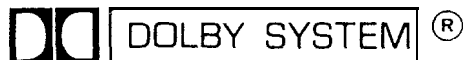


SHARP SERVICE MANUAL

RT-20H/HB

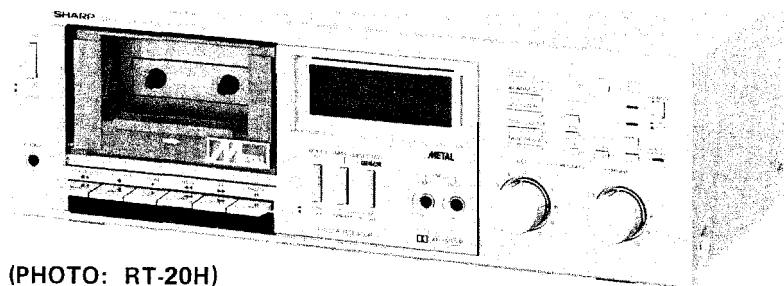
ATSMX80167DCK



Noise reduction system manufactured under license from Dolby Laboratories, "Dolby" and the double-D symbol are trademarks of Dolby Laboratories.

STEREO CASSETTE DECK

MODEL RT-20H (Silver Panel) RT-20HB (Brown Panel)



(PHOTO: RT-20H)

In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

As for the items "Mechanical Adjustment", "Circuit Description of Dolby Noise Reduction System", they are all omitted from the explanations of this Service Manual and therefore refer to the already issued "RT-10H/HB, RT-10E/EB Service Manual" to see the details of them.

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SHARP CORPORATION OSAKA, JAPAN

SPECIFICATIONS

Type:	4-track Z-channel stereo cassette tape recorder/player deck with built-in Dolby noise reduction system	Frequency response: Use of normal tape; 40 ~ 12,000 Hz (DIN 45 511) (50 ~ 11,000 Hz $\pm$ 3 dB) Use of MAXELL UDXL II tape; 40 ~ 13,000 Hz (DIN 45 511) (50 ~ 12,000 Hz $\pm$ 3 dB) Use of TDK Metal tape; 40 ~ 15,000 Hz (DIN 45 511) (50 ~ 13,000 Hz $\pm$ 3 dB)
Power source:	AC 110/220/240 V, 50/60 Hz	
Power consumption:	15 Watts	
Semi-conductors:	5-ICs (integrated circuit) 38-Transistors 22-Diodes (1 Zener diode) 3-LEDs (Light Emitting Diode) 1LSI	Signal to noise ratio (Use of MAXELL UDXL II tape): Dolby NR off; 52 dB Dolby NR on; 62 dB (at over 5 kHz) Distortion: 1.5% (-3 dB of level meter) Channel separation: 45 dB Erase ratio: 70 dB Input sensitivity and input impedance: Microphones: 0.2 mV, 2.2K ohms Line in: 50 mV, 50K ohms DIN record/playback: 6.8mV, 2.2K ohms
Dimensions:	Width: 390 mm (15-3/8") Height: 125 mm (5") Depth: 226 mm (8-7/8")	Output level and loaded impedance: Headphones: 40 mV ("0" dB), 8 ohms Line out: 550 mV ("0" dB), 50K ohms DIN record/playback: 550 mV ("0" dB), 50K ohms
Weight:	3.8 kg (8.4 lbs.)	
Input circuitry:	Microphone sockets, 2.2K ohms Line input sockets, 50K ohms DIN record/playback socket, 2.2K ohms	
Output circuitry:	Headphones socket, 8 ohms Line output sockets, 50K ohms DIN record/playback socket, 50K ohms	
Tape:	Philips standard compact cassette tape	
Tape speed :	4.8 cm/sec. (1-7/8 ips.)	
Recording system:	AC bias system (105 kHz)	
Erasing system:	AC erasing	
Fast forward & rewind time:	100 seconds (C-60) 0.09% W.R.M.S. 0.25% (DIN 45 500) 0.17% (DIN 45 511)	
Wow and flutter:		

Specifications are subject to change without prior notice.

DIAGRAM AND EXPLANATION OF PARTS

Front Panel

1. Power Switch
2. Cassette Compartment
3. Fluorescent Display Panel
4. Time Counter and Reset Button
5. Tape Counter and Reset Button
6. Alarm Set Button
7. Clock Button
8. Clock/Alarm Set Hour Adjustment Button
9. Clock/Alarm Set Minute Adjustment Button
10. Clock Minute Zero Set Button
11. Alarm Switch and Indicator
12. Time Counter and Tape Remaining time Hold Button and Indicator
13. Tape End Warning Indicator
14. Tape Remaining time Button and Tape Type (C-46/C-60/C-90) Selector
15. Headphones Socket
16. Stop/Eject Key
17. Record Key
18. Playback Key
19. Rewind Key
20. Fast Forward Key

21. Pause Key
22. Dolby NR Switch
23. Tape Selector Switches
24. Microphone Sockets
25. Record Level Controls

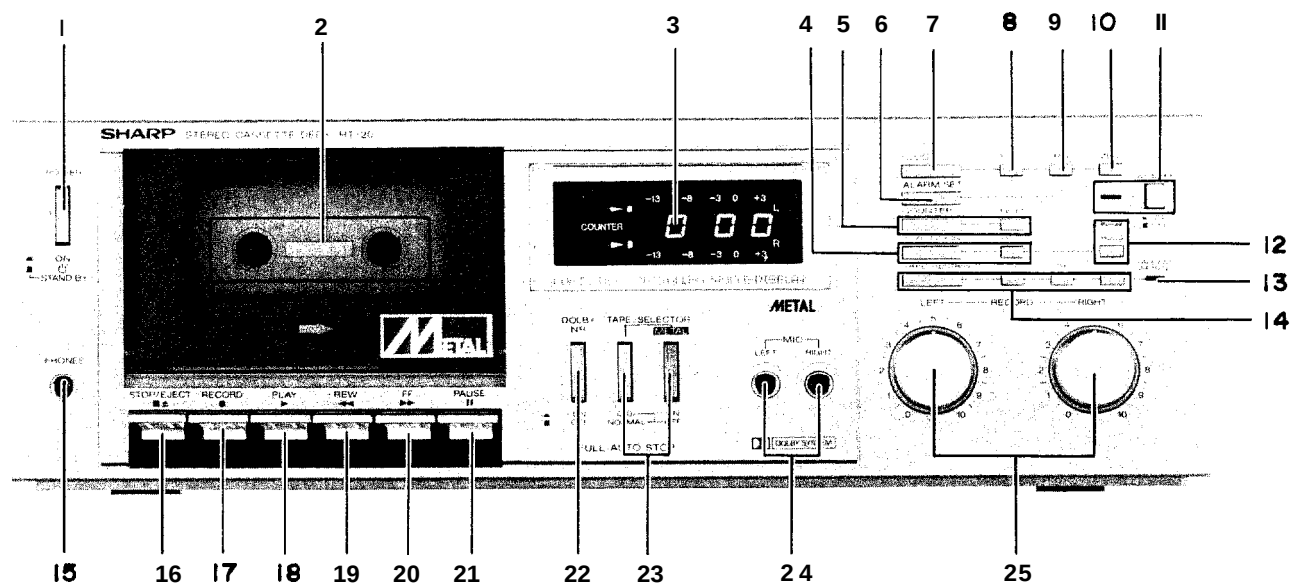
Fluorescent Display Panel

26. Dolby NR Indicator
27. Tape Counter Mode Indicator
28. Time Counter and Tape Remaining time Mode Indicator
29. Alarm Set Indicator
30. Peak Level Meter (Left/Right channel)
31. Clock, Alarm Set, Tape Counter, Time Counter and Tape Remaining time Display and Colon

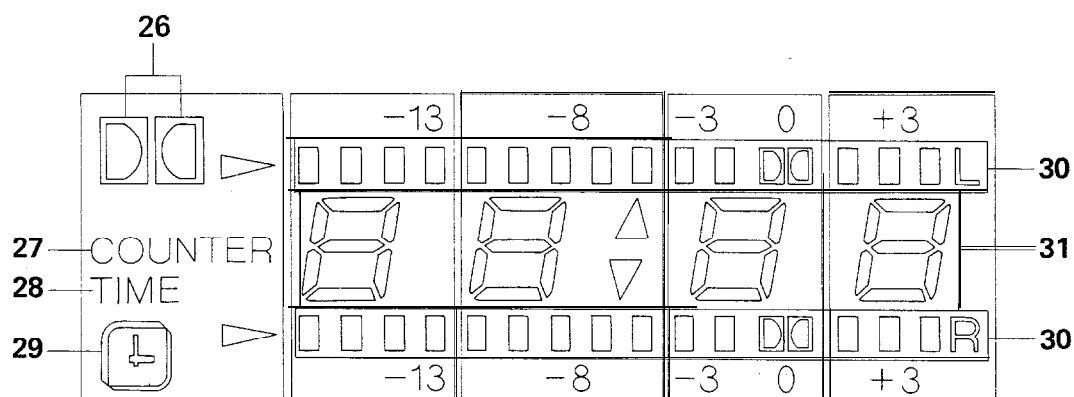
Rear Panel

32. Input Selector Switch
33. DIN Record/Playback (Input/Output) Socket
34. Line Output Sockets
35. Line Input Sockets
36. AC Supply Lead
37. AC Line Frequency Change-over Switch
38. AC Supply Voltage Selector

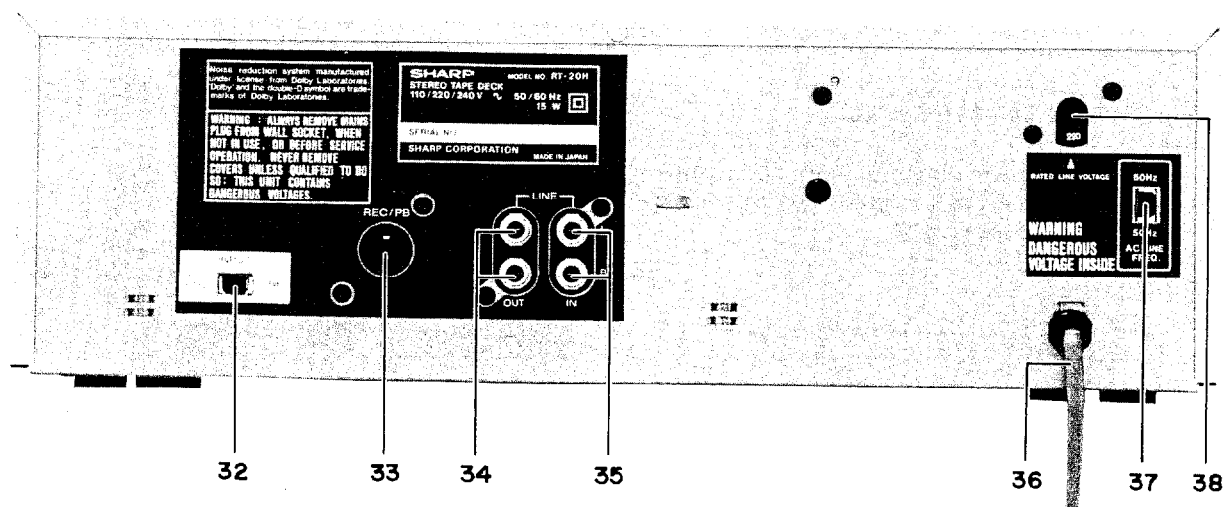
Front Panel



Fluorescent Display Panel



Rear Panel



AC MAINS VOLTAGE SELECTION

Check AC voltage level setting at rear of unit before plugging in AC supply cord. If necessary, adjust SELECTOR to correspond to the AC supply voltage of your area.

Selector Adjustment:

Voltage selector is on the rear of the unit. Turn the selector with a screwdriver in either direction until the correct voltage can be read in the window next to the adjustment screw. (Refer to Figure 4-1)

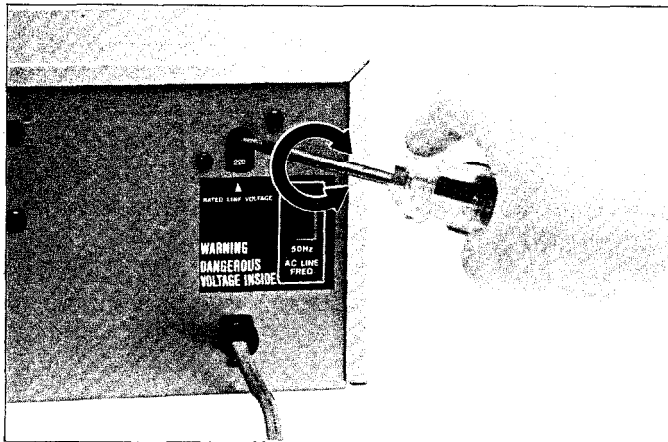


Figure 4-1

RT-20H (for UK only)

1. IMPORTANT

The following colour code is used for the wires in the mains lead of this apparatus.

BLUE: "NEUTRAL"
BROWN: "LIVE"

2. CONNECTING PLUG TO MAINS LEAD:

If the colours of the wires in the mains lead of this apparatus do not correspond with the coloured markings identifying the terminals in the plug, proceed as follows:

- * Connect the wire coloured BLUE to the terminal marked with the letter N or coloured BLACK.
- * Connect the wire coloured BROWN to the terminal marked with the letter L or coloured RED.

3. Use a 3A fuse in the mains plug or distribution board to protect this apparatus.

CAUTION ON SERVICING

Once the parts are disassembled during the job, be sure to restore the part settings (position), spacing, wiring, leads arrangement to the state as they were.

DISASSEMBLY

CABINET REMOVAL

1. From the cabinet, remove the four (4) screws two each at its right and left sides, and the one (1) screw at its rear surface. (Refer to Figure 4-2.)
2. Detach the cabinet while lifting it up – with enough force applied to its lower part

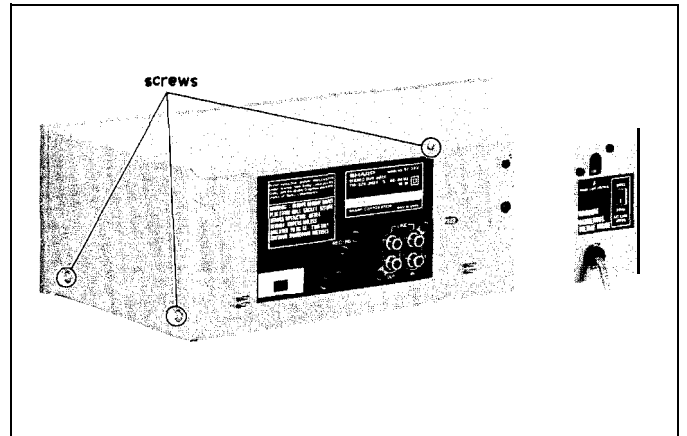


Figure 4-2

MAIN CHASSIS REMOVAL

1. Separate the cabinet following the instructions in "Cabinet Removal".
2. Turn the unit over, and remove the five (5) screws from its bottom – out of them the two are to retain the mechanism block. (Refer to Figure 4-3.)

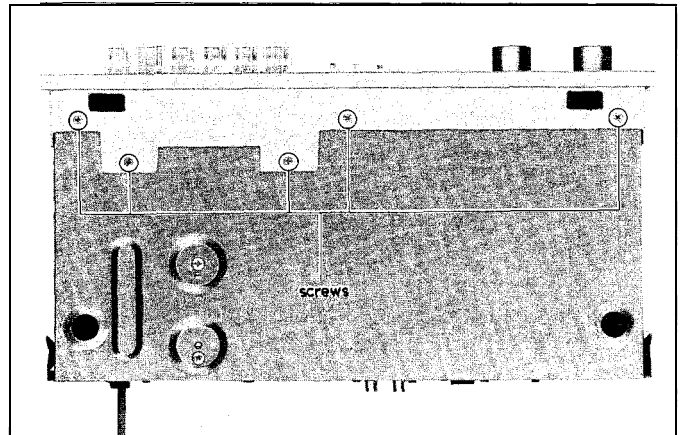


Figure 4-3

3. Remove the four (4) screws from the line input/output sockets (J4A to D) and DIN record/playback socket (SO1) at the rear of the unit. (Refer to Figure 4-4.)

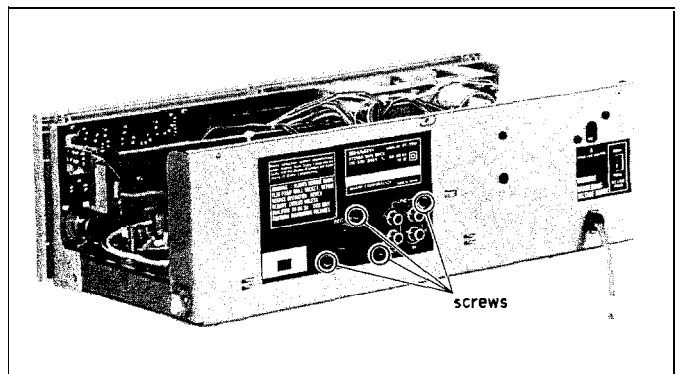


Figure 4-4

4. Remove the two (2) screws one each at the right and left sides of the front panel, (Refer to Figure 5-1 and Figure 5-Z.)
5. Remove the one (1) screw from the headphone socket P.W.B. (Refer to Figure 5-1.)

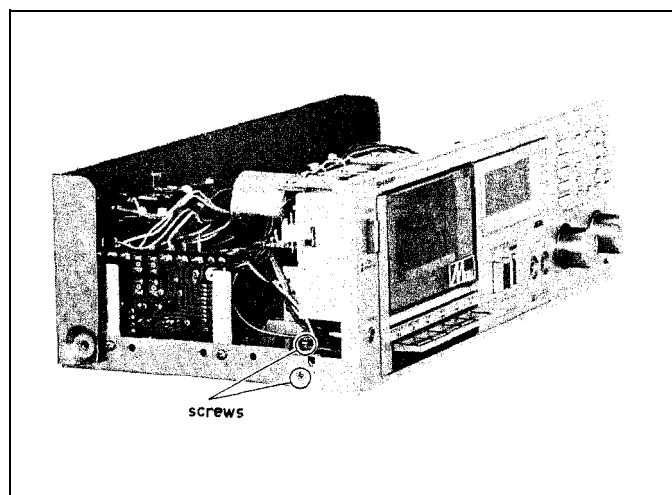


Figure 5-1

7. Remove the three (3) nylon bands holding the leads. (Refer to Figure 5-3.)
8. Pull the three (3) leads (4, 5, 6) — from the secondary of the power transformer — out of the lug terminal on the main P.W.B. (Refer to Figure 5-3.)
9. Pull the three (3) leads (1, 2, 3) and socket (CNS601), all of them in connection with the power supply P.W.B., out of the lug terminal. (Refer to Figure 5-3.) Then the main chassis can be removed from the front panel. You are now allowed to take services on the main P.W.B.

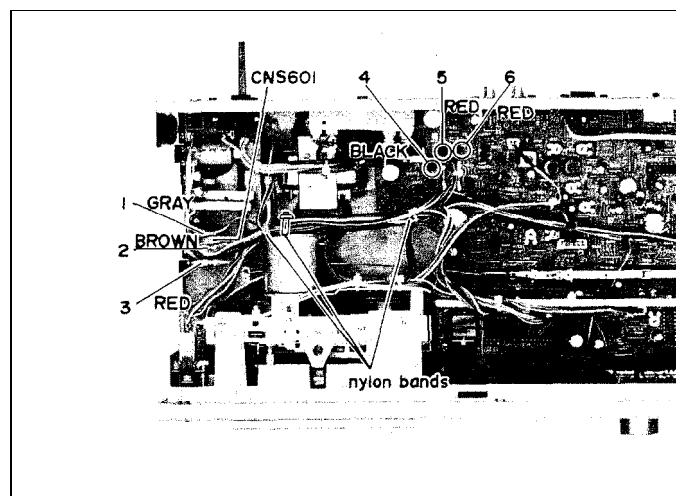


Figure 5-3

6. Remove the one (1) screw from the main P.W.B. (Refer to Figure 5-2.)

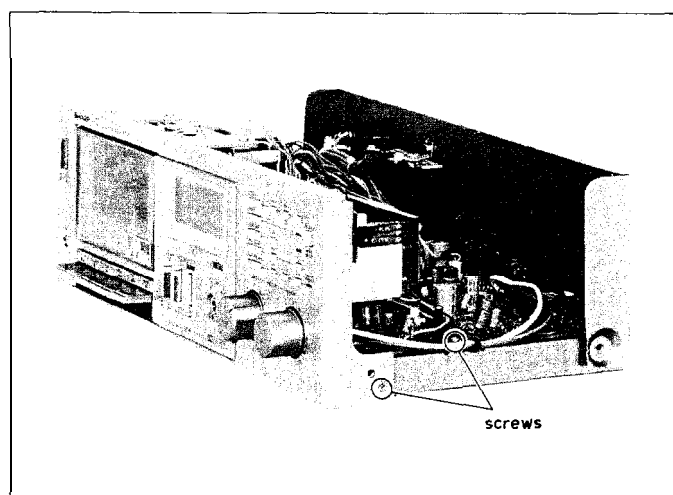


Figure 5-2

MICROCOMPUTER BLOCK REMOVAL

1. Disconnect the two (2) sockets (CNS701 and CNS702) from the microcomputer block. (Refer to Figure 5-4.)

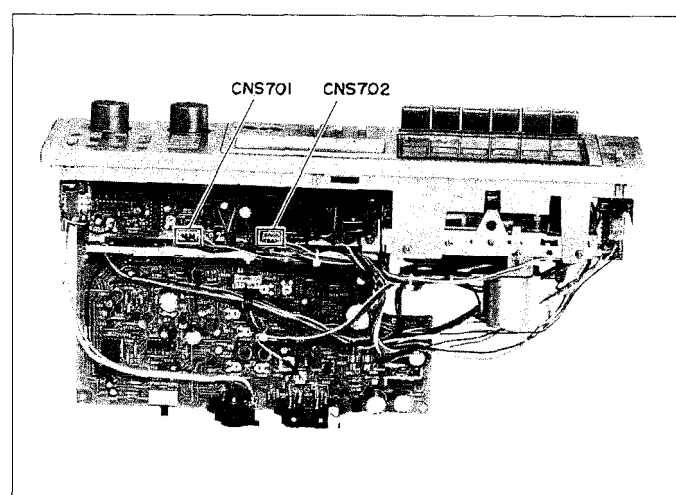


Figure 5-4

ELECTRICAL ADJUSTMENT

BIAS CURRENT AND BIAS OSCILLATION FREQUENCY ADJUSTMENT OF RECORD AMPLIFIER (Refer to Figure 8-1)

1. Connect V.T.V.M., across a resistor (R102 or R202), between the test point (TP101 or TP 201) and ground.
2. Connect an oscilloscope and a frequency counter to the output terminals of V.T.V.M.
3. There are two tape selector switches: one is the SW3-2 named a normal/CrO₂ tape selector switch, and another is the SW3-3 named a metal tape ON/OFF switch. To allow the unit to play a normal tape, set the SW3-2 at "NORMAL ()" position and the SW3-3 at "OFF ()" position, respectively.
4. Place the unit in record mode.
5. Adjust the bias oscillation coil (L303) so that the bias oscillation frequency becomes 105 kHz.
6. Set the metal tape ON/OFF switch (SW3-3) to "ON ()" position.

7. Adjust the semi-variable resistors (VR301 and VR302) so that the V.T.V.M. reads 90 mV.
8. Then, change the metal tape ON/OFF switch (SW3-3) to "OFF ()" position.
9. See that the V.T.V.M. reading varies as tabulated below, as the normal/CrO₂ tape selector switch (SW3-2) changes its position ["NORMAL ()" or "CrO₂ ()"]

Tape in use	SW3-3	SW3 -2	V.T.V.M. reading
NORMAL	"OFF ()" "	"NORMAL ()" "	39mV to 47mV
CrO ₂	"OFF ()" "	"CrO ₂ ()" "	55mV to 65mV

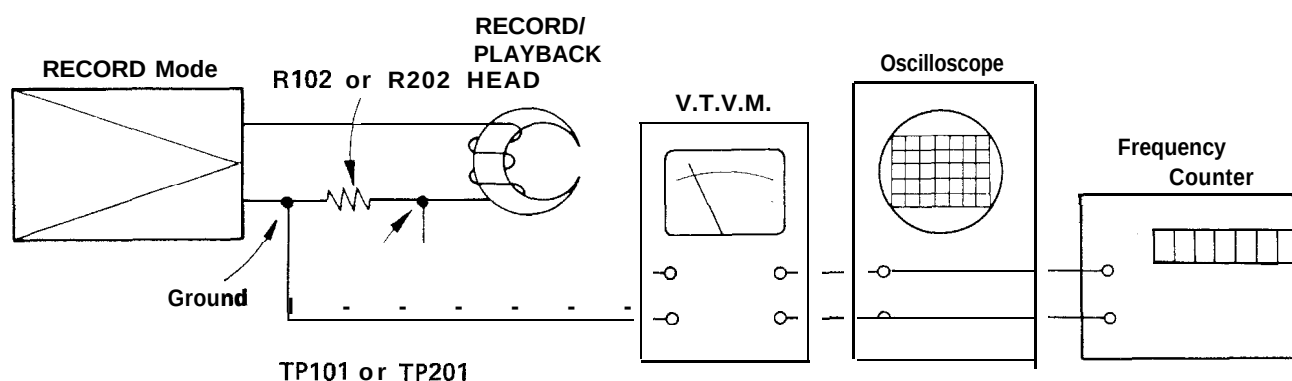


Figure 8-1

RECORD AMPLIFIER ERASE VOLTAGE CHECK

(Refer to Figure 8-2)

1. Connect V.T.V.M. between the test point (TP301) and ground, via both ends of the erase head.
2. Set the metal tape ON/OFF switch (SW3-3) to "ON ()" position.

Note:

If this switch (SW3-3) is set "ON" once, it overcomes the function of the NORMAL/CrO₂ tape selector switch (SW3-2) whichever position it may be set at.

3. Place the unit in record mode, and see that the V.T.V.M. is reading as follows.

Tape	SW3-2	SW3-3	V.T.V.M. reading
METAL	—	"ON ()" "	42.0V to 50.0V

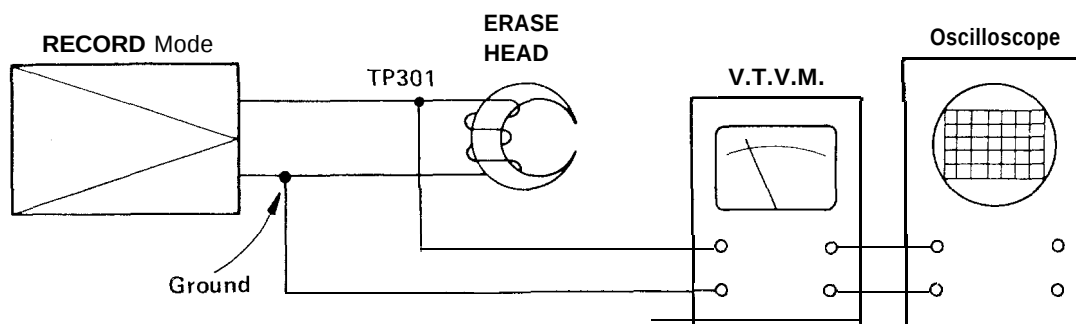


Figure 8-2

ADJUSTMENT POINTS

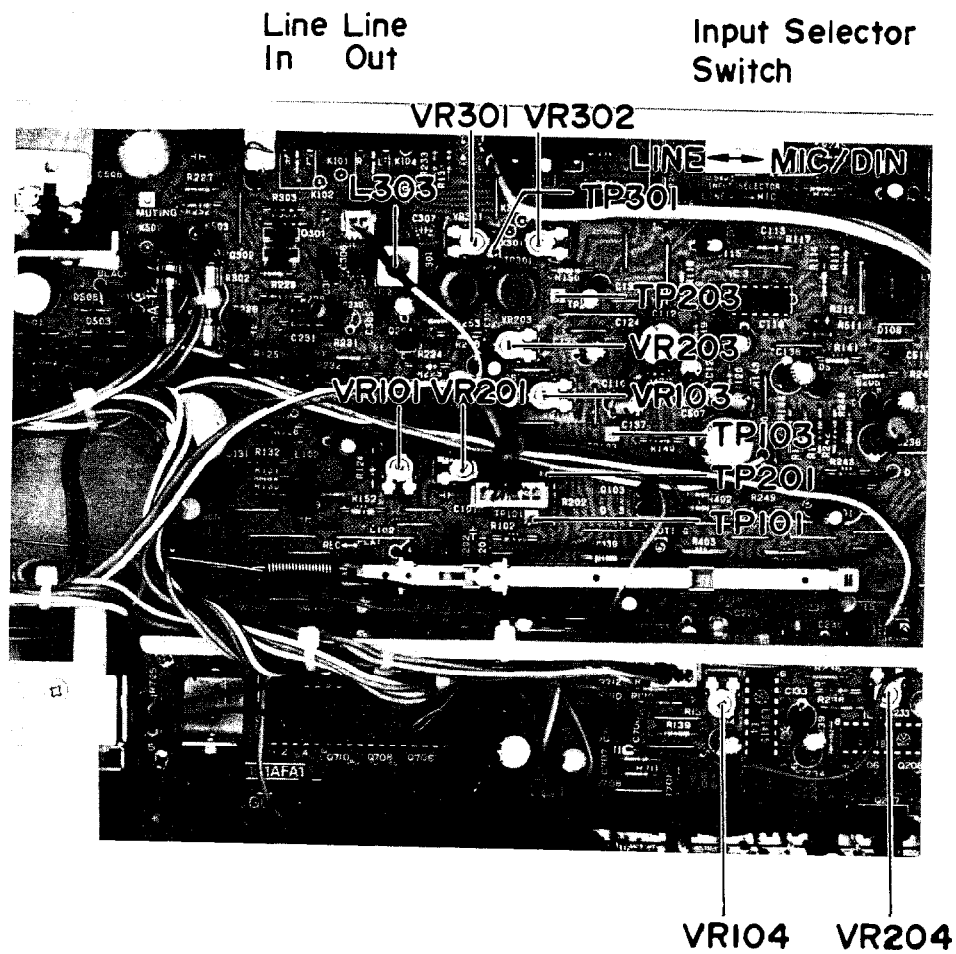


Figure 7

2. Remove the tape counter drive belt from the magnet pulley. (Refer to Figure 6-1.)
3. Let down the tab retaining the microcomputer block, and remove the two (2) screws from the microcomputer block. (Refer to Figure 6-1.)
4. Gently take the microcomputer block away from the front panel.

3. Finally push the stop/eject key to open the cassette holder, and remove the mechanism block. (Refer to Figure 6-3.)

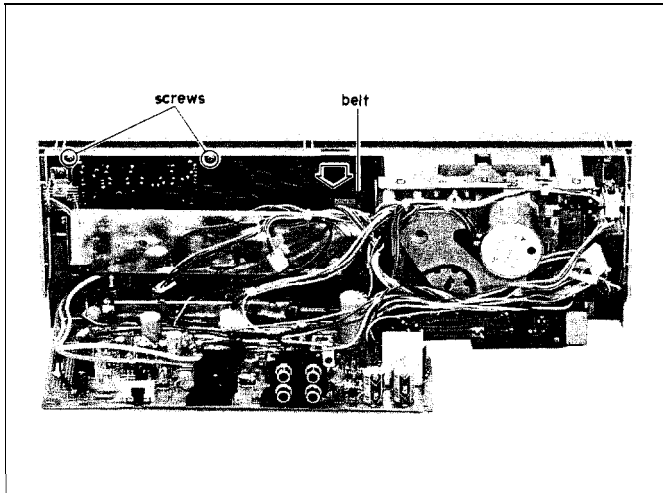


Figure 6-1

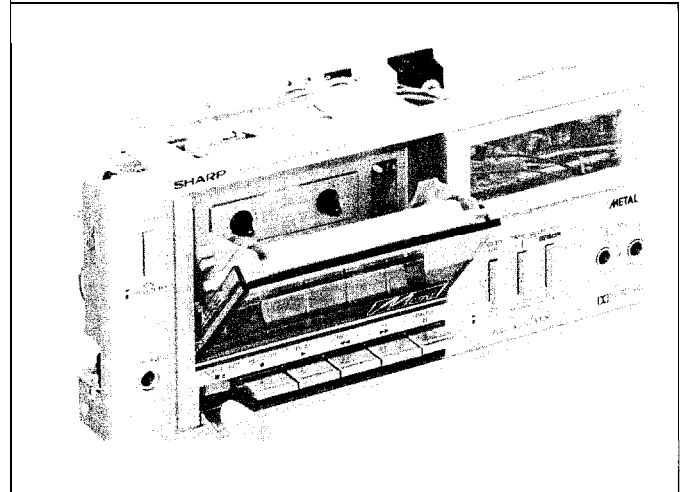


Figure 6-3

MECHANISM BLOCK REMOVAL

1. Remove the spring which is between the record/playback selector switch (SW1) and the record/playback selector switch interlocking lever. (Refer to Figure 6-2.)
2. Remove the two (2) screws from the mechanism block. (Refer to Figure 6-2.)

MECHANISM P.W.B. REMOVAL

1. Remove the three (3) screws from the mechanism P.W.B., then it is allowed to take the P.W.B. apart. When replacing the P.W.B. to its original position, be sure to push down the pause key and fast forward key to avoid undue force applying to the mechanism switches. (Refer to Figure 6-4.)

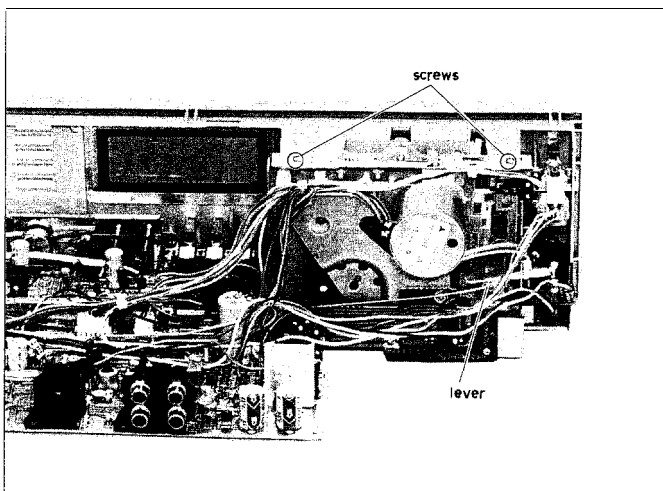


Figure 6-2

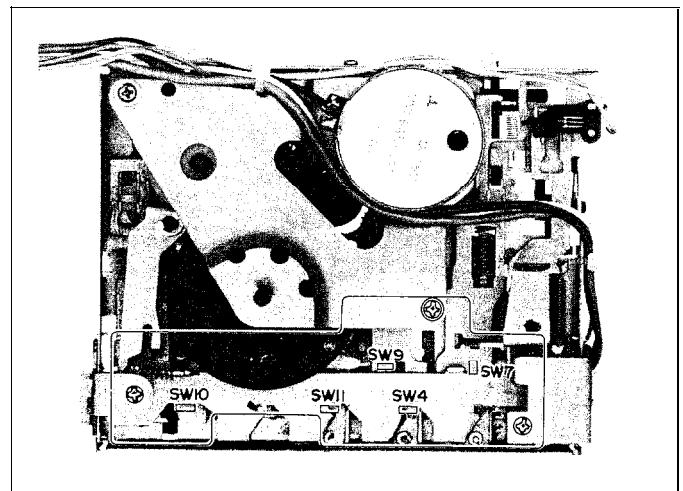
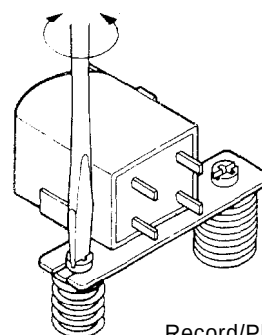


Figure 6-4

RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT

(Refer to Figure 9-1)

1. Connect V.T.V.M. between the test point (TP103 or TP203) and ground
2. To allow the unit to play a normal tape, set the NORMAL/ CrO₂ tape selector switch (SW3-2) at "NORMAL ()" position and the metal tape ON/OFF switch (SW3-3) at "OFF ()" position.
Also set the Dolby NR switch (SW3-1) at "OFF ()" position.
3. Put a test tape (TEAC, MTT-1 14, 10kHz, 250pWb/mm, -10dB recorded) into the unit and play it back.
4. Adjust the head azimuth adjusting screw so that the V.T.V.M. reaches its maximum reading, with no phase difference between the channels.



Record/Playback Head

Note:

It is now recommendable to use an oscilloscope to check that there will be the same phase for the right and left channels.

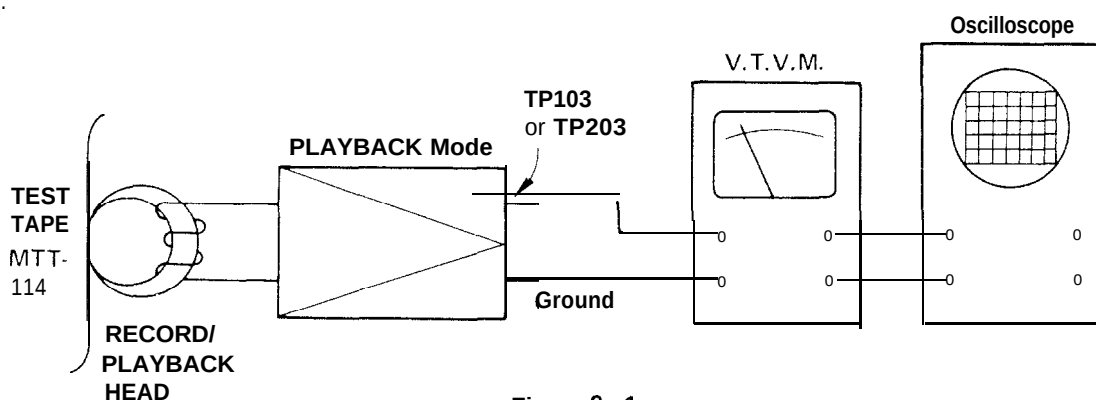


Figure 9-1

PLAYBACK FREQUENCY CHARACTERISTIC CHECK

(Refer to Figure 9-2)

1. Connect V.T.V.M. to the line output socket (J4-C or J4-D).
2. To allow the unit to play a normal tape, set the NORMAL/ CrO₂ tape selector switch (SW3-2) at "NORMAL ()" position and the metal tape ON/OFF switch (SW3-3) at "OFF ()" position.
Also set the Dolby NR switch (SW3-1) at "OFF ()" position.
3. Put a test tape (TEAC, MTT-217G, 12.5 kHz/1kHz/40 Hz, 250pWB/mm, -10dB, recorded) - useful for the check of playback frequency characteristic - into the unit, and play it back.
4. See that the V.T.V.M. is showing the deviation of two different input signals (40 Hz and 12.5 kHz) against the 1 kHz input, as tabulated below,

	Deviation against 1 kHz input shown by V.T.V.M.
With 40 Hz input	- 1 dB to +7 dB
With 12.5 kHz input	- 4 dB to +4 dB

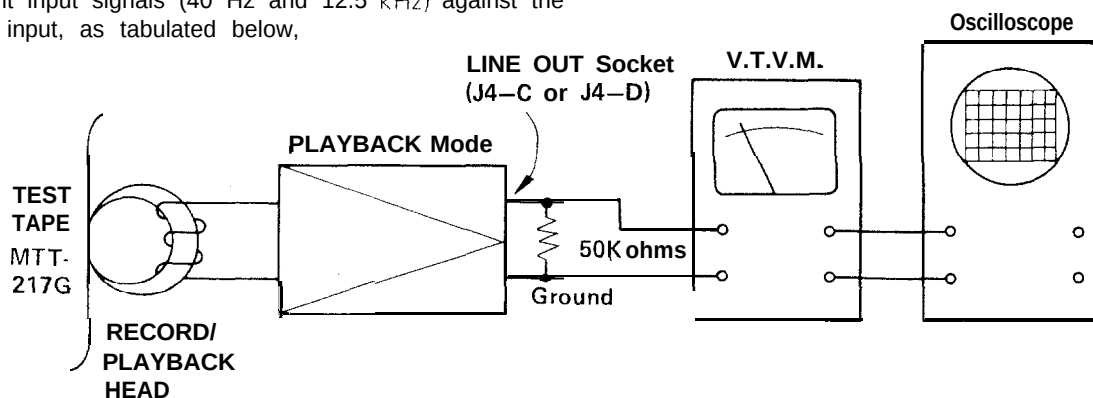


Figure 9-2

PLAYBACK SENSITIVITY ADJUSTMENT

(Refer to Figure 10-1)

1. Connect V.T.V.M. between the test point (TP103 or TP203) and ground.
2. To allow the unit to play a normal tape, set the NORMAL/CrO₂ tape selector switch (SW3-2) at "NORMAL ()" position and the metal tape ON/OFF switch (SW3-3) at "OFF ()" position.
Also set the Dolby NR switch (SW3-1) at "OFF ()" position.
3. Put a test tape (TEAC, MTT-150. 400Hz 200pWb/mm recorded) into the unit and play it back.
4. At this time, Adjust the semi-variable resistors (VR101 and VR201) so that the V.T.V.M. reading will be 580 mV

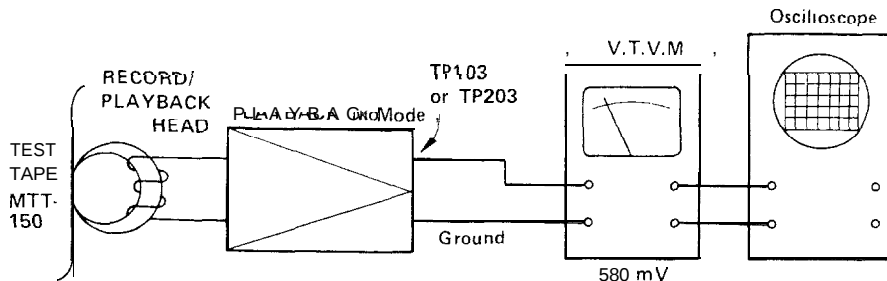


Figure 10-1

RECORD/PLAYBACK SENSITIVITY ADJUSTMENT

(Refer to Figure 10-2)

1. Connect V.T.V.M. between the test point (TP103 or TP203) and ground.
2. Connect CR oscillator to the line input socket (J4-A or J4-B), and apply a signal of oscillation frequency 1 kHz, output level -10 dB (316 mV) to the unit. Set the input selector switch (SW2) at "LINE" position.
3. To allow the unit to play a normal tape, set the NORMAL/CrO₂ tape selector switch (SW3-2) at "NORMAL ()" position and the metal tape ON/OFF switch (SW3-3) at "OFF ()" position.
Also set the Dolby NR switch (SW3-1) at "OFF ()" position.
4. Put a normal tape (TEAC, MTT-502) into the unit, and place it in record mode. Adjust then the record level controls (VR102 and VR202) so that the V.T.V.M. reading will be almost 410 mV.
5. Play back the normal tape which has been recorded in the step 4, and adjust the semi-variable resistors (VR103 and VR203) so that the V.T.V.M. reading will be almost 410 mV.
6. Repeat the steps 4 and 5 until the V.T.V.M. reading will stay in the range of 410 mV $\pm$ 50 mV.
7. Now change the normal tape to a CrO₂ tape (MAXELL, C60, UDXL II) and put it into the unit. To allow the unit to play a CrO₂ tape, set the NORMAL/CrO₂ tape selector switch at "CrO₂ ()" position and the metal tape ON/OFF switch at "OFF ()" position. Place the unit in record mode.
8. Play back the CrO₂ tape which has been recorded in the step 7, and see that the V.T.V.M. is reading from 326 mV to 487 mV.
9. Again change the CrO₂ tape to a metal tape (TDK, AC-71 I), and put it into the unit. Set the metal tape ON/OFF switch (SW3-3) at "ON ()" position, and place the unit in record mode.
10. Play back the metal tape which has been recorded in the step 9, and see that the V.T.V.M. is reading from 326 mV to 487 mV.

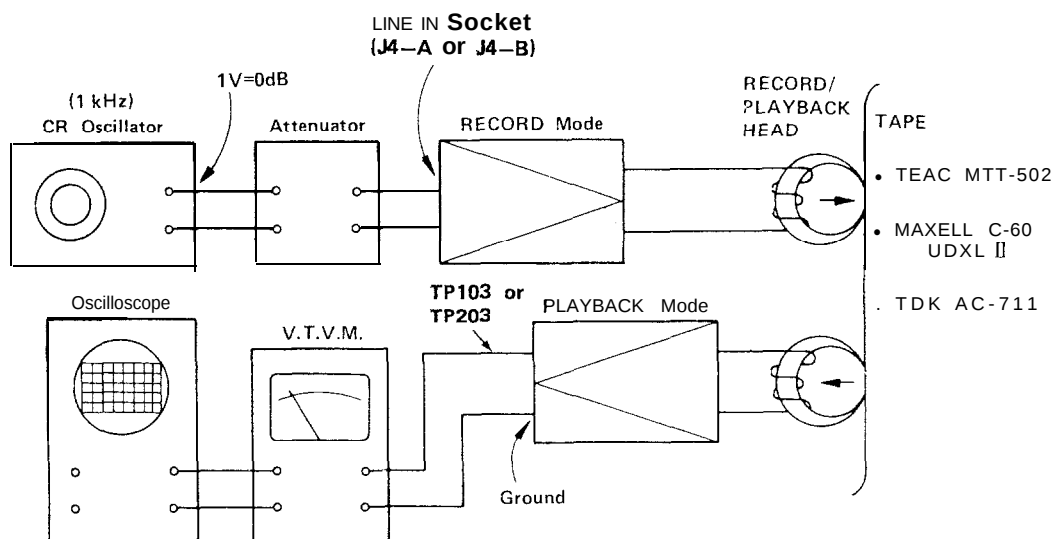


Figure 10-2

DOLBY NOISE REDUCTION CIRCUIT CHECK

(Refer to Figure 11-1)

1. Connect V.T.V.M. between the test point (TP103 or TP203) and ground.
2. Set the Dolby NR switch (SW3-1) at "ON ()" position and the input selector switch (SW2-A,B) at "LINE" position.
3. To allow the unit to play a normal tape, set the NORMAL/ CrO₂ tape selector switch (SW3-2) at "NORMAL (1)" position and the metal tape ON/OFF switch (SW3-3) at "OFF ()" position.
4. Insert the normal tape.
5. With the set at record mode, give it signal of -35 dB (17.8 mV) 100 Hz from line input socket (J4-A or J4-B) and adjust the record level controls (VR102 and VR202) so that the V.T.V.M. reads 32.6 mV.
6. Give the unit 1 kHz signal, 10 kHz signal and 12.5 kHz signal in the order and if the V.T.V.M. reads as tabulated below with each input signal, it is normal. (See table 11-1).

Frequency	1 kHz	10 kHz	12.5 kHz
V.T.V.M. reads	45.7 ~ 81 mV	44.5 ~ 70 mV	42.6 ~ 68.2 mV

Table 11-1

7. Give the unit signal of -50 dB (3.16 mV), 100 Hz and adjust the record level controls (VR102 and VR202) so that the V.T.V.M. reads 5.8 mV.
8. In the same manner as in the step 6 above, give the unit 1 kHz signal, 10 kHz signal and 12.5 kHz signal in the order and if the V.T.V.M. reads as tabulated below with each input signal, it is normal. (See Table 11-2)

Frequency	1 kHz	10 kHz	12.5 kHz
V.T.V.M. reads	8.2 ~ 16.4 mV	13.7 ~ 24.9 mV	13.5 ~ 23.4 mV

Table 11-2

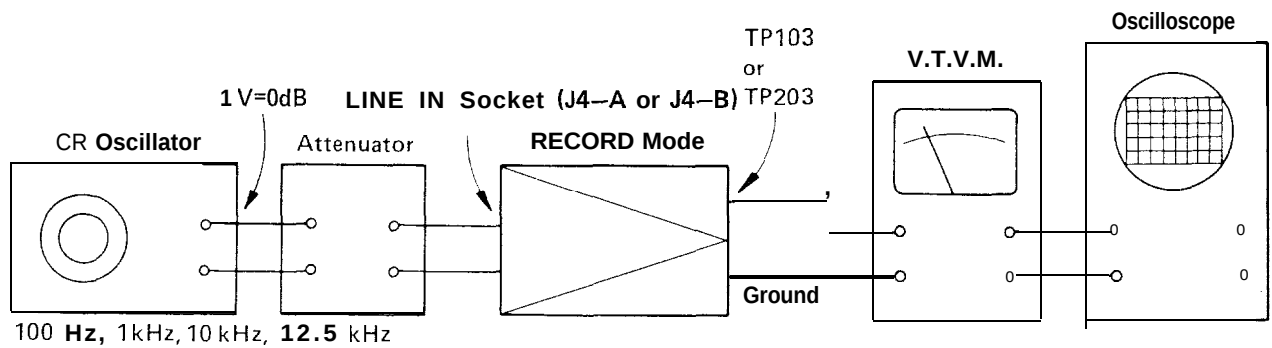


Figure 11-1

PEAK LEVEL DISPLAY METER SENSITIVITY ADJUSTMENT (Refer to Figure 11-2)

1. Connect V.T.V.M. between the test point (TP103 or TP203) and ground.
2. Set the Dolby NR switch (SW3-1) at "OFF ()" position and the input selector switch (SW2-A or SW2-B) at "LINE" position.
3. Connect CR oscillator to the line input socket (J4-A or J4-B), and apply the signal of oscillator frequency 1 kHz, 316 mV (-10 dBV) to the unit placing it in record mode.
4. Adjust the record level controls (VR102 and VR202) so that the V.T.V.M. will read 580 mV (-4.7 dBV).
5. Change the output level of CR oscillator from 316 mV (-10 dBV) to 305 mV (-10.3 dBV), and adjust, then, the semi-variable resistors (VR104 and VR204) so that the segments up to "0 dB" of the peak level display meter will light up.
6. Again change the output level of CR oscillator from 305 mV (-10.3 dBV) to 295 mV (-10.6 dBV), and see, then, that the segment indicative of "0 dB" of the peak level display meter is going off. (The segments up to "-3 dB" must remain lit.)

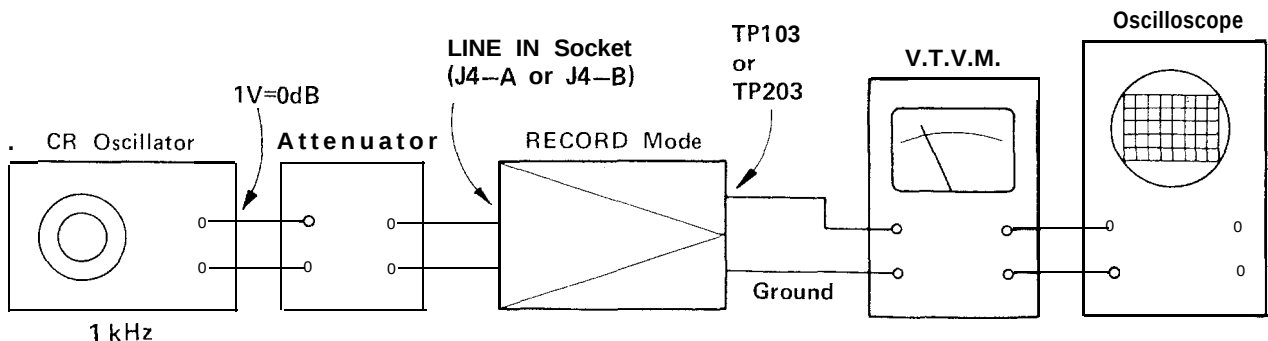


Figure 11-2

CIRCUIT DESCRIPTION

MICROCOMPUTER UNIT

This set is inclusive of a 4-bit/1-chip microcomputer (IC5) which gives a full control over the such functions as of the clock, timer, tape counter, time counter and remaining tape indicator, merely by your pushing of the concerned control buttons. That's something new preceding the conventional cassette deck.

We will now explain the circuits of the microcomputer unit which follow one after another.

● WAVE-SHAPING CIRCUIT

The clock of the RT-20H/HB is operating in time with the power supply frequency, for which a wave-shaping circuit is provided to convert AC power into pulse signals.

AC power is fed to the base of transistor Q703 where it changes to 10Vp-p pulse, and it goes out of the collector of Q703. This pulse then enters pin ③① (input pin) of the microcomputer (IC5), which is here used as a reference pulse to induce the clock to operate.

■ BEEP TONE CIRCUIT

The beep tone is under control by the output signal (D10) from pin ⑧ of the microcomputer (IC5). Once the alarm switch (SW8) has been set at "ON" position, if the clock agrees with the timer's alarm time, that signal (D10) causes the beep tone oscillator circuit to operate getting the piezo-electric buzzer sounding for 10 seconds.

■ TAPE COUNT PULSE GENERATOR CIRCUIT

Tape count pulses are produced by the magnet pulley and Hall IC (IC6), the former of which is rotating in time with the take-up turntable in rotation. Three pulses are generated at pin ③ of Hall IC (IC6) every single rotation of the magnet pulley, and they are applied to the base of transistor Q702 in which their output is made the same in level as the input found in the microcomputer (IC5). The resultant pulse then enters pin ③① of the microcomputer, and here its frequency is made one-fifth of the original value, which allows the tape counter to illuminate on the fluorescent display panel.

■ MICROCOMPUTER (IC5)

The microcomputer is controlled by the clock frequency (reference frequency) which is kept at 400 kHz, the value which is decided by the capacitor C704 and resistor R715. Pin ②⑥ of the microcomputer is connected with the power switch (SW5-A and -B), and it changes from "Low" level (-20V) to "High" level (10V) when the power switch is set at "ON" position so that the microcomputer changes from "clock" mode to "counter" mode: it changes from "High" level (10V) to "Low" level (-20V) when the power switch is set at "OFF" position so that the microcomputer changes to "clock" mode from whichever mode it has been set at.

Pin ②⑦ is to move the time upward when the microcomputer is in "time counter" mode, and to move it downward when it is in "tape remain" mode. This time up/down motion is allowed only when the set is in playback mode in which pin ②⑦ becomes "High" level (10V). When the set is in stop, pause, fast forward or rewind mode, pin ②⑦ lowers to "Low" level (-20V) to discontinue the time up/down motion holding the time as it is. At the same time, pin ⑦ gets "High" level (10V) to turn on the transistor Q714 causing the time hold indicator (diode D709) to light up.

Pin ②⑧ is to count the tape up or down when the microcomputer is in "tape counter" mode. That is, it becomes "Low" level (-20V) when the set is in playback or fast forward mode so the tape counter will count up, and it becomes "High" level (10V) when the set is in rewind mode so the tape counter will count down.

Pin ②⑨ is to get the clock operation in time to follow the power supply frequency whichever it is 50 or 60 Hz. The 50/60 Hz changeover switch (SW12) must be set at "60 Hz" when the set is operating on 60 Hz power; there, pin ②⑨ rises to "High" level (10V) in which 1 second of the clock advance becomes equivalent to 1/60 of the supply frequency (60 Hz). And the switch must be set at "50 Hz" when the set is operating on 50 Hz power; there, pin ②⑨ falls to "Low" level (-20V) in which 1 second of the clock advance becomes equivalent to 1/50 of the supply frequency (50 Hz).

Pin ② is to work when the microcomputer is in "tape remain" mode, and it will produce one cycle of pulses (10Vp-p) when the tape is found to remain within 3 minutes away, which causes the tape end warning indicator (diode D710) to blink.

RH-IX1198AFZZ (HD38750A17)

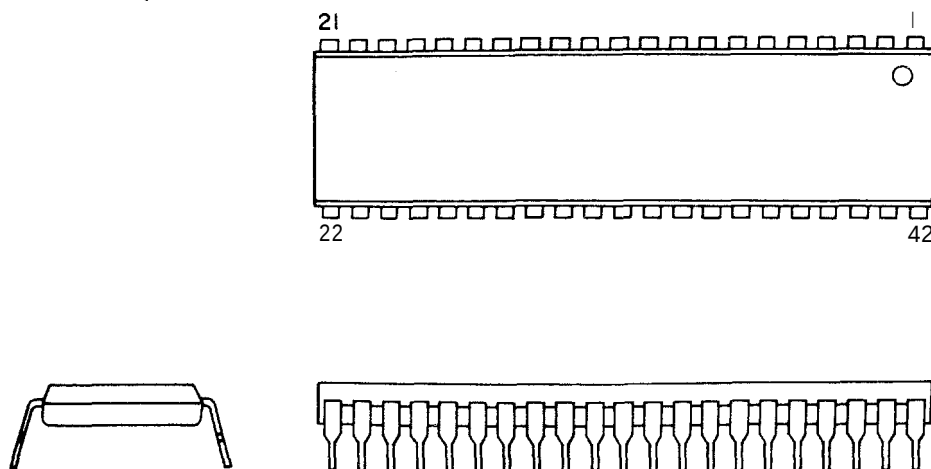
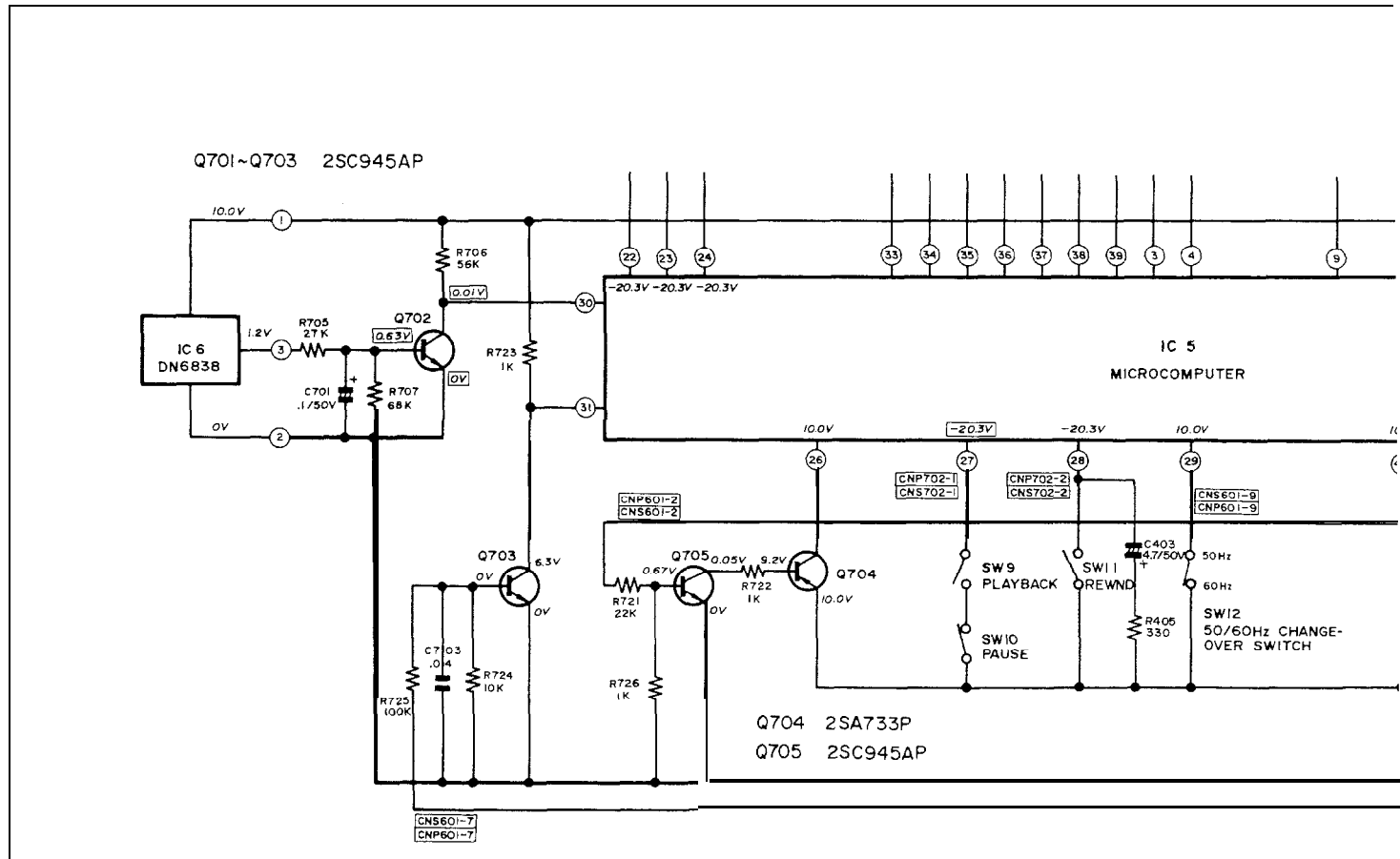


Figure 12 OUTER VIEW OF MICROCOMPUTER (IC5)

■ INPUT/OUTPUT PINS OF MICROCOMPUTER

Pin No.	Name	Input/output	Application	Pin No.	Name	Input/output	Application
1	D ₃	Input/output	Not in use (open)	22	R ₀	Input	Key Strobe input
2	D ₄	Output	3-minute tape remain output	23	R ₀₁	Input	
3	D ₅	output	Display segment output: colon (lower)	24	R ₀₂	Input	
4	D ₆	output	Display segment output: colon (upper)	25	R ₀₃	Input	Not in use (open)
5	D ₇	Output	Not in use (shorted to 10V)	26	R ₁₀	Input/output	Input switch: Power
6	D ₈	In/Out		27	R ₁₁	Input/output	Input switch: Playback
7	D ₉	Output		28	R ₁₂	Input/output	Input switch: Rewind
8	D ₁₀	Output	Time hold output	29	R ₁₃	Input/output	Input switch: 50/60 Hz
9	D ₁₁	output	Display digit output (and key strobe)	30	INTO	Input	Tape counter input
10	D ₁₂	output		31	INTI	Input	Clock 50/60 Hz input
11	D ₁₃	output		32	R ₂₀	Output	Not in use (shorted to 10V)
12	D ₁₄	Output		33	R ₂₁	Output	Display segment output a
13	D ₁₅	Output		34	R ₂₂	Output	Display segment output b
14	VDISP	Power supply	-20 v	35	R ₂₃	Output	Display segment output c
15	RESET	Input	Reset input (shorted to 0V)	36	R ₃₀	Output	Display segment output d
16	V _{BB}			37	R ₃₁	Output	Display segment output e
17	V _{DD}			38	R ₃₂	Output	Display segment output f
18	OSC			39	R ₃₃	Output	Display segment output g
19	N/C			40	D ₀		
20	TEST			41	D ₁		
21	V _{SS}			42	D ₂		

Table 13



VHILB1415//–1(LB1415)

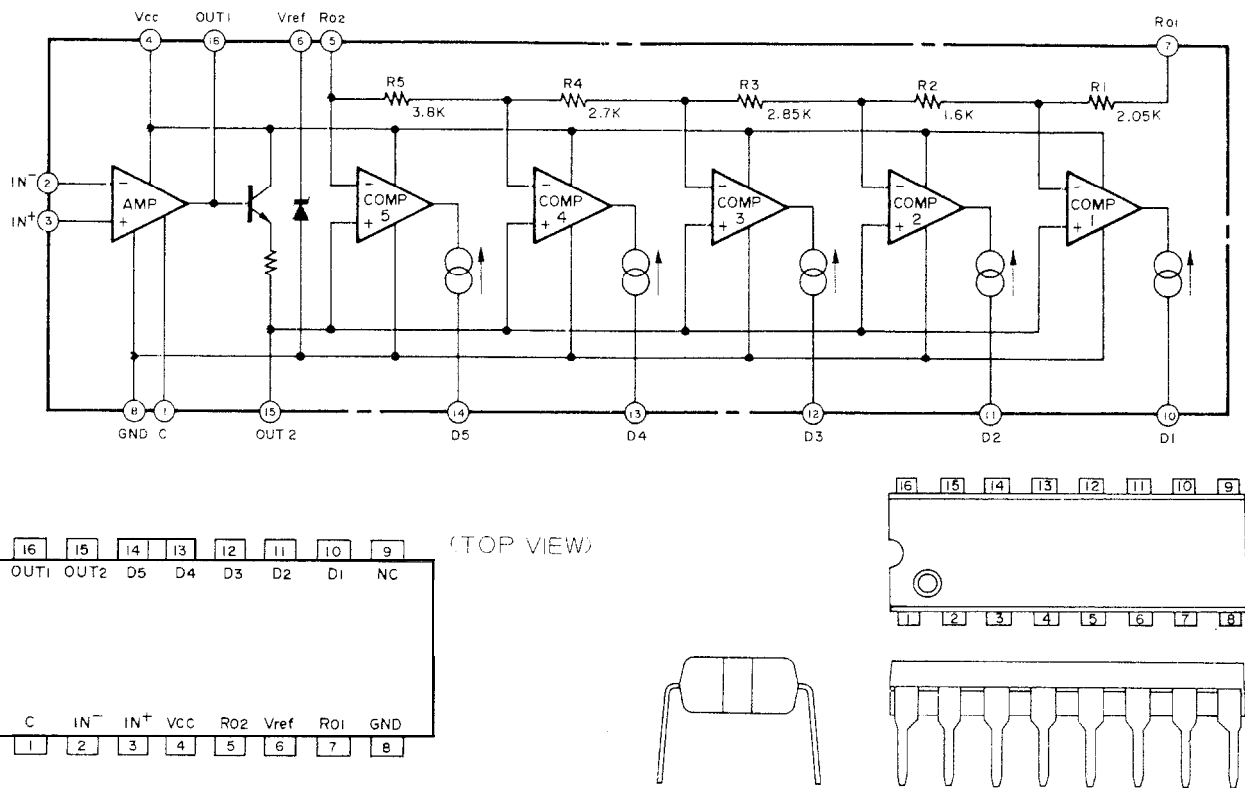


Figure 16–1 BLOCK DIAGRAM OF INTEGRATED CIRCUIT (IC1 and IC2)

VHINE646B//1F(NE646B)

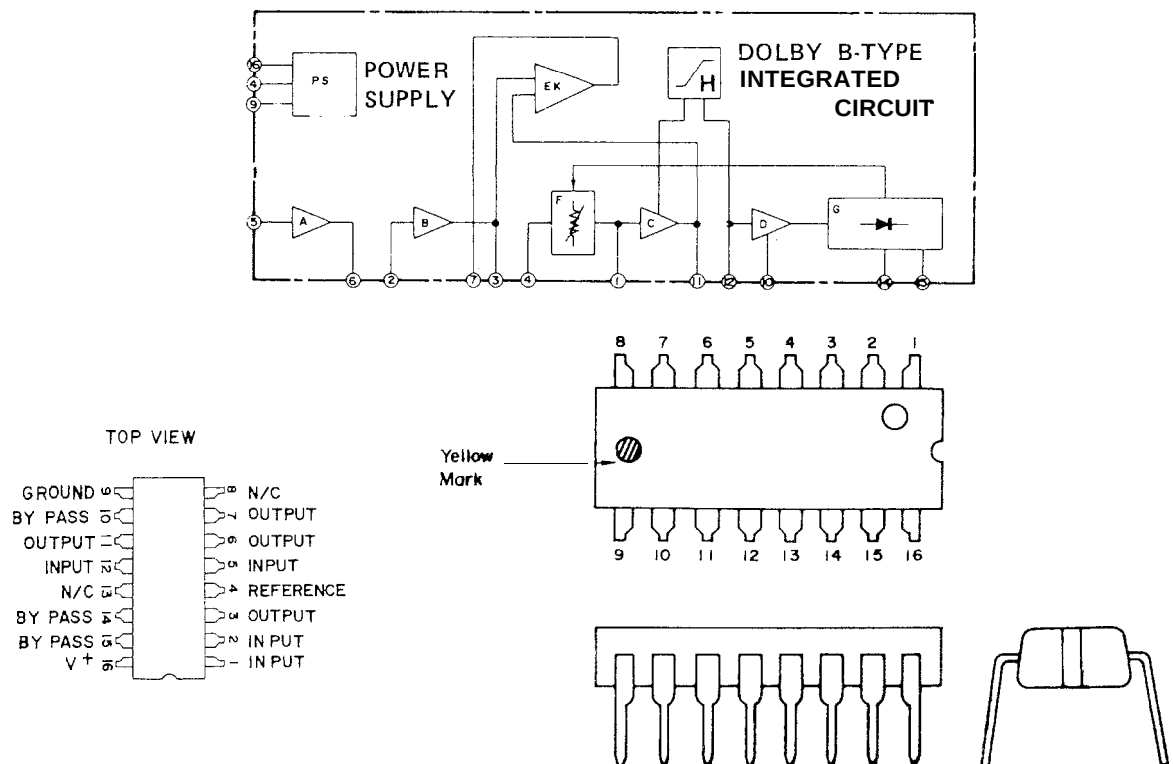
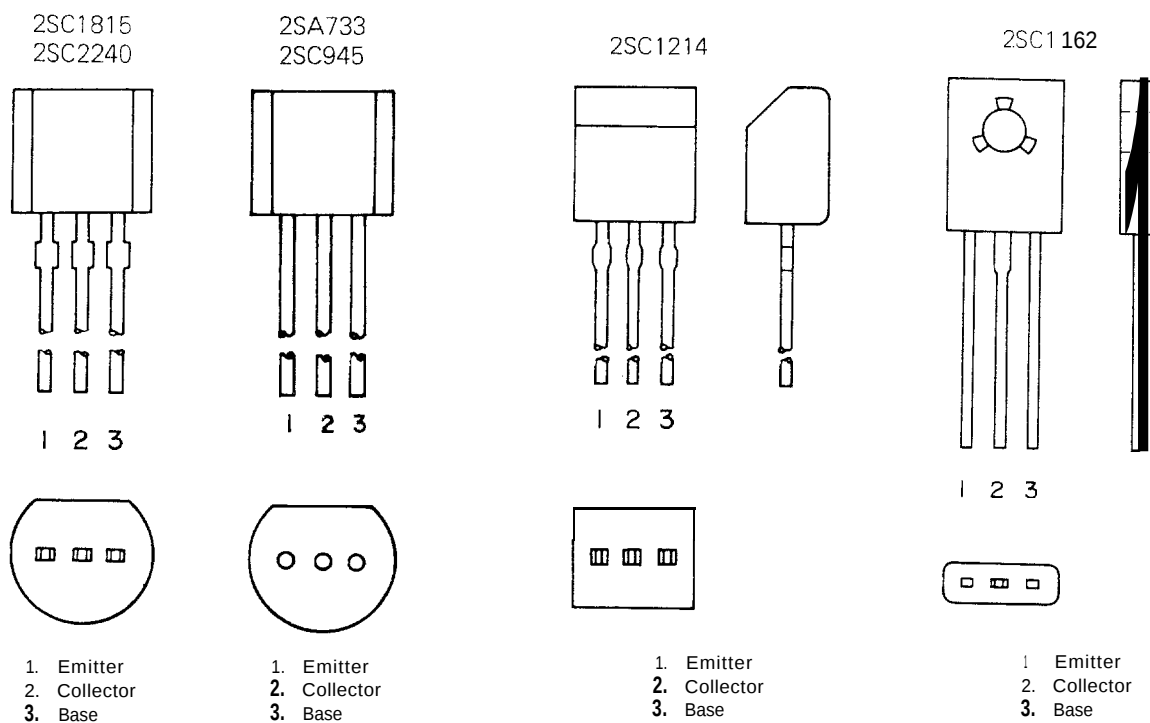


Figure 16-2 BLOCK DIAGRAM OF INTEGRATED CIRCUIT (IC3 and IC4)

TRANSISTORS :



DIODES/LEDS :

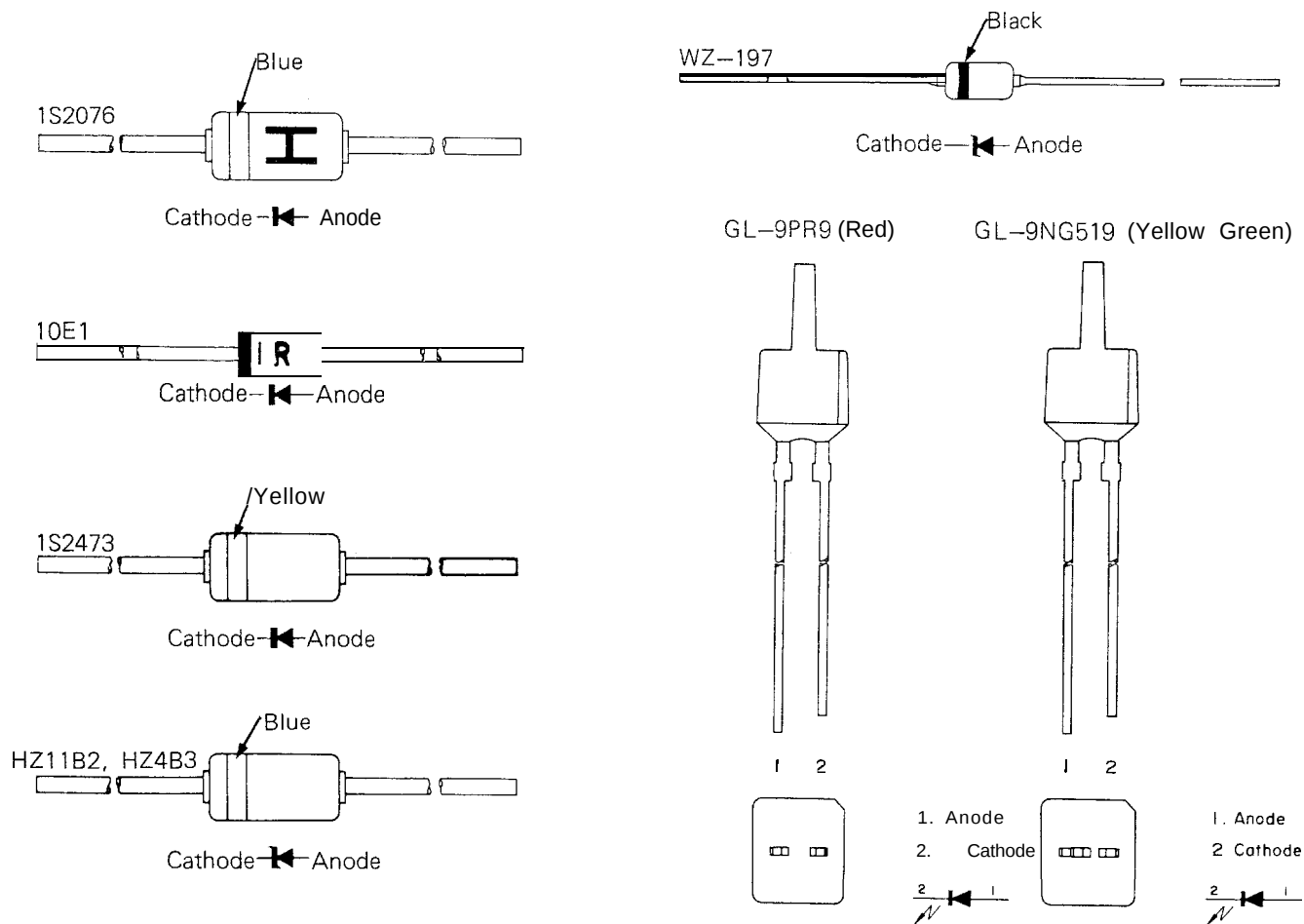


Figure 15 TRANSISTORS, DIODES AND LEDS TYPE

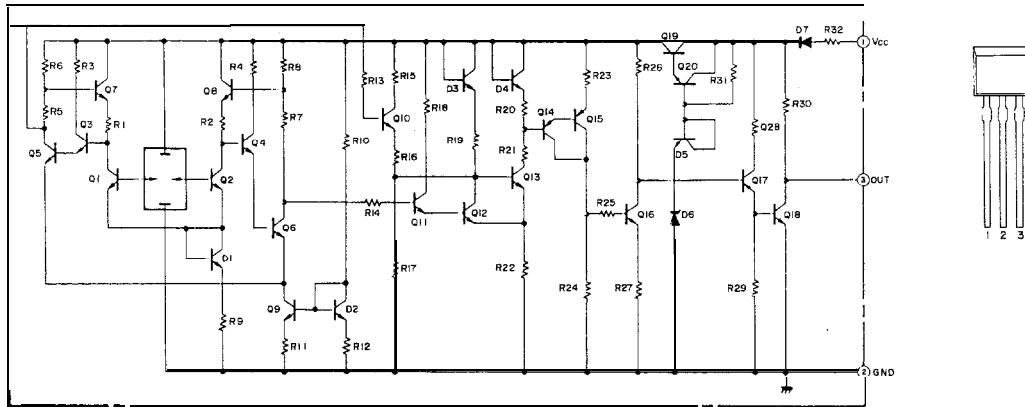
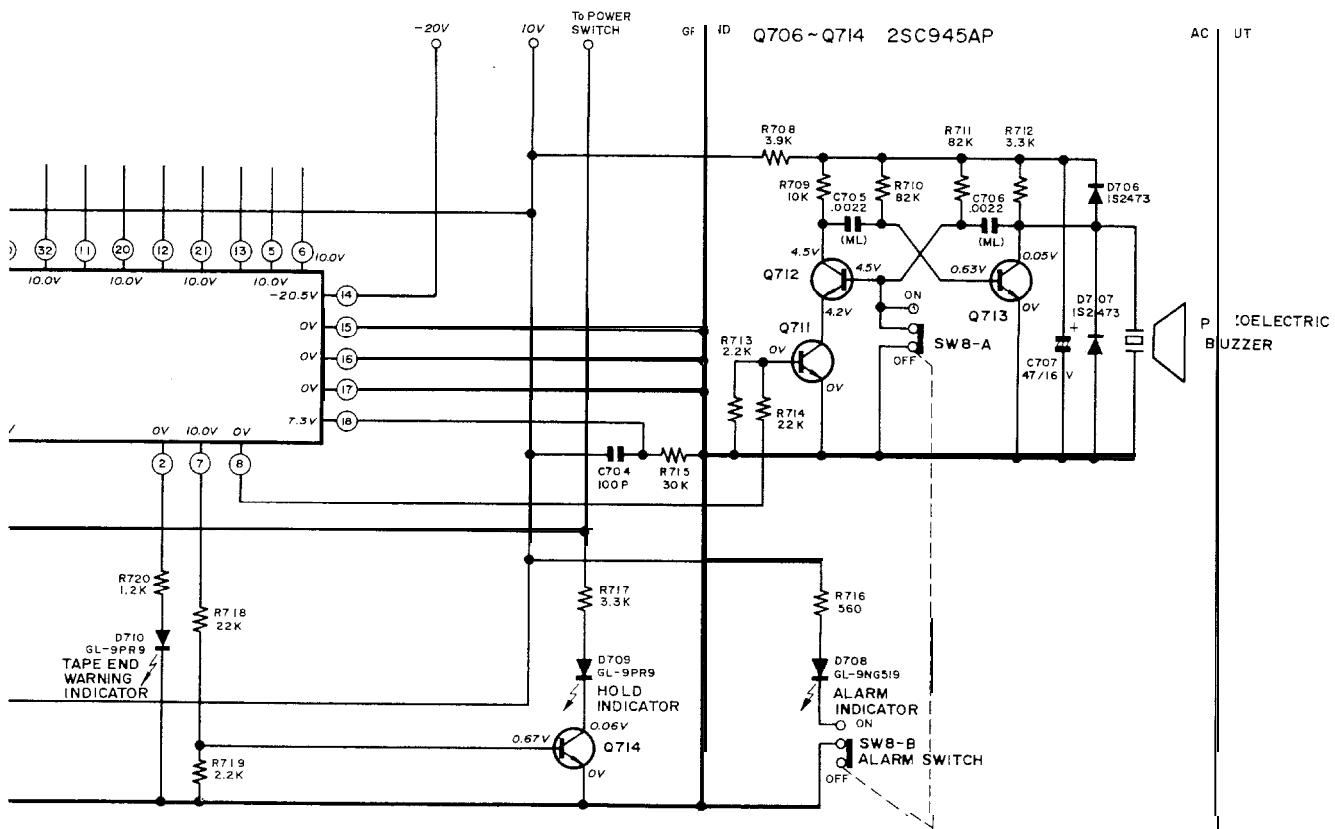


Figure 14 EQUIVALENT CIRCUIT OF INTEGRATED CIRCUIT (IC6)



RT-20H (UK only)

PACKING DIAGRAM

Packing Procedure

Setting positions of every switch and knob

- The tape counter is set at "000" position.
- The cassette holder is closed.
- The power switch is set at "STAND BY (■)" position.
- The 6-ganged keys (to control the mechanism) are unlocked.
- The Dolby NR switch is set at "OFF (■)" position.
- The input selector switch is set at "LINE" position.
- The record level control knob is set at "0" position.
- The Metal tape ON/OFF switch is set at "OFF (■)" position.
- The NORMAL/C/O: tape selector switch is set at "NORMAL (■)" position.
- The alarm ON/OFF switch is set at "OFF (■)" position.

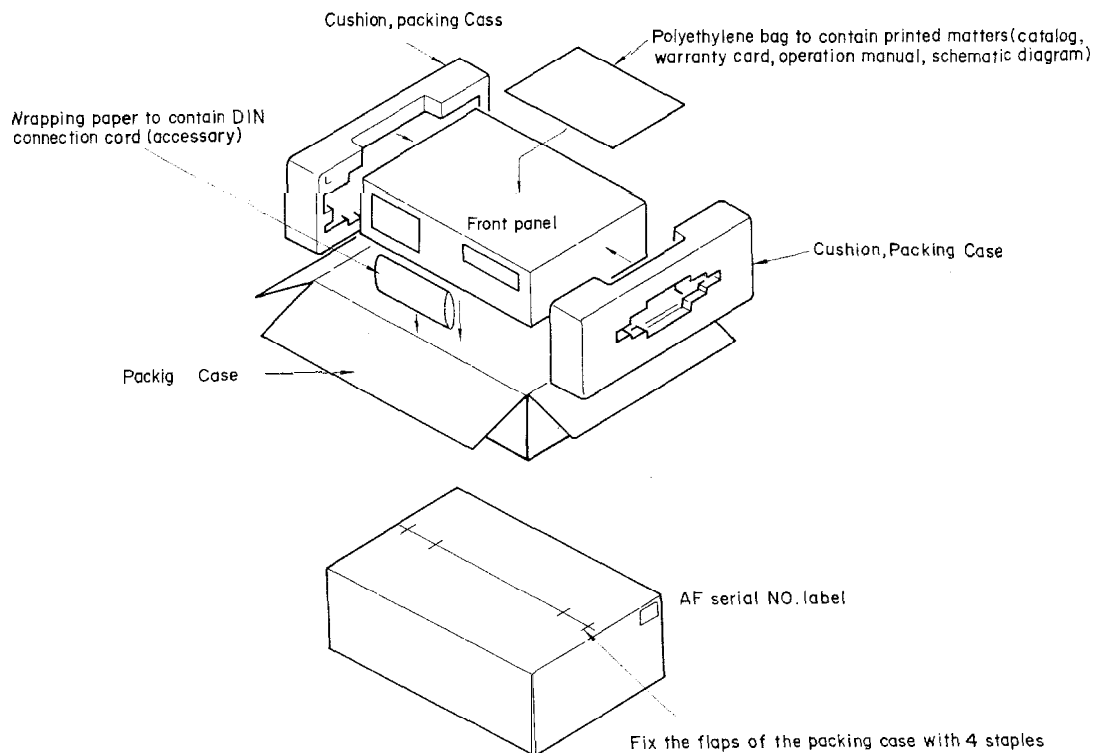
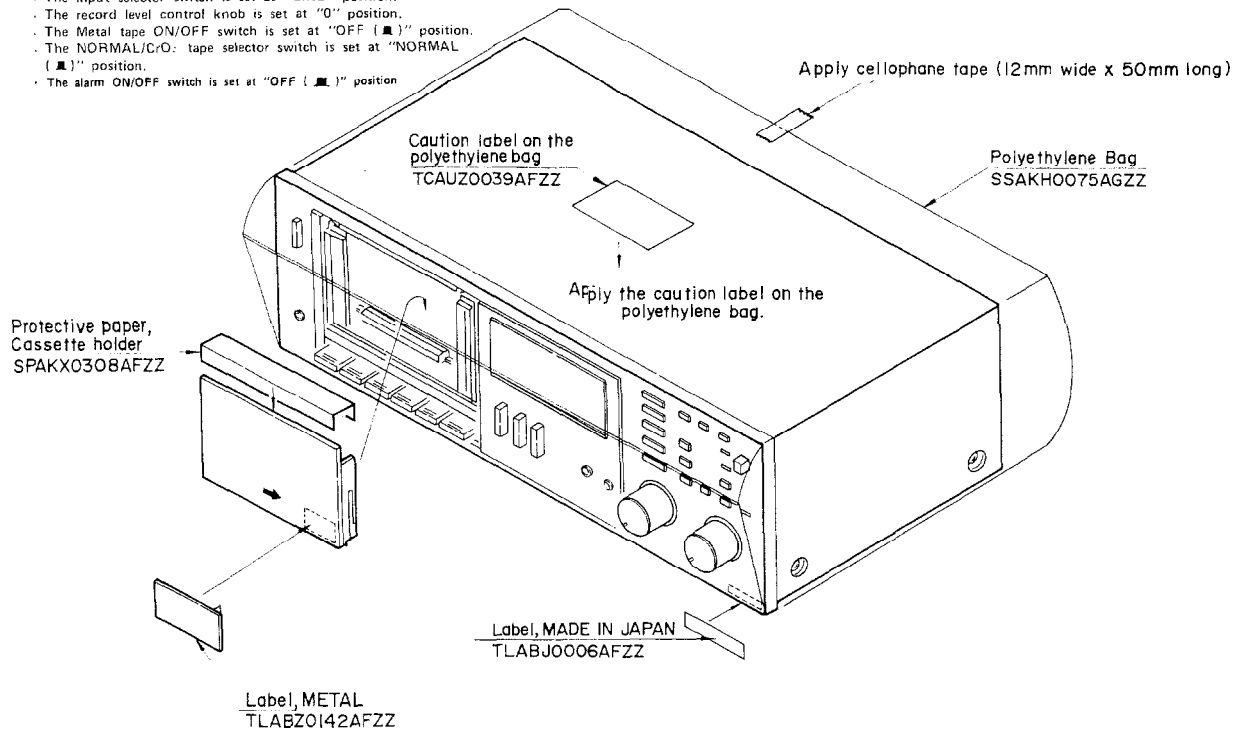


Figure 17 PACKING DIAGRAM (RT-20H, UK only)

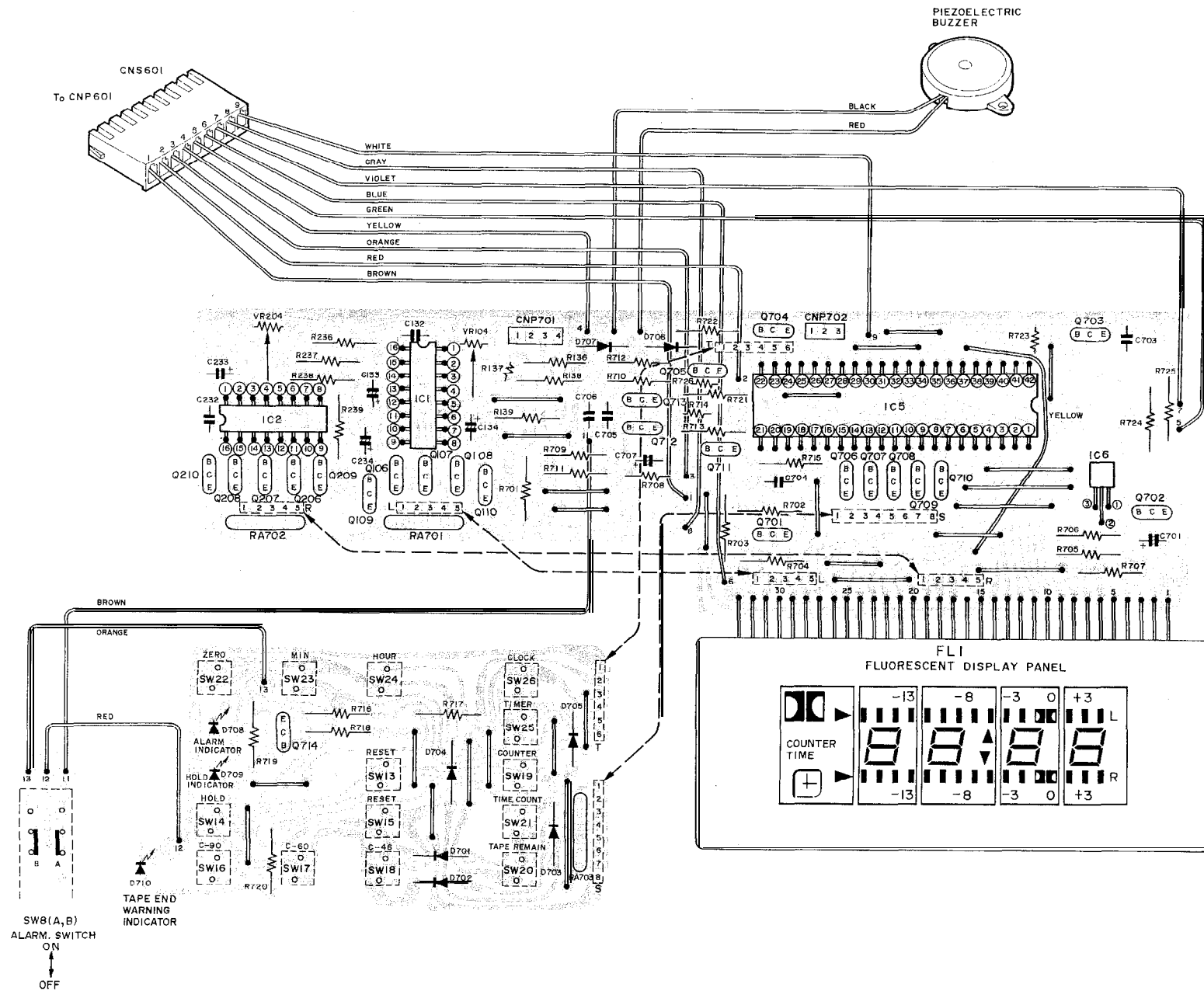
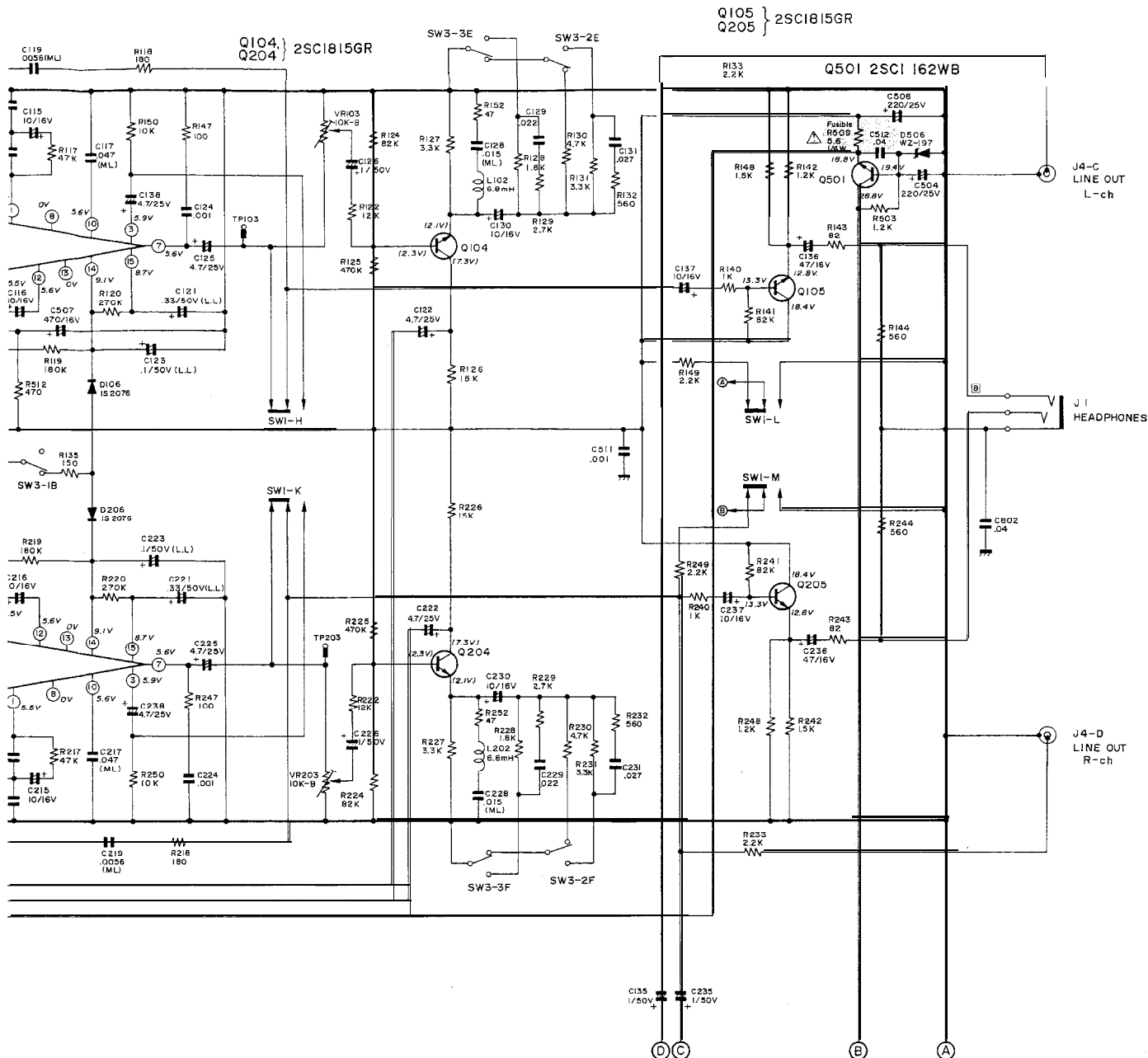


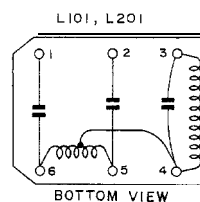
Figure 18 WIRING SIDE OF PRINTED WIRING BOARD (1/2)





JUNCTION	POSITION
RD/PLAYBACK	PLAYBACK — RECORD
T SELECTOR	MIC (DIN) — LINE
Y NR	ON — OFF
SELECTOR	NOR — CROZ
L SWITCH	ON — OFF
NG SWITCH	PLAY/REC — STOP
R SWITCH	ON — STAND BY
SWITCH	ON — OFF
IR SWITCH	ON — OFF

SW. NO	FUNCTION	POSITION
SW8(A,B)	ALARM SWITCH	ON — OFF
SW9	PLAYBACK SWITCH	ON — OFF
SW10	PAUSE SWITCH	ON — OFF
SW11	REWIND SWITCH	ON — OFF
SW12	50/60Hz SWITCH	50Hz — 60Hz
SW13 ~ SW26	MICROCOMPUTER CONTROL SWITCH	ON — OFF



Notes:

- Resistor:
To differentiate the units of resistors, such symbols as K and M are used: the symbol K means 1000 ohm and the symbol M means 1000K ohm and the resistor without any symbol is ohm-type resistor. Besides, the one with "Fusible" is a fuse type.
- Capacitor:
To indicate the unit of capacitor, a symbol P is used; this symbol P means micro-microfarad and the unit of the capacitor without such symbol is microfarad. As

- to electrolytic capacitor, the expression "capacitance/withstand voltage" is used
- Voltage values
The voltages of all the parts are the ones each measured through a VTVM with respect to the chassis.
(1) The voltage in parentheses are measured in record mode under the conditions that enough input signal is applied to cause the segments up to "0dB" of the peak level display meter to light up, the metal tape ON/OFF switch (SW3-3) is at "OFF", Dolby

- NR switch (SW3-1) is at "OFF", no tape is loaded in the unit
- The voltage in a square are measured in stop mode
- The voltages without parentheses nor a square are measured in play mode under the conditions that both the metal tape ON/OFF switch and Dolby NR switch are at "OFF", no tape is loaded and no input signal is applied

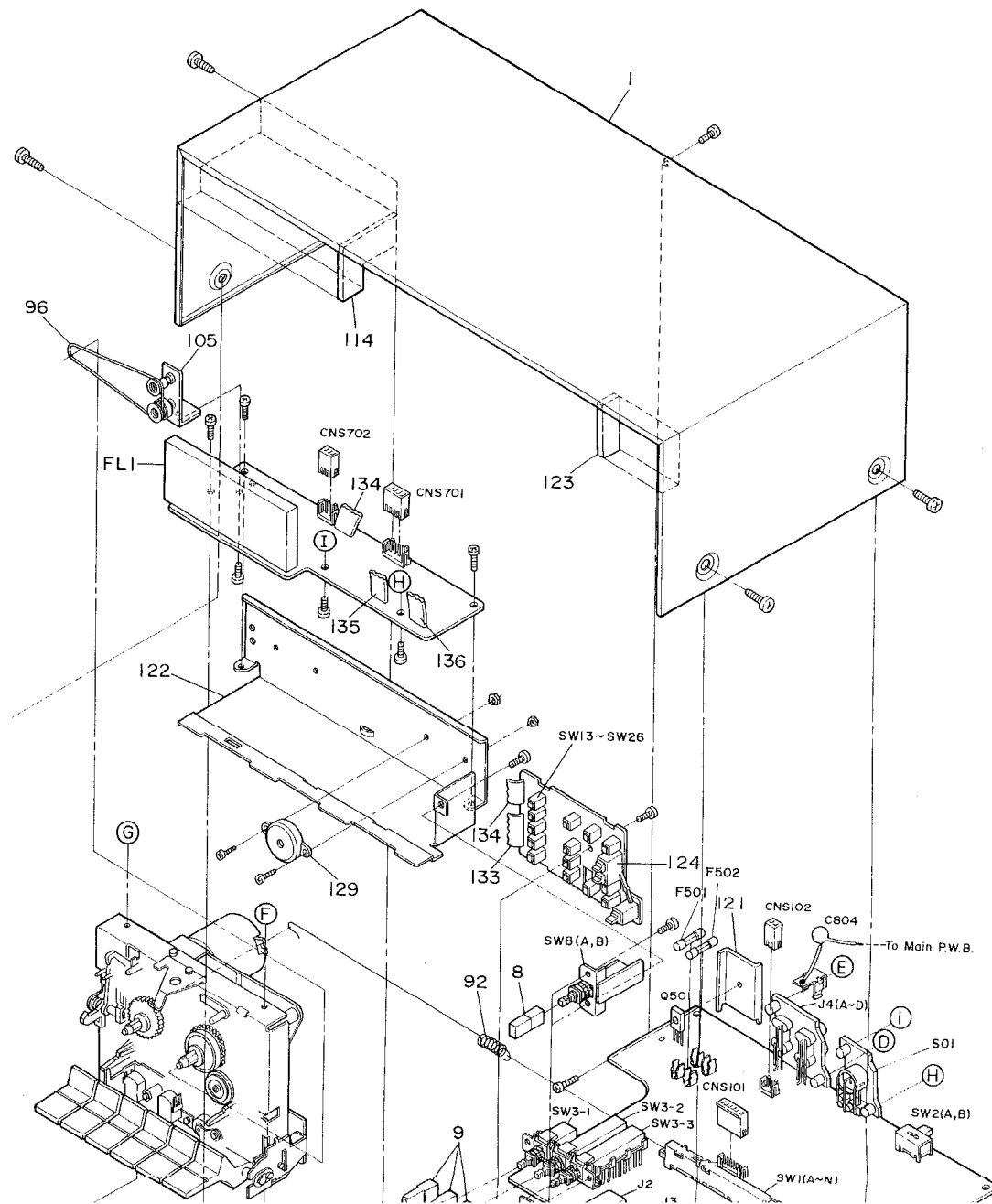


Figure 25 CABINET EXPLODED VIEW

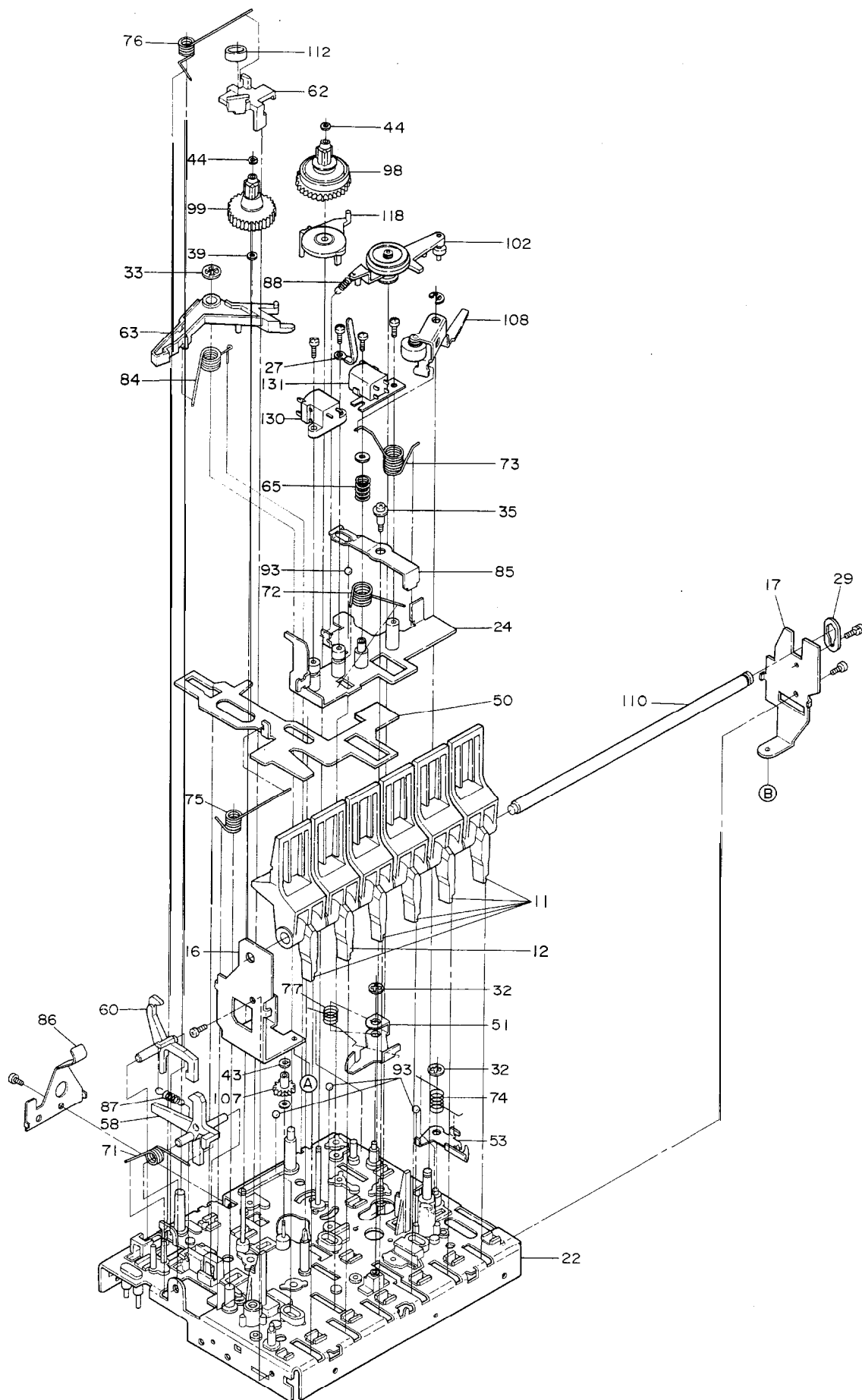


Figure 27 MECHANISM EXPLODED TOP VIEW

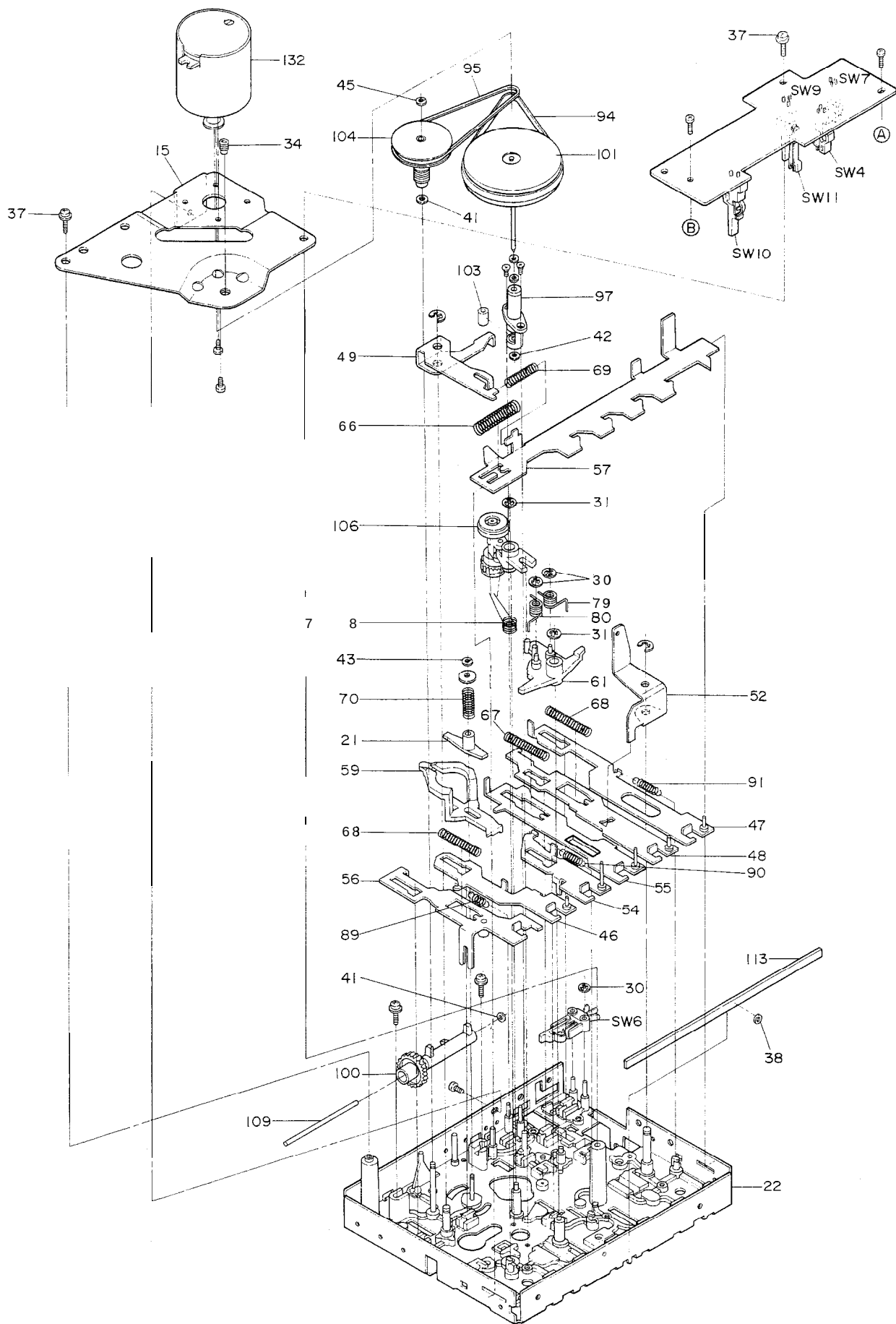


Figure 28 MECHANISM EXPLODED BOTTOM VIEW

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE	
TRANSFORMER								
ΔT501	RTRNP0731AFZZ	P o w e r	AY	AC502	RC-EZW108AF1H	1000MFD, 50V, ±20%		
				C503	RC-EZV477AF1E	470MFD, 25V, ±20%	AC	
				C504	VCEAAVI EW227Y	220MFD; 25V, +50 -10%	AC	
				C506	VCEAAVI EW227Y	220MFD, 25V, +50 -10%	AC	
				C507	VCEAAV1CW477Y	470MFD, 16V, +50 -10%	AC	
				C509	RC-EZAI 07AF1E	100MFD, 25V, ±20%	AC	
				C510	VCEAAV1CW277Y	220M FD, 16V, +50 -10%	AC	
				AC601	RC-EZW108AF1V	1000MFD, 35V, ±20%	A F	
				AC602	VCEAAU1VW477Y	470MFD, 35V, +50 -10%	AE	
				C605	RC-EZV227AF1E	220MFD, 25V, ±20%	AC	
				C607	VCEAAV1AW107Y	100MDF, 10V, +50 -10%	AB	
				C701	VCEALU1HW104M	.1MFD, 50V, ±20%, Yellow		
				C707	RC-EZA476AF1C	47MFD, 16V, ±20%	AB	
CONTROLS				CAPACITORS				
VR101, VR201	RVR-M0249AFZZ	50K ohm (B), Playback Sensitivity Adjust	AB	C102, C202	VCQY KA1HM102J	.001MFD, 50V, ±5%, Mylar	AB	
VR102, VR202	RVR-A0132AFZZ	50K ohm (B), Record Level Control	AE	C104, C204	VCCSPA1HL221J	220PF, 50V, ±5%, Ceramic	AA	
VR103, VR203	RVR-M0248AFZZ	1 OK ohm (B), Record/Playback Sensitivity Adjust	AB	C105, C205	VCQY KA1HM183J	.018MFD, 50V, ±5%, Mylar	AB	
VR104, VR204	RVR-M0249AFZZ	50K ohm (B), Peak Level Meter Sensitivity Adjust	AB	C106, C206	VCCSPA1HL330J	33PF, 50V, ±5%, Ceramic	AA	
VR301, VR302	RVR-M0256AFZZ	20K ohm (B), Bias Current Adjust	AB	C113, C213	VCQY KA1HM472J	.0047MFD, 50V, ±5%, Mylar	AB	
ELECTROLYTIC CAPACITORS				Cl 14, C214	VCQY KA1HM273J	.027MFD, 50V, ±5%, Mylar	AB	
C103, C203	VCEALA1CC106M	10MFD, 16V, ±20%, Orange	AB	C117, C217	VCQYKA1HM473J	.047MFD, 50V, ±5%, Mylar	AB	
C107, C207	RC-EZA476AF1A	47MFD, 10V, ±20%	AB	Cl 19, C219	VCQY KA1HM562J	.0056MFD, 50V, ±5%, Mylar	AB	
C108, C208	RC-EZA335AF1E	3.3MFD, 25V, ±20%	AB	C124, C224	VCKYPA1HB102K	.001MFD, 50V, ±10%, Cerami	AA	
C109, C209	RC-EZ105AF1H	1MFD, 50V, ±20%	AB	C128, C228	VCQY KA1HM153J	.015MFD, 50V, ±5%, Mylar	AB	
C110, C210	VCEALA1HW224M	.22MFD, 50V, ±20%, Yellow	AB	c129, c229	VCTYPA1EX223K	.022MFD, 25V, ±10%, Semiconductor	AA	
c112, c212	VCEAAV1CW227Y	220MFD, 16V, +50 -10%	AC	C131, C231	VCTYPA1EX273K	.027MFD, 25V, ±10%, Semiconductor	AB	
c115, C215	RC-EZAI 06AF1C	10MFD, 16V, ±20%	AB	Cl32, C232	VCCSPA1HL470J	47PF, 50V, ±5%, Ceramic	AA	
C116, C216	RC-EZAI 06AF1C	10MFD, 16V, ±20%	AB	C232, C139, c239	VCCSPU1HL470J	47PF, 50V, ±5%, Ceramic		
c121, c221	VCEALA1HW334K	.33MFD, 50V, ±10%, Yellow	AB	C139, c239	VCKYAT1 HB271 K	270PF, 50V, ±10%, Ceramic	AA	
Cl 22, c222	RC-EZA475AF1E	4.7MFD, 25V, ±20%	AB	C301, C302	VCCSPA1 HL471 J	470PF, 50V, ±5%, Ceramic	AA	
C123, C223	VCEALA1HW104K	.1MFD, 50V, ±10%, Yellow	AB	C303	VCQPKQ2AA472J	.0047MFD, 100V, ±5%, Polypropylene	AB	
C125, C225	RC-EZA475AF1E	4.7MFD, 25V, ±20%	AB	C304, C305	VCQY KA1HM272K	.0027MFD, 50V, ±10%, Mylar	AA	
Cl 26, C226	RC-EZA105AF1H	.1 MFD, 50V, ±20%	AB	C306	VCTYPA1EX562K	.0056MFD, 25V, ±10%, Semiconductor	AA	
C130, C230	RC-EZAI 06AF1C	10MFD, 16V, ±20%	AB	C309	VCQY KA1HM183J	.018MFD, 50V, ±5%, Mylar	AB	
C133	RC-EZA106AF1C	10MFD, 16V, ±20%	AB	C402	VCKZPU1HF103Z	.01MFD, 50V, +80 -20%. Ceramic	AA	
C233	RC-EZV106AF1H	1 OM FD, 50V, ±20%	AB		c511	VCTY PA1 EX 102M	.001MFD, 25V, ±20%, Semiconductor	AA
c134, C234	VCEALA1HW105M	1MFD, 50V, ±20%, Yellow	AB	AC512	VCKZPA1HF403Z	.04MFD, 50V, +80 -20%. Cermiac		
C135, C235	RC-EZAI 05AF1H	1MFD, 50V, ±20%	AB	C604	VCKZPU1HF403Z	.04MFD, 50V, +80 -20%, Ceramic		
C136, C236	RC-EZA476AF1C	47MFD, 16V, ±20%	AB	C606	VCKZPU1HF403Z	.04MFD, 50V, +80 -20%. Ceramic		
C137, C237	RC-EZAI 06AF1C	10MFD, 16V, ±20%	AB					
C138, C238	RC-EZA475AF1E	4.7MFD, 25V, ±20%	AB					
C308	RC-EZA335AF1E	3.3MFD, 25V, ±20%	AB					
C401	RC-EZA105AF1H	1MFD, 50V, ±20%	AB					
C403	VCEALU1HC475K	4.7μFD, 50V, ±10%	AC					

REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following information

- | | |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO. |
| 3. PART NO. | 4. DESCRIPTION |

NOTES

Be sure to use regular parts for securing the safety and reliability of the set. Parts marked with "△" and parts cross hatched (in black) are especially important for maintaining the safety and protecting ability of the set. Be sure to replace them with parts of specified part number.

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE		
INTEGRATED CIRCUITS				DIODES					
IC1, IC2, IC3, IC4, IC5	VHILB1415//-1	Peak Level Meter Drive (LB1415)	AH	Q713	VS2SC945AP/-1	Beep Tone Oscillator (2SC945AP)	AB		
	VHINE646B//1F	Dolby Noise Reduction Circuit (NE646B)	AM	Q714	VS2SC945PA/-1	Switching (2SC945AP)	AB		
	RH-IX1198AFZZ	Microcomputer (HD38750A17)	AW	D106, D206	VHD1S2076//-1	Switching, Dolby NR Circuit (1S2076)	AB		
	VHIDN6838//-1	Hall Element (DN6838)	AG			D401	VHD1S2076//-1	Reverse Current Prevention (1S2076)	AB
TRANSISTORS				COILS					
Q101, Q201, Q102, Q202, Q103, Q203, Q104, Q204, Q105, Q205, Q106, Q107, Q108, Q109, Q110, Q206, Q207, Q208, Q209, Q210	VS2SC2240B L-1	Pre Amplifier (2SC2240BL)	AC	△D501, △D502, △D503, △D504	VHD10E1////-1	Power Rectifier (10E1)	AC		
	VS2SC2240BL-1	Pre Amplifier (2SC2240BL)	AC			D506	VHEWZ-197//-1	Zener, Voltage Regulator (WZ-197)	AB
	VS2SC1815GR-1	Muting (2SC1815GR)	AB			△D601, △D602, △D603, △D604	RH-DX1006AFZZ	Power Rectifier (10E1)	AB
	VS2SC1815GR-1	Record Amplifier (2SC1815GR)	AB					D605	VHEHZ11B-2/-1
	VS2SC1815GR-1	Audio Amplifier (2SC1815GR)	AB	D606	VHEHZ4B-3//-1			Zener, Voltage Regulator (HZ4B3)	AB
	VS2SA733-P/-1	Inverter (2SA733P)	AC	D607	RH-DX1006AFZZ	Reverse Current Prevention (10E1)	AB		
				D701, D702, D703, D704, D705, D706, D707, D708	VHD1S2473//-1	Reverse Current Prevention (1S2473)	A0		
						D706	VHD1S2473//-1	Protector, Transistor (1S2473)	AB
						D707	VHD1S2473//-1	Protector, Transistor (1S2473)	AB
						D708	VHPGL-9NG519F	Alarm Indicator, Yellow Green (GL-9NG519)	AD
Q301, Q302	VS2SC1214-C-1	Bias Oscillator (2SC1214C)	AC	D709	VHPGL-9PR9/-1	Hold Indicator, Red (GL-9PR9)	AC		
Q501	VS2SC1162WB-3	Ripple Filter (2SC1162WB)	AF	D710	VHPGL-9PR9/-1	Tape End Warning Indicator, Red (GL-9PR9)	AC		
Q601	VS2SC1162WB-3	Ripple Filter (2SC1162WB)	AF						
Q701	VS2SC945AP/-1	Switching (2SC945AP)	AB						
Q702	VS2SC945AP/-1	Level Shift Amplifier (2SC945AP)	AB						
Q703	VS2SC945AP/-1	Wave-shaping Circuit (2SC945AP)	AB						
Q704	VS2SA733-P/-1	Switching (2SA733P)	AC	L101, L201	RCILL0065AFZZ	Trap, 19kHz/105kHz	AG		
Q705	VS2SC945AP/-1	Switching (2SC945AP)	AB			L102, L202	RCILZ0086AFZZ	6.8mH, Equalizer	AC
Q706, Q707, Q708, Q709, Q710	VS2SC945AP/-1	Buffer Amplifier (2SC945AP)	AB	L301, L302	RCILB0499AFZZ			Bias Step-up	AD
Q711	VS2SC945AP/-1	Switching (2SC945AP)	AB			L303	RCILB0500AFZZ	Bias Oscillator	AD
Q712	VS2SC945AP/-1	Beep Tone Oscillator (2SC945AP)	AB						

CAUTION

If any one of the nylon bands shown in the Figure 29 is once removed for some reason, be sure to reprice it to the original place in the same appearance as before.

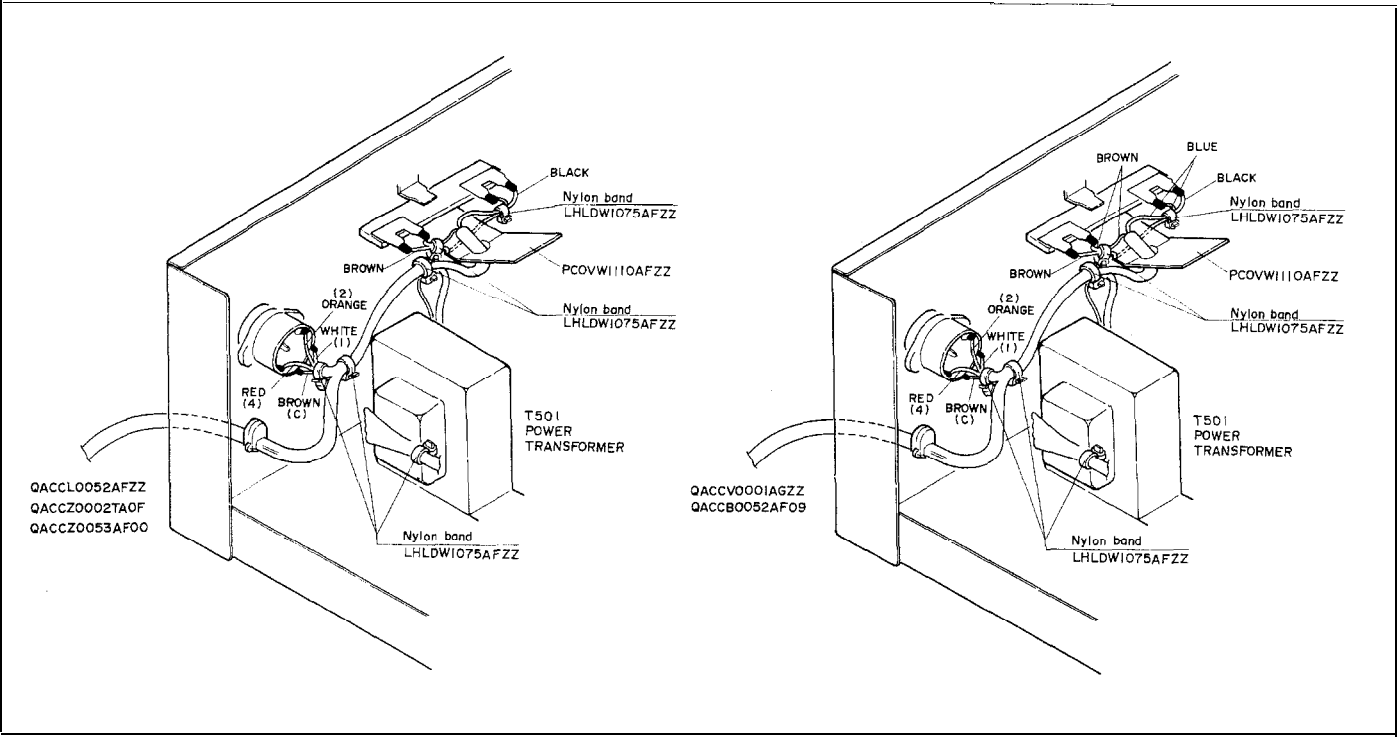


Figure 29

AC supply cord	Bushing	Connection		Figure
		Ⓐ	Ⓑ	
QACC L0052AFZZ	LBSHC0007AFZZ	Black	Black	
QACCV0001AGZZ	LBSHC0004AGZZ	Blue	Brown	
QACCV0002TA0F	LBSHC0007AFZZ	Brown	Brown	
QACCV0053AF00	LBSHC0007AFZZ	Black	Black	
QACCB0052AF09	LBSHC0002AGZZ	Blue	Brown	

TABLE 29 AC SUPPLY LEAD WIRING CONNECTIONS

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
C703	VCKZPA1HF403Z	.04MFD, 50V, +80 -20%. Ceramic	AA	R126, R226	VRD-ST2EE153J	15K ohm	
C704	VCCSPA1HL101J	100PF, 50V, ±5%, Ceramic	AA	R127, R227	VRD-ST2RE332J	3.3K ohm	
C705, C706	VCQY KA1HM222K	.0022MFD, 50V, ±10%, Mylar	AA	R128, R228	VRD-ST2EE182J	1.8K ohm	
C801	VCKZPA1HF403Z	.04MFD, 50V, +80 -20%. Ceramic	AA	R129, R229	VRD-ST2EE272J	2.7K ohm	
C802	VCKZPV1HF403Z	.04MFD, 50V, +80 -20%. Ceramic	AA	R130, R230	VRD-ST2EE472J	4.7K ohm	
C803	VCKZPA1HF403Z	.04MFD, 50V, +80 -20%, Ceramic	AA	R131, R231	VRD-ST2EE332J	3.3K ohm	
C804	VCKZPU 1 HF403Z	.04M FD, 50V, +80 -20%, Ceramic	AA	R132, R232	VRD-ST2EE561J	560 ohm	
△C805, △C806	VCKZPU1HF403Z	.04MFD, 50V, +80 -20%, Ceramic	AA	R133, R233	VRD-ST2EE222J	2.2K ohm	
C807	VCKZPU 1HF403Z	.04MFD, 50V, +80 -20%, Ceramic	AA	R135	VRD-ST2EE154J	150K ohm	
RESISTORS				R136, R236	VRD-ST2EE393J	39K ohm	
(Unless otherwise specified resistors are 1/4W, ±5%, Carbon type.)				R137	VRD-SU2EE104J	100K ohm	
R101, R201	VRD-ST2EE333J	33K ohm		R237	VRD-ST2EE104J	100K ohm	
R102, R202	VRD-ST2EE101J	100 ohm		R138, R238	VRD-ST2EE153J	15K ohm	
R103, R203	VRD-ST2EE222J	2.2K ohm		R139, R239	VRD-ST2EE122J	1.2K ohm	
R104, R204	VRD-ST2EE103J	10K ohm		R140, R240	VRD-ST2EE102J	1K ohm	
R105, R205	VRD-ST2EE184J	180K ohm		R141, R241	VRD-ST2EE823J	82K ohm	
R106, R206	VRD-ST2EE101J	100 ohm		R142	VRD-ST2EE122J	1.2K ohm	
R107, R207	VRD-ST2EE184J	180K ohm		R242	VRD-ST2EE152J	1.5K ohm	
R108, R208	VRD-ST2EE564J	560K ohm		R143, R243	VRD-ST2EE820J	82 ohm	
R109, R209	VRD-ST2EE153J	15K ohm		R144, R244	VRD-ST2EE561J	560 ohm	
R110, R210	VRD-ST2EE562J	5.6K ohm		R145, R245	VRD-ST2EE682J	6.8K ohm	
R111, R211	VRD-ST2EE154J	150K ohm		R146, R246	VRD-ST2EE124J	120K ohm	
R112, R212	VRD-ST2EE821J	820 ohm		R147, R247	VRD-ST2EE101J	100 ohm	
R113, R213	VRD-ST2EE332J	3.3K ohm		R148	VRD-ST2EE152J	1.5K ohm	
R114, R214	VRD-ST2EE332J	3.3K ohm		R248	VRD-ST2EE122J	1.2K ohm	
R115, R215	VRD-ST2EE682J	6.8K ohm		R149, R249	VRD-ST2EE222J	2.2K ohm	
R116, R216	VRD-ST2EE332J	3.3K ohm		R150, R250	VRD-ST2EE103J	10K ohm	
R117, R217	VRD-ST2EE473J	47K ohm		R152, R252	VRD-ST2EE470J	47 ohm	
R118, R218	VRD-ST2EE181J	180 ohm		R153, R253	VRD-ST2EE123J	12K ohm	
R119, R219	VRD-ST2EE184J	180K ohm		R301, R302	VRD-ST2EE683J	68K ohm	
R120, R220	VRD-ST2EE274J	270K ohm		R303	VRD-ST2EE180J	18 ohm	
R122, R222	VRD-ST2EE123J	12K ohm		R304	VRD-ST2EE681J	680 ohm	
R124, R224	VRD-ST2EE823J	82K ohm		VR305	VRS-PT3DB331K	330 ohm, 2W, ±10%, Metal Oxide Film	AE
R125, R225	VRD-ST2EE474J	470K ohm		VR307	VRG-ST2EA270J	27 ohm, 1/4W, ±5%, Fusible	AE
				VR308	VRS-PT3DB271K	270 ohm, 2W, ±10%, Metal Oxide Film	AE
				R309	VRD-ST2EE180J	18 ohm	
				R310	VRD-ST2EE391J	390 ohm	
				R401, R402	VRD-ST2EE222J	2.2K ohm	
				R403	VRD-ST2EE222J	2.2K ohm	
				R404	VRD-ST2EE220J	22 ohm	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	ODE	REF. NO.	PART NO.	DESCRIPTION	CODE
121	PRDAR0153AFZZ	Heat Sink	AC	AS0501	QSOCE0558AFZZ	AC Supply Voltage Selector	AG
122	PSLDC3102AFZZ	Shield Plate, Microcomputer Circuit	AF			Selector	
123	PSPAI0159AFZZ	Hard Board, Cabinet (40 x 13 x t 3.5mm)	AA	SW1 (A ~ N)	QSW-S0253AFZZ	Switch, Record/Playback	AH
124	PSPAS0110AFSA	LED Spacer, Alarm Indicator, Hold indicator and Tape End Warning Indciator	AA	SW2 (A, B)	QSW-S0268AFZZ	Switch, Input Selector (Microphone/DIN ↔ Line)	AD
△125	QACCB0052AF09	AC Supply Lead without Plug, for U K	AH	SW3 (1 ~ 3)	QSW-P0270AFZZ	Switches SW3-1 (A, B); Dolby NR SW3-2(A ~ F); Tape Selector (Normal/CrO ₂) SW3-3(A ~ F); Tape Selector (Metal ON/OFF)	AM
△	QACCL0052AFZZ	AC Supply Lead SAA Safety Standard with P l u g	AL	SW4	QSW-F0146AFZZ	Switch, Power ON/STAND BY	AE
△	QACCV0001 AGZZ	AC Supply Lead VDE Safety Standard with Plug	AL	△SW5 (A, B)	QSW-P0271 AFZZ	Switch, Power	AF.
△	QACCC0002TA0F	AC Supply Lead with Plug	AG	SW6	QSW-F0136AFZZ	Switch, Bias	AD
△	QACCC0053AF00	AC Supply Lead with Plug	AK	SW7	QSW-F0146AFZZ	Switch, Motor	AE
△	QFSHD2051AFZZ	Holder, Fuse "	AA	SW8 (A, B)	QSW-P0253AFZZ	Switch, Alarm	AE
126	QLUGP0106CEFW	Lug Terminal	AA	SW9	QSW-F0143AFZZ	Switch, Playback	AE
127	QLUGP0111CEFW	Lug Terminal	AA	SW10	QSW-F0144AFZZ	Switch, Pause	AE
128	QTIPZ0062AFZZ	Tip, Wiring	AA	SW11	QSW-F0145AFZZ	Switch, Rewind	AF
129	RALMB0052AFZZ	Piezoelectric Buzzer	AG	SW12	QSW-S0268AFZZ	Switch, AC Line Change-over	AD
130	RHEDA0075AFZZ	Head, Erase	AL	SW13	QSW-K0052AFZZ	Switch, Reset	AD
131	RHEDH0085AFZZ	Head, Record/Playback	AS	SW14	QSW-K0052AFZZ	Switch, Hold	AD
132	RMOTV0081 AFZZ	Motor (DC)	AU	SW15	QSW-K0052AFZZ	Switch, Reset	AD
133	QCNW-0823AFZZ	Jumper, 8 Lead, 160mm	AD	SW16	QSW-K0052AFZZ	Switch, C-90	AD
134	QCNW-0824AFZZ	Jumper, 6 Lead, 130mm	AC	SW17	QSW-K0052AFZZ	Switch, C-60	AD
135	QCNW-0825AFZZ	Jumper, 5 Lead, 130mm	AC	SW18	QSW-K0052AFZZ	Switch, C-46	AD
136	QCNW-0826AFZZ	Jumper, 5 Lead, 200mm	AC	SW19	QSW-K0052AFZZ	Switch, Counter	AD
137	LANG R0519AFZZ	Bracket, Power Transformer, Strengthen		SW20	QSW-K0052AFZZ	Switch, Tape Remain	AD
CNP101	QCNCM175FAFZZ	Plug, 6-pin	AC	SW21	QSW-K0052AFZZ	Switch, Time Count	AD
CNP102	QCNCM171 BAFZZ	Plug, 2-pin	A 6	SW22	QSW-K0052AFZZ	Switch, Zero	AD
CNP601	QCNCM178JAFZZ	Plug, 9-pin	AC	SW23	QSW-K0052AFZZ	Switch, Min	AD
CNP701	QCNCM173DAFZZ	Plug, 4-pin	AB	SW24	QSW-K0052AFZZ	Switch, Hour	AD
CNP702	QCNCM1 72CAFZZ	Plug, 3-pin	AB	SW25	QSW-K0052AFZZ	Switch, Timer	AD
CNS101	QCNW-0687AFZZ	Connecting Cord with Socket, B-pin	AH	SW26	QSW-K0052AFZZ	Switch, Clock	AD
CNS1 0 2	QCNW-0713AFZZ	Connecting Cord with Socket, 2-pin	AE	FL1	VVK5BT81ZS1-1	Fluorescent Display Panel	BA
	CCNCW149JAF12	Connecting Cord with Socket			QCNW-0718AFZZ	Connecting Cord (RCA Pin Type) x 2	AH
	LHLDW1075AFZZ	Nylon Band, 60mm	AA		QCNW-0139AFZZ	Connecting Cord, DIN Type, 1.5m, for UK	AQ
CNS601	QCNCW149JAFZZ	Socket, S-pin	AB		QCNW-0727AFZZ	Connecting Cord, DIN Type, 75cm	AP
	QTIPZ0058AFZZ	Tip, Socket	AA		QPLGA0250AFZZ	Adaptor, AC Power Supply Lead	AF
	CCNCW144DAF40	Connecting Cord with Socket			QPLGA0251AFZZ	Adaptor, AC Power Supply Lead	AE
	LHLDW1 075AFZZ	Nylon Band, 60mm	AA		SPAKA0622AFZZ	Cushion, Packing Case	AD
CNS701	QCNCW1 44DAFZZ	Socket, 4-pin	AB		SPAKC1 630AFZZ	Packing Case, Unit (RT-20H)	
	QTIPZ0058AFZZ	Tip, Socket	AA		SPAKC1631 AFZZ	Packing Case, Unit (RT-20HB)	
CNS702	QCNW-0784AFZZ	Connecting Cord with Socket, 3-pin	AD		SPAKF0053AFZZ	Wrapping Paper, Connecting Cord	AD
△F501, △F502, △F601, △F602	QFS-C321CAGNI	fuse, T315mA/250V	AE		SPAKX0308AFZZ	Packing Material, Cassette Compartment Protector	AA
	QFS-C201CAGNI	F u s e , T200mA/250V	AE		SSAKA0024AFZZ	Polyethylene Bag, Operation Manual	AA
J1	QJAKJ0059AFZZ	Socket, Headphones	AE		SSAKH0075AGZZ	Polyethylene Bag, Unit	AB
J2	QJAKZ0066AFZZ	Socket, Microphone, Left	AE		TCAUH0056AGZZ	Caution Label, Mains Supply Cord, for UK	
J3	QJAKZ0066AFZZ	Socket, Microphone, Right	AE		TCAUZ0039AFZZ	Caution Sheet, Set	
J4	QSOCCJ0471AFZZ	Socket, J4-A, B; Line Inputs	AG			Polyethylene Bag, for UK	
(A ~ D)		J4-C, D; Line Outputs			TCTLE0001 AGZZ	Catalog, for UK	
SO1	QSOCD0583AFZZ	Socket, DIN (5-Pin) Record/ Playback (Input/Playback)	AE		TGANE1117AFZZ	Warranty Card, for UK	
					TGANE1118AFZZ	Warranty Card, for Australia	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	ODE	REF. NO.	PART NO.	DESCRIPTION	CODE
27	LHLDW3007AGFD	Wire Holder	A A	76	MSPRD0246AFFJ	Spring, Supply Turntable Brake Lever	A A
28	LHLDZ1110AFSA	Holder, Fluorescent Display Panel Control Switch Knobs	AG	77	MSPRD0247AFFJ	Spring, Auto-Stop Killer Lever	A A
29	LSTPF0052AFFW	Stopper, Function Key Shaft	AB	78	MSPRD0248AFFJ	Spring, Fast Forward/Rewind Roller	A A
30	LSTWC2001 AFZZ	Stop Ring, 2mm Dia.	A A	79	MSPRD0249AFFJ	Spring, Fast Forward/Rewind Shift Lever, Left Side	A A
31	LSTWC2403AFZZ	Stop Ring, 2mm Dia.	A A	80	MSPRD0250AFFJ	Spring, Fast Forward/Rewind Shift Lever, Right Side	AA
32	LSTWC3002AFZZ	Stop Ring, 3mm Dia.	A A	81	MSPRD0251AFFJ	Spring, Damper	AB
33	LSTWC4004AFZZ	Stop Ring, 4mm Dia.	A A	82	MSPRD0271AFFJ	Spring, Cassette Tape Guide, Left Side.	AA
34	LX-BZ0107AGZZ	Screw, Flywheel Thrust Adjust	AB	83	MSPRD0272AFFJ	Spring, Cassette Tape Guide, Right Side	A A
35	LX-BZ0282AFFD	Screw, Sub-chassis Retaining Plate Spring	A A	84	MSPRD0275AFFJ	Spring, Pause Brake Lever	A A
37	LX-HZ0056AFFD	Screw with Flange, Flywheel Bracket Retaining, 3mm Dia. x 10mm	A A	85	MSPRP0231AFFW	Plate Spring, Sub-chassis Retaining	AB
38	LX-WZ5013AGZZ	Washer, 2.1mm Dia. x4mm Dia. x0.13mm	A A	86	MSPRP0232AFFW	Plate Spring, Cassette Retaining	AC
39	LX-WZ5018AGZZ	Washer, 2.1mm Dia. x 4mm Dia. x0.25mm	A A	87	MSPRT0623AFFJ	Spring, Record Safety (Fool-Proof) Lever	A A
41	LX-WZ5037AGZZ	Washer, 2.6mm Dia. x 4.7mm Dia. x0.25mm	A A	88	MSPRT0624AFFJ	Spring, Take-up Idler	A A
42	LX-WZ9053AFZZ	Washer, Oil Thrower	A A	89	MSPRT0625AFFJ	Spring, Fast Forward Lever	A A
43	LX-WZ9063AFZZ	Washer, 1.2mm Dia.	A A	90	MSPRT0626AFFJ	Spring, Rewind Lever	A A
44	LX-WZ9064AFZZ	Washer, 1.5mm Dia.	A A	91	MSPRT0627AFFJ	Spring, Stop/Eject Lever	A A
45	LX-WZ9065AFZZ	Washer, 2mm Dia.	A A	92	MSPRT0622AFFJ	Spring, Record/Playback Selec- tor Switch Interlocking	AC
46	MLEVF1006AFZZ	Lever, Fast Forward	AC	93	NBALS0053AFZZ	Steel Ball, 3.5mm Dia.	A A
47	MLEVF1007AFZZ	Lever, Stop/Eject	AB	94	NBLTH0071AFZZ	Belt, Mechanism Drive	AC
48	MLEVF1008AFZZ	Lever, Record	AC	95	NBLTK0153AFZZ	Belt, Auto-Stop Mechanism	AB
49	MLEVF1010AFZZ	Lever, Lock (Function Lever Lock Lever) Release	AC	96	NBLTK0180AFZZ	Belt, Tape Counter Drive	AB
50	MLEVF1011AFZZ	Lever, Brake	AC	97	NBRGC0061AFZZ	Bearing, Capstan	AE
51	MLEVF1013AFZZ	Lever, Auto-Stop Killer	A O	98	NDAIR0138AFSA	Turntable, Take-up	AF
52	MLEVF1014AFZZ	Lever, Record/Playback Selec- tor Switch Interlocking	AB	99	NDAIR0139AFSA	Turntable, Supply	AD
53	MLEVF1036AFZZ	Lever, Pause Lock	A A	100	NDRM-0161AFZZ	Worm Wheel, Auto-Stop Mechanism	AE
54	MLEVF1071AFZZ	Lever, Rewind	AC	101	NFLYC0082AFZZ	Flywheel	AH
55	MLEVF1072AFZZ	Lever, Playback	AC	102	NIDR-0075AFZZ	Idler, Take-up	AE
56	MLEVF1073AFZZ	Lever, Pause	AD	103	NPLY R0050AFZZ	Pulley, Take-up, Rubber	AB
57	MLEVF1074AFFW	Lever, Function Lever Lock	AC	104	NPLY R0068AFZZ	Worm Pulley, Auto-Stop Mechanism	AO
58	MLEVP0112AFZZ	Lever, Cassette Holder Lock	AC	105	NPLY R0074AFZZ	Pulley, Magnet	AC
59	MLEVP0168AFZZ	Lever, Auto-Stop Sensor	AB	106	NROLW0012AFZZ	Roller, Fast Forward/Rewind Operating	AC
60	MLEVP0169AFZZ	Lever, Record Safety (Fool-Proof)	AB	107	NROLX0013AFZZ	Gear, Rewind	AB
61	MLEVP0170AFZZ	Lever, Rewind/Fast Forward Shift	AB	108	NROLY0030AFZZ	Pressure Roller Assembly	AE
62	MLEVP0192AFZZ	Lever, Supply Turntable Brake	AC	109	NSFTN0004AFFW	Shaft, Auto-Stop Worm Wheel	AC
63	MLEVP0195AFZZ	Lever, Pause Brake	AC	110	NSFTT0140AFFP	Shaft, Function Key	AO
64	MLIFP0008AFZZ	Damper, Cassette Holder	AD	111	PCOVW9113AFZZ	Cover, Tip	AA
65	MSPRC0031AGMN	Spring, Record/Playback Head Azimuth Adjust	A A	112	PCUSG0026AG00	Rubber, Supply Turntable Brake Lever	AA
66	MSPRC0195AFFJ	Spring, Function Lever Lock Lever	A A	113	PCUSG0112AF00	Cushion, Rubber, Function Lever Shock Absorb	AA
67	MSPRC0197AFFJ	Spring, Playback Lever	A A	114	PSPAW0052AFZZ	Hand Board, Cabinet	AB
68	MSPRC0198AFFJ	Spring, Pause Lever and Record Lever	A A	115	PFILW0029AFSA	Filter, Fluorescent Display Panel	AC
69	MSPRC0214AFFJ	Spring, Lock (Function Lever Lock Lever) Release Lever	A A	116	PFLT-0404AFZZ	Felt, Front Leg	AA
70	MSPRC0201AFFJ	Spring, Auto-Stop Sensor Lever Spacer	A A	117	PFLT-0405AFZZ	Felt, Rear Leg, Right	AA
71	MSPRD0241AFFJ	Spring, Cassette Holder Lock Lever	A A	118	PGIDM0074AFZZ	Guide, Auto-Stop Sensor Lever	AC
72	MSPRD0242AFFJ	Spring, Over Stroke Absorbing	A A	119	PGIDM0075AFSA	Guide, Cassette Tape, Left Side (RT-20H)	AB
73	MSPRD0243AFFJ	Spring, Pressure Roller	A A		PGIDM0075AFSB	Guide, Cassette Tape, Left Side (RT-20HB)	AB
74	MSPRD0244AFFJ	Spring, Pause Lock Lever	A A	120	PGIDM0076AFSA	Guide, Cassette Tape, Right Side (RT-20H)	AB
75	MSPRD0245AFFJ	Spring, Brake Lever	A A		PGIDM0076AFSB	Guide, Cassette Tape, Right Side (RT-20HB)	AE

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
R405	VRD-ST2EE331J	330 ohm	AB	3	JKNBM0341AFSB	Knob, Power Switch, Dolby NR Switch and Tape Selector Switch (RT-20H)	AD
R503	VRD-ST2EE122J	1.2K ohm			JKNBM0341AFSD	Knob, Power Switch, Dolby NR Switch and Tape Selector Switch (RT-20HB)	
R505	VRD-ST2EE561J	560 ohm		10	JKNBN0474AFSA	Knob, Record Level Controls (RT-20H)	AF
R506	VRD-ST2EE473J	47K ohm			JKNBN0474AFSB	Knob, Record Level Controls (RT-20HB)	AF
△R509	VRG-ST2EA5R6J	5.6 ohm, 1/4W, ±5%, Fusible		11	JKNBR0157AFSE	Key, Stop/Eject, Playback, Rewind, Fast Forward and Pause (RT-20H)	AG
R511, } R512 }	VRD-ST2EE471J	470 ohm			JKNBR0157AFSG	Key, Stop/Eject, Playback, Rewind, Fast Forward and Pause (RT-20HB)	
R601	VRD-ST2EE222J	2.2K ohm		12	JKNBR0157AFSF	Key, Record (RT-20H)	AG
R602	VRD-ST2EE332J	3.3K ohm			JKNBR0157AFSH	Key, Record (RT-20HB)	
R701, } R702 }	VRD-ST2EE563J	56K ohm		13	JKNBZ0172AFSB	Button, Clock Adjustment, Alarm Set Adjustment, Tape Counter, Time Counter and Tape Remain (RT-20H)	AB
R703	VRD-ST2EE682J	6.8K ohm			JKNBZ0172AFSC	Button, Clock Adjustment, Alarm Set Adjustment, Tape Counter, Time Counter and Tape Remain (RT-20HB)	AB
R704	VRD-ST2EE563J	56K ohm		14	JKNBZ0174AFSB	Button, Clock/Alarm Set Hour Adjustment, Clock/Alarm Set Minute Adjustment, Clock Minute Zero Set, Tape Counter Reset, Time Counter Reset, Tape Type (C-46/C-60/C-90) Selector and Time Counter/ Tape Remaining Time Hold (RT-20H)	AB
R705	VRD-ST2EE273J	27K ohm			JKNBZ0174AFSC	Button, Clock/Alarm Set Hour Adjustment, Clock/Alarm Set Minute Adjustment, Clock Minute Zero Set, Tape Counter Reset, Time Counter Reset, Tape Type (C-46/C-60/C-90) Selector and Time Counter/ Tape Remaining Time Hold (RT-20HB)	AB
R706	VRD-ST2EE563J	56K ohm					
R707	VRD-ST2EE683J	68K ohm					
R708	VRD-SU2EE392J	3.9K ohm					
R709	VRD-ST2EE103J	10K ohm					
R710, } R711 }	VRD-ST2EE823J	82K ohm					
R712	VRD-ST2EE332J	3.3K ohm					
R713	VRD-ST2EE222J	2.2K ohm					
R714	VRD-SU2EE223J	22K ohm					
R715	VED-ST2EE303G	30K ohm, 1/4W, ±2%, Carbon					
R716	VRD-ST2EE561J	560 ohm					
R717	VRD-ST2EE332J	3.3K ohm					
R718	VRD-ST2EE223J	22K ohm					
R719	VRD-ST2EE222J	2.2K ohm					
R720	VRD-ST2EE122J	1.2K ohm					
R721	VRD-ST2EE223J	22K ohm					
R722	VRD-ST2EE102J	1K ohm					
R723	VRD-SU2EE102J	1K ohm					
R724	VRD-ST2EE103J	10K ohm					
R725	VRD-ST2EE104J	100K ohm					
R726	VRD-SU2EE102J	1K ohm					
RESISTOR ARRAYS							
RA701, } RA702, } RA703 }	RMPTC0032AFZZ	56K ohm x 5	AC				
MISCELLANEOUS							
1	GCAB-3093AFSA	Cabinet	AN	15	LANGF0545AFZZ	Bracket, Flywheel	AD
2	GCOVA1186AFSA	Window, Cassette Compartment	AF	16	LANGF0569AFFW	Bracket, Function Key Shaft, Left Side	AC
3	GCOVA1203AFSA	Cover, Fluorescent Display Panel	AW	17	LANG F0570AFFW	Bracket, Function Key Shaft, Right Side	AC
4	GFTAC1120AFSA	Cassette Holder (RT-20H)	AF	18	LANGK0240AFZZ	Bracket, Power Supply P.W.B.	AB
	GFTAC1120AFSB	Cassette Holder (RT-20HB)	AF	19	LANGQ0744AFZZ	Bracket, Record Level Control Retainig	AD
5	HDECA0410AFSA	Decoration Plate, Fluorescent Display Panel (RT-20H)	AE	20	LBSHC0002AGZZ	Bushing, AC Supply Lead, for UK	AB
	HDECA0410AFSC	Decoration Plate, Fluorescent Display Panel (RT-20HB)	AE		LBSHC0004AGZZ	Bushing, AC Supply Lead	AB
6	HDECZ0063AFSA	Mirror Sheet, Cassette Compartment	A A		LBSHC0007AFZZ	Bushing, AC Supply Lead	AB
7	HPNLC1321AFSA	Front Panel (RT-20H)		21	LBSHZ0054AFZZ	Spacer, Auto-Stop Sensor Lever	A A
	HPNLC1321AFSB	Front Panel (RT-20HB)		22	LCHSM0329AFZZ	Mechanism Chassis	
8	JKNBM0314AFSD	Knob, Alarm Switch (RT-20H)	AC	23	LCHSM0367AFZZ	Main Chassis (Rear Panel)	
	JKNBM0314AFSC	Knob, Alarm Swtich (RT-20HB)	AB	24	LCHSS0149AFZZ	Mechanism Sub-chassis	
				25	LHLDW1068AFZZ	Nylon Band, 100mm	A A
				26	LH LDW1 075AFZZ	Nylon Band, 60mm	A A

PARTS LIST

[illegible]