



# HITACHI

## SERVICE MANUAL

TK

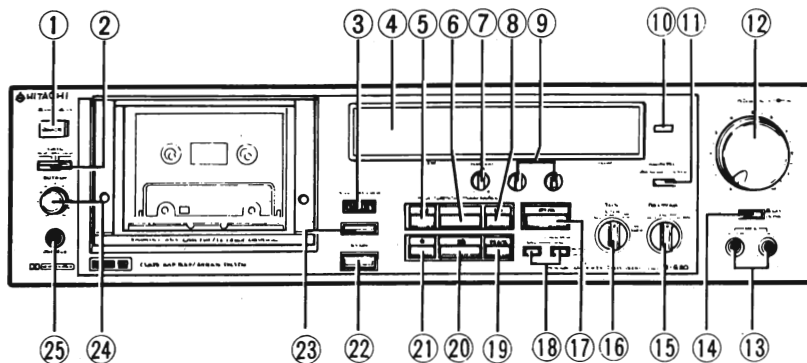
No. 1465E

# D-E95

(U,C,FS,BS,AU,W)

Use this manual together with the D-E95 Technical Information (No.1472).

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### KEY TO ILLUSTRATIONS

- |                                 |                                 |
|---------------------------------|---------------------------------|
| 1. Power (Mains) switch         | 14. Input select switch         |
| 2. Timer switch                 | 15. Dolby NR switch             |
| 3. Tape counter                 | 16. Tape select switch          |
| 4. Digital peak meter           | 17. Stop button                 |
| 5. Rewind button                | 18. Auto/memory rewind switches |
| 6. Playback button              | 19. REC. mute button            |
| 7. Bias fine adjustment control | 20. Pause button                |
| 8. Fast forward button          | 21. Record button               |
| 9. REC. calibration controls    | 22. Eject button                |
| 10. Peak hold switch            | 23. Counter reset button        |
| 11. Monitor switch              | 24. Output level control        |
| 12. Recording level controls    | 25. Headphone socket            |
| 13. Microphone sockets          |                                 |

### 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  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

December 1980 TOKAI WORKS

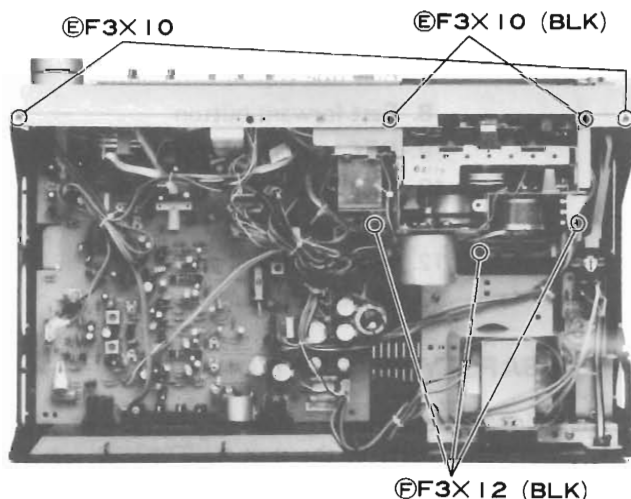
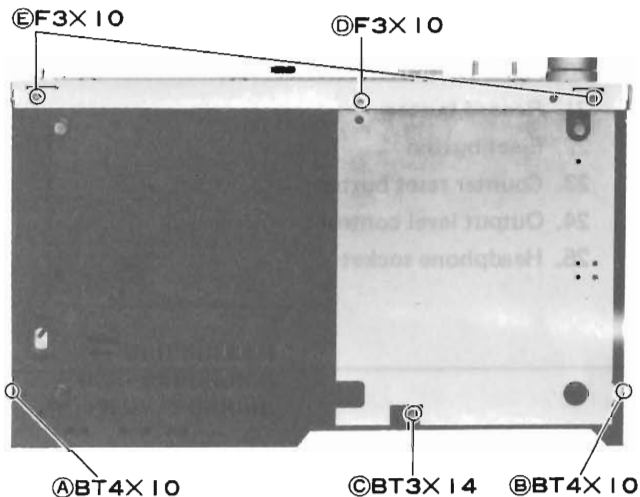
## SPECIFICATIONS

<b>Semiconductors:</b>	
Module:	1
ICs:	6
FET:	2
Transistors:	34 (U, C) 36 (FS, BS, AU, W)
Diodes:	41 (U, C) 44 (FS, BS, AU, W)
LED:	3
Thermistor:	1
Track System:	4 track 2 channel stereo
Tape:	Cassette tape (C-30, 60, 90)
Tape Speed:	4.75 cm/s
<b>Recording System and</b>	
Bias Frequency:	AC bias, 85 kHz
<b>Erasing System:</b>	
Erasing System:	AC erase
Erase Ratio:	65 dB or more (at 1 kHz)
<b>Frequency Response:</b>	
ER/UD (NOR):	20 Hz ~ 18 kHz 30 Hz ~ 17 kHz (±3 dB) 30 Hz ~ 17 kHz*
EX/SX (CrO <sub>2</sub> ):	20 Hz ~ 20 kHz 30 Hz ~ 18 kHz (±3 dB) 30 Hz ~ 18 kHz*
FeCr:	20 Hz ~ 18 kHz 30 Hz ~ 17 kHz (±3 dB) 30 Hz ~ 17 kHz*
ME (METAL):	20 Hz ~ 21 kHz 30 Hz ~ 19 kHz (±3 dB) 30 Hz ~ 19 kHz*
<b>S/N (Signal to Noise Ratio):</b>	
Dolby NR OFF:	61 dB (Weighted A, Reference 3% THD Metal Tape) 61 dB*
Dolby NR ON:	69 dB (Weighted A, Reference 3% THD Metal Tape) 69 dB*

<b>Wow and Flutter:</b>	0.038% (WRMS) 0.12%*
<b>Input Sensitivity and Impedance:</b>	
Microphone:	0.3 mV, 300 ohms ~ 5k ohms
Line in:	60 mV, 50 kohms or more
DIN (Record/Playback):	0.3 mV, 5k ohms (FS, BS, AU, W)
<b>Output Level:</b>	500 mV
<b>Output Load Impedance:</b>	
Line out:	50k ohms or more
DIN (Record/Playback):	470k ohms or more (FS, BS, AU, W)
<b>Headphone:</b>	8 ohms ~ 2k ohms
<b>Distortion:</b>	0.8% (1 kHz, -3 dB)
<b>Crosstalk:</b>	60 dB or more (at 1 kHz)
<b>Channel Separation:</b>	30 dB or more (at 1 kHz)
<b>Power Supply:</b>	
	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) 30W
<b>Power Consumption:</b>	30W
<b>Dimensions:</b>	110(H) x 435(W) x 266(D) mm
<b>Weight:</b>	6 kg
<b>Motor:</b>	DC servo motor x 1 DC motor x 1
<b>Heads:</b>	1.4 mm Cross gap Metal Record/ Playback head Ferrite gird special permalloy Erase head

\* According to DIN 45 500

## DISASSEMBLY



**1. Cassette door**

Depress the eject button to open the cassette door. Lift up the cassette door to remove it.

**2. Upper cover**

Remove (A) and (B) (two) screws.

**3. Bottom cover**

Remove (B), (C) and (D) (three) screws.

**4. Front panel**

1) Remove three knobs (Output, Tape selector, Dolby NR).

2) Remove (D) and (E) (seven) screws.

**5. Cassette chassis**

Remove (F) (three) screws.

**ADJUSTMENT**

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

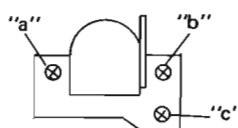
Symbol No.	Switches and Controls	Position	Symbol No.	Switches and Controls	Position
S1	Tape select switch	ER/UD(NOR)	RV1L, R	Record level controls	Max.
S2	Monitor switch	TAPE	RV2L, R	Output level control	Max.
S3	Dolby NR switch	OFF	RV3L, R	Record calibration controls	Center
S4	Input select switch	LINE	RV4	Bias fine control	Center

\* 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	Semi-variable resistor in the motor	3000 Hz +30 Hz -10 (3150 Hz*)	See Note 1
2	Head azimuth	● VTVM	—	LINE OUT	MTT-216 or MTT-316, 14 kHz	Playback	Azimuth adjusting screw "a"	Output Max.	See Note 2
3	Dolby NR	● Audio oscillator (5 kHz) ● VTVM	LINE IN	TP1L, R	—	Record	RT2L, R	Level is boosted by 8 ± 0.25 dB	See Note 3
4	Playback gain	● VTVM	—	LINE OUT	MTT-150, 400 Hz 20 m Maxwell	Playback	RT1L, R	775mV(0dB) -0.3 dB	See Note 4
5	Digital peak meter	● VTVM	—	LINE OUT	—	Playback	RT200L, R	Digital peak meter indicate 0 dB	See Note 5
6	Bias trap	● VTVM	—	TP2L, R	—	Record	L3	Output Min.	See Note 6
7	Record level	● Audio oscillator (1.5 kHz)	LINE IN	—	ER/UD tape	Record	RT5L, R	Digital peak meter indicate 0 dB	See Note 7
8	Bias current	● Audio oscillator (1.5kHz/15 kHz, 0 dB -20 dB) ● Attenuator ● VTVM	LINE IN	LINE OUT	ER/UD Tape	Record	RT6L,R	Output difference within 1 dB	See Note 8

Note:

- Adjust within 30 sec. after heat-running for more than 20 minutes.
- 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. Then, use test tape to adjust the azimuth of Record/playback head by means of the adjusting screw "a" for maximum output.
- Feed a 5 kHz signal to the LINE IN jacks in the recording mode and adjust the audio oscillator output so that the level of TP1L, R becomes 23.5 mV (-30.4 dBm). Then, adjust RT2L, R so that the level is boosted by 8 dBm±0.25 dB when the Dolby NR switch is set to ON.



- Playback a test tape (MTT-150, 400 Hz 20 m Maxwell) and adjust RT1L, R so that the level of LINE OUT jacks become 775 mV (0 dB) - 0.3 dB.
- With the condition shown in item 4, adjust RT200L, R so that the digital peak meter indicate 0 dB.
- Adjust L3 so that the level of TP2L, R becomes minimum in the recording mode.
- 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 indicate 0 dB.  
3) Then, set the monitor switch to the TAPE position and adjust RT5L, R so that the digital peak meter indicate 0 dB.
- 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 indicate 0 dB. Then, adjust the attenuator to lower the output level by 20 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 RT6L, R so that the output level difference between two frequencies is within 1 dB.

**INSPECTION OF MECHANISM**

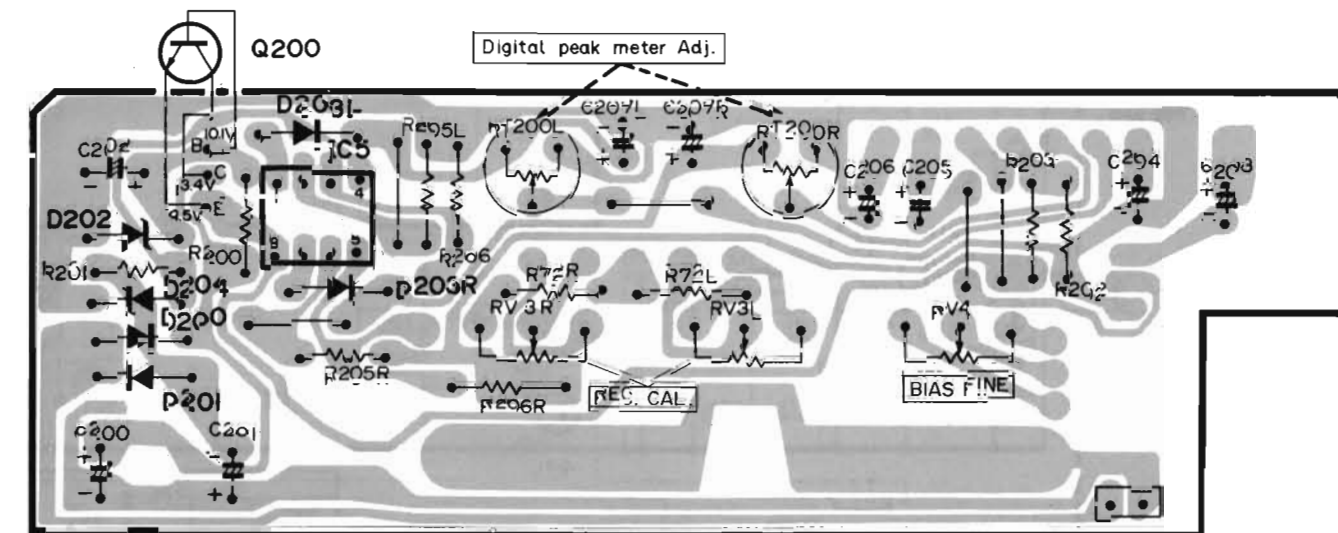
Check Item		Reference Value	Remarks	
1	Pressure of Pressure roller	Take-up side: 300 to 400 gr Supply side: 170 to 250 gr	Measure in playback mode	
	2	Torque	Take-up: 35 to 65 gr-cm Fast forward: 75 to 120 gr-cm Rewind: 75 to 120 gr-cm	Measure in playback mode Measure in Fast forward mode Measure in Rewind mode
3		Back-tension	Take-up side: Less than 6 gr-cm Supply side: 7 to 12 gr-cm	Without counter Without counter
		4	Flywheel thrust gap	0.05 to 0.5 mm
5	Pressure of take-up roller	200 to 250 gr	Measure in playback mode	
6	Brake force	More than 15 gr-cm	Measure in playback mode	

**LUBRICATION**

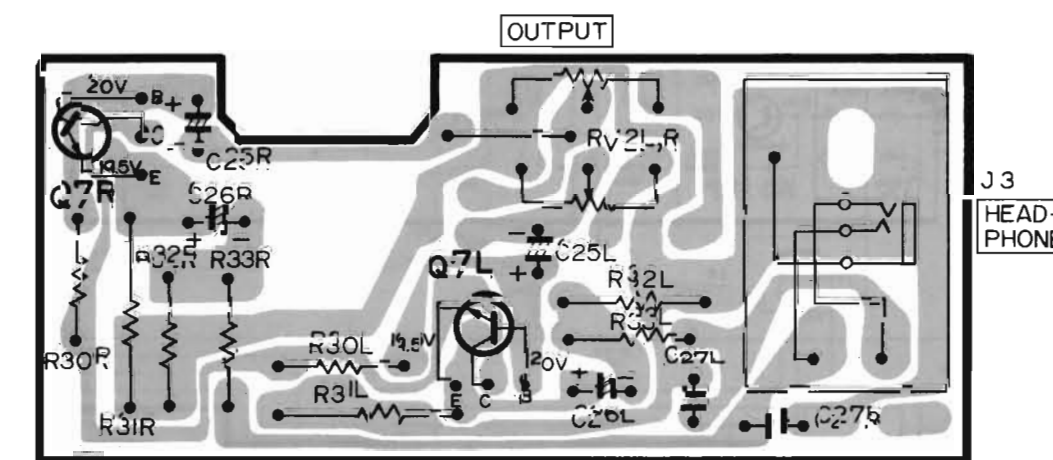
Lubricate one or two drops of oil to rotating point or lubricate grease to sliding point. Lubricate the respective parts listed below once every 1000 hours or once a year under normal conditions of use. Avoid oiling them excessively, or rotation may become irregular because of oil splashes.

	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	Froil (GB-TS-1)

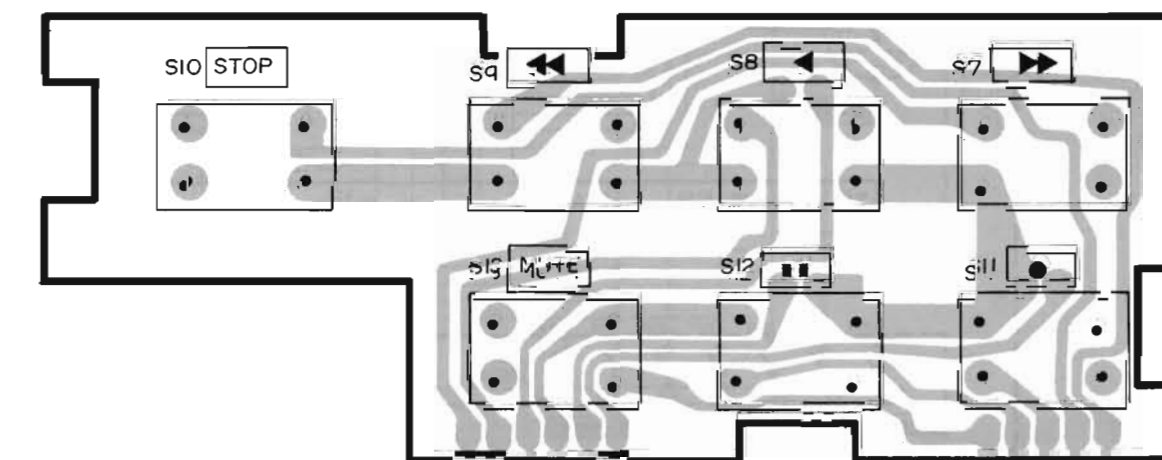
**CIRCUIT BOARD DIAGRAM**



METER PC Board

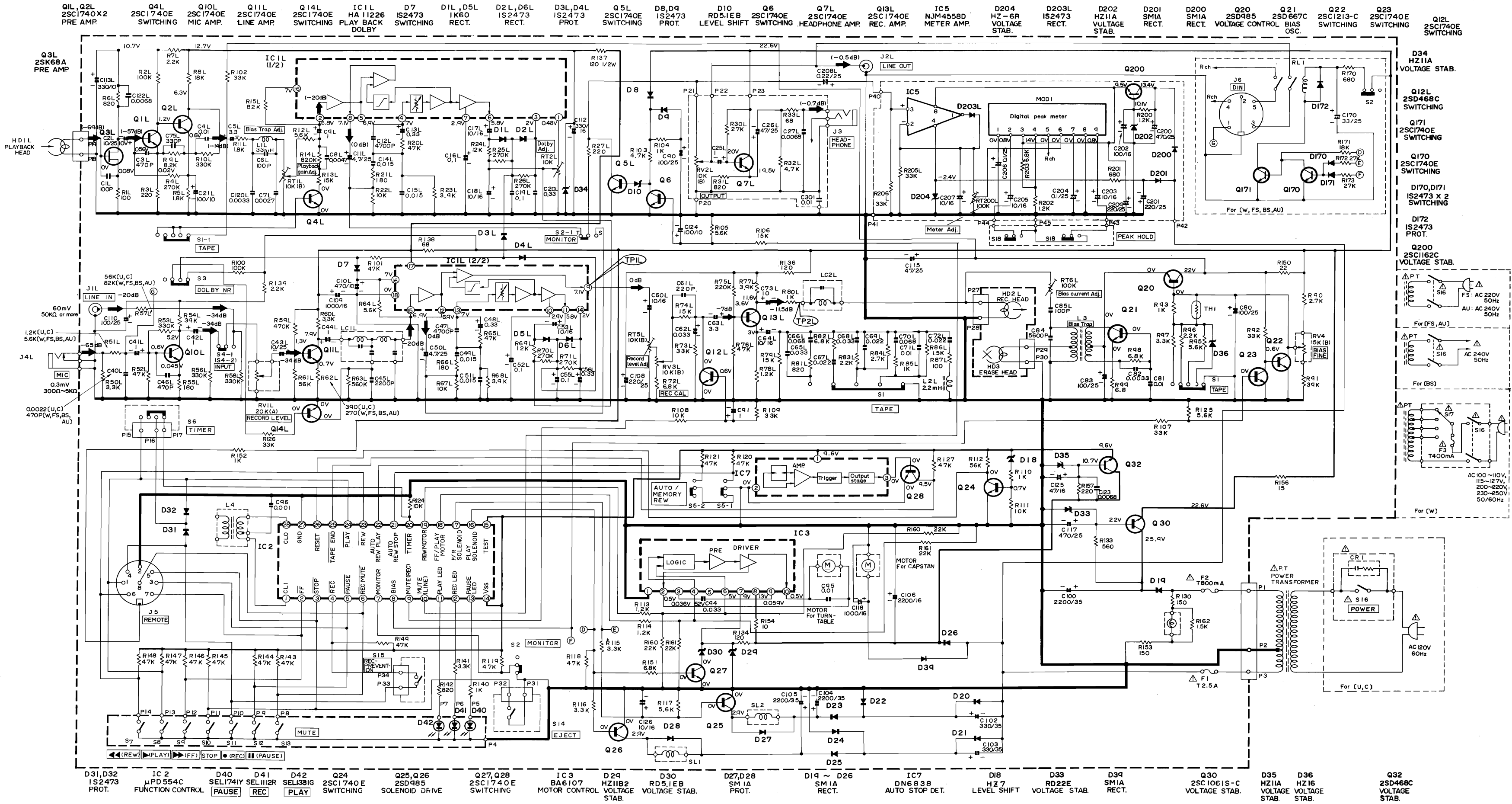


HEADPHONE PC Board



FUNCTION SWITCH PC Board

SCHMATIC DIAGRAM



Note

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

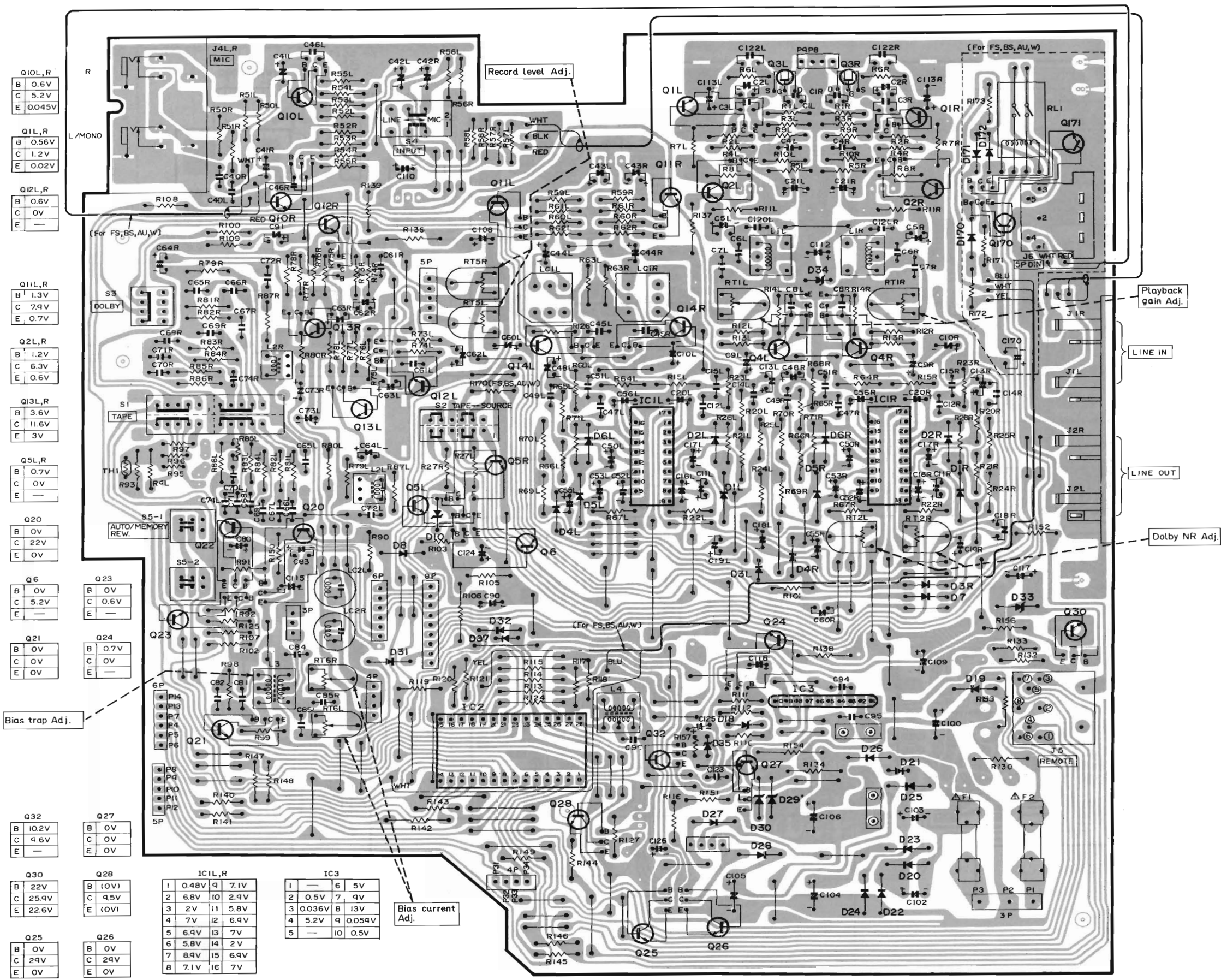
Circuit No.	
Value	No indicated Ω(Ohm) M : 1000kΩ
Tolerance	No indicated ±5% K : ±10% M : ±20%
Wattage	No indicated ¼W
Sort	No indicated Carbon film RC : Composition RW : Wire wound RS : Oxide metal film RN : Fixed metal film

Circuit No.	
Value	No indicated μF P : PF
Tolerance	No indicated ±10% J : ± 5% M : ±20% Z : +80% - 20% 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.



CIRCUIT BOARD DIAGRAM



Q10L,R

B	0.6V
C	5.2V
E	0.045V

Q1L,R

B	0.56V
C	1.2V
E	0.02V

Q2L,R

B	0.6V
C	0V
E	—

Q11L,R

B	1.3V
C	7.9V
E	0.7V

Q2L,R

B	1.2V
C	6.3V
E	0.6V

Q13L,R

B	3.6V
C	11.6V
E	3V

Q5L,R

B	0.7V
C	0V
E	—

Q20

B	0V
C	22V
E	0V

Q6

B	0V
C	5.2V
E	—

Q21

B	0V
C	0V
E	0V

Q23

R	0V
C	0.6V
E	—

Q24

B	0.7V
C	0V
E	—

Q32

B	10.2V
C	9.6V
E	—

Q27

B	0V
C	0V
E	0V

Q30

B	22V
C	25.9V
E	22.6V

Q25

B	0V
C	29V
E	0V

Q23

R	0V
C	0.6V
E	—

Q24

B	0.7V
C	0V
E	—

Q27

B	0V
C	0V
E	0V

Q28

B	10V
C	9.5V
E	10V

Q26

B	0V
C	29V
E	0V

IC1L,R

1	0.48V	9	7.1V
2	6.8V	10	2.9V
3	2V	11	5.8V
4	7V	12	6.9V
5	6.9V	13	7V
6	5.8V	14	2V
7	8.9V	15	6.9V
8	7.1V	16	7V

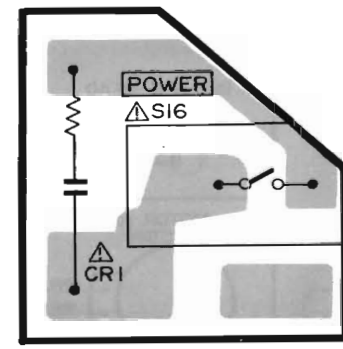
IC3

1	—	6	5V
2	0.5V	7	9V
3	0.036V	8	13V
4	5.2V	9	0.059V
5	—	10	0.5V

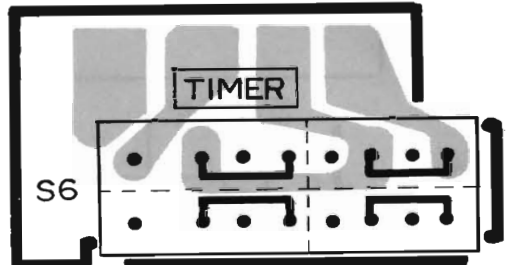
Bias current Adj.

Bias trap Adj.

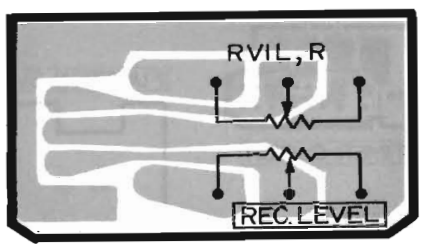
MAIN PC Board



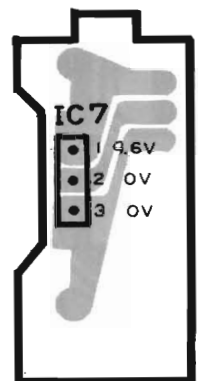
POWER SWITCH PC Board



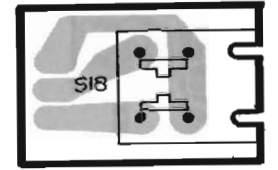
TIMER SWITCH PC Board



RECORD LEVEL PC Board

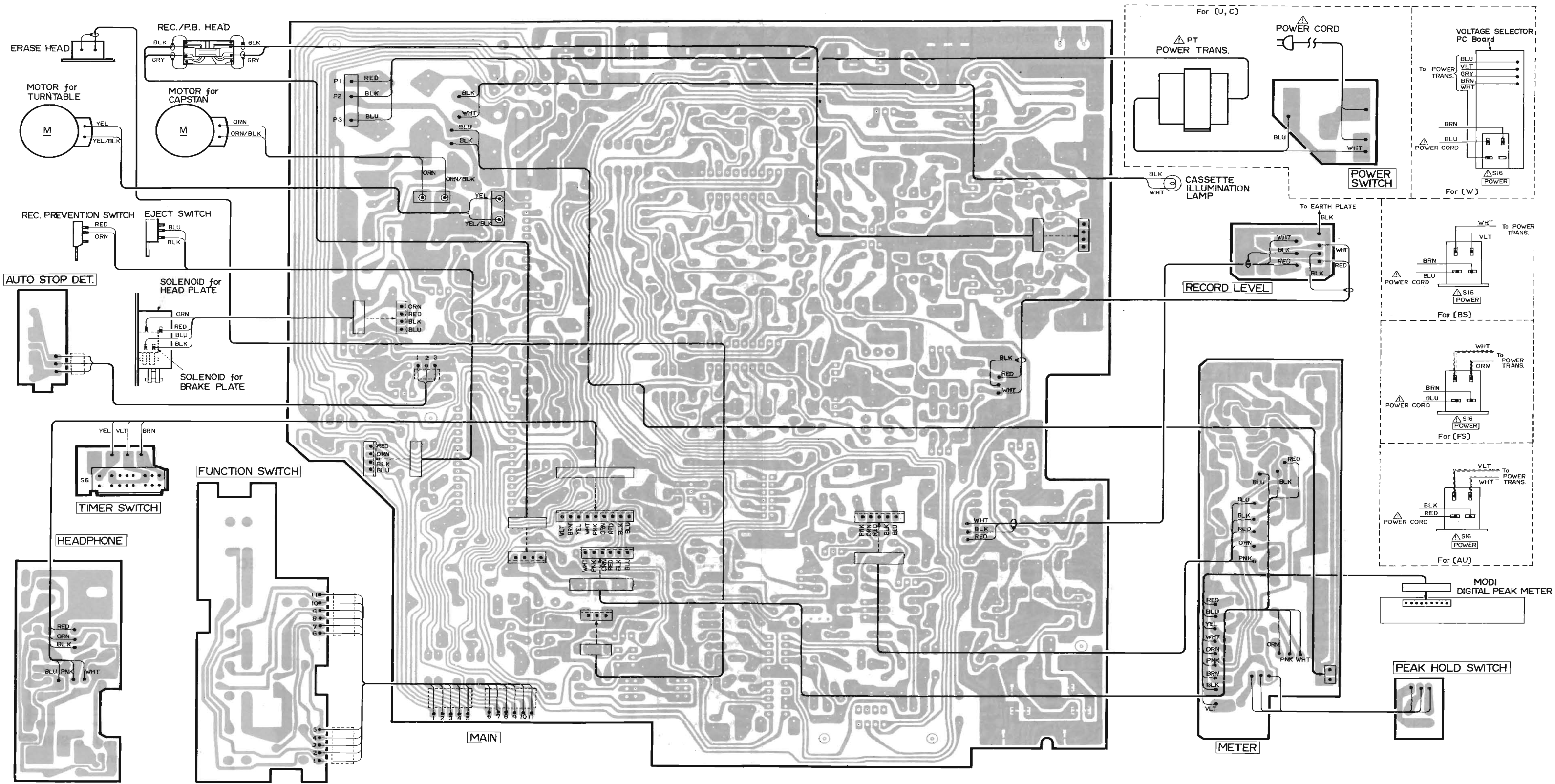


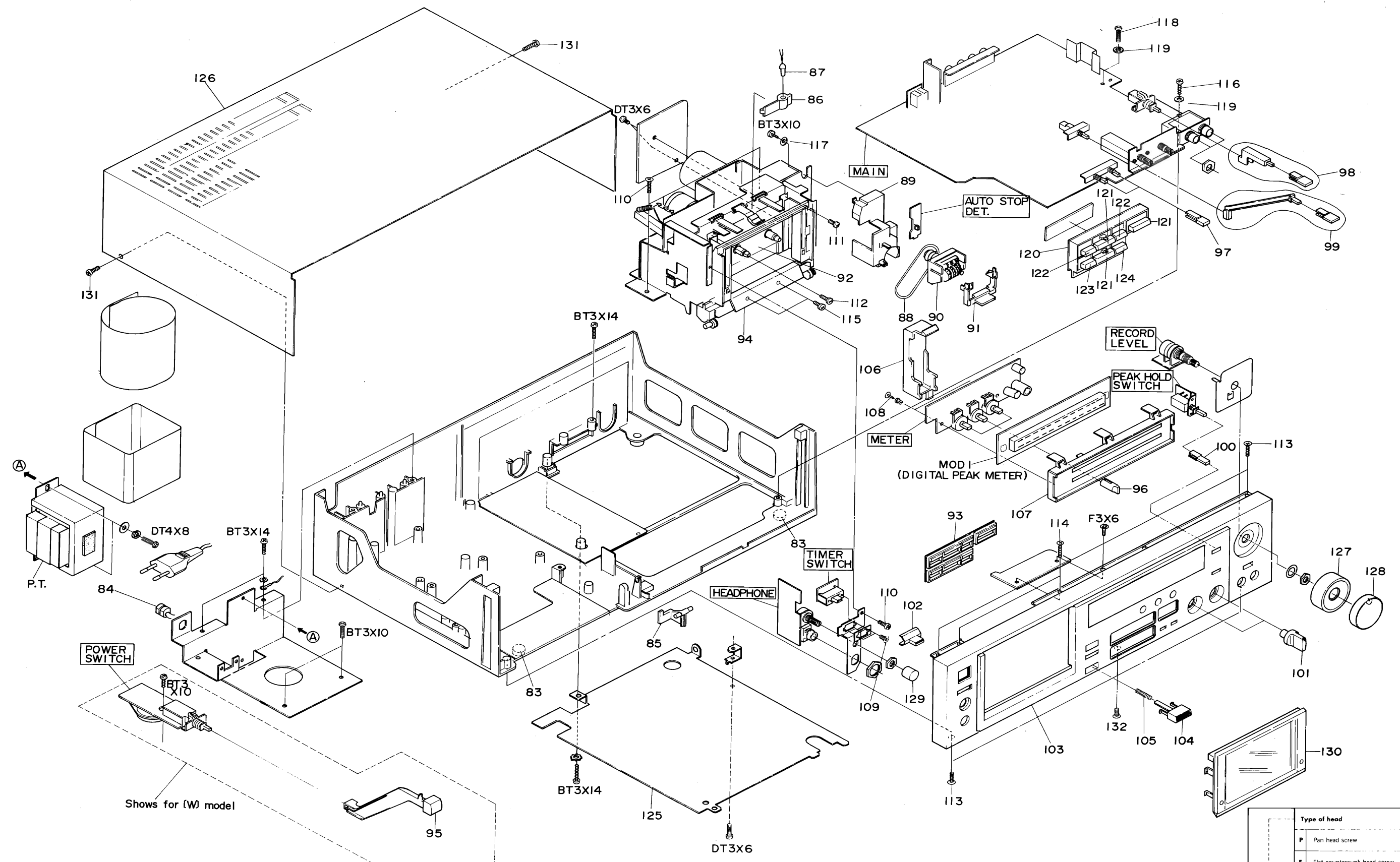
AUTO STOP DET. PC Board



PEAK HOLD SWITCH PC Board

### WIRING DIAGRAM





Shows for (W) model

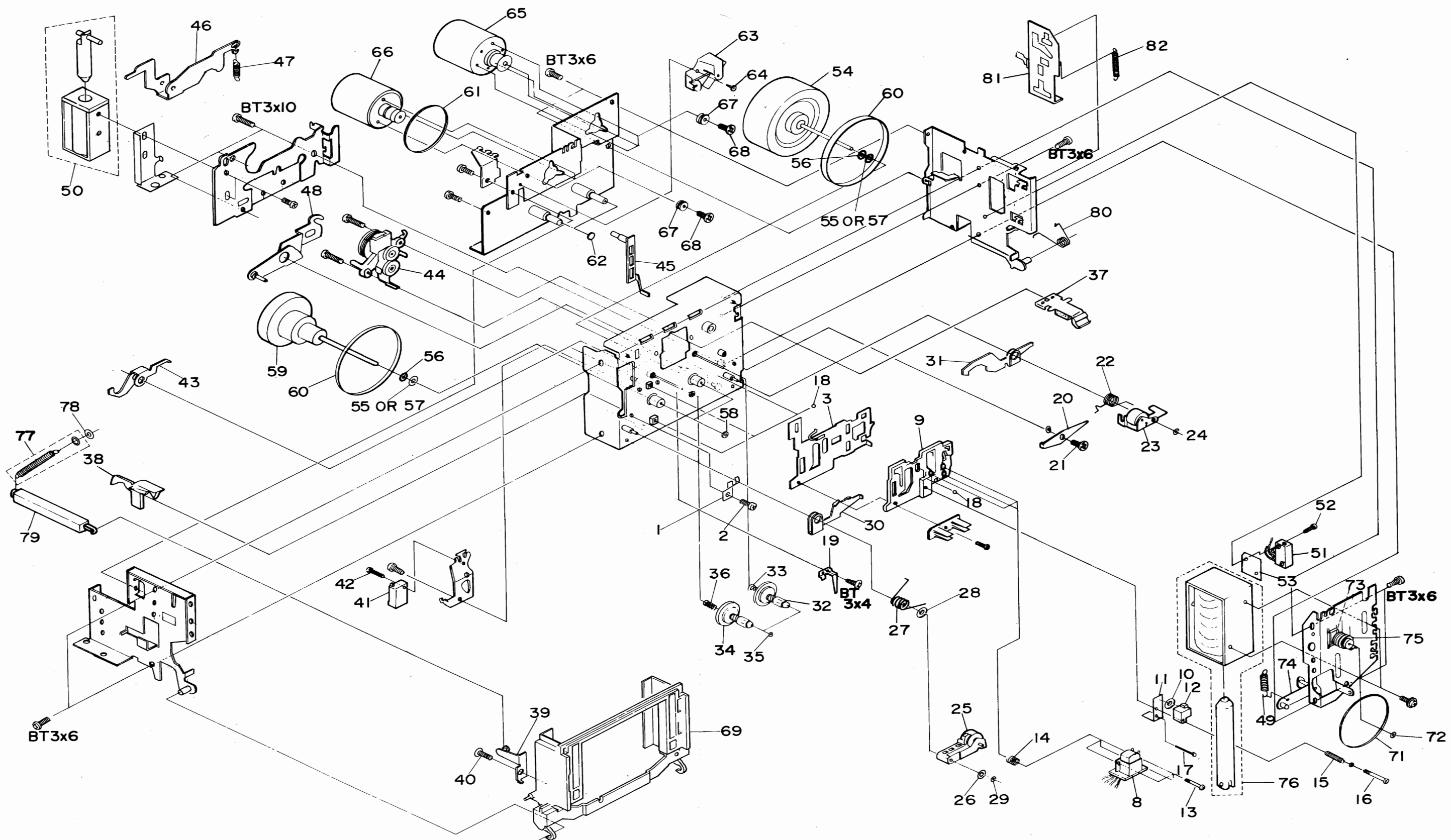
**Note:** Components marked without numbers in this drawing are not specified as replacement parts.

Type of head					
P	Pan head screw		BT	Binding head tapping screw	
F	Flat countersunk head screw		BL	Bolt	
B	Binding head screw		W	Washer	
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.



EXPLODED VIEW (Cassette Chassis)



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



## REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
CAPACITORS			D200	5331422	DIODE SM-1A-02
C 2LR	0256388	TANTALUM ELECTROLYTIC 10MF,10V	D201	5331422	DIODE SM-1A-02
△CR1	0219902	CR PACK 120 OHM 0.0033MF 450V (U)	D202	5330551	ZENER DIODE HZ11A
△CR1	0219907	CR PACK (C)	D203LR	5330574	DIODE 1S2473
RESISTORS			D204	5330847	DIODE RD2.7E-B2
R 99	0170479	FUSE RESISTOR 6.80HM+-5% 1/4W	IC1LR	5350561	IC HA 11226
R150	0170481	FUSE RESISTOR 220HM+-5% 1/4W	IC2	5359724	IC μPD554C046
RT 1LR	0151808	SEMI VARIABLE RESISTOR 10K OHM	IC3	5352221	IC BA6107
RT 2LR	0151808	SEMI VARIABLE RESISTOR 10K OHM	IC5	5350601	IC NJM4558D
RT 5LR	0151808	SEMI VARIABLE RESISTOR 10K OHM	IC7	5391031	HALL ELEMENT DN6838
RT 6LR	0151818	SEMI VARIABLE RESISTOR 100 KOHM	Q 1LR	5321295	TRANSISTOR 2SC1740E
RT200LR	5007189	SEMI VARIABLE RESISTOR 100KOHM	Q 2LR	5321295	TRANSISTOR 2SC1740E
RV1LR	5000556	VARIABLE 20KOHM(A)	Q 3LR	5321506	TRANSISTOR 2SK68A-N
RV2LR	5000616	VARIABLE RESISTOR 10KOHM(B)	Q 4LR	5321295	TRANSISTOR 2SC1740E
RV 3LR	5000682	VARIABLE RESISTOR 10KOHM(B)	Q 5LR	5321295	TRANSISTOR 2SC1740E
RV 4	5000683	VARIABLE RESISTOR 5KOHM(B)	Q 6	5321295	TRANSISTOR 2SC1740E
SEMI-CONDUCTORS			Q 7LR	5321295	TRANSISTOR 2SC1740E
D 1LR	5331503	DIODE 1KR9	Q 10LR	5321295	TRANSISTOR 2SC1740E
D 2LR	5330574	DIODE 1S2473	Q 11LR	5321295	TRANSISTOR 2SC1740E
D 3L	5330571	DIODE 1S2473VE	Q 12LR	5321213	TRANSISTOR 2SD468C
D 3R	5330574	DIODE 1S2473	Q 13LR	5321295	TRANSISTOR 2SC1740E
J 4LR	5330574	DIODE 1S2473	Q 14LR	5321295	TRANSISTOR 2SC1740E
D 5LR	5331503	DIODE 1KR9	Q 20	5322671	TRANSISTOR 2SD985
D 6LR	5330574	DIODE 1S2473	Q 21	5322651	TRANSISTOR 2SD667C
D 7	5330574	DIODE 1S2473	Q 22	5320613	TRANSISTOR 2SC1213C
D 8	5330574	DIODE 1S2473	Q 23	5321295	TRANSISTOR 2SC1740E
D 10	5330841	ZENER DIODE RD5.1E-B	Q 24	5321295	TRANSISTOR 2SC1740E
D 18	5330311	DIODE SILICON HZ7A 1.0M	Q 25	5322671	TRANSISTOR 2SD985
D 19-28	5331422	DIODE SM-1A-02	Q 26	5322671	TRANSISTOR 2SD985
D 29	5330555	DIODE HZ11B2	Q 27	5321295	TRANSISTOR 2SC1740E
D 30	5330848	ZENER DIODE RD5.1EB2	Q 28	5321295	TRANSISTOR 2SC1740E
U 31	5330574	DIODE 1S2473	Q 30	5321301	TRANSISTOR 2SC1061
D 32	5330574	DIODE 1S2473	Q 32	5321213	TRANSISTOR 2SD468C
D 33	5331581	DIODE RD22EB2	Q170	5321295	TRANSISTOR 2SC1740E (W,FS,BS,AU)
D 34	5330556	ZENER DIODE HZ11A2	Q171	5321295	TRANSISTOR 2SC1740E (W,FS,BS,AU)
D 35	5330556	ZENER DIODE HZ11A2	Q200	5320643	TRANSISTOR SILICON 2SC1162 150M
D 36	5330562	DIODE HZ16-2	TH1	5340231	THERMISTER 112302-2
D 37	5330571	DIODE 1S2473VE	TRANSFORMERS		
D 38	5330841	ZENER DIODE RD5.1E-B	△PT	5212921	POWER TRANSFORMER (U,C)
D 39	5331422	DIODE SM-1A-02	△PT	5212922	POWER TRANSFORMER (FS)
D 40	5380651	LED SEL1741Y	△PT	5212923	POWER TRANSFORMER (BS)
D 41	5380631	LED SEL1112R	△PT	5212924	POWER TRANSFORMER (W)
D 42	5380641	LED SEL1331G	△PT	5212925	POWER TRANSFORMER (AU)
D170	5330574	DIODE 1S2473 (W,FS,BS,AU)	COILS		
D171	5330574	DIODE 1S2473 (W,FS,BS,AU)	L1LR	5260215	TRAP COIL 33HH
D172	5330574	DIODE 1S2473 (W,FS,BS,AU)	L2LR	5120274	CHOKO COIL

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
COILS			9	6973414	HEAD BASE
L3	5260368	OSCILLATOR TRANSFORMER	10	7786215	POLY SLIDER WASHER
L4	5132113	CHOKO COIL	11	7321221	ERASE HEAD BASE
MISCELLANEOUS			12	5445313	ERASE HEAD
MOD1	5310521	DIGITAL PEAK METER	13	7781752	SPECIAL SCREW
RL1	5641141	REED RELAY (W,FS,BS,AU)	14	6321246	HEAD SPRING
J6	5651141	5P DIN SOCKET (W,FS,BS,AU)	15	6320744	HEAD SPRING
	5722113	FUSE HOLDER	16	7781921	PAN HEAD SCREW-2MMDX25MM
△	5746157	POWER CORD (W,FS)	17	7780554	SCREW
△	5746342	POWER CORD (BS)	18	0948492	BALL - 2MMD
△	5746442	POWER CORD (U,C)	19	6532991	HEAD PLATE SPRING
△	5746571	POWER CORD (AU)	20	7311982	EJECT STOP PLATE
△F1	5721064	FUSE 2.5A (W,FS,BS,AU)	21	7536872	LOCK LEVER PIN
△F1	5721224	FUSE 2.5A (U,C)	22	6545953	SPRING FOR PRESSURE ROLLER
△F2	5720175	FUSE 0.8A (W,FS,BS,AU)	23	7329782	PRESSURE ROLLER ARM ASSEMBLY
△F2	5721163	FUSE 800MA (U,C)	24	7778856	POLYESTER WASHER
△F3	5720172	FUSE 400MA (W)	25	6383475	PRESSURE ROLLER ARM ASSEMBLY
J1LR, J2LR	5676261	PIN JACK ASSEMBLY (LINE IN/LINE OUT)	26	7772623	SPRING
J3	5674262	HEADPHONE JACK	27	6545334	SPRING
J4LR	5674201	MIC JACK	28	7786215	POLY SLIDER WASHER
J5	5677131	8P DIN SOCKET (REMOTE)	29	7778856	POLYESTER WASHER
LC1LR	5161665	DOLBY FILTER	30	7329041	PAUSE LEVER (L)
LC2LR	5120562	TRAP COIL	31	7329051	PAUSE LEVER (R)
S 1	5613381	ROTARY SWITCH (TAPE SELECTOR)	32	6414021	TURNTABLE ASSEMBLY
S 2	5634367	PUSH SWITCH (MONITOR)	33	6305892	BACK TENSION SPRING
S 3	5612297	ROTARY SWITCH (DOLBY NR)	34	6414023	TURNTABLE ASSEMBLY (SUPPLY)
S 4	5634306	PUSH SWITCH (INPUT SELECTOR)	35	7786115	POLYESTER WASHER
S 5	5634368	PUSH SWITCH (AUTO REW.)	36	6320731	BACK TENSION SPRING LEFT
S 6	5620082	SLIDE SWITCH (TIMER)	37	6752856	CASSETTE HOLDER SPRING
△S16	5633482	PUSH SWITCH (POWER) (U,C)	38	6752873	RECORD PREVENTION ARM
△S16	5633541	PUSH SWITCH (POWER) (FS,BS,AU)	39	7331331	TRAY BRACKET ASSEMBLY
△S16	5633641	PUSH SWITCH (POWER) (W)	40	7781582	FALT SCREW-3MMDX10MM(BLACK)
△S17	5605083	ROTARY SWITCH (VOLTAGE SELECTOR) (W)	41	5633361	PUSH SWITCH
S18	5634306	PUSH SWITCH (PEAK HOLD)	42	0671310	DT SCREW-2.6MMDX10MM
FOR ACCESSORIES			43	7330392	BRAKE FUNCTION ARM
	7740321	HEAD CLEANING STICK	44	6413817	FF/REWIND BASE ASSEMBLY
	5894163	PATCH CORD	45	7312125	PAUSE SLIDER ASSEMBLY
△	5662021	SOCKET ADAPTER (W)	46	7330382	PAUSE ARM
FOR CASSETTE DECK ASSEMBLY (GF-3G)			47	6300987	SPRING
1	6534251	SPRING	48	7312511	PLAY ARM ASSEMBLY
2	0671306	DT SCREW-2.6MMDX6MM	49	6322473	SPRING
3	7334346	HEAD PLATE ASSEMBLY	50	5642522	DC SOLENOID ASSEMBLY
8	5444853	RECORD PLAYBACK HEAD	51	5633361	PUSH SWITCH
			52	0671310	DT SCREW-2.6MMDX10MM
			53	7745241	INSULATION FIBER
			54	6373325	FLYWHEEL ASSEMBLY (R)
			55	7778848	POLY SLIDER WASHER

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR CASSETTE DECK ASSEMBLY (GF-3G)			95	6762011	PUSH BUTTON ASSEMBLY(POWER)(U,C,FS,BS,AU)
56	7772623	SPRING		6762012	PUSH BUTTON ASSEMBLY (POWER) (W)
57	7778847	POLY SLIDER WASHER	96	6283541	KNOB-8MMD (BIAS ADJ., REC. CAL.)
58	7786623	POLY SLIDER WASHER	97	6299241	PUSH BUTTON (AUTO, MEMORY REWIND)
59	6373305	FLYWHEEL ASSEMBLY (L)	98	6762001	PUSH BUTTON ASSEMBLY (INPUT)
60	6357301	FLYWHEEL BELT	99	6762002	PUSH BUTTON ASSEMBLY (MONITOR)
61	6355214	BELT	100	6299231	PUSH BUTTON (PEAK HOLD)
62	7768682	THRUST SUPPORT	101	6288281	SELECTOR KNOB (TAPE+DOLBY NR)
63	7290501	GOVERNOR	102	6295621	SLIDE KNOB (TIMER SW)
64	0671305	DT SCREW-2.6MMDX5MM	103	6224071	FRONT PANEL ASSEMBLY
65	5576881	DC MOTOR ASSEMBLY (PLAY)	104	6299261	EJECT KNOB
66	5576665	DC MOTOR ASSEMBLY (FF/REWIND)	105	6303057	SPRING FOR EJECT KNOB
67	6576084	RUBBER PLATE	106	6764851	METER HOLDER
68	7539002	SCREW FOR MOTOR MOUNTING	107	6762831	LED,FRAME ASSEMBLY
69	6762216	CASSETTE TRAY ASSEMBLY	108	6714215	NYLON RIVET
71	6354684	BELT FOR FF+REWIND	109	0721304	FLAT SCREW-2.6MMDX4MM
72	7786115	POLYESTER WASHER	110	7781585	BT FLAT SCREW-3MMDX12MM (BLACK)
73	7778855	POLY SLIDER WASHER	111	0678316	DT SCREW-2.6MMDX16MM (BLACK)
74	7312114	PLAY ARM ASSEMBLY	112	7780915	BIND TAPPING SCREW-2MMDX5MM
75	6422401	COUNTER PULLEY	113	7781581	BT FLAT SCREW-3MMDX10MM
76	5642662	SOLENOID ASSEMBLY (PLAY)	114	7781582	FALT SCREW-3MMDX10MM (BLACK)
77	6540015	DAMPER SPRING	115	8699408	BT BIND HEAD SCREW-3MMDX8MM (BLACK)
78	7778848	POLYSLIDER WASHER	116	8699410	BT BIND HEAD SCREW-3MMDX10MM (BLACK)
79	6753014	EJECT ARM ASSEMBLY	117	0681276	WASHER - 3MM
80	6546085	SPRING FOR EJECT ARM	118	8678408	DT SCREW-3MMDX8MM
81	7325822	EJECT SLIDER ASSEMBLY	119	7786353	WASHER
82	6301722	SPRING	120	5982141	FUNCTION SWITCH ASSEMBLY
FOR CASSETTE DECK ASSEMBLY (B)			121	6299271	BUTON (PLAY+PAUSE+STOP)
83	7740601	FELT LEG	122	6299272	BUTTON (FF+REWIND)
△ 84	0043793	BUSHING (U,C+AU)	123	6299273	BUTTON (REC)
	6794081	BUSHING (W,FS)	124	6299274	BUTTON (MUTE)
	6711351	BUSHING (BS)	MISCELLANEOUS		
85	6760443	EJECT LEVER	125	6042804	BOTTOM COVER
86	6760111	LAMP HOLDER	126	6043503	UPPER COVER (W,FS+BS,AU)
87	5762036	PILOT LAMP		6043504	UPPER COVER (U,C)
88	6355064	COUNTER BELT	127	6288175	KNOB ASS-38MMD (RECORD LEVEL-R)
89	6764981	COUNTER HOLDER	128	6288163	KNOB ASS-36.5MMD (RECORD LEVEL-L)
90	5559461	COUNTER	129	6288301	KNOB ASS-12MMD (OUTPUT LEVEL)
91	6052252	RESET BUTTON ASSEMBLY	130	6092984	CASSETTE DOOR ASSEMBLY
92	6631385	CASSETTE METAL ASSEMBLY	131	7781731	BT BIND SCREW-4MMDX10MM (W,FS+BS,AU)
93	6762021	FUNCTION FRAME		8699610	BT BIND SCREW-4MMDX10MM (U,C)
94	6182223	HEAD COVER ASSEMBLY	132	7781581	BT FLAT SCREW-3MMDX10MM



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# HITACHI SERVICE MANUAL

TK

No. 1472E

## D-E95

(U, C, FS, BS, AU, W)

## TECHNICAL INFORMATION

RECEIVED NOV 12 1982

This Technical Information describes the new circuit (microprocessor and peripheral circuits) of the D-E95. Refer to Service Manual No.1465 for other items. The operation of the microprocessor ( $\mu$ PD-554C-046) mounted in this unit is basically the same as that ( $\mu$ PD-554C-028) of the D-85S. However, some of the input/output pins and parts of the program are different, so the microprocessors are not interchangeable.

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Timing chart.....	5
Test program operation procedure .....	8
IC2 ( $\mu$ PD-554C-046) pin functions .....	11

### CAUTIONS ON USING MOS IC

1. The MOS ICs are inserted into a black sponge for shipment. This sponge is conductive and is used to prevent destruction by short-circuiting between leads.  
Do not remove the IC from this sponge during storage. Avoid removing ICs from the sponge and do not place on plastic which is likely to be charged with static electricity or inserting it into styrofoam.
2. Be sure to ground the soldering iron or use a low voltage soldering iron for soldering because a high voltage may be applied due to a leakage from the soldering iron.
3. The worker should be grounded during work because the human body, clothes made from synthetic fibers, nylon gloves, etc., may be charged with several thousand volts of static electricity.
4. Be sure to ground measuring instruments such as oscilloscopes, VTVMs, etc. when they are used.
5. Be sure to cut off the power supply before starting soldering.

## STEREO CASSETTE TAPE DECK

January 1981 TOKAI WORKS

## EXPLANATION OF NEW CIRCUIT

### 1. Initial start circuit

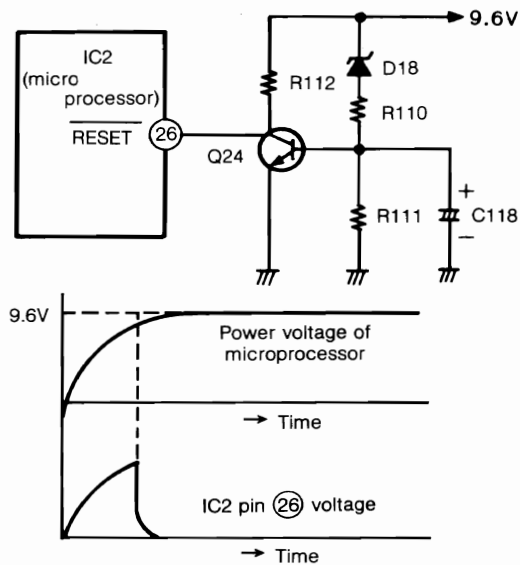


Fig. 1

This circuit sets the operation of the microprocessor to the initial mode (to operate from the start of its program) when the power is switched on or when the power rises again to the operational voltage after the power supply of the microprocessor drops instantaneously for any reason.

Pin 26 of the microprocessor is set to Lo level during normal operation. When the power to the microprocessor is first switched on and the power rises to a voltage more than the Zener voltage of D18, the reverse current becomes larger and the diode is activated. As a result, base current flows through R110, so Q24 is turned ON, pin 26 is set to Lo level and the microprocessor is reset.

### 2. Reel motor drive circuit

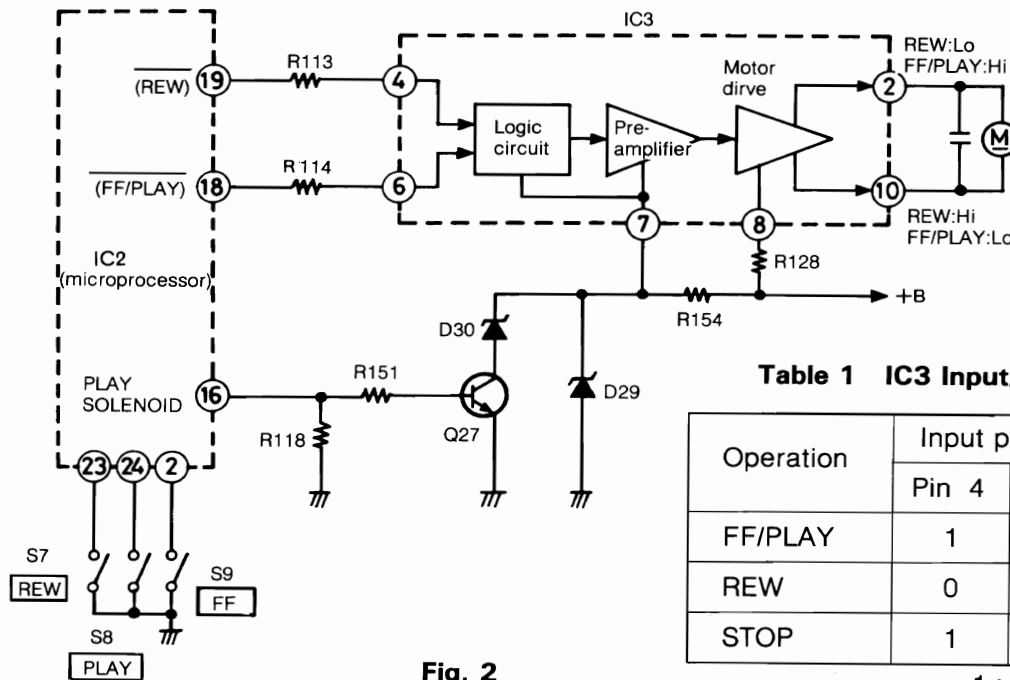


Fig. 2

Table 1 IC3 Input/output truth table

Operation	Input potential		Output potential	
	Pin 4	Pin 6	Pin 2	Pin 10
FF/PLAY	1	0	1	0
REW	0	1	0	1
STOP	1	1	0	0

1 : Hi potential, 0 : Lo potential

#### (1) FF/PLAY

When the FF button (S9) or PLAY button (S8) is pressed, IC2 pin 18 is set to Lo potential output and pin 19 to Hi potential output, and these outputs are applied to the IC3 input pins. Pin 10 is set to Lo potential and pin 2 to Hi potential output by these 2 inputs as shown in Table 1, so the drive current flows to pin 10 from the motor via pin 2, and the motor rotates in the take-up direction. The motor rotates in the same way during PLAY,

but the IC2 pin 16 is set to Hi potential output simultaneously during PLAY, and Q27 is set to ON, becoming activated. As a result, the pin 7 potential drops, the drive current of the output increases and the motor speed decreases.

#### (2) REW

In reverse to the FF mode, when the REW button (S7) is pressed, pin 19 is set to Lo potential and pin 18 is set to Hi potential output, so the motor rotates in the REW direction.

### 3. Tape end detector circuit

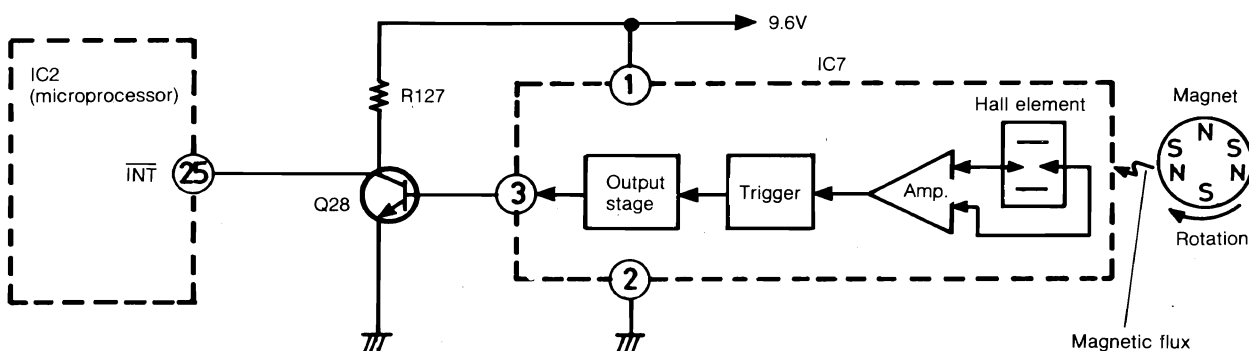


Fig. 3

IC7 (DN6838) is the tape end detecting IC; it detects variation of the magnetic flux caused by rotation of the multipolar magnet mounted on the tape counter,

and outputs it from pin 3 as a pulse wave; it is phase-inverted by Q28 and input to IC2 pin 25.

### Microprocessor operational principle

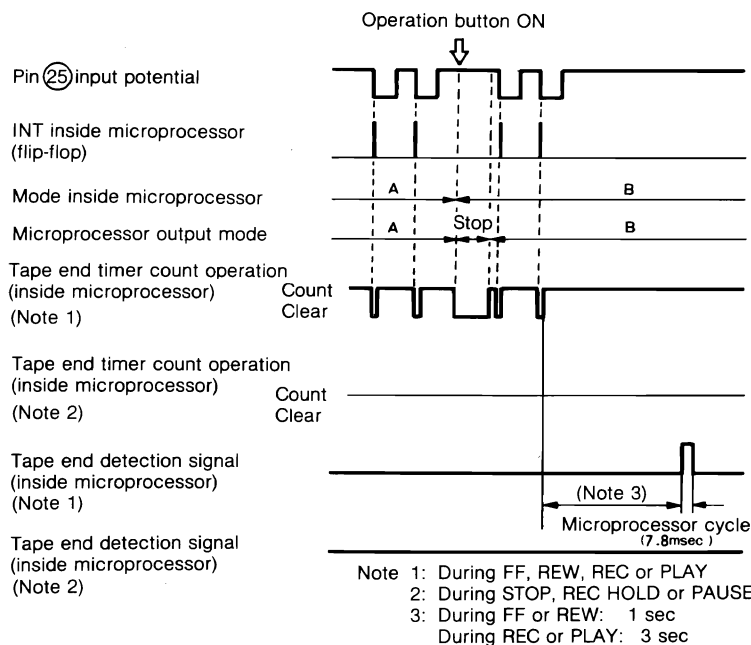


Fig. 4

As is shown in the timing chart, when a pulse is input to pin 25, the timer count pulse is generated at the input pulse trailing edge in the INT (Flip-flop) inside the microprocessor and the count operation is performed by the tape end timer counter inside the microprocessor.

Pulse generated by IC7 stops at the tape end, so pin 25 is set to Hi potential to stop the timer count pulse generation in INT inside the microprocessor. As a result, the tape end detection pulse signal is

generated to stop the deck 1 sec after the final tape end timer count operation during FF or REW mode, and 3 sec later, during REC or PLAY mode.

The timer count pulse from the time when the PLAY button is pressed until the REW button is pressed is counted and memorized during the memory rewind stop/play mode. It is counted down during the REW mode and the tape is rewound by 4 more pulses from the position where the PLAY button is pressed, and a tape end signal is generated to stop the deck.

## 4. Solenoid drive circuit/Muting circuit

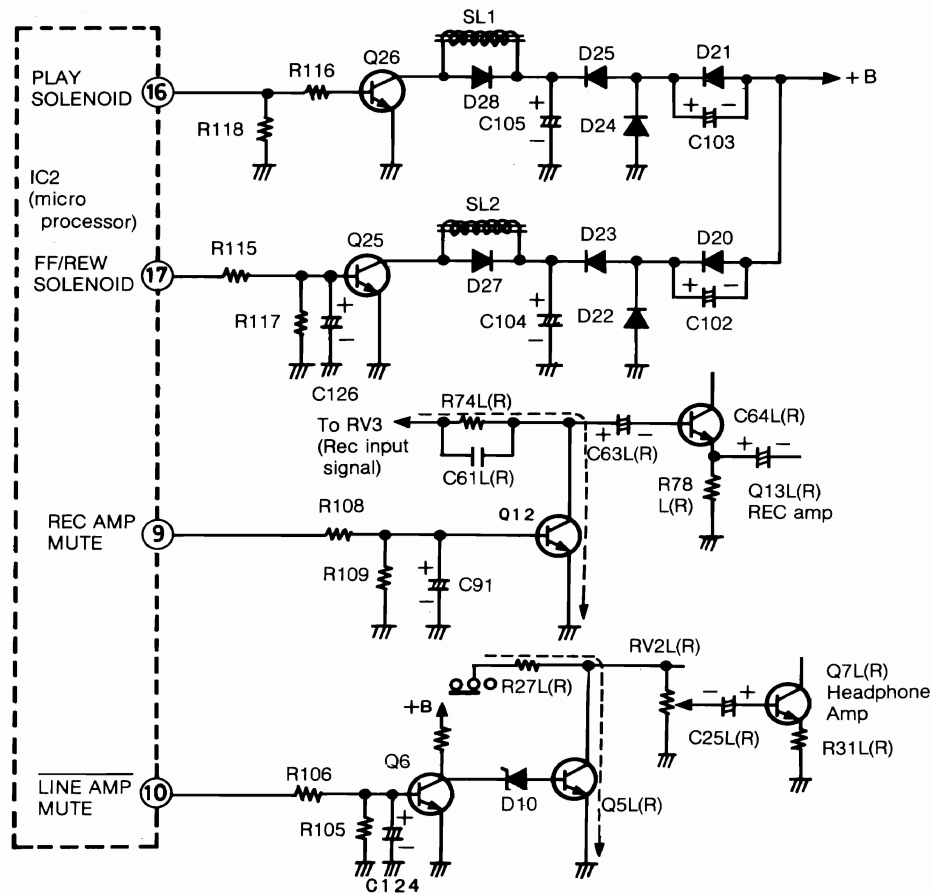


Fig. 5

## (1) Solenoid drive circuit

## • During PLAY

When the PLAY button (S8) is set to ON, the microprocessor pin 16 is set to Hi potential, the base current flows across R116 and Q26 is set to ON, the head solenoid operates and the unit enters the PLAY mode.

## • During FF/REW

When the FF button (S9) or REW button (S7) is set to ON, the microprocessor pin 17 is set to Hi potential, so Q25 is set to ON, the brake plate solenoid operates and the unit enters the FF or REW mode.

## (2) Muting circuit

## • REC amp muting circuit

The REC amp mute output pin 9 of IC2 is set to Hi potential in general, so the muting transistor Q12 is kept ON and the input signal of the REC amp Q13L(R) is muted. The Lo potential is input after the inhibit time (200ms) when the REC button (S11) is operated (when recording), so Q12 is set to OFF, the REC signal is input to the REC amp and recording is performed.

## • PLAY amp muting circuit

The output pin 10 always outputs Hi potential when the monitor switch is set to the SOURCE position, so Q6 is set to ON and Q5L(R) is kept OFF. The Hi potential is output after the inhibit time of 200ms (when selecting the mode from STOP or PAUSE mode) or 900ms (when selecting the mode from FF or REW mode) with the PLAY button (S8) set to ON. The Lo potential is output in other modes than the PLAY mode, so Q6 is set to OFF, the bias current is applied to the base via D10, Q5L(R) is set to ON and the PLAY signal is muted.

## • AUTO REC MUTE circuit

When the REC MUTE button (S13) is set to ON, the Hi potential is output from pin 9 in the same way as recording and the recording signal is muted.



### TIMING CHART

#### 1. Solenoid output/Motor output/REC bias oscillator output/Mute output

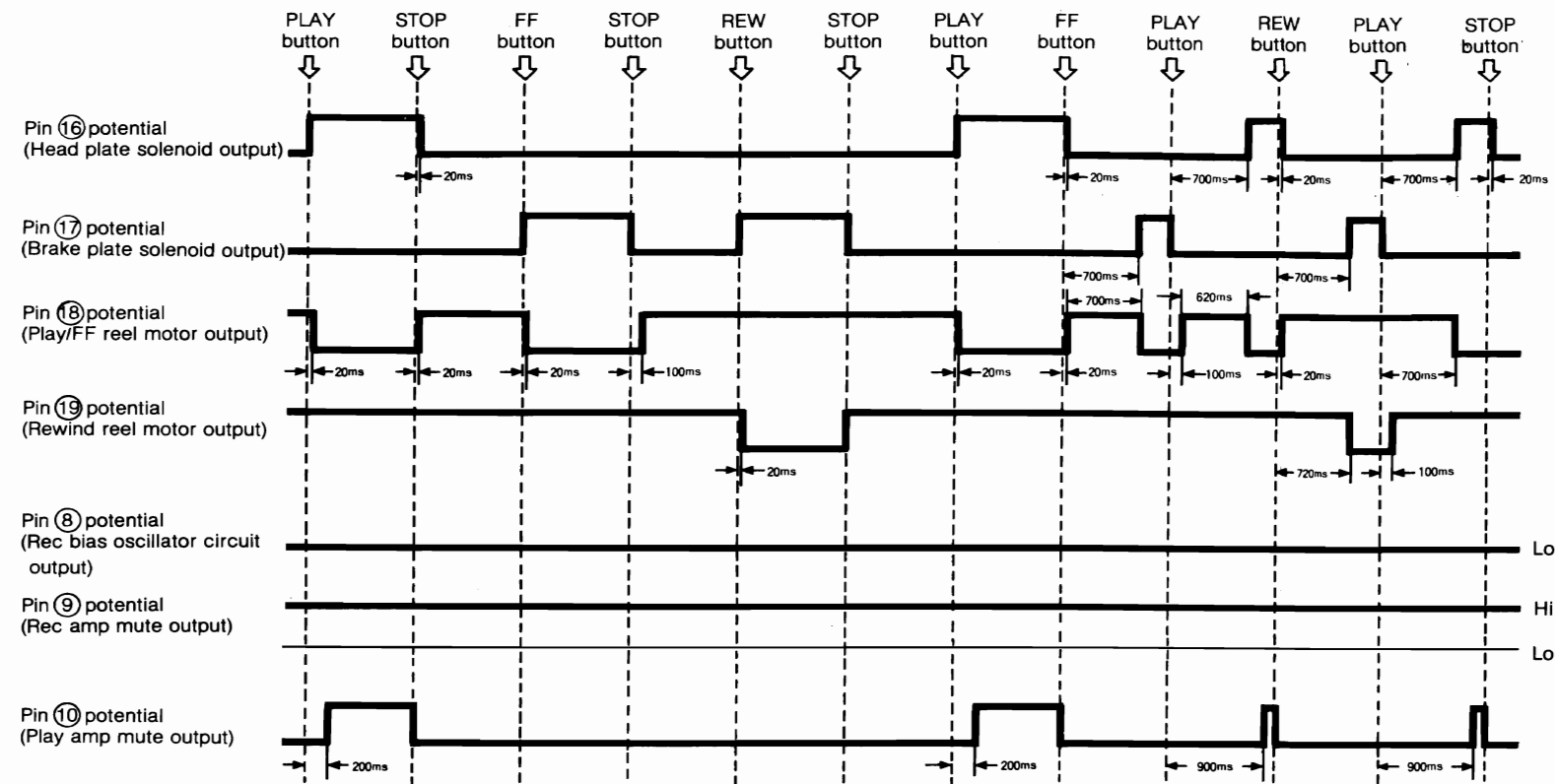


Fig. 6

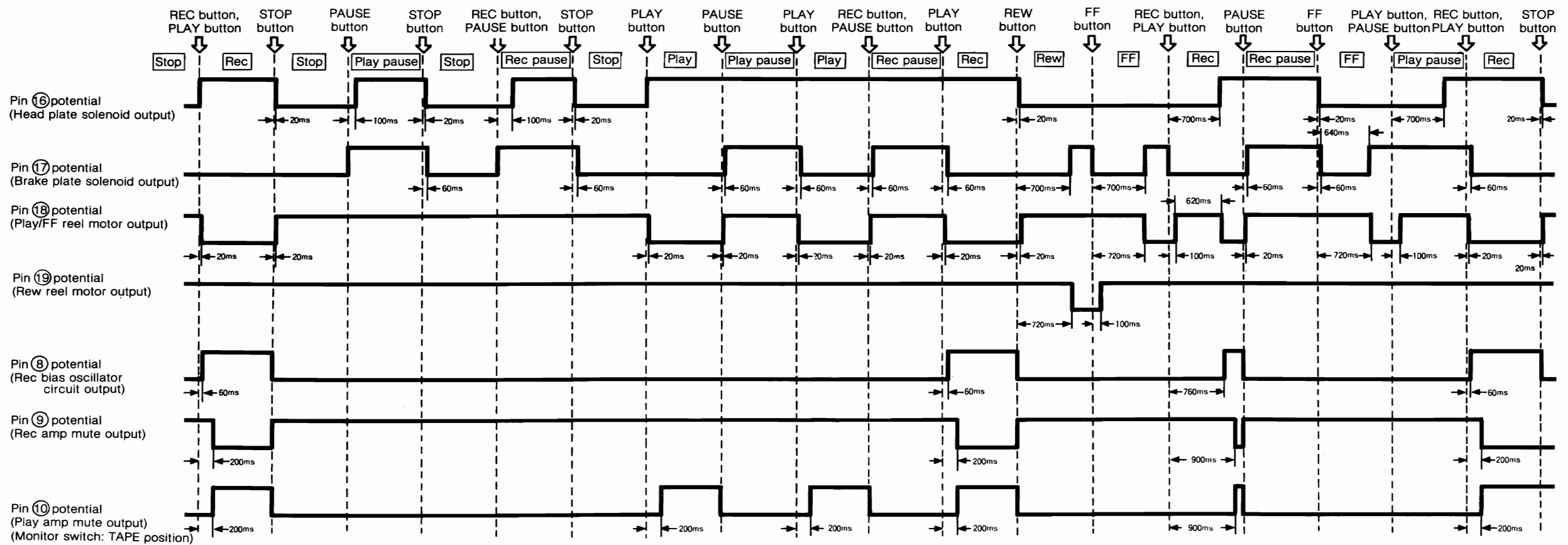


Fig. 7

2. AUTO REC MUTE output

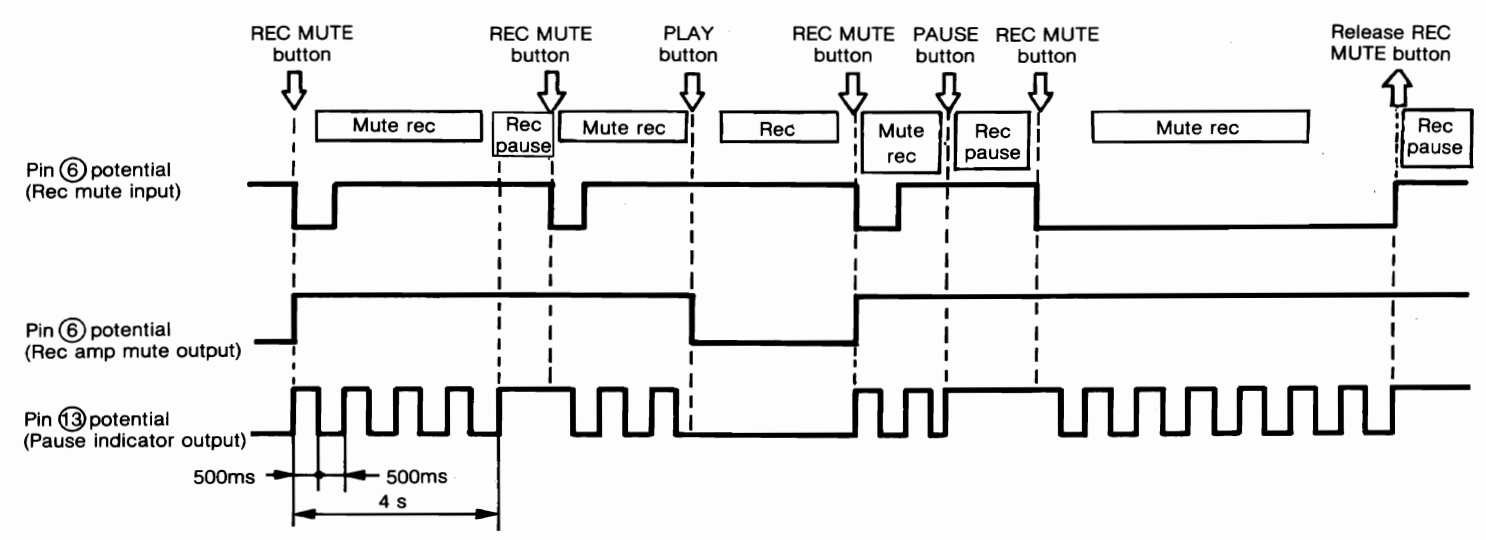


Fig. 8

3. PLAY indicator

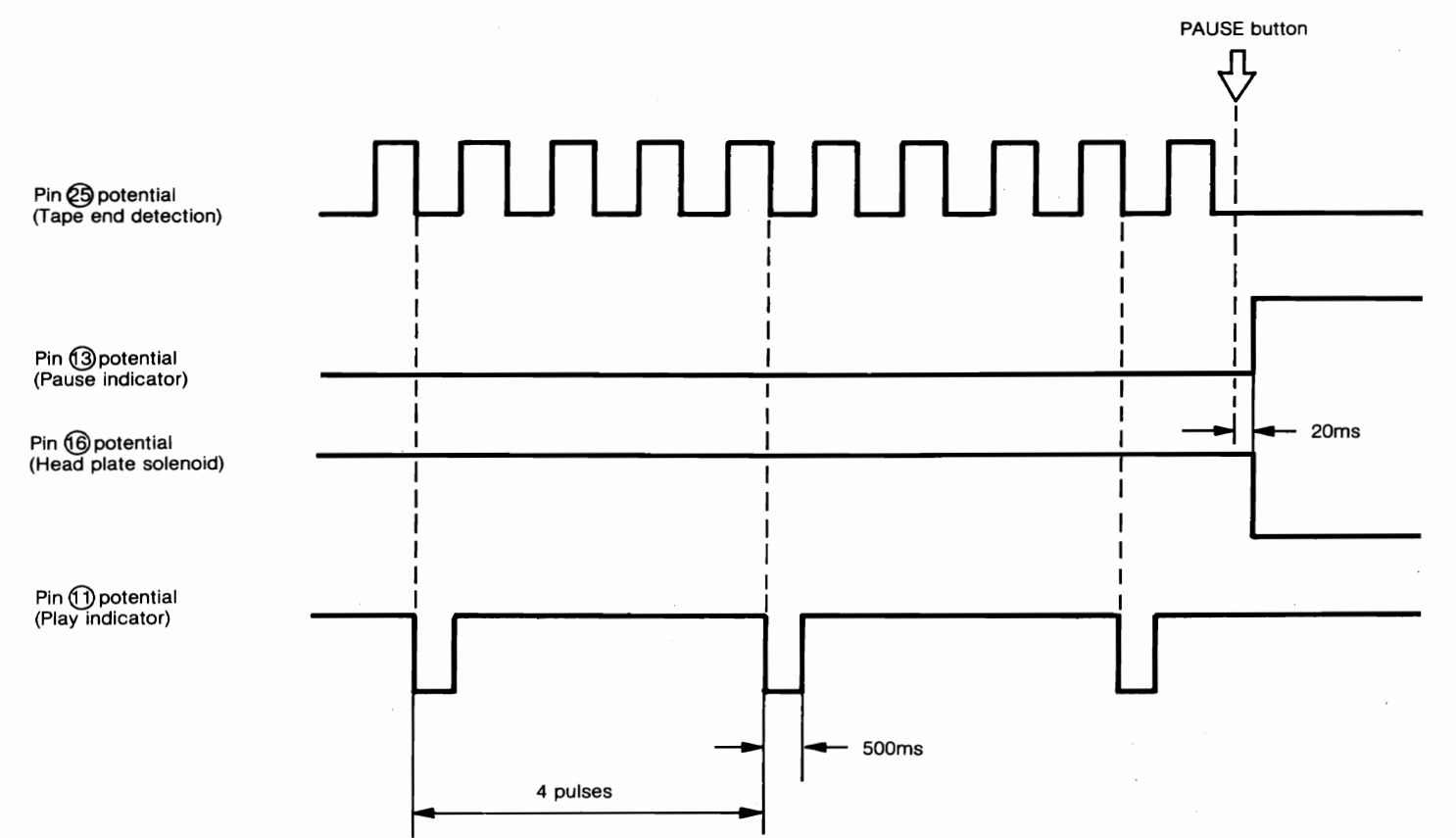


Fig. 9

TEST PROGRAM OPERATION PROCEDURE

A test data is programmed in the microprocessor in this unit. Troubleshoot according to the following procedure when any trouble is found in the microprocessor or its peripheral circuit.

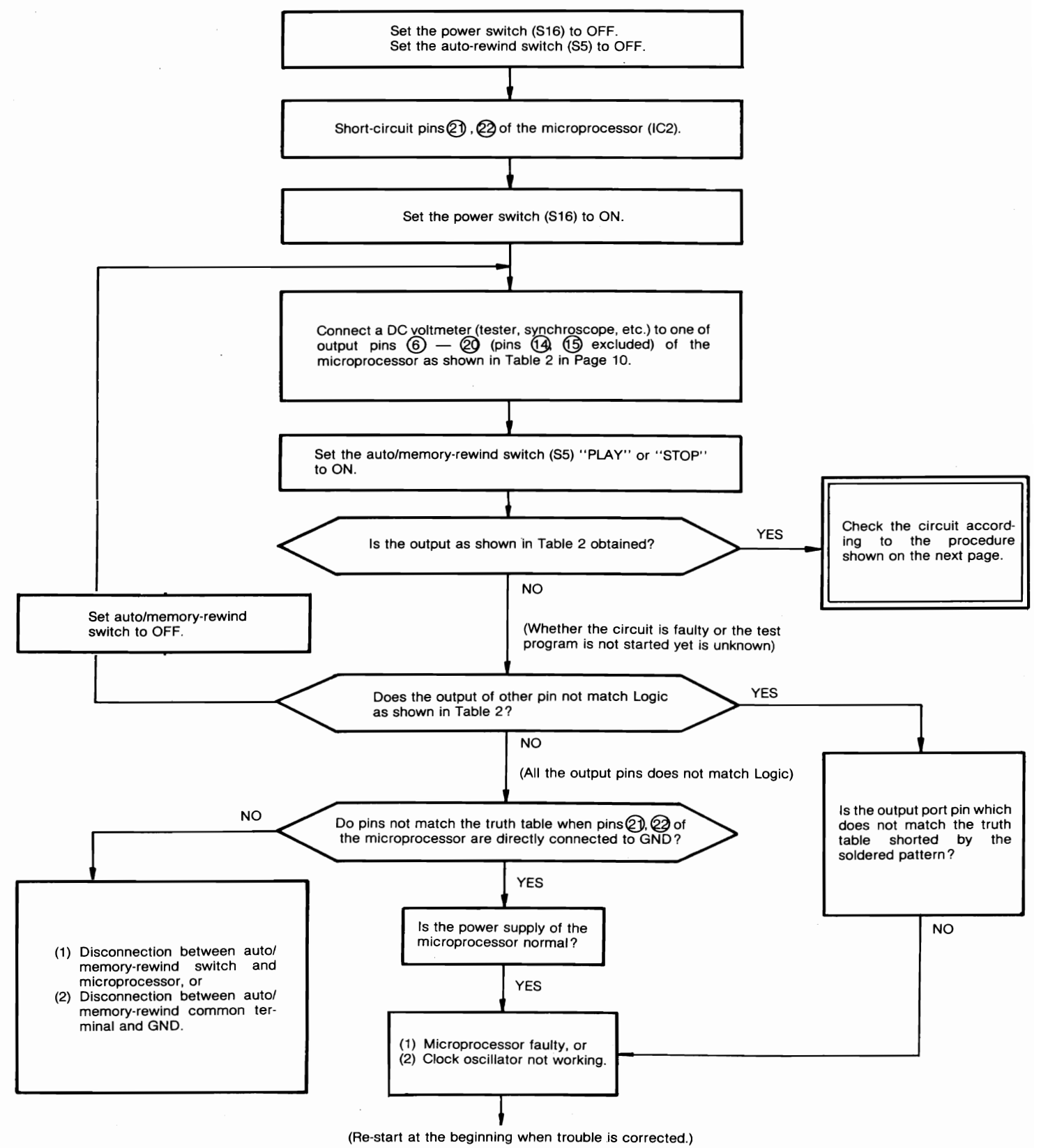


Fig. 10

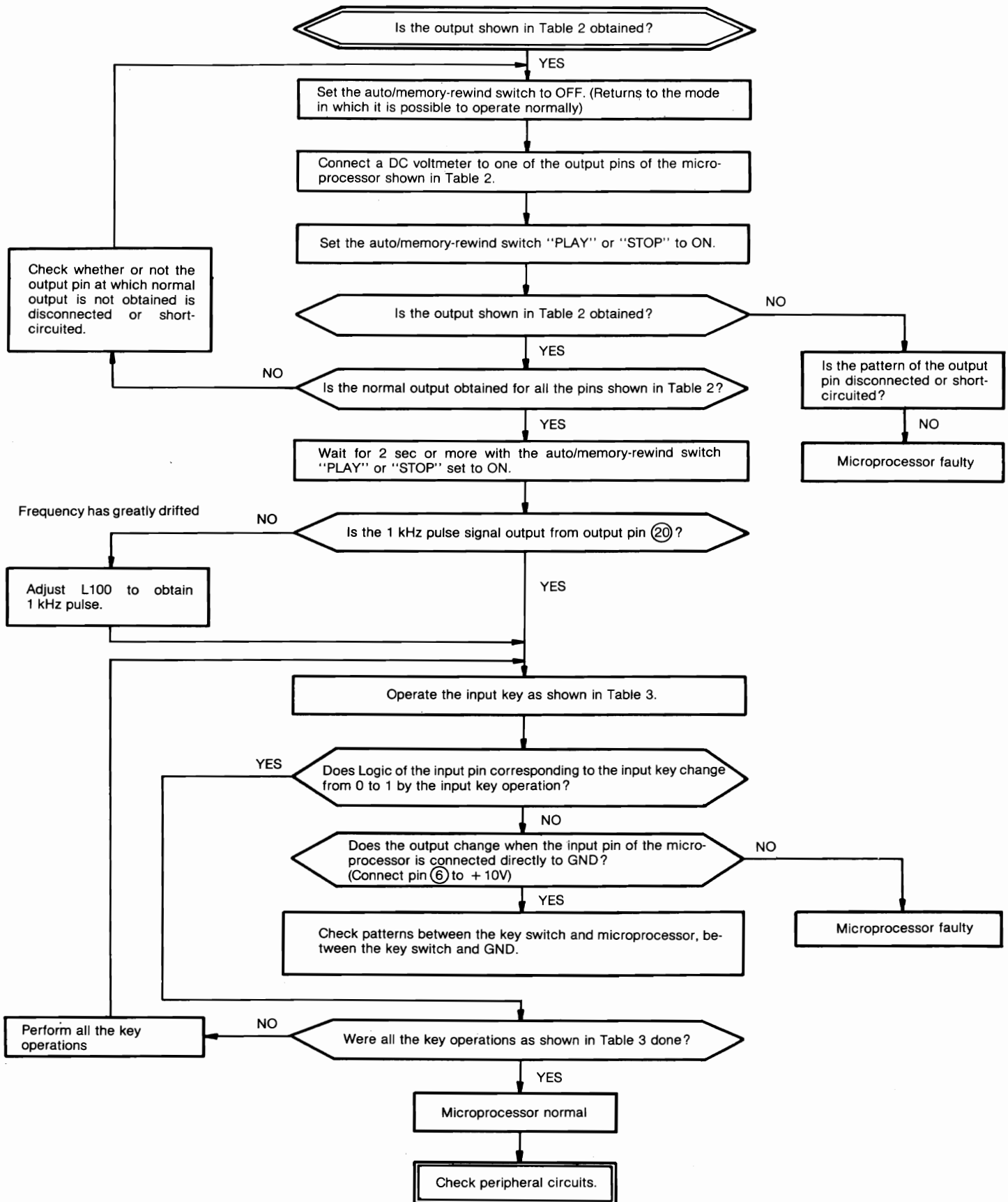





Fig. 11

**Table 2 Output port truth table when starting TEST program**

Microprocessor output port		Time and output port truth value after starting test program		
Pin No. (Pin mark)	Control circuit	1 sec after start	1 ~ 2 sec after start	More than 2 sec after start
6	( $\overline{PD}_0$ ) (Rec mute)	0	1	0
7	( $PD_1$ ) (Monitor switch)	0	0	0
8	( $PD_2$ ) Bias	0	1	1
9	( $PD_3$ ) Rec amp mute	1	0	1
10	( $\overline{PE}_0$ ) Play amp mute	0	1	0
11	( $PE_1$ ) Play indicator	1	0	0
12	( $PE_2$ ) Rec indicator	0	1	0
13	( $PE_3$ ) Pause indicator	1	0	0
16	( $PF_0$ ) Head plate solenoid	1	0	0
17	( $PF_1$ ) Brake plate solenoid	0	1	0
18	( $\overline{PF}_2$ ) Play/FF motor	1	0	1
19	( $\overline{PF}_3$ ) Rew motor	0	1	0
20	( $\overline{PG}_0$ ) Timer	1	0	1 kHz pulse

**Note:** "0" shows Lo (0V), and "1", Hi (8 ~ 10V).

**Table 3 Mechanism operation check during button operation (truth table)**

Pro- cedure	Button (key) operation	Deck chassis (mechanism) operation	Input pin		Output pin	
			No.	Potential	No.	Potential
1	Press PLAY button	REC indicator (  , D41) lights.	24	1 → 0	12	0 → 1
2	Turn take-up reel slightly	PLAY indicator (  , D42) lights.	25	Pulse input	11	0 → 1
3	Press REC button (Rec prevention switch set to ON)	PAUSE indicator (  , D40) lights.	4	1 → 0	13	0 → 1
4	Press PAUSE button	Head plate solenoid (SL1) attracts.	5	1 → 0	16	0 → 1
5	Press FF button	Brake plate solenoid (SL2) attracts.	2	1 → 0	17	0 → 1
6	Press REW button	PLAY signal is muted (Check voltage variation at the output pin).	23	1 → 0	10	0 → 1
7	Press STOP button	PLAY/FF, REW motor stops rotation.	3	1 → 0	19	0 → 1

\*This truth table shows the input/output pin number of the button operation and the voltage change. It can be checked by connecting a DC voltmeter to each pin.  
Note: "1" shows Hi (8~10V) and "0", Lo (0V).



## IC2 ( $\mu$ PD-554C-046) PIN FUNCTIONS

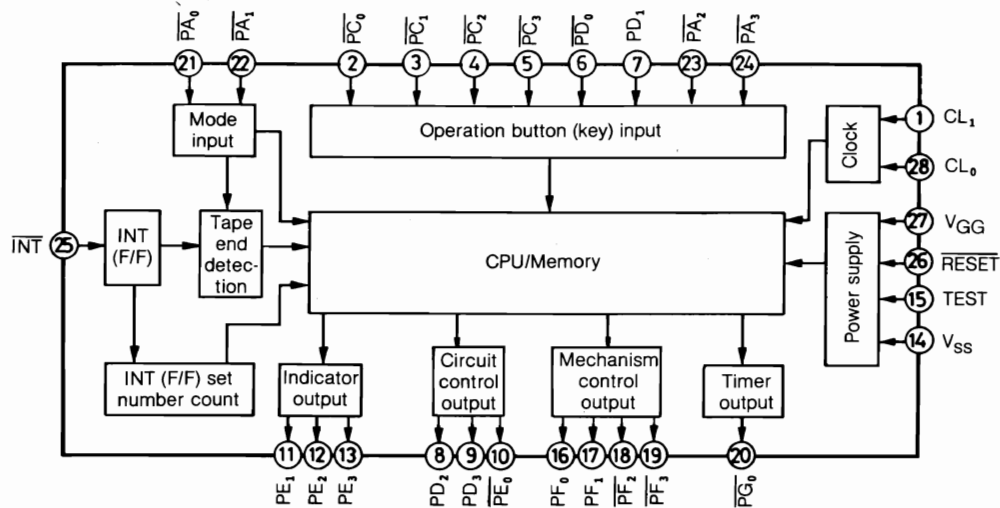
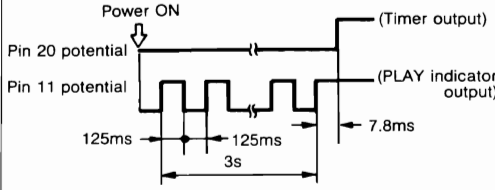
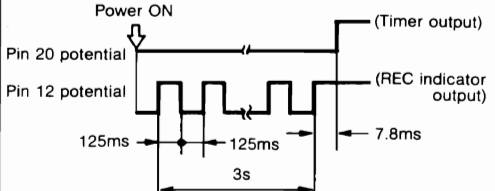
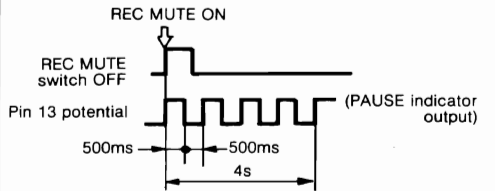
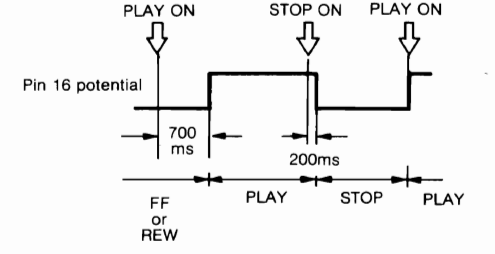
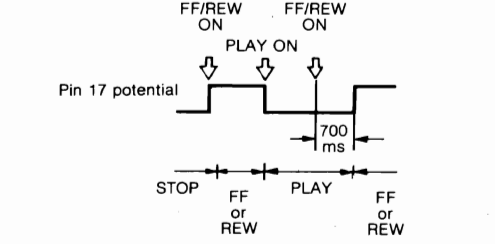
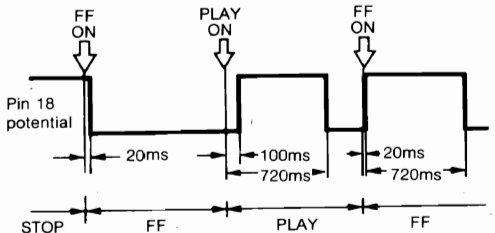
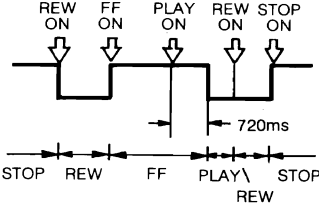


Fig. 12

Pin No.	Pin symbol	Application
1	CL <sub>1</sub>	These pins set the oscillation frequency to operate the built-in clock oscillator circuit which is the reference for the microprocessor operation using the external LC resonance circuit. The oscillation frequency is set to 1kHz.
28	CL <sub>0</sub>	
2	$\overline{PC}_0$	FF mode input pin. Judged as FF mode with Lo potential.
3	$\overline{PC}_1$	STOP mode input pin. Judged as STOP mode with Lo potential. (When STOP or EJECT button is operated)
4	$\overline{PC}_2$	REC mode input pin. Judged as REC mode with Lo potential.
5	$\overline{PC}_3$	PAUSE mode input pin. Judged as PAUSE mode with Lo potential.
6	$\overline{PD}_0$	<ul style="list-style-type: none"> <li>REC MUTE input pin. When Lo potential is input in REC or REC/PAUSE mode, Hi potential is output.</li> <li>It is released automatically 4 sec after the output is set or by pressing the PLAY button, PAUSE button or changing the mode.</li> </ul>
7	PD <sub>1</sub>	Monitor mode detection input pin. This pin detects the set position of the monitor switch, and inputs Lo potential during TAPE and Hi potential during SOURCE.
8	PD <sub>2</sub>	Output pin to operate the REC bias oscillator circuit. Outputs Hi potential during recording or REC mode.
9	PD <sub>3</sub>	REC amp mute output pin. Outputs Hi potential in other modes than REC mode or during AUTO REC MUTE to mute the recording signal.
10	$\overline{PE}_0$	PLAY amp mute output pin. Outputs Lo potential in other modes than PLAY mode to mute the PLAY signal.
11	$\overline{PE}_1$	<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> <p>The diagram shows a square wave for Pin 25 (Tape end detection input) and a corresponding square wave for Pin 11 (PLAY indicator output). The Pin 11 signal consists of 4 pulses, each occurring during a high pulse of the Pin 25 signal. The off-time of the Pin 11 signal is marked as 500ms.</p> </div> <div style="flex: 1; padding-left: 20px;"> <ul style="list-style-type: none"> <li>PLAY indicator output pin. Outputs Hi potential during recording, play and pause.</li> <li>Synchronizes with the tape end input pulse during PLAY and generates the flashing pulse. Off time of the indicator is a constant 500ms.</li> </ul> </div> </div>

Pin No.	Pin symbol	Application
11	PE <sub>1</sub>	 <ul style="list-style-type: none"> <li>When the PLAY button is pressed or the timer switch "PLAY" or "REC" is kept ON within 3 sec after the power is supplied and resetting is complete, the flashing pulse is output at 250ms interval for 3 sec after resetting. After 3 sec has elapsed, it is the same as in PLAY.</li> </ul>
12	PE <sub>2</sub>	 <ul style="list-style-type: none"> <li>REC indicator output pin. Outputs Hi potential during REC, REC PAUSE and REC HOLD.</li> <li>When the REC and PLAY buttons are pressed simultaneously or the timer switch "REC" is kept ON within 3 sec after the power is supplied and resetting is complete, the flashing pulse is output at an interval of 250ms for 3 sec. After 3 sec, the Hi potential is output.</li> </ul>
13	PE <sub>3</sub>	 <ul style="list-style-type: none"> <li>PAUSE indicator output. Outputs Hi potential during PAUSE.</li> <li>When the REC MUTE button is pressed during recording or REC/PAUSE mode, the flashing pulse is output at 1 set interval for 4 sec. After 4 sec, ordinary Hi potential is output.</li> </ul>
14	V <sub>SS</sub>	Power pin on Hi side. Supplies +10V.
15	TEST	Microprocessor TEST pin. Connected to V <sub>SS</sub> because it is not used in general.
16	PF <sub>0</sub>	 <ul style="list-style-type: none"> <li>Head plate solenoid drive output pin. Outputs Hi potential during REC mode (REC &amp; PLAY buttons are pressed simultaneously) or PLAY. Outputs Hi potential after inhibit time (700ms) when the mode is changed from FF or REW to PLAY.</li> </ul>
17	PF <sub>1</sub>	 <p>Brake plate solenoid drive (FF/REW) output pin. Outputs Hi potential during FF or REW mode. Outputs after inhibit time (700ms) when the mode is changed from REC or PLAY.</p>
18	PF <sub>2</sub>	 <p>PLAY/FF reel motor drive output pin. It is Hi potential in general and set to Lo potential during PLAY or FF mode. (Pin 19 is Hi potential.) It is set to Lo potential after the inhibit time (20msec) when changed from STOP mode, or after the inhibit time (720msec) when changed to PLAY (or FF) mode from FF (or PLAY) mode, or changed from REW mode.</p>

Pin No.	Pin symbol	Application
19	$\overline{PF}_3$	 <ul style="list-style-type: none"> <li>• Rewind reel drive output pin. Set to Hi potential normally, and to Lo potential during REW. (Pin 18 is set to Hi potential.) It is set to Lo potential after the inhibit time (720msec) when from other modes than the STOP mode.</li> </ul>
20	$\overline{PG}_0$	<p>Timer REC/PLAY output pin. Set to Lo potential until 1 cycle of the main program is completed after the inhibit time (approx. 3 sec) has elapsed after power is supplied. Then, it is fed back to the REC or PLAY input pins via the timer switch. Set to Hi potential when 1 cycle of the main program is completed.</p>
21	$\overline{PA}_0$	<ul style="list-style-type: none"> <li>• Input pin to operate the auto-rewind STOP by tape end detection. When the auto-rewind switch is set to "STOP", it is set to Lo potential and read in as input.</li> <li>• Input pin of the auto-rewind STOP function. When the REW button is pressed during the PLAY or REC mode, the deck rewinds the tape to the position where the PLAY button was pressed to stop it automatically.</li> <li>• This is the input pin used to execute the test program; it reads in the program when set to Lo potential simultaneously with pin 22.</li> </ul>
22	$\overline{PA}_1$	<ul style="list-style-type: none"> <li>• Input pin to operate the auto-rewind PLAY by tape end detection. When the auto-rewind switch is set to "PLAY", it is set to Lo potential and read in as input.</li> <li>• Input pin of the memory rewind PLAY function. When the REW button is pressed during the PLAY or REC mode, the deck rewinds the tape to the position where the PLAY button was pressed and it enters the PLAY mode again.</li> <li>• Input pin to execute the test program. It reads in the program when set to Lo potential simultaneously with pin 21.</li> </ul>
23	$\overline{PA}_2$	Input pin of REW mode. Judged to be the REW mode when at Lo potential.
24	$\overline{PA}_3$	Input pin of PLAY mode. Judged to be the PLAY mode when at Lo potential.
25	$\overline{INT}$	Tape end detection input pin. Inputs the output pulse signal from the tape end detector circuit.
26	$\overline{RESET}$	RESET pin. Initial resetting is performed by setting this pin to Lo potential when the power is applied.
27	$V_{SS}$	Power pin. Supplies -10V in contrast with power pin 14 on the Hi potential side.

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