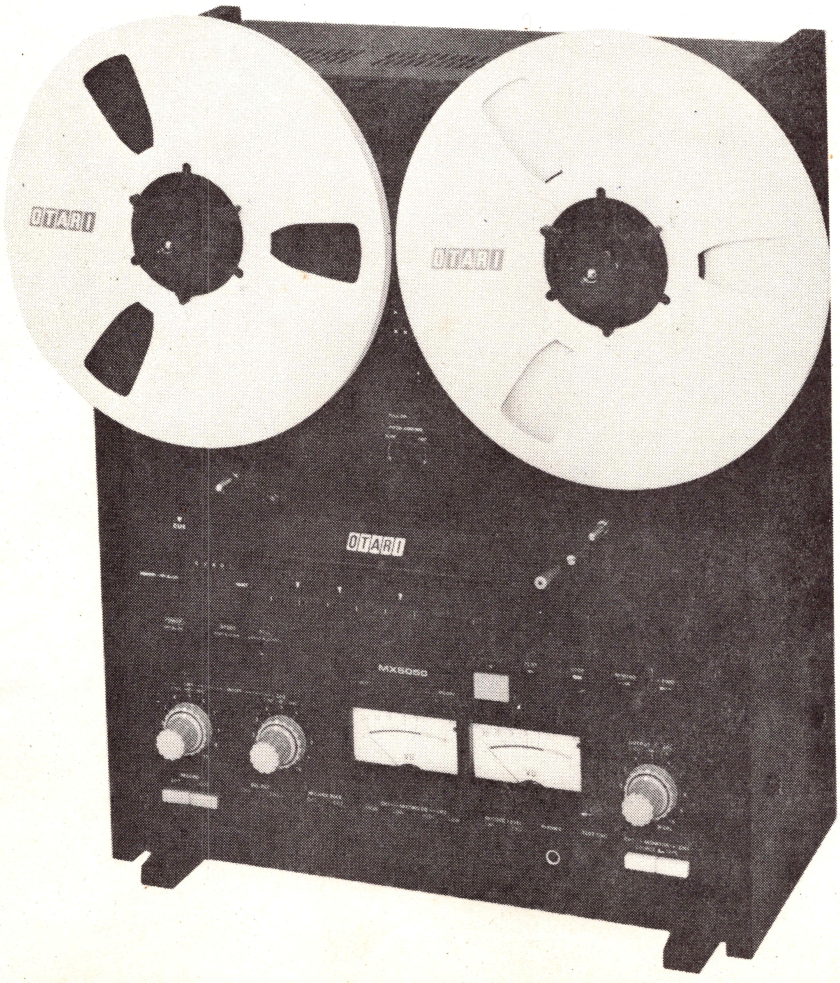
OS2—004

OTARI®

MX-5050

PROFESSIONAL RECORDER

MAINTENANCE MANUAL



SERVICE COPY
NOT FOR RESALE

MX-5050 SERIES PROFESSIONAL RECORDERS

INTRODUCTION

This manual is a maintenance supplement to the MX-5050B series instruction manual, catalog No. OS1-011, and provides detailed maintenance information.

This manual is intended for use by qualified maintenance or service personnel only.

Prior to using this manual, it is suggested that the user become familiar with the information contained in the basic manual.



MX-5050 Recorder

(2-Channel Version)

COMMUNICATION WITH OTARI
—FOR SERVICE INFORMATION AND PARTS—

OTARI PRODUCTS are manufactured under strict quality control and each unit is carefully tested and inspected prior to shipment from our factory.

If, however, adjustment or technical support becomes necessary, replacement parts are required, or technical questions arise, please contact your nearest Otari dealer or write to:

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Another part of Otari's continous technical support program for our products is the continous revision of manuals as equipment is improved or modified. In order for you to receive information and service applicable to your equipment, and for technical support to function properly, please include the following information, most of which can be obtained from the name plate on the equipment, when you communicate with Otari.

1. Model Number
2. Serial Number
3. Date of purchase
4. Name and address of dealer from whom unit was purchased
5. Power requirements (voltage and frequency)
6. Manual number to which you are referring

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SECTION 1
GENERAL INFORMATION

1-1 TEST AND MAINTENANCE EQUIPMENT REQUIREMENTS

All maintenance, electronic, and mechanical test equipment required during maintenance, alignment, and adjustment of the recorder is listed in Table 1-1.

In addition, recommended maintenance periods are shown by accumulative hours of usage and/or elapsed period of time, whichever comes first. Equivalent equipment can be substituted for the equipment suggested in the table.

Table 1-1. Test and Maintenance Equipment

Equipment Type	Suggested Model	Used For	Period
Head cleaner	Ampex 087-007	Cleaning heads and guides	8 hours
Isopropyl or denatured alcohol	Any	Cleaning capstan pinch-roller	8 hours
Q tips	Any	Cleaning heads and guides	8 hours
Head demagnetizer	Ampex 4010820	Demagnetizing heads and guides	8 hours
Lubricating oil	Anderol #456	Oiling of capstan, pinch roller, and guide roller bearings	1,000 hours or 6 months
Spring scales 0-16 oz, 0-32 oz, and 0-10 lbs	Any	Mechanical adjustment	1,000 hours or 6 months
Vacuum cleaner and brushes	Any	General cleaning	1 month
Standard alignment test tape	Refer to Table 1-2 and 1-3.	Reproduce amplifier alignmemt	150 hours or 1 month
Audio oscillator	Hewlett Packard H20-200CD	Overall frequency response and signal-to-noise measurement	150 hours or 1 month
Ac voltmeter (VTVM)	Hewlett Packard 400L or 400FL	Same as above	Same as above
Bandpass filter	Refer to Fig.4-1	Same as above	Same as above

Flutter meter	Meguro Electronics Corp. MK668C or MK669	Flutter and wow, tape speed measurement	Same as above
Wave analyzer	Hewlett Packard 3590A or 310A	Distortion and crosstalk measurement	Same as above
Test cables	Refer to text		
Technicians tools			
Allen wrenches	Metric		
Volt-ohm meter	20,000 ohms/volt any brand	Test and adjustment	

The test tapes listed in Table 1-2 and Table 1-3 should be used for the appropriate alignment.

Table 1-2. Flutter Test Tapes

Tape Width (inches)	Speed inches/second	Frequency (Hz)	Ampex Catalog No.
1/4	3 3/4	3000	01-31336-01
1/4	7 1/2	3000	01-31326-01
1/4	15	3000	01-31316-01

Table 1-3 Reproduce Alignment Test Tape

Tape speed	Equalization	MRL Catalog Number	Reference level
15 ips	NAB	21J205	250 nWb/m*2
7 1/2 ips	NAB	21T204	250 nWb/m*2
3 3/4 ips	NAB(IEC)	21F101	200 nWb/m*2
15 ips	IEC	21J303	320 nWb/m*1
7 1/2 ips	IEC	21T302	320 nWb/m*1

*1: Open circuit flux which correspond to 290 nWb/m of short circuit flux.

*2: Short circuit flux.

SECTION 2
ROUTINE MAINTENANCE
AND CONVERSION INFORMATION

2-1 ROUTINE MAINTENANCE

It is important that routine maintenance be performed at the recommended intervals. External cleaning and demagetization procedures should be performed after each eight hours of operation, and the interior of the transport should be cleaned once a month. The lubrication procedure should be performed after 1,000 hours of operation or after 6 months, whichever comes first.

2-1-(1) CLEANING

Oxide particles from the magnetic tape tend to collect on components in the tape path and degrade the performance of the recorder.

To clean the head assembly, proceed as follows:

1. Disconnect the power cable from the power supply.
2. Lift the head cover as shown in Fig.2-1.

CAUTION

WHEN CLEANING THE HEADS, USE ONLY THE RECOMMENDED SOLVENT (HEAD CLEANER) TO AVOID DAMAGING THE HEADS. KEEP THE HEAD CLEANER OFF PLASTIC FINISHES AND THE CAPSTAN PINCH ROLLER. DO NOT USE METAL TOOLS THAT CAN SCRATCH THE HEADS.

3. Clean each head stack thoroughly with a cotton-tipped applicator(Q tip) dampened with head cleaner.
4. Use isopropyl alcohol to clean all tape-guiding components, the capstan shaft, and the capstan pinch roller.

CAUTION

1. DO NOT USE A HEAD CLEANER ON THE CAPSTAN PINCH ROLLER AS DAMAGE WILL RESULT AND THE TAPE WILL SLIP.

2. BEFORE REMOVING THE REAR COVER, THE PLUG MUST BE DISCONNECTED FROM THE POWER SUPPLY TO AVOID AN ELECTRIC SHOCK.

5. Remove the rear cover of the recorder by removing 6 screws(Refer to Fig.3-1).
6. Use a vacuum cleaner and a small brush to remove all dust or contamination from the interior of the transport. If necessary lightly moisten brush with isopropyl alcohol to clean parts.
7. Install the rear cover.

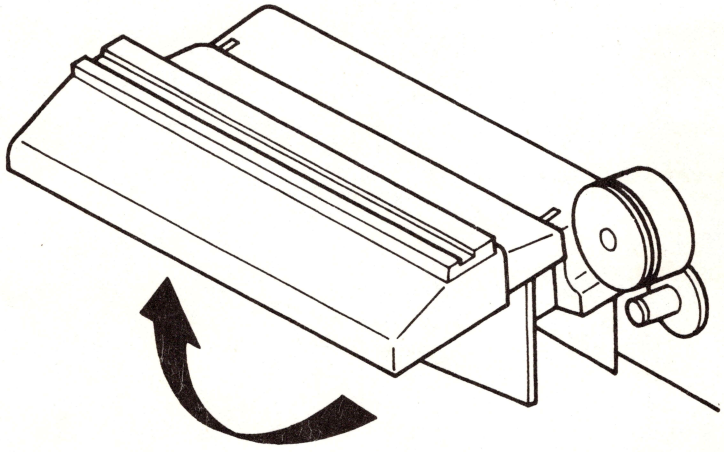


Fig. 2-1 Lifting the Head Cover

2-1-(2) DEMAGNETIZING

The heads and tape guiding components in the tape path should be demagnetized after each eight hours of operation. These components can acquire permanent magnetization that increases signal noise and distortion and partially erase high frequencies on recorded tape. Use a hand-held head demagnetizer to demagnetize all components in the tape path as follows:

1. Turn equipment power off and move any recorded tape near the transport away (tape could be partially erased by the demagnetizer).
2. Lift the head cover as shown in Figure 2-1
3. Cover the demagnetizer tips with adhesive tape to prevent scratching the head stacks.
4. With the demagnetizer held away from the transport, connect the demagnetizer to a power source.

5. Slowly move the demagnetizer tips close to the head, lightly touch the demagnetizer tips to the face of one head stack and slowly move the tips up and down the stack several times. Then slowly withdraw the demagnetizer as shown in Fig. 2-2
6. Repeat step 5 for each head stack.
7. Repeat the motions in step 5 for each guide and other metallic parts in the tape path.
8. Move the demagnetizer slowly away from the transport to at least three feet and then disconnect the power from the demagnetizer.

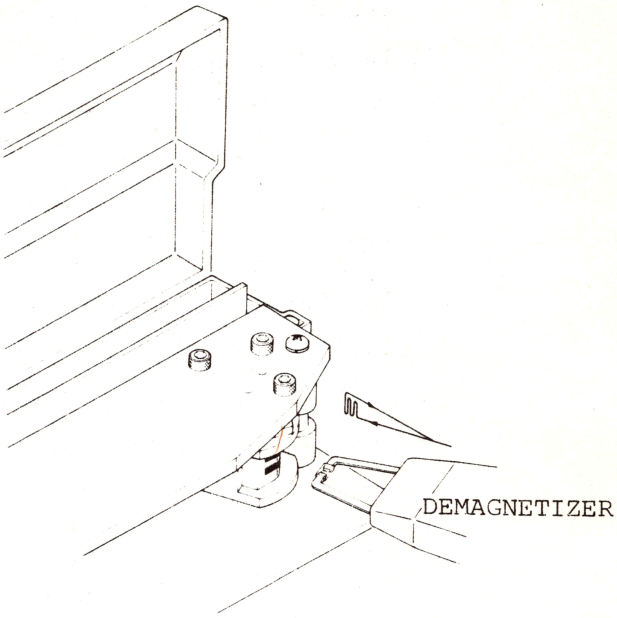


Fig. 2-2 Demagnetizing

2-1-(3) LUBRICATION

The only components requiring lubrication are the capstan sleeve bearing, the guide roller bearing, and the capstan pinch roller bearing. Refer to Fig. 2-3 and proceed as follows:

CAUTION

1. *DO NOT USE ANY OIL EXCEPT ANDEROL #456 FOR LUBRICATION.*
2. *BE CERTAIN TO CLEAN THE CAPSTAN SHAFT THOROUGHLY. LUBRICATING OIL CAN RUIN THE CAPSTAN PINCH ROLLER AND MAGNETIC TAPE. CLEAN THE CAPSTAN, PINCH ROLLER, AND GUIDE ROLLER WITH ISOPROYL ALCOHOL, AFTER LUBRICATION.*

For the pinch roller bearing and the capstan sleeve bearing:

1. Remove the pinch roller cap by removing the screw on it.
2. Remove the pinch roller from the pinch roller shaft.
   Note that there are two polyslider washers on both sides of the pinch roller bearing.
3. Remove the metal dust cap from the capstan shaft by turning it counter-clockwise.
4. The felt collar is now visible. Apply 2 or 3 drops of oil to this felt collar. Do not over lubricate.
5. Apply a few drops of oil to the pinch roller bearing.
6. Wipe off any excess oil and install the dust cap and pinch roller cap.

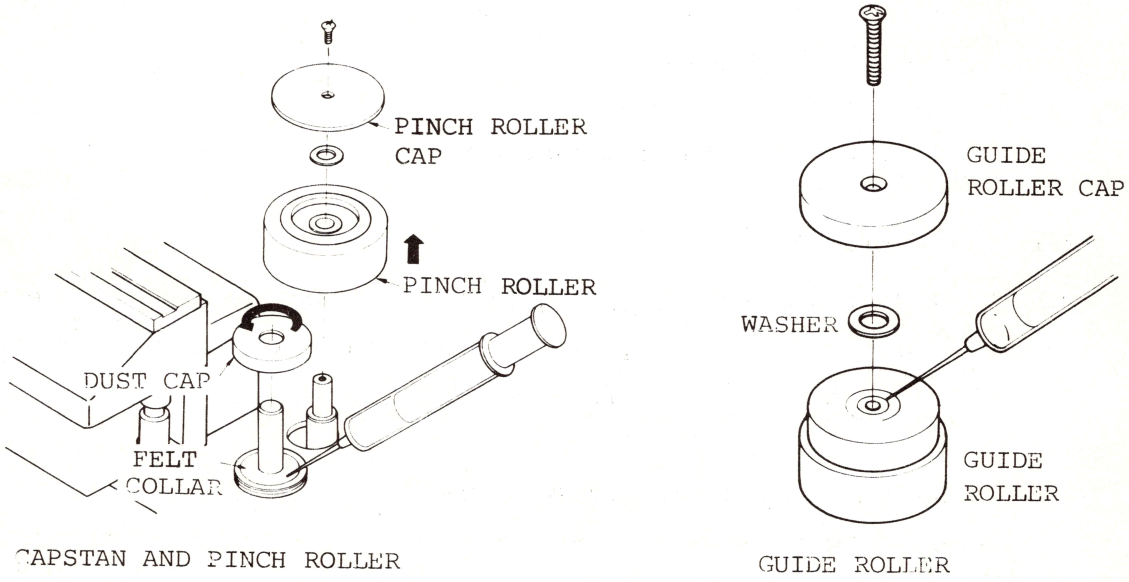


Fig. 2-3 Lubrication

For the guide roller bearing

1. Remove the guide roller cap by removing the screw on the cap as shown in Fig. 2-3.
2. Apply a few drops of oil to the guide roller bearing.
3. Wipe off any excess oil and install the guide roller cap.

2-2 TAPE REPLACEMENT

The MX-5050B is set at the factory for Scotch #206 Recording Tape. If another tape is to be used, the following adjustment may be required for the optimum performance of the tape. Refer to Section 4. Required adjustments are:

1. The record bias adjustment.
2. The record level set for NAB equalization.
3. The record level adjustment.

2-3 EQUALIZER CHANGE

The equalizer between the NAB or the IEC can be changed by means of the EQUALIZER switch (SW505) on the back panel.
However, a fine equalizer adjustment and a record level set made by the RECORD LEVEL switch are required.
Refer to Section 4 to aid the fine adjustment.

1. Set the EQUALIZER switch on the back panel to the desired position IEC or NAB.
2. On IEC equalization, set the RECORD LEVEL switch to "H" 320nWb/m reference recorded level.
   On NAB equalization, set the RECORD LEVEL switch to the appropriate position depending on the capability of the tape being used.
   Refer to Table 2-1 for RECORD LEVEL set on NAB equalization.

Table 2-1 Record level switch position

Position	Flux	Relative level	Test Tape	Recording tape to be used
Low	185 nWb/m*	0 dB	Ampex Operating level	Scotch 177, Ampex 641
Medium	250 nWb/m*	+2.6 dB	MRL NAB Reference flux	Scotch 206, 207, 250 Ampex 406, 407, 456
High	320 nWb/m**	+3.8 dB	BASF or MRL IEC Standard	IEC Equalization

* Short circuit flux

** Open circuit flux

2-4 FREQUENCY CONVERSION

On the direct-drive capstan version, frequency conversion is not required. Frequency conversion is performed by changing the drive pulley and the wiring on the starting capacitor p.c.b. as follows. Required parts are listed in Table 2-2.

1. Place the transport in an upright position and remove the rear cover.
2. Remove the capstan drive belt from the drive pulley.
3. Loosen the two hexagonal socket-head screws on the drive pulley and remove it.
4. Insert the required drive pulley to the motor shaft, adjust the height of the drive pulley to the same height as the capstan fly-wheel, and tighten the two hexagonal socket-head screws.
5. Install the capstan drive belt.
6. Resolder the lead wire on the starting capacitor p.c.b. as shown is Fig2-4.

Table 2-2 Required parts

Model		MX-5050B-2H		MX-5050B-2L,4L	
Tape speed		15 and 7 1/2ips		7 1/2 and 3 3/4ips	
Line frequency		50Hz	60Hz	50Hz	60Hz
Otari Part No.	Pulley	KC0D010	KC0D011	KC0D018	KC0D019
	Belt	BE2M140		BE2M128A	

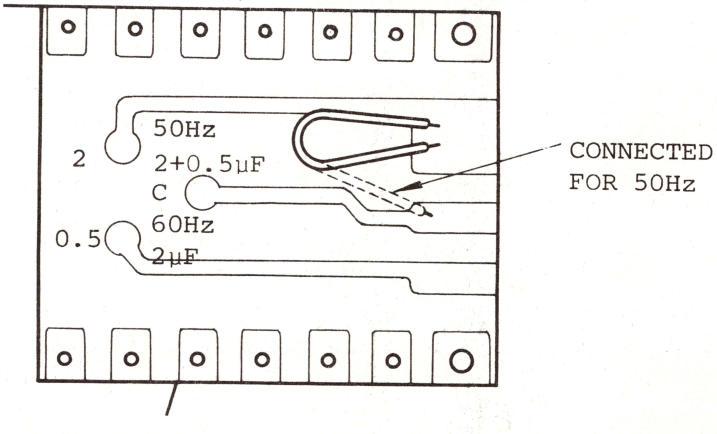


Fig. 2-4 Starting Capacitor

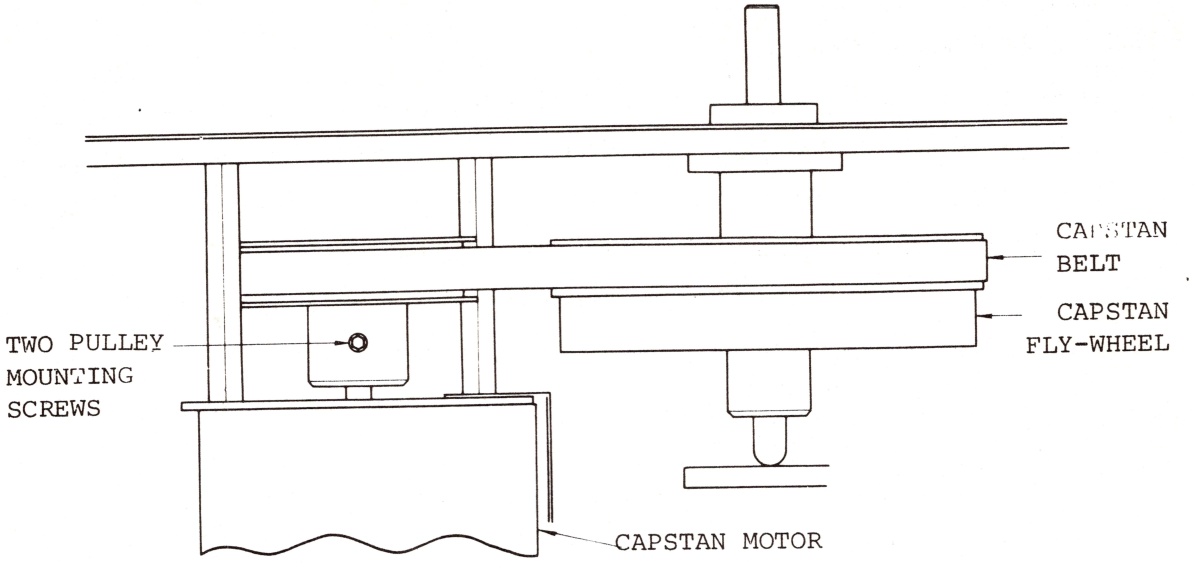
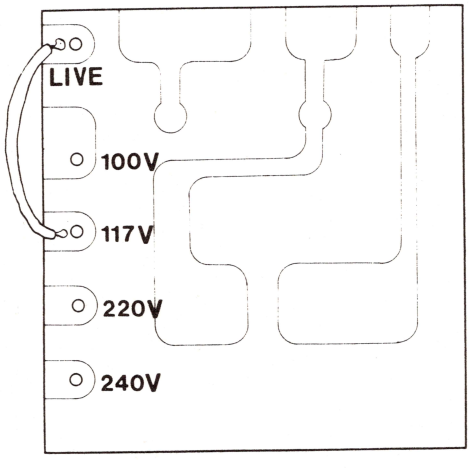


Fig. 2-5 Capstan Assembly

2-5 LINE VOLTAGE CONVERSION

The line voltage is converted by resoldering the wiring on the junction terminals.

1. Remove the rear cover by removing six cross-head screws.
2. Resolder the lead wire of the voltage selection terminal on the junction terminals to the desired voltage terminal marked as shown in Fig. 2-6.



CONNECTED FOR 117 VOLT

Fig. 2-6 Junction Terminals

2-6 TAPE SPEED CONVERSION

2-6-(1) DC SERVO CAPSTAN MOTOR MODEL

Tape speed conversion on the direct drive capstan model can only be made by placing the speed conversion switch (SW701), as shown in Fig. 2-7 , to the desired position, as well as the equalization switch. However, fine adjustment of the equalizer and a tape speed test are necessary.

Refer to Section 4 for the equalizer fine adjustment, and for the tape speed test.

1. Remove the rear cover.
2. Place the speed conversion switch to the desired position by using a minous-head screw driver.
3. Adjust the reproduce and record equalizer, and the tape speed as necessary.

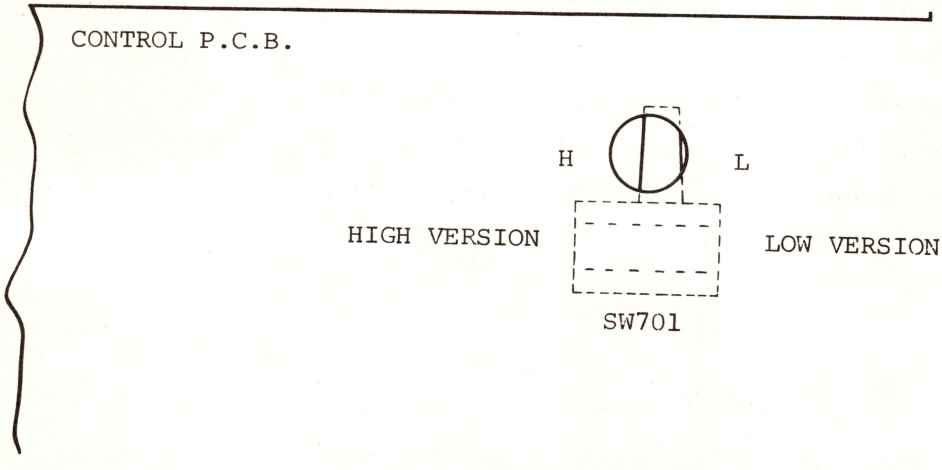


Fig. 2-7 Location of Tape Speed Conversion Switch

2-6-(2) HYSTERESIS SYNCHRONOUS MOTOR MODEL

On the hysteresis synchronous motor driven capstan model, drive pulley and drive belt replacement, and speed coversion switch set are necessary. Refer to Table 2-2 for the required parts.

After the tape speed conversion, fine adjustment of the equalizer is necessary.

1. Place the transport in an upright position and remove the rear cover.
2. Place the speed conversion switch(SW701) to the desired position by using a minous-head screw driver (refer to Fig. 2-7).
3. Remove the capstan drive belt from the drive pulley.
4. Loosen the two hexagonal socket-head screws on the drive pulley and remove it.
5. Insert the required drive pulley to the motor shaft, adjust the height of the drive pulley to the same height as the capstan fly-wheel, and tighten the two hexagonal socket-head screws.
6. Install the capstan drive belt.
7. Adjust the reproduce and record equalizer as necessary.

2-7 FUSE REPLACEMENT

If a fuse is blown, check the cause and repair it.

CAUTION

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE OF FUSE. BEFORE REPLACING THE FUSE, REMOVE THE POWER CORD FROM THE POWER SOURCE.

Information concerning the seven fuses can be found in Table 2-3.

For the main power fuse (FS801), proceed as follows:

1. Remove the side board on the left by removing four hexagonal socket-head screws.
2. Replace the main power fuse (FS801) on the power switch p.c.b.
3. Re-install the left side board.

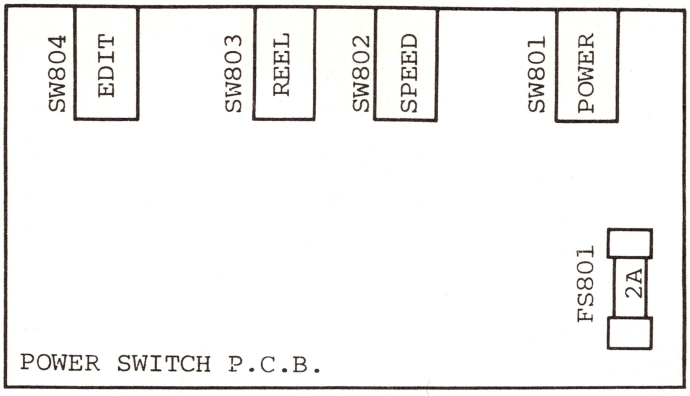


Fig. 2-8 Main Power Fuse Location

For other fuses (FS701∿706), proceed as follows:

1. Remove the rear cover by removing six cross-head screws.
2. Remove six screws marked "OPEN" on the control p.c.b.
3. Pull the control p.c.b. down, and replace the blown fuse.

Table 2-3 Fuse Information

Reference Number	current	Rating				Otari part number	Used for
		voltage	size(inch mm)	carry	blow		
FS 801	2A	250V	1/4×1 1/4 inch 6.3×32mm	110%	135% in 1 hour	FH7E020	primary circuit
FS 701	"	"	13/64×45/64 inch 5×20mm	"	" " " "	FH7F020	De servo cap. motor driver
FS 702	"	"	" " " "	"	" " " "	"	Brake & pinchroller solenoids
FS 703	"	"	" " " "	"	" " " "	"	+5Vdc transport control VU meter lump
FS 704	1A	"	" " " "	"	" " " "	FH7F010	Relays & Dc servo cap. motor control
FS 705	"	"	" " " "	"	" " " "	"	±15V amplifier
FS 706	"	"	" " " "	"	" " " "	"	"

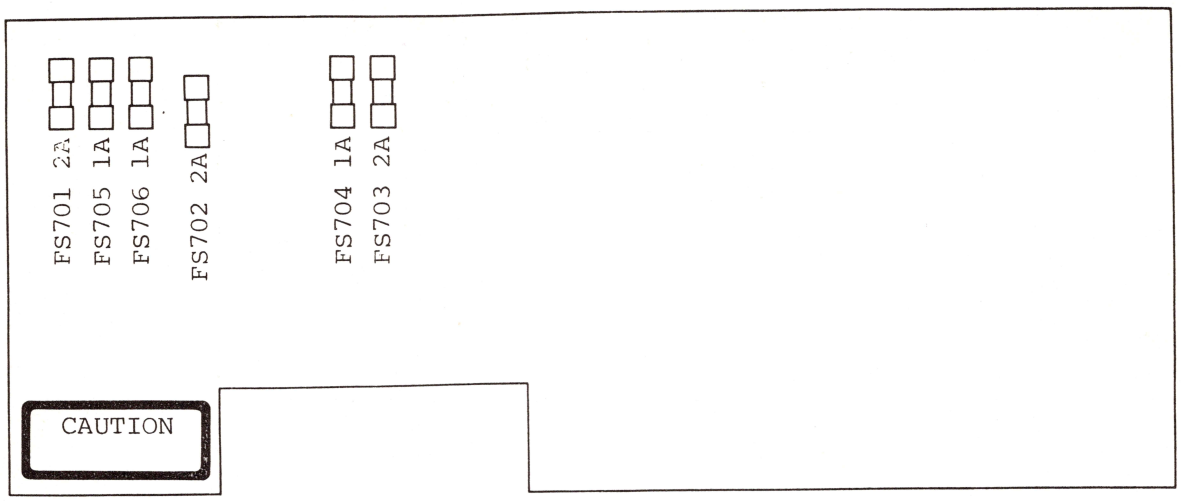


Fig. 2-9 Internal Fuse Location

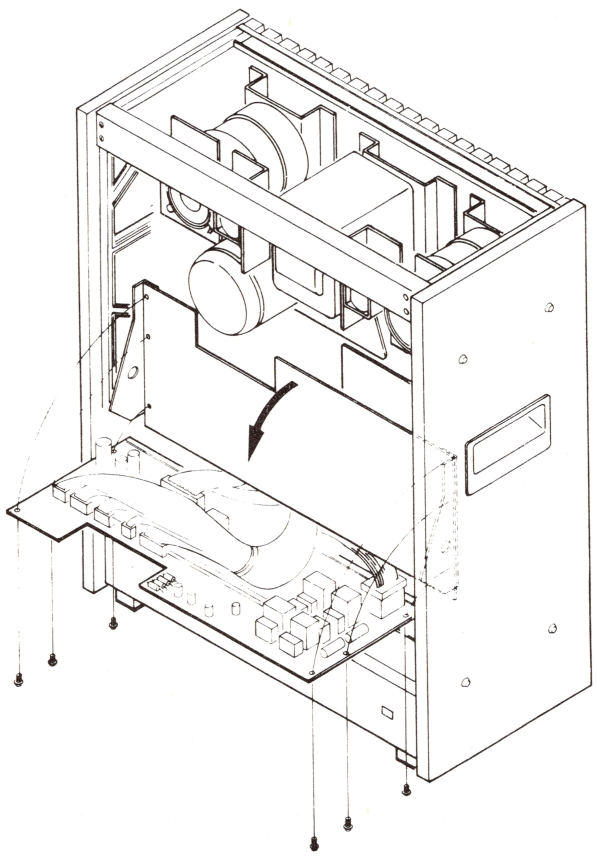


Fig. 2-10 Rotating Control P.C.B.

SECTION 3

TAPE TRANSPORT MAINTENANCE

Tape transport maintenance includes procedures for adjusting the supply and take-up reel brakes, the capstan pinch roller pressure and the capstan speed adjustment.

3-1 TRANSPORT ACCESS

To gain access to the recorder transport, proceed as follows:

1. Remove the power cable and place the recorder in an upright position.
2. Remove the rear cover by removing the six cross-recessed screws on the panel(two screws are with studs.)
3. Open the control printed circuit board by removing six cross-recessed screws marked"OPEN".
4. Remove the two side panels by removing the four hex-socket screws on each panel.

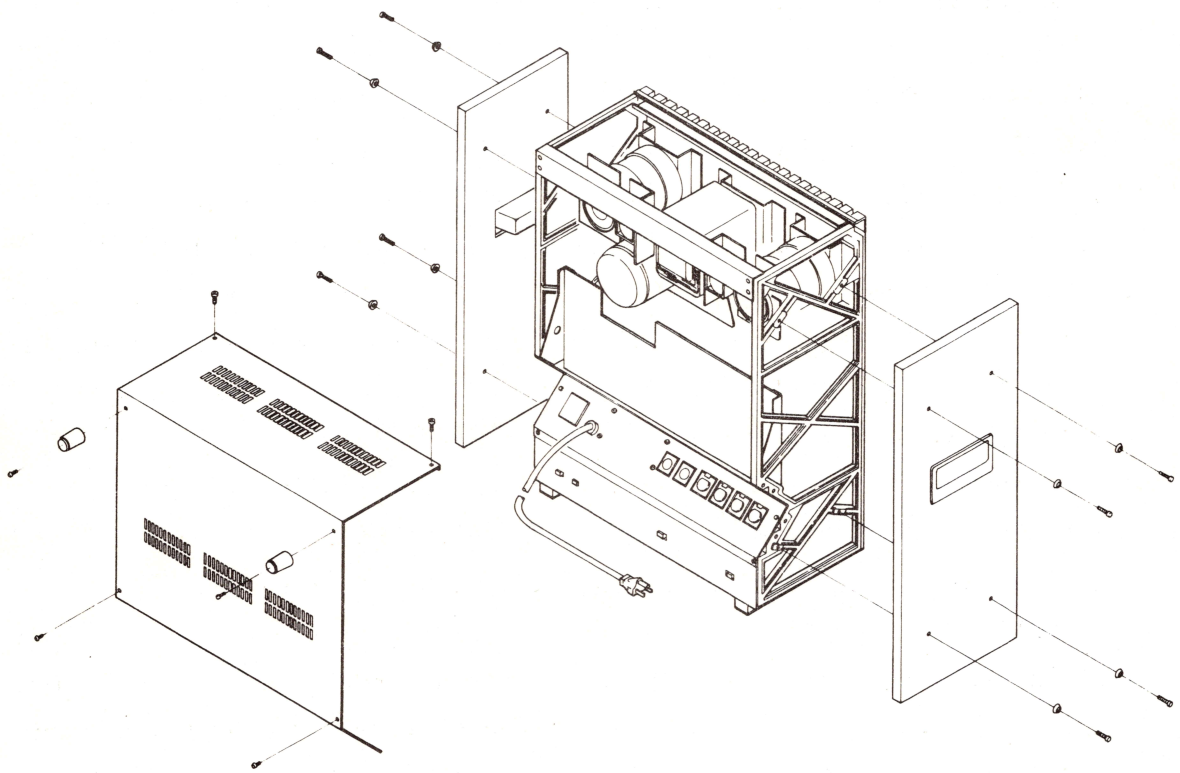


Fig. 3-1 Tape Transport Access

3-2 BRAKE ADJUSTMENT

The brake system on each reel, stops reel rotation when the stop mode is entered into or when power is removed. The brakes are checked and adjusted with the power removed. Since the brake force is different for each direction of rotation (brake differential), and there is but a single adjustment, the force is checked and adjusted for the best compromise force in each direction.

In the following steps, an empty 10 1/2 inch diameter NAB reel (4 1/2 inch diameter hub) is used and a length of cord or twine is wrapped on the reel. A spring scale is attached to a small loop formed in the free end of the cord or twine.

If 10 1/2 inch diameter NAB reel (4 1/2 inch diameter hub) is not available, a 7 inch diameter reel (2 1/4 inch diameter hub) may be used but all readings must be multiplied by a factor of 2. Proceed as follows:

Refer to table 3-1 for the braking force specifications.

1. Place an empty 10 1/2 inch diameter NAB reel on the supply reel turntable. Secure with a holddown knob.
2. Wind a length of cord or twine a few turns counterclockwise on the hub. Tie a loop in the free end of the cord or twine.
3. Insert the hook of a 0-16 ounce or 0-32 ounce spring scale through the loop and hold the spring scale upright as shown in Fig. 3-2.
4. Pull on the scale slowly to make the reel rotate counterclockwise (direction "B" in Fig. 3-2). While being sure the cord does not rub against either flange, note the scale reading. The reading should be 7.9 to 9.7 ounces (225 to 275 grams)
5. Wind the cord or twine in a clockwise direction on the supply reel.
6. Repeat steps 3 and 4 to make the reel rotate clockwise (direction "A" in Fig. 3-2). The reading should be 3.6 to 4.5 ounces (100 to 125 grams).
7. If the readings were low in both directions, remove the brake spring (shown in Fig. 3-3) from the existing anchor hole on the brake lever and install the spring in the next hole located father away from the brake solenoid.

8. If the readings were high in both directions, move the spring anchor point closer to the brake solenoid.
9. If the brake spring was moved, repeat steps 2 through 6 to check the results.
10. Repeat the brake adjustment procedure on the takeup reel. Note that a high braking force is present when the takeup reel is rotated clockwise. The braking force specifications are the same as for the supply reel.

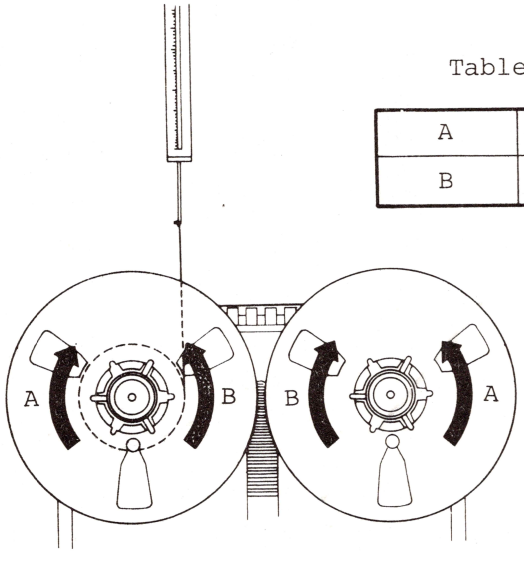


Fig. 3-2 Brake Measurement

Table 3-1 Braking Force Specifications

A	3.6 to 4.5 ounces (100 to 125 grams)
B	7.9 to 9.7 ounces (225 to 275 grams)

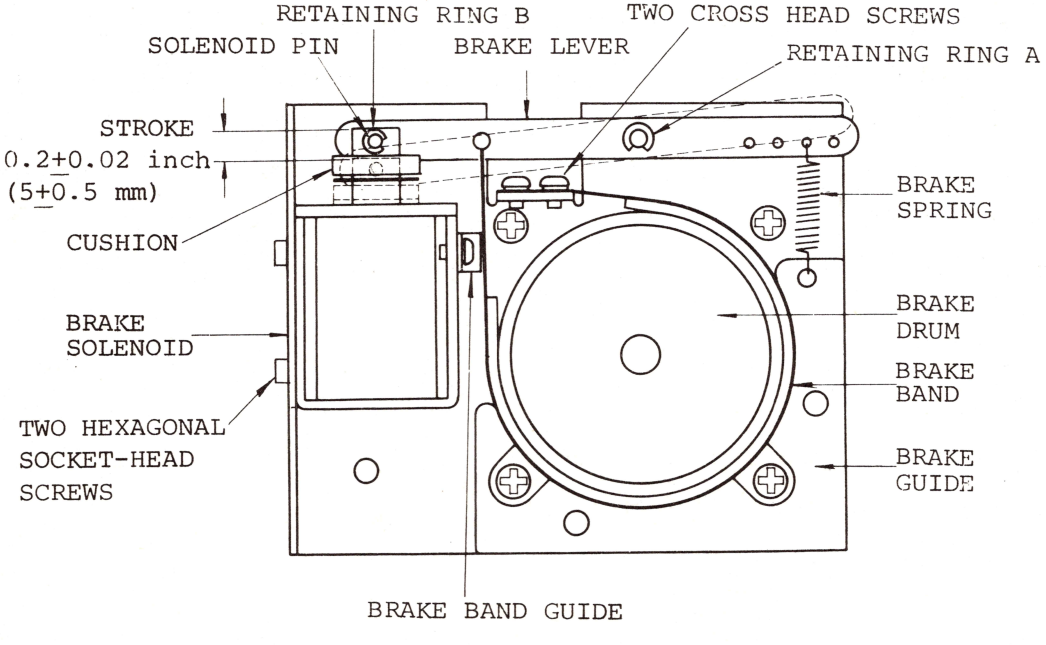


Fig. 3-3 Brake Assembly Location

3-3 CAPSTAN PINCH ROLLER PRESSURE ADJUSTMENT

The capstan pinch roller's pressure against the capstan is determined by the capstan solenoid spring. This force is adjusted by means of the nut shown in Fig. 3-5. The nut is adjusted to obtain a force of 6.4∿7.0 pounds. The resistance of the solenoid coil rises with the temperature and causes the solenoid's force to decrease. Therefore, do not adjust the pinch roller's pressure until the recorder has been operated in the play mode for at least 30 minutes. The following procedure should be adhered to.

1. Use adhesive tape to hold the takeup-tension-arm safety switch in an upright position so that the safety switch is not activated.
2. Tie a length of cord or twine together to form a continuous loop. Place one end of the loop around the capstan pinch roller shaft.
3. Press the PLAY pushbutton. The pinch roller will move to make contact with the capstan and both will rotate.
4. Hook a 0 to 10 pound spring scale to the other end of the cord and pull the cord taut, straight to the center of the capstan as is shown in Fig. 3-4. Do not let the cord come into contact with the rotating pinch roller.
5. Pull on the scale and note the scale reading when the pinch roller just loses contact with the capstan (the pinch roller stops rotating). The scale reading should be 6.4 ∿ 7.0 pounds.
6. If a proper scale reading was not obtained in step 5, loosen the locknut and adjust the pressure nut as required. (Turning the pressure nut towards the spring increases pinch roller pressure.) Tighten the locknut.
7. After adjustment has been completed, check that the solenoid bottoms within the solenoid coil (the pinch roller can easily be pushed away from the capstan). If the solenoid does not bottom, loosen the locknut and turn the pressure nut away from the spring until the solenoid bottoms. Recheck the pressure adjustment and tighten the locknut.

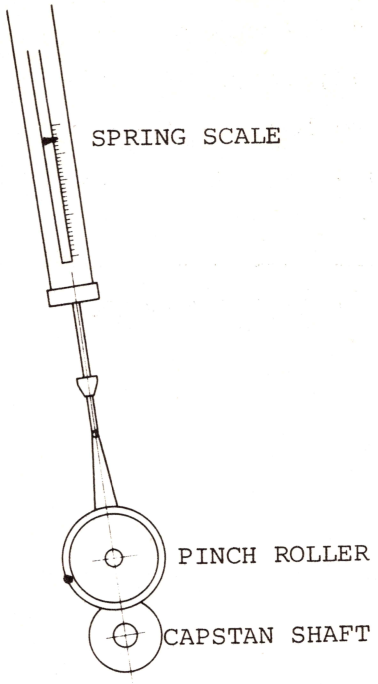


Fig. 3-4 Pinch Roller Pressure Measurement

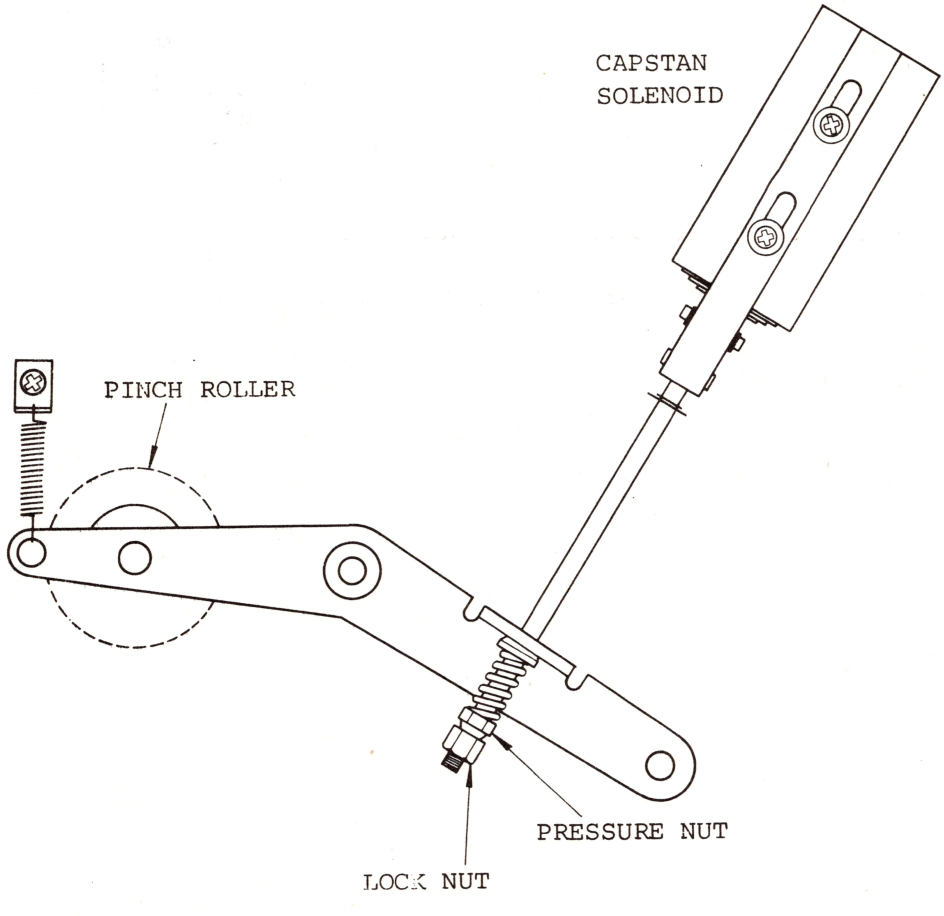


Fig. 3-5 Pinch Roller Pressure Adjustment

3-4 CAPSTAN SPEED ADJUSTMENT

The capstan speed can only be adjusted on the dc servo capstan motor, by using the speed adjustment controls on the servo control p.c.b. This adjustment follows the tape speed measurement in Section 4, and the speed control shown in Fig. 3-6 is adjusted as necessary.

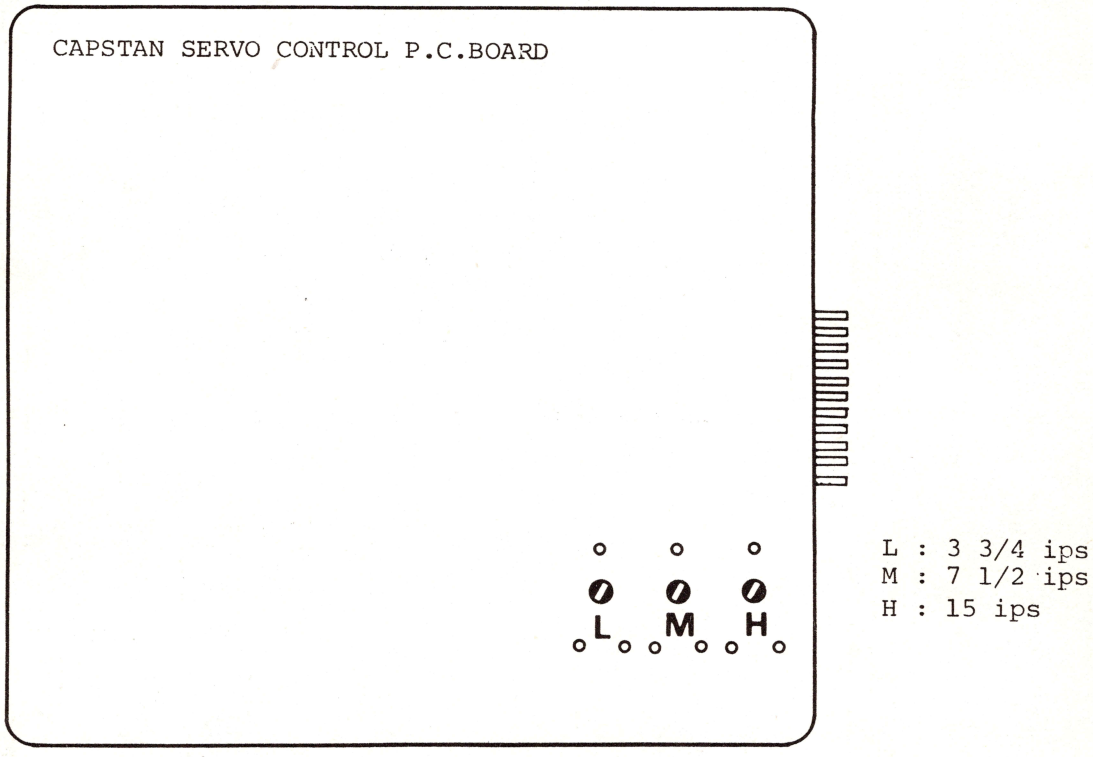


Fig. 3-6 Capstan Servo Control P.C.B.

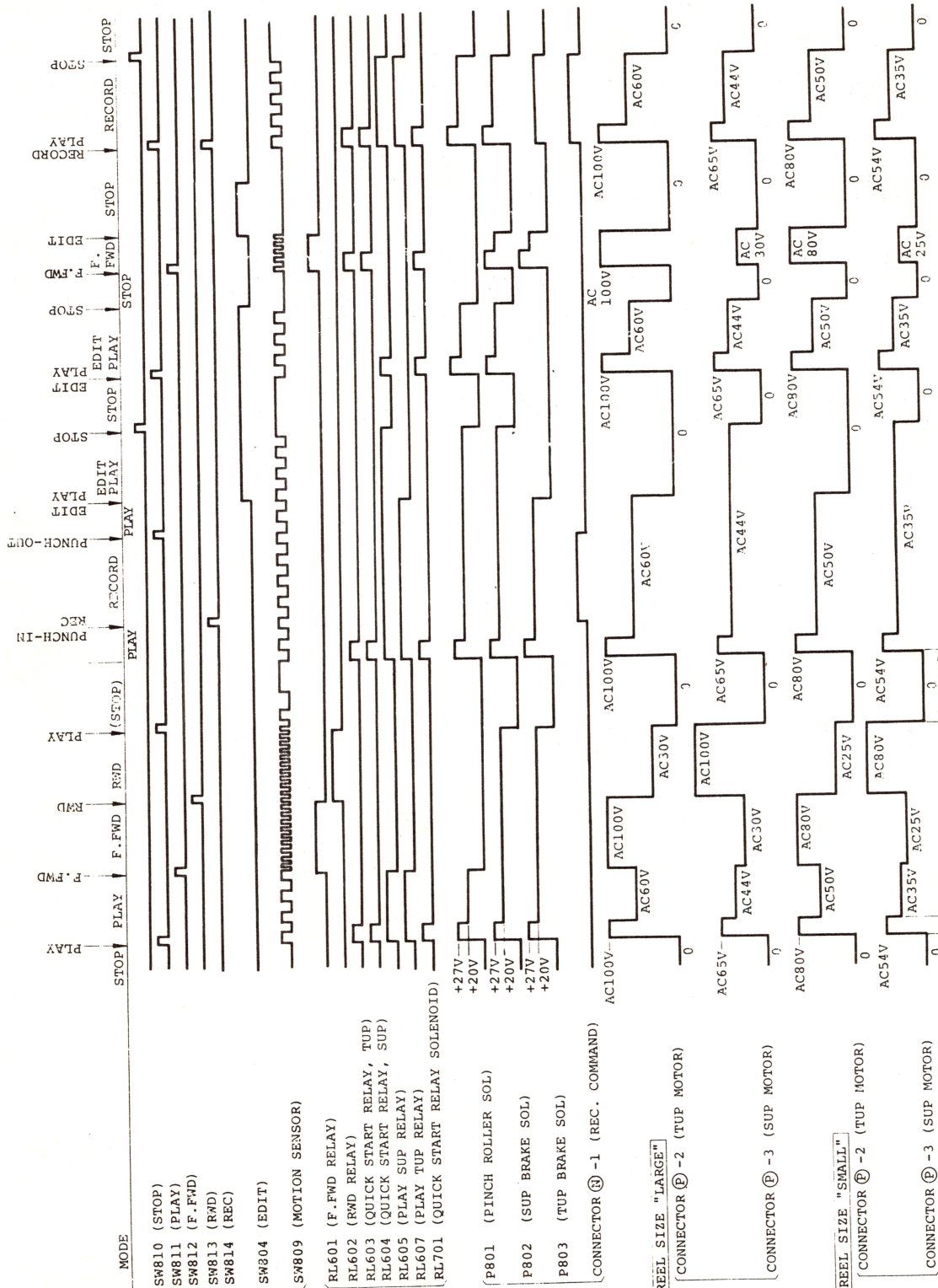
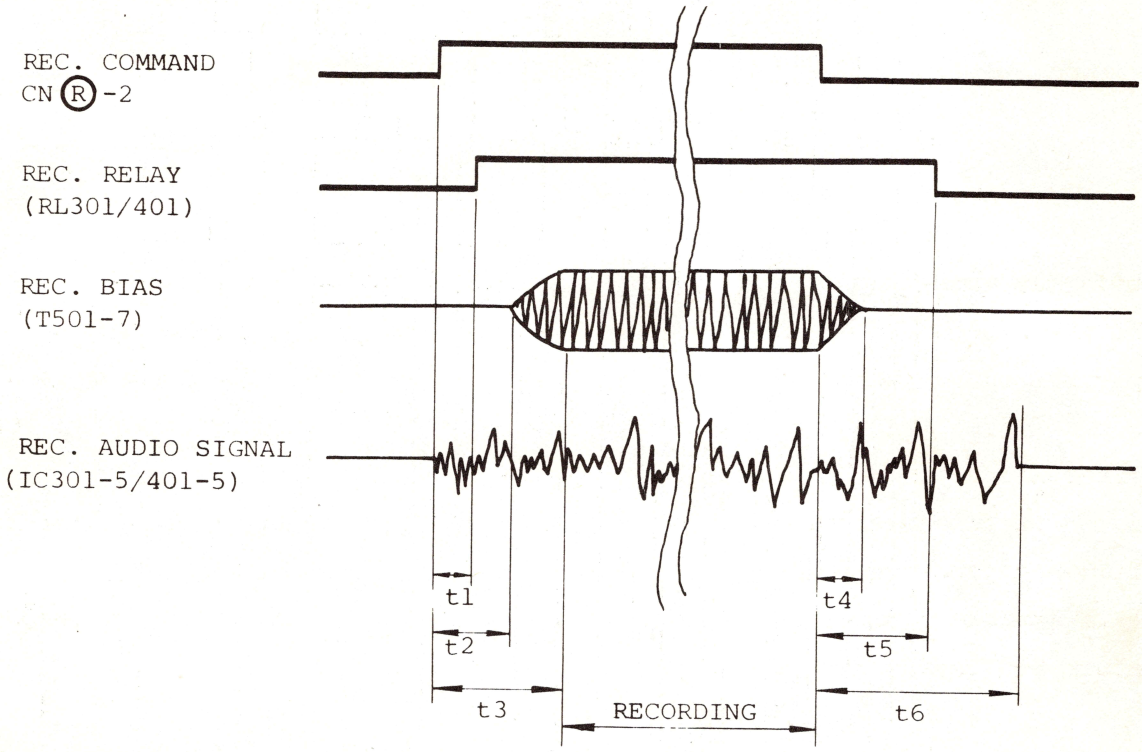


Fig. 3-7 Control Timing Chart

3-6 RECORDING PROCESS TIMING CHART



t1 : Rec. relay operate time ; 7 to 20 msec
t2 : Rec. bias start delay time ; 30 msec
t3 : Rec. bias rise time (95%) ; 350 msec
t4 : Rec. bias fall time ; 40 msec
t5 : Rec. relay release delay time ; 230 msec
t6 : Rec. signal muting delay time ; 300 msec

Fig. 3-8 Recording Process Timing Chart

SECTION 4
PERFORMANCE TESTING
AND ELECTRONIC ALIGNMENT

Performance testing should be made at regularly scheduled intervals (every 150 hours or every month) to ensure that the recorder is performing within specifications. These tests should also be performed whenever the recorder appears to be malfunctioning and following repairs to the equipment that may affect performance.

If the performance test is not successful, proceed to the applicable electronic alignment procedure.

It is important to clean and demagnetize the head and tape guiding components before performing the following steps.

4-1 GENERAL NOTICE

It is important to clean and demagnetize the head and tape guiding components before performing the test and alignment procedures.

The voltages indicated in this section are for the MX-5050B-2H (D) model and are at a 1KHz frequency at reference recording level of 250 nWb/m (The RECORD LEVEL switch on the back panel is in the 'M' position). In the case of IEC equalization, the reference record level is 320nWb/m (RECORD LEVEL switch is in the 'H' position) that is 1.2 dB above 250nWb/m (RECORD LEVEL switch is in the 'M' position). Refer to Fig. 4-10.

The test and alignment procedures for the MX-5050B-F and the MX-5050B-4 models may be carried out in essentially the same manner. However, the sensitivity of the reproduce heads, the biasing current and the signal current of the record heads differ from the values in MX-5050B-2H(D). Refer to the block diagrams for 4-track and full-track type to obtain each value for the MX-5050B-F and MX-5050B-4. A double designated symbol number is for the left channel/right channel.

The test equipment listed in Table 1-1 are required for completion of the performance and alignment procedures.

4-2 TEST TAPES

Test tapes are precisely recorded under controlled conditions and must be correctly handled and stored to retain accuracy.

Handle the test tapes as follows:

1. Clean and demagnetize the head and tape guiding components before installing the test tape.
2. Never store test tapes in areas where there are temperature or humid extremes.
3. Never run the test tapes on speeds other than a normal play run (never use the rewind or fast forward mode). This is further explained below.

During the alignment procedure, the rewind and fast forward modes should not be used.

After alignment, wind the tape completely on the takeup reel, interchange reels, thread the tape, and place the equipment in the play mode to wind the tape back on its original reel.

After extensive use, high frequency tones may be drop as much a 2 dB. In addition, flutter indication may rise even though actual flutter remains unchanged.

Flutter increase is caused by demagnetization of the recorded signal from repeated plays, tape deformation due to tape tension, changes in temperature and humidity, and increased dropout resulting from tape wear.

4-3 TEST CONDITIONS

The test conditions specified in the following steps are to be met prior to performing the tests. After these test conditions are met, continue with the following procedures for checking overall signal-to-noise, overall distorion, crosstalk, and flutter.

1. Clean and demagnetize the heads.
2. Use high quality low-noise tape such as Ampex 406, 407, 456, or Scotch 206, 207, 250, or an equivalent, and bulk erase the blank tape.
3. Turn the power on and allow the unit to warm up for 20 minutes.
4. Be sure the head cover is installed for all tests.

4-4 PERFORMANCE TESTS

Before performance testing, a SRL check, reproduce frequency response check, record level check, source level check, an overall frequency response check, and a SEL.REP level check are necessary. Refer to section 4-7, ELECTRONIC ALIGNMENT, in this manual for checking procedures.

For performance testing, at first proceed as follows.

Demagnetize and clean the heads and all guiding components.

1. Set the REEL switch to the appropriate position, and set the EDIT switch to the "out" non-edit position.
2. Set the LINE OUT switch to 'H', set each RECORD switch to the appropriate position, set each SEL.REP switch to the "out" position, and set each MONITOR switch to the "out"SOURCE position.
3. Thread a reel of bulk-erased tape onto the transport, set the SRL switch to the SRL position, and push the PITCH CONTROL knob to its fixed position.

4-4-(1) OVERALL SIGNAL-TO-NOISE

The overall signal-to-noise test requires an ASA "A" weighted filter for weighted measurement and a noise filter for unweighted measurement to attenuate noise outside of the audible frequency band. The filter may be built into a small aluminum box as is shown in Fig. 4-1.

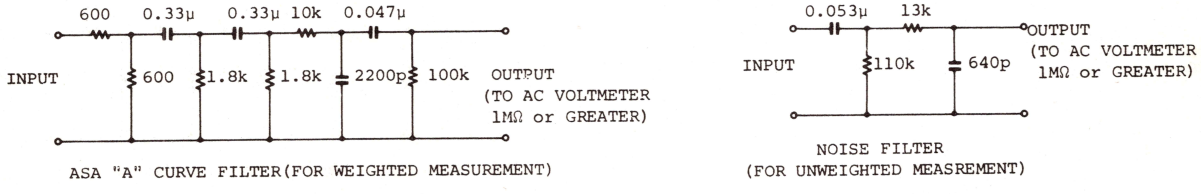


Fig. 4-1 Filter Schematics

The signal-to-noise ratio depends on the SRL calibration, reproduce equalization, bias calibration, and record equalization. Proceed as follows:

1. Connect the filter to CH-1 LINE OUT and connect an ac voltmeter to the output of the filter.
2. Set the reproduce head selector switch on the head assembly to the appropriate position.
3. Set the SRL switch to the "SRL" position and set the RECORD LEVEL switch to the "L" (185nWb/m) position.

4. Hold the TEST OSC pushbutton depressed and adjust the CH-1 INPUT LINE control for a 0 VU indication on the VU meter. Note the ac voltmeter indication; the ac voltmeter will not read +4 dBm due to the insertion loss of the filter.
5. Depress the CH-1 MONITOR switch to the "in" TAPE position, and set the CH-1 INPUT LINE and CH-1 INPUT MIC controls to their full counterclockwise positions. Reset the TAPE TIMER to "0000".
6. Start the record mode and record for one minute. Rewind the tape to the "0000" indication on the timer.
7. Reproduce the recorded portion and read the noise level on the ac voltmeter.
8. The signal-to-noise ratio is determined by calculating the difference in readings obtained in step 2 and step 5 plus 9 dB (A-B)+9 dB (peak recording level-520 nWb/m-is 9 dB above SRL-185 nWb/m)
9. Repeat steps 1 through 6 for the other channels as required, and change the tape speed to check all signal-to-noise ratios.

Table 4-1. Signal-to-Noise Specifications

Tape Speed	1/2 Track		1/4 Track		Full Track	
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted
15 ips	65/63 dB	62/60 dB	62/60 dB	59/57 dB	68/66 dB	65/63 dB
7 1/2 ips	65/63 dB	62/60 dB	62/60 dB	59/57 dB	68/66 dB	65/63 dB
3 3/4 ips	63/63 dB	60/60 dB	60/60 dB	57/57 dB	66/66 dB	63/63 dB

Note: 65dB/63dB indicates NAB/IEC equalization

If signal-to-noise specifications are not met, check and adjust the following items.

1. SRL calibration.
2. RECORD BIAS adjustment.
3. Reproduce equalization.
4. Record equalization.
5. Record and/or reproduce electronics.
6. Head magnetization.
7. Magnetic flux of a motor, a soldering iron or a transformer near the recorder.

4-4-(2) OVERALL DISTORTION TEST

For accurately checking distortion it is necessary to use an audio oscillator with less than 0.1% distortion and a wave analyzer with an adjustable bandwidth capability. A wave analyzer with too narrow a bandwidth may make it difficult to measure harmonics due to flutter components within the transport. Instruments that measure total harmonic distortion will be affected by tape and modulation noise in addition to harmonic distortion. To measure overall harmonic distortion proceed as follows:

1. Connect a wave analyzer to CH-1 LINE OUTPUT and connect an audio oscillator to CH-1 LINE INPUT.
2. Set the MONITOR switches to their "in" TAPE positions, set the audio oscillator frequency to 1000 Hz, set the SRL switch to the "SRL" position, and set the RECORD LEVEL switch to the "M" (250 nWb/m) position.
3. Set the wave analyzer frequency to 1000 Hz, the bandwidth to 100 Hz, and the mode selector switch to AFC.
4. Start the record mode and adjust the CH-1 INPUT LINE control for a 0 VU reading on the VU meter.
5. Adjust the fine tuning control on the wave analyzer and adjust the analyzer input level control for a full scale reading of 100%.
6. Change the wave analyzer tuning control to 2000 Hz and measure the second harmonic content. The second harmonic content should not exceed 0.1%.
7. Change the wave analyzer tuning control to 3000 Hz and measure the third harmonic content. Third harmonic distortion is dependent upon the type of tape used, and the accuracy of the RECORD BIAS setting. A typical reading for low noise high output tape is 0.4%.

If distortion specifications are not met, check and adjust the following items.

1. SRL calibration.
2. RECORD BIAS adjustment
3. Head magnetization.
4. Record and/or reproduce electronics.

4-4-(3) CROSSTALK TEST

It is important that blank bulk-erased tape be used for the crosstalk test. To measure crosstalk between channels proceed as follows:

1. Follow the procedure in the Overall Distortion Test, steps 1 through 5.
2. Connect a wave analyzer from the output of CH-1 to CH-2 LINE OUTPUT.
3. Measure the crosstalk in dB.

   Crosstalk should not exceed that shown in Table 4-2. If crosstalk specifications are not met, record and reproduce head alignment (height and tape contact) is incorrect or the record or reproduce head is defective.

Table 4-2. Crosstalk specifications

Track	Crosstalk
1/2 track	55 dB
1/4 track	55 dB

4-4-(4) ERASURE TEST

It is important that blank bulk-erased tape be used in the erasure test. To measure depth of erase, proceed as follows:

1. Follow the procedure in the Overall Distortion Test, steps 1 through 5. A 1000 Hz signal is being recorded at SRL.
2. Set the SRL switch to the off position and adjust the OUTPUT control for a -10 VU reading on the VU meter.
3. Adjust the INPUT LINE control for a 0 VU reading on the VU meter, a 1000 Hz signal is being recorded at 10 dB above SRL. Continue recording for a few minutes.
4. Disconnect the audio oscillator.
5. Rewind and reproduce the recorded section. The VU meter reading should be 0 VU.
   Check the wave analyzer and readjust it as necessary for a full scale reading of 100%.
6. Press the RECORD pushbutton to place the recorder in the record mode. As the tape is being erased, adjust the percent scale on the wave analyzer to read the residual 1000 Hz tone.
7. Repeat the same procedure for the other channels.
8. The depth of erasc should be more than 70 dB.

If erasure specifications are not met, check and adjust the following items.

1. Erase and/or record head alignment, (height, tape contact).
2. Erase head wear.
3. Erase head surface cleanliness.
4. Bias oscillator adjustment.

4-4-(5) TAPE SPEED MEASUREMENT

A flutter test tape is used for measuring tape speed.
Since tape tension affects tape speed, it is important for accurate measurement that the flutter test tape used is attached to the end of a full reel of blank tape as shown in Fig. 4-2, and is used with the REEL pushbutton set to the appropriate reel size.
Proceed as follows:

1. Place the PITCH CONTROL in the fixed position and set all RECORD switches to their off "out" positions.

2. Connect a flutter meter to LINE OUT and set the MONITOR switch to the TAPE position.
3. Set the SPEED switch to "HIGH" and use the test tape at its appropriate speed.
4. Attach the test tape to a 10 1/2 inch NAB reel as shown in Fig. 4-2, place the test tape on the supply reel table, thread the tape, and set the REEL switch to the LARGE position.
5. Place the recorder in the play mode and note the reading on the frequency counter. The reading should be between 2994 and 3006 Hz (3000Hz ± 0.2%).
6. Repeat the procedure at a point towards the end of the reel, for a 7 inch EIA reel, and for low tape speeds.
7. If adjustment is necessary, refer to section 3-5.

If speed accuracy is not within ±0.2%, check and adjust the following items.

1. Pinch roller tire wear and pressure.
2. Brakeshoe for brake drum contact.
3. Tape tension.
4. Power correctness.
5. Pinch roller and capstan cleanliness.

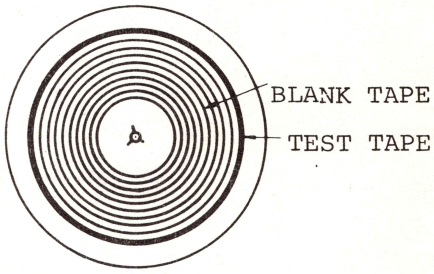


Fig 4-2 Test Tape Loading

In addition, check the following items for the dc servo capstan motor.

6. Servo control circuit.
7. Capstan motor.

Or for the hysteresis synchronous capstan motor:

6. Capstan belt, pulley, and fly-wheel cleanliness.
7. Capstan belt tension.

NOTE

To avoid error affected by the line frequency, it is recommended that the time-base of a frequency counter be set as follows:

A. On the dc servo capstan motor, set the time-base to the crystal oscillator

B. On the hysteresis synchronous capstan motor, set the time-base to the line frequency.

4-4-(6) FLUTTER AND WOW TEST

It is recommended that these checks be made with standard flutter test tapes (See Table 1-2) which are recorded on precise equipment to produce less than 0.03% rms flutter. After recording a section of tape, rewind to the beginning and start the tape in the reproduce mode. Flutter meters are sensitive to amplitude modulation that results from poor head-to-tape contact or from signal dropout. Therefore, clean the heads before making a flutter test.

The following method is used with a test tape:

It is important that the flutter test tape used is attached to the end of a full reel of blank tape as shown in Fig. 4-2, and is used with the REEL pushbutton set to the appropriate reel size.

1. Place the PITCH CONTROL to the fixed position and set all RECORD switches to the off "out" position.
2. Connect a flutter meter to the LINE OUT of an inner track channel's MONITOR switch in the TAPE position.
3. Set the selector switch of the flutter meter to the NAB weighted position, set the SPEED switch to Hl, and use the test tape at an appropriate speed.
4. Attach the test tape to a 10 1/2 inch NAB reel as shown in Fig. 4-2, place the test tape on the supply reel table, thread the tape, and set the REEL switch to the L position.
5. Place the recorder in the play mode and note the reading on the flutter meter. The reading should be as shown in Table 4-3.
6. Repeat the procedure at a point towards the end of the reel, a 7 inch EIA reel, and at low tape speeds.

The following method is used when a test tape is not available:

1. Connect the oscillator signal output of the flutter meter to an inner channel (not an edge channel) LINE INPUT of the recorder.
2. Connect the same channel's LINE OUTPUT of the recorder to the signal input of the flutter meter.
3. Set the SPEED switch to "HIGH", set the SRL switch to the SRL position, set the MONITOR switch to the TAPE position, start the record mode, and adjust the appropriate INPUT LINE control.

4. Rewind and reproduce the recorded portion, and note the flutter and wow on the flutter meter.
5. Check the flutter and wow at a low tape speed, and check it at a point towards the end of the reel.

Table 4-3 Flutter and wow specifications

Tape speed	Flutter and wow
15 ips	0.06%
7.5 ips	0.08%
3 3/4 ips	0.12%

Flutter and wow can be caused by any element in the tape path. Excessive flutter and wow may be traced by observing the flutter component on an oscilloscope screen connected to the demodulator output of the flutter meter. If the fluctuation rate observed on the oscilloscope coincides with the rotational elements, such as the supply or takeup reel, capstan or pinch roller, the problem source may be easily traced. Other sources of excessive flutter and wow are:

1. Defective capstan servo control.
2. Damaged capstan motor.
3. Capstan needs lubrication (dry bearing).
4. Incorrect tape tension.
5. Brakeshoe is contacting brake drum.
6. Defective tape reels or tape.
7. Pinch roller tire is worn or has insufficient pressure, or the pinch roller solenoid is not bottomed.
8. Dirty pinch roller and capstan.

4-5 ACCESS TO ELECTRONICS ASSEMBLY

The record/reproduce electronics assembly can easily be opened for adjustment. To gain access to the electronics assembly, proceed as follows:

1. Place the equipment in a horizontal position.
2. Remove the bottom cover by removing the four screws on the cover as shown in Fig 4-3, remove the two screws on the electronics front panel, and remove two screws on the electronics chassis, as shown in Fig 4-3.
3. Pull the electronics assembly up, rotate it to a horizontal position, and push it to fix it horizontally.

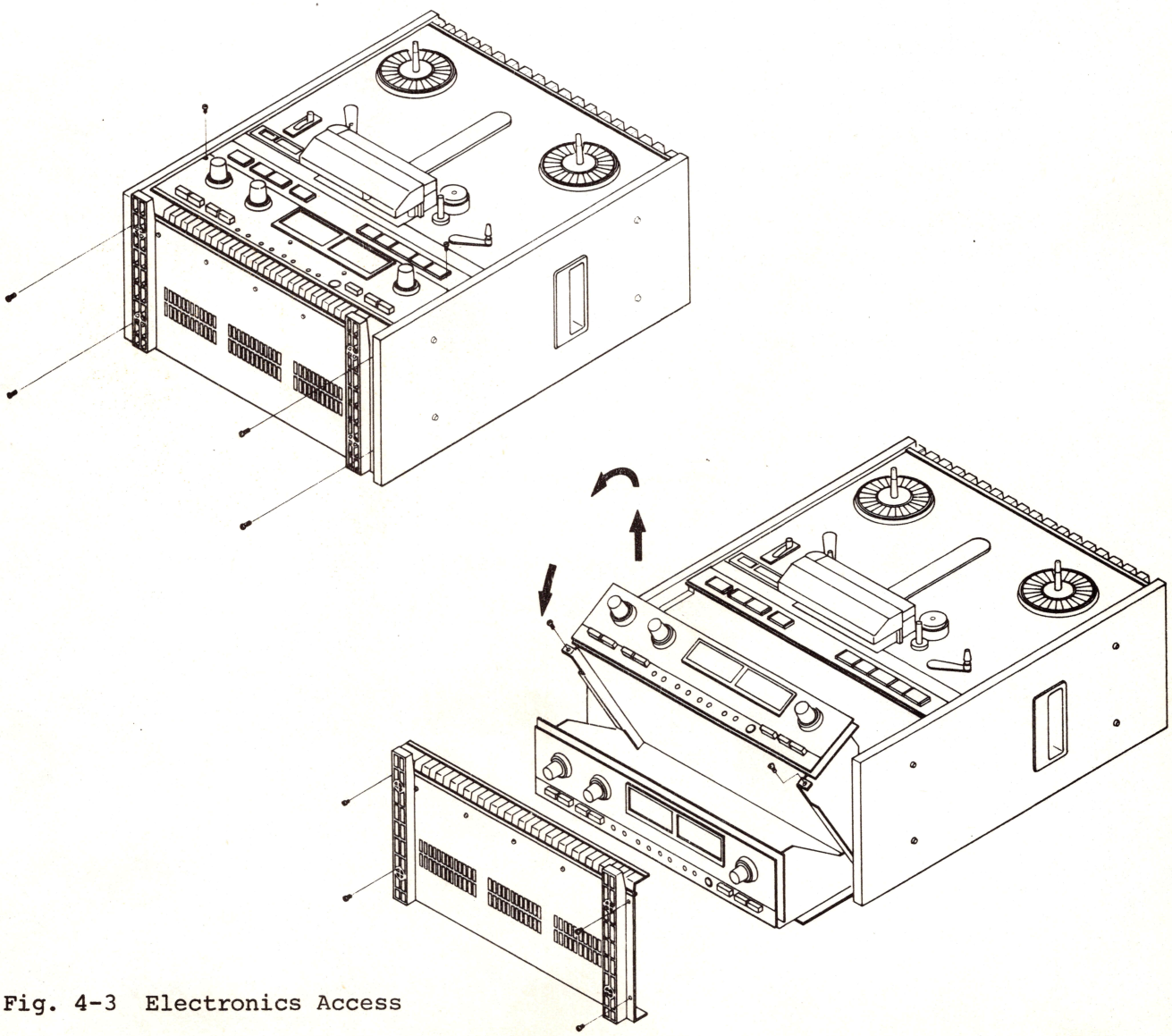


Fig. 4-3 Electronics Access

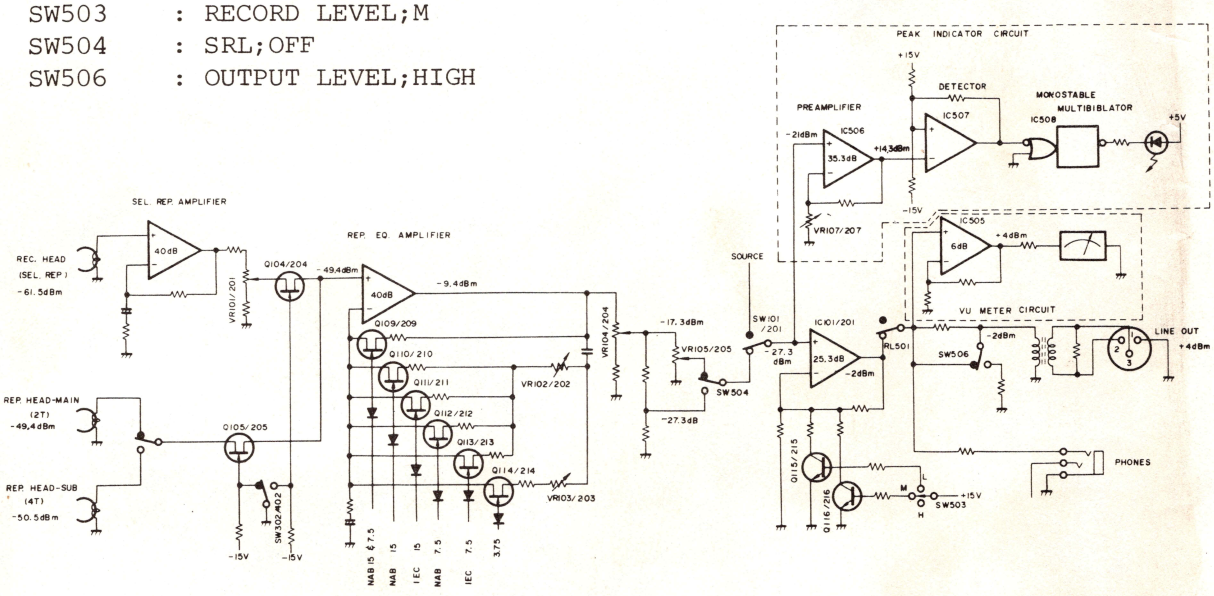
4-6 ELECTRONIC ALIGNMENT

If the previous performance tests were not successful, perform the following applicable reproduce, record, and bias amplifier alignment procedures.

4-6-(1) REPRODUCE SYSTEM

Reproduce system alignments consist of reproduce head azimuth adjustment, frequency response adjustment, SRL adjustment and SEL.REP. level adjustment.

VR101/201: SEL. REP. LEVEL
VR102/202: REP. EQ. 15 and 7 1/2 ips
VR103/203: REP. EQ. 3 3/4 ips
VR104/204: SRL
VR105/205: OUTPUT LEVEL (TAPE)
VR107/207: PEAK INDICATOR TRIGGER LEVEL
SW101/201: MONITOR;TAPE
SW302/402: SEL.REP.;OFF
SW503 : RECORD LEVEL;M
SW504 : SRL;OFF
SW506 : OUTPUT LEVEL;HIGH



The levels in the peak indicator circuit is at peak indicator trigger level.

Fig. 4-4 Reproduce System Simplified Diagram

4-6-(2) REPRODUCE HEAD AZIMUTH ADJUSTMENT

The head azimuth adjustment should be adjusted with a "LOW" tape speed for a critical alignment. Use the test tapes listed in Table 1-3.

1. Thread a low speed test tape, depending on the model of the equipment, to the recorder.
2. Connect the ac voltmeter to the LINE OUT connector and set the EQUALIZER switch on the back panel to the appropriate position depending on the test tape to be used.
3. Reproduce the coarse azimuth adjustment signal (250 Hz at 3 3/4 ips or 500 Hz at 7 1/2 ips) of the test tape and adjust the OUTPUT control for a 0 dBm reading on the ac voltmeter.
4. Then, reproduce the fine azimuth adjustment signal (8kHz at 3 3/4 ips or 16kHz at 7 1/2 ips) and adjust the azimuth screw "A4" for a maximum reading on the ac voltmeter.

CAUTION

DO NOT ADJUST ANY OTHER SCREW EXCEPT THE AZIMUTH ADJUSTMENT SCREW (LABELED "A4" IN Fig. 4-5).

5. If a maximum reading cannot be achieved within one full turn of the azimuth screw, or a maximum reading on the ac voltmeter is well below O dBm, a full head alignment may be required. Refer to section 4 of this manual.
6. Repeat step 3 and 4 for the auxiliary reproduce head. In this adjustment, the adjusting screw is "A2".

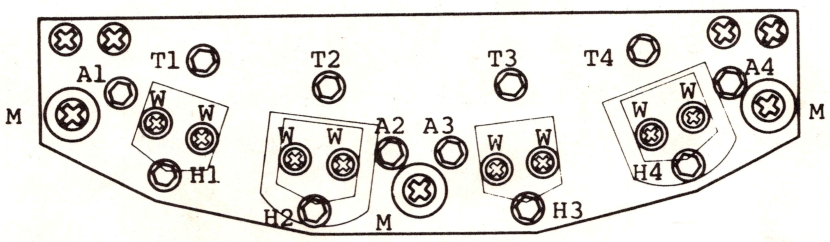


Fig. 4-5 Head Assembly

4-6-(3) FREQUENCY RESPONSE

Since the reproduce equalizer adjustment controls are commonly used for both 15 ips and 7 1/2 ips on the high speed version, an adjustment is made firstly, for 15 ips.

Table 4-4 shows the time constant at each equalizer. On the low speed version, adjustment controls for each speed are provided.

1. Connect the ac voltmeter to the LINE OUTPUT terminals and set the EQUALIZATION switch on the back panel to the desired position.
2. Thread the test tape through the equipment.

For 15 ips:

3. Reproduce a 500HZ signal on the test tape and adjust the OUTPUT controls for a OdBm reading on the ac voltmeter.
4. Reproduce the frequency response test signal (from 31.5 up to 20KHZ) and note the reading on the ac voltmeter.
5. Adjust the VR 102/202 adjustment controls with a frequency of 10 kHz for a 0 dBm reading on the ac voltmeter.
   The reading should be 31.5 Hz to 20 kHz $\pm$2 dB.

For 7 1/2 ips:

6. On the high speed version, repeat steps 3 and 4 to check the frequency response.
   The reading should be 31.5HZ to 16KHZ $\pm$2 dB.
7. On the low speed version, repeat step 1 through 5 at 7 1/2 ips tape speed and adjust the VR102/202 as necessary.
   The reading should be 31.5HZ to 16KHZ ±2dB.

For 3 3/4 ips:

8. Repeat step 1 through 4 with the test signal from 31.5 up to 10KHZ and adjust the VR 103/203 adjustment controls with a frequency of 8KHZ for a OdBm reading on the ac voltmeter.
   The frequency response should be 31.5 Hz to 10 kHz $\pm$2 dB.

Table 4-4 Equalizer Time Constants

Equalizer	Time Constants
NAB 15 ips	3180 + 50 μsec
IEC 15 ips	∞ + 35 μsec
NAB 7.5 ips	3180 + 50 μsec
IEC 7.5 ips	∞ + 70 μsec
NAB & IEC 3.75 ips	3180 + 90 μsec

Table 4-5 Standard Reference Level of MX-5050B

RECORD LEVEL SW	SRL		
	RECORDED FLUX	OUTPUT	
		VU METER	OUTPUT LEVEL SW
			HIGH / LOW
L	185nWb/m	0dB	+4dBm / -10dB
M	250nWb/m		
H	320nWb/m		

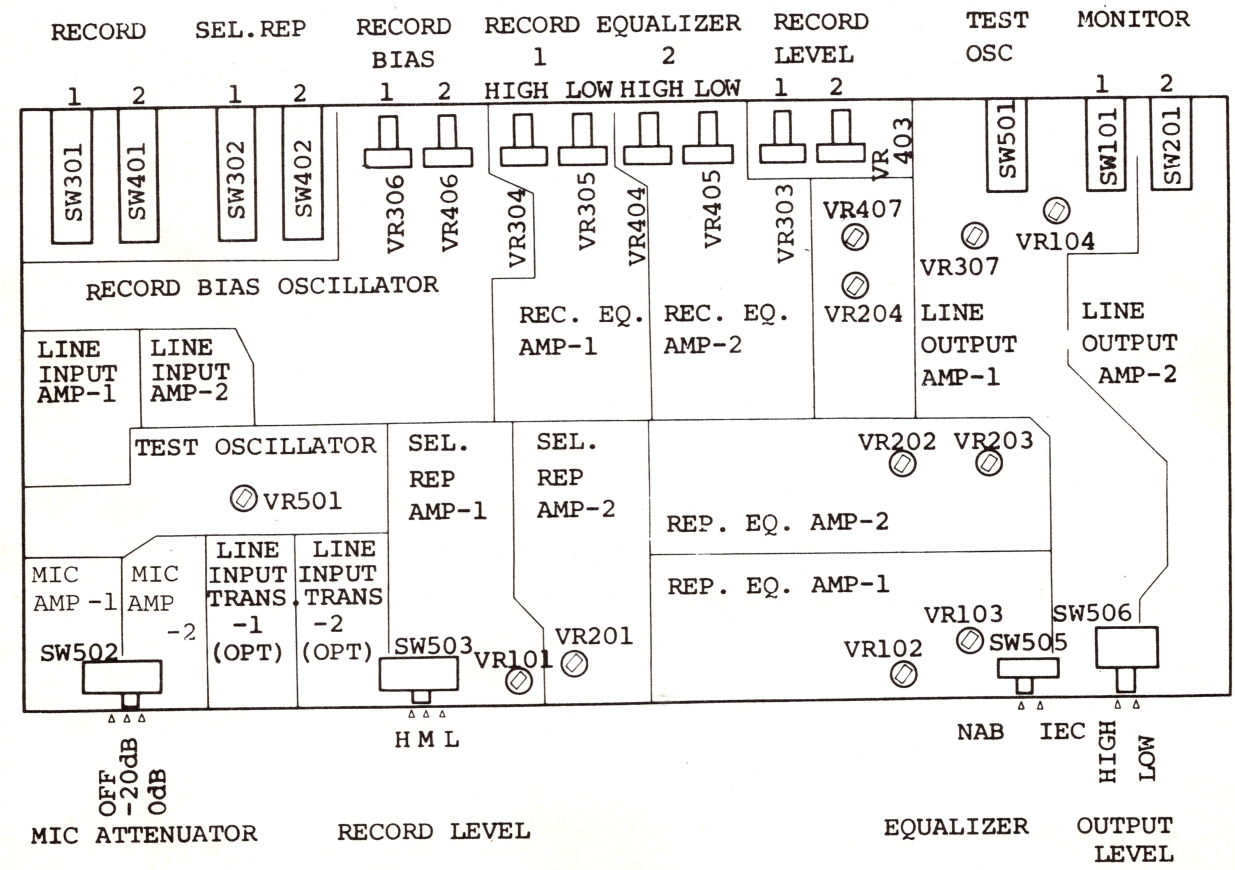


Fig. 4-6 Location of Record/Reproduce Electronics

4-6-(4) SRL ADJUSTMENT

Table 4-5 shows each SRL (Standard Reference Level) of the MX-5050B. For example, when a recorded flux of 185 nWb/m is reproduced with the RECORD LEVEL switch in the "L" position, the VU meter will indicate a 0 dB and a standard output level will be obtained at the LINE OUTPUT terminals.

For a SRL adjustment, proceed as follows:

1. Set the SRL switch to the SRL position and thread the test tape through the equipment.
2. Place the RECORD LEVEL switch to the appropriate position depending on the reference recorded flux of the test tape to be used.
3. Reproduce the reference recorded flux on the test tape and adjust the VR104/204 adjustment controls for a 0 dB indication on the VU meters.

4-6-(5) SEL. REP LEVEL ADJUSTMENT

This adjustment follows the SRL adjustment.

1. Press both the CH1 and CH2 SEL. REP buttons for the SEL. REP mode.
2. Reproduce the reference recorded flux and adjust the VR101/201 adjustment controls for a 0 dB indication on the VU meters.

4-6-(6) RECORD SYSTEM

Before performing record system adjustments, a reproduce system adjustment must be made.

4-6-(7) RECORD HEAD AZIMUTH ADJUSTMENT

The head azimuth may be adjusted at a low tape speed for critical head alignment and at 20 dB below the standard recording level.

1. Connect the ac voltmeter to the LINE OUTPUT terminals and connect the audio oscillator to the LINE INPUT terminals.
2. Set the SRL switch to the SRL position, the OUTPUT LEVEL switch to the HIGH position, and the MONITOR switch to the TAPE position.

3. Thread a blank tape through the equipment.
4. Set the audio oscillator frequency to 1 kHz.
5. Place the equipment in the record/reproduce mode and adjust the LINE INPUT control for -20 dBm on the ac voltmeter.
6. Adjust the record head azimuth screw "A3" for a maximum reading on the ac voltmeter in the 7.5 kHz for 3 3/4 ips or 15 kHz for 7 1/2 ips record/reproduce mode.

CAUTION

DO NOT ADJUST ANY OTHER SCREW EXCEPT THE AZIMUTH ADJUSTMENT SCREW (LABELED "A3" IN Fig. 4-5).

7. If a maximum reading can not be achieved within one full turn of the azimuth screw, or a maximum reading on the ac voltmeter is well below -20 dBm, a full head alignment may be required. Refer to Section 5 of this manual.

4-6-(8) RECORD BIAS ADJUSTMENT

Figure 4-7 shows the variation of the frequency response by the bias set and the RECORD EQ. adjustment control, and Figure 4-9 shows the characteristic of the bias current v.s output and distortion of Scotch #206 tape.

The record bias affects the distortion and the overall frequency response.

The record bias should be set between the peak bias and 1 dB over bias at 1 kHz for low distortion and high maximum output level (MOL).

The overall frequency response may be adjusted with both the RECORD EQ. and the RECORD BIAS adjustment controls for a flat frequency response curve.

1. Set the tape speed to 7 1/2 ips, place the SRL switch in the SRL position, and set the MONITOR switch to the TAPE position.

BIAS ADJUSTMENT AT 1 kHz

2. Record and reproduce the 1 kHz signal of the TEST OSC and adjust the LINE INPUT control for a 0 dB indication on the VU meter.
3. Adjust the RECORD BIAS adjustment controls (VR306/406) for a peak indication on the VU meter and then turn the RECORD BIAS adjustment controls clockwise until a decreased level of 0.2 dB is obtained.

   The standard biasing point of the MX-5050B is at 0.2 dB overbias at 1 kHz for 7 1/2 ips.

BIAS ADJUSTMENT AT 5 kHz

It is recommended that the bias adjustment is made at 5 kHz for ease.

1. In the same mode at 1 kHz bias adjustment, connect the audio oscillator to the LINE INPUT connectors, feed a 5 kHz signal with the record/reproduce mode, and adjust each relative LINE INPUT control to obtain a 0 dB indication on the VU meter.
2. Adjust RECORD BIAS adjustment controls (VR306/406) for a peak on the VU meter.

   Turn the VR306/406 clockwise until a decrease of 2.2 dB is obtained. 2.2 dB overbias at 5 kHz for 7 1/2 ips is a standard biasing point for the MX-5050B.

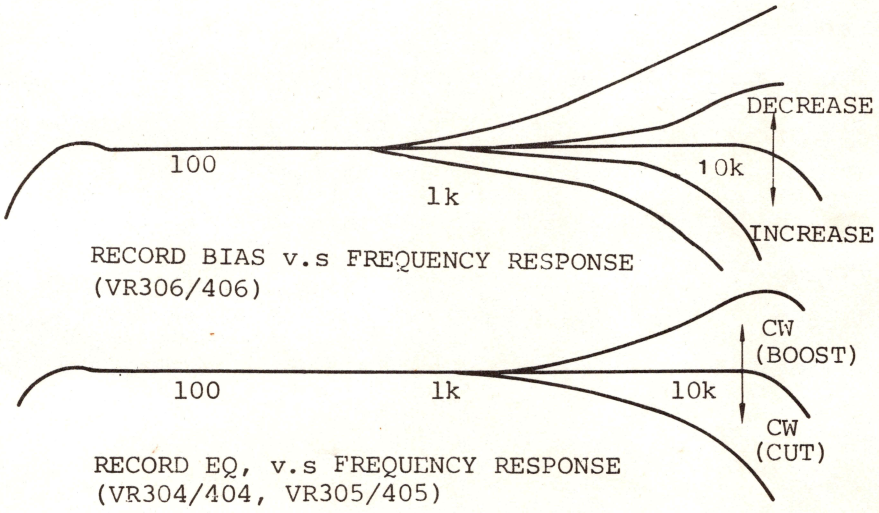


Fig. 4-7 Overall Frequency Response

VR301/401: MIC INPUT LEVEL
VR302/402: LINE INPUT LEVEL
VR303/403: RECORD LEVEL
VR304/404: RECORD EQ. HIGH
VR305/405: RECORD EQ. LOW
VR306/406: RECORD BIAS LEVEL

VR307/407: SOURCE MONITOR LEVEL
VR501 : TEST OSC. LEVEL
SW501 : TEST OSC.;OFF
SW502 : MIC ATTENUATOR;0 dB
SW503 : RECORD LEVEL;M

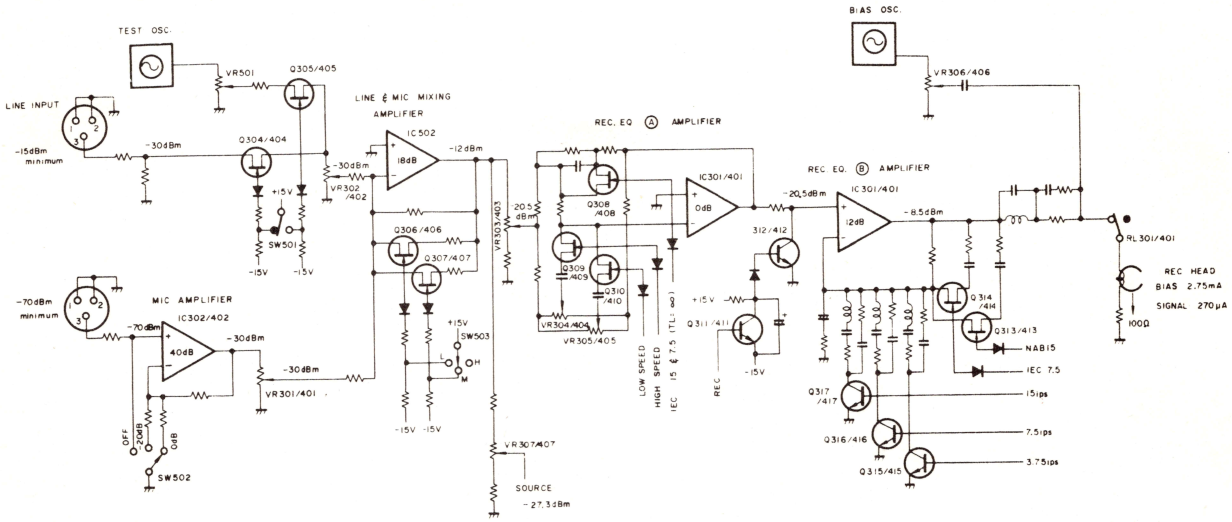


Fig. 4-8 Record System Simplified Diagram

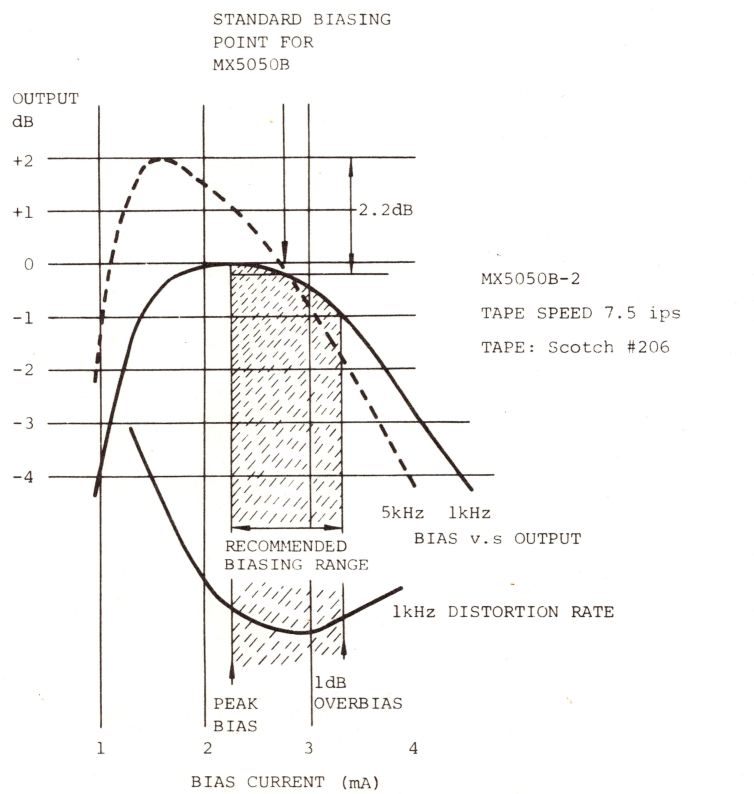


Fig. 4-9 Bias Current v.s Output and Distortion

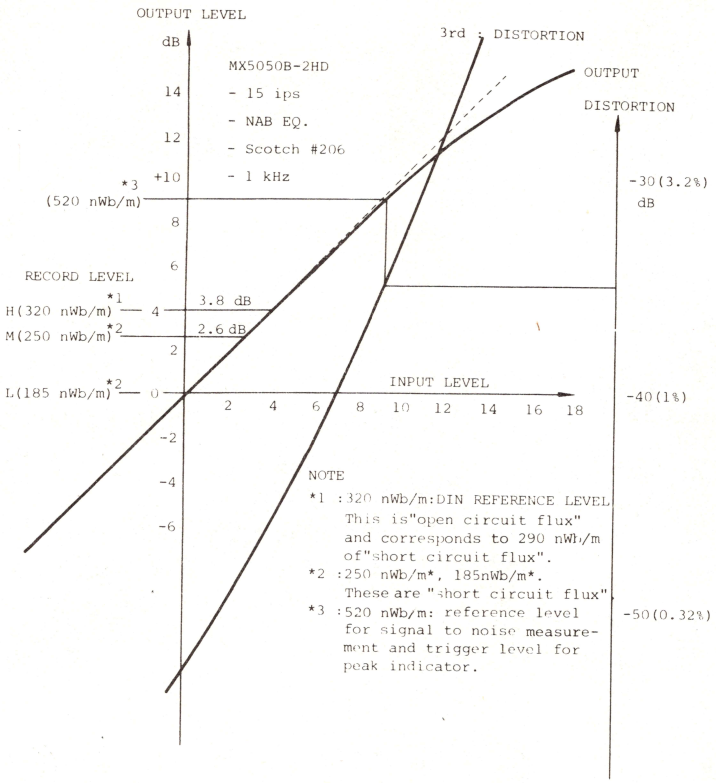


Fig. 4-10 Input v.s Output and Distortion

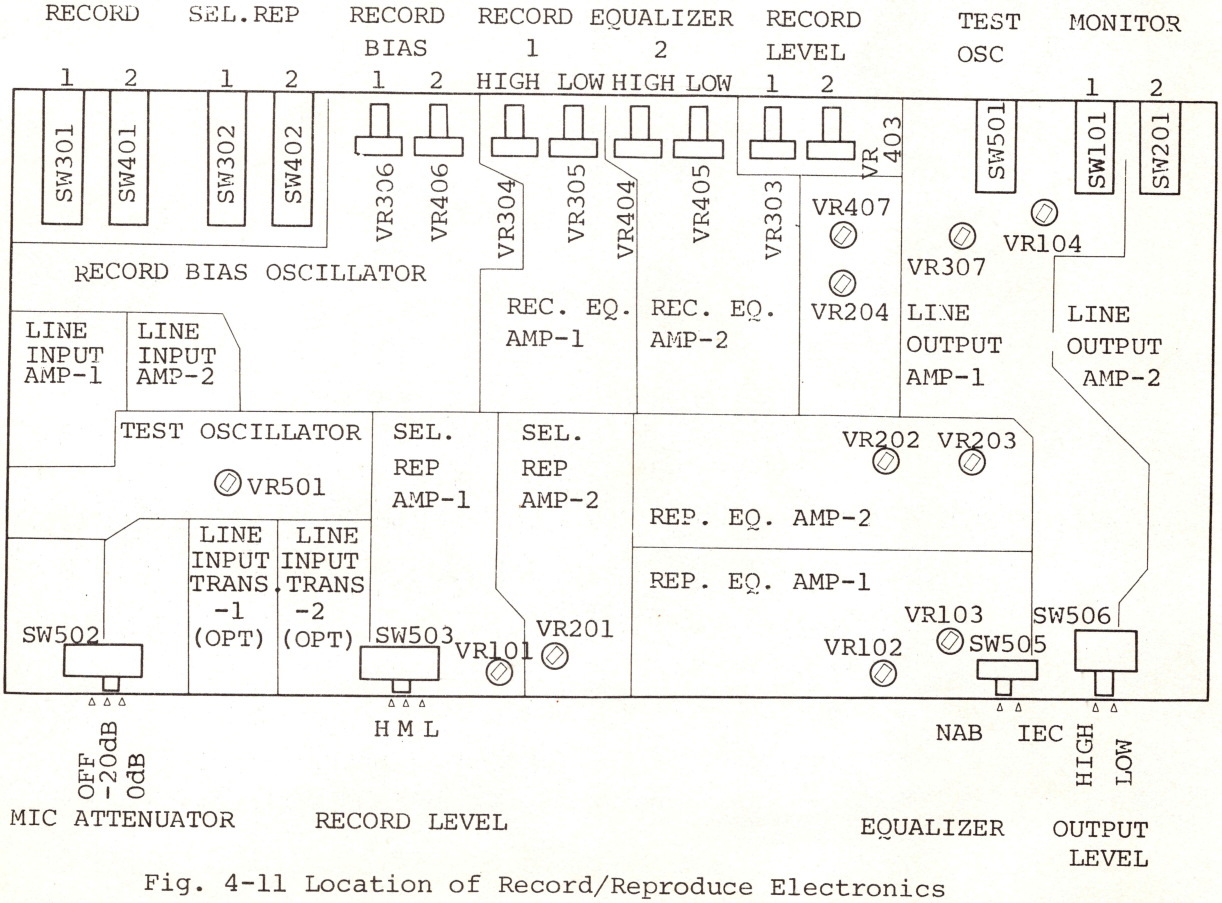


Fig. 4-11 Location of Record/Reproduce Electronics

4-6-(9) OVERALL FREQUENCY RESPONSE

At 15 ips, overall frequency response is measured at SRL, and at 7 1/2 ips and 3 3/4 ips, it should be measured at at least 20 dB below the SRL.

The overall frequency response is affected by the biasing.

Refer to 4-7-(8) RECORD BIAS ADJUSTMENT to adjust the record biasing.

RECORD EQUALIZER adjustment controls HIGH(VR304/404) and LOW(VR305/405) relate to the HIGH and LOW of the SPEED switch.

1. Connect the audio oscillator to the LINE INPUT connectors and connect the ac voltmeter to the LINE OUTPUT.
2. Set the MONITOR switch to TAPE, place the SRL switch in the SRL position, and place the OUTPUT LEVEL switch in the HIGH position.
3. Place the equipment in the record mode.

For 15 ips:

4. Feed a 1 kHz signal, and adjust the LINE INPUT control to obtain a 0 dB indication on the VU meter.
5. Shift the frequency to 10 kHz and adjust the RECORD EQ. HIGH adjustment controls (VR304/404) to obtain a 0 dB indication on the VU meter.
6. Vary the frequency from 20 Hz to 20 kHz and confirm that the frequency response is within the specifications.
   The frequency response specification should be 30 Hz to 20 kHz $\pm$2 dB.

For 7 1/2 ips:

7. Shift the frequency to 1 kHz and adjust the LINE INPUT control to obtain a -20 dBm reading on the ac voltmeter with the record mode.
8. Shift the frequency to 10 kHz and adjust the RECORD EQ. adjustment control [LOW (VR305/405) on the high speed version or HIGH (VR304/404) on the low speed version] so that a -20 dBm reading on the ac voltmeter is obtained.
9. Vary the frequency from 20 Hz to 20 kHz and confirm that the frequency response is within the specifications.
   The frequency response specification should be 20 Hz to 18 kHz $\pm$2 dB.

For 3 3/4 ips:

10. Feed a 1 kHz signal when in the record mode and adjust the LINE INPUT control to obtain -20 dBm reading on the ac voltmeter.
11. Shift the frequency to 8 kHz and adjust the RECORD EQ. LOW (VR305/405) adjustment controls to obtain a -20 dBm reading on the ac voltmeter.
12. Vary the frequency from 20 Hz to 10 kHz and confirm that the frequency response is within the specifications.
    The frequency response specification should be 20 Hz to 10 kHz ±2 dB.

NOTE

If the specified frequency response characteristics were not obtained in the above procedures, adjust the record biasing within the recommended biasing range (between peak bias to 1 dB over bias at 1 kHz).

4-6-(10) MONITOR SOURCE LEVEL ADJUSTMENT

1. Connect the audio oscillator to the LINE INPUT connector and feed a 1 kHz for a -15 dBm signal.
2. Place the MONITOR switch in the SOURCE position and turn the LINE INPUT controls fully clockwise.
3. Adjust the VR307/407 to obtain a 0 dB indication on the VU meters.

4-6-(11) TEST OSC LEVEL ADJUSTMENT

Before making this adjustment, the monitor source level adjustment should be completed.

1. Shift the audio oscillator level to -5 dBm and adjust the LINE INPUT controls for a 0 dB indication on the VU meter.
2. Press the TEST OSC. switch to generate the test oscillator signal and adjust the VR501 to obtain a 0 dB indication on the VU meter.

4-6-(12) RECORD LEVEL ADJUSTMENT

A record level adjustment should be made whenever the tape used with the equipment is changed and the head is replaced.

1. Set the SPEED selector switch to HIGH and set the MONITOR switch to the SOURCE position.
2. Press TEST OSC and adjust the LINE INPUT controls to obtain a 0 dB indication on the VU meter.
3. Change the MONITOR switch to the TAPE position and place the equipment in the record mode.
4. Adjust the RECORD LEVEL adjustment controls (VR303/403) to obtain a 0 dB indication on the VU meter (record/reproduce output level).

4-6-(13) PEAK INDICATOR TRIGGER LEVEL ADJUSTMENT

Peak indicators are triggered at the recorded flux level of 520 nWb/m. This point is 9 dB above 185 nWb/m (RECORD LEVEL switch in "L" position), 6.4 dB above 250 nWb/m (RECORD LEVEL switch in "M" position), and 5.2 dB above 320 nWb/m (RECORD LEVEL switch in "H" position as shown in Fig. 4-10.

For peak indicator trigger level adjustment, proceed as follows:

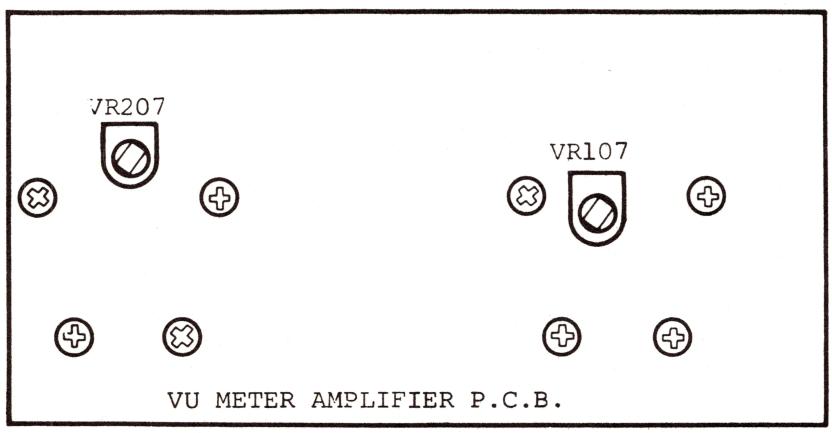


Fig. 4-12 VU Meter Amplifier P.C.B.

1. Set the RECORD switch to the "L" position, connect the audio oscillator to the LINE INPUT terminals, and feed a 0 dBm signal.
2. Set the MONITOR switch to the SOURCE position and adjust the LINE INPUT controls for a 0 dB indication on the VU meter.
3. Shift the feeding level of the audio oscillator to +9 dBm.
4. Turn the VR107/207 adjustment controls on the VU meter amplifier p.c.b. fully counterclockwise and then clockwise until each peak indicator in the VU meter illuminates.

SECTION 5

MAJOR COMPONENT REPLACEMENT

5-1 REEL MOTOR ASSEMBLY REPLACEMENT

5-1-(1) REEL TABLE REPLACEMENT AND HEIGHT ADJUSTMENT

The reel table may be removed by removing the three cross-head screws accessible from the front of the transport. To adjust the reel table height, loosen the two hexagonal socket-head screws shown in Fig. 5-2, adjust the height and retighten the screws.

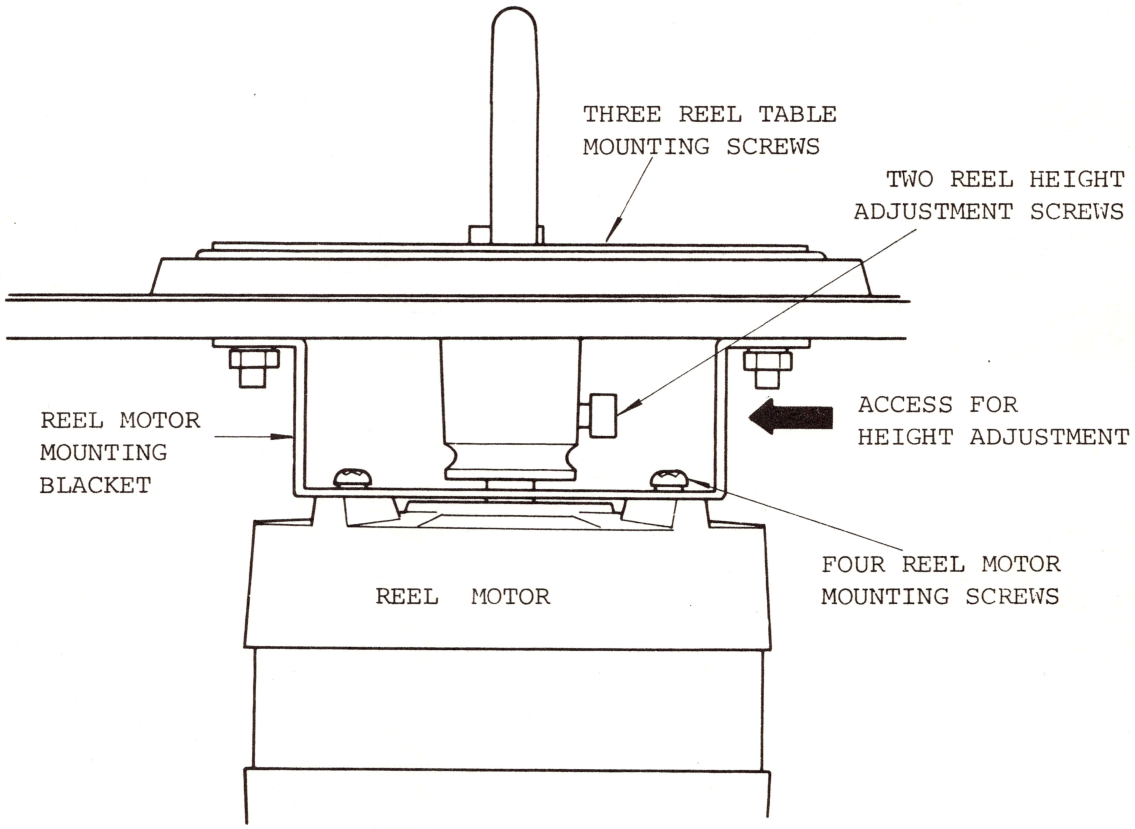


Fig. 5-1 Reel Motor Mounting

5-1-(2) REEL MOTOR REPLACEMENT

To replace the supply or takeup motor proceed as follows:

1. Loosen the two hexagonal socket-head screws on the reel shaft holder (Fig.4-1) and remove the reel table and holder.
2. Tag and unsolder the motor leads attached to the printed circuit board.
3. Remove the four motor mounting cross-head screws, accessible from the front of the transport.
4. Remove the brake assembly by removing the four brake assembly mounting screws on the bottom of the reel motor as shown in Fig. 5-2.

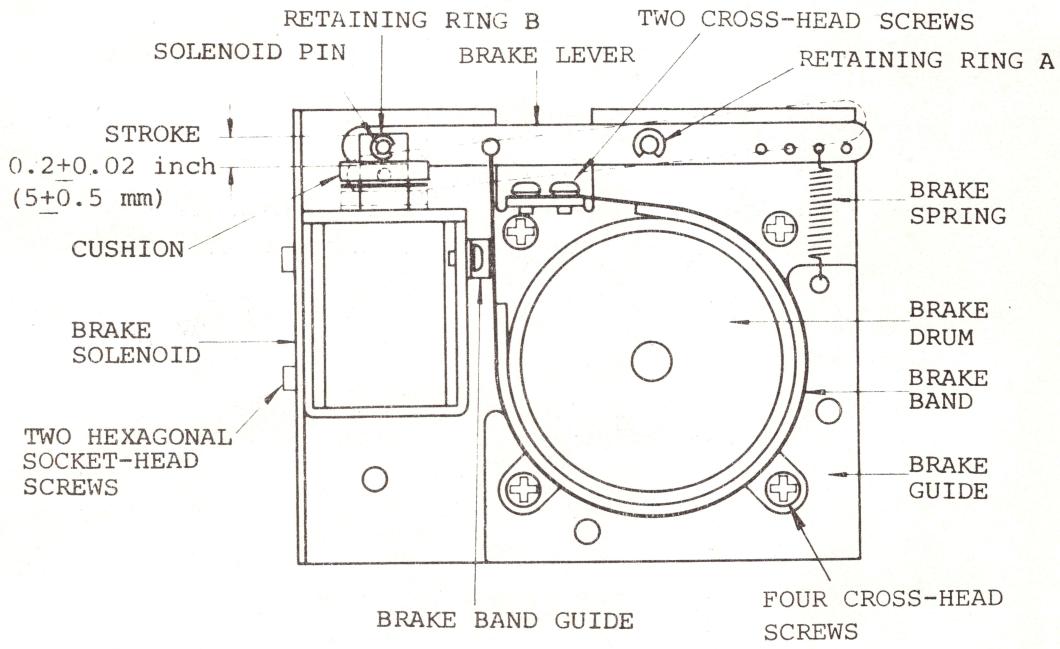


Fig. 5-2 Brake Assembly

5-1-(3) BRAKE BAND AND BRAKE SOLENOID REPLACEMENT

When a new brake band or new brake solenoid is installed (Fig. 5-2), it is necessary to position the brake guide and/or brake solenoid to ensure that is uniform brake band clearance around the brake drum when the solenoid is energized.

Also, the brake solenoid plunger must bottom in the solenoid housing when the solenoid is energized.

When the solenoid is de-energized, the brake band should uniformly contact the drum surface.

After installation, perform the brake adjustment procedure in Section 3 of this manual.

After completion of the adjustments, place the recorder in the play mode for 30 minutes.

Then press the STOP and PLAY pushbuttons to ensure that the solenoid bottoms when it is hot.

To replace the brake band, proceed as follows:

The brake band is replaced together with the brake lever as assembly.

1. Remove the retaining ring "A" and "B", and remove the brake spring.
2. Remove the two cross-head screws, and replace the brake band and brake lever.

To replace the brake solenoid, proceed as follows.

1. Remove the brake spring.
2. Remove retaining ring B on the solenoid pin and remove the solenoid pin.
3. Remove the solenoid housing and plunger by removing the two hexagonal socket screws.
4. Install a new solenoid housing and plunger and adjust the solenoid for 0.2 ± 0.02 inch plunger stroke by loosing two hexagonal socket-head screws.

5-2 POWER TRANSFORMER REPLACEMENT

To replace the power transformer (refer to EXPLODED VIEW 13), proceed as follows:

1. Tag and unsolder all transformer leads.
2. Remove the four M4 nuts that secure the transformer to the transport.
3. Install a new transformer in the reverse order of removal, and resolder the leads to the terminals on the transformer.

5-3 CAPSTAN AND CAPSTAN MOTOR REPLACEMENT

This section provides separately both dc servo capstan motor and hysteresis synchronous capstan motor replacement procedures.

5-3-(1) DC SERVO CAPSTAN MOTOR

The capstan motor should be replaced along with the servo control printed circuit board assembly. To replace the capstan motor proceed as follows:

1. Remove the capstan pinch roller by removing the screw on the pinch roller cap and remove the capstan dust cap by turning the dust cap counterclockwise.
2. Remove the connector on the servo control printed circuit board assembly located above the capstan.
3. Remove the servo control printed circuit board assembly and its mounting plate by turning the four M3 cross-head screws (B) on the mounting plate.
4. Remove the capstan mounting plate and capstan motor by removing the four M4 cross-head screws (A) on the mounting plate.
5. Remove the capstan motor by removing the three M4 cross-head screws (C) on the mounting plate and install a new capstan assembly in the reverse order of removal.

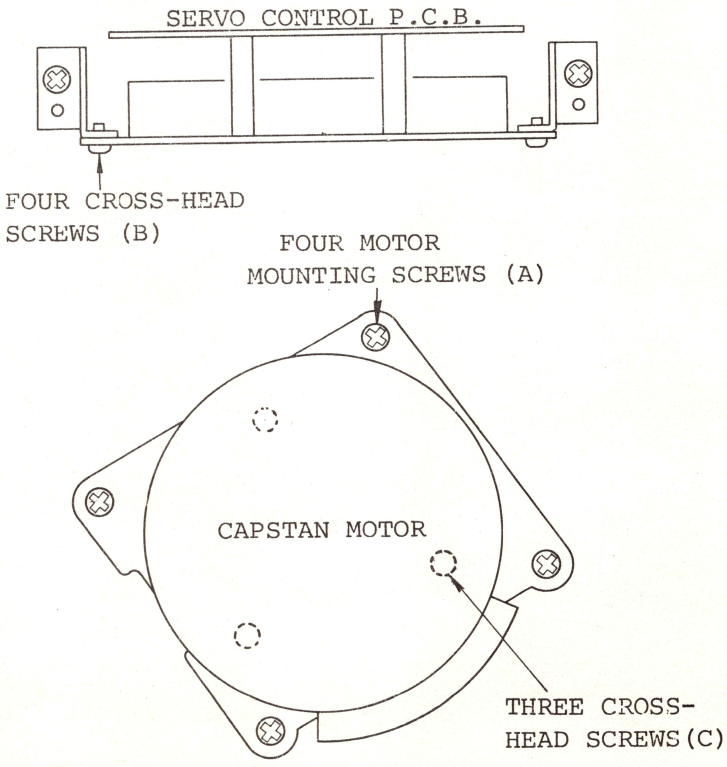


Fig. 5-3 Location of Dc Servo Capstan Motor

5-3-(2) HYSTERESIS SYNCHRONOUS CAPSTAN MOTOR

On the hysteresis synchronous capstan motor version, the capstan assembly and capstan motor are seperately replaced. To replace the capstan assembly and capstan motor, proceed as follows:

For the capstan motor:

1. Remove the capstan belt from the motor pulley and the capstan fly-wheel.
2. Remove the capstan motor assembly with the mounting plate by removing four cross-head screws "A".
3. Remove the motor by loosning two screws (B).
4. Install a new motor in the reverse order.

For the capstan assembly:

5. Remove the capstan pinch roller by removing the screws on the pinch roller cap and remove the capstan dust cap by turning it counterclockwise.
6. Remove the capstan shaft with fly-wheel.
7. Remove the capstan holder by removing three holder mounting screws.
8. Install a new capstan holder and capstan shaft with fly-wheel in the reverse order.

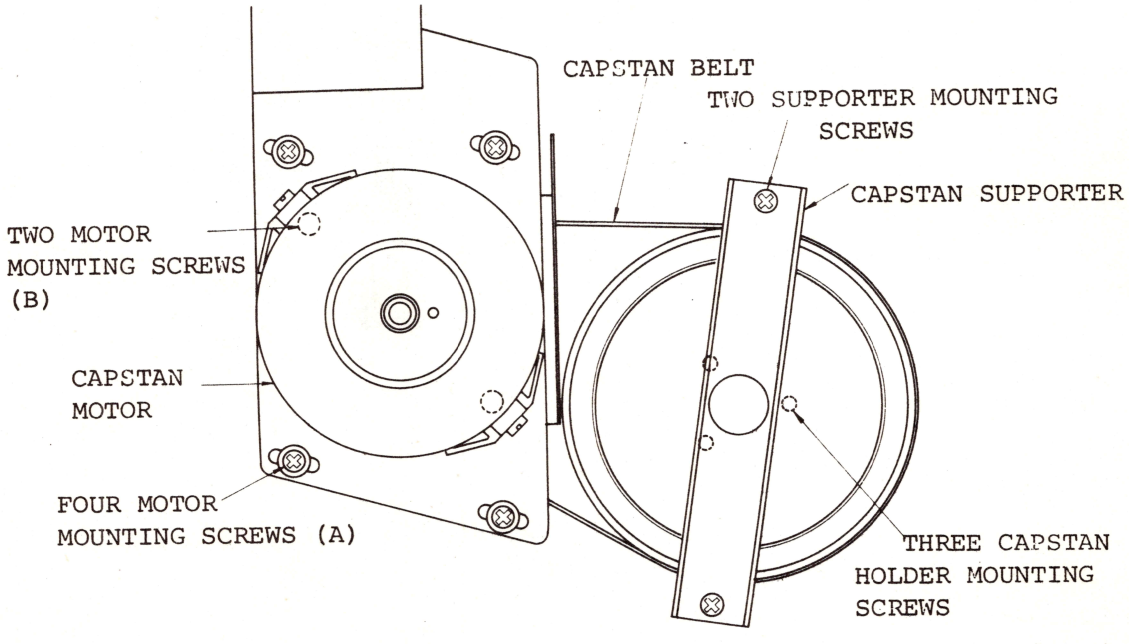


Fig. 5-4 Hysteresis Synchronous Capstan Motor.

5-4 PINCH ROLLER REPLACEMENT

To replace the pinch roller assembly proceed as follows:

1. Remove the pinch roller cap by removing the screw on it.

   NOTE: There are polyslider washers on both sides of the pinch roller.

2. Install a new pinch roller, the polyslider washers, and pinch roller cap in the reverse order.

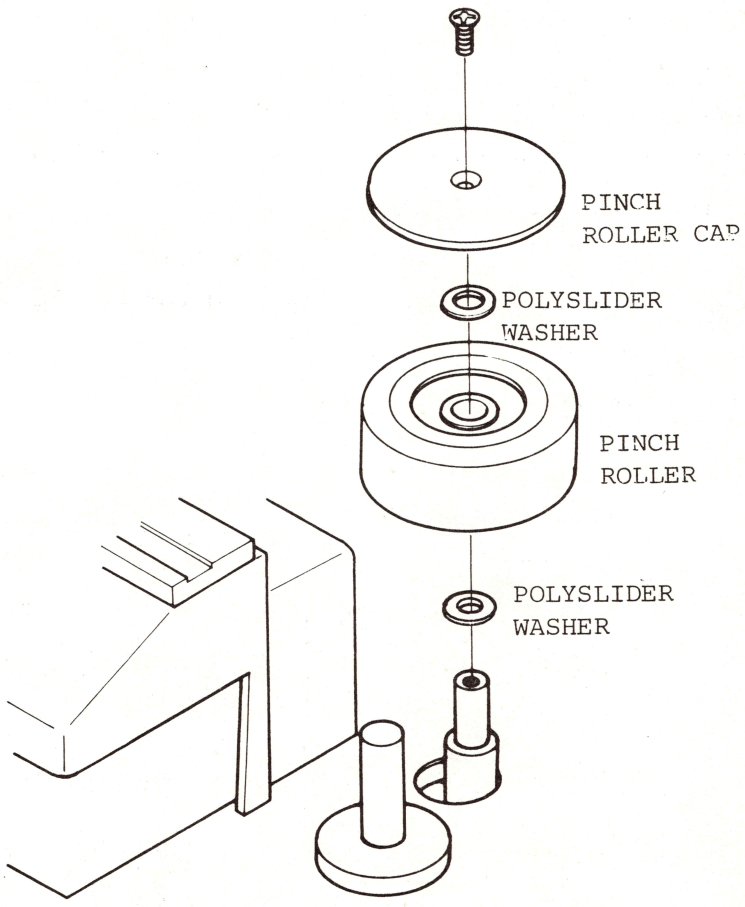


Fig. 5-5 Pinch Roller Removal

5-5 HEAD ASSEMBLY REPLACEMENT

This section provides a description of the head assembly, the procedure for changing the head stack, and the adjustment procedure for adjusting head azimuth (tilt), head height, head zenith (perpendicularity),and tape wrap (racking).

These adjustment are required whenever a head stack is replaced.

5-5-(1) DESCRIPTION

The head assembly is mounted on three tape-guide posts and secured in place by the three screws labeled "M" in Fig. 5-6.

The insulating shield for the head assembly printed circuit board is secured by the screws labeled "S".

Each head stack is secured to a bracket by the screws labeled "W" with a spacer between the bracket and the head stack.

Each bracket is suspended from the head base by the three spring-loaded screw labeled "H", "A", and "T".

Screws labeled "W" are used to adjust tape wrap.

Screws labeled "H", "A", and "T" are used to adjust height, azimuth, and zenith.

A head stack may be removed and re-lapped (face resurfaced) if the amount of wear is small and only an indication of poor head-to-tape contact is evident.

Poor contact is the result of improper adjustment and is evidenced by loss of high frequency response of the record or reproduce head stack, difficulty in achieving bias peak (record stack), and insufficient erase stack erasure.

5-5-(2) HEAD STACK REPLACEMENT

To change a head stack, proceed as follows:

1. Lift the head cover and remove the ac power cord.
2. Remove the three screws labeled "M" and pull the head assembly out from the head connector.
3. Tag and unsolder (use a low wattage pencil type iron to prevent damage) the leads at the rear terminal of the head stack.
4. Remove the head stack by removing the two screws labeled "A", "T", and "H".

5. Install a new head stack and resolder the leads.
6. As a preliminary adjustment, measure the distance between the head base and the bracket at a point near spring-loaded screws "A", "T", and "H".

   If necessary adjust the screws for equal spacing.
7. Paint the head face with a soft crayon, run the tape for about ten seconds, and check the crayon rubbed away by the tape.

   If tape wrap is incorrect, adjust the wrap by loosening the screws labeled "W" as shown in Fig. 5-6.

Head alignment and the following adjustments are necessary whenever the head is replaced.

1. In the case of reproduce head replacement.
   - A. Reproduce equalization adjustment.
   - B. SRL adjustment.
2. In the case of record head replacement.
   - A. Record bias adjustment.
   - B. Overall frequency response adjustment.
   - C. Record level adjustment.
3. In the case of erase head replacement
   - A. Record bias adjustment.

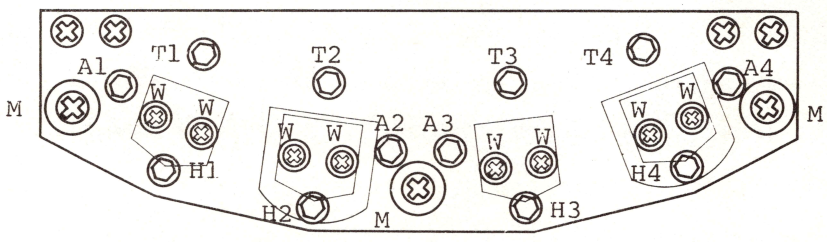


Fig. 5-6 Head Assembly

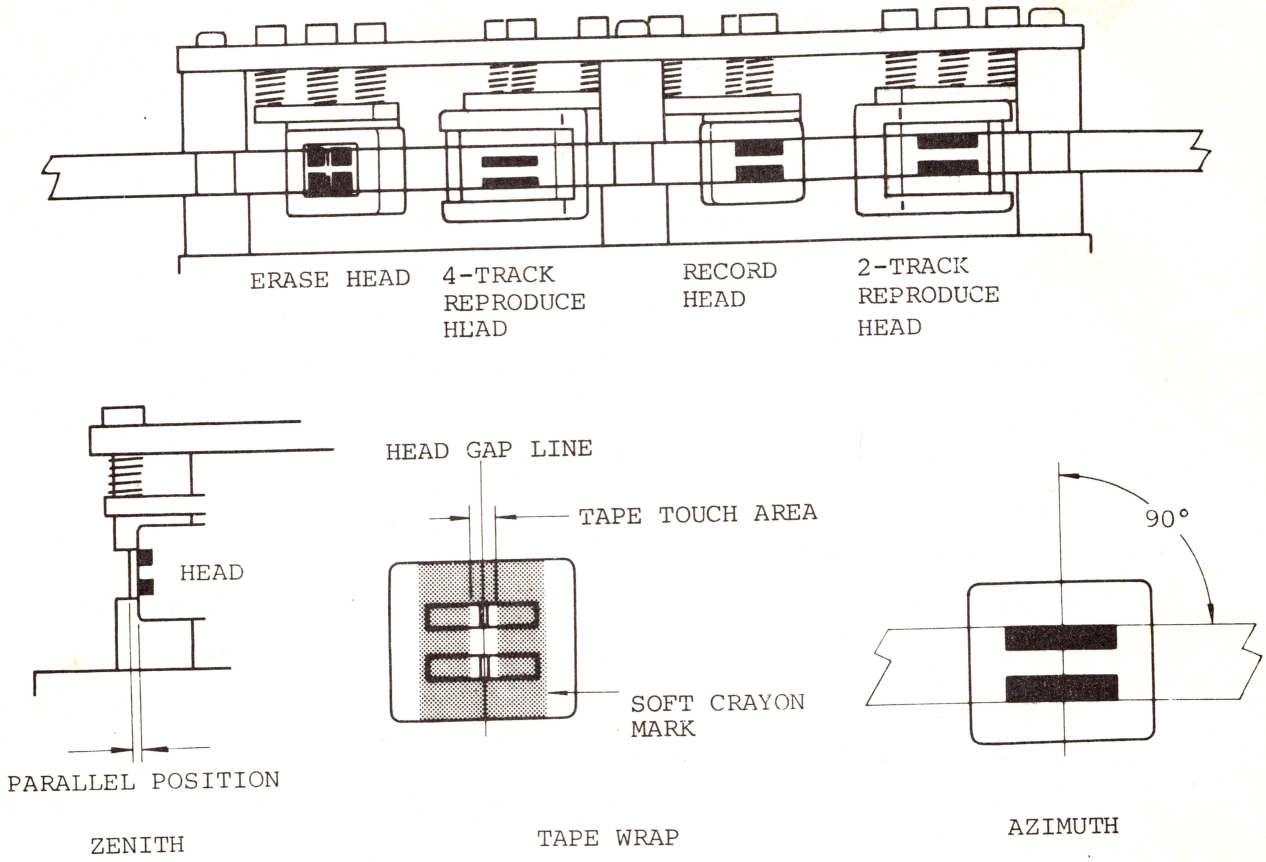


Fig. 5-7 Head Alignment

5-6-(3) RECORD AND REPRODUCE HEAD ADJUSTMENT

Follow the procedure for reproduce system adjustment given in section 4 of this manual.

For the final adjustment of a record stack, the height and azimuth adjustment may be accomplished in the same manner as for a reproduce head stack, by playing back an alignment tape with the equpment in the selective reproduction mode (SEL/REP switches "in").

5-6-(4) ERASE HEAD ALIGNMENT

Erase head azimuth is not critical, however wrap angle and head height relative to the record head are important to achieve maximum efficiency.

Poor erasure is often caused by misalignment of the erase head.

Before making any attempt to adjust the erase head stack, an entire electronic alignment procedure (reproduce, record, and bias alignment) should be performed so that the record and reproduce head height are correct, the SRL adjustment is correct, and bias and record levels are properly calibrated.

An approximate erase head adjustment can be accomplished by using a headset or a speaker/amplifier.

However, for precise alignment, a wave analyzer should be used.

Proceed as follows

1. Follow the procedure for the erasure test steps 1 through 6 given in Section 4-5-(4).
2. Observe the reading on the wave analyzer and turn screw "H" (Fig. 5-6) 1/4 turn clockwise.
   If the reading decreases, turn the screws "A" and "Z" 1/4 turn clockwise. If the reading increases when "H" is turned 1/4 turn clockwise, turn "H" counterclockwise past the original setting to 1/4 turn counterclockwise.
   If the reading decreases, turn screws "A" and "T" counterclockwise by the same amount.
3. Repeat step 2 in small increments to achieve a minimum reading on the wave analyzer.
   Typical amount of erasure should be 65 dB or better.
   Note: After the screw "H" is turned, be sure to turn the screws "A" and "T" the same amount.
4. If adjustment of the erase head height alone does not achieve satisfactory erasure, set screws "H","A", and "T" for a minimum reading on the wave analizer.
   Note that there are two gaps on the face of the erase head. The trailing gap has the most effect on erasure and must have good contact with the tape.
   Loosen screws "W" slightly and rotate the erase head stack for a minimum reading on the wave analyzer. Tighten screws "W".

SECTION 6
PARTS LISTS AND SCHEMATICS

When ordering parts, the part number must be specified. Components which do not have part numbers should be specified by a reference number.
Concerning components on the printed circuit boards, those which have part numbers should be specified by their respective part number, and those which do not have part numbers should be specified either by their assembly name or reference numbers.

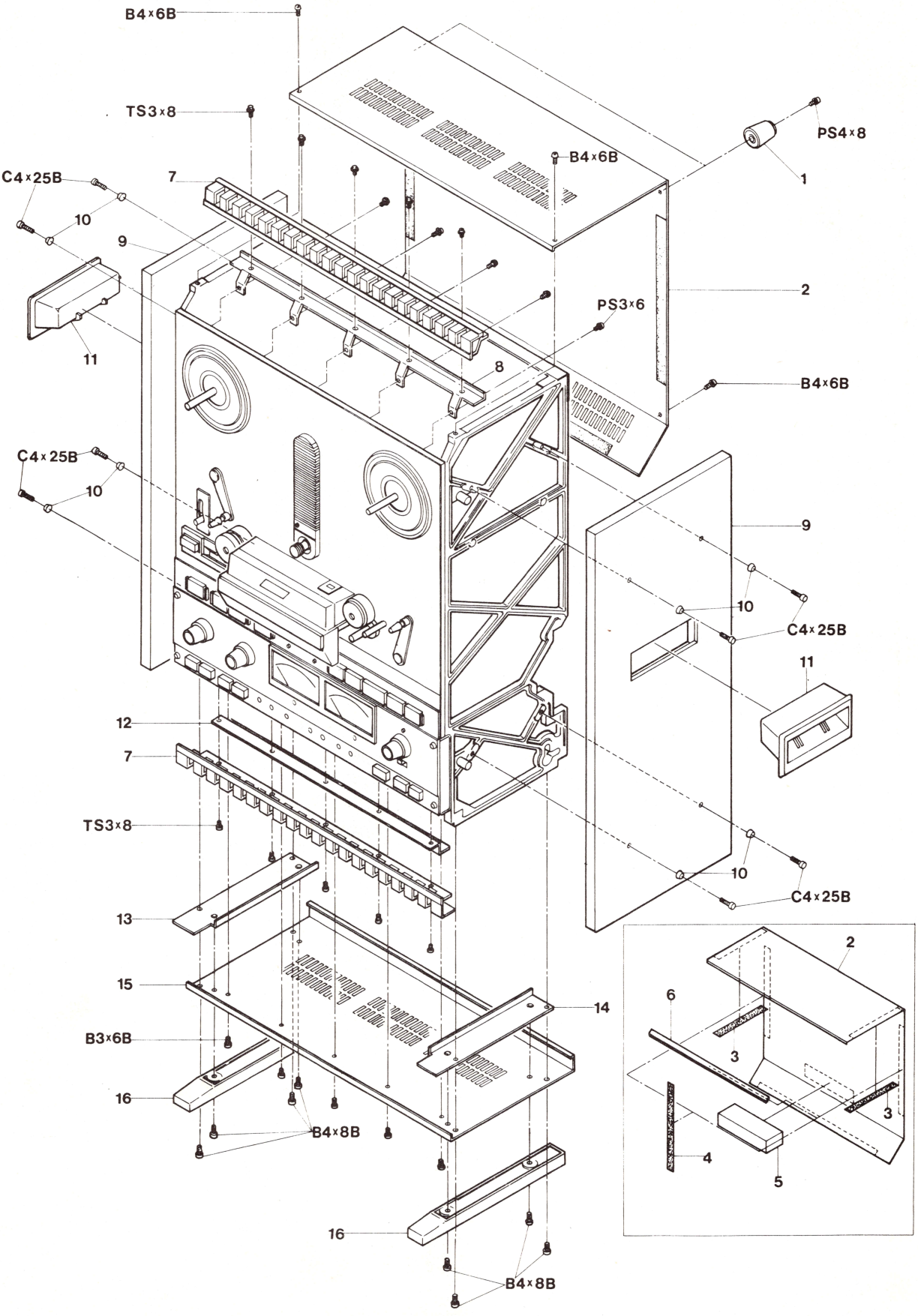
NOTE

1. *The part numbers in parenthesis are included in the assembly numbers indicated in the "Notes" next to those "Parts No.", therefore, those parts must be specified by the assembly numbers.*
2. *There are several versions of the MX-5050B depending on the capstan motor type, the tape speeds pair, and the track format, therefore, those parts may differ depending on each version.*
   Since the exploded views in this manual show the MX-5050B-2HD and 2LD as standard, confirm a required part number for other versions by the appropriate parts list.

PARTS LIST 1 CASE PARTS

Ref. No.	Description	Part No.	Notes
1-1	Foot, Rear	CY4013	
1-2	Cover Ass'y, Rear	K102903	→Ass'y K102903
1-3	Felt, A. Rear Cover	(PZ1B029)	
1-4	Felt, B. Rear Cover	(PZ1B030)	
1-5	Rubber, sheet Rear Cover	(PZ1C038)	
1-6	Rubber, Block Rear Cover	(PZ1C023)	
1-7	Escutcheon, Ventilate	CY5001	
1-8	Bracket, B. Ventilate	K102908	
1-9	Board, Side	K102902	
1-10	Washer, Trim, Side Board	KZ6C016	
1-11	Grip, Side Board	CY1004	
1-12	Bracket, A. Ventilate	K102907	
1-13	Angle, L, Bottom Cover	K102909	
1-14	Angle, R, Bottom Cover	K102910	
1-15	Cover, Bottom	K102906	
1-16	Foot, Bottom	CY4011-A	

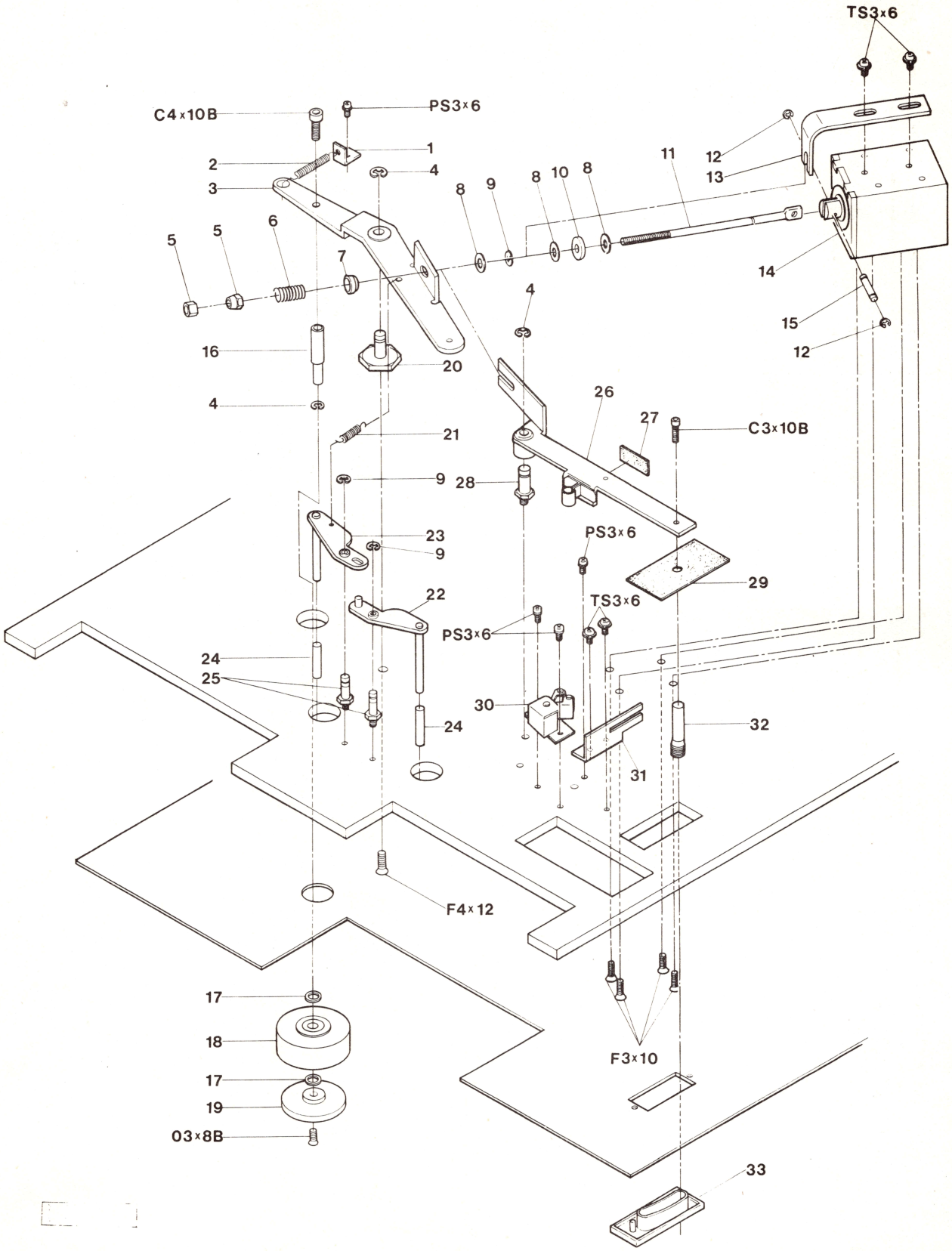
EXPLODED VIEW 1 CASE PARTS



PARTS LIST 2 PINCH ROLLER and LIFTER ASSEMBLY

Ref. No.	Description	Part No.	Notes
2-1	Angle, Spring Hook	KZ3A023	
2-2	Spring, Roller Arm	GS1011	
2-3	Arm, Pinch Roller	KP4B002	
2-4	Retaining Ring, E Type ø4	F754	
2-5	Nuts, M4, Rod	F517-4	
2-6	Spring, Pressure, Rod	GS2003	
2-7	Washer, Spherical, Rod	KP0G004	
2-8	Washer, Fiber ø5	F526-5	
2-9	Retaining Ring, E Type ø3	F753	
2-10	Cushion,Solenoid	PZ1C021	
2-11	Rod, Solenoid	KZ6A022	
2-12	Retaining Ring E Type ø2	F752	
2-13	Limit Stop. Solenoid	KZ2A016	
2-14	Solenoid, Pinch Roller	GP1B06	
2-15	Pin Solenoid	KZ5A003	
2-16	Shaft, Pinch Roller	KP0B010	
2-17	Washer, Polyslider. ø6x0.25	F523-6	
2-18	Pinch Roller,	KP0A007	
2-19	Cap, Pinch Roller	KP0C012	
2-20	Shaft, Roller Arm	KP4B001	
2-21	Spring, Lifter Arm	GS1028-A	
2-22	Arm, Lifter A	KR0B005	
2-23	Arm, Lifter B	KR0B006	
2-24	Tube, Vinyl, Lifter Arm	KR4F001	
2-25	Shaft, Lifter Arm	KR4B001	
2-26	Arm, Cue	(KR4B008)	Ass'y KR-4F-A
2-27	Felt, Cushion, Cue Arm,	(PZ1B009)	
2-28	Shaft, Cue Arm	KR4B007	
2-29	Felt, Blind, Cue Arm	PZ1B001	
2-30	Catch, Cue Arm	CY3001	
2-31	Plate, Guide, Cue Arm	KR4B011	
2-32	Knob, Cue Arm	KR4F002	
2-33	Escution, Cue	KR4B006	

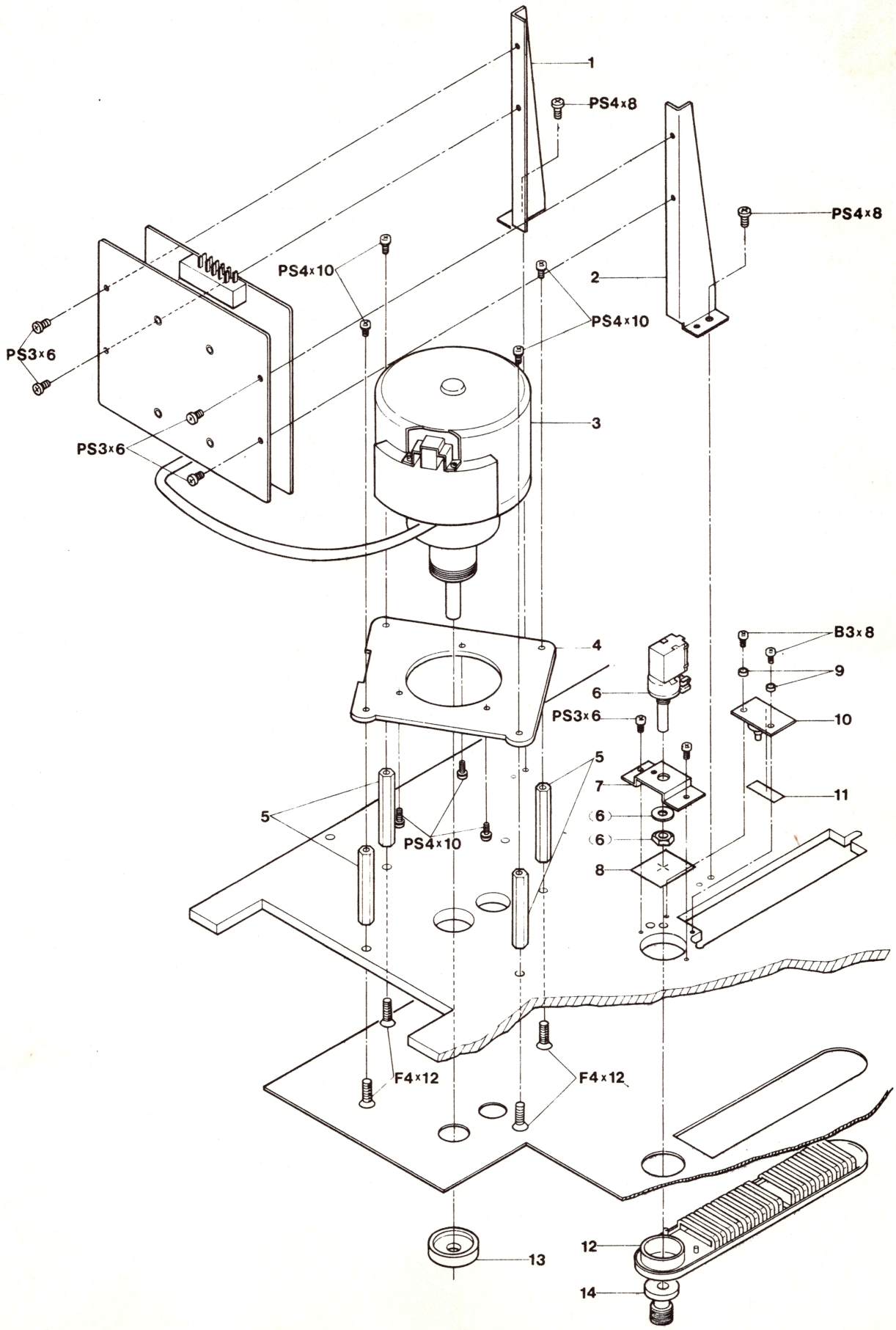
EXPLODED VIEW 2 PINCH ROLLER and LIFTER ASSEMBLY



PARTS LIST 3 CAPSTAN ASSEMBLY (DC SERVO VERSION)

Ref. No.	Description	Part No.	Notes
3-1	Bracket, R, Capstan P.C, Board	KC4H004	
3-2	Bracket, L, Capstan P.C, Board	KC4H003	
3-3	Motor, Capstan	MR5A008	
3-4	Plate, Capstan Motor	KC4H001	
3-5	Stud, Capstan Motor	KZ7B220	
3-6	Resistor, Var. 500Ω	RV252009	
3-7	Bracket, Resistor, Var	KC4H002	
3-8	Felt, Potentiometer	PZ1B037	
3-9	Spacer, P.C, Board LED(A)	KZ7A823	
3-10	P.C, Board Ass'y, LED,(A)	PB-81G	→Ass'y PB-81G
3-11	Felt, P.C, Board LED(A'	(PZ1B038)	
3-12	Escutcheon, Pitch Control.	KC4H005	
3-13	Cap, Capstan Motor	KC0B011	
3-14	Knob, Pitch Control	KN1024	

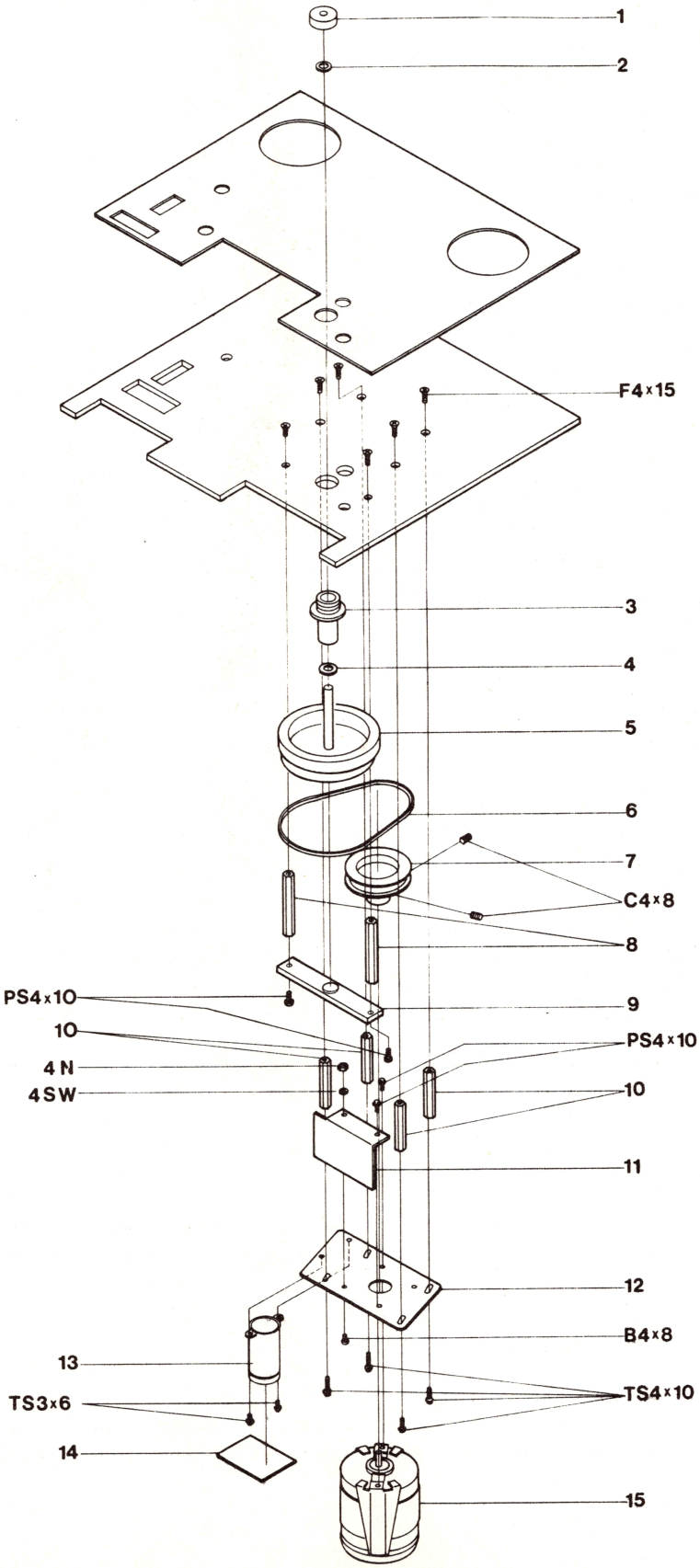
EXPLODED VIEW 3 CAPSTAN ASSEMBLY (DC SERVO VERSION)



PARTS LIST 4 CAPSTAN ASSEMBLY (HYSTERESIS VERSION)

Ref. No.	Description	Part No.	Notes
4-1	Cap, Capstan	KC0B011	
4-2	Felt, Capstan	PZ1B007	
4-3	Holder, Bearing	KC4B001	
4-4	Washer, Capstan	KZ6C014	or. KZ6C026 adjust
4-5	Flywheel, Capstan	KC0A020	
4-6	Belt, Flat, Capstan	BE2M128A	Low Speed
4-6	Belt, Flat, Capstan	BE2M140	High Speed
4-7	Pulley, Capstan Motor	KC0D019	Low Speed 60HZ
4-7	Pulley, Capstan Motor	KC0D011	High Speed 60HZ
4-7	Pulley, Capstan Motor	KC0D018	Low Speed 50HZ
4-7	Pulley, Capstan Motor	KC0D010	High Speed 50HZ
4-8	Stud, Capstan Flywheel	KZ7B203	
4-9	Plate, Capstan Flywheel	KC4B004	
4-10	Stud, Capstan Motor	KZ7B204	
4-11	Plate, Shield, Motor	KC4B006	
4-12	Plate, Capstan Motor	KC4B005	
4-13	Capacitor, Capstan Motor	CZ10011W	2+0.5μ
4-14	P.C. Board, Capacitor	PB9A026	
4-15	Motor, Capstan	MR2F010	

EXPLODED VIEW 4 CAPSTAN ASSEMBLY (HYSTERESIS VERSION)



PARTS LIST 5 TENSION ARM ASSEMBLY (A) SUP.

Ref. No.	Description	Part No.	Notes
5-1	Cap. Arm	KA0C005	
5-2	Arm, Tension	KA0A017	
5-3	Guide, Tension Arm	KG4D007	
5-4	Shaft, Arm	KA4J001	
5-5	Washer, Polyslider ø5xt0.5	F524-5	
5-6	Holder, Arm.	KA0B008	
5-7	Plate, Spring Hook	KZ3A024	
5-7	Nat, Holder	KZ6D004	
5-9	Drum, A, Spring Retaining	KA0E004	
5-10	Spring, Tension Arm	GS1025	
5-11	Angle, Limit Stop	KA0H004	

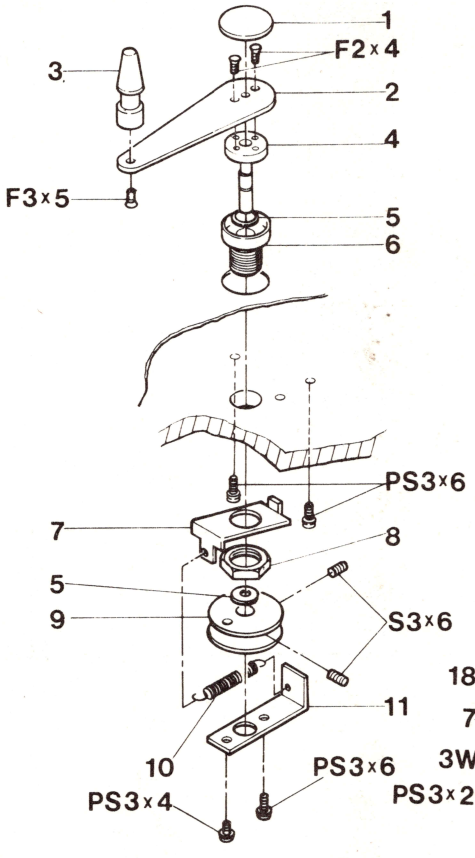
PARTS LIST 6 TENSION ARM ASSEMBLY (B) TAKE UP

Ref. No.	Description	Part No.	Notes
6-1	Cap, Arm	KA0C005	
6-2	Arm, Tension	KA0A017	
6-3	Guide, Tension Arm	KG4D007	
6-4	Shaft, Arm	KA4J001	
6-5	Washer, Polyslider ø5xt0.5	F524-5	
6-6	Holder, Arm	KA0B008	
6-7	Angle, Spring Hook	KZ3A023	
6-8	Bracket, Magnet	(KZ3A069)	→ Ass'y
6-9	Magnet	(GP8A01)	KA-4K-A
6-10	Stud,	KZ7A163	
6-11	Drum, B, Spring Retaining	KA0E005	
6-12	Felt, Switch Actuate	(PZ1B036)	
6-13	Weight	(KA4K002)	
6-14	Arm, Switch Actuate	(KZ4K001)	→ Ass'y
6-15	Cushion, Switch Actuate	(PZ1C007)	KA-4K-B
6-16	Rubber, Switch Actuate	(PZ1C037)	
6-17	Spring, Tension Arm	GS1048	
6-18	Switch, Micro	WH510011	

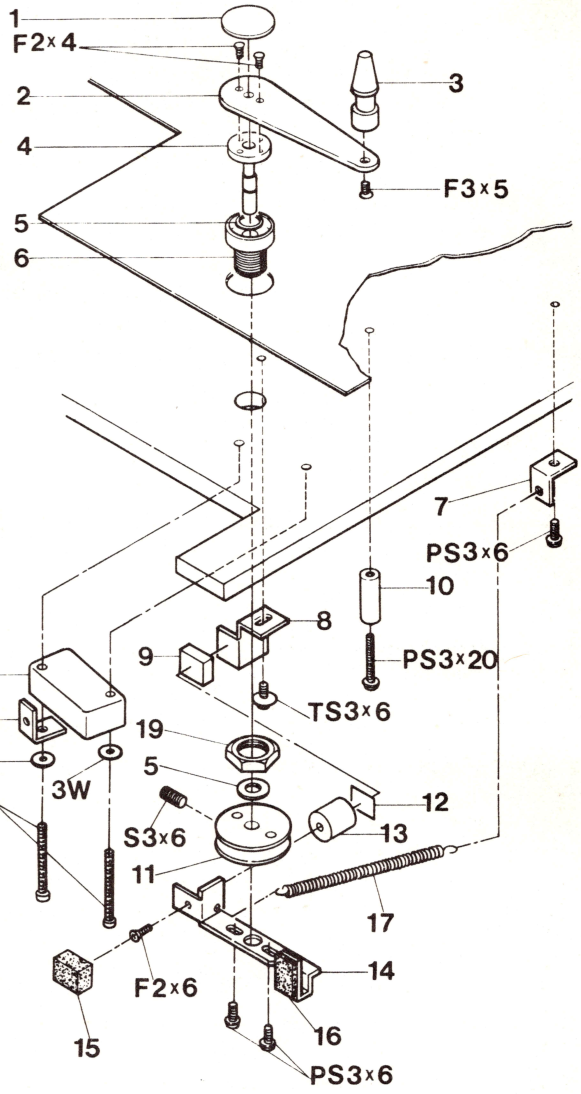
PARTS LIST 7 GUIDE ROLLER ASSEMBLY

Ref. No.	Description	Part No.	Notes
7-1	Cap, Roller	GR0A013	
7-2	Washer, Polyslider ø6xt0.5	F524-6	
7-3	Shaft, Roller	GR4H001	
7-4	Roller	GR4H002	
7-5	Base, Roller	GR4G004	

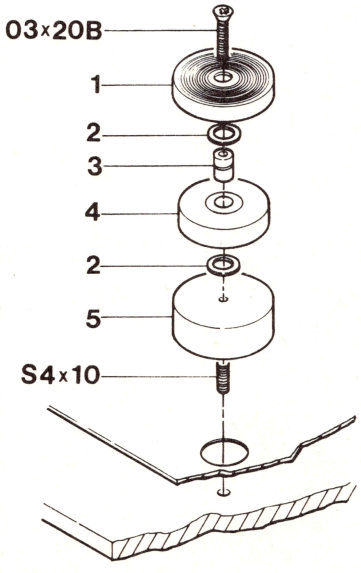
EXPLODED VIEW 5 TENSION
ARM ASSEMBLY (A) SUP.



EXPLODED VIEW 6 TENSION
ARM ASSEMBLY (B) TAKE UP



EXPLODED VIEW 7
GUIDE ROLLER ASSEMBLY



PARTS LIST 8 HEAD ASSEMBLY

Ref. No.	Description	Parts No.	Notes
8-1	Protector, P.C, Board	KH4K002	
8-2	P.C, Board, Head	PB-71I	
8-3	Felt, Head, Switch	PZ1B010	
8-4	Plate, Head Mount. Base	KH0C019	
8-5	Bracket, L, P.C, Board	KZ3A066	
8-6	Bracket, R, P.C, Board	KZ3A067	
8-7	Spring, Head, 8mm	GS2015	
8-8	Spring, Head, 6mm	GS2016	
8-9	Head, Erase 2T/2cH	GH4B004B	
8-10	Head, Reproduce 4T/2cH	GH4P007C	
8-11	Head, Record 2T/2cH	GH4R005B	
8-12	Head, Reproduce 2T/2cH	GH4P027A	
8-13	Guide, Head	KG4C002	
8-14	Plate, Shield	KH4K001	
8-15	Connecter, P.C, Board	CN314002	
8-16	Plate, Housing Base	KH0C020	
8-17	Head Housing Ass'y	KH-4C-A	
8-18	Cramp, Head Wire	KZ3A032	
8-19	Spring, Head. 8mm	GS2015	
8-20	Spring, Head. 6mm	GS2016	

The following two parts lists show only the parts that differ from the above list depending on the version of the equipment.

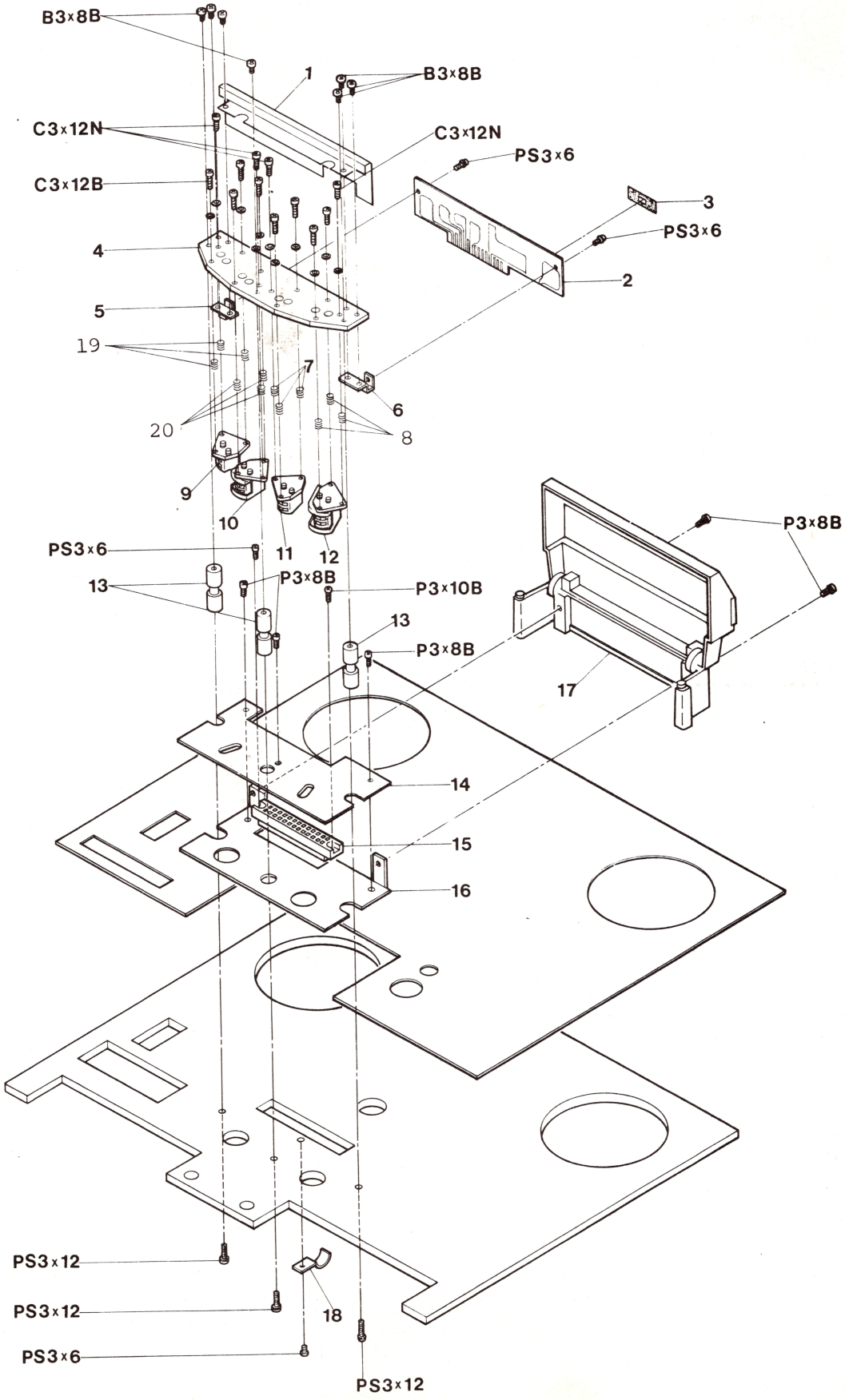
MX5050B-4L,4LD

Ref. No.	Description	Part No.	Notes
8-7	Spring, Head 8mm	GS2016	
8-8	Spring, Head 8mm	GS2016	
8-9	Head, Erase 4T/2CH	GH4E058A	
8-10	Head, Reproduce 2T/2CH	GH4P027C	
8-11	Head, Record 4T/2CH	GH4R033B	
8-12	Head, Reproduce 4T/2CH	GH4P007E	
8-19	Spring, Head 8mm	GS2016	
8-20	Spring, Head 8mm	GS2016	

MX5050B-FHD,FLD

Ref. No.	Description	Part No.	Notes
8-7	Spring, Head 8mm	GS2016	
8-8	Spring, Head 8mm	GS2016	
8-9	Head, Erase Full	GH4E012B	
8-10	Head, Reproduce 2T/2CH	GH4P027C	
8-11	Head, Record Full	GH4R057B	
8-12	Head, Reproduce Full	GH4P056B	
8-17	Head Housing Ass'y	KH-4G-A	
8-19	Spring, Head 8mm	GS2016	
8-20	Spring, Head 8mm	GS2016	

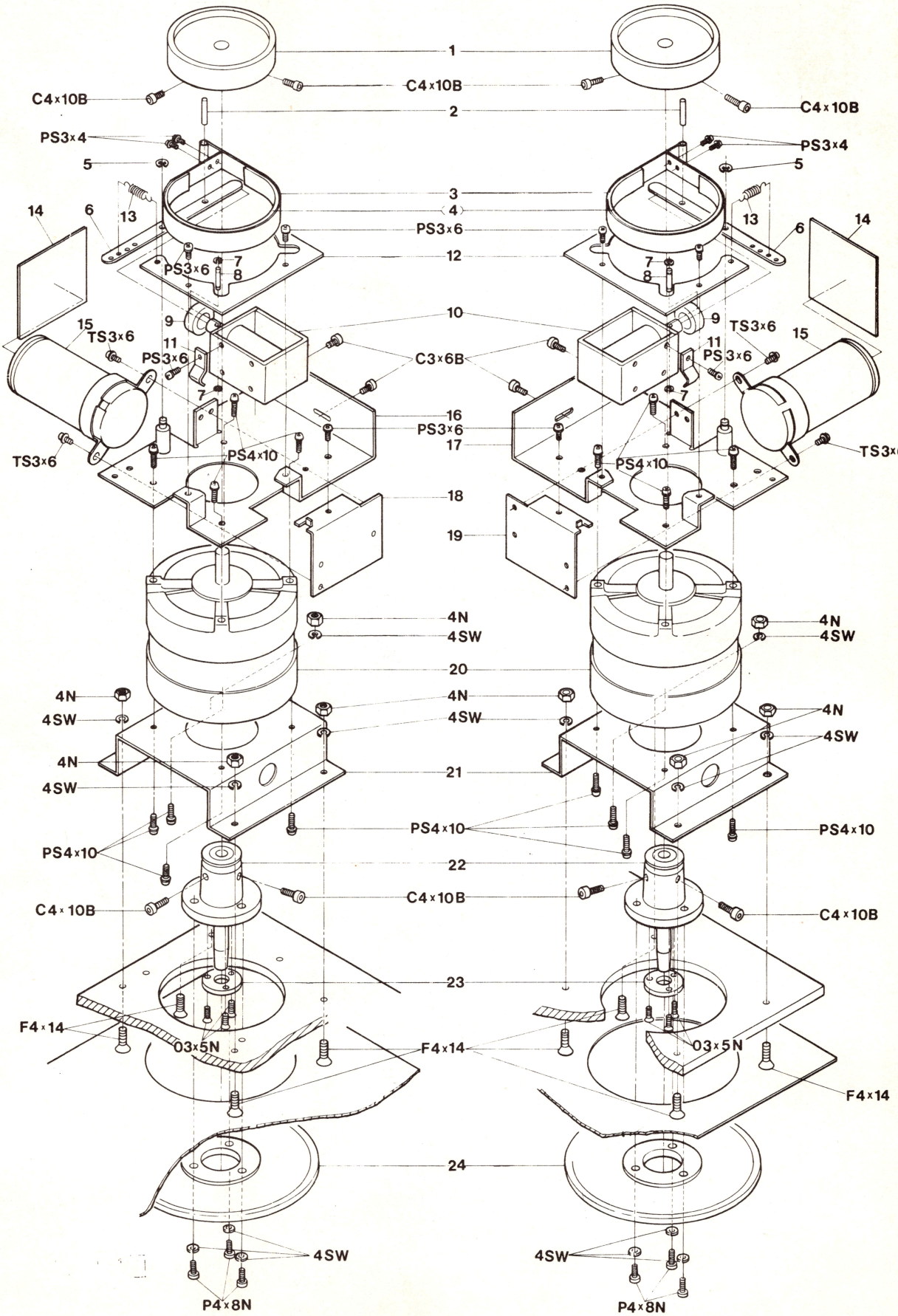
EXPLODED VIEW 8 HEAD ASSEMBLY



PARTS LIST 9 REEL ASSEMBLY

Ref. No.	Description	Part No.	Notes
9-1	Drum, Brake	KW0A012	
9-2	Pin, Brake, ø3×16	(F63316)	
9-3	Band, Brake	(KW0D015)	Ass'y
9-4	Felt, Brake	(KW0D016)	KW-4J-A
9-5	Retaining Ring, E Type ø3	F753	
9-6	Arm, Brake	(KW0D014)	
9-7	Retaining Ring. E Type ø2	F752	
9-8	Pin, Brake Solenoid	KZ5A003	
9	Cushion, Brake Solenoid	PZ1C022	
10	Solenoid, Brake	GP1F02	
11	Clamp, Brake	KZ3A047	
12	Retainer, Brake	KW4B001	
13	Spring, Brake	GS1024	
14	P.C, Board, Capacitor	(PB9A179)	PB-73R
15	Capacitor, Reel Motor 6.5μF	(CZ10023W)	Ass'y
16	Plate, R. Reel Motor	KW0G012	
17	Plate, L. Reel Motor	KW0G013	
18	Plate, R. Capacitor	KW4B004	
19	Plate, L. Capacitor	KW4B003	
20	Motor, Reel	MR1C012	
21	Bracket, Reel Motor	KW0G016	
22	Drum, Reel	KW0B017	
23	Nails, Reel Drive	KW0E038	
24	Reel Table	KW4J002	

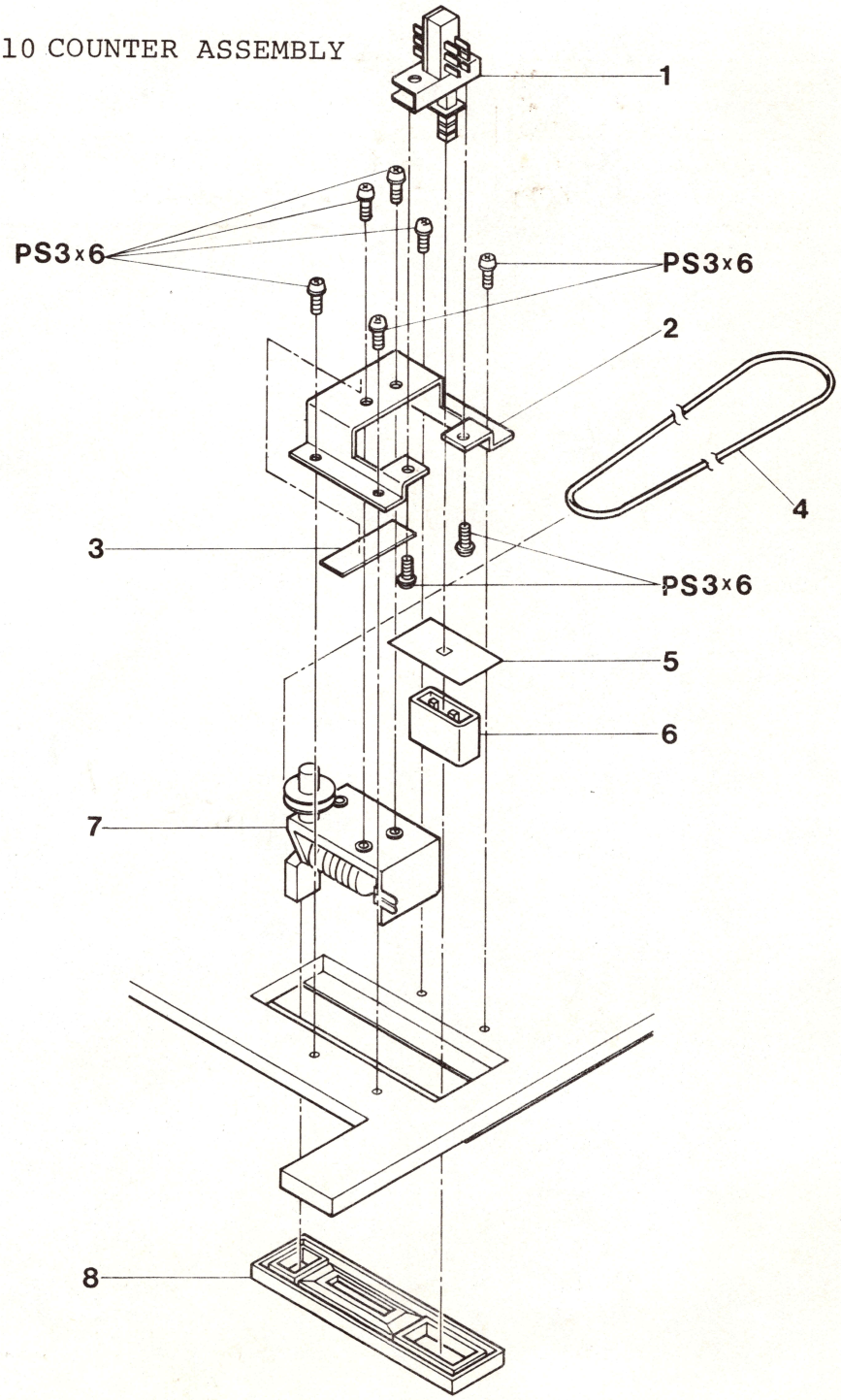
EXPLODED VIEW 9 REEL ASSEMBLY



PARTS LIST 10 COUNTER ASSEMBLY

Ref. No.	Description	Parts No.	Notes
10-1	Switch, Push	WH12023	
10-2	Bracket, Counter	(SR8D001)	┐ Ass'y
10-3	Felt, Counter Spacer	(PZ1B028)	┘ SR-8D-A
10-4	Belt, Counter	BE1B147	
10-5	Felt, Switch	PZ1B012	
10-6	Button, Push, Switch	KN2026	
10-7	Counter	SR8Z004	
10-8	Escutcheon, Counter	SR8D002	

EXPLODED VIEW 10 COUNTER ASSEMBLY



PARTS LIST 11 CONTROL SWITCH ASSEMBLY

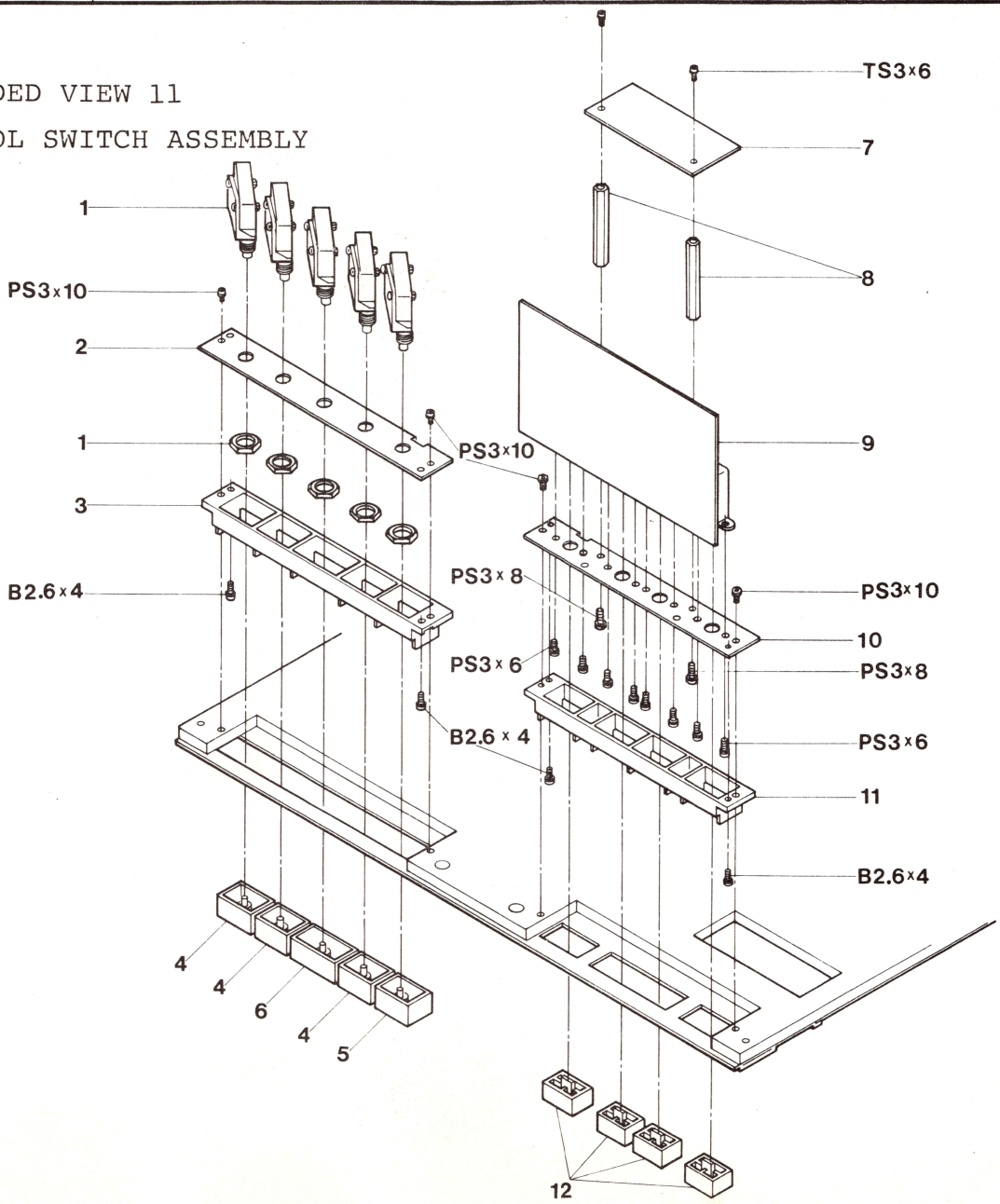
Ref. No.	Description	Part No.	Notes
11-1	Switch, Micro	WH11007	
11-2	Plate, R, Switch, Base	CB20601	
11-3	Protector, R, Button	CB20602	
11-4	Button, Push, A, PLAY F.FWD REWIND	KN2028	
11-5	Button, Push, B, REC	KN2029	
11-6	Button, Push, C, STOP	KN2030	
11-7	P.C, Board Ass'y, Aux, Switch	PB-42F	
11-8	Stud, Power P.C, Board	KZ7B106	
11-9	P.C, Board Ass'y, Power Switch	PB-42E	
11-10	Plate, L, Switch Base	PB41A01A	
11-11	Protector, L, Button	CB20701	
11-12	Button, Push Power	KN2031	

The following list is for the MX5050B-2H,2L,and 4L models.

11-7	P.C.Board Ass'y Aux Switch	PB-42L	
11-9	P.C.Board Ass'y Power Switch	PB-42M	

EXPLODED VIEW 11

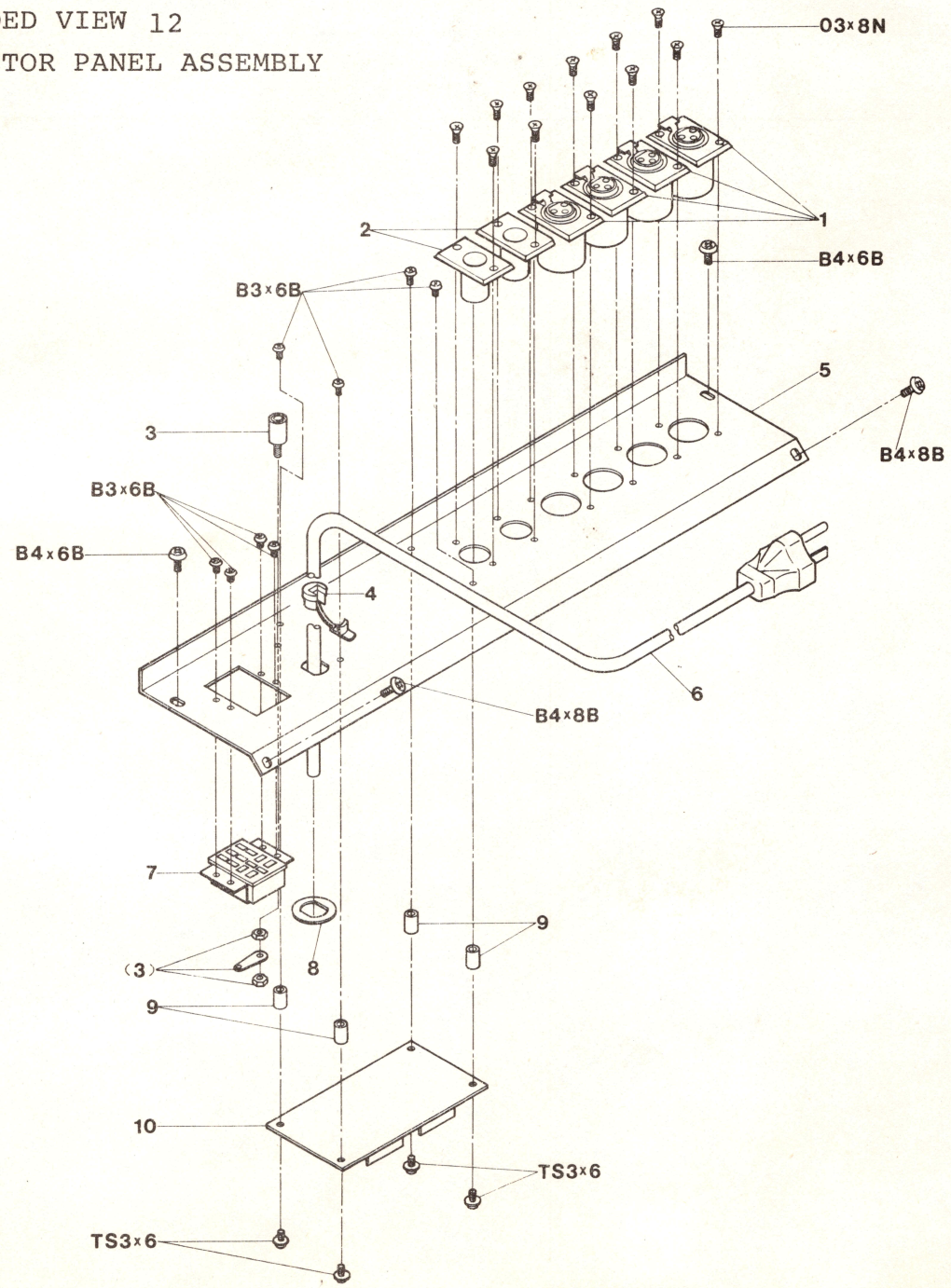
CONTROL SWITCH ASSEMBLY



PARTS LIST 12 CONNECTOR PANEL ASSEMBLY

Ref. No.	Description	Part No.	Notes
12-1	Connector, 3Soc,	CN103046	
12-2	Connector, 3Pin,	CN103045	
12-3	Terminal, Earth	CN901040	
12-4	Bush, Cord	PZ1G021	
12-5	Panel, Connector	CB70101	
12-6	Cord, Power	PZ9D017	
12-7	Connector Ass'y, Remote	CN7C-006	
12-8	Spacer, Cord Bush	KZ6C025	
12-9	Stud, P.C Board, Output	KZ7A131	
12-10	P.C, Board Ass'y, Output,	Transformer PB-73E	

EXPLODED VIEW 12
CONNECTOR PANEL ASSEMBLY

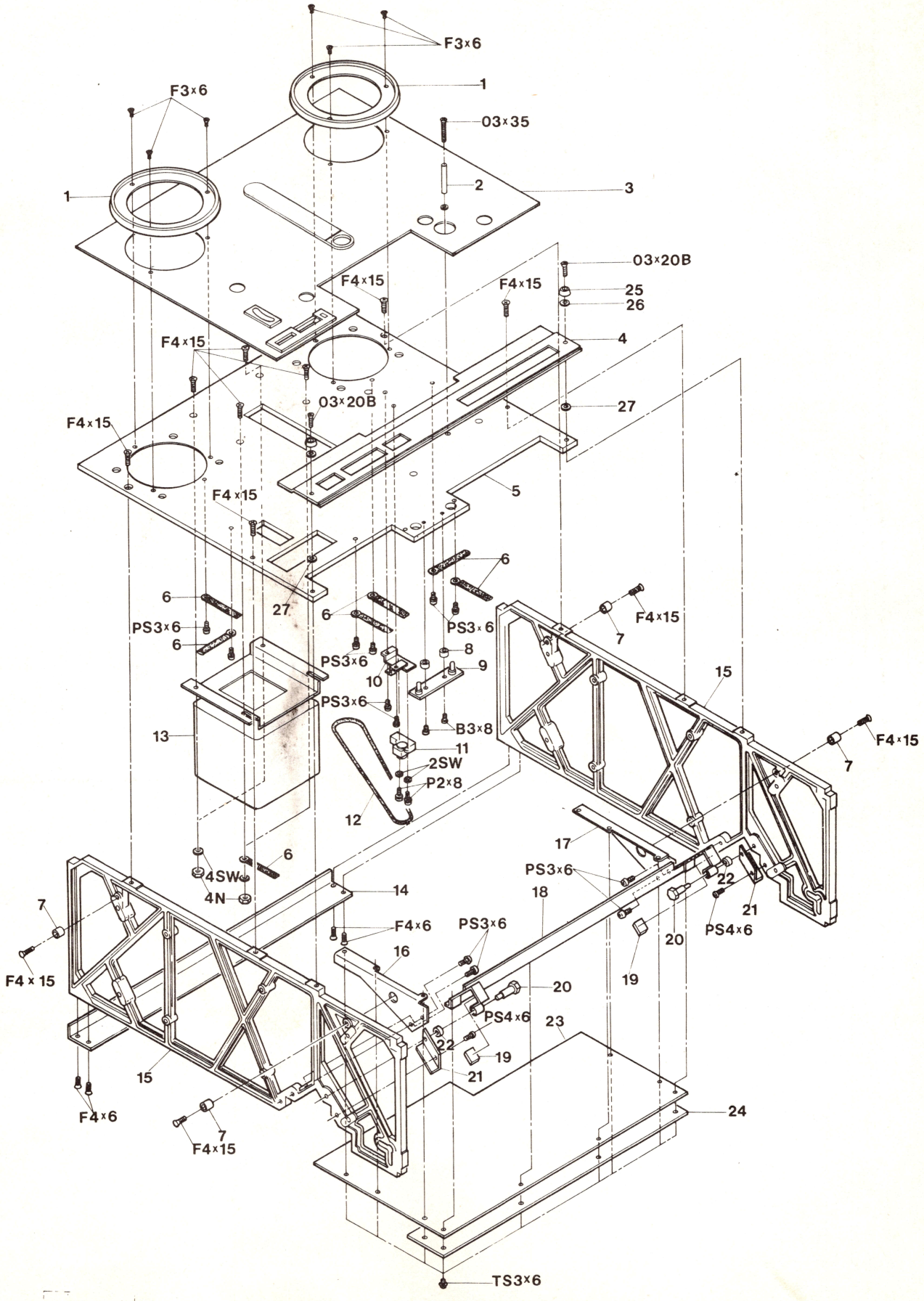


PARTS LIST 13 CHASSIS ASSEMBLY

Ref. No.	Description	Parts No.	Notes
13-1	Protector, Reel	KWOH007	
13-2	Shaft, Tape Guide	KG6E003	
13-3	Panel, Trim, Transport	(T506102)*1	Ass'y T5061-A
NOTE*1	Escutcheon, Pitch Control	(KC4H005)*1	
	Escutcheon, Counter	(SR8D002)*1	
	Escutcheon, Cue	(KR4B006)*1	
13-3	Panel, Tape Transport	(T506301)*2	Ass'y T5063-A
NOTE*2	Eseutcheon, Counter	(SR8D002)*2	
	Escutcheon, Cue	(KR4B006)*2	
13-4	Panel, Trim, Control	T506103	
13-5	Panel, Chassis, Transport	T506101	
13-6	Cramp, Wire	KZ3A022	
13-7	Stud, Frame	KZ7A215	
13-8	Spacer, P.C, Board,LED(B)	KZ7A823	
13-9	P.C, Board Ass'y LED.(B)	PB-81H	
13-10	Bracket, Sensing Switch	T505005	
13-11	Switch, Sensing	WH91005	
13-12	Belt, Sensing Switch	BE1B069	
13-13	Transformer, Power	TF11025A	
13-14	Angle, Chassis, Rear	T506104	
13-15	Frame, Chassis, Side	T506106	
13-16	Plate, L, P,C,Board	T506107	
13-17	Plate, R, P.C, Board	T506108	
13-18	Angle, Control P.C, Board	(T506111)	Ass'y T5061-B
13-19	Cushion, Angle	(PZ1C031)	
13-20	Bolt, Angle	T506109	
13-21	Angle	KZ3A068	
13-22	Spacer, Angle,P.C, Board	KZ7A315	
13-23	P.C, Board Ass'y, Control	PB-42D	
13-24	Protector, P.C, Board	T506114	
13-25	Washer, Trim, Panel	KZ6C010	
13-26	Washer, Vinyl, Panel	KZ6C011	

NOTE: *1; For dc servo version:MX-5050B-2HD, 2LD, 4LD, FHD, and FLD.
*2; For synchronous version:MX-5050B-2H, 2L, and 4L.

EXPLODED VIEW 13 CHASSIS ASSEMBLY



PARTS LIST 14 AMPLIFIER ASSEMBLY

Ref. No.	Description	Parts No.	Notes
14-1	Knob,A.upper,Amp	KN1014	
14-2	Knob. B. Lower, Amp	KN1015	
14-3	Washer, Knob, Amp	KZ6C017	
14-4	Button, Push, Red, Amp	KN2025	
14-5	Button, Push, Black	KN2026	
14-6	Button, Push, Gry	KN2027	
14-7	Panel, Trim, Amp	(A102801)	→Ass'y A1028-A
14-8	Escutcheon, Meter	(PZ4A007)	
14-9	Meter, VU	ME11005	
14-10	Felt, Shield, VU Meter	PZ1B013	
14-11	P.C, Board Ass'y. LED(E)	PB-81L	
14-12	P.C, Board Ass'y. LED(D)	PB-81K	
14-13	Felt, Push Switch	PZ1B012	
14-14	Panel, Chassis, Amp.	A102802	
14-15	Resistor, Var, Amp	RV224010	
14-16	Jack, Stereo	CN603009	
14-17	Switch, Slide	WH340013	
14-18	P.C, Board Ass'y, LED(C)	PB-81J	
14-19	P.C, Bord Ass'y, VU Amp	PB-13K	
14-20	P.C, Board Ass'y, Amplifier	PB-13J	
14-21	P.C, Board Ass'y, Rec, EQ	PB-81Q	
14-22	Angle, P.C, Board Rec, EQ	KZ3A072	
14-23	Frame, L. Chassis, Amp	A102808	
14-24	Frame, R. Chassis, Amp	A102807	
14-25	Pivot	A102809	
14-26	Bracket, P.C, Board, Amp	A102803	
14-27	Felt, Slide, Switch	PZ1B010	

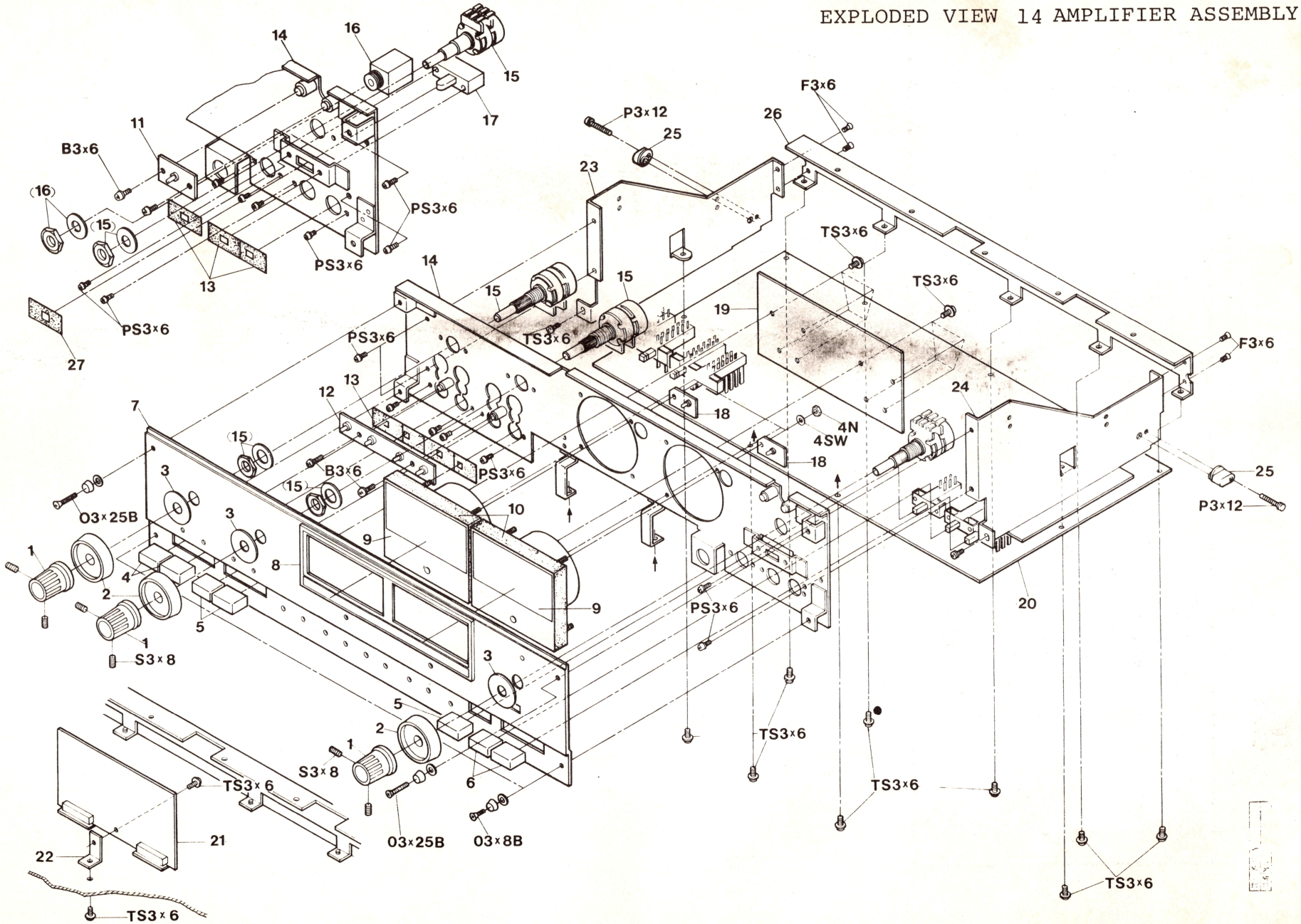
For MX5050B-4L, 4LD

14-20	P.C.Board Ass'y Amplifier	PB-13Z	

For MX5050B-FHD,FLD

14-7	Panel, Trim, Amp	(A103301)	→Ass'y A1033-A
14-8	Escutcheon, Meter	(PZ4A007)	
14-12	P.C.Board Ass'y LED(F)	PB-81T	
14-20	P.C.Board Ass'y Amplifier	PB-13X	
14-21	P.C.Board Ass'y Rec. EQ.	PB-81S	

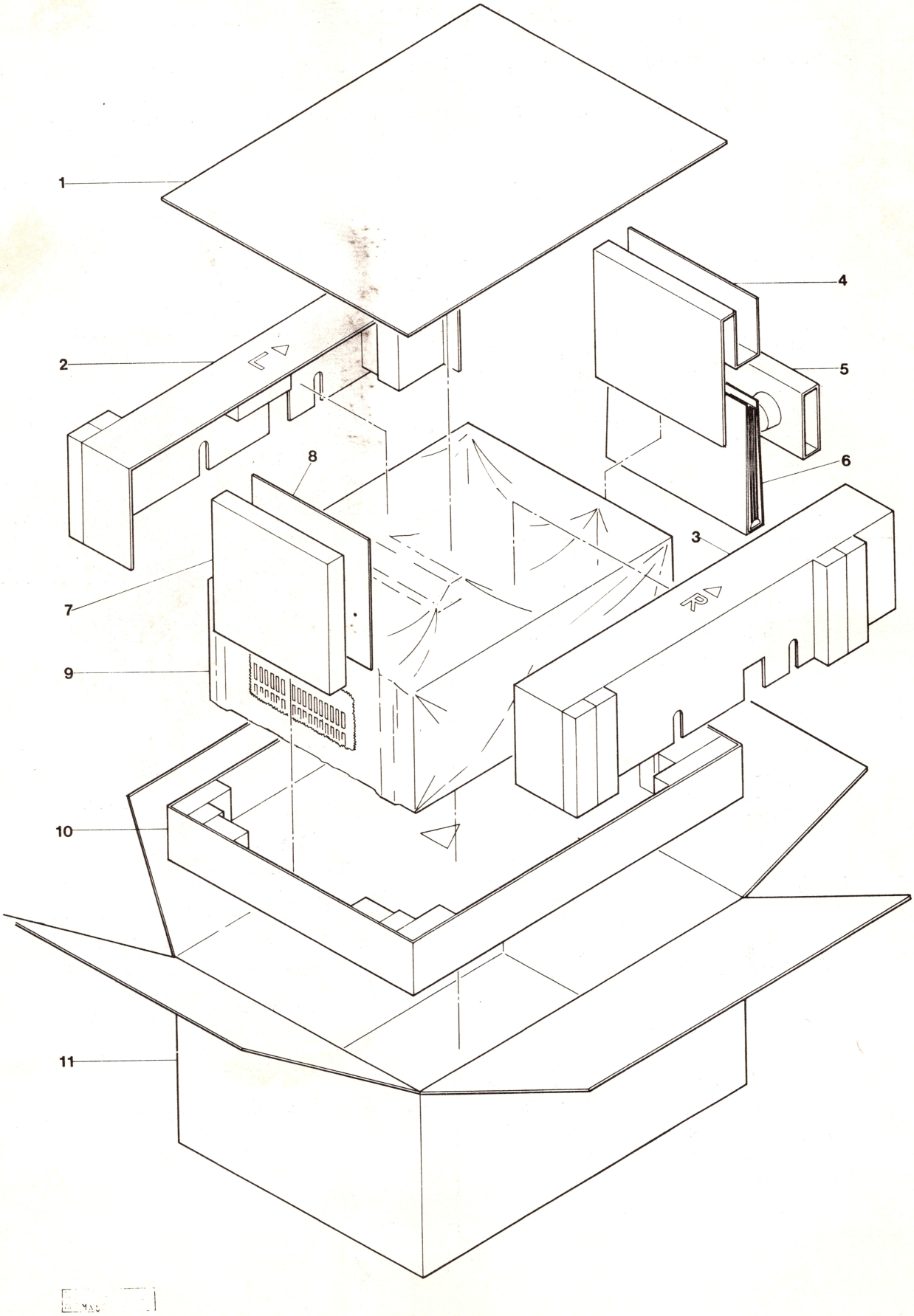
EXPLODED VIEW 14 AMPLIFIER ASSEMBLY



PARTS LIST 15 PACKAGING

Ref. No.	Description	Part No.	Notes
15-1	Plate, TOP	K703126	
15-2	Packing, L. Side	K703103	
15-3	Packing, R. Side	K703102	
15-4	Plate, Manual Hold	K703124	
15-5	Accessory, Hold Down Knob	KWOHA	
15-6	Accessory, Operation, Manual	OS1-011	
15-7	Accessory, Reel. Open	ZA-51A	
15-8	Plate, Spacing, Reel Box	K703123	
15-9	Cover, Tape Recorder	PZ9C003	
15-10	Packing, Bottom	K703104	
15-11	Case, Packing	K703101	

EXPLODED VIEW 15 PACKAGING

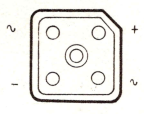


PIN IDENTIFICATION

Following table shows the pin identification of all diodes, transistors, and integrated circuits (ICs), used in the circuits of this equipment.

DIODES

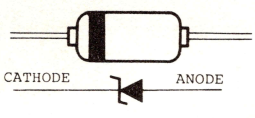
D-1



BOTTOM VIEW

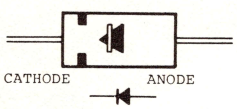
PNS2VB20
(S2VB20)

D-2



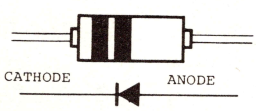
PN-0038
(RD12EB3)

D-3



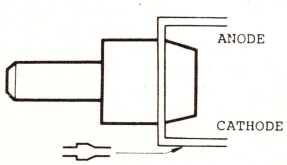
PNSM1-02
(SM1-02)

D-4



PN1S953
(1S953)

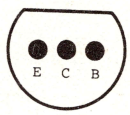
D-5



PN-0003
(SEL103S)
PN-0002
(SEL303E)

TRANSISTORS

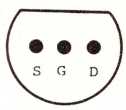
Tr-1



BOTTOM VIEW

QC945LK
(2SC945LK)
QA733P
(2SA733P)
QC1222EA
(2SC1222(2)EA)
QC2003K
(2sc2003K)

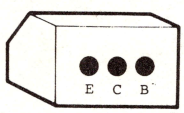
Tr-2



BOTTOM VIEW

Q2SK68AN
(2SK68AN)

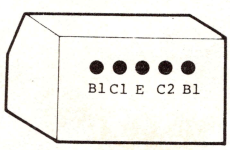
Tr-3



BOTTOM VIEW

QD571L
(2SD571L)

Tr-4

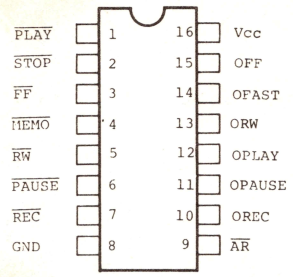


BOTTOM VIEW

QC1583G
(2SC1583G)
QA798G
(2SA798G)

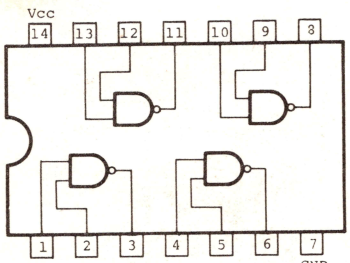
ICs

IC-1 — IM54410P (M54410P)



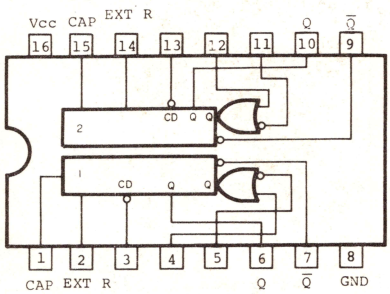
TOP VIEW

IC-2 — IA00N (SN7400N) IA03N (SN7403N)



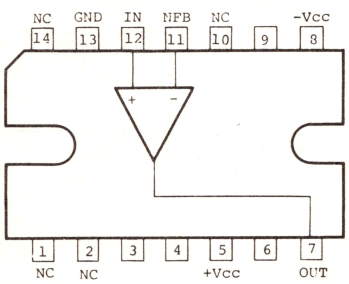
TOP VIEW

IC-3 — I9602PC (9602PC)



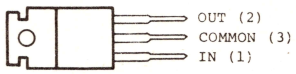
TOP VIEW

IC-4 — IHC571C (µPC571C)

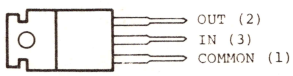


TOP VIEW

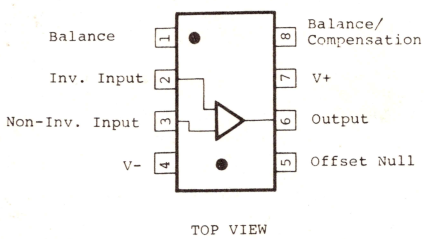
IC-5 — IHC14305 (µA7805UC or µPC14305H) IHC14324 (µA7825UC or µPC14324H) IHC14315 (µA7815UC or µPC14315H)



IC-6 — [IC704] II15UC (µA7915UC)



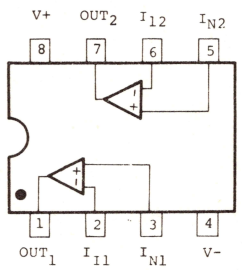
IC-7 — I-0004 (NE5534AN)



TOP VIEW

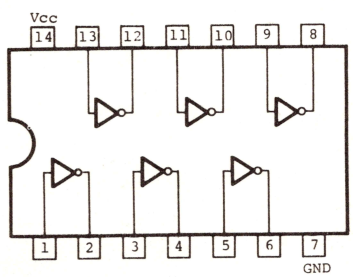
TOP VIEW

IC-8 — I-0001 (NJM4559DE)



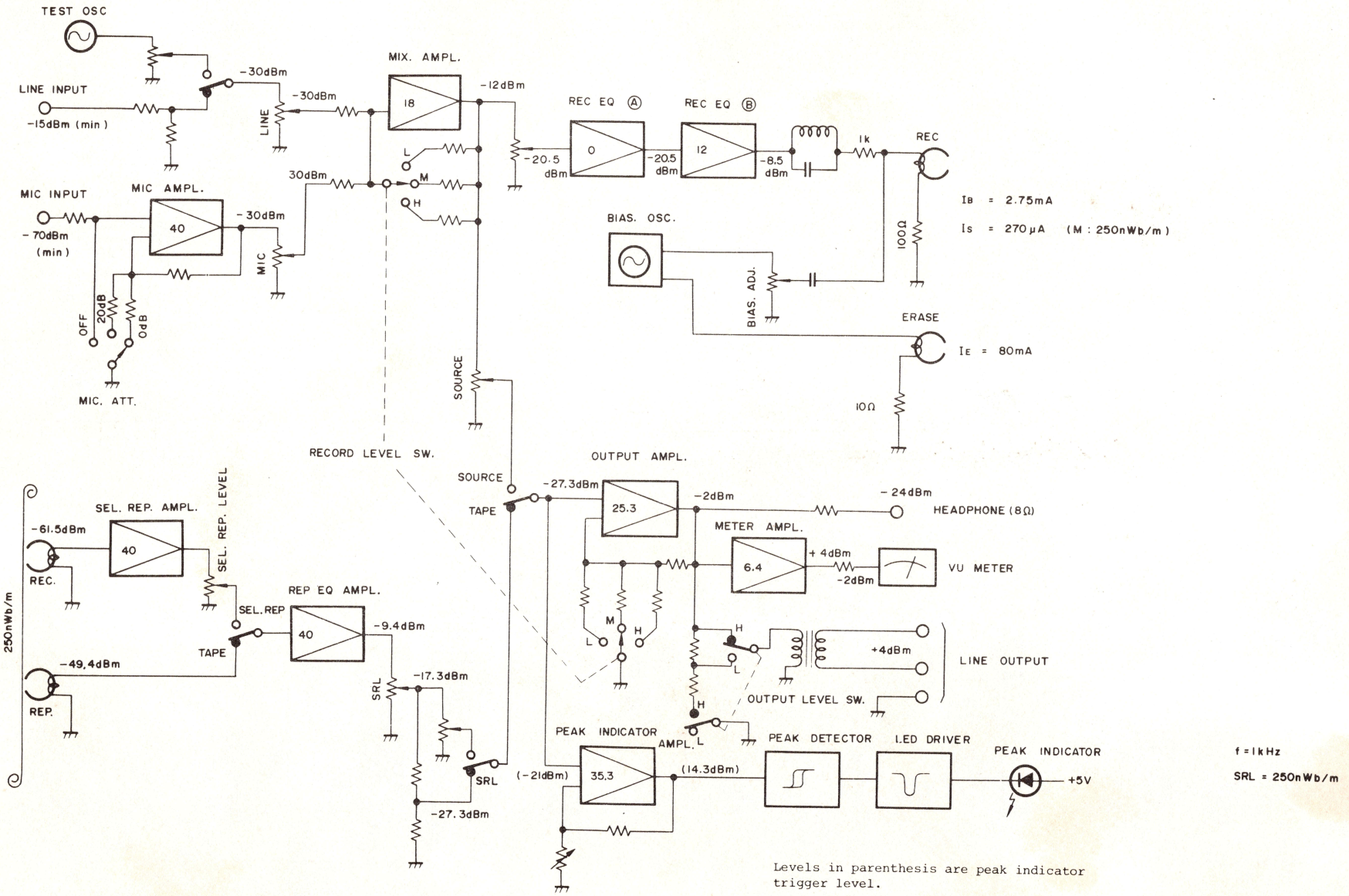
TOP VIEW

IC-9 — IA14N (SN7414N)



TOP VIEW

BLOCK DIAGRAM (for 2 track type)

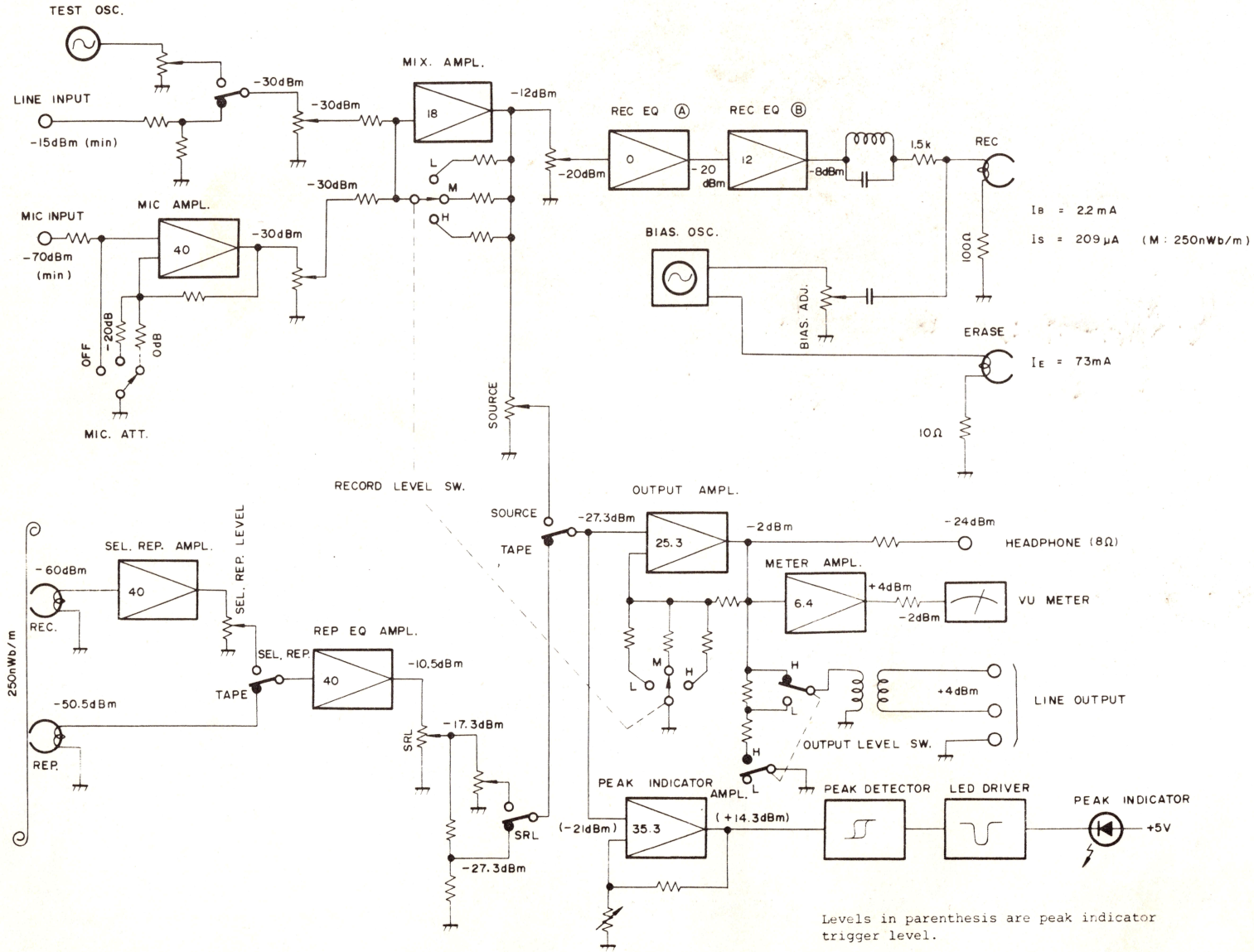


f = 1kHz

SRL = 250nWb/m

Levels in parenthesis are peak indicator trigger level.

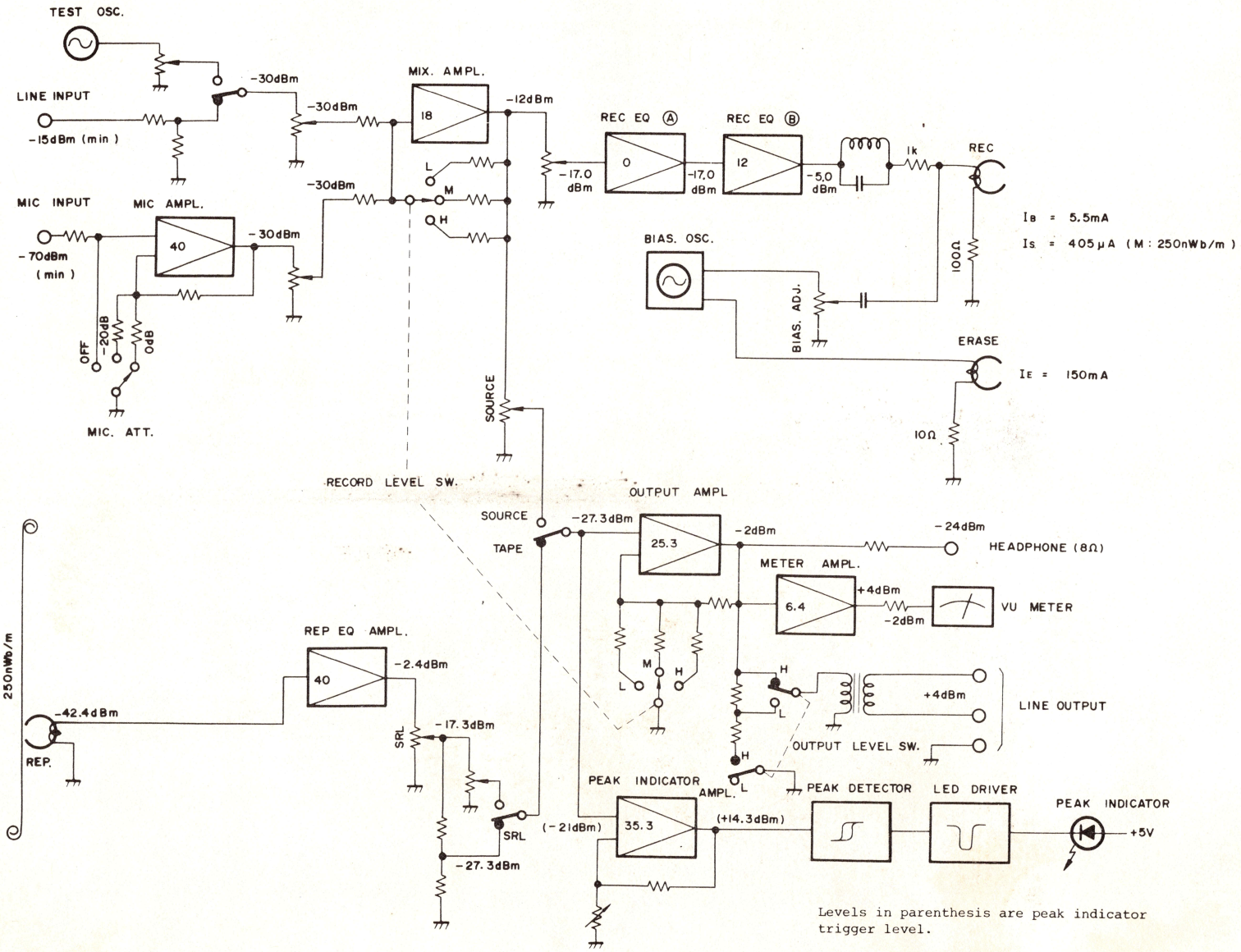
BLOCK DIAGRAM (for 4 track type)



at 1kHz
at 250nWb/m SRL

Levels in parenthesis are peak indicator trigger level.

BLOCK DIAGRAM (for Full track type)

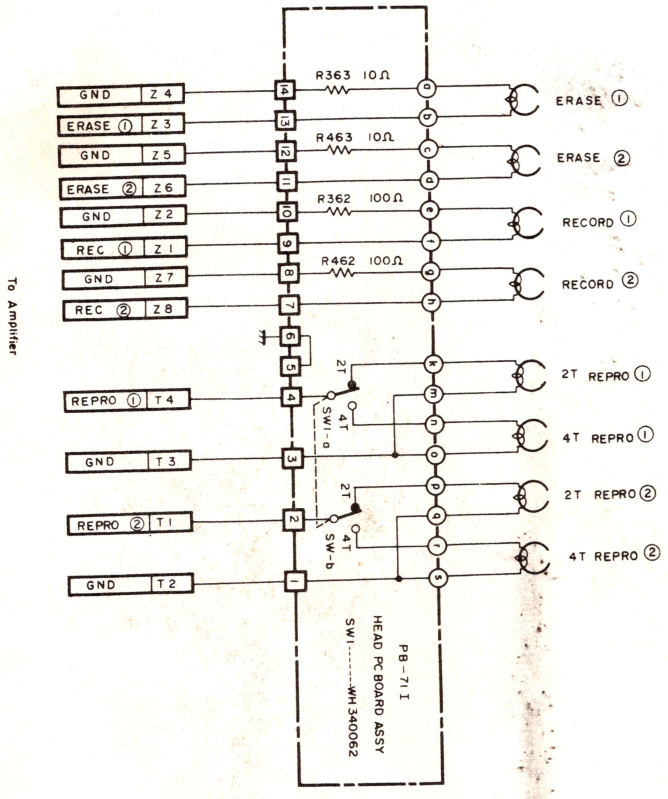


at 1kHz
at 250nWb/m SRL.

Levels in parenthesis are peak indicator trigger level.

HEAD ASSEMBLY

(for MX5050B-2LD, 2HD, 4LD)



(for MX5050B-FHD, FLD)

