



# HITACHI

## SERVICE MANUAL

TK

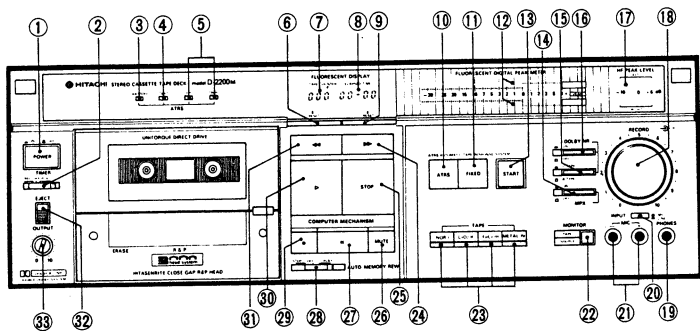
No. 1672E

# D-2200M

171

### CONTENTS

Specifications .....	2
Disassembly .....	2
Adjustment.....	5
Inspection of mechanism.....	7
Lubrications .....	8
Block diagram .....	9
Schematic diagram (DD Motor Section).....	11
Schematic diagram .....	12
Circuit board diagram.....	15
Wiring diagram.....	22
Schematic diagram/Circuit board diagram (FL meter module).....	25
IC pin function table.....	26
Microprocessor test program .....	32
Replacement parts list.....	33
Exploded view (Mechanism-DX-1).....	35
Exploded view (Cabinet).....	39



### KEY TO ILLUSTRATIONS

- |                                   |                              |
|-----------------------------------|------------------------------|
| ① POWER (MAINS) SWITCH            | ①⑦ HF PEAK LEVEL INDICATOR   |
| ② TIMER SWITCH                    | ①⑧ RECORDING LEVEL CONTROLS  |
| ③ BATTERY INDICATOR               | ①⑨ HEADPHONE SOCKET          |
| ④ TEST INDICATOR                  | ②① INPUT SELECT SWITCH       |
| ⑤ TEST FREQUENCY INDICATORS       | ②② MICROPHONE SOCKETS        |
| ⑥ COUNTER RESET SWITCH            | ②③ MONITOR SWITCH            |
| ⑦ TAPE COUNTER                    | ②④ TAPE SELECT BUTTONS       |
| ⑧ ELAPSED TIMER                   | ②⑤ STOP BUTTON               |
| ⑨ ELAPSED TIME RESET SWITCH       | ②⑥ REC. MUTE BUTTON          |
| ⑩ ATRS BUTTON                     | ②⑦ PAUSE BUTTON              |
| ⑪ FIXED BUTTON                    | ②⑧ AUTO/MEMORY REWIND SWITCH |
| ⑫ DIGITAL PEAK METER              | ②⑨ RECORD BUTTON             |
| ⑬ ATRS START BUTTON               | ③① PLAYBACK BUTTON           |
| ⑭ MPX SWITCH                      | ③② REWIND BUTTON             |
| ⑮ DOLBY B/C NR CHANGE OVER SWITCH | ③③ EJECT BUTTON              |
| ⑯ DOLBY NR SWITCH                 | ③④ OUTPUT LEVEL CONTROL      |

### SAFETY PRECAUTION

The following precautions should be observed when servicing.

- Since many parts in the unit have special safety related characteristics, always use genuine Hitachi's replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes. Critical parts are marked with  $\Delta$  in the schematic diagram and circuit board diagram.
- Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

## STEREO CASSETTE TAPE DECK

January 1982

TOKAI WORKS

171

**SPECIFICATIONS**

<b>Semiconductors :</b>	
Modules :	5
ICs :	16
Transistors :	71
FETs :	2
Diodes :	69
LEDs :	24
Track System :	4 track 2 channel stereo
Tape :	Cassette tape (C-30, 60, 90)
Tape Speed :	4.75cm/s
<b>Recording System and</b>	
Bias Frequency :	AC bias, 105 kHz
<b>Erasing System :</b>	
Erasing System :	AC erase
Erase Ratio :	65 dB or more (at 1 kHz)
<b>Frequency Response :</b>	
NOR-I :	20 Hz - 20 kHz 30 Hz - 18 kHz ± 3 dB 25 Hz - 20 kHz *
CrO <sub>2</sub> -II :	20 Hz - 22 kHz 30 Hz - 20 kHz ± 3 dB 25 Hz - 20 kHz *
FeCr-III :	20 Hz - 20 kHz 30 Hz - 18 kHz ± 3 dB 25 Hz - 20 kHz *
METAL-IV :	20 Hz - 22 kHz 30 Hz - 20 kHz ± 3 dB 25 Hz - 20 kHz *
<b>S/N (Signal to Noise Ratio) :</b>	
Dolby B NR ON :	69 dB (Weighted A, Reference 3% THD, Metal tape) 69 dB *

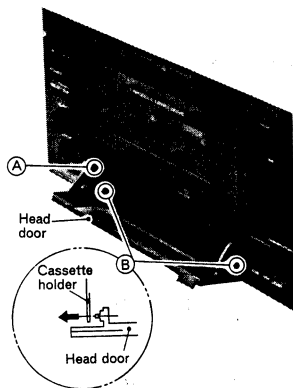
Dolby C NR ON :	75 dB (Weighted A, Reference 3% THD, Metal tape) 75 dB *
Dolby NR OFF :	61 dB (Weighted A, Reference 3% THD, Metal tape) 61 dB *
Wow and Flutter :	0.019% (WRMS) 0.055% *
<b>Input Sensitivity and Impedance :</b>	
Microphone :	0.4mV, 300 ohms-5 kohms
Line in :	100mV, 50 kohms or more
Output Level :	500mV
<b>Output Load Impedance :</b>	
Line out :	50 kohms or more
Headphone :	8 ohms-2 kohms
Distortion :	0.8% (1 kHz, 160 nwb/m)
Channel Separation :	40 dB or more (at 1 kHz)
Cross Talk :	60 dB or more (at 1 kHz)
Power Supply :	AC 120V, 60 Hz (U, C) AC 100-110V/115-127V/ 200-220V/230-250V, 50/60 Hz (W) AC 220V, 50 Hz (FS) AC 240V, 50 Hz (BS, AU)
<b>Power Consumption :</b>	
	36W (U, C) 33W (FS, BS, AU, W)
Dimensions :	150(H) × 435(W) × 282(D)mm
Weight :	7.3kg
Motor :	Uni-torque DD motor × 1 DC motor × 1
Heads :	1.4mm gap HITASENRITE R & P head Ferrite guard special permalloy erase head

\* According to DIN 45 500

**DISASSEMBLY**

**1. Head door**

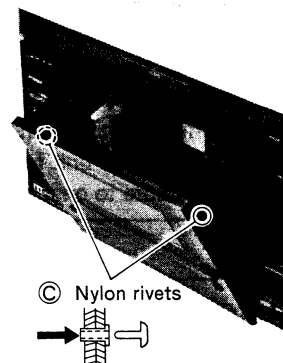
- 1) Open the head door.
- 2) Remove the polyester washer (A) and the engagement sections (B).



**Fig. 1**

**2. Cassette door**

- 1) Depress the eject button to open the cassette door.
- 2) Remove the two nylon rivets (C).



**Fig. 2**

**3. Upper cover**

Remove the six screws (D, E, F).

**4. Bottom cover**

Remove the five screws (F, G, H, I).

**5. Front panel**

- 1) Remove the beads band of lead wires and pull out the connectors of the FL meter module, REC volume PC board.
- 2) Remove the seven screws (J, K).

**6. Cassette chassis**

After removing the front panel, remove the five screws (I, L).

**7. Power PC board**

Remove the two screws (M) and open the PC board.

**8. HF peak PC board**

Remove the two screws (N).

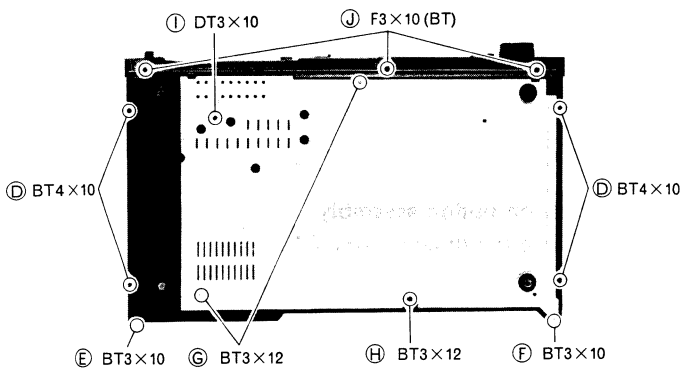


Fig. 3

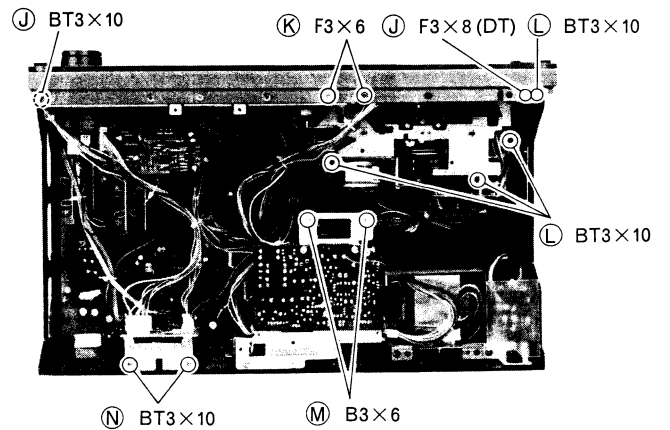


Fig. 4

**9. Main PC board**

Remove the seven screws [H (Fig. 3), O, P] and jack holder (Q).

**10. DD motor PC board**

Remove the one screw (R).

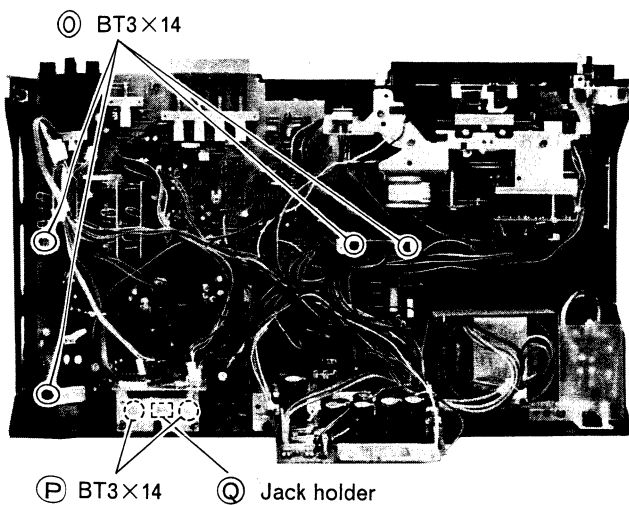


Fig. 5

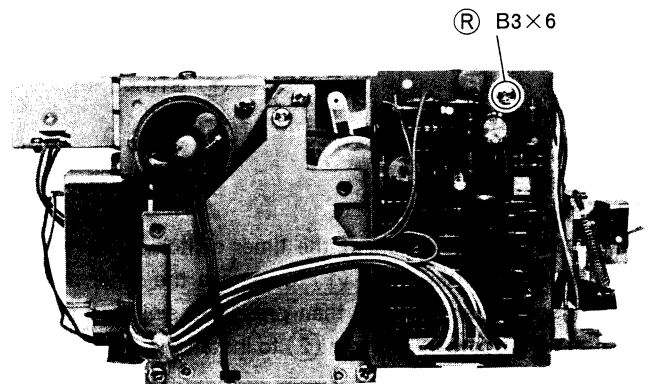


Fig. 6

11. FL meter module PC board  
Remove the two screws (S).

13. Function switch PC board  
Remove the six screws (V).

12. Counter PC board  
Remove the two screws (T) and push the two tabs (U).

14. Dolby/ATRS switch PC board  
Remove the two screws (W) and push the four tabs (X).

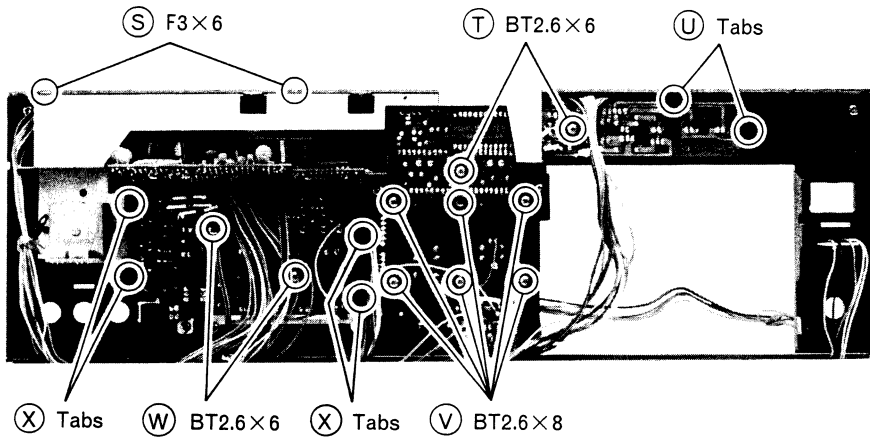


Fig. 7

15. REC volume PC board  
Remove the REC level control knobs and the one screw (Y).

17. Function button assembly  
Remove the three screws (A1).

16. HF peak indicator PC board  
Remove the one screw (Z).

18. Clear plate  
Remove the two screws (B1).

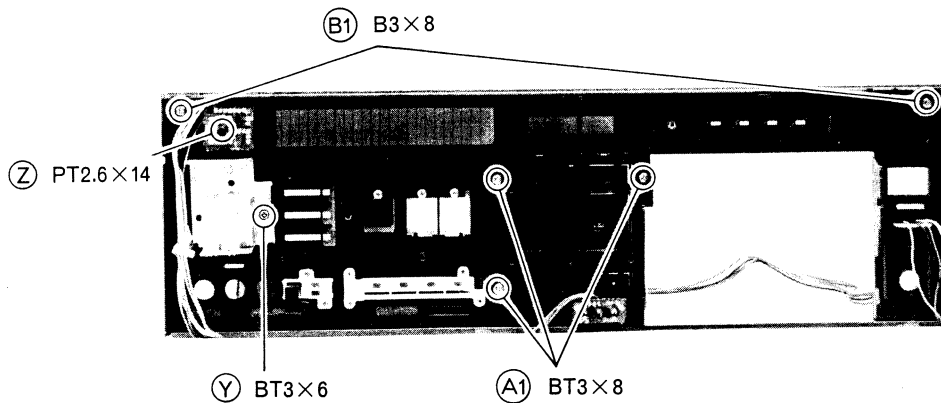


Fig. 8

19. Timerswitch  
Press the projection of the timer switch holder in the direction of the arrow ① to remove the timer switch. Engage section (A) and then press the switch holder in the direction of the arrow ② to install the timer switch.

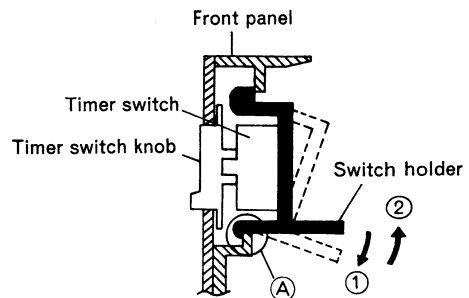


Fig. 9

**ADJUSTMENT**

Perform the following adjustments in the sequence stated after cleaning the heads, pressure rollers, and capstans with a head cleaning stick moisted in alcohol. Also, unless otherwise specified, set the switches and controls to the positions indicated in the table.

Symbol No.	Switches and Controls	Position	Symbol No.	Switches and Controls	Position
S1	Input select switch	LINE	S7	MPX switch	OFF
S2	Tape select switches	NOR-I	S8	Monitor switch	TAPE
S3	Auto/memory rewind switch	OFF	S109	ATRS switch	OFF
S4	Timer switch	OFF	S111	Fixed switch	ON
S5	Dolby NR switch	OFF	RV1L, R	Record level controls	MAX.
S6	Dolby NR B/C switch	B	RV2L, R	Output level control	MAX.

\* According to DIN 45 500

Item	Adjustments	Measuring Instrument and Connection			Check Tape	Mode	Adjusted Position	Adjusted Value	Remarks
		Measuring Instrument	Input Terminal	Output Terminal					
1	Tape speed	· Frequency counter	—	LINE OUT	MTT-111, 3000 Hz (3150 Hz*)	Playback	RT1	3000 Hz +20 Hz + 5 (3150 Hz*)	See Note 1
2	(1) Tilt and height of the head	· Head adjusting jig	—	—	—	Playback	Screw (A), (B), (C)	—	See Note 2
	(2) Head azimuth	· VTVM	—	LINE OUT	MTT-114 (10 kHz)	Playback	Screw (C)	Output Max.	See Note 3
3	Digital peak meter	· Audio oscillator (400 Hz) · Attenuator · VTVM	LINE IN	TP1L, R	—	—	RT303L, R	0 dB indicators flash	See Note 4
4	Playback gain	· VTVM	—	TP2L, R	MTT-150, 400 Hz, 20m Maxwell	Playback	RT301L, R	580mV	See Note 5
5	HF peak indicator	· Audio oscillator (15 kHz) · Attenuator	LINE IN	—	—	—	RT601L, R	0 dB indicators lights	See Note 6

**Note :**

1. Adjust within 30 sec. after heat-running for more than 20 minutes.
2. Use the Hitachi head adjusting jig and instructions (consult nearest Hitachi office) to obtain the correct head height, tilt and azimuth. This adjustment has to be done alternately.

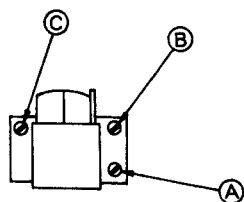


Fig. 10

3. When the maximum values of both channels are different, adjust to the maximum value of the L channel. In this case, the difference between the maximum values of both channels should be within 2 dB.
4. 1) Set the monitor switch to the SOURCE position.  
2) Feed a 400 Hz signal to the LINE IN jacks and adjust the audio oscillator output so that the level of TP1L, R becomes 580mV.  
3) Then, adjust the attenuator to lower the input level by 0.5 dB and adjust RT303L, R so that 0 dB indicators of the digital peak meter flash.  
4) Adjust the attenuator to increase the input level by 0.5 dB and confirm 0 dB indicators of the digital peak meter lights.

5. Playback a test tape (MTT-150, 400 Hz 20m Maxwell) and adjust RT301L, R so that the level of TP2L, R becomes 580mV.
6. 1) Set the monitor switch to the SOURCE position.  
2) Feed a 15 kHz signal to the LINE IN jacks and adjust

the audio oscillator output so that the digital peak meter indicates 0 dB.

- 3) Then, adjust the attenuator to lower the input level by 1 dB and adjust RT601L, R so that 0 dB indicators of the HF peak indicator lights.

**ATRS circuit adjustment**

Item	Adjustments	Measuring Instrument and Connection			Check Tape	Mode	Adjusted Position	Adjusted Value	Remarks
		Measuring Instrument	Input Terminal	Output Terminal					
1	Bias current	· Audio oscillator (1.5 kHz/15 kHz, 0 dB-23 dB) · Attenuator · VTVM	LINE IN	LINE OUT	Hitachi UD(C-90) tape	Record	RT103L, R	Output difference within ±0.5 dB	See Note 1
2	(1) Bias trap	Set RV1L, R (Record level controls) to Minimum.							
		· VTVM	—	TP3L, R	—	Record	L108L, R	Min.	See Note 2
3	Record level	· Audio oscillator (1 kHz, 0 dB-23 dB) · Attenuator · VTVM	LINE IN	LINE OUT	Hitachi UD(C-90) tape	Record	RT102L, R	Output difference within ±0.2 dB	See Note 3
4	(1) AF oscillator	Set the AUTO/MEMORY REW switch (S3) to PLAY position and connect a diode (1S2473 or 1S2076) as shown in Fig. 11. Then, set the power switch to ON. (Microprocessor test program is performed).							
		· VTVM	—	TP4	Hitachi UD(C-90) tape	—	RT101	Output difference within ±0.3 dB	See Note 4
5	A/D conversion	· Audio oscillator (1 kHz, 0 dB-23 dB) · Attenuator · VTVM	LINE IN	LINE OUT	Hitachi UD(C-90) tape	Record	RT302L, R	Within ±0.3 dB	See Note 5

**Note :**

1. 1) Set the monitor switch to the SOURCE position and feed a 1.5 kHz signal to the LINE IN jacks in the recording mode.  
2) Adjust the audio oscillator output so that the digital peak meter indicates 0 dB. Then, adjust the attenuator to lower the input level by 23 dB.  
3) Set the monitor switch to the TAPE position and read the playback output level of LINE OUT jacks.  
4) Then, set the audio oscillator frequency to 15 kHz and read the playback output level of LINE OUT jacks.  
5) Adjust RT103L, R so that the output level difference between two frequencies is within ±0.5 dB.
2. With the condition shown in item 1, set RV1L, R (Record level controls) to Minimum. Then, adjust L108L, R so that the level of TP3L, R becomes minimum.
3. 1) Set the monitor switch to the SOURCE position and

feed a 1 kHz signal to the LINE IN jacks in the recording mode.

- 2) Adjust the audio oscillator output so that the digital peak meter indicates 0 dB. Then, adjust the attenuator to lower the input level by 23 dB.
- 3) Set the monitor switch to the TAPE position and adjust RT102L, R so that the output level difference between SOURCE and TAPE is within ±0.2 dB at LINE OUT jacks.
4. 1) Insert a tape.  
2) Connect the VTVM to TP4, press the PLAY button and read the output of the 1 kHz signal.  
3) Next, press the REC button, read the output of the 14 kHz signal and adjust RT101 so that the output difference between two frequencies is within ±0.3 dB  
4) After adjustment, remove a diode as shown in Fig. 11.

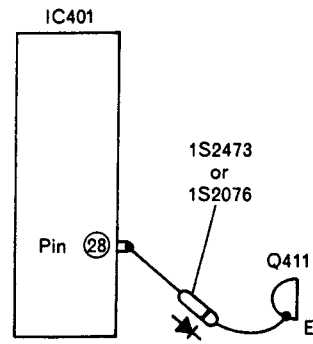


Fig. 11

5. 1) Perform the ATRS test using Hitachi UD(C-90) tape.
- 2) Set the monitor switch to the SOURCE position and feed a 1kHz signal to the LINE IN jacks in the recording mode.
- 3) Adjust the audio oscillator output so that the digital peak meter indicates 0 dB. Then, adjust the attenuator to lower the input level by 23 dB.
- 4) Read the output of LINE OUT jacks when the monitor switch is changed over, and adjust RT302L, R so that the output when the MONITOR switch is set to TAPE is within  $\pm 0.3$  dB with respect to the output when the monitor switch is set to SOURCE.

**INSPECTION OF MECHANISM**

Check Item		Reference Value	Remarks
1	Pressure roller (Take-up side)	Pressure	380—450g
		Driving force	120g or more
2	Pressure of pressure roller (Supply side)	130—180g	Measure in playback mode (Fig. 12)
3	Pressure of take-up idler	60g or more	Measure in playback mode (Fig. 14)
4	Torque	Take-up	
		Fast forward	75—110g·cm
		Rewind	
5	Back tension	Supply side	7—10g·cm
		Take-up side	1.7—5g·cm
6	Brake torque	Supply side	50—100g·cm
		Take-up side	
7	Head plate return strength	200g or more	Measure in stop mode (Fig. 17)
8	Head plate play lock allowance	300g or more	Measure in playback mode (Fig. 18)
9	Head plate pressing strength	150g or more	Measure in playback mode (Fig. 19)

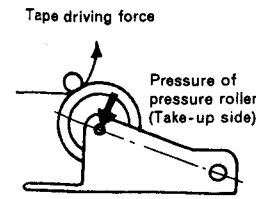


Fig. 12

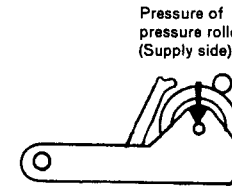


Fig. 13

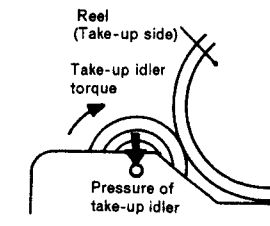


Fig. 14

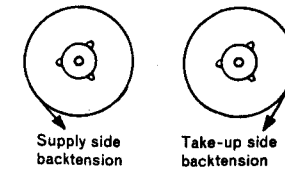


Fig. 15

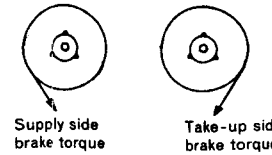


Fig. 16

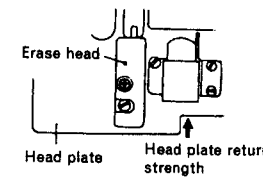


Fig. 17

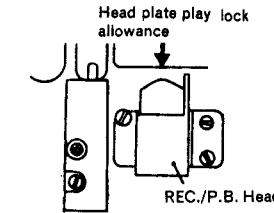


Fig. 18

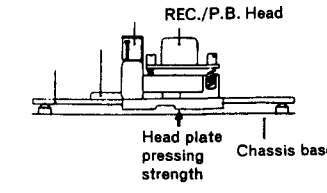


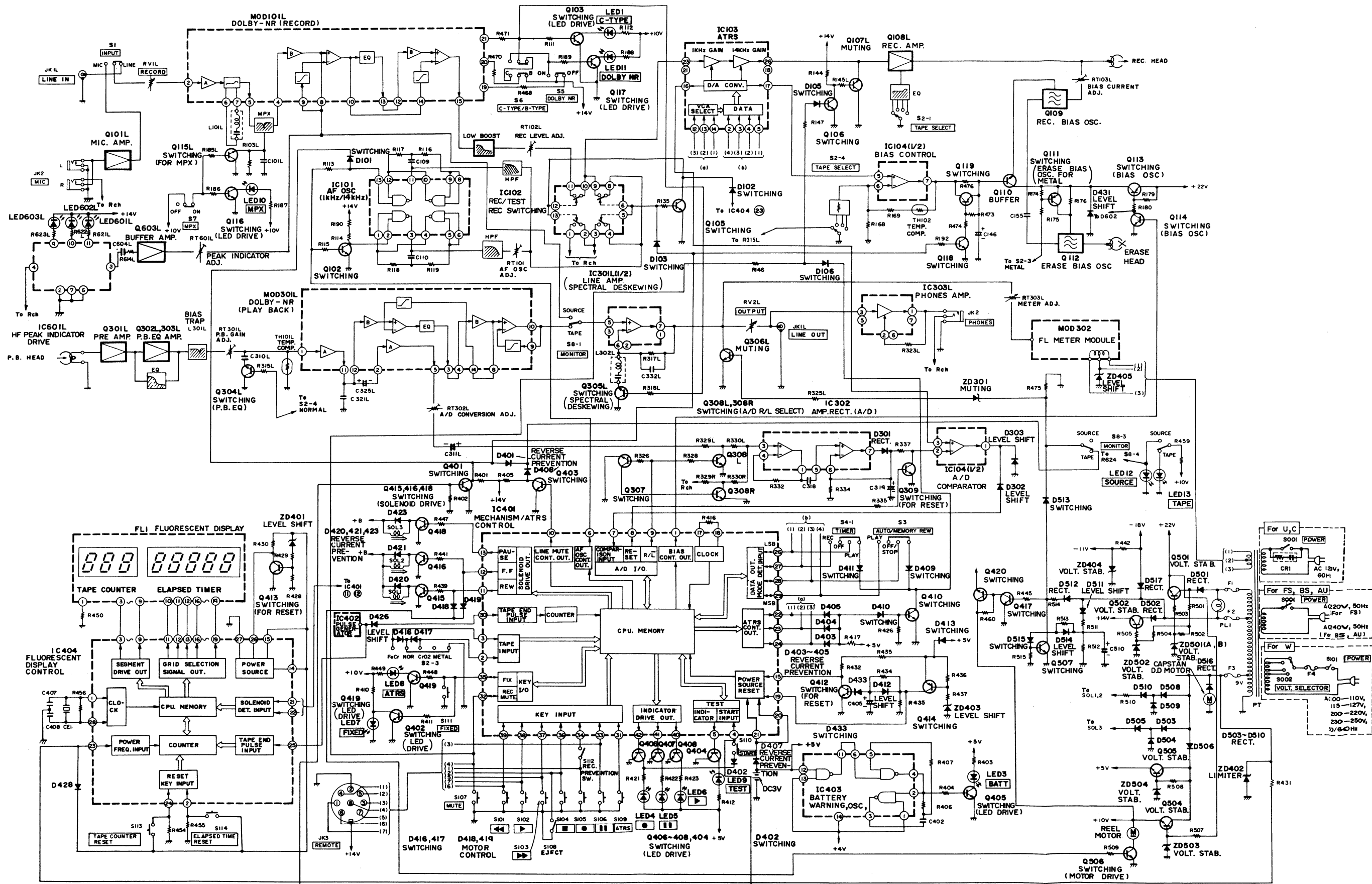
Fig. 19

**LUBRICATIONS**

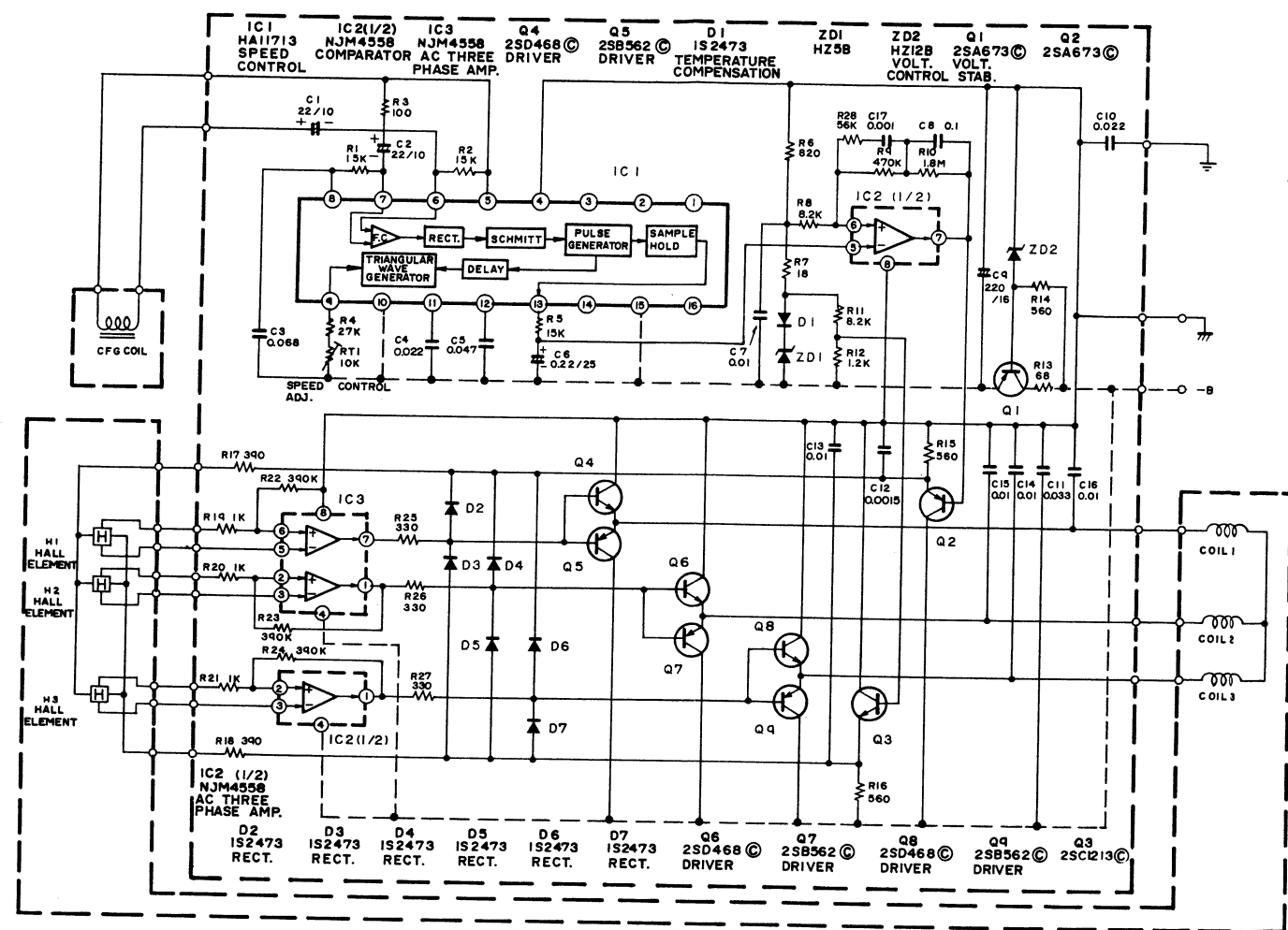
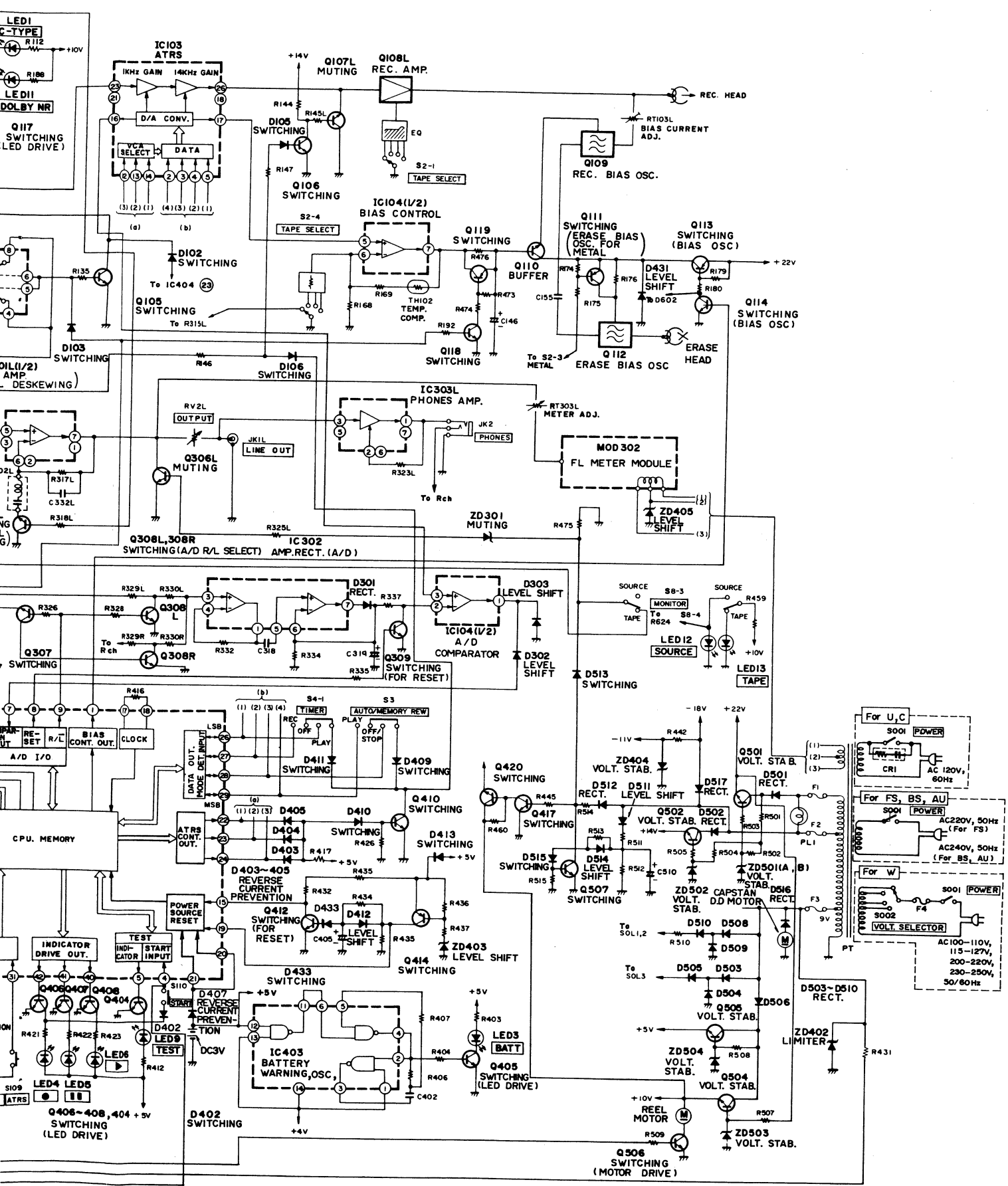
Lubricate one or two drops of oil to rotating point or lubricate grease to sliding point.  
 Lubricate the respective parts listed once every 1000 hours or once a year under normal conditions of use.  
 Avoid oiling them excessively, or rotation may become irregular because of oil splashes.

	Lubrication	Oil or Grease
Rotary section	Metal and metal	Pan motor oil (10W-40)
	Mold and metal	Sonic slider oil (#1600)
Sliding section	Metal and metal	Hitasol (MO-138)
	Mold and mold	White grease (FL-LUBE-A)
	Mold and metal	White grease (FL-LUBE-A)
Spring resonance prevention		Froil (GB-TS-1)

BLOCK DIAGRAM



SCHEMATIC DIAGRAM (DD Motor Section)





SCHEMATIC DIAGRAM

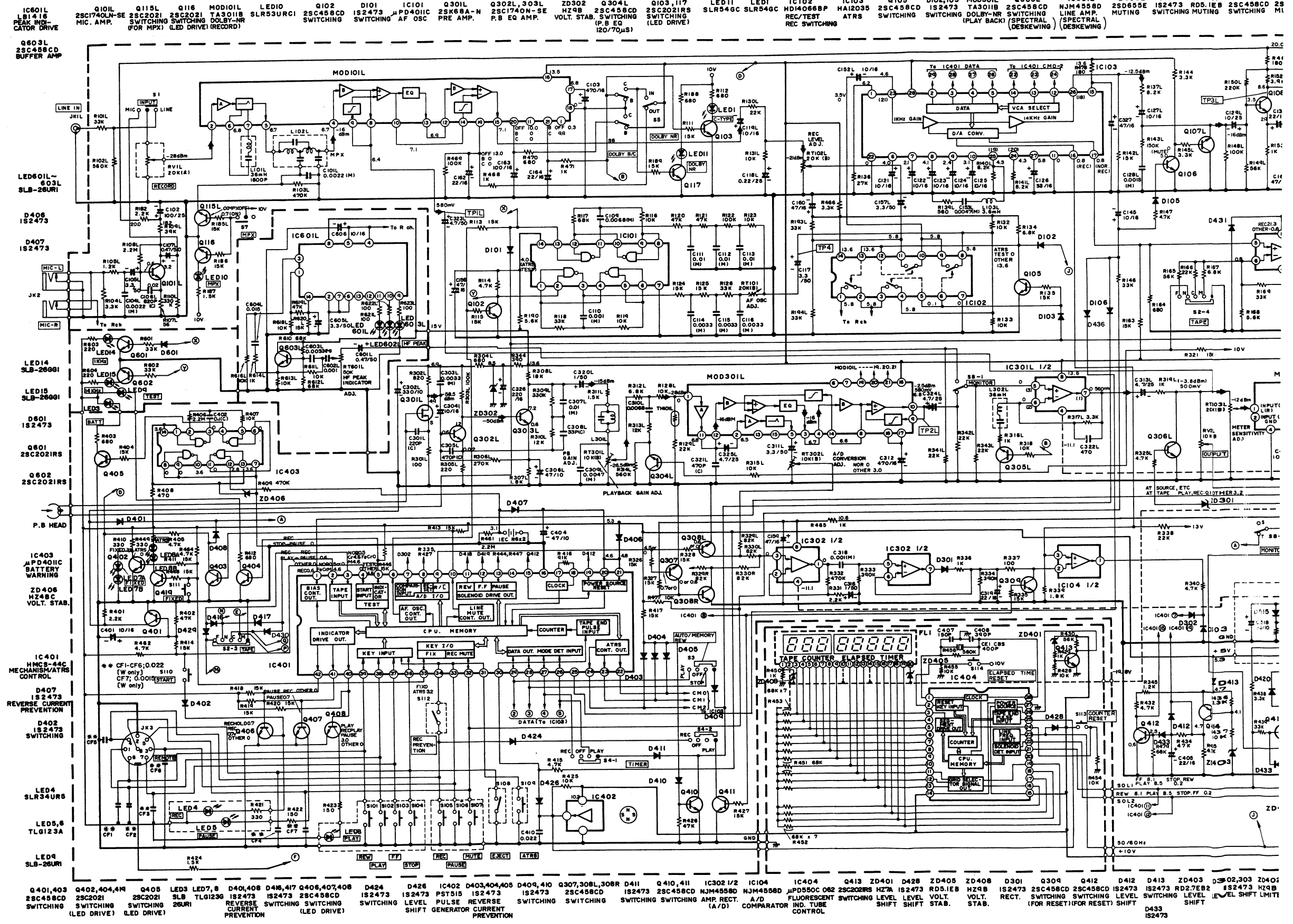
Note

- 1. Voltage measured at base of chassis with minimum volume control and no signal.
- 2. Nomenclature of Resistors and Capacitors.

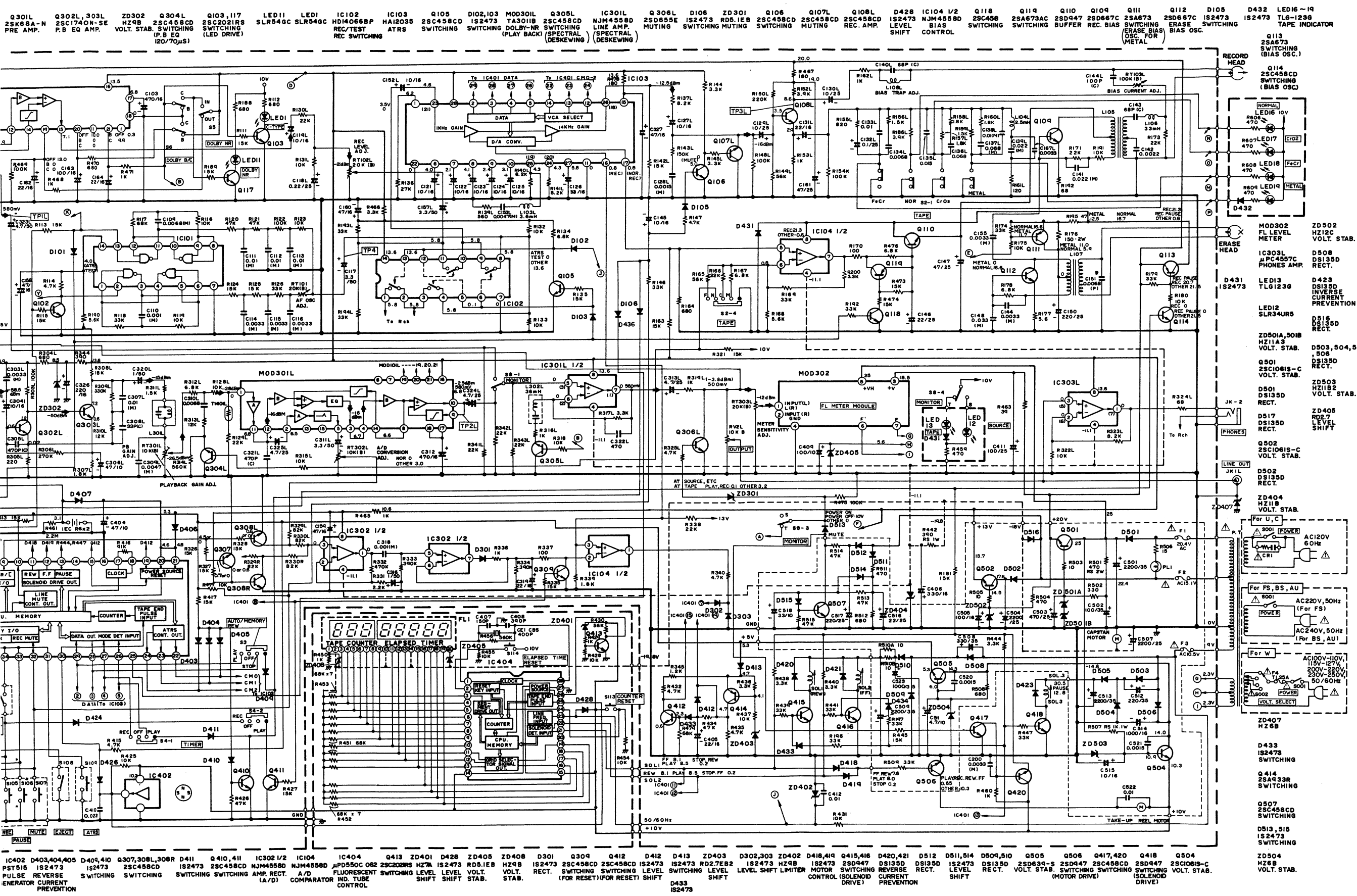
Circuit No.	
Value	No indicated Ω(Ohm) M : 1000kΩ
Tolerance	No indicated ±5% K : ±10% M : ±20%
Wattage	No indicated 1/4W
Sort	No indicated Carbon film RC : Composition RW : Wire wound RS : Oxide metal film RN : Fixed metal film

Circuit No.	
Value	No indicated μF P : PF
Tolerance	No indicated ±10% J : ± 5% M : ±20% Z : +80% - 20% D : ±0.5pF C : ±0.25pF
Sort	Ceramic Electrolytic Mylar Polyester Styrol
Voltage	No indicated 50WV

- 3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.
- 4. When replacing capacitors marked with \*, use specified ones stated on parts list since required temperature characteristics.

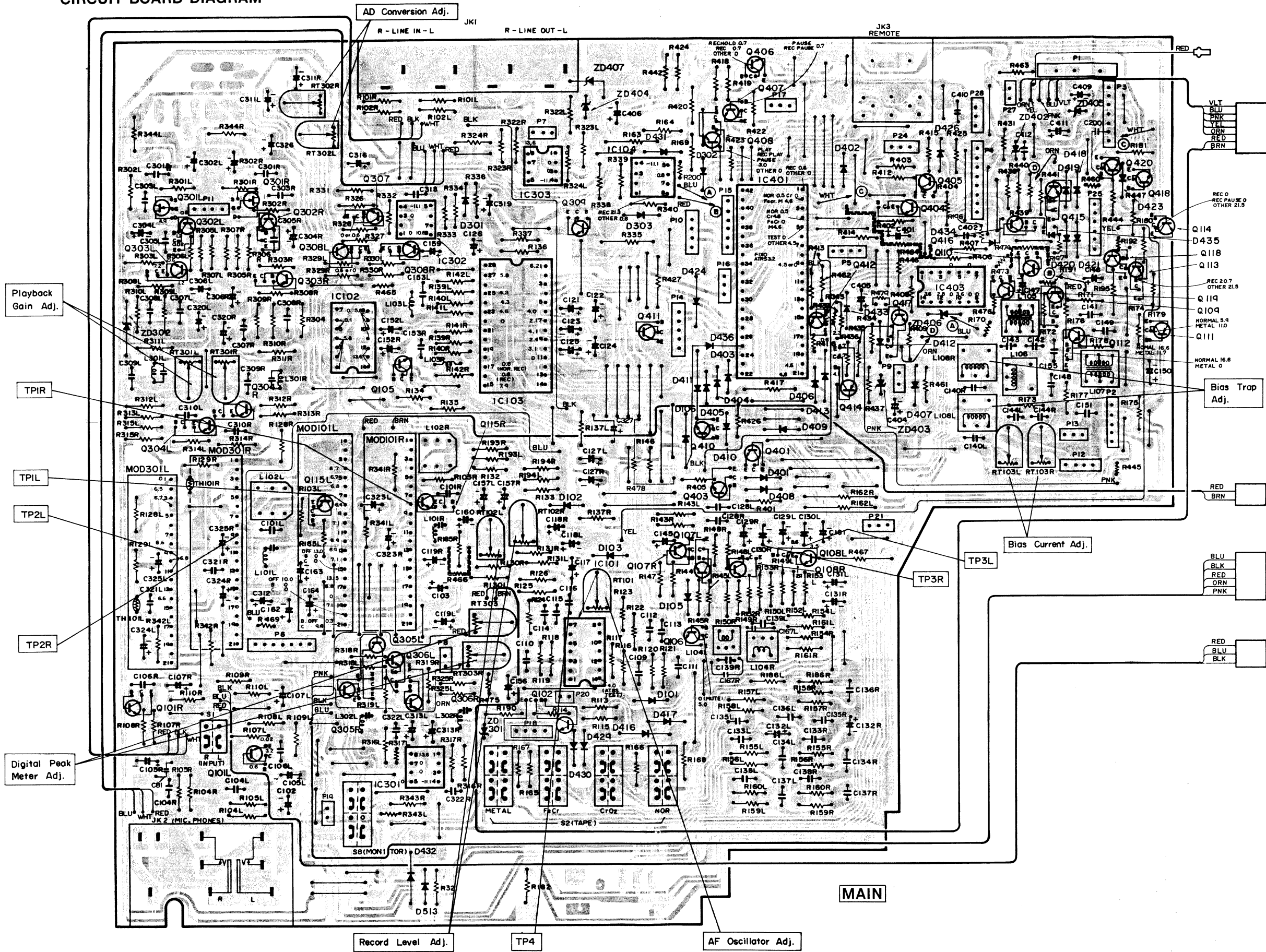


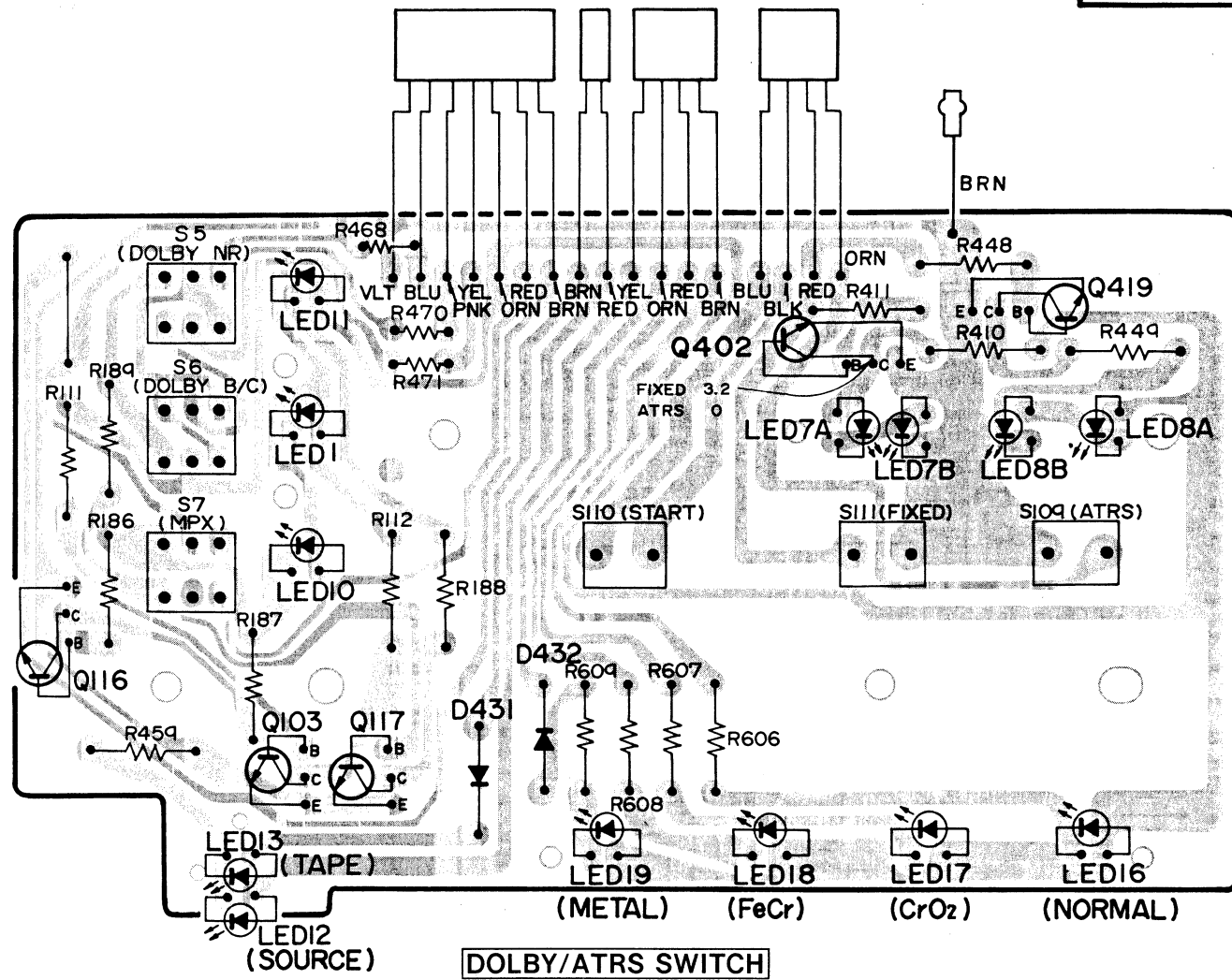
D-2200 M D-2200 M



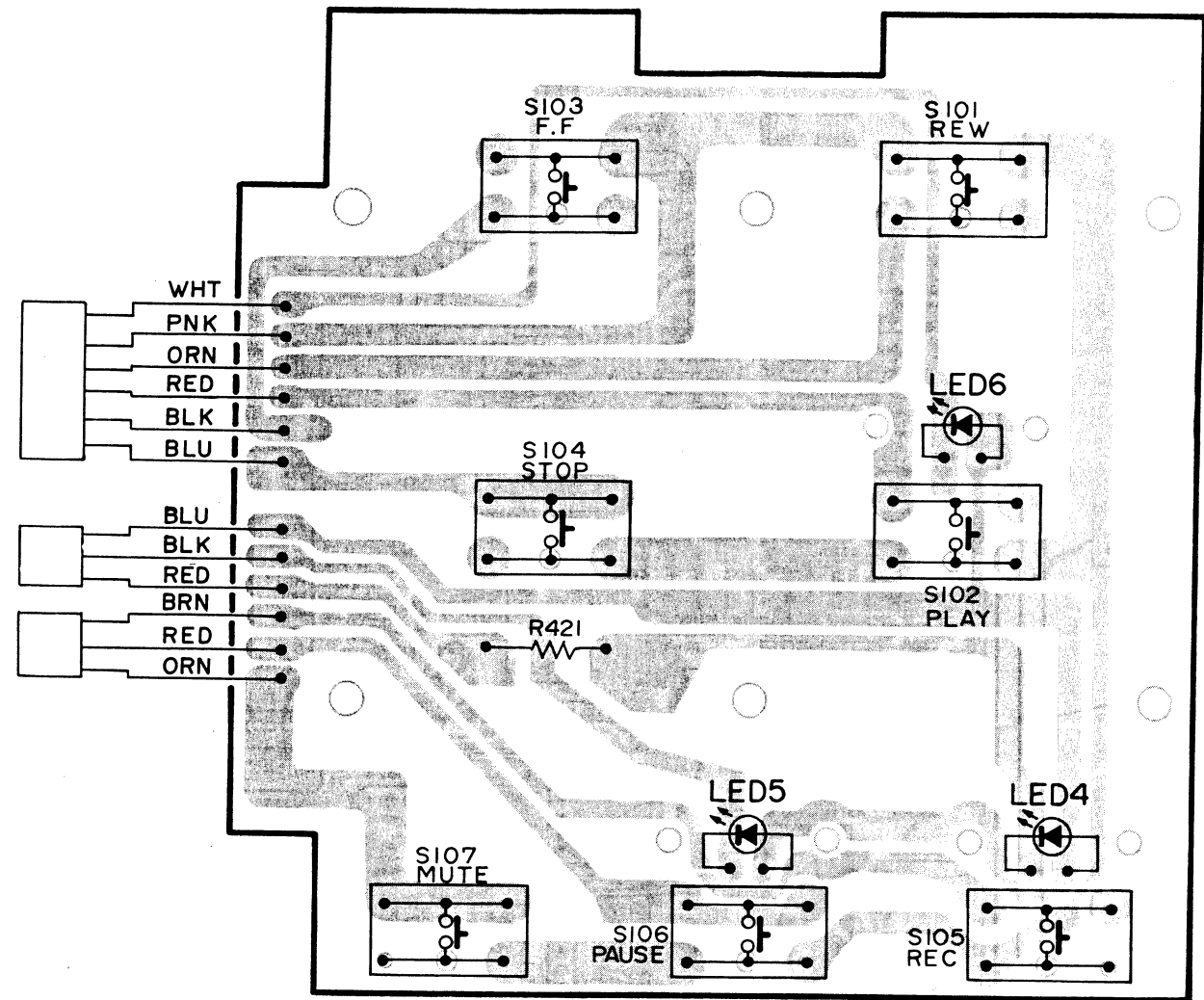
- Q301L 2SK68A-N PRE AMP.
- Q302L, Q303L 2SC1740N-SE P.B EQ AMP.
- ZD302 HZ9B VOLT. STAB.
- Q304L 2SC458CD SWITCHING (120/70μS)
- Q103, I17 2SC2021RS SWITCHING (LED DRIVE)
- LED11 SLR54GC LED DRIVE
- LED1 SLR54GC LED DRIVE
- IC102 HD14066BP REC/TEST REC SWITCHING
- IC103 HA12035 ATRS SWITCHING
- Q105 2SC458CD SWITCHING
- D102, I03 MOD301L TA3011B SWITCHING (PLAY BACK)
- Q305L 2SC458CD SWITCHING (SPECTRAL DESKEWING)
- IC301L NJM4558D LINE AMP. (SPECTRAL DESKEWING)
- Q306L 2SD655E MUTING
- D106 IS2473 SWITCHING
- ZD301 RD5.1E8 SWITCHING
- Q106 2SC458CD SWITCHING
- Q107L 2SC458CD SWITCHING
- Q108L 2SC458CD REC. AMP.
- D428 IS2473 LEVEL SHIFT
- IC104 1/2 NJM4558D BIAS CONTROL
- Q118 2SC458 SWITCHING
- Q119 2SA673AC SWITCHING
- Q110 2SD47 BUFFER
- Q109 2SD67C REC. BIAS
- Q111 2SA673 SWITCHING (ERASE BIAS OSC. FOR METAL)
- Q112 2SD67C ERASE BIAS OSC.
- D105 IS2473 SWITCHING
- D432 LED16~19 TAPE INDICATOR
- Q113 2SA673 SWITCHING (BIAS OSC.)
- Q114 2SC458CD SWITCHING (BIAS OSC.)
- D431 MOD302 FL I LEVEL METER
- IC303L APC4597C PHONES AMP.
- LED13 TLG1236
- LED12 SLR34UR5
- ZD501A, 501B HZ11.3 VOLT. STAB.
- Q501 2SC1061S-C VOLT. STAB.
- D501 DS135D RECT.
- D517 DS135D RECT.
- Q502 2SC1061S-C VOLT. STAB.
- D502 DS135D RECT.
- ZD404 HZ11.8 VOLT. STAB.
- ZD407 HZ2.6 VOLT. STAB.
- D433 IS2473 SWITCHING
- Q414 2SA433R SWITCHING
- Q507 2SC458CD SWITCHING
- D513, 515 IS2473 SWITCHING
- ZD504 HZ2.8 VOLT. STAB.

CIRCUIT BOARD DIAGRAM

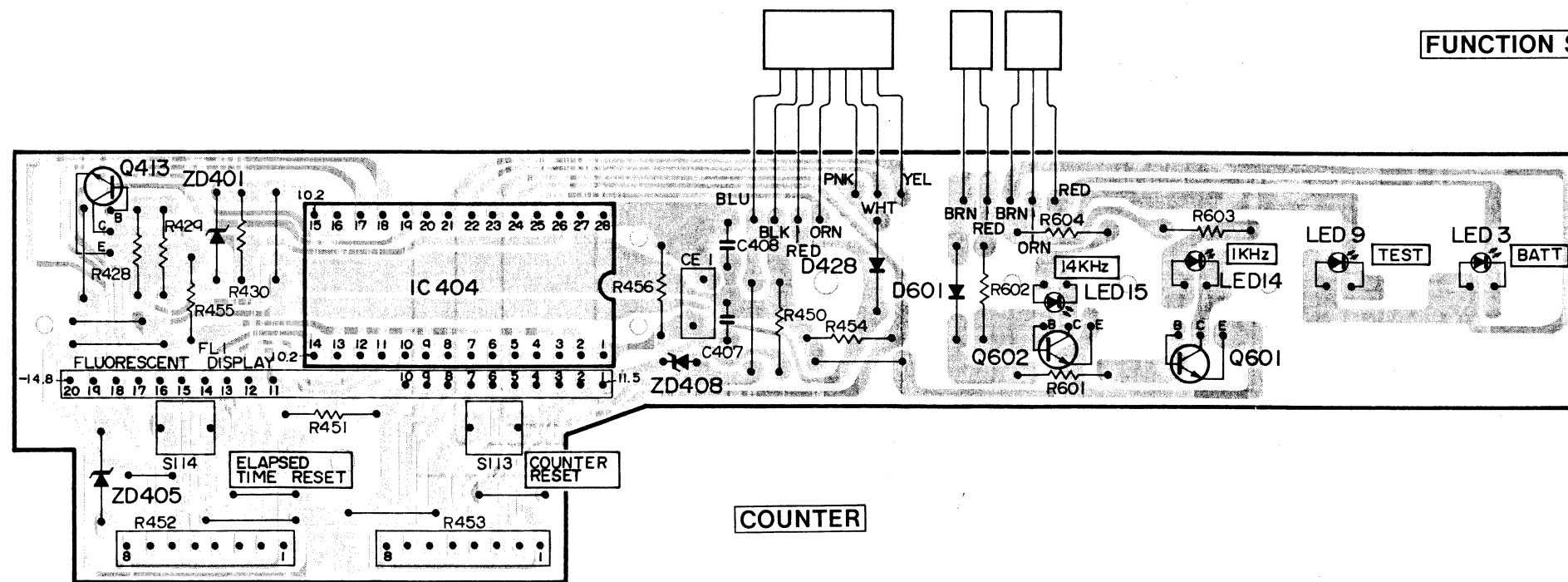




DOLBY/ATRS SWITCH

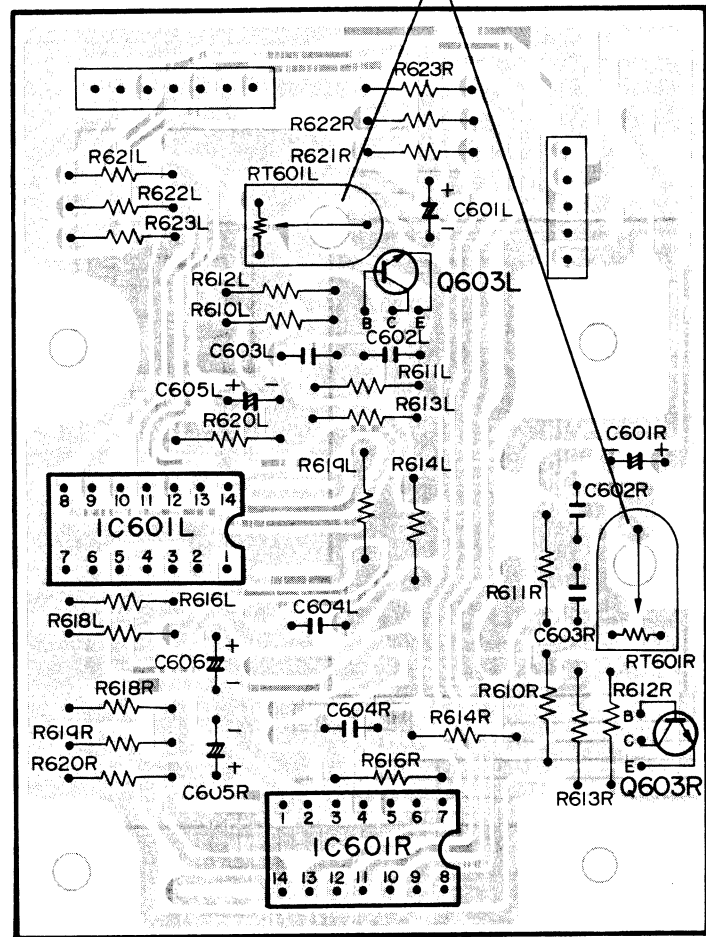


FUNCTION SWITCH

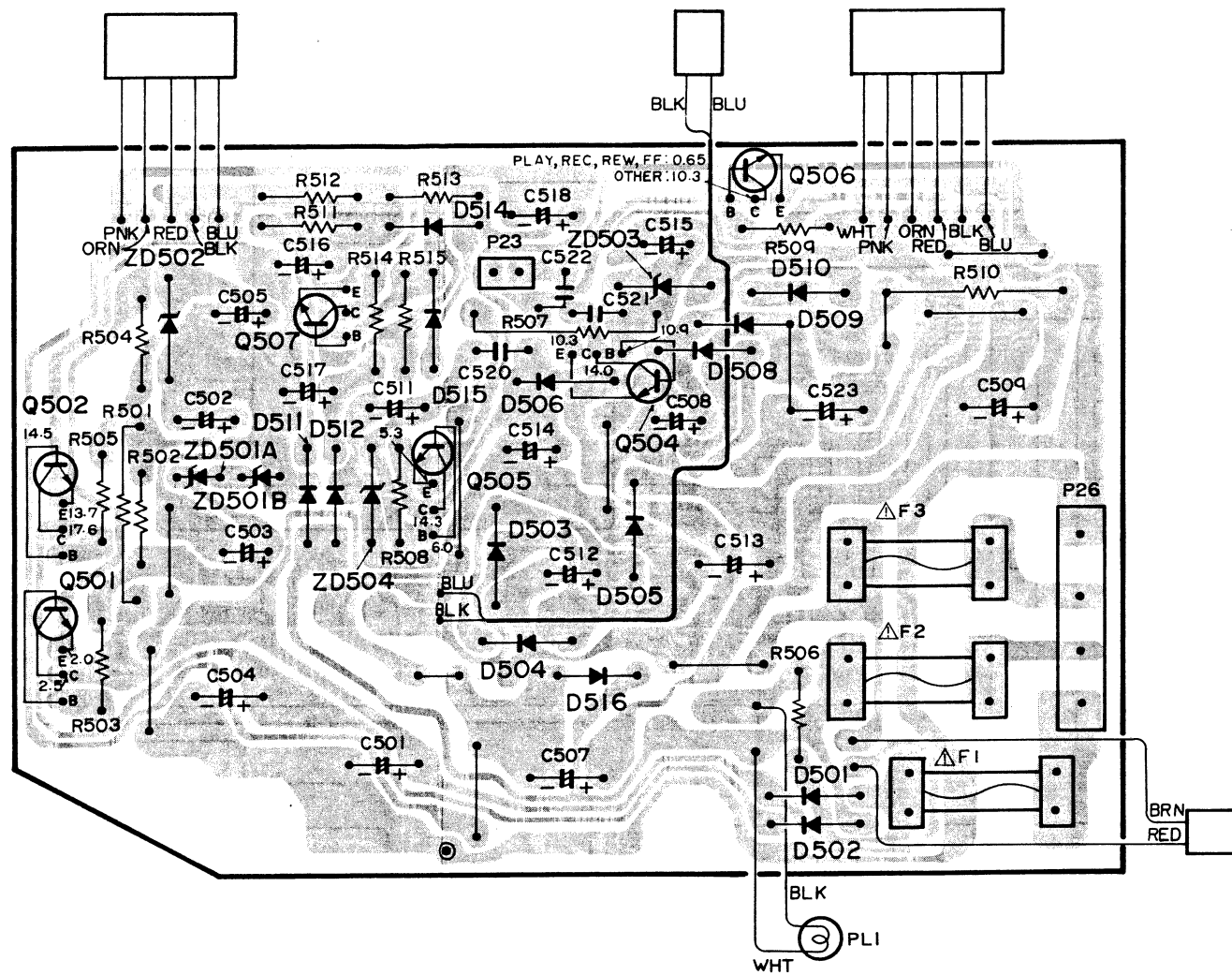


COUNTER

HF Peak Indicator Adj.

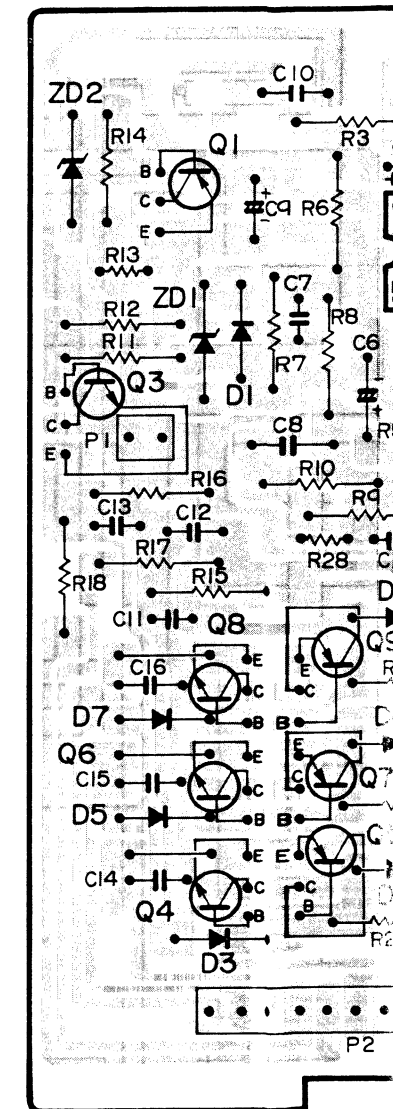


HF PEAK

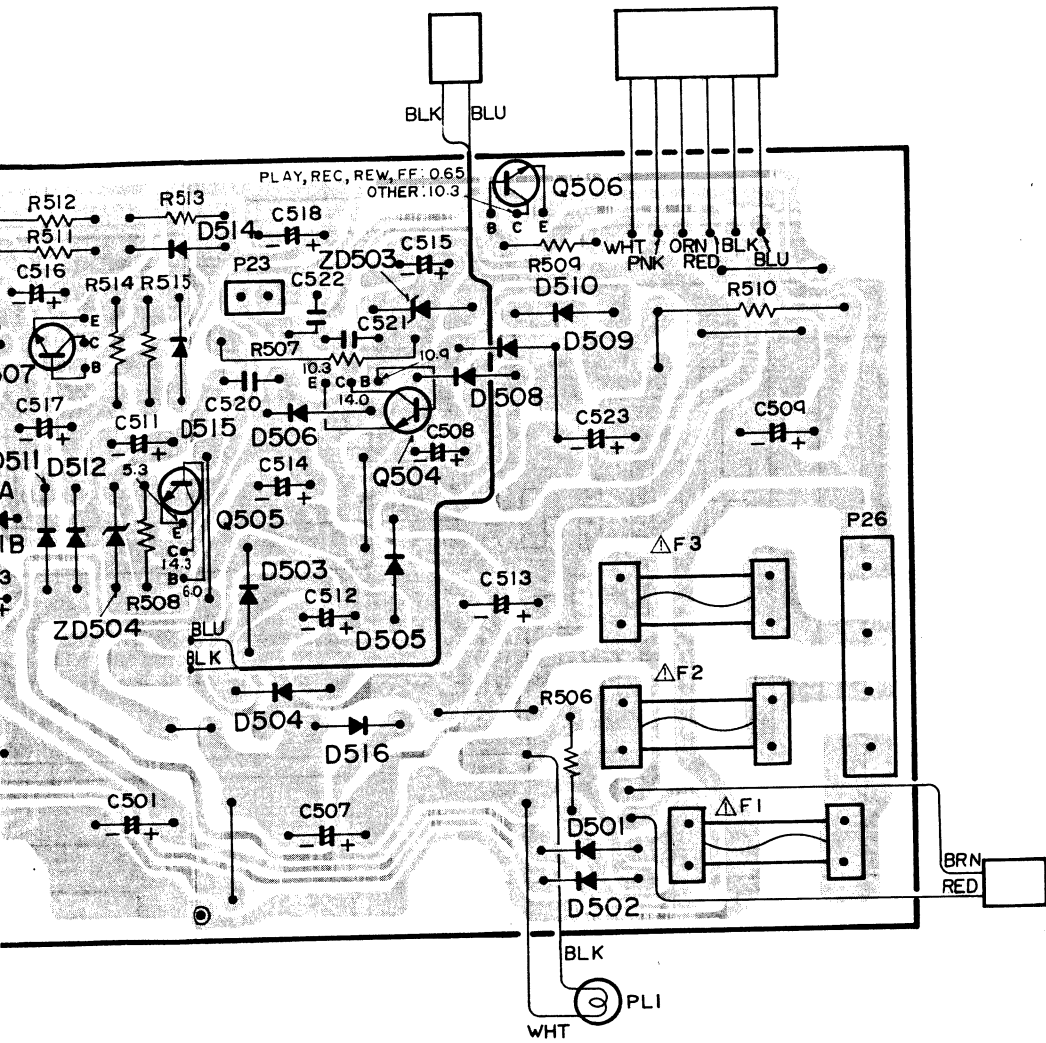


POWER

Motor (Tape) Speed

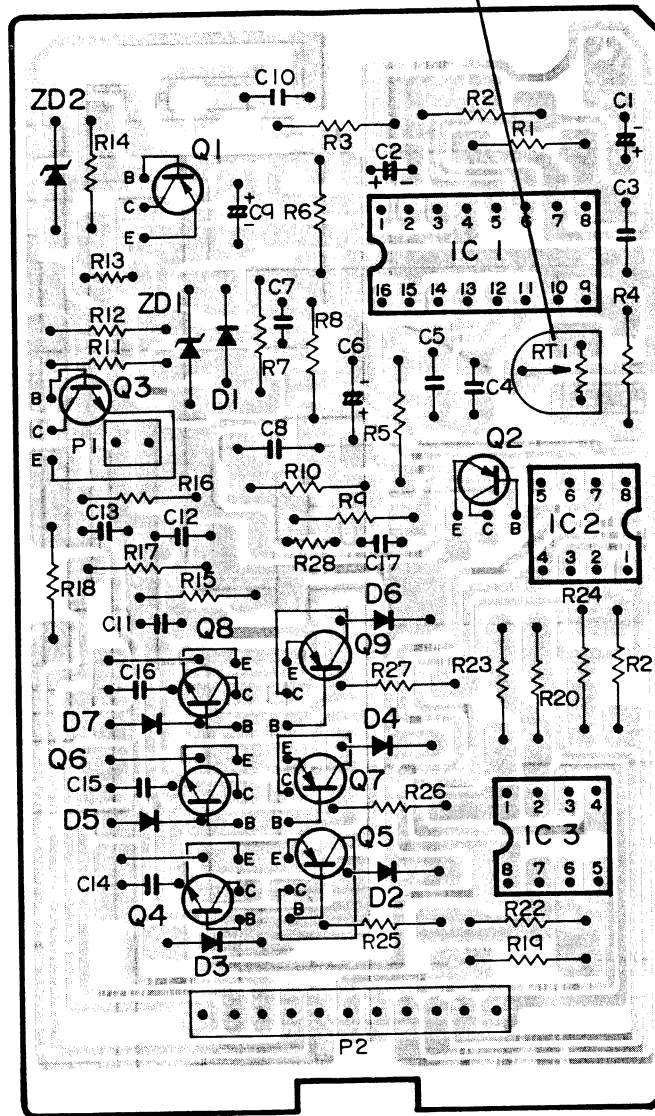


DD MOTOR C

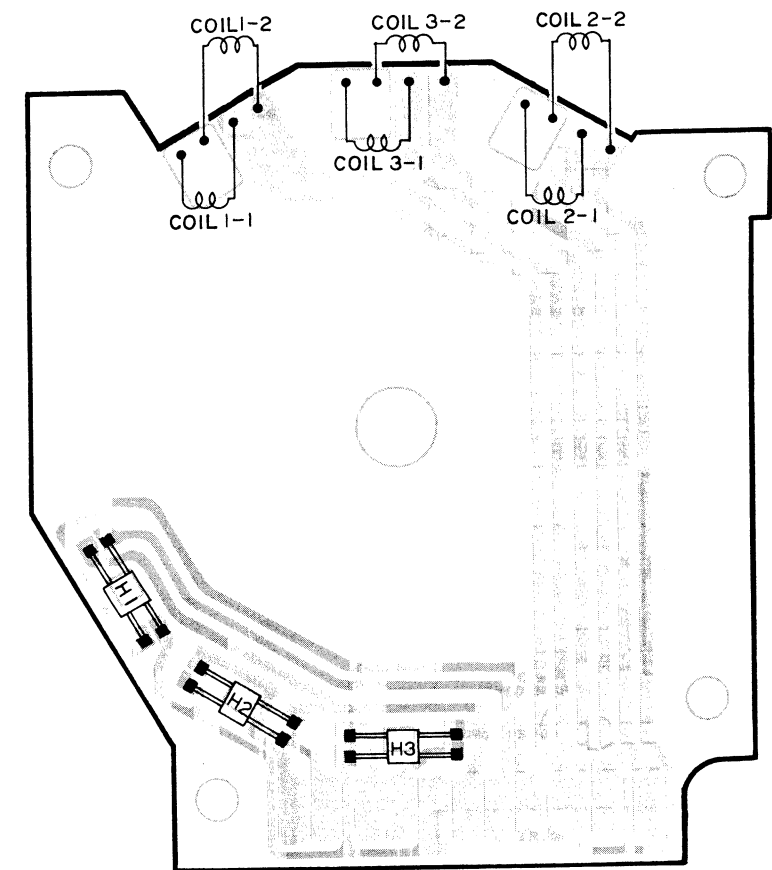


POWER

Motor (Tape) Speed Adj.

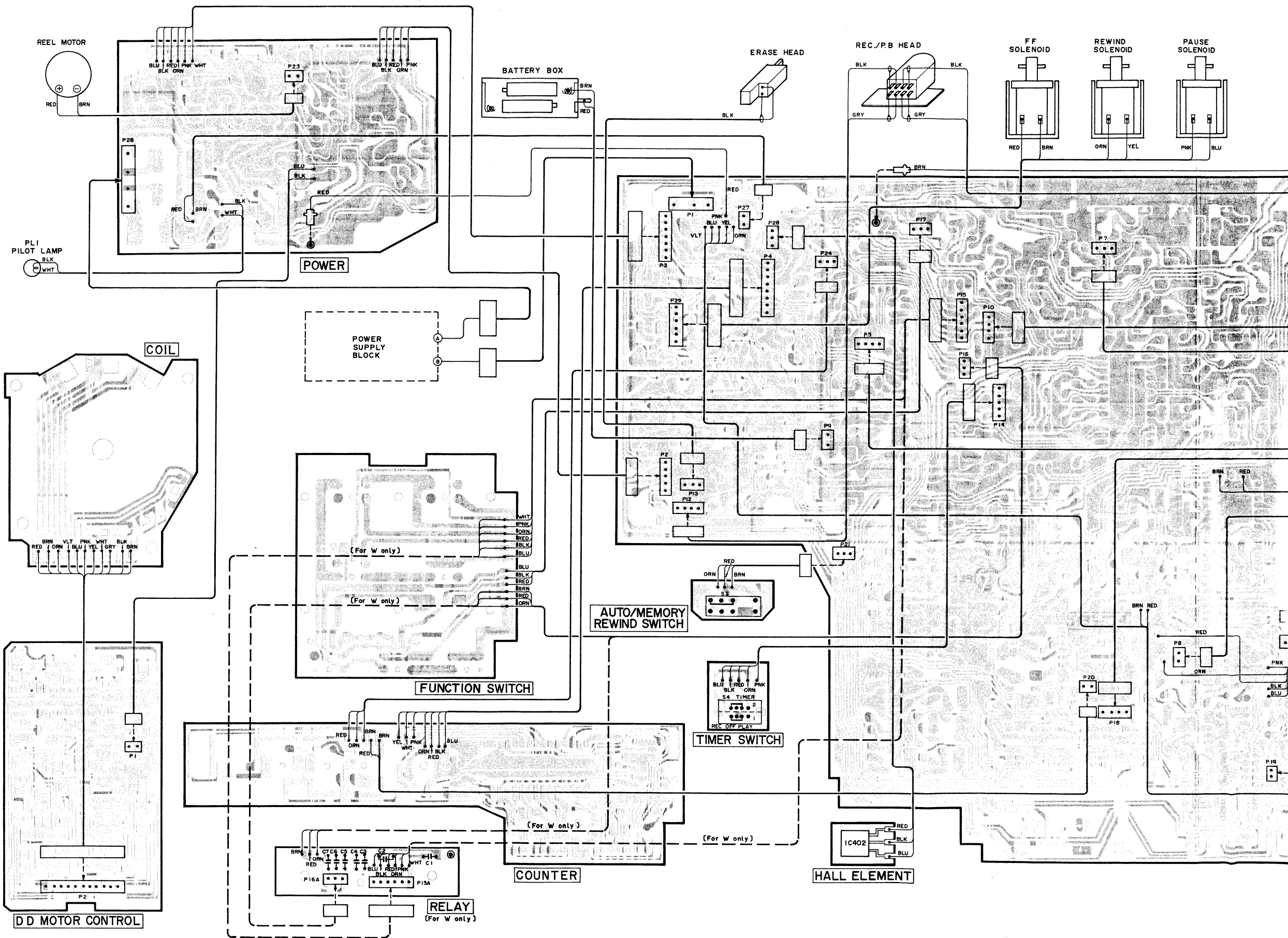
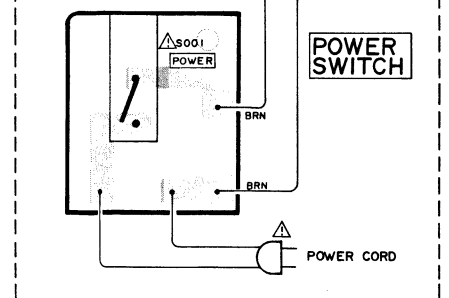
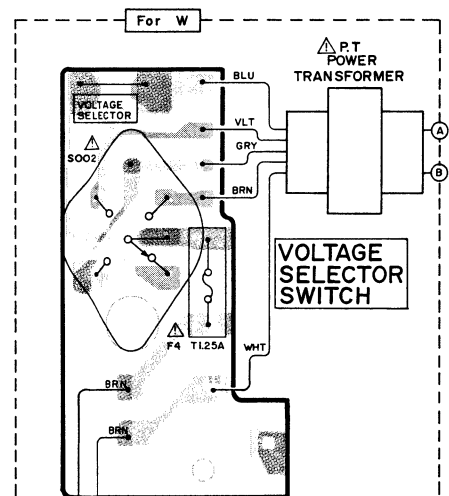
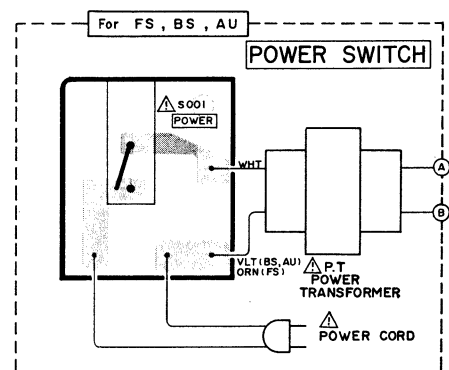
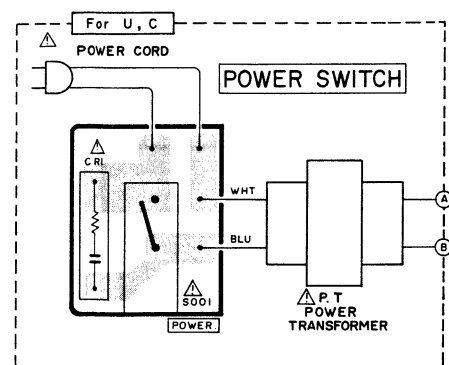


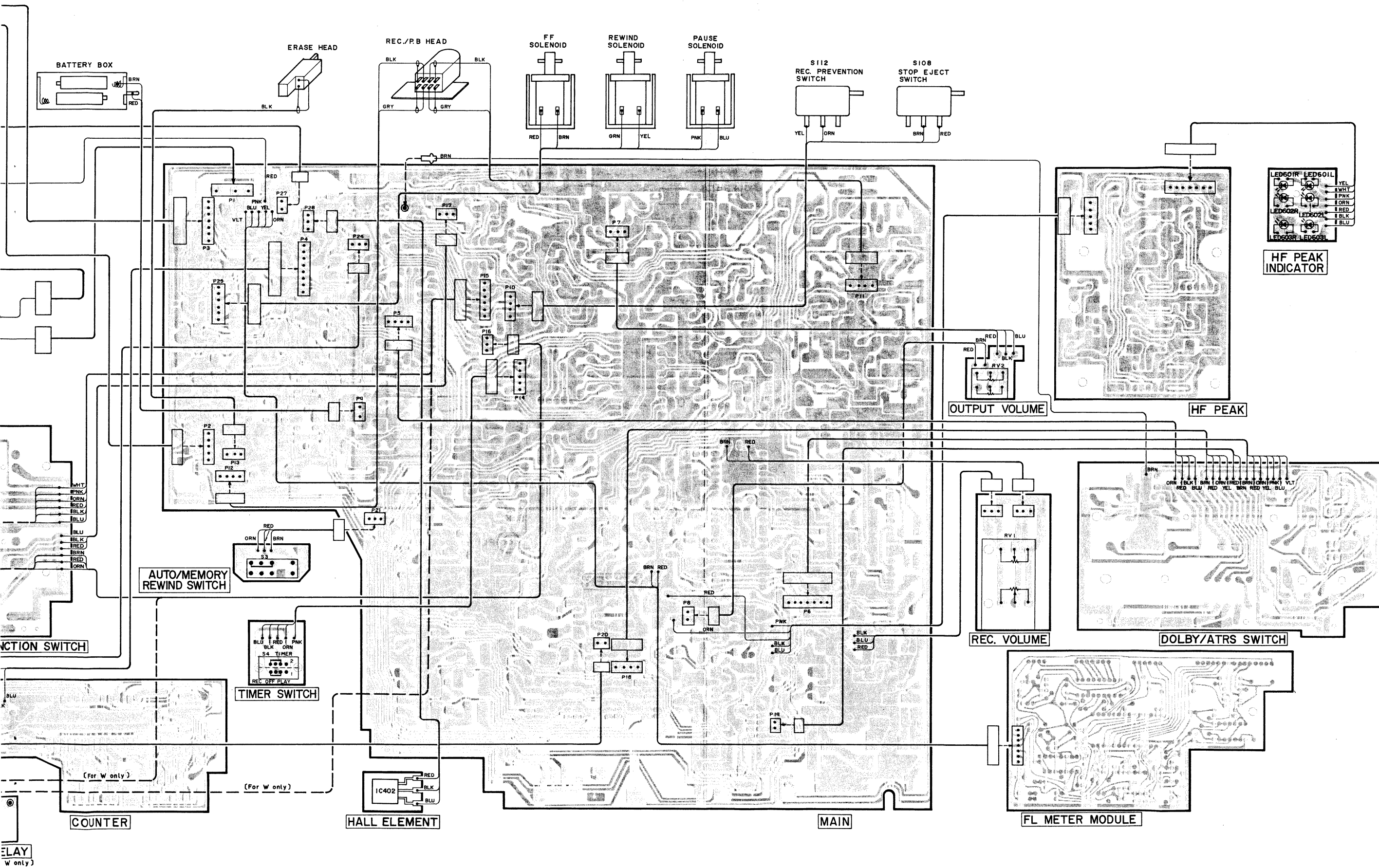
DD MOTOR CONTROL



COIL

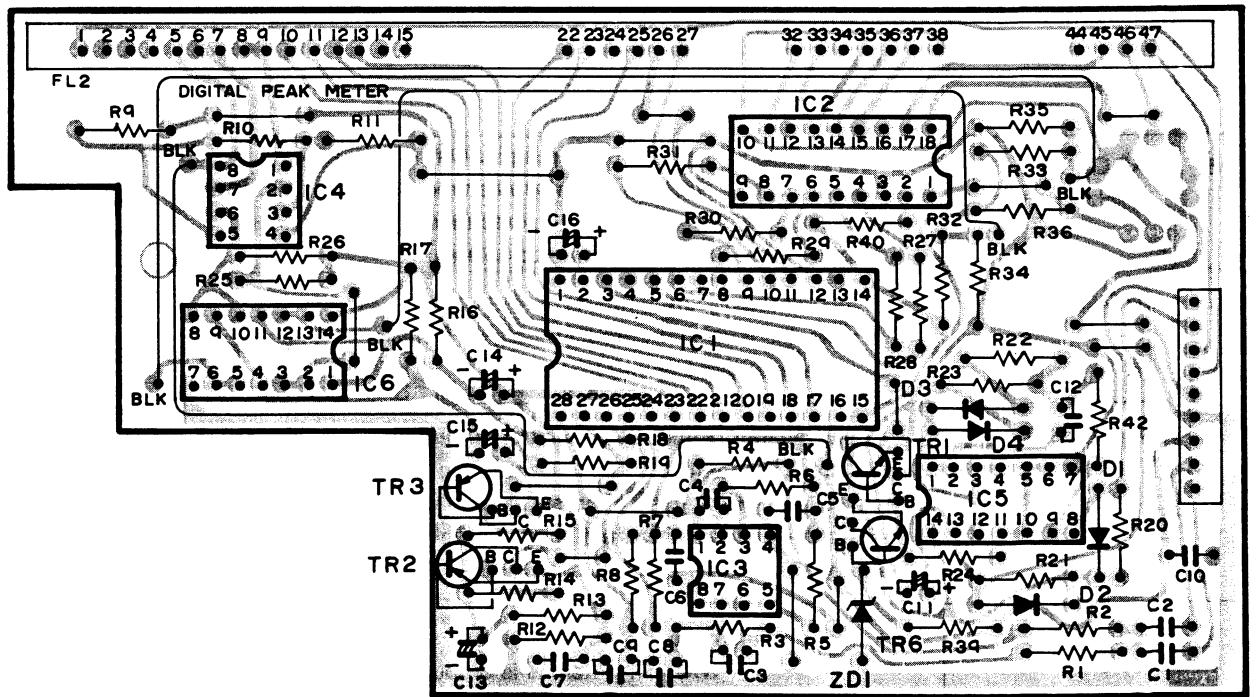
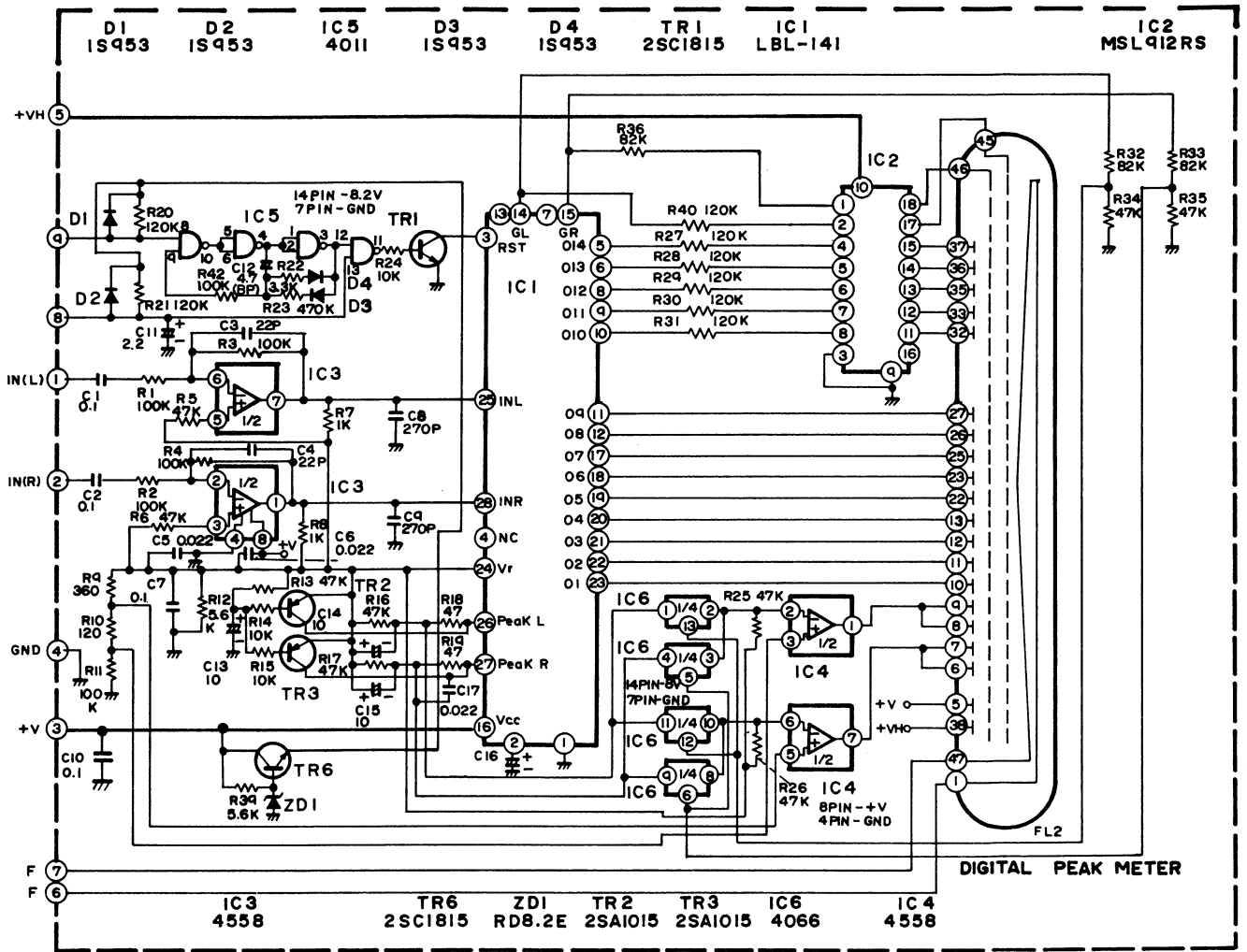
WIRING DIAGRAM





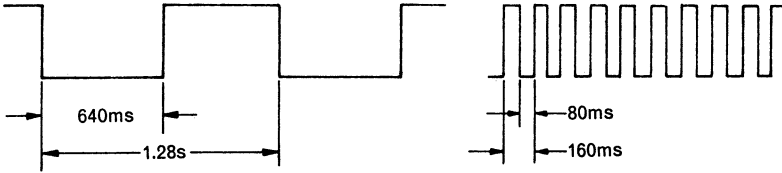


SCHEMATIC DIAGRAM/CIRCUIT BOARD DIAGRAM (FL Meter Module)



## IC PIN FUNCTION TABLE

## 1. IC401 (HD44801A41 for mechanism/ATRS control)

Pin No.	Pin Symbol	Function															
1	BIAS	<ul style="list-style-type: none"> <li>Control output pin to operate the bias oscillation circuit. Outputs Lo potential normally and Hi potential in the REC mode and the REC-PAUSE mode. Outputs after elapse of the inhibit time of 120 ms when the mode is changed from STOP, PLAY or PAUSE, and outputs after elapse of the inhibit time of 820 ms when the mode is changed from FF or REW. Outputs after elapse of the inhibit time of 180 ms when the mode is changed from STOP to REC-PAUSE.</li> </ul>															
2 3	TAPE SELECT 1 TAPE SELECT 2	<ul style="list-style-type: none"> <li>Tape select switch (S2) position detection input pin. Detects the tape select switch position according to the truth table shown below and changes over the output data.</li> </ul> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Switch position Input pins</th> <th>NORMAL</th> <th>FeCr</th> <th>CrO<sub>2</sub></th> <th>METAL</th> </tr> </thead> <tbody> <tr> <td>Pin ②</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>Pin ③</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Switch position Input pins	NORMAL	FeCr	CrO <sub>2</sub>	METAL	Pin ②	0	1	0	1	Pin ③	0	0	1	1
Switch position Input pins	NORMAL	FeCr	CrO <sub>2</sub>	METAL													
Pin ②	0	1	0	1													
Pin ③	0	0	1	1													
4	TEST START	<ul style="list-style-type: none"> <li>ATRS test start detection input pin. Inputs Hi potential normally and inputs Lo potential by the button operation in the REC, REC-PAUSE or REC-HOLD mode, to detect the ATRS test start. The ATRS test starts actually when the input is detected during the REC or REC-PAUSE mode.</li> <li>Outputs Lo potential when executing the ATRS test and outputs Hi potential normally.</li> </ul>															
5	TEST INDI.	<ul style="list-style-type: none"> <li>Test indicator drive output pin. Outputs Lo potential normally and outputs the flashing pulse with 1.28 sec. period when executing the ATRS test. When error occurs during the ATRS test, the flashing pulse with 160 ms period is output as error indication. This error indication continues until the play button or pause button key input is given.</li> </ul> 															
6	AF OSC (1kHz/14kHz)	<ul style="list-style-type: none"> <li>AF signal oscillator control output pin. Outputs Hi potential until ATRS test starts when power is ON. Outputs Hi potential when recording the 1 kHz signal and Lo potential when recording the 14 kHz signal during execution of the ATRS test. It is set to the Lo potential output mode after ATRS test is completed.</li> </ul>															
7	A/D COMP.	<ul style="list-style-type: none"> <li>A/D comparator output input pin. Detects the inversion output (fall signal from Hi to Lo potential) of the A/D comparator during execution of the ATRS test.</li> </ul>															
8	A/D RESET	<ul style="list-style-type: none"> <li>A/D comparator circuit reset control output pin. Outputs Lo potential in other modes than the ATRS operation, and outputs Hi potential with 80 ms width just after scanning the A/D comparison reference voltage during execution of the ATRS test to reset the test sample hold, and outputs Hi potential for approx. 3 sec. after power is supplied.</li> </ul>															
9	A/D SELECT	<ul style="list-style-type: none"> <li>A/D comparison circuit input (play output signal) channel select control output pin. <ul style="list-style-type: none"> <li>When Hi potential is output : R channel</li> <li>When Lo potential is output : L channel</li> </ul> </li> </ul>															

Pin No.	Pin Symbol	Function																																							
10	LINE MUTE	• LINE amp final stage muting control output pin. Outputs Hi potential during REC, PLAY and REC-PAUSE after recording to mute the play signal of the LINE amp output. Hi potential is output after elapse of the inhibit time of 120 ms during play, after elapse of the inhibit time of 400 ms during record and after elapse of the inhibit time of 1100 ms when changing the mode from FF or REW.																																							
11	REW SOL.	• REW solenoid drive output pin. Outputs Lo potential normally and outputs Hi potential during REC, PLAY and REW.																																							
12	FF SOL.	• FF solenoid drive output pin. Outputs Lo potential normally and outputs Hi potential during REC, PLAY and FF.																																							
13	PAUSE SOL.	• PAUSE solenoid drive output pin. Outputs Lo potential normally and outputs Hi potential during REC-PAUSE mode and PLAY-PAUSE mode.																																							
14	NC	• Blank pin.																																							
15	RESET	• Initial reset input pin. This pin input is set to Hi potential when power is supplied to perform initial resetting.																																							
16	GND	• Connected to GND.																																							
17 18	OSC 1 OSC 2	• The external resonance circuit is coupled with these pins to operate the built-in clock oscillation circuit which is the reference of microprocessor operation. The oscillation frequency is set to 400 kHz.																																							
19	HALT	• HALT pin. This pin changes from Lo potential to Hi potential when power is supplied and the program of the microprocessor is executed. It is set to Lo potential when power is set to OFF and the execution of the program stops and is held.																																							
20	TEST	• Microprocessor test pin. Connected to Vcc pin (21) because this is not used.																																							
21	Vcc	• Power pin. Applies +5V.																																							
22 ? 24	VCA SELECT 0 ? VCA SELECT 2	<p>• ATRS IC (HA12035) control output pins. Output during REC, REC-PAUSE and REC-HOLD, and designate the object of the ATRS IC internal circuit to be controlled by the control data output from the data output pins (26) ~ (29). These outputs are composed of the 3-bit signal.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="3">Output pins</th> <th rowspan="2">Designation function</th> </tr> <tr> <th>(24)</th> <th>(23)</th> <th>(22)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>Designates that data has no meaning.</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>Designates that it is 1 kHz, Lch data.</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>Designates that it is 14 kHz, Lch data.</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>Designates that it is bias data.</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>Designates that it is 14 kHz, R ch data.</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>Designates that it is 1 kHz, R ch data.</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>Designates that it is A/D comparison reference voltage.</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>Designates to clear all data.</td> </tr> </tbody> </table> <p>• Auto/memory rewind switch and timer switch position detection output pin. Outputs 111 when detecting switch position.</p>	Output pins			Designation function	(24)	(23)	(22)	0	0	0	Designates that data has no meaning.	0	0	1	Designates that it is 1 kHz, Lch data.	0	1	0	Designates that it is 14 kHz, Lch data.	0	1	1	Designates that it is bias data.	1	0	0	Designates that it is 14 kHz, R ch data.	1	0	1	Designates that it is 1 kHz, R ch data.	1	1	0	Designates that it is A/D comparison reference voltage.	1	1	1	Designates to clear all data.
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Pin No.	Pin Symbol	Function																															
25	IC MUTE	• IC muting control output pin.																															
26 ? 29	DATA 0(LSB) ? DATA 3(MSB)	<p>• ATRS IC (HA12035) control output pins. The control data is composed of 4-bit signal and output during REC, REC-PAUSE and REC-HOLD.</p> <p>• Auto/memory rewind switch and timer switch position detection input pins. Input the timer switch position detection signal for 3 sec. after power is supplied, to judge the mode.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="4">Input pins</th> <th rowspan="2">Criterion mode</th> </tr> <tr> <th>(29)</th> <th>(28)</th> <th>(27)</th> <th>(26)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>x</td> <td>x</td> <td>Test program execution</td> </tr> <tr> <td rowspan="3">DATA2 + DATA3 = 1</td> <td></td> <td>0</td> <td>0</td> <td rowspan="2">Timer recording</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>Timer play</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>1</td> <td></td> </tr> </tbody> </table>	Input pins				Criterion mode	(29)	(28)	(27)	(26)	0	0	x	x	Test program execution	DATA2 + DATA3 = 1		0	0	Timer recording		0	1		1	0	Timer play			1	1	
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		1	0	Timer play																													
		1	1																														
30	REEL PULSE	<p>• Input pin of tape end detection Hall element pulse output. When the take-up reel disk stops rotating, pulse input disappears and tape end is detected with pulse not input for 3 sec. or more during REC and PLAY, and for 1 sec. or more during REW and FF.</p> <p>• Tape count during the memory rewind function operation is done counting the input pulses.</p>																															
31	ATRS	• ATRS mode input pin. Judged as ATRS mode with Lo potential input.																															
32	REC MUTE	• Auto REC MUTE detection input/output pin. When Lo potential is input by the REC-MUTE button operation during outputting Hi potential (during REC or REC-PAUSE mode), it is judged as AUTO REC MUTE mode and Lo potential is output for approx. 4 sec.																															
33	PAUSE	• PAUSE mode input pin. Judged as PAUSE mode with Lo potential input.																															
34	REC	• REC mode input pin. Judged as REC mode with Lo potential input.																															
35	FIXED	<p>• ATRS FIXED mode input pin. When Lo potential is input, it is judged as FIXED mode and the REC control data output is changed over from the ATRS data to FIXED data.</p> <p>• When the Lo potential is input and it is judged as FIXED mode, Lo potential is output to light the FIXED indicator and makes ATRS indicator go off.</p>																															
36	STOP	• STOP mode input pin. When Lo potential is input, it is judged as STOP mode.																															
37	FF	• FF mode input pin. When Lo potential is input, it is judged as FF mode.																															
38	PLAY	<p>• PLAY mode input pin. When Lo potential is input, it is judged as PLAY mode.</p> <p>• When the timer record or play is set within 3 sec. after power is supplied, Lo potential is output after approx. 3 sec. Outputs Lo potential with approx. 80 ms width simultaneously with the play operation start in the auto rewind play mode. This Lo potential is the one action control signal when the unit is combined with the system component stereo.</p>																															
39	REW	• REW mode input pin. When Lo potential is input, it is judged as REW mode.																															

2. IC404 (μPD550C 062, for counter with elapsed timer)

Pin No.	Pin Symbol	Function
40	PLAY INDI.	<ul style="list-style-type: none"> <li>PLAY indicator drive output pin. Flashing pulse is output synchronizing with the reel pulse input during REC and PLAY. When the time of light gone off becomes 500 ms, Hi potential is output regardless of presence/absence of the reel pulse input.</li> <li>Outputs Hi potential during REC-PAUSE and PLAY-PAUSE.</li> <li>When the REC and PLAY buttons are pressed simultaneously within 3 sec after power is supplied and reset is completed, or during the timer recording or play, flashing pulse is output with 180 ms period for 3 sec. after resetting, and Hi potential is output after elapse of 3 sec.</li> </ul>
41	PAUSE INDI.	<ul style="list-style-type: none"> <li>PAUSE indicator drive output pin. Outputs Hi potential during REC-PAUSE and PLAY-PAUSE.</li> <li>Flashing pulse is output with 1.3 sec. period during the AUTO REC MUTE, and Hi potential is output after AUTO REC MUTE is completed.</li> <li>Flashing pulse is output with 160 ms period during the stand-by mode and the Lo potential is output after the mode is complete.</li> </ul>
42	REC INDI.	<ul style="list-style-type: none"> <li>REC indicator drive output pin. Outputs Hi potential during REC, REC-PAUSE and REC-HOLD.</li> <li>When the REC and PLAY buttons are pressed simultaneously within 3 sec. after power is supplied and resetting is complete or during the timer recording, flashing pulse is output with 180 ms period for 3 sec. after resetting is completed, and Hi potential is output after 3 sec.</li> </ul>

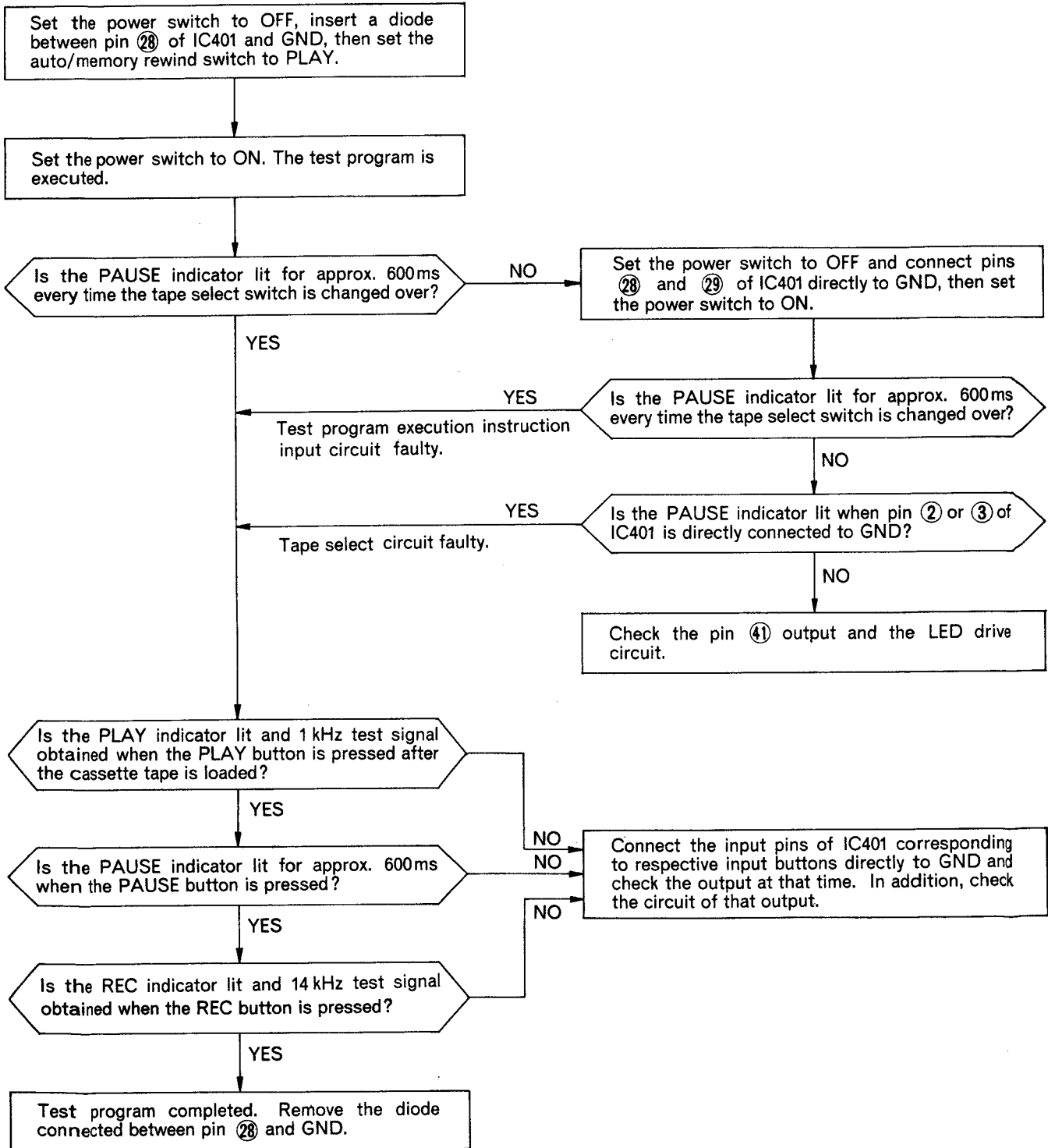
Pin No.	Pin Symbol	Function																																																																																																
1	CLOCK 1	<ul style="list-style-type: none"> <li>The external resonance circuit is coupled with these pins to operate the built-in clock oscillation circuit which is the reference of the microprocessor operation, and the oscillation frequency is set to 400 kHz.</li> </ul>																																																																																																
28	CLOCK 0																																																																																																	
2	TIMER CLEAR	<ul style="list-style-type: none"> <li>Elapsed time indication timer (stopwatch indication) zero clear input pin. Inputs Lo potential normally and inputs Hi potential during button operation.</li> </ul>																																																																																																
3 7 9	a f g	<ul style="list-style-type: none"> <li>Fluorescent display tube plate segment drive output pins. The Hi potential output segment is lit synchronized with the grid select signal.</li> </ul> <table border="1"> <thead> <tr> <th>Segment Display</th> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>f</th> <th>g</th> </tr> </thead> <tbody> <tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>2</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>3</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>4</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>5</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>6</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>7</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>8</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>9</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>—</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr> </tbody> </table>	Segment Display	a	b	c	d	e	f	g	0	1	1	1	1	1	1	0	1	0	1	1	0	0	0	0	2	1	1	0	1	1	0	1	3	1	1	1	1	0	0	1	4	0	1	1	0	0	1	1	5	1	0	1	1	0	1	1	6	1	0	1	1	1	1	1	7	1	1	1	0	0	0	0	8	1	1	1	1	1	1	1	9	1	1	1	1	0	1	1	—	0	0	0	0	0	0	1
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10 13 16 17 19	9 5 4 7 1	<ul style="list-style-type: none"> <li>Fluorescent display tube dynamic drive grid select (for display digit scanning) data output pins, and the display of the Hi potential output digit is lit.</li> </ul> <table border="1"> <thead> <tr> <th rowspan="2">Output pin</th> <th colspan="3">Tape counter</th> <th colspan="5">Elapsed timer</th> </tr> <tr> <th>3 rd digit</th> <th>2 nd digit</th> <th>1 st digit</th> <th>10 minute</th> <th>1 minute</th> <th>—</th> <th>10 sec</th> <th>1 sec</th> </tr> </thead> <tbody> <tr><td>1 (pin 19)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>2 (pin 18)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>3 (pin 17)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>4 (pin 16)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>5 (pin 13)</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>7 (pin 12)</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>8 (pin 11)</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>9 (pin 10)</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </tbody> </table>	Output pin	Tape counter			Elapsed timer					3 rd digit	2 nd digit	1 st digit	10 minute	1 minute	—	10 sec	1 sec	1 (pin 19)	0	0	0	0	0	0	0	1	2 (pin 18)	0	0	0	0	0	0	1	0	3 (pin 17)	0	0	0	0	0	1	0	0	4 (pin 16)	0	0	0	0	1	0	0	0	5 (pin 13)	0	0	0	1	0	0	0	0	7 (pin 12)	0	0	1	0	0	0	0	0	8 (pin 11)	0	1	0	0	0	0	0	0	9 (pin 10)	1	0	0	0	0	0	0	0							
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	3 rd digit	2 nd digit	1 st digit	10 minute	1 minute	—	10 sec	1 sec																																																																																										
1 (pin 19)	0	0	0	0	0	0	0	1																																																																																										
2 (pin 18)	0	0	0	0	0	0	1	0																																																																																										
3 (pin 17)	0	0	0	0	0	1	0	0																																																																																										
4 (pin 16)	0	0	0	0	1	0	0	0																																																																																										
5 (pin 13)	0	0	0	1	0	0	0	0																																																																																										
7 (pin 12)	0	0	1	0	0	0	0	0																																																																																										
8 (pin 11)	0	1	0	0	0	0	0	0																																																																																										
9 (pin 10)	1	0	0	0	0	0	0	0																																																																																										
14	Vss	<ul style="list-style-type: none"> <li>Hi side power pin. Applies +10V.</li> </ul>																																																																																																
15	TEST	<ul style="list-style-type: none"> <li>Microprocessor test pin. Connected to Vss pin because this is not used.</li> </ul>																																																																																																
20	NC	<ul style="list-style-type: none"> <li>Blank pin.</li> </ul>																																																																																																
21 22	FF SOL. REWIND SOL.	<ul style="list-style-type: none"> <li>Mechanism operation (solenoid operation) detection input pin. Addition/subtraction to/from the tape counter or addition of the elapsed timer is executed by inputting, and displayed to the fluorescent display tube.</li> </ul>																																																																																																

Pin No.	Pin Symbol	Function																				
21 22	FF SOL. REWIND SOL.	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Pin (21) Potential</th> <th>Pin (22) Potential</th> <th>Tape counter</th> <th>Elapsed timer</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>—</td> <td>—</td> </tr> <tr> <td>0</td> <td>1</td> <td>Count subtracted</td> <td>—</td> </tr> <tr> <td>1</td> <td>0</td> <td>Count added</td> <td>—</td> </tr> <tr> <td>1</td> <td>1</td> <td>Count added</td> <td>Count added</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• Test program execution instruction input pin. Test program is executed when pin ② is set to Hi potential input with power ON reset.</li> </ul>	Pin (21) Potential	Pin (22) Potential	Tape counter	Elapsed timer	0	0	—	—	0	1	Count subtracted	—	1	0	Count added	—	1	1	Count added	Count added
Pin (21) Potential	Pin (22) Potential	Tape counter	Elapsed timer																			
0	0	—	—																			
0	1	Count subtracted	—																			
1	0	Count added	—																			
1	1	Count added	Count added																			
23	50/60	<ul style="list-style-type: none"> <li>• Elapsed time indication timer drive power frequency pulse input pin. Inputs power frequency pulse within 2 sec. after power is ON and resetting is complete and executes the 50/60 Hz frequency automatic discrimination.</li> </ul>																				
24	COUNTER CLEAR	<ul style="list-style-type: none"> <li>• Tape counter indication reset (zero clear) input pin. Inputs Lo potential normally and inputs Hi potential during button operation.</li> </ul>																				
25	REEL PULSE	<ul style="list-style-type: none"> <li>• Input pin of tape end detection Hall element pulse output signal. Becomes the reference signal of the addition/subtraction count of the tape counter.</li> </ul>																				
26	RESET	<ul style="list-style-type: none"> <li>• Reset pin. This pin is set to Lo potential when power is supplied and initial resetting is performed at the retrailing edge of the pulse.</li> </ul>																				
27	V <sub>CC</sub>	<ul style="list-style-type: none"> <li>• Power pin. Connected to GND.</li> </ul>																				

### MICROPROCESSOR TEST PROGRAM

The test programming is stored in the microprocessor of this unit. Judge troubles according to the following procedure when the microprocessor and peripheral circuits are malfunctioning.

#### IC401 (HD44801A41)



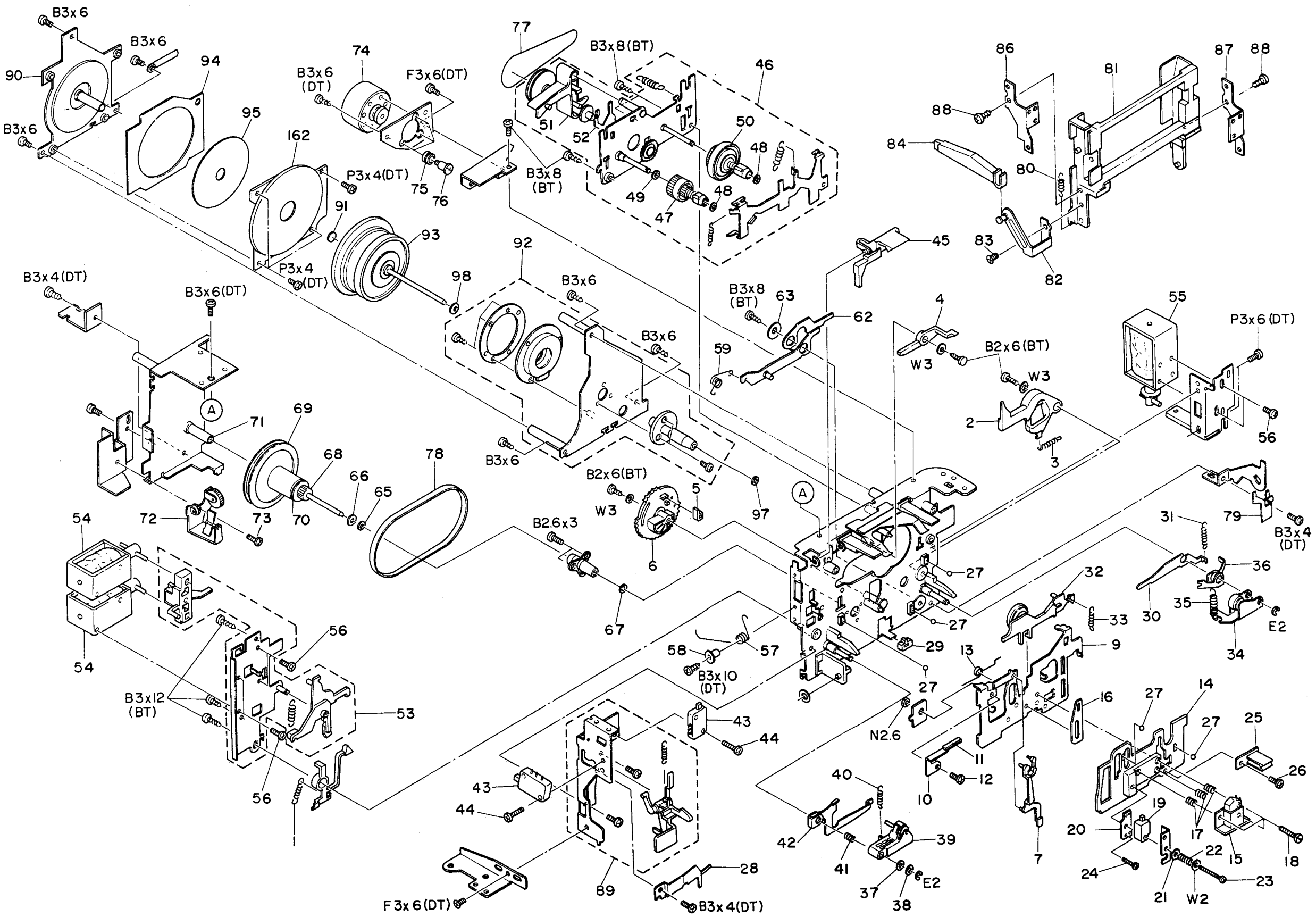
REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
CAPACITORS					
△ CR 1	0210902	CR PACK 120 OHM 0.0033MF 450V (U)	D513	5330573	DIODE 1S2473
△ CR 1	0219907	CR PACK (C)	D514	5330573	DIODE 1S2473
RESISTORS					
R 4	0171257	METAL FILM RESISTOR 27K OHM+-1%,1/4W	D515	5380101	LED SLP-24B
R 13	0170480	FUSE RESISTOR 68 OHM+-5% 1/4W	D516	5331671	DIODE DS135D-FA3
RT 1	5007224	SEMI VARIABLE 10K OHM	D601	5330574	DIODE 1S2473
RT101	5007478	SEMI VARIABLE 20K OHM	IC 1	5352101	IC HA11713
RT102LR	5007478	SEMI VARIABLE 20K OHM	IC 2	5350601	IC NJM4558D
RT103LR	5007481	SEMI VARIABLE 100K OHM	IC 3	5350601	IC NJM4558D
RT301LR	5007477	SEMI VARIABLE 10K OHM	IC101	5359501	IC MPD4011C
RT302LR	5007477	SEMI VARIABLE 10K OHM	IC102	5365491	IC HD14068BP
RT303LR	5007478	SEMI VARIABLE 20K OHM	IC103	5355041	IC HA12035
RT601LR	5007479	SEMI VARIABLE 50K OHM	IC104	5350601	IC NJM4558D
RV 2	5000872	VARIABLE RESISTOR 10K OHM (B)	IC301	5350601	IC NJM4558D
R176	0111301	OXIDE METAL FILM 150 OHM+-5%	IC302	5350601	IC NJM4558D
R195	0112912	METAL OXIDE RESISTOR 47 OHM+-10%	IC303	5352031	IC MPC4557C
R301LR	0171253	METAL FILM RESISTOR 100 OHM+-1%,1/4W	IC401	5365559	IC HD44801A41
R302LR	0171252	METAL FILM RESISTOR 820 OHM+-1% 1/4W	IC402	5352911	HALL IC PST515
R442	0111078	OXIDE METAL FILM RESISTOR 390 OHM+-5%,1W	IC403	5359501	IC MPD4011C
R452	5068302	RESISTOR BLOCK	IC404	5359729	IC MPD550C
R453	5068302	RESISTOR BLOCK	IC601LR	5359871	IC LB1416
R467	0111303	OXIDE METAL FILM RESISTOR 82 OHM	LED 1	5380481	LED SLR-54GC
R478	0111070	OXIDE METAL FILM RESISTOR 180 OHM+-5%,1W	LED 3	5380361	LED SLB26UR1
R501	0111313	OXIDE METAL FILM RESISTOR 470 OHM+-5%,2W	LED 4	5380691	LED SLR34UR
R507	0111153	METAL OXIDE 1K OHM 1W	LED 5	5380711	LED TLG123A
R510AB	0170407	FUSE RESISTOR 10 OHM+-5% 1/2W	LED 6	5380711	LED TLG123A
SEMI-CONDUCTORS					
D 1-7	5330572	DIODE SILICON 1S2473HC	LED 7AB	5380711	LED TLG123A
D101-103	5330573	DIODE 1S2473	LED 8AB	5380711	LED TLG123A
D105	5330573	DIODE 1S2473	LED 9	5380361	LED SLB26UR1
D106	5330573	DIODE 1S2473	LED 10	5380482	LED SLR53URC1
D301-303	5330573	DIODE 1S2473	LED 11	5380481	LED SLR-54GC
D401-413	5330573	DIODE 1S2473	LED 12	5380691	LED SLR34UR
D416-419	5330573	DIODE 1S2473	LED 13	5380711	LED TLG123A
D420-423	5331671	DIODE DS135D-FA3	LED 14	5380362	LED SLB26GG1
D424	5330573	DIODE 1S2473	LED 15	5380362	LED SLB26GG1
D426	5330573	DIODE 1S2473	LED 16-19	5380711	LED TLG123A
D428	5330574	DIODE 1S2473	LED601LR	5380361	LED SLB26UR1
D429-432	5330573	DIODE 1S2473	LED602LR	5380361	LED SLB26UR1
D431	5330574	DIODE 1S2473	LED603LR	5380361	LED SLB26UR1
D432	5330574	DIODE 1S2473	MOD101LR	5378063	MODULE TA3011B
D433	5330573	DIODE 1S2473	MOD301LR	5378063	MODULE TA3011B
D434-436	5330573	DIODE 1S2473	Q 1	5320593	TRANSISTOR 2SA673C
D501-505	5331671	DIODE DS135D-FA3	Q 2	5320593	TRANSISTOR 2SA673C
D506	5331671	DIODE DS135D-FA3	Q 3	5320613	TRANSISTOR 2SC1213C
D508-510	5331671	DIODE DS135D-FA3	Q 4	5321213	TRANSISTOR 2SD468C
D511	5330573	DIODE 1S2473	Q 5	5321203	TRANSISTOR SILICON 2SB562C
D512	5331671	DIODE DS135D-FA3	Q 6	5321213	TRANSISTOR 2SD468C
			Q 7	5321203	TRANSISTOR SILICON 2SB562C
			Q 8	5321213	TRANSISTOR 2SD468C
			Q 9	5321203	TRANSISTOR SILICON 2SB562C
			Q101LR	5321298	TRANSISTOR 2SC1740LN-SE
			Q102	5320069	TRANSISTOR 2SC458CD

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
SEMI-CONDUCTORS					
Q103	5321663	TRANSISTOR 2SC2021R/S	Q603LR	5320069	TRANSISTOR 2SC458CD
Q105	5320069	TRANSISTOR 2SC458CD	TH101LR	5340232	THERMISTOR 112103-2
Q106	5320069	TRANSISTOR 2SC458CD	ZD 1	5331012	ZENER DIODE HZ5B
Q107LR	5320069	TRANSISTOR 2SC458CD	ZD 2	5330532	ZENER DIODE SILICON HZ-12B
Q108LR	5320069	TRANSISTOR 2SC458CD	ZD301	5330841	ZENER DIODE RD5.1E-B
Q109	5322651	TRANSISTOR 2SD667C	ZD302	5330322	ZENER DIODE SILICON TR-9S
Q110	5323071	TRANSISTOR 2SD947	ZD401	5330311	ZENER DIODE SILICON HZ7A
Q111	5320603	TRANSISTOR SILICON 2SA673A-C	ZD402	5330322	ZENER DIODE SILICON TR-9S
Q112	5322651	TRANSISTOR 2SD667C	ZD403	5331588	ZENER DIODE RD2.7EB2
Q113	5320603	TRANSISTOR SILICON 2SA673A-C	ZD404	5330552	ZENER DIODE HZ11B
Q114	5320069	TRANSISTOR 2SC458CD	ZD405	5330841	ZENER DIODE RD5.1E-B
Q115LR	5321663	TRANSISTOR 2SC2021R/S	ZD405	5330847	ZENER DIODE RD2.7E-B2
Q116	5321663	TRANSISTOR 2SC2021R/S	ZD406	5330711	ZENER DIODE HZ4BC
Q117	5321663	TRANSISTOR 2SC2021R/S	ZD407	5330392	ZENER DIODE SILICON HZ6B
Q118	5320069	TRANSISTOR 2SC458CD	ZD408	5330324	ZENER DIODE HZ9B1
Q119	5320603	TRANSISTOR SILICON 2SA673A-C	ZD501A	5330557	ZENER DIODE HZ11B1
Q301LR	5321506	TRANSISTOR 2SK66A-N	ZD501AB	5330551	ZENER DIODE HZ11A
Q302LR	5321298	TRANSISTOR 2SC1740LN-SE	ZD502	5330533	ZENER DIODE SILICON HZ-12C
Q303LR	5321298	TRANSISTOR 2SC1740LN-SE	ZD502B	5330557	ZENER DIODE HZ11B1
Q304LR	5320069	TRANSISTOR 2SC458CD	ZD503	5330555	ZENER DIODE HZ11B2
Q305LR	5320069	TRANSISTOR 2SC458CD	ZD504	5330392	ZENER DIODE SILICON HZ6B
Q306LR	5322381	TRANSISTOR 2SD655	COILS		
Q307	5320069	TRANSISTOR 2SC458CD	L101LR	5120564	TRAP COIL
Q308LR	5320069	TRANSISTOR 2SC458CD	L102LR	5161668	DOLBY FILTER
Q309	5320069	TRANSISTOR 2SC458CD	L103LR	0333151	PEAKING COIL 36MH
Q401	5320069	TRANSISTOR 2SC458CD	L104LR	5120274	CHOKE COIL
Q402	5320069	TRANSISTOR 2SC458CD	L105	5260368	OSCILLATOR TRANSFORMER
Q403	5320069	TRANSISTOR 2SC458CD	L106	5260215	TRAP COIL 33HH
Q404-407	5320069	TRANSISTOR 2SC458CD	L107	5260368	OSCILLATOR TRANSFORMER
Q408	5320069	TRANSISTOR 2SC458CD	L108LR	5260215	TRAP COIL 33HH
Q410	5320069	TRANSISTOR 2SC458CD	L301LR	5120561	BIAS TRAP COIL
Q411	5320069	TRANSISTOR 2SC458CD	L302LR	5120564	TRAP COIL
Q412	5320069	TRANSISTOR 2SC458CD	MISCELLANEOUS		
Q413	5321663	TRANSISTOR 2SC2021R/S	CE 1	5780631	CERAMIC OSCILLATOR 400KHZ
Q414	5322832	TRANSISTOR 2SA933R	△ F 1	5721063	FUSE 1.25AT (W,FS,BS,AU)
Q415	5323071	TRANSISTOR 2SD947	△ F 1	5721161	FUSE 1.6A (U,C)
Q416	5323071	TRANSISTOR 2SD947	△ F 2	5721063	FUSE 1.25AT (W,FS,BS,AU)
Q417	5320069	TRANSISTOR 2SC458CD	△ F 2	5721161	FUSE 1.6A (U,C)
Q418	5323071	TRANSISTOR 2SD947	△ F 3	5721064	FUSE 2.5A (W,FS,BS,AU)
Q419	5320069	TRANSISTOR 2SC458CD	△ F 3	5721224	FUSE 2.5A (U,C)
Q420	5320069	TRANSISTOR 2SC458CD	△ F 4	5721063	FUSE 1.25AT (W)
Q501	5321301	TRANSISTOR 2SC1061	FL 1	5310641	FLUORESCENT DISPLAY (COUNTER/ELAPSED TIMER)
Q502	5321301	TRANSISTOR 2SC1061	JK 1	5676261	PIN JACK ASSEMBLY (LINE IN, LINE OUT)
Q504	5320643	TRANSISTOR 2SC1162WT-C	JK 2	5679525	JACK (MIC, HEADPHONE)
Q504	5321301	TRANSISTOR 2SC1061	JK 3	5677131	8P DIN SOCKET (REMOTE CONTROL)
Q505	5322442	TRANSISTOR 2SD639S	PL 1	5762036	PILOT LAMP
Q506	5323071	TRANSISTOR 2SD947	S 1	5634363	PUSH SWITCH (INPUT SELECTOR)
Q507	5320069	TRANSISTOR 2SC458CD	S 2	5634433	PUSH SWITCH (TAPE SELECTOR)
Q601	5321663	TRANSISTOR 2SC2021R/S	S 3	5620852	SLIDE SWITCH (AUTO/MEMORY REW)
Q602	5321663	TRANSISTOR 2SC2021R/S			

(Continue to Page 41)

EXPLODED VIEW (Mechanism-DX-1)



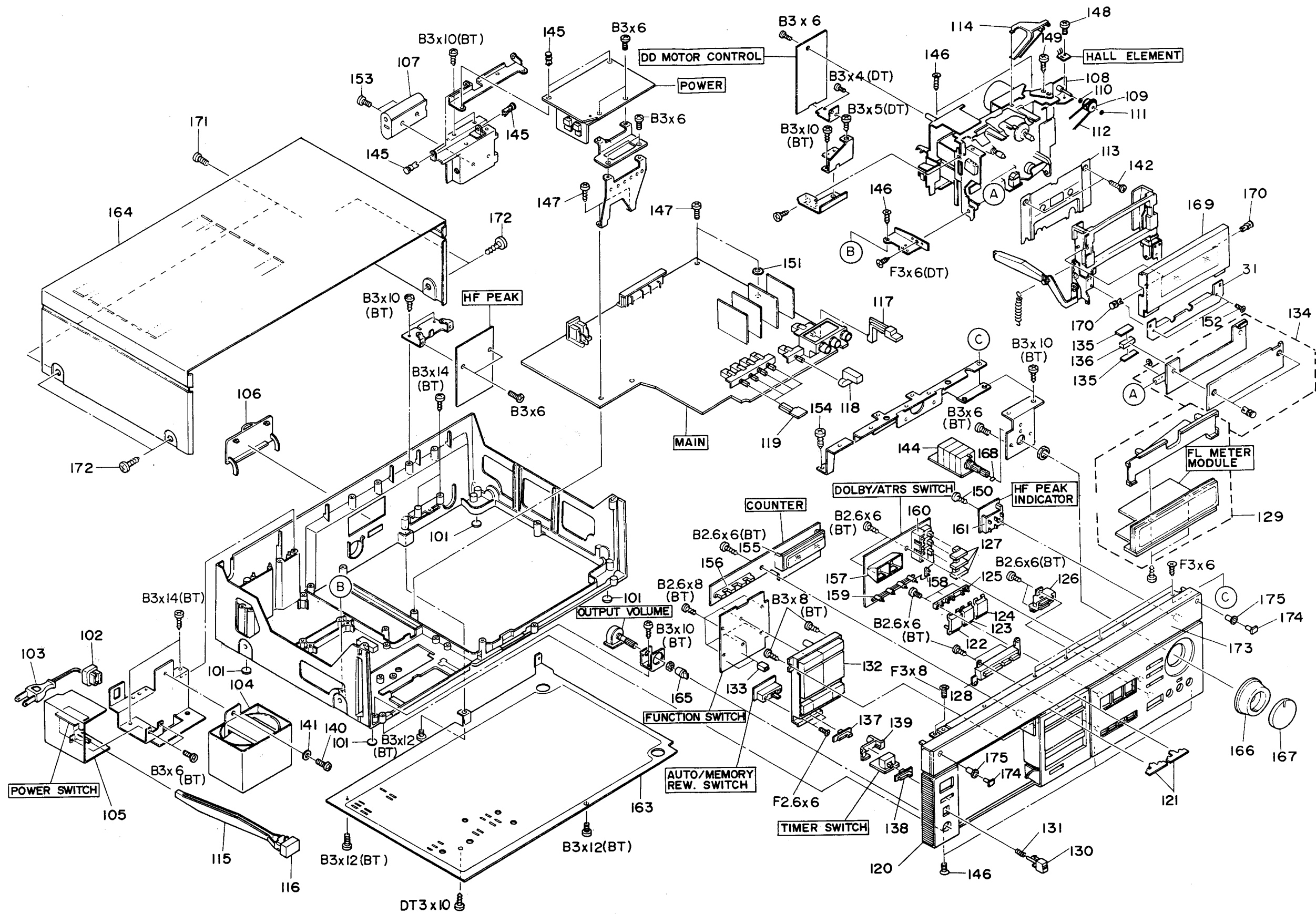
Note : Components marked without numbers in this drawing are not specified as replacement parts.



SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
MECHANISM (DX-1)					
1	6300981	SPRING	50	6414213	TURNTABLE ASSEMBLY (TAKE UP)
2	6766552	PLAY ARM	51	6761673	FF/REWIND ARM ASSEMBLY
3	6323761	SPRING	52	6761733	SELECT SLIDER ASSEMBLY
4	6761821	PICK UP ARM	53	7342891	SOLENOID PLATE ASSEMBLY
5	6590122	RUBBER	54	5642961	DC SOLENOID (PLAY, FF, REW)
6	6431522	PLAY GEAR	55	5642981	DC SOLENOID
7	6768012	REWIND ARM	56	8741403	BIND SCREW-3MMDX3MM
			57	6547791	EJECT SPRING
			58	7571531	COLLAR
9	7341785	HEAD PLATE	59	6547771	SPRING FOR PAUSE ARM
10	6535212	LEAF SPRING FOR HEAD PLATE			
11	7740394	FELT	62	7342546	PAUSE ARM ASSEMBLY
12	0741304	BIND SCREW-2.6MMDX4MM	63	0645587	SPECIAL WASHER
13	6547801	SPRING FOR HEAD PLATE			
14	6973981	HEAD BASE	65	7778847	POLY SLIDER WASHER
15	5449101	RECORD PLAYBACK HEAD	66	7772623	SPRING
16	7342611	PAUSE SLIDER	67	7787566	POLY SLIDER WASHER
17	6321246	HEAD SPRING	68	6431533	FLYWHEEL GEAR
18	7781751	SPECIAL SCREW	69	6973964	FLYWHEEL ASSEMBLY
19	5445313	ERASE HEAD	70	7790991	STOPPER RING
20	7321222	ERASE HEAD BASE	71	7768686	THRUST SUPPORT
21	7786215	POLY SLIDER WASHER	72	6347261	GOVERNER
22	6321737	HEAD SPRING FOR ERASE HEAD	73	0671305	DT SCREW-2.6MMDX5MM
23	7780559	SPECIAL SCREW-2MMDX25MM	74	6428143	DC MOTOR ASSEMBLY (FF/REWIND)
24	7780554	SCREW	75	6576322	RUBBER PLATE
25	6766501	LEAD WIRE GUIDE	76	7539002	SCREW FOR MOTOR MOUNTING
26	0671306	DT SCREW-2.6MMDX6MM	77	6355193	BELT
27	0948492	BALL - 2MMD	78	6357301	FLYWHEEL BELT
28	6535202	LEAF SPRING FOR HEAD PLATE HOLDER	79	6535291	LEAF SPRING
29	6581042	RUBBER FOR RECORD PREVENTION	80	6301723	SPRING FOR CASSETTE HOLDER
30	7341651	RETURN LEVER FOR HEAD PLATE	81	6768334	CASSETTE HOLDER
31	6300971	SPRING	82	7346961	DAMPER BRACKET ASSEMBLY
32	6768536	TAKE UP IDLER ASSEMBLY	83	7781589	SPECIAL SCREW-3MMDX8MM
33	6320577	SPRING	84	6753015	EJECT ARM ASSEMBLY
34	7330583	PRESSURE ROLLER ARM ASSEMBLY (TAKE UP)			
35	6321254	SPRING FOR PRESSURE ROLLER (TAKE UP)	86	7346811	CASSETTE HOLDER BRACKET (L)
36	7345093	PAUSE ARM (R)	87	7343112	CASSETTE HOLDER BRACKET (R)
37	7786215	POLY SLIDER WASHER	88	8699308	BT BIND SCREW-2.6MMDX8MM(BLACK)
38	7786216	POLY SLIDER WASHER	89	7330669	EJECT HOLDER ASSEMBLY
39	7346464	PRESSURE ROLLER ARM ASSEMBLY (SUPPLY)	90	7342332	STAY YOKE ASSEMBLY
40	6301004	SPRING	91	7768686	THRUST SUPPORT
41	6303731	SPRING	92	7342322	MOTOR HOLDER ASSEMBLY
42	7341703	PAUSE ARM (L)	93	6974023	ROTOR ASSEMBLY
43	5633361	PUSH SWITCH	94	7746151	INSULATION SHEET
44	0671310	DT SCREW-2.6MMDX10MM	95	7757681	INSULATION SHEET
45	6761815	RECORD PREVENTION ARM			
46	6766588	REEL BASE ASSEMBLY	97	7787566	POLY SLIDER WASHER
47	6414431	TURNTABLE ASSEMBLY (SUPPLY)	98	7778647	POLY SLIDER WASHER
48	7786745	POLY SLIDER WASHER			
49	7778855	POLY SLIDER WASHER			

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR CASSETTE DECK ASSEMBLY					
	101	7740603 FELT LEG	137	6292051 SLIDE KNOB (AUTO REWIND)	
△	102	6794401 BUSHING (U,C,W,FS,AU)	138	6291712 SLIDE KNOB (TIMER)	
△	102	6794411 BUSHING (BS)	139	6769181 SWITCH HOLDER	
△	103	5746443 POWER CORD (U,C)	140	8671608 DT SCREW-4MMDX8MM	
△	103	5746661 POWER CORD (W,FS)	141	0626577 SPECIAL WASHER	
△	103	5746342 POWER CORD (BS)	142	0678312 DT SCREW-2.6MMDX12MM (BLACK)	
△	103	5746571 POWER CORD (AU)	144	5956991 VOLUME PC BOARD ASSEMBLY	
△	104	5213122 POWER TRANSFORMER (U,C)	145	6714215 NYLON RIVET	
△	104	5213125 POWER TRANSFORMER (W)	146	7781582 FLAT SCREW-3MMDX10MM (BLACK)	
△	104	5213123 POWER TRANSFORMER (FS)	147	8699414 BT BIND HEAD SCREW-3MMDX14MM (BLACK)	
△	104	5213124 POWER TRANSFORMER (BS,AU)	148	0711304 SCREW - 2.6MMD X 4MM	
	105	7758242 SWITCH COVER	149	7761581 BT FLAT SCREW-3MMDX10MM	
	106	6174253 BATTERY LID	150	7780263 BIND TAPPING SCREW-2.6MMDX14MM	
	107	6488342 BATTERY BOX	151	7786353 WASHER	
	108	7348651 PULLEY BRACKET ASSEMBLY	152	0747305 BIND SCREW-2.6MMDX5MM	
	109	6422541 COUNTER PULLEY ASSEMBLY	153	8699308 BT BIND SCREW-2.6MMDX8MM (BLACK)	
	110	7778856 POLYESTER WASHER	154	8678408 DT SCREW-3MMDX8MM (BLACK)	
	111	7786115 POLYESTER WASHER	155	6768731 COUNTER HOLDER	
	112	6354471 COUNTER BELT	156	6768931 LED SPACER	
	113	7341183 CASSETTE METAL ASSEMBLY	157	6768721 LED SPACER	
	114	6761962 LAMP HOLDER	158	6768381 LED SPACER	
	115	6764211 POWER LEVER	159	6768921 LED SPACER	
	116	6055621 PUSH BUTTON ASSEMBLY (POWER)	160	6768671 LED SPACER	
	117	6055472 PUSH BUTTON ASSEMBLY (INPUT)	161	6769201 LED SPACER	
	118	6055522 PUSH BUTTON (MONITOR)	FOR CHASSIS ASSEMBLY		
	119	6291981 KNOB (TAPE SELECT)	162	5391071 HALL ELEMENT (H=20C)	
	120	6225064 FRONT PANEL ASSEMBLY	MISCELLANEOUS		
	121	6055582 RESET BUTTON (COUNTER, ELAPSED TIMER)	163	6044694 BOTTOM COVER	
	122	6060391 PUSH BUTTON (ATRS)	164	6044922 UPPER COVER	
	123	6060392 PUSH BUTTON (FIXED)	165	6286672 KNOB (OUTPUT)	
	124	6060395 PUSH BUTTON (START)	166	6289372 KNOB (RECORD-R)	
	125	6768661 BUTTON HOLDER	167	6286682 KNOB (RECORD-L)	
	126	6792442 MONITOR INDICATOR ASSEMBLY	168	6328412 SPRING	
	127	6055512 PUSH BUTTON (DOLBY NR,DOLBY B/C,MPX)	169	6093571 CASSETTE DOOR ASSEMBLY	
	128	6792501 TAPE SWITCH INDICATOR ASSEMBLY	170	6714214 NYLON RIVET	
	129	5310681 FLUORESCENT METER ASSEMBLY	171	8691410 BT BIND SCREW-3MMDX10MM (BLACK)	
	130	6054862 EJECT BUTTON ASSEMBLY	172	8699610 BT BIND SCREW-4MMDX10MM	
	131	6303115 SPRING FOR EJECT BUTTON	173	7790982 CLEAR PLATE ASSEMBLY	
	132	6055593 FUNCTION BUTTON ASSEMBLY	174	6635351 CLEAR PLATE HOLDER	
	133	6769311 LED SPACER (REC, PLAY, PAUSE INDICATOR)	175	6587142 RUBBER BUSH	
	134	6769041 HEAD DOOR ASSEMBLY			
	135	7346851 MAGNET HOLDER			
	136	5771831 MAGNET			

EXPLODED VIEW (Cabinet)



Note : Components marked without numbers in this drawing are not specified as replacement parts.

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
MISCELLANEOUS					
S 4	5624131	SLIDE SWITCH (TIMER)	S109-111	5633671	PUSH SWITCH (ATRS, TEST START, FIXED)
S 5-7	5633792	PUSH SWITCH (DOLBY NR, DOLBY B/C, MPX)	S113	5633671	PUSH SWITCH (COUNTER RESET)
S 8	5634367	PUSH SWITCH (MONITOR)	S114	5633671	PUSH SWITCH (ELAPSED TIME RESET)
△ S001	5633842	PUSH SWITCH (POWER) (U, C)	FOR ACCESSORIES		
△ S001	5633843	PUSH SWITCH (POWER) (W, FS, BS, AU)	7740321		HEAD CLEANING STICK
△ S002	5605083	ROTARY SWITCH (VOLTAGE SELECTOR) (W)	5894163		PATCH CORD
S101-107	5633851	PUSH SWITCH (REW, PLAY, FF, STOP, REC, PAUSE, REC MUTE)	△ 5652291		SOCKET ADAPTER (W)

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Type of head			
P	Pan head screw		BT
F	Flat countersunk head screw		BL
B	Binding head screw		W
T	Round head tapping screw		E
			"E" ring
Length (L mm)			
Diameter (D mm)			

When ordering hardware excluding stated on these lists, be sure to make your orders with type and size.

**D-2200M TK No. 1672E TOKAI**  
**U, C, FS, BS, AU, W**