

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.

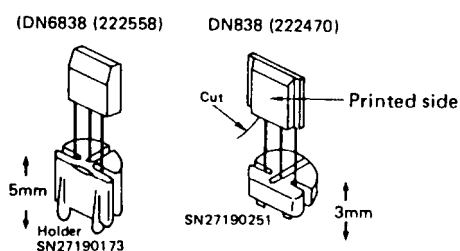
2. Instruction resistance measurement

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.

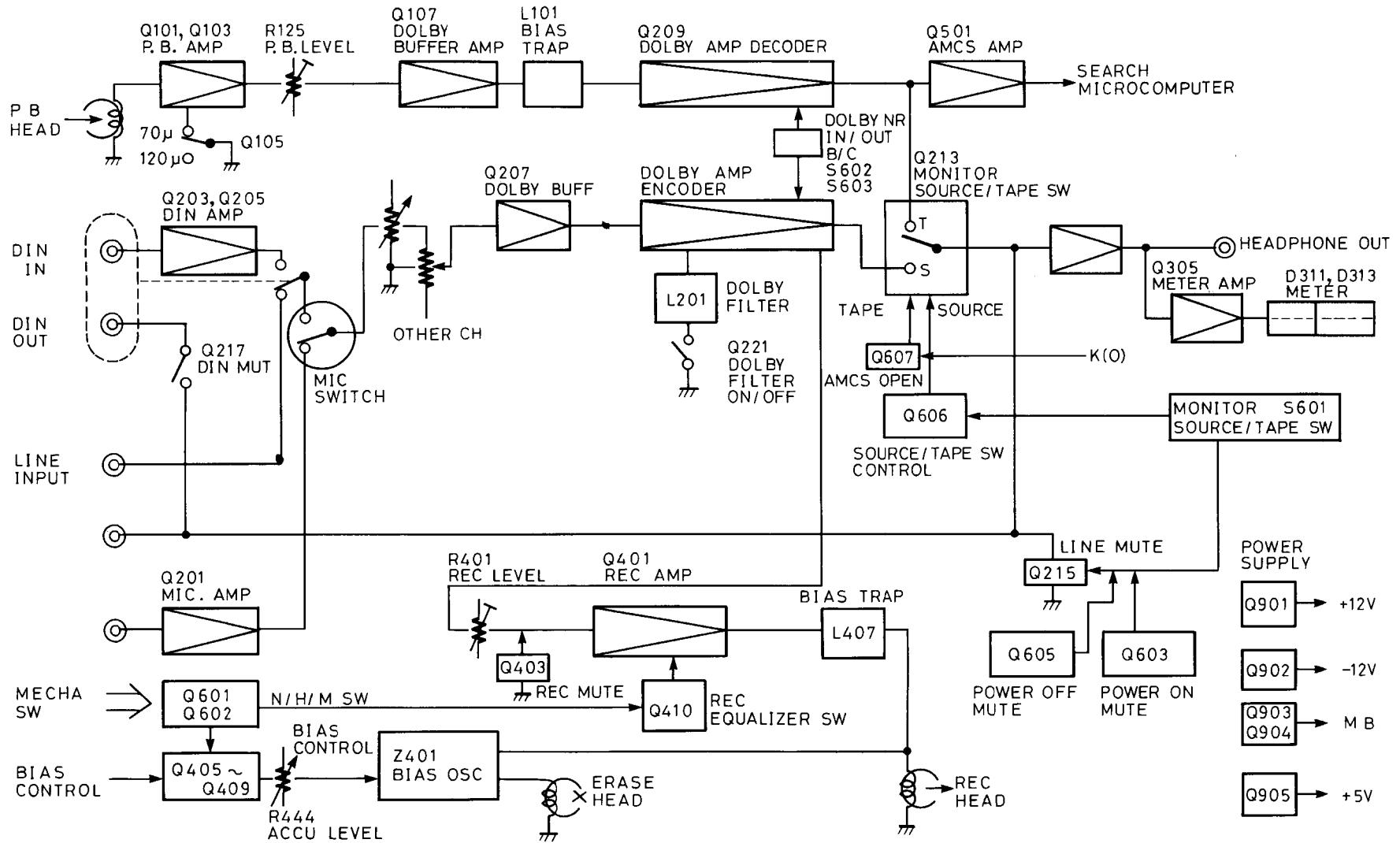
Auto Space Rec Mute Key

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

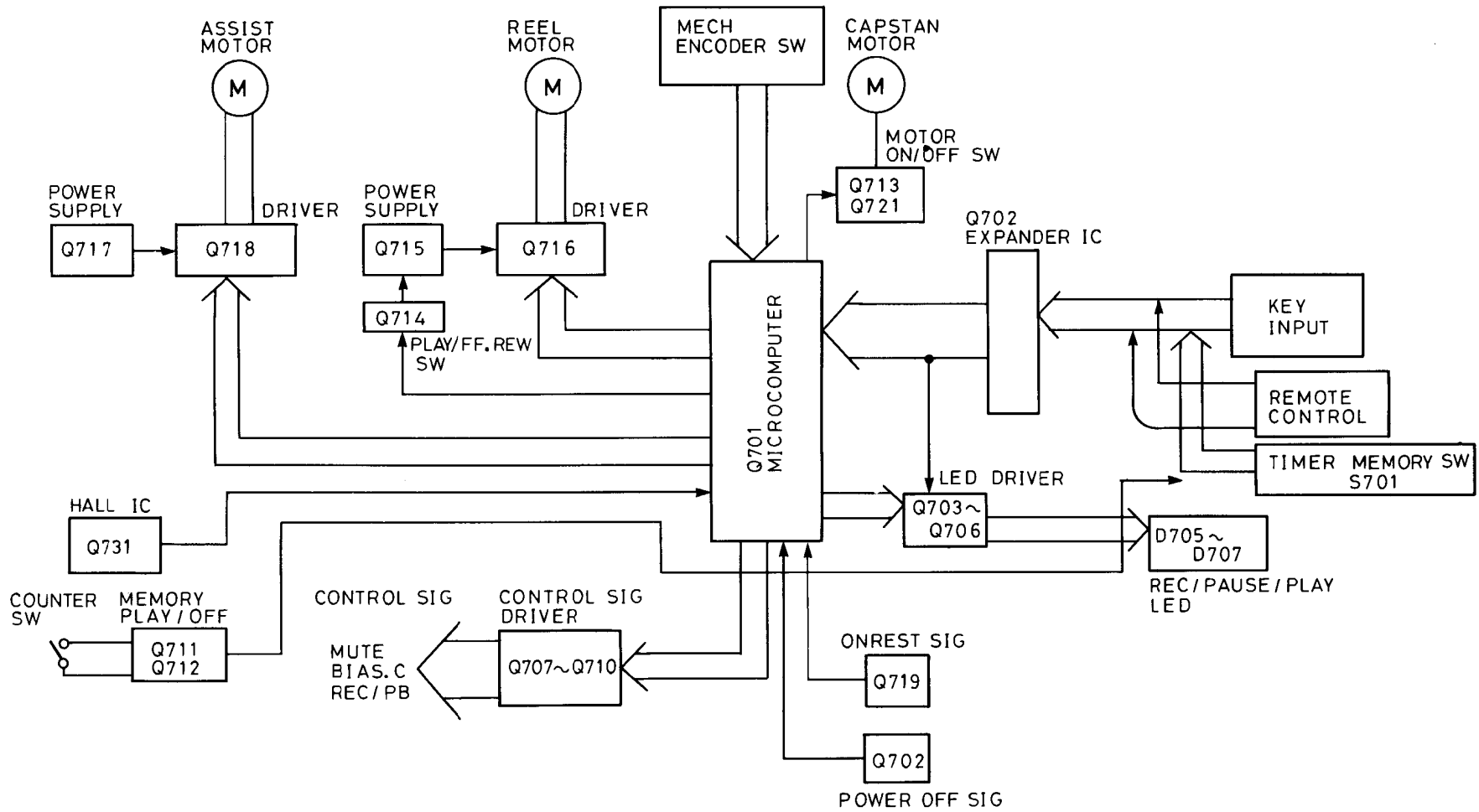
Fully Automatic Tape Selection

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.

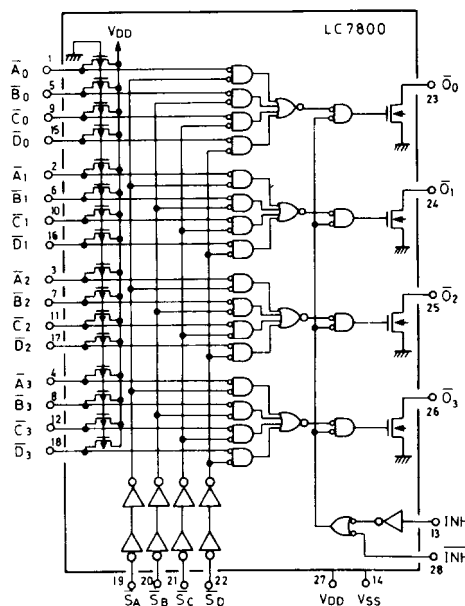
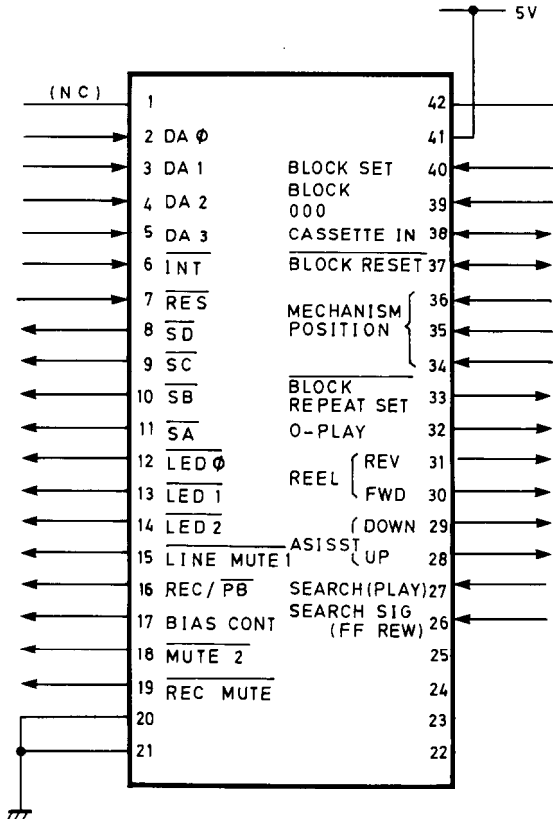


Fig. 1 LC7800 equivalent circuit

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 | H |
| | #29 (DOWN) | H | L | H | H | H | L | 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

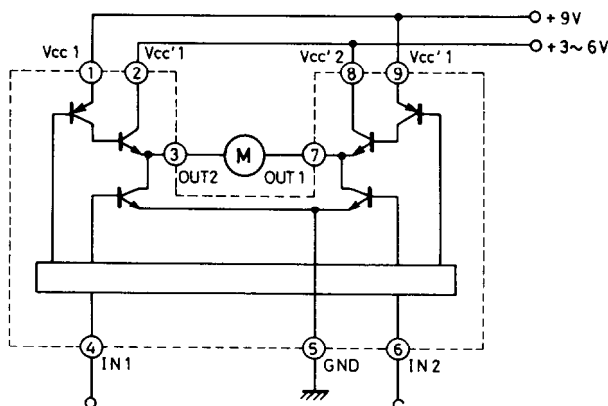
The control output of the REEL motor is momentarily held under braking condition only when the power is turned on, then is restored to normal to output the control signals as usual.

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 | — |

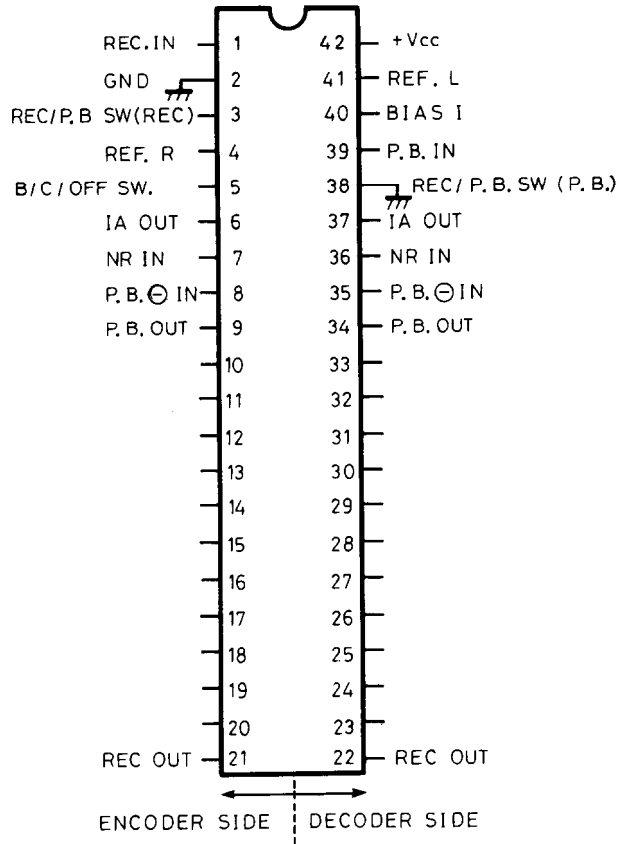
IC BLOCK DIAGRAM

M54544AL (MOTOR DRIVE)

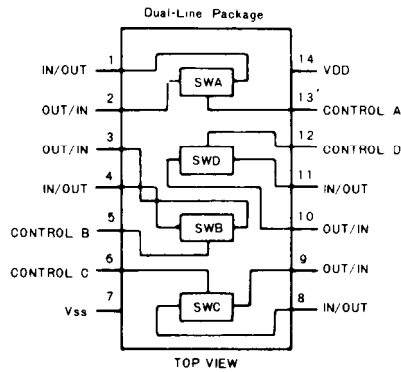


| INPUT | | OUTPUT | | Remark |
|-------|-----|--------|-----|--------|
| # 4 | # 6 | # 3 | # 7 | |
| L | L | OFF | OFF | — |
| H | L | H | L | FWD |
| L | H | L | H | REV |
| H | H | L | L | Brake |

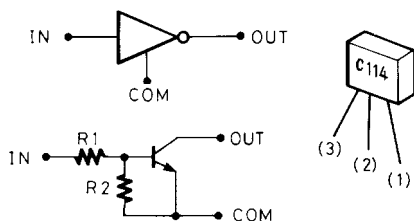
HA-12090NT
(DOLBY B & C TYPE NR SYSTEM, ENCODER & DECODER
IN ONE PACKAGE)



4066BP or BU4066



DTC144ES
DTC114YS (Digital transistor)



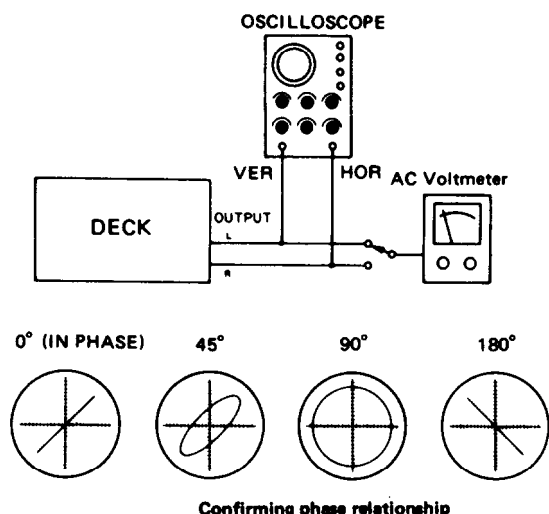
| | R 1 | R 2 |
|------------|-------|-------|
| DTC 114 YS | 10 kΩ | 47 kΩ |
| DTC 144 ES | 47 kΩ | 47 kΩ |

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 | 2.1 x 4.5 x 0.1, Washer | 168c | 24610848 | Holder, left |
| 78 | 24611003 | 1.8 x 3.8 x 0.5, 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

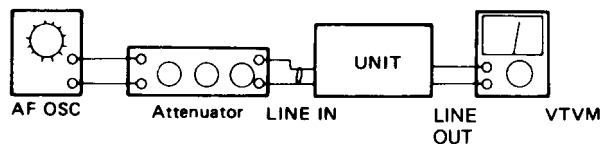
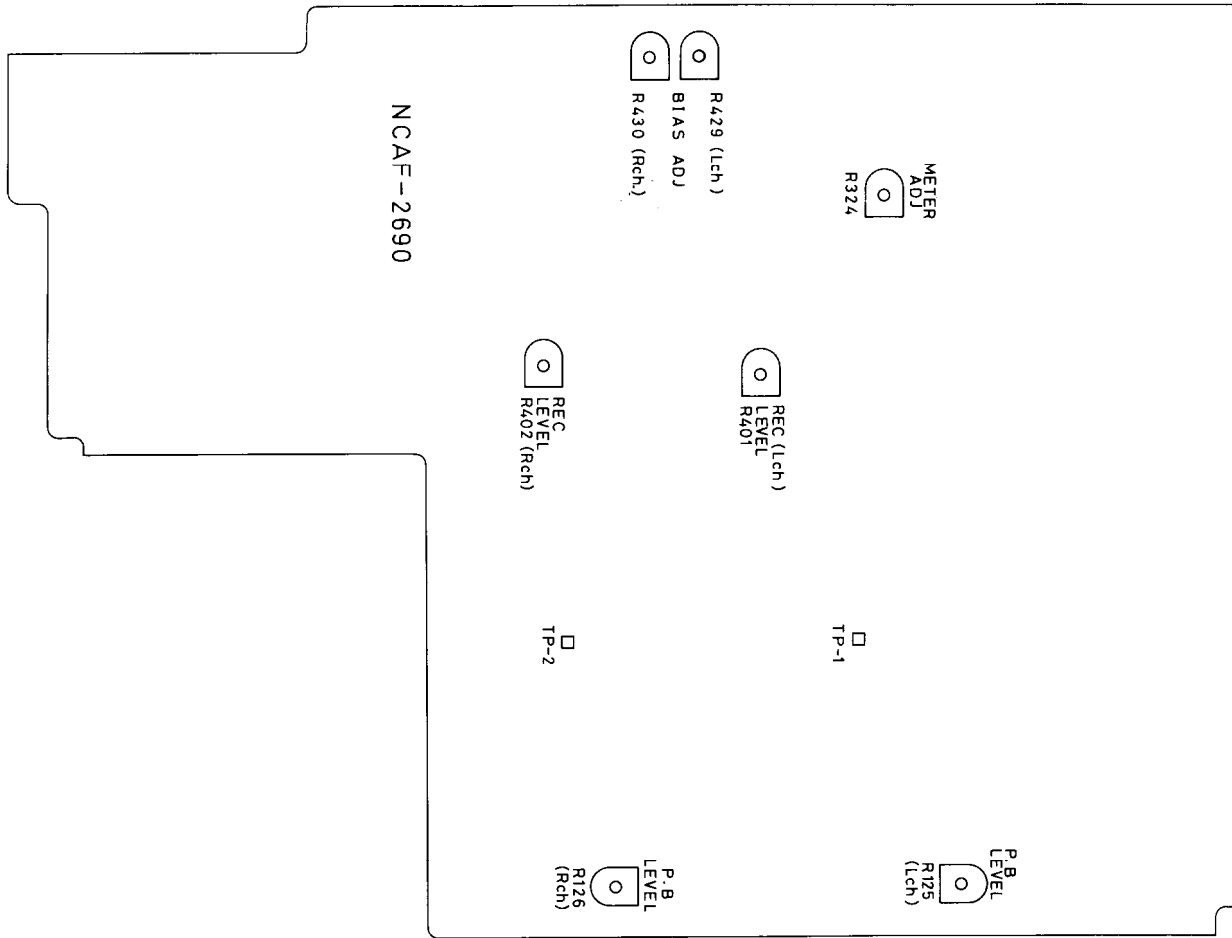


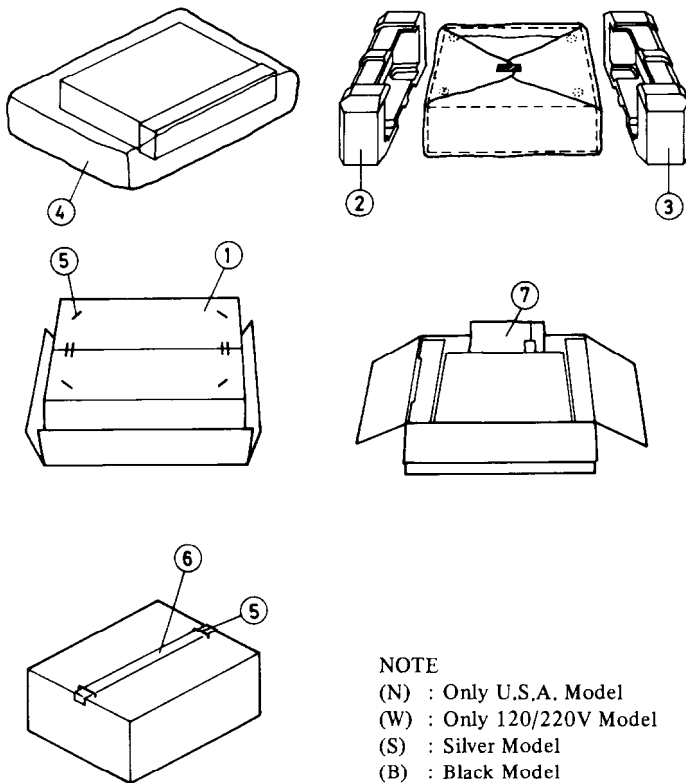
fig-2

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. |

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|-------------|----------------------------------|
| | | 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 |

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|----------|----------------------|
| | | 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)

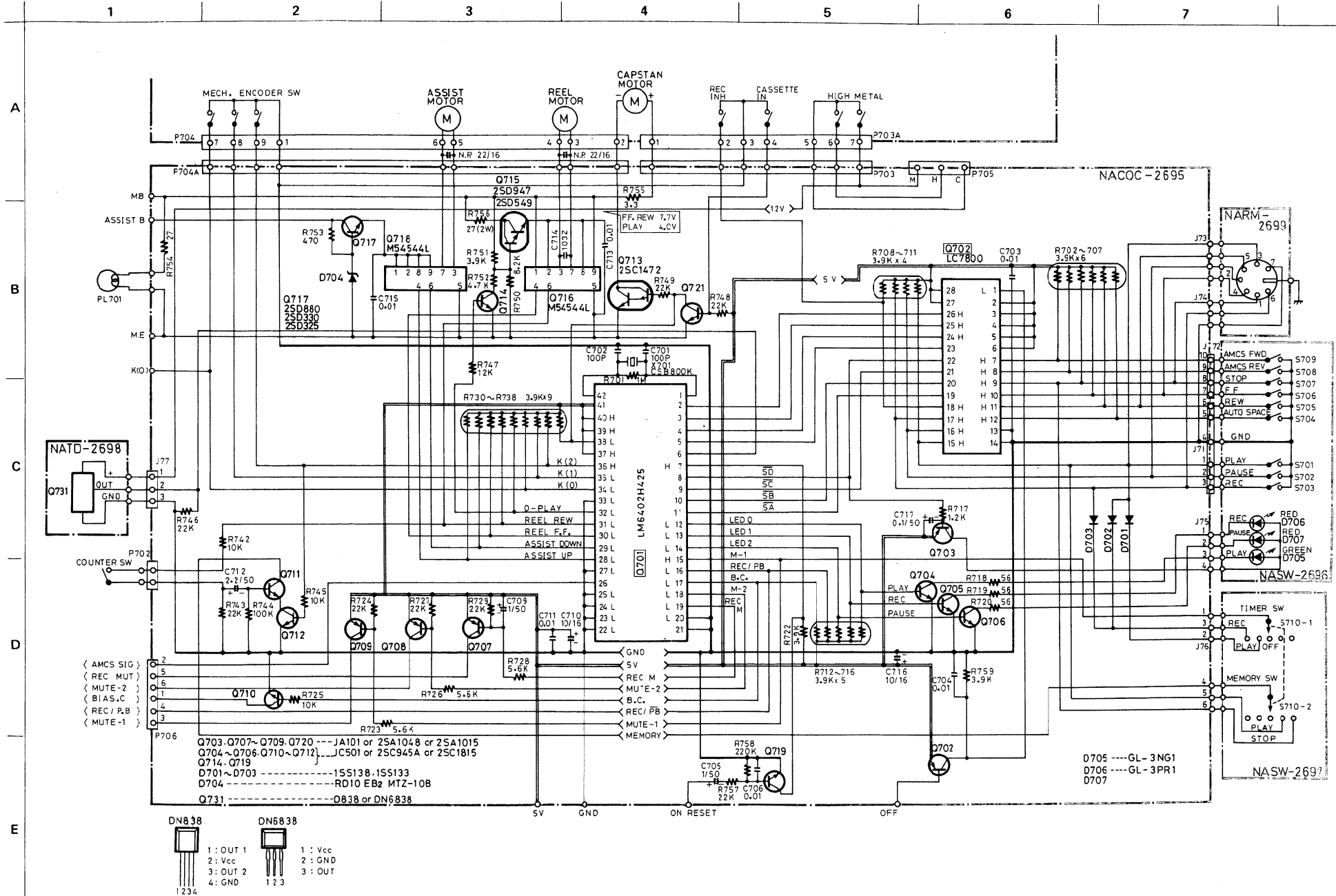
| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|----------|-------------------|
| P701 | 25050070 | NSCT-7P20, Socket |

PC BOARD PART LIST

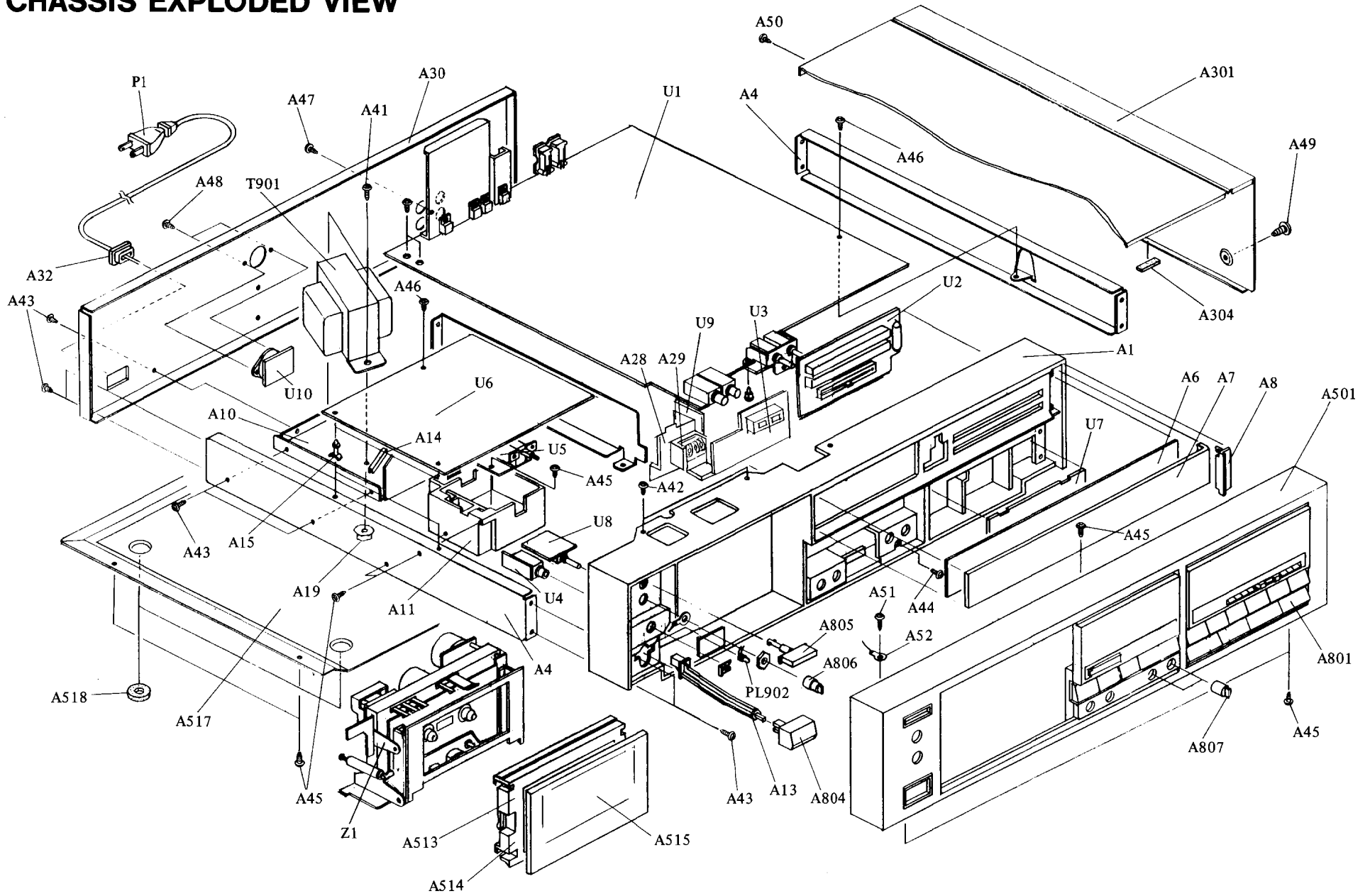
Main circuit Pc board (NAFF-2690-1)

| 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. |

SCHEMATIC DIAGRAM-CONTROL SECTION



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, Scred | 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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