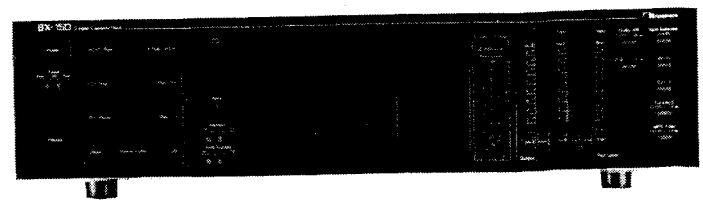
Nakamichi

Service Manual

Nakamichi
BX-150
BX-150E

2 Head Cassette Deck



CONTENTS

1. GENERAL

1.1. Voltage Selector

Voltage selector is installed on the rear panel for Other version of the Nakamichi BX-150.
This voltage selector can select either 120 V or 220-240 V at customer's disposal.

1.2. Packing Materials and Owner's Manual

Part No.	Description	Q'ty
0F03738A	Carton Box BX-150 (Silver)	1
0F03739A	Carton Box BX-150 (Black)	1
0F03752A	Carton Box BX-150E (Silver)	1
0F03753A	Carton Box BX-150E (Black)	1
0F03674B	Packing	2
0D04313A	Owner's Manual (BX-150 (U.S.A., Canada & Australia) & BX-150E (UK))	1
0D04314A	Owner's Manual (BX-150 (Japan))	1
0D04318A	Owner's Manual (BX-150 (Others) & BX-150E (220V Class 2))	1

1.3. Serial Number

The BX-150 has two versions, Silver and Black.
In the service manual, serial numbers of these versions are identified as follows:

Silver version: A320xxxxx
Black version: A321xxxxx

However, the actual serial number on the serial number plate of the BX-150 is indicated as A320.1xxxxx.
The serial number begins with A320.101001.

2. MECHANICAL ADJUSTMENTS

2.1. Tape Guide Height Check for Record/Playback Head and Erase Head

With use of an M-300 produced by Information Terminals, tape guide height check for the Record/Playback and Erase Heads shall be made, wherein a small block shall be pushed straight down to the base while in use of the M-300. Refer to Fig. 2.1.

(1) Record/Playback Head Tape Guide Height
(a) Load the base of the M-300 carefully, then set the cassette deck in Play mode.
(b) Place the small block of the M-300 on the base.
(c) Slide the small block against the tape guide of the Record/Playback Head, and check to insure that the block is accepted by the tape guide.
(d) If not, loosen the screw and insert a shim (either 30 μm (0C80048A), 60 μm (0C80038A), or 100 μm (0C80039A)) to raise the Record/Playback Head, then tighten and apply a quantity of lock tight paint to the screw.

(2) Erase Head Tape Guide Height
(a) Load the base of the M-300 carefully, then set the cassette deck in Play mode.
(b) Place the small block of the M-300 on the base.
(c) Slide the small block against the tape guide of the Erase Head, and check whether the block is accepted by the tape guide.

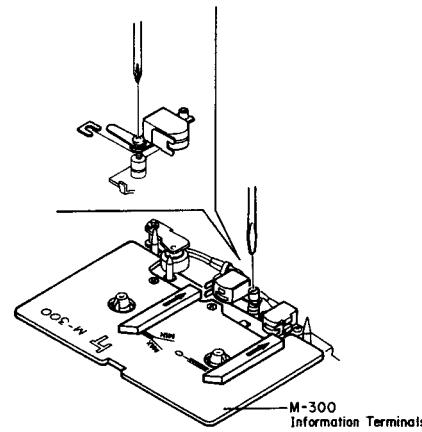


Fig. 2.1

2.2. Head Base Stroke Check

Refer to Fig. 2.2.
(1) Load the base of the M-300 carefully, then push the base toward the Record/Playback Head to eliminate the clearance between the reference pin and the base.
(2) Set the cassette deck in Play mode.
(3) Place the small block of the M-300 on the base.
(4) Contact the small block with the Record/Playback Head surface and the Erase Head surface, and check whether the end of the small block is located within the specified tolerance as shown in the figure.

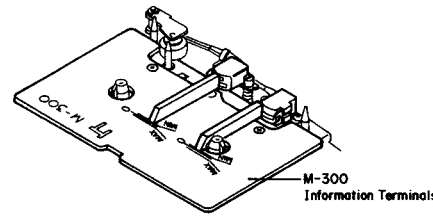


Fig. 2.2

2.3. Record/Playback Azimuth Alignment and Height Check

Refer to Fig. 2.1.
(1) Connect a VTVM to the Output Jacks.
(2) Load a 15 kHz Azimuth Tape (DA09004B), then set the cassette deck in Play mode.
(3) Turn the Azimuth Alignment Screw until the outputs of both channels become maximum.
(4) Load a 1 kHz Track Alignment Tape (DA09007B), then set the cassette deck in Play mode.
(5) Check to insure that the readings of both channels on the VTVM are below −25 dB.
If not, replacement of the Record/Playback Head will be required.
(6) Apply a quantity of lock tight paint to the Azimuth Alignment Screw.

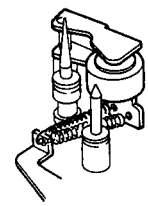


Fig. 2.3

2.4. Pressure Adjustment of Pressure Roller

Refer to Fig. 2.3.
(1) In Play mode, measure the torque of the Pressure Roller and check whether the torque is in a range of 320 ±50 g-cm.
(2) If torque is out of the range, correct it by changing the installation point of the Pressure Roller Spring.

2.5. Tape Travelling Check

Load the Tape Travelling Cassette (DA09027B), then set the cassette deck in Play mode and check the following:
(1) After more than 2 seconds, the fluctuation of the tape travelling on the Record/Playback Head is small.
(2) Tape is in contact with the head sufficiently.
(3) Tape waving is small on the heads and pressure roller.

2.6. Eject Damper Adjustment

Refer to Fig. 2.4. 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 movement by the Adjustment Screw.
CCW: Damper moves fast.
CW: Damper moves slowly.

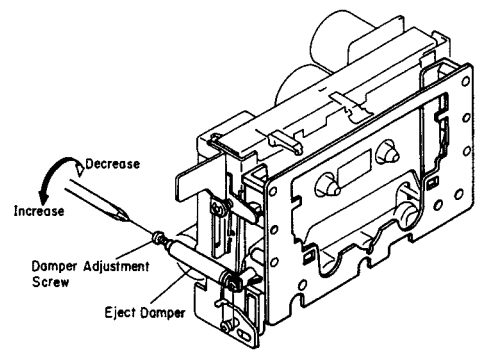


Fig. 2.4

2.7. 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 meter TW-211 (made by Sony) and set the cassette deck in Play mode.
(3) Adjust VR601 on the Main P.C.B. Ass'y to obtain exactly 50 g-cm on the torque meter.

2.8. Tape Speed Adjustment

Refer to Fig. 2.5.

(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.

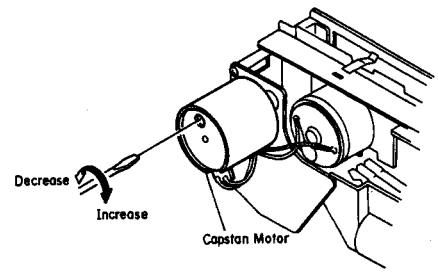


Fig. 2.5

2.9. 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 (EP56)
    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

3. PARTS LOCATION FOR ELECTRICAL ADJUSTMENT

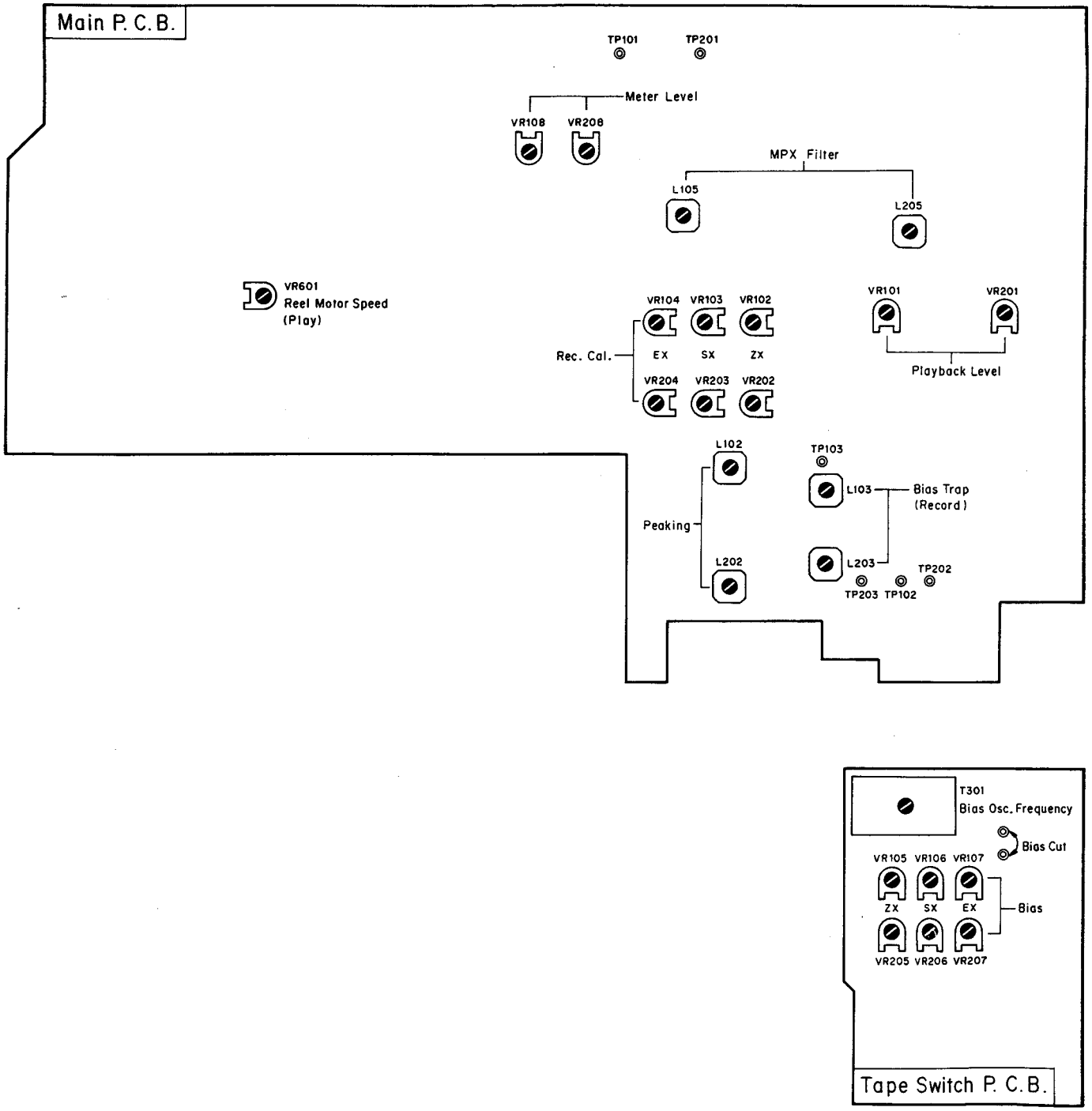


Fig. 3

4. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

Note: Electrical adjustment should be performed after mechanical adjustment is completed.

4.1. Adjustment and Measurement Instructions

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
1	Tape Speed Adjustment	3 kHz Speed and Wow/Flutter Tape (DA09006C)	Frequency Counter to Output Jacks	Playback Eq. SW — 70 μs	Tape Speed Adjustment Volume	Adjust the volume incorporated in the capstan motor to obtain 3 kHz ±0.5% on the frequency counter.
2	Meter Level Calibration	400 Hz to Input Jacks	VTVM to TP101, TP201 on Main P.C.B.	Record, Pause	Main P.C.B. VR108,VR208	1. Feed in 400 Hz, then adjust the Input Level control to obtain 350 mV —0.8 dB on the VTVM. 2. Adjust VR108 (VR208) so that the 0 dB segment of the level meter starts illuminating. 3. Adjust the Input Level control to obtain 350 mV on the VTVM, then decrease the generator output level by 20 dB. 4. Check to insure that the segment for —20 dB illuminates.
3	MPX Filter Adjustment	19 kHz ±100 Hz to Input Jacks	VTVM to Output Jacks	Record, Pause MPX SW — OFF/ON	Main P.C.B. L105,L205	1. Adjust the Input Level control to obtain 0 dB (500 mV) on the VTVM. 2. Set the MPX Filter switch to ON, then adjust L105 (L205) to obtain minimum reading on the VTVM (minimum reading will be less than —30 dB).
4	Record/ Playback Head Azimuth Alignment	15 kHz Azimuth Tape (DA09004B)	VTVM to Output Jacks	Playback Eq. SW — 70 μs Dolby NR SW — OFF MPX SW — OFF	Record/Playback Head Azimuth Alignment Screw	Adjust the Record/Playback Head Azimuth Alignment Screw to obtain maximum readings of both channels on the VTVM.
5	Playback Level Calibration	400 Hz Level Tape (DA09005B)	VTVM to TP101, TP201 on Main P.C.B.	Same as above	Main P.C.B. VR101,VR201	Adjust VR101 (VR201) to obtain 350 mV on the VTVM.
6	Playback Frequency Response Adjustment	400 Hz Level Tape (DA09005B) 10 kHz PB Frequency Response Tape (DA09003B) 15 kHz PB Frequency Response Tape (DA09002B) 20 kHz PB Frequency Response Tape (DA09001B)	VTVM to Output Jacks	Playback Eq. SW — 70 μs Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. R110,R210 R195,R295	1. Load a 400 Hz level tape and play it back. 2. Load 10 kHz, 15 kHz and 20 kHz PB frequency response tapes and adjust the record/playback head azimuth to obtain maximum levels on the VTVM with each tape. 3. Read the maximum levels with each tape and check to insure that the levels against the 400 Hz level tape are within the following ranges. If not, short R110 (R210) or R195 (R295) on the Main P.C.B. Ass'y to obtain satisfactory results. 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 Check to insure that the difference in level between 10 kHz (—20 dB) and 20 kHz (—20 dB) is less than 2 dB. Refer to the "Playback Frequency Response Adjustment" in item 4.2 for the detailed description. 4. Conduct step 4 "Record/Playback Head Azimuth Alignment".
7	Bias Oscillation Frequency and Erase Current Adjustment		Frequency Counter to TP102 on Main P.C.B. and VTVM across the additional 0.1 Ω resistor	Record, Pause Tape SW — ZX Eq. SW — 70 μs Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. T301 R318,R350	1. Adjust T301 to obtain 105 kHz on the frequency counter. 2. Connect an additional 0.1 Ω resistor in series to the Erase Head, then connect a VTVM across it. 3. Check the erase current by the VTVM. Erase current will be in a range of 145 mA to 185 mA (typically approx. 165 mA). If erase current is not sufficient, increase it by shorting R318 or R350. 4. After completion of the erase current adjustment, re-check the bias oscillation frequency. 5. Remove the additional 0.1 Ω resistor.
8	Record Amplifier Equalizer Adjustment	21 kHz (—20 dB) to Input Jacks	VTVM to TP102, TP202 on Main P.C.B.	Same as above	Main P.C.B. L102,L202	1. Short both Bias Stop test pins with a clip to stop the bias oscillation. 2. Adjust L102 (L202) to obtain peak reading at 21 kHz on the VTVM. 3. Remove the clip from the test pins.
9	Bias Trap Adjustment (Record Amp.)	Remove input signals	VTVM to TP103, TP203 on Main P.C.B.	Same as above	Main P.C.B. L103,L203	Adjust L103 (L203) to obtain maximum reading on the VTVM.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
10	Record Level Calibration and Recording Bias Current Adjustment	400 Hz (0 dB), 400 Hz (—20 dB), 10 kHz (—20 dB) and 17 kHz (—20 dB) to Input Jacks	VTVM to TP101, TP201 and TP102, TP202 on Main P.C.B. and VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 μs (ZX/SX) 120 μs (EX) Dolby NR SW — C-Type/B-Type/ OFF MPX SW — OFF	Main P.C.B. (Level) ZX: VR102,VR202 SX: VR103,VR203 EX: VR104,VR204 (Bias) ZX: VR105,VR205 SX: VR106,VR206 EX: VR107,VR207	Adjustment should be made in the order of ZX, SX and EX. 1. Set the Dolby NR switch to C-Type. 2. Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y. 3. Set the BX-150 in Record/Pause mode. 4. Feed in 400 Hz, then adjust the Input Level control to obtain 350 mV (0 dB) on the VTVM. 5. Load a reference ZX tape (DA09037B), reference SX tape (DA09025B) and reference EXII tape (DA09066B). 6. Adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EXII to center positions. 7. Connect the VTVM to TP102 (TP202) on the Main P.C.B. Ass'y. Adjust Bias VR105 (VR205) for ZX, VR106 (VR206) for SX and VR107 (VR207) for EXII to obtain the following bias current in Record/Pause mode (the VTVM is connected across a 10-ohm resistor). ZX: approx. 1 mA SX: approx. 0.5 mA EXII: approx. 0.3 mA 8. Connect the VTVM to the Output Jacks. 9. Feed in 400 Hz (—20 dB) and 17 kHz (—20 dB), then record, rewind and play them back. Adjust Bias VR105 (VR205) for ZX, VR106 (VR206) for SX and VR107 (VR207) for EXII to obtain the same playback levels at 400 Hz (—20 dB) and 17 kHz (—20 dB) on the VTVM. 10. Feed in 400 Hz (0 dB), then record, rewind and play it back. Adjust Record Cal. VR102 (VR202) for ZX, VR103 (VR203) for SX and VR104 (VR204) for EXII to obtain 0 dB on the VTVM. 11. Repeat above 9 and 10 two or three times to obtain optimum performance. 12. Set the Dolby NR switch to OFF. 13. Feed in 400 Hz (—20 dB), 10 kHz (—20 dB) and 17 kHz (—20 dB), then record, rewind and play them back. Check to insure that the playback levels are within —20 dB ±3 dB against the levels in Dolby NR C-Type. 14. Set the Dolby NR switch to B-Type. 15. Feed in 10 kHz (—20 dB) and 17 kHz (—20 dB), then record, rewind and play them back. Check to insure that the levels are within —20 dB ±2 dB against the levels in Dolby NR OFF. 16. Check to insure whether the total harmonic distortion is less than 1.0% for ZX and EXII tapes and 1.2% for SX tape. 17. If above is not sufficient, repeat 9 to 16 till satisfactory results are obtained.
11	Overall Frequency Response Adjustment	400 Hz (0 dB) and 20 Hz to 17 kHz (—20 dB) to Input Jacks	VTVM to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 μs (ZX/SX) 120 μs (EX) Dolby NR SW — OFF MPX SW — OFF	Main P.C.B. L102,L202	1. Set the BX-150 in Record/Pause mode. 2. Feed in 400 Hz, then set the Input Level control to obtain 0 dB (500 mV) on the VTVM. 3. Decrease the generator output control by 20 dB. 4. Feed in 20 Hz to 17 kHz (—20 dB) and record, rewind and play them back, then check to insure whether the output levels are within —20 dB ±4 dB. 5. If above is not sufficient, adjust L102 (L202) to obtain approx. —20 dB on the VTVM, then conduct step 10 "Record Level Calibration and Recording Bias Current Adjustment". 6. If above is not sufficient, precise re-adjustment of step 6 "Playback Frequency Response", replacement of Record/Playback Head or check on item 2.5 "Tape Travelling Check" will be required.
12	Crosstalk Measurement	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback Tape SW — ZX Eq. SW — 70 μs Dolby NR SW — OFF MPX SW — OFF		1. Erase the tape with bulk eraser. 2. Adjust the Input Level control to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037B). 3. Turn the cassette tape the other way round and play it back. 4. Measure the difference between 2 and 3.

STEP	ITEM	SIGNAL SOURCE	OUTPUT CONNECTION	MODE	ADJUST-MENT	REMARKS
13	Channel Separation Measure-ment	1 kHz to Input Jacks	1 kHz Band Pass Filter and VTVM to Output Jacks	Record and Playback Tape SW — ZX Eq. SW — 70 μs Dolby NR SW — OFF MPX SW — OFF		1. Erase the tape with bulk eraser. 2. Adjust the Input Level control to obtain 0 dB on the VTVM, and set the Balance control to the extreme left (right). 3. Record, rewind and play it back, then measure the R ch (L ch) level.
14	Erasure Measure-ment	100 Hz to Input Jacks	100 Hz Band Pass Filter and VTVM to Output Jacks	Same as above		1. Erase the tape with bulk eraser. 2. Adjust the Input Level control to obtain 0 dB on the VTVM, and record the signals on the reference ZX tape (DA09037B). 3. Rewind the tape, set the Input Level control to minimum, and then record again. 4. Rewind the tape, play it back, and then measure the difference between 2 and 3.
15	Signal to Noise Ratio Measure-ment	400 Hz to Input Jacks	IHF-A Curve, Filter, VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW — ZX Eq. SW — 70 μs Dolby NR SW — B-Type/C-Type MPX SW — OFF		1. Set the Dolby NR switch to B-Type/C-Type. 2. Feed in 400 Hz, then record, rewind and play it back. 3. Adjust the Input Level control to obtain 3% total harmonic distortion in Playback mode. 4. Set the Input Level control to minimum then record again. 5. After rewound, play back and check the output level difference between 3 and 4. Note: The filter of IHF-A curve shall be used in the measurements.
16	Total Harmonic Distortion Measure-ment	400 Hz to Input Jacks	VTVM and Distortion Meter to Output Jacks	Record and Playback Tape SW — ZX/SX/EX Eq. SW — 70 μs (ZX/SX) 120 μs (EX) Dolby NR SW — OFF MPX SW — OFF		1. Adjust the Input Level control to obtain 0 dB on the VTVM. 2. Record, rewind and play it back. 3. Read the distortion meter and check to insure that the distortion is as follows: EXII . . . . . 1.0% or less SX . . . . . 1.2% or less ZX . . . . . 1.0% or less
17	Wow/ Flutter Measure-ment	3 kHz Speed and Wow/ Flutter Tape (DA09006C)	Wow/Flutter Meter to Output Jacks	Playback Eq. SW — 70 μs		Play back and read the wow/flutter meter.

4.2. Playback Frequency Response Adjustment

Figs. 4.1 and 4.2 show the playback amp. circuit for adjustment and the playback equalization curve.

This adjustment will be required if playback level is not sufficient during playing back a 20 kHz PB frequency response tape.

The peaking portion of the equalization curve compensates the gap loss of the playback head. Peaking level is varied by the short circuit of R110 (R210) or R195 (R295).

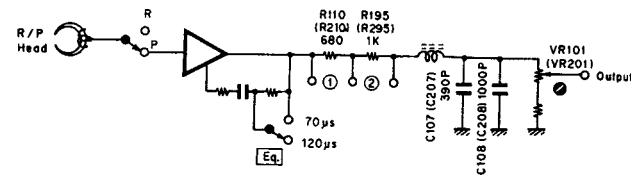


Fig. 4.1

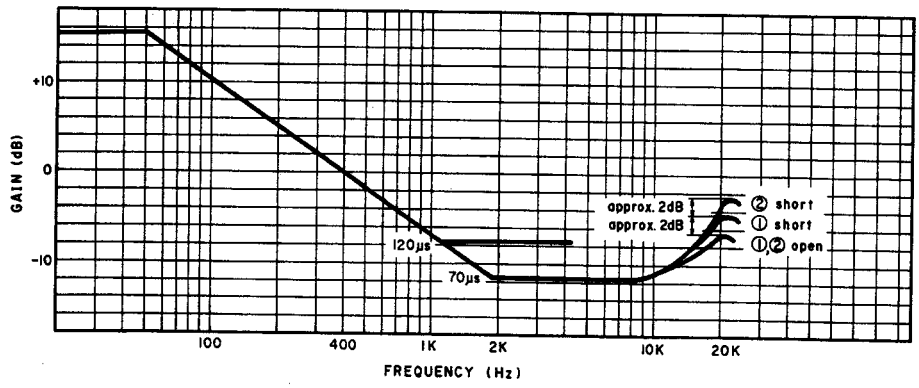


Fig. 4.2

4.3. Dolby NR Circuit Check

Dolby NR circuit incorporates Dolby NR ICs which have no adjustment point.
Perform the following checks and make sure that the IC operates accurately, i.e., frequency response through IC is accurate.

4.3.1. Dolby NR B-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C134 (C234) on Main P.C.B. (Positive side is connected to IC101-9 (IC201-9)).
Output Connection: VTVM to test point TP101 (TP201) on Main P.C.B.
Mode: Stop
Dolby NR SW — ON (B-Type)/OFF

(a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
(b) Set the Dolby NR switch to B-Type.
Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
(c) Set the Dolby NR switch to OFF.
Check to insure that the reading is +3.2 dB ±1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks
Output Connection: VTVM to test point TP101 (TP201) and negative side of C140 (C240) on the Main P.C.B.
Mode: Record/Pause
Dolby NR SW — ON (B-Type)/OFF

(a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
(b) Feed in 1.4 kHz and adjust the Input level control to obtain 35 mV/11.1 mV on the VTVM.
(c) Remove the VTVM from TP101 (TP201) and reconnect it to negative side of C140 (C240).
(d) Check to insure that the reading at C140 (C240) corresponds to the following with Dolby NR switch OFF and B-Type.

Input Level	Level at negative side of C140 (C240)	
at TP101 (TP201)	Dolby NR OFF	Dolby NR B-Type
35 mV	0 dB	+3.2 dB ±1.5 dB
11.1 mV	0 dB	+8.2 dB ±1.5 dB

4.3.2. Dolby NR C-Type Circuit Check

(1) Playback Dolby NR Circuit

Signal Source: 1.4 kHz to negative side of C134 (C234) on Main P.C.B. (Positive side is connected to IC101-9 (IC201-9)).
Output Connection: VTVM to test point TP101 (TP201) on Main P.C.B.
Mode: Stop
Dolby NR SW — ON (C-Type)/OFF

(a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
(b) Set the Dolby NR switch to C-Type.
Feed in 1.4 kHz and adjust the generator output control to obtain 35 mV on the VTVM.
(c) Set the Dolby NR switch to OFF.
Check to insure that the reading is +6.5 dB ±1.5 dB on the VTVM.

(2) Record Dolby NR Circuit

Signal Source: 1.4 kHz to Input Jacks
Output Connection: VTVM to test point TP101 (TP201) and negative side of C140 (C240) on the Main P.C.B.
Mode: Record/Pause
Dolby NR SW — ON (C-Type)/OFF

(a) Connect a VTVM to TP101 (TP201) on the Main P.C.B. Ass'y.
(b) Feed in 1.4 kHz and adjust the Input level control to obtain 35 mV/11.1 mV on the VTVM.
(c) Remove the VTVM from TP101 (TP201) and reconnect it to negative side of C140 (C240).
(d) Check to insure that the reading at C140 (C240) corresponds to the following with Dolby NR switch OFF and C-Type.

Input Level	Level at negative side of C140 (C240)	
at TP101 (TP201)	Dolby NR OFF	Dolby NR C-Type
35 mV	0 dB	+6.5 dB ±1.5 dB
11.1 mV	0 dB	+11.4 dB ±1.5 dB

5. MECHANISM ASS'Y AND PARTS LIST

5.1. Synthesis

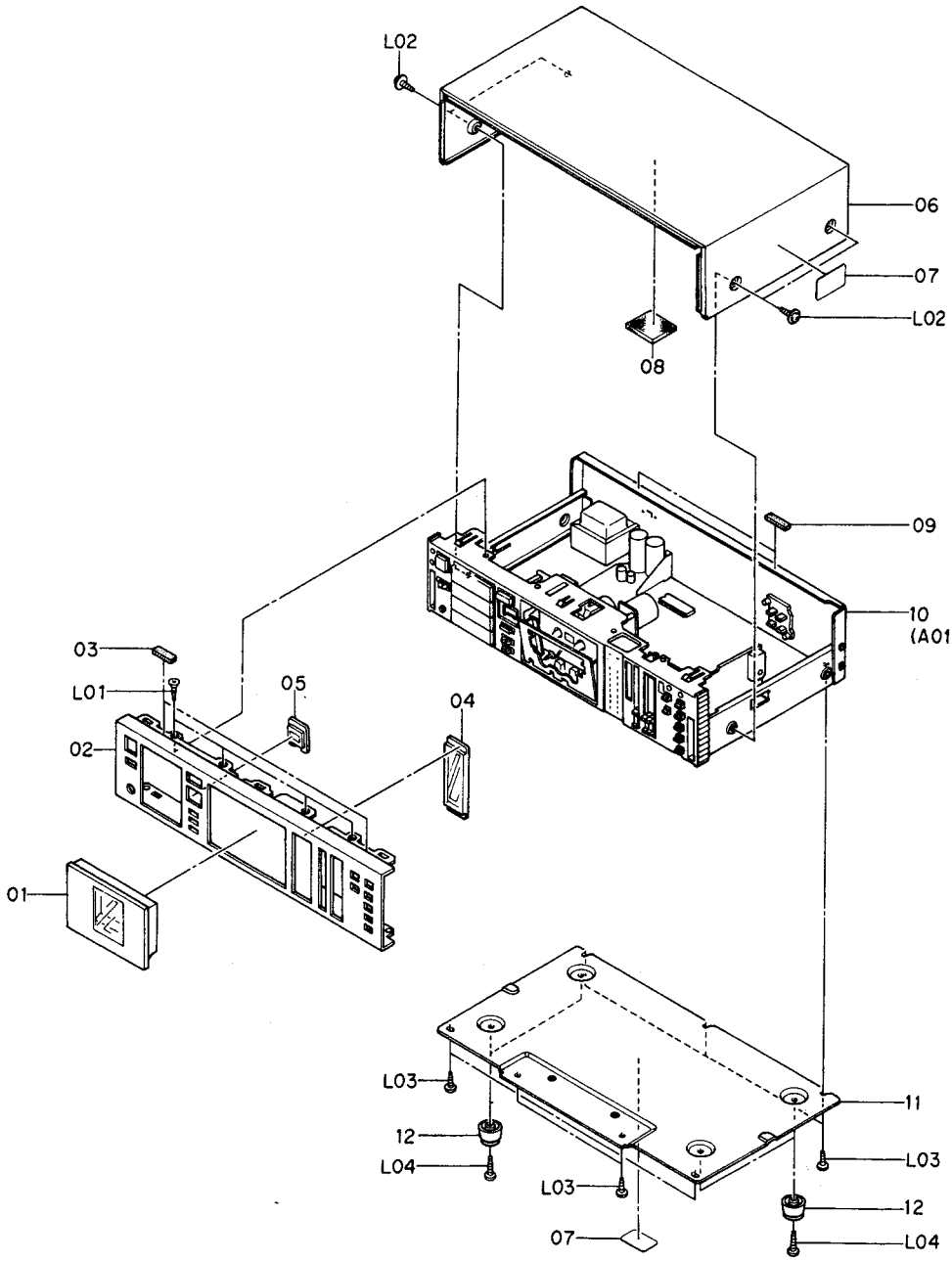


Fig. 5.1

Schematic Ref. No.	Part No.	Description	Q'ty	Schematic Ref. No.	Part No.	Description	Q'ty
		Synthesis Serial No.: A32001001 - (Silver)				Synthesis Serial No.: A32101001 - (Black)	
01	HA04494A	Cassette Case Cover Ass'y	1	01	HA04495A	Cassette Case Cover Ass'y	1
02	0H04265A	Front Panel BX-150	1	02	0H04266A	Front Panel BX-150	1
	0H04360A	Front Panel BX-150E	1		0H04361A	Front Panel BX-150E	1
03	0J04628A	Top Cover Cushion (Front)	2	03	0J04628A	Top Cover Cushion (Front)	2
04	0H04308A	Meter Cover	1	04	0H04308A	Meter Cover	1
05	0H04293A	Counter Cover	1	05	0H04293A	Counter Cover	1
06	0H04155B	Top Cover	1	06	0H04156B	Top Cover	1
07	0M04377A	Caution Label	1	07	0M04377A	Caution Label	1
08	0J04630A	Top Cover Rubber	1	08	0J04630A	Top Cover Rubber	1
09	0J04629A	Top Cover Cushion (Rear)	2	09	0J04629A	Top Cover Cushion (Rear)	2
10	—	Synthesis Mechanism Ass'y	1	10	—	Synthesis Mechanism Ass'y	1
11	0J04762A	Bottom Cover	1	11	0J04762A	Bottom Cover	1
12	0J03564A	Leg T-H	4	12	0J03564A	Leg T-H	4
L01	0E03054A	BT 3x8 ⊕ Countersunk	4	L01	0E03054A	BT 3x8 ⊕ Countersunk	4
L02	0E03033A	BT 4x8 ⊕ Pan Washer-Faced	4	L02	0E03033A	BT 4x8 ⊕ Pan Washer-Faced	4
L03	0E00868A	BT 3x8 ⊕ Binding	7	L03	0E00868A	BT 3x8 ⊕ Binding	7
L04	0E00865A	BT 3x10 ⊕ Binding	4	L04	0E00865A	BT 3x10 ⊕ Binding	4

5.2. Synthesis Mechanism Ass'y (A01)

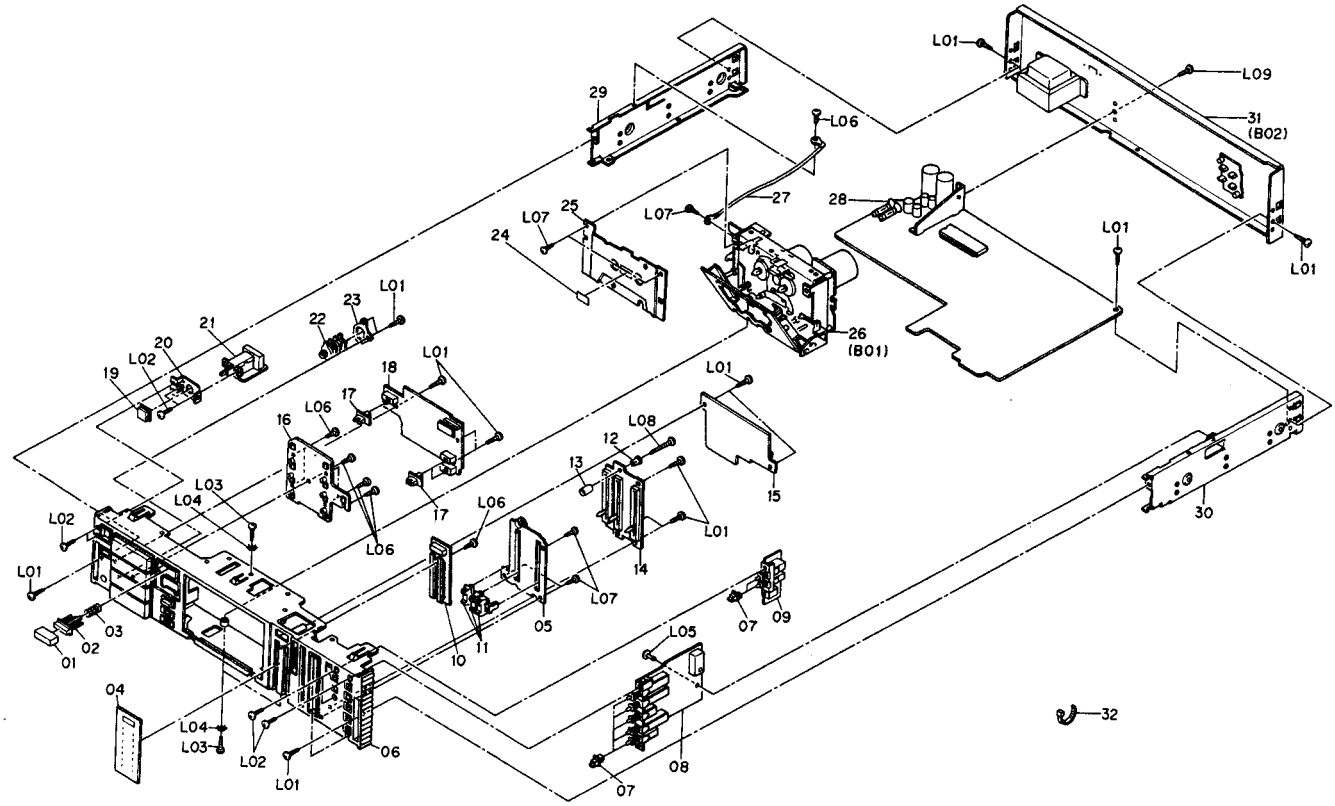


Fig. 5.2

Schematic Ref. No.	Part No.	Description	Q'ty
A01		Synthesis Mechanism Ass'y Serial No.: A32001001 - (Silver)	1
01	0H04270A	Eject Button	1
02	0J04766A	Button Joint	1
03	0J04765A	Spring	1
04	0H04279A	Meter Scale	1
05	0H04285A	Volume Plate	1
06	HA04524A	Front Chassis Ass'y	1
07	0H04288A	Push Switch Button	7
08	BA05100A	Tape Switch P.C.B. Ass'y	1
09	BA05103A	Dolby NR Switch P.C.B. Ass'y	1
10	BA05135A	Indicator Ass'y	1
11	0H04289A	Volume Knob	3
12	0J04704A	P.C.B. Spacer B	1
13	0J04703A	P.C.B. Spacer A	1
14	BA05102A	Volume P.C.B. Ass'y	1
15	BA05101A	Indicator P.C.B. Ass'y	1
16	BA05104A	Control Switch P.C.B. Ass'y	1
17	0H04309A	Slide Switch Knob	3
18	BA05105A	Counter P.C.B. Ass'y	1
19	0H04290A	Power Switch Button	1
20	0J04763A	Power Switch Holder	1
21	BA04823A	Power Switch P.C.B. Ass'y (BX-150 (U.S.A. & Canada))	1
	BA04824A	Power Switch P.C.B. Ass'y (BX-150 (Australia & Others) & BX-150E)	1
	BA04825A	Power Switch P.C.B. Ass'y (BX-150 (Japan))	1
22	0B08511A	Headphone Jack	1
23	0J04611A	Headphone Plate	1
24	0M04196A	Cassette Label	1
25	0H04154B	Cover Plate	1
26	CA08498A	Mechanism Ass'y	1
27	BA05131A	Earth Wire	1
28	BA05090A	Main P.C.B. Ass'y	1
29	0J04603E	Side Chassis L	1
30	0J04773A	Side Chassis R	1
31	HA04511A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04512A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04513A	Rear Panel Ass'y BX-150 (Others)	1
	HA04514A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04510A	Rear Panel Ass'y BX-150E (UK)	1
	HA04515A	Rear Panel Ass'y BX-150E (220V Class 2)	1
32	0B08515A	Insu-Lock	1
L01	0E00868A	BT 3x8 ⊕ Binding	16
L02	0E00766A	M3x8 ⊕ Binding	6
L03	0E03074A	BT 2.6x8 ⊕ Binding	2
L04	0E00233A	Washer 2.6mm Toothed Lock	2
L05	0B08583A	Plastic Rivet	1
L06	0E00857A	BT 3x6 ⊕ Binding	7
L07	0E00859A	BT 2.6x6 ⊕ Binding	6
L08	0E00835A	BT 3x25 ⊕ Pan	1
L09	0E03028A	BT 3x8 ⊕ Binding (Nickel)	1

Schematic Ref. No.	Part No.	Description	Q'ty
A01		Synthesis Mechanism Ass'y Serial No.: A32101001 - (Black)	1
01	0H04269A	Eject Button	1
02	0J04766A	Button Joint	1
03	0J04765A	Spring	1
04	0H04279A	Meter Scale	1
05	0H04285A	Volume Plate	1
06	HA04525A	Front Chassis Ass'y	1
07	0H04248A	Push Switch Button	7
08	BA05100A	Tape Switch P.C.B. Ass'y	1
09	BA05103A	Dolby NR Switch P.C.B. Ass'y	1
10	BA05135A	Indicator Ass'y	1
11	0H04247A	Volume Knob	3
12	0J04704A	P.C.B. Spacer B	1
13	0J04703A	P.C.B. Spacer A	1
14	BA05102A	Volume P.C.B. Ass'y	1
15	BA05101A	Indicator P.C.B. Ass'y	1
16	BA05104A	Control Switch P.C.B. Ass'y	1
17	0H04242A	Slide Switch Knob	3
18	BA05105A	Counter P.C.B. Ass'y	1
19	0H04243A	Power Switch Button	1
20	0J04763A	Power Switch Holder	1
21	BA04823A	Power Switch P.C.B. Ass'y (BX-150 (U.S.A. & Canada))	1
	BA04824A	Power Switch P.C.B. Ass'y (BX-150 (Australia & Others) & BX-150E)	1
	BA04825A	Power Switch P.C.B. Ass'y (BX150 (Japan))	1
22	0B08511A	Headphone Jack	1
23	0J04611A	Headphone Plate	1
24	0M04196A	Cassette Label	1
25	0H04154B	Cover Plate	1
26	CA08498A	Mechanism Ass'y	1
27	BA05131A	Earth Wire	1
28	BA05090A	Main P.C.B. Ass'y	1
29	0J04603E	Side Chassis L	1
30	0J04773A	Side Chassis R	1
31	HA04517A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04518A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04519A	Rear Panel Ass'y BX-150 (Others)	1
	HA04520A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04516A	Rear Panel Ass'y BX-150E (UK)	1
	HA04521A	Rear Panel Ass'y BX-150E (220V Class 2)	1
32	0B08515A	Insu-Lock	1
L01	0E00868A	BT 3x8 ⊕ Binding	16
L02	0E00766A	M3x8 ⊕ Binding	6
L03	0E03074A	BT 2.6x8 ⊕ Binding	2
L04	0E00233A	Washer 2.6mm Toothed Lock	2
L05	0B08583A	Plastic Rivet	1
L06	0E00857A	BT 3x6 ⊕ Binding	7
L07	0E00859A	BT 2.6x6 ⊕ Binding	6
L08	0E00835A	BT 3x25 ⊕ Pan	1
L09	0E00921A	BT 3x8 ⊕ Binding (Black Chromate)	1

5.3. Mechanism Ass'y (B01)

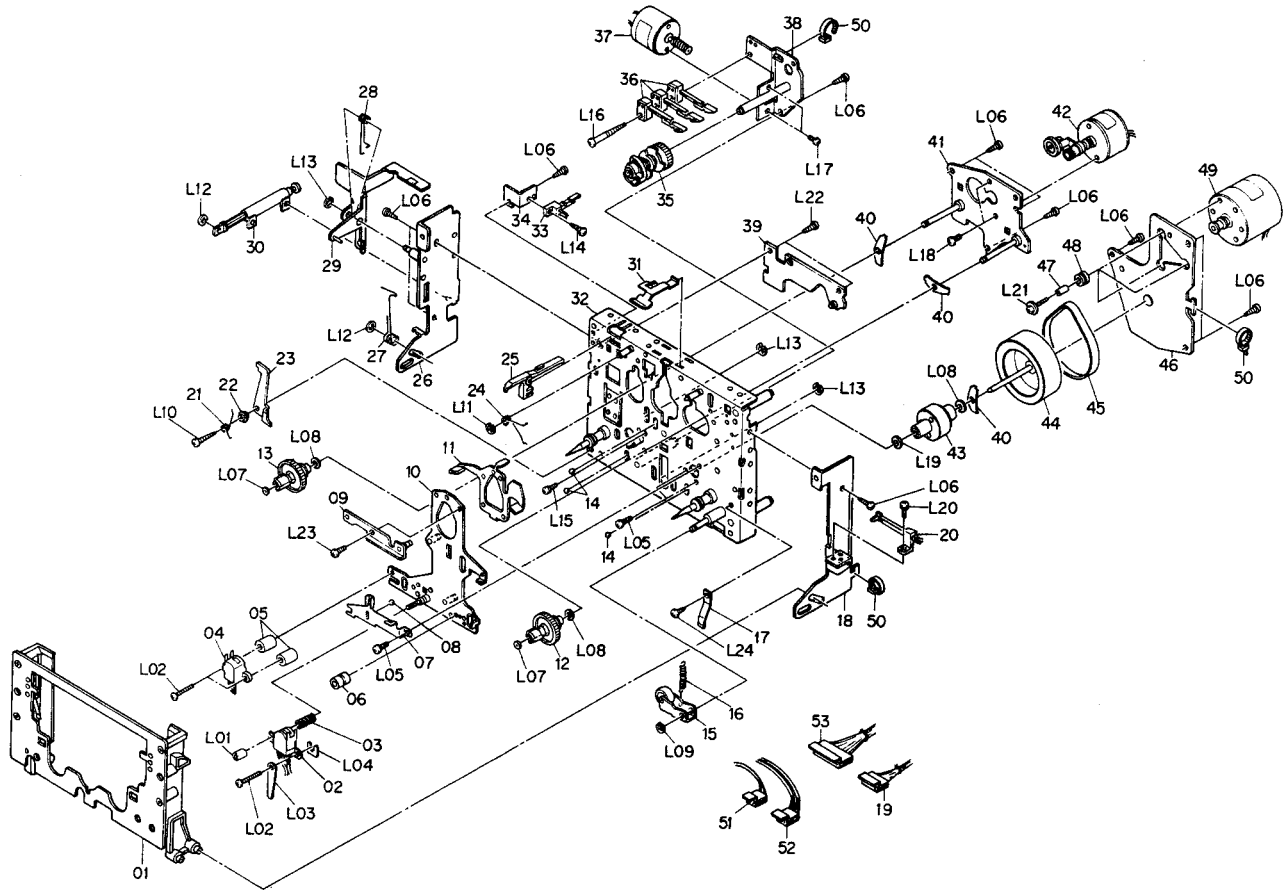
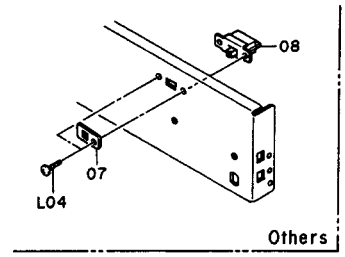


Fig. 5.3

Schematic Ref. No.	Part No.	Description	Q'ty
B01	CA08498A	Mechanism Ass'y Serial No.: A320.101001 -	1
01	CA80001A	Cassette Case Ass'y	1
02	0G01371A	Record/Playback Head RP-2G	1
03	0C80001A	Azimuth Adjust Spring	1
04	0G01365A	Erase Head E-2D	1
05	0C80044A	Erase Head Collar	2
06	0C80045A	Record/Playback Head Collar	1
07	0C80003A	Head Base Hold Plate	1
08	0C80004A	Steel Ball 30	1
09	0C80005A	Reinforce Plate	1
10	0C80006A	Head Base	1
11	CA80002A	Brake Ass'y	1
12	CA80003B	Take-up Reel Hub Ass'y	1
13	CA80004B	Supply Reel Hub Ass'y	1
14	0C80007A	Steel Ball 20	3
15	CA80005A	Pressure Roller Ass'y	1
16	0C80008A	Pressure Roller Spring	1
17	0C80009A	Cassette Case Spring	1
18	0C80010B	Cassette Case Holder R	1
19	0C80043A	5P-H Connector	1
20	0C80012A	Eject Sensor	1
21	0C80013A	Lock Lever Spring	1
22	0C80014A	Lock Lever Collar	1
23	0C80015B	Lock Lever	1
24	0C80016A	Brake Spring	1
25	0C80017A	Record Protector Lever	1
26	0C80018A	Cassette Case Holder L	1
27	0C80019B	Eject Spring	1
28	0C80020A	Eject Lever Spring	1
29	0C80021A	Eject Lever	1
30	CA80006A	Pneumatic Damper Ass'y	1
31	0C80022B	Cassette Hold Spring	1
32	0C80023A	Mechanism Chassis	1
33	0C80024A	Record Protector	1
34	0C80025A	Record Protector Holder	1
35	0C80026A	Cam	1
36	0C80027A	Mode Switch	3
37	CA80007A	Control Motor Ass'y	1
38	0C80028A	Control Motor Holder	1
39	CA80011A	Shut-off P.C.B. Ass'y	1
40	0C80029A	Back Tension Spring	3
41	0C80030A	Reel Motor Holder	1
42	CA80008B	Reel Motor Ass'y	1
43	0C80031A	Capstan Flange	1
44	0C80033A	Flywheel	1
45	0C80034A	Capstan Belt	1
46	CA80009A	Flywheel Holder Ass'y	1
47	0C80035A	Sleeve	3
48	0C80036A	Floating Rubber	3
49	CA80010A	Capstan Motor Ass'y	1
50	0C80037A	Insu-Lock	3
51	0C80040A	2P-H Connector	1
52	0C80041A	4P-H Connector	1
53	0C80042A	9P-H Connector	1
L01	0C80046A	Azimuth Adjust Screw	1
L02	0E03038A	M2x12 ⊕ Binding	3
L03	0E03053A	Wire Holder	1
L04	0C80048A	Shim 0.03T	(1)
	0C80038A	Shim 0.06T	(1)
	0C80039A	Shim 0.1T	(1)
L05	0E03046A	M2.6x6 ⊕ Pan (2A)	3
L06	0E03042A	FT M2.5x5 ⊕ Pan	12
L07	0E03049A	Washer 1.8mm FT	2
L08	0E03050A	Washer 3.1mm FT	3
L09	0E00222A	E-Ring 2mm	1
L10	0E03043A	FT M2.5x10 ⊕ Pan	1
L11	0E00698A	E-Ring 2.5mm	1
L12	0E03052A	Stopper Ring 2.4mm	2
L13	0E00181A	E-Ring 3mm	3
L14	0E03048A	FT M2.6x6 ⊕ Pan	1
L15	0E03036A	M2x4 ⊕ Pan (2A)	1
L16	0E03044A	FT M2.5x20 ⊕ Pan	1
L17	0E00691A	M2x3 ⊕ Pan	2
L18	0E03045A	M2.6x3 2 Binding	2
L19	0E03051A	Capstan Washer	1
L20	0E03037A	M2x5 ⊕ Pan (2A)	1
L21	0E03047A	M2.6x9 ⊕ Pan	3
L22	0E03041A	FT M2.5x4 ⊕ Pan	2
L23	0E03040A	FT M2.5x3.5 ⊕ Pan	1
L24	0E03035A	M2x3.2 ⊕ Truss	1

5.4. Rear Panel Ass'y (B02)



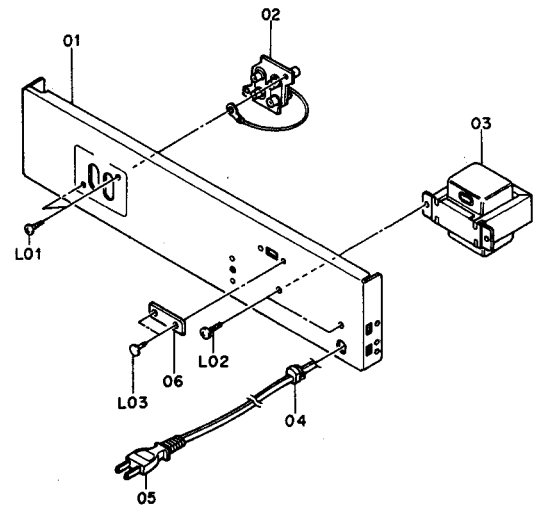


Fig. 5.4

Schematic Ref. No.	Part No.	Description	Q'ty
B02	HA04511A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04512A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04513A	Rear Panel Ass'y BX-150 (Others)	1
	HA04514A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04510A	Rear Panel Ass'y BX-150E (UK)	1
	HA04515A	Rear Panel Ass'y BX-150E (220V Class 2) Serial No.: A32001001 - (Silver)	1
01	0H04300A	Rear Panel BX-150	1
	0H04364A	Rear Panel BX-150E	1
02	0B81001A	4P PIN Jack	1
03	0B50017A	Power Transformer (BX-150 (U.S.A. & Canada))	1
	0B50011A	Power Transformer (BX-150 (Japan))	1
	0B50009A	Power Transformer (BX-150 (Australia) & BX-150E)	1
	0B50010A	Power Transformer (BX-150 (Others))	1
04	0B08037A	Cord Bushing 4P-4 (BX-150 & BX-150E (220V Class 2))	1
	0B08351A	Cord Bushing 4K-4 (BX-150E (UK))	1
05	0B08533A	Power Cord (BX-150 (U.S.A. & Canada & Others))	1
	0B08219B	Power Cord (BX-150 (Japan))	1
	0B08348A	Power Cord (BX-150E (UK))	1
	0B08093U	Power Cord (BX-150E (220V Class 2))	1
	0B05241A	Power Cord (BX-150 (Australia))	1
06	0J04622B	Switch Cover Gray (BX-150 (U.S.A., Canada, Japan & Australia) & BX-150E)	1
07	0M04407A	Voltage Selector Lock Plate Gray (BX-150 (Others))	1
08	0B07092U	Voltage Selector (BX-150 (Others))	1
L01	0E03028A	BT 3x8 ⊕ Binding (Nickel)	2
L02	0E03024A	BT 4x8 ⊕ Binding (Nickel)	2
L03	0B08583A	Plastic Rivet	2
L04	0E03031A	M3x8 ⊕ Binding (Nickel)	2
B02	HA04517A	Rear Panel Ass'y BX-150 (U.S.A. & Canada)	1
	HA04518A	Rear Panel Ass'y BX-150 (Japan)	1
	HA04519A	Rear Panel Ass'y BX-150 (Others)	1
	HA04520A	Rear Panel Ass'y BX-150 (Australia)	1
	HA04516A	Rear Panel Ass'y BX-150E (UK)	1
	HA04521A	Rear Panel Ass'y BX-150E (220V Class 2) Serial No.: A32101001 - (Black)	1
01	0H04301A	Rear Panel BX-150	1
	0H04365A	Rear Panel BX-150E	1
02	0B81001A	4P PIN Jack	1
03	0B50017A	Power Transformer (BX-150 (U.S.A. & Canada))	1
	0B50011A	Power Transformer (BX-150 (Japan))	1
	0B50009A	Power Transformer (BX-150 (Australia) & BX-150E)	1
	0B50010A	Power Transformer (BX-150 (Others))	1
04	0B08037A	Cord Bushing 4P-4 (BX-150 & BX-150E (220V Class 2))	1
	0B08351A	Cord Bushing 4K-4 (BX-150E (UK))	1
05	0B08533A	Power Cord (BX-150 (U.S.A. & Canada & Others))	1
	0B08219B	Power Cord (BX-150 (Japan))	1
	0B08348A	Power Cord (BX-150E (UK))	1
	0B08093U	Power Cord (BX-150E (220V Class 2))	1
	0B05241A	Power Cord (BX-150 (Australia))	1
06	0J04601B	Switch Cover Black (BX-150 (U.S.A., Canada, Japan & Australia) & BX-150E)	1
07	0M03948A	Voltage Selector Lock Plate Black (BX-150 (Others))	1
08	0B07092U	Voltage Selector (BX-150 (Others))	1
L01	0E00921A	BT 3x8 ⊕ Binding (Black Chromate)	2
L02	0E00915A	BT 4x8 ⊕ Binding (Black Chromate)	2
L03	0B08583A	Plastic Rivet	2
L04	0E00818A	M3x8 ⊕ Binding (Black Chromate)	2

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. Following transistors are interchangeable with each other.
a. 2SA733, 2SA608SP, 2SA1048, 2SA1175
b. 2SC945, 2SC536SP, 2SC2458, 2SC2785
4. Abbreviation for part name:
TR — Transistor, SiD — Silicon Diode, GD — Germanium Diode, ZD — Zener Diode
RK — Carbon Resistor, RM — Metal Film Resistor, RF — Fail Safe Type Resistor, RC — Cement Resistor, RW — Wire Wound Resistor
CE — Electrolytic Capacitor, CM — Mylar Capacitor, CC — Ceramic Capacitor, CP — PP Capacitor, CT — Tantalum Capacitor, CM — Film Capacitor, C — Mica Capacitor

6.1. Power Switch P.C.B. Ass'y

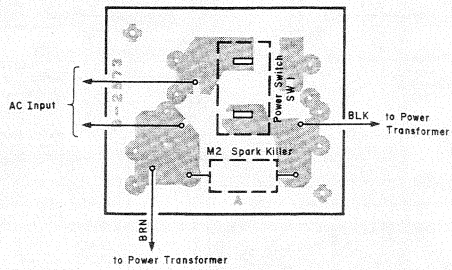


Fig. 6.1

6.2. Dolby NR Switch P.C.B. Ass'y

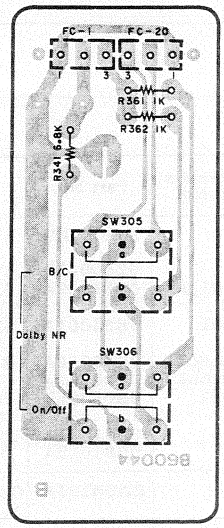


Fig. 6.2

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

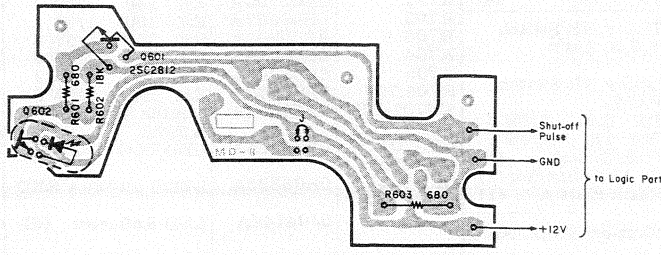


Fig. 6.3

6.4. Volume P.C.B. Ass'y

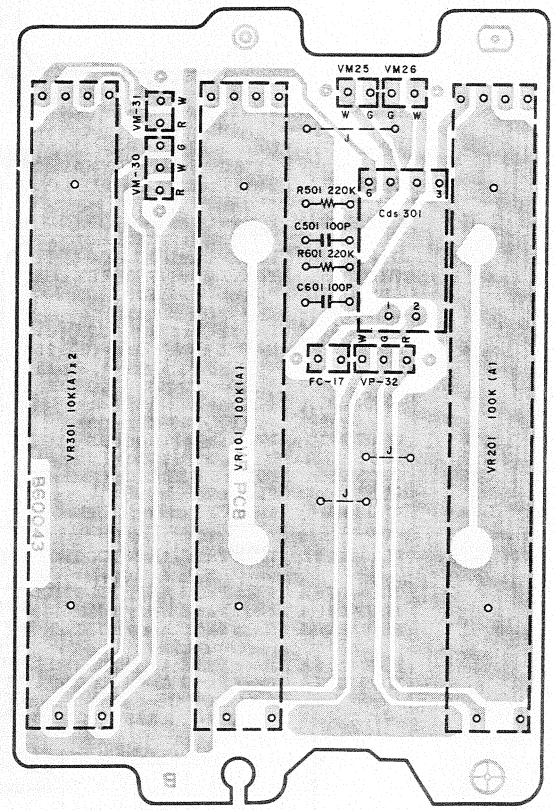


Fig. 6.4

6.5. Control Switch P.C.B. Ass'y

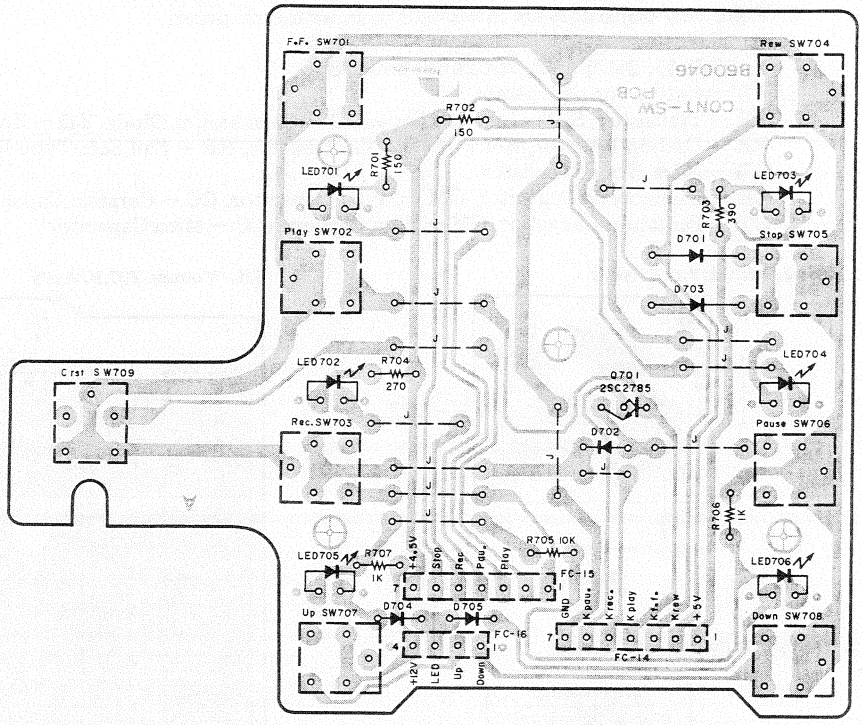


Fig. 6.5

Schematic Ref. No.	Part No.	Description
	BA04823A	**Power Switch P.C.B. Ass'y (BX-150 (U.S.A., Canada & Others))**
	BA04824A	**Power Switch P.C.B. Ass'y (BX-150 (Australia) & BX-150E)**
	BA04825A	**Power Switch P.C.B. Ass'y (BX-150 (Japan))**
	0B02573D	Power Switch P.C.B.
SW1	0B70002A	Power Switch
M2	0B08363A	Spark Killer (BX-150 (Japan))
M2	0B08342A	Spark Killer (BX-150 (U.S.A., Canada & Others))
M2	0B08955A	Spark Killer (BX-150 (Australia) & BX-150E)
	0E00752A	Eyelet 2x3 (2)
	BA05103A	**Dolby NR Switch P.C.B. Ass'y**
	0B60044B	Dolby NR Switch P.C.B.
R341	0B09697A	RK 6.8K 1/6W J
R361,362	0B09677A	RK 1K 1/6W J
	0B70009A	Push Switch (1)
	0B02351A	6P JP Connector (1)
	0J04768A	Earth Plate A (1)
	CA80011A	**Shut-off P.C.B. Ass'y**
	0C80047A	Shut-off P.C.B.
Q601	0B06388A	TR 2SC2812
Q602	0B06389A	Photo Reflector NJL5141
R601,603	0B09840A	RK 680 Leadless
R602	0B09841A	RK 18K Leadless

Schematic Ref. No.	Part No.	Description
	BA05102A	**Volume P.C.B. Ass'y**
	0B60043B	Volume P.C.B.
VR101,201	0B31002A	Slide Volume 100K (A)
VR301	0B31001A	Slide Volume 10K (A)x2
R501,601	0B09733A	RK 220K 1/6W J
C501,601	0B09282A	CC 100P 50V K
Cds301	0B06325B	Photocoupler MCD7214F
	0B81011A	Dip Mate 4P (1)
	0B81012A	Dip Mate 5P (2)
	BA05104A	**Control Switch P.C.B. Ass'y**
	0B60046A	Control Switch P.C.B.
Q701	0B06456A	TR 2SC2785
D701,702 703,704 705	0B06398A	SiD 1SS176
R701	0B05795A	RK 150 1/4W J
R702	0B09657A	RK 150 1/6W J
R703	0B09667A	RK 390 1/6W J
R704	0B09663A	RK 270 1/6W J
R705	0B09701A	RK 10K 1/6W J
R706,707	0B09677A	RK 1K 1/6W J
SW701-709	0B70004A	Toutch Switch 4.3mm
LED701 702,703	0B06334A	LED TLG124A GRN
LED704 705,706	0B06333A	LED TLR124A RED
	0J04744A	LED Reflector (6)

6.6. Counter P.C.B. Ass'y

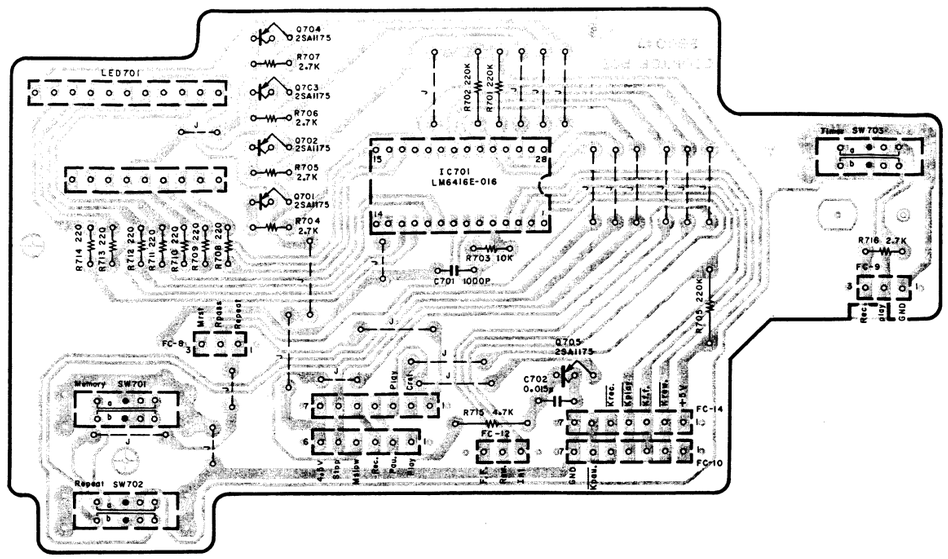


Fig. 6.6

6.7. Tape Switch P.C.B. Ass'y

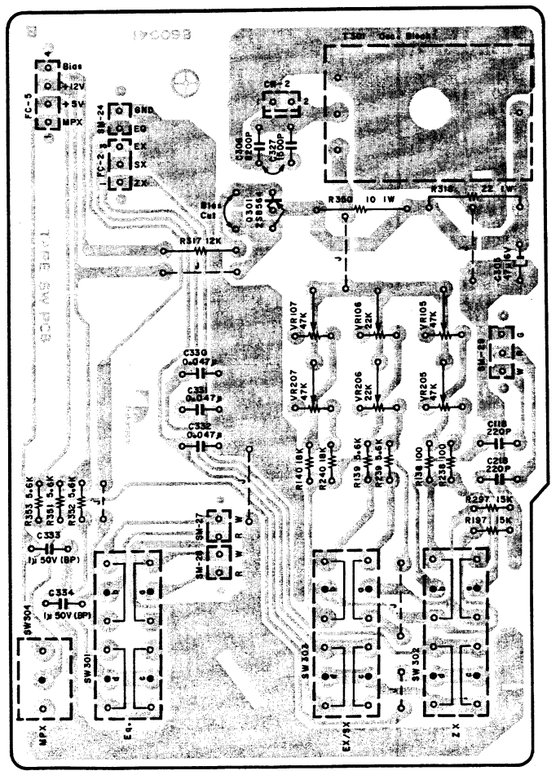


Fig. 6.7

6.8. Indicator P.C.B. Ass'y

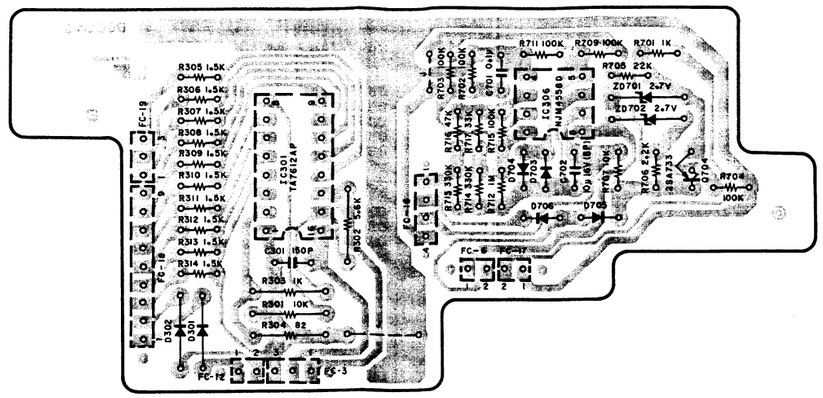


Fig. 6.8

Schematic Ref. No.	Part No.	Description	Schematic Ref. No.	Part No.	Description
	BA05105A	**Counter P.C.B. Ass'y**		**BA05101A**	**Indicator P.C.B. Ass'y**
	0B60047A	Counter P.C.B.		0B60042B	Indicator P.C.B.
IC701	0B06368A	IC LM6416E-106	IC301	0B06369A	IC TA7612AP
Q701,702 703,704 705	0B06455A	TR 2SA1175	IC306 Q704 ZD701,702	0B11031A 0B06013A 0B06191A	IC NJM4558D TR 2SA733 (P,Q) ZD 2.7V RD2.7EB
LED701	0B12098A	Counter LED	D301,302 703,704 705,706	0B06398A	SiD 1SS176
R701,702 705	0B05625A	RK 220K 1/4W J			
R703	0B09701A	RK 10K 1/6W J	R301	0B01888A	RK 10K 1/4W J
R704,705 706,707 716	0B09687A	RK 2.7K 1/6W J	R302 R303 R304	0B01887A 0B01857A 0B05631A	RK 5.6K 1/4W J RK 1K 1/4W J RK 82 1/4W J
R708-714	0B09661A	RK 220 1/6W J (7)	R305-314	0B09681A	RK 1.5K 1/6W J (10)
R715	0B01846A	RK 4.7K 1/4W J	R701	0B09677A	RK 1K 1/6W J
C701	0B09282A	CC 100P 50V K	R702,703 704,709 711,715	0B09725A	RK 100K 1/6W J
C702	0B05557A	CM 0.015μ 50V J			
SW701,702	0B70010A	Slide Switch 2-2	R705	0B09709A	RK 22K 1/6W J
SW703	0B07437A	Slide Switch 2-3	R706	0B09685A	RK 2.2K 1/6W J
	0B81016A	IC Socket 9P (1)	R707	0B09701A	RK 10K 1/6W J
	0B81017A	IC Socket 11P (1)	R712	0B09749A	RK 1M 1/6W J
	0J04786A	Counter Himelon (1)	R713,714	0B09737A	RK 330K 1/6W J
			R716	0B09717A	RK 47K 1/6W J
	BA05100A	**Tape Switch P.C.B. Ass'y**	R717	0B09713A	RK 33K 1/6W J
			C301	0B09281A	CC 150P 50V K
	0B60041B	Tape Switch P.C.B.	C701	0B09868A	CF 0.1μ 50V J
Q301	0B06332A	TR 2SB564M	C702	0B09163A	CE 10μ 16V (BP)
T301	0B06688C	Bias Osc. Unit		0B02349A	JP Connector 4P (1)
VR105,107 205,207	0B32010A	Semi-fixed VR 47K		0B02356A	JP Connector 12P (1)
VR106,206	0B32009A	Semi-fixed VR 22K		0B81011A	Dip Mate 4P (1)
R138,238	0B09653A	RK 100 1/6W J		0B81012A	Dip Mate 5P (1)
R139,239 351,352 353	0B09695A	RK 5.6K 1/6W J			
R140,240	0B09707A	RK 18K 1/6W J			
R197,297	0B09705A	RK 15K 1/6W J			
R317	0B09263A	RK 12K 1/4W J			
R318	0B09831A	RF 22 1W J			
R350	0B09837A	RF 10 1W J			
C118,218	0B09283A	CC 220P 50V K			
C305	0B01403A	CE 47μ 16V			
C306	0B09828A	CP 8200P 100V J			
C327	0B41229A	CP 1500P 100V J			
C330,331 332	0B05796A	CM 0.047μ 50V J			
C333,334	0B09187A	CE 1μ 50V (BP)			
CN2	0B81051A	2P-S Post			
	0B70005A	Push Switch (1)			
	0B81010A	Dip Mate 3P (1)			
	0B81011A	Dip Mate 4P (2)			
	0B81012A	Dip Mate 5P (1)			
	0J04768A	Earth Plate A (1)			

Schematic Ref. No.	Part No.	Description
	BA05090A	**Main P.C.B. Ass'y**
	— PB Eq. Amp. —	
Q101,102	0B06142A	TR 2SC2240 (BL)
201,202		
Q103,203	0B01872A	TR 2SC945L (P,Q)
ZD301	0B12009A	ZD 10V RD10JB2T
D304	0B01909A	SiD 1S1555
L101,201	0B03919B	Inductor 36mH
VR101,201	0B32009A	Semi-fixed VR 22K
R101,201	0B09741A	RK 470K 1/6W J
R102,103	0B09330A	RK 100K 1/4W J
202,203		(Noiseless)
R104,204	0B05631A	RK 82 1/4W J
R105,205	0B09731A	RK 180K 1/6W J
R106,206	0B09685A	RK 2.2K 1/6W J
R107,207	0B09711A	RK 27K 1/6W J
R108,208	0B09830A	RM 4.87K 1/4W F
R109,209	0B09829A	RM 3.32K 1/4W F
R110,210	0B09673A	RK 680 1/6W J
R111,211	0B01888A	RK 10K 1/4W J
R112,212	0B09703A	RK 12K 1/6W J
R195,295	0B09677A	RK 1K 1/6W J
R319	0B01857A	RK 1K 1/4W J
R357	0B09725A	RK 100K 1/6W J
C102,202	0B09137A	CE 22μ 25V (LN)
C103,203	0B09283A	CC 220P 50V K
C104,204	0B01403A	CE 47μ 16V
C105,205	0B01863A	CE 3.3μ 50V
C106,206	0B05832A	CM 0.018μ 50V J
C107,207	0B41002A	CP 390P 100V J
C108,208	0B05550A	CM 1000P 50V J
C304	0B09868A	CF 0.1μ 50V J
C307	0B01400A	CE 100μ 16V
RL301	0B90011A	DS Relay
CN1	0B02242A	4P-T Post
	— Rec. Eq. Amp. —	
IC303	0B06387A	IC NJM2043DD
Q104,204	0B06299A	TR 2SC2878
L102,202	0B00068A	Trap Coil 10.5mH
L103,203	0B06696A	L-C Block
R113,213	0B09711A	RK 27K 1/6W J
R114,214	0B09701A	RK 10K 1/6W J
R115,116	0B09725A	RK 100K 1/6W J
117,215		
216,217		
R118,218	0B09677A	RK 1K 1/6W J
R119,219	0B09731A	RK 180K 1/6W J
R120,220	0B09691A	RK 3.9K 1/6W J
R121,221	0B09665A	RK 330 1/6W J
R122,222	0B09669A	RK 470 1/6W J
R123,223	0B09715A	RK 39K 1/6W J
R125,225	0B09697A	RK 6.8K 1/6W J
R126,226	0B05936A	RK 10 1/4W J
R153,253	0B09741A	RK 470K 1/6W J
C110,210	0B01804A	CM 3900P 50V J
C111,211	0B40178A	CE 0.47μ 50V
C112,212	0B01862A	CE 22μ 16V
C114,214	0B05659A	CM 5600P 50V J
C115,215	0B41186A	CM 5100P 50V J
C116,216	0B01412A	CE 10μ 16V
C117,217	0B09866A	CF 0.068μ 50V J
C160,260	0B09280A	CC 47P 50V J
C161,261	0B09187A	CE 1μ 50V (BP)
C173,273	0B09815A	CE 47μ 6.3V
	— Rec. Level —	
IC305	0B11027A	IC TC9145P
Q112,212	0B01872A	TR 2SC945L (P,Q)
VR102,202	0B32009A	Semi-fixed VR 22K
VR103,104	0B32008A	Semi-fixed VR 10K
203,204		
R127,227	0B09705A	RK 15K 1/6W J
R128,228	0B22327A	RM 7.15K 1/6W F
R129,229	0B09699A	RK 8.2K 1/6W J
R130,230	0B01888A	RK 10K 1/4W J
R131,231	0B09707A	RK 18K 1/6W J
R132,135	0B09701A	RK 10K 1/6W J
137,232		
235,237		
R133,136	0B05629A	RK 2.7K 1/4W J
233,236		
R198,298	0B09709A	RK 22K 1/6W J

Schematic Ref. No.	Part No.	Description
R354,355	0B09725A	RK 100K 1/6W J
356,363		
364		
C119,219	0B05571A	CM 680P 50V J
C120,220	0B05843A	CM 0.012μ 50V J
C121,221	0B05659A	CM 5600P 50V J
C122,222	0B09993A	CM 820P 50V J
C123,223	0B01913A	CM 1800P 50V J
	— Dolby NR —	
IC101,201	0B06383A	IC TEA0654
IC102,202	0B06382A	IC TEA0652
Q110,111	0B01872A	TR 2SC945L (P,Q)
210,211		
ZD102,202	0B06167A	ZD 6.2V RD6.2EB3
L104,204	0B06691A	L-C Block YEL
L105,205	0B06690A	L-C Block BLUE
R154,193	0B05671A	RK 2.2M 1/4W J
254,293		
R173,273	0B09687A	RK 2.7K 1/6W J
R174,274	0B09688A	RK 3K 1/6W J
R175,275	0B09686A	RK 2.4K 1/6W J
R176,276	0B22286A	RM 3.30K 1/6W F
R178,278	0B22229A	RM 1.00K 1/6W F
R180,280	0B09721A	RK 68K 1/6W J
R181,281	0B22309A	RM 5.10K 1/6W F
R182,282	0B22265A	RM 2.20K 1/6W F
R184,284	0B22305A	RM 4.70K 1/6W F
R185,285	0B09717A	RK 47K 1/6W J
R186,286	0B09722A	RK 75K 1/6W J
R187,190	0B09737A	RK 330K 1/6W J
287,290		
R188,189	0B09739A	RK 390K 1/6W J
288,289		
R191,291	0B09796A	RM 12K 1/4W F
R192,194	0B09709A	RK 22K 1/6W J
292,294		
R196,296	0B09723A	RK 82K 1/6W J
R340	0B09330A	RK 100K 1/4W J
R358,359	0B09725A	RK 100K 1/6W J
R702,802	0B01679A	RK 100 1/4W J
C132,134	0B40185A	CE 1μ 50V
232,234		
C135,235	0B09312A	CP 0.01μ 100V G
C136,236	0B09240A	CP 0.033μ 100V G
C137,237	0B05652A	CM 4700P 50V J
C138,140	0B01412A	CE 10μ 16V
154,238		
240,254		
321		
C139,239	0B09280A	CC 47P 50V J
C141,241	0B09864A	CF 0.047μ 50V J
C142,148	0B09862A	CF 0.033μ 50V J
242,248		
C143,147	0B09868A	CF 0.1μ 50V J
243,247		
C144,244	0B09570A	CE 0.15μ 50V (LN)
320		
C145,245	0B09866A	CF 0.068μ 50V J
C149,249	0B09872A	CF 0.22μ 50V J
C150,250	0B09189A	CM 2700P 50V J
C151,251	0B05687A	CM 1200P 50V J
C152,252	0B40054A	CE 2200μ 6.3V
C153,253	0B09191A	CP 4700P 100V G
C172,272	0B01400A	CE 100μ 16V
	— Line Amp. —	
IC302	0B06146A	IC NJM4558DD
R152,252	0B09677A	RK 1K 1/6W J
R162,262	0B09709A	RK 22K 1/6W J
R163,263	0B09702A	RK 11K 1/6W J
C127,227	0B09251A	CE 33μ 25V
C129,229	0B01412A	CE 10μ 16V
	— Meter Amp. —	
Q105,106	0B01872A	TR 2SC945L (P,Q)
107,205		
206,207		
ZD101,201	0B12101A	ZD 5V 5C-1
D101,201	0B06398A	SiD 1SS176
D102,202	0B06181A	SiD 1SS53
305		

Schematic Ref. No.	Part No.	Description
VR108,208	0B32011A	Semi-fixed VR 100K
R141,241	0B09713A	RK 33K 1/6W J
R142,242	0B01889A	RK 100K 1/4W J
R143,243	0B09743A	RK 560K 1/6W J
R144,244	0B09729A	RK 150K 1/6W J
R145,146	0B09725A	RK 100K 1/6W J
245,246		
R147,148	0B09719A	RK 56K 1/6W J
247,248		
R149,249	0B09709A	RK 22K 1/6W J
R320	0B09216A	RF 10 1/4W J
C124,224	0B09570A	CE 0.15μ 50V (LN)
C125,225	0B09148A	CE 10μ 25V (LN)
C308	0B01400A	CE 100μ 16V
	— Headphone Amp. —	
IC304	0B06370A	IC 4556D
Q108,208	0B06299A	TR 2SC2878
R165,265	0B09685A	RK 2.2K 1/6W J
R166,266	0B09697A	RK 6.8K 1/6W J
R167,168	0B09725A	RK 100K 1/6W J
267,268		
R170,270	0B05579A	RK 22 1/4W J
R171,199	0B09677A	RK 1K 1/6W J
271,299		
R342	0B09049A	RF 22 1/4W J
C130,230	0B09327A	CE 0.33μ 50V (LN)
C131,231	0B01398A	CE 220μ 16V
C170,270	0B09291A	CC 0.022μ 50V Z
C323	0B01400A	CE 100μ 16V
	— Logic —	
IC601	0B06178A	IC μPD4011BC
IC602	0B06214A	IC μPD4071BC
IC603	0B11020A	IC TMP4315BP-1814
Q601	0B06332A	TR 2SB564M
Q602,604	0B01872A	TR 2SC945L (P,Q)
606,621		
623,625		
Q603,605	0B06013A	TR 2SA733 (P,Q)
616,617		
618,619		
Q607,624	0B10021A	TR 2SD1164 (K,L)
Q608,609	0B06372A	TR 2SA953 (K,L)
610,611		
Q612,613	0B06322A	TR 2SC2002 (K,L)
614,615		
Q620	0B06066A	TR 2SD471 (L,M)
Q622	0B10023A	TR 2SC2002 (K)
D601,603	0B06181A	SiD 1SS53 (15)
604		
606-613		
615-618		
D602	0B12100A	Double SiD MC921
L601	0B06689A	L-C Block
VR601	0B32007A	Semi-fixed VR 470
R601	0B09749A	RK 1M 1/6W J
R602,604	0B09725A	RK 100K 1/6W J
613,616		
617,618		
619,651		
R603,606	0B09701A	RK 10K 1/6W J
611,660		
R605	0B09304A	RK 3.3 1/4W J
R607,608	0B05509A	RK 33K 1/4W J
615		
R609,610	0B09729A	RK 150K 1/6W J
647		
R612	0B09217A	RF 5.6 1/4W J
R614,644	0B09737A	RK 330K 1/6W J
R620	0B09711A	RK 27K 1/6W J
R621	0B09695A	RK 5.6K 1/6W J
R622	0B09663A	RK 270 1/6W J
R623	0B09672A	RK 620 1/6W J
R624	0B01854A	RK 39K 1/4W J
R625	0B09699A	RK 8.2K 1/6W J
R626	0B06706A	R Coil 3.5
R627,628	0B01679A	RK 100 1/4W J
R629,630	0B01933A	RK 220 1/4W J
R631	0B24007A	RF 22 2W J
R632	0B09707A	RK 18K 1/6W J
R633,636	0B09741A	RK 470K 1/6W J
637,640		

Schematic Ref. No.	Part No.	Description
R634,635	0B09677A	RK 1K 1/6W J
638,639		
658		
R641,650	0B01889A	RK 100K 1/4W J
R642	0B09717A	RK 47K 1/6W J
R643	0B01846A	RK 4.7K 1/4W J
R645,646	0B09733A	RK 220K 1/6W J
R648,649	0B05629A	RK 2.7K 1/4W J
R652	0B09705A	RK 15K 1/6W J
R653	0B09693A	RK 4.7K 1/6W J
R654,655	0B09713A	RK 33K 1/6W J
R656	0B09803A	R-Network 47Kx5
R657	0B09824A	R-Network 100Kx3
R659	0B09681A	RK 1.5K 1/6W J
C601	0B40079A	CE 220μ 16V
C602,604	0B01405A	CE 1μ 50V
610		
C603,606	0B40024A	CE 0.33μ 50V
C607	0B01802A	CM 2200P 50V J
C608	0B09290A	CC 0.01μ 50V Z
C609	0B09222A	CE 0.47μ 50V (LN)
C611	0B09817A	CE 33μ 10V (LN)
	0B02243A	5P-T Post (1)
	0B02245A	9P-T Post (1)
	— DC Supply —	
IC402	0B06380A	IC NJM7812
Q401,405	0B06322A	TR 2SC2002 (K,L)
Q402,403	0B01872A	TR 2SC945L (P,Q)
404		
ZD401	0B06167A	ZD 6.2V RD6.2EB3
ZD402	0B12003A	ZD 5.6V RD5.6JB2T
D401	0B06282A	Diode Bridge DBA10
D402	0B12100A	Double SiD MC921
D403,404	0B06398A	SiD 1SS176
406		
R403	0B24006A	RF 560 1W J
R404	0B01857A	RK 1K 1/4W J
R405	0B09671A	RK 560 1/6W J
R406	0B24007A	RF 22 2W J
R407	0B09725A	RK 100K 1/6W J
R408	0B09707A	RK 18K 1/6W J
R409	0B09695A	RK 5.6K 1/6W J
R410	0B09665A	RK 330 1/6W J
R411	0B09693A	RK 4.7K 1/6W J
R413	0B09713A	RK 33K 1/6W J
R414	0B09719A	RK 56K 1/6W J
R415	0B24023A	R Fuse 1
C402	0B40095A	CE 1000μ 25V
C403	0B01392A	CE 470μ 16V
C404	0B01403A	CE 47μ 16V
C405,406	0B09292A	CC 0.1μ 50V Z
C407	0B09799A	CE 4700μ 25V
C408	0B09798A	CE 6800μ 16V
C409	0B40011A	CE 33μ 16V
C411	0B01405A	CE 1μ 50V
C412	0B01398A	CE 220μ 16V
TF1	0B08715A	Thermal Fuse 129
	0B08676B	Heat Sink A304 (1)
	0E00507A	Nut Hex. M3 (Chromate) (1)
	0E00612A	M3x6 ⊕Pan (2A) (1)
	0E00857A	BT 3x6 ⊕Binding (Chromate) (2)
	— Miscellaneous —	
	0B60040B	Main P.C.B.
	0B02348A	JP Connector 3P (3)
	0B02351A	JP Connector 6P (1)
	0B02352A	JP Connector 7P (1)
	0B81002A	Dip Mate 2P (6)
	0B81010A	Dip Mate 3P (6)
	0B81011A	Dip Mate 4P (3)
	0B81012A	Dip Mate 5P (1)
	0B81013A	Dip Mate 6P (1)

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

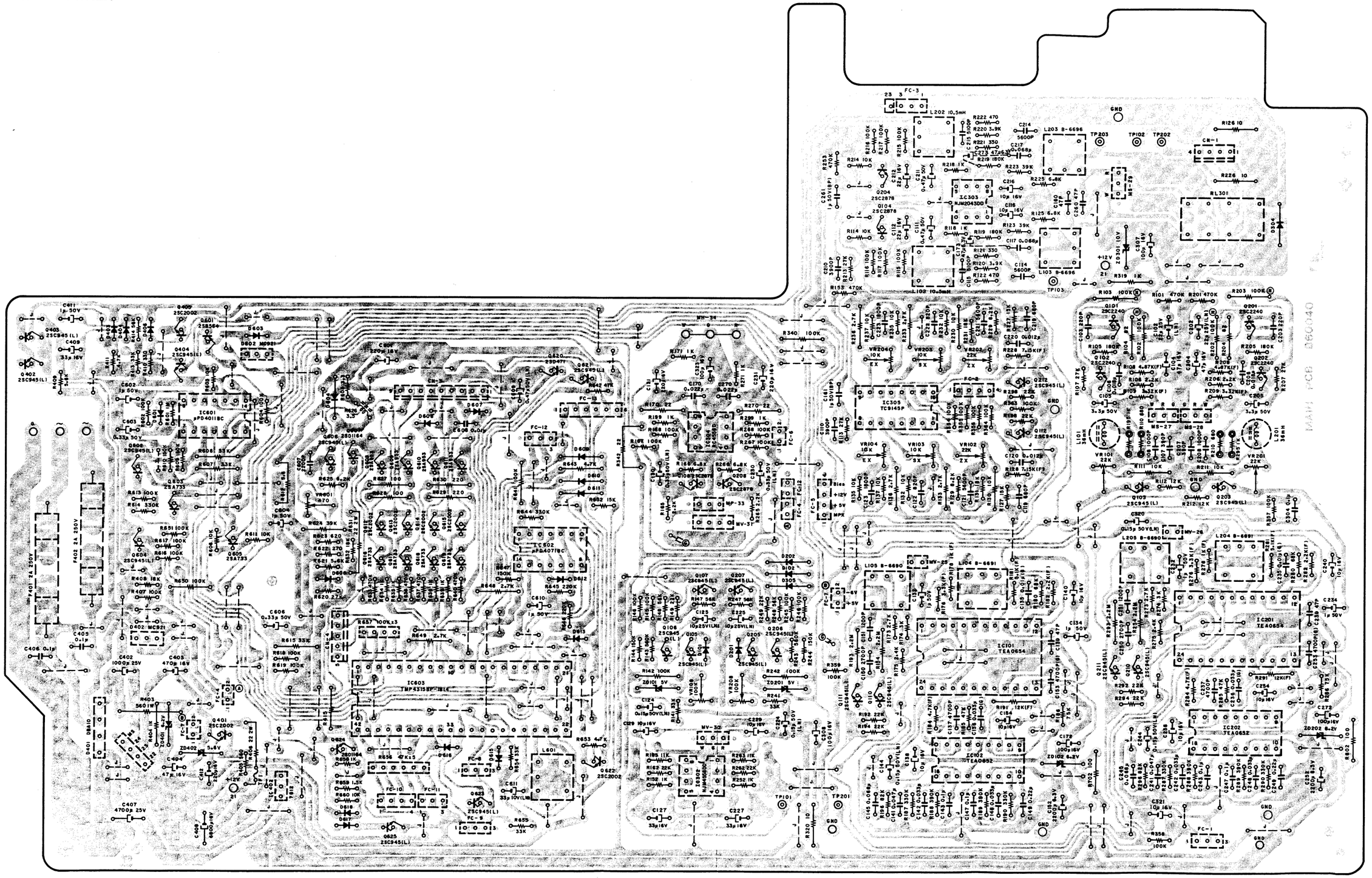


Fig. 6.9.1 2nd Version

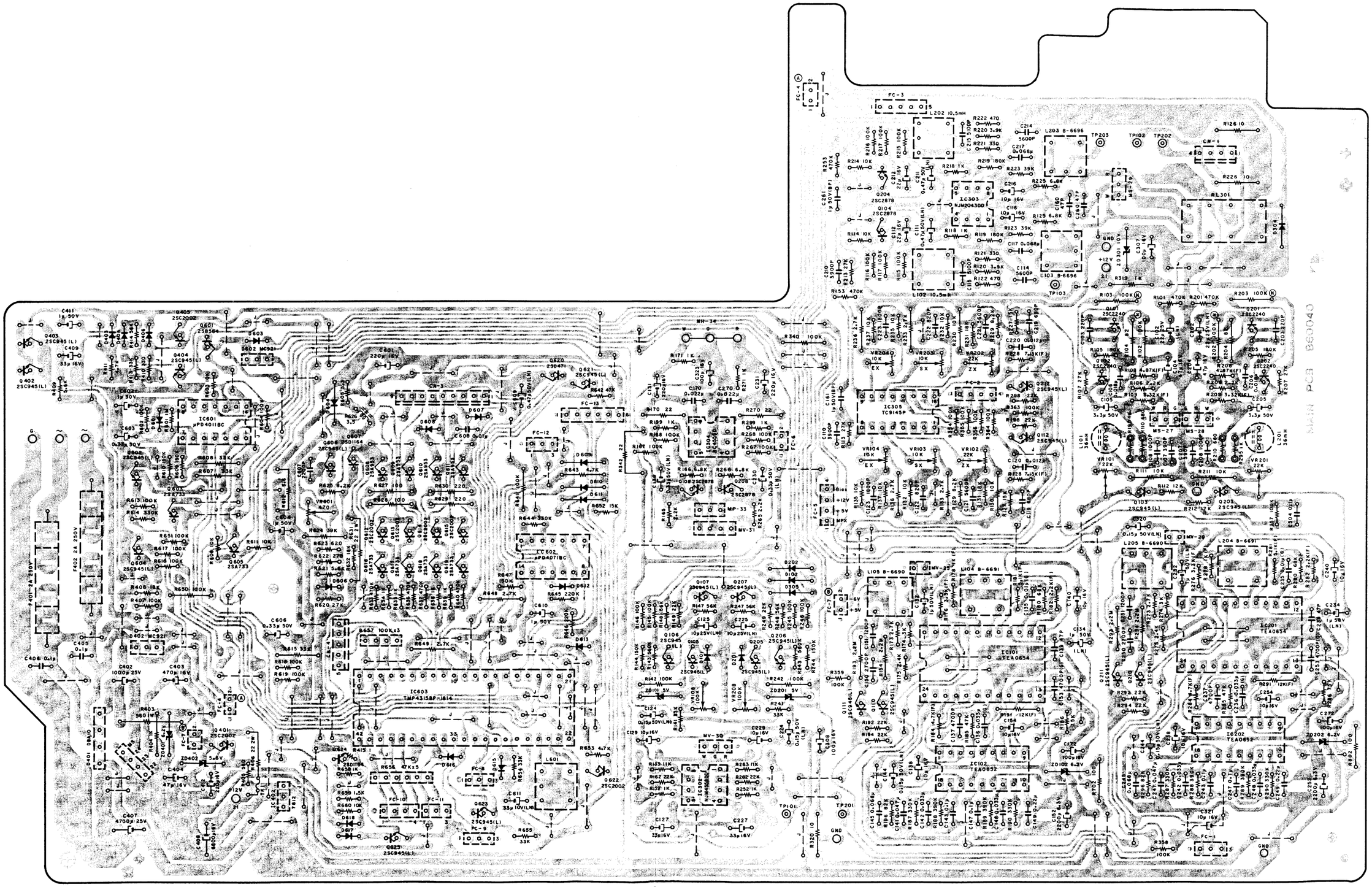


Fig. 6.9.2 1st Version

7. SCHEMATIC DIAGRAMS

7.1. Attention to Servicemen

(1) Caution

(a) If a part is in need of removing (or replacing) for service, it should be remounted (or replaced with specified parts) by the same methods as before after servicing.

(b) The appliance should be used only specified parts for preventing a risk of fire and electric shock and maintaining the characteristics.

(c) Before returning the repaired appliance to a customer, check to insure that the exposed part is accurately insulated from the Power Supply by measuring the leakage current or the insulation resistance between them.

(2) Parts Replacement

Following parts shall be replaced with the specified ones.
Refer to the parts list.

(a) Power Supply Circuit
Power Cord
Power Transformer: T1
Fuses: F401, 402

(b) Power Switch P.C.B. Ass'y
Power Switch: SW1
Spark Killer: M2

(c) Tape Switch P.C.B. Ass'y
Power Transistor: Q301
Fail Safe Type Resistor: R318, 350

(d) Main P.C.B. Ass'y
Regulator IC: IC402
Power Transistors: Q601, 607, 620, 624
Diode Bridge: D401
Fail Safe Type Resistors: R320, 342, 403, 406, 612, 631
Thermal Fuse: TF1

7.2. IC Block Diagrams

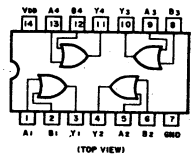


Fig. 7.2.1. OR Gate C-MOS IC μPD4071BC

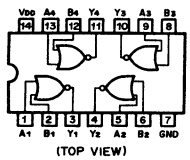


Fig. 7.2.2 NAND Gate C-MOS IC μPD4011BC

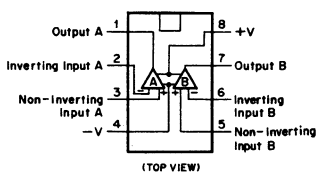


Fig. 7.2.3 Operational Amp. IC4558DD, 4556D, NJM4558D, NJM2043DD

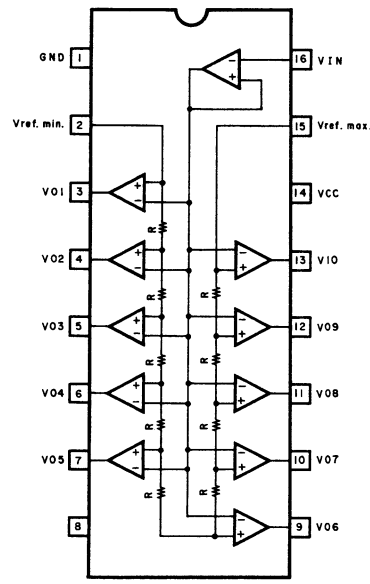


Fig. 7.2.4 Level Meter Driver TA7612AP

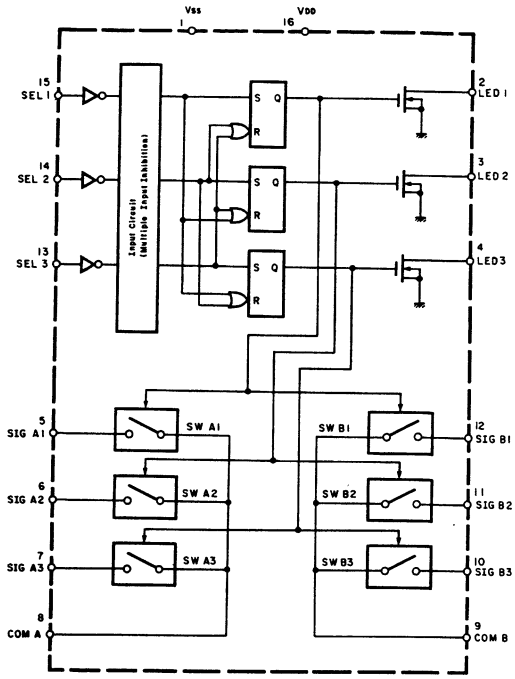


Fig. 7.2.5 Analog Switch Selector TC9145P

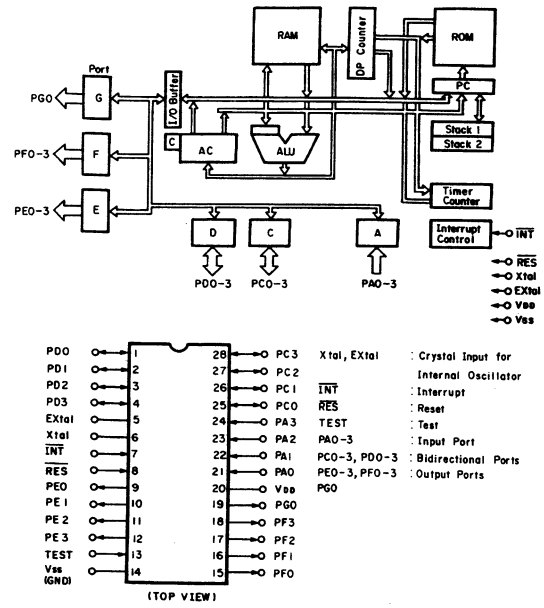
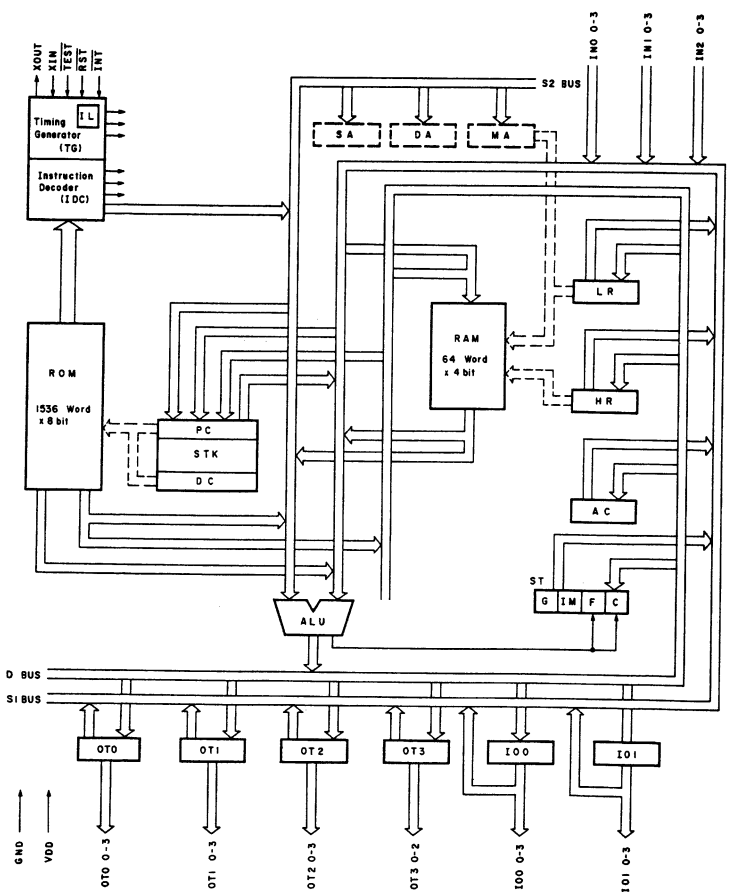
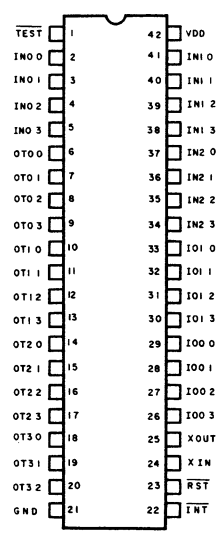


Fig. 7.2.6 4-Bit Micro-processor LM6416E-106





IN0 0 — 3: Input Port IN0
IN1 0 — 3: Input Port IN1
IN2 0 — 3: Input Port IN2
OT0 0 — 3: Output Port OT0
OT1 0 — 3: Output Port OT1
OT2 0 — 3: Output Port OT2
OT3 0 — 2: Output Port OT3
IO0 0 — 3: Bidirectional Port IO0
IO1 0 — 3: Bidirectional Port IO1
$\overline{RST}$: Reset
$\overline{INT}$: Interrupt
XIN, XOUT: Clock Terminals

Fig. 7.2.7 4-Bit Micro-processor TMP4315BP-1814

7.3. Schematic Diagram

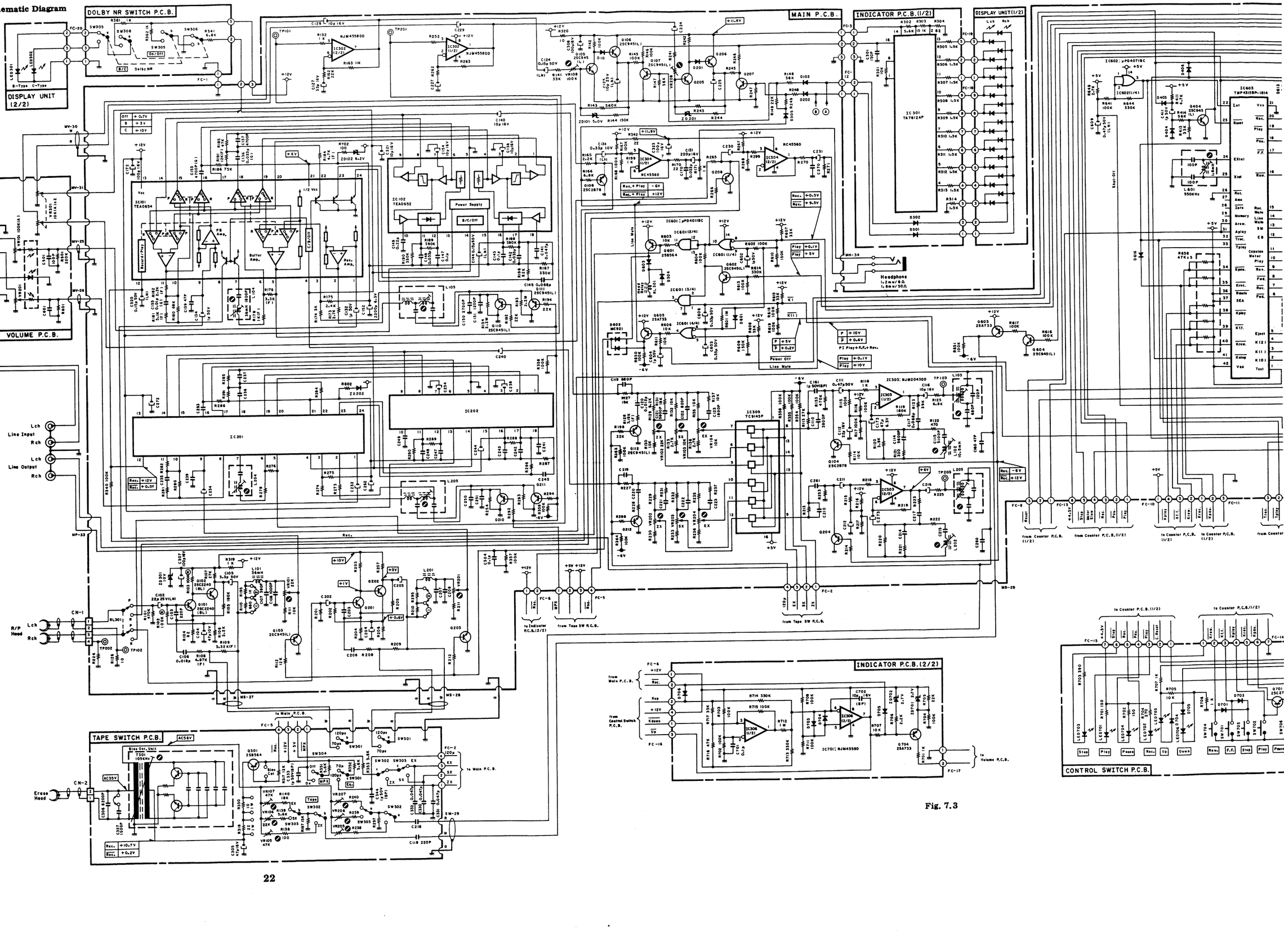
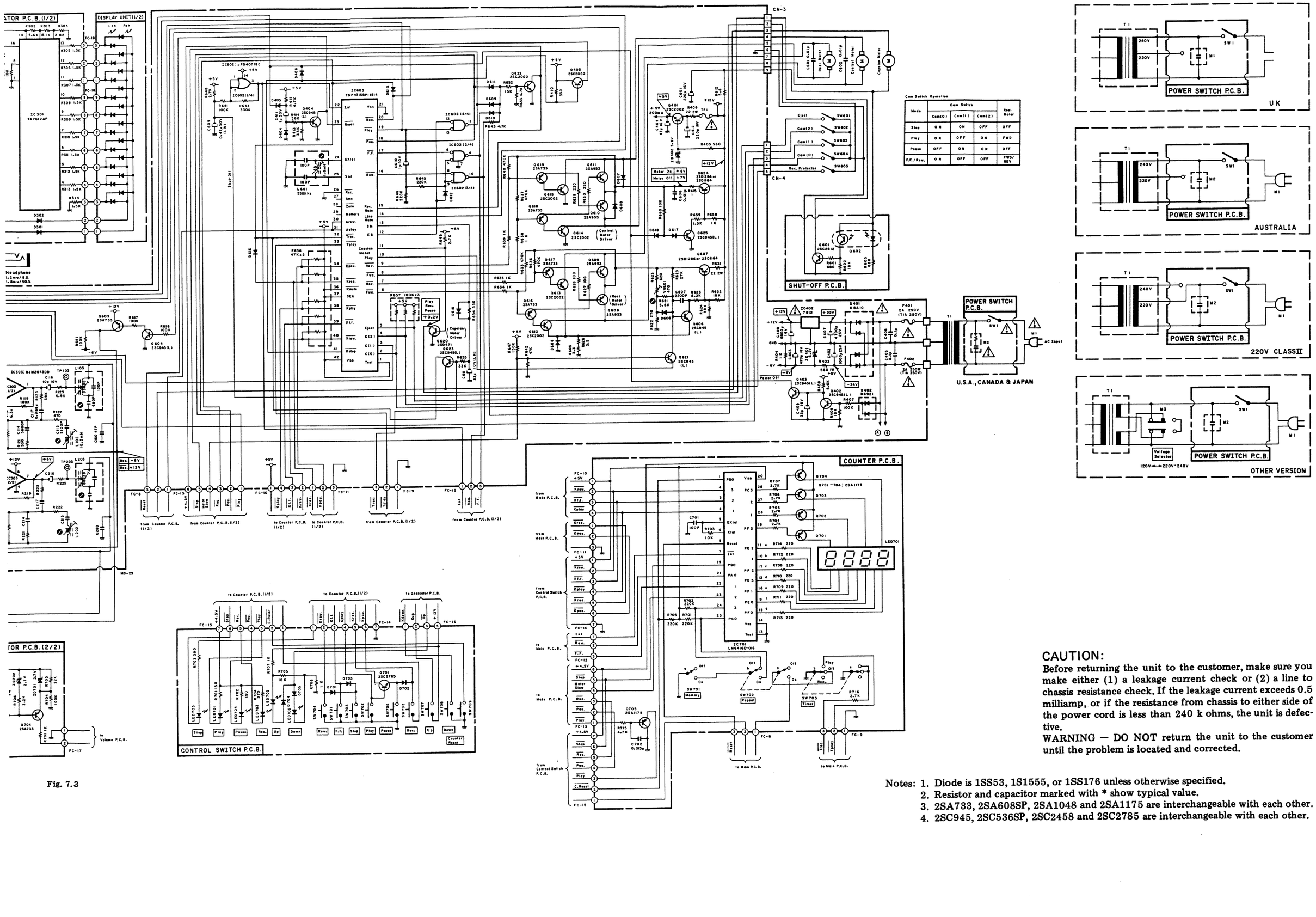


Fig. 7.3



Cam Switch Operation

Mode	Cam Switch			Reel Motor
	Cam(0)	Cam(1)	Cam(2)	
Stop	ON	ON	OFF	OFF
Play	ON	OFF	ON	FWD
Pause	OFF	ON	ON	OFF
F.F./Rew.	ON	OFF	OFF	FWD/REV

Fig. 7.3

CAUTION:

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.

Notes: 1. Diode is 1SS53, 1S1555, or 1SS176 unless otherwise specified.
2. Resistor and capacitor marked with * show typical value.
3. 2SA733, 2SA608SP, 2SA1048 and 2SA1175 are interchangeable with each other.
4. 2SC945, 2SC536SP, 2SC2458 and 2SC2785 are interchangeable with each other.

8. WIRING DIAGRAM

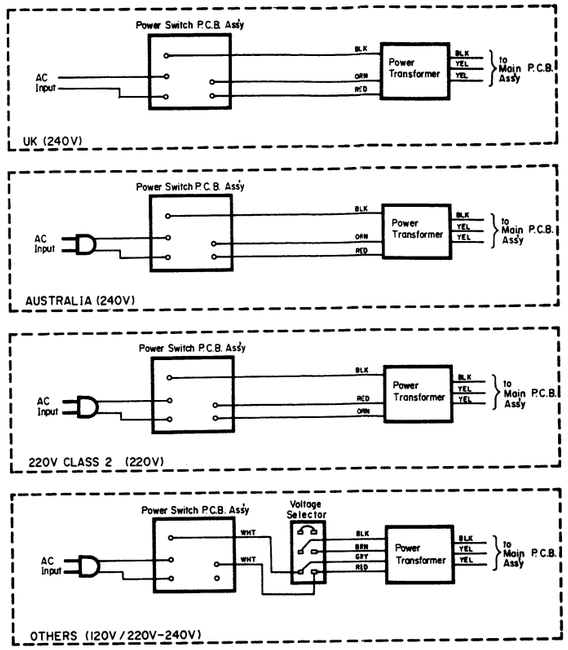
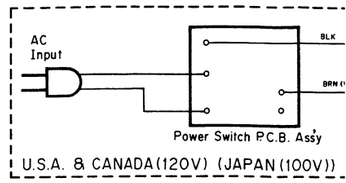
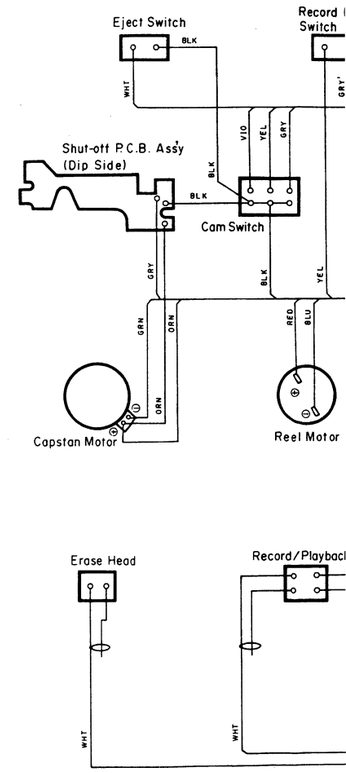


Fig. 8.1





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.

ıGRAM

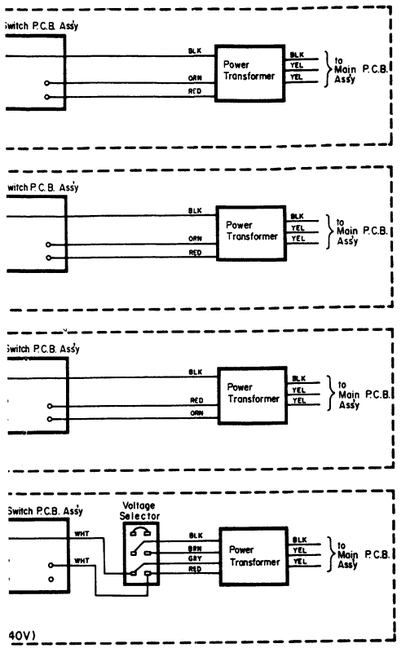


Fig. 8.1

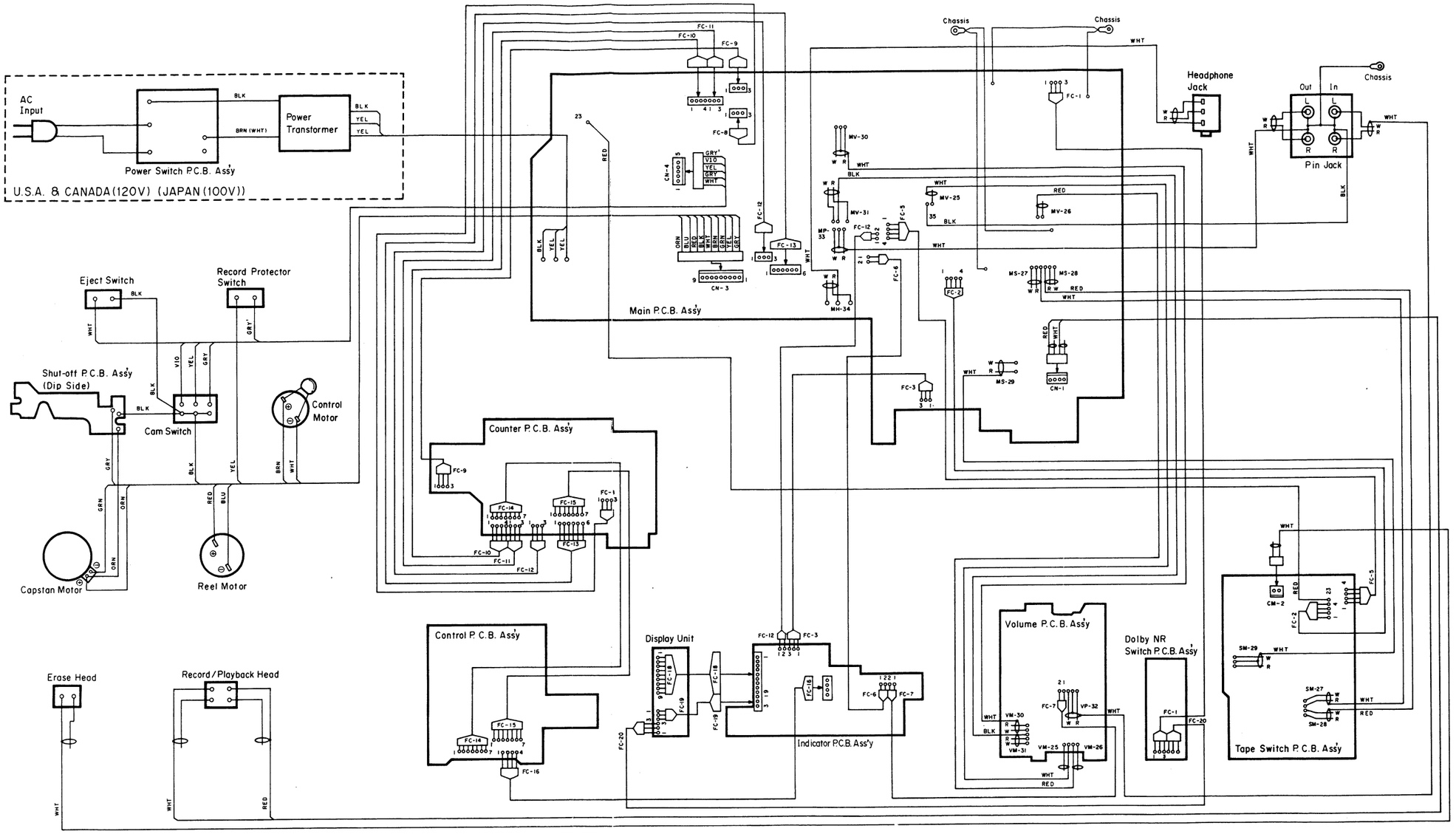


Fig. 8.2.1 2nd Version

wire colors

- Brown — BLU — Blue
- Red — VIO — Violet
- Orange — GRY — Gray
- Yellow — WHT — White
- Green — BLK — Black

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

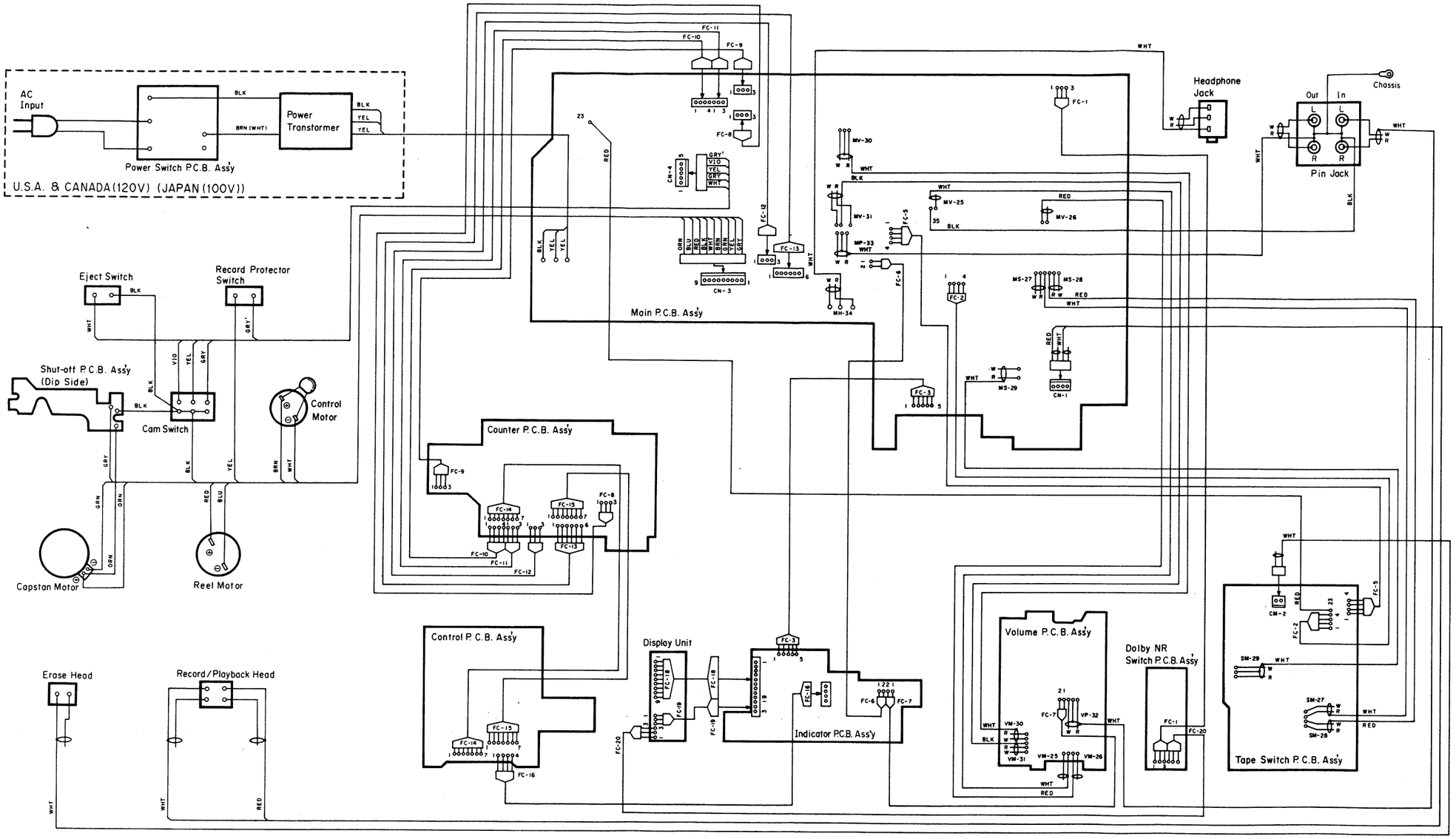


Fig. 8.2.2 1st Version

9. BLOCK DIAGRAMS

9.1. Amplifier Section

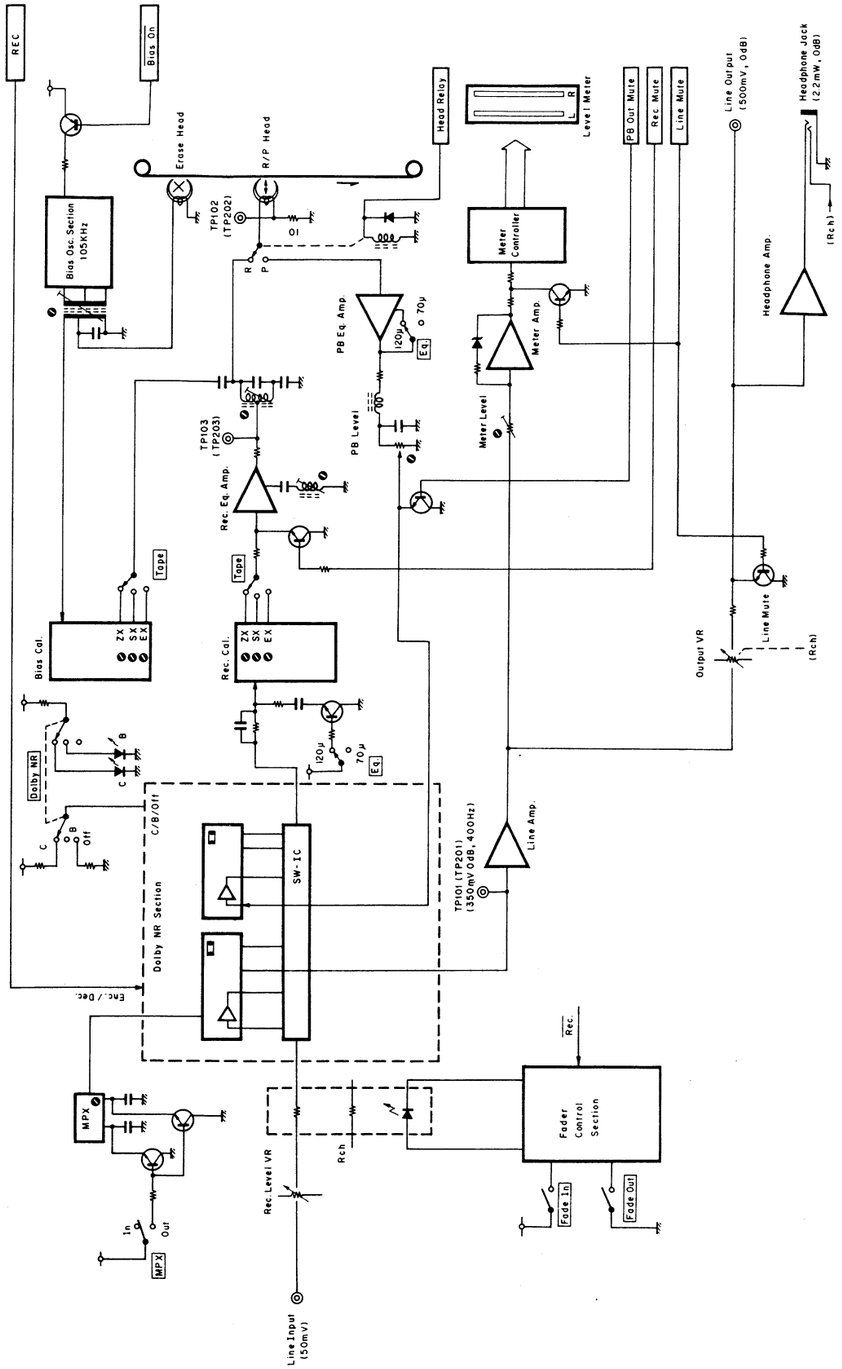


Fig. 9.1

9.2. Mechanism Control Section

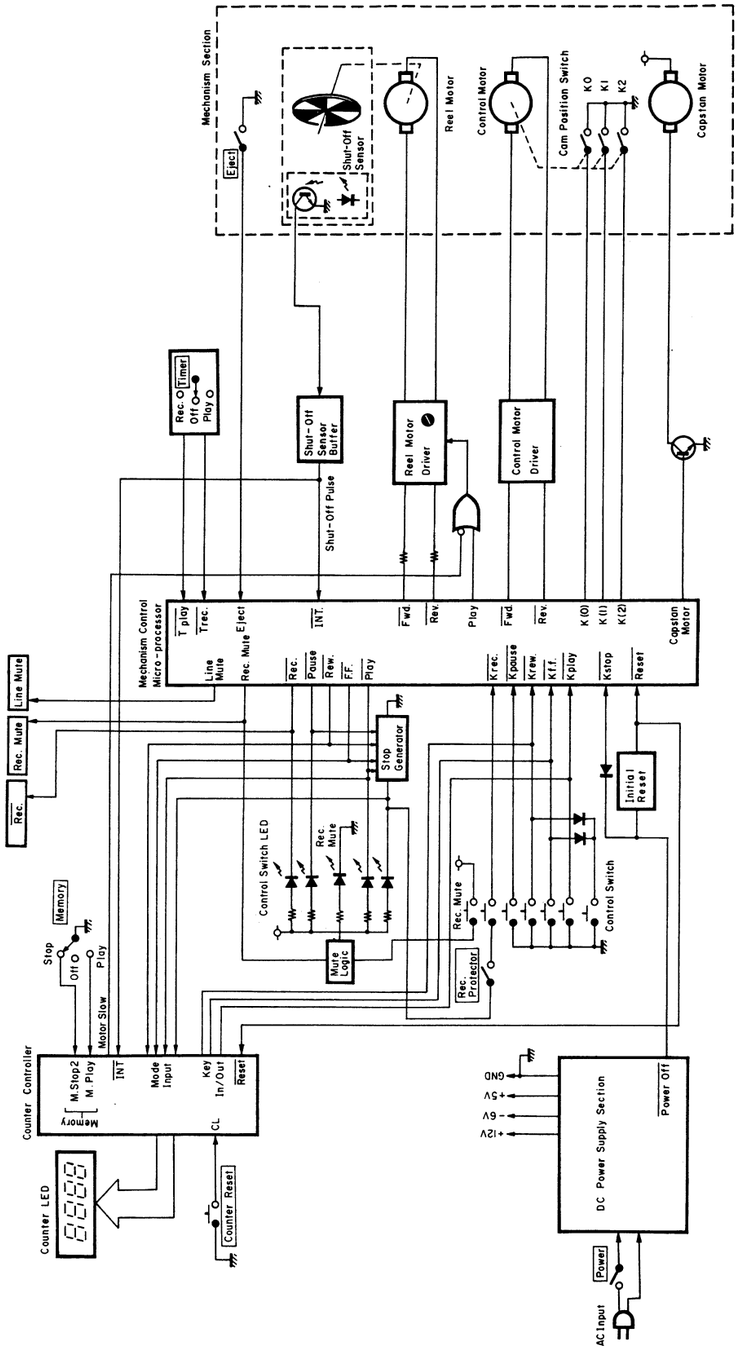


Fig. 9.2

10. TIMING CHART AND EQ. AMP. FREQUENCY RESPONSE

10.1. Timing Chart

(1) Overall Timing Chart

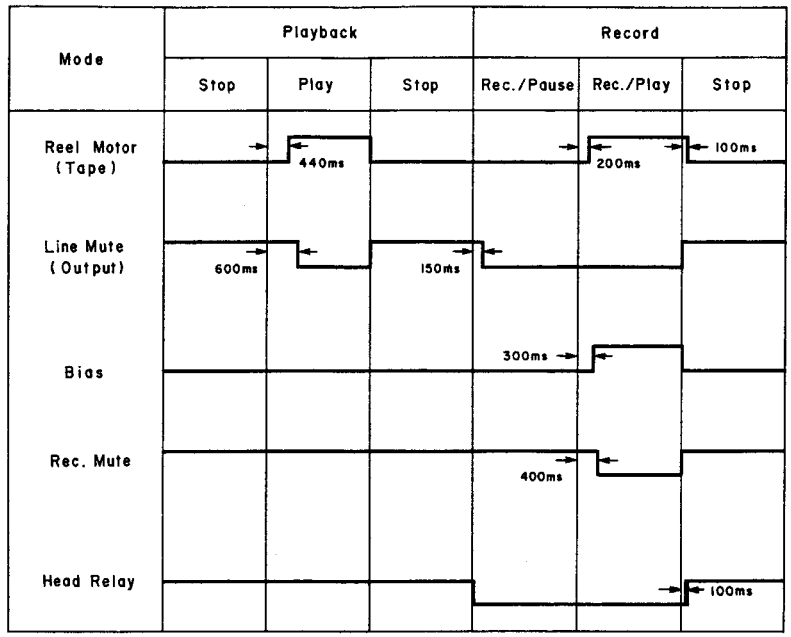


Fig. 10.1.1

(2) Mechanism Control Timing Chart

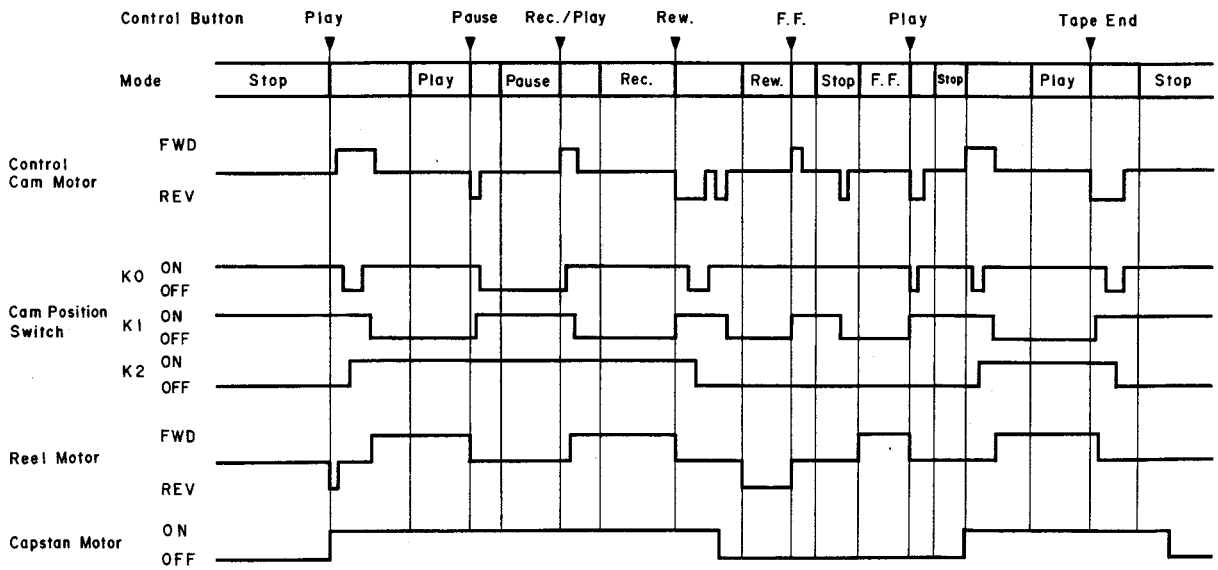


Fig. 10.1.2

10.2. Eq. Amp. Frequency Response
(1) Playback Frequency Response

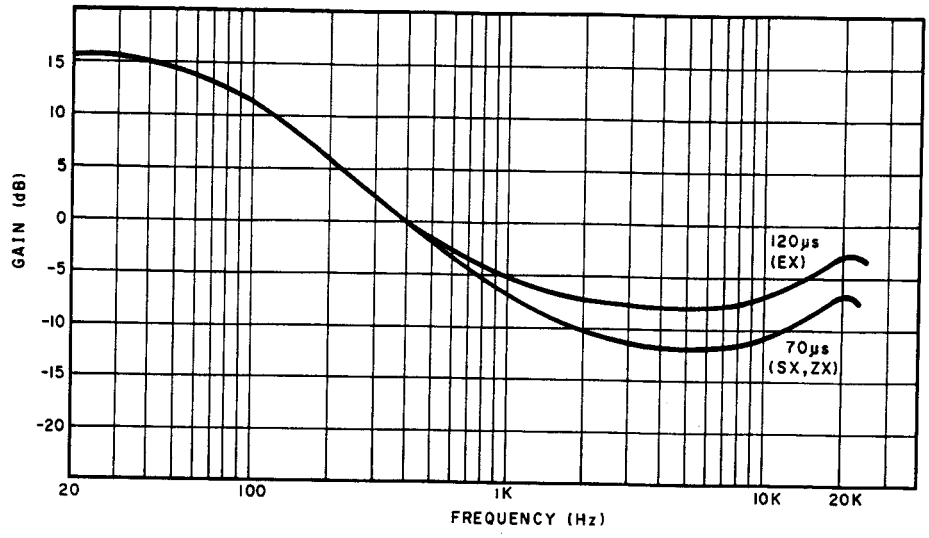


Fig. 10.2.1

(2) Record Current Frequency Response

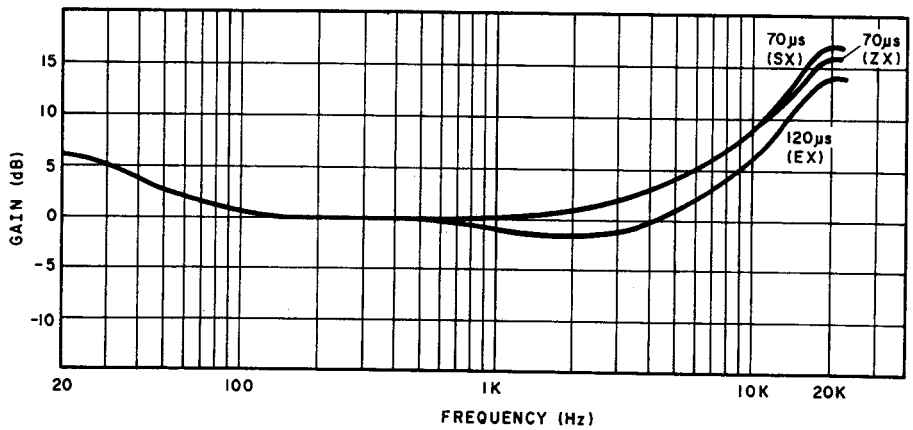


Fig. 10.2.2

11. SPECIFICATIONS

Track Configuration	4 Tracks/2-Channel Stereo
Heads	2 (Erase Head x 1, Record/Playback Head x 1)
Motors (Tape Transport)	DC Servo Motor (Capstan Drive) x 1 DC Motor (Reel Drive) x 1
Power Source	100, 120, 120/220-240, 220 or 240V AC; 50/60 Hz (According to country of sale)
Power Consumption	23 W max.
Tape Speed	1-7/8 ips. (4.8 cm/sec.) ±0.5%
Wow-and-Flutter	Less than 0.11% WTD Peak Less than 0.06% WTD RMS
Frequency Response	20 Hz—20,000 Hz (recording level —20 dB)
Signal-to-Noise Ratio	Dolby C-Type NR on <70 μs, ZX tape> Better than 68 dB (400 Hz, 3% THD, IHF A-WTD RMS) Dolby B-Type NR on <70 μs, ZX tape> Better than 62 dB (400 Hz, 3% THD, IHF A-WTD RMS)
Total Harmonic Distortion	Less than 1.0% (400 Hz, 0 dB, ZX, EXII tape) Less than 1.2% (400 Hz, 0 dB, SX tape)
Erasure	Better than 60 dB (100 Hz, 0 dB)
Separation	Better than 36 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Input (Line)	50 mV, 30 kΩ
Output (Line)	0.5 V (400 Hz, 0 dB, output level control at max.) 2.2 kΩ
(Headphones)	2.2 mW (400 Hz, 0 dB, output level control at max.) 8 Ω load
Fast-Winding Time	Approx. 85 seconds (with C-60 cassette)
Dimensions	430 (W) x 110 (H) x 250 (D) millimeters 16-15/16 (W) x 4-5/16 (H) x 9-7/8 (D) inches
Approximate Weight	5.5 kg 12 lb. 2 oz

- Specifications and appearance design are subject to change for further improvement without notice.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
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