

OTARI®

MX-5050
PROFESSIONAL RECORDER
INSTRUCTION MANUAL



CAUTION

To prevent fire or shock hazard:

Do not expose this appliance to rain or moisture.

Do not remove back.

No user-serviceable parts inside.

Refer servicing to qualified service personnel.

MX-5050 SERIES PROFESSIONAL RECORDERS

INTRODUCTION

This manual provides descriptive information, installation, operation, preventive maintenance, and normal adjustment instructions for the Otari MX-5050 Series Professional Recorders.



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 was 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:

OTARI ELECTRIC CO., LTD.

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Suginamiku, Tokyo, 167, Japan
Phone: (03) 333-9631
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OTARI CORPORATION

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Another part of Otari's continuous technical support program for our products is the continuous 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

The MX-5050 Series Recorders are professional quality two-speed audio tape recorder/reproducers designed for optimum performance and long life.

The MX-5050 Series units use 1/4-inch tape and are available in 8 different model configurations as shown in Table 1-1. The configuration is determined by the tape speeds and the tape recording and reproducing format.

Table 1-1 MX-5050B Model Configuration

Model No.	Capstan Motor	Tape Speed	Recording	Reproducing
MX-5050B-2H	Hysteresis Synchronous Motor	15 and 7.5 inch/sec (38 and 19 cm/sec)	1/2-track 2-channel stereo 1/2-track monaural Recording with synchronous reproducing	1/2-track 2-channel stereo 1/4-track 2-channel stereo
MX-5050B-2HD	Dc Servo Motor			
MX-5050B-2L	Hysteresis Synchronous Motor	7.5 and 3.75 inch/sec (19 and 9.5 cm/sec)		
MX-5050B-2LD	Dc Servo Motor			
MX-5050B-4L	Hysteresis Synchronous Motor	7.5 and 3.75 inch/sec (19 and 9.5 cm/sec)	1/4-track 2-channel stereo 1/4-track monaural Recording with Synchronous Reproducing	1/4-track 2-channel stereo 1/2-track 2-channel stereo
MX-5050B-4LD	Dc Servo Motor			
MX-5050B-FHD	Dc Servo Motor	15 and 7.5 inch/sec (38 and 19 cm/sec)	Full track monaural	Full-track monaural 1/2-track 2-channel stereo
MX-5050B-FLD	Dc Servo motor	7.5 and 3.75 inch/sec (19 and 9.5 cm/sec)		

1-1. SYSTEM DESCRIPTION

Among the many professional features of the MX-5050 Series are: selective reproduction, motion sensing, an edit control that permits spilling, an adjustable cueing control for audible monitoring in fast forward and rewind, a built-in test and cue-tone oscillator, front adjustable record bias, equalization, and level controls, XLR type connectors for input and output lines and microphones, a standard reference level output switch, separate line and microphone input level controls for each channel, a VU meter with a peak indicator for each channel, switches for recording levels, equalization, microphone and output level attenuators, and a memory stop for automatically stopping the tape while in the rewind mode at a desired position.

1-1-(1). TAPE TRANSPORT

All components of the tape transport system are mounted on a rigid aluminum frame for stability. The transport design incorporates two 6-pole induction motors for the reels and a 2-speed hysteresis-synchronous motor or dc servo motor (Direct drive) for the capstan in Table 1-2.

Table 1-2. Capstan Motor

Model Numbers	Capstan Motor
MX-5050B-2H, 2L, 4L	Hysteresys synchronous motor
MX-5050B-2HD, 2LD, 4LD, FHD, FLD	Dc servo motor (Direct drive)

Speed selection is made by operation of front panel pushbutton switches which also switches the equalizer. The operating speeds of each MX-5050 model are summarized in Table 1-3.

Table 1-3. Standard Tape-Speed Combinations

Model Type	Model Numbers	Speed Combination	
		High	Low
High Speed	MX-5050B-2HD, 2H, FHD	15 in/sec	7 1/2 in/sec
Low Speed	MX-5050B-2LD, 2L, 4LD, 4L, FLD	7 1/2 "	3 3/4 "

The transport accommodates tape reels of 10 1/2 inches, 8 inches, 7 inches, and 5 inches in diameter in NAB or EIA hub configurations. A solenoid-actuated tape lifter lifts the tape away from the heads in the fast forward and rewind modes, in addition to the stop mode, to increase head and tape life.

In addition to the editing controls, a tape-splicing block (Fig. 3-3.) mounted on the head cover holds the tape for ease of editing, cutting, and the application of splicing tape.

Momentary contact pushbutton switches on the transport are used to select operational modes: record, play, stop, rewind, and fast forward. These modes may be controlled from a remote location by means of an optional remote control unit (Table 1-6)

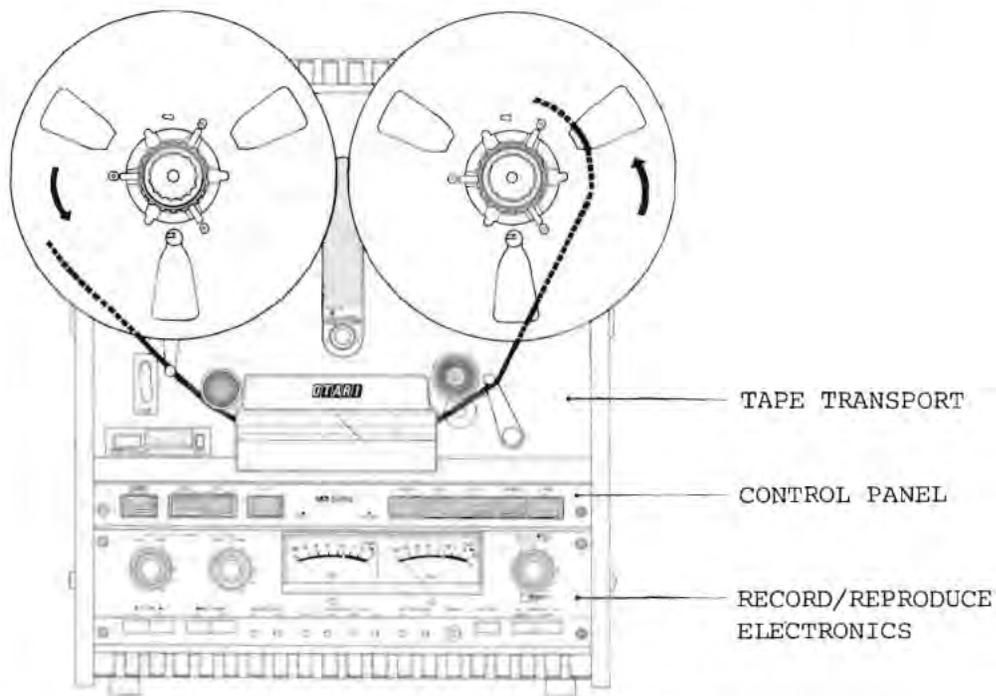


Fig. 1-1 MX-5050 Major Components

1-1-(2). RECORD/REPRODUCE ELECTRONICS

FEATURES

- (1) The RECORD/REPRODUCE amplifier unit is connected to the transport unit by only the connectors and simultaneously that unit can be made to remove to the front, so that this machine can be serviced easily.
- (2) This machine contains a SEL.REP. function for overdubbing: SOUND WITH SOUND, SOUND ON SOUND, etc., carried out by the PUNCH-IN and PUNCH-OUT functions of the transport control.
- (3) This machine provides both NAB and IEC equalizers, switchable on the rear panel. However, when the equalizer position is changed, tune the record and reproduce equalizer adjustment controller finely.
- (4) This machine always gives optimum performance for the tape used, for the Record bias, level, and equalizer controls on the front panel can be adjusted to meet any need.
- (5) To improve the signal to noise ratio and increase the head room, this amplifier has been designed with a high-fidelity amplifier.

1-1-(3). HEAD ASSEMBLIES

As viewed from the front of the recorder, the configuration of the head assembly of each model MX-5050 is shown in Table 1-4.

Table 1-4. Head Assembly Configuration

Model No.	Head Structure				Recording Head
	H 1	H 2 (Sub Head)	H 3	H 4	
MX-5050B-2H -2HD -2L -2LD	Erase 1/2T, 2CH	Playback 1/4T, 2CH	Record 1/2T, 2CH	Playback 1/2T, 2CH	1/2-track 2-channel stereo 1/2-track monaural Recording with synchronous reproducing
MX-5050B-4L -4LD	Erase 1/4T, 2CH	Playback 1/2T, 2CH	Record 1/4T, 2CH	Playback 1/4T, 2CH	1/4-track 2-channel stereo 1/4-track monaural Recording with synchronous reproducing
MX-5050B-FHD -FLD	Erase Full T	Playback 1/2T, 2CH	Record Full T	Playback Full T	Full track monaural

Note The head assemblies of these models contain two playback head stacks. A head change-over switch on the head assembly permits selection of either head stack.

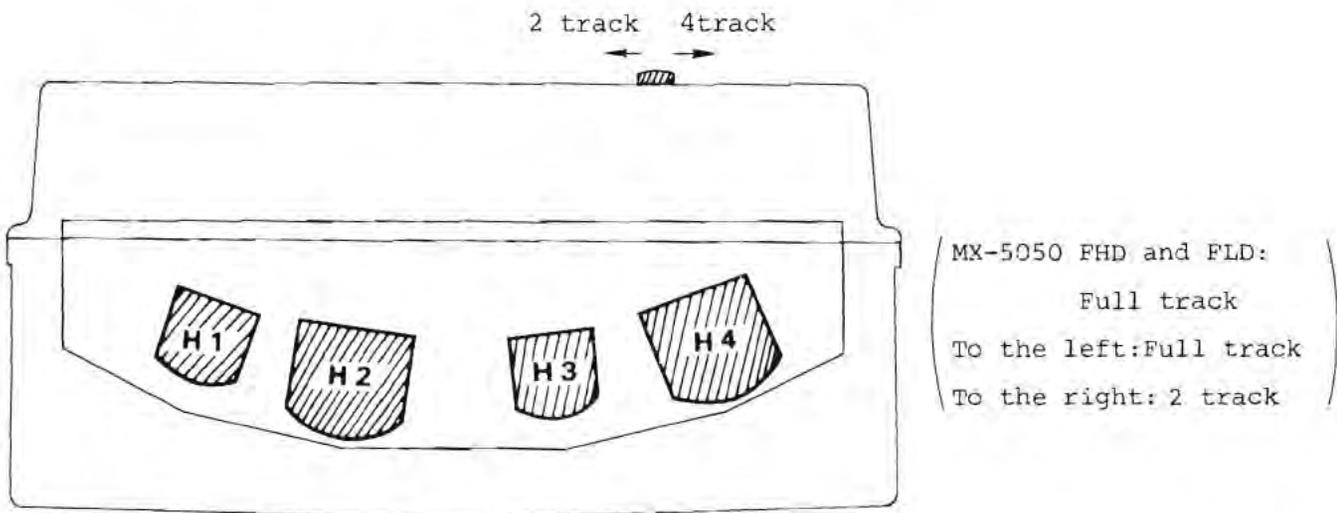


Fig. 1-2 Head Arrangement

1-2. STANDARD ACCESSORIES

The MX-5050 is supplied with the standard accessories listed in Table 1-5.

Table 1-5. Standard Accessories

Description	Quantity	Otari Part Number
NAB Hub Reel Hold Down Knob	2	KWOHA (TW670)*
Reel Adjusting Disc (Shim)**	2	KWOC005 (TY506)*
NAB empty Reel, 10 1/2 inch	1	ZA-51A (TY500)*
Instruction Manual	1	OS1-011

NOTES * Occasionally, old part numbers are given in parentheses following the number currently in use.

** The reel-adjusting disc (shim) is placed between a metal reel and the turntable to compensate for the difference in thickness between metal reels and plastic reels.

1-3. OPTIONAL ACCESSORIES

Optional accessories available are listed in Table 1-6.

Table 1-6. Optional Accesories

Description	Otari Part Number
Remote Control Unit	CB102 (CR705A)
Balanced Input line transformer assembly, 10 Kohms (for two channels)	ZA-51T*
Maintenance Manual	OS2-004
Cleaning Kit	ZA-51B (TY502)

*Refer to section 2-5-(3) for installation.

1-4. SERVICE AND REPLACEMENT PARTS

For service and replacement parts, or for technical support, please contact your nearest service center, Otari dealer, or write directly to Otari. (See page ii for complete addresses.)

1-5. SPECIFICATIONS

The specifications of the MX-5050 Series are as listed in Table I-7.

Table 1-7. Specifications of the MX-5050 Series

Tape Width and tracks:	1/4 inch (6.3 mm) tape: 2 tracks (0.079 in. or 2.0 mm track width) 4 tracks (0.040 in. or 1.0 mm track width) Full tracks (0.24 in. or 6.1 mm track width)
Tape Speeds:	7 1/2 and 15 ips (19 and 38 cm/sec) or 3 3/4 and 7 1/2 ips (9.5 and 19 cm/sec) Maximum deviation: $\pm 0.2\%$ measured with 1.5 mil (0.038 mm) tape.
Reel Sizes:	7 inch or 10 1/2 inch plastic or metal, EIA or NAB.
Heads:	Model MX-5050B-2: Half-track Model MX-5050B-4: Quarter-track Model MX-5050B-F: Full-track Four head stacks: MX-5050B-2: 1/2 erase, 1/4 reproduce, 1/2 record, 1/2 reproduce. MX-5050B-4: 1/4 erase, 1/2 reproduce, 1/4 record, 1/4 reproduce. MX-5050B-F: Full erase, 1/2 reproduce, Full record, Full reproduce.

Motors: Capstan:

Two speed hysteresis synchronous, or dc servo controlled motor. (Pitch control limits $\pm 7\%$)

Reels:

Two induction torque motors.

Operating position:

Vertical or horizontal.

Power requirements:

117 volts 60 Hz, single phase ac, 100 watts or 220/240 volts, 50 Hz, single phase ac, 100 watts.

Operating Environment:

40° to 104°F (5° to 40°C)
20 to 80% RH.

Storage Environment:

-5° to 113°F (-20° to 45°C)

Dimension and Weight

Dimension 430 width, 225 depth,
 527 hight in mm.
 16.9 width, 8.8 depth,
 20.7 hight in inch.
Weight 24 kgs, 53lbs.

Mounting:

Black leather-finished cabinet.

Standard Accessories:

One empty 10 1/2 inch NAB reel, two NAB reel hold down knobs, two NAB reel-adjusting discs (shims), and one instruction manual.

Remote control unit:

An optional remote control unit is used to control the record, play, stop rewind, and fast forward modes.

Connectors:

Line input, line output, and microphone, standard three-pin XLR.

Inputs: Line:

Microphone:

Minimum -15 dBm, unbalanced 50 k ohms. Minimum -15 dBm, balanced 10 k ohms with optimal transformer. Minimum -70 dBm, unbalanced, adaptable microphone's impedance: 150 to 10 k ohms. The microphone attenuator switch may be set to the 0 dB, -20 dB, or Off position depending on the circumstances.

Outputs: Line:

Level: +4 dBm or -10 dBm, rear panel switch selectable.

Balanced, Floating, Source impedance: 50 ohms.

Load impedance: More than 600 ohms.

Maximum line output: +28 dBs with 600 ohms load.

Headphone Jack:

Level: -24 dBm with an 8 ohm load.

Load impedance: 8 ohms or greater.

Equalization:

NAB or IEC for 3 3/4, 7 1/2, and 15 ips. Switchable on the rear panel, but calibration is necessary.

Frequency Response:

15 ips: 30 Hz to 20 kHz ± 2 dB.

7 1/2 ips: 20 Hz to 18 kHz ± 2 dB.

3 3/4 ips: 20 Hz to 10 kHz ± 2 dB.

Specifications refer to a 1 kHz reference when recorded on 3M 206.

Signal to Noise ratio:

NAB equalization

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

IEC equalization

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

Crosstalk:

With a 1 kHz signal on adjacent tracks:

2 tracks: greater than 55 dB.

4 tracks: greater than 55 dB.

Wow and Flutter

(NAB weighted):

Tape Speed	
15 ips.	less than 0.06%
7 1/2 ips.	less than 0.08%
3 3/4 ips.	less than 0.12%

Distortion:

Less than 0.7% at 1 kHz at 250 nWb/m.

Erase Efficiency:

Greater than 70 dB.

Test Oscillator Frequency:

Nominal 1 kHz.

Bias and Erase Frequency:

133 kHz

Peak indicator

Trigger level: 520 nWb/m (9 dB above Ampex operating level) recorded flux level.

Record level
(SRL)

3 position switchable on the rear panel.

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

- Notes
1. Signal to noise ratio is measured with respect to a recorded level of 520 nWb/m to biased tape noise when using Scotch 206, magnetic tape.
Unweighted: Using a 30 to 18 kHz RC filter to attenuate noise outside the audio spectrum.
Weighted : Using an NAB or ASA "A" weighting filter and a 1 kHz reference.
 2. Main schematic diagrams are attached to the last part of this manual.
 3. Otari reserves the right to change specifications without notice and/or obligation.

SECTION 2 INSTALLATION

This section of the manual provides information on unpacking and inspection, location and environment, and power and signal connections.

2-1. UNPACKING AND INSPECTION

The MX-5050 Series system is shipped from the factory in a single cardboard packing case. Upon receipt, examine the case for any sign of damage. Unpack the equipment and inspect for any sign of damage. Use great care when unpacking the equipment and removing packing materials to prevent damage to critical components such as the capstan, head assembly, and tension arms.

Referring to Table 1-5. and Table 1-6. (as applicable), verify that all items have been received. Report any shortage or damage to the carrier and your local Otari dealer. Save the packing case for possible shipment of the equipment to another location or in case of re-shipment. Other packaging may cause damage during transportation and will void the warranty.

Regarding the repacking method, please refer to the illustration which is attached to a flap of the packing box.

2-2. LOCATION AND ENVIRONMENT

The area chosen for operation should be adequately ventilated and dust free. Since recording is by an electromagnetic process, it is possible that strong electromagnetic fields may affect the system adversely. Common sources of interference are fluctuating loads on nearby high-voltage lines, heavy duty transformers, and transmitting equipment.

It is recommended that the equipment be used in an environment where the surrounding temperature does not exceed limits of 40° to 104°F (5° to 40°C), with the relative humidity between 20 and 80%. Allow at least a 4 inch clearance behind the rear-panel ventilation grill.

2-3. DIMENSIONS

Equipment dimensions of the MX-5050 Series are shown in Fig. 2-1.

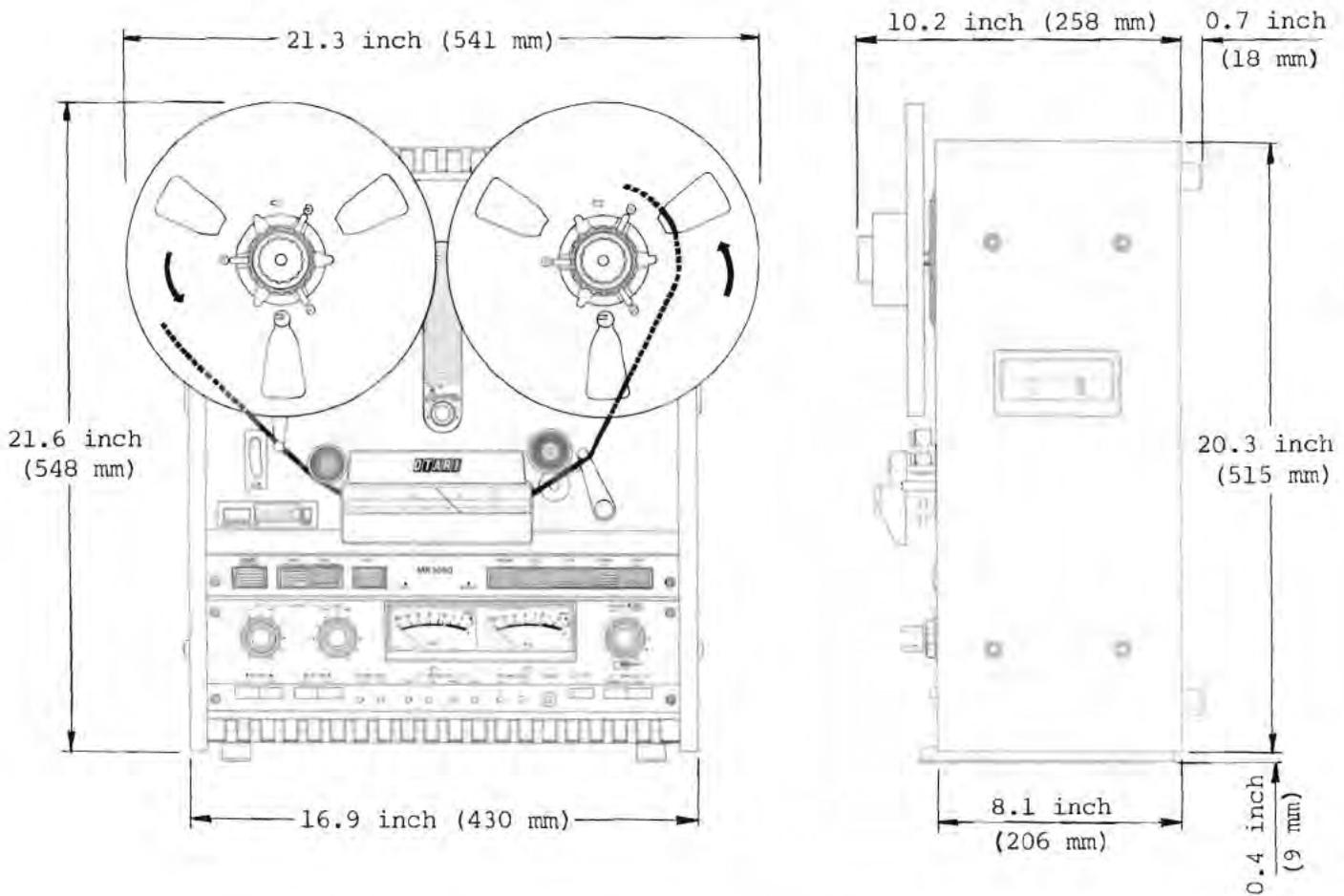


Fig. 2-1. Equipment Dimension

2-4. STANDARD SWITCH POSITION ON SHIPMENT

Either the NAB standard or the IEC standard of equalization, recording level, etc, may be used with the Otari MX-5050 series. These units have been provided with a slide switch on the back panel which selects one of these two standards; to change standards, merely slide the switch to the desired position.

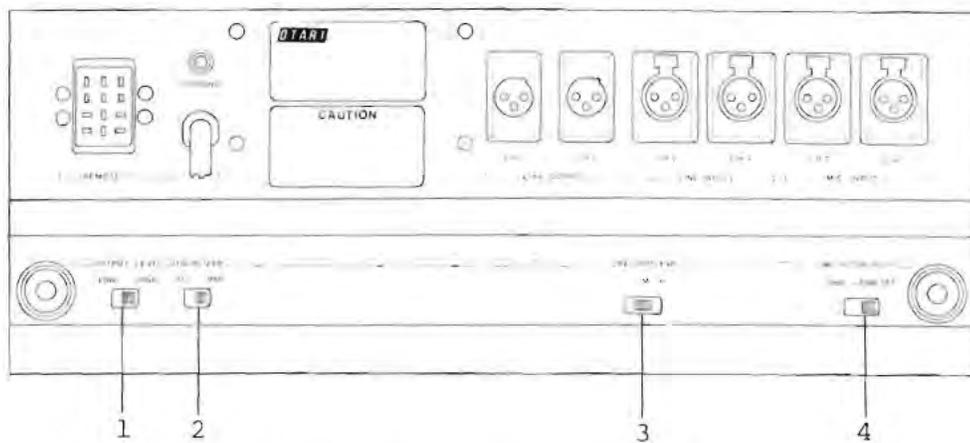


Fig. 2-2(a). Standard switch position on shipment (NAB).

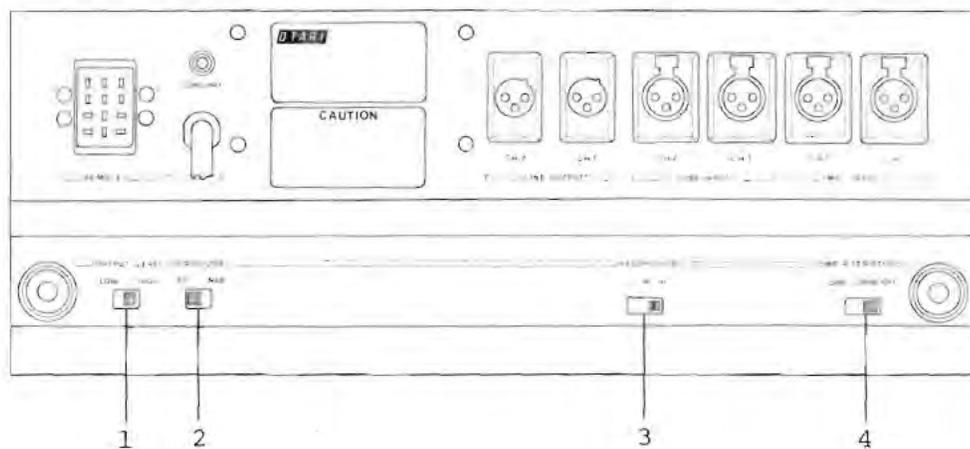


Fig. 2-2(b). Standard switch position on shipment (IEC).

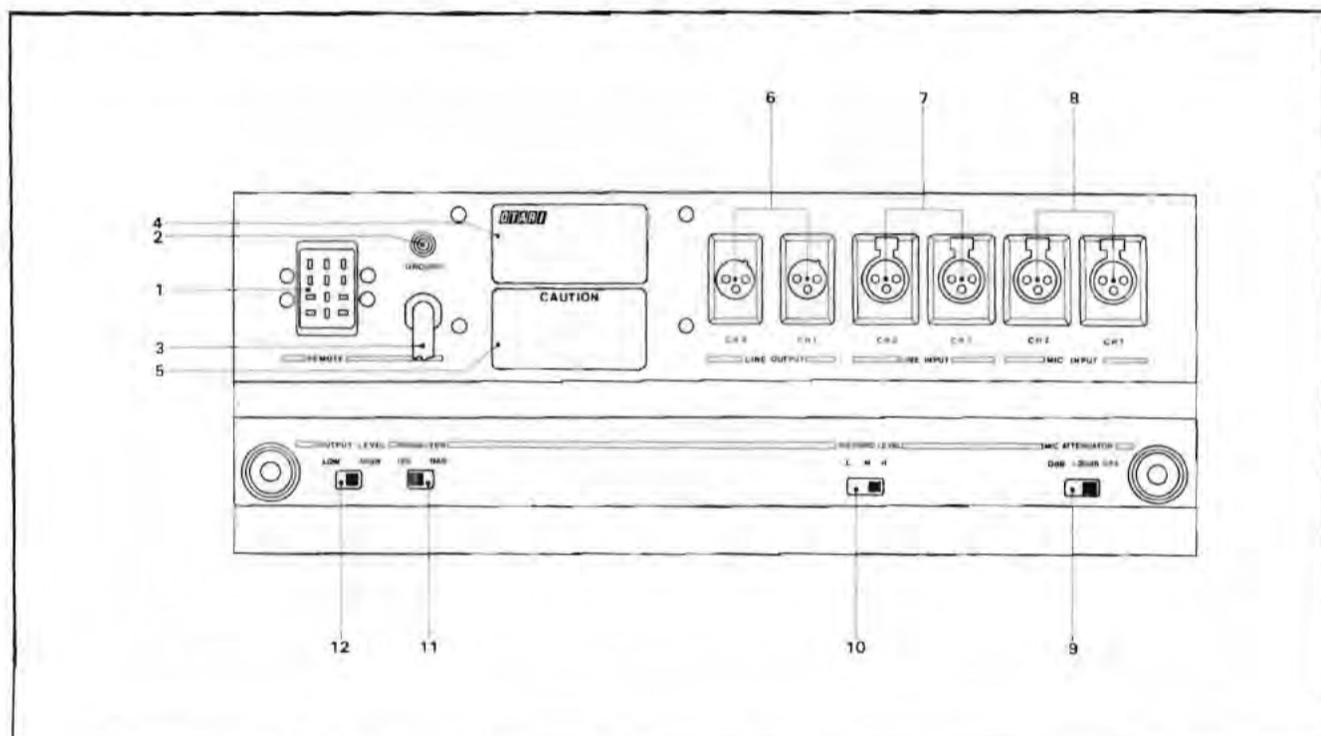
SWITCH	Ref. No.	NAB	IEC
OUTPUT LEVEL	1	HIGH	HIGH
EQUALIZER	2	NAB	IEC
RECORD LEVEL	3	M	H
MIC. ATT	4	OFF	OFF

Table 2-1. Standard switch position on shipment.

2-5. POWER AND SIGNAL CONNECTION

All power and signal connections are made on the connector panel of the MX-5050. Table 2-2. shows the function of each connector and component on the rear panel.

Table 2-2. Rear Connector Panel.



Index No.	Name	Function
1	REMOTE control connector	Remote control connector for use with the optional remote control unit to control the record, play, stop, rewind, and fast forward modes.
2	GROUND Terminal	Auxiliary ground connection for use with equipment not connected to a common ac ground.

3	Ac Power Cable	Three-wire cable for connection to ac power and ground.
4	Label	Indicates model number, production lot number (serial number), power requirement, and place of manufacture.
5	Caution	Precautions for preventing fire and shock.
6	LINE OUTPUT Connector	Male XLR-type connector. Balanced output. Source impedance: 50 ohms. Load impedance : 600 ohms or greater. Level : +4 dBm or -10 dBm at 0 VU switchable by the OUTPUT LEVEL switch.
7	LINE INPUT Connector	Female XLR-type connector. Unbalanced input standard. Input impedance : 50 k ohms. Minimum input : -15 dBm. Maximum input before clipping : +30 dBm. Optional balanced input Input impedance : 10 k ohms. Minimum input : -15 dBm. Maximum input before clipping : +30 dBm.
8	MICROPHONE input connector	Female XLR-type connector. Unbalanced input. Applicable microphone impedance : 150-10 k ohms. Minimum input : -70 dBm or -50 dBm switchable by means of the MIC ATTENUATOR switch.

9 MICROPHONE ATTENUATOR switch

Used to adjust the sensitivity of the microphone amplifier in accordance with the microphone's input level.

ATT	Minimum Input (Sensitivity)
0 dB	-70 dBm
-20 dB	-50 dBm
OFF	_____

When a microphone is not used, this switch should be placed in the "OFF" position to avoid noise from the microphone amplifier being placed on the tape.

10 RECORD LEVEL Selector switch

This switch is used for setting the recording level: "High", "Medium", and "Low".

Position	Flux	Relative level	Test Tape	Recording tape to be used
Low	185 nWb/m*	0 dB	Ampex Operating level	Scotch 177, Ampex 641
Medume	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

11	EQUALIZER selector switch	<p>The two-position EQUALIZER selector switch is used to select either IEC or NAB equalization. The equalizer of this unit has five settings. These have already adjusted before shipment. These setting may be changed, but it is necessary to tune them finely.</p>
		<ol style="list-style-type: none"> 1 NAB 15 ips (3180+50 μsec) 2 NAB 7.5 ips (3180+50 μsec) 3 IEC 15 ips (∞ +35 μsec) 4 IEC 7.5 ips (∞ +70 μsec) 5 Both NAB and IEC 3.75 ips (3180+90 μsec)
12	LINE OUTPUT LEVEL Selector switch	<p>A two-position output level switch used to select either the +4 dBm or -10 dBm output standard reference level (SRL).</p>

2-5-(1). AC POWER CONNECTION

The MX-5050 Series is factory set to operate at the line voltage and frequency indicated on the packing case and on the rear connector panel of the equipment. Ac power is connected by means of a three-wire power cable which also provides a common ground connection. If a two-wire receptacle is used with an adaptor, be sure the adaptor is properly grounded.

If a change of line voltage and/or frequency is desired to accommodate different power requirements, please contact your nearest Otari dealer.

2-5-(2). SIGNAL CONNECTIONS

The microphone input (female), line input (female) and line output (male) connectors are XLR-type connectors. To wire the mating plugs, refer to Fig. 2-3. and proceed as follows.

LINE AND MIC INPUT CONNECTOR WIRING:

For balanced inputs, wire the male XLR-connector as follows:

1. Connect the signal leads of a two-conductor shielded cable to pin 3 (high) and pin 2 (low) of the connector.
2. Connect the cable shield to pin 1.

For unbalanced inputs using two-conductor shielded cable, wire the male XLR-connector as follows:

1. Connect the signal leads of a cable to pin 3 (high) and pin 2 (low) of the connector.
2. Connect the cable shield to pin 1 of the connector.
3. Connect a jumper from pin 1 to pin 2 of the connector.

For unbalanced inputs using single-conductor shielded cable, wire the male XLR-connector as follows:

1. Connect the center conductor of the single-conductor shielded cable to pin 3 of the connector.
2. Connect the cable shield to pins 1 and 2.

LINE OUTPUT CONNECTOR WIRING

For balanced outputs, wire the female XLR-connector as follows:

1. Connect the signal leads of a two-conductor shielded cable to pin 3 (high) and pin 2 (low) of the connector.
2. Connect the cable shield to pin 1.

For unbalanced outputs using two-conductor shielded cable, wire the female XLR-connector as follows:

1. Connect the signal leads of the cable to pin 3 (high) and pin 2 (low) of the connector.
2. Connect the cable shield to pin 1 of the connector.
3. Connect a jumper from pin 1 to pin 2 of the connector.

For unbalanced outputs using single-conductor shielded cable, wire the female XLR-type connector as follows:

1. Connect the center conductor cable to pin 3 of the connector.
2. Connect the cable shield to pin 2 of the connector.
3. Connect a jumper between pins 1 and 2 of the connector.

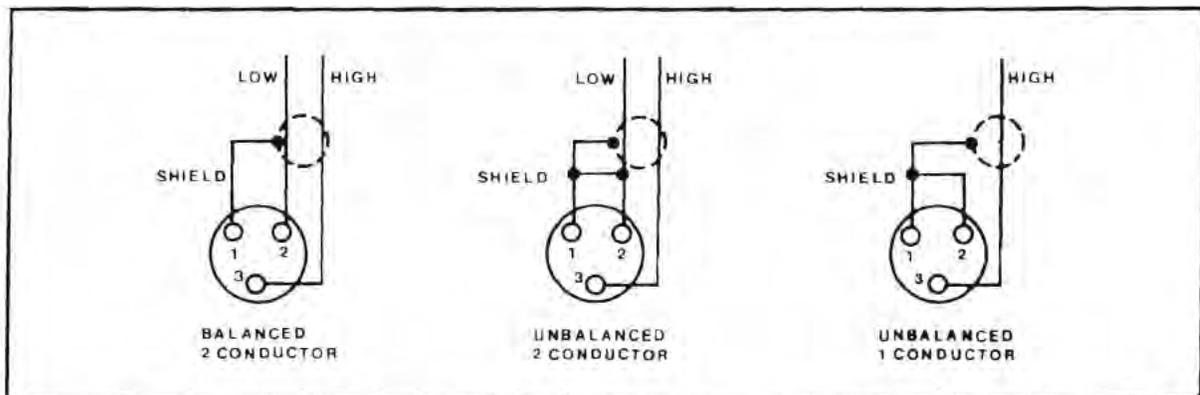


Fig. 2-3. Input/Output Assembly Connector Wiring.

2-5-(3). INSTALLATION OF OPTIONAL LINE INPUT TRANSFORMER FOR
BALANCED INPUT

Optional line input transformer assembly (ZA-51T) consists of the
follows.

Description	Quantity	Otari part number
Input transformer	2	TF 21006
Resistor 4.7 k Ω	4	RLIJ 4729
Resistor 1.3 k Ω	4	RLIJ 1329

The specifications when the balanced line input transformer is used are
as follows.

- ° Minimum input level : -15 dBm
- ° Maximum input level before clipping : +30 dBm
- ° Input impedance : 10 k ohms
- ° Floating

These are attached by the following process. (Refer to Fig. 2-5-(a),(b))

1. Remove R312 (R412) 43 k ohms.
2. Cut printed circuits where the marks (cut→x) are indicated in the
P.C.B. (Printed Circuits Board) of this machine.
3. Solder R308 to R311 and R408 to R411.
4. Solder the lead of the transformer to the P.C.B. When the trans-
former is attached, note carefully the attachment director of the
transformer and mate the lead number of the transformer and the P.C.B.
together.

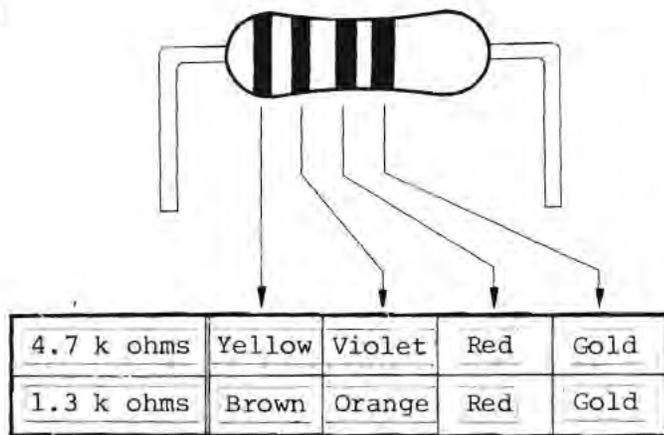


Fig. 2-4. Resistor Color Code

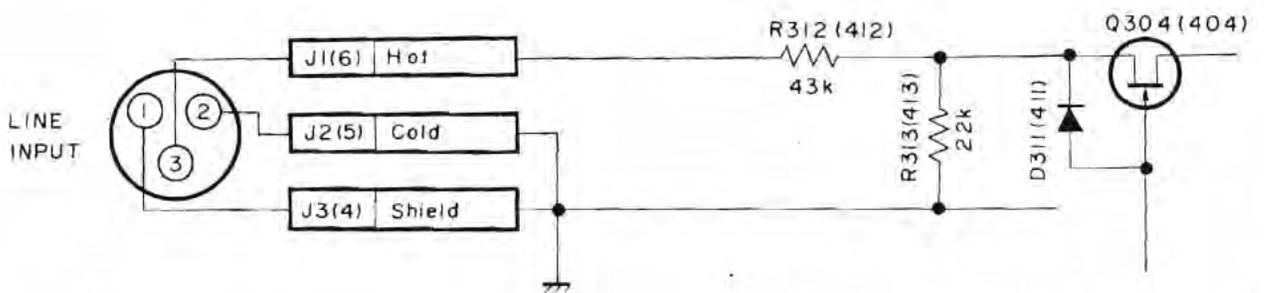


Fig. 2-5-(a). Standard unbalanced input.

Note. The reference numbers given in parenthesis are for CH 2.

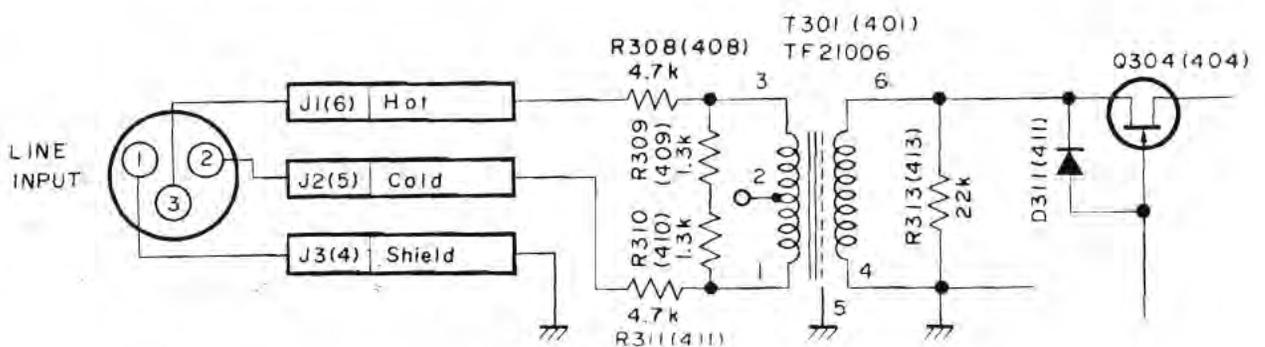


Fig. 2-5-(b). Optional Balanced Floating Input.

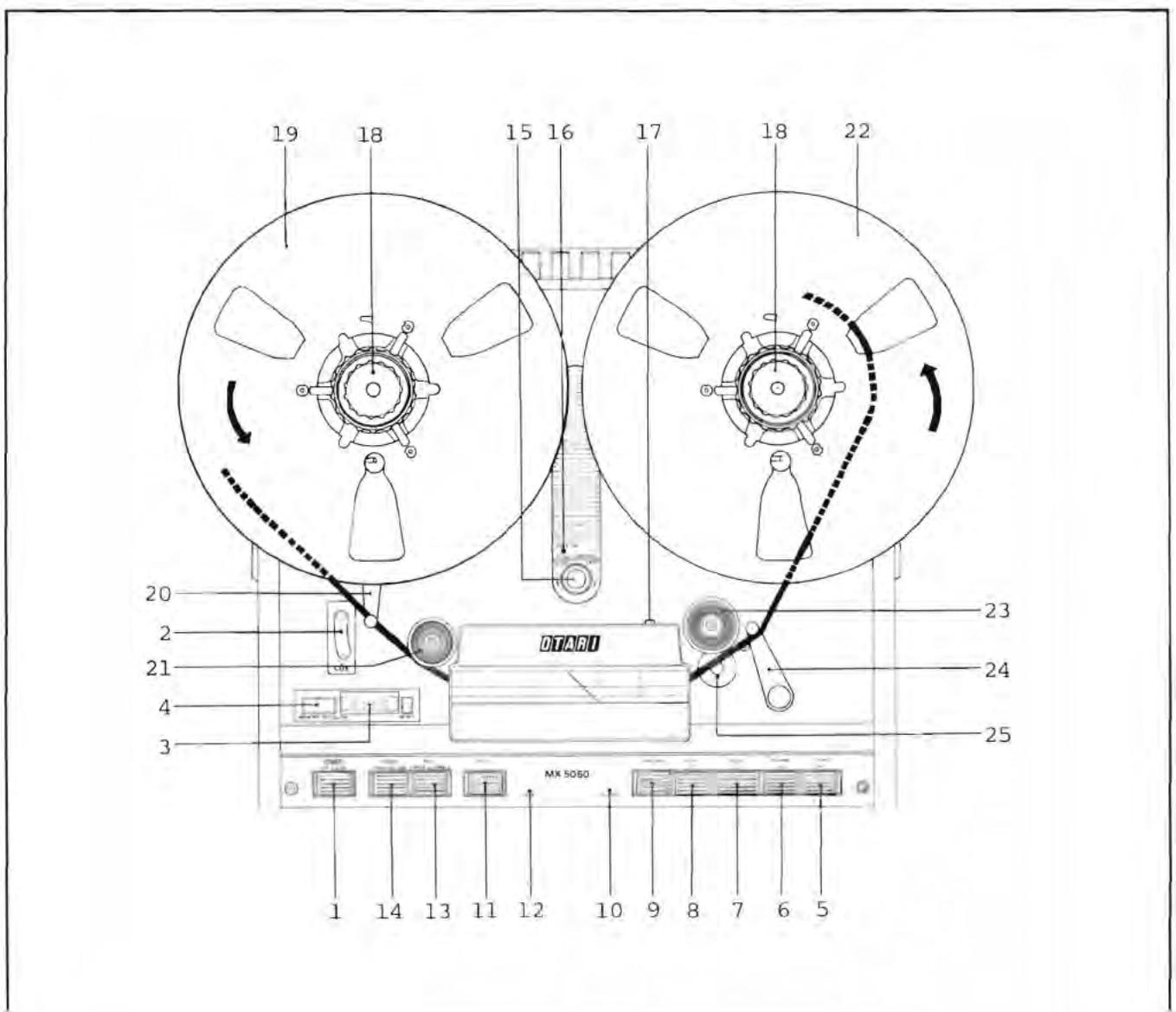
Note. The reference numbers given in parenthesis are for CH 2.

SECTION 3 OPERATION

This section of the manual provides a description of all operating controls and indicators and their use in the system, and step-by-step procedures for the various modes of operation.

3-1. CONTROLS AND INDICATORS

Table 3-1. Tape Transport Controls and Indicators



Index No.	Name	Function
1	POWER pushbutton switch	In the depressed position, power is applied to the equipment, and the VU meters illuminate.
2	CUE lever	In the up position, the system operates normally. In the fast forward and rewind modes, moving the lever downward permits variable control of the tape lifter to carry out audio monitoring. The lever locks in the full down position.
3	Reel Rotation Counter	A four-digit counter used to locate or log program material on tape. The pushbutton resets the counter to "0000".
4	MEMORY pushbutton switch	Depress this switch and the MX-5050 will enter the STOP mode when the index counter reads "0000" → "9999" in the rewind mode.
5	F.FWD pushbutton switch	Used to select the fast forward mode to run the tape from left to right at high speed. This mode may be entered into from any other mode except the edit mode.
6	REWIND pushbutton switch	Used to select the rewind mode to run the tape from right to left at high speed. This mode may be entered into from any other mode except the edit mode.
7	STOP pushbutton switch	Used to stop the tape transport and cancel the existing mode of operation.
8	PLAY pushbutton switch	Used to select the play mode, or used in conjunction with the RECORD pushbutton switch. Pressing the PLAY pushbutton during the fast

9 RECORD pushbutton switch

forward or rewind modes stops the tape, then automatically starts the play mode.

Used in conjunction with the PLAY pushbutton switch and the RECORD channel selector. With the desired channel pushbutton switches depressed, simultaneously pressing the PLAY and RECORD pushbuttons initiates the record mode and the red indicator illuminates. In the play mode, when the RECORD pushbutton is pushed, this unit enters into the record mode. (This is called "Punch in") In the record mode, when the PLAY pushbutton is pushed, the unit enters into the reproduce mode (This is called "Punch out"). Punch in and Punch out are used for overdubbing in conjunction with the sel.rep. function.

10 Record indicator (red)

Used to indicate the record mode.

Transport record indicator	Amplifier record indicator	Transport	Recording
dark	dark	non rec. mode	x
blinks	lit	non rec. mode	x (ready)
remains lit	dark	rec. mode	x
	lit	rec. mode	o

Blinking means that the amplifier is in the record-ready mode. Recording is being carried out the record indicators of both the amplifier and the transport remain lit.

11	EDIT pushbutton switch	Used to initiate the edit mode to aid in cutting out unwanted tape. When the EDIT pushbutton is depressed the green indicator illuminates and power is disconnected from the takeup reel. The play pushbutton switch is then depressed causing the supply reel to rotate and tape to spill off on the takeup side of the transport. Other operations are halted.
12	EDIT indicator (green)	Lights when the EDIT pushbutton switch is depressed.
13	Large/Small REEL pushbutton switch	An alternate-action pushbutton switch used to select the supply and takeup-reel tape tension for either large or small reel-diameter hubs. Place the pushbutton in the "in" Small position for reels with EIA hubs (2 1/4 inch hubs). Place the pushbutton in the "out" Large position for reels with NAB hubs (4 1/2 inch diameter hubs). (THE SAME SIZE REELS SHOULD BE USED ON BOTH TURN-TABLES.)
14	HIGH/LOW Speed pushbutton switch	An alternate-action pushbutton switch used to select operating speeds.

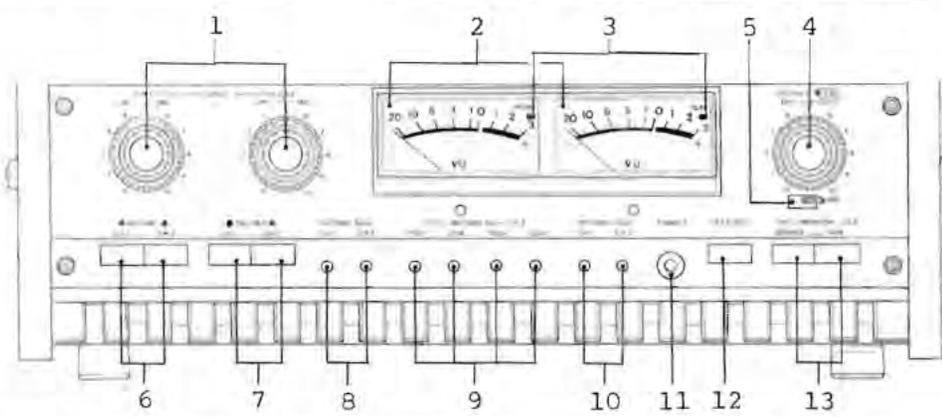
Model Type	Model Numbers	Speed Combination	
		High	Low
High Speed	MX-5050B-2HD, 2H, FHD	15 in/sec	7 1/2 in/sec
Low Speed	MX-5050B-2LD, 2L, 4LD 4L,FLD	7 1/2 in/sec	3 3/4 in/sec

15	PITCH CONTROL	Used to control tape speed. The capstan's speed can be controlled within $\pm 7\%$. When the PITCH CONTROL knob is pulled out and turned clockwise,
----	---------------	--

		capstan speed increases. When pulled out and turned counterclockwise, capstan speed decreases. PITCH CONTROL FUNCTIONS IN BOTH THE RECORD AND PLAY MODES.
16	PITCH CONTROL indicator (red)	Lights when the PITCH CONTROL switch is pulled out (Variable).
17	Reproduce Head Selector switch	Used to select the appropriate reproduce head stack to conform to the type of tape to be reproduced. (Refer to section 1-1-(3).)
18	NAB Hub Reel Hold Down Knobs	Used to attach EIA or NAB hub reels to the reel table. (Refer to 3-2-(1).)
19	Supply Reel	Used to supply tape for reproduction or recording.
20	Tension Arm	Used to damp tape tension fluctuations.
21	Guide roller	Used to reduce wow and flutter.
22	Takeup reel	Used to take up tape.
23	Pinch roller	Used to correctly transmit the rotation of the capstan to the tape.
24	Tension Arm with Safety switch	Used to damp tape tension fluctuations. When tape is exhausted, supply and takeup reel rotation is automatically stopped by the safety switch attached to the tension arm.
25	Capstan shaft	The shaft used to keep speed constant while in the reproduce and record modes.

Table 3-2. shows the location and function of each control and indicator on the record/reproduce electronics control panel.

Table 3-2. Record/Reproduce Electronics Controls and Indicators.



Index No.	Name	Function
1	LINE/MIC INPUT level controls	Used to control the recording level line input (outside knob) and microphone (inside knob) of the associated channel.
2	VU meters	Indicate the record and playback level of the associated channel depending on the mode of operation and position of the MONITOR SOURCE/TAPE switch (Index No.13 in this table). The meters light when the recorder is turned on.
3	Peak indicators (red)	Used to show signal peaks. When the input signal exceeds the standard level by 9 dB, the peak indicator lights. At a frequency of 700 Hz, the magnetic flux at the standard level is 185 nWb/m. When the peak indicator lights, the level is 520 nWb/m. This trigger level may be adjusted.

4 OUTPUT
level controls

Used to control the playback level of the related channel. (Control is deactivated when the SRL switch is in the "SRL" position.)

5 SRL switch and
indicator
(red)

In the "SRL (Standard Reference Level)" position, the red indicator is illuminated any playback level is determined by an internal preset potentiometer. The SRL can be selected by the Record level switch on the rear panel as follows:

RECORD LEVEL	Standard Reference Level	
	Flux	Based on
L	185 nWb/m	Ampex Operating level
M	250 nWb/m	MRL reference fluxivity of 250 nWb
H	320 nWb/m	BASF or MRL IEC reference level

In the normal position, the reproduce level is controlled by the OUTPUT controls of the associated channel.

DO NOT TURN THIS SWITCH OFF UNLESS YOU TURN THE LINE OUTPUT LEVEL CONTROLS (INDEX NO.4 IN THIS TABLE) DOWN TO THE MINIMUM LEVEL WHILE A SIGNAL IS BEING OUTPUT TO OTHER EQUIPMENT TO PREVENT POSSIBLE DAMAGE.

6 RECORD selector
switch and
indicator
(red)

Used to select channels for recording, and used in conjunction with the PLAY and RECORD pushbutton switches (Index Nos. 8 and 9 of Table 3-1.) In the "out" position this switch prevents activation of the channel record mode. In the "in" position it permits the channel record mode to be entered into and the red indicator is illuminated.

7	SEL/REP selector switch and indicator	In the SEL. REP. (Selective Reproduction) "out" position, the signal on the tape is reproduced normally. In the SEL/REP "in" position, the green indicator is illuminated and the signal on the tape is reproduced by the record head (rather than by the reproduce head) to permit recording on the other channel in synchronism with the channel.
8	RECORD BIAS adjustment control	Used to adjust the amplitude of the bias current in accordance with the tape being used for optimum performance. Used in conjunction with the Test OSC function (Index No. 12 in this table).
9	RECORD EQ adjustment control	Used to adjust record equalization of related channels and speed modes (HIGH or LOW).
10	RECORD LEVEL adjustment control	Used to make fine adjustments when different types of tape are to be employed.
11	PHONES jack	Receptacle for headphones. Used to monitor the input or output signal as selected by the MONITOR SOURCE/TAPE selector switch (Index No. 13 in this table). (Load impedance : 8 ohms or greater)
12	TEST OSC pushbutton switch	When held pressed, a 1.0 kHz test tone is generated and fed to the line input circuit. Used for cue tone recording and RECORD BIAS adjustment (Index No. 8 of this table.)
13	MONITOR SOURCE/TAPE switch	In the "out" SOURCE position, The input signal is fed to the LINE OUT connectors, The PHONES jack, the VU meters, and the peak indicators. In the "in" position, the signal being reproduced is fed to the LINE OUT connectors, the PHONES jack, VU meters, and the peak indicators.

3-2. OPERATING INFORMATION

3-2-(1). USE OF THE REEL HOLD DOWN KNOBS

NAB hud reel hold down knobs are used as follows:

When a EIA hub (2 1/4 inch diameter hub) is used,

- (1) remove the NAB reel hold down knob by turning the inner knob counterclockwise,
- (2) place the reel on the reel table.
- (3) Place the reel hold down knob on the reel and fix it by turning the inner knob clockwise.

When a NAB hub (4 1/2 inch diameter hub) reel is used,

- (1) Place the reel hold down knob on the reel table and lock it by turning the inner knob clockwise.
- (2) Place the NAB hub reel on to the reel table and fix it by pulling and turning the outer knob.

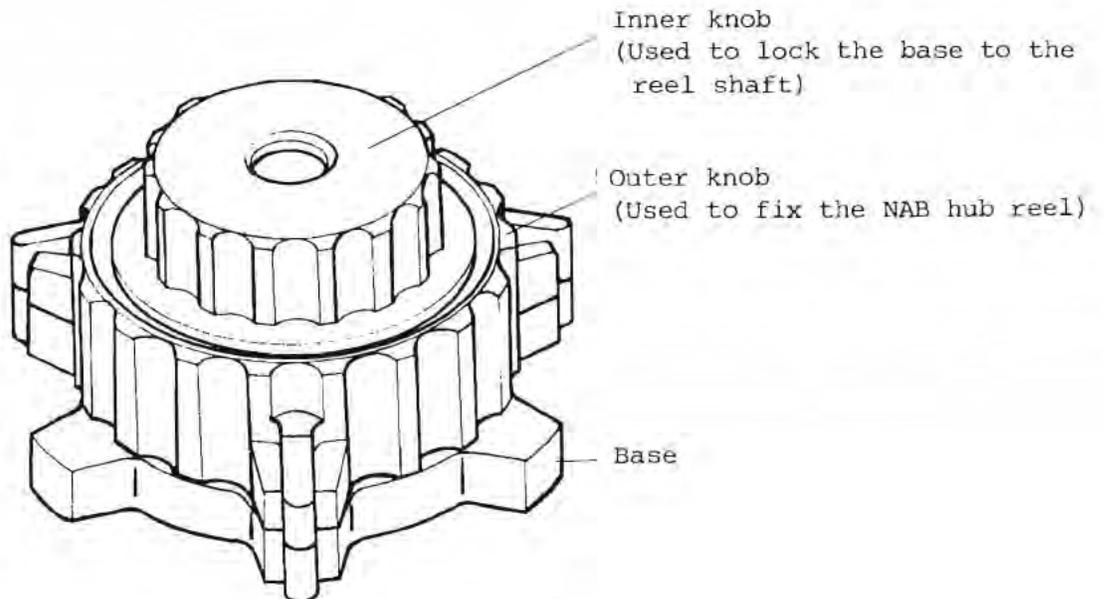


Fig. 3-1. REEL HOLD DOWN KNOBS.

3-2-(2). PRE-OPERATING PROCEDURE

After the equipment has been installed as described in Section 2 of this manual and the operator has become familiar with all the operating controls and indicators described in Tables 3-1 and 3-2, prepare the recorder for operation as follows.

- (1) Place the POWER switch in the on position. The VU meter lights will illuminate.
- (2) If metal reels are to be used, use reel-adjusting discs (shims) between the reels and the turntables. Place a reel of tape on the supply (left-hand) turntable. Note that the reel must turn counter-clockwise as tape is pulled off the reel. Place the same size empty reel on the takeup (right-hand) turn table.
- (3) Thread the tape as shown in Fig. 3-2. and place the end of the tape in the slot in the empty reel.
- (4) Set the HIGH/LOW SPEED switch to the desired tape speed.
- (5) Set the LARGE/SMALL REEL switch to conform to the size of the reel hub diameter being used. Place the switch to the "out" LARGE position for NAB hubs (4 1/2 inch diameter) or to the "in" SMALL position for EIA hubs (2 1/4 inch diameter). (THE SAME SIZE REELS SHOULD BE USED ON BOTH TURNTABLES.)
- (6) Set the reproduce head selector switch (Index No.17 in Table 3-1.) to the appropriate position as determined by the track format of the tape to be reproduced.

Notes. * MX-5050B-2HD, 2H, 2LD, and 2L:

Normal switch position is to the left side. If the switch is placed on the right side, this unit can be used for 4 track reproduction.

* MX-5050B-4LD, and 4L:

Normal switch position is to the right side. If the switch is placed on the left side, this unit can be used for 2 track reproduction.

* MX-5050B-FHD, FLD, and:

Normal switch position is to the left side. If the switch is placed on the right side, this unit can be used for 2 track reproduction.

* *For recording, set this switch in the position of the same track format of the record head.*

- (7) If desired, connect a headset or monitor speaker/amplifier to the PHONE jack.

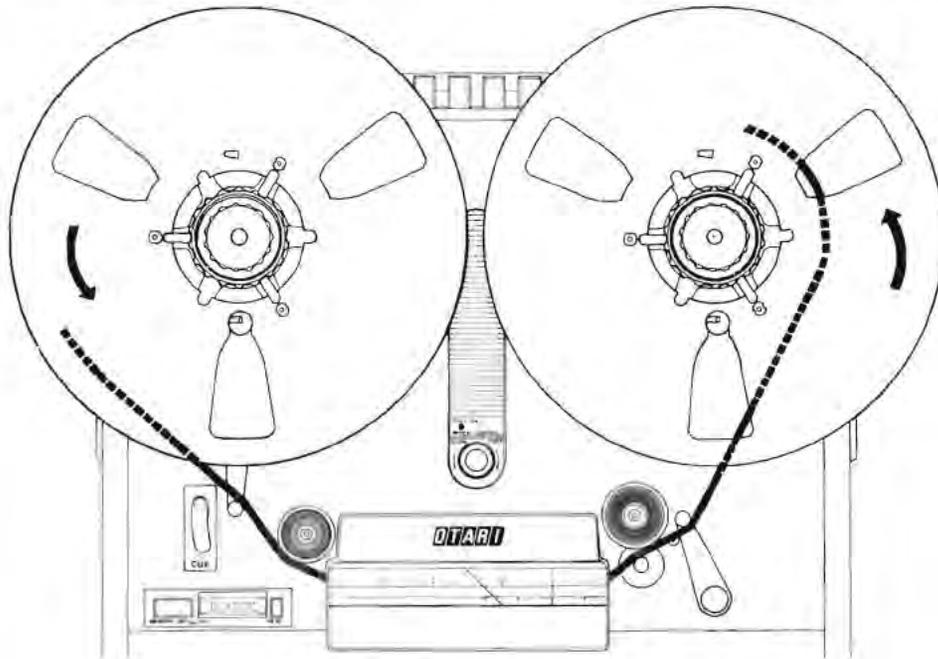


Fig. 3-2. Tape threading.

3-2-(3). REPRODUCTION

To reproduce, proceed as follows:

- (1) Perform all steps in the pre-operating procedure.
- (2) Set the channel RECORD selector switch(es) to the "out" position.
- (3) Set the reproduce head selector switch to its appropriate position.
- (4) Set the channel MONITOR selector switches to their TAPE "in" positions.
- (5) Press the PLAY pushbutton to begin reproducing the pre-recorded tape.
- (6) Adjust the channel OUTPUT level control(s) for the desired output level or set the SRL switch to the "SRL" position.
- (7) When the desired program has been reproduced, press the STOP pushbutton.

3-2-(4). NORMAL RECORDING

To record normally, proceed as follows:

- (1) Perform all steps in the pre-operating procedure.
- (2) Set the desired RECORD selector switches to the "in" position for the channel(s) selected for recording. The associated red indicator(s) will illuminate to indicate the selected channel(s). Simultaneously the tape transport RECORD indicator begins to blink.
- (3) Set the desired MONITOR SOURCE/TAPE switch to the "out" SOURCE position.
- (4) Adjust the desired LINE/MIC INPUT level control(s) so that the VU meter(s) indicates 0 for most audio peaks. (It is advisable to adjust the channel input levels so that the peak indicator lamps, located in the VU meter housings, blink occasionally.)
- (5) Push the reel rotation counter pushbutton to reset the counter to "0000".
- (6) Press the PLAY and RECORD pushbuttons simultaneously to start recording on the selected channel(s). The tape transport RECORD indicator will cease blinking and instead will light continuously.
- (7) While recording, the input signal of each channel can be compared with the signal reproduced on each channel by pressing the MONITOR switch to the "in" TAPE position.
- (8) After recording is complete, but while still in the record mode, once again press the PLAY pushbutton to enter directly into the play mode without stopping the tape transport (punch out). After punching out, if desired, press the RECORD pushbutton to enter directly into the record mode without stopping the tape transport (punch in). If further recording is not necessary, press the STOP pushbutton to stop tape motion and deactivate the record mode.
- (9) This unit has the following three record mode capabilities.
 - i) Microphon connection(s).

Note: Set the MIC. ATT. switch on the rear panel to either the "0 dB" or "-20 dB" position in accordance with the microphone input level.

ii) Line connection(s).

Note: *Check that the MIC. ATT. switch is set to the "OFF" position to avoid noise from the microphone amplifier.*

iii) Microphone(s) and line(s) connection

Note: *Mic and line mixing recording may be carried out.*

3-2-(5). RECORDING WITH SELECTIVE REPRODUCTION

The selective reproduction function causes the reproduced audio to be taken from the record head rather than from the reproduce head. This permits a recording to be made on another channel synchronized (in phase) with the channel being reproduced. To record with selective reproduction, proceed as follows.

- (1) Perform all steps in the pre-operating procedure.
- (2) Perform all steps in the normal recording procedure for the channel to be prerecorded.
- (3) Rewind the tape to the point where selective reproduction is to begin.
- (4) Set the selective reproduction (SEL/REP) switch to the "in" position corresponding to the channel to be monitored while the recording is being made.
- (5) Set the RECORD selector switch to the "in" position corresponding to the channel to be recorded.
- (6) Set the MONITOR selector switch to the TAPE "in" position corresponding to the channel being monitored.
- (7) Set the MONITOR selector switch to the SOURCE "out" position corresponding to the channel to be recorded.
- (8) Adjust the LINE/MIC INPUT level control so that the VU meter indicates 0 for most audio peaks. (It is advisable to adjust the channel output levels so that the peak indicator lamps, located in the VU meter housings, blink occasionally.)
- (9) Press the PLAY pushbutton to start tape motion. At the point where overdub is desired press the RECORD pushbuttons to start recording on the selected channel(s).

(10) When recording is complete, press the STOP pushbutton to stop tape motion and deactivate the record mode, or punch-out by pressing the PLAY pushbutton.

Notes:

- (1) *If this unit is a full-track model, the SEL.REP. function is not included.*
- (2) *The pitch control is used to finely adjust one track with another track(s). It can be used in both the Record and Reproduce modes.*
- (3) *The SEL. REP. mode has priority over the Record mode in this unit. (While the SEL. REP. pushbutton(s) is (are) pushed, the associated channel(s) can not enter the record mode.)*

3-2-(6). FAST WINDING

For fast-winding operations, and for editing or cueing, press the F.FWD or REWIND pushbutton as appropriate. These pushbuttons can be pressed alternately without having to press the STOP pushbutton between fast-winding operations. These modes may be entered into from any other mode except the edit mode. Pressing PLAY during a fast-winding mode causes the tape to automatically come to a stop and then enter into the play mode. In a fast-winding mode, the tape lifters are automatically actuated and lift the tape away from the heads. To monitor the tape in a fast-winding mode, the position of the tape lifters can be varied by operation of the CUE lever. Thus the distance of the tape from the heads may be varied to control the signal level from the tape.

3-2-(7). EDITING AND SPLICING TAPE

For editing and splicing operations, the CUE lever can be used in fast-winding modes to quickly locate the desired program material. In addition, there is a EDIT mode of operation, used as follows:

Depressing the EDIT pushbutton while in the play mode removes power from the takeup reel and causes the tape to be spilled off on the takeup side of the transport. This mode is used to facilitate cutting out unwanted tape. The edit mode can also be entered into from the stop mode by pressing the PLAY pushbutton while the EDIT pushbutton is in its depressed position.

The tape-splicing block (Fig. 3-3.) mounted on the head cover can be used to hold the tape for ease in cutting the tape with a single-edged razor blade and applying splicing tape. Use 7/32-inch splicing tape wide (3M Co., No.41) and never use cellophane tape.

The tape splicing block has the following features:

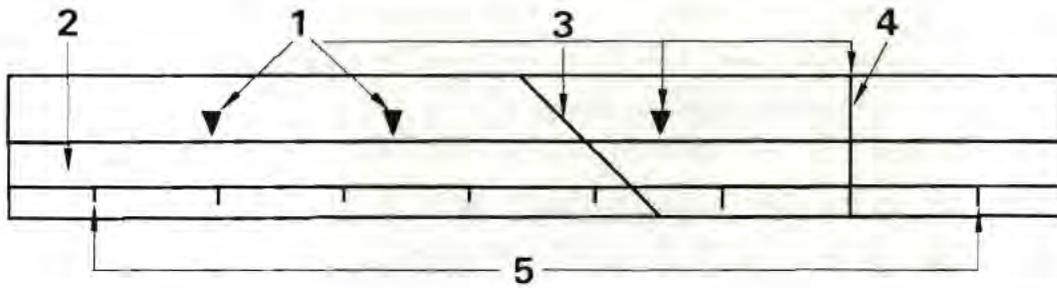


Fig. 3-3. Tape splicing block.

- | | | |
|---|--------------------------------|---|
| 1 | Head-stack indicator marks: | Indicates location of the individual head stacks. |
| 2 | Tape-guide channel: | Holds the tape for ease of cutting and splicing. |
| 3 | 45° cutting guide: | Used to guide tape cutter for a diagonal cut. |
| 4 | 90° cutting guide: | Used to guide tape cutter for a vertical cut. |
| 5 | Tape length calibration marks: | Used to determine where a splice should be made. |

To determine the exact location of the point where the tape should be cut during editing note that the distance from the right or left hand calibration mark to the 90° cutting guide is the same as the distance from the right or left hand tape guide assembly to the center of the reproduce head.

SECTION 4

PREVENTIVE MAINTENANCE AND ADJUSTMENTS

This section provides information on preventive maintenance and adjustments, including routine maintenance and normal mechanical/electronic adjustment procedures which should be carried out at the recommended times to maintain optimum performance.

For detailed information on maintenance and use of optional accessories, and such procedures as conversion and modification, we have prepared an optional maintenance manual (Otari Part No. OS2-004) which is separately available from Otari.

4-1. TEST AND MAINTENANCE EQUIPMENT REQUIRMENTS

The test and maintenance items listed in Table 4-1 are required for the performance of the maintenance procedures. Equivalent items may be substituted for the ones suggested in the table.

Table 4-1. Test and Maintenance Items

Item	Suggested Model	Used for
Head cleaner	Ampex 087-007	Cleaning the heads
Isopropyl alcohol	Any (Otari Cleaning Kit Ty-502 contains the above cleaning materials.)	Cleaning the tape guides, capstan, and capstan pitch roller
Head demagnetizer	Any	Demagnetizing the heads and tape guides
Lubricating oil	Mobil DTE Heavy Medium	Lubricating the capstan of the hysteresis synchronous motor
	Anderol #456	Lubricating the capstan of the dc servo control motor.
Reproduction alignment tape	NAB 3 3/4 ips: MRL 21F101 7 1/2 ips: MRL 21T204 15 ips: MRL 21J205 IEC 7 1/2 ips: MRL 21T302 15 ips: MRL 21J303	Setting the operating standard reference levels.
Audio Oscillator 20 to 20 kHz	Hewlett-Packard 204C or 209D	Setting record equalization
Ac volt meter	Hewlett-packard 400L or 400FL	Setting record and playback frequency Response

4-2. PREVENTIVE MAINTENANCE

For optimum performance, cleaning and demagnetizing should be performed after every eight hours of operation, and lubrication should be carried out at the recommended times as indicated below.

4-2-(1). CLEANING

Oxide particles from the magnetic tape tend to collect on components in the tape path and degrade the performance of the recorder. The heads and all other components in the tape path must be cleaned after every eight hours of operation, or more frequently if visual inspection indicates cleaning is required. To clean the head assembly, proceed as follows:

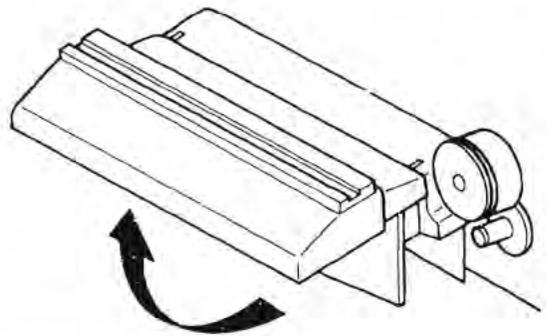


Fig. 4-1 Lifting the Head Cover

- (1) Lift the head cover as illustrated in Fig. 4-1.
- (2) Clean each head stack thoroughly with a cottontipped applicator dampened with head cleaner.

CAUTION

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

- (3) Use isopropyl alcohol to clean all tape guiding components including the capstan shaft and the rubber capstan pinch roller.

4-2-(2). DEMAGNETIZING

The heads and tape guiding components in the tape path should be demagnetized after every 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 demagnetizer to demagnetize all components in the tape path as follows:

- (1) Turn the unit's power off and remove any recorded tape near the transport. The tape could be partially erased by the demagnetizer.
- (2) Lift the head cover as illustrated in Fig. 4-1.
- (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) Move the demagnetizer tips slowly close to the head, lightly touch 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. 4-2.
- (6) Repeat step five for each head stack.
- (7) Repeat the procedure in step five for each guide and other metallic parts in the tape path.
- (8) Move the demagnetizer slowly away from the transport for at least three feet, and then disconnect the power from the demagnetizer.

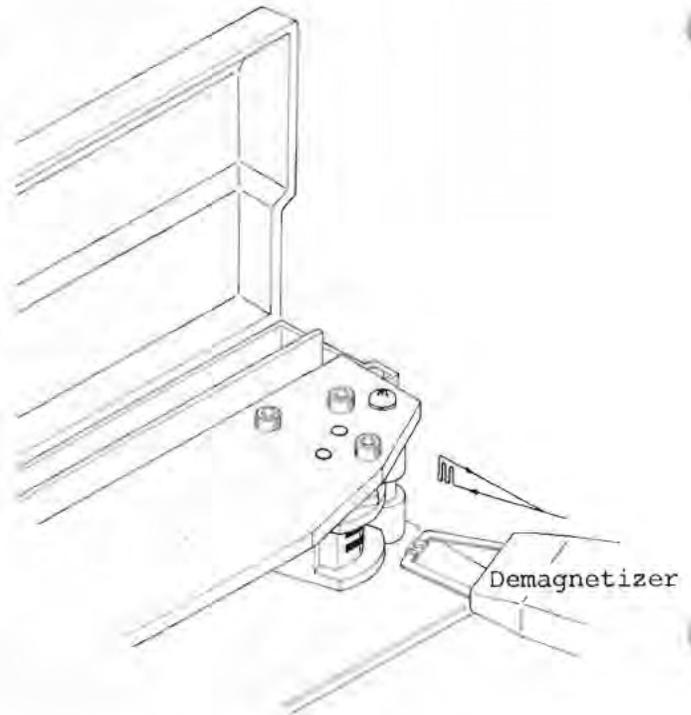


Fig. 4-2 Demagnetizing

4-2-(3). LUBRICATION

The only component requiring lubrication is the capstan.

Lubricate the capstan every four months, or after each 1,000 hours of operation (whichever occurs first), using the recommended lubricating oil (Table 1-6) For lubrication, proceed as follows, referring to Fig. 4-3:

- (1) Remove the pinch roller cap by turning the cross-head screw counterclockwise.
- (2) Remove the pinch roller from the pinch roller shaft.
- (3) Remove the metal dust cap from the capstan shaft by turning it counterclockwise.
- (4) The felt collar should now be visible. Apply two or three drops of oil onto this felt collar. Please do not over-lubricate.
- (5) Wipe off any excess oil and replace the dust cap, pinch roller, and pinch roller cap.

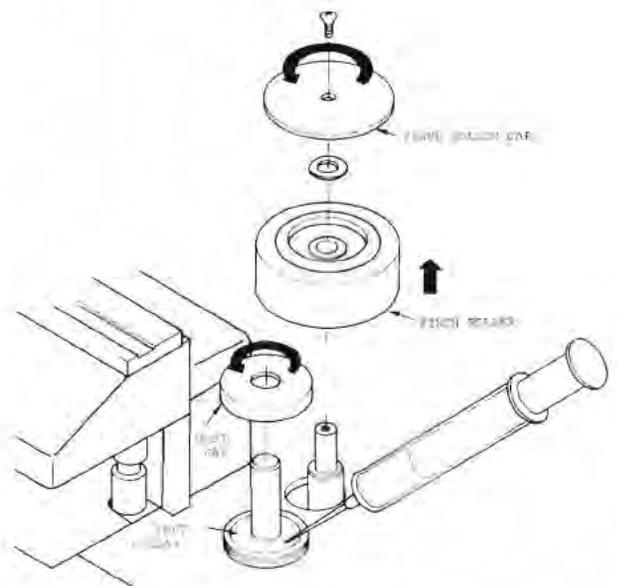


Fig. 4-3. Lubrication.

CAUTION

WHEN THE EQUIPMENT IS FIRST RECEIVED THE CAPSTAN MAY HAVE DRIED OUT, EVEN WITH OIL IN THE FELT COLLAR. RUNNING THE CAPSTAN MAY RESULT IN DAMAGE OR FRICTION NOISE BEFORE THE OIL REACHES IT, SO LUBRICATION BEFORE OPERATION MAY BE REQUIRED. CHECK THE FELT COLLAR BEFORE INITIAL OPERATION.

4-3. ELECTRONIC ALIGNMENT

Electronic alignment consists of setting the record bias, and setting the record equalization and record level. Note that the reproduction adjustments must be performed before making the recording adjustments. These electronic adjustments should be performed at regularly scheduled intervals, and when changing from one type of recording tape to another.

4-3-(1). RECORD BIAS ADJUSTMENT

For optimum performance, biasing should be done using the type of tape that will normally be used. To set the bias level, carry out the following procedure for each channel.

- (1) Thread bulk-erased tape on to the recorder.
- (2) Set the SRL calibration switch to the SRL position. Set the SPEED switch to the "7 1/2" position.
- (3) Start the tape in the record mode.
- (4) Press the TEST OSC pushbutton and set the record level control for a 0 reading on the VU meters.
- (5) Adjust the RECORD BIAS adjustment trim pot for a maximum reading on the VU meters.

4-3-(2). RECORD LEVEL ADJUSTMENT

- (1) Set the Record level switch to the "H", "M", or "L" position according to the tape being used or the equalization standard.
- (2) Thread bulk-erased tape on to the recorder.
- (3) Set the SRL calibration switch to the "SRL" position and the Monitor switch to the "SOURCE" position.
- (4) Pushing the TEST OSC pushbutton, adjust the line input levels so that the VU meters indicate 0 VU.
- (5) Change the mode of the Monitor switch from "SOURCE" to "TAPE".
- (6) Start the tape in the record mode, and adjust the appropriate RECORD LEVEL adjustment trim pot so that the VU meter indicates 0 VU.

4-3-(3). RECORD EQUALIZATION ADJUSTMENT

Set the record equalization for each speed and each channel as follows:

- (1) Thread bulk-erased tape on to the recorder.
- (2) Connect an audio oscillator to the INPUT of the recorder and set the oscillator's frequency to 1 kHz.
- (3) Set the SRL switch to the "SRL" position.
- (4) Start the tape in the record mode.
- (5) For the 15 ips tape speed, adjust the record levels so that the VU meters indicate 0 VU. For the 3 3/4 and 7 1/2 ips tape speeds, set the record levels so that the VU meters indicate -10 VU. Next, set the SRL switch to its normal position and adjust the OUTPUT level controls so that the VU meters indicate 0 VU.
- (6) Change the audio oscillator's output to 10 kHz.
- (7) As a preliminary setting, adjust the appropriate low or high speed equalizer so that the VU meters indicate 0 VU.
- (8) Check the response above and below 10 kHz and trim the record equalizer for the response desired.

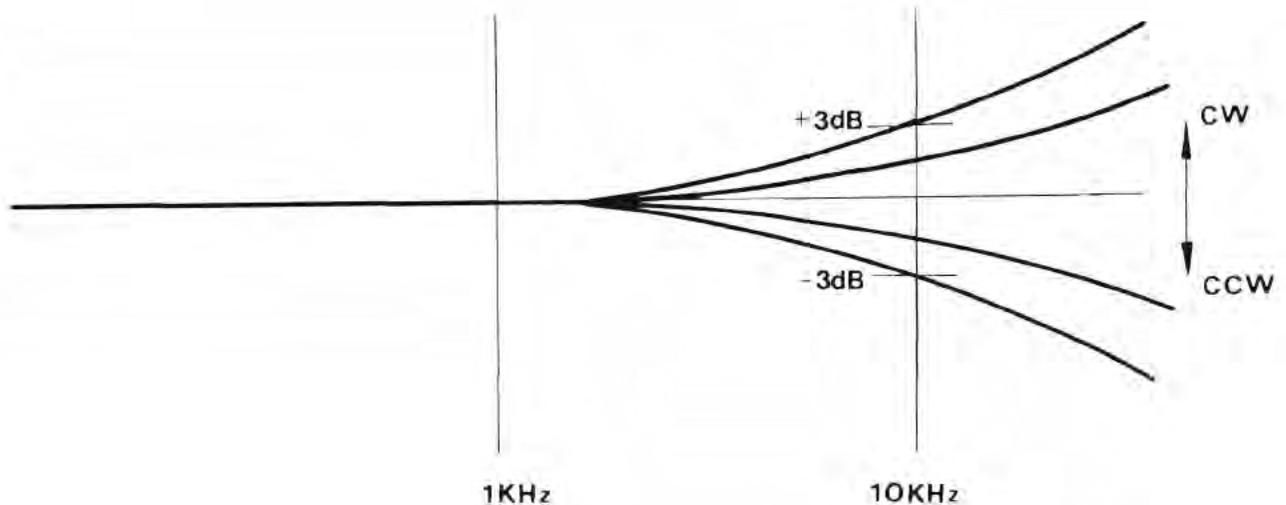
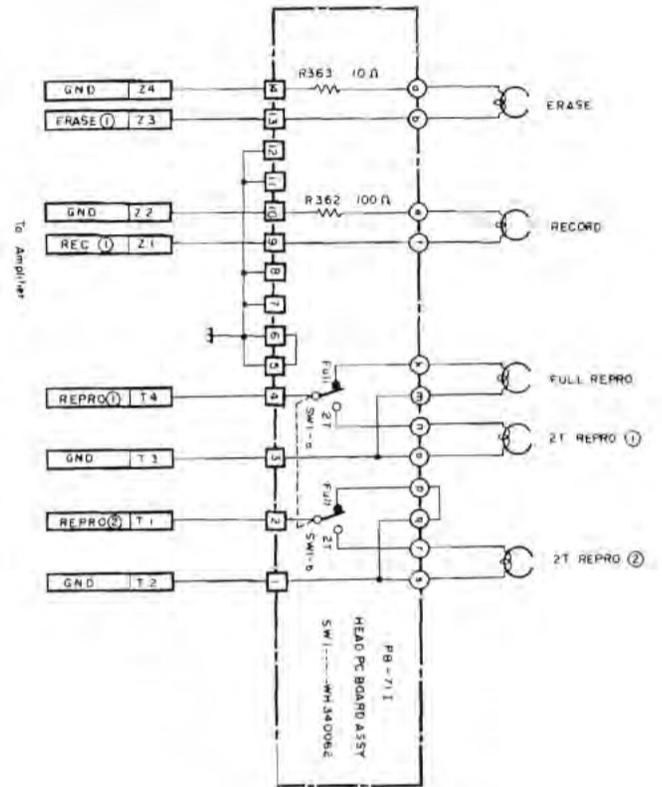
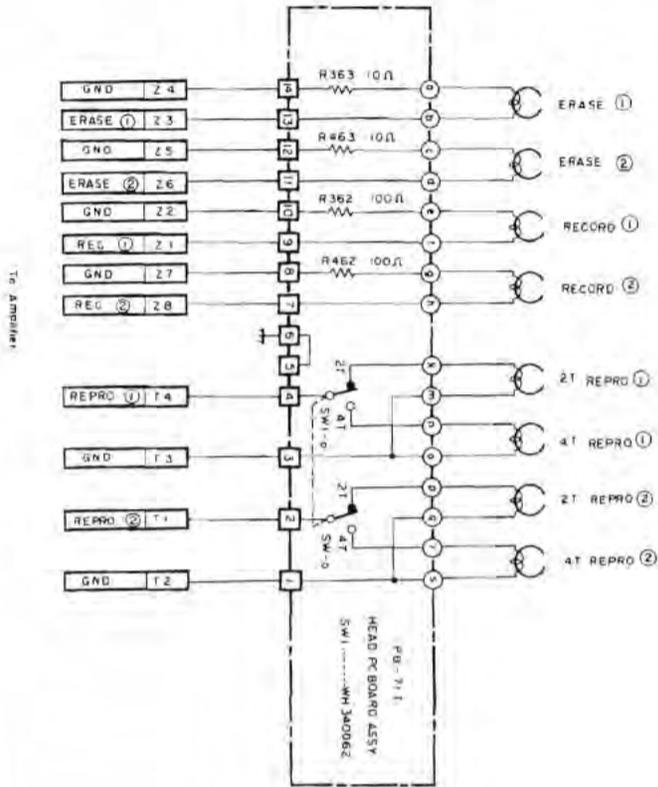


Fig. 4-4. Record Equalization Adjustment.

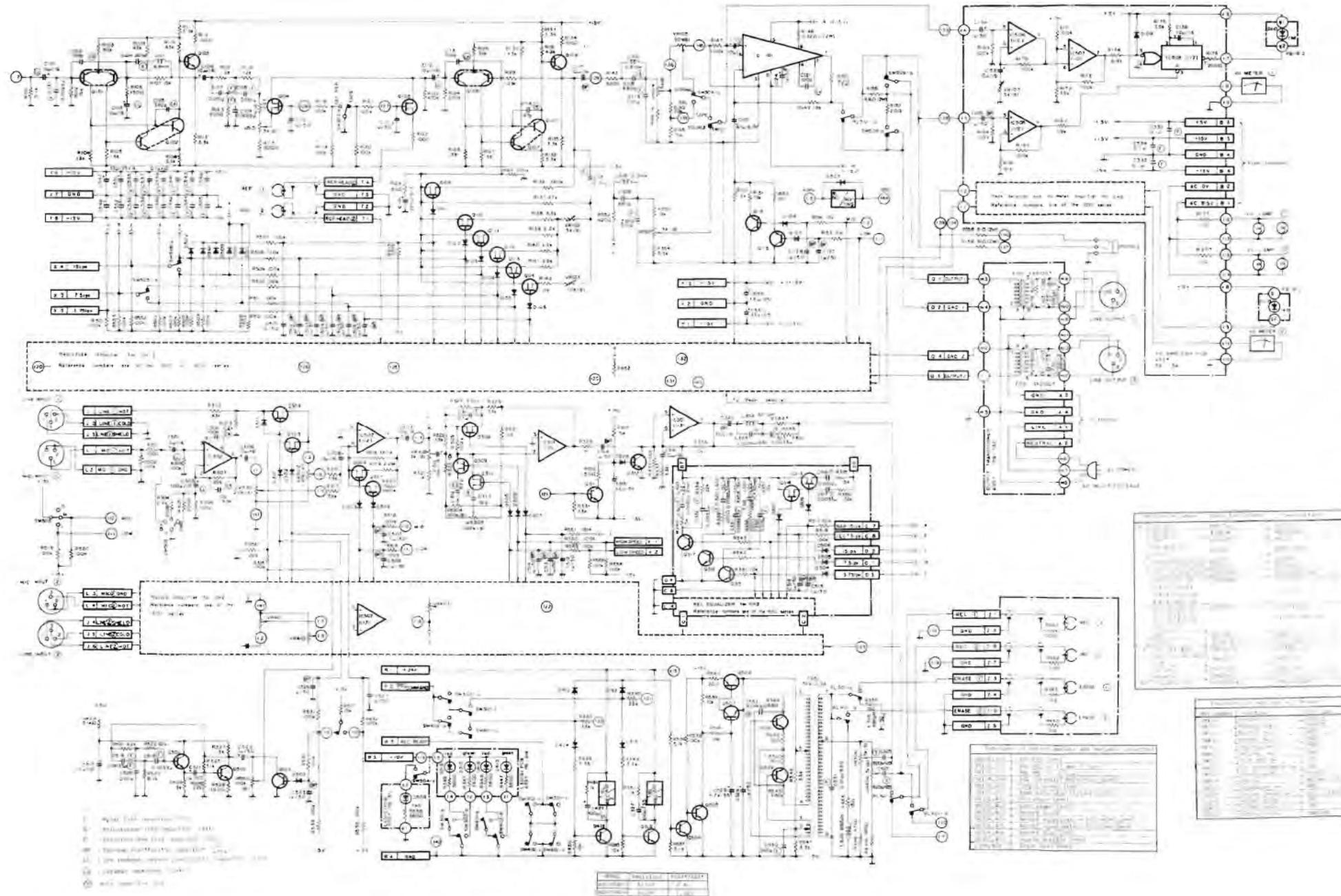
HEAD ASSEMBLY

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

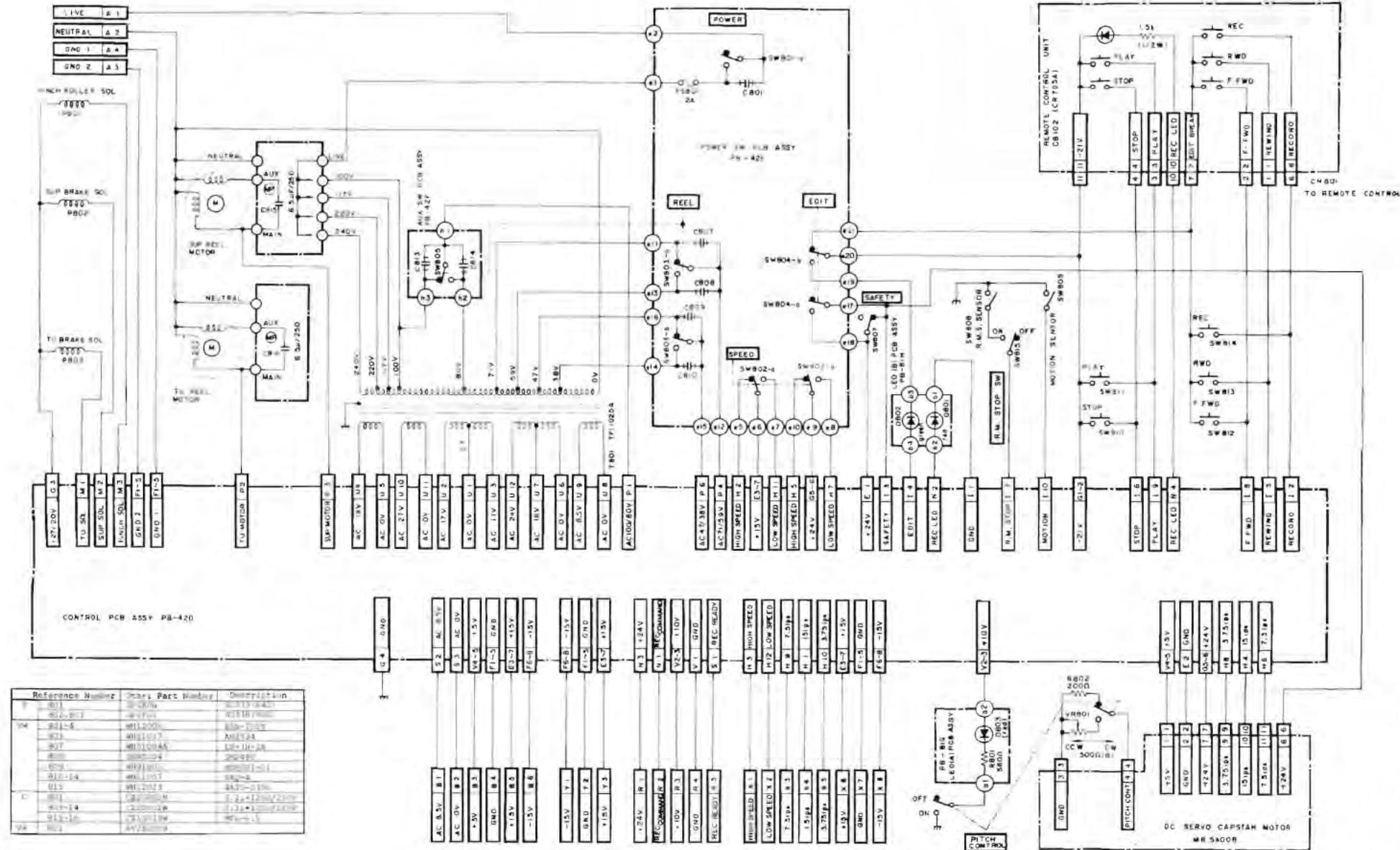
(for MX5050B-FHD, FLD)



RECORD REPRODUCE AMPLIFIER; A1028 (for MX5050B-2H, 2HD, 2L, 2LD, 4L, 4LD)



TAPE TRANSPORT; T5061 (for MX5050B-2HD, 2LD, 4LD, FHD, FLD)



NEELED PAPER CONNECTION

TO AMPLIFIER

RECORD REPRODUCE AMPLIFIER; A1034 (FOR MX5050B-FHD, FLD)

