

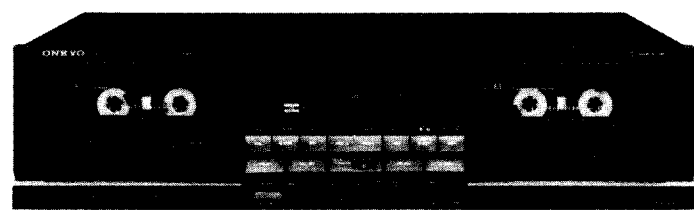


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# ONKYO SERVICE MANUAL

## STEREO CASSETTE TAPE DECK

### MODEL TA-RW470



Black model

|                                 |                         |
|---------------------------------|-------------------------|
| UD, UD $\text{\textcircled{N}}$ | 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  $\triangle$  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-tracks, 2-channels   |
| Erasing System:      | AC erase   |
| Tape Speed:          | 4.8 cm/sec. (1-7/8 i.p.s.)<br>9.6 cm/sec. (3-3/4 i.p.s.) (high speed dubbing)  |
| Wow and Flutter:     | 0.06% (WRMS)   |
| Frequency Response:  | 20–15,000Hz (Normal)<br>(30–14,000Hz $\pm$ 3dB)<br>20–16,000Hz (High)<br>(30–15,000Hz $\pm$ 3dB)<br>20–17,000Hz (Metal)<br>(30–16,000Hz $\pm$ 3dB)   |
| S/N Ratio:           | Dolby NR off: 58dB (metal position tape)<br>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:         | Microphone jack: 1<br>Input sensitivity: 1mV/600 ohms<br>Input impedance: 5.6 kohms<br>Line IN: 2<br>Input sensitivity: 60mV<br>Input impedance: 50 kohms                                    |
| Outputs:             | Headphone jack: 1<br>Optimum load impedance: 8 to 200 ohms<br>Line OUT: 2<br>Standard output level: 500mV (0dB)<br>Optimum load impedance: over 50 kohms                                     |
| Motors:              | DC servo motor x 2; DC motor x 2   |
| Heads:               | REC/PB: special hard permalloy x 2;<br>Erase head: ferrite x 1   |
| Power Supply Rating: | U.K. and Australian models:<br>AC 240V, 50Hz<br>U.S.A. and Canadian models:<br>AC 120V, 60Hz<br>Worldwide models:<br>AC 120V and 220V switchable, 50/60Hz                                    |
| Power Consumption:   | 27 watts   |
| Dimensions:          | 435(W) x 115(H) x 334(D)mm<br>(17-1/8" x 4-1/2" x 13-1/8")   |
| Weight:              | 6.0 kg. (13.2 lbs.)  |

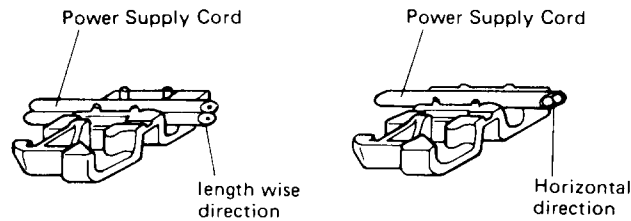


Specifications and external appearance are subject to change without notice because of product improvements.

## SERVICE PROCEDURES

### 1. Replacement of power supply cord

There are two power supply cord outlets on the strainrelief. Insert them in prescribed direction to ensure safety. AS-UC-3 (UD<120V> model) should be inserted lengthwise and other types of cords should be inserted horizontally.



### 2. Insulating resistance measurement

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

Specifications; 500V more than 10MΩ

## MECHANISM OPERATION

### 1. Overview of the Cassette Drive Mechanism

The cassette drive mechanism consists of two motors and one solenoid. It is based on the same principle as our previous three-motor mechanisms (which employed separate capstan, reel and assist motors) except that one motor is used for both the reel and assist functions. The solenoid is provided to switch between the two functions. As the mechanism is basically identical to our previous three-motor configuration except for the reel/assist switching function, the discussion below will focus on the switching function's main features.

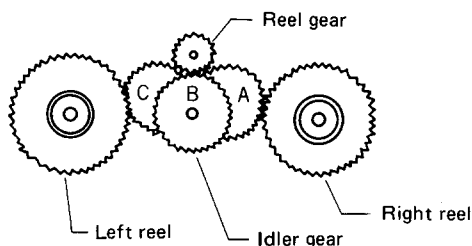


Figure 1: Frontal View of the Assist/Reel Drive Train

In the previous (three-motor) mechanism, the idler gear had two positions: A for fast forward and C for rewind. In the new configuration a third position (B) is added for assist operation.

In the B position, the idler gear is linked to a cam which raises and lowers the heads and rotates them during auto-reverse play. To keep the gear firmly in position, a

notched lever presses up against the gear shaft from below. The gear shaft rests in the notch in the lever, maintaining the idler gear in the B position. This arrangement makes it possible to use a single motor for both the reel and assist functions.

Attraction from the solenoid is used to switch from the assist position (position B in figure 1 above) to either the rewind or fast forward position for reel operation. Attractive force from the solenoid is applied to the notched lever, pulling it downward. This disengages the gear shaft from the notch and frees the gear. Then, by applying voltage to the motor, the idler gear can be moved to either the A or C position for reel operation. The notched lever also acts a brake for the reels when solenoidal attraction is applied.

In order to switch back from reel to assist operation, the polarity of the voltage being applied to the motor is reversed. This causes the gear to jerk in the direction of the opposite reel. When it comes to point B, however, the gear shaft catches in the notch in the lever, holding the gear in position for assist operation. This design ensures that the idler gear always switches initially to the assist position before switching to another operation. This also guarantees that the mechanism will be in the correct position after all operations are completed.

The assist/reel motor uses three different voltages to perform the operations described above. The approximate voltages are as follows: 8V for assist operations; 6V for high-speed fast forward and reverse; and 3.5V for recording and playback. They are controlled by the TRQ1 and TRQ2 signals from the microprocessor. In assist operation, the idler gear turns clockwise (viewed from the front) during forward play and counterclockwise during reverse play.

### 2. Mechanism Drive System

The waveforms which drive the mechanism look rather complicated on an oscilloscope. If we break them down into the basic patterns which indicate separate operations, however, and display the combined result in tabular form, table 1 is the result. When the operations listed under "Mechanism Operations" are performed in the order specified (i.e. left to right), the operation "modules" listed under "Drive Sequence" are activated in the order shown (left to right). Figure 2 through 8 below illustrate the waveforms for the various modules.

**Note:** The polarity of the waveforms differs depending on the direction of tape travel and the type of operation. All durations are given in milliseconds [ms].

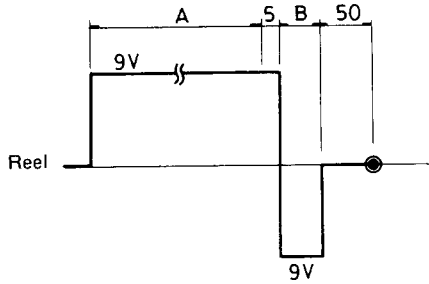
| Mechanism Operations |          | Drive Sequence |                  |
|----------------------|----------|----------------|------------------|
| PLAY                 | → STOP   | A              | → E → G          |
| SEARCH               | → STOP   | C              | → B → A          |
| FF/REW               | → STOP   | C              | → G              |
| STOP                 | → PLAY   | A              | → D <sub>2</sub> |
| PLAY                 | → SEARCH | A              | → D <sub>1</sub> |
| STOP                 | → FF/REW | D <sub>1</sub> |                  |

**Table 1: Drive Sequences for Representative Operations**

■ **Drive waveform for assist operation**

- A: While searching for target position
- B: The motor reverses to absorb inertia for 30 ms when the heads are being raised and 70 ms when heads are being lowered.

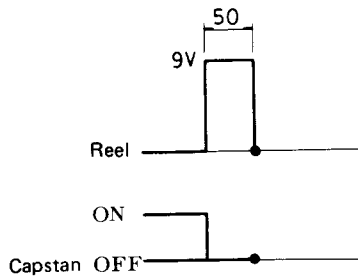
Note: The 5 ms gap between A and B is needed in order to move the tape to the center of the target area. The 50 ms period following B is for resetting the mechanism position. Assist operation is performed again if the position is not correct. In this case (only), B is 10 ms in duration. The (●) mark indicates the mechanism position double-check point.



**Figure 2: Module A**

■ **Drive waveform 1 for changing position of idler gear**

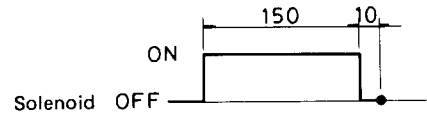
If the capstan motor is turning when the reel drive signal is received, it is shut off.



**Figure 3: Module B**

■ **Drive waveform for brake**

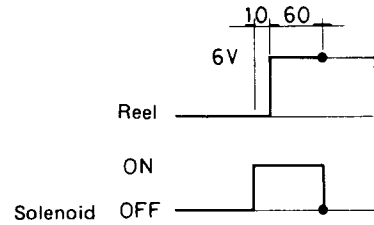
Attraction from the solenoid engages the brake. The final 10 ms gap is the pause before the next operation starts.



**Figure 4: Module C**

■ **Reel drive waveform**

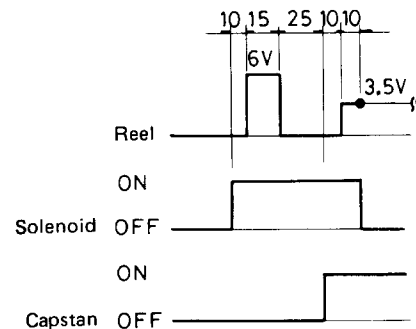
(Used during fast forward, reverse and music search)



**Figure 5: Module D1**

■ **Reel drive waveform**

(Used during record and playback)



**Figure 6: Module D2**

■ **Waveform for taking up tape slack**

The reel drive voltage normally consists of 15 pulses (3.5V: on 5 ms, off 2 ms). The number of pulses is increased to 25 during double-speed operation.

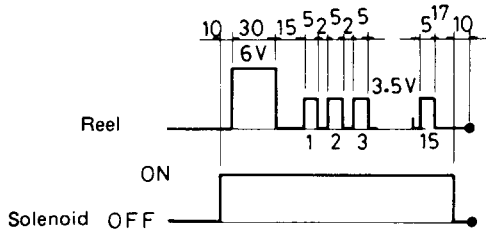


Figure 7: Module E

■ **Drive waveform 2 for changing position of idler gear**

The movement produced is the same as in module B. However, after the first 50 ms peak, the position of the mechanism is checked. If it is not in the stop position, module A is executed. The duration of assist reverse rotation is 10 ms in this case. The (⊙) mark indicates the mechanism position double-check point.

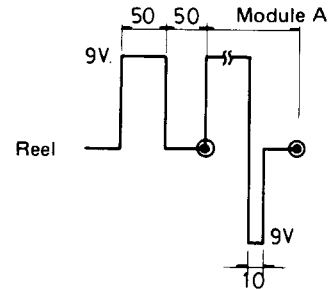


Figure 8: Module G

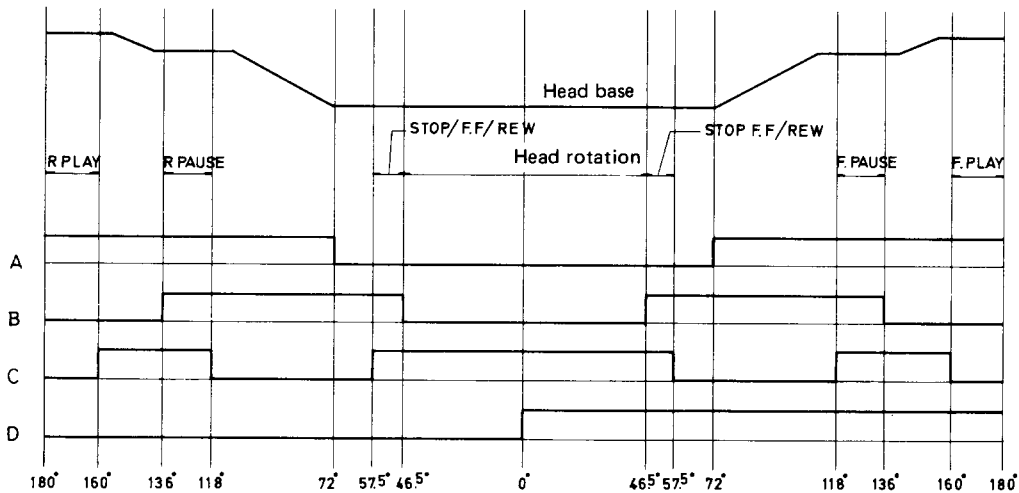
**3. Initialization of the Mechanism**

When power is initially turned on, there is no guarantee that the idler gear is in the assist position. Therefore, signals are issued to move the idler gear first to the left and then to the right, and the gear is secured in position B as shown in figure 1 above. Then modules A, E and G are

executed in succession to put the mechanism in the stop position.

Note: In this particular case, the number of pulses in module E is 25 (the same as during double-speed operation).

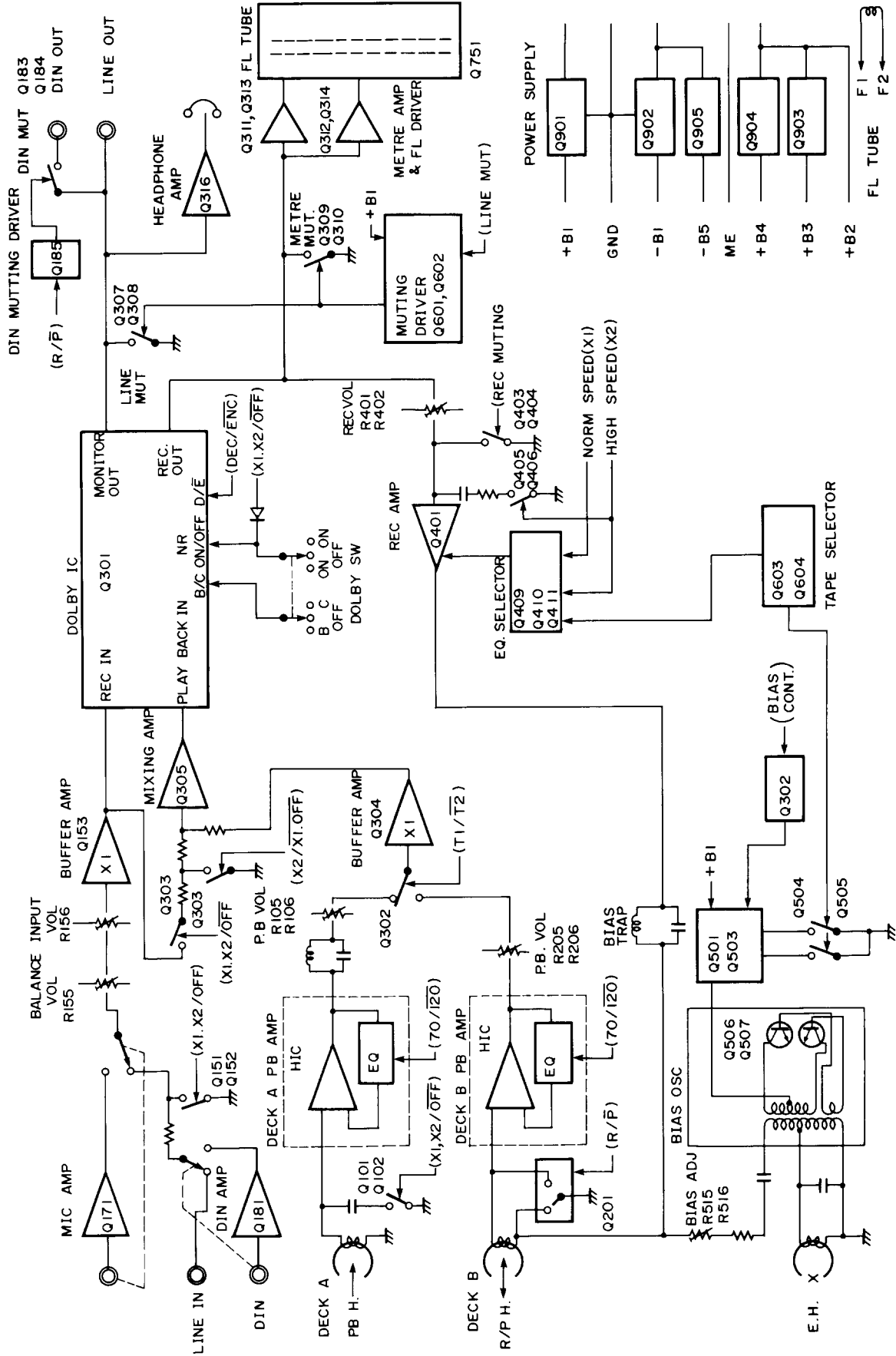
**4. Mechanism Positioning Data**



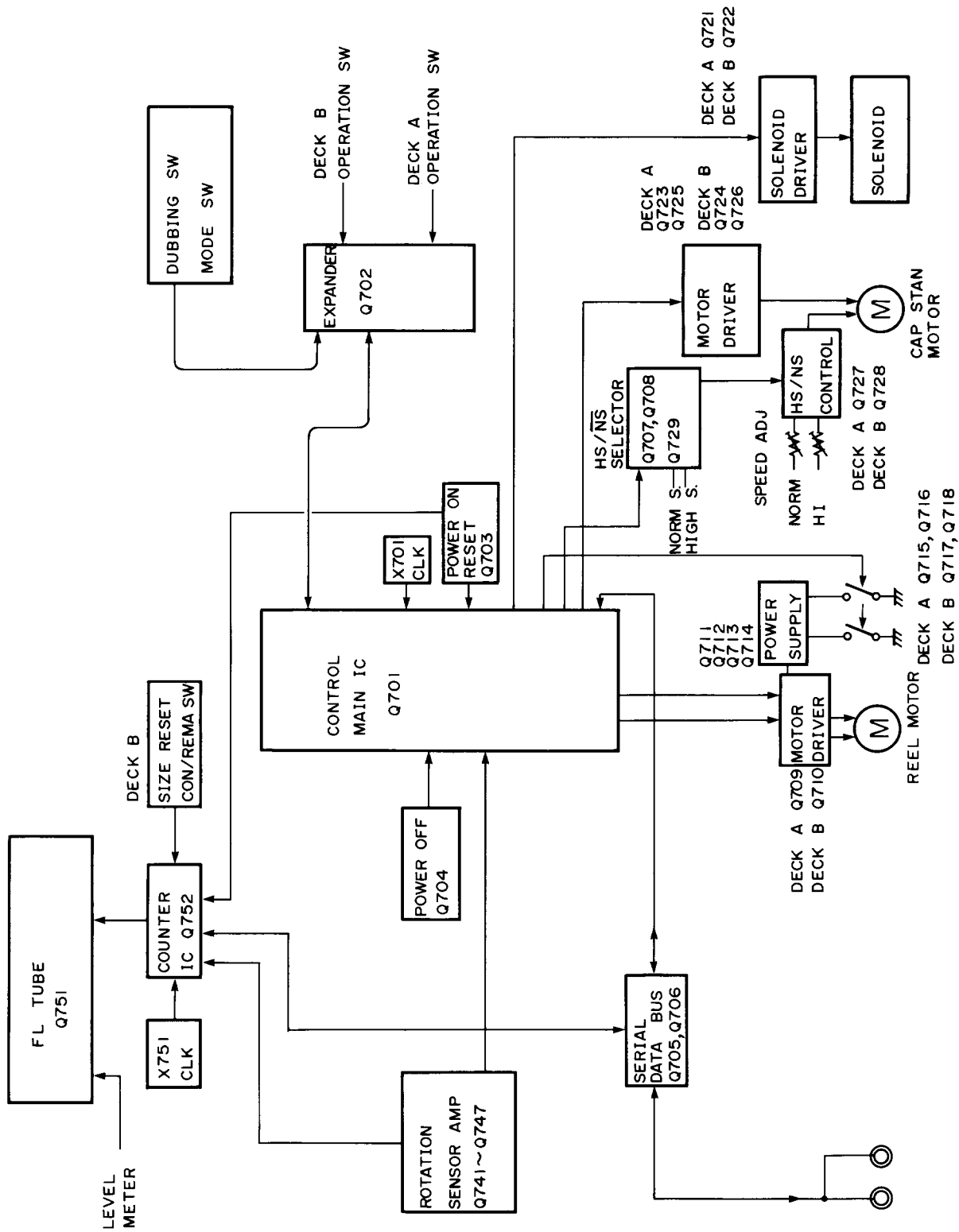
Note: The dotted lines in the positioning data indicate either "0V" or "switch on".

Figure 9: Mechanism Positions and Positioning Data

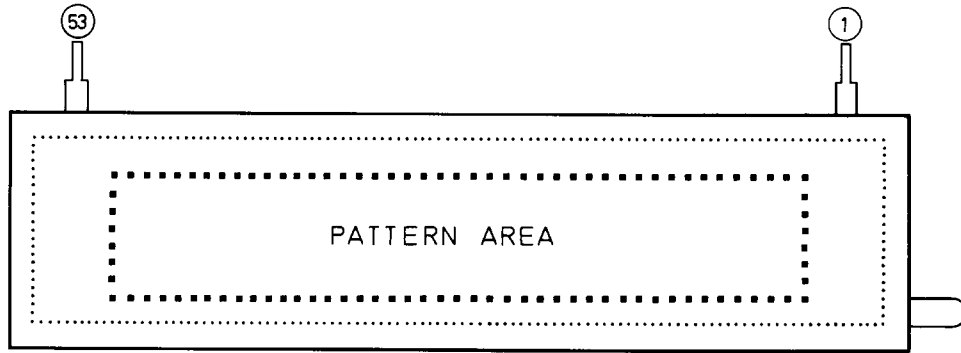
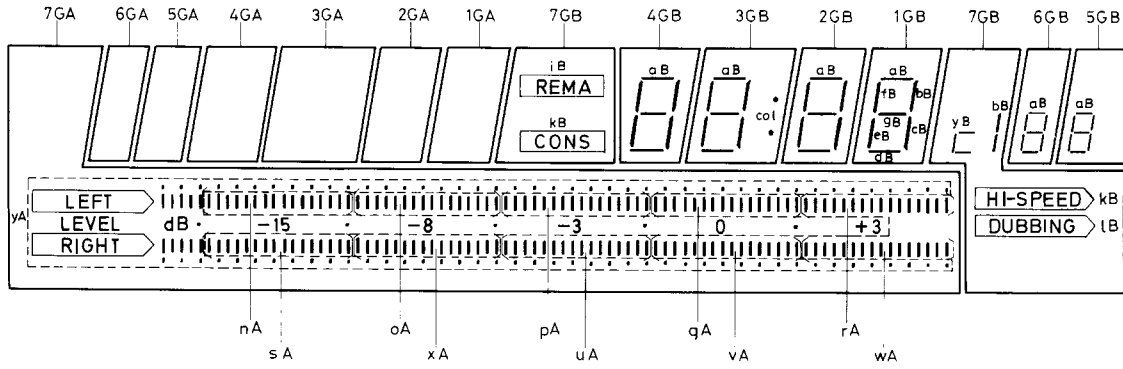
# BLOCK DIAGRAM (AUDIO SECTION)



# BLOCK DIAGRAM (CONTROL SECTION)



BG-554G (DISPLAY TUBE)

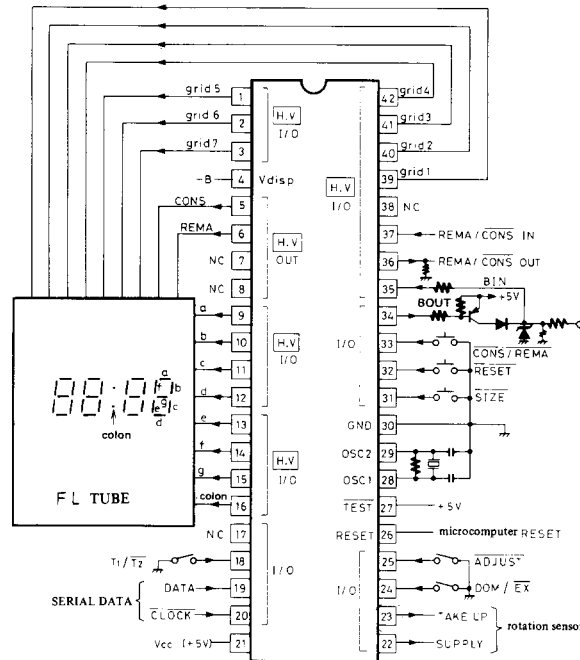


PIN CONNECTION

| PIN NO.    | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 | 31 | 30      | 29  | 28  | 27  | 26  | 25  | 24  | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13      | 12  | 11  | 10  | 9   | 8   | 7   | 6  | 5  | 4  | 3  | 2  | 1  |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|---------|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|
| CONNECTION | F2 | F2 | NP | wA | vA | uA | tA | sA | rA | qA | pA | oA | nA | xA | gA | fA | eA | dA | cA | bA | aA | NP | NP | 7GA, yA | 6GA | 5GA | 4GA | 3GA | 2GA | 1GA | xB | iB | hB | gB | fB | eB | dB | cB | bB | aB | 7GB, yB | 6GB | 5GB | 4GB | 3GB | 2GB | 1GB | kB | iB | mB | NP | F1 | F1 |



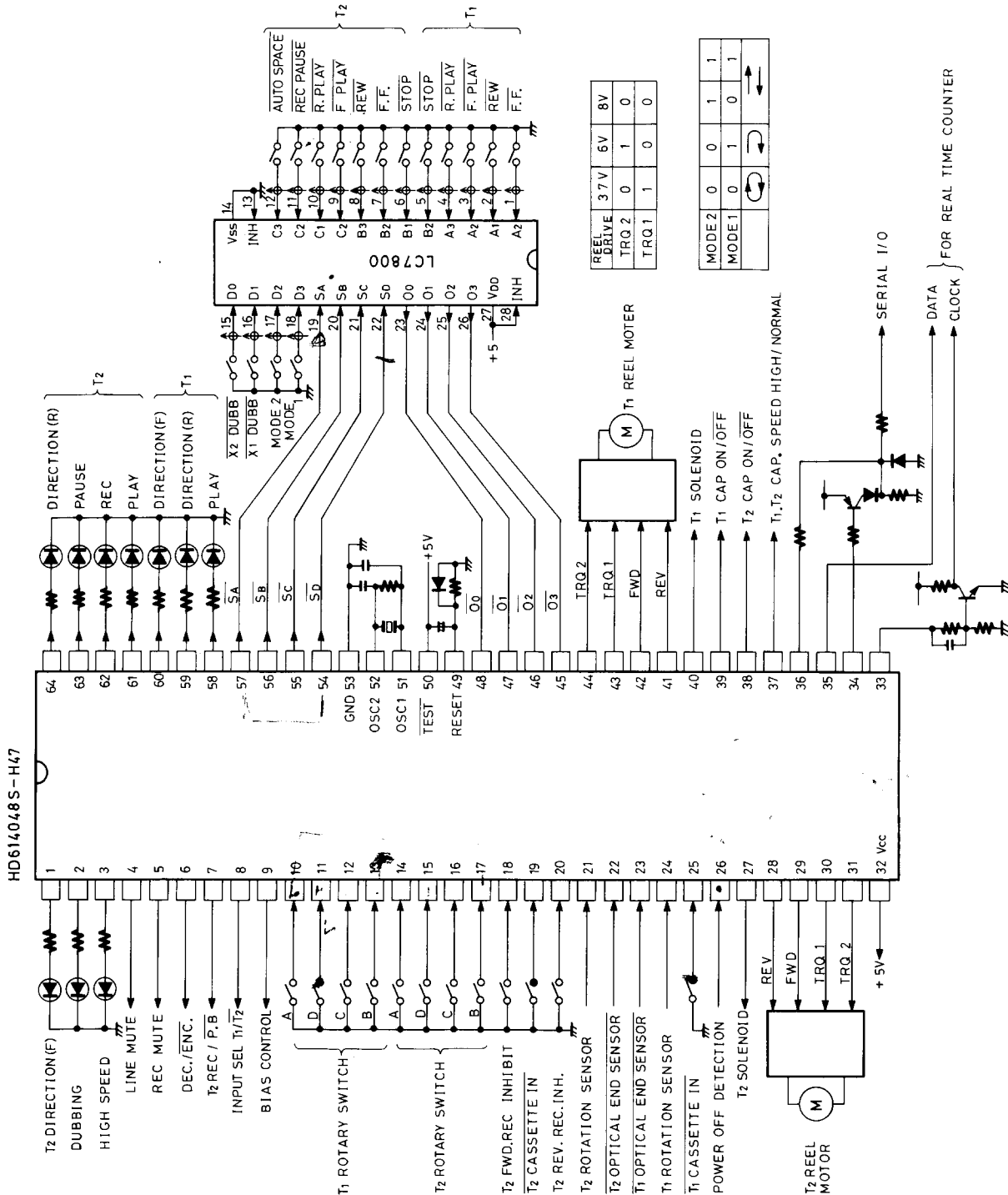
## HD614128S-A41 (COUNTER)



## Terminal Name and Function

| Pin No. | Name                           | Function   |
|---------|--------------------------------|--|
| 1 ~ 3   | Grid 5 ~ 7                     | FL tube grid (DIGIT) drive use output  |
| 4       | V <sub>disp</sub>              | Input (FL tube use) for minus bias voltage to pin Nos. 1 ~ 3, 5, 6, 9 ~ 16, 39 ~ 42  |
| 5       | CONS                           | FL tube <b>CONS</b> display use output (time lapse)  |
| 6       | REMA                           | FL tube <b>REMA</b> display use output (time remaining)  |
| 9 ~ 15  | a ~ g                          | FL tube segment drive use output   |
| 16      | Colon                          | FL tube ":" drive use output   |
| 18      | T <sub>1</sub> /T <sub>2</sub> | Microcomputer T <sub>1</sub> /T <sub>2</sub> function selection input (With T <sub>2</sub> , system I/O receiving)                     |
| 19      | DATA                           | Deck mechanism status input (8 bit serial data) from mechanism control micro-computer  |
| 20      | CLOCK                          | Clock input for reading above DATA (DATA taken on pulse wave dropping)   |
| 21      | V <sub>cc</sub>                | Microcomputer power source (+5V)   |
| 22      | SUPPLY                         | Cassette mechanism tape feed side turning pulse input  |
| 23      | TAKE UP                        | Cassette mechanism tape windup side turning PULSE INPUT  |
| 24      | DOM/EX                         | Domestic/export setting use selector input (Tape size type selector use)<br>Domestic: With power ON C46 → C54 → C60 → C80 → C90 → C120 |
| 25      | ADJUST                         | Remaining time calculation buffer compensating value input (normally open, compensating ground)  |
| 26      | RESET                          | Microcomputer system reset   |
| 27      | TEST                           | Microcomputer internal test use port, normally connected to V <sub>cc</sub>  |
| 28, 29  | OSC1, OSC2                     | Microcomputer clock oscillator terminal  |
| 30      | GND                            | Microcomputer power source (GND)   |
| 31      | SIZE                           | Tape size selector input   |
| 32      | RESET                          | Lapsed time reset input (When <b>CONS</b> displays, digits are □ : □ □)  |
| 33      | CONS/REMA                      | Lapsed time ← → remaining time selector input (toggle display)   |
| 34      | BOUT                           | System bus output  |
| 35      | BIN                            | System bus input   |
| 36      | REMA/CONS OUT                  | Remaining time display/lapsed time display status output (when T <sub>2</sub> )  |
| 37      | REMA/CONS IN                   | Remaining time display/lapsed time display status input (when T <sub>2</sub> )   |
| 39 ~ 42 | Grid 1 ~ 4                     | FL tube grid (DIGIT) drive use output  |

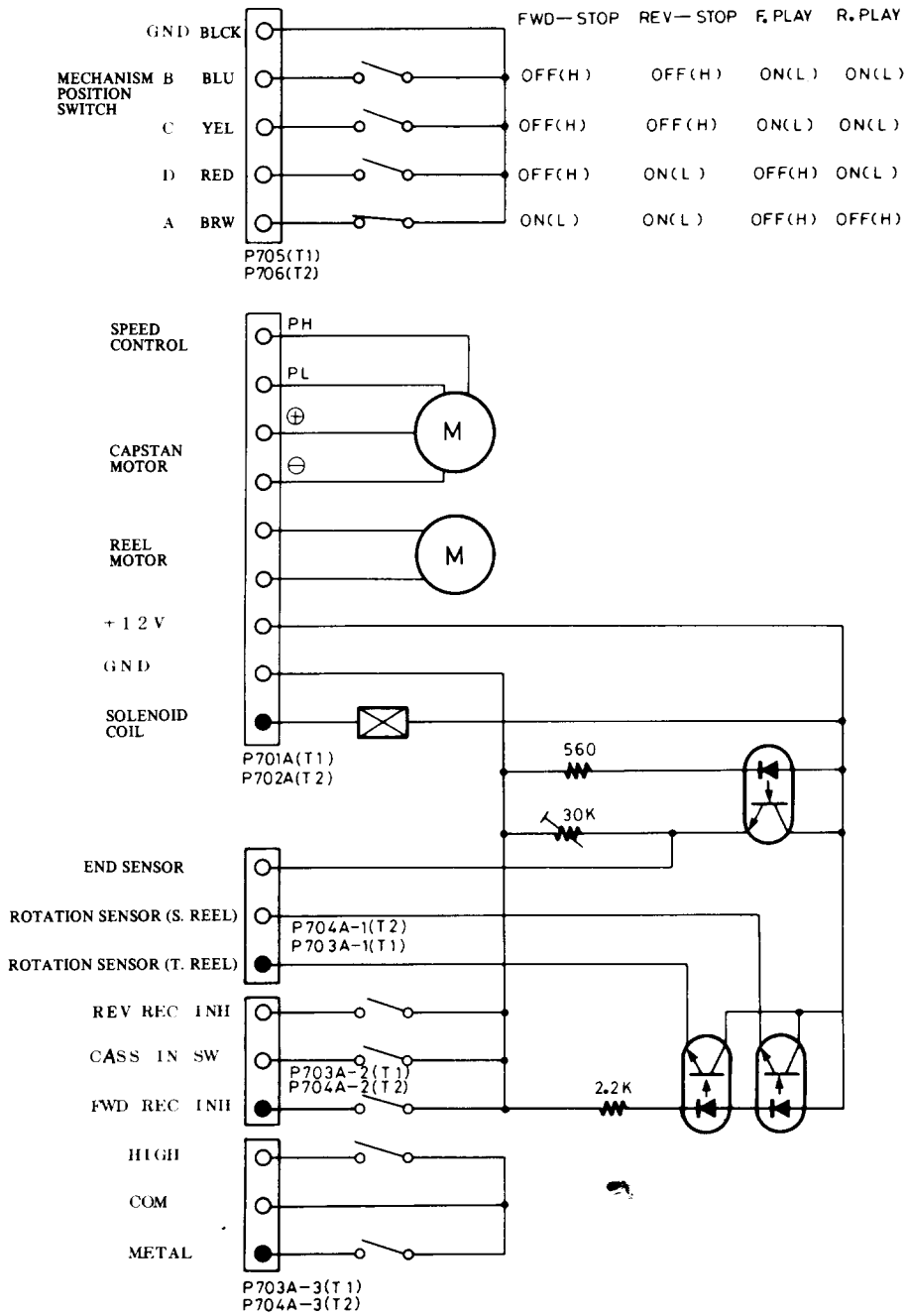
# HD614048S-H47 (MICROCOMPUTER)



| REEL DRIVE | 3.7V | 6V | 8V |
|------------|------|----|----|
| TRQ.2      | 0    | 1  | 0  |
| TRQ.1      | 1    | 0  | 0  |

| MODE.2 | 0 | 0 | 0 | 1 | 1 |
|--------|---|---|---|---|---|
| MODE.1 | 0 | 1 | 0 | 1 | 1 |

# TAPE MECHANISM CONNECTION



## ADJUSTMENT PROCEDURES

### PRECAUTIONS

- Before adjustment, clean the following parts with an alcohol moistend swab.
  - \* record/playback head      \* erase head
  - \* pinch roller                \* capstan
- Do not use magnetized screwdriver for adjustments.
- Demagnetize record/playback head with a head demagnetizer.

### TEST EQUIPMENT/TOOLS REQUIRED:

Audio oscillator  
 Digital frequency counter  
 Oscilloscope  
 Attenuator  
 AC voltmeter  
 Non-magnetic screw driver  
 Test tapes

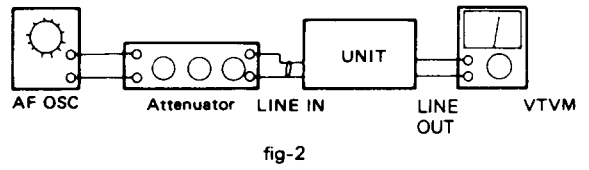
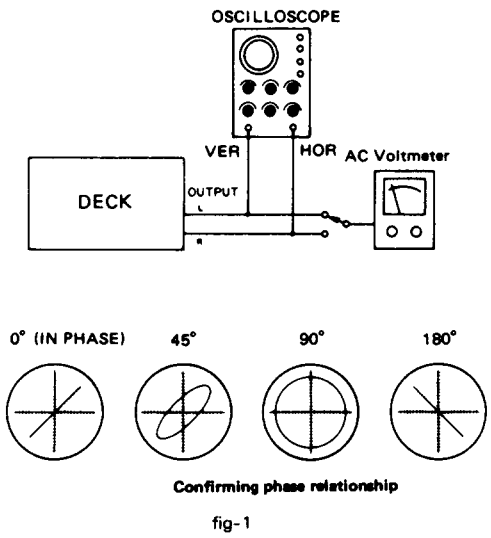
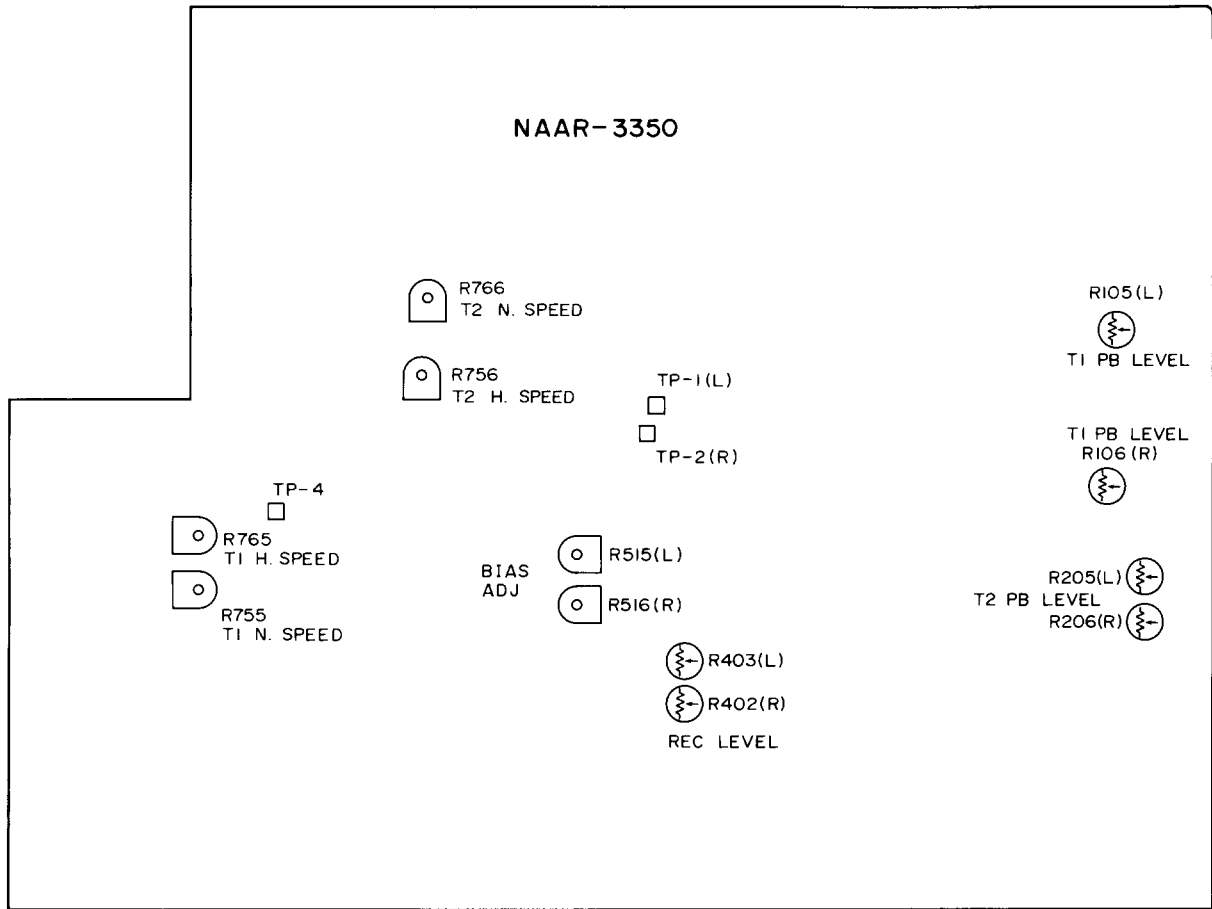
VTT-658 : 10 KHz, -15dB  
 MTT-111 : 3 kHz, -10dB  
 MTT-150 : Dolby level calibration  
 400Hz, tone 200nWb/m

| 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 | T1 Normal R755<br>T1 High R765<br>T2 Normal R756<br>T2 High R766     | 3010 ± 5Hz<br>6020 ± 10Hz<br>2990 ± 5Hz<br>5980 ± 10Hz | High speed connect the TP-4 to GND |                   |
| 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      | T1 R105 (Ch.L)<br>T1 R106 (Ch.R)<br>T2 R205 (Ch.L)<br>T2 R206 (Ch.R) | 245mV  |                                    |                   |
| 4    | Bias current                  | fig-2   | 1kHz, -20dB and 12kHz, -20dB  | XL-II C-90 | REC/PB            | AC voltmeter   | T2 R515 (Ch.L)<br>T2 R516 (Ch.R)                       | Same level at REC/PB               | Input VR maximum. |
| 5    | Record level                  | fig-2   | 1kHz                          | XL-II C-90 | REC               | AC voltmeter   | Attenuator or AF OSC output                            | 350mV                              |                   |
|      |                               |   |                               |            | REC/PB            | AC voltmeter   | T2 R403 (Ch.L)<br>T2 R404 (Ch.R)                       | Same level at REC/PB               |                   |
| 6    | Reverse operation sensitivity | DC voltmeter to sockets P703A-1(T1) #1 P704A-1(T2) #1 | TDK AD-120 Magnetic substance | FWD PB     | DC voltmeter      | Semi-fixed VR (T-1, T-2) on the mechanism P.C.B.                     | 2 ~ 2.5V   |                                    |                   |

#### 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 ----- 2 ~ 5 g/cm



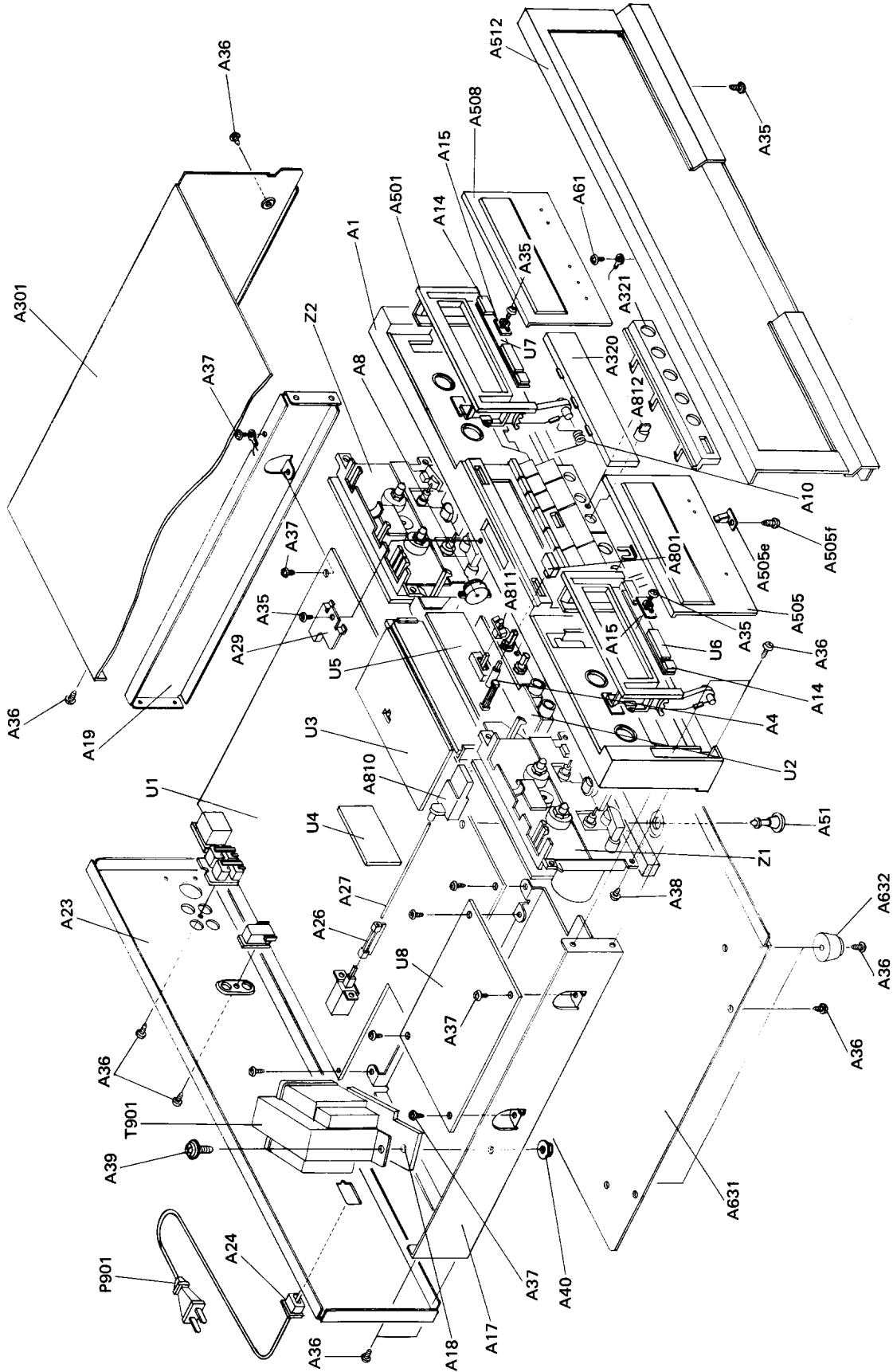
## CHASSIS EXPLODED VIEW PART LIST

| REF.NO. | PART NO.   | DESCRIPTION                  | REF.NO. | PART NO.      | DESCRIPTION                        |
|---------|------------|------------------------------|---------|---------------|------------------------------------|
| A1      | 27110423   | FRONT BRACKET AS             | P701A   | 2000881       | NSAS-18P837                        |
| A4      | 27273082   | JOINT (EJECT)                | P702A   | 2000882       | NSAS-18P838                        |
| A8      | 28400282   | DAMPER                       | △ P901  | 253112A       | AC CORD AS-UC-4 (D)                |
| A9      | 27180314   | SPRING (T1)                  |         | 253148        | AC CORD AS-CEE (G/W)               |
| A10     | 27180315   | SPRING (T2)                  |         | 253104        | AC CORD C2.5BS2 (QB)               |
| A14     | 27190563   | HOLDER (L.E.D.-5)            | △ T901  | 2300265B      | NPT-976D (D)                       |
| A15     | 27141159   | BRACKET                      |         | 2300266A      | NPT-976G (G)                       |
| A17     | 27130500   | BRACKET (PT)                 |         | 2300267A      | NPT-976DG (W)                      |
| A18     | 27270214A  | SPACER                       |         | 2300274A      | NPT-976Q (QB)                      |
| A19     | 27115194-1 | SIDE BRACKET(R)              | △ S902  | 25065123      | NSS-1258P (W)                      |
| A23     | 27121121   | BACK PANEL (D)               | U1      | 1N044550-1    | NAAR-3350-1 (D)                    |
|         | 27121122   | BACK PANEL (G)               |         | 1N044550-1A   | NAAR-3350-1A (G)                   |
|         | 27121124   | BACK PANEL (W)               | U2      | 1N044551-1    | NAAF 3351-1                        |
| A24     | 27300750   | BUSHING (CORD)               | U3      | 1N044552-1    | NADIS-3352-1                       |
| A26     | 27273084   | JOINT (POW)                  | U4      | 1N044553-1    | NADG-3353-1                        |
| A27     | 27260084   | SHAFT                        | U5      | 1N044554-1    | NASW-3354-1                        |
| A29     | 27141158   | BRACKET (FL)                 | U6      | 1N044555-1    | NADIS-3355-1                       |
| A35     | 833430080  | TAP-TIGHT SCREW 3TTP+8P(BC)  | U7      | 1N044556-1    | NADIS-3356-1                       |
| A36     | 834430088  | TAP-TIGHT SCREW 3TTS+8B(BC)  | U8      | 1N044557-1    | NAETC-3357-1                       |
| A37     | 831130088  | TAP-TIGHT SCREW 3TTW+8B      | Z1      | <u>244115</u> | NDM-107,CASSETTE DECK<br>MECHANISM |
| A38     | 831430100  | TAP-TIGHT SCREW 3TTW+10P(B)  |         |               | NDM-102,CASSETTE DECK<br>MECHANISM |
| A39     | 838440129  | TAP-TIGHT SCREW 4TTB-12C(B)  |         |               |                                    |
| A40     | 86414010   | FLANGE NUT FWN4+10FN         | Z2      | 244110A       |                                    |
| A51     | 27190524   | HOLDER                       |         |               |                                    |
| A61     | 834230088  | TAP-TIGHT SCREW 3TTS+8B(Ni)  |         |               |                                    |
| A301    | 28184373   | COVER (B)                    |         |               |                                    |
|         | 28184396   | COVER (S)                    |         |               |                                    |
| A320    | 28191473   | CLEAR PLATE                  |         |               |                                    |
| A321    | 28400347   | COSMETIC PLATE (B)           |         |               |                                    |
|         | 28400347   | COSMETIC PLATE (S)           |         |               |                                    |
| A501    | 28400339   | FRAME AS (CASSETTE)          |         |               |                                    |
| A505    | 28400407   | CASSETTE LID AS (A)          |         |               |                                    |
| A505e   | 27180362   | SPRING                       |         |               |                                    |
| A505f   | 834230108  | TAP-TIGHT SCREW 3TTS+10B(Ni) |         |               |                                    |
| A508    | 28400408   | CASSETTE LID AS (B)          |         |               |                                    |
| A512    | 27210960   | FRONT PANEL                  |         |               |                                    |
| A631    | 27170243   | BOTTOM BOARD                 |         |               |                                    |
| A632    | 27175009A  | LEG                          |         |               |                                    |
| A634    | 28140805   | CUSHION                      |         |               |                                    |
| A801    | 28323149   | KNOB (EJECT) L               |         |               |                                    |
| A802    | 28323150   | KNOB (EJECT) R               |         |               |                                    |
| A810    | 28323151   | KNOB (POW) (B)               |         |               |                                    |
|         | 28323347   | KNOB (POW) (S)               |         |               |                                    |
| A811    | 28323152   | KNOB (MODE)                  |         |               |                                    |
| A812    | 28323163   | KNOB (DOLBY) (B)             |         |               |                                    |
|         | 28323349   | KNOB (DOLBY) (S)             |         |               |                                    |

NOTE (D): Only 120V model  
(G): Only 220V model  
(W): Only Worldwide model  
(S): Silver model  
(QB): Only U.K. model  
(B): Black model

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

# CHASSIS EXPLODED VIEW







# PRINTED CIRCUIT BOARD PART LIST

| CIRCUIT NO.          | PART NO.                          | DESCRIPTION                             |
|----------------------|-----------------------------------|---|
| C407,C408            | 354780479T                        | 4.7 $\mu$ F50V,ELECT.                   |
| C501                 | 354721019S                        | 100 $\mu$ 6.3V,ELECT.                   |
| C506                 | 370131234S                        | 0.012 $\mu$ F100V,APS                   |
| C601                 | 354744709T                        | 47 $\mu$ F16V,ELECT.                    |
| C602,C603            | 354780479T                        | 4.7 $\mu$ F50V,ELECT.                   |
| C604,C605            | 354780109T                        | 1 $\mu$ F50V,ELECT.                     |
| C606                 | 354780479T                        | 4.7 $\mu$ F50V,ELECT.                   |
| C607,C608            | 354780109T                        | 1 $\mu$ F50V,ELECT.                     |
| C609                 | 354741009T                        | 10 $\mu$ F16V,ELECT.                    |
| C611,C612            | 354780109T                        | 1 $\mu$ F50V,ELECT.                     |
| C701                 | 354741009T                        | 10 $\mu$ F16V,ELECT.                    |
| C705                 | 354741009T                        | 10 $\mu$ F16V,ELECT.                    |
| C706,C707            | 354742219T                        | 220 $\mu$ F16V,ELECT.                   |
| C712                 | 354780229T                        | 2.2 $\mu$ F50V,ELECT.                   |
| C901                 | 3500065A                          | 0.01 $\mu$ F400VAC,IS                   |
| <b>Resistors</b>     |                                   |   |
| R105,R106            | 5210062                           | N06HR 4.7KBD                            |
| R205,R206            | 5210062                           | N06HR 4.7KBD                            |
| R401,R402            | 5210064                           | N06HR 10KBD                             |
| R509                 | 442520104                         | RS1/2WBJ 1.0 $\Omega$                   |
| R515,R516            | 5215047 or<br>5215024             | N08HR 100KBC<br>N08HR 100KBC            |
| R703                 | 49163392411                       | 3.9k $\Omega$ $\times$ 11,1/10W,NETWORK |
| R726                 | 49163392404                       | 3.9k $\Omega$ $\times$ 4,1/10W,NETWORK  |
| R727                 | 49163392412                       | 3.9k $\Omega$ $\times$ 12,1/10W,NETWORK |
| R737,R738            | 441722704                         | RS 2 WBJ 27 $\Omega$                    |
| R755,R756            | 5215044 or<br>5215020             | N08HR 5KBC<br>N08HR 5KBC                |
| R759-R762            | 4000118,<br>4000119 or<br>4000112 | TDS-090,<br>SDT-09 or<br>TD5-A090D      |
| R765,R766            | 5215044 or<br>5215020             | N08HR 5KBC<br>N08HR 5KBC                |
| R767,R768            | 4000115                           | LT3600 1/4S 1.8K $\Omega$               |
| <b>Plugs</b>         |                                   |   |
| P101                 | 25055102                          | NPLG-5P86                               |
| P102                 | 25045142                          | NPJ-4PDBL55                             |
| P104                 | 25050064                          | NSCT5P18,DIN (G)                        |
| P105-P107            | 25055133                          | NPLG-3P117                              |
| P201                 | 25055102                          | NPLG-5P86                               |
| P301,P303            | 25055133                          | NPLG-3P117                              |
| P501                 | 25055100                          | NPLG-3P84                               |
| P601                 | 25055148                          | NPLG-4P132                              |
| P701,P702            | 25055139                          | NPLG-9P123                              |
| P705,P706            | 25055135                          | NPLG-5P119                              |
| P709                 | 25055147                          | NPLG-3P131                              |
| P710                 | 25055152                          | NPLG-8P136                              |
| P711                 | 25055185                          | NPLG-4P169                              |
| P712,P713            | 25055187                          | NPLG-6P171                              |
| P715                 | 25055148                          | NPLG-4P132                              |
| P902                 | 25055136                          | NPLG-6P120                              |
| <b>Miscellaneous</b> |                                   |   |
| P717                 | 25045172                          | HSJ-1003-01-020                         |
| S901                 | 25035558                          | NPS-111L520P,POWER SWITCH               |
| P901                 | 2000760A                          | NSAS-12P716,SOCKET                      |
| P703A                | 2000761                           | NSAS-18P717,SOCKET                      |
| P704A                | 2000762                           | NSAS-18P718,SOCKET                      |
|                      | 27160029-1                        | RAD-07B,RADIATOR                        |
|                      | 82143006                          | 3P+6FN,SCREW                            |
|                      | 27141059                          | BRACKET                                 |
|                      | 27150189                          | SHIELD PLATE                            |
|                      | 25060092                          | NTM-1S33,TERMINAL                       |

| <b>NAAF-3351-1</b>   |                         |                                     |
|----------------------|-------------------------|-------------------------------------|
| CIRCUIT NO.          | PART NO.                | DESCRIPTION                         |
| <b>Ics</b>           |                         |                                     |
| Q153,Q171            | 222811 or<br>222502     | NJM4558DD or<br>NJM4558DX           |
| <b>Capacitors</b>    |                         |                                     |
| C171                 | 353783399S              | 0.33 $\mu$ 50V,ELECT                |
| C174                 | 353780109S              | 1 $\mu$ 50V,ELECT                   |
| C175,C176            | 353741009S              | 10 $\mu$ 16V,ELECT                  |
| <b>Resistors</b>     |                         |                                     |
| R155                 | 5104213                 | N09RLC250KW15F                      |
| R156                 | 5104214                 | N09R2L50KA15F                       |
| <b>Miscellaneous</b> |                         |                                     |
| P103                 | 25045130                | HLJ4308-01-010,MIC.                 |
| P105A                | 2000521                 | NSAS-6P477,SOCKET                   |
| P106A                | 2000522                 | NSAS-6P478,SOCKET                   |
| P107A                | 2000428                 | NSAS-6P387,SOCKET                   |
| P301A                | 2000524                 | NSAS-6P480,SOCKET                   |
| P302                 | 25045187                | HLJ0541-01-010                      |
| P601A                | 2000754                 | NSAS-8P710,SOCKET                   |
| S601                 | 25030295<br>27141160A   | NRSF-223-15MP,SWITCH<br>BRACKET(VR) |
| <b>NADIS-3352-1</b>  |                         |                                     |
| CIRCUIT NO.          | PART NO.                | DESCRIPTION                         |
| <b>Ics</b>           |                         |                                     |
| Q311,Q312            | 22240087 or<br>22240088 | BA6137 or<br>LB1423N                |
| Q315                 | 222687                  | LB1241                              |
| Q751                 | 212058                  | BG-554G                             |
| Q752                 | 22240084                | HD614128S-A41                       |
| <b>Transistors</b>   |                         |                                     |
| Q313,Q314            | 2212600                 | DTA124ES                            |
| Q753                 | 2211255 or<br>2210746   | 2SC1815-GR or<br>2SC945A-P          |
| <b>Xtal</b>          |                         |                                     |
| X751                 | 3010118 or<br>3010129   | CSA3.00MG or<br>PRS-3.00RM03        |
| <b>Capacitors</b>    |                         |                                     |
| C343,344             | 354741009T              | 10 $\mu$ 16V,ELECT                  |
| C754                 | 354761009T              | 10 $\mu$ 35V,ELECT                  |
| <b>Miscellaneous</b> |                         |                                     |
| P303A                | 2000524                 | NSAS-6P480                          |
| P708A                | 2000751                 | NSAS-4P707                          |
| P709A                | 2000600                 | NSAS-6P556                          |
| P710A                | 2000728                 | NSAS-16P684                         |
| P716                 | 25055147<br>27190564    | NPLG-3P131<br>HOLDER(FL)            |
| <b>NADG-3353-1</b>   |                         |                                     |
| CIRCUIT NO.          | PART NO.                | DESCRIPTION                         |
| <b>Ics</b>           |                         |                                     |
| Q741                 | 222465                  | NJM-4558D                           |
| Q742,Q744            | 2211255 or<br>2210746   | 2SC1815-GR or<br>2SC945-AP          |
| Q743,Q745            | 221281                  | DTC114YS                            |
| Q746                 | 2211255 or<br>2210746   | 2SC1815-GR or<br>2SC945-AP          |
| Q747                 | 221281                  | DTC114YS                            |

# PRINTED CIRCUIT BOARD PART LIST

| CIRCUIT NO. | PART NO.          | DESCRIPTION        |
|-------------|-------------------|--------------------|
|             | <b>Diodes</b>     |                    |
| D741,D742   | 223163            | 1SS133             |
|             | <b>Capacitors</b> |                    |
| C743,C744   | 352982296S        | 0.22 $\mu$ 50V,NP. |
|             | <b>Plugs</b>      |                    |
| P703-1      | 25055133          | NPLG-3P117         |
| P704-1      | 25055133          | NPLG-3P117         |
| P707        | 25055322          | NPLG-8P305         |
| P708        | 25055146          | NPLG-2P130         |

## NASW-3354-1

| CIRCUIT NO. | PART NO.      | DESCRIPTION      |
|-------------|---------------|------------------|
|             | <b>Switch</b> |                  |
| S701-S710   | 25035548      | NPS-111S510,PUSH |
| S711,S712   | 25035570      | NPS-111S532,PUSH |
| S713        | 25065325      | NSS-23128        |
| S714-S718   | 25035570      | NPS-111S532,PUSH |
|             | <b>Socket</b> |                  |
| P713A       | 2000775       | NSAS-12P731      |
| P714A       | 2000818       | NSAS-14P774      |
| P715A       | 2000599       | NSAS-8P555       |
| P716A       | 2000600       | NSAS-6P556       |

## NADIS-3355-1

| CIRCUIT NO. | PART NO.      | DESCRIPTION |
|-------------|---------------|-------------|
|             | <b>LED</b>    |             |
| D721-D723   | 225192        | GL1NG1      |
|             | <b>Socket</b> |             |
| P711A       | 2000605       | NSAS-8P561  |

## NADIS-3356-1

| CIRCUIT NO. | PART NO.      | DESCRIPTION |
|-------------|---------------|-------------|
|             | <b>LED</b>    |             |
| D724        | 225192        | GL1NG1      |
| D725,D726   | 225190        | GL1PR1      |
| D727,D728   | 225192        | GL1NG1      |
|             | <b>Socket</b> |             |
| P712A       | 2000738A      | NSAS-12P694 |

## NAETC-3357-1

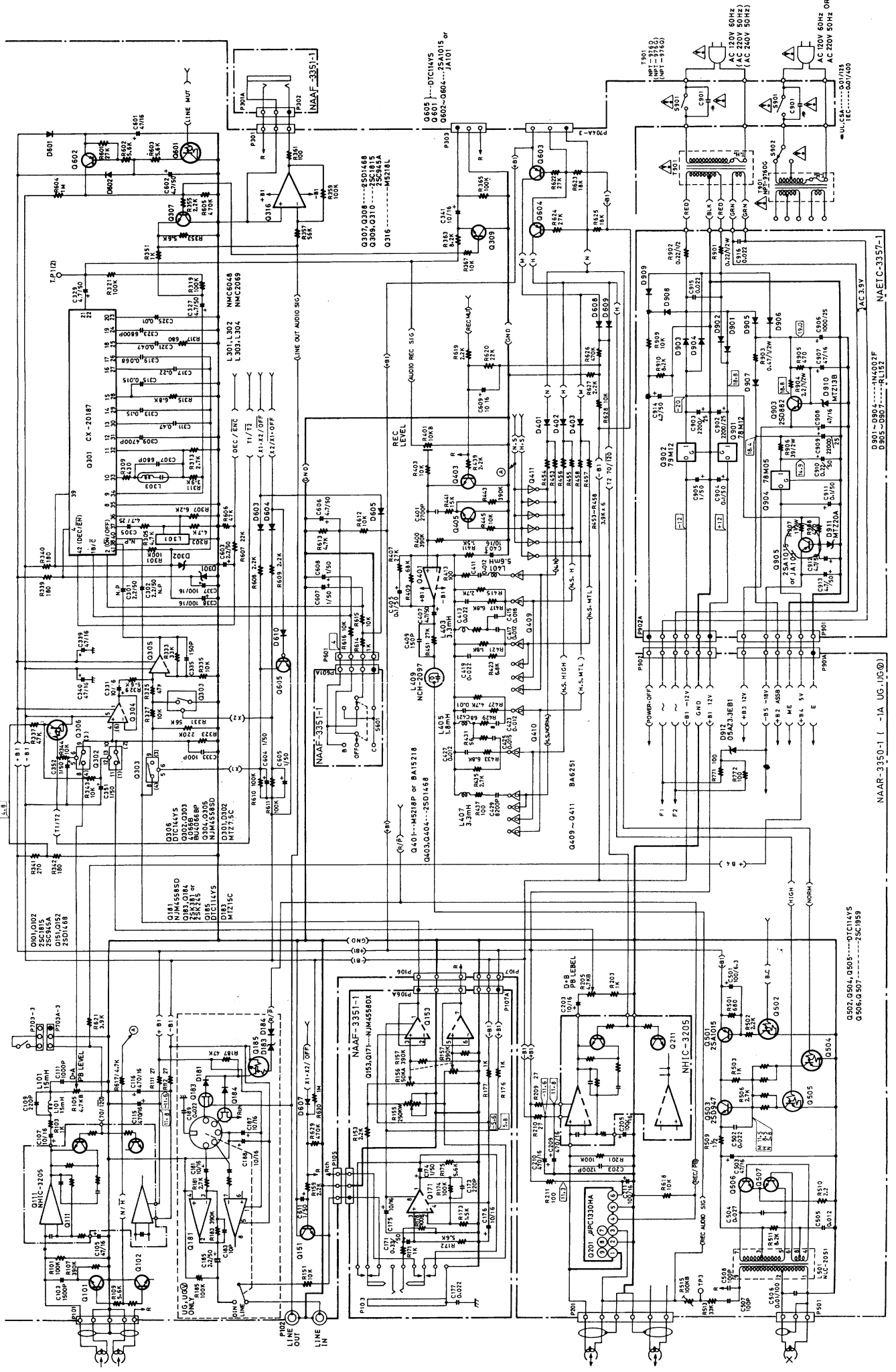
| CIRCUIT NO. | PART NO.              | DESCRIPTION             |
|-------------|-----------------------|-------------------------|
|             | <b>ICs</b>            |                         |
| Q901,Q902   | 222780122             | 78M12                   |
| Q904        | 222780052             | 78M05                   |
|             | <b>Transistors</b>    |                         |
| Q903        | 2201285 or<br>2201286 | 2SD882-Q or<br>2SD882-P |
| Q905        | 2211455 or<br>2212495 | 2SA1015-GR or<br>JA101Q |

| CIRCUIT NO. | PART NO.                                | DESCRIPTION                        |
|-------------|---|------------------------------------|
|             | <b>Diodes</b>                           |                                    |
| D901-D904   | 223894                                  | 1N4002F                            |
| D905-D907   | 223891                                  | RL-152                             |
| D908,D909   | 223163                                  | 1SS133                             |
| D910        | 224451302,<br>224651302 or<br>224151302 | MTZ13B,<br>HZ-13E-B2 or<br>05AZ13Y |
| D911        | 224452001,<br>224652001 or<br>224152001 | MTZ20A,<br>HZ20EB1 or<br>05AZ20X   |
|             | <b>Capacitors</b>                       |                                    |
| C902,C903   | 354752229S                              | 2200 $\mu$ F25V,ELECT.             |
| C904        | 354781099T                              | 0.1 $\mu$ F50V,ELECT.              |
| C905        | 354780109T                              | 1 $\mu$ F50V,ELECT.                |
| C906        | 354751029S                              | 1000 $\mu$ F25V,ELECT.             |
| C907,C908   | 354744709T                              | 47 $\mu$ F16V,ELECT.               |
| C909        | 3504211S                                | 22000 $\mu$ 25V,ELECT.             |
| C910        | 354782299T                              | 0.22 $\mu$ F50V,ELECT.             |
| C911        | 354781099T                              | 0.1 $\mu$ F50V,ELECT.              |
| C912-C914   | 354780479T                              | 4.7 $\mu$ F50V,ELECT.              |
|             | <b>Resistors</b>                        |                                    |
| R901,R902   | 442522294                               | RS1/2WBJ 0.22 $\Omega$             |
| R903        | 442524794                               | RS1/2WBJ 0.47 $\Omega$             |
| R904        | 442520224                               | RS1/2WBJ 2.2 $\Omega$              |
|             | <b>Miscellaneous</b>                    |                                    |
| P901        | 25055136                                | NPLG-6P120                         |
| P902A       | 2000398                                 | NSAS-12P357                        |
|             | 27160211-1                              | RAD-68B,RADIATOR                   |
|             | 27160029                                | RAD-07,RADIATOR                    |
|             | 82143006                                | 3P+6FN(BC),SCREW                   |

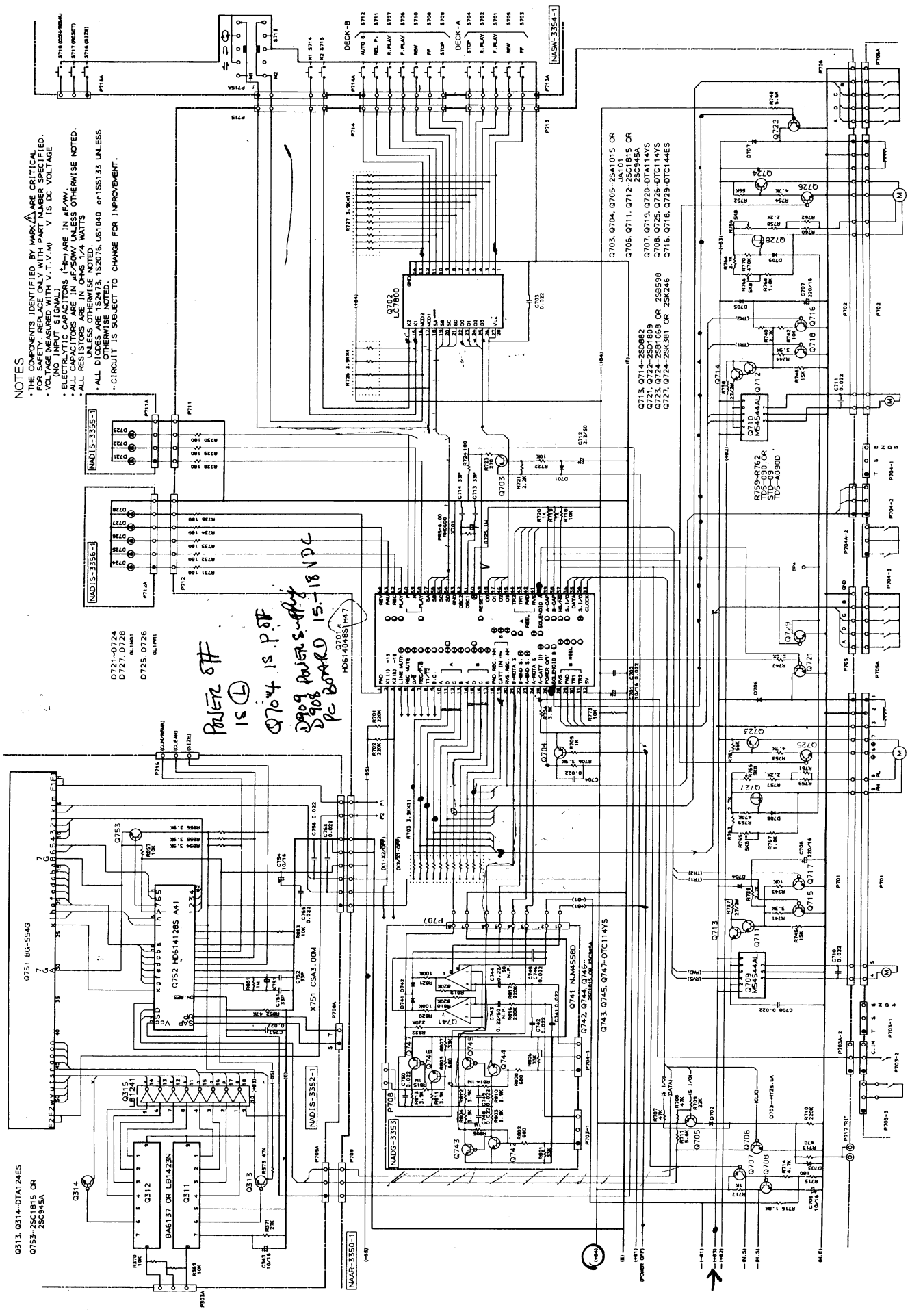
## NOTE

(G) : Only 220V model

SCHEMATIC DIAGRAM (AUDIO SECTION) 1/2



CHEMATIC DIAGRAM (CONTROL SECTION) 2/2



NOTES

- THE COMPONENTS IDENTIFIED BY MARK  $\Delta$  ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE INDICATED WITH V, T, V, M, W IS DC VOLTAGE (NO INPUT).
- ELECTROLYTIC CAPACITORS ( $\Delta$ ) ARE IN  $\mu$ F/WV.
- ALL CAPACITORS ARE IN  $\mu$ F/500V UNLESS OTHERWISE NOTED.
- ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
- ALL DIODES ARE 1S2473, 1S2076, US1040 OR 1S5133 UNLESS OTHERWISE NOTED.
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

POWER OFF  
IS  $\Delta$   
Q704 IS P.O.F.  
2909 POWER SUPPLY  
S908 BOARD IS-18 NDC  
Q701  
HD6140485-1447

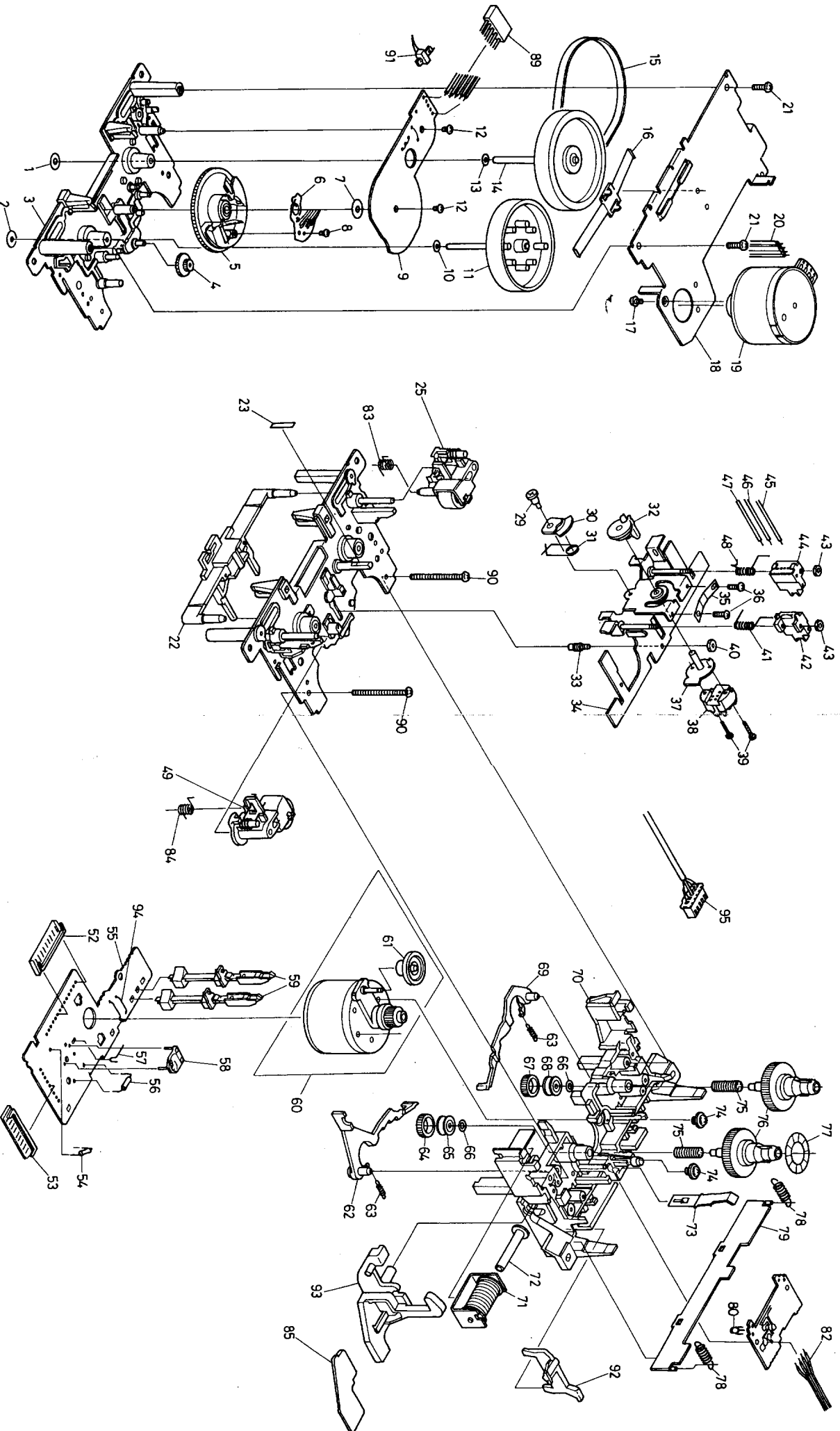
Q703, Q704, Q705-25A1015 OR JA1015  
Q706, Q711, Q712-25C1815 OR 25C1815  
Q707, Q719, Q720-Q7A114YS  
Q708, Q725, Q726-D7C114YS  
Q721, Q724-25K381 OR 25K246  
Q716, Q718, Q729-D7C144ES

Q713, Q714-25D882  
Q715, Q717-25D882  
Q718, Q722-25D882  
Q723, Q724-25K381 OR 25K246  
Q727, Q728-25K381 OR 25K246

Q759-Q762  
TDS-030 OR  
SUS-A0300

POWER OFF

PE MECHA NISM-EXPLODED VIEW (DECK A)



1

2

3

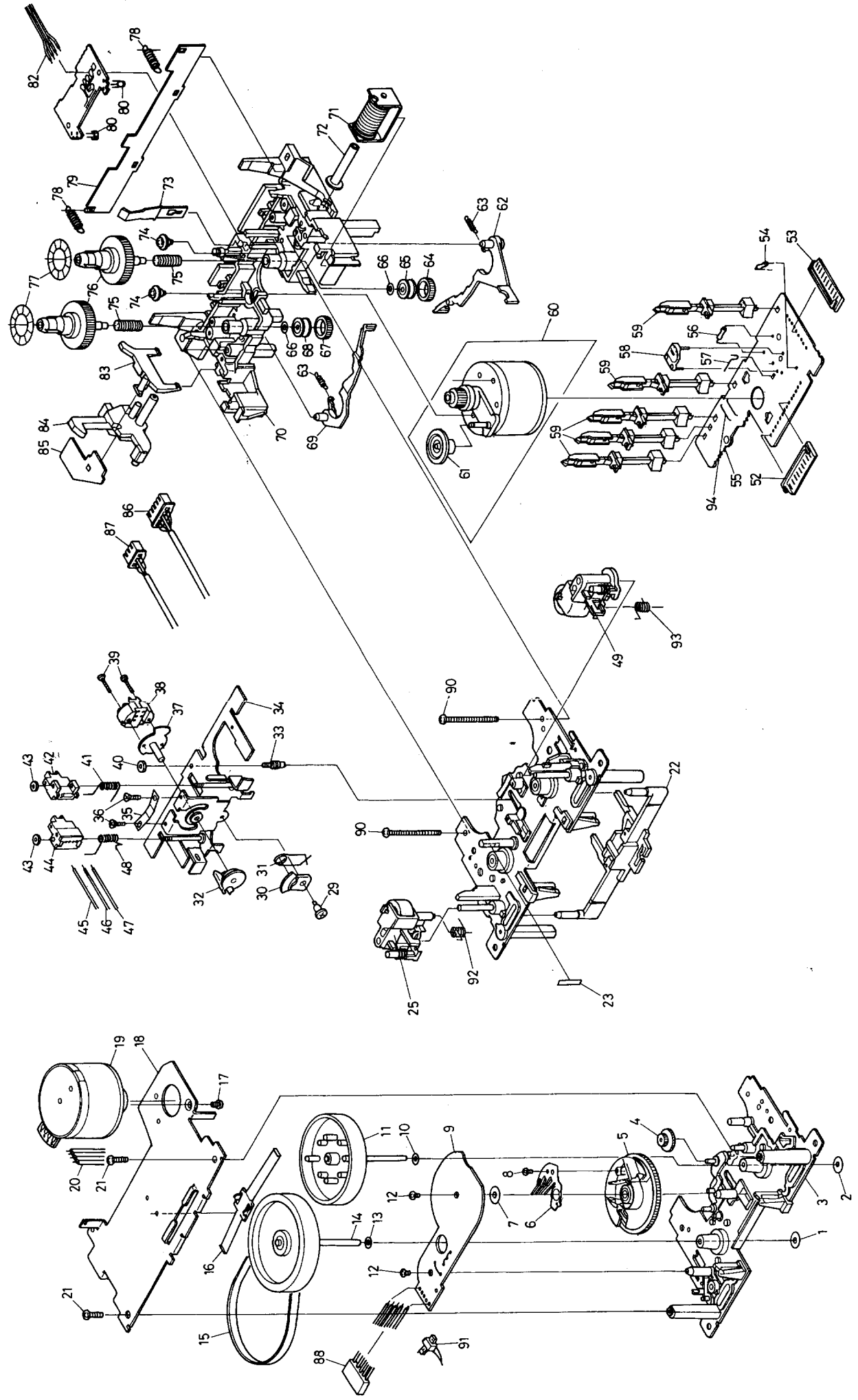
4

5

6

7

TAPE MECHANISM-EXPLODED VIEW (DECK B)



## TAPE MECHANISM-PART-LIST

## DECK A

| REF.NO. | PART NO.            | DESCRIPTION            |
|---------|---------------------|------------------------|
| 1       | 24610673            | WASHER                 |
| 2       | 24611295            | WASHER 2.2×7×0.8       |
| 3       | 24611325            | MECHANISM CHASSIS      |
| 4       | 24602432            | ASSIST GEAR            |
| 5       | 24602433            | CAM                    |
| 6       | <del>24606282</del> | CONTACT                |
| 7       | 24611337            | WASHER 7×8×.5          |
| 8       | 82112003            | PAN-HEAD SCREW M2×3    |
| 9       | <del>24606283</del> | CONTROL P.C.B.         |
| 10      | 24611294            | WASHER 2.3×4.7×0.5     |
| 11      | 24602446            | FLYWHEEL AS            |
| 12      | 82112003            | PAN-HEAD SCREW M2×3    |
| 13      | 24611148            | WASHER 2.3×4.7×0.5     |
| 14      | 24602435            | FLYWHEEL               |
| 15      | 24602436            | BELT                   |
| 16      | 24611326            | THRUST SPRING          |
| 17      | 82112603            | PAN-HEAD SCREW M2.6×3  |
| 18      | 24611327            | BRACKET (MOTOR)        |
| 19      | 24601231            | →CAPSTAN MOTOR AS      |
| 21      | 833126082           | TAPPING SCREW M2.6×8   |
| 22      | 24603349            | LEVER (SLIDE)          |
| 23      | 24611336            | REFLECTOR              |
| 25      | 24602437            | PINCH ROLLER AS (L)    |
| 29      | 24609010            | SPECIAL SCREW M2×3     |
| 30      | 24602440            | GEAR                   |
| 31      | 24605668            | SPRING                 |
| 32      | 24602441            | GEAR (HEAD)            |
| 33      | 24604089            | SHAFT (HEAD BASE)      |
| 34      | 24611328            | HEAD BASE AS           |
| 35      | 24605669            | SPRING                 |
| 36      | 801337              | ADJUSTING SCREW        |
| 37      | 24611329            | BRACKET AS (HEAD)      |
| 38      | 24600078            | HEAD                   |
| 39      | 82111406            | PAN HEAD SCREW M1.4×6  |
| 40      | 863125              | NUT M2.5               |
| 41      | 24605670            | SPRING                 |
| 42      | 24611330            | TAPE GUIDE             |
| 43      | 863120              | NUT M2                 |
| 44      | 24606289            | SENSOR                 |
| 48      | 24605671            | SPRING                 |
| 49      | 24602438            | PINCH ROLLER AS (R)    |
| 55      | 24606284            | P.C.B.                 |
| 59      | 24606285            | LEAF SWITCH            |
| 60      | 24601230            | REEL MOTOR AS          |
| 62      | 24603350            | ASSIST LEVER (A)       |
| 63      | 24605673            | SPRING                 |
| 65      | 24602443            | BRAKE PULLEY           |
| 66      | 24610952            | WASHER 2.6×5.5×0.13    |
| 67      | 24611331            | BRAKE RUBBER           |
| 68      | 24602444            | BRAKE PULLEY           |
| 69      | 24603351            | ASSIST LEVER (B)       |
| 70      | 24611333            | SUB CHASSIS            |
| 71      | 24606286            | YOKE AS                |
| 72      | 24606287            | CORE                   |
| 73      | 24605674            | SPRING                 |
| 74      | 24609011            | SPECIAL SCREW M2.6×1.6 |
| 75      | 24605675            | SPRING                 |
| 76      | <del>24602445</del> | REEL                   |
| 77      | <del>24611334</del> | REFLECTOR (5P)         |
| 78      | 24605677            | SPRING                 |
| 79      | 24611335            | HOLDER (CASSETTE)      |
| 80      | <del>24606288</del> | SENSOR                 |
| 83      | 24605678            | PINCH SPRING (L)       |
| 84      | 24605679            | PINCH SPRING (R)       |
| 85      | 24603352            | EJECT LEVER            |
| 90      | 82112630            | PAN HEAD SCREW M2.6×30 |

## DECK B

| REF.NO. | PART NO.            | DESCRIPTION            |
|---------|---------------------|------------------------|
| 1       | 24610673            | WASHER                 |
| 2       | 24611295            | WASHER 2.2×7×0.8       |
| 3       | 24611325            | MECHANISM CHASSIS      |
| 4       | 24602432            | ASSIST GEAR            |
| 5       | 24602433            | CAM                    |
| 6       | 24606282            | CONTACT                |
| 7       | 24611337            | WASHER 7×8×.5          |
| 8       | 82112003            | PAN-HEAD SCREW M2×3    |
| 9       | <del>24606283</del> | CONTROL P.C.B.         |
| 10      | 24611294            | WASHER 2.3×4.7×0.5     |
| 11      | 24602446            | FLYWHEEL AS            |
| 12      | 82112003            | PAN-HEAD SCREW M2×3    |
| 13      | 24611148            | WASHER 2.3×4.7×0.5     |
| 14      | 24602435            | FLYWHEEL               |
| 15      | 24602436            | BELT                   |
| 16      | 24611326            | THRUST SPRING          |
| 17      | 82112603            | PAN-HEAD SCREW M2.6×3  |
| 18      | 24611327            | BRACKET (MOTOR)        |
| 19      | →24601231 CDo34     | →CAPSTAN MOTOR AS      |
| 21      | 833126082           | TAPPING SCREW M2.6×8   |
| 22      | 24603349            | LEVER (SLIDE)          |
| 23      | 24611336            | REFLECTOR              |
| 25      | 24602437            | PINCH ROLLER AS (L)    |
| 29      | 24609010            | SPECIAL SCREW M2×3     |
| 30      | 24602440            | GEAR                   |
| 31      | 24605668            | SPRING                 |
| 32      | 24602441            | GEAR (HEAD)            |
| 33      | 24604089            | SHAFT (HEAD BASE)      |
| 34      | 24611328            | HEAD BASE AS           |
| 35      | 24605669            | SPRING                 |
| 36      | 801337              | ADJUSTING SCREW        |
| 37      | 24611329            | BRACKET AS (HEAD)      |
| 38      | 24600074            | HEAD                   |
| 39      | 82111406            | PAN HEAD SCREW M1.4×6  |
| 40      | 863125              | NUT M2.5               |
| 41      | 24605670            | SPRING                 |
| 42      | 24611330            | TAPE GUIDE             |
| 43      | 863120              | NUT M2                 |
| 44      | 24606289            | SENSOR                 |
| 48      | 24605671            | SPRING                 |
| 49      | 24602438            | PINCH ROLLER AS (R)    |
| 55      | 24606284            | P.C.B.                 |
| 59      | 24606285            | LEAF SWITCH            |
| 60      | 24601230            | REEL MOTOR AS          |
| 62      | 24603350            | ASSIST LEVER (A)       |
| 63      | 24605673            | SPRING                 |
| 65      | 24602443            | BRAKE PULLEY           |
| 66      | 24610952            | WASHER 2.6×5.5×0.13    |
| 67      | 24611331            | BRAKE RUBBER           |
| 68      | 24602444            | BRAKE PULLEY           |
| 69      | 24603351            | ASSIST LEVER (B)       |
| 70      | 24611333            | SUB CHASSIS            |
| 71      | 24606286            | YOKE AS                |
| 72      | 24606287            | CORE                   |
| 73      | 24605674            | SPRING                 |
| 74      | 24609011            | SPECIAL SCREW M2.6×1.6 |
| 75      | 24605675            | SPRING                 |
| 76      | 24602445            | REEL                   |
| 77      | 24611334            | REFLECTOR (5P)         |
| 78      | 24605677            | SPRING                 |
| 79      | 24611335            | HOLDER (CASSETTE)      |
| 80      | 24606288            | SENSOR                 |
| 83      | 24603355            | LEVER                  |
| 84      | 24603356            | EJECT LEVER (L)        |
| 85      | 24603352            | EJECT LEVER            |
| 90      | 82112630            | PAN HEAD SCREW M2.6×30 |

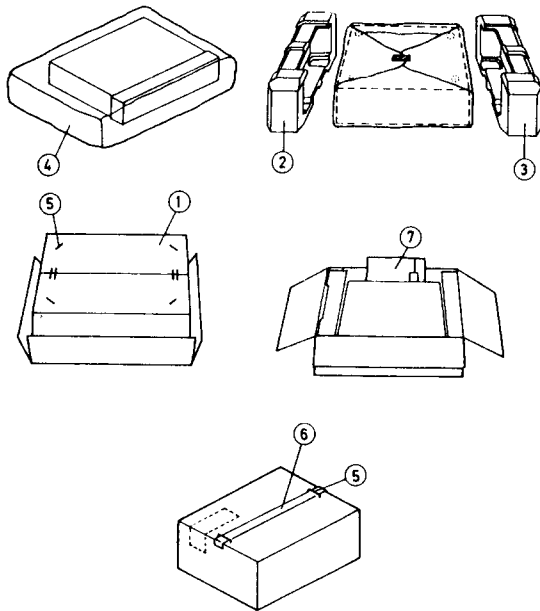
DECK A

| REF.NO. | PARTS NO. | DESCRIPTION     |
|---------|-----------|-----------------|
| 92      | 24603353  | LEVER (R)       |
| 93      | 24603354  | EJECT LEVER (R) |

DECK B

| REF.NO. | PARTS NO. | DESCRIPTION      |
|---------|-----------|------------------|
| 92      | 24605678  | PINCH SPRING (L) |
| 93      | 24605679  | PINCH SPRING (R) |

PACKING VIEW



D Model

| REF. NO. | PART NO.                   | DESCRIPTION              |
|----------|----------------------------|--------------------------|
| 1        | 29051720                   | Master carton box        |
| 2        | 29091204                   | Pad(L)                   |
| 3        | 29091205                   | Pad(R)                   |
| 4        | 290311A                    | 620 X 550 Poly bag       |
| 5        | 282301                     | Sealing hook             |
| 6        | 260012                     | Dampion tape             |
| 7        | <b>Accessory bag ass'y</b> |                          |
|          | 29341283                   | Instruction manual       |
|          | 2010098A                   | Connection cable         |
|          | 29358002F                  | Service station list (N) |
|          | 29100006A                  | 350 X 250 Poly bag       |
|          | 29365019                   | Waranty card (N)         |

G/W Model

| REF. NO. | PART NO.                   | DESCRIPTION                  |
|----------|----------------------------|------------------------------|
| 1        | 29051720                   | Master carton box            |
| 2        | 29091204                   | Pad(L)                       |
| 3        | 29091205                   | Pad(R)                       |
| 4        | 290311A                    | 620 X 550 Poly bag           |
| 5        | 282301                     | Sealing hook                 |
| 6        | 260012                     | Dampion tape                 |
| 7        | <b>Accessory bag ass'y</b> |                              |
|          | 29341284                   | Instruction manual           |
|          | 29341285                   | Instruction manual(I)        |
|          | 2010098A                   | Connection cable             |
|          | 25055018                   | Conversion plug (CV-K-I) (W) |
|          | 29100006A                  | 350 X 250 Poly bag           |
|          | 29365022                   | Waranty card (QB)            |

NOTE

- (N): Only U.S.A. model
- (W): Only worldwide model
- (I): Only Italian model
- (QB): Only U.K. model

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