individually.

1. Remove tape from recorder.
2. Place a piece of tape over the shut-off lever so that it cannot raise when mechanism is engaged.
3. Turn FORWARD/STOP/REWIND Selector ⑯ to FORWARD position.
4. Turn CH-1 playback level control to maximum.
5. Place CONTOUR switch ⑬ in 〔BASS〕 position to increase audible level of hum.
6. Adjust corresponding Hum Balance Control ㉕ to the

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right or left until the lowest hum level is determined.

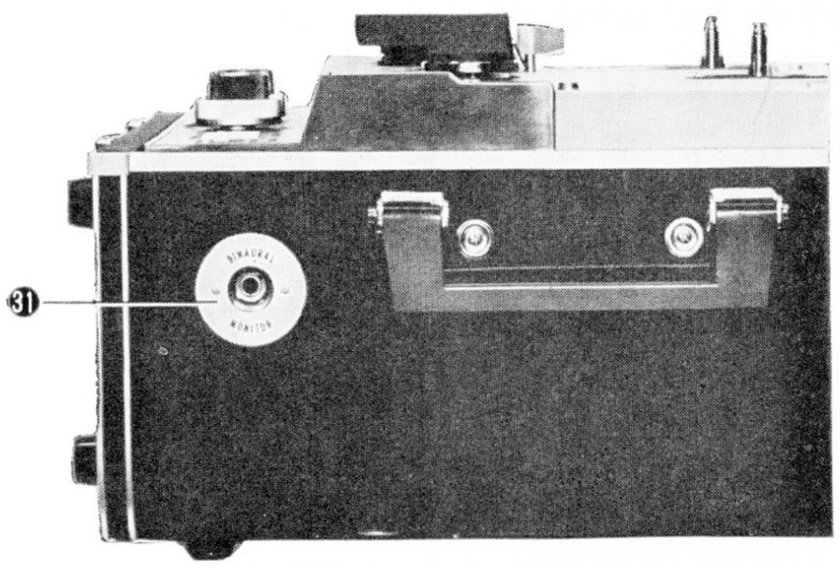
7. Repeat operation using CH-2 controls.

NOTE : If using the recorder through external amplification, and hum is discernible, do not adjust Hum Balance Controls ㉕ on the recorder until first isolating the source of the hum. Audible hum may be resulting from the external amplifiers.

8. BINAURAL MONITOR ㉛

A binaural monitor output ㉛ is located on the right side of the recorder and designated 〔BINAURAL MONITOR〕.

This output is low impedance and is used for stereo headset monitoring of recording or playback. Ideal headsets are the Sony ME-13S, Sony DR-1A or any stereo headset having 8 ohm impedance.



9. AUXILIARY RECORD/PLAYBACK CONNECTOR ㉚ (DIN* CONNECTOR)

This is the 5-pin socket located on the upper center rear of the chassis and designated 〔AUX. REC/PB〕 directly below the connector. This socket is an optional feature and is used for the interconnection of high level inputs and line outputs of the recorder with outside pre-amp/amplifiers utilizing the special Sony connector cable that is available as an accessory.

* Deutsche Industrie Normen

NOTE : (1) In applying the Sony Record/Playback cable, RC-2, the external pre-amplifier or power amplifier must be equipped with the corresponding 5-pin connector.

(2) Recording level can be adjusted only by the MICROPHONE INPUT LEVEL CONTROLS of the recorder in record mode without relation to sound volume of the external amplifiers.

(3) Playback level of the recorder can be adjusted only by the volume controls of the external amplifiers without relation to sound volume of the recorder.

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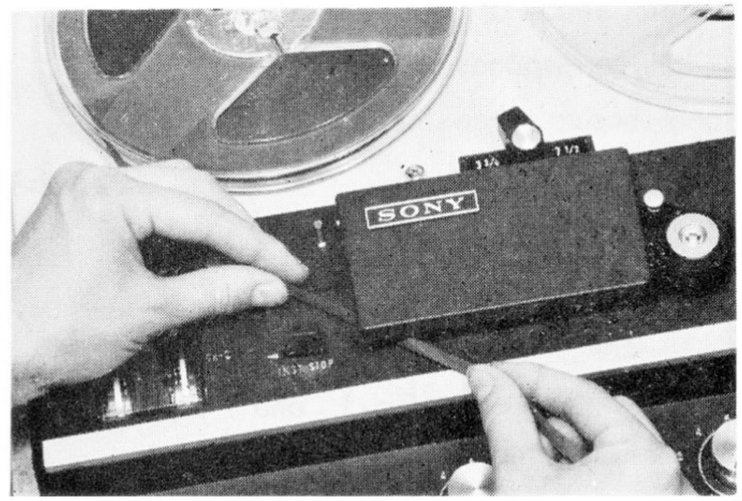
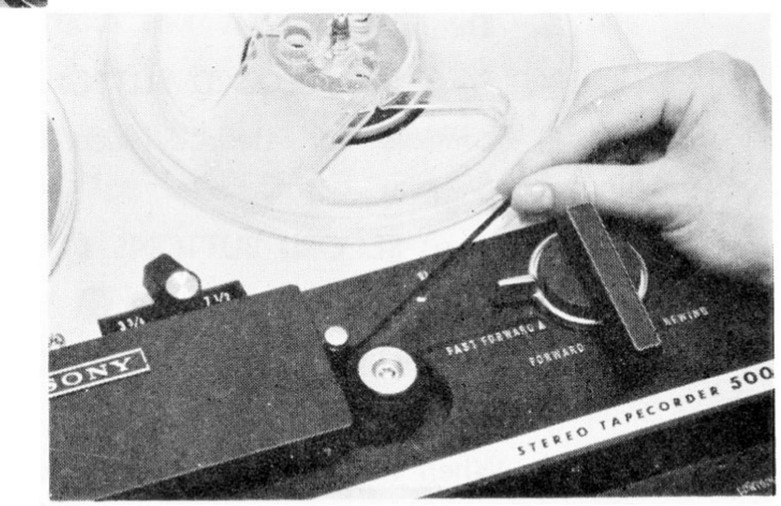
Tape Loading Procedure

This recorder accommodates reel sizes from 3" to 7" in diameter. Reels of the same size are recommended for use to obtain optimum performance. Loading and threading is the same for all sizes.

1. Place take-up reel ⓴ on the right spindle ⓳. Rotate until the three spindle spokes engage with the corresponding slots of the take-up reel.
2. Place reel of tape ❶ on the left spindle ❷ and engage as described in Step 1.
3. Unwind approximately 1½ feet of the tape or leader from full reel.
4. Keep unwound portion of the tape (leader) slightly taut with shiny surface to the outside. Bring the leader from left to right, under the head cover ❸ and against the outside of the tape guide rollers on each side of the head cover.
5. Place the tape leader between the capstan ⓲ and the pinch roller ⓱ and around adjustment tape guide to right of the capstan and the pinch roller.
6. Wrap the leader around the hub of take-up reel ⓴, or insert the end into the slot provided on the reel. Tape is now ready for playing or recording.

NOTE: Do not use the rubber reel caps when the recorder is in Horizontal position. They are for use in Vertical position only.





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Complete Recording and Playback Procedure

NOTE : In all recording modes the erase head of the recorder will pre-erase the tracks for the corresponding tracks of the recording head. Erasure only occurs when the RECORD BUTTON ❽ is down.

1. 4-TRACK STEREO RECORDING

1. Select desired speed.
2. Connect stereo source to proper inputs on CH-1 and CH-2.
3. Thread tape.
4. Press both RECORD BUTTONS ❽ and adjust proper level controls for desired recording level. (See VU meters page 5.)
5. Keep RECORD BUTTONS ❽ depressed and turn FORWARD/STOP/REWIND Selector ⓰ to FORWARD position. Record buttons will remain down until the mechanism is returned to STOP position.
6. When the end of the tape is reached, do not rewind. You will have recorded two tracks on the upper portion of each half of the tape. To record the other two tracks on the lower portion of each half of the tape, proceed with the following :
7. Reverse reels (the loaded take-up reel is inverted and placed on the feed spindle, and the empty reel is placed on the take-up spindle).
8. Repeat operations 4 and 5.
9. When the end of the tape is now reached, you will have recorded two stereo tracks in each direction.

2. 4-TRACK STEREO PLAYBACK

1. Set TAPE SPEED Selector at the recommended speed of the pre-recorded tape.
2. Thread 4-track pre-recorded tape on the recorder and set SPEAKER switch to ON position. Turn FORWARD/STOP/REWIND Selector ⓰ to FORWARD position.
3. Adjust upper level controls ❾ for desired volume and stereo balance.
4. When the end of the tape is reached, do not rewind. Reverse reels and repeat operations 2 and 3 to play side 2 of the tape.

3. 4-TRACK MONOPHONIC RECORDING

NOTE : The use of pre-erased or bulk erased tape is recommended for 4-track monophonic recording.

PROCEDURE

1. Connect monophonic source (microphone, tuner, TV, etc.) to CH-1 input for source used.
2. Turn both CH-2 level controls to Zero position.
3. Press CH-1 RECORD BUTTON and adjust recording level on CH-1. Keeping the RECORD BUTTON depressed, place the mechanism in motion to prcceed with recording.
4. When the end of the tape is reached, do not rewind tape.

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Remove both reels and reverse them. The loaded take-up reel will be inverted and placed on the feed spindle and the empty reel will be placed on the take-up spindle.

5. Repeat operations 1 through 3.
6. When the end of the tape is again reached, do not rewind. You will now have recorded two monophonic tracks.
7. Change source connection from CH-1 to CH-2.
8. Turn both CH-1 level controls to Zero position.
9. Adjust recording level on CH-2 and proceed with recording.
10. When the end of the tape is reached, do not rewind. Reverse reels and repeat operation 9.

When the end of the tape is now reached, you will have recorded four separate monophonic tracks.

NOTE : Playback sequence of each track should conform to the sequence of recording ; i. e.

		Playback
1st recorded track	(Track 1)	CH-1
2nd recorded track	(Track 4)	CH-1
3rd recorded track	(Track 3)	CH-2
4th recorded track	(Track 2)	CH-2

4. PROCEDURE FOR "MIX" RECORDING

As described on page 4, the feature of separate level controls for microphone and auxiliary inputs permits simultaneous recording with microphones and other sources such as AM/FM tuners, stereo discs or TV.

PROCEDURE ··· (The use of headset is necessary for "mixed" recording.)

1. Connect microphones and other source to proper inputs.
2. Using the VU meters ❻ for indication, adjust the recording level of the predominant source desired. (For example : if recording a narration or solo performances, and a musical background is desired, the microphone would be the predominant source. If recording from a tuner or stereo disc and narration is secondary, the predominant source would be the auxiliary input.)
3. After adjusting desired recording level of the predominant source, adjust level control of the secondary source until a desired balance of both sources is audible through the headset.
4. You are now ready to proceed with the recording.

NOTE : Mixing can be utilized for both Stereo and Monophonic recording.

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Sound-on-Sound Recording

This recorder is equipped to produce high quality professional "Sound-on-Sound" composite recordings. A small amount of practice with the following procedures will enable the user to become expert in the many fascinating uses of "Sound-on-Sound" facilities.

PROCEDURE

1. Record the basic source material on CH-2 as outlined under 4-TRACK MONOPHONIC RECORDING.
2. Rewind and connect low impedance headset to BINAURAL MONITOR jack ㉛.
3. Connect high impedance microphone to CH-1 MIC INPUT.
4. Connect CH-2 LINE OUTPUT to CH-1 AUX. INPUT with special SOUND-ON-SOUND Patch Cord (RK-57) supplied as an accessory. Set SPEAKER switch ⑭ to OFF.
5. Press CH-1 RECORD button and turn the Selector knob ⑯ to FORWARD.
6. Adjust CH-2 playback volume for comfortable listening level in headset. Both CH-1 AUX. and MIC volume controls should be adjusted to obtain the desired balance between microphone and the previously recorded information from CH-2. The composite information, CH-2 and microphone, is now being recorded on CH-1.
7. Rewind the tape and play back the composite SOUND-ON-SOUND recording on CH-1.

NOTE: Do not exceed "0" level on meter during playback of CH-2 and microphone of CH-1 when recording composite track. A reasonable amount of practice with level control will assure excellent composite recordings.

Tape Teaching

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

Master Recording

1. Connect Microphone to MIC CH-1 (in cases of recording from radio or other sources, connect to AUX. INPUT CH-1") and record teacher's master on CH-I by pressing CH-1 RECORD BUTTON.
   (cf. 4-TRACK MONOPHONIC RECORDING, Page 10)

Practice Recording

2. Rewind the tape back to the beginning of the master recording. Connect stereo headset to BINAURAL MONITOR ㉛.
3. Change the microphone connection from MIC CH-1 to MIC CH-2.
4. Press CH-2 RECORD BUTTON and record your practice on CH-2 by repeating or answering the master recording which is heard through the stereo headset.

Simultaneous Playback

5. Rewind and play back the tape in the same manner as a stereo tape ; then, the master track and the practice track are simultaneously played back.

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

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Public Address

The built-in amplification of this recorder can be used for the purpose of Public Address.

TO OPERATE

1. Plug a Microphone into either MIC INPUT ⓫ (CH-1 or CH-2) for monaural application. Plug a Microphone into each channel for stereophonic application.
2. Connect the attached speaker of the recorder or any external speaker to SPEAKER OUT ㉔ (CH-1 or CH-2). Connect a speaker to each channel for stereophonic application. Set SPEAKER switch to ON position.
3. Press RECORD BUTTON ❽ (CH-1 or CH-2) to activate the record amplifiers. Press both buttons for stereophonic application.
4. Adjust MIC/PLAYBACK LEVEL CONTROLS ❾ to the desired sound level.

NOTE : (1) Howling effect (acoustic feedback) may be caused when the Microphones are too near the Speakers or when Level Controls are adjusted for too much sound volume.

(2) To release RECORD BUTTONS :

a. When one of the buttons is down :
Slightly press the other button. Depressed button will rise.

b. When both buttons are down :
Firmly press one button down, then the other will be released. Slightly press this released button. Both buttons are now released.

RECORD BUTTONS will also be released by turning FORWARD/STOP/REWIND Selector to FORWARD. Be sure to return the selector to STOP position to prevent the malfunction in the mechanism.

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Adaptation to the Local Power Line

AC VOLTAGE SELECTOR

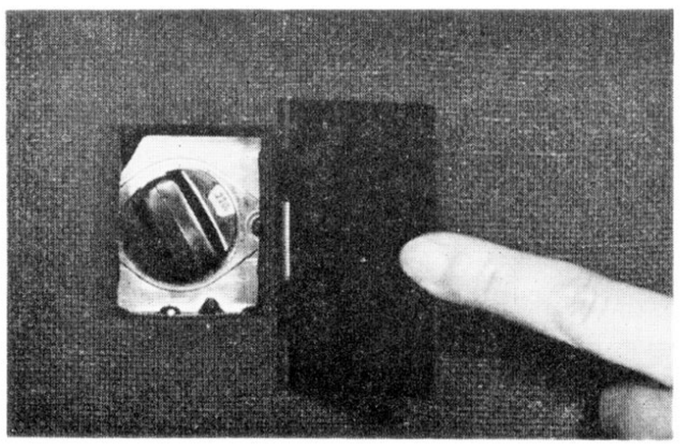
The black, round selector cap located on the bottom of the chassis selects the operating AC Power Line Voltage of either 100, 110, 117, 125, 220 or 240 volts. It is designated in white letters 〔AC VOLTAGE SELECTOR〕 on the lid.

TO OPERATE

Check whether or not the recorder is set for the operating AC voltage identical to your local power line voltage.

To reset the Voltage Selector, pull out the black selector cap. Then, firmly insert the three-prong selector cap to the Voltage Selector socket with the correct voltage figure appearing in the cutout of the selector cap.

NOTE : Check operating voltage of the recorder with the local AC power line voltage every time the recorder is moved to the different power line system area. The checking and resetting, if necessary, of the selector must be done before connecting the recorder to the AC power line.



AC FREQUENCY SWITCH

The small switch ㉗ located on the lower right rear of the chassis selects the operating AC power line frequency of either 50 or 60 cps for the motor. It is designated 〔50〕 and 〔60〕.

TO OPERATE

Check whether or not the recorder is set for the operating AC frequency identical to your local power line frequency. To reset the Frequency Switch, turn the switch with a screwdriver counterclockwise to the 60 cps position, or clockwise to the 50 cps position.

NOTE : (1) Identify the operating AC frequency of the recorder with the local AC power line frequency everytime the recorder is moved to the different power line system area.

The checking and the resetting of the switch must be done before connecting the recorder to the AC power line.

(2) The Frequency Switch selects only the operating AC frequency for the motor. When the Frequency Switch is reset, Capstan ⑱ and Pinch Roller ⑰ must be also replaced with correct ones.

The Capstan and the Pinch Roller for 60 cps are inscribed with WHITE circular lines on the top and bottom surfaces respectively. The circular lines are RED on the Capstan and the Pinch Roller for 50 cps.

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Maintenance

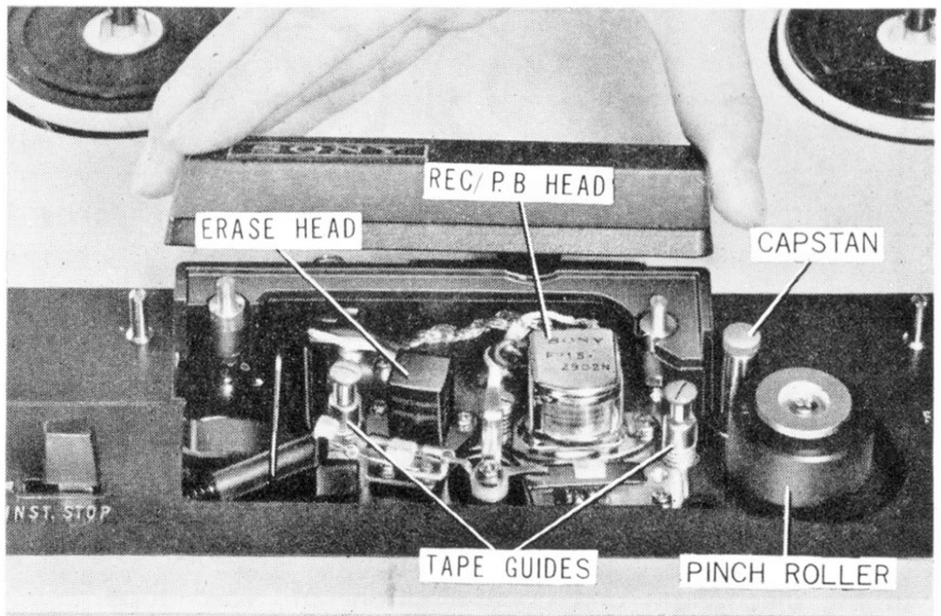
CLEANING HEADS

A clean contact between heads and tape is important for optimum performance. Recording companies customarily clean heads before each recording. Generally, cleaning heads after every 10 hours of use will be sufficient.

TO CLEAN

Remove the head cover by loosening the two screws located at left and right sides of the cover with a screw driver.

Take the head cleaning ribbon furnished or a piece of soft, clean fabric (about the same width as the tape) moistened with denatured alcohol, and carefully wipe the portion of the heads over which the tape travels. The same procedure is recommended for cleaning the capstan and pinch roller surfaces. This prevents oxide deposits from causing flutter and wow.



DEMAGNETIZING HEAD

As a result of newly developed circuitry, the record/playback head of the recorder will rarely become magnetized with normal use ; however, with continuous use, the varying magnetic fields will gradually build up a residual magnetism on the gap of the head.

Excess residual magnetism on the head will produce noise on tapes being played ; therefore, it is advisable to demagnetize the head from time to time. The use of any popular head demagnetizer is sufficient ; however, this recorder features a "built-in" method of demagnetizing that will be sufficient under normal use.

TO OPERATE

1. Turn recorder ON.
2. Remove tape from unit.
3. Defeat the automatic shut-off lever, found under the head cover, by the use of a piece of pressure sensitive tape to hold it back and keep it inactive.
4. Press both RECORD BUTTONS ❽ and turn FORWARD/STOP/REWIND Selector ⓰ to FORWARD position.
5. Allow recorder to run until tubes warm up.
6. Push POWER ON/OFF switch ❼ to OFF. Turn FORWARD/STOP/REWIND Selector ⓰ to STOP position. Head is now demagnetized.

   NOTE : Demagnetizing the head is only necessary after repeated use of playback only. However, for best signal-to-noise results, periodic use of an external demagnetizer is recommended.

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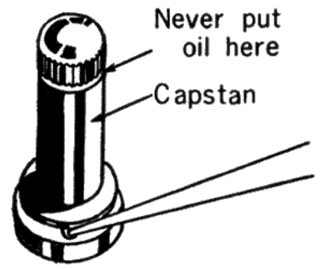
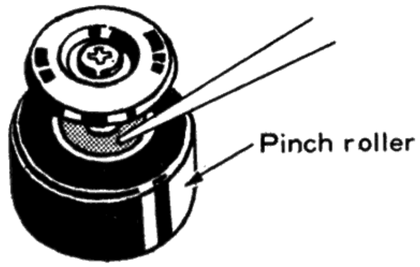
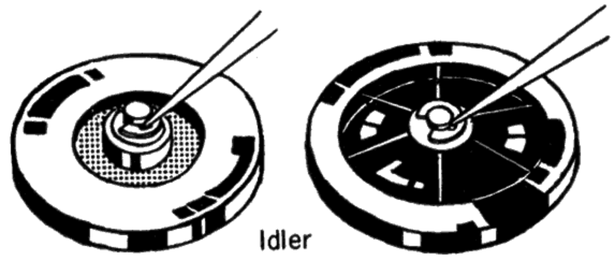
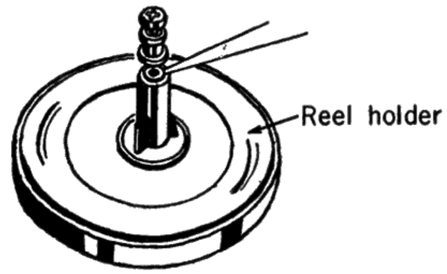
Lubrication Chart

Parts to lubricate	Quantity of oil	Type of oil	Remarks	Figures
Capstan bearings	3 drops once a month	light machine oil	Don't stain capstan surface.	
Pinch roller bearings	1 drop once a month	light machine oil	Don't stain rubber surface.	
Idler shafts	1 drop once a month	light machine oil	Remove top cover panel to gain access.	
Reel shafts	1 drop once a month	light machine oil		

NOTE: (1) Avoid excessive lubrication. It will cause slippage in the mechanism and contamination of your tape.
(2) If stalling occurs in FAST FORWARD motion, clean each rubber idler wheel under the top panel with a soft cloth moistened with denatured alcohol.

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Quick Guide to Simple Servicing

Trouble	Possible Cause	Service
Pilot lights out, motor inoperative	Open AC circuit	Check AC line connection to wall or chassis, check fuse, check On/Off switch ❼. Check automatic shut-off switch.
No sound in playback when meters indicate signal	Defective speaker cords	Check speaker, cords and plugs for shorts or open circuits. Check SPEAKER SWITCH ⓮.
No sound in playback and meters do not indicate signal	Defective tubes in pre-amplifiers, head leads disconnected, defective rectifier 6CA4 tube, or defective power amplifier tube 6AQ5	Check pre-amplifier tubes 12AD7 and check lead connections of heads and at plugs in chassis. Check 6CA4 rectifier tube and check 6AQ5 amplifier tube.
Poor volume or dull sound in playback, poor frequency response	Dirt on head tracks	Clean heads.
Excessive tape hiss	Magnetized heads	Demagnetize heads.
Flutter and wow	Dirt and grease on capstan or pinch roller, slipping tape	Clean capstan and roller, lubricate motor, tighten capstan screw.
Crackling noise during volume adjustments	Dirty or defective volume control potentiometers	Contact competent technician or service station.
Pre or post echoes on recorded tapes	Print-through effect due to exposure of tapes to heat or magnetic fields	NOTE: To prevent print through, store tapes in cool place. Remove from storage space in case when operating the recorder.
Operates in playback but not in record, no meter indication	Defective microphones or microphone leads or input	Check if the recorder is in record position, check movement of record/playback switch, check microphone jacks or aux. input and jacks.
Previously recorded sounds in background of newly recorded tapes	Poor erasure, dirt on heads	Clean erase head, check oscillator tube (12BH7A).

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Technical Specifications

Power Requirement:	100V, 110V, 117V, 125V, 220V or 240V 110 watts 50/60 cycles
Tape Speeds:	Instantaneous selection 7½ ips or 3¾ ips (19 or 9.5 centimeters per second)
Frequency Response:	30-18000 at 7½ ips ±2 db 50-14000 cps at 7½ ips 30-13000 cps at 3¾ ips
Signal-to-Noise Ratio: (Per Channel)	50 db (Measured by NAB standards)
Flutter and Wow:	Less than 0.15% at 7½ ips Less than 0.20% at 3¾ ips
Harmonic Distortion:	Less than 2% at 3 db below rated output
Erase Head:	In-line (stacked) quarter track
Record/Playback Head:	In-line (stacked) quarter track
Bias Frequency:	Approx. 80 Kc
Level Indication:	Two VU meters (calibrated to 0 db at 12 db below saturation)
Level Controls:	Individual controls on each channel for playback, microphone and auxiliary inputs; provides professional mixing facilities.
Tone Control:	Two position switch selects either flat response or approximately 8 db bass boost for monitor speakers or low level listening.
Editing Facilities:	Instant Stop Lever (to be locked), Automatic Tape Lifters, Fast Forward and Rewind, Manual Cueing and Digital Tape Counter
Input Impedance:	Microphone—high impedance Auxiliary Input—high impedance
Output Impedance:	Monitor Speaker—low impedance Line Output—1.5K ohms-0 db Binaural Monitor—low impedance
Output Level:	Monitor Speaker—3 watts per channel
Tube Complement:	2-12AD7 (or 12AX7), 2-6AU6, 2-6AQ5, 1-12BH7A, 1-6CA4
Weight:	Approx. 55 pounds (25kg)
Dimensions:	18½"W × 16 3/16"D × 12¼"H (470W × 410D × 310H mm)

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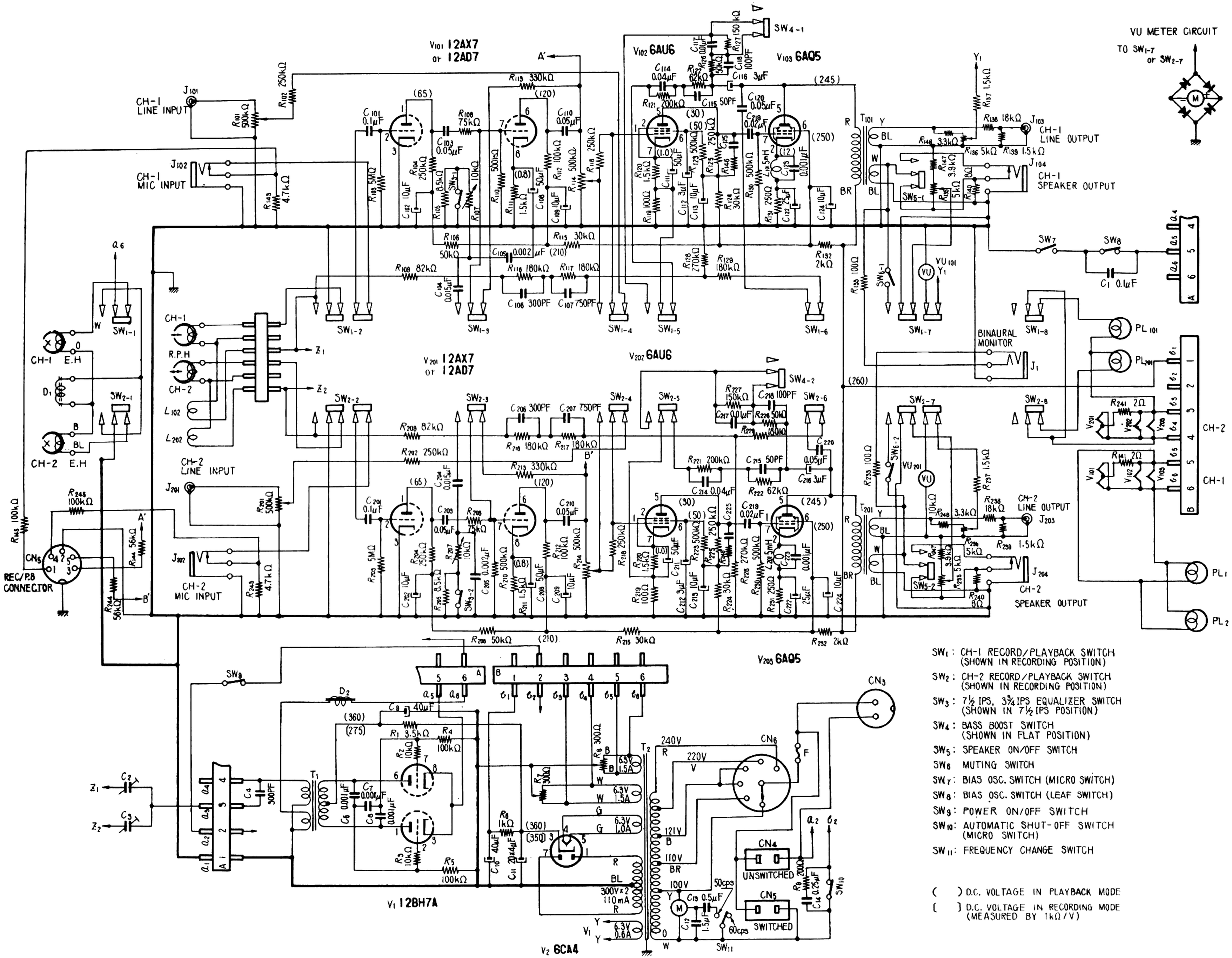
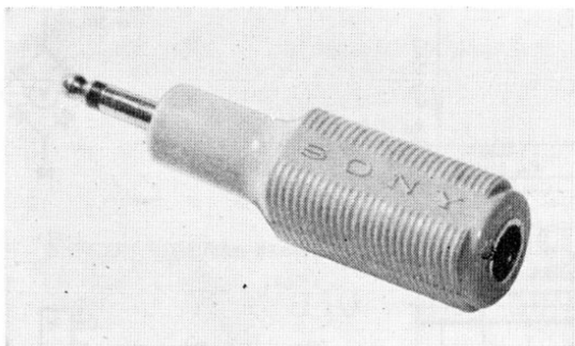
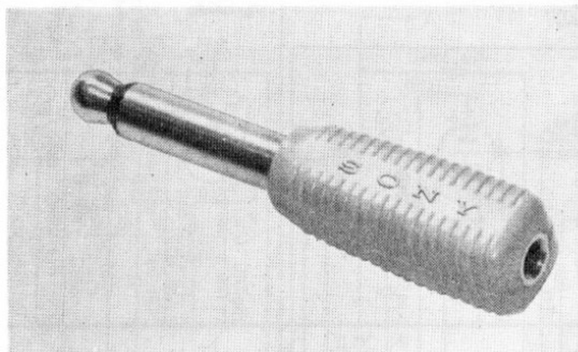

VU METER CIRCUIT
TO SW1-7 or SW2-7
CH-1 LINE INPUT
CH-1 MIC INPUT
CH-1 LINE OUTPUT
CH-1 SPEAKER OUTPUT
CH-1 E.H
CH-2 E.H
CH-2 LINE INPUT
CH-2 MIC INPUT
CH-2 LINE OUTPUT
CH-2 SPEAKER OUTPUT
REC/P.B CONNECTOR
BINAURAL MONITOR
V101 12AX7 or 12AD7
V102 6AU6
V103 6AQ5
V201 12AX7 or 12AD7
V202 6AU6
V203 6AQ5
V1 12BH7A
V2 6CA4
UNSWITCHED
SWITCHED
SW1 : CH-1 RECORD/PLAYBACK SWITCH (SHOWN IN RECORDING POSITION)
SW2 : CH-2 RECORD/PLAYBACK SWITCH (SHOWN IN RECORDING POSITION)
SW3 : 7½ IPS, 3¾ IPS EQUALIZER SWITCH (SHOWN IN 7½ IPS POSITION)
SW4 : BASS BOOST SWITCH (SHOWN IN FLAT POSITION)
SW5 : SPEAKER ON/OFF SWITCH
SW6 MUTING SWITCH
SW7 : BIAS OSC. SWITCH (MICRO SWITCH)
SW8 : BIAS OSC. SWITCH (LEAF SWITCH)
SW9 : POWER ON/OFF SWITCH
SW10 : AUTOMATIC SHUT-OFF SWITCH (MICRO SWITCH)
SW11 : FREQUENCY CHANGE SWITCH
( ) D.C. VOLTAGE IN PLAYBACK MODE
[ ] D.C. VOLTAGE IN RECORDING MODE (MEASURED BY 1kΩ/V)

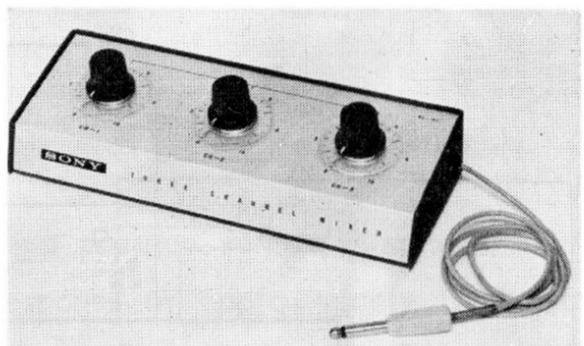
Recommended Accessories



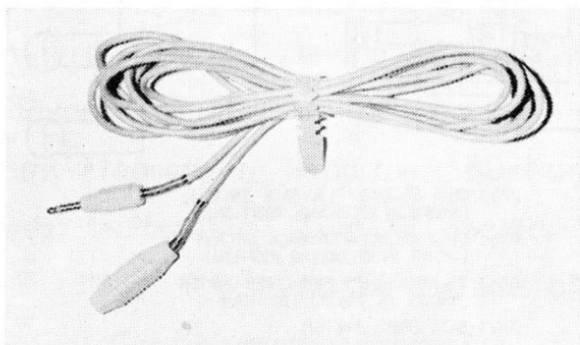
Plug Adaptor, PC-1
Use when the jack on the tape recorder is of a miniature size, while you want to make a connection with the standard plug.



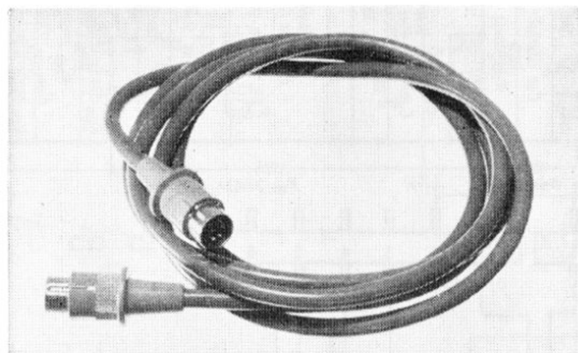
Plug Adaptor, PC-2
Use when the jack on the tape recorder is of the standard, while you want to make a connection with a miniature size plug.



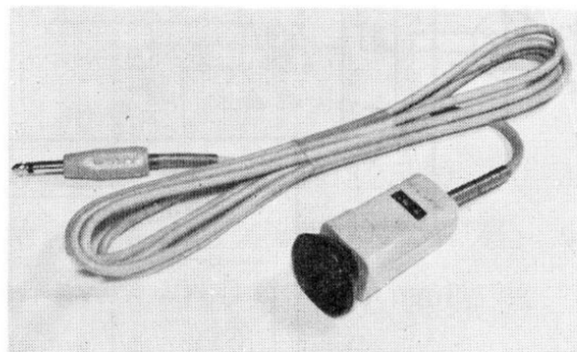
Microphone Mixer, MX-10K
3-channel, 10K ohm MIC and/or LINE INPUT mixer with independent volume controls for each channel.



Extension Cord, EC-5M, -10M, -25M
EC-5M (5 meter long), EC-10M (10 meter long), EC-25M (25 meter long) Series of microphone cords for extension of microphone.



SONY REC/PB Cord, RC-2
Connecting cord with 5-pin connector for recording from or reproducing through a Hi-Fi amplifier.



Telephone Pick-up, TP-4S
For recording of telephone conversation on tape.

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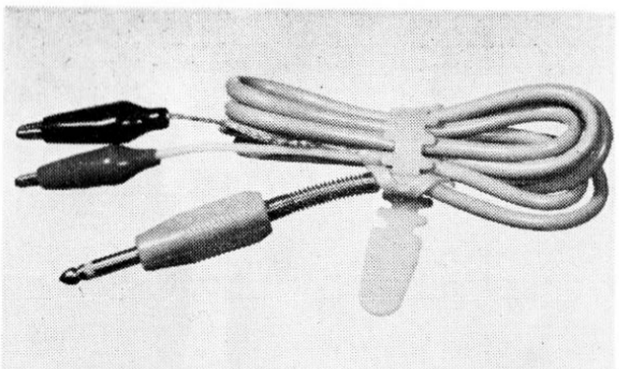
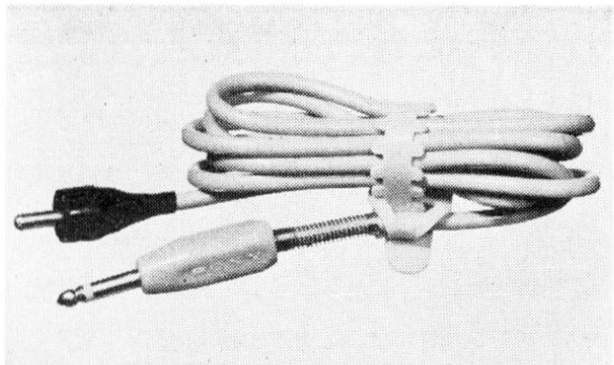
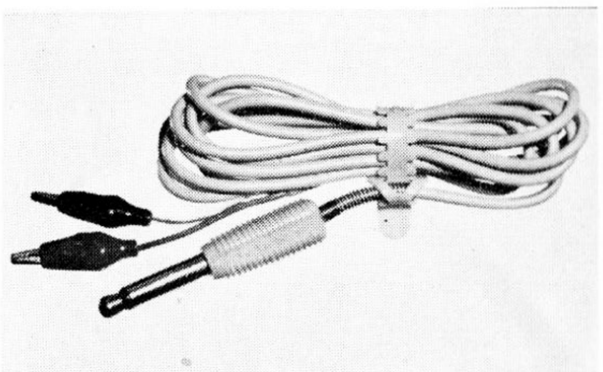


Connecting Cord, RK-36
1 meter cord with mini-plug on one end and alligator clips on the other end.



Connecting Cord, RK-50
1 meter cord with mini-plug on one end and a phono plug on the other end.



Connecting Cord, RK-55
2 meter cord with phone plug on one end and alligator clips on the other end.

Stereo Headset, DR-1A
High quality dynamic headset of low impedance(8 ohms)with binaural phone plug for private stereo listening or monitoring while recording.

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