

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 \triangle 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 MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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 \pm 3 dB) 20—18,000 Hz (High) (30—17,000 Hz \pm 3 dB) 20—20,000 Hz (Metal) (30—18,000 Hz \pm 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:	Sandust 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 extremely 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, editing 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 important 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)

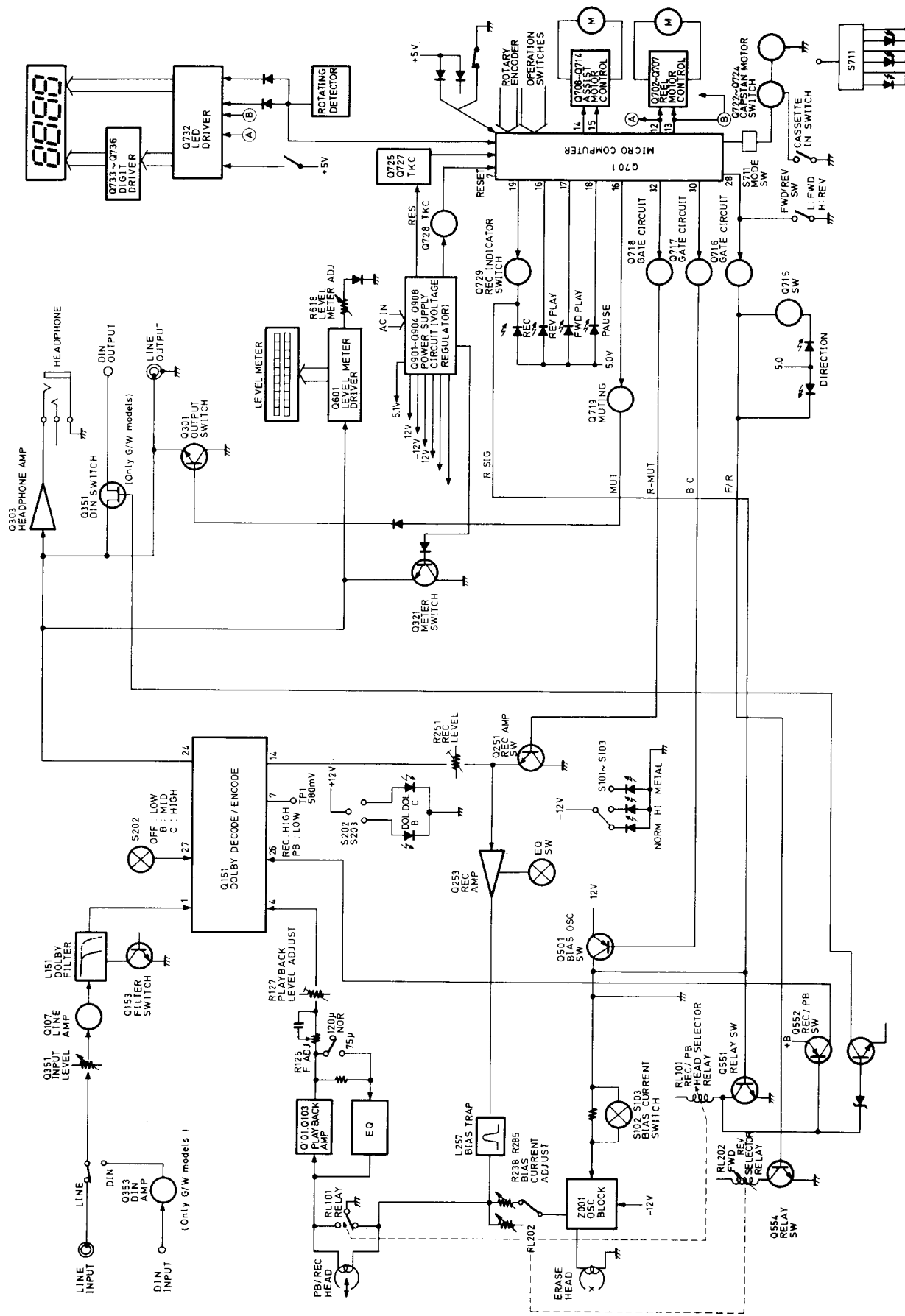
Caution; Before replacing the lamps, be sure to unplug the power supply cable.

2. Insulation resistance measurement

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 in 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.

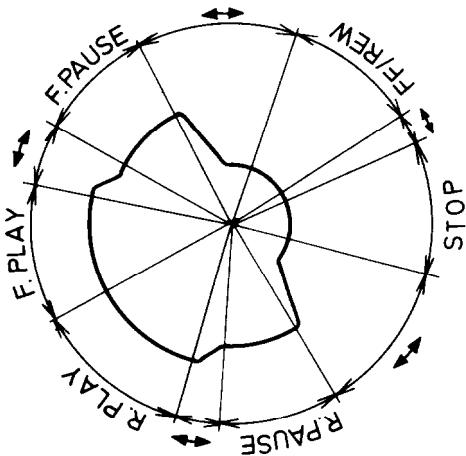


Fig. 1 Head base up-down cam

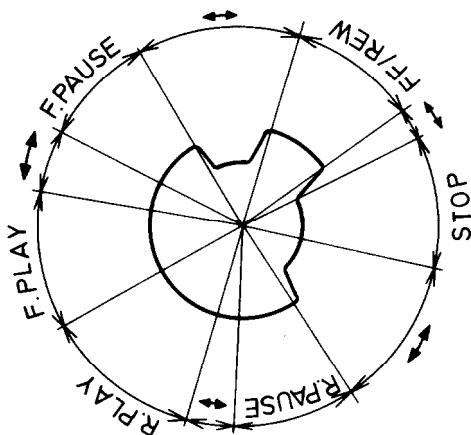


Fig. 2 Brake cam

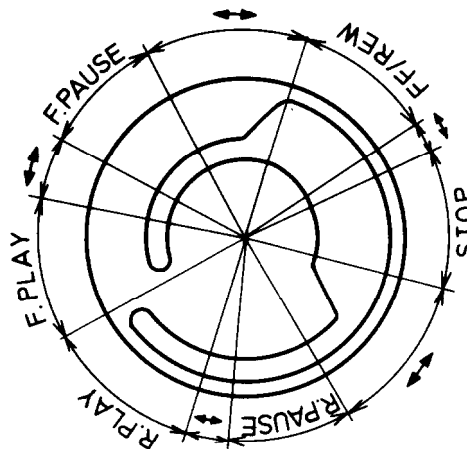


Fig. 3 Head reversal cam

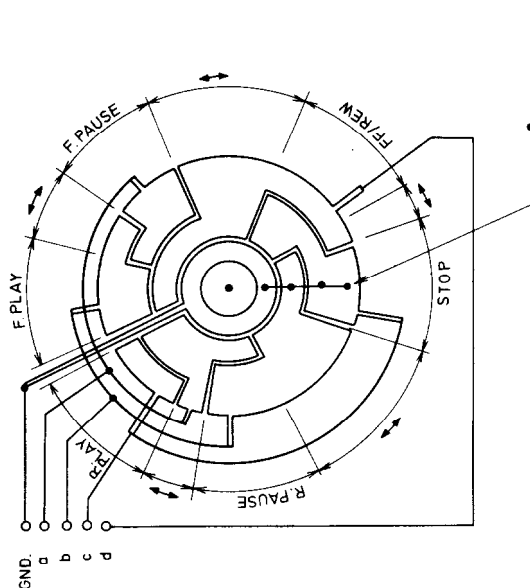


Fig. 4 Rotary encoder

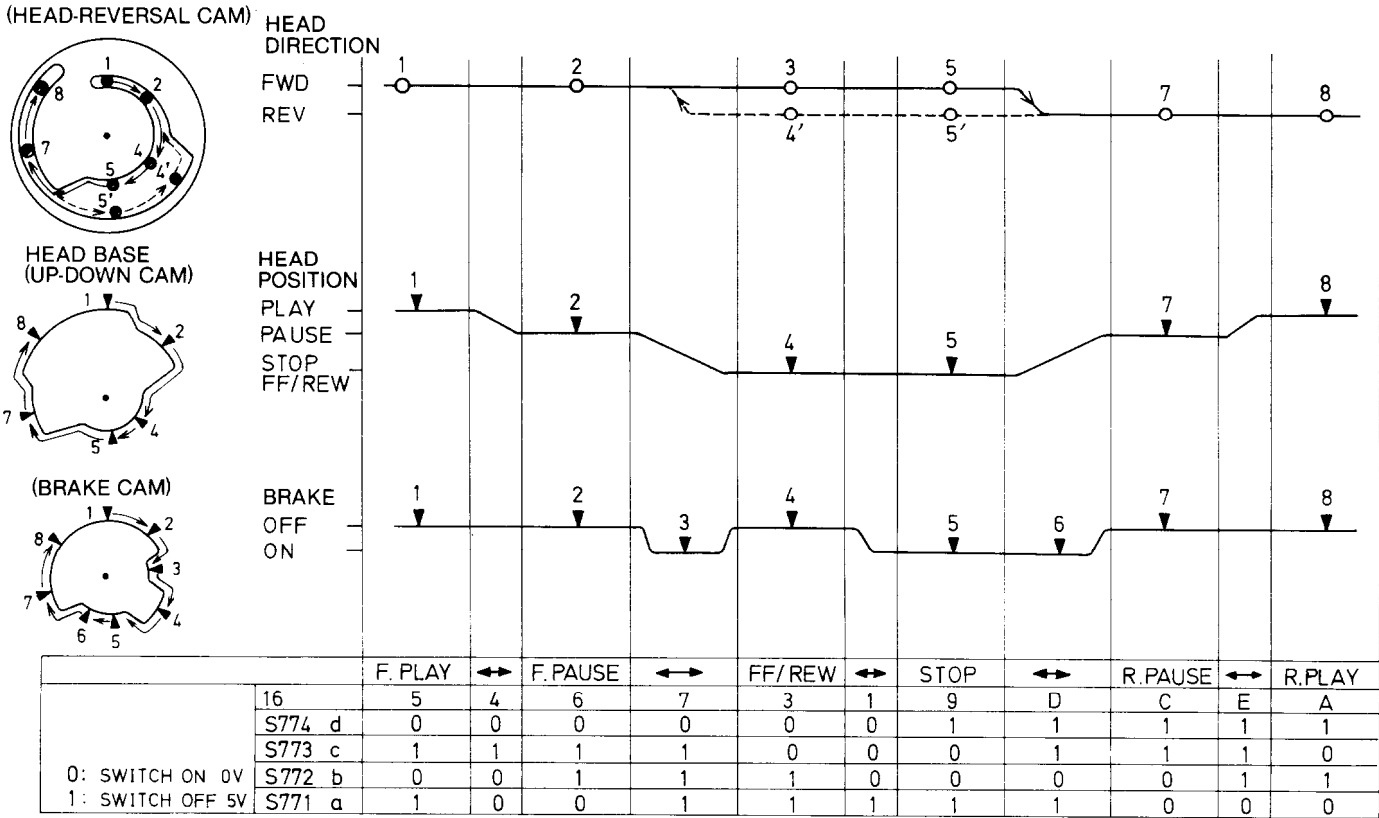
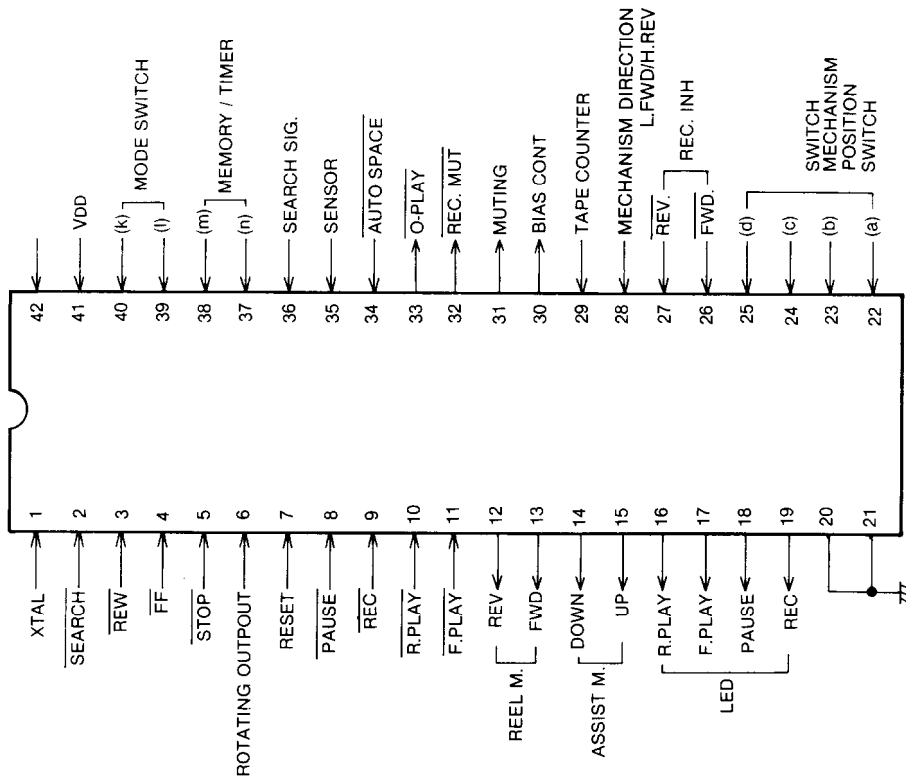


Fig. 5

MICRO COMPUTER
LM 6402 (L)



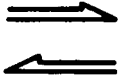
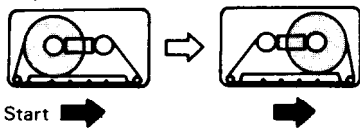
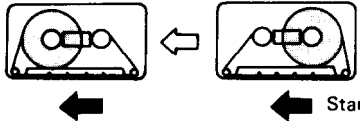

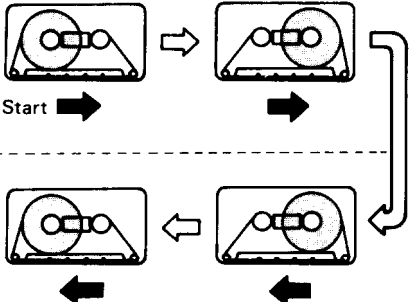

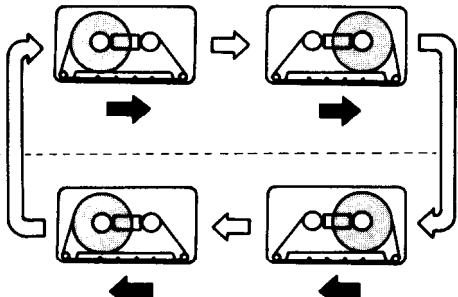
OPERATION MODE

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

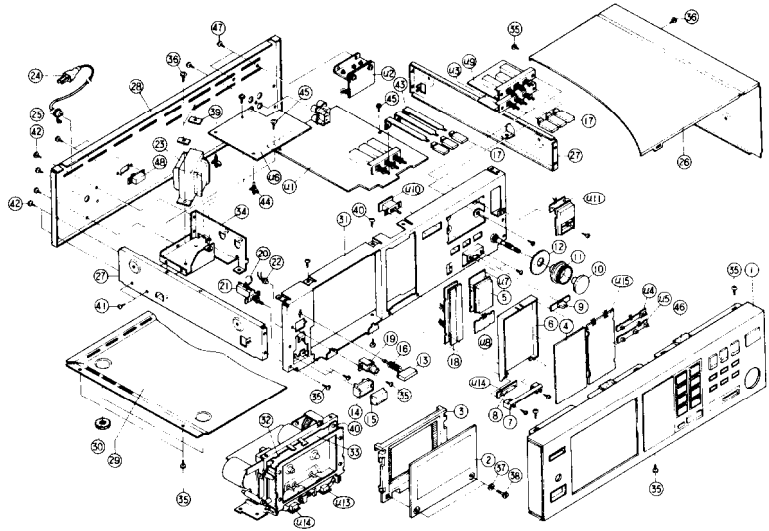
SPECIAL MODES OF OPERATION

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

CHASSIS-EXPLODED VIEW



REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	16088121 16069121	Front panel ass'y Front panel ass'y (B)	24	253099B 253083	AS-UC-3, Power supply cord (D) AS-CEE, Power supply cord (G/W)	U3	16088536	NASW-1636, Dolby switch pc board ass'y
2	28400131B 28400132A	Window Window (B)	25	270025	SR-3P-4, Strainrelief (D)	U4	16088537	NALED-1637, Dolby indicator LED pc board ass'y
3	16088901	Cassette lid ass'y	26	270280	SR-4K-4, Strainrelief (G/W)	U5	16088538	NALED-1638, Tape selector indicator LED pc board ass'y
4	28191170A	Clear plate	27	28184180	Top cover	U6	16088539	NACOC-1639, Controller pc board ass'y
5	28199086A	Film	28	28184181 27115139	Top cover (B) Side bracket	U7	16088540	NAIND-1640, Indicator LED pc board ass'y
6	27190194	Holder, LED	29	27120472 27120473	Back panel (D) Back panel (G)	U8	16088541	NALED-1641, Tape counter indicator LED pc board ass'y
7	27300532	Holder for 6	30	27120474	Back panel (W)	U9	16088542	NASW-1642, Mode switch pc board ass'y
8	210165	14 V, 150 mA, Lamp, dial plate, Illumination	31	27170150	Bottom board	U10	16088543	NASW-1643, Timer switch pc board ass'y
9	28321035 28321028	Knob, timer Knob, timer (B)	32	27110193A 244046	Front bracket Tape mechanism ass'y	U11	16088544	NALED-1644, TAB indicator LED pc board ass'y
10	28321033	Knob, input level L	33	27300534	Cassette panel	U12	16088545	NALED-1645, Direction indicator LED pc board ass'y
11	28321034 28321031	Knob, input level L (B) Knob, input level R	34	24610634A 2713033B	Tube, light Bracket, power transformer	U13	16088546	NALED-1646, Direction indicator LED pc board ass'y
12	28321032	Knob, input level R (B)	35	834420068	3TTS + 6B(BC), Tapping screw	U14	16088547	NAPL-1647, Lamp pc board ass'y
13	28140185	Cushion	36	834420068	4TTB + 8C(BC), Tapping screw	U15	16088548	NASW-1648, Operation switch pc board ass'y
14	28321027	Knob, eject	37	870100	Washer			
15	28321028 28320828B	Knob, eject (B) Knob, base	38	27300397-1A	Special screw			
16	28321023	Knob, power	39	870065	Special washer			
17	28321024	Knob, power (B)	40	834426068	2.6TTS + 6B(BC), Tapping screw			
18	2780179	Spring	41	838130088	3TTB + 8B, Tapping screw			
19	28321073A 28321074A	Knob, band Knob, band (B)	42	801230	3TTS + 8B(BC), Tapping screw			
20	225129	Level meter	43	27273022	Joint C			
21	25045124	Stereo headphone jack	44	27190009	Holder			
22	25045132	Stereo headphone jack (B)	45	831430088	3TTW + 8B(BC), Tapping screw			
23	3500065A	DE7150FZ10-3PAC400V, Capacitor IS	46	28140408	Cushion			
	25035224	NPS-121-L188P, Power switch (D)	47	834430108	3TTS + 10B(BC), Tapping screw			
	25035192	NPS-122-L156P, Power switch (G)	48	25065123	NSS-1258P, Voltage selector switch			
	25035207	NPS-121-L171P, Power switch (W)	U1	16088534	NAAF-1634, Rec. and playback amplifier pc board ass'y (D)			
	210169	14V60mA, Lamp, power indicator	U2	16088535	NAAF-1634a, Rec., playback and DIN amplifier pc board ass'y (G/W)			
	210149	14V, 60mA, Lamp, power indicator (B)			NAPS-1635, Power supply circuit pc board ass'y			
	230689	NPT-807D, Power transformer (D)						
	230690	NPT-807G, Power transformer (G)						
	230691	NPT-807DG, Power transformer (W)						

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

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

ADJUSTMENT PROCEDURES

PRECAUTIONS

- Before adjustment, clean the following parts with an alcohol moistened swab.
 - * record/playback head
 - * pinch roller
 - * rybber belt
 - * erase head
 - * capstan
- Do not use magnetized screwdriver for adjustments.
- Demagnetize record/playback head with a head demagnetizer.
- The switches and controls should be set as follows unless otherwise specified.

TAPE SEL.....NORM
 DOLBY NR.....OUT
 INPUT LEVEL.....0
 TIMER/MEMORY.....OFF

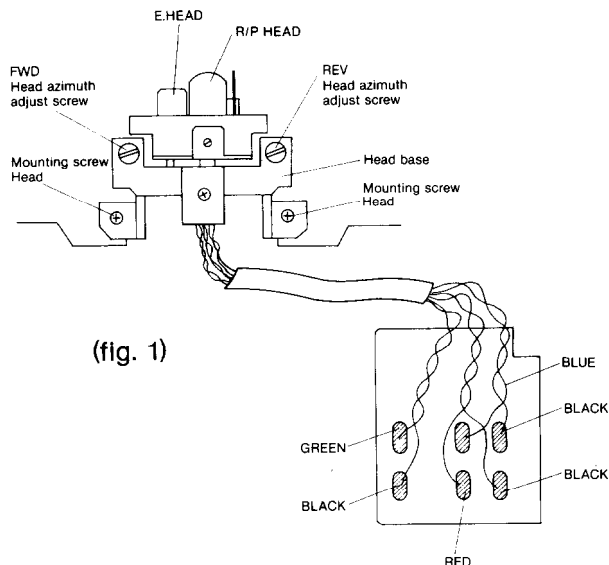
TEST EQUIPMENT/TOOLS REQUIRED:

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



1. Tape speed adjustment

Connect the frequency counter to the line output 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

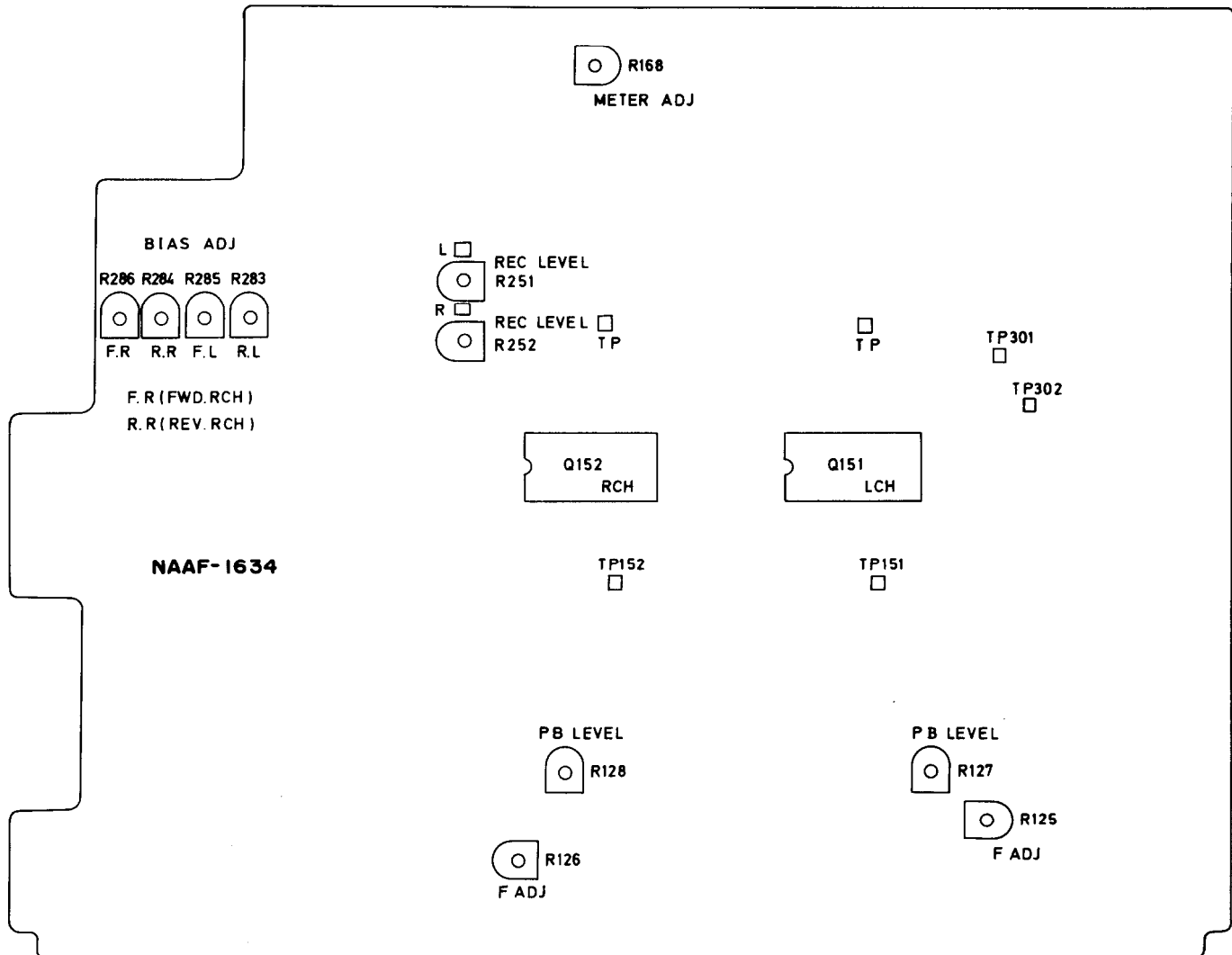
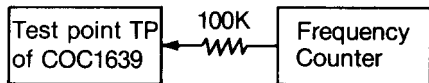
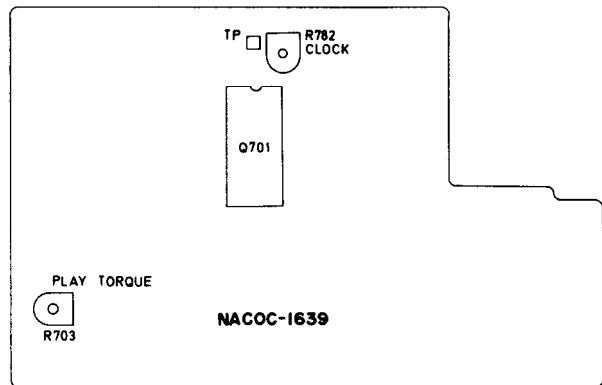
Insert the normal blank tape into the cassette holder. Press the recording and pause buttons together and put the cassette deck into the recording mode. Apply the 400 Hz signal to line-in terminal. Adjust the input level volume so that the 0 dB indicator light up. Then set the attenuator for—10 dB input 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

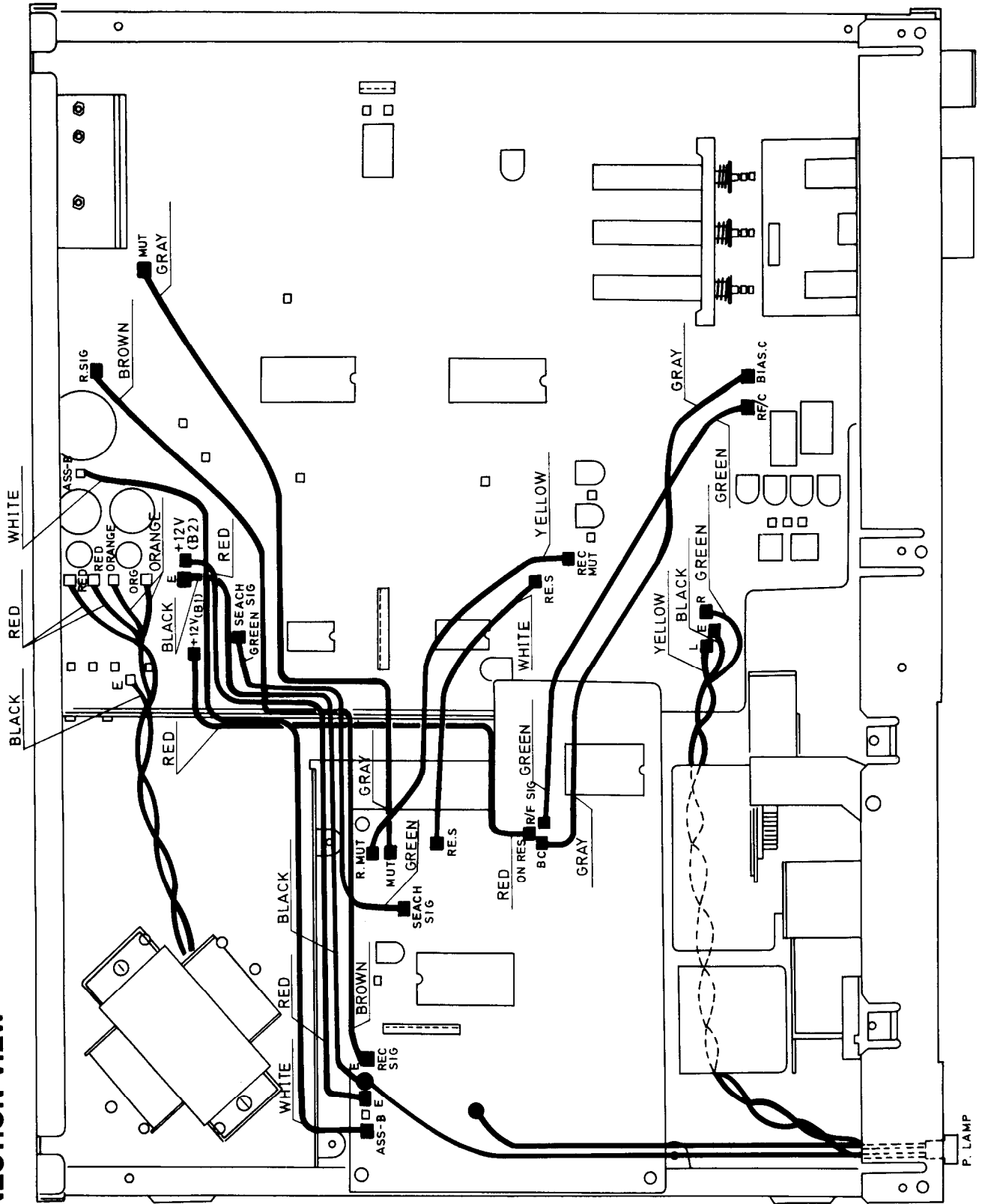
Insert the normal blank tape into the cassette holder. Apply the 1,000 Hz signal to line-in terminal. Put the cassette deck into the recording mode. Adjust the input level volume so that the voltmeter reads 350 mV. Record on the tape. Adjust the R251 (L ch.) and R252 (R ch.) so that the playback level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

9. Clock adjustment

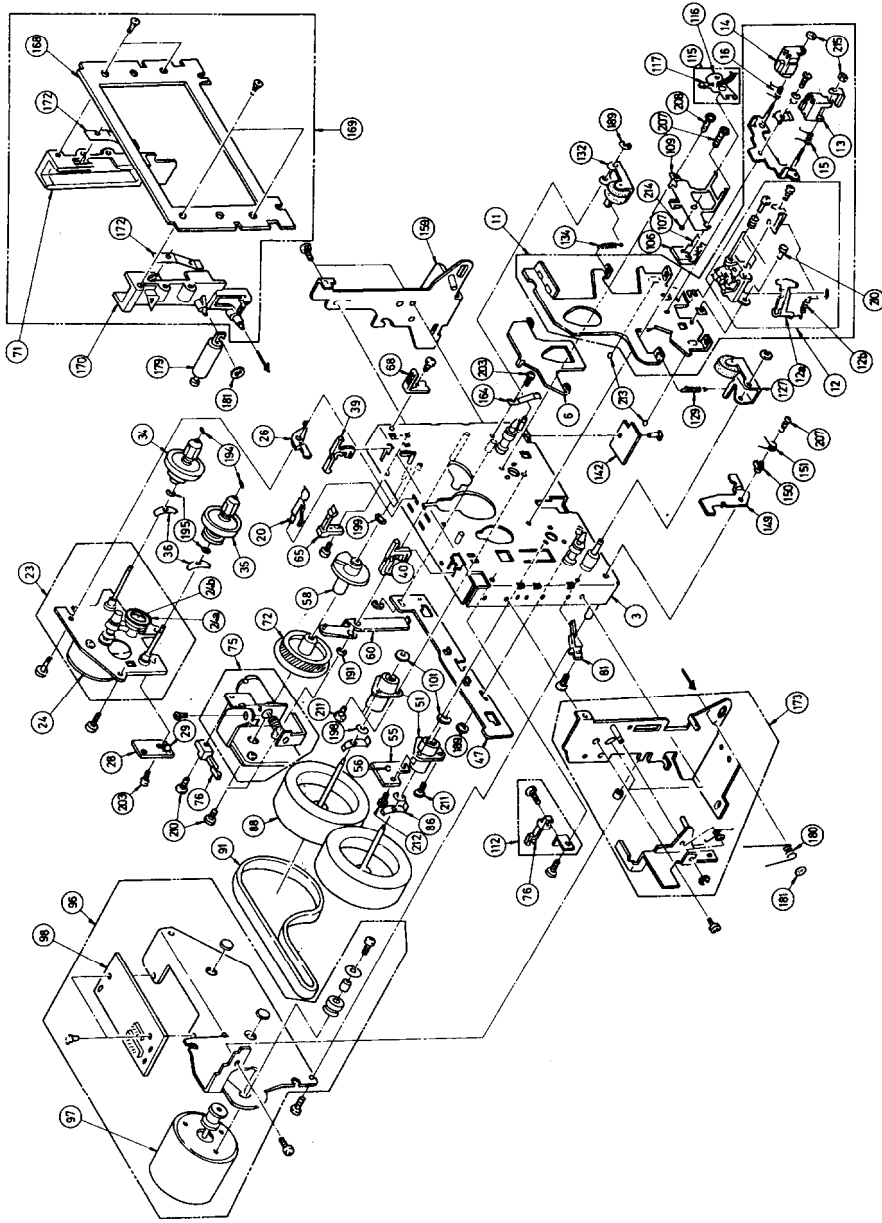
Connect the frequency counter via the resistor 100 k Ω to the TP terminal on the control pc board. Adjust the R782 so that the frequency counter indication becomes 170 \pm 10 kHz.



CONNECTION VIEW

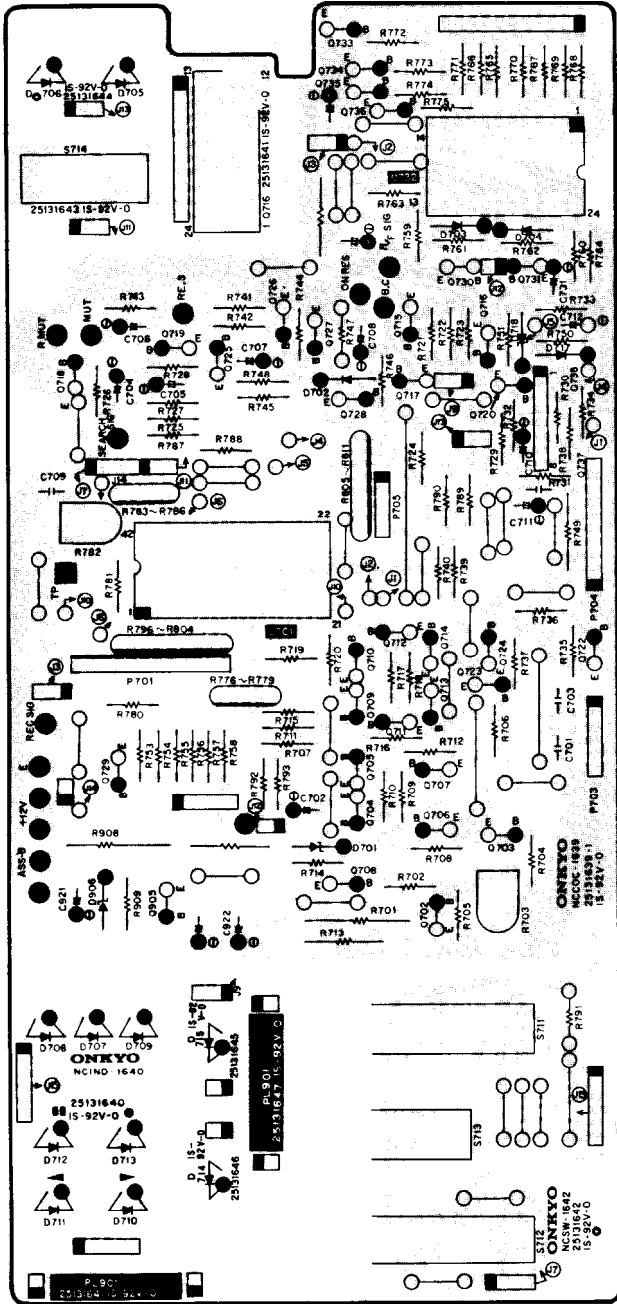


TAPE MECHANISM-EXPLODED VIEW



REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
3	24610932	Mechanism chassis	98	24606171	Motor controller pc board ass'y	170	24610848	Holder L	210	801250	2x4, Pan head machine screw
6	24610931	Brake plate ass'y	101	24610673	Washer	171	24610849	Holder R	211	833126057	2.6x5, Pan head tapping screw
11	24600038	Head base	106	24610935	Base, guide	172	24605463	Cassette spring	212	833126067	2.6x6, Pan head tapping screw
12	24610947	Head	107	24610936	Guide	173	24610941	Side bracket L	213	24610351	Ø2, Steelball
12a	24605459	Inverse wheel	109	24610937	Head holding plate	179	24610942	Damper unit	214	24610279	Ø3, Steelball
12b	24605459	Spring	112	24606167	Leaf switch L.E.D. pc board ass'y	180	24605456	Tension spring	215	863120	Nut
13	24610946	Tape guide ass'y	115	24606168	Lamp holder ass'y	181	891024	Ø1, Circlip			
14	24605457	Tape guide	116	24606168	Lamp holder L.E.D.	189	893025	Ø1, Circlip			
15	24605457	Tension spring L	117	24610498	Lamp holder	190	893025	Ø1, Circlip			
16	24605458	Tension spring R	116	24610498	Lamp holder	191	893030	Ø1, Circlip			
20	24605450	Cassette holding spring	117	24606173	Lamp	194	24610349	1.8x4.7x0.25, Washer			
23	24601134	Mounting plate, motor	127	24602223	Pinch arm R	195	24610792	Washer			
24	24601106A	Reel motor ass'y	129	24605453	Tension spring	198	24610515	Washer			
24a	24602223	Idler wheel	132	24602224	Pinch arm F	199	24610944	4.1x5.8x0.1, Washer			
24b	24610942	Washer	134	24605454	Tension spring	203	801292	Washer 2x3.2, Truss screw			
26	24603270	Leaf wheel	142	24606169	Connector	205	833125059	2.5x5, Pan head machine screw			
28	24606166	Leaf wheel	146	24602028	Binder	207	833125069	2.5x8, Pan head machine screw			
28	24603436	Leaf wheel	149	24610938	Lock plate	208	833130049	3x4, Pan head machine screw			
28	24606162	Hall IC pc board ass'y	150	24604052	Collar						
29	2225188	DN6838, Hall IC ass'y	151	24605455	Spring						
34	24602136	Take-up reel ass'y	159	24610939	Flywheel						
35	24602219	Supply reel ass'y	164	24605188	Capstan motor ass'y						
			169	24610940	Cassette holder ass'y						

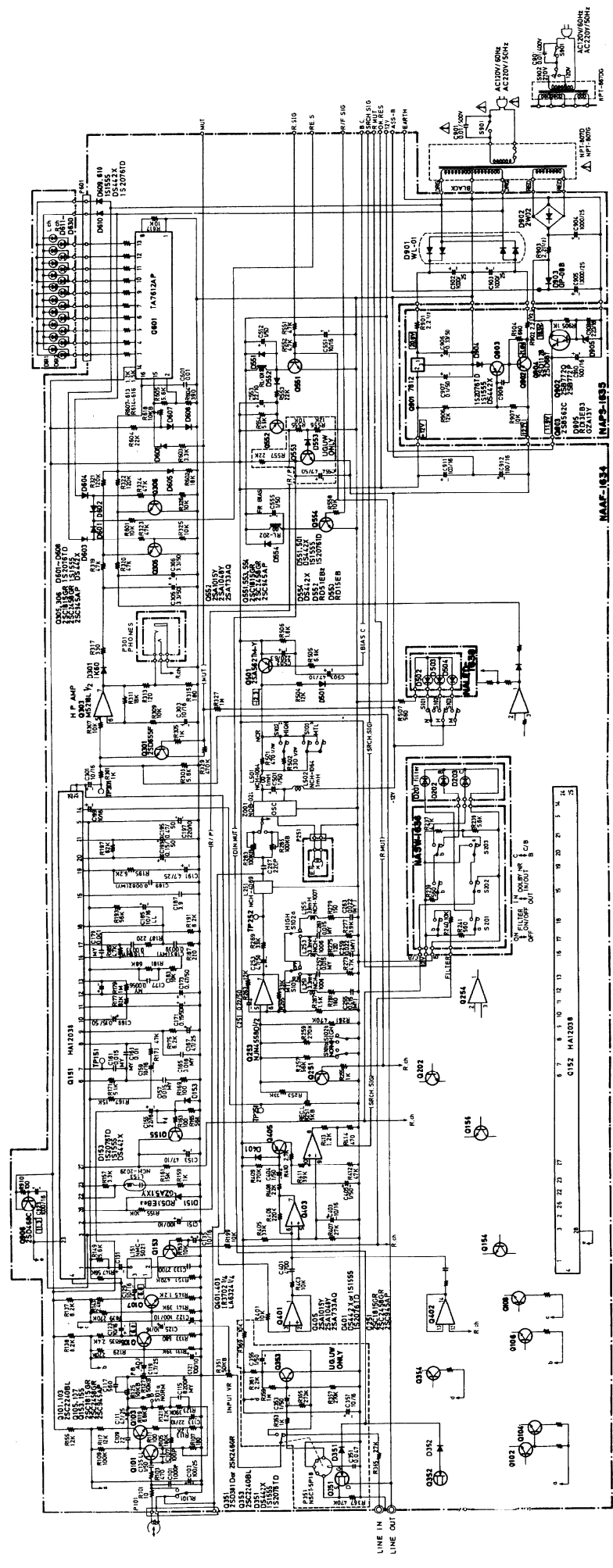
PC BOARD VIEW FROM COMPONENT SIDE



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

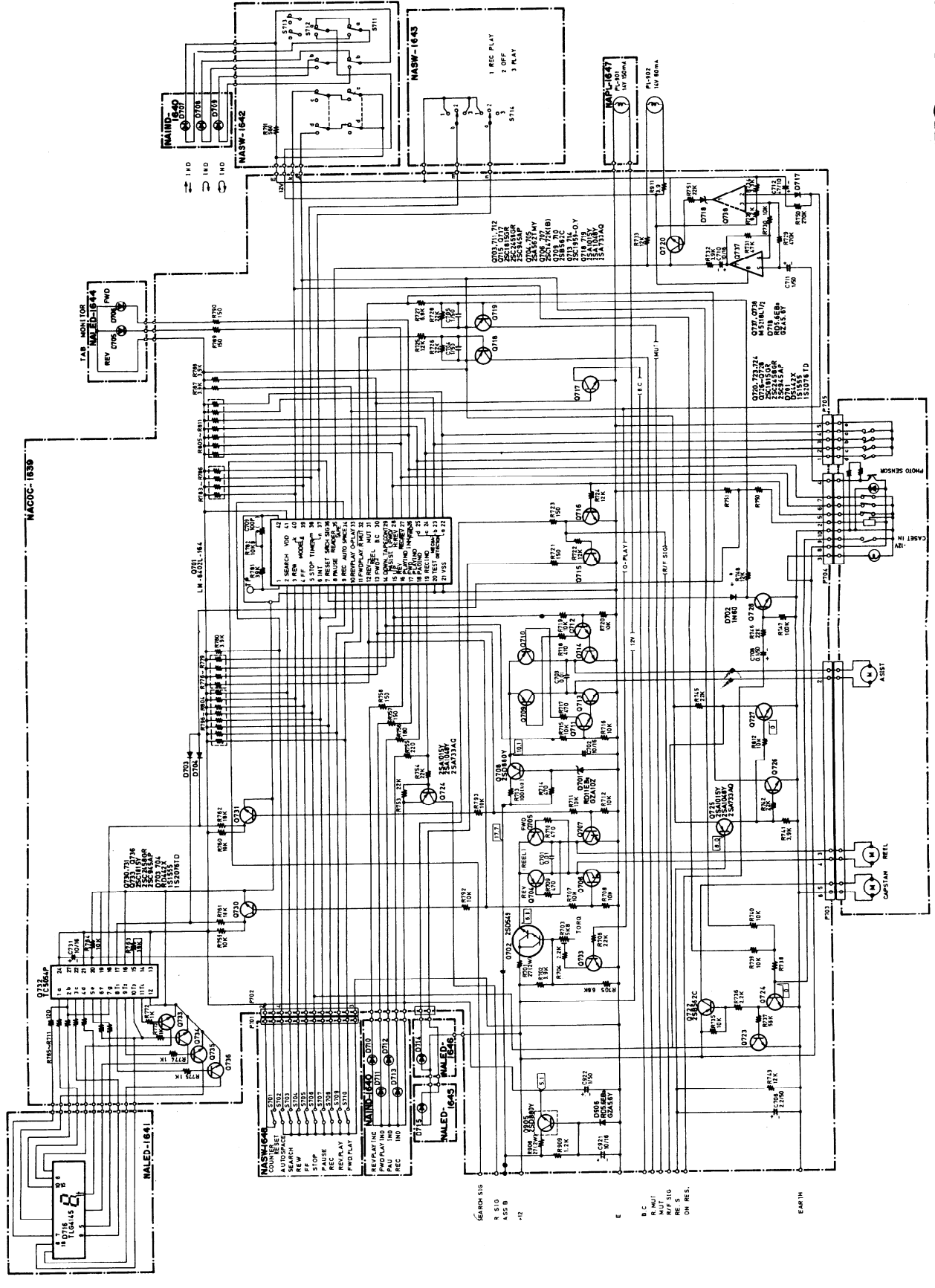
CIRCUIT NO.	PARTS NO.	DESCRIPTION
ICs		
Q151, Q152	222668	HA-12038, Dolby
Q253, Q254	222465	NJM-455'D
Q303, Q304	222652	M-5218L
Q401-Q404	222604 or 222695	LM324N or LA6324
Q601	222507	TA7612-AP
Transistors		
Q101-Q104	2211406	2SC2240(BL)
Q105-Q108	2212115,	2SC2458(GR),
Q153-Q156	2210746 or	2SC945A(P) 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	2SA562M(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 UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN P.F. UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS (E.C.) ARE IN μ F/V.V.
 - VOLTAGE IS MEASURED WITH V.T.V.M. (NO INPUT SIGNAL).
 - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
 - THE COMPONENTS IDENTIFIED BY MARK A 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. (NALED-1637)	DESCRIPTION
D201	225126	GL-3PR1, L.E.D
D202	225134	GL-3NG1, L.E.D
D203	225134 27270103	GL-3NG1, L.E.D Spacer, L.E.D
D502-D504	225134 27270103 (NALED-1638)	GL-3NG1, L.E.Ds Spacer, L.E.D
D716	225148 (NALED-1641)	TLG-4145, L.E.D
D705,D706	225137 27250057 (NALED-1644)	SEL-2413E, L.E.D Case, lamp
D714	225137 27250058A (NALED-1645)	SEL-2413E, L.E.D Case, lamp
D715	225137 27250058A (NALED-1646)	SEL-2413E, L.E.D 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. L.E.Ds	DESCRIPTION
D707-D711	225137	SEL-2413E
D712	225142	SEL-2913K
D713	225141 Case 27250057	SEL-2213C Lamp

CONTROL PC BOARD (NACOC-1639)

CIRCUIT NO.	PARTS NO. ICs	DESCRIPTION
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 2211544	2SC1959(O) or 2SC1959(Y)
Q718,Q719	211454,	2SA1015(Y),
Q725,Q729	2212124 or 2210804	2SA1048(Y) or 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 2210746	2SC2458(GR) or 2SC945A(P)
Q905	2201074	2SD880(Y)

CIRCUIT NO.	PARTS NO. Diodes	DESCRIPTION
D701	2239611 or 2241073	RD11EB1 or GZA10Z
D702	223132	1K60
D703,D704	223145,	1S2076TD,
D717	223105 or 223133	1S1555 or DS442X
D718,D906	2239473 or 2240952	RD5.6EB3 or GZA5.6Y

Capacitors

C702	352741009	10 μ F, 16 V, Elect.
C704,C705	352780109	1 μ F, 50 V, Elect.
C706	352780229	2.2 μ F, 50 V, Elect.
C708	352781099	0.1 μ F, 50 V, Elect.
C710	352741009	10 μ F, 16 V, Elect.
C711	352780109	1 μ F, 50 V, Elect.
C712	352734709	47 μ F, 10 V, Elect.
C714	352722219	220 μ F, 6.3 V, Elect.
C731,C921	352741009	10 μ F, 16 V, Elect.
C922	52780109	1 μ F, 50 V, Elect.

Resistors

R701	441722704	27 Ω , 2W, Metal oxide film
R703	5215044	N08HR5KBC, Semi-fixed
R713	441521004	10 Ω , 1/2W, Metal oxide film
R776-R779	49121392404	3.9k Ω x4, 1/8W, Network
R783-R786		
R796-R804	49121392408	3.9k Ω x8, 1/8W, Network
R805-R811	49121392407	3.9k Ω x7, 1/8W, Network
R908	441722704	27 Ω , 2W, Metal oxide film

Sockets

P704	2000226	NSAS-20P-130
P703	2000227	NSAS-12P-131
P705	2000228	NSAS-12P-132

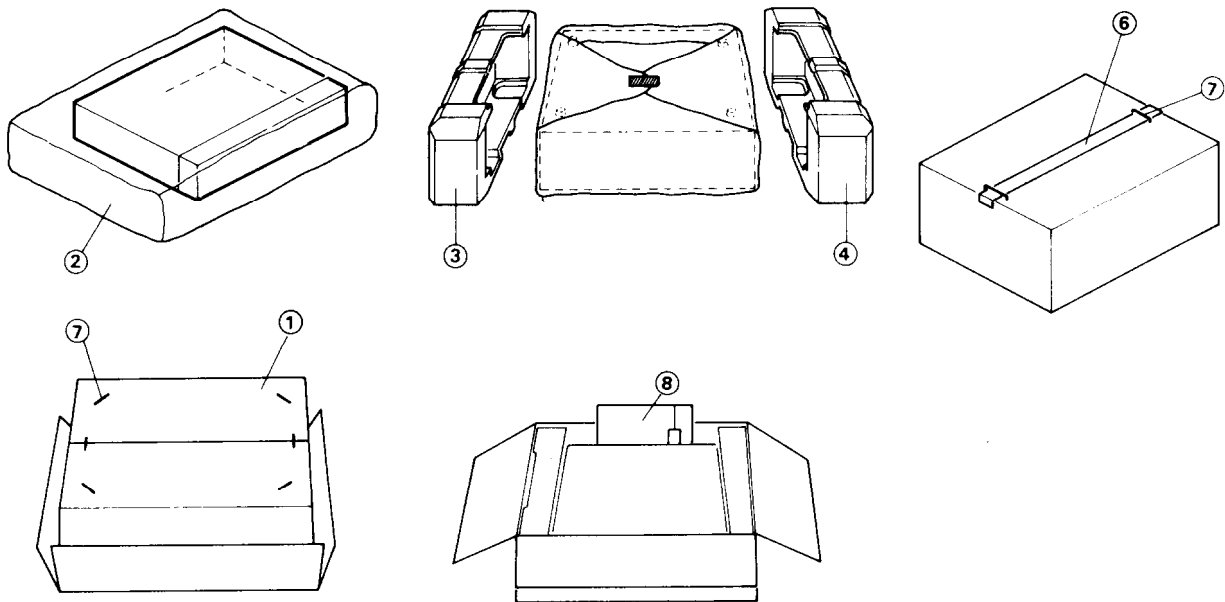
Plug

P701	25055047	NPLG-12P35
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Radiator

	27160029	
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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		Accessory 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		Accessory 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 Mûchen-Germering, Industriestrasse 18, West Germany. Telex: 521726 Telefon: (089)-84-3071