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Service Manual

Nakamichi Cassette Deck 1



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1. GENERAL

1.1. Production No.

Production No.: A133

1.2. Destinations

USA, CAN, EP, UK, AUS, OTR, SAU, JPN

Abbreviation

USA — U.S.A.	AUS — Australia
CAN — Canada	OTR — Other
EP — Europe	SAU — Saudi Arabia
UK — United Kingdom	JPN — Japan

1.3. Parts Supply

(1) Unstocked Parts

Parts marked with "★" at the head of part No. are not stocked. So, it takes time to supply the parts after we receive your order.

(2) Unsupplied Parts

Parts without part Nos. (indicated as "—" in the parts list) are not supplied.

1.4. CAUTIONS/WARNINGS

(1) Product Safety Notice

Parts marked with the symbol  in the schematic diagram have critical characteristics.

Use ONLY replacement parts recommended by the manufacturer.

It is recommended that the unit be operated from a suitable DC supply or batteries during initial check-out procedures.

(2) Leakage Current Check/Resistance Check

Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamp, or if the resistance from chassis to either side of the power cord is less than 240 k ohms, the unit is defective.

WARNING — DO NOT return the unit to the customer until the problem is located and corrected.

1.5. Voltage Selector

Voltage selector is installed on the Rear Panel of the Nakamichi Cassette Deck 1 (Other & Saudi Arabia). The voltage selector can select either 110V/127V or 220V/240V at customer's disposal.

1.6. Package Ass'y and Accessory Ass'y

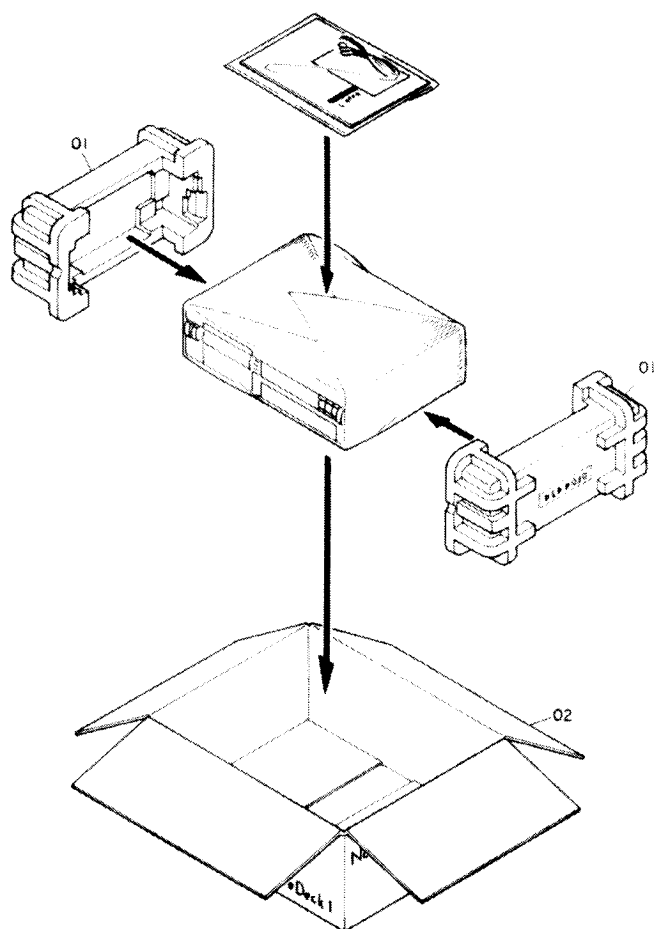


Fig. 1

Schematic Ref. No.	Part No.	Description	Qty
	—	Package Ass'y	
01	0F04483A	Packing	2
02	0F04457A	Carton Box	1
	DA04402A	Accessory Ass'y (USA, CAN)	1
	DA04407A	Accessory Ass'y (UK)	1
	DA04404A	Accessory Ass'y (EP)	1
	DA04403A	Accessory Ass'y (AUS, OTR, SAU)	1
	DA04401A	Accessory Ass'y (JPN)	1
	0D06122A	Owner's Manual (Japanese)	1
	0D06123A	Owner's Manual (English/French/Germany)	1
	DA04439A	Pin-Pin Cord Ass'y	1

2. REMOVAL PROCEDURES

2.1. Top Cover

Refer to Fig. 2.1.

- (1) Loosen screws F01 (2 pcs.) and F02 (4 pcs.), and remove F03 (Top Cover).

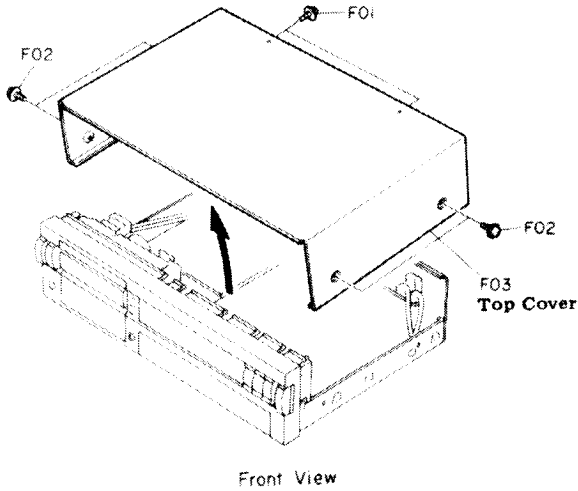


Fig. 2.1

2.2. Cassette Case Cover Ass'y

Refer to Fig. 2.2.

- (1) Press the Eject button to open F01 (Cassette Case Cover Ass'y).
- (2) Pull F01 (Cassette Case Cover Ass'y) upward.

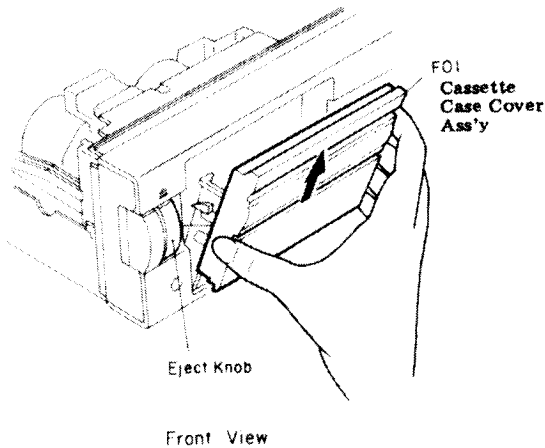


Fig. 2.2

2.3. Sealing Panel Ass'y

Refer to Fig. 2.3.

- (1) Open F01 (Sealing Panel Ass'y).
- (2) Hold by hand and pull F01 (Sealing Panel Ass'y) in the direction of the arrow.

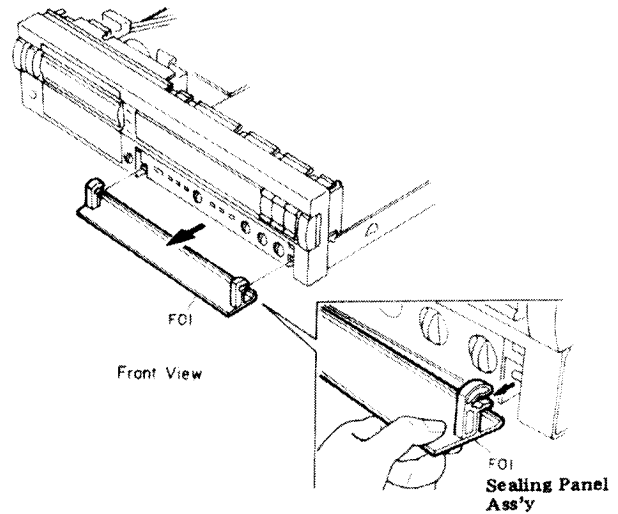


Fig. 2.3

2.4. Front Panel

Refer to Fig. 2.4.

- (1) Remove the Top Cover referring to item 2.1.
- (2) Loosen screws F01 (2 pcs.), F02 (1 pce.) and F03 (2 pcs.).
- (3) With pressing claws A (3 pcs.), remove F04 (Front Panel).

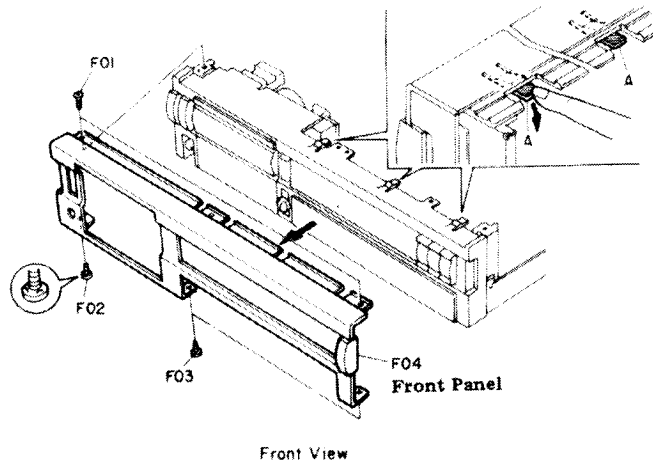


Fig. 2.4

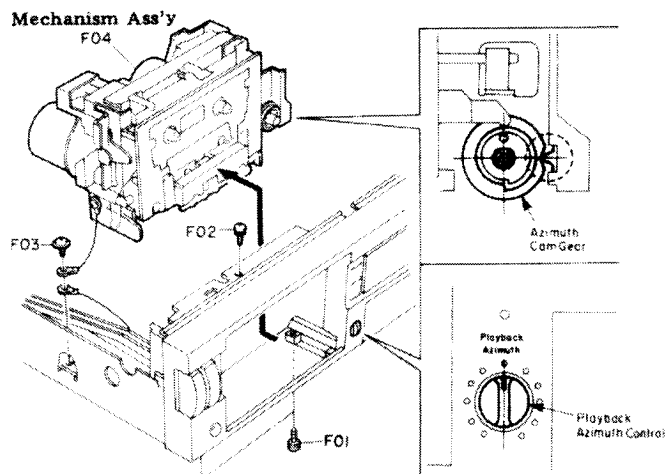
2.5. Mechanism Ass'y

Refer to Fig. 2.5.

- (1) Remove the Top Cover and Cassette Case Cover Ass'y referring to item 2.1 and 2.2.
- (2) Loosen screws F01 (2 pcs.), F02 (1 pce.) and F03.
- (3) Remove F04 (Mechanism Ass'y) in the direction of the arrow.

Note: When installing the Mechanism Ass'y, perform the following:

- (1) Turn the Azimuth Cam Gear by hand so that it is set as shown in the figure.
(In this position, playback head azimuth is set to zero.)
- (2) Set the Playback Azimuth control on the Front Panel to the center position.
- (3) Install the Mechanism Ass'y by reversing the above procedure.



Front View

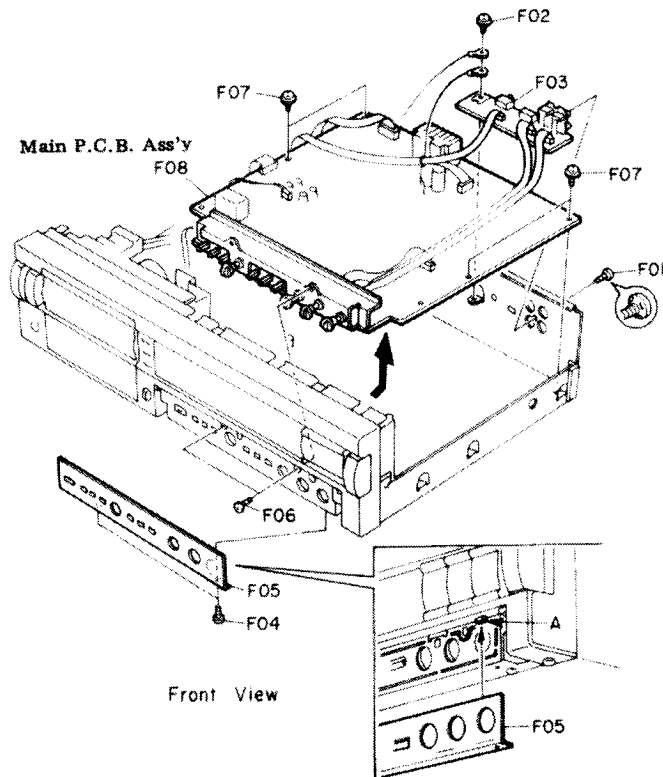
Fig. 2.5

2.6. Main P.C.B. Ass'y

Refer to Fig. 2.6.

- (1) Remove the Top Cover and Sealing Panel Ass'y referring to items 2.1 and 2.3.
- (2) Loosen screws F01 (1 pce.) and F02 (1 pce.), and remove F03 (Pin Jack P.C.B. Ass'y).
- (3) Loosen screws F04 (2 pcs.) and remove F05 (Inner Panel).
- (4) Loosen screws F06 (2 pcs.) and F07 (4 pcs.), and remove F08 (Main P.C.B. Ass'y) in the direction of the arrow.

Note: When installing F05 (Inner Panel), insert protrusions A (3 pcs.) into the claws of F05 (Inner Panel) and fasten F05 (Inner Panel) with screws F04 (2 pcs.).



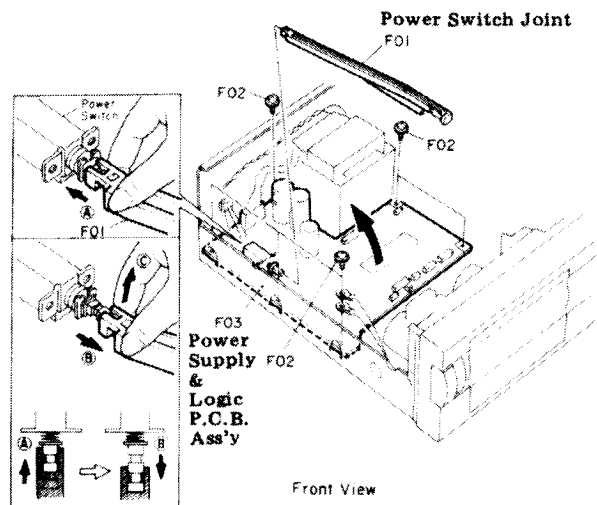
Front View

Fig. 2.6

2.7. Power Switch Joint and Power Supply and Logic P.C.B. Ass'y

Refer to Fig. 2.7.

- (1) Remove the Top Cover Ass'y referring to item 2.1.
- (2) Push F01 (Power Switch Joint) backward (in the direction of (A)).
- (3) Pull F01 (Power Switch Joint) forward (in the direction of (B)).
- (4) Pull F01 (Power Switch Joint) upward (in the direction of (c)) to remove it.
- (5) Loosen screws F02 (6 pcs.) and remove F03 (Power Supply and Logic P.C.B. Ass'y) in the direction of the arrow.



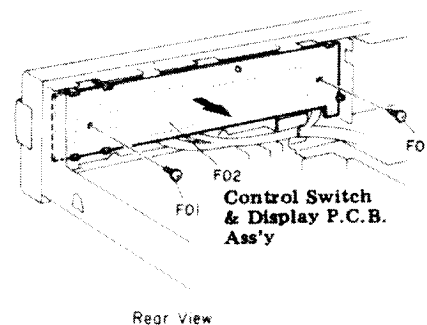
Front View

Fig. 2.7

2.8. Control Switch & Display P.C.B. Ass'y

Refer to Fig. 2.8.

- (1) Remove the Mechanism Ass'y referring to item 2.5 to gain access to the fastening screw.
- (2) Loosen screws F01 (2 pcs.), unhook the claws (6 pcs.), and remove F02 (Control Switch & Display P.C.B. Ass'y).



Rear View

Fig. 2.8

3. TEST TAPES AND GAUGES

2.9. Head Mount Base Ass'y

Refer to Fig. 2.9.1.

- (1) Remove the Mechanism Ass'y referring to item 2.5.
- (2) Loosen screws F01 (2 pcs.) and remove F02 (Head Mount Cover).
- (3) Loosen screws F03 (2 pcs.) and remove F04 (Head Mount Base Ass'y).

Note: When installing the Head Mount Base Ass'y, follow the next steps. Refer to Figs. 2.9.2 and 2.9.3.

- (a) Insert the Plate Washers into the grooves of the shafts by hand. See Fig. 2.9.2.
- (b) Install F04 (Head Mount Base Ass'y) and fasten F03 (2 pcs.). Push the Plate Washers with a blade of the screwdriver so that the Plate Washers come off the grooves. See Fig. 2.9.3.

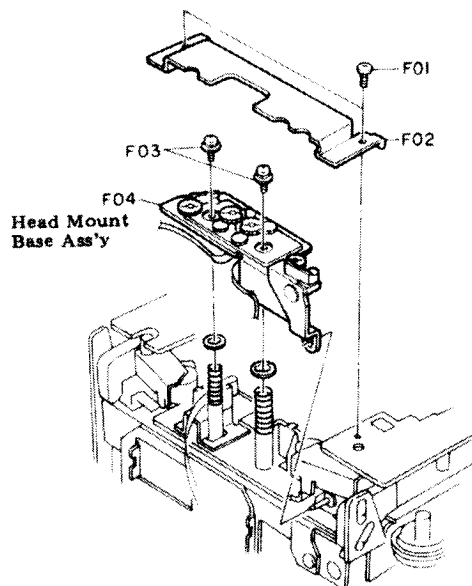


Fig. 2.9.1

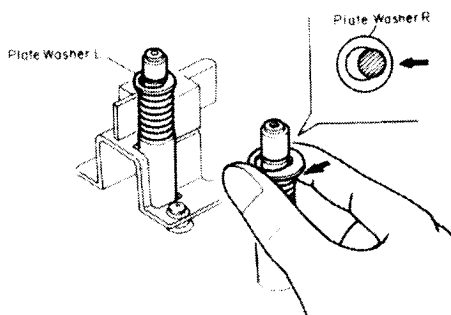


Fig. 2.9.2

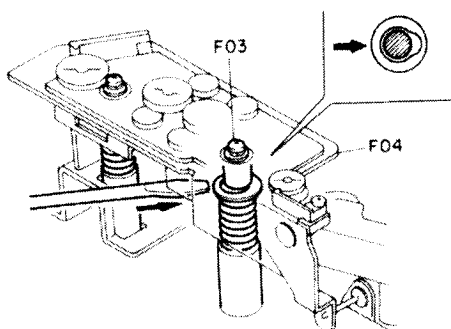


Fig. 2.9.3

- (1) 400 Hz Level Tape (DA09005B)
- (2) 1 kHz Track Alignment B Tape (DA09007B)
- (3) 10 kHz PB Frequency Response Tape (DA09003B)
- (4) 15 kHz PB Frequency Response Tape (DA09002B)
- (5) 20 kHz PB Frequency Response Tape (DA09001B)
- (6) 15 kHz Azimuth Tape (DA09004B)
- (7) 3 kHz Speed and Wow/Flutter Tape (DA09006C)
- (8) Tape Travelling Cassette (DA09071A)
- (9) Reference EXII Tape (DA09111A)
- (10) Reference SX Tape (DA09110A)
- (11) Reference ZX Tape (DA09109A)
- (12) EH Tilt Check Gauge S (DA09088A)
- (13) Stroke Check Gauge S (DA09090A)
- (14) Tape Guide Height Check Gauge S (DA09091A)
- (15) Tilt Check Gauge S (DA09039B)
- (16) Torque Gauge FWD (DA09082A)
- (17) Playback Azimuth Centering Pin (0D09066A)



4. MECHANICAL ADJUSTMENTS

4.1. Record Head and Playback Head Tilt Adjustment

Note: Before adjusting items 4.1 to 4.5, pull out the Cassette Case Cover Ass'y referring to item 2.2 and remove the Head Mount Cover by loosening two screws.

Refer to Fig. 4.1.

- (1) Remove the pad lifter from the playback head.
- (2) Load a Tilt Check Gauge S (DA09039B) in the cassette deck.
- (3) Clip the grounding terminal of the Tilt Check Gauge with one end of the cord with clip, and the chassis of the cassette deck with the other end.
- (4) Remove both of the Height Gears.
- (5) Set the cassette deck in Play mode. Check to insure whether the Beacons Playback Head "Upper" or "Lower" and Record Head "Upper" or "Lower" are illuminating. In order not to give damages onto the head surfaces, push both of slide knobs of the Gauge to away from the heads, then return them to the original place to be in contact with record head and playback head surfaces after Play mode is securely locked.
- (6) Beacon Playback Head "Lower" will light on when height adjustment screw (PH) turned counterclockwise but playback Head "Upper" when clockwise. Adjust so that both "Upper" and "Lower" will light on even when you move the slide knob away from the heads and then return it to the original place.
- (7) Same procedures will apply to the Beacons Record Head "Upper" and "Lower", except for the height adjustment screw (RH).
- (8) Set the cassette deck in Stop mode and fit both of the serrated Height Gears. Then set the cassette deck again in Play mode and insure all of the 4 Beacons are illuminating. If not, (4) through (7) will have to be repeated till satisfactory results are obtained.
- (9) Mount the pad lifter on the playback head.

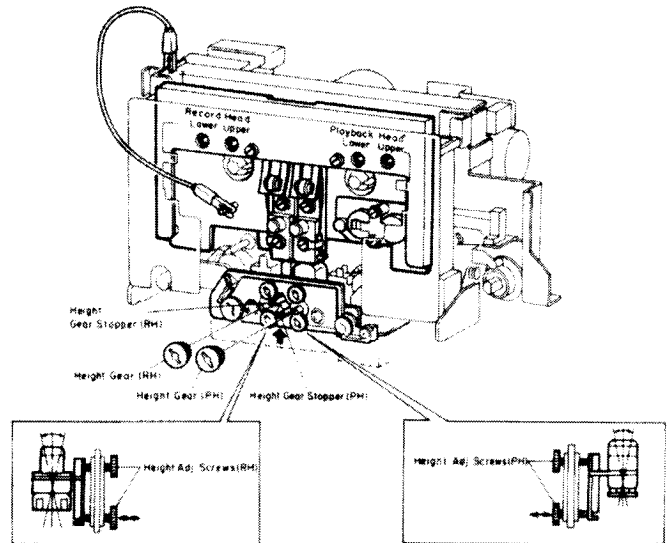


Fig. 4.1

4.2. Head Base Stroke Check

Remove the Cover Plate Ass'y.

Refer to Fig. 4.2.

Note: Before you conduct this adjustment, adjust with a "Tilt Check Gauge S" to insure freedom from tilt on the playback head and record head.

- (1) Load a Stroke Check Gauge S (DA09090A) in the cassette deck.
- (2) Move Record Head Indicator and Playback Head Indicator to the direction of arrow mark "A" with your finger tip and then set the cassette deck in Play mode. Then slowly release the Indicators and insure whether each of the Indicators is in contact with record and playback heads.
- (3) Check to insure whether the line "P" on the Playback Head Indicator meets the central line on the Indicator Plate.
- (4) Check to insure whether the line "P" on the Playback Head Indicator locates between the 2 lines on the Record Head Indicator, thus check can be made on record head stroke.

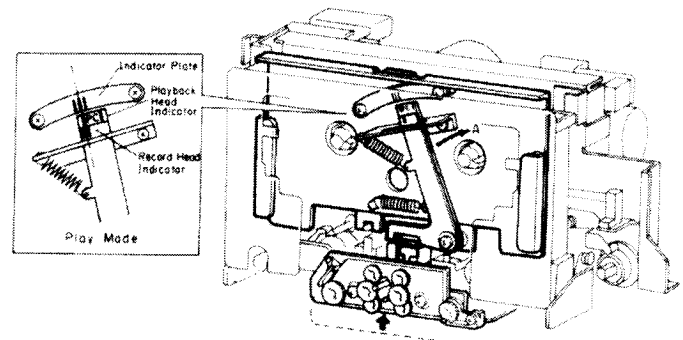


Fig. 4.2

4.3. Erase Head Stroke Adjustment and Tape Guide Height Check

Remove the Cover Plate Ass'y and the Head Mount Base Ass'y.
Refer to Fig. 4.3.

(1) Erase Head Stroke Adjustment

- (a) Load a Tape Guide Height Check Gauge S (DA09091A) in the cassette deck.
- (b) Set the cassette deck in Play mode, thus check can be made on erase head stroke through the EH Stroke Indicator.
- (c) Check to insure whether the erase head surface is aligned with red line on the EH Stroke Indicator. If not, adjust the erase head stroke by loosening screw A that assembles erase head with erase head plate.
- (d) After completion of adjustment, screw A shall be locked with lock tight paint.

(2) Supply Tape Guide Height Adjustment

- (a) Load a Tape Guide Height Check Gauge S (DA09091A) in the cassette deck.
- (b) Set the cassette deck in Play mode.
- (c) Slide the Supply Tape Guide Check Bar down against the supply tape guide, and check to insure that the Supply Tape Guide Check Bar is accepted by the supply tape guide. If not, adjust the supply tape guide height by turning screw B.

(3) Take-up Tape Guide Height Check

- (a) Load a Tape Guide Height Check Gauge S (DA09091A) in the cassette deck.
- (b) Set the cassette deck in Play mode.
- (c) Slide the Take-up Tape Guide Check Bar down against the take-up tape guide, and check to insure that the Take-up Tape Guide Check Bar is accepted by the take-up tape guide.

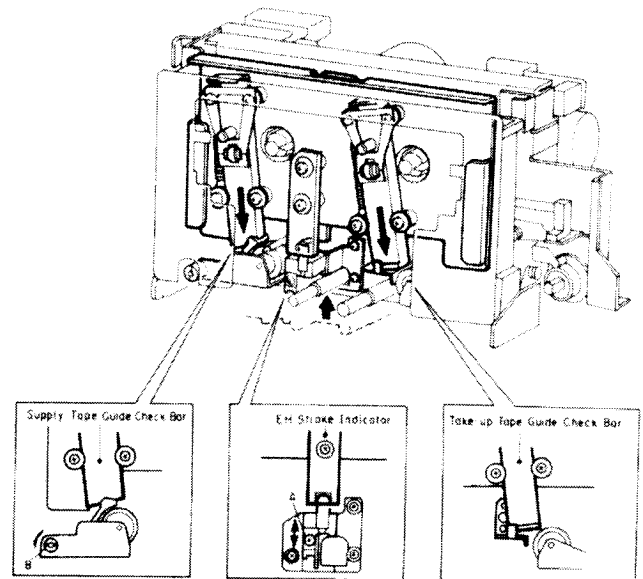


Fig. 4.3

4.4. Erase Head Height and Tilt Adjustment

Refer to Fig. 4.4.

- (1) Remove the Cassette Case Cover Ass'y, Cover Plate Ass'y, and Head Mount Base Ass'y.
- (2) Load an EH Tilt Check Gauge S (DA09088A) in the cassette deck.
- (3) Set the cassette deck in Stop mode.
- (4) Check to insure whether one of the 3 Beacons is illuminating. Look down the mirror and slowly turn the Screw "Height" counterclockwise (or clockwise) so that the two horizontal lines on the mirror will become superposed on the line (in different color) of the erase head, and check to insure whether the first Beacon is illuminating.
- (5) Turn Screw "Tilt" counterclockwise (or clockwise) to light on the second Beacon. Excessive turning will cause the first Beacon to light off. Adjustments of Screw "Tilt" will therefore be conducted till both of the first and the second Beacons illuminate.
- (6) Turn Screw "Azimuth" counterclockwise (or clockwise) to light on the third Beacon. Excessive turning will cause either the first or the second Beacon to light off, and therefore adjust Screw "Azimuth" until all of the 3 Beacons illuminate.

- (7) Check to insure whether the horizontal line on the mirror corresponds to that on the erase head. If not, (4) through (7) will have to be repeated till satisfactory results are obtained.
- (8) After completion of adjustment, 3 pcs. of screws shall be locked with lock tight paint.

Note: Before use of this gauge, check to insure freedom from dust or dirt, or overflow in the groove of the erase head surface.

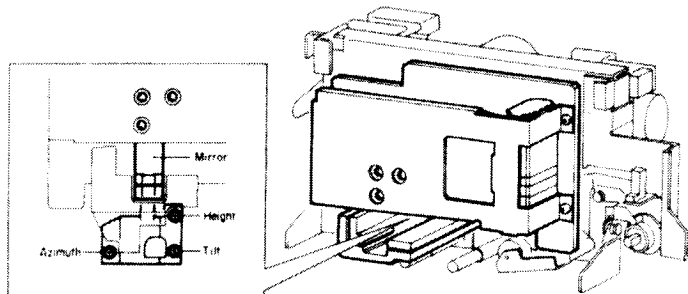


Fig. 4.4

4.5. Playback Head and Record Head Height Adjustment and Azimuth Alignment

Refer to Figs. 4.5.1 and 4.5.2.

(1) Playback Head Height Adjustment and Azimuth Alignment

Note: The Cassette Deck 1 is equipped with the playback azimuth control which can change the playback azimuth manually. So, before adjusting the playback head, perform the following to fix the playback head azimuth to the mechanical center.

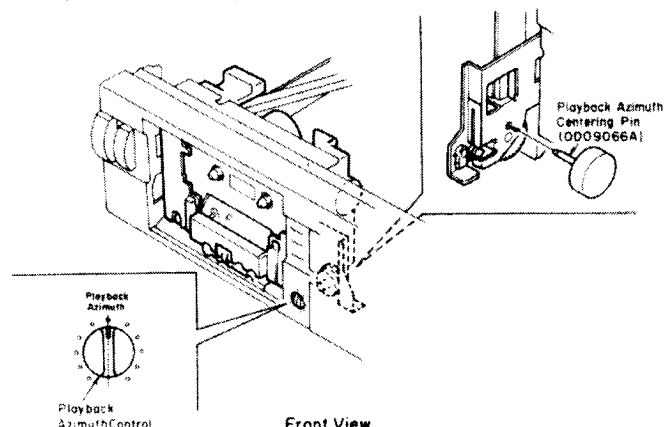
1. Set the Playback Azimuth control on the Front Panel to the center position. (See Fig. 4.5.1.)
2. Insert the Playback Azimuth Centering Pin (0D09066A) securely as shown in Fig. 4.5.1.

- (a) Press the Monitor button to select TAP $\bar{C}$ indication.
- (b) Connect an AC voltmeter to the Output Jacks.
- (c) Load a 1 kHz Track Alignment B Tape (DA09007B) and set the cassette deck in Play mode.
- (d) Turn the PH Height Gear until the outputs of both channels become minimum.
- (e) Load a 15 kHz Azimuth Tape (DA09004B) and set the cassette deck in Play mode.
- (f) Turn the PH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (g) Repeat above steps (c) through (f) two or three times to obtain optimum performance.

(2) Record Head Height Adjustment and Azimuth Alignment

- (a) Connect an AC voltmeter to Output Jacks.
- (b) Press the Monitor button to select TAPE indication.
- (c) Press the Type IV button.
- (d) Load a reference ZX tape.

- (e) Feed in 400 Hz (0 dB) to the Input Jacks.
- (f) Set the cassette deck in Record and Play mode and turn the RH Height Gear until the outputs of both channels become maximum.
- (g) Feed in 15 kHz (-20 dB) to the Input Jacks and turn the RH Azimuth Alignment Screw until the outputs of both channels become maximum.
- (h) Repeat (e) to (g) two or three times to obtain optimum performance.
- (i) Set the cassette deck in Stop mode and remove the Playback Azimuth Centering Pin.



Front View

Fig. 4.5.1

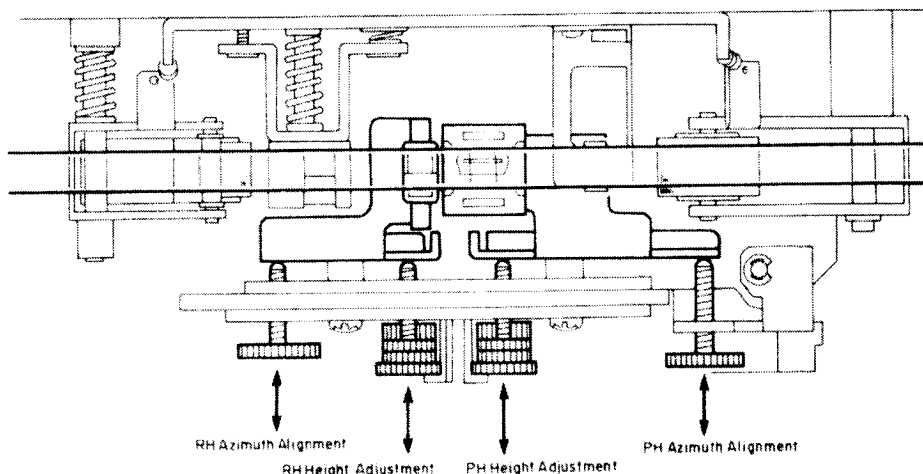


Fig. 4.5.2

4.6. Tape Travelling Check

Load and play back a Tape Travelling Cassette and check the following:

- (1) Tape is in contact with heads sufficiently.
- (2) Tape waving is small on the heads and pressure rollers.
- (3) Tape is free from waving or slippage from the tape guides.

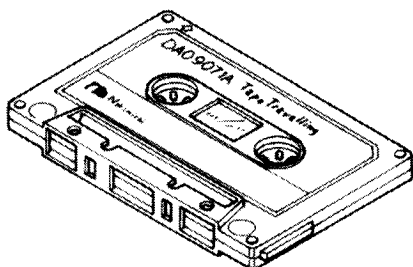


Fig. 4.6

4.7. Eject Damper Adjustment

Refer to Fig. 4.7. Load a cassette tape, and with opening the Cassette Case by pressing the Eject button and closing it by hand, adjust the speed of damper action by the Adjustment Screw.

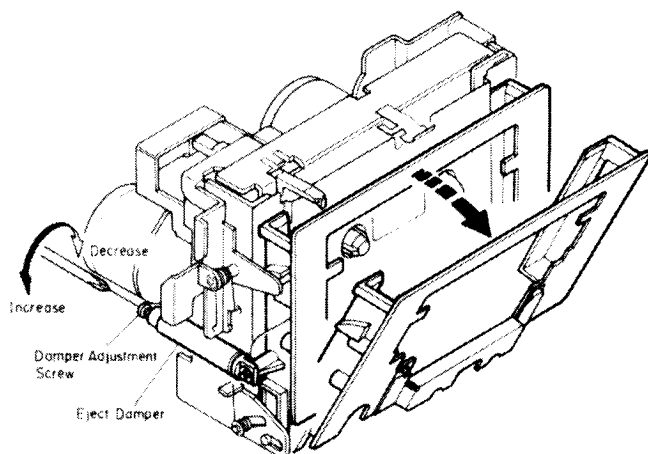


Fig. 4.7

4.8. Reel Motor Speed Adjustment in Play Mode

- (1) To warm-up the cassette deck, load a C-60 cassette tape and set the cassette deck in Play mode.
- (2) After more than four minutes, load a Torque Gauge FWD (DA09082A) and set the cassette deck in Play mode.
- (3) Adjust VR501 on the Power Supply & Logic P.C.B. Ass'y to obtain 47 ± 1 g-cm on the torque gauge.

4.9. Tape Speed Adjustment

Refer to Fig. 4.8.

- (1) Connect a frequency counter to the Output Jacks.
- (2) Load a 3 kHz Speed and Wow/Flutter Tape (DA09006C) and play it back.
- (3) Adjust the Tape Speed Adjustment Volume incorporated in the Capstan Motor to obtain 3,000 Hz on the frequency counter.

CCW: Motor drives slowly.

CW: Motor drives fast.

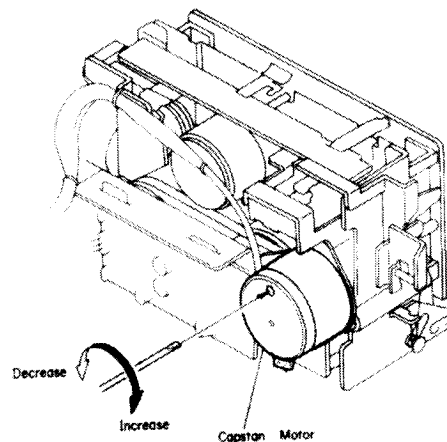


Fig. 4.8

4.10. Lubrication

The tape transport is of a lubrication-free type mechanism. When the following parts are replaced, apply the specified lubricant.

- (1) Molykote (R) Grease (X5-6020)
Cam Motor Pulley
Thrust portion on the Capstan Shaft
- (2) FLOIL GB-TS-1
Washer between Reel Hub Ass'y and Back Tension Spring
- (3) Diamond Oil (EP-56)
Reel Hub Shaft
- (4) Anderol 456
Capstan Shaft

Note: We suggest that you use the above specified lubricant or equivalent type.

The company dealing in the above lubricant is as follows:

- (a) Molykote (R) Grease (X5-6020)
Dowcorning Co., Ltd., 1-15-1 Nishishinbashi, Minato-ku, Tokyo, Japan
- (b) FLOIL GB-TS-1
Kanto Chemicals Co., Ltd., 2-7 Kanda Sakuma-cho, Chiyoda-ku, Tokyo, Japan
- (c) Diamond Oil (EP-56)
Mitsubishi Oil Co., Ltd., 1-2-4 Toranomon, Minato-ku, Tokyo, Japan
- (d) Anderol 456
Toyo Kokusai Oil Co., Ltd., 3-3-5 Hatchobori, Chuo-ku, Tokyo, Japan

5. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

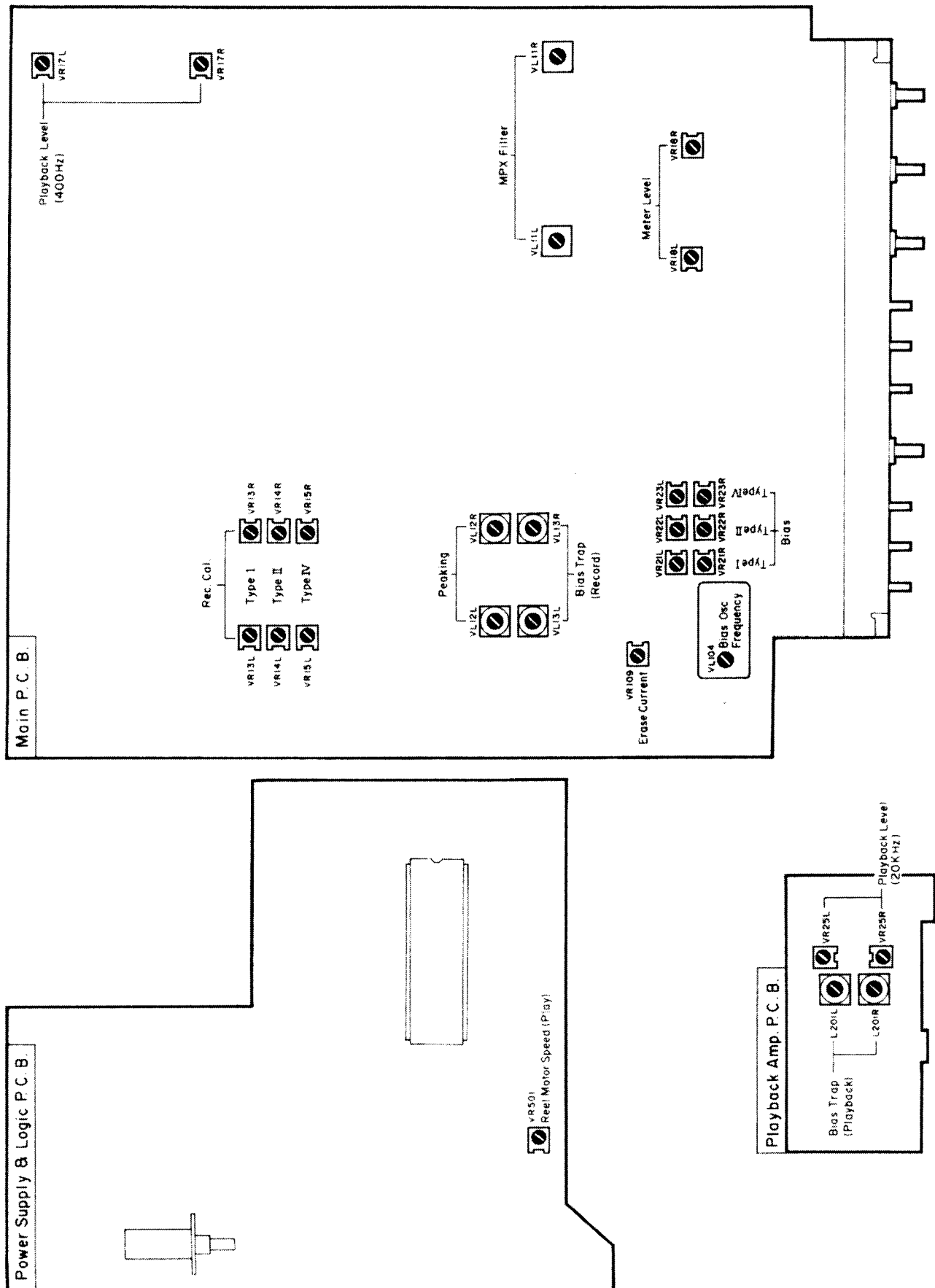
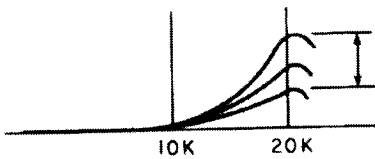


Fig. 5

6. ELECTRICAL ADJUSTMENTS

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
1	Preliminary Step			Output Level - Max. Balance - Center Bias Tune - Center Monitor - Tape Tape - IV MPX Filter - OFF Dolby NR - OFF		Set the Cassette Deck 1 as shown in MODE.
2	Reel Motor Speed Adjustment (Play)	Torque Gauge FWD (DA09082A)		Playback	Power Supply & Logic P.C.B. VR501	Adjust VR501 to obtain 47 ± 1 g-cm on the torque gauge.
3	Tape Speed Adjustment	3 kHz Speed and Wow/Flutter Tape (DA09006C)	Frequency Counter to Output Jacks	Playback Monitor - Tape Tape - I	Tape Speed Adj. Volume (Capstan Motor)	Adjust the volume incorporated in the Capstan Motor Ass'y to obtain 3 kHz $\pm$ 15 Hz on the frequency counter.
4	Meter Level Calibration	400 Hz to Input Jacks	AC Voltmeter to Output Jacks	Monitor - Source	Main P.C.B. VR18L VR18R	1. Feed in 400 Hz and adjust the Record Level control to obtain 500 mV -2 dB on the AC voltmeter. 2. Adjust VR18L (VR18R) so that the 0 dB segment on the level meter starts illuminating.
5	MPX Filter Adjustment	19 kHz $\pm$ 100 Hz to Input Jacks	AC Voltmeter to Output Jacks	Monitor - Source MPX - OFF/ON	Main P.C.B. VL11L VL11R	1. Adjust the Input Level control to obtain 500 mV (0 dB) on the AC voltmeter. 2. Set the MPX Filter switch to ON and adjust VL11L (VL11R) to obtain minimum reading on the AC voltmeter. (The minimum reading will be less than -30 dB.)
6	Playback Head Track Alignment	1 kHz Track Alignment B Tape (DA09007B)	AC Voltmeter to Output Jacks	Playback Monitor - Tape Tape - IV Dolby NR - OFF	PH Height Gear	Adjust the PH Height Gear to obtain the minimum readings on the AC voltmeter for both channels. Refer to "Playback Head Height Adjustment" in item 4.5. (Azimuth Centering Pin (0D09066A) must be set before adjusting.)
7	Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004B)	AC Voltmeter to Output Jacks	Same as above	Playback Head Azimuth Alignment Screw	Adjust the Playback Head Azimuth Alignment Screw to obtain maximum readings on the AC voltmeter for both channels. Refer to "Playback Head Height Adjustment and Azimuth Alignment" in item 3.5. (Azimuth Centering Pin (0D09066A) must be set before adjusting.) Note: Repeat Steps 6 and 7 two or three times to obtain optimum performance.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARK
8	Playback Level Calibration	400Hz Level Tape (DA09005B)	AC Voltmeter to Output Jacks	Playback Monitor - Tape - IV Dolby NR - OFF	Main P.C.B. VR17L VR17R	Adjust VR17L (VR17R) to obtain 500 mV on the AC voltmeter.
9	Playback Frequency Response Adjustment	400Hz Level Tape (DA09005B) 10 kHz PB Frequency Response Tape (DA09003B) 15 kHz PB Frequency Response Tape (DA09002B) 20 kHz PB Frequency Response Tape (DA09001B)	AC Voltmeter to Output Jacks	Same as above	Playback Amp. P.C.B. VR25L VR25R	1. Load a 400 Hz level tape, play it back, and read the playback level on the AC voltmeter. 2. Load 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the playback head azimuth to obtain maximum levels on the AC voltmeter with each tape. Check that the playback levels are as follows with respect to the level for 400 Hz level tape. 10 kHz: -20 dB -2 dB to +2 dB 15 kHz: -20 dB -2 dB to +3 dB 20 kHz: -20 dB -2 dB to +4 dB If the levels are out of the ranges, play back the 20 kHz PB frequency response tape and adjust VR25L (VR25R) to obtain -20 dB +1.0 dB. VR25L (VR25R) compensates the playback frequency response at 20 kHz as shown below:  3. Conduct Step 7 "Playback Head Azimuth Alignment".
10	Bias Oscillation Frequency and Erase Current Adjustment	None	AC Voltmeter across the additional 0.1 ohm resistor and Frequency Counter between terminals 1 and 2 of CN-102 (i.e., across Erase Head) on Main P.C.B.	Record, Playback Monitor - Source Tape - IV Dolby NR - OFF	Main P.C.B. VL104 VR109	1. Connect an additional 0.1 ohm resistor in series to the Erase Head and connect the AC voltmeter across the resistor. 2. Record and playback a reference ZX tape. 3. Adjust VL104 to obtain 105 kHz on the frequency counter. 4. Check the erase current by the AC voltmeter. Erase current will be within the range of 310 mA to 380 mA (typically approx. 350 mA). If erase current is less than 310 mA, adjust VR109 to obtain satisfactory results. 5. If erase current is adjusted with VR109, re-check the bias oscillation frequency. 6. Remove the additional 0.1 ohm resistor.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
11	Bias Trap Adjustment (Record Amp.)	Remove input signals	AC Voltmeter between emitter of Q111L/R and GND on Main P.C.B.	Record, Playback Monitor - Source Tape - IV Dolby NR - OFF	Main P.C.B. VL13L VL13R	1. Load a cassette without tape inside. 2. Adjust VL13L (VR13R) to obtain minimum reading on the AC voltmeter.
12	Record Head Height Adjustment	400 Hz (0 dB) to Input Jacks	AC Voltmeter to Output Jacks	Record, Playback Monitor - Tape Tape - II Dolby NR - OFF	RH Height Gear	1. Load a reference SX tape, and record and play it back. 2. Adjust the RH Height Gear to obtain maximum readings for both channels on the AC voltmeter. Refer to "Record Head Height Adjustment and Azimuth Alignment" in item 4.5.
13	Record Head Azimuth Alignment	15 kHz (-20 dB) to Input Jacks	AC Voltmeter to Output Jacks	Same as above	Record Head Azimuth Alignment Screw	Adjust the Record Head Azimuth Alignment Screw to obtain maximum readings for both channels on the AC voltmeter. Refer to "Record Head Height Adjustment and Azimuth Alignment" in item 4.5. Note: Repeat Steps 12 and 13 two or three times to obtain optimum performance.
14	Bias Trap Adjustment (Playback Amp.)	None	AC Voltmeter to Output Jacks	Record, Playback Monitor - Tape Tape - IV Dolby NR - OFF	Playback Amp. P.C.B. L201L L201R	1. Load a cassette without tape inside. 2. Adjust L201L (L201R) to obtain minimum reading on the AC voltmeter.
15	Record Level Calibration and Recording Bias Current Adjustment	400 Hz (0 dB), 20 kHz (-20 dB) and 10 kHz/20 kHz (-20 dB) to Input Jacks	AC Voltmeter to Output Jacks	Record, Playback Monitor - Source/Tape Tape - I/II/IV Dolby NR - OFF/B/C	Main P.C.B. (Level) IV:VR15L VR15R II:VR14L VR14R I:VR13L VR13R (Bias) IV:VR23L VR23R II:VR22L VR22R I:VR21L VR21R	Adjustment should be made in the order of tape type IV, II, and I. 1. Set the Monitor switch to Source and Dolby NR switch to OFF. 2. Feed in 400 Hz, and set the Input Level control to obtain 0 dB (500 mV) on the AC voltmeter. 3. Set the Monitor switch to tape. 4. Load a reference ZX tape, reference SX tape and reference EXII tape. 5. Feed in 400 Hz (0 dB) record and play back, and adjust the following semi-fixed volumes to obtain 0 dB on the AC voltmeter. ZX tape (IV): VR15L, VR15R SX tape (II): VR14L, VR14R EX tape (I): VR13L, VR13R 6. Set the Dolby NR Switch to C. 7. Feed in 20 kHz (-20 dB) and adjust Bias VR23L (VR23R), VR22L (VR22R) and VR21L (VR21R) to obtain the same readings as source monitor levels on the AC voltmeter. (to be continued)

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUSTMENT	REMARKS
						8. Repeat above 6 and 7 two or three times to obtain optimum performance. 9. Feed in 10 kHz and 20 kHz (-20 dB), record and play them back, and check whether the playback levels are within the following ranges. With Dolby NR OFF: -20 dB $\pm$ 3 dB Level difference between Dolby NR OFF and B: $\pm$ 2 dB Level difference between Dolby NR OFF and C: $\pm$ 3 dB 10. Check that the total harmonic distortion is less than 0.8% for ZX and EXII tapes and 1.0% for SX tape. If satisfactory results are not obtained, re-adjust VR21L (VR21R) referring to Step 9 "Playback Frequency Response Adjustment" and repeat above steps.
16	Overall Frequency Response Adjustment	400 Hz (0 dB) and 20 Hz to 20 kHz (-20 dB) to Input Jacks	AC Volt-meter to Output Jacks	Record, Playback Monitor - Source/Tape - I/II/IV Dolby NR - OFF	Main P.C.B. VL12L VL12R	1. Set the Monitor switch to Source. 2. Feed in 400 Hz and adjust the Input Level control to obtain -20 dB on the AC voltmeter. 3. Set the Monitor switch to Tape. 4. Feed in 20 Hz to 20 kHz (-20 dB) and check to insure whether the output levels are within -20 dB $\pm$ 3 dB. 5. If above is not sufficient, adjust L12L (L12R) to obtain approx. -20 dB at 20 kHz. 6. Conduct step 15 "Record Level Calibration and Recording Bias Current Adjustment". 7. If above is not sufficient, precise re-adjustment of step 9 "Playback Frequency Response", replacement of Playback Head or Record Head, and check on item 4.7 "Tape Travelling Check" will be required.

7. MECHANISM ASS'Y AND PARTS LIST

7.1. Synthesis

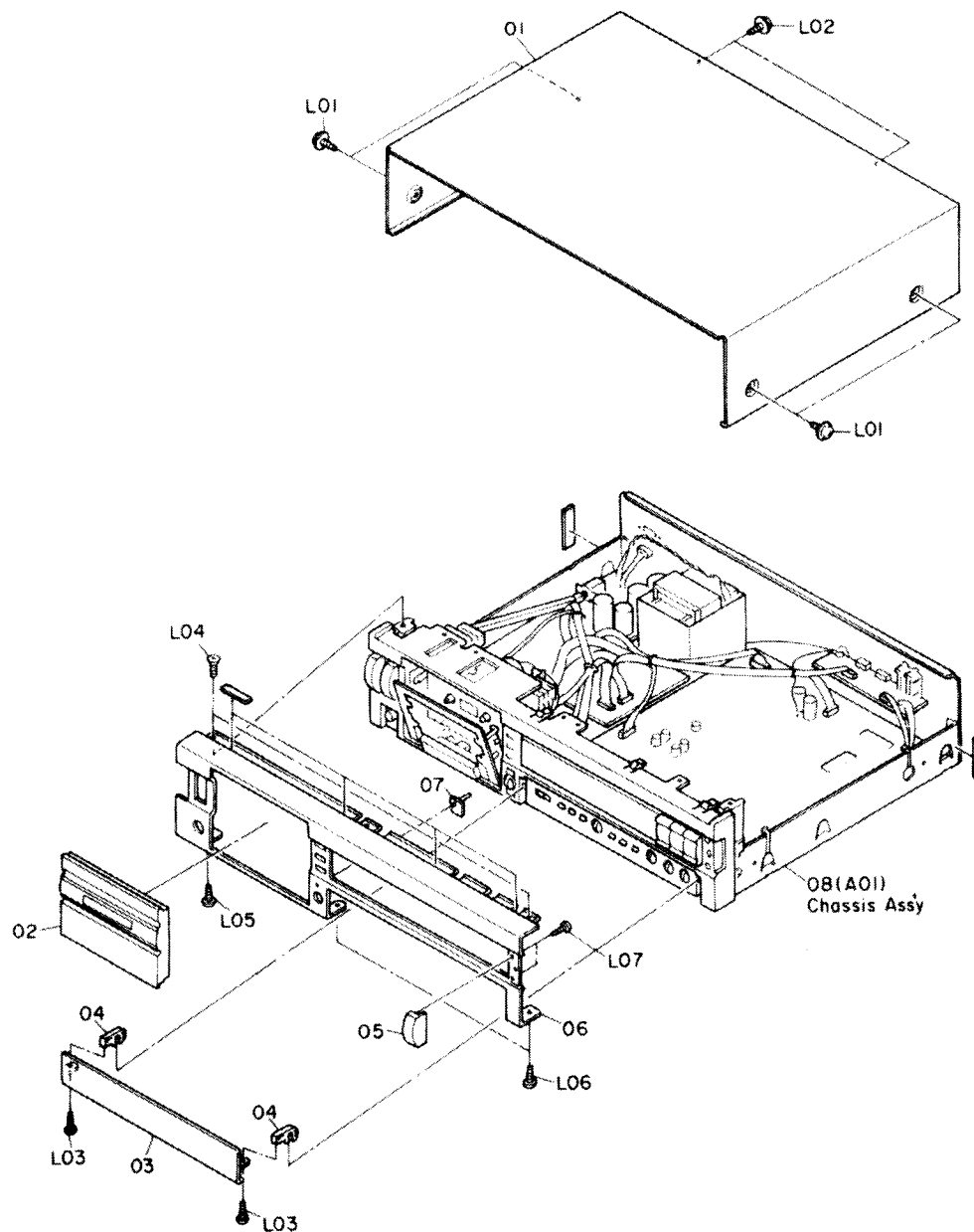


Fig. 7.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
7.1. Synthesis				L03	0E03641A	BT3x6 @ Pan (Black Chromate)	
		Synthesis		L04	0E03054A	BT3x8 @ Countersunk	
01	0H05710A	Top Cover	1	L05	0E03366A	BT3x8 @ Binding (Black Chromate)	
02	HA05935A	Cassette Case Cover Ass'y	1	L06	0E00921A	BT3x8 @ Binding (Black Chromate)	
03	0H05833A	Sealing Panel	1	L07	0E00855A	BT2x6 @ Binding	
04	0J06261B	Sealing Arm	2				
05	0H05714A	Dummy Cap	1				
06	0H05831A	Front Panel	1				
07	0H05845A	Center Lens	1				
08	—	Chassis Ass'y	1				
L01	0E03032A	BT4x8 @ Pan Washer Faced (Black Chromate)					
L02	0E03632A	BT3x8 @ Binding With Washer (Black Chromate)					

7.2. Chassis Ass'y (A01)

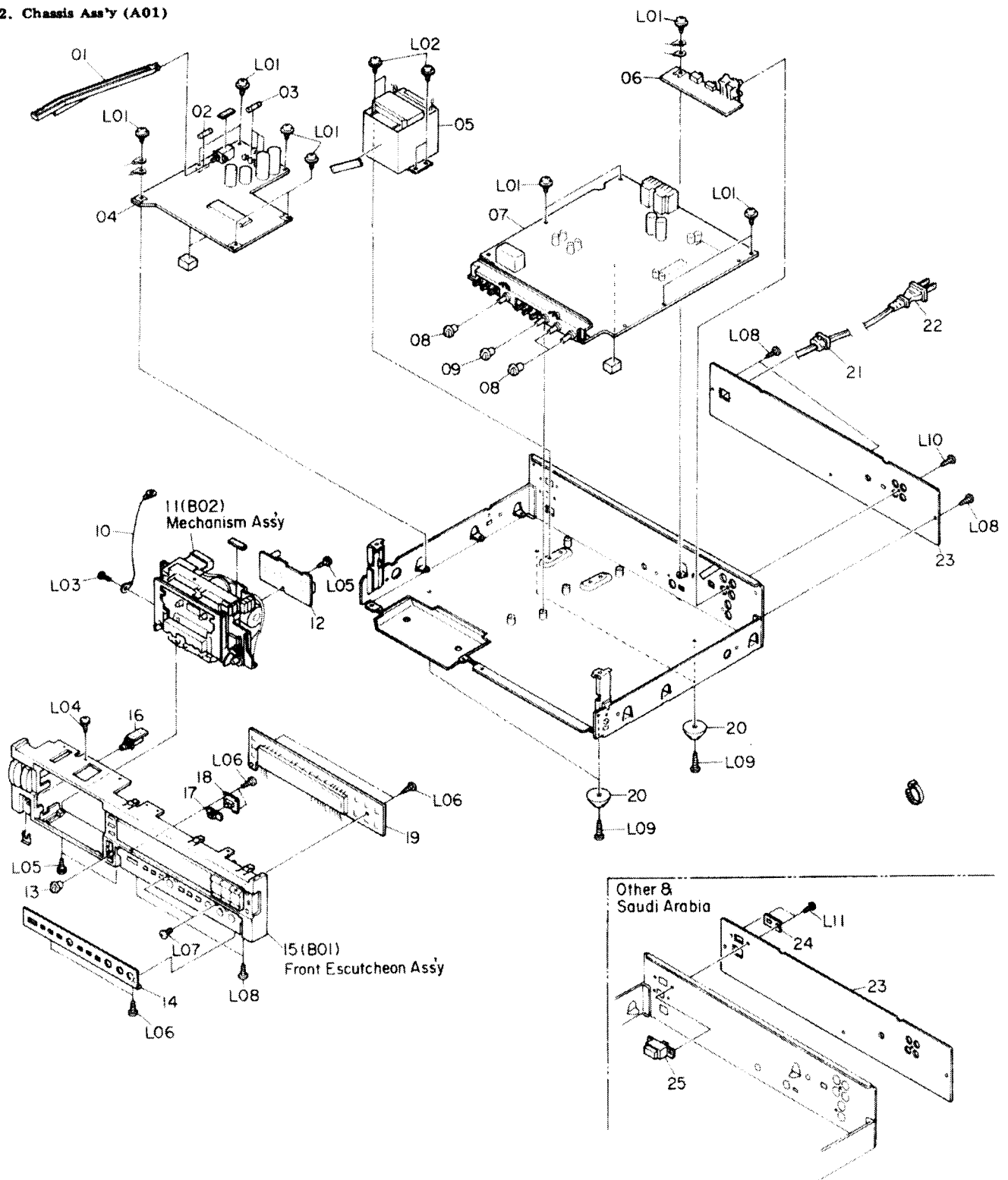


Fig. 7.2

7.3. Front Escutcheon Ass'y (B01)

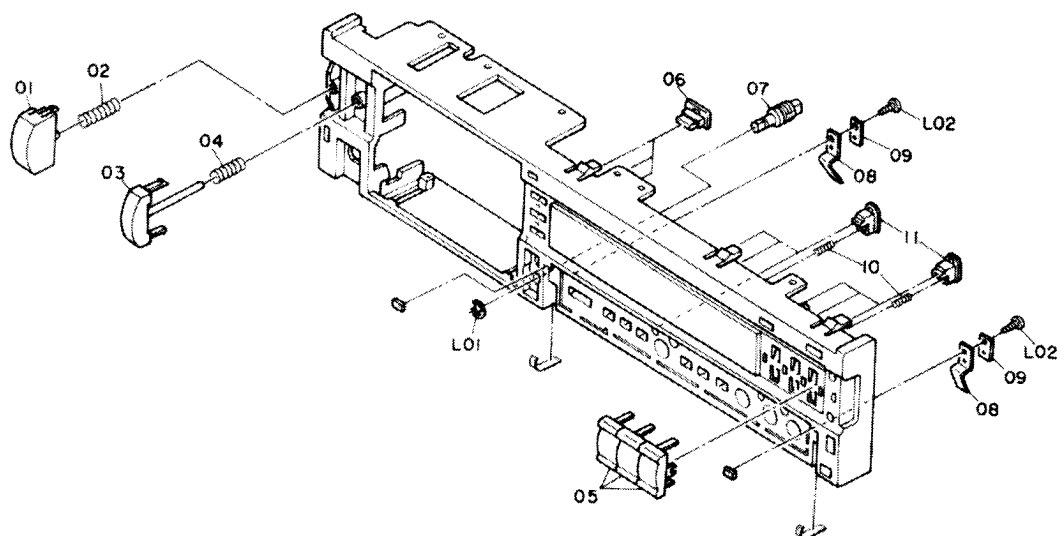


Fig. 7.3

*: Unstocked parts:

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
7.2. Chassis Ass'y				7.3. Front Escutcheon Ass'y (B01)			
A01	—	Chassis Ass'y	1	B01	—	Front Escutcheon Ass'y	1
01	0J06258B	Power Switch Joint	1	01	0H05723A	Power Switch Button	1
02	0B90493A	Fuse 500mA [F404] (USA, CAN, JPN)	1	02	0C09392A	Power Switch Spring	1
	0B08505A	Fuse F500mA [F404] (EP, UK, AUS, OTR, SAU)	1	03	HA05929A	Eject Knob Ass'y	1
03	0B90375A	Fuse 1.6A [F401-403] (USA, CAN, JPN)	3	04	0J06252A	Eject Spring	1
	0B90382A	Fuse T1.25A [F401-403] (EP, UK, AUS, OTR, SAU)	3	05	0H05716A	Control Knob A	3
04	* BA07988A	Power Supply & Logic P.C.B. Ass'y (USA, CAN, EP, UK, AUS, OTR, SAU)	1	06	0H05825B	Tact Knob	3
	* BA07981A	Power Supply & Logic P.C.B. Ass'y (JPN)	1	07	0J06260A	Azimuth Joint	1
05	0B50183A	Power Transformer 120V (USA, CAN)	1	08	0J06262A	Sealing Spring	2
	0B50182A	Power Transformer 230V (EP)	1	09	0J06334A	Lock Plate	2
	0B50179A	Power Transformer 240V (UK, AUS)	1	10	0J06253A	Push Knob Spring	6
	0B50181A	Power Transformer 115-230V (OTR, SAU)	1	11	0H05819A	Push Knob	6
	0B50180A	Power Transformer 100V (JPN)	1	L01	0E00134A	E-Ring 4mm	
06	* BA07985A	Pin Jack P.C.B. Ass'y	1	L02	0E00921A	BT3x8 @ Binding (Black Chromate)	
07	* BA07984A	Main P.C.B. Ass'y	1				
08	0H05821A	Input & Bias Tuning Volume Knob	3				
09	0H05822A	Output Volume Knob	1				
10	0B83916A	Mechanism GND Ass'y	1				
11	CA09048A	Mechanism Ass'y	1				
12	* BA07987A	Playback Amp. P.C.B. Ass'y	1				
13	0H05711A	Playback Azimuth Knob	1				
14	0H05834A	Inner Panel	1				
15	—	Front Escutcheon Ass'y	1				
16	* BA07986A	Headphone P.C.B. Ass'y	1				
17	0H05823A	Slide Knob	1				
18	* BA07983A	Timer Switch P.C.B. Ass'y	1				
19	* BA07982A	Control Switch & Display P.C.B. Ass'y	1				
20	HA05833A	Leg Ass'y	4				
21	0B90280A	Cord Bushing (USA, CAN, EP, UK, AUS)	1				
	0B90283A	Cord Bushing (OTR, SAU, JAN)	1				
22	0B08504A	Power Cord (USA, CAN)	1				
	0B08093U	Power Cord (EP)	1				
	0B08348A	Power Cord (UK)	1				
	0B05241A	Power Cord (AUS)	1				
	0B08533A	Power Cord (OTR, SAU)	1				
	0B08219B	Power Cord (JPN)	1				
23	0H05835A	Rear Panel (USA, CAN, EP, UK, AUS, JPN)	1				
	0H05848A	Rear Panel (OTR, SAU)	1				
24	0M05611A	Voltage Lock Plate (OTR, SAU)	1				

*: Unstocked parts:

Schematic Ref. No.	Part No.	Description	Qty	Schematic Ref. No.	Part No.	Description	Qty
7.4. Mechanism Ass'y (B02)				82	OC81416A	Thrust Spring B	1
B02				83	OC80027A	Mode Switch	3
01	OC85309A	Eject Arm	1	84	OC81415A	Warm Thrust Bush	1
02	OC85310A	Eject Arm Spring	1	85	CA81646A	Control Motor Ass'y	1
03	CA80006A	Pneumatic Damper Ass'y	1	86	OC85319A	Azimuth Arm Spring B	1
04	OC82720A	Eject Lever Spring	1	87	CA81670A	Azimuth Arm B Sub Ass'y	1
05	OC85414A	Eject Lever	1	88	CA81669A	Azimuth Plate Sub Ass'y	1
06	OC85301A	Cassette Case Holder L	1	89	OC85314A	Azimuth Cam Gear	1
07	OC80019B	Eject Spring	1	90	OC85315A	Cassette Case Spring	1
08	OC80620A	Back Tension Arm Pulley	1	91	OC85316A	Cassette Case Spring Collar	1
09	OC80621A	Back Tension Arm Belt	1	92	CA81667A	Azimuth Chassis Sub Ass'y	1
10	OC80617A	Back Tension Arm Spring	1	93	OC85318A	Azimuth Cam Spring	1
11	OC80618A	Back Tension Arm Collar	1	94	OC85317A	Azimuth Cam Switch	1
12	OC80619A	Back Tension Arm	1	95	CA81671A	Azimuth 2P Connector Ass'y	1
13	OC85425A	Lock Lever Spring	1	96	OC80012A	Sensor Switch	1
14	OC85426A	Lock Lever Collar	1	97	CA81673A	5P Connector Ass'y	1
15	OC85427A	Lock Lever	1	98	CA81672A	9P Connector Ass'y	1
16	CA80726A	Supply Reel Hub Ass'y	1	L01	OE00698A	E-Ring 2.5mm	
17	OC80612A	Spring Holder	2	L02	OE00181A	E-Ring 3mm	
18	OC80614A	Supply Reel Hub Spring	1	L03	OE00222A	E-Ring 2mm	
19	OC81421A	Supply Pressure Roller Arm	1	L04	OE00042A	E-Ring 1.5mm	
		Adjustment Nut	1	L05	OE00165A	E-Ring 1.2mm	
20	CA80366A	Supply Pressure Roller Arm Ass'y	1	L06	OE03052A	CS Stopper 2.4mm	
21	OC81420A	Supply Pressure Roller Arm Spring	1	L07	OE03042A	FT2.5x 5 @Pan	
22	OC81422A	Supply Pressure Roller Arm	1	L08	OE03043A	FT2.5x10 @Pan	
		Track Spring	1	L09	OE03202A	M2.6x3 @ Binding (Black Chromate)	
23	OH04415C	Head Mount Cover	1	L10	OE03437A	FT2.5x3.5 @Pan (Black Chromate)	
24	CA80200B	Cassette Case Ass'y	1	L11	OE03654A	M2x4 @Pan (3A)	
25	HA05937A	Cover Plate Ass'y	1	L12	OE03018A	M2x5 @Pan	
26	OC08762A	Head Height Adjustment Gear	2	L13	OE03232A	M1.7x7 @Pan	
27	OC08761A	Head Height Adjustment Screw	4	L14	OE03222A	Washer 1.8x3.8x0.3	
28	OC08763A	Azimuth Alignment Screw	1	L15	OE03655A	M2x5 @Pan (2A)	
29	OC85424A	Head Mount Plate	1	L16	OE03234A	M2x3 @Pan	
30	CA08659B	R-3L Record Head Ass'y	1	L17	OE03228A	FT3x4 @Pan	
31	OC08776A	Head Plate Spring L	1	L18	OE03236A	M2x5 @Pan (2A)	
32	CA81676A	RH 4P Connector Ass'y	1	L19	OE03231A	M2x30 @Pan	
33	OC08026D	PB Head Azimuth Alignment Screw	1	L20	OE03041A	FT2.5x4 @Pan	
34	OC81391A	PB Head Azimuth Alignment Screw	1	L21	OE03233A	Washer 2.6x8x1	
		Stopper	1	L22	OE03230A	ST2.6x12 @Pan	
35	OC85313A	PB Head Azimuth Arm Shaft A	1	L23	OE03045A	M2.6x3 @ Binding	
36	OC85312A	PB Head Azimuth Arm A	1	L24	OE03229A	FT5x6 @Pan	
37	CA08755A	P2H-3L Playback Head Ass'y	1	L25	OC82725A	M2.6x9 Washer Faced	
38	OC08775A	Head Plate Spring R	1	L26	OE00691A	M2x3 @Pan	
39	CA81675A	PH 4P Connector Ass'y	1	L27	OE03044A	FT2.5x20 @Pan	
40	CA81674A	EH 2P Connector Ass'y	1	L28	OE00851A	ST3x5 @Pan	
41	GA02201A	E-4F Erase Head	1	L29	OE03666A	ST3.5x6 @Pan	
42	OC08768A	E.H. Hold Plate	1	L30	OE03035A	M2x3.2 @ Truss	
43	OC08889A	E.H. Hold Plate Tapering Spring	2	L31	OE03235A	Washer 2x5x0.25	
44	OC08886A	E.H. Hold Plate Spring	1	L32	OE03225A	Washer 1.8x3.8x0.5	
45	OC82710A	Head Base Hold Plate	1	L33	OE03226A	Washer 2.1x4.5x0.1	
46	OC80004A	Steel Ball 3mm	1	L34	OC85423A	S. Thrust Spring Washer	
47	OC08771A	Tape Guide Plate	1	L35	OE03049A	Washer 1.8x3.2x0.5	
48	CA80365A	Head Base Sub Ass'y	1	L36	OC08774A	Plate Washer L	
49	OC80007A	Steel Ball 2mm	3	L37	OC08773A	Plate Washer R	
50	CA80725A	Take-up Reel Hub Ass'y	1	L38	OE03227A	Washer 2.7x5x0.5	
51	OC80613A	Take-up Reel Hub Spring	1	L39	OE03237A	Nut Hex. M2.6	
52	CA80368A	Take-up Pressure Roller Arm Ass'y	1	L40	OE00694A	Nut M2	
53	OC81423A	Take-up Pressure Roller Arm Spring	1	L41	OC82716A	Capstan Washer S	
54	OC85429A	Switch Hold Plate	1	L42	OC82717A	Capstan Washer T	
55	OC80623A	Switch Plate	2	L43	OE00912A	Polyslider FT25	
56	OC80624A	Switch Collar A	2	L44	OE03509A	Washer 1.3x3.4x0.5	
57	OC80626A	Leaf Switch	1	L45	OE03653A	Washer 1.6x4x0.25	
58	OC80625A	Switch Collar B	2	L46	OE03508A	Washer 1.7x6x0.25	
59	OC80017B	Record Protector Lever	1	L47	OE03180A	Washer 2.6mm	
60	OC80022B	Cassette Hold Spring	1	L48	OE03645A	Washer 1.6x4x0.25	
61	CA80736A	Mechanism Chassis Ass'y	1	L49	OE03194A	Washer 2.1mm	
62	* CA80011B	Shut-off P.C.B. Ass'y	1				
63	CA08204A	Brake Ass'y	1				
64	OC80628A	Brake Spring B	1				
65	OC80630A	Brake Arm Collar	1				
66	OC80629A	Brake Arm	1				
67	OC82724A	Reel Motor Holder	1				
68	CA81699A	Reel Motor Ass'y	1				
69	OC83380A	Idle Gear	1				
70	OC82701A	Supply Capstan Flange	1				
71	OC82700A	Take-up Capstan Flange	1				
72	OC80428A	Hold Spring	2				
73	OC82699A	Supply Flywheel	1				
74	OC82698A	Take-up Flywheel	1				
75	OC82702A	Capstan Belt	1				
76	OC82718A	Thrust Plate	2				
77	OC82726A	Floating Rubber	3				
78	CA81698A	Capstan Motor Ass'y	1				
79	OC85320A	Flywheel Holder	1				
80	OC81417A	Cam Gear B	1				
81	OC81418A	Control Motor Holder	1				

7.4. Mechanism Ass'y (B02)

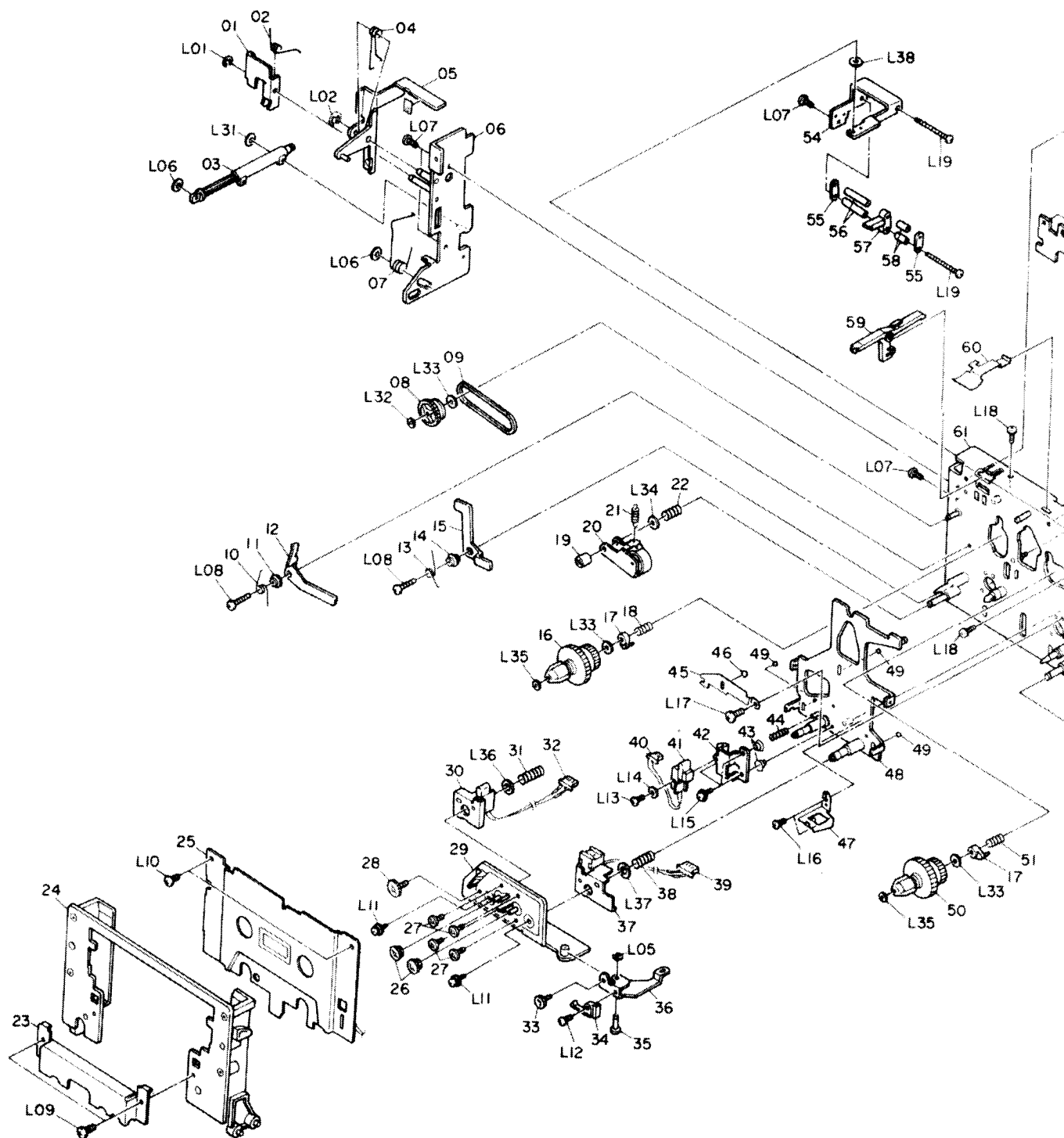
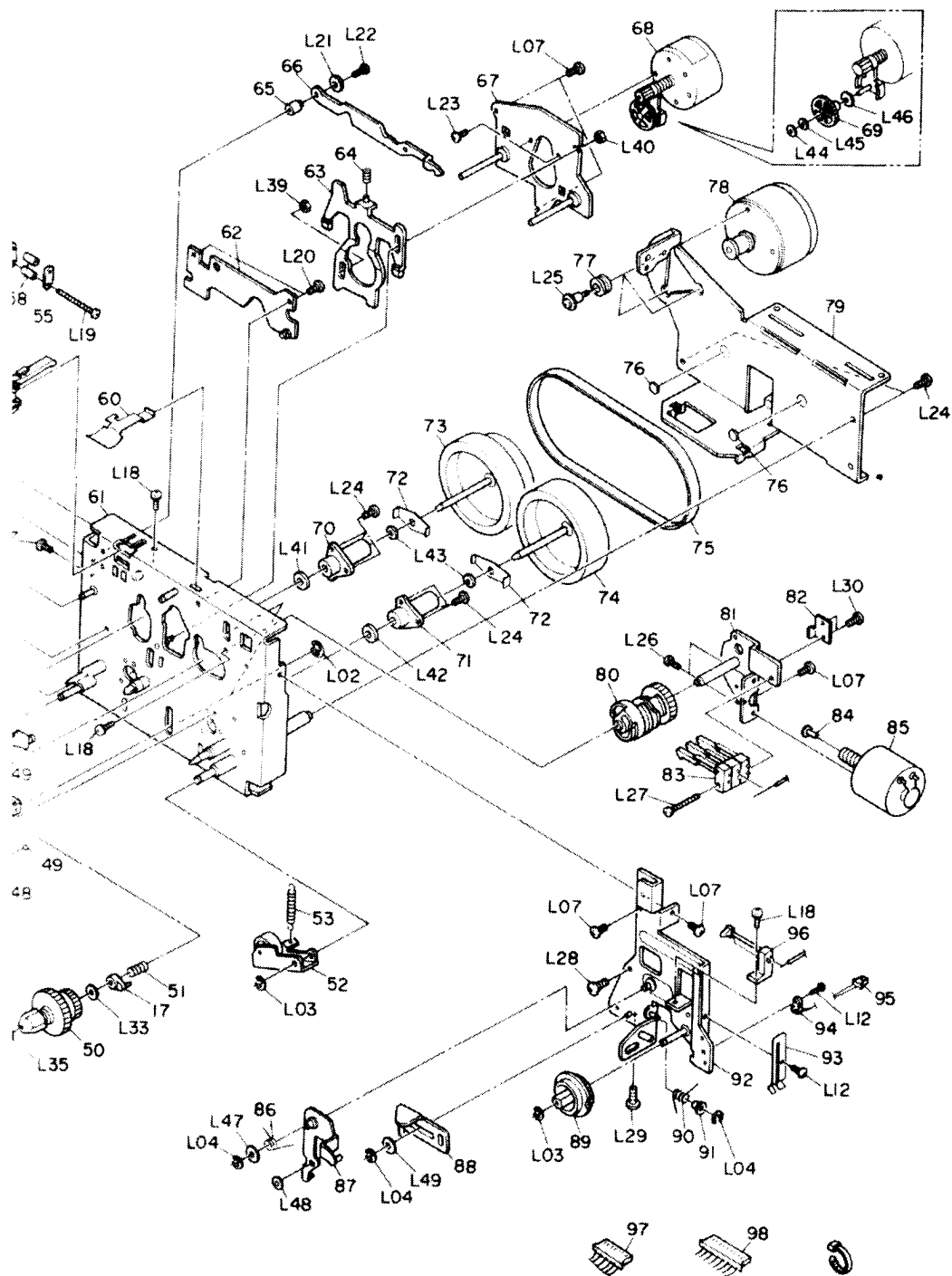


Fig. 7.4



8. MOUNTING DIAGRAMS AND PARTS LIST

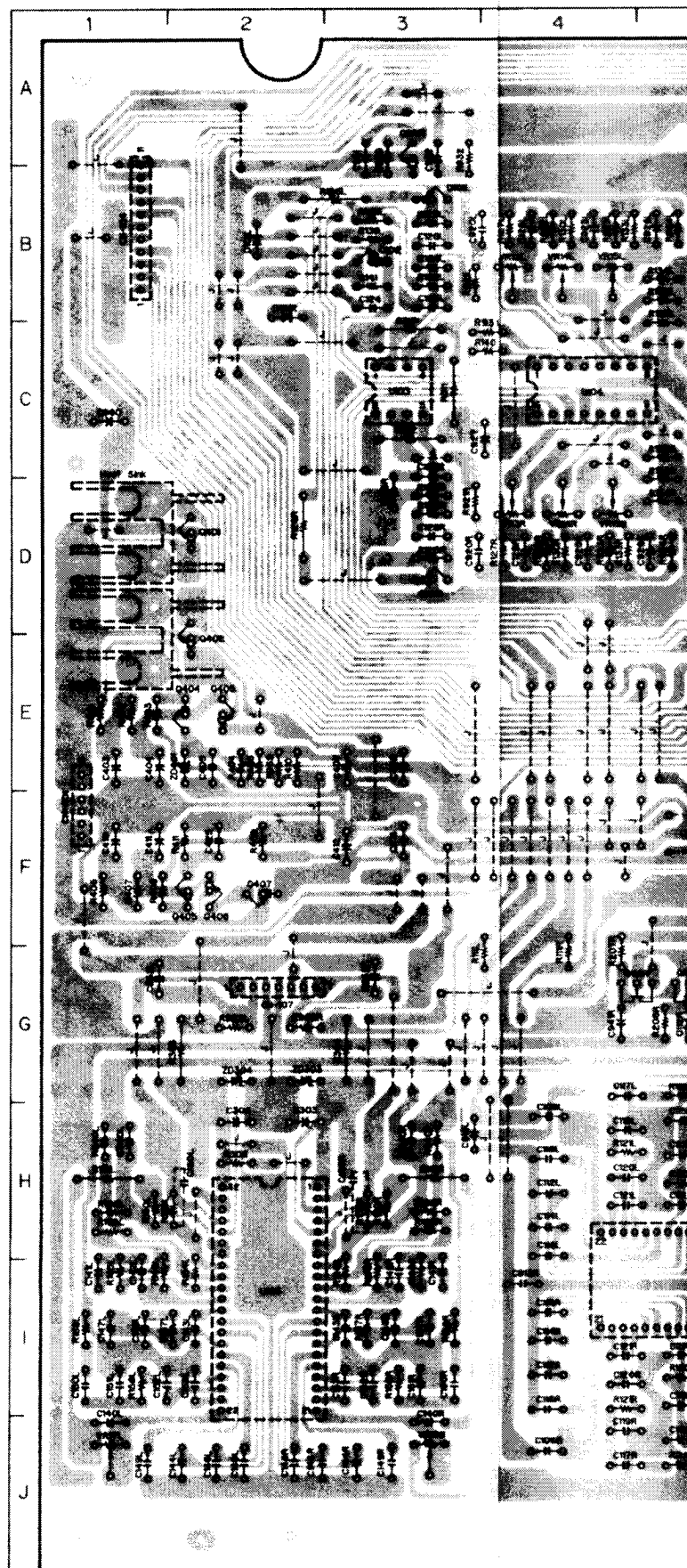
8.1. Main P.C.B. Assy

Notes:

1. Mounting diagram shows a dip side view of the printed circuit board.
2. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
3. Abbreviation for part name:
 TR — Transistor, SiD — Silicon Diode,
 ZD — Zener Diode, Varicap — Variable Capacitance Diode
 RK — Carbon Resistor, RM — Metal Film Resistor, RF — Fail Safe Type Resistor,
 RC — Cement Resistor
 CE — Electrolytic Capacitor, CML — Mylar Capacitor, CC — Ceramic Capacitor, CPP — PP Capacitor, CMM — Metalized Mylar Capacitor,
 CSP — Polystyrene Capacitor, C — Mica Capacitor, CT — Tantalum Capacitor

• Semiconductor Location

Ref. No.	Location	Ref. No.	Location
U101	I-8	Q405	F-2
U102	H-5	Q406	F-2
U103	C-3	Q407	F-2
U104	C-4	Q930	A-3
U105	I-10	Q960L	F-9
U106	I-2	Q960R	H-9
U107	C-6	Q980	B-9
U108	H-10	ZD15L	G-10
Q101L	B-3	ZD15R	H-10
Q101R	D-3	ZD96L	G-10
Q102	B-3	ZD96R	H-10
Q105	B-8	ZD301	I-6
Q106L	B-6	ZD302	H-6
Q106R	D-6	ZD303	G-2
Q107L	B-7	ZD304	G-2
Q107R	D-7	ZD401	E-2
Q108L	B-7	D101L	B-2
Q108R	D-7	D101R	B-2
Q109L	B-6	D103L	B-6
Q109R	D-6	D103R	D-5
Q110L	B-6	D104L	B-5
Q110R	D-6	D104R	E-6
Q111L	B-7	D105L	B-5
Q111R	D-7	D105R	E-6
Q112	B-8	D106L	B-5
Q115L	G-5	D106R	E-6
Q115R	G-5	D107L	B-5
Q116L	G-5	D107R	E-6
Q116R	G-4	D108L	B-7
Q117L	G-8	D108R	D-7
Q117R	G-7	D109	B-8
Q118L	G-8	D110L	G-10
Q118R	G-7	D110R	H-10
Q119	B-9	D111L	G-10
Q120	D-9	D111R	H-10
Q121	D-9	D112L	G-5
Q122	D-9	D112R	G-5
Q123	B-9	D113L	G-8
Q124	C-9	D113R	G-7
Q125	C-9	D114	B-9
Q401	D-2	D115	E-9
Q402	E-2	D960L	G-10
Q403	E-2	D960R	H-9
Q404	E-2		



★: Unstocked parts:

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
8.1. Main P.C.B. Assy								
* BA07984A Main P.C.B. Assy			— Decoder —					
— Input Amp. —			R171	OB09725A	RK 100K 1/6W J	U106	OB11363A	IC CX20188
U101	OB11204A	IC NJM5532DD	R172L,R	OB09709A	RK 22K 1/6W J	ZD303,304	OB12695A	ZD 10V MA4100(N)
VL11L,R	OB51373A	L-C Block (MPX)	R173L,R	OB09733A	RK 220K 1/6W J	VR17L,R	OB32192A	Semi VR 5K
VR101	OB30132A	VR 100K (MN)	R174L,R	OB25195A	RM 1K 1/4W F	R158L,R	OB09673A	RK 680 1/6W J
VR102	OB30133A	VR 100K (A)	R175L,R	OB09685A	RK 2.2K 1/6W J	R159L,R	OB09725A	RK 100K 1/6W J
R101L,R	OB09749A	RK 1M 1/6W J	R176L,R	OB09677A	RK 1K 1/6W J	R160L,R	OB25195A	RM 1K 1/4W F
R102L,R	OB09717A	RK 47K 1/6W J	R177L,R	OB25252A	RM 3.92K 1/4W F	R161L,R	OB09420A	RM 2.2K 1/4W F
R103L,R	OB09717A	RK 47K 1/6W J	R178L,R	OB09694A	RK 5.1K 1/6W J	R162L,R	OB25244A	RM 3.24K 1/4W F
R104L,R	OB09709A	RK 22K 1/6W J	R179L,R	OB09741A	RK 470K 1/6W J	R163L,R	OB25251A	RM 3.83K 1/4W F
R105L,R	OB09677A	RK 1K 1/6W J	R180L,R	OB09693A	RK 4.7K 1/6W J	R164L,R	OB09749A	RK 1M 1/6W J
R106L,R	OB09677A	RK 1K 1/6W J	R181L,R	OB09741A	RK 470K 1/6W J	R165L,R	OB25171A	RM 562 1/4W F
R107L,R	OB25236A	RM 2.67K 1/4W F	R182L,R	OB09695A	RK 5.6K 1/6W J	R166L,R	OB25324A	RM 22.1K 1/4W F
R108L,R	OB25236A	RM 2.67K 1/4W F	R183L,R	OB09741A	RK 470K 1/6W J	R167L,R	OB09698A	RK 7.5K 1/6W J
R109L,R	OB25267A	RM 5.62K 1/4W F	R184L,R	OB09733A	RK 220K 1/6W J	R168L,R	OB09700A	RK 9.1K 1/6W J
R900L,R	OB09725A	RK 100K 1/6W J	R185L,R	OB25365A	RM 59.0K 1/4W F	R304,305	OB09508A	RF 56 1/4W J
C101L,R	OB40778A	CE 10μ 25V	R186L,R	OB09709A	RK 22K 1/6W J	R306	OB25398A	RM 130K 1/4W F
C102L,R	OB47197A	CSP 33P 160V J	R187L,R	OB09709A	RK 22K 1/6W J	OB25099A	RM 100 1/4W F	
C103L,R	OB47142A	CSP 68P 160V J	R188L,R	OB25213A	RM 1.54K 1/4W F	OB47154A	CML 120P 50V J	
C104L,R	OB47197A	CSP 33P 160V J	R189L,R	OB09709A	RK 22K 1/6W J	OB41133A	CPP 2200P 100V G	
C105L,R	OB01802A	CML 2200P 50V J	R190L,R	OB09695A	RK 5.6K 1/6W J	OB41133A	CPP 2200P 100V G	
C900L,R	OB47154A	CML 120P 50V J	R191	OB09717A	RK 47K 1/6W J	OB41139A	CPP 3900P 100V G	
C901L,R	OB09189A	CML 2700P 50V J	R192	OB09701A	RK 10K 1/6W J	OB41306A	CML 0.47μ 50V J	
C902L,R	OB41139A	CPP 3900P 100V J	R193	OB09701A	RK 10K 1/6W J	OB40817A	CE 1μ 50V (BP)	
			R194	OB09629A	RK 10 1/6W J	OB41300A	CML 0.15μ 50V J	
			R195L,R	OB09701A	RK 10K 1/6W J	OB41288A	CML 0.015μ 50V J	
			R950L,R	OB09701A	RK 10K 1/6W J	OB41302A	CML 0.22μ 50V J	
			C165L,R	OB41133A	CPP 2200P 100V G	OB41296A	CML 0.068μ 50V J	
			C166L,R	OB01914A	CML 3300P 50V J	OB40817A	CE 1μ 50V (BP)	
			C167L,R	OB05582A	CML 0.022μ 50V J	OB41295A	CML 0.056μ 50V J	
			C168L,R	OB09045A	CML 0.027μ 50V J	OB41143A	CPP 5600P 100V G	
			C169L,R	OB05682A	CML 0.068μ 50V J	OB41286A	CML 0.01μ 50V J	
			C170L,R	OB40557A	CE 1μ 50V	OB41201A	CPP 100P 100V J	
			C171L,R	OB01914A	CML 3300P 50V J	OB40608A	CE 470μ 16V	
			C172L,R	OB40559A	CE 47μ 16V	OB47154A	CML 120P 50V J	
			C173L,R	OB41795A	CSP 330P 160V J			
			C174L,R	OB47146A	CSP 2200P 160V J			
			C175	OB40778A	CE 10μ 25V			
			C310	OB05550A	CML 1000P 50V J			
			C950	OB40798A	CE 330μ 35V			

Description	Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
IC CX20188	R208L,R	OB09733A	RK 220K 1/6W J	S103-105	OB70176A	Push Switch TAPE (1)
ZD 10V MA4100(N)	R209L,R	OB09749A	RK 1M 1/6W J			
Semi VR 5K	R210L,R	OB09733A	RK 220K 1/6W J			
RK 680 1/6W J	R211L,R	OB09725A	RK 100K 1/6W J			
RK 100K 1/6W J	C912L,R	OB40778A	CE 10μ 25V			
RM 1K 1/4W F	C941L,R	OB40778A	CE 10μ 25V			
RM 2.2K 1/4W F		— Bias Osc. —		CN100		
RM 3.24K 1/4W F	Q119	OB10055A	TR DTA124ES	CN103		
RM 3.83K 1/4W F	Q120	OB10070A	TR DTC143ES			
RK 1M 1/6W J	Q121	OB10033A	TR 25C1740S (S)	CN104		
RM 562 1/4W F	Q122	OB06069A	TR 25B564			
RM 22.1K 1/4W F	Q123	OB10033A	TR 25C1740S (S)	CN105		
RK 7.5K 1/6W J	Q124	OB06451A	TR 25B1015			
RK 9.1K 1/6W J	Q125	OB10222A	TR 25C2705 (Y)	CN107		
RF 56 1/4W J	Q980	OB10053A	TR DTA144ES			
RM 130K 1/4W F	D114,115	OB06398A	SiD 1SS176	CN108		
RM 100 1/4W F	VL104	OB51047A	Bias Osc.	CN401		
CML 120P 50V J	VL105	OB51372A	Osc. Tune			
CPP 2200P 100V G	TH215	OB19006A	Thermistor 3.3K			
CPP 2200P 100V G	VR109	OB32192A	Semi VR 5K			
CPP 3900P 100V G	VR110	OB30138A	Volume 10K			
CML 0.47μ 50V J	R212,213	OB09665A	RK 330 1/6W J			
CE 1μ 50V (BP)	R214	OB09701A	RK 10K 1/6W J			
CML 0.15μ 50V J	R216	OB9711A	RK 27K 1/6W J			
CML 0.015μ 50V J	R217	OB09653A	RK 100 1/6W J			
CML 0.22μ 50V J	R218	OB09701A	RK 10K 1/6W J			
CML 0.068μ 50V J	R219	OB09725A	RK 100K 1/6W J			
CE 1μ 50V (BP)	R220	OB09701A	RK 10K 1/6W J			
CML 0.056μ 50V J	R221	OB09617A	RK 3.3 1/6W J			
CPP 5600P 100V G	R225	OB09701A	RK 10K 1/6W J			
CML 0.01μ 50V J	R952L,R	OB09648A	RK 62 1/6W J			
CPP 100P 100V J	R980	OB09717A	RK 47K 1/6W J			
CE 470μ 16V	R981	OB09693A	RK 4.7K 1/6W J			
CML 120P 50V J	C185,186	OB40780A	CE 100μ 16V			
Amp. —	C187	OB09993A	CML 820P 50V J			
C M5216	C188	OB41255A	CPP 0.018μ 100V J			
VR 10K(A)	C189	OB41261A	CPP 0.033μ 100V J			
RM 2.2K 1/4W F	C192	OB40778A	CE 10μ 25V			
RF 10 1/4W J	C952L,R	OB40608A	CE 470μ 16V			
RK 47K 1/6W J	C981	OB40115A	CE 4.7μ 50V			
RK 47K 1/6W J	C982	OB41196A	CSP 470P 160V J			
CE 10μ 25V	CN102	OB81459A	2P T-Post			
CE 100μ 16V		— Bias Adj. —				
CPP 3900P 100V G	VR21L,R	OB32195A	Semi VR 50K			
CSP 68P 160V J	VR22L,R	OB32194A	Semi VR 20K			
5P T-Post (1)	VR23L,R	OB32193A	Semi VR 10K			
ly —	R222L,R	OB09705A	RK 15K 1/6W J			
IR 2SD1406	R223L,R	OB09697A	RK 6.8K 1/6W J			
IR 2SC2240	R224L,R	OB09653A	RK 100 1/6W J			
IR 2SA970		— Meter Amp. —				
IR 2SB1015	U108	OB06124A	IC NJM4558D			
ZD 5.1V	Q960L,R	OB06299A	TR 2SC2878			
MA4051N-M	ZD15L,R	OB12714A	ZD 3.3V RD3.3ESB1			
RK 2.2K 1/6W J	ZD96L,R	OB12289A	ZD 5.1V MT25.1C			
RK 1K 1/6W J	D110L,R	OB06398A	SiD 1SS176			
RM 3.9K 1/4W F	D111L,R	OB06398A	SiD 1SS176			
RM 4.7K 1/4W F	D960L,R	OB06398A	SiD 1SS176			
RK 2.2K 1/6W J	VR18L,R	OB32192A	Semi VR 5K			
RK 1K 1/6W J	R200L,R	OB09749A	RK 1M 1/6W J			
RM 12K 1/4W F	R201L,R	OB09741A	RK 470K 1/6W J			
RM 15K 1/4W F	R202L,R	OB09677A	RK 1K 1/6W J			
RK 470 1/6W J	R203L,R	OB09677A	RK 1K 1/6W J			
RK 1.6K 1/6W J	R960L,R	OB09696A	RK 6.2K 1/6W J			
CE 100μ 25V	R961L,R	OB09682A	RK 1.6K 1/6W J			
CML 0.1μ 50V J	R963L,R	OB09701A	RK 10K 1/6W J			
CE 3300μ 16V	C180L,R	OB40257A	CE 3.3μ 50V (LN)			
CML 0.1μ 50V J	C181L,R	OB40817A	CE 1μ 50V (BP)			
CE 100μ 25V	C960	OB40608A	CE 470μ 16V			
CE 2200μ 16V		— Push Switch —				
CML 0.1μ 50V J	R226	OB09701A	RK 10K 1/6W J			
CML 0.1μ 50V J	R227	OB09685A	RK 2.2K 1/6W J			
Heat Sink (2)	R228	OB09709A	RK 22K 1/6W J			
e Switch —	R230,231	OB09701A	RK 10K 1/6W J			
IR FET 2SK246	R307	OB09711A	RK 27K 1/6W J			
IR FET 2SK246	R308,309	OB09725A	RK 100K 1/6W J			
IR FET 2SK246	C190L,R	OB41196A	CSP 470P 160V J			
SiD 1SS176	C307	OB40559A	CE 47μ 16V			
SiD 1SS176	C308	OB41298A	CML 0.1μ 50V			
RK 1M 1/6W J	S100-102	OB70177A	Push Switch			
RK 100K 1/6W J			MPX-DOLBY (1)			

8.2. Power Supply & Logic P.C.B. Assy

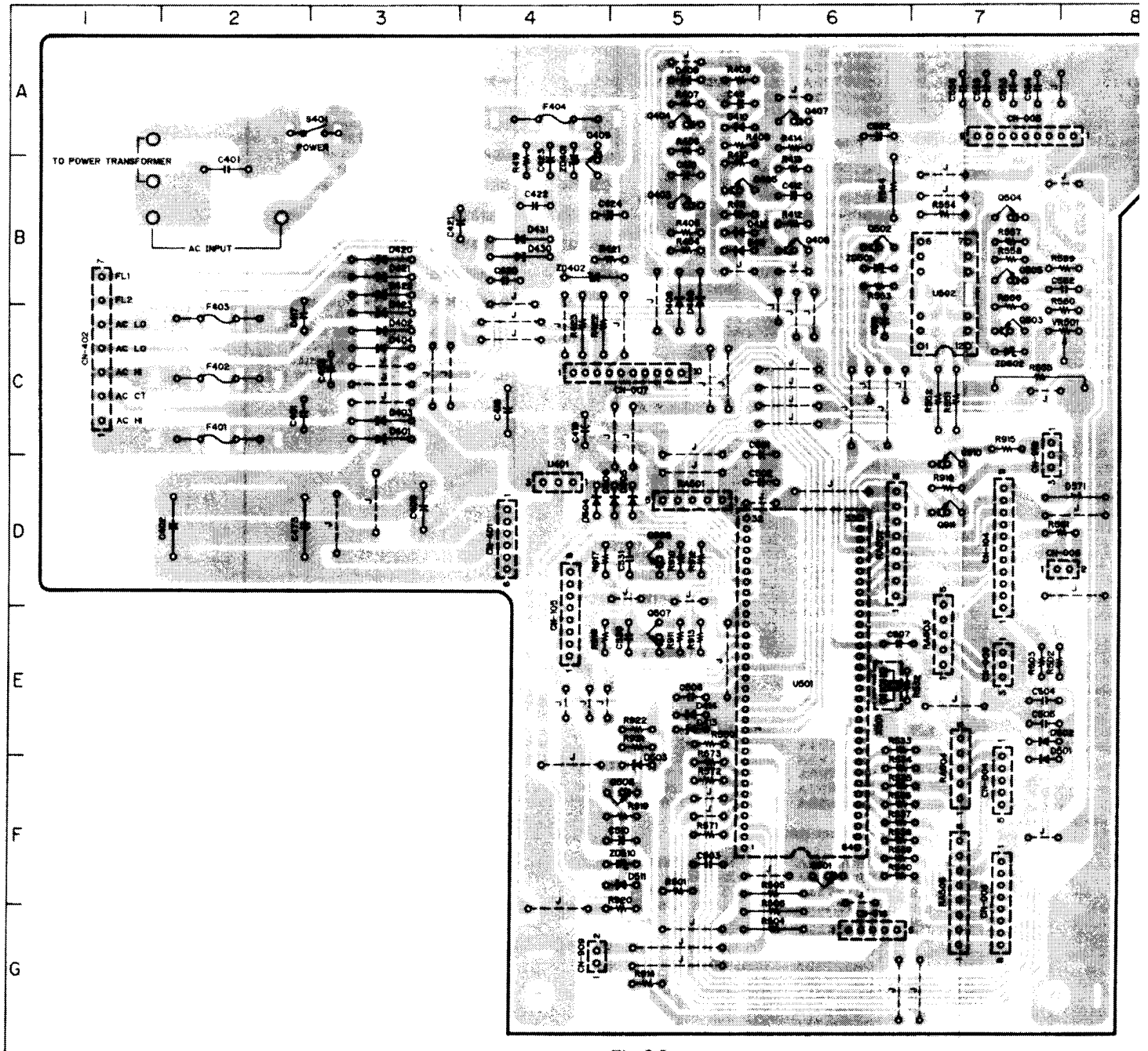
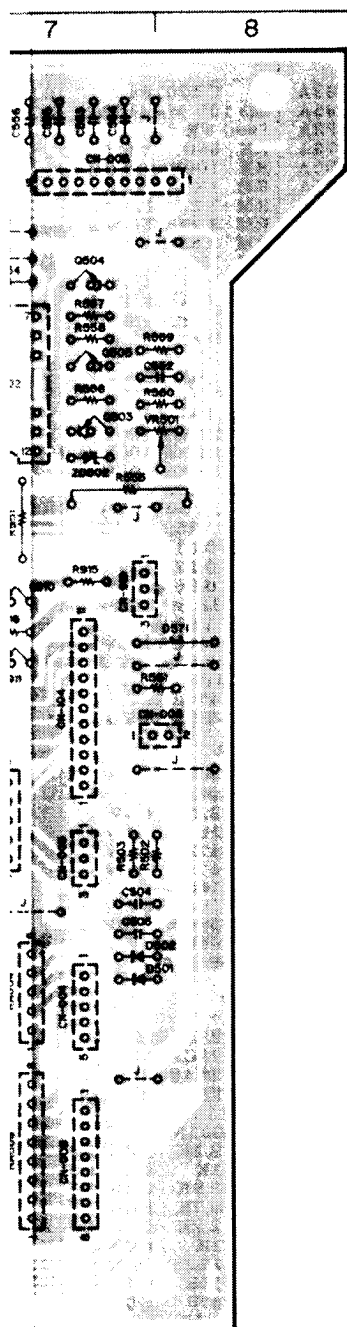


Fig. 8.2

• Semiconductor Location

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
U401	D-4	Q503	C-7	ZD502	C-7	D412	B-5	D503	F-5
U501	E-6	Q504	B-7	ZD510	F-5	D413	E-5	D504	D-4
U502	B-7	Q505	B-7	D401	C-3	D414	E-5	D505	D-5
Q403	B-5	Q506	D-5	D402	C-3	D420	B-3	D506	D-4
Q404	A-5	Q507	E-5	D403	C-3	D421	B-3	D511	F-5
Q405	B-5	Q508	F-5	D404	C-3	D422	B-3	D571	D-8
Q406	B-6	Q910	C-7	D405	B-5	D423	B-3		
Q407	A-6	Q911	D-7	D406	B-5	D430	B-4		
Q409	A-4	ZD401	B-4	D409	A-5	D431	B-4		
Q501	F-6	ZD402	B-4	D410	A-5	D501	E-7		
Q502	B-6	ZD501	B-6	D411	B-5	D502	E-7		



★: Unstocked parts:

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
8.2. Power Supply & Logic P.C.B Assy			R560	OB09677A	RK 1K 1/6W J
★	BA07988A	Power Supply & Logic P.C.B. Assy (USA, CAN, EP, UK, AUS, OTR, SAU)	R561	OB09669A	RK 470 1/6W J
	BA07981A	Power Supply & Logic P.C.B. Assy (JPN)	R564	OB09217A	RF 5.6 1/4W J
— Power Supply —			C551	OB40078A	CE 100μ 16V
U401	OB11753A	IC NJM7805FA	C552	OB41286A	CML 0.01μ 50V J
Q403,404	OB10033A	TR 2SC1740S (S)	C553,554	OB41298A	CML 0.1μ 50V J
Q405	OB10033A	TR 2SC1740S (S)	C555,556	OB41298A	CML 0.1μ 50V J
Q406	OB10058A	TR DTA114ES	C562	OB40079A	CE 220μ 16V
Q407	OB10033A	TR 2SC1740S (S)	CN005	OB84084A	9P T-Post
Q408	OB10015A	TR 2SA1020	CN006	OB84278A	2P T-Post
ZD401	OB12708A	ZD 24V MA4240N-H			
ZD402	OB12707A	ZD 4.7V MA4047N			
D401,402	OB12365A	SID 1SR35-100A			
D403,404	OB12365A	SID 1SR35-100A			
D405,406	OB12365A	SID 1SR35-100A			
D409,410	OB06398A	SID 1SS176			
D411,412	OB06398A	SID 1SS176			
D420,421	OB12365A	SID 1SR35-100A			
D422,423	OB12365A	SID 1SR35-100A			
D430,431	OB12365A	SID 1SR35-100A			
R404	OB09709A	RK 22K 1/6W J			
R405	OB09703A	RK 12K 1/6W J			
R406	OB09701A	RK 10K 1/6W J			
R407,408	OB09693A	RK 4.7K 1/6W J			
R409	OB09719A	RK 56K 1/6W J			
R410	OB09713A	RK 33K 1/6W J			
R411,412	OB09693A	RK 4.7K 1/6W J			
R413	OB09719A	RK 56K 1/6W J			
R414	OB09713A	RK 33K 1/6W J			
R419	OB09685A	RK 2.2K 1/6W J			
R421	OB09701A	RK 10K 1/6W J			
R422,423	OB09653A	RK 100 1/6W J			
C401	OB41825A	CC 4700P AC400V (USA, CAN, EP, UK, AUS, OTR, SAU)			
	OB41826A	CC 4700P AC250 (JPN)			
C402	OB40801A	CE 6800μ 25V			
C409	OB40363A	CE 2200μ 25V			
C410	OB40630A	CE 22μ 10V (LN)			
C411,412	OB40255A	CE 1μ 50V (LN)			
C416	OB40362A	CE 6800μ 18V			
C417	OB41298A	CML 0.1μ 50V J			
C419	OB40067A	CE 470μ 10V			
C420	OB41298A	CML 0.1μ 50V J			
C421	OB40798A	CE 330μ 35V			
C422	OB40120A	CE 100μ 50V			
C423	OB40100A	CE 10μ 35V			
C424	OB40802A	CE 1000μ 35V			
C451,452	OB41298A	CML 0.1μ 50V J			
C473	OB40801A	CE 6800μ 25V			
S401	OB71012A	Power Switch 1P TV-4			
CN401	OB81463A	6P T-Post			
CN402	OB81574A	7P T-Post			
	OB08349B	Fuse Clip (8)			
	OE03355A	Earth Lug for P.C.B. (4)			
— Motor Driver —					
U502	OB11368A	IC IC LB1649			
Q502	OB10062A	TR DTC144ES			
Q503	OB10029A	TR 2SA933S (S)			
Q504	OB10062A	TR DTC144ES			
Q505	OB10033A	TR 2SC1740S (S)			
ZD501	OB12290A	ZD 5.6V MTZ5.6A			
ZD502	OB12288A	ZD 5.1V MTZ5.1B			
D413,414	OB06398A	SID 1SS176			
D503,504	OB06398A	SID 1SS176			
D505,506	OB06398A	SID 1SS176			
VR501	OB32192A	Semi VR 5K			
R551,552	OB01857A	RK 1K 1/4W J			
R553,554	OB09677A	RK 1K 1/6W J			
R555	OB24349A	RF 27 1/2W			
R556	OB09701A	RK 10K 1/6W J			
R557	OB09681A	RK 1.5K 1/6W J			
R558	OB09695A	RK 5.6K 1/6W J			
R559	OB09717A	RK 47K 1/6W J			

8.3. Shut-off P.C.B. Ass'y

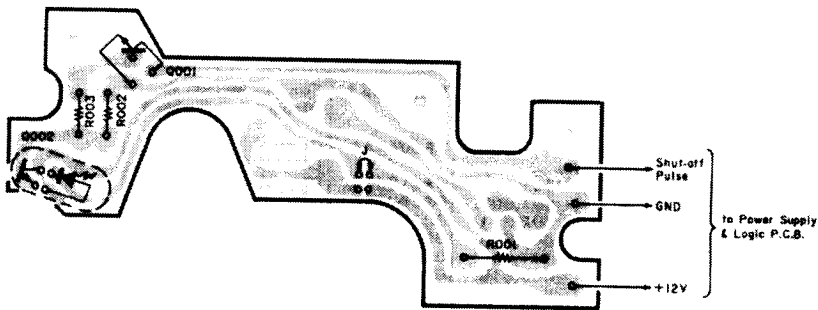


Fig. 8.3

8.4. Timer Switch P.C.B. Ass'y

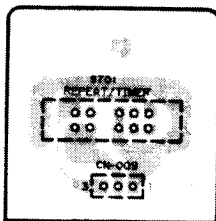


Fig. 8.4

8.5. Headphone P.C.B. Ass'y

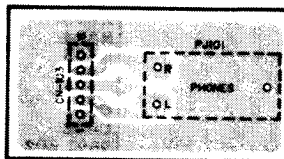


Fig. 8.5

8.6. Pin Jack P.C.B. Ass'y

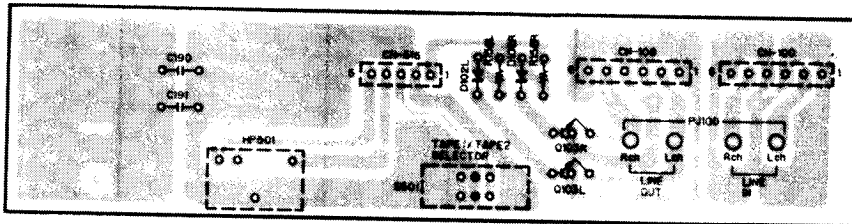


Fig. 8.6

8.7. Playback Amp. P.C.B. Ass'y

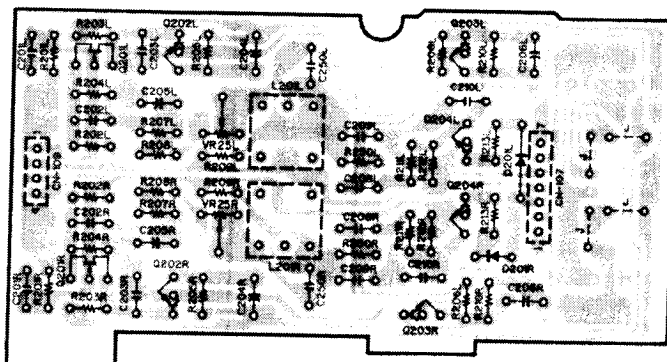


Fig. 8.7

★: Unstocked parts:

Schematic Ref. No.	Part No.	Description
8.3. Shut-off P.C.B. Assy		
	* CA80011B	Shut-off P.C.B. Assy
Q001	0C80047A	Shut-off P.C.B.
Q002	0B06388A	TR 2SC2812
	0B06389A	Photo Reflector
		NJL5141
R001	0C81330A	RM 750
R002	0B09841A	RK 15K
R003	0B09840A	RK 680
8.4. Timer Switch P.C.B. Assy		
	* BA07983A	Timer Switch P.C.B. Assy
S701	0B60848A	Timer Switch P.C.B.
CN009	0B70176A	Slide Switch 2-4
	0B83936A	3P H-Connector Assy
8.5. Headphone P.C.B. Assy		
	* BA07986A	Headphone P.C.B. Assy
PJ101	0B60851A	Headphone P.C.B.
	0B81478A	Headphone Jack
8.6. Pin Jack P.C.B. Assy		
	* BA07985A	Pin Jack P.C.B. Assy
Q103L,R	0B60850A	Pin Jack P.C.B.
D102L,R	0B06299A	TR 2SC2878
R152L,R	0B06398A	SiD 1SS176
C190	0B09693A	RK 4.7K 1/6W J
C191	0B05550A	CML 1000P 50V J
S501	0B41298A	CML 0.1μ 50V J
HP501	0B70178A	Slide Switch 2-2
PJ100	0B84028A	Stereo Mini Jack
CN516	0B84350A	4P Pin Jack
	0B83927A	5P H-Connector
	0E03855A	Ass'y 300
		Earth Lug for P.C.B. (1)
8.7. Playback Amp. P.C.B. Assy		
	* BA07987A	Playback Amp. P.C.B. Assy
	0B60852A	Playback Amp. P.C.B.
Q201L,R	0B10383A	FET 2SK369 (GR)
Q202L,R	0B10060A	TR 2SA970 (BL)
Q203L,R	0B06142A	TR 2SC2240 (BL)
Q204L,R	0B10033A	TR 2SC1740S (S)
D201L,R	0B06398A	SiD 1SS176
L201L,R	0B51375A	PB Trap Coil
VR25L,R	0B32190A	Semi VR 1KB
R201L,R	0B09725A	RK 100K 1/6W J
R202L,R	0B25074A	RM 54.6 1/4W F
R203L,R	0B25236A	RM 2.61K 1/4W F
R204L,R	0B25401A	RM 140K 1/4W F
R205L,R	0B09673A	RK 680 1/6W J
R206L,R	0B09713A	RK 33K 1/6W J
R207L,R	0B25672A	RM 6.2K 1/4W F
R208L,R	0B09665A	RK 330 1/6W J
R209L,R	0B09709A	RK 22K 1/6W J
R210L,R	0B09697A	RK 6.8K 1/6W J
R211L,R	0B25292A	RM 10.2K 1/4W F
R212L,R	0B09741A	RK 470K 1/6W J
R213L,R	0B09701A	RK 10K 1/6W J
R250L,R	0B25279A	RM 7.5K 1/4W F
C201L,R	0B41754A	CSP 150P 160V J
C202L,R	0B05582A	CML 0.022μ 50V J
C203L,R	0B41763A	CSP 10P 160V J
C204L,R	0B40066A	CE 330μ 10V
C205L,R	0B40778A	CE 10μ 25V
C206L,R	0B40050A	CE 220μ 6.3V
C208L,R	0B05530A	CML 6800P 50V J
C209L,R	0B41139A	CSP 3900P 100V J
C210L,R	0B47027A	CML 470P 50V J
C250L,R	0B41816A	CSP 220P 160V J
CN107	0B81464A	7P T-Post
CN109	0B81461A	4P T-Post

Schematic Ref. No.	Part No.	Description
8.8. Control Switch & Display P.C.B. Ass'y		
	* BA07982A	Control Switch & Display P.C.B. Ass'y
	0B60847A	Control Switch & Display P.C.B.
U601	0B11860A	IC MSC7112-01
Q601,602	0B10033A	TR 2SC1740S (S)
Q603,604	0B10033A	TR 2SC1740S (S)
Q605,606	0B10033A	TR 2SC1740S (S)
Q607,608	0B10033A	TR 2SC1740S (S)
Q609,610	0B10033A	TR 2SC1740S (S)
Q611	0B10033A	TR 2SC1740S (S)
ED601	0B12709A	LED TLSG126
R601	0B09713A	RK 33K 1/6W J
R602	0B09701A	RK 10K 1/6W J
R603,604	0B09717A	RK 47K 1/6W J
R605,606	0B09717A	RK 47K 1/6W J
R607,608	0B09717A	RK 47K 1/6W J
R609,610	0B09717A	RK 47K 1/6W J
R611,612	0B09717A	RK 47K 1/6W J
R613	0B09629A	RK 10 1/6W J
R614	0B09717A	RK 47K 1/6W J
R623	0B09701A	RK 10K 1/6W J
R624	0B09693A	RK 4.7K 1/6W J
R625	0B09705A	RK 15K 1/6W J
R626	0B09701A	RK 10K 1/6W J
R627	0B09698A	RK 4.7K 1/6W J
C601	0B41974A	CC 100P 50V J
C602	0B40158A	CE 100μ 6.3V
S601,602	0B70161A	Tact Switch
S603,604	0B70161A	Tact Switch
S605,606	0B70161A	Tact Switch
S607,608	0B70161A	Tact Switch
S609	0B70161A	Tact Switch
CN007	0B83935A	10P H-Connector Ass'y 400
CN008	0B83934A	8P H-Connector Ass'y 300
CN919	0B83937A	3P H-Connector Ass'y 250
FL601	0B90461A	FL Display FIP13BW7Y
	QJ06219C	FL Cushion
	QJ06238A	FL Stopper

9. SCHEMATIC DIAGRAM

9.1. IC Block Diagrams

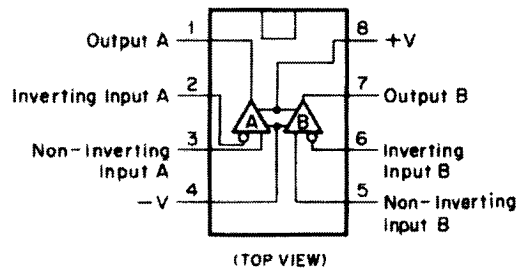


Fig. 9.1.1 Operational Amp. IC 4558D, 5532DD, 5216

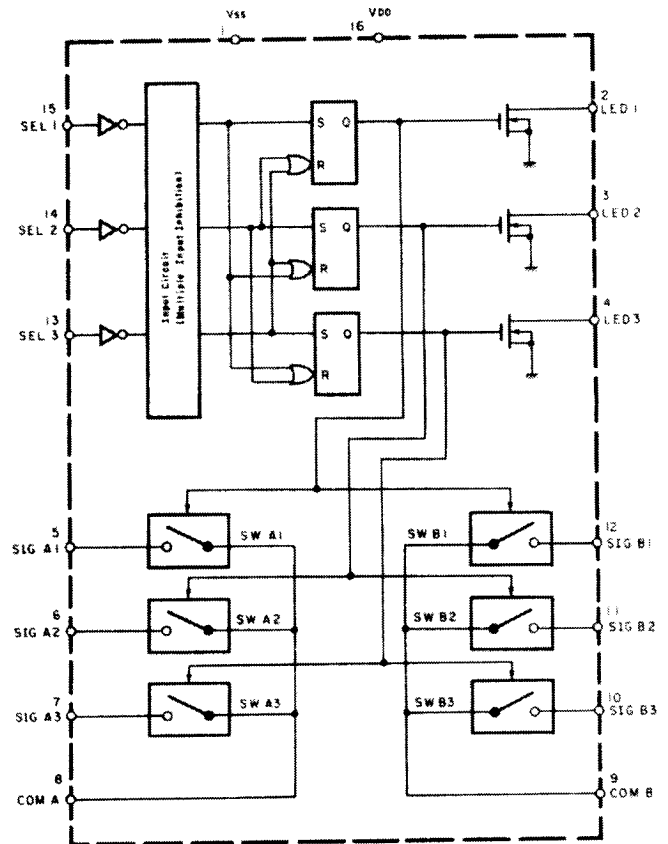
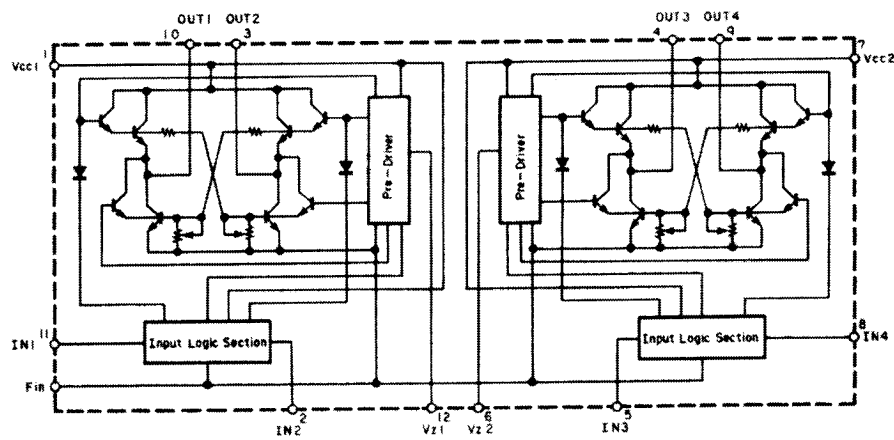


Fig. 9.1.2 Analog Switch Selector TC9145P

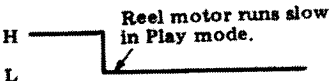
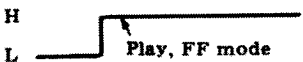
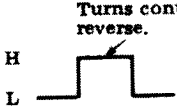


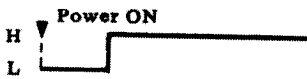
INPUT	OUTPUT	OPERATION
IN1/3 IN2/4	OUT1/3 OUT2/4	
0 0	0 0	Braking
1 0	1 0	Forward (Reverse)
0 1	0 1	Reverse (Forward)
1 1	0 0	Braking

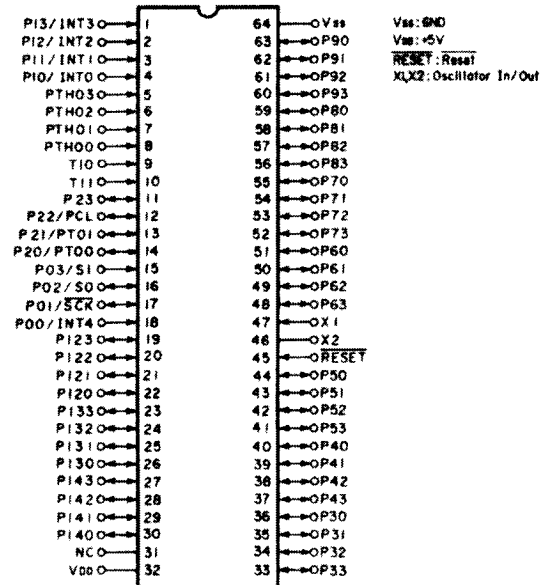
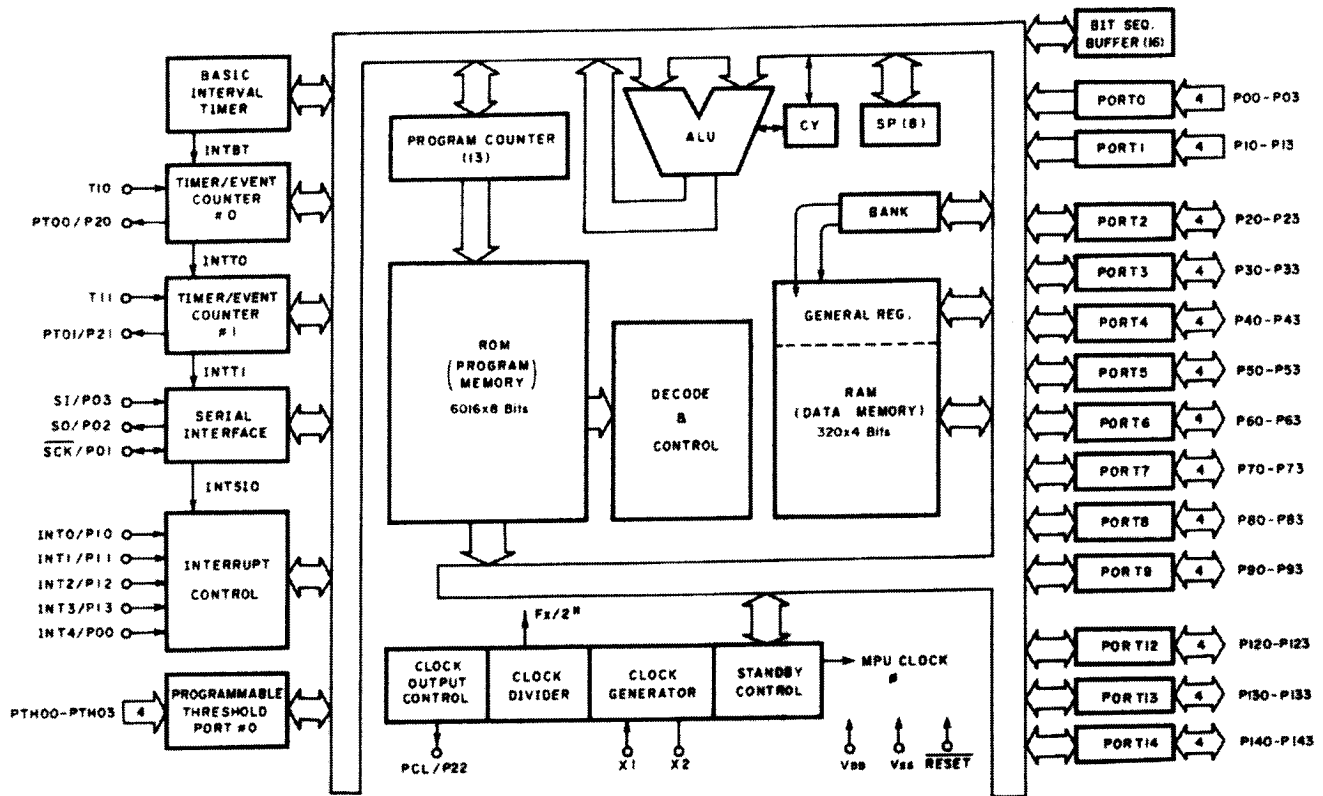
Fig. 9.1.3 Motor Driver IC LB1649

U501 μ PD75106CW (Microprocessing Unit (MPU))

Pin No.	Signal Name	In/Out	Function
1	—	I	Not used. Connected to GND.
2	AZCT	I	Playback azimuth control center detect switch is connected. Becomes "H" when the Playback Azimuth control on the Front Panel is set to the center position.
3	REM	I	Remote control receiver signal input.
4	REL P	I	Reel motor pulse input. Pulse train is input while take-up reel hub is rotating, i.e., tape is running.
5	LVR	I	Rch input for level meter. Input level is A/D-converted in this IC and the converted result is transferred to the Display Control IC (U601) via pin 13 (DDAT).
6	LVL	I	Lch input for level meter. The function is the same as above LVR (Rch).
7	KS1	I	Record/Monitor switch input. Record switch ON: 0 V Monitor switch ON: 1.6 V
8	KSO	I	Stop/Counter Search/Counter Reset switch input. Stop switch ON: 0 V Counter Search switch ON: 1.6 V Counter Reset switch ON: 3.3 V
9	MREM	I	System remote mode signal input. "L": "Tape 1" is selected. "H": "Tape 2" is selected.
10	HD $\overline{2/3}$	I	Fixed to "H".
11	—	O	Not used.
12	DCLK	O	Clock for serial data DDAT at pin 13.
13	DDAT	O	Serial data for Display Control IC (U601), which includes display data and control information.
14	DEN	O	Enable signal to Display Control IC (U601). Active "H".
15 16 17	—	I	Not used. Connected to GND.
18	POFF	I	Power OFF signal input. Becomes "L" when power is turned OFF. Power ON 
19	LMUT	O	Line mute signal output. Active "L".
20	RMUT	O	Record mute signal output. Active "L". Record mute is released only in Record/Play mode.
21	BIAS	O	Bias ON/OFF signal output. "L": Bias ON.
22 23 24	—	O	Not used. (Open).
25	HPLY	O	Source signal output. Active "L".
26	HREC	O	Tape signal output. Active "L".

Pin No.	Signal Name	In/Out	Function												
27	RMSP	O	Reel motor speed select signal output. Becomes "L" in play mode. 												
28	—	O	Not used.												
29	RMR	O	Reel motor drive control signal output. Becomes "H" in Rewind mode. 												
30	RMF	O	Reel motor drive control signal output. Becomes "H" in Play or Fast Forward mode. 												
31	NC	—	No connection.												
32	VDD	—	Supplied with +5 V.												
33	AZRD	O	Off center position indication signal of the Playback Azimuth control. Drives red LED in Rec./Play or Rec./Pause mode.												
34	AZGR	O	Center position indication signal of the Playback Azimuth control. Drives Green LED in Playback mode. <table border="1" data-bbox="1065 972 1484 1089"><thead><tr><th>Mode</th><th>Center</th><th>Out of Center</th></tr></thead><tbody><tr><td>Play</td><td>Green</td><td>—</td></tr><tr><td>Rec./Play Rec./Pause</td><td>Green</td><td>Red</td></tr></tbody></table>	Mode	Center	Out of Center	Play	Green	—	Rec./Play Rec./Pause	Green	Red			
Mode	Center	Out of Center													
Play	Green	—													
Rec./Play Rec./Pause	Green	Red													
35	ASMR	O	Control motor reverse drive signal output. Becomes "H" when turning the control motor reverse (in the direction of Play-Pause-Stop-FF/REW). 												
36	ASMF	O	Control motor forward drive signal output. Becomes "H" when turning the control motor forward (in the direction of FF/REW-Stop-Pause-Play). 												
37 38	TAP B TAP A	I	Tape type select signal input. <table border="1" data-bbox="1105 1545 1432 1671"><thead><tr><th>Type</th><th>TAP A</th><th>TAP B</th></tr></thead><tbody><tr><td>Type I</td><td>H</td><td>H</td></tr><tr><td>Type II</td><td>L</td><td>H</td></tr><tr><td>Type IV</td><td>H/L</td><td>L</td></tr></tbody></table>	Type	TAP A	TAP B	Type I	H	H	Type II	L	H	Type IV	H/L	L
Type	TAP A	TAP B													
Type I	H	H													
Type II	L	H													
Type IV	H/L	L													
39 40	B/C DOLBY NR	I	Dolby NR mode select signal input. <table border="1" data-bbox="1094 1726 1461 1852"><thead><tr><th>Mode</th><th>DOLBY</th><th>B/C</th></tr></thead><tbody><tr><td>Dolby NR OFF</td><td>H</td><td>H/L</td></tr><tr><td>Dolby NR B</td><td>L</td><td>H</td></tr><tr><td>Dolby NR C</td><td>L</td><td>L</td></tr></tbody></table>	Mode	DOLBY	B/C	Dolby NR OFF	H	H/L	Dolby NR B	L	H	Dolby NR C	L	L
Mode	DOLBY	B/C													
Dolby NR OFF	H	H/L													
Dolby NR B	L	H													
Dolby NR C	L	L													
41	MPX	I	MPX filter switch signal input. "L": MPX Filter ON, "H"=OFF												

Pin No.	Signal Name	In/Out	Function															
42 43	TIM B TIM A	I	Repeat/Timer switch signal input. <table><tr><th>Mode</th><th>TIM A</th><th>TIM B</th></tr><tr><td>OFF</td><td>H</td><td>H</td></tr><tr><td>Auto Repeat</td><td>L</td><td>H</td></tr><tr><td>Timer Play</td><td>H</td><td>L</td></tr><tr><td>Timer Record</td><td>L</td><td>L</td></tr></table>	Mode	TIM A	TIM B	OFF	H	H	Auto Repeat	L	H	Timer Play	H	L	Timer Record	L	L
Mode	TIM A	TIM B																
OFF	H	H																
Auto Repeat	L	H																
Timer Play	H	L																
Timer Record	L	L																
44	REC PRO	I	Record protect switch signal input. "H": Recording is allowed.															
45	RESET	I	System reset signal input. Active "L". 															
46 47	X2 X1	I	4 MHz oscillator is connected.															
48 49 50 51	—	O	Not used. (Open)															
52	RREM	O	System remote return signal output.															
53 54 55	—	O	Not used. (Open)															
56	EJC	I	Cassette In switch signal input. Becomes "L" while the Cassette Cover Assy is open.															
57 58 59	CAM2 CAM1 CAM0	I	Cam switch signal input. Mode of the mechanism can be sensed according to states of CAM0, CAM1 and CAM2.															
60	KFF	I	FF switch signal input. "L" when pressed.															
61	KREW	I	REW switch signal input. "L" when pressed.															
62	KPUS	I	Pause switch signal input. "L" when pressed.															
63	KPLY	I	Play switch signal input. "L" when pressed.															
64	VSS	—	Grounded.															



(TOP VIEW)

Fig. 9.1.4 Microprocessing Unit (MPU) μ PD76106CW

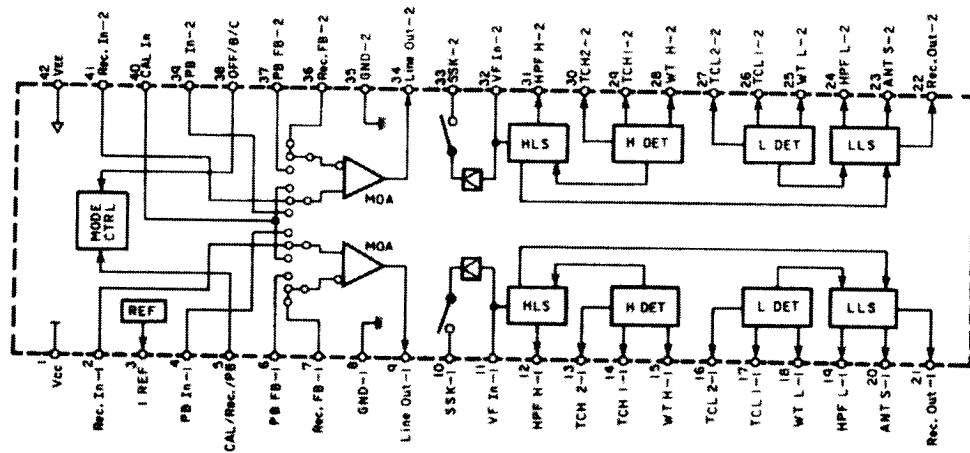


Fig. 9.1.5 Dolby NR IC CX20188

U102/U106 CX20188 (Dolby NR IC)

Pin No.	Signal Name	Function
1	Vcc	Positive power supply input terminal.
2,41	Rec. In	Record signal input terminal.
3	I Ref.	Reference current input terminal.
4,39	PB In	PB signal input terminal.
5	CAL/Rec./PB	Calibration/Recording/Playback select terminal.
6,37	PB FB	Playback signal feedback terminal.
7,36	Rec. FB	Record signal feedback terminal.
8,35	GND	GND terminal.
9,34	Line Out	Line signal (decoded signal) output terminal.
10,33	SSK	Spectral skewing switch terminal.
11,32	VF In	Encode circuit input terminal.
12,31	HPF H	HLS high-pass filter terminal.
13,30	TCH 2	HLS detector time constant determination terminal 2.

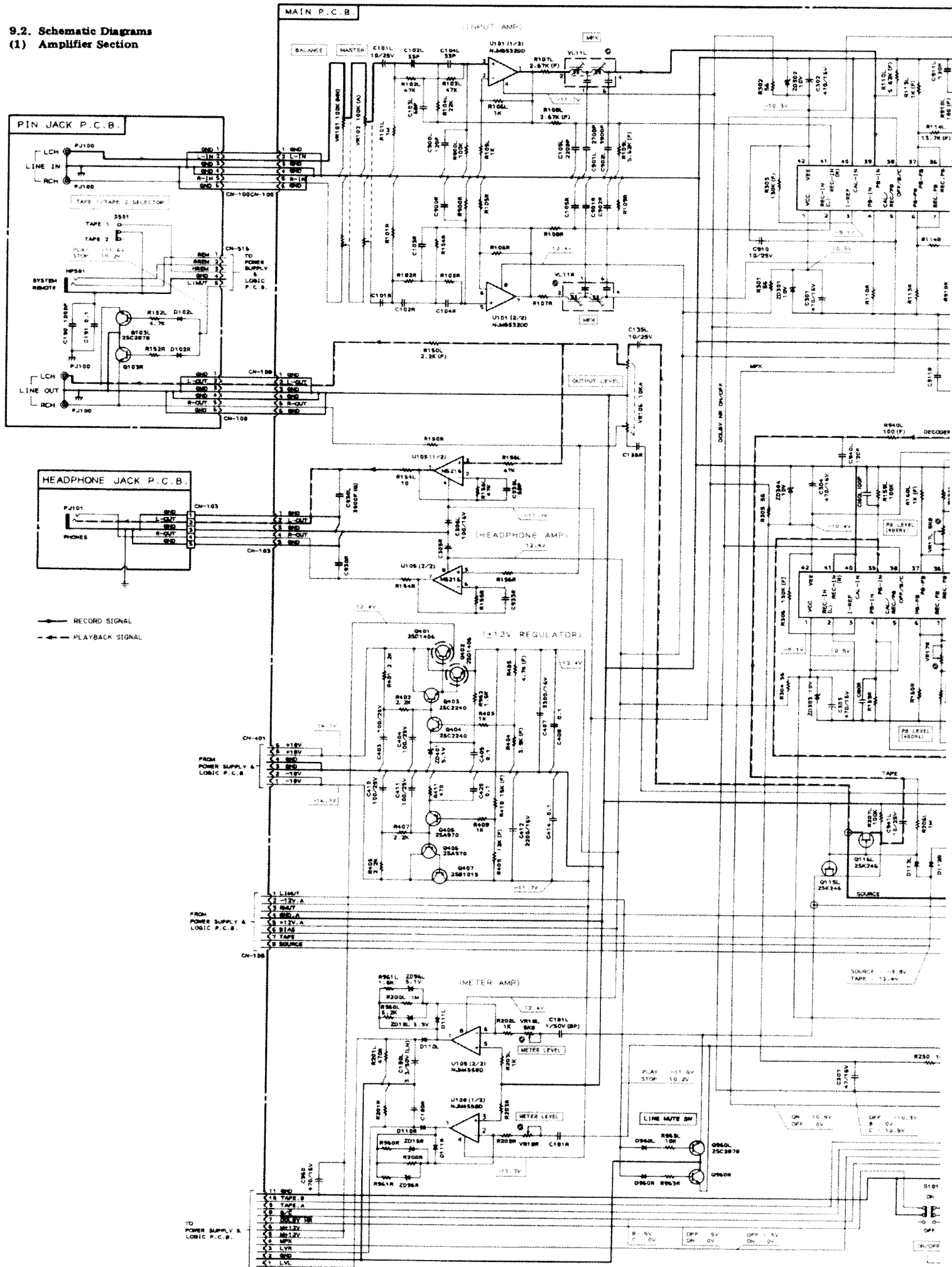
Pin No.	Signal Name	Function
14,29	TCH 1	HLS detector time constant determination terminal 1.
15,28	WT H	HLS weighting terminal.
16,27	TCL 2	LLS detector time constant determination terminal 2.
17,26	TCL 1	LLS detector time constant determination terminal 1.
18,25	WT L	LLS weighting terminal.
19,24	HPF L	LLS high-pass filter terminal.
20,23	ANT S	Anti-saturation terminal.
21,22	Rec. Out	Record signal (encoded signal) output terminal.
38	OFF/B/C	Dolby NR OFF/B-type/C-type select terminal.
40	CAL In	Calibration input terminal. Not used.
42	VEE	Negative power supply input terminal.

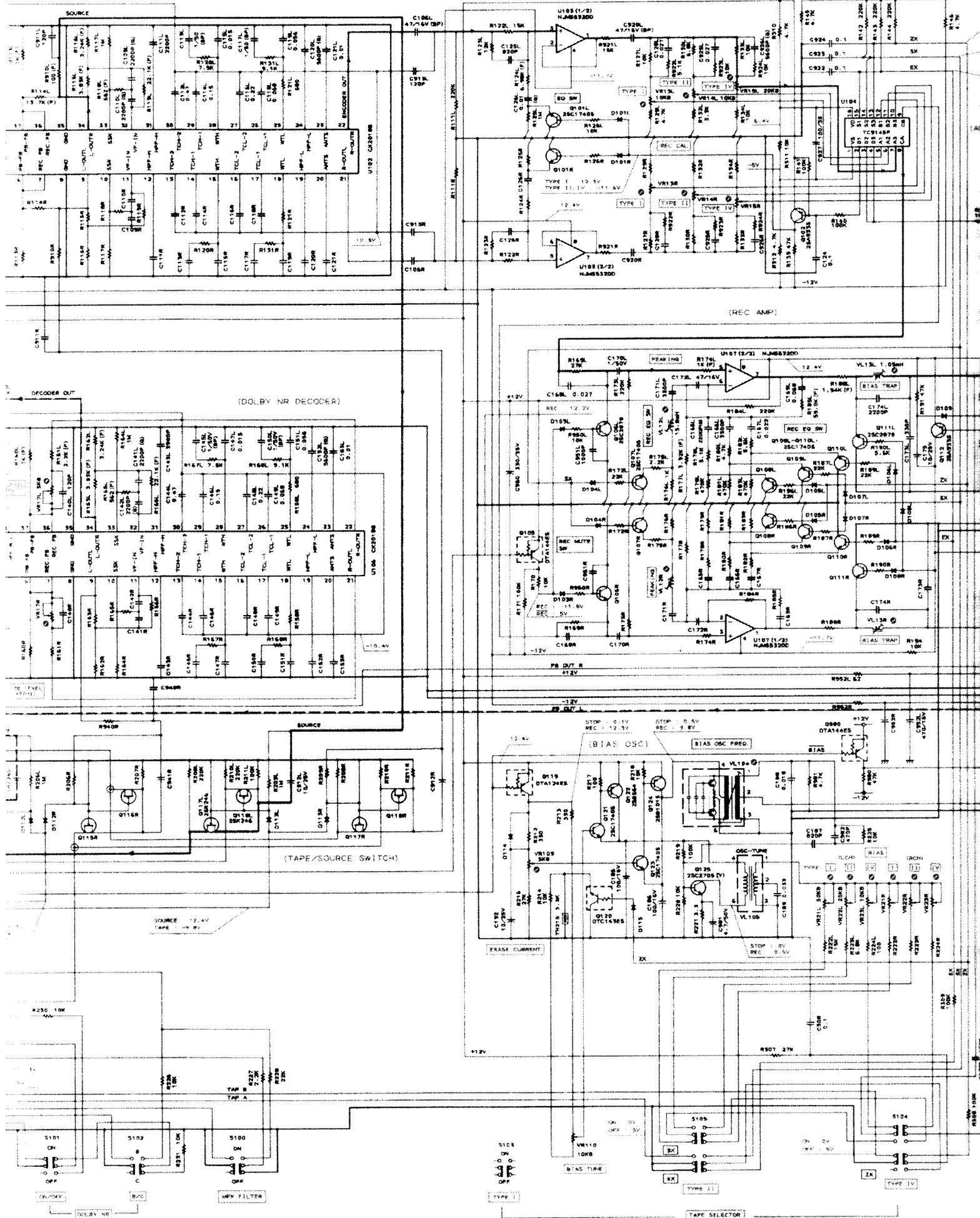
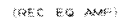
U601 MSC7112 (Display Controller)

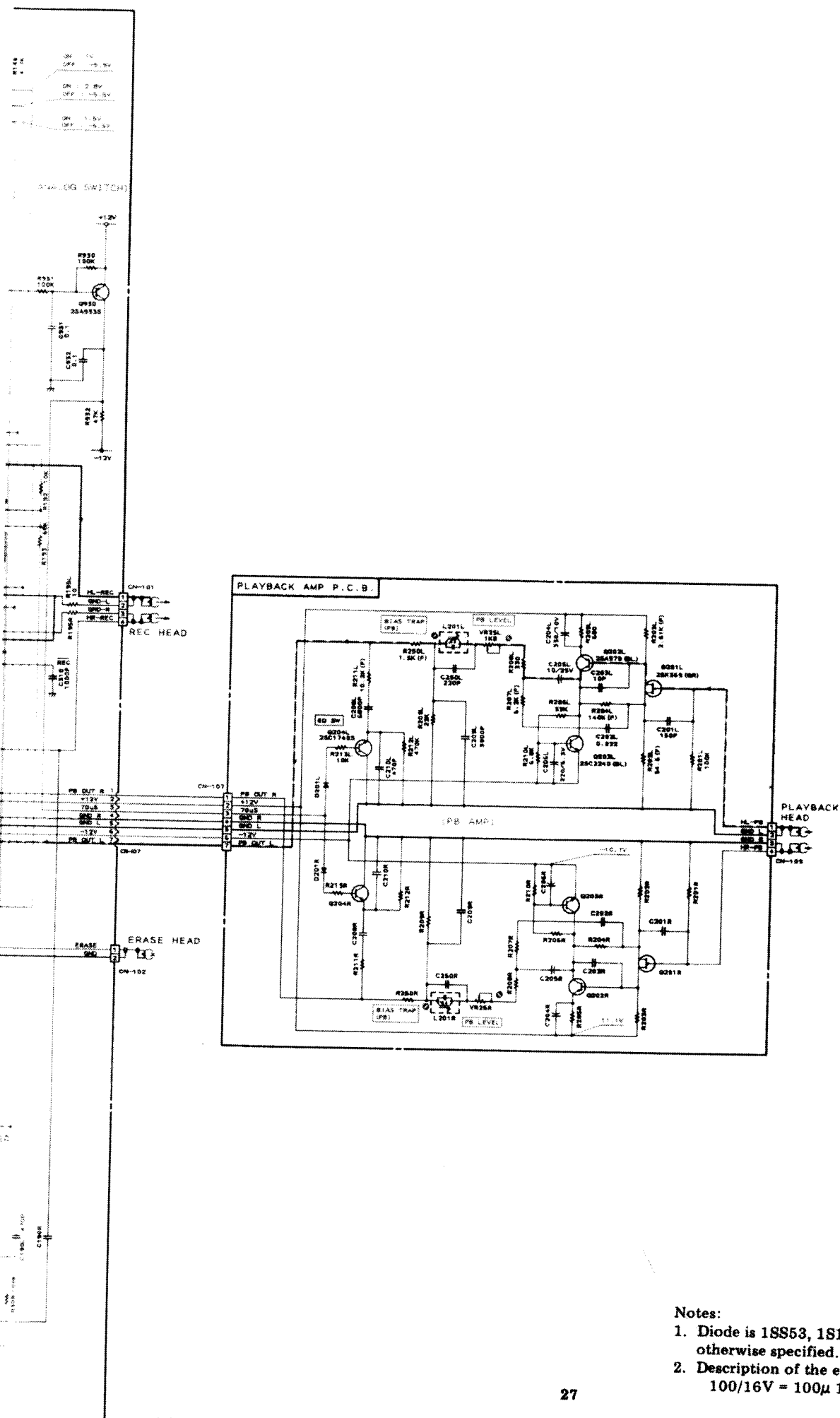
Pin No.	Signal Name	In/Out	Function
1	OSC1	I	An RC circuit is connected for making an oscillation circuit.
2	OSC0	O	
3	POR	I	Reset signal input at power ON. The IC is reset when "L".
4	VDD	—	Supplied with +5 V.
5 to 16	D1 to D12	O	FL tube grid drive output. (D8—D12 are not used.)
17 to 21	LED1 to LED5	O	Not used. (Open)
22	VSS	—	Grounded.

Pin No.	Signal Name	In/Out	Function
23	VEE	—	Supplied with approx. -25 V.
24 to 39	SEG P to SEG A	O	FL tube anode drive output. Active "H". (SEGP—SEGN are not used.)
40	SCLK	I	Shift clock input for internal shift register. Shifts the data at pin 41 (DATAIN) at every rising edge.
41	DATAIN	I	Control & display serial data sent from the mechanism control MPU (U501). MSB first.
42	LOAD	I	Data latch pulse. The data is latched to the internal register at the falling edge.

(1) Amplifier Section







2SA933S
2SC1740S
DTA114ES
DTA124ES
DTA144ES
DTC143ES
DTC144ES



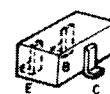
2SA970
2SA1020
2SC2240
2SC2878



2SC2705



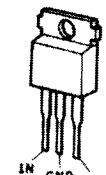
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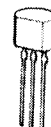
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2SB1015
2SD1406



7805



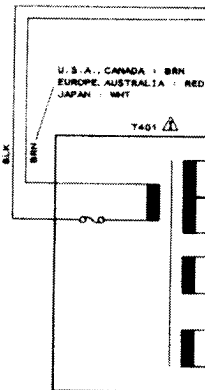
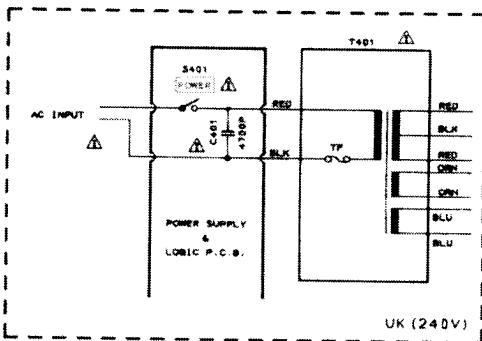
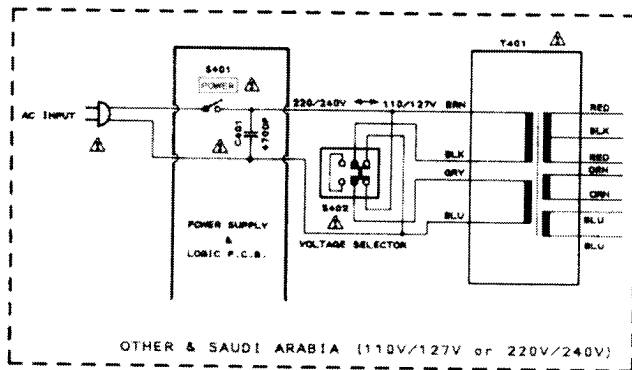
2SK246



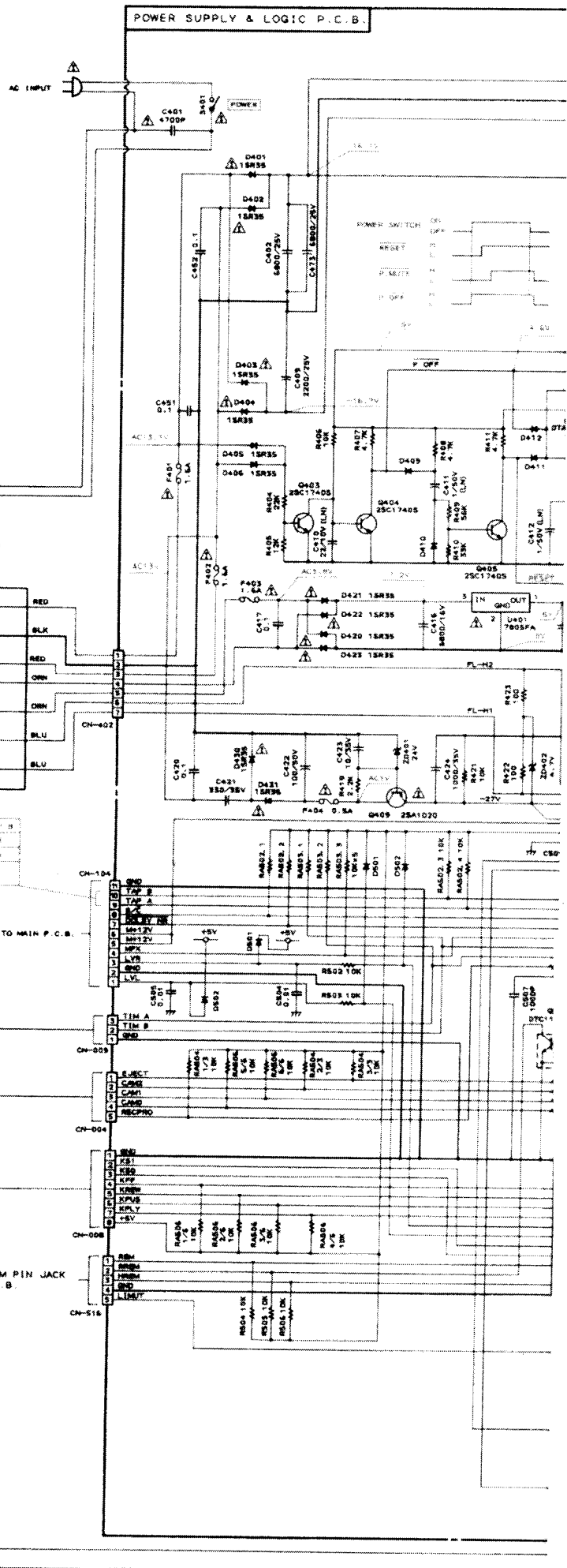
2SK369

Notes:

1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
2. Description of the electrolytic capacitor:
100/16V = 100μ 16V



TAPE	TAPE A	TAPE B
TYPE I	H	H
TYPE II	L	H
TYPE IV	H	L



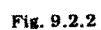
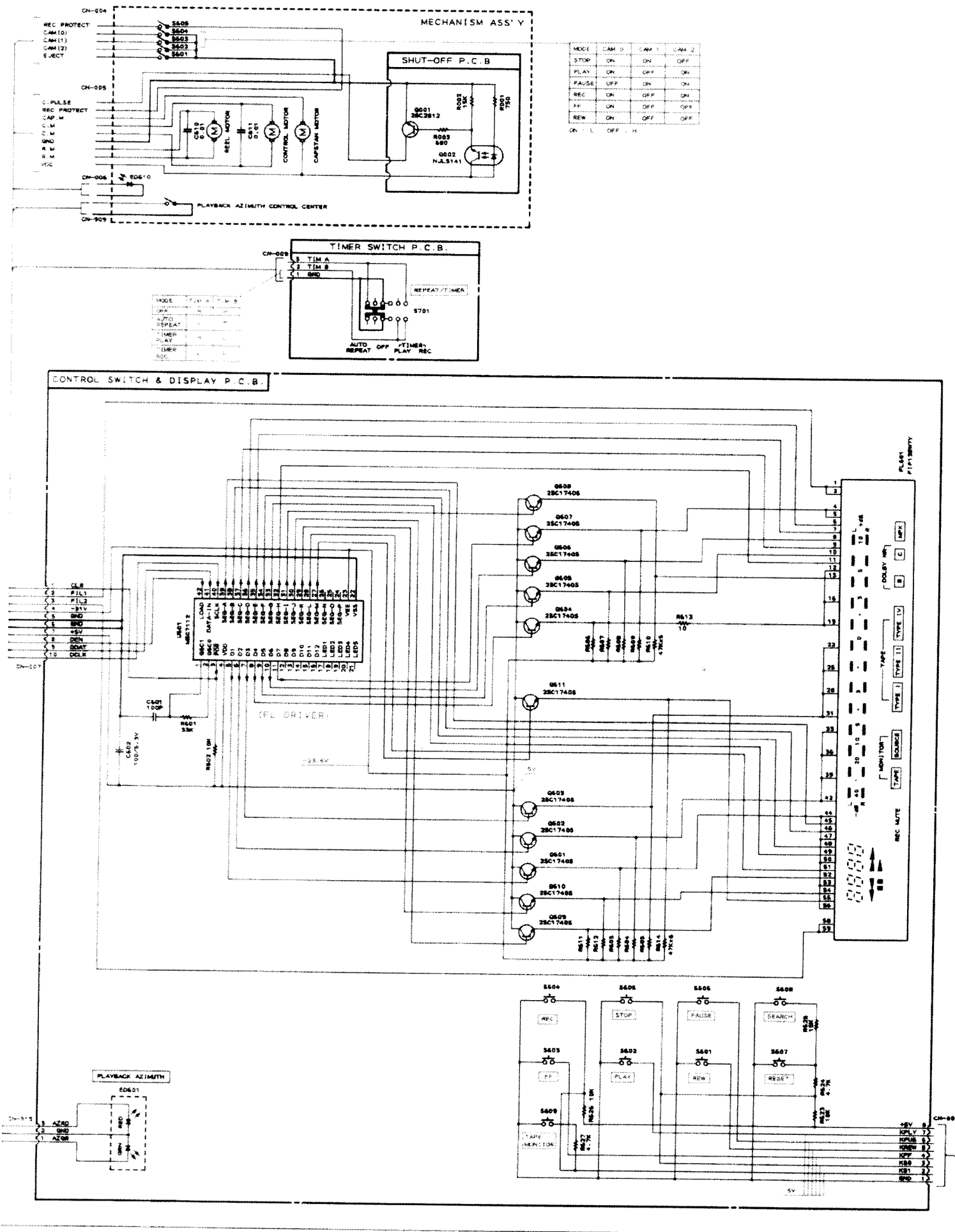
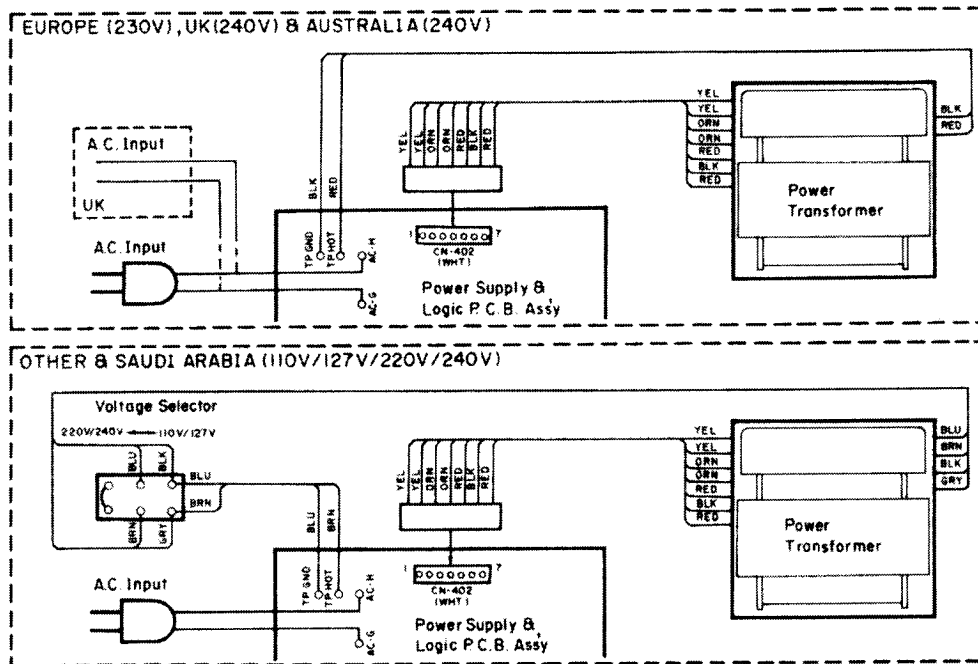


Fig. 9.2.2



10. WIRING DIAGRAM



Notes: 1. Table of wire colors

BRN — Brown	BLU — Blue
RED — Red	VIO — Violet
ORN — Orange	GRY — Gray
YEL — Yellow	WHT — White
GRN — Green	BLK — Black

2. Component side view of the P.C.B. is illustrated unless otherwise specified.

3. Wire tube color is shown in ().

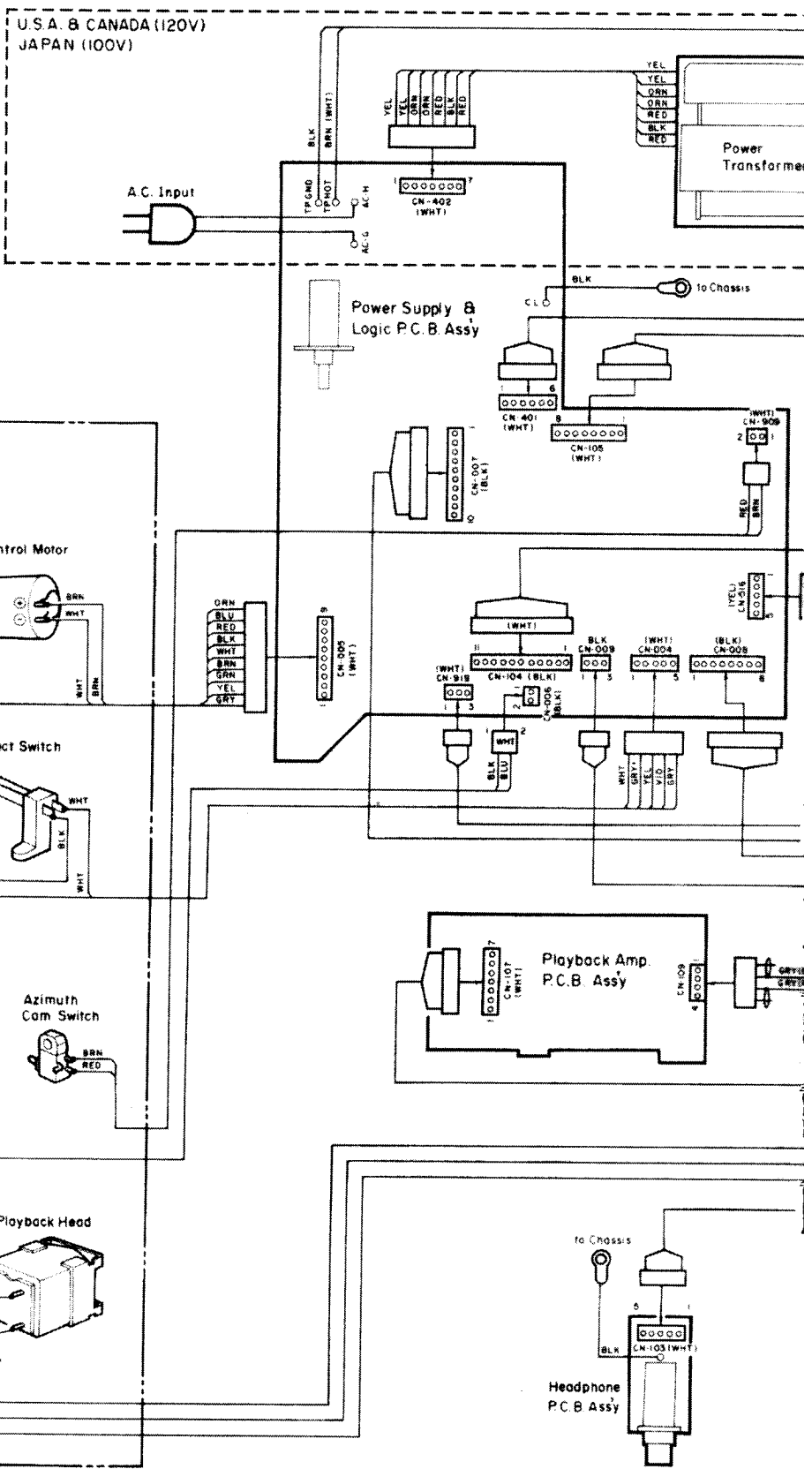
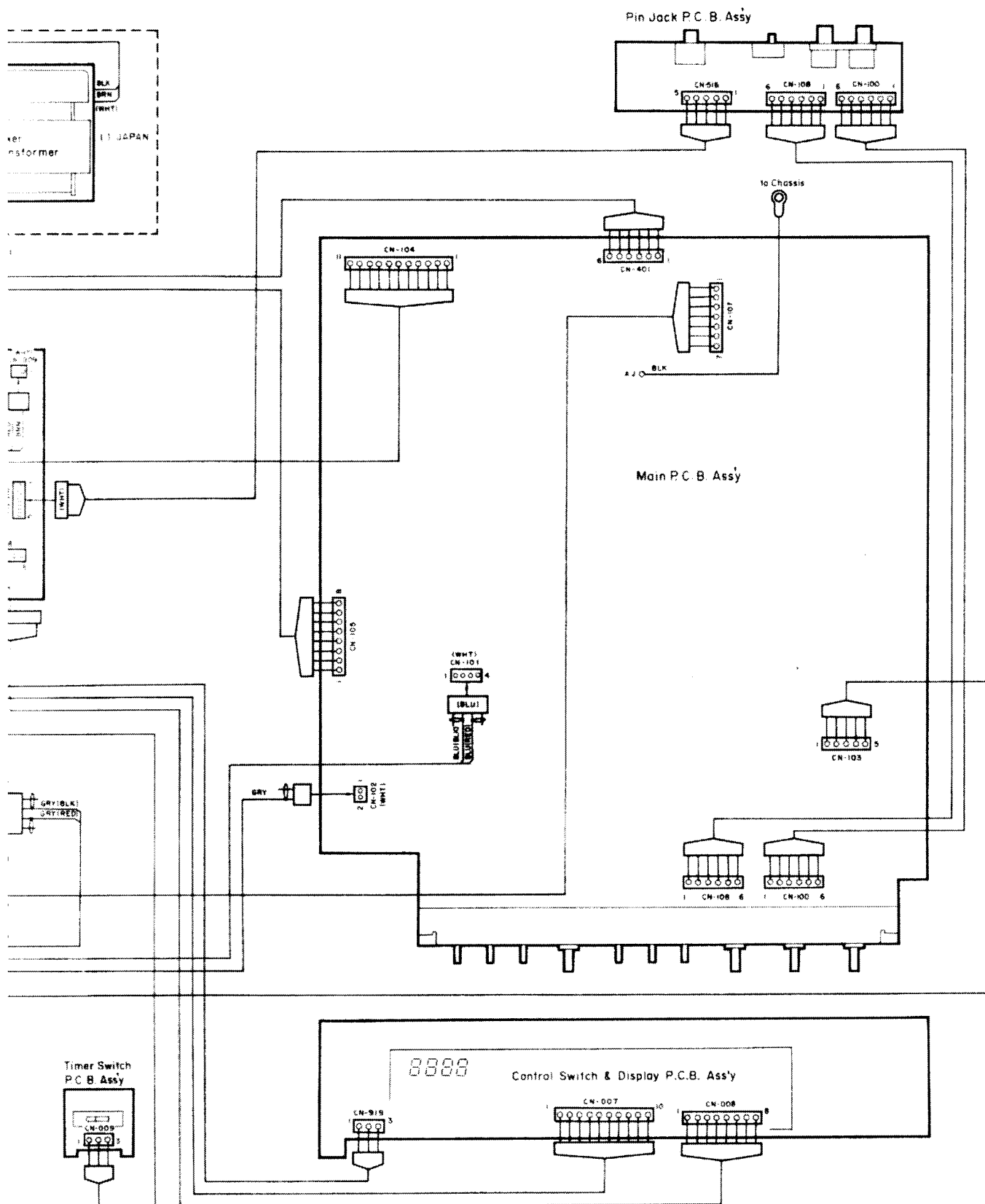


Fig. 10



11.1. Amplifier Section



11.2. Mechanism Control Section

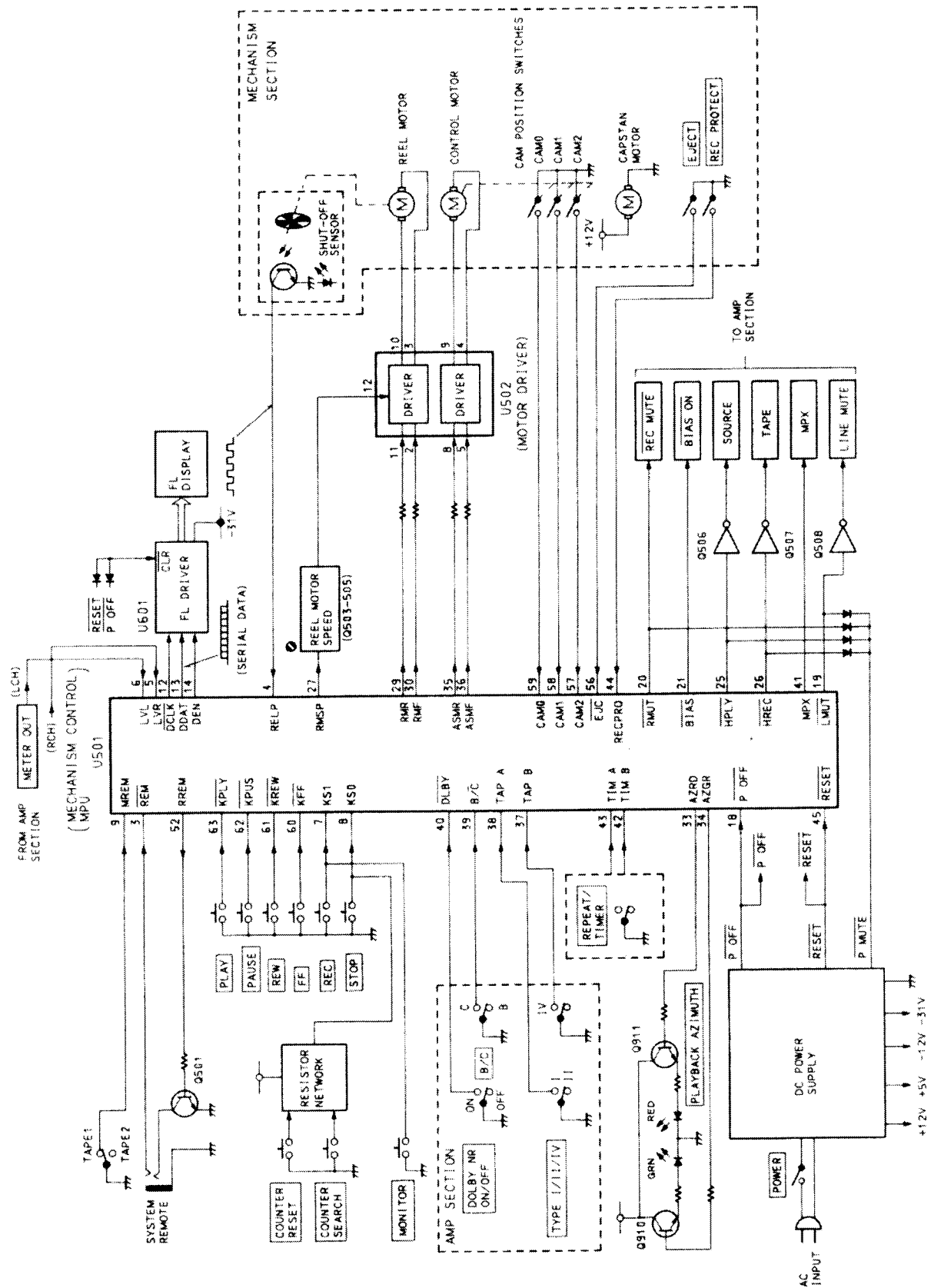


Fig. 11.2

12. TIMING CHARTS AND EQ. AMP. FREQUENCY RESPONSE

12.1. Timing Charts

(1) Overall Timing Chart

Mode	Playback			Record		
	Stop	Play	Stop	Rec./Pause	Rec./Play	Stop
Reel Motor						
Line Mute						
Bias						
Rec. Mute						

Fig. 12.1.1

(2) Mechanism Control Timing Chart

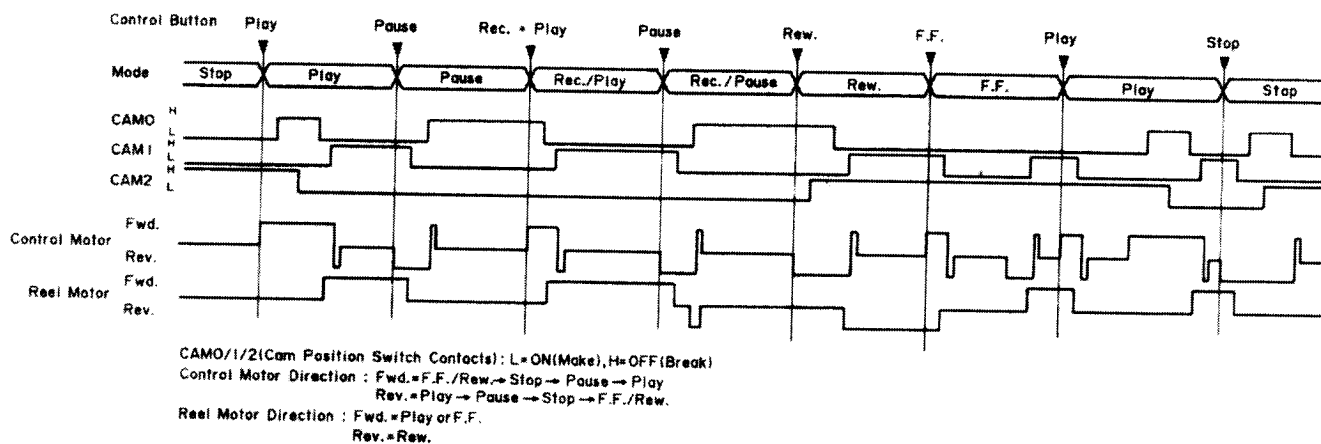


Fig. 12.1.2

12.2. Eq. Amp. Frequency Response

(1) Playback Frequency Response

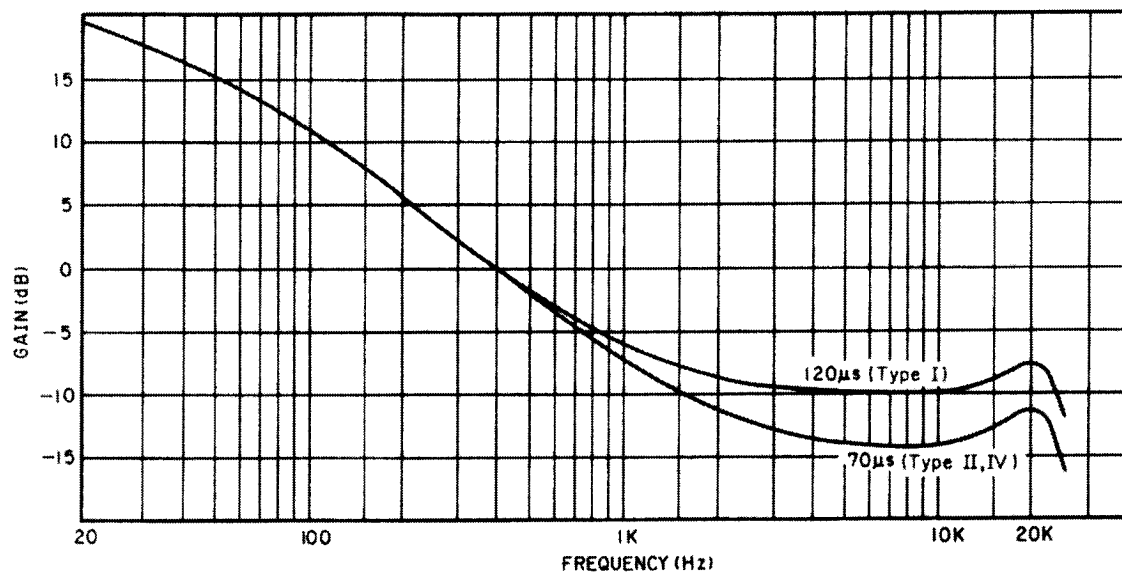


Fig. 12.2.1

(2) Record Current Frequency Response

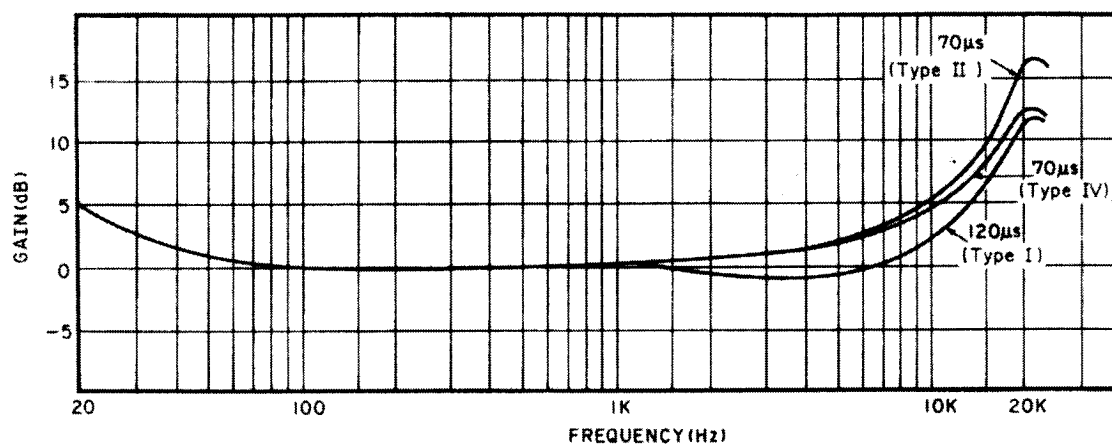


Fig. 12.2.2

13. SPECIFICATIONS

Track Configuration	4 tracks/2-channel stereo
Heads	3 (erase head x 1, record head x 1, playback head x 1)
Motors	
<Tape Transport>	DC servo motor (capstan drive) x 1 DC motor (reel drive) x 1
<Mechanism>	DC motor (cam drive) x 1
Wow and Flutter	Less than $\pm 0.06\%$ WTD Peak Less than 0.035% WTD RMS
Tape Speed	1-7/8 ips. (4.8 cm/sec.) $\pm 0.5\%$
Fast-Wind Time	Approx. 95 seconds (with C-60 cassette)
Frequency Response	20—21,000 Hz ± 3 dB (recording level —20 dB, Type I/II/IV)
Signal to Noise Ratio	
Dolby C-Type NR On	Better than 72 dB (400 Hz, 3% THD, IHF A-WTD RMS)
<70 μ s, Type IV>	
Dolby B-Type NR On	Better than 66 dB (400 Hz, 3% THD, IHF A-WTD RMS)
<70 μ s, Type IV>	
Total Harmonic Distortion	Less than 0.8% (400 Hz, 0 dB, Type I/IV) Less than 1.0% (400 Hz, 0 dB, Type II)
Channel Separation	Better than 37 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Erase	Better than 60 dB (100 Hz, +10 dB)
Bias Frequency	105 kHz
Input (Line)	50 mV/40 k Ω
Output	
Line	0.5 V/2.2 k Ω (400 Hz, 0 dB, output level control at max.)
Headphones	5.0 mW/8 Ω (400 Hz, 0 dB, output level control at max.)
Power Source	120, 230, 240 V or 110—127/220—240 VAC, 50/60 Hz
Power Consumption	25 W max.
Dimensions*	430 (W) x 100 (H) x 320 (D) mm 16-15/16 (W) x 3-15/16 (H) x 12-5/8 (D) inches
Approximate Weight	5.4 kg/11 lbs. 14 oz.

*: Dimensions do not include protruding parts. Height is the panel height.

- Specifications and Design are subject to change for further improvement without notice.
- Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
- "DOLBY" and the double-D symbol $\square\square$ are trademarks of Dolby Laboratories Licensing Corporation.

Service Manual

Cassette Deck 1

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Nakamichi America Corporation
Nakamichi Canada
Nakamichi Australia
Nakamichi GmbH

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19701 South Vermont Ave., Torrance, CA 90502 Phone: (213) 538-8150
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Praunheimer Landstraße 32, 6000 Frankfurt Main 90 Phone: (069) 768-2021 (Office), 2025 (Service)