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ONKYO SERVICE MANUAL**STEREO CASSETTE
TAPE DECK
MODEL TA-RW400**

| | |
|--------------|-------------------------|
| 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 \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 cmsec. (1-78 i.p.s.) 9.6 cmsec. (3-34 i.p.s.) (high speed dubbing) |
| Wow and Flutter: | 0.07% (WRMS) |
| Frequency Response: | 20-15,000Hz (Normal) (30-14,000Hz \pm 3dB) 20-16,000Hz (High) (30-15,000Hz \pm 3dB) 20-17,000Hz (Metal) (30-16,000Hz \pm 3dB) |
| SN Ratio: | Dolby NR off: 58dB (metal position tape) 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: | Line IN: 2 Input sensitivity: 60mV Input impedance: 50 kohms |
| Outputs: | Headphone jack: 1 Optimum load impedance: 8 to 200 ohms Line OUT: 2 Standard output level: 500mV (0dB) Optimum load impedance: over 50 kohms |
| Motors: | DC servo motor \times 2; DC motor \times 2 |
| Heads: | RECPB: special hard permalloy \times 2; Erase head: ferrite \times 1 |
| Power Supply Rating: | U.K. and Australian models: AC 240V, 50Hz European models: AC 220V, 50Hz U.S.A. and Canadian models: AC 120V, 60Hz Worldwide models: AC 120V and 220V switchable, 50/60Hz |
| Power Consumption: | 32 watts |
| Dimensions: | 435(W) \times 115(H) \times 334(D)mm (17-18" \times 4-12" \times 13-18") |
| Weight: | 4.8 kg. (10.6 lbs.) |

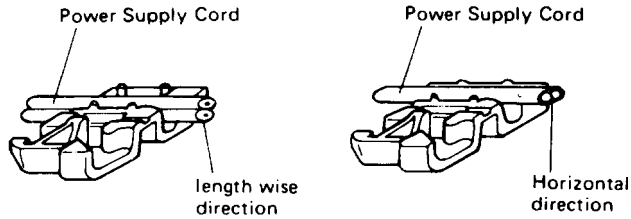
Specifications and external appearance are subject to change without notice because of product improvements.



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

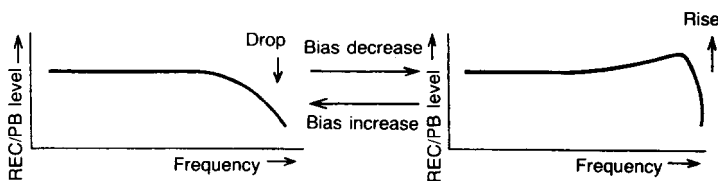
Connect the insulating-resistance tester between the plug of power supply cord and chassis.

Specifications: 500V more than 10MΩ

HX PRO CIRCUIT OPERATION EXPLANATION

1. Regarding recording frequency characteristic and bias

Ordinarily, if the recording bias current is increased, REC/PB frequency response level in the high frequency region (about 10KHz and above) drops, and if the bias is decreased, the response rises.



2. Regarding the basic operation of HX PRO (Refer to Fig. 1)

The HX PRO uses the μ PC1297CA IC. The operation is in accordance with the following.

- 1) At (a), the recording bias is added onto the audio signal, and the recording signal is detected. This is the same as the recording head recording the signal on the tape.
- 2) The signal of 1) preserves the frequency response with the integrated circuit of (b)

$$\text{Frequency} = \frac{R450 + R448}{2\pi \times C426 \times R450 \times R448} \quad (2.1)$$

By means of the frequency of Fig. 1, the frequency which is effective from the beginning is determined. In the ordinary situation, this is half the audio band (10KHz), (10KHz ~ 7.5KHz).

- 3) At (c), in order to use the affected waveform after-ward, absolute detection is carried out.

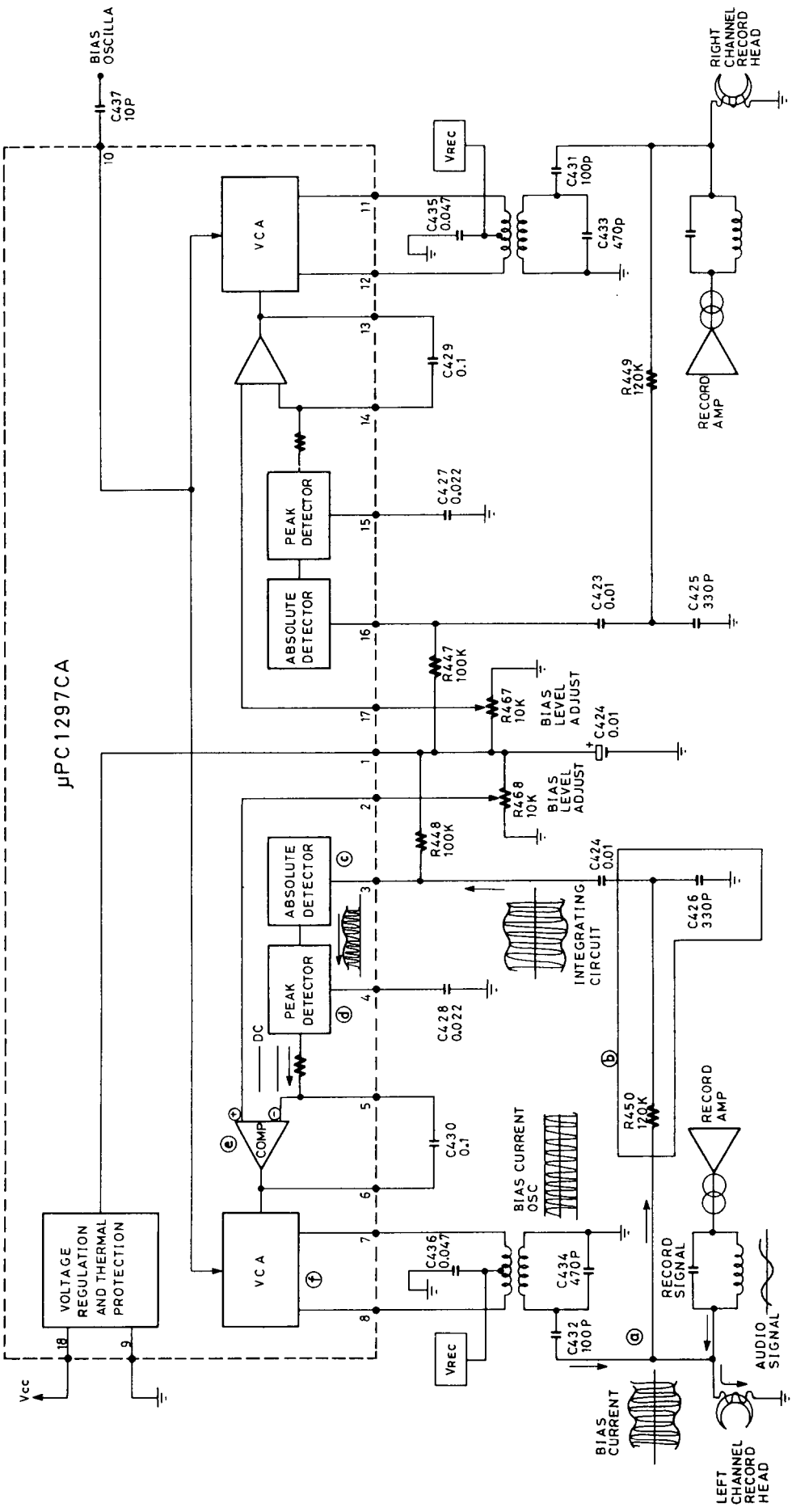
- 4) At (d), the waveform peak value is detected. The output becomes the peak DC voltage.
- 5) At (e), the standard voltage and the voltage of (4) are compared.
- 6) With the output of (e), the frequency generation level is controlled (voltage controlled amplifier). That is, the bias size is varied.
- 7) Summing up 1) ~ 6):

At (a), the time constant (frequency) that is detected in the recording signal is preserved, and above a certain frequency and above a certain level, the VCA controls the bias current by causing its reduction. When this is done, in the manner shown in the explanation of Item 1 above, the frequency high region is raised. With this control, the audio signal is instantaneously dealt with.

3. Regarding the operating conditions of the HX PRO

- 1) With equation (2. 1) noted above, the effect begins at the frequency thus determined.
- 2) Above a certain level the effect begins.
(Substantially 0 dB: In the vicinity of 500mV line out)
The audio signal component level is dependent upon the waveform after point (c).

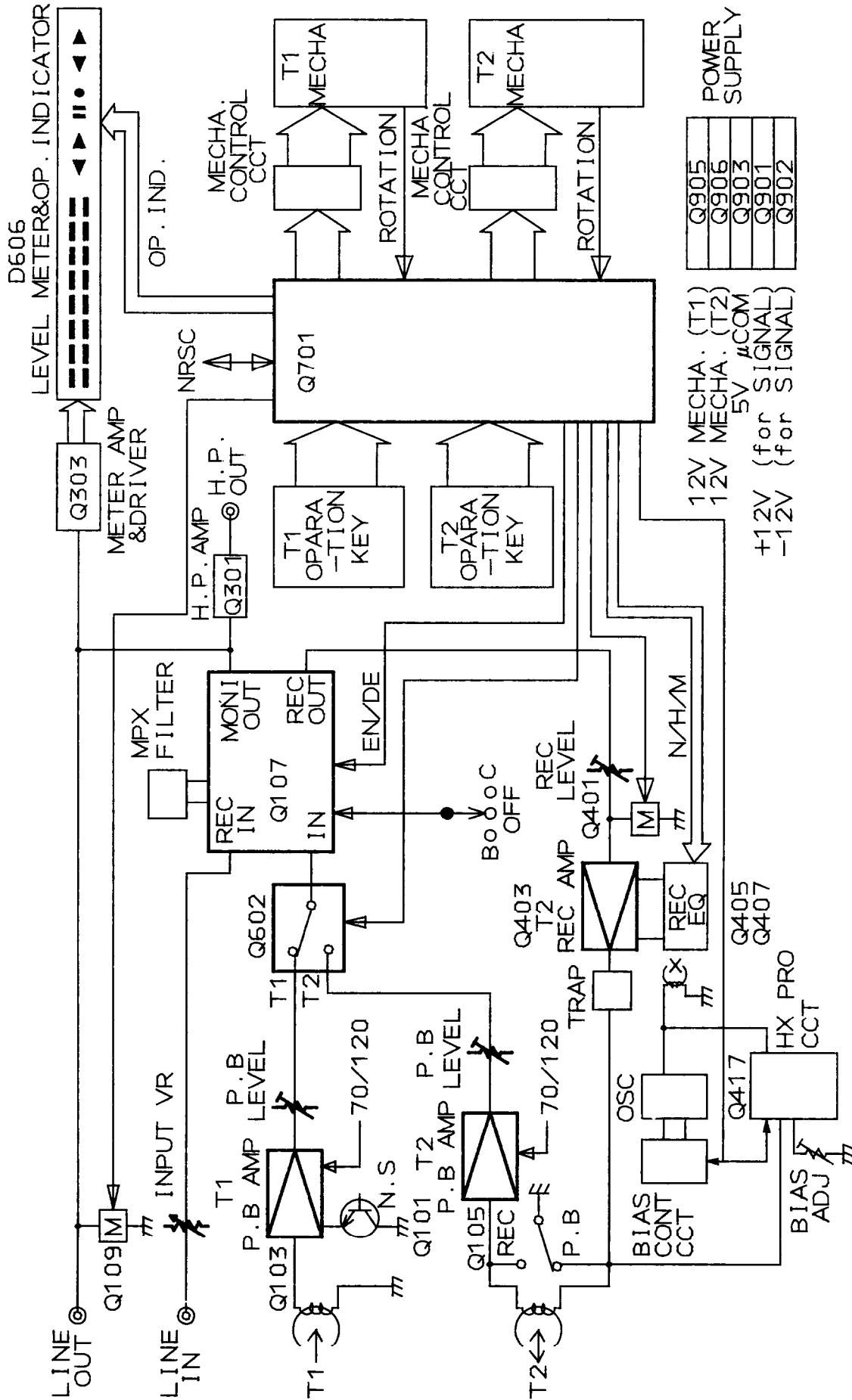
HX PRO BLOCK DIAGRAM



$$f = \frac{R450 + R448}{2\pi \times C426 \times R450 \times R448}$$

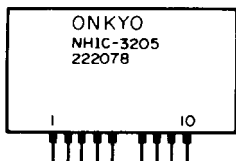
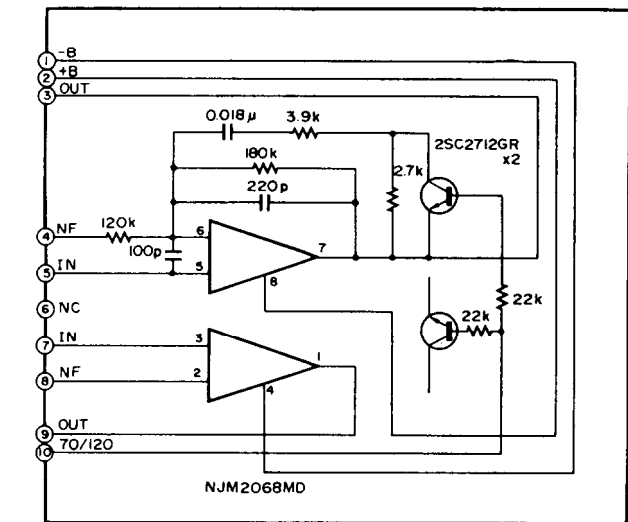
Fig. 1

BLOCK DIAGRAM

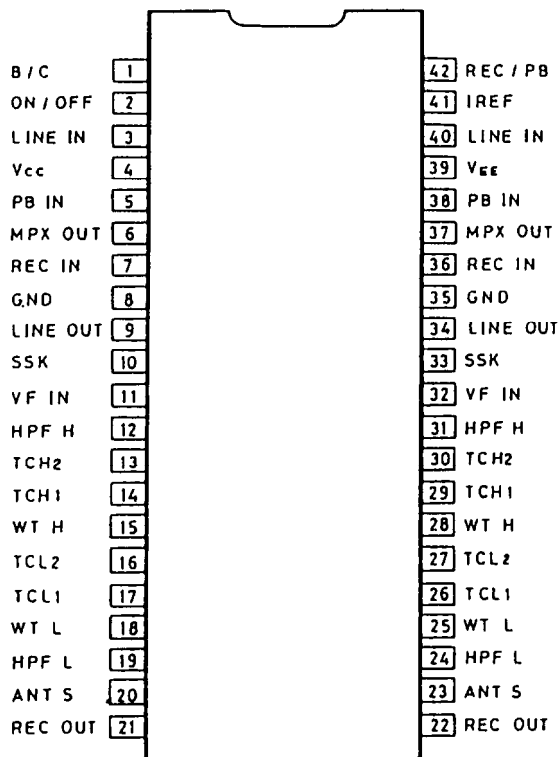


IC BLOCK DIAGRAM

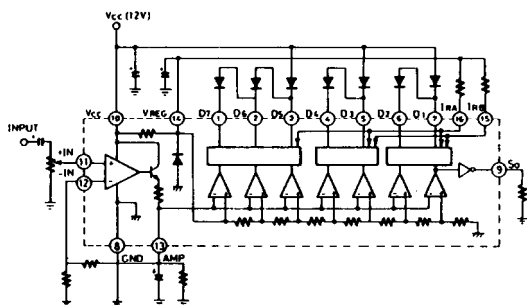
NCHC-3205 (P.B. AMP)



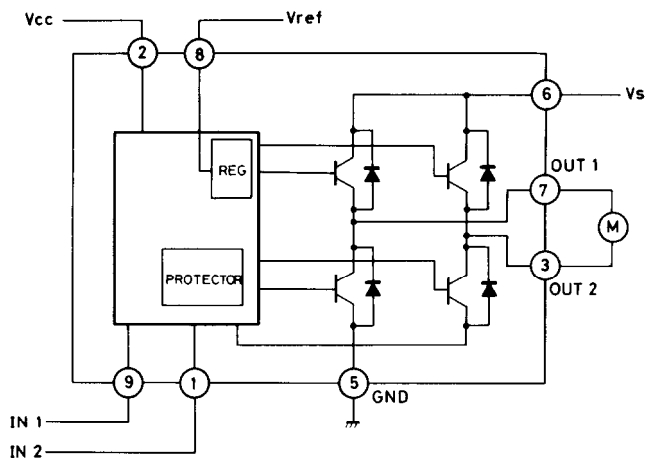
CX20187 (DOLBY N.R)



IR-2E02 (LEVEL METER DRIVE)

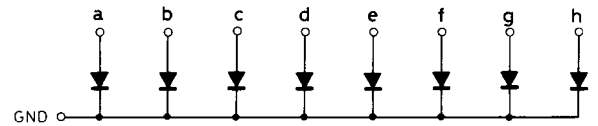
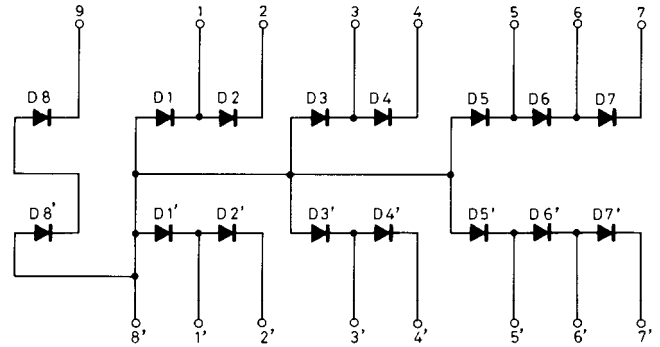
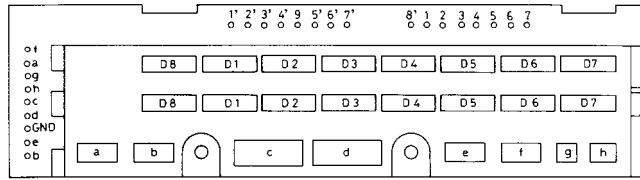


TA-7291S (MOTOR DRIVE)



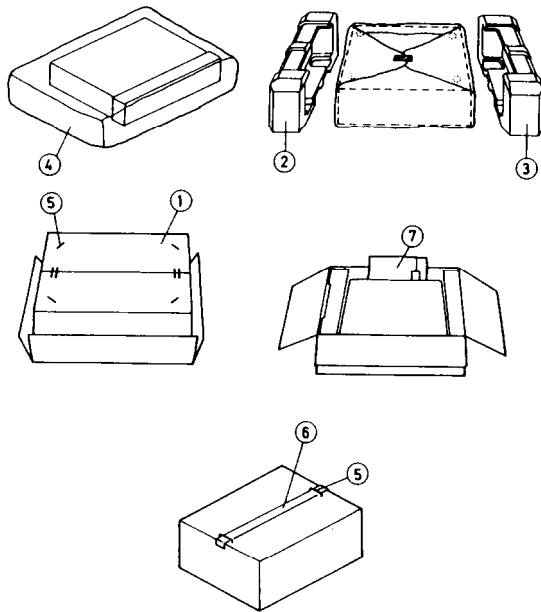
| INPUT | | OUTPUT | | MODE |
|-------|------|--------|-------|--------|
| IN 1 | IN 2 | OUT 1 | OUT 2 | |
| 0 | 0 | ∞ | ∞ | STOP |
| 1 | 0 | H | L | CW/CCW |
| 0 | 1 | L | H | CCW/CW |
| 1 | 1 | L | L | BRAKE |

LS-0241 (DISPLAY TUBE)



D1 ~ D4, D8, D1' ~ D4' D8'; a, b, e, f, ----GRN
 D5 ~ D7, D5' ~ D7'; c, d, g, h ----- RED

PACKING VIEW



NOTE (N) : Only U.S.A. Model
 (QB) : Only U.K. Model

D MODEL

| REF NO. | PART NO. | DESCRIPTION |
|---------|---------------------|--------------------------|
| 1 | 29051875 | Master carton box |
| 2 | 29091235A | Pad(L) |
| 3 | 29091236A | Pad(R) |
| 4 | 29100037A | 650×500 Poly bag |
| | 29095378 | Protection sheet |
| 5 | 282301 | Sealing hook |
| 6 | 260012 | Damplon tape |
| 7 | Accessory bag ass'y | |
| | 29341387 | Instruction manual |
| | 2010098A | Connection cable |
| | 29365019 | Waranty card (N) |
| | 29358002G | Service station list (N) |
| | 29100006A | 350×250 Poly bag |

G/W MODEL

| REF NO. | PART NO. | DESCRIPTION |
|---------|---------------------|--------------------|
| 1 | 29051875 | Master carton box |
| 2 | 29091235A | Pad(L) |
| 3 | 29091236A | Pad(R) |
| 4 | 29100037A | 650×500 Poly bag |
| | 29095378 | Protection sheet |
| 5 | 282301 | Sealing hook |
| 6 | 260012 | Damplon tape |
| 7 | Accessory bag ass'y | |
| | 29341388 | Instruction manual |
| | 2010098A | Connection cable |
| | 29100006A | 350×250 Poly bag |
| | 29365022 | Waranty card (QB) |

MECHANISM OPERATION

The mechanism in this set uses the power of a capstan motor to move the head up and down. It has one capstan motor, one reel motor and one solenoid.

The mechanism has three operating modes FWD PLAY, REV PLAY and STOP. The operating mode is selected by the solenoid timing. Typical timings are shown in fig. 2.

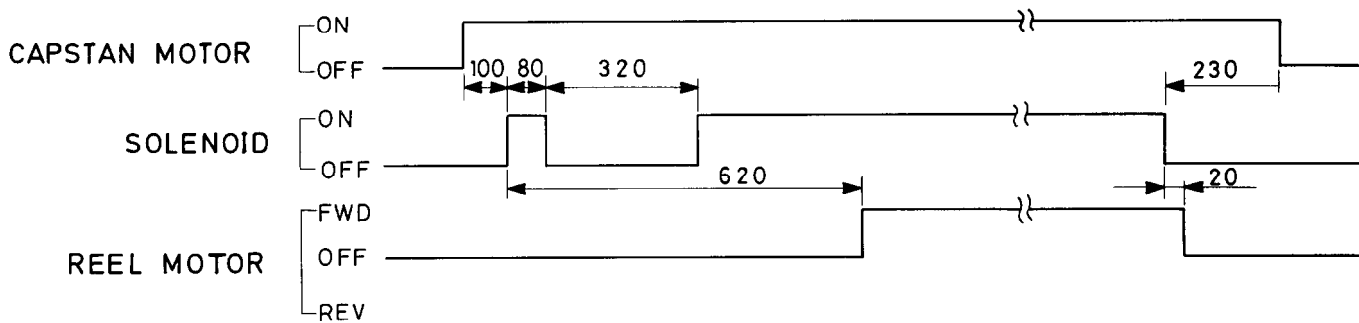
This mechanism is designed so that the solenoid is continuously held back in PLAY mode, so there is no longer any need to fit a PLAY switch for detecting head rise. When the solenoid stops being held back, the mechanism stops. This allows the mechanism to be initialized when the power is switched on by turning the capstan motor without holding back the solenoid. This allows that the mechanism to be returned to STOP mode, regardless of what state it was in when it was stopped.

FF and REW are handled by rotating the reel motor at high speed in STOP mode. Holding back the solenoid when moving from STOP to PLAY takes sometime, and the mechanism is structured to allow this. This is done because the capstan motor is designed to rotate at a constant speed. For double speed dubbing the capstan motor speed is switched when PLAY finishes.



Fig. 1 mechanism operating modes

STOP → FWD · PLAY → STOP



STOP → REV · PLAY → STOP

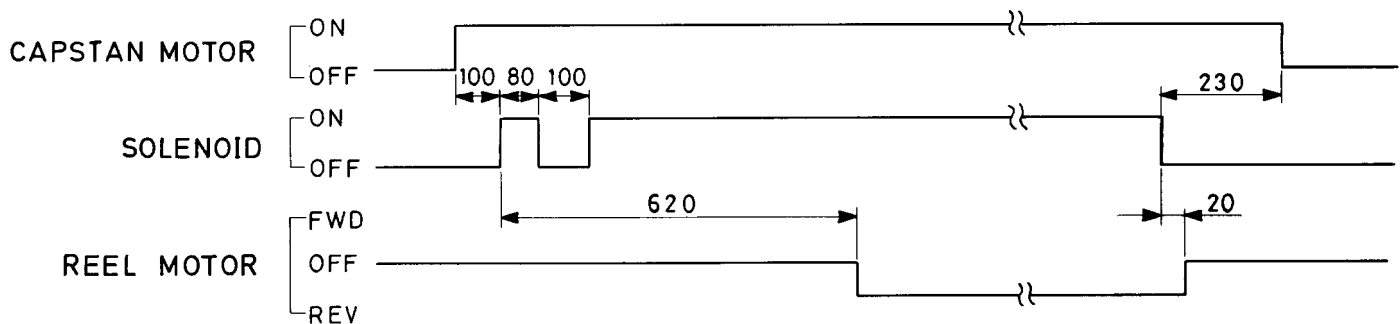


Fig. 2 Typical timings for PLAY modes

MICRO COMPUTER PORT NAMES AND FUNCTION

| Pin no | Pin | Function | Port |
|--------|--------------------------------------|---|------|
| 1 | ×2 DUBB | Double speed dubbing display output | D |
| 2,3 | T1REV.T1FWD. | T1 direction display output | D |
| 4 | REC.MUTE | Record muting output | D |
| 5 | | Not used (dropped to earth by resistance) | D |
| 6 | INPUT SEL.T2/ $\overline{T1}$ | Input signal select output.T2 selected by logical 1, T1 selected by logical 0 | D |
| 7 | BIAS CONT. | Bias oscillator control output (Service documentation) | D |
| 8 | T2 REC/ \overline{PB} | Audio record/playback output | D |
| 9 | SPEED ×2/ $\overline{×1}$ | Capstan motor speed signal output. (for selecting audio line) | D |
| 10~17 | | Control key switch inputs | D |
| 18 | T1 ROTATION SENSOR | T1 rotation signal input (for tape end sensing) | D |
| 19 | T2 ROTATION SENSOR | T1 rotation signal input (for tape end sensing) | D |
| 20 | T2 METAL POSITION | T2 Tape type sensor switch input (for detecting metal tape) | B |
| 21 | T2 SIDE-A REC.INH | T2 Side A record inhibit pit sensor switch input | B |
| 22 | $\overline{T2}$ CASSETTE IN | T2 cassette tape sensor switch input | B |
| 23 | T2 HIGH POSITION | T2 Tape type sensor switch input (for detecting chrome tape) | B |
| 24 | T2 SIDE-B.REC.INH | T2 Side A record inhibit pin sensor switch input | B |
| 25 | $\overline{T1}$ CASSETTE IN | T2 cassette tape sensor switch input | B |
| 26 | MODE $\overline{=}$ / $\overline{0}$ | Reverse mode switch input | B |
| 27 | P-OFF | Power off detection input | A |
| 28,29 | CAP.CONT | T1, T2 capstan rotation control output | C |
| 30,31 | ×2/ $\overline{×1}$ | T1, T2 capstan speed control output (Service documentation) | C |
| 32 | VCC | Power terminal (+5V) | - |
| 33 | NRSC IN | Serial code reciprocal control signal input | A |
| 34 | \overline{NRSC} OUT | Serial code reciprocal control signal output | B |
| 35 | LINE MUTE | Line muting output Not used (Connected to GND) | B |
| 36 | | | A |
| 37,41 | FF. | T1, T2 reel motor FF rotation control output | C |
| 38,42 | REW | T1, T2 reel motor REW rotation control output | C |
| 39,43 | O-PLAY. | T1, T2 reel motor rotation torque control output | C |
| 40,44 | $\overline{SOL.HOLD}$ | T1, T2 solenoid hold output | B |
| 45~48 | | Control key switch inputs | B |
| 49 | SYSTEM RESET | Microprocessor reset input | - |
| 50 | \overline{TEST} | Microprocessor internal test terminal (connected to VCC) | - |
| 51,52 | OSC | Clock oscillator pin | |
| 53 | GND | Power terminal | |
| 54~56 | TAPE.SEL | Tape type select output (for selecting audio line) | |
| 57 | DOLBY DEC/ \overline{ENC} | Dolby circuit encode/decode select output (Service documentation) | |
| 58,59 | SOLENOID | T1, T2 solenoid hold time power up output | |
| 60,61 | T2 FWD T2 REV | T2 direction display output | |
| 62 | T2 REC | T2 recording display output | |
| 63 | T2 PAUSE | T2 recording pause display output | |
| 64 | DUBBING | Constant speed dubbing display output | |

①Ports:

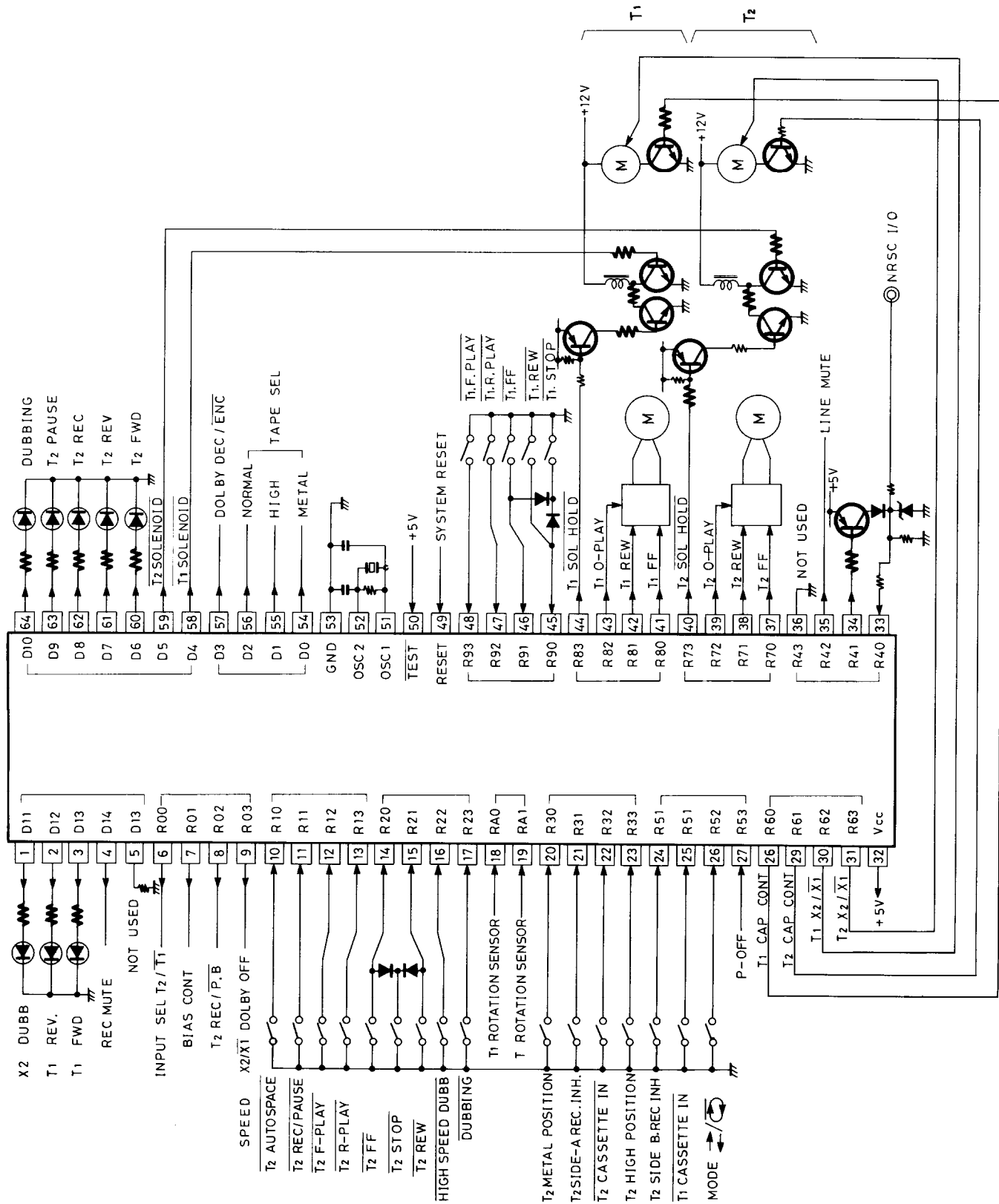
A: NMOS open drain. No pull-up MOS

B: NMOS open drain. With pull-up MOS

C: CMOS output

D: PMOS open drain. No pull-down MOS

MICRO COMPUTER (HD614088S-J46)



ADJUSTMENT PROCEDURES

PRECAUTIONS

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

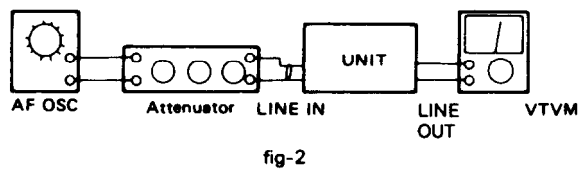
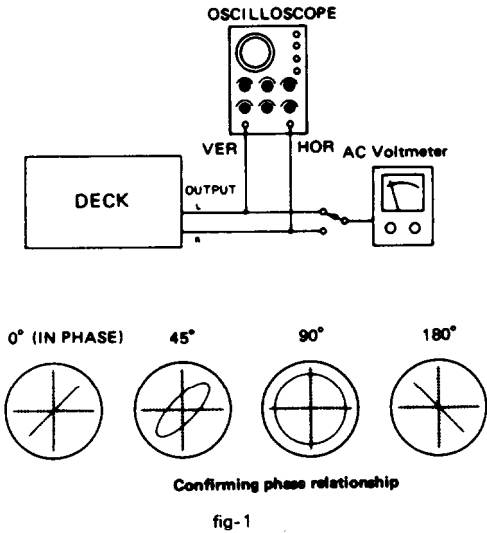
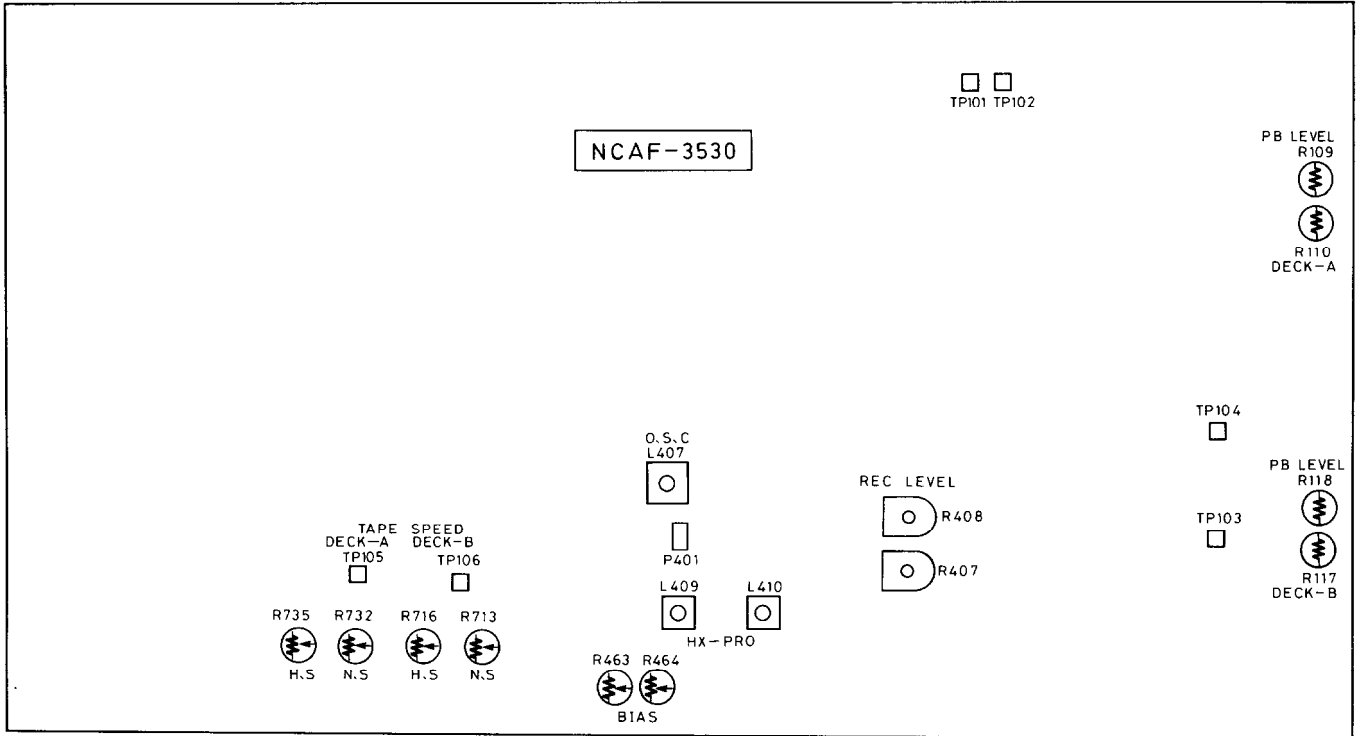
TEST EQUIPMENT/TOOLS REQUIRED:

- 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 R732 T1 High R735 T2 Normal R713 T2 High R716 | 3010 ± 10Hz 6030 ± 20Hz 3005 ± 10Hz 6010 ± 20Hz | High speed connect the TP105(T1) to GND TP106(T2) to GND High speed first | |
| 2 | Head azimuth | AC voltmeter and oscilloscope to LINE output terminal | VTT-658 | PB | AC voltmeter | Head azimuth serew | Maximum and same phase at channels L and R | fig-1 | |
| 3 | Playback level | AC voltmeter to terminals TP101 and TP102 | MTT-150 | PB | AC voltmeter | T1 R109 (Ch.L) T1 R110 (Ch.R) T2 R117 (Ch.L) T2 R118 (Ch.R) | 245mV | | |
| 4 | OSC Block | Frequency counter to P401 read loose coupling | T2 METAL TAPE MX-C60 | T2 REC | Frequency counter | L407 | 85KHz ± 2KHz | | |
| 5 | HX-PRO | AC voltmeter to terminals TP103 and TP104 | METAL TAPE | REC | AC voltmeter | L-409 (Ch.L) L-410 (Ch.R) | Maximum | R-463 R-464 Max clock wise | |
| 6 | Bias current | fig-2 | 1KHz, -20dB and 12KHz, -20dB | XL- II C-90 | REC/PB | AC voltmeter | R463 (Ch.L) R464 (Ch.R) | Same level at REC/PB | Input VR maximum |
| 7 | Record level | fig-2 | 1KHz | XL- II C-90 | REC | AC voltmeter | Attenuator or AF OSC output | 350mV | |
| | | | | | REC/PB | AC voltmeter | R407 (Ch.L) R408 (Ch.R) | Same level at REC/PB | |

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

PLAY torque.....30~70g/cm
 FF.REW torque.....80~180g/cm
 Back tention 2~7g/cm



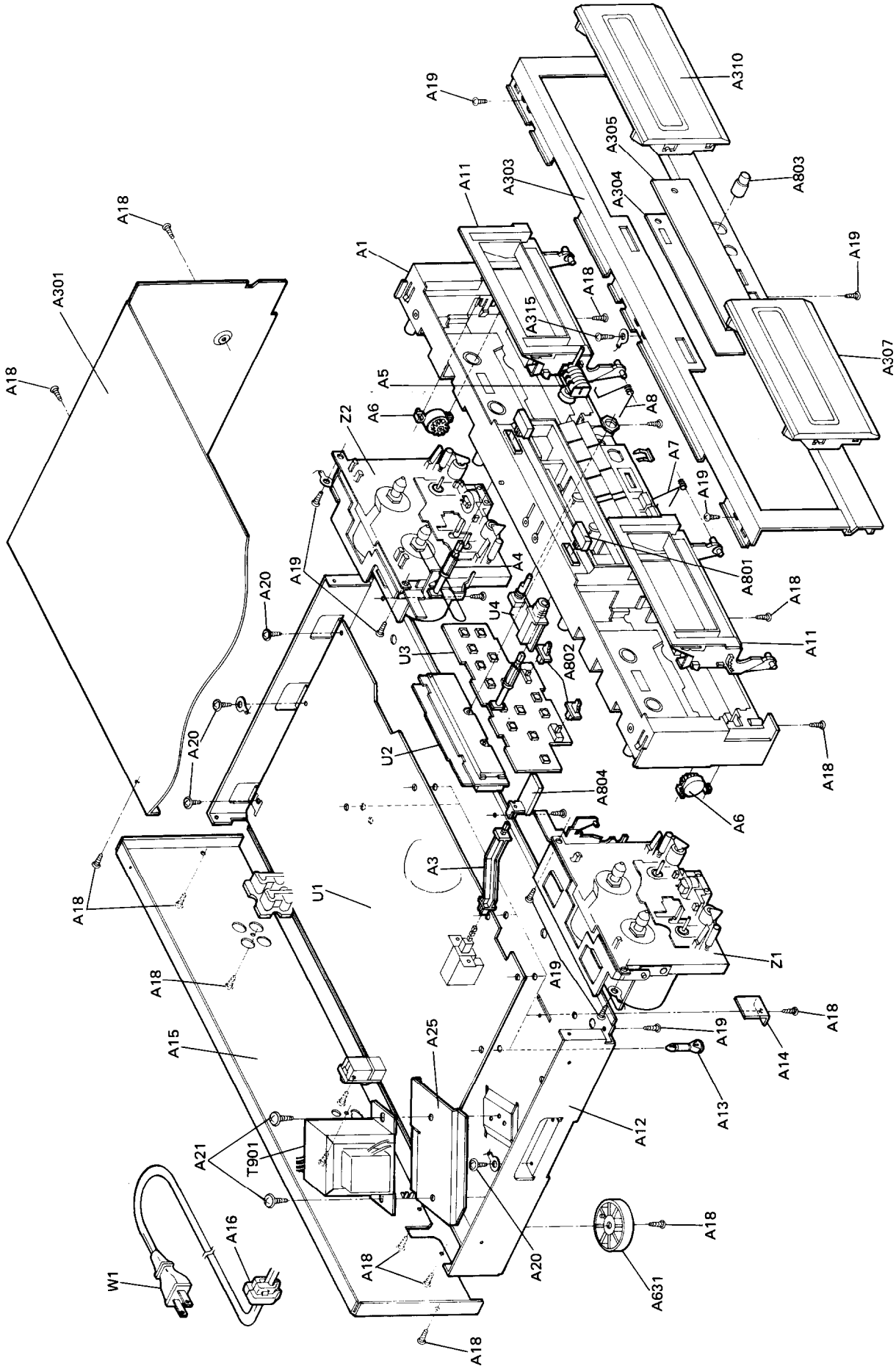
CHASSIS-EXPLODED VIEW PARTS LIST

| REF.NO. | PART NO. | DESCRIPTION | REF.NO. | PART NO. | DESCRIPTION |
|---------|------------|------------------------------|---------|------------|----------------------------------|
| A1 | 27110478 | FRONT BRACKET AS | U3 | IN057532-2 | NASW-3532-2 |
| A3 | 27273117 | JOINT (POW) | U4 | IN057533-2 | NAETC-3533-2 |
| A4 | 27273042B | JOINT (EJ) | W1 | 253099C | AC CORD(AS-UC3) (D) |
| A5 | 24601220 | TAPE COUNTER | △ | 253149 | AC CORD(AS-CEE) (G/W) |
| A6 | 28400282 | DAMPER | △ | 253104 | AC CORD(C2.5BS2) (QB) |
| A7 | 27180332-1 | SPRING (T1) | △ | 253118 | AC CORD(AS-SAA) (QA) |
| A8 | 27180333-1 | SPRING (T2) | Z1 | 244122 | CASSETTE DECK MECHANISM(NDM-114) |
| A9 | 28199182 | FILM | Z2 | 244123 | CASSETTE DECK MECHANISM(NDM-115) |
| A11 | 28400473 | FRAME AS (CASSETTE) | | | |
| A11-a | 28400463 | FRAME | | | |
| A11-b | 27180272 | SPRING (CA) | | | |
| A12 | 27100184A | CHASSIS | | | |
| A13 | 27190266 | HOLDER | | | |
| A14 | 27141339 | BRACKET (SLD) | | | |
| A15 | 27121231 | BACK PANEL (D) | | | |
| | 27121232 | BACK PANEL (G) | | | |
| | 27121234 | BACK PANEL (W) | | | |
| | 27121277 | BACK PANEL (QA/OB) | | | |
| A16 | 27300750 | BUSHING (CORD) | | | |
| A18 | 834430088 | TAP-TIGHT SCREW 3TTS+8B(BC) | | | |
| A19 | 833430088 | TAP-TIGHT SCREW 3TTP+8B(BC) | | | |
| A20 | 831130088 | TAP-TIGHT SCREW 3TTW+8B | | | |
| A21 | 830440089 | TAP-TIGHT SCREW 4TTC+8C(BC) | | | |
| A25 | 27130585 | BRACKET (PT) | | | |
| A301 | 28184433 | TOP COVER | | | |
| A303 | 27211081 | FRONT PANEL | | | |
| A304 | 28133219 | BACK PLATE | | | |
| A305 | 28191505 | CLEAR PLATE | | | |
| A307 | 28400471 | CASSETTE LID AS (BA) | | | |
| A307-a | 28400464 | CASSETTE LID (BA) | | | |
| A307-b | 28400468 | WINDOW | | | |
| A310 | 28400472 | CASSETTE LID AS (BB) | | | |
| A310-a | 28400465 | CASSETTE LID (BB) | | | |
| A310-b | 28400468 | WINDOW | | | |
| A315 | 834230108 | TAP-TIGHT SCREW 3TTS+10B(Ni) | | | |
| A631 | 27175219 | LEG | | | |
| A801 | 28322838A | KNOB (EJECT) | | | |
| A802 | 28323669 | KNOB (TIM) | | | |
| A803 | 28323671 | KNOB (VOL) | | | |
| A804 | 28323639 | KNOB (POW) | | | |
| T901 | 2300403A | NPT-1026D (D) | | | |
| | 2300404A | NPT-1026G (G) | | | |
| | 2300405A | NPT-1026DG (W) | | | |
| | 2300444 | NPT-1026Q (QA/QB) | | | |
| S902 | 25065123 | NSS-1258P (W) | | | |
| U1 | 1N057530-2 | NAAF-3530-2 | | | |
| U2 | 1N057531-2 | NADIS-3531-2 | | | |

NOTE (D) : Only 120V model
 (G) : Only 220V model
 (W) : Only Worldwide model
 (Q) : Only 240V model
 (QB) : Only U.K. Mmodel

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

CHASSIS-EXPLODED VIEW

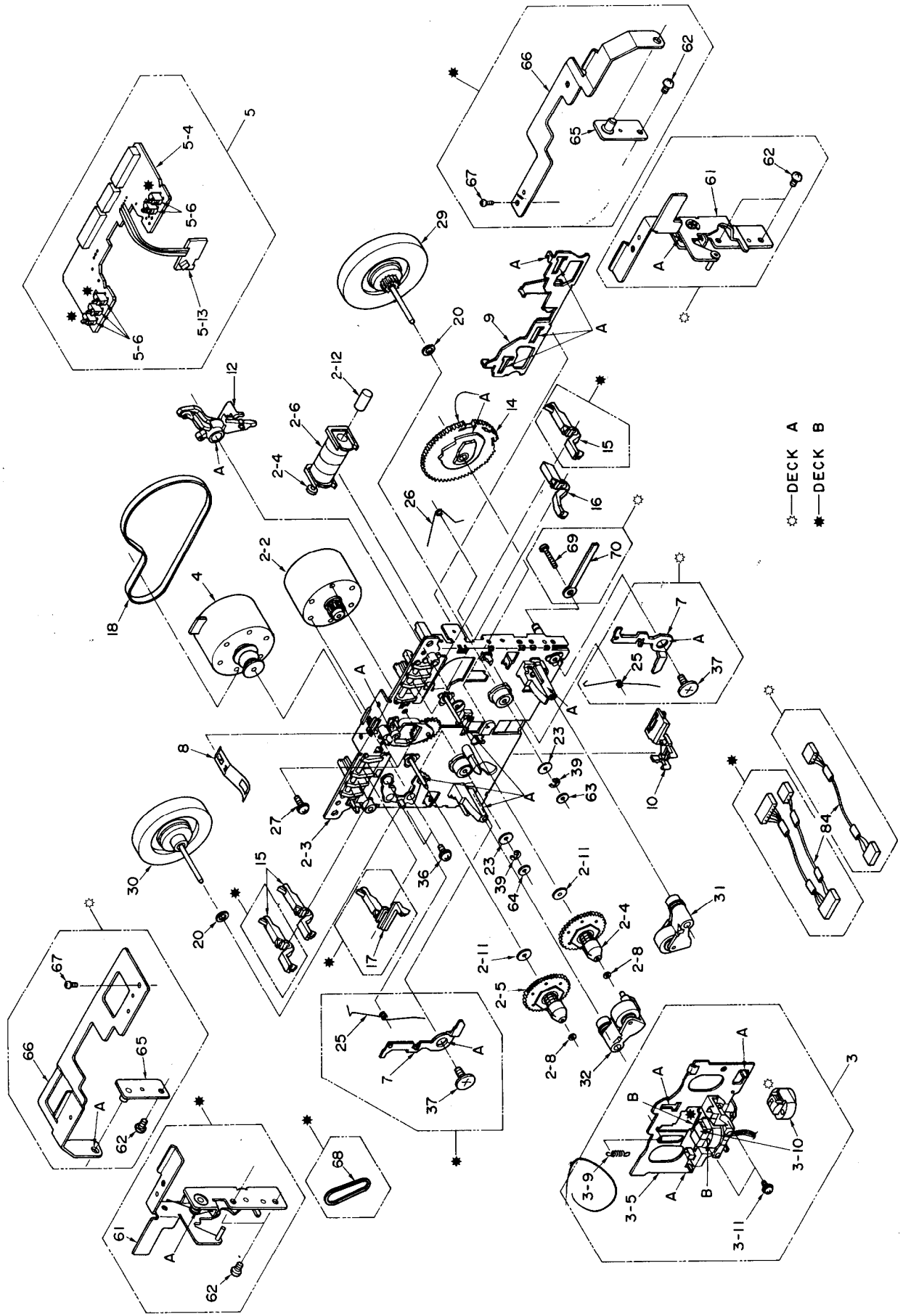


TAPE MECHANISM PARTS LIST

| REF.NO. | PART NO. | DESCRIPTION |
|-----------------|----------------------|-------------------------------|
| 2 | 24611381 | MECHANISM CHASSIS AS |
| 2-1 | 24602482 | IDLER AS |
| 2-2 | 24601245 | REEL MOTER |
| 2-3 | 24611382 | BASE AS (CHASSIS) |
| 2-4 | 24602483 | BASE AS (REEL) |
| 2-5 | 24602484 | BASE AS (REEL) |
| 2-6 | 24606333 | SOLENOID COIL AS |
| 2-7 | 82112606 | PAN-HEAD SCREW 2.6P + 6F |
| 2-8 | 24611177 | PLASTIC WASHER 1.7×.2×.25 |
| 2-9 | 24606331 | PLANGER |
| 2-11 | 24611175 | PLASTIC WASHER 2.1×.25 |
| 3 | 24600087 | HEAD PLATE AS (DECK A) |
| | 24600088 | HEAD PLATE AS (DECK B) |
| 3-5 | 24611383 | HEAD BASE |
| 3-9 | 24605711 | SPRING |
| 3-10 | 24600085 | HEAD AS (DECK A) |
| | 24600086 | HEAD AS (DECK B) |
| 3-11 | 833120059 | TAPPING SCREW 2×5ZN |
| 4 | 24601244 | CAPSTAN MOTOR AS |
| 5 | 24606334 | P.C.B. AS (CONTROL) (DECK A) |
| | 24606337 | P.C.B. AS (CONTROL) (DECK B) |
| 5-4 | 24606335 | P.C.B. (CONTROL) |
| 5-6 | 24606271 | PUSH SWITCH |
| 5-13 | 24606319 | GP2S04B |
| 7 | 24607065A | ARM (PROTECT) R (DECK A) |
| | 24607041A | ARM (PROTECT) L (DECK B) |
| 9 | 24611384 | SLIDE PLATE |
| 10 | 24611385 | LEAD HOLDER |
| 12 | 24607101 | ARM (PLAY) |
| 14 | 24602485 | CAM GEAR (3R) |
| 15 | 24603365 | LEVER (REC) |
| 16 | 24603366 | LEVER (PACK) L |
| 17 | 24603367 | LEVER (METAL) (DECK B) |
| 18 | 24602486 | MAIN BELT |
| 20 | 24611041 | PLASTIC WASHER 2.6×0.25 |
| 23 | 24610841 | PLASTIC WASHER 2.6×4.7×.5 |
| 25 | 24605712 | SPRING (R) (DECK A) |
| | 24605714 | SPRING (L) (DECK B) |
| 26 | 24605713 | SPRING |
| 29 | 24602487 | FLYWHEEL AS |
| 30 | 24602488 | FLYWHEEL AS |
| 31 | 24602414B | PINCH ROLLER AS |
| 32 | 24602421B | PINCH ROLLER AS |
| 33 | 24611387 | LABEL |
| 36 | 24609001 | PAN HEAD SCREW SW2.6×5ZN |
| 37 | 24609006 | SCREW |
| 39 | 8930151 | E WASHER 1.5S |
| 61 | 24611386 | HOLD PLATE AS (DECK A) |
| | 24611388 | HOLD PLATE AS (DECK B) |
| 62 | 833126049 | TAP-TIGHT SCREW 2.6TTP+4C |
| 63 | 24611188A | WASHER (OIL SEAL) |
| 64 | 24610844 | WASHER 1.9×5×0.25 |
| 65 | 24611390 | HOLD PLATE AS (DECK A) |
| | 24611389 | HOLD PLATE AS (DECK B) |
| 66 | 24607097A | ARM (EJECT) R (DECK A) |
| | 24607099 | ARM (EJECT) A (DECK B) |
| 67 | 24609002 | PAN HEAD SCREW SW2.0×4ZN |
| 68 | 24602404 | BELT |
| 69 | 838126080 | SCREW 2.6×8ZN |
| 70 | 24611323 | LUG |
| 84 | 24606336 | WIRE CONNECTOR (P/B) (DECK A) |
| | 24606338 | WIRE CONNECTOR (R/P) (DECK B) |

A B C D E F G H

TAPE MECHANISM-EXPLODED VIEW (DECK-A, DECK-B)



PC BOARD PARTS LIST

NAAF-3530-2

| CIRCUIT NO. | PART NO. | DESCRIPTION | CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|---------------------------|---------------------------|-------------|---|---------------------------------------|
| Q103,Q105 | 222078 | NHIC-3205 | Q905,906 | 2201924 or 2201925 | 2SD1761-E or 2SD1761-F |
| Q107 | 222999 | CX-20187 | | Diodes | |
| Q301 | 22240247 or 222652 | BA15218N or M5218L | D601-D605 | 223163 | 1SS133 |
| Q403 | 22240111 or 222808 | BA15218 or M5218P | D701-D703 | 223163 | 1SS133 |
| Q405 | 222840661TOS | 4066B | D704 | 224450562, 224150562 or 224650562 | MTZ5.6B, 05AZ5.6Y or HZ-5.6E-B2 |
| Q407,Q408 | 22240240 | IR2C30 | D705 | 223163 | 1SS133 |
| Q417 | 222959 | μ PC1297CA | D706,D708 | 224450433, 224150433 or 224650433 | MTZ4.3C, 05AZ4.3Z or HZ4.3EB3 |
| Q601 | 22240147 | μ PC1330HA | D707,D709 | 224450752, 224150752 or 224650752 | MTZ7.5B, 05AZ7.5Y or HZ7.5EB2 |
| Q602 | 222933 | BU4066BP | D901-D904 | 22380032 | 1SR139-100 |
| Q701 | 22240241 | HD61408PS | D905,D906 | 22380027 | 1SR35-100A |
| Q707,Q712 | 22240239 | TA-7291S | D907 | 224451501, 224151501 or 224651501 | MTZ15A, 05AZ15X or HZ15EB1 |
| Q901 | 222780125 or 222780122 | 78M12 or 78M12 | D908,D909 | 223163 | 1SS133 |
| Q902 | 222790125 or 222790122 | 79M12 or 79M12 | D910,D911 | 224450753, 224150753 or 224650753 | MTZ7.5C, 05AZ7.5EB3 or HZ7.5EB3 |
| Q903 | 222780055 or 222780052 | 78M05 or 78M05 | D912 | 224450511, 224150511 or 224650511 | MTZ5.1A, 05AZ5.1X or HZ5.1EB1 |
| | Transistors | | D913,D914 | 223163 | 1SS133 |
| Q101,Q102 | 2211255 or 2211183 | 2SC1815-GR or 2SC1740R | | Coils | |
| Q109,Q110 | 2212794 or 2212795 | 2SD1468-R or 2SD1468-S | L103,L104 | 233313 | NMC-6048 |
| Q401,Q402 | 2211255 or 2211183 | 2SC1815-GR or 2SC1740R | L105,L106 | 233382 | NMC-2069 |
| Q409,Q410 | 2211544 | 2SC1959-Y | L401,L402 | 231087 | NCH-2135 |
| Q412 | 2211705 or 2211706 | 2SD655-E or 2SD655-F | L403,L404 | 231081 | NCH-2129 |
| Q413 | 2211554 | 2SA562TM-Y | L405,L406 | 231165 | NTR-6505 |
| Q414 | 221281 | DTC114YS | L407 | 231063 | NLO-2037 |
| Q415,Q416 | 221281 | DTC114YS | L409,L410 | 231127 | NCH-4183 |
| Q603 | 221281 | DTC114YS | X701 | 3010149 | CST6.00MGW |
| Q604 | 2211455 or 2213074 | 2SA1015-GR or 2SA933R | | Capacitors | |
| Q605,Q606 | 221281 | DTC114YS | C105,C106 | 354722219 | 220 μ F6.3V,ELECT. |
| Q702 | 2211455 or 2213074 | 2SA1015-GR or 2SA933R | C115,C116 | 354722219 | 220 μ F6.3V,ELECT. |
| Q703 | 2211255 | 2CS1815GR | C201 | 354780479 | 4.7 μ F50V,ELECT. |
| Q704 | 2211706 | 2SD655F | C203,C204 | 354780229 | 2.2 μ F50V,ELECT. |
| Q705 | 221281 | DTC114YS | C205-C208 | 354780479 | 4.7 μ F50V,ELECT. |
| Q706 | 2212304 or 2211945 | 2SK381-D or 2SK246-GR | C211,C212 | 354780479 | 4.7 μ F50V,ELECT. |
| Q708 | 221281 | DTC114YS | C215,C216 | 354784799 | 0.47 μ F50V,ELECT. |
| Q709 | 2211706 | 2SD655F | C217,C218 | 354781599 | 0.15 μ F50V,ELECT. |
| Q710 | 221281 | DTC114YS | C221,C222 | 354782299 | 0.22 μ F50V,ELECT. |
| Q711 | 2212304 or 2211945 | 2SK381-D or 2SK246-GR | C231,C232 | 354780479 | 4.7 μ F50V,ELECT. |
| Q713 | 221281 | DTC114YS | C403,C404 | 354744709 | 47 μ F16V,ELECT. |
| Q714 | 2211705 or 2211706 | 2SD655-E or 2SD655-F | C423,C424 | 354782299 | 0.22 μ F50V,ELECT. |
| Q715 | 2213170 | 2SD1809 | C425,C426 | 354780479 | 4.7 μ F50V,ELECT. |
| Q716 | 2213170 | 2SD1809 | C431 | 370131534S | 0.015 μ 100V,APS. |
| Q717 | 2211705 or 2211706 | 2SD655-E or 2SD655-F | C434 | 354744709 | 47 μ F16V,ELECT. |
| Q718 | 2211255 | 2SC1815-GR | C435 | 354722219 | 220 μ F6.3V,ELECT. |
| Q719 | 2213039 | DTA114YS | C437,C438 | 354741009 | 10 μ F16V,ELECT. |
| Q720 | 2211455 or 2213074 | 2SA1015-GR or 2SA933R | C447,C448 | 370131014T | 100PF100V,APS. |
| Q721,Q722 | 2213090 | DTA114YS | C449,C450 | 370131814S | 180PF100V,APS. |
| Q904 | 2211255 or 2211183 | 2SC1815-GR or 2SC1740R | C453 | 354744709 | 4.7 μ F50V,ELECT. |
| | | | C601 | 354782299 | 0.22 μ F50V,ELECT. |
| | | | C603 | 354780479 | 4.7 μ F50V,ELECT. |
| | | | C605 | 354780479 | 4.7 μ F50V,ELECT. |
| | | | C606 | 354784799 | 0.47 μ F50V,ELECT. |
| | | | C607,C608 | 354741009 | 10 μ F16V,ELECT. |
| | | | C706,C708 | 354741019 | 100 μ F16V,ELECT. |

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|----------------------|-------------|---------------------------------|
| C713 | 354780479 | 4.7 μ F50V,ELECT. |
| C714,C715 | 352982296 | 0.22 μ F50V,NP. |
| C901 | 3500065A | 0.01 μ F,AC400V,IS. |
| C903, | 354752229S | 2200 μ F25V,ELECT. |
| C904 | 354751029S | 1000 μ F25V,ELECT. |
| C907,C908 | 354784799 | 0.47 μ F50V,ELECT. |
| C909 | 3504168 | 13000 μ F25V,ELECT. |
| C912,C913 | 354744709 | 47 μ F16V,ELECT. |
| C914 | 354744709 | 47 μ F16V,ELECT. |
| C915 | 354741009 | 10 μ F16V,ELECT. |
| C916 | 354762209S | 22 μ F35V,ELECT. |
| C921,C922 | 354744719 | 470 μ F16V,ELECT. |
| C923,C924 | 354742219 | 220 μ F16V,ELECT. |
| C927 | 354742219 | 220 μ F16V,ELECT. |
| Resistors | | |
| R109,R110 | 5210062 | N06HR 4.7KBD |
| R117,R118 | 5210062 | N06HR 4.7KBD |
| R407,R408 | 5215046 | N08HR 50KBC |
| R454 | 442520104F | RS1/2WBJ 1 Ω |
| R455 | 442521504F | RS1/2WBJ 15 Ω |
| R457 | 442521214F | RS1/2WBJ 120 Ω |
| R463,R464 | 5210064 | N06HR 10KBD |
| R471 | 442523304F | RS1/2WBJ 33 Ω |
| R701 | 49163392410 | 3.9K Ω \times 10,1/10W |
| R702 | 49163392407 | 3.9K Ω \times 7,1/10W |
| R713 | 5210066 | N06HR 22KBD |
| R716 | 5210064 | N06HR 10KBD |
| R720 | 442524704F | RS1/2WBJ 47 Ω |
| R732 | 5210066 | N06HR 22KBD |
| R735 | 5210064 | N06HR 10KBD |
| R739 | 442524704F | RS1/2WBJ 47 Ω |
| R744,R753 | 442623904F | RS1/2WBJ 39 Ω |
| R759 | 49163392404 | 3.9K Ω \times 4,1/10W |
| R901,R902 | 442522294F | RS1/2WBJ 0.22 Ω |
| R903 | 441724704F | RS2WBJ 47 Ω |
| R905,R906 | 442520224F | RS1/2WBJ 2.2 Ω |
| R907 | 442524714F | RS1/2WBJ 470 Ω |
| R911,R912 | 442522704F | RS1/2WBJ 27 Ω |
| R915 | 441521014F | RS1/2WBJ 100 Ω |
| Switch | | |
| S901 | 25035558 | NPS-111-L520P |
| Plugs,Jack | | |
| P101 | 25055133 | NPLG-3P117 |
| P102 | 25055135 | NPLG-5P119 |
| P103 | 25045165 | NPJ-4PDBL59 |
| P401 | 25055132 | NPLG-2P116 |
| P701 | 25045172 | HSJ-1003-01-020 |
| Socets | | |
| P704A | 2000963 | NSAS-6P915 |
| P705A | 2000964 | NSAS-12P916 |
| P706A | 2000966 | NSAS-14P918 |
| P707A | 2000600 | NSAS-6P556 |
| P708A | 2000965 | NSAS-14P917 |
| P709A | 2000962 | NSAS-6P914 |
| Miscellaneous | | |
| | 27160211-1 | RAD-68B,RDDIATOR |
| | 27160211 | RAD-68,RDDIATOR |
| | 82143006 | 3P+6FW(BC),SCREW |
| | 25060092 | NTM-1S33,TERMINAL |

NADIS-3531-2

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------------|------------|-----------------------|
| Q303,Q304 | 222623 | IR2E02 |
| D606 | 225253 | LS-0241 |
| Led | | |
| Capacitors | | |
| C303,C304 | 353750479S | 4.7 μ F25V,ELECT. |
| C305,C306 | 353780109S | 1 μ F50V,ELECT. |
| C307 | 353750479S | 4.7 μ F25V,ELECT. |
| Socket | | |
| P710A | 2000982 | NSAS-18P936 |

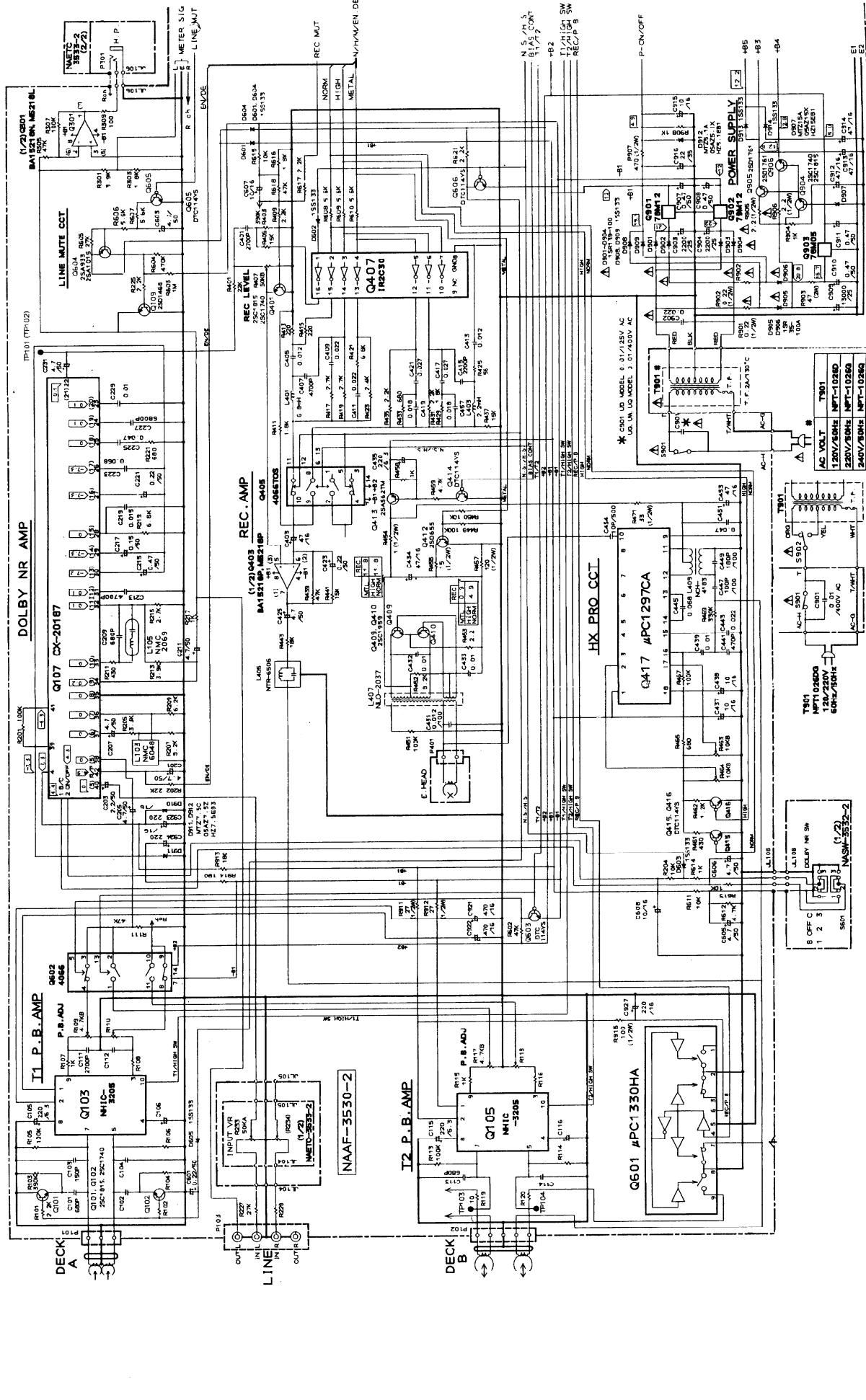
NASW-3532-2

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---------------|----------|--------------|
| D711-D714 | 223163 | 1SS133 |
| Diodes | | |
| Switch | | |
| S601 | 25065297 | NSS-23119 |
| S701-S705 | 25035548 | NPS-111-S510 |
| S706 | 25065364 | NSS-12138 |
| S707-S715 | 25035548 | NPS-111-S510 |
| Socket | | |
| P702A | 2000981 | NSAS-18P933 |
| P703A | 2000983 | NSAS-10P935 |

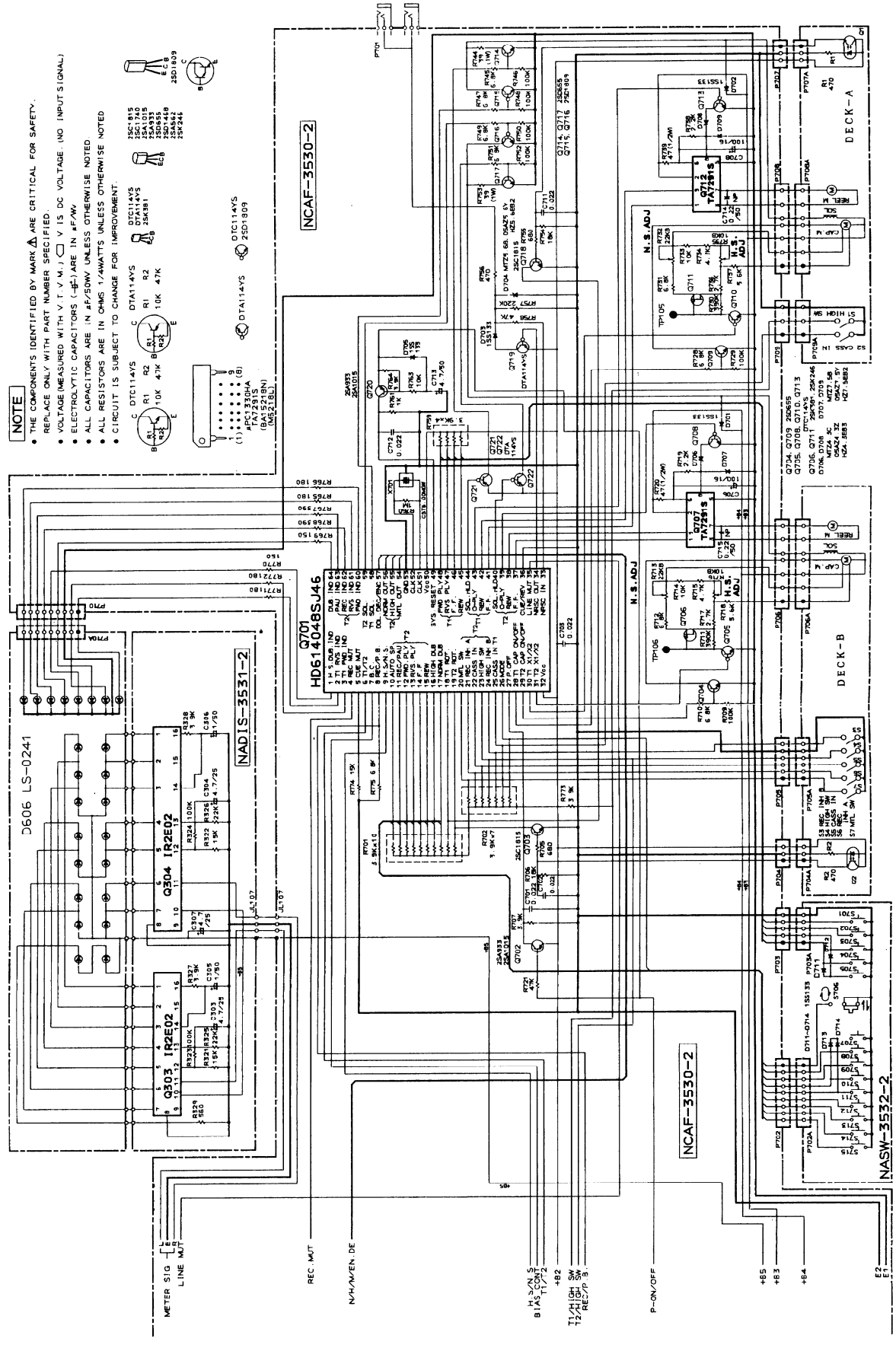
NAETC-3533-2

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-----------------|----------|----------------|
| R233,R234 | 5104214 | N09R2L50KA15F |
| Resistor | | |
| Jack | | |
| P301 | 25045255 | YKB21-5009,H.P |

SCHEMATIC DIAGRAM (AUDIO SECTION) 1/2



SCHEMATIC DIAGRAM (CONTROL SECTION) 2/2



NOTE

- THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY.
- REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE MEASURED WITH V.T.V.M.; \square IS DC VOLTAGE (NO INPUT SIGNAL).
- ELECTROLYTIC CAPACITORS (Ψ) ARE IN μ F/W.
- ALL CAPACITORS ARE IN μ F/50W UNLESS OTHERWISE NOTED.
- ALL RESISTORS ARE IN OHMS 1/4WATTS UNLESS OTHERWISE NOTED.
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

