

ONKYO SERVICE MANUAL

STEREO CASSETTE TAPE DECK MODEL TA-2048



Black and silver model

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

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ 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 Format:	4 tracks, 2 channels
Erasing System:	AC erase
Tape Speed:	4.8 cm/sec. (1-7/8 i.p.s.)
Wow & Flutter:	0.045% (WRMS)
Frequency Response:	20-17,000 Hz (30-16,000 Hz \pm 3dB) (normal position tape) 20-18,000 Hz (30-17,000 Hz \pm 3dB) (high position tape) 20-19,000 Hz (30-18,000 Hz \pm 3dB) (metal position tape)
Signal-to-Noise Ratio:	60dB (metal position tape, Dolby NR out) A noise reduction of 10dB above 5kHz and 5dB at 1kHz is possible with Dolby B NR. A noise reduction of 20dB at 5kHz is possible with Dolby C NR.
Input Jacks:	Mic jacks: 2 Input sensitivity: 0.6mV/600 ohms Input impedance: 2.7 kohms Line IN: 2 Input sensitivity: 60mV Input impedance: 50 kohms
Outputs:	Line OUT: 2 Std output level: 500mV (0dB) Optimum load impedance: over 50 kohms Headphone Jack: 1

ONKYO[®]
AUDIO COMPONENTS

	Optimum load impedance: 8-200 ohms
Motors:	DC servo motor: 1 DC motor: 2
Heads:	REC/PB heads: Special Hard Permalloy Erase head: Ferrite
Power Supply:	AC 120V/60 Hz
Power Consumption:	28 watts
Dimensions:	435 (W) x 112 (H) x 360 (D) mm (17-1/8" x 4-3/8" x 14-1/8")
Weight:	5.8 kg. (12.8 lbs.)

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

SERVICE PROCEDURES

1. Replacing the lamp

This unit used the lamp listed below.

Circuit No.	Parts No.	Description
PL-901	210090	150mA, 14V, Lamp
PL-902	210183	600mA, 14V, Lamp

Caution; Before replacing the lamp. Be sure to unplug the power supply cable.

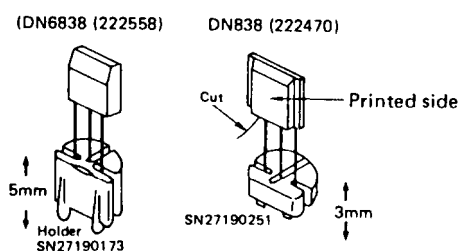
2. Instruction resistance measurement

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

Specifications; 500V more than 10M Ω

3. Replacing the Hall ICs

Cautions: As the position of leg of DN6838 and DN838 differ, use the same Hall IC when replacing.



FEATURES

Three Heads with Special Hard Permalloy For Superior Metal Tape Performance

Having three heads means you can monitor the actual recorded signal as you record instead of rewinding the tape to check your recording afterward. The 3-head system also has the advantage of making possible the use of separate record and playback gaps, each optimized for its own task. The special hard permalloy head formulation boasts the high saturation flux density and abrasion resistance needed for true metal tape compatibility.

ACCUBIAS For The Best Performance With Any Tape

The ACCUBIAS system fine tunes the recording bias to ob-

tain optimum performance with any kind of tape (except metal tape). By setting precisely the correct bias level, ACCUBIAS guarantees the flattest frequency response and highest signal-to-noise ratio possible with each tape.

2-Motor Tape Transport with Separate Head Assembly Motor

The tape transport system, along with the heads, determines the level of performance of a cassette deck. To assure extremely stable and accurate transport, this unit uses a DC servo-controlled capstan motor. This motor is unaffected by fluctuations in the power supply voltage and frequency and instantaneous changes in load. A highly reliable simple drive transmission system and precision vertical cassette holder further enhance overall accuracy and stability. As a result, wow and flutter is under 0.045%. In addition, separate DC motors drive the reel tables and head base and the head assembly is constructed to move silently with no annoying clicks.

Dolby B and C Noise Reduction

Along with standard Dolby B NR, this unit also has the even more effective Dolby C NR system. Dolby C NR reduces tape background noise by 20dB at 5kHz, 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)

The AMCS automatically locates the beginning of every song on a cassette in either the forward or the reverse direction. When AMCS FWD is pressed during the play mode, tape is rapidly wound to the beginning of the next song and approximately the first 10 seconds 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 PLAY key is pressed to cancel AMCS operation and return to normal playback. When AMCS REV is pressed during the play mode, the same process is performed in the reverse direction.

Remote Control Unit Terminal

With an optional remote control unit (such as the RC-5T), this unit can be controlled even while you are relaxing in your favorite chair. All transport modes are included: record, play, fast forward, rewind, stop and pause.

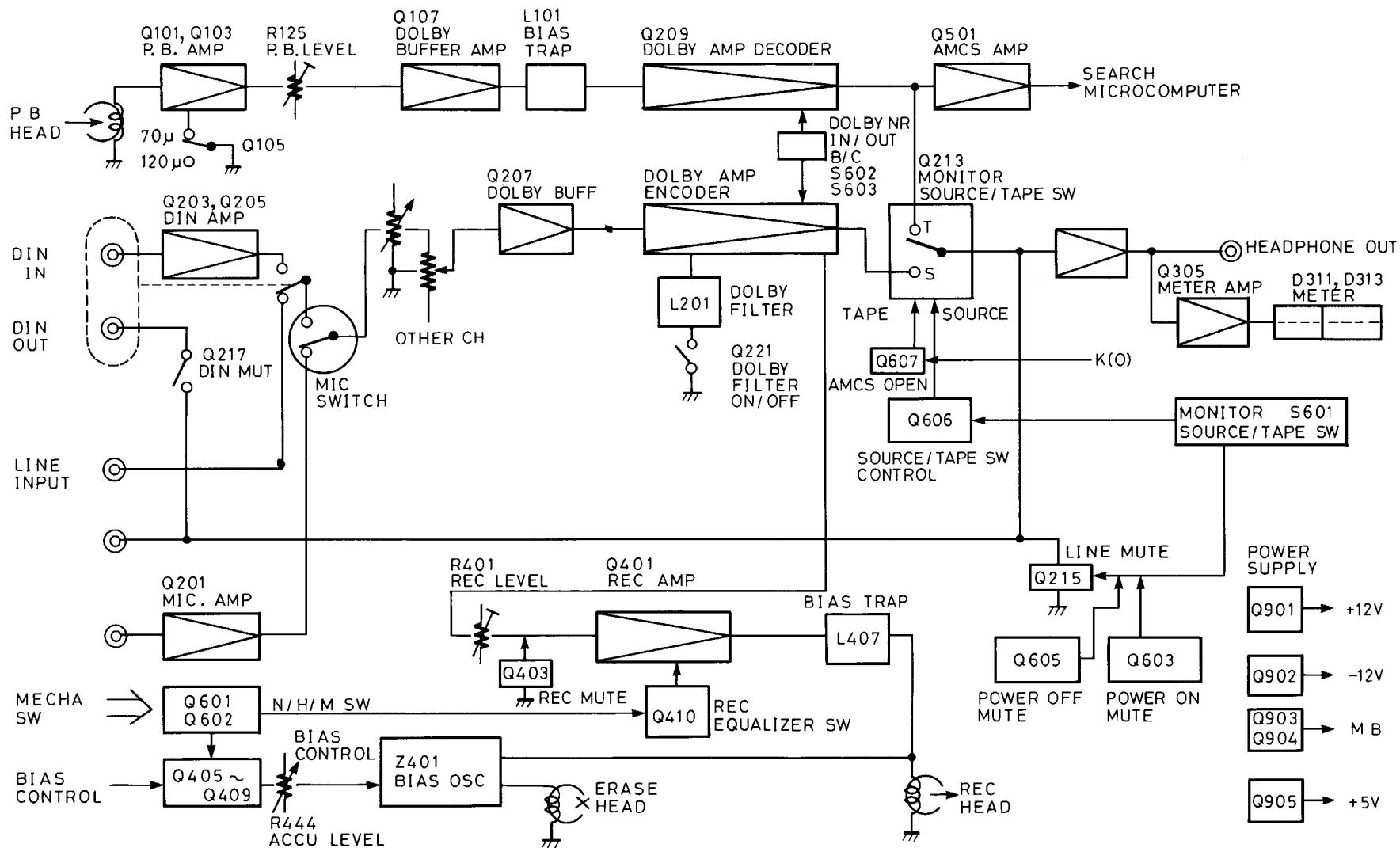
Auto Space Rec Mute Key

This key lets you insert unrecorded sections five seconds long with just one quick tap.

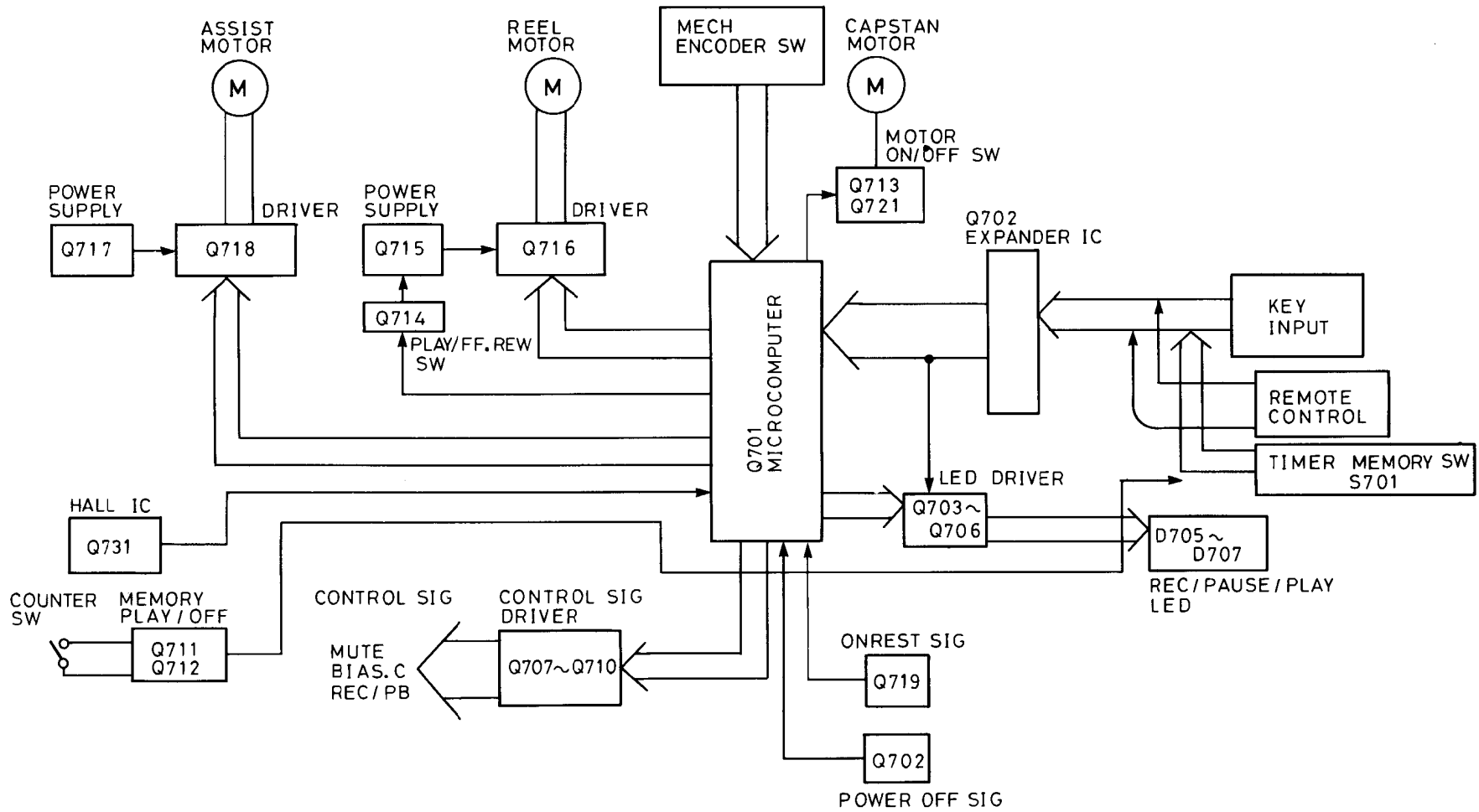
Fully Automatic Tape Selection

This deck senses the type of cassette inserted and automatically sets the correct amount of bias and equalization.

BLOCK DIAGRAM (AMPLIFIER SECTION)



BLOCK DIAGRAM (CONTROL SECTION)



INPUT PORT EXPANDER IC

The equivalent circuit of the LC7800 used to expand input ports is shown in Figure 1. This IC includes four 4-bit input ports, one 4-bit output port, and one 4-bit selector input port. When BA of the selector input is set to LOW and the other bits to HIGH, the A0" A1" A2" A3 input port is connected to the D0" D1" D2" D3 output port. And if only the BB bit is set to LOW, the B0" B1" B2" B3 input is selected. Hence, a LOW level signal is applied to the selector port bits in cyclic order, and the operation indicator LEDs are switched on and off dynamically in combination with the #13, #14, and #15 LED output ports while input port data is being read out.

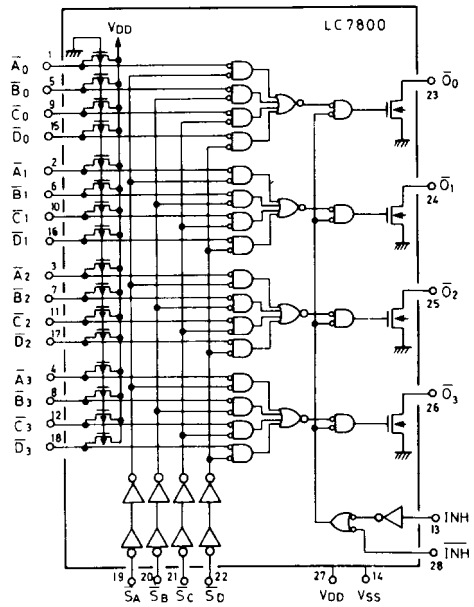
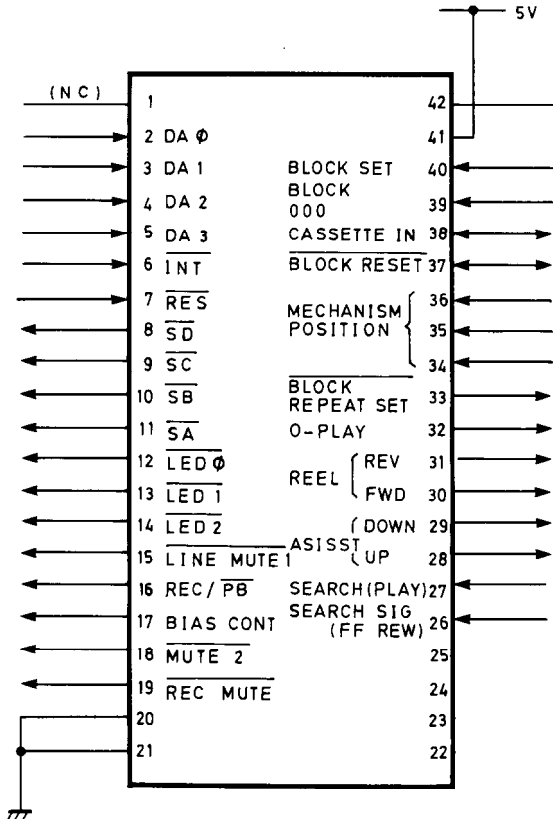


Fig. 1 LC7800 equivalent circuit

MICROCOMPUTER(LM6402H-425)

Pin no.	Name	Function	Classification
2~5	DA0~DA3	Reading of data from the inport port expander IC	IN
6	INT	Rotation signal input (for auto-stop operation)	IN
8~11	SA~SD	Input port expander IC and dynamic LED selector IC	OUT
12~14	LED0~LED3	Operation display dynamic LED data output	OUT
15	LINE MUTE 1	Line muting output signal generated when the power is switched on, and during ACCU BIAS operation.	OUT
16	REC/PB	Output signal for muting DIN outputs when recording	OUT
17	BIAS CONT.	Output signal for control of bias oscillator	OUT
18	MUTE2	Signal for switching muting off during playback	OUT
19	REC. MUTE	Signal for muting the recording amplifier output	OUT
22	ACCU BUSY	Output signal generated during ACCU BIAS operation	OUT
23			OUT
24			OUT
25			OUT
26	SEARCH SIG (HIGH)	Input signal from high-speed travel tune-selector.	IN
27	SEARCH SIG (LOW)	Input signal from low-speed travel tune-selector amplifier	IN
28	UP	Output signal for driving the assist motor towards the PLAY position.	OUT
29	DOWN	Output signal for driving the assist motor towards the FF/REW position.	OUT
30	FWD	Output signal for driving the reel motor towards the FF position.	OUT
31	REW	Output signal for driving the reel motor towards the REV position.	OUT
32	O-PLAY	Reel motor torque switching output	OUT
33	BLOCK SET	Output which informs the counter IC that the BLOCK SET key has been pressed.	OUT
34~36	a.b.c	Input ports for signal from the mechanism position switches	IN
37	BLOCK RESET	Output which informs the counter IC that the BLOCK RESET key, or any other key apart from the BLOCK SET key has been pressed.	OUT
38	CASSETTE IN	Input involved in detection of cassette half. and output which stops the capstan motor when an abnormal mechanism status is detected.	I/O
39	BLOCK MATCHING & 000 INPUT	Input of 000 input signal and BLOCK matching signal from the counter IC.	IN
40	BLOCK SET	Input which accepts signals from the counter IC during BLOCK SET.	IN

**MICRO COMPUTER
LM6402H-425**



Assist up, down, and Reel FWD/REV signals

	Q701	POWER ON → PLAY → STOP → PLAY (FF)						
Assist motor	#28 (UP)	H	H	H	L	H	H	H
	#29 (DOWN)	H	L	H	H	H	L	H
Reel motor	#30 (FWD)	H		H		L		H
	#31 (REV)	H		L		L		L

As illustrated above, the steady-state (during STOP, FF, RW, and PLAY) control output of the ASSIST motor is at HIGH level, holding the motor under brake applied by the motor control IC

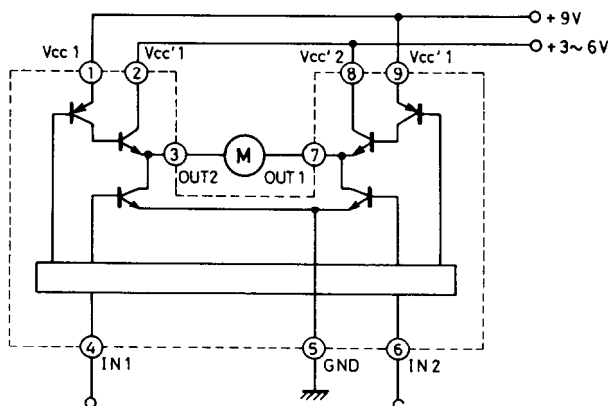
The control output of the REEL motor is momentarily held under braking condition only when the power is turned on, then is restored to normal to output the control signals as usual.

Mechanical position code

#34	Q-701		Mode
	#35	#36	
H	H	L	—
L	H	L	PLAY
L	L	L	—
H	L	L	PAUSE
H	L	H	—
L	L	H	STOP
L	H	H	FF, REW
H	H	H	—

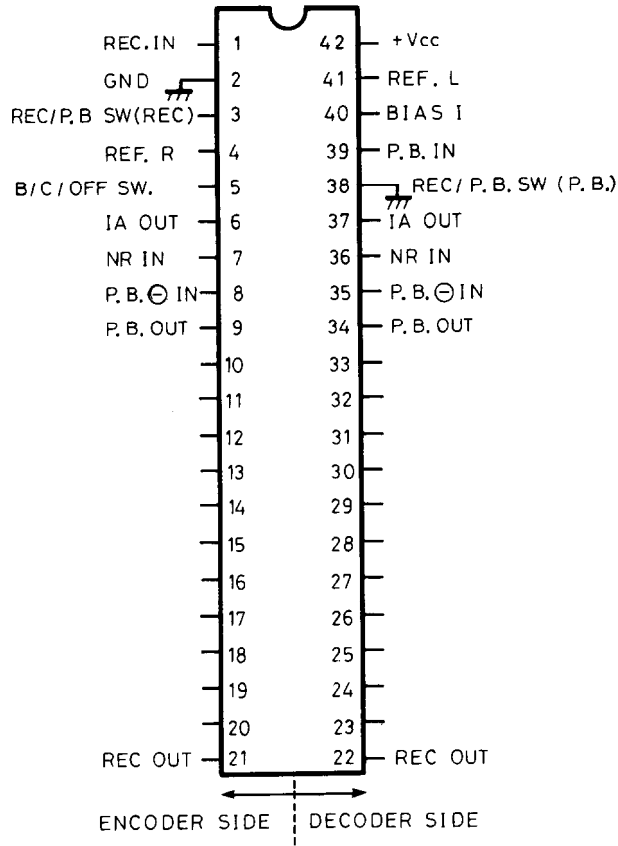
IC BLOCK DIAGRAM

M54544AL (MOTOR DRIVE)

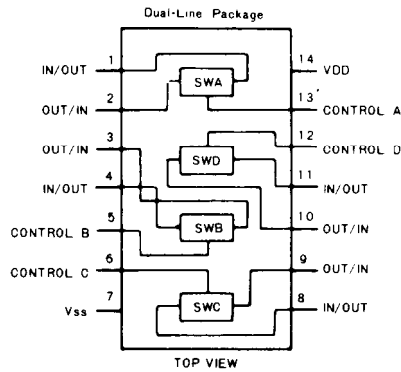


INPUT		OUTPUT		Remark
# 4	# 6	# 3	# 7	
L	L	OFF	OFF	—
H	L	H	L	FWD
L	H	L	H	REV
H	H	L	L	Brake

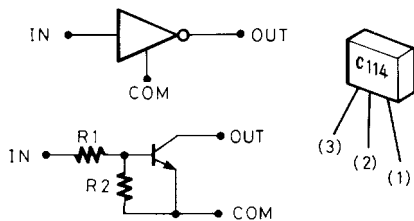
HA-12090NT
(DOLBY B & C TYPE NR SYSTEM, ENCODER & DECODER
IN ONE PACKAGE)



4066BP or BU4066



DTC144ES
DTC114YS (Digital transistor)



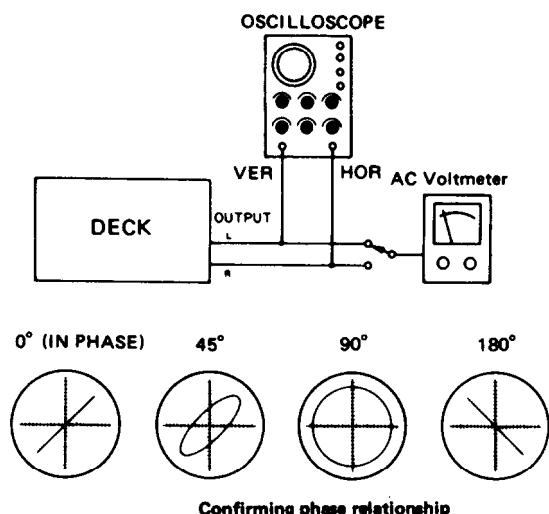
	R 1	R 2
DTC 114 YS	10 kΩ	47 kΩ
DTC 144 ES	47 kΩ	47 kΩ

TAPE MECHANISM-PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	24611042-1	Chassis	94	24601145	Reel motor ass'y
2	24605468	Spring	94a	24601054	Reel motor
11	24611043	Brake plate ass'y	94b	24605467	Spring
11a	24611053	Brake plate	94c	24602235A	Lever ass'y, wheel
11b	24610999	Brake rubber	94d	24602236A	Wheel
11c	24605500	Spring	94e	24610969	1.3x3.4x0.5mm, Washer
21a	24611045-1	Head base	94f	24610970	Felt
21b	24611046	Head block	94g	24602237A	Wheel, motor
21c	24605502	Spring	94h	24610981	1.7x4x0.25mm, Washer
21d	82512012	2 x 12mm, Binding screw	94i	24610374	Washer
21e	801250	2 x 4mm, Pan head screw	94j	24611048	Holder, spring
21f	24600037A	Rec/pb. head	95	352942206	22 μ F, 16V, Elect. capacitor
21g	24600041	Erase head	105	24602372	Flywheel
21h	24605618	Spring	107	24605452	Spring, thrust
21i	24611052	Binder	110	24602269	Flat belt
21j	24611054	Stopper	112	24610673	Flat washer
21k	24611055	Washer	115a	24610971	Plate, flywheel
21l	82112002	2 x 2mm, Pan head screw	115b	24610671	Holder, thrust
21m	801251	Screw	115d	24601202	Motor ass'y, capstan
21n	24610652	Shaft	115g	801338	Pan head screw with washer
21o	24610495	Adjustment nut	121	24602270	Arm, pinch roller
21p		Connector ass'y	123	24605453	Spring
21q		Connector ass'y	125	833125069	2.5x8mm, Pan head screw
21r		Connector ass'y	126	833125059	2.5x5mm, Pan head screw
21t	24604062	Spacer	129	801250	2 x 4mm, Pan head screw
22	893030	E3, Circlip	131	82512614	2.6x14mm, Binding screw
46	24610943	ϕ 3mm, Steelball	133	833426105	2.6x10mm, Tapping screw
47	24610963	Plate, head holding	134	833126055	2.6x5mm, Tapping screw
53	24610964	Spring holder	136	837120058	2x5, Truss screw
54	24605501	Spring	139	24610349	1.8x3.2x0.5mm, Washer
55	24605505	Spring	140	24610515	2.6x4.7x0.25mm, Washer
56	24602267	Reel stand ass'y	141	24610972	2.6x4.7x0.13mm, Washer
63a	24611056	Plate, switch holding	142	24610973	2.7x6x0.5mm, Washer
63b	24606205	Leafswitch	150	24605481	Spring
63c	24611057	Washer	151	24611235	Panel ass'y
63d	82112030	2 x 30mm, Pan head screw	152	24602271	Belt
63e		Connector ass'y	153	24602395	Belt
63f	24611058	Washer	155	26411079	Brake
70	24603281	Lever, switch	156	833130049	Pan head screw
71	24603282	Lever, switch, metal	158	24610939	Plate, right side
72	24611049	Plate, lock	164	24605188	Spring, cassette
73	24605503	Spring	168	24610940	Holder ass'y
74	891030	CS3, Circlip	168a	24610949	Plate, holder
76	24601167	Pulley ass'y	168b	24610849	Holder, right
77	24611047	2.1x4.5x0.1, Washer	168c	24610848	Holder, left
78	24611003	1.8x3.8x0.5, Washer	168d	24605463	Spring, cassette
80	24601216	PAD unit ass'y	168e	835426082	2.6x8mm, Flat head screw
80a	24610968	Plate	172a	24611059	Plate, left
80b	24601103	Motor PAD	172b	24603283	Lever, cancel
80c	24606182	Leafswitch	172c	24605504	Spring
80d	24602133	Cam gear	172d	893030	E3, Circlip
80e	82112003	2 x 3mm, Pan head screw	172e	24610452	Flat washer
80f	833125209	2.5 x 20mm, Pan head screw	179	24611051	Damper unit
80g	24606181	Pc board	180	24605456	Spring
80h	25055106	Post with base	181	891024	CS2.4, Circlip
80i	352942206	22 μ F, 16V, Elect. capacitor			
90	24611052	Binder			

ADJUSTMENT PROCEDURES

Item	Connection of instrument	Line input	Test tape	Mode	Output indicator	Adjustment point	Adjust	Remarks
1	Tape speed Frequency counter to LINE output terminal		MTT-111	PB	Frequency counter	Semi-fixed on the motor	3,010 to 3,020Hz	
2	Head azimuth AC voltmeter and oscilloscope to LINE output terminal		VTT-658	PB	AC Voltmeter	Head azimuth screw	Maximum and same phase at channels L and R	Fig. 1
3	Playback level AC voltmeter to terminals TP-1 and TP-2		MTT-150	PB	AC voltmeter	R-125 (Ch. L) R-126 (Ch. R)	300mV	
4	Meter Level		MTT-150	PB	Level Indicator	R-324	0db level Indicator Light on	
5	Bias current Fig. 2	1KHz, -20db and 12KHz, -20db	XL-II C-90	REC/PB	AC voltmeter	R-429 (Ch. L) R-430 (Ch. R)	Same level at REC/PB	Input VR maximum
6	Record level Fig. 2	1 KHz		REC PAUSE	AC voltmeter	Attenuator or AF OSC output	350mV	accu VR center position
				REC/PB	AC voltmeter	R-401 (Ch. L) R-402 (Ch. R)	Same level at REC/PB	



Confirming phase relationship

fig-1

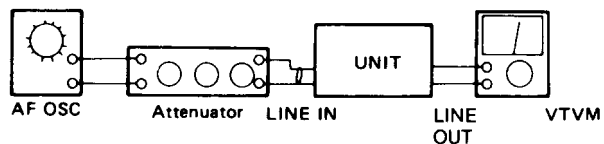
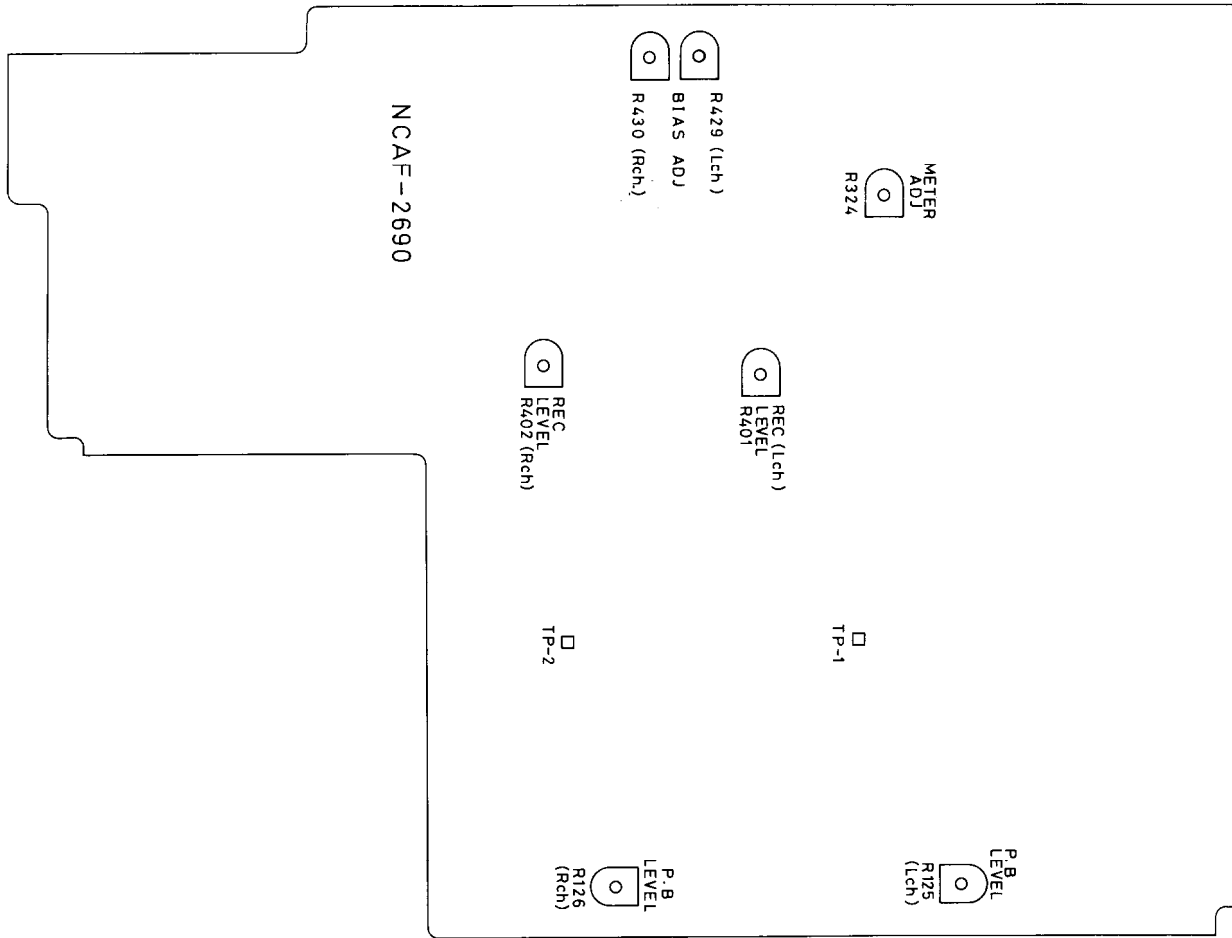


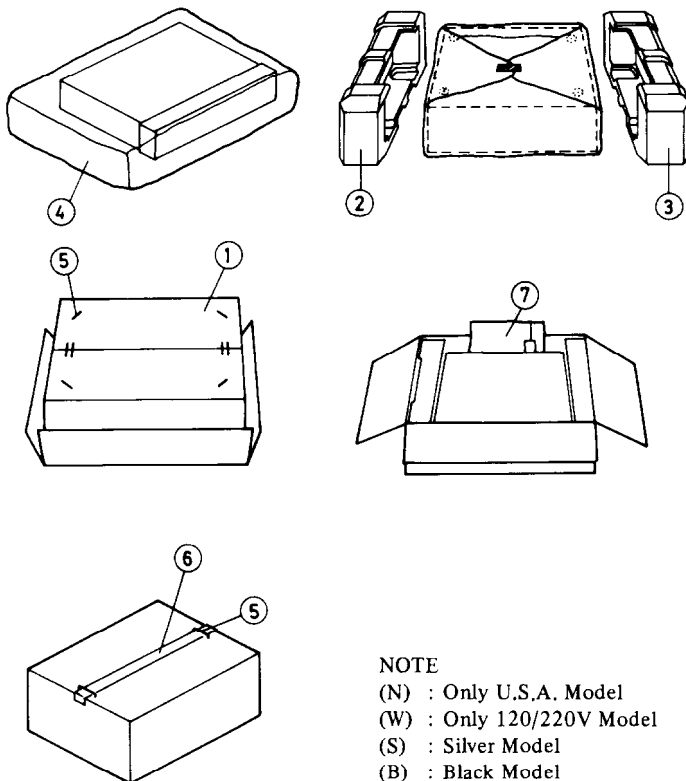
fig-2

Blank tape
 NORMAL ---- UD-1 C-90
 HIGH ----- XL-II C-90
 METAL ----- MX C-90

PLAY torque ----- 30 ~ 60 g/cm
 FF. REW torque ---- 70 ~ 140 g/cm
 Back tension ----- 4 ~ 7 g/cm



PACKING VIEW



NOTE

- (N) : Only U.S.A. Model
- (W) : Only 120/220V Model
- (S) : Silver Model
- (B) : Black Model

D Model

REF NO.	PART NO.	DESCRIPTION
1	29051319	Master carton box (S)
	29051321	Master carton box (B)
2	29090770A	Pad (L)
3	29090769B	Pad (R)
4	290311A	620x550 Poly bag
	29055012-1	500x800 Protection sheet (B)
5	282301	Sealing hook
6	260012	Damplon tape
7	Accessory bag ass'y	
	29341012	Instruction manual
	2010095	Connection cable
	29365006-7	Warranty card (N)
	29358002D	Service station list (N)
	29100006A	305x250 Poly bag

G/W Model

REF NO.	PART NO.	DESCRIPTION
1	29051319	Master carton box (S)
	29051321	Master carton box (B)
2	29090770A	Pad (L)
3	29090769B	Pad (R)
4	290311A	620x550 Poly bag
	29095012-1	500x800 Protection sheet (B)
5	282301	Sealing hook
6	260012	Damplon tape
7	Accessory bag ass'y	
	29341014A	Instruction manual
	2010095	Connection cable
	25055018	Conversion plug (CV-K-2) (W)
	29100006A	350x250 Poly bag

PC BOARD PART LIST

Headphone terminal pc board (NAHP-2693-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P301	25045139	HLJ0540-01-010, Terminal

Power supply pc board (NAPS-2694-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
C991	350065A	0.01 μ F, 400V, IS.
P901	25035375	NPS-111-L339P, Push

Control pc board (NACOC-2695-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ics	
Q701	222777	LM6402H-425
Q702	222810	LC7800
Q716, Q718	222953	M54544AL
	Transistors	
Q703	2211454,	2SA1015Y,
	2212124 or	2SA1048Y or
	2212494	JA101P
Q704-Q706	2211255,	2SC1815GR,
	2212115,	2SC2458GR,
	2210746 or	2SC945AP or
	2212485	JC501Q
Q707-Q709	2211454,	2SA1015Y,
	2212124 or	2SA1048Y or
	2212494	JA101P
Q710-Q714	2211255,	2SC1815GR,
	2212115,	2SC2458GR,
	2210746 or	2SC945AP or
	2212485	JC501Q
Q715	2201540 or	2SD947 or
	2201060	2SD549
Q717	2201074	2SD880Y,
	2201385 or	2SD330E or
	2201035	2SD325E
Q719, Q721	2211255,	2SC1815GR,
	2210746 or	2SC945AP or
	2212485	JC501Q
Q720	2211454 or	2SA1015Y or
	2212494	JA101P
	Diodes	
D701-D703	223163 or	1SS133 or
	223155	1SS138
D704	2239592 or	RD10EB2 or
	2243212	MTZ10B
	Lamp	
PL902	210183	14V, 600mA
	Ceramic OSC	
X701	3010069	CSB800A

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C705	354780109	1 μ F, 50V, Elect.
C709	354780109	1 μ F, 50V, Elect.
C710	354741009	10 μ F, 16V, Elect.
C712	354780229	2.2 μ F, 50V, Elect.
C716	354741009	10 μ F, 16V, Elect.
C717	354781099	0.1 μ F, 50V, Elect.
	Resistors	
R702-R707	49163392406	3.9k Ω x6, 1/10W, Network
R708-R711	49163392404	3.9k Ω x4, 1/10W, Network
R712-R716	49163392405	3.9k Ω x5, 1/10W, Network
R730-R738	49163392409	3.9k Ω x9, 1/10W, Network
R756	441722704	27 Ω , 2W, Oxidefilm
	Miscellaneous	
P702	25055132	NPLG-2P-116, Plug
P703	25055137	NPLG-7P-121, Plug
P704A	2000573	NSAS-9P-529, Socket
P705	25050267	NSCT-39-95, Socket
P706	25050270	NSCT-6P-98, Socket

Operation switch pc board (NASW-2696-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	LED	
D705	225134	GL-3NG1
D706, D707	225126	GL-3PR1
	Switch	
S701-S709	25035389	NPS-111-S538, Push
	Holder	
	27190447	Holder (LED- \emptyset)

Timer switch pc board (NASW-2697-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Switch	
S710	25030277A	NRS-225-20MP

Hall IC pc board (NATD-2698-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q731	222558 or	DN6836 or
	222470	DN838K
	Spacer	
	27190173	Holder (for DN6838) or
	27190251	Spacer (for DN838K)

Remoto control pc board (NARM-2699-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P701	25050070	NSCT-7P20, Socket

PC BOARD PART LIST

Main circuit Pc board (NAFF-2690-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	Ics		D303, D304	223163	1SS133
Q107, Q108	222736	NJM4558S	D305, D306	223848	GP08B
Q201, Q202,	222811 or	NJM4558DD or	D307-D310	223155 or	1SS138 or
Q207, Q208	222502	NJM4558DX		223163	1SS133
Q209, Q210	222958	HA12090NT	D401, D403	223155 or	1SS138 or
Q213, Q214	222840661 or	4066BP or		223163	1SS133
	222933	BU4066B	D404, D405	2239673 or	RD15EB3 or
Q301, Q302	222652	M5218L		2243253	MTZ15C
Q401, Q402	222808	M5218P	D501	2239472 or	RD5.6EB2 or
Q410	222918	BA6251		2243152	MTZ5.6B
Q501	222695 or	LA6324 or	D502, D503,	223163 or	1SS133 or
	222681	IR3702	D601, D602	223155	1SS138
Q901	222780122	78M12	D603	223123	1K60
Q902	222790122	79M12	D604-D608	223163 or	1SS133 or
Q905	222780050	7805		223155	1SS138
	Transistors		D609, D610	223163 or	1SS133 or (G/W)
Q101-Q104	2211896 or	2SC1815LBL or		223155	1SS138
	2211406	2SC2240BL	D611	2239673 or	RD15EB3 or (G/W)
Q105, Q106	2211255,	2SC1815GR,		2243253	MTZ15C
	2210746 or	2SC945AP or	D612	223163 or	1SS133 or
	2212485	JC501Q		223155	1SS138
Q203-Q206	2211896 or	2SC1815LBL or (G/W)	D613	2239452 or	RD5.1EB2 or
	2211406	2SC2240BL		2243142	MTZ5.1B
Q211, Q212	2211255,	2SC1815GR,	D901	223862 or	WL01 or
	2210746 or	2SC945AP or		223890	WL01RL
	2212485	JC501Q	D902	223868 or	2W02 or
Q215, Q216	2211705,	2SD655E,		223889	RC202
	2211706,	2SD655F,	D903	2239653 or	RD13EB3 or
	2212794 or	2SD1468R or		2243243	MTZ13C
	2212795	2SD1468S	D904	223842 or	GP15B or
Q217, Q218	2212304,	2SK381D, (G/W)		223891	RL152
	2212305,	2SK381E,	D905, D906	223155 or	1SS138 or
	2211945 or	2SK246GR or		223163	1SS133
	2211946	2SK246BL		Coils	
Q303, Q304	2211255,	2SC1815GR,	L101, L102	231099	NCH-6146
	2210746 or	2SC945AP or	L103, L104	233245	NMC-2029
	2212485	JC501Q	L105, L106	231077,	NCH-2125,
Q403, Q404	2211255,	2SC1815GR,		231025 or	NCH-1064 or
Q406, Q408	2210746 or	2SC945AP or		233188	NCH-1033
	2212485	JC501Q	L201, L202	231103	NMC-6149
Q405, Q407	2211454 or	2SA1015Y or	L203, L204	233245	NCH-2029
	2212494	JA101P	L205, L206	231077,	NCH-2125,
Q409	2201540	2SD947		231025 or	NCH-1064 or
Q601-Q603	2211454 or	2SA1015Y or		233188	NCH-1033
	2212494	JA101P	L401, L402	231089 or	NCH-2137 or
Q604	2211255,	2SC1815GR, (G/W)		231044	NCH-2084
	2210746 or	2SC945AP or	L403-L406	231084 or	NCH-2032 or
	2212485	JC501Q		231039	NCH-2079
Q605	2211454 or	2SA1015Y or	L407, L408	231101	NCH-2148
	2212494	JA101P	L409, L410	231025	NCH-1064
Q606	221282	DTC-144ES		OSC Block	
Q607	2211454	2SA1015Y	Z401	24606198	NOB-029
Q903	2211255,	2SC1815GR,		Capacitors	
	2210746 or	2SC945AP or	C103, C104	392880337	3.3 μ F, 50V, LL.
	2212485	JC501Q	C109-C112	354741009	10 μ F, 16V, Elect.
Q904	2201074,	2SD880Y,	C121, C122	354732219	220 μ F, 10V, Elect.
	2201385 or	2SD330E or	C125-C128	354741009	10 μ F, 16V, Elect.
	2201035	2SD325E	C131, C132	354780109	1 μ F, 50V, Elect.
	Diodes		C135, C136	354786899	0.68 μ F, 50V, Elect.
D201, D202	223163 or	1SS133 or (G/W)	C137, C138	354780229	2.2 μ F, 50V, Elect.
	223155	1SS138	C145, C146	354786899	0.68 μ F, 50V, Elect.
D301, D302	223123	1K60	C201, C202	354783399	0.33 μ F, 50V, Elect.
D303, D304	223155 or	1SS138 or	C205, C206	354780109	1 μ F, 50V, Elect.

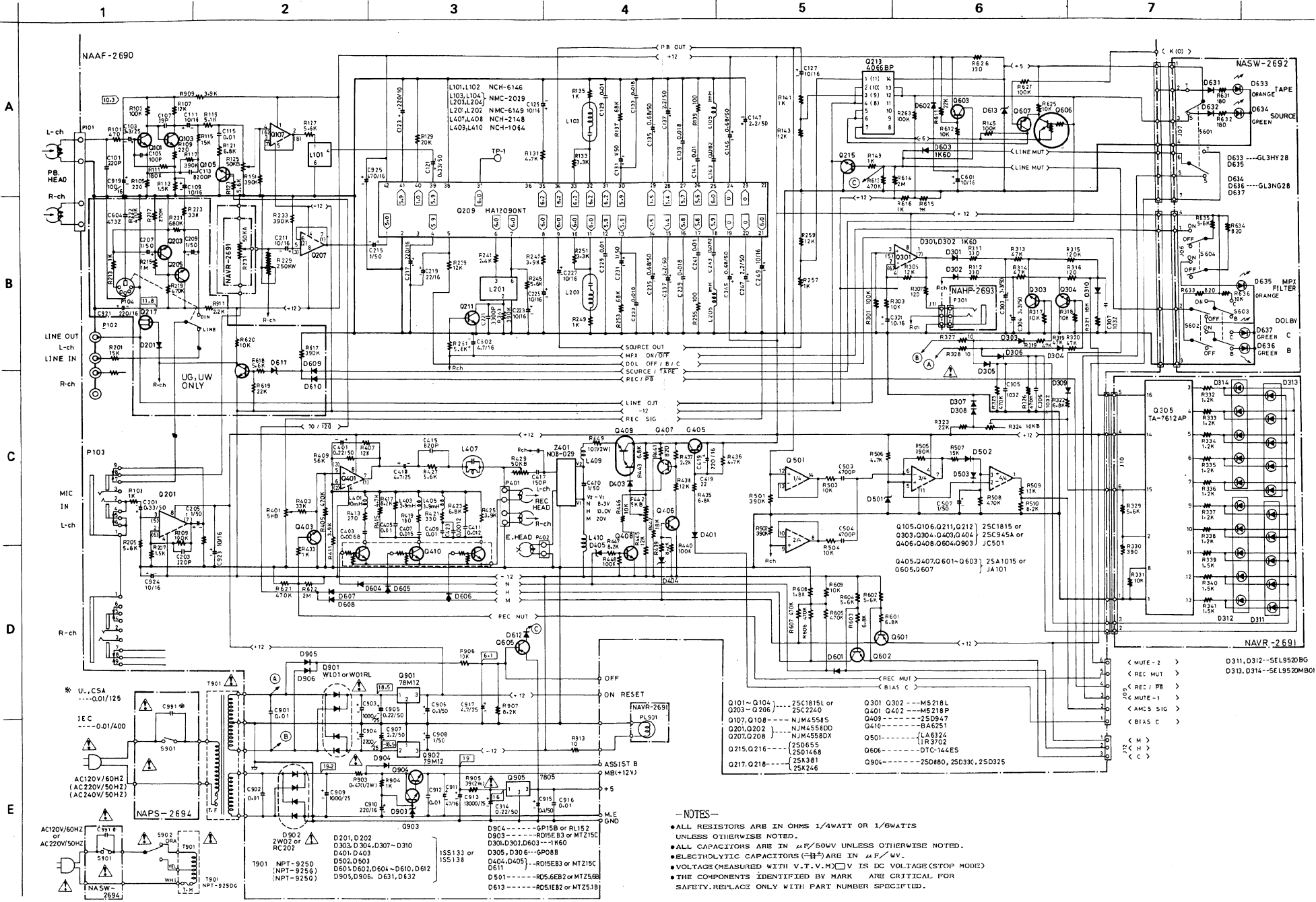
CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors			Miscellaneous	
C207–C210	354780109	1 μ F, 50V, Elect. (G/W)	P101, P401	25055134	NPLG–4P118, Plug
C211, C212	354741009	10 μ F, 16V, Elect.	P402	25055132	NPLG–2P116, Plug
C214, C215	354780109	1 μ F, 50V, Elect.	P102	25045120	NPS–4PDBL49, Terminal
C217, C218	354732219	220 μ F, 10V, Elect.	P103	25045195	HLJ–4338–01–3010, Terminal
C219, C220	354742209	22 μ F, 16V, Elect.	P104	25050064	NSCT–5P18, DIN Socket (G)
C223–C227	354741009	10 μ F, 16V, Elect.		27160156	Radiator
C231, C232	354780109	1 μ F, 50V, Elect.		27160029–1	RAD–07B, Radiator
C235, C236	354786899	0.68 μ F, 50V, Elect.		223019	AC–229, TR Spacer
C237, C238	354780229	2.2 μ F, 50V, Elect.		223017	AC–310, Bush
C245, C246	354786899	0.68 μ F, 50V, Elect.		27141069	Bracket
C247, C248	354780229	2.2 μ F, 50V, Elect.		880009	Revert
C249, C250	354741009	10 μ F, 16V, Elect.		82143010	3P+10FN (BC), Screw
C301, C302	354741009	10 μ F, 16V, Elect.		863430	N–3F–N (BC), Nut
C303, C304	354780339	3.3 μ F, 50V, Elect.		27225077	Shield plate
C401, C402	354782299	0.22 μ F, 50V, Elect.	Input volum pc board (NAVR–2691–1)		
C413, C414	354750479	4.7 μ F, 25V, Elect.	CIRCUIT NO.	PART NO.	DESCRIPTION
C419	354732219	220 μ F, 10V, Elect.		lc	
C420	354780109	1 μ F, 50V, Elect.	Q305	222507	TA7612AP
C507	354780109	1 μ F, 50V, Elect.		LEDs	
C601	354741009	10 μ F, 16V, Elect.	D311, D312	225160	SEL9520BG
C602	354750479	4.7 μ F, 25V, Elect.	D312, D314	225161	SEL9520MB01
C903, C904	352751029	1000 μ F, 25V, Elect.		Lamp	
C905	354782299	0.22 μ F, 50V, Elect.	PL901	210090	14V, 150mA
C906	354781099	0.1 μ F, 50V, Elect.		Resistors	
C907	354780229	2.2 μ F, 50V, Elect.	R231, R232	6172001	N60LGL50kA5Z, Variable
C908	354780109	1 μ F, 50V, Elect.		Miscellaneous	
C909	352751029	1000 μ F, 25V, Elect.		223004–1	Terminal
C910	354742219	220 μ F, 16V, Elect.		8767200604	W2x6B (Ni), Washer
C911	354744709	47 μ F, 16V, Elect.		82142003	3P+3F (BC), Screw
C913	3504168	1300 μ F, 25V, Elect.		27225076	Shield pleta
C914	354782299	0.22 μ F, 50V, Elect.		27225078	Shield pleta
C915	354781099	0.1 μ F, 50V, Elect.	Display pc board (NASW–2692–1)		
C917	354750479	4.7 μ F, 25V, Elect.	CIRCUIT NO.	PART NO.	DESCRIPTION
C919, C920	354741019	100 μ F, 16V, Elect.		Diodes	
C921	354742219	220 μ F, 16V, Elect.	D631, D632	223155 or	1SS138 or
C923, C924	354741009	10 μ F, 16V, Elect.		223163	1SS133
C925, C926	354744719	470 μ F, 16V, Elect.		LEDs	
	Resistors		D633, D635	225178	GL3HY28
R125, R123	5215046	N08HR50kBC, Semi-fixed	D634	225179	GL3NG28
R229	5104184	N09RL1C250kWT20M, Variable	D636, D637	225179	GL3NG28
R324	5215045	N08HR10kBC, Semi-fixed		Switch	
R401, R402	5215044	N08HR5kBC, Semi-fixed	S601–S604	25035523	NPS–122–L485
R429, R430	5215046	N08HR50kBC, Semi-fixed		Holder	
R444	5104189	N09RL1C5kWB20M, Variable		27190462A	Holder (LED–5)
R449	441521004F	10 Ω , 1/2W, Oxidefilm			
R905	441723904NF	39 Ω , 2W, Oxidefilm			

NOTE

(G): Only 220V model

(W): Only Universal model

SCHEMATIC DIAGRAM-AMPLIFIER SECTION



- COMPONENT IDENTIFICATION**
- Q105, Q106, Q211, Q212 25C1815 or
 - Q303, Q304, Q403, Q404 25C945A or
 - Q406, Q408, Q604, Q903 1C501
 - Q405, Q407, Q601-Q603 2SA1015 or
 - Q605, Q607 2SA1015
 - Q301, Q302 ---M5218L
 - Q401, Q402 ---M5218P
 - Q107, Q108 ---NJM4558S
 - Q409 ---250947
 - Q410 ---DA2551
 - Q501 ---LA6324
 - Q502 ---1R3702
 - Q215, Q216 ---25D655
 - Q217, Q218 ---25D1468
 - Q219 ---25K381
 - Q220 ---25K246
 - Q303, Q302 ---M5218L
 - Q401, Q402 ---M5218P
 - Q409 ---NJM4558S
 - Q501 ---LA6324
 - Q502 ---1R3702
 - Q215, Q216 ---25D655
 - Q217, Q218 ---25D1468
 - Q219 ---25K381
 - Q220 ---25K246
 - Q904 ---6P15B or RL152
 - Q905 ---RD5E83 or MT215C
 - D300, D301, D603 ---1F50
 - D305, D306 ---P0808
 - D404, D405 ---RD5E83 or MT215C
 - D611 ---RD5E83 or MT215C
 - D501 ---RD5E83 or MT215C
 - D613 ---RD5E82 or MT251B

- NOTES**
- ALL RESISTORS ARE IN OHMS 1/4WATT OR 1/2WATTS UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN μ F/50V UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS (E) ARE IN μ F/V.
 - VOLTAGE MEASURED WITH V.T.V.M. IS DC VOLTAGE (STOP MODE)
 - THE COMPONENTS IDENTIFIED BY MARK ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.

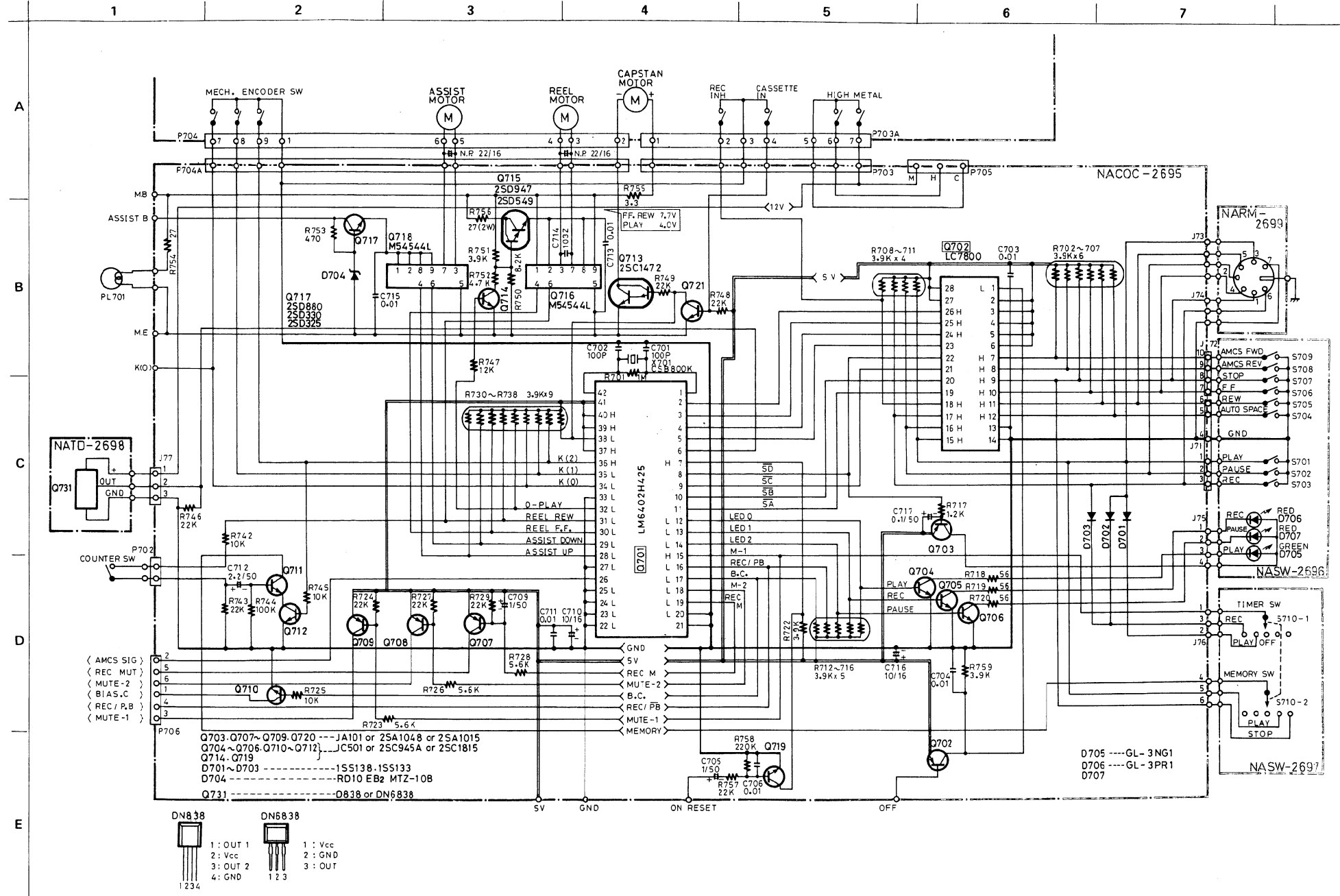
* U.L. CSA
---0.01/125
IEC
---0.01/400

AC120V/60HZ
(AC220V/50HZ)
(AC240V/50HZ)

AC120V/60HZ
or
AC220V/50HZ

< MUTE - 2 > D311, D312 ---5E19520RG
< REC MUT > D313, D314 ---5E19520MB0
< REC / PB >
< MUTE - 1 >
< AMCS SIG >
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< M >
< M >
< C >

SCHEMATIC DIAGRAM-CONTROL SECTION



NATO-2698

NACOC-2695

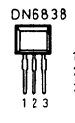
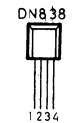
NARM-2699

NASW-2696

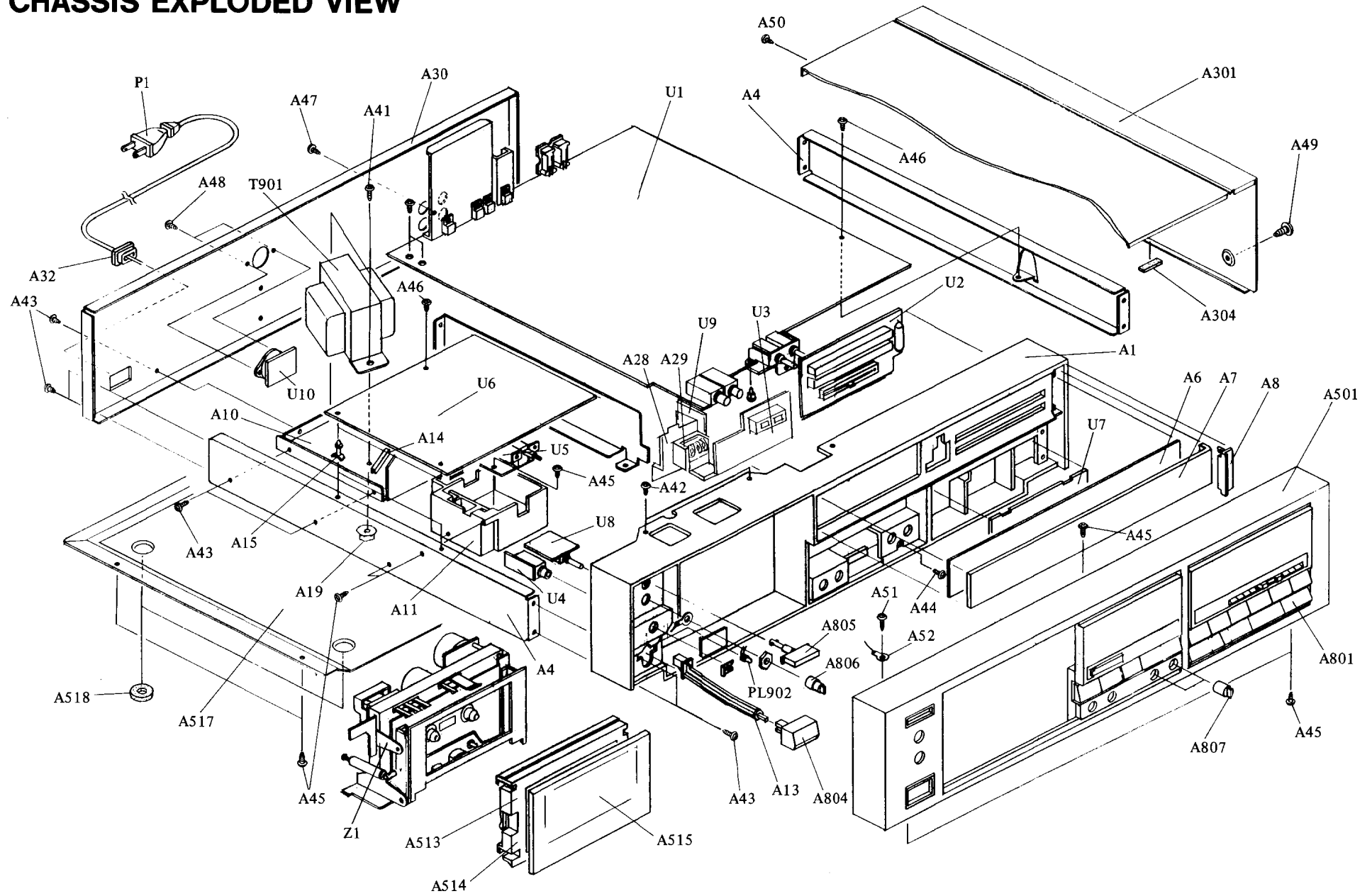
NASW-2697

- Q703-Q707~Q709, Q720 ---JA101 or 2SA1048 or 2SA1015
- Q704~Q706, Q710~Q712, ---JC501 or 2SC945A or 2SC1815
- Q714, Q719 ---1SS138, 1SS133
- D701~D703 ---SS138, 1SS133
- D704 ---RD10 EB2 MTZ-10B
- Q731 ---D838 or DN838

- D705 ---GL-3NG1
- D706 ---GL-3PR1
- D707



CHASSIS EXPLODED VIEW



CHASSIS EXPLODED VIEW PART LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
A1	27110282B	Front bracket	A513	27300697	Cassette lid
A4	27115205	Side bracket	A514	27262441	Plate
A5	28140690	Cushion	A515	28191350	Window
A6	28133166	Back plate	A517	27170225A	Bottom board
A7	28130237	Dial plate	A518	27175011C	Leg
A8	27190446	Holder	A801	28322565	Knob ass'y (S)
A10	27130331H	Bracket (PT)		28322568	Knob ass'y (B)
A11	27190551-1	Holder (POW)	A804	28321904A	Knob (POW) ass'y (S)
A13	27273030C	Joint (L)		28321905	Knob (POW) ass'y (B)
A14	28170014	Bushing	A805	28321027B	Knob (EJ) ass'y (S)
A15	27190009	Holder		28321988	Knob (EJ) ass'y (B)
A19	86414010	FWN4x10, Flange nut	A806	28320797	Knob (SEL) (S)
A27	880009	Revert		28321735	Knob (SEL) (B)
A28	27141074	Bracket (C)	A807	28322437	Knob (LEV)
A29	24601205	Counter	A808	870039A	Washer
A30	27120875A	Back bracket (D)	T901	△ 2300121	NPT-925D, Power transformer (D)
	27120876A	Back bracket (G)		△ 2300122	NPT-925G, Power transformer (G)
	27120878A	Back bracket (W)		△ 2300123	NPT-925DG, Power transformer (W)
	27120891	Back bracket (Q)		△ 2300136	NPT-925Q, Power transformer (Q)
A32	27300750	Strainrelief	P1	△ 253112	AS-UC-4, Power supply cord (D)
A41	830440089	4TTC+8C (BC), Screw		△ 253128A	AS-CEE, Power supply cord (G/W)
A42	834426068	2.6TTS+6B (BC), Screw		△ 253118	AS-SAA, Power supply cord (Q)
A43	894430068	3TTS+6B (BC), Screw	P101	2000580	NSAS2P536, Socket
A44	801217	8W-3P+12F, Screw	S902	25065123	NSS-1258P, Voltage selector (W)
A45	833430080	3TTP+8P (BC), Screw	U1	15088590-1	NAAF-2690-1 (D)
A46	831430088	3TTW+8B (BC), Screw		15084590-1A	NAAF-2690-1A (G/W)
A47	834430108	3TTW+10B (BC), Screw			Main pc board ass'y
A48	82142604	2.6P+4F (BC), Screw	U2	15088591-1	NAVR-2691-1,
A49	838440089	4TTB+8C (BC), Screw			Input volum pc board ass'y
A50	838430088	3TTB+8B (BC), Screw	U3	15088592-1	NASW-2692-1
A51	834230108	3TTS+10B (Ni), Screw			Display pc board ass'y
A52	223004-1	Lug terminal	U4	15088593-1	NAHP-2693-1
A301	28184235	Top cover (S)			Headphone pc board ass'y
	28184236	Top cover (B)	U5	15088594-1	NAPS-2694
A304	28140408	Cushion			Power supply pc board ass'y
A501	15088121	Front panel ass'y (S)	U6	15088595-1	NACOC-2695-1
	15098121	Front panel ass'y (B)			Contorol pc board ass'y
-a	28125133	End cap (L) (S)	U7	15088596-1	NASW-2696-1
	28125135A	End cap (L) (B)			Operation switch pc board ass'y
-b	28125134	End cap (R) (S)	U8	15088597-1	NASW-2697-1
	28125136A	End cap (R) (B)			Timer switch pc board ass'y
-c	27267238A	Guide (EJ) (S)	U9	15088598-1	NATD-2698-1
	27267239A	Guide (EJ) (B)			Hall IC pc board ass'y
-d	27267206B	Guide (POW) (S)	U10	15088599-1	NARM-2699-1
	27267235B	Guide (POW) (B)			Remoto contorol pc board ass'y
-e	28198577	Facet (POW)	Z1	244092	NDM-84, Tape mechanism ass'y
-f	28191354A	Clear plate			
-g	27262410	Plate			

NOTE: THE COMPONENTS IDENTIFIED BY MARK △ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

NOTE: (D): Only 120V model
 (G): Only 220V model
 (W): Only Universal model
 (Q): Only 240V model
 (S): Only Silver model
 (B): Only Black model

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