

# 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.)

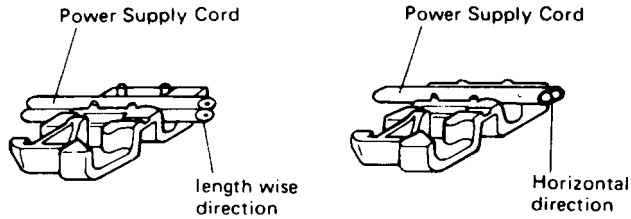
Specifications and external appearance are subject to change without notice because of product improvements.



## 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

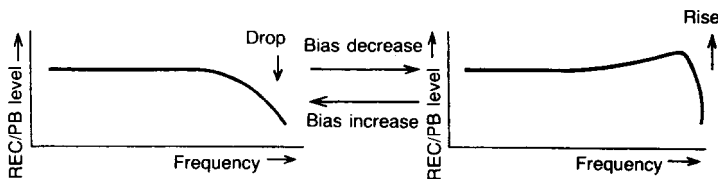
Connect the insulating-resistance tester between the plug of power supply cord and chassis.

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  $\mu$  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.

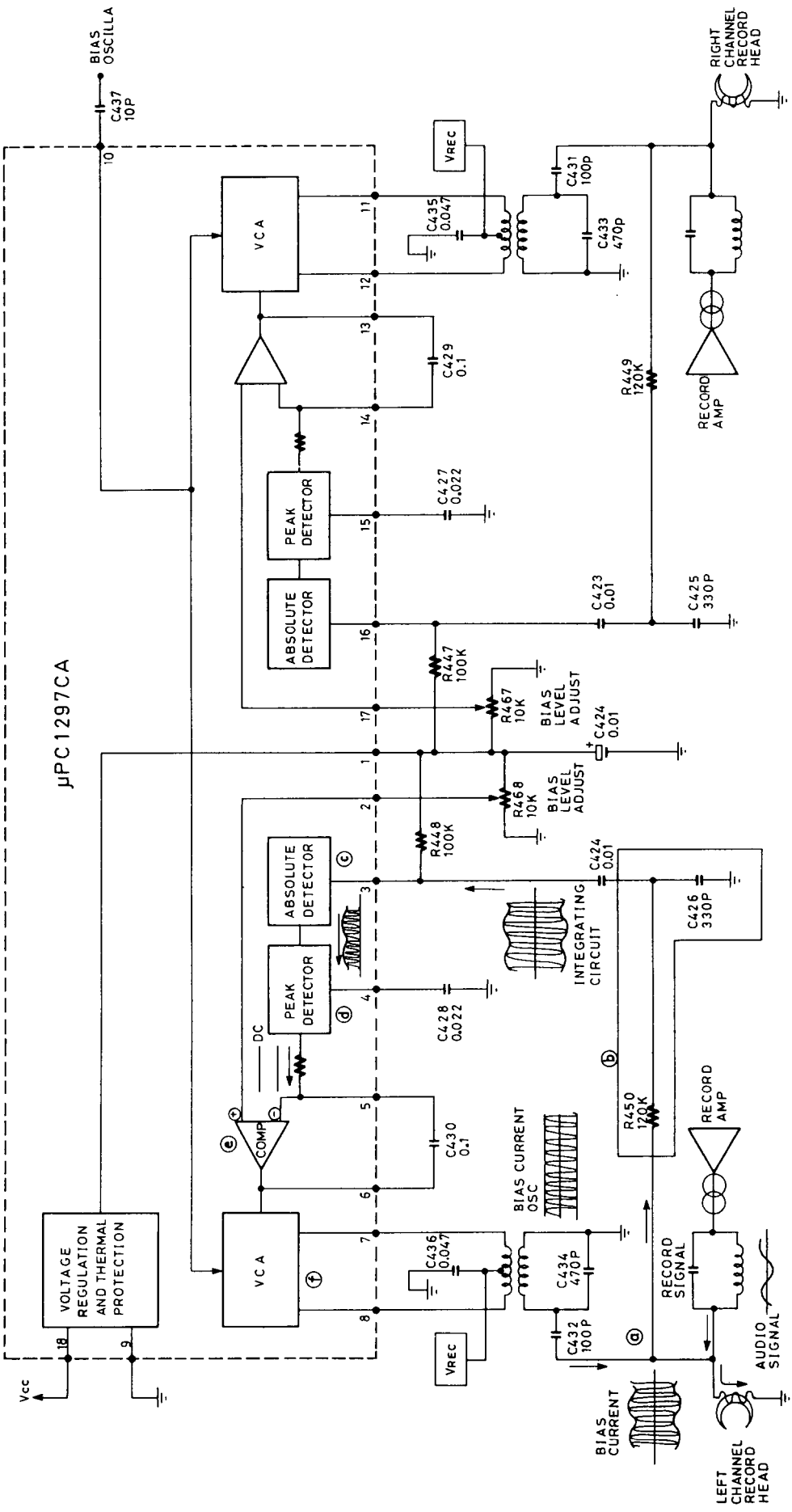
- 4) At (d), the waveform peak value is detected. The output becomes the peak DC voltage.
- 5) At (e), the standard voltage and the voltage of (4) are compared.
- 6) With the output of (e), the frequency generation level is controlled (voltage controlled amplifier). That is, the bias size is varied.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

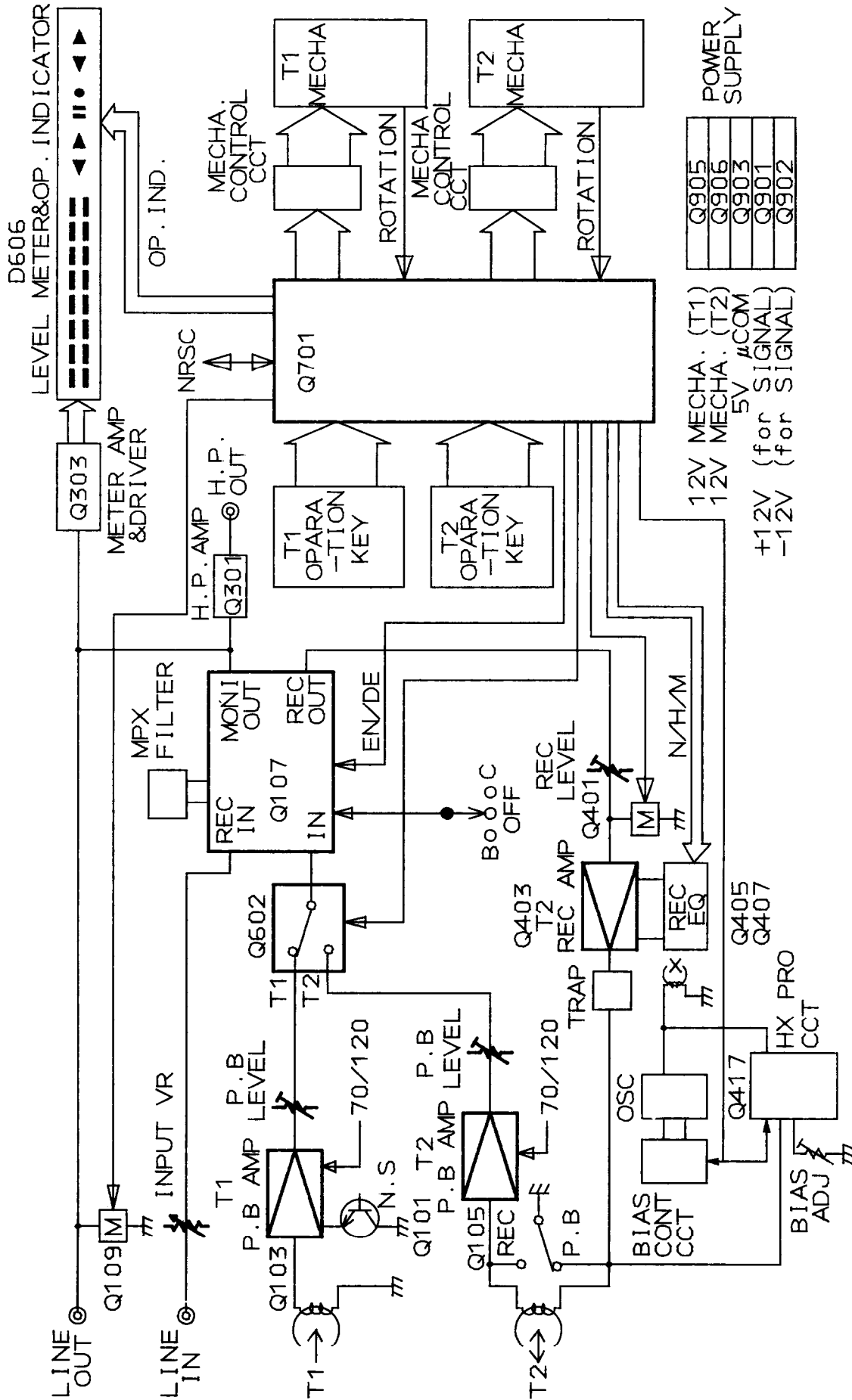


$$f = \frac{R450 + R448}{2\pi \times C426 \times R450 \times R448}$$

Ⓟ CUT OFF

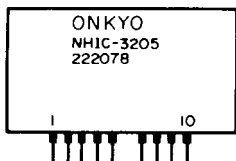
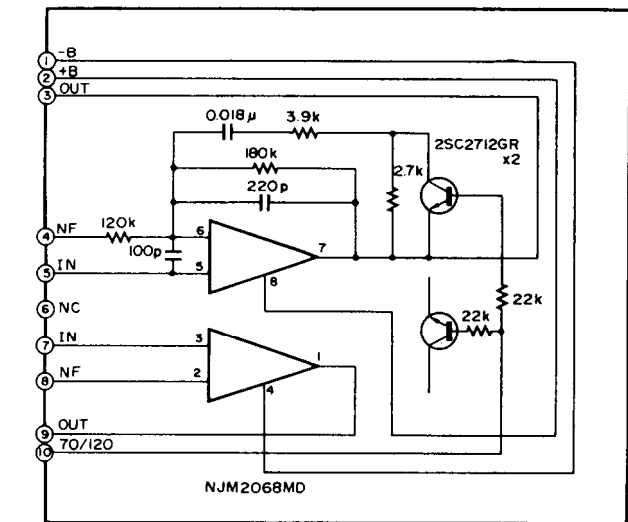
Fig. 1

# BLOCK DIAGRAM

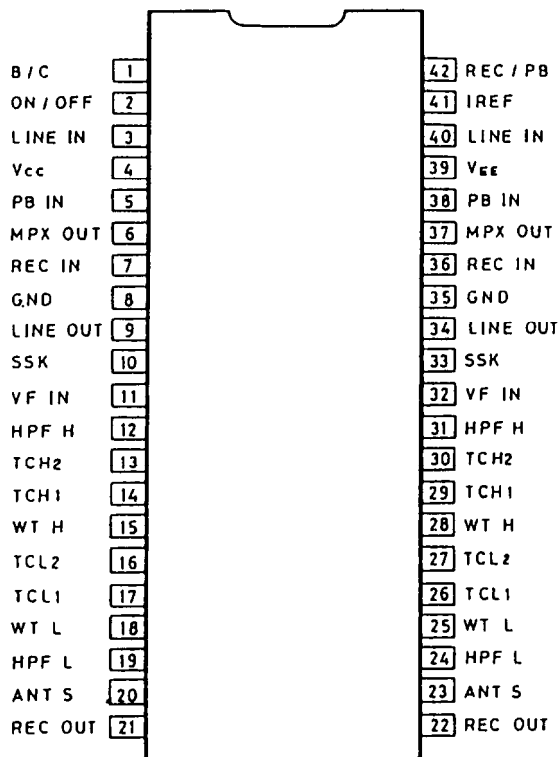


# IC BLOCK DIAGRAM

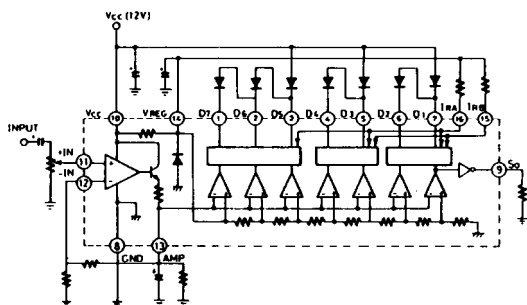
NCHC-3205 (P.B. AMP)



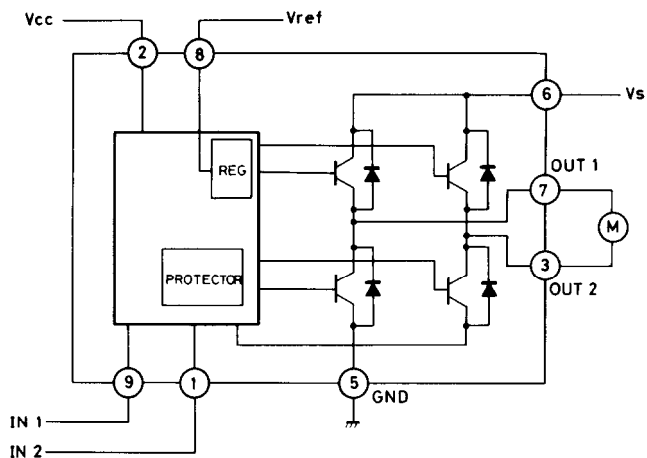
CX20187 (DOLBY N.R)



IR-2E02 (LEVEL METER DRIVE)

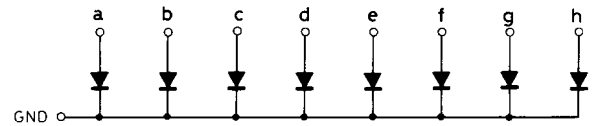
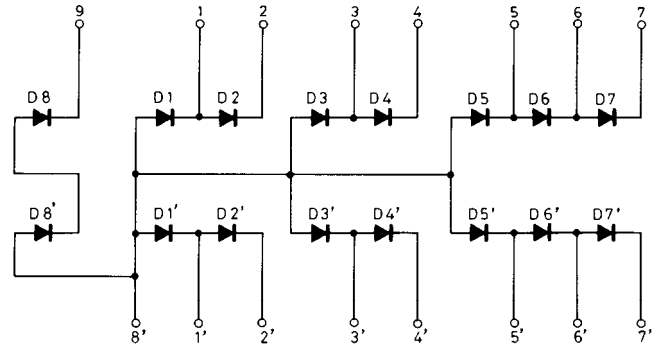
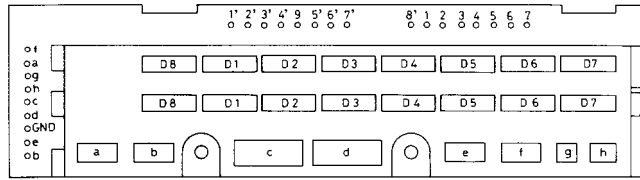


TA-7291S (MOTOR DRIVE)



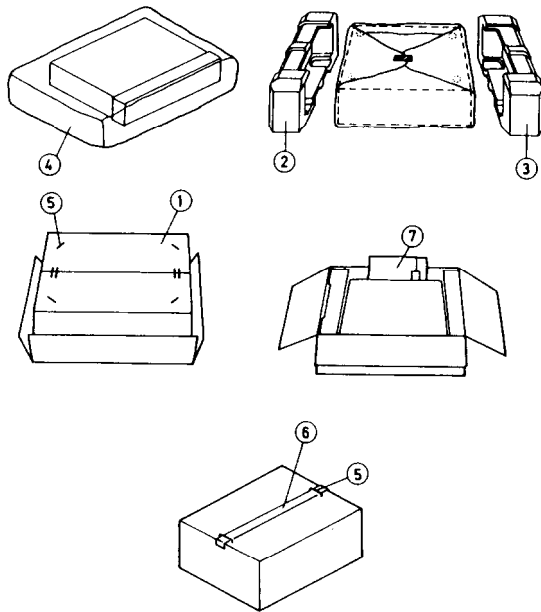
INPUT		OUTPUT		MODE
IN 1	IN 2	OUT 1	OUT 2	
0	0	∞	∞	STOP
1	0	H	L	CW/CCW
0	1	L	H	CCW/CW
1	1	L	L	BRAKE

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.

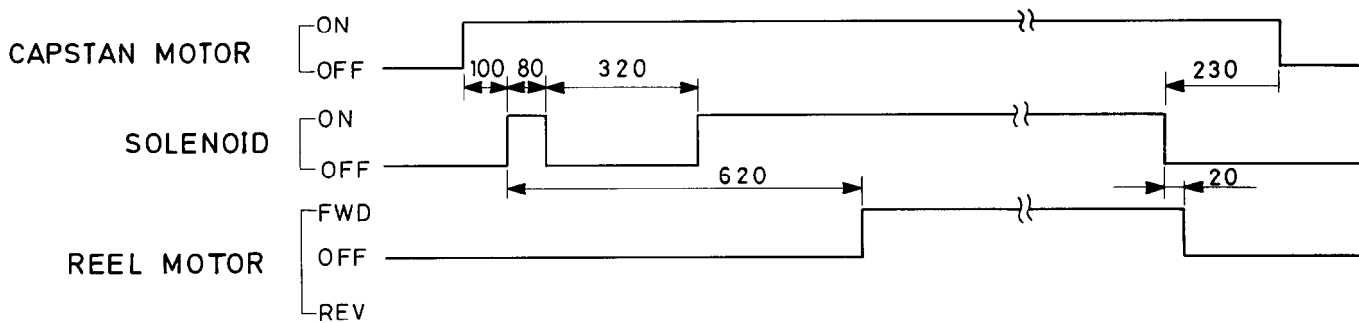
This mechanism is designed so that the solenoid is continuously held back in PLAY mode, so there is no longer any need to fit a PLAY switch for detecting head rise. When the solenoid stops being held back, the mechanism stops. This allows the mechanism to be initialized when the power is switched on 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

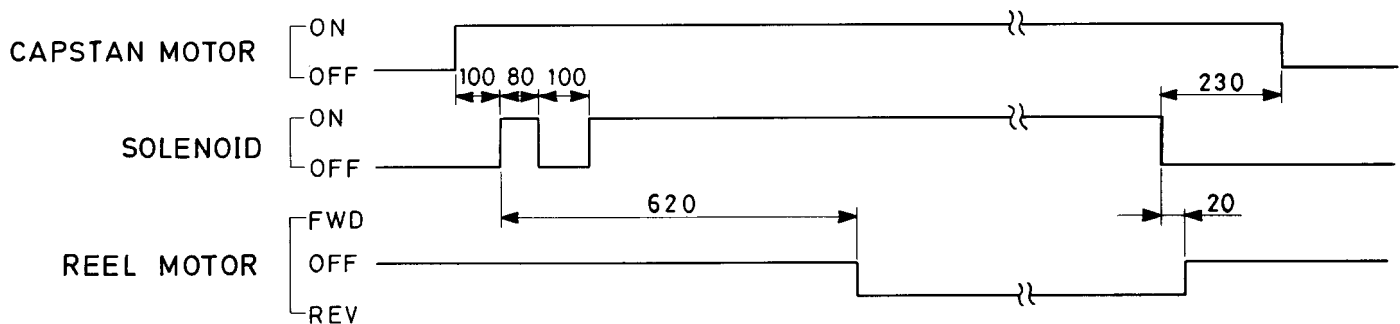


Fig. 2 Typical timings for PLAY modes

## 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

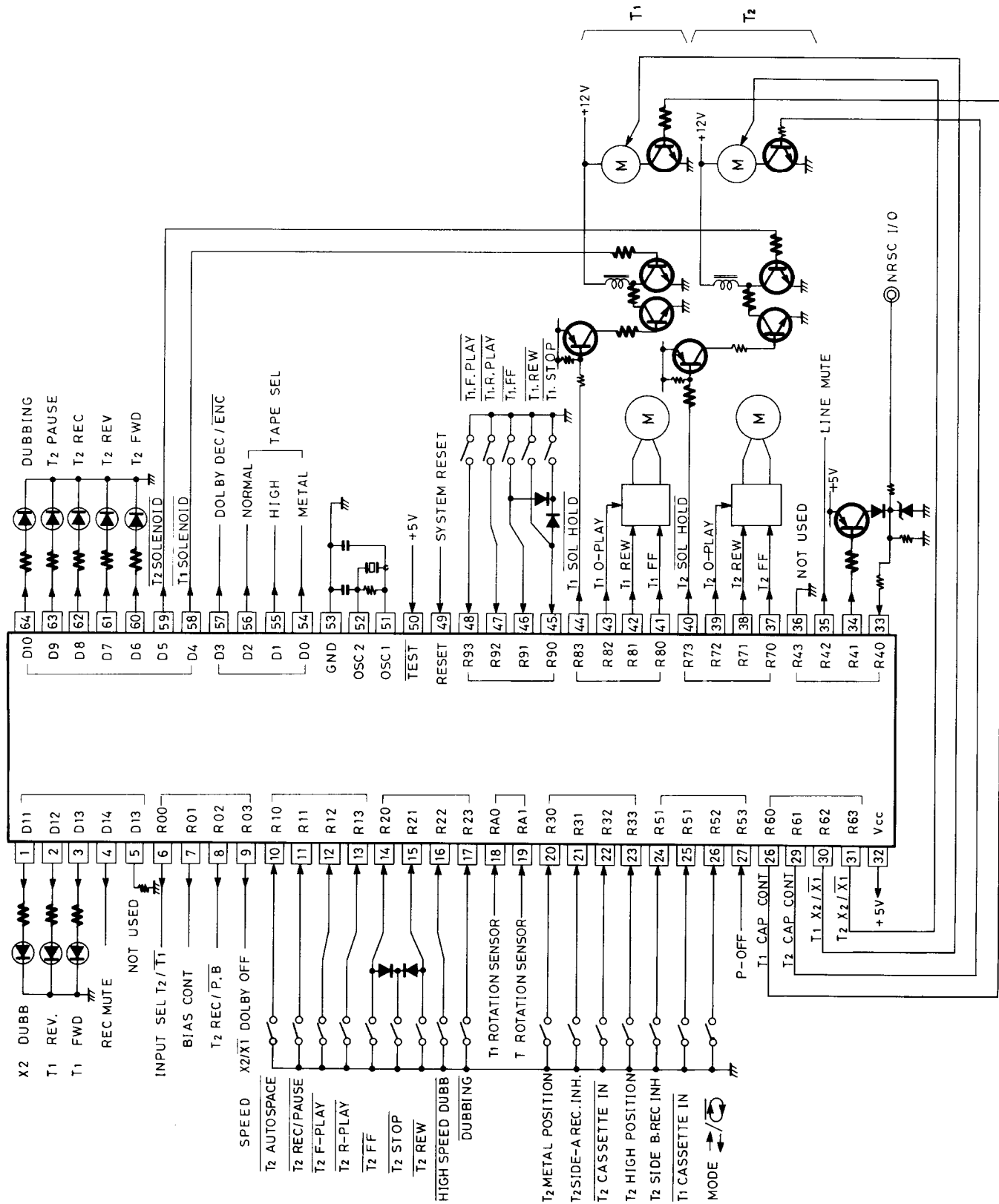
B: NMOS open drain. With pull-up MOS

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.

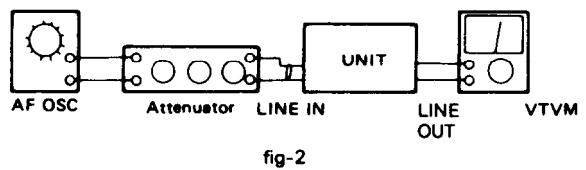
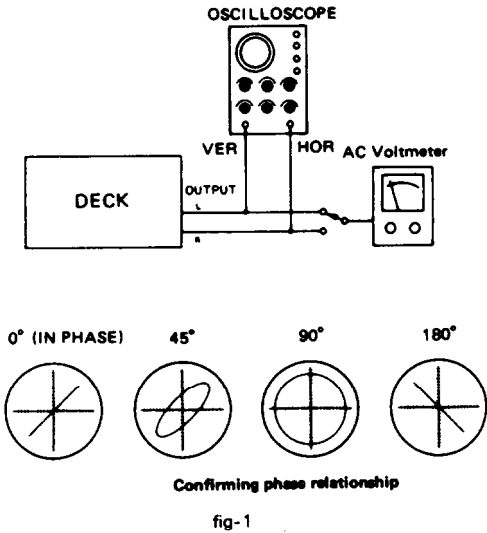
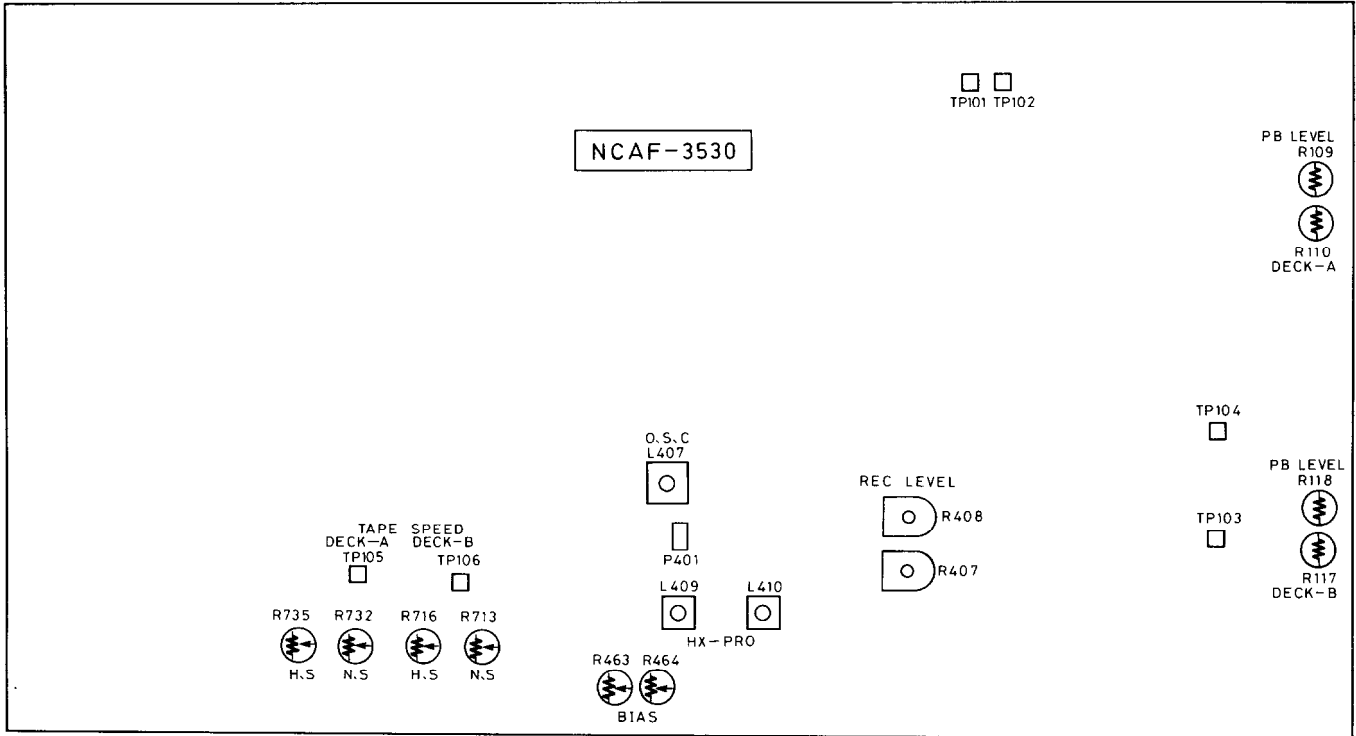
## TEST EQUIPMENT/TOOLS REQUIRED:

- 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



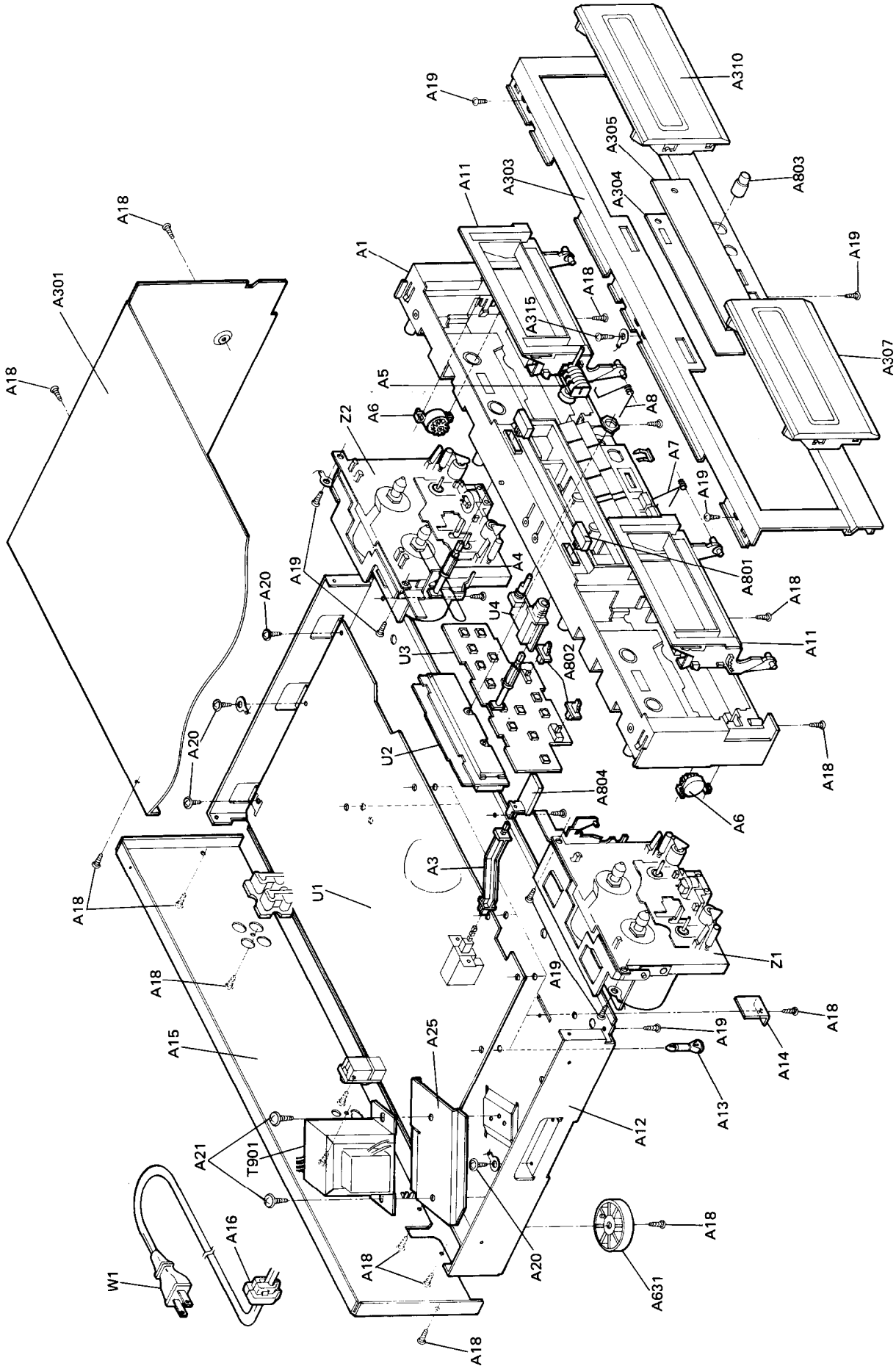
# CHASSIS-EXPLODED VIEW PARTS LIST

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

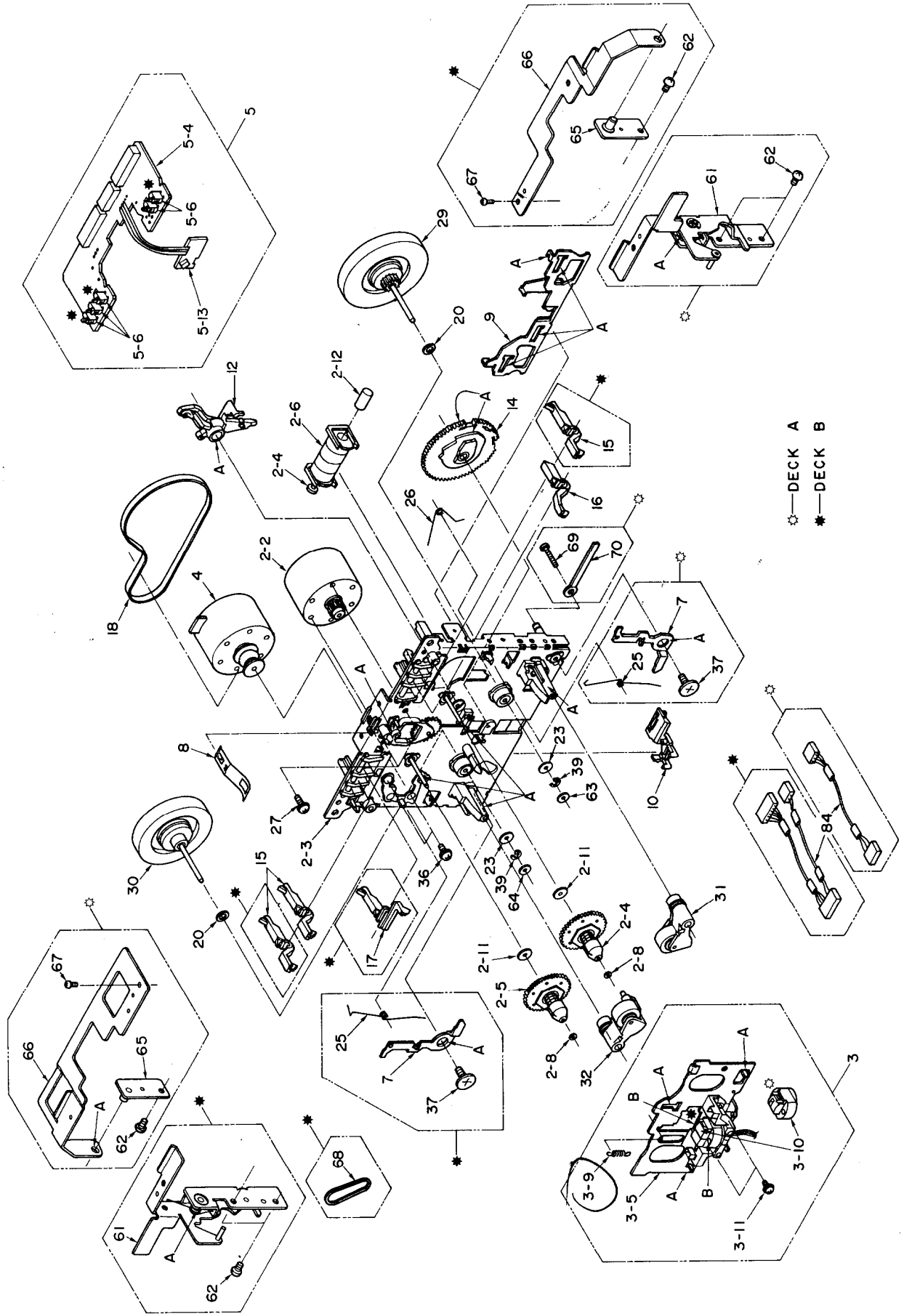


## TAPE MECHANISM PARTS LIST

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	<del>24605711</del>	<del>SPRING</del>
<del>3-10</del>	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
<del>32</del>	<del>24602421B</del>	<del>PINCH ROLLER AS</del>
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		<b>Diodes</b>	
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	$\mu$ PC1297CA	D706,D708	224450433, 224150433 or 224650433	MTZ4.3C, 05AZ4.3Z or HZ4.3EB3
Q601	22240147	$\mu$ 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
	<b>Transistors</b>		D913,D914	223163	1SS133
Q101,Q102	2211255 or 2211183	2SC1815-GR or 2SC1740R		<b>Coils</b>	
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		<b>Capacitors</b>	
Q605,Q606	221281	DTC114YS	C105,C106	354722219	220 $\mu$ F6.3V,ELECT.
Q702	2211455 or 2213074	2SA1015-GR or 2SA933R	C115,C116	354722219	220 $\mu$ F6.3V,ELECT.
Q703	2211255	2CS1815GR	C201	354780479	4.7 $\mu$ F50V,ELECT.
Q704	2211706	2SD655F	C203,C204	354780229	2.2 $\mu$ F50V,ELECT.
Q705	221281	DTC114YS	C205-C208	354780479	4.7 $\mu$ F50V,ELECT.
Q706	2212304 or 2211945	2SK381-D or 2SK246-GR	C211,C212	354780479	4.7 $\mu$ F50V,ELECT.
Q708	221281	DTC114YS	C215,C216	354784799	0.47 $\mu$ F50V,ELECT.
Q709	2211706	2SD655F	C217,C218	354781599	0.15 $\mu$ F50V,ELECT.
Q710	221281	DTC114YS	C221,C222	354782299	0.22 $\mu$ F50V,ELECT.
Q711	2212304 or 2211945	2SK381-D or 2SK246-GR	C231,C232	354780479	4.7 $\mu$ F50V,ELECT.
Q713	221281	DTC114YS	C403,C404	354744709	47 $\mu$ F16V,ELECT.
Q714	2211705 or 2211706	2SD655-E or 2SD655-F	C423,C424	354782299	0.22 $\mu$ F50V,ELECT.
Q715	2213170	2SD1809	C425,C426	354780479	4.7 $\mu$ F50V,ELECT.
Q716	2213170	2SD1809	C431	370131534S	0.015 $\mu$ 100V,APS.
Q717	2211705 or 2211706	2SD655-E or 2SD655-F	C434	354744709	47 $\mu$ F16V,ELECT.
Q718	2211255	2SC1815-GR	C435	354722219	220 $\mu$ F6.3V,ELECT.
Q719	2213039	DTA114YS	C437,C438	354741009	10 $\mu$ 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 $\mu$ F50V,ELECT.
			C601	354782299	0.22 $\mu$ F50V,ELECT.
			C603	354780479	4.7 $\mu$ F50V,ELECT.
			C605	354780479	4.7 $\mu$ F50V,ELECT.
			C606	354784799	0.47 $\mu$ F50V,ELECT.
			C607,C608	354741009	10 $\mu$ F16V,ELECT.
			C706,C708	354741019	100 $\mu$ F16V,ELECT.



CIRCUIT NO.	PART NO.	DESCRIPTION
C713	354780479	4.7 $\mu$ F50V,ELECT.
C714,C715	352982296	0.22 $\mu$ F50V,NP.
C901	3500065A	0.01 $\mu$ F,AC400V,IS.
C903,	354752229S	2200 $\mu$ F25V,ELECT.
C904	354751029S	1000 $\mu$ F25V,ELECT.
C907,C908	354784799	0.47 $\mu$ F50V,ELECT.
C909	3504168	13000 $\mu$ F25V,ELECT.
C912,C913	354744709	47 $\mu$ F16V,ELECT.
C914	354744709	47 $\mu$ F16V,ELECT.
C915	354741009	10 $\mu$ F16V,ELECT.
C916	354762209S	22 $\mu$ F35V,ELECT.
C921,C922	354744719	470 $\mu$ F16V,ELECT.
C923,C924	354742219	220 $\mu$ F16V,ELECT.
C927	354742219	220 $\mu$ F16V,ELECT.
<b>Resistors</b>		
R109,R110	5210062	N06HR 4.7KBD
R117,R118	5210062	N06HR 4.7KBD
R407,R408	5215046	N08HR 50KBC
R454	442520104F	RS1/2WBJ 1 $\Omega$
R455	442521504F	RS1/2WBJ 15 $\Omega$
R457	442521214F	RS1/2WBJ 120 $\Omega$
R463,R464	5210064	N06HR 10KBD
R471	442523304F	RS1/2WBJ 33 $\Omega$
R701	49163392410	3.9K $\Omega$ $\times$ 10,1/10W
R702	49163392407	3.9K $\Omega$ $\times$ 7,1/10W
R713	5210066	N06HR 22KBD
R716	5210064	N06HR 10KBD
R720	442524704F	RS1/2WBJ 47 $\Omega$
R732	5210066	N06HR 22KBD
R735	5210064	N06HR 10KBD
R739	442524704F	RS1/2WBJ 47 $\Omega$
R744,R753	442623904F	RS1/2WBJ 39 $\Omega$
R759	49163392404	3.9K $\Omega$ $\times$ 4,1/10W
R901,R902	442522294F	RS1/2WBJ 0.22 $\Omega$
R903	441724704F	RS2WBJ 47 $\Omega$
R905,R906	442520224F	RS1/2WBJ 2.2 $\Omega$
R907	442524714F	RS1/2WBJ 470 $\Omega$
R911,R912	442522704F	RS1/2WBJ 27 $\Omega$
R915	441521014F	RS1/2WBJ 100 $\Omega$
<b>Switch</b>		
S901	25035558	NPS-111-L520P
<b>Plugs,Jack</b>		
P101	25055133	NPLG-3P117
P102	25055135	NPLG-5P119
P103	25045165	NPJ-4PDBL59
P401	25055132	NPLG-2P116
P701	25045172	HSJ-1003-01-020
<b>Socets</b>		
P704A	2000963	NSAS-6P915
P705A	2000964	NSAS-12P916
P706A	2000966	NSAS-14P918
P707A	2000600	NSAS-6P556
P708A	2000965	NSAS-14P917
P709A	2000962	NSAS-6P914
<b>Miscellaneous</b>		
	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
<b>Led</b>		
<b>Capacitors</b>		
C303,C304	353750479S	4.7 $\mu$ F25V,ELECT.
C305,C306	353780109S	1 $\mu$ F50V,ELECT.
C307	353750479S	4.7 $\mu$ F25V,ELECT.
<b>Socket</b>		
P710A	2000982	NSAS-18P936

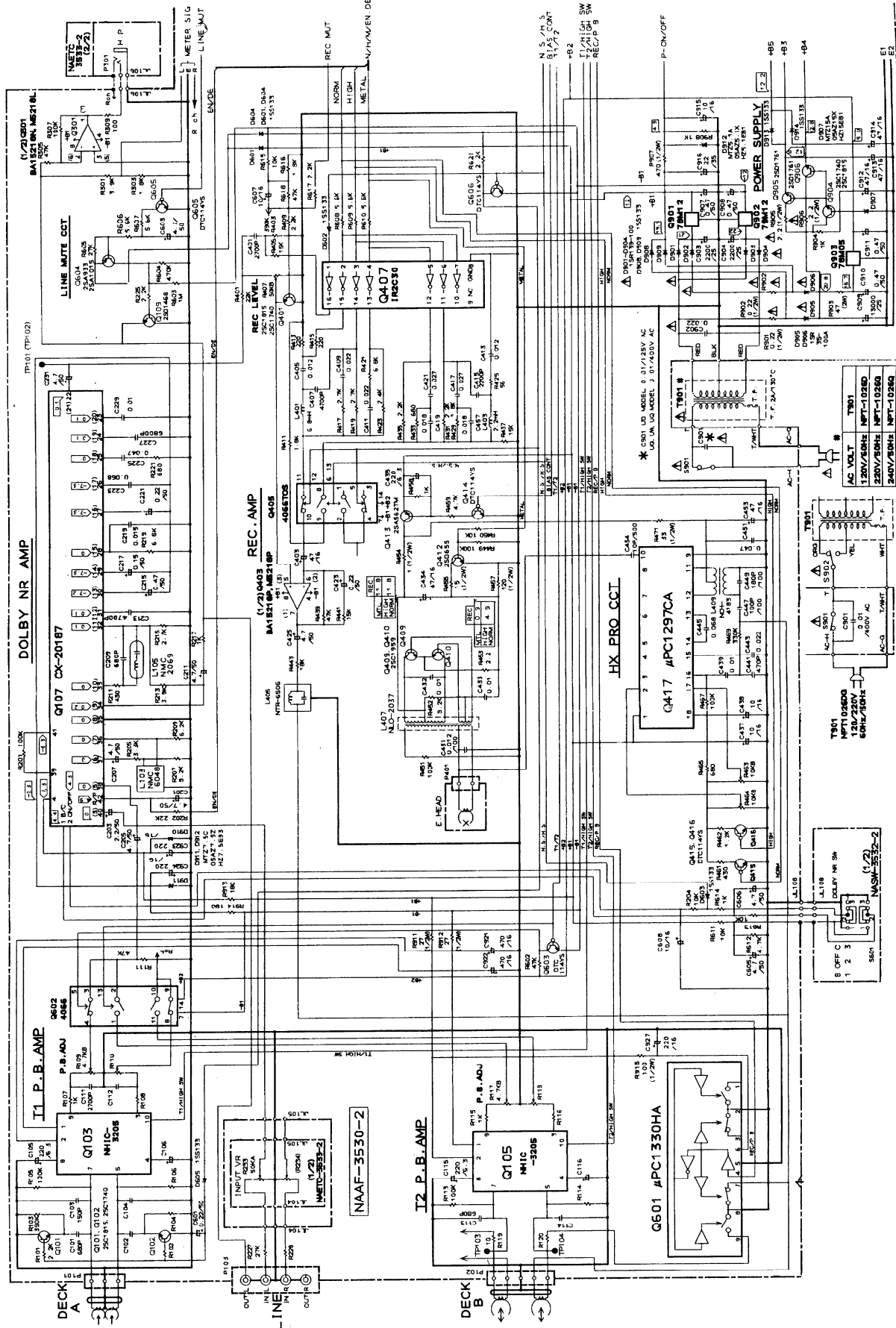
**NASW-3532-2**

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

**NAETC-3533-2**

CIRCUIT NO.	PART NO.	DESCRIPTION
R233,R234	5104214	N09R2L50KA15F
<b>Resistor</b>		
<b>Jack</b>		
P301	25045255	YKB21-5009,H.P

SCHEMATIC DIAGRAM (AUDIO SECTION) 1/2



SCHEMATIC DIAGRAM (CONTROL SECTION) 2/2

