SERIAL NO. 3144

ONKYO® SERVICE MANUAL

STEREO CASSETTE

TAPE DECK

MODEL TA-R77

UDN, UDC, UD	120V AC, 60Hz
UGV, UG	220V AC, 50Hz
UW	120 or 220V AC, 50/60Hz
UQA, UQB	240V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MESUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

Track system:	4-track, 2-channel stereo
Recording System:	AC bias
Erasing System:	AC erase
Tape Speed:	4.8 cm/sec
Wow and Flutter:	0.04%(WRMS)
Frequency Response:	20—16,000 Hz (Normal) (30—15,000 Hz ±3 dB) 20—18,000 Hz (High) (30—17,000 Hz ±3 dB) 20—20,000 Hz (Metal) (30—18,000 Hz ±3 dB)
S/N Ratio:	Dolby NR out: 60dB (metal position tape) A noise reduction of 10 dB above 5 kHz and 5 dB at 1 kHz is possible with Dolby B. A noise reduction of 20 dB at 5 kHz is possible with Dolby C.
Input Jacks:	Line IN: 2 Minimum input level: 50 mV Input impedance: 50 kohms DIN Jack: 1 Minimum input level: 0.1 mV/1 kohm Input impedance: 2.7 kohms

Output Jacks:	Line OUT: 2 Std output level: 500 mV (0 dB) Opt load impedance: over 50 kohms DIN Jack: 1 Standard output level: 500 mV (at 0 dB) Opot load impedance: over 50 kohms
Motors:	DC motor: 3
Heads:	Sendust rec/pb head: 1 Ferrite erase head: 1
Semiconductors:	TR: 65 Diodes: 35 IC: 10 LED: 18
Power supply:	AC 220 V/50 Hz, 120/220 V, 50/60 Hz, and 240 V/50 Hz
Power Consumption:	30 watts
Dimensions:	435(W) x 112(H) x 371(D) mm (17-1/8" x 4-3/8" x 14-5/8)"
Weight:	6.7 kg. (14.8 lbs.)

Specifications and external appearance are subject to change without notice because of product improvements.

FEATURES

Quick Reverse Operation With Photo Sensor

A newly developed photo sensor is used to detect the point where the direction of tape transport is reversed. This system makes it possible to perform transport reversal in about 0.9 seconds. Since tape transport is virtually uninterrupted, quick reverse is ideal for continuous side A-side B playback and recording as well as endless playback for background music.

Microcomputer-Controlled 3-Motor System

The tape transport system, along with the heads, determines the performance level of a cassette deck. To guarantee extermely stable and accurate transport, the TA-R77 uses a DC servo-controlled capstan motor. This motor is unaffected by fluctuations in the power supply voltage and frequency or instantaneous changes in load. A highly reliable, simple drive transmission system and a precision vertical cassette holder further enhance overall accuracy and stability. As a result, wow and flutter is 0.04%. In addition, separate DC motors drive the reel tables and head base. For extraconvenience, the head assembly is constructed to move silently with no annoying clicks.

Auto Space Rec Mute Button

Press this button while you're making a recording to automatically enter a blank section of tape about five seconds long. Once the blank section has been entered, the TA-R77 will automatically switch to the REC-PAUSE mode. To continue recording, simply press the PLAY button. This function is useful for temporarily interrupting recording, editting tape during dubbing and inserting unrecorded sections long enough for the AMCS circuit to detect.

Dolby B and C Noise Reduction

Along with standard Dolby B NR, the TA-R77 also has the even more effective Dolby C NR system. Dolby C NR reduces tape background noise by 20 dB at 5 kHz, about 3 times more than Dolby B NR. In addition to its wide band noise reduction, Dolby C NR uses a sliding band technique that varies the band width of noise reduction according to the input level, thereby avoiding noise "pumping." Dolby C NR also has an anti-saturation effect to reduce the chance of tape saturation in the high range. All these features combine to eliminate the adverse effects on tape sound that other noise reduction systems can cause.

Auto Music Control System (AMCS)

TA-R77 has an AMCS function which automatically locates the beginning of every song on a cassette in either the forward or reverse direction. When the AMCS button is pressed during the forward play mode, tape is rapidly wound to the beginning of the next song and the first 10 seconds (approximately) is played. Then the tape is rapidly wound forward to the beginning of the next song and about 10 seconds is played. This process continues until the FORWARD PLAY button is pressed to cancel AMCS and return to normal palyback. When the AMCS button is pressed during the reverse play mode, this process is performed in the reverse direction.

Bright Peak Level Meters

The left and right peak level meters react instantaneously to signals and the two-color layout assures that you won't miss any potentially harmful input signals when setting the recording level.

Erasure Prevention Tab Monitor

The absence or presence of the erasure prevention tabs for cassette sides A and B is automatically detected and displayed. This assures that there will be no mistakes when you're about to make an im portant recording.

SERVICE PROCEDURES

1. Replacing the lamps

This unit uses the lamps listed below.

Circuit No.	Parts No.	Description
PL901	210165	14 V, 150 mA, Dial plate illumination
PL902	210149	PL14V0. 06AW-3.0, Power indicator
	210169	PL14V0. 06AW-3.0, Power indicator (Black type)

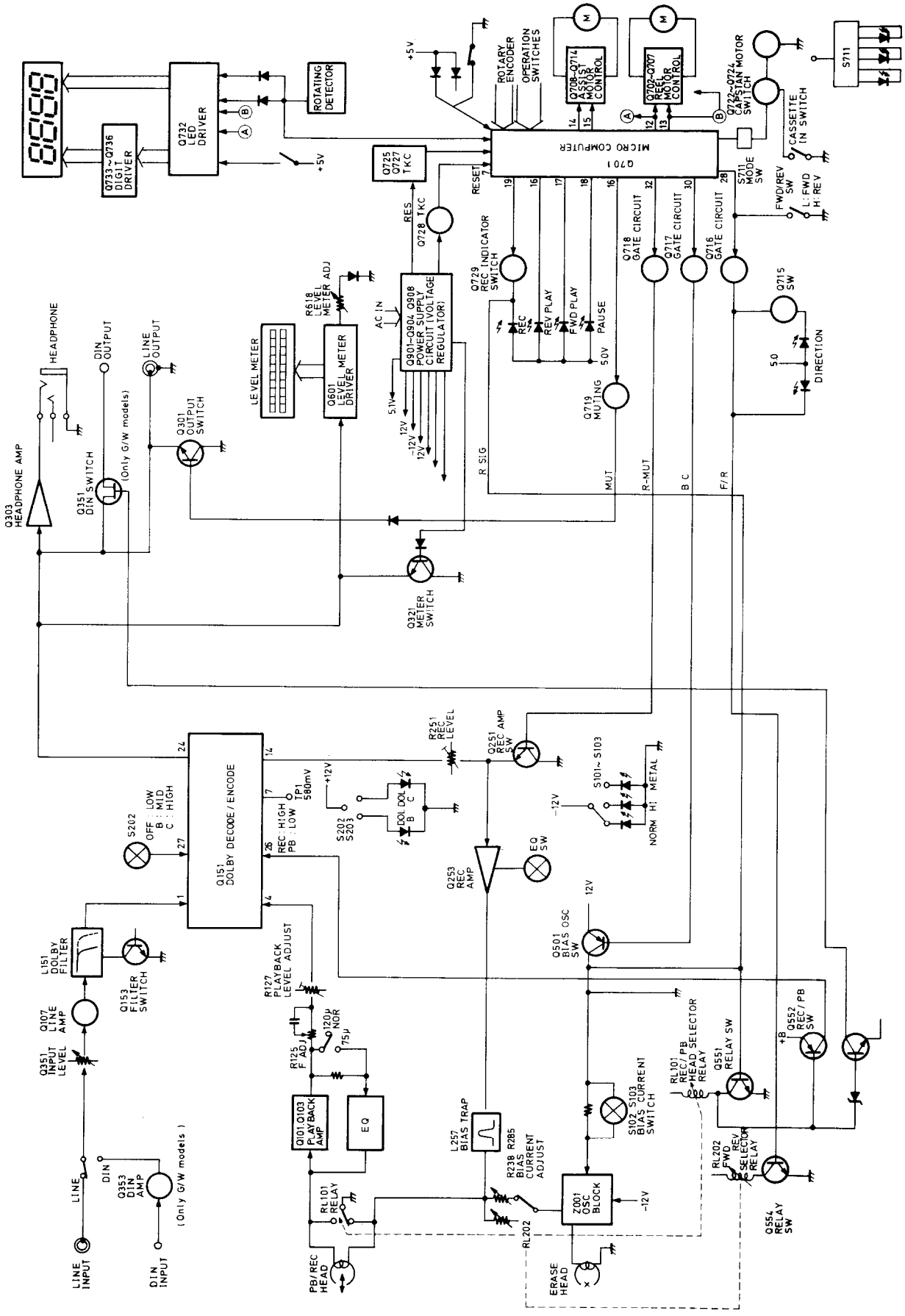
Caution; Before replacing the lamps, be sure to unplug the power supply cable.

2. Insulation resistance mesurement

Connect the insulating-resistance tester between the plug of power supply cord and chassis.

Specifications;	D model	500 V 3.3±0.33 MΩ
	G/W models	500 V more than 10 MΩ

BLOCK DIAGRAM



MECHANISM OPERATIONS

The rotations of the assist motor are transmitted via the worm gear simultaneously to the cam that raises and lowers the head base, the brake cam and the head reversal cam. Figures 1, 2 and 3 show the configuration of each cam. The sections in the diagrams in which the name of an operation is written within the angular range of that operation indicate the effective operating range of the cam for that particular operation. The — mark indicates that operation is prohibited since the positions of the head base and brake panel are not fixed. The rotary encoder shown is Fig. 4 detects each angular operation range and the 4-bit data, a, b, c and d, are obtained from this encoder. The microcomputer uses these data to check the position of the mechanism and drive the assist motor to the correct position. The relationship between rotary encoder output and the mechanism position is shown in Fig. 5.

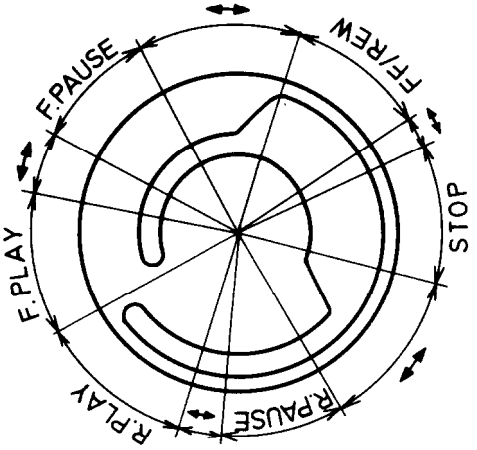


Fig. 3 Head reversal cam

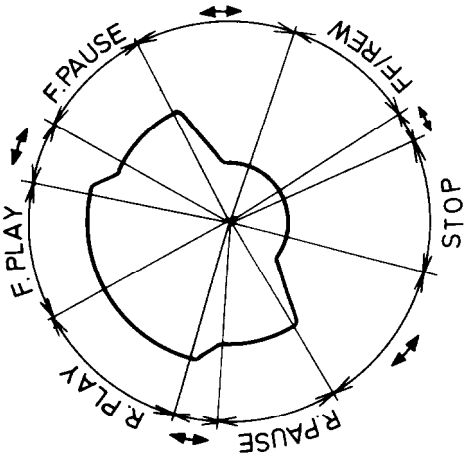


Fig. 1 Head base up-down cam

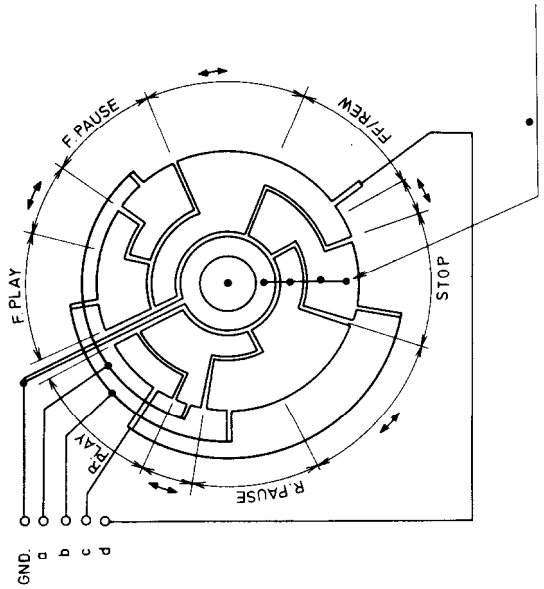


Fig. 4 Rotary encoder

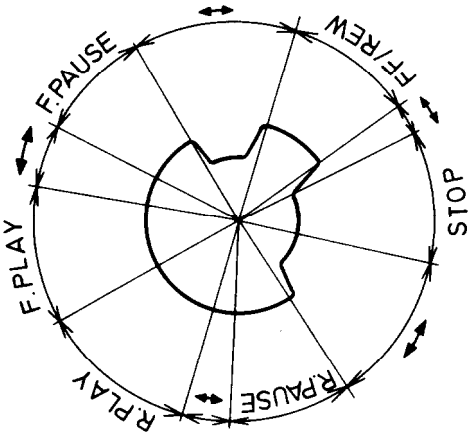
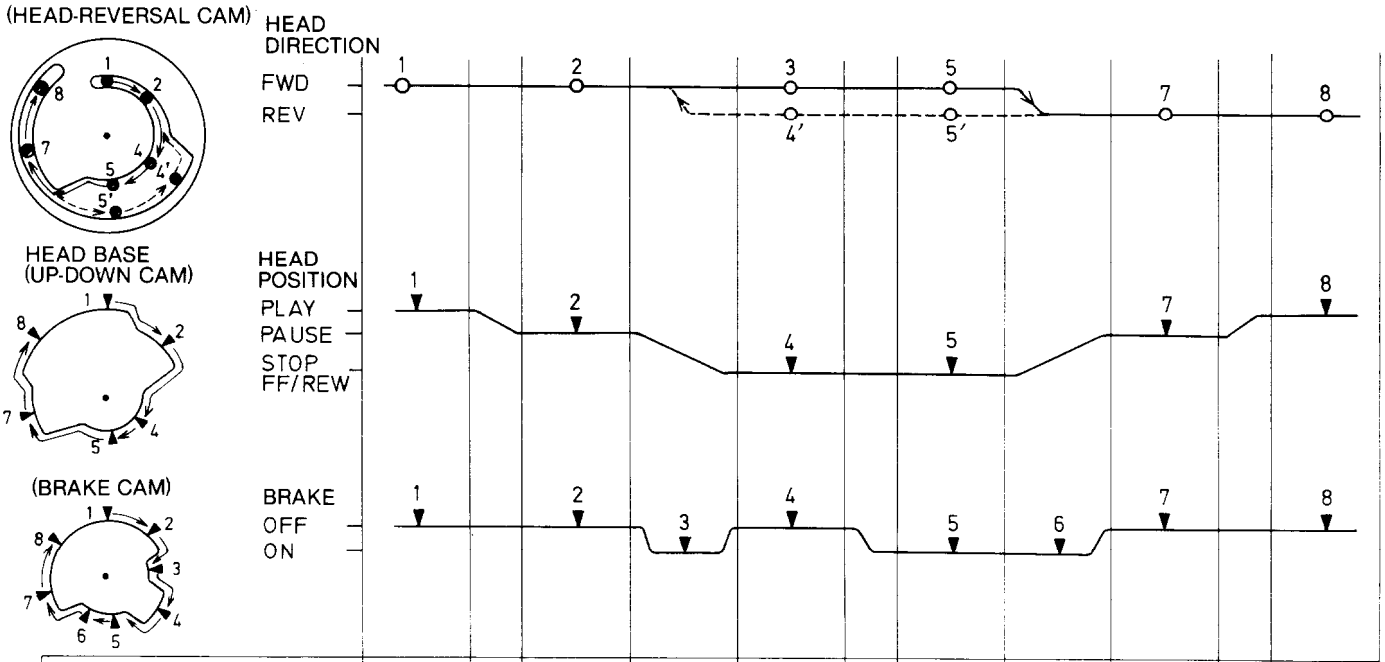


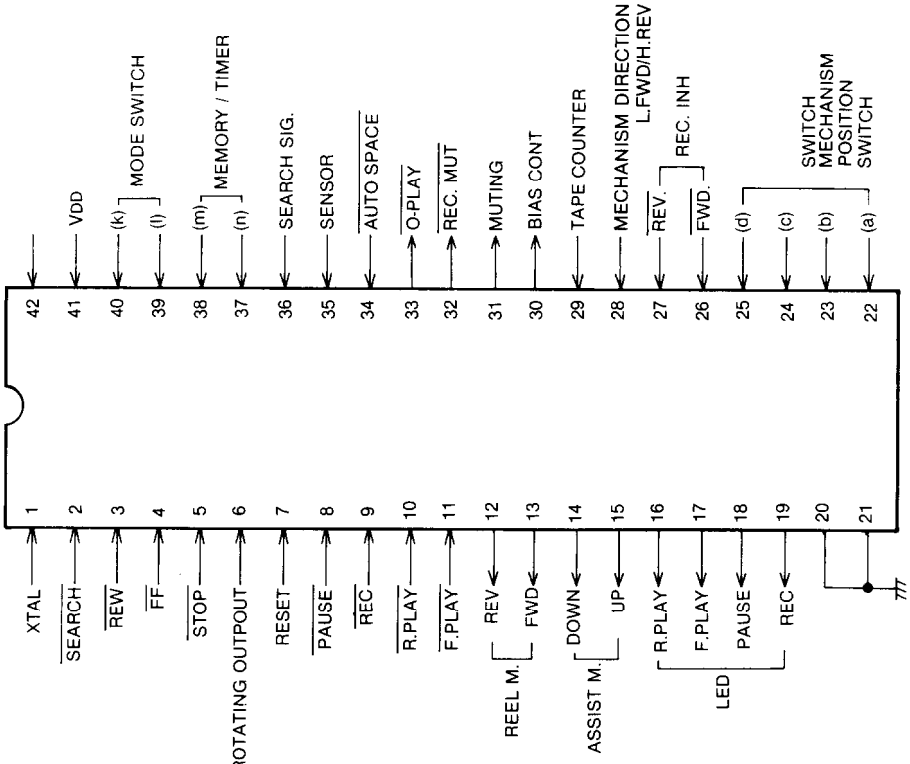
Fig. 2 Brake cam



		F. PLAY	↔	F. PAUSE	↔	FF/REW	↔	STOP	↔	R. PAUSE	↔	R. PLAY
	16	5	4	6	7	3	1	9	D	C	E	A
	S774 d	0	0	0	0	0	0	1	1	1	1	1
	S773 c	1	1	1	1	0	0	0	1	1	1	0
0: SWITCH ON 0V	S772 b	0	0	1	1	1	0	0	0	0	1	1
1: SWITCH OFF 5V	S771 a	1	0	0	1	1	1	1	1	0	0	0

Fig. 5

MICRO COMPUTER
LM 6402 (L)



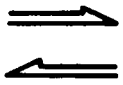
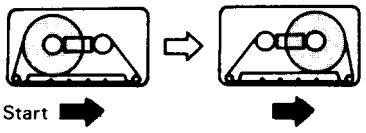
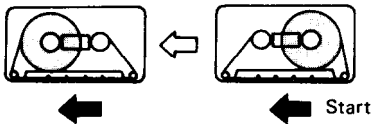
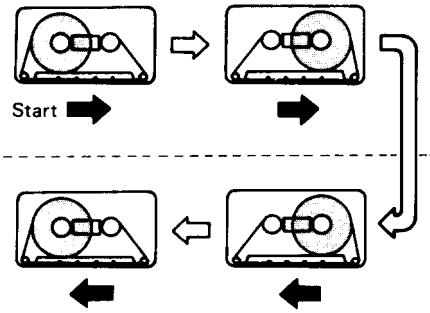
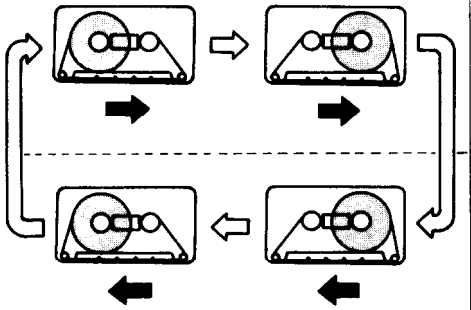
OPERATION MODE

k	l	m	n	MEM/TIM
0	0	0	0	TIMER REC
0	1	0	1	TIMER PLAY
1	0	1	0	MEMORY PLAY
1	1	1	1	MEMORY STOP & OFF

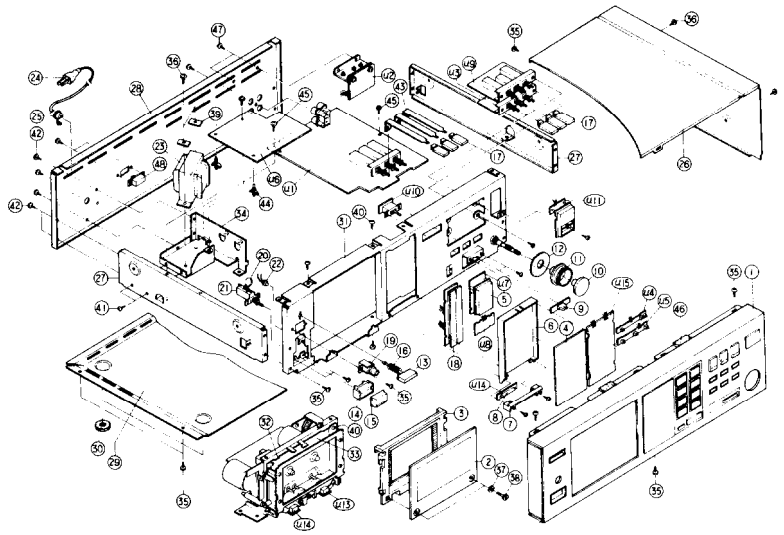
SPECIAL MODES OF OPERATION

MODE SELECTOR GUIDE

- Confirm the current tape travel direction setting with the direction indicator before beginning playback or recording.
- The following explanations assume that the cassette side A is facing outward.
- Due to the location of the photo sensor, the transparent leader must go by the heads before it is sensed for reverse-to-forward switching. As a result, the silent gap is about 1 second longer than the forward-to-reverse switching gap.

Mode Selector Button		Tape Travel	Playback	Recording
One side		Only forward 	Press ► forward play button Only side A (front) is played (once).	Press ● REC button and ► forward play button at the same time. Only side A (front) is recorded.
		Only reverse 	Press ◄ reverse play button . Only side B (rear) is played (once).	Press ● REC button and ◄ reverse play button at the same time. Only side B (rear) is recorded.
Two sides (only forward to reverse)			Press ► forward play button to begin playback in the forward direction. Side A and then B are played after which tape travel automatically stops.	Press ● REC button and ► forward play button at the same time. Side A and then B are recorded after which tape travel automatically stops.
			If playback is started in the reverse direction, only side B is played after which tape travel automatically stops.	If recording is started in the reverse direction, only side B is recorded after which tape travel automatically stops.
Continuous			Press ► forward play button . Sides A and B are played five times or until ■ STOP button is pressed.	Press ► forward play button and ● REC button at the same time. Side A and then side B are recorded after which tape travel automatically stops. If recording is started in the reverse direction, only side B is recorded.

CHASSIS-EXPLODED VIEW



REF. NO.		PARTS NO.	DESCRIPTION
1		16088121	Front panel ass'y
		16069121	Front panel ass'y (B)
2		28400131B	Window
		28400132A	Window (B)
3		16088901	Cassette lid ass'y
4		28191170A	Clear plate
5		28199086A	Film
6		27190194	Holder, LED
7		27300532	Holder for 6
8		210165	14 V, 150 mA, Lamp,dial plate, Illumination
9		28321035	Knob, timer
		28321028	Knob, timer (B)
10		28321033	Knob, input level L
		28321034	Knob, input level L (B)
11		28321031	Knob, input level R
		28321032	Knob, input level R (B)
12		28140185	Cushion
13		28321027	Knob, eject
		28321028	Knob, eject (B)
14		28320828B	Knob, base
15		28321023	Knob, power
		28321024	Knob, power (B)
16		2780179	Spring
17		28321073A	Knob, band
		28321074A	Knob, band (B)
18		225129	Level meter
19		25045124	Stereo headphone jack
		25045132	Stereo headphone jack (B)
20	⚠	3500065A	DE7150FZ10-3PAC400V, Capacitor IS
21	⚠	25035224	NPS-121-L188P, Power switch (D)
	⚠	25035192	NPS-122-L156P, Power switch (G)
	⚠	25035207	NPS-121-L171P, Power switch (W)
22		210169	14V60mA, Lamp, power indicator
		210149	14V, 60mA, Lamp, power indicator (B)
23	⚠	230689	NPT-807D, Power transformer (D)
	⚠	230690	NPT-807G, Power transformer (G)
	⚠	230691	NPT-807DG, Power transformer (W)
24	⚠	253099B	AS-UC-3, Power supply cord (D)
	⚠	253083	AS-CEE, Power supply cord (G/W)
25	⚠	270025	SR-3P-4, Strainrelief (D)
		270280	SR-4K-4, Strainrelief (G/W)
26		28184180	Top cover
		28184181	Top cover (B)
27		27115139	Side bracket
28		27120472	Back panel (D)
		27120473	Back panel (G)
		27120474	Back panel (W)
29		27170150	Bottom board
31		27110193A	Front bracket
32		244046	Tape mechanism ass'y
33		27300534	Cassette panel
		24610634A	Tube, light
34		2713033B	Bracket, power transformer
35		834420068	3TTS + 6B(BC), Tapping screw
36		838440089	4TTB + 8C(BC), Tapping screw
37		870100	Washer
38		27300397-1A	Special screw
39		870065	Special washer
40		834426068	2.6TTS + 6B(BC), Tapping screw
41		838130088	3TTB + 8B, Tapping screw
42		801230	3TTS + 8B(BC), Tapping screw
43		27273022	Joint C
44		27190009	Holder
45		831430088	3TTW + 8B(BC), Tapping screw
46		28140408	Cushion
47		834430108	3TTS + 10B(BC), Tapping screw
48		25065123	NSS-1258P, Voltage selector switch
U1		16088534	NAAF-1634, Rec. and playback amplifier pc board ass'y (D)
		16094534A	NAAF-1634a, Rec., playback and DIN amplifier pc board ass'y (G/W)
U2		16088535	NAPS-1635, Power supply circuit pc board ass'y
U3		16088536	NASW-1636, Dolby switch pc board ass'y
U4		16088537	NALED-1637, Dolby indicator LED pc board ass'y
U5		16088538	NALED-1638, Tape selector indicator LED pc board ass'y
U6		16088539	NACOC-1639, Controller pc board ass'y
U7		16088540	NAIND-1640, Indicator LED pc board ass'y
U8		16088541	NALED-1641, Tape counter indicator LED pc board ass'y
U9		16088542	NASW-1642, Mode switch pc board ass'y
U10		16088543	NASW-1643, Timer switch pc board ass'y
U11		16088544	NALED-1644, TAB indicator LED pc board ass'y
U12		16088545	NALED-1645, Direction indicator LED pc board ass'y
U13		16088546	NALED-1646, Direction indicator LED pc board ass'y
U14		16088547	NAPL-1647, Lamp pc board ass'y
U15		16088548	NASW-1648, Operation switch pc board ass'y

Note: (D): 120 V model
(G): 220 V model
(W): 120/220 V model
(B): Black model

NOTE: The components identified by mark ⚠ are critical for risk of fire and electric shock. Replace only with parts number specified.

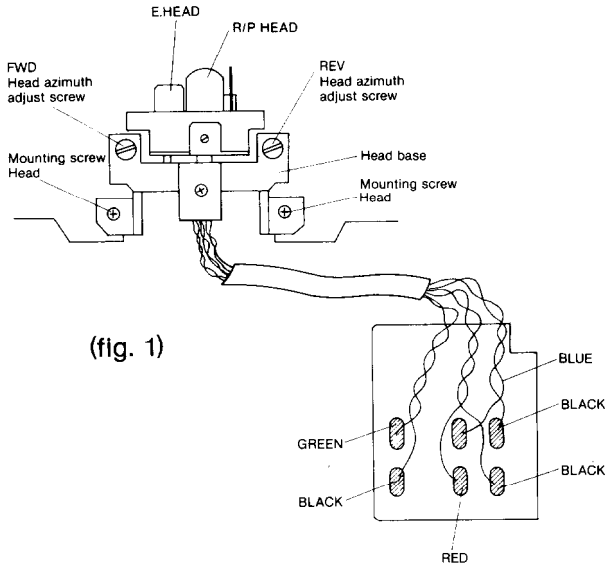
ADJUSTMENT PROCEDURES

PRECAUTIONS

1. Before adjustment, clean the following parts with an alcohol moinstend swab.
   * record/playback head
   * erase head
   * pinch roller
   * capstan
   * rybber belt
2. Do not use magnetized screwdriver for adjustments.
3. Demagnetize record/playback head with a head demagnetizer.
4. The switches and controls should be set as follows unless otherwise specified.
   TAPE SEL.....NORM
   DOLBY NR.....OUT
   INPUT LEVEL.....0
   TIMER/MEMORY.....OFF

TEST EQUIPMENT/TOOLS REQUIRED:

Audio oscillator
Digital frequency counter
Oscilloscope
Attenuator
AC voltmeter
Non-magnetic screw driver
Blank tapes (completely erased)
   NORMAL.....UD-XL/I
   HIGH.....UD-XL/II
   METAL.....MX
Test tapes
   VTT-658 : 10 kHz,—15 dB
   MTT-111 : 3 kHz,—10 dB
   MTT-150 : Dolby level calibration 400 Hz tone 200 nWb/m
   MTT-215C : 315 Hz, 10 kHz
   TW-2111 : Torque meter
   MC-12C : Mirror tape



(fig. 1)

1. **Tape speed adjustment**
   Connect the frequency counter to the line outpout terminal.
   Play the MTT-111 back.
   Adjust the semi-fixed resistor on the motor control pc board so that the counter indication becomes 3,000Hz.

2. **Play torque adjustment**
   Play the torque meter TW-2111 back.
   Adjust the R703 so that the torque of take-up reel becomes 40 gr-cm.

3. **Head azimuth adjustment**
   Play the test tape VTT-658 back.
   Adjust the head azimuth screws so that the AC voltmeter reads maximum.
   See fig. 1

4. **Playback frequency adjustment**
   Connect the AC voltmeter to the line output terminal. Play the MTT-215C back. Adjust the R125 and R126 so that the 315 Hz and 10 kHz signal level become same.

5. **Playback output level adjustment**
   Connect the AC voltmeter to the TP151 and TP152 terminals. Play the MTT-150 back.
   Adjust the R127 and R128 so that the indication of AC voltmeter becomes 580 mV.

6. **Level meter adjustment**
   Play the MTT-150 back.
   Adjust the R618 so that the 0 dB of level meter light on.

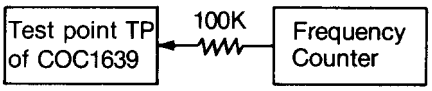
7. **Recording bias adjustment**
   Insert the normal blank tape into the cassette holder. Press the recording and pause buttons together and put the casstte deck into the recording mode. Apply the 400 Hz signal to line-in terminal. Adjust the input level volume so that the 0 dB indicator light up. Then set the attenuator for—10 dB input level. Release the pause button and record on the tape. Next change the frequency of the 10 kHz and record again. Adjust the R823 (REV L ch.), R824 (REV R ch.), R825 (FWD L ch.) and R826 (FWD R ch.) so that the 400 Hz and 10 kHz playback level become same.

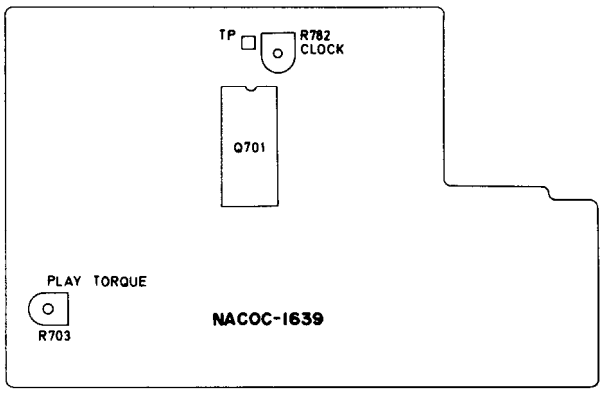
8. Recording level adjustment

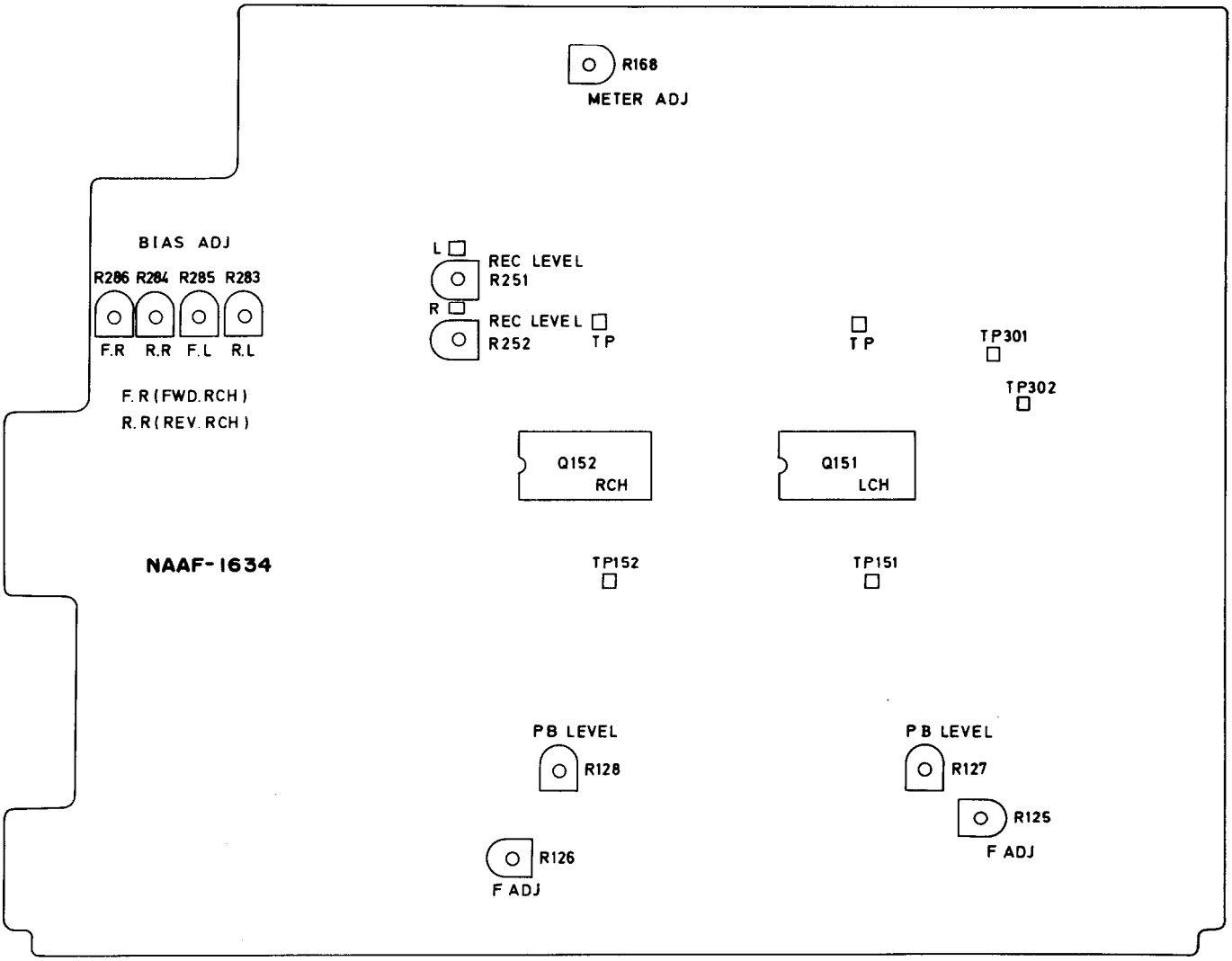
Insert the normal blank tape into the cassette holder. Apply the 1,000 Hz signal to line-in terminal. Put the cassette deck into the recording mode. Adjust the input level volume so that the voltmeter reads 350 mV. Record on the tape. Adjust the R251 (L ch.) and R252 (R ch.) so that the playback level becomes 350 mV ±0.5 dB.

9. Clock adjustment

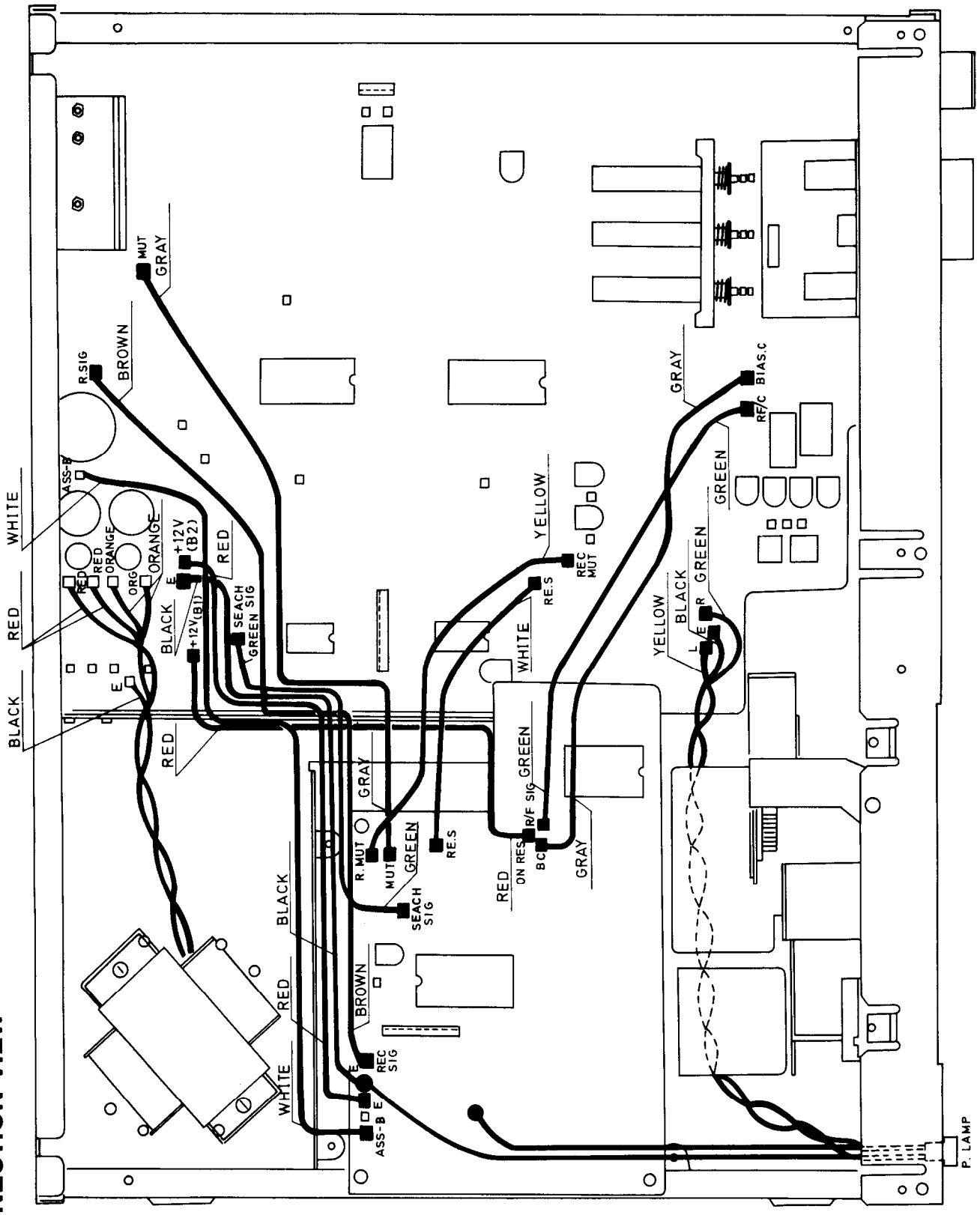
Connect the frequency counter via the resistor 100 kΩ to the TP terminal on the control pc board. Adjust the R782 so that the frequency counter indication becomes 170 ±10 kHz.



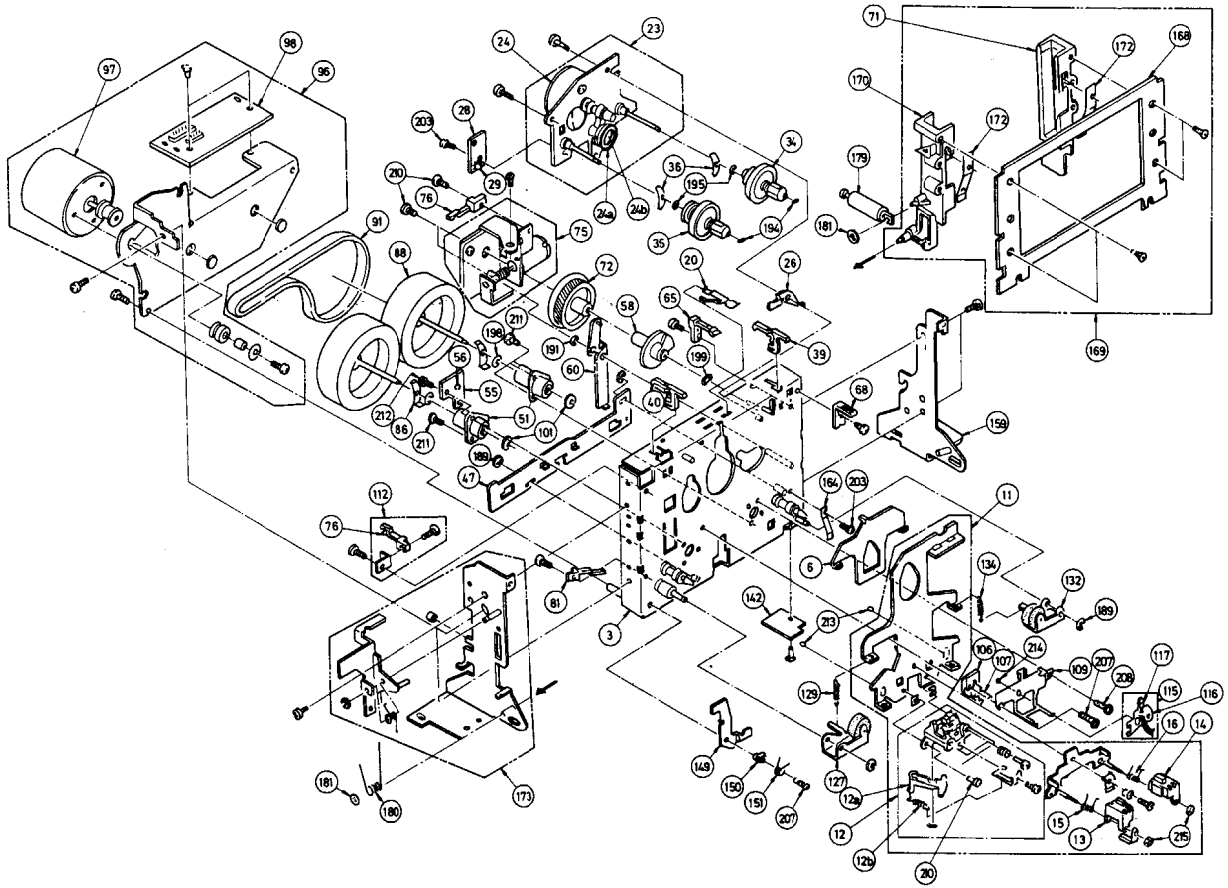




CONNECTION VIEW

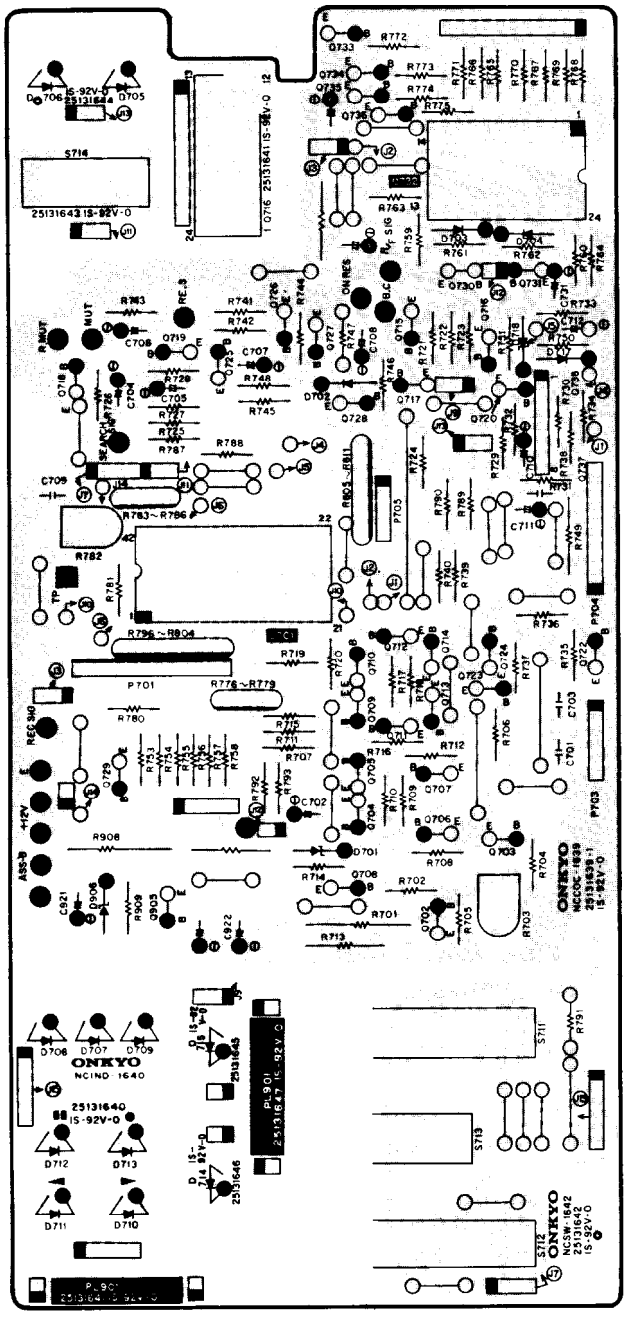


TAPE MECHANISM-EXPLODED VIEW



REF. NO.	PARTS NO.	DESCRIPTION
3	24610932	Mechanism chassis
6	24610931	Brake plate ass'y
11	~~24600039~~	Head base
12	24600038	Head
12a	24610947	Inverse wheel
12b	24605459	Spring
13	24610945	Tape guide ass'y
14	24610946	Tape guide
15	24605457	Tension spring L
16	24605458	Tension spring R
20	24605450	Cassette holding spring
23	24601134	Mounting plate, motor
24	24601106A	Reel motor ass'y
~~24a~~	24602225	Idler wheel
~~24b~~	24610822	Washer
26	24603270	Lever, brake
28	24606162	Hall IC pc board ass'y
29	2225588	DN6838, Hall IC
34	24602136	Take-up reel ass'y
35	24602219	Supply reel ass'y
36	24605303	Back tension spring
39	24603271	Recording lever R
40	24603205	Recording lever
47	24603272	Slide lever
51	24610934	Capstan stand
55	24606163	L.E.D pc board ass'y
56	24606172	L.E.D
58	24602220	Cam
60	24603273	Switching lever ass'y
65	24606164	Leaf switch
68	24610659A	Protection plate
72	24602221	Rotary gear
75	24601136	Motor ass'y
76	24603129	Leaf switch
81	24606166	Leaf switch
86	24605436	Spring, thrust
88	24602135	Flywheel
91	24602222	Flat belt
96	24601137	Capstan motor ass'y
97	24601139	Capstan motor
98	24606171	Motor controller pc board ass'y
101	24610673	Washer
106	24610935	Base, guide
107	24610936	Guide
109	24610937	Head holding plate
112	24606167	Leaf switch
115	24606168	Lamp holder ass'y
116	24610498	Lamp holder
117	23606173	Lamp
127	24602223	Pinch arm R
129	24605453	Tension spring
132	24602224	Pinch arm F
134	24605454	Tension spring
142	24606169	Connector
146	260208	Binder
149	24610938	Lock plate
150	24604052	Collar
151	24605455	Spring
159	24610939	Side bracket
164	24605188	Spring, cassette
168	24610949	Mounting plate
169	24610940	Cassette holder ass'y
170	24610848	Holder L
171	24610849	Holder R
172	24605463	Cassette spring
173	24610941	Side bracket L
179	24610942	Damper unit
180	24605456	Tension spring
181	891024	Circlip
189	893020	E2, Circlip
190	893025	E2.5, Circlip
191	893030	E3, Circlip
194	24610349	1.8x4.7x0.25, Washer
195	24610792	Washer
198	24610515	2.6x4.7x0.25, Washer
199	24610944	4.1x5.8x0.1, Washer
203	801292	2x3.2, Truss screw
205	833125059	2.5x5, Pan head machine screw
207	833125069	2.5x8, Pan head machine screw
208	833130049	3x4, Pan head machine screw
210	801250	2x4, Pan head machine screw
211	833126057	2.6x5, Pan head tapping screw
212	833126067	2.6x6, Pan head tapping screw
213	24610351	ø2, Steelball
214	24610279	ø3, Steelball
215	863120	Nut

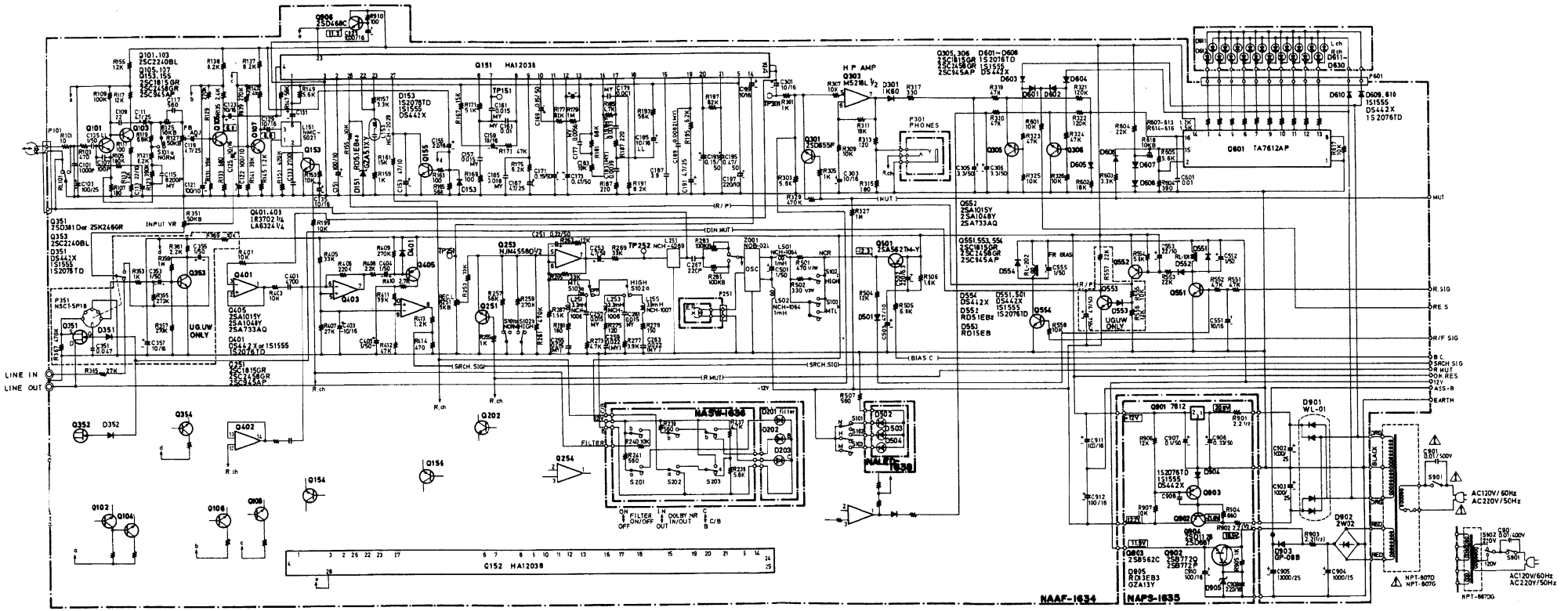
PC BOARD VIEW FROM COMPONENT SIDE



REC., AND PLAYBACK AMPLIFIER PC BOARD (NAFF-1634)

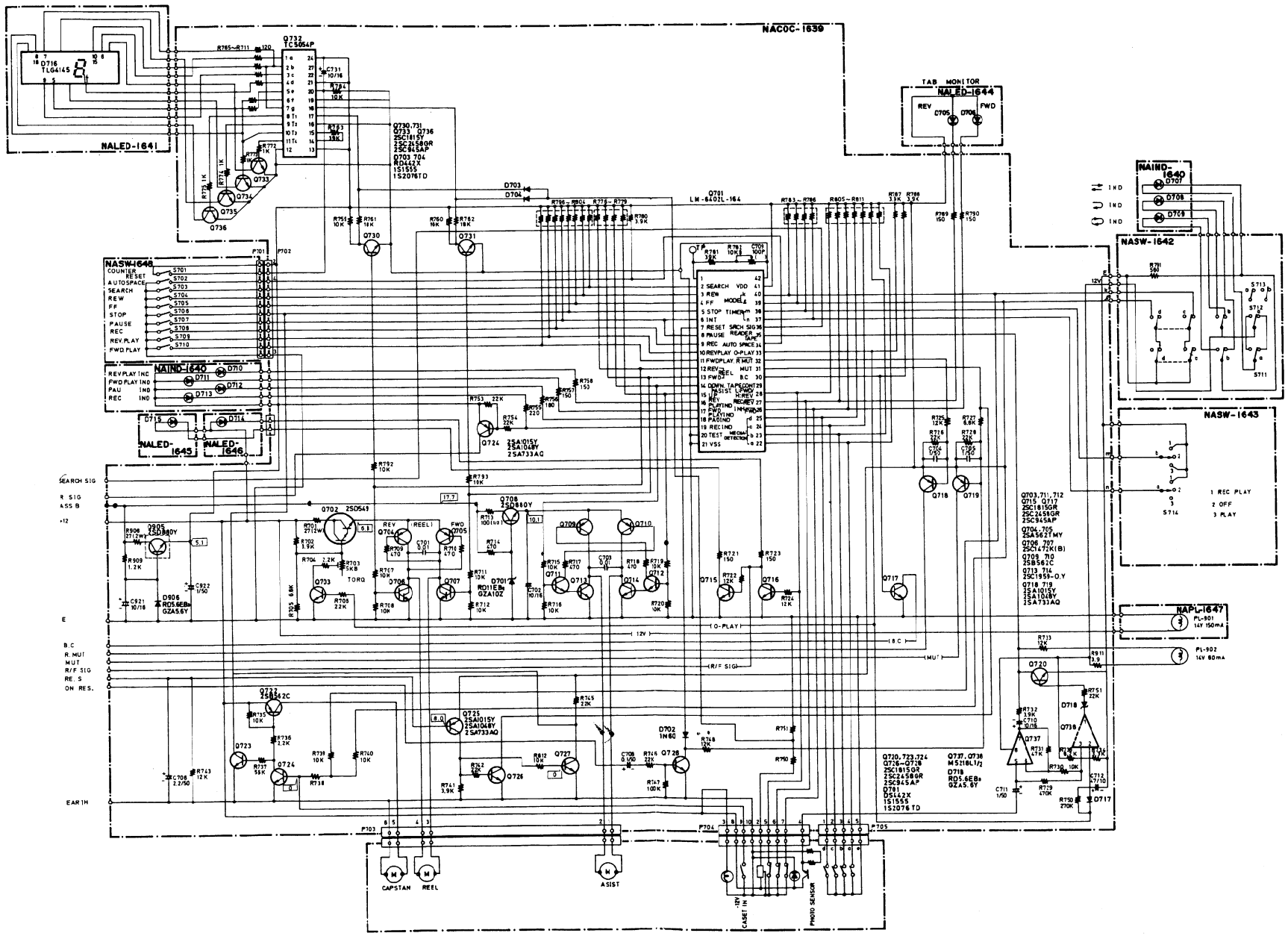
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q151,Q152	222668	HA-12038, Dolby
Q253,Q254	222465	NJM-455'D
Q303,Q304	222652	M-5218L
Q401-Q404	222604 or	LM324N or
	222695	LA6324
Q601	222507	TA7612-AP
	Transistors	
Q101-Q104	2211406	2SC2240(BL)
Q105-Q108	2212115,	2SC2458(GR),
Q153-Q156	2210746 or	2SC945A(P) or
Q251,Q252	2211255	2SC1815(GR)
Q301,Q302	2211706	2SD655(F)
Q305,Q306	2211255,	2SC1815(GR),
	2212115 or	2SC2458(GR) or
	2210746	2SC945A(P)
Q351,Q352	2212304 or	2SK381(D) or
	2211945	2SK246(GR)
Q353,Q354	2211406	2SC2240(BL)
Q405	2211454,	2SA1015(Y),
	2212124 or	2SA1048(Y) or
	2210804	2SA733A(Q)
Q501	2211554	2SA562TM(Y)
Q551,Q553	2211255,	2SC1835(GR),
Q554	2210746 or	2SC945A(P) or
	2212115	2SC2458(GR)
Q906	2211683	2SD468(C)
	Diodes	
D151,D152	2239452,	RD5.1EB2,
D552	2239453,	RD5.1EB3,
	2240931 or	GZA5.1X or
	2240932	GZA5.1Y
D153,D351	223145,	1W2076TD
D352,D401	223105 or	1S1555 or
D501,D551	223133	DS442X
D301,D302	223132	1K60
D553	223967,	RD15EB,
	2241151,	GZA15X,
	2241152 or	GZA15Y or
	2241153	GZA15Z
D554	223145,	1S2076TD,
D601-D610	223105 or	1S1555 or
	223133	DS442X
D901	223862	WL-01
D902	223868	2W02
D903	223848	GP-08B
	Coils	
L151,L152	233221	NMC-5021
L153,L154	233245	NMC-2029
L251-L254	24606080	NCH-1022
L255,L256	24606069	NCH-1007
L257,L258	233292	NCH-4069
L501,L502	231025	NCH-1064

SCHEMATIC DIAGRAM
LINE INPUT/OUTPUT AMPLIFIER SECTION



NOTES
- ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF, 50WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (⁺⁻) ARE IN μF/WV.
- VOLTAGE (MEASURED WITH V.T.V.M.) (NO INPUT SIGNAL).
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
- THE COMPONENTS IDENTFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.

SCHEMATIC DIAGRAM
CONTROL SECTION



L.E.D. PC BOARDS (NALED-1637/1638/1641/1644/1645/1646)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	(NALED-1637)	
D201	225126	GL-3PR1, L.E.D
D202	225134	GL-3NG1, L.E.D
D203	225134	GL-3NG1, L.E.D
	27270103	Spacer, L.E.D
	(NALED-1638)	
D502-D504	225134	GL-3NG1, L.E.Ds
	27270103	Spacer, L.E.D
	(NALED-1641)	
D716	225148	TLG-4145, L.E.D
	(NALED-1644)	
D705,D706	225137	SEL-2413E, L.E.D
	27250057	Case, lamp
	(NALED-1645)	
D714	225137	SEL-2413E, L.E.D
	27250058A	Case, lamp
	(NALED-1646)	
D715	225137	SEL-2413E, L.E.D
	27250058A	Case, lamp

LAMP PC BOARD (NAPL-1647)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL901	210165	150 mA, 14 V, Lamp

INDICATOR PC BOARD (NAPL-1640)

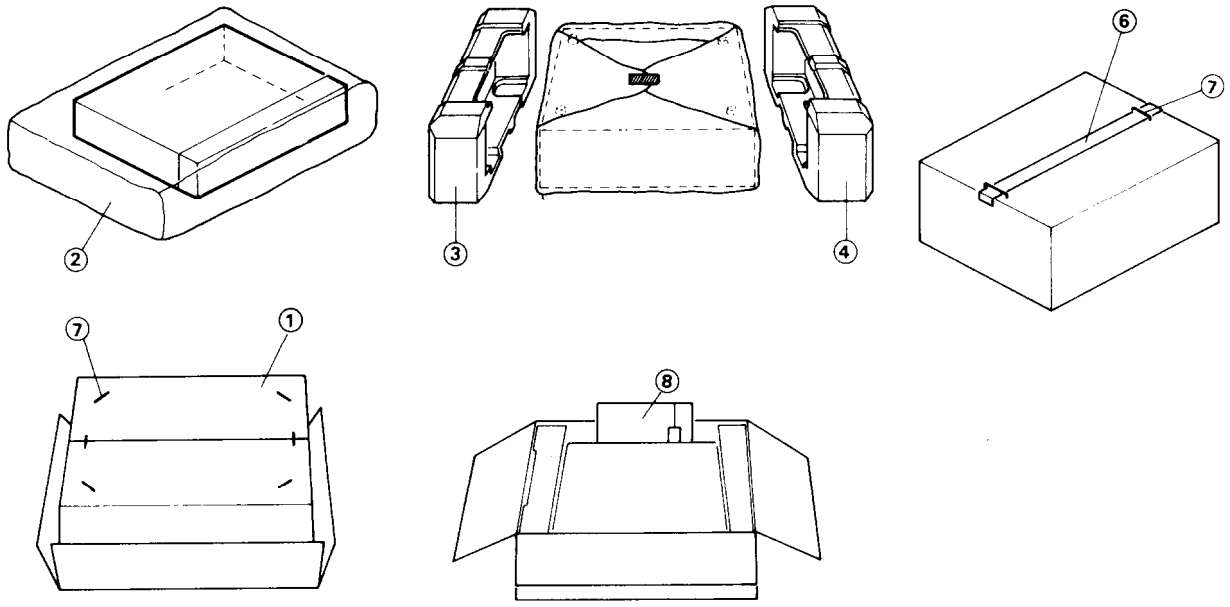
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	L.E.Ds	
D707-D711	225137	SEL-2413E
D712	225142	SEL-2913K
D713	225141	SEL-2213C
	Case	
	27250057	Lamp

CONTROL PC BOARD (NACOC-1639)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q701	222699	LM6402-L-164
Q732	222700	TC5054P, CMOS
Q737,Q738	222652	M5218L
	Transistors	
Q702	2201060	2SD549
Q703,Q711	2211255,	2SC1815(GR),
Q712,Q715	2212115 or	2SC2458(GR) or
Q716,Q717	2210746	2SC945A(P)
Q704,Q705	2211554	2SA562TM(Y)
Q706,Q707	2211952	2SC1472K(B)
Q708	2201074	2SD880(Y)
Q709,Q710	2211563	2SB562(C)
Q713,Q714	2211543 or	2SC1959(O) or
	2211544	2SC1959(Y)
Q718,Q719	211454,	2SA1015(Y),
Q725,Q729	2212124 or	2SA1048(Y) or
	2210804	2SA733A(Q)
Q720,Q723	2211255,	2SC1815(GR),
Q724,Q725	2212125 or	2SC2458(GR) or
Q727,Q728	2210746	2SC945A(P)
Q722	2211563	2SB562(C)
Q730,Q731	2211255,	2SC1815(GR),
Q733-Q736	2212115 or	2SC2458(GR) or
	2210746	2SC945A(P)
Q905	2201074	2SD880(Y)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Diodes	
D701	2239611 or	RD11EB1 or
	2241073	GZA10Z
D702	223132	1K60
D703,D704	223145,	1S2076TD,
D717	223105 or	1S1555 or
	223133	DS442X
D718,D906	2239473 or	RD5.6EB3 or
	2240952	GZA5.6Y
	Capacitors	
C702	352741009	10μF, 16 V, Elect.
C704,C705	352780109	1μF, 50 V, Elect.
C706	352780229	2.2μF, 50 V, Elect.
C708	352781099	0.1μF, 50 V, Elect.
C710	352741009	10μF, 16 V, Elect.
C711	352780109	1μF, 50 V, Elect.
C712	352734709	47μF, 10 V, Elect.
C714	352722219	220μF, 6.3 V, Elect.
C731,C921	352741009	10μF, 16 V, Elect.
C922	52780109	1μF, 50 V, Elect.
	Resistors	
R701	441722704	27Ω, 2W, Metal oxide film
R703	5215044	N08HR5KBC, Semi-fixed
R713	441521004	10Ω, 1/2W, Metal oxide film
R776-R779	49121392404	3.9kΩx4, 1/8W, Network
R783-R786		
R796-R804	49121392408	3.9kΩx8, 1/8W, Network
R805-R811	49121392407	3.9kΩx7, 1/8W, Network
R908	441722704	27Ω, 2W, Metal oxide film
	Sockets	
P704	2000226	NSAS-20P-130
P703	2000227	NSAS-12P-131
P705	2000228	NSAS-12P-132
	Plug	
P701	25055047	NPLG-12P35
	Radiator	
	27160029	

PACKING VIEW



D model

REF. NO.	PARTS NO.	DESCRIPTION
1	29095012-1	500x800mm, Protection sheet
2	29100037A	650x500mm, Poly bag
3	29090769	Pad, right
4	29090770	Pad, left
6	29050648	Master carton box
7	282301	Sealing hook
8	260012	W-500mm, Damplon tape
9		Accessary bag ass'y
	29340675	Instruction manual
	253074	Connection cable
	29365006-1	Warranty card
	29358002	Service station list
	29100005	220x330mm, Poly bag

G/W model

REF. NO.	PARTS NO.	DESCRIPTION
1	29095012-1	500x800mm, Protection sheet
2	29100037A	650x500mm, Poly bag
3	29090769	Pad, right
4	29090770	Pad, left
6	29050648	Master carton box
7	282301	Sealing hook
8	260012	W-500mm, Damplon tape
9		Accessary bag ass'y
	29340676	Instruction manual
	253074	Connection cable
	29365005-3	Warranty card [G]
	25055040	CV-K-2, Conversion plug [W]
	29100005	220x330mm, Poly bag

[G] : Only West Germany model
[W] : Only 120/220 V model

ONKYO CORPORATION
International Division: No.24 Mori Bldg., 23-5, 3-chome, Nishi-Shinbashi, Minato-ku, Tokyo, Japan
Telex: 2423551 ONKYO J. Phone: 03-432-6981
ONKYO U.S.A. CORPORATION
200 Williams Drive, Ramsey, N.J. 07446 Tel. 201-825-7950
ONKYO DEUTSCHLAND GMBH, ELECTRONICS
8034 Müchen-Germering, Industriestrasse 18, West Germany. Telex: 521726 Telefon: (089)-84-3071

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