

ONKYO SERVICE MANUAL

STEREO CASSETTE TAPE DECK MODEL TA-R200

UD, UD (N)	120V AC, 60Hz
UW	120/220V AC, 50/60Hz
UQ	240V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

SPECIFICATIONS

Track Format: 4-tracks, 2-channels
Erasing System: AC erase
Tape Speed: 4.8 cm/sec. (1-7/8 i.p.s.)

Wow 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)
S/N Ratio: 58dB (metal tape, Dolby NR off)
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: Line OUT: 2
Standard output level: 500mV (0dB)
Optimum load impedance: over 50 kohms
Headphone jack: 1
optimum load impedance: 8 to 200 ohms
Motors: DC servo motor: 1
Heads: REC/PB: Special Hard Permalloy \times 1;
Erase head: Ferrite \times 1
Power Supply Rating: U.K. and Australian models:
AC 240V, 50Hz
U.S.A. and Canadian models:
AC 120V, 60Hz.
Worldwide models:
AC 120V and 220V switchable, 50/60Hz
Power Consumption: 11 watts
Dimensions: 435(W) \times 122(H) \times 264(D)mm
(17-1/8" \times 4-13/16" \times 10-3/8")
Weight: 3.9 kg. (8.6 lbs.)

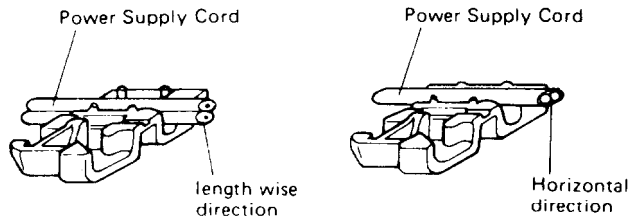
Specifications and external appearance are subject to change without notice because of product improvements.



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

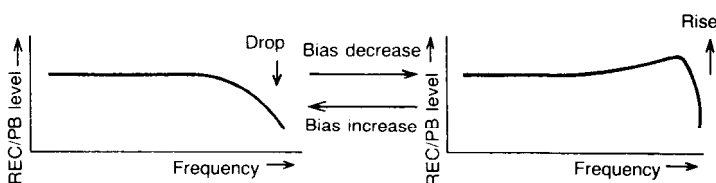
Connect the insulating-resistance tester between the plug of power supply cord and chassis.

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).

$$\text{Frequency} = \frac{R435 + R433}{2\pi \times C435 \times R435 \times R433} \quad (2.1)$$

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

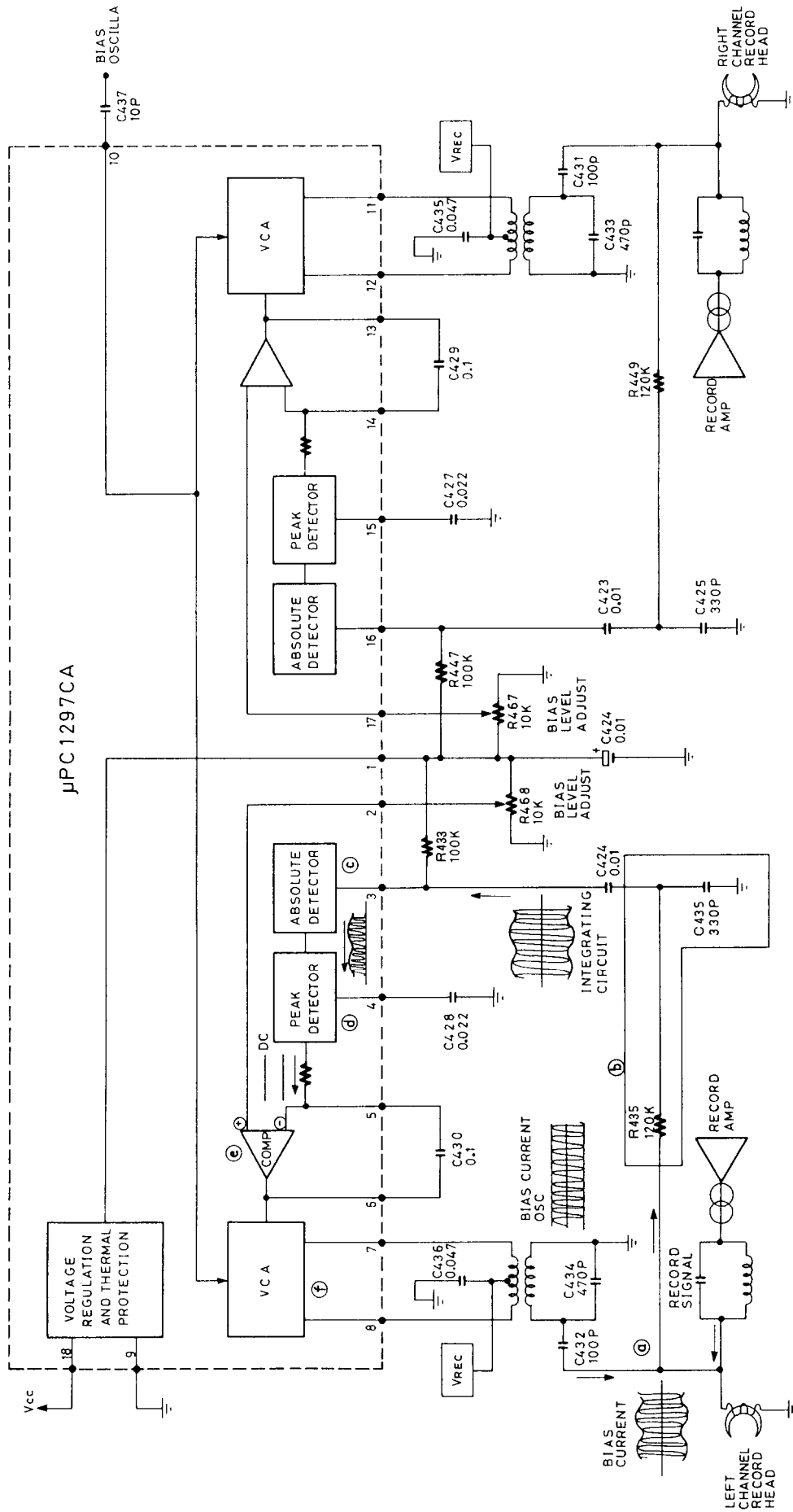
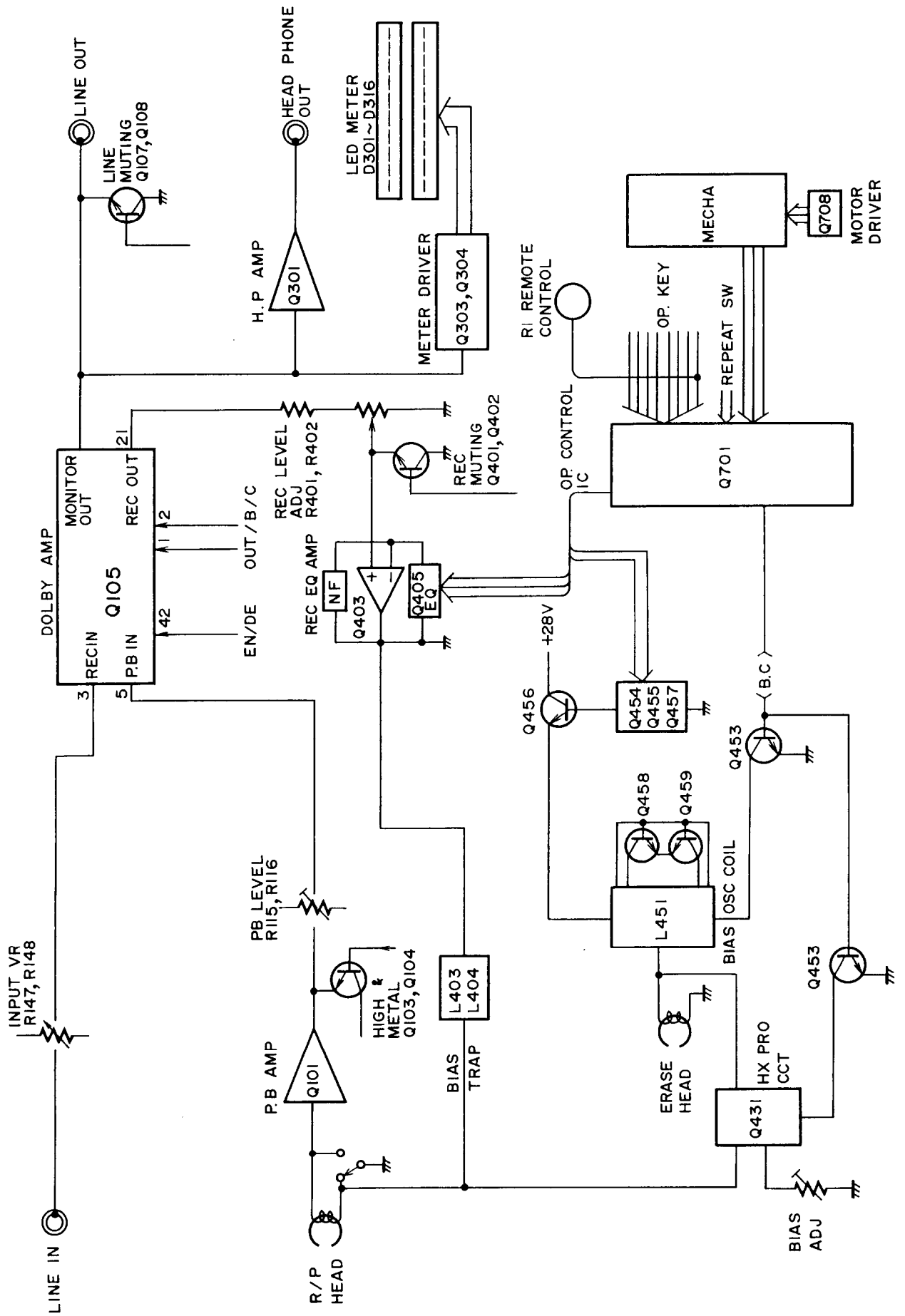
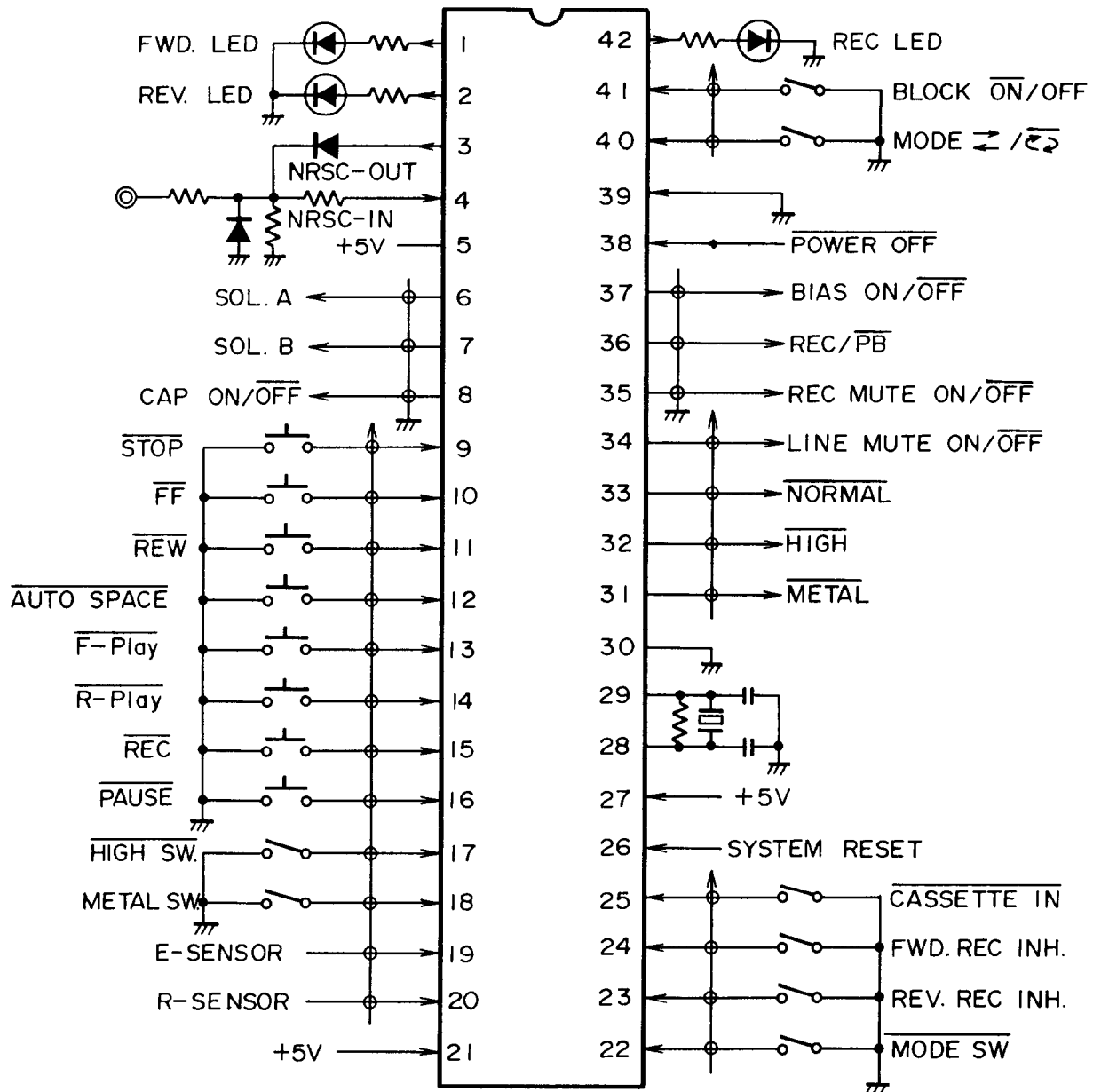


Fig. 1

BLOCK DIAGRAM



MICROCOMPUTER (HD614148SA47)



PRINTED CIRCUIT BOARD PARTS LIST

NAAF-3638-1

NAAF-3638-1			CIRCUIT NO.	PART NO.	DESCRIPTION
CIRCUIT NO.	PART NO.	DESCRIPTION			
	ics		D708	223163	1SS133
Q101	222905	μ PC1228HA	D901-D905	22380032	1SR139-100
Q105	222999	CX-20187	D906, D907	223163	1SS133
Q301	22240247 or 222652	BA15218N or M5218L	D908	224151303 or 224651303	05AZ13Z or HZ13EB3
Q403	22240111 or 222808	BA15218 or M5218P		Coils	
Q405	222918	BA6251	L121, L122	233313	NMC-6048
Q431	222959	μ PC1297CA	L123, L124	233382	NMC-2069
Q432	222921 or 222465	BA4558 or NJM-4558D	L401, L402	231085 or 24606072	NCH-2133 or NCH-1010
Q601	22240147	μ PC1330HA	L403, L404	233314	NCH-2097
Q701	22240260	HD614148SA47	L431, L432	231127	NCH-4183
Q902	222780055	78M05	L451	231144A	NLO-2048
	Transistoers		X701	3010150	CST4.00MGW
Q103, Q104	2211183 or 2212485	2SC1740R or JC501Q	C103, C104	354780109	1 μ F50V, ELECT.
Q107, Q108	2212794 or 2212795	2SD1468-R or 2SD1468-S	C107, C108	354721019	100 μ F6.3V, ELECT.
Q401, Q402	2211183 or 2212485	2SC1740R or JC501Q	C113, C114	354780109	1 μ F50V, ELECT.
Q433, Q434	221281	DTC114YS	C121	354780109	1 μ F50V, ELECT.
Q451	2213074 or 2212494	2SA933R or JA101P	C123-C126	354780229	2.2 μ F50V, ELECT.
Q452	221281	DTC114YS	C127-C130	354780479	4.7 μ F50V, ELECT.
Q453	2211183 or 2212485	2SC1740R or JC501Q	C131, C132	354722219	220 μ F6.3V, ELECT.
Q454, Q455	221281	DTC114YS	C135, C136	354780479	4.7 μ F50V, ELECT.
Q456	2201540	2SD947	C139, C140	354784799	0.47 μ F50V, ELECT.
Q457	2211183 or 2212485	2SC1740R or JC501Q	C141, C142	354781599	0.15 μ F50V, ELECT.
Q458, Q459	2201883	2SC1213-C	C145, C146	354782299	0.22 μ F50V, ELECT.
Q602	221281	DTC114YS	C155, C156	354780479	4.7 μ F50V, ELECT.
Q603, Q604	2213074 or 2212494	2SA933R or JA101P	C301-C304	354780479	4.7 μ F50V, ELECT.
Q605	221281	DTC114YS	C401, C402	354780479	4.7 μ F50V, ELECT.
Q606-Q608	2213090	DTA114YS	C403, C404	354741009	10 μ F16V, ELECT.
Q702	2213074 or 2212494	2SA933R or JA101P	C413, C414	354783399	0.33 μ F50V, ELECT.
Q704, Q705	221281	DTC114YS	C415, C416	354780479	4.7 μ F50V, ELECT.
Q706, Q707	2212853 or 2212855	2SB1068-K or 2SB1068-U	C431, C432	354741009	10 μ F16V, ELECT.
Q708	2211706	2SD655-F	C441-C444	370131514	150PF 100V, APS
Q710, Q711	2211183 or 2212485	2SC1740R or JC501Q	C447	354742209	22 μ F16V, ELECT.
Q901	2201924 or 2201925	2SD1761-E or 2SD1761-F	C451	354724719	470 μ F6.3V, ELECT.
Q903	2211945 or 2212304	2SK246-GR or 2SK381-D	C452	354744709	47 μ F16V, ELECT.
	Diodes		C453	354741019	100 μ F16V, ELECT.
D401, D402	223163	1SS133	C457	370131234	0.012 μ F100V, APS
D403	223150, 223124 or 223145	US1040, 1S2473 or 1S2076TD	C601, C602	354780109	1 μ F50V, ELECT.
D404-D410	223163	1SS133	C603	354780229	2.2 μ F50V, ELECT.
D601, D602	223163	1SS133	C604	354780479	4.7 μ F50V, ELECT.
D701, D703	223163	1SS133	C701	354741009	10 μ F16V, ELECT.
D704	224150562 or 224650562	05AZ5.6Y or HZ-5.6E-B2	C703, C704	354780229	2.2 μ F50V, ELECT.
D705	223163	1SS133	C706	354780109	1 μ F50V, ELECT.
D706, D707	223150, 223124 or 223145	US1040, 1S2473 or 1S2076TD	C707	354742209	22 μ F16V, ELECT.
			C708	354721019	100 μ F6.3V, ELECT.
			C904	354761029	1000 μ F 35V, ELECT.
			C905, C906	354744709	47 μ F16V, ELECT.
			C907	354746829	6800 μ F 16V, ELECT.
			C909	354781599	0.15 μ F50V, ELECT.
			C910	354744709	47 μ F16V, ELECT.
			C912	354742219	220 μ F16V, ELECT.
			C914	354741009	10 μ F16V, ELECT.

CIRCUIT NO.	PART NO.	DESCRIPTION
Resistors		
R115, R116	5210066 or 5210218	N06HR 22KBD or N06HR 20KBD
R147, R148	5104226	N11RL50KA17, VR
R401, R402	5210068 or 5210220	N06HR 47KBD or N06HR 50KBD
R431, R432	5210064	N06HR 10kBD
R440	5104254	N11RLC5KB17Z
R702	49163392404	3.9K Ω ×4, 1/10W
R736	49163392411	3.9K Ω ×11, 1/10W
R901, R902	441520104F	RS1/2WBJ 1 Ω
Plugs, Socket		
P101A	2009990008	NSAS-20P0014
P102	25045165	NPJ-4PDBL59
P701	25045172	HSJ-1003-01-020
P702A	2002393030	NSAS-30P0012
P703A	2006392030	NSAS-20P0013
P901A	2009990011A	NSAS-10P0020
Switch		
S709-S712	25035587	NPS-422-S549
Miscellaneous		
	27141059	BRACKET
	27300243	CLAMP

NADIS-3639-1

CIRCUIT NO.	PART NO.	DESCRIPTION
lc		
Q303, Q304	222623	IR2E02
LED		
D301-D310	225137CG or 225137DG	SEL2413E-CG or SEL2413E-DG
D311-D316	225141	SEL2213C
D711	225141	SEL2213C
D712, D713	225137CG or 225137DG	SEL2413E-CG or SEL2413E-DG
Capacitors		
C305, C306	354780479	4.7 μ F 50V, ELECT.
C307, C308	354780109	1 μ F 50V, ELECT.
Switch		
S701-S708	25035548	NPS-111S510, PUSH
Holder		
	27190722	LED-19

NASW-3640-1

CIRCUIT NO.	PART NO.	DESCRIPTION
Capacitor		
C901	3500065A	0.01 μ F AC400V, IS.
Switch		
S901	25035558	NPS-111-L520P
Terminal		
	25060092	NJM-1S33

NAETC-3641-1

CIRCUIT NO.	PART NO.	DESCRIPTION
Terminal		
P301	25045255	YKB21-5009, ST JACK

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.

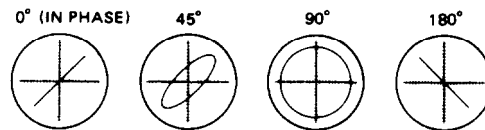
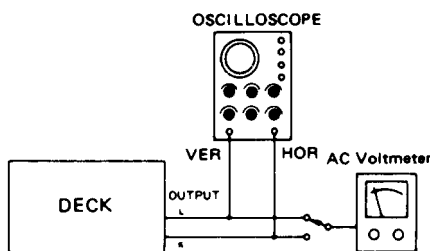
TEST EQUIPMENT/TOOLS REQUIRED:

- 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	Semi-fixed on the motor	3020±20Hz	
2	Head azimuth	AC voltmeter and oscilloscope to Line output terminal	VTT-703L	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-121 and TP-122	MTT-150	PB	AC voltmeter	R115(Ch.L) R116(Ch.R)	25mV	
5	OSC Block	Frequency counter to P101a read loose coupling	METAL TAPE MX-C90	REC	Frequency counter	L-451	85kHz±2kHz	
6	HX-PRO	AC voltmeter to terminals Tp-101 and TP-102	METAL TAPE	REC	AC voltmeter	L-431(ch.L) L-432(ch.R)	Maximum	R-431 R-432 clock wise
7	Bias current	fig. 2	1kHz, -20dB and 12kHz, -20dB	XL-II C-90	REC-PB	R431(ch.L) R432(ch.R)	Same level at REC-PB	Input VR maximum.
8	Record level	fig. 2	1kHz	XL-II	REC	AC voltmeter	Attenuator or AF OSC output	350mV
					REC/Pb	AC voltmeter	R401(ch.L) R402(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 30~70/cm
- FF.REW torque 80~180/cm
- Back tention 2~7g/cm



Confirming phase relationship fig-1

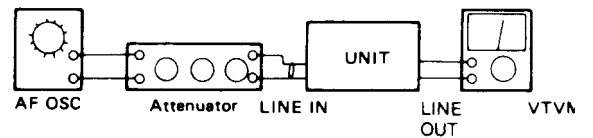
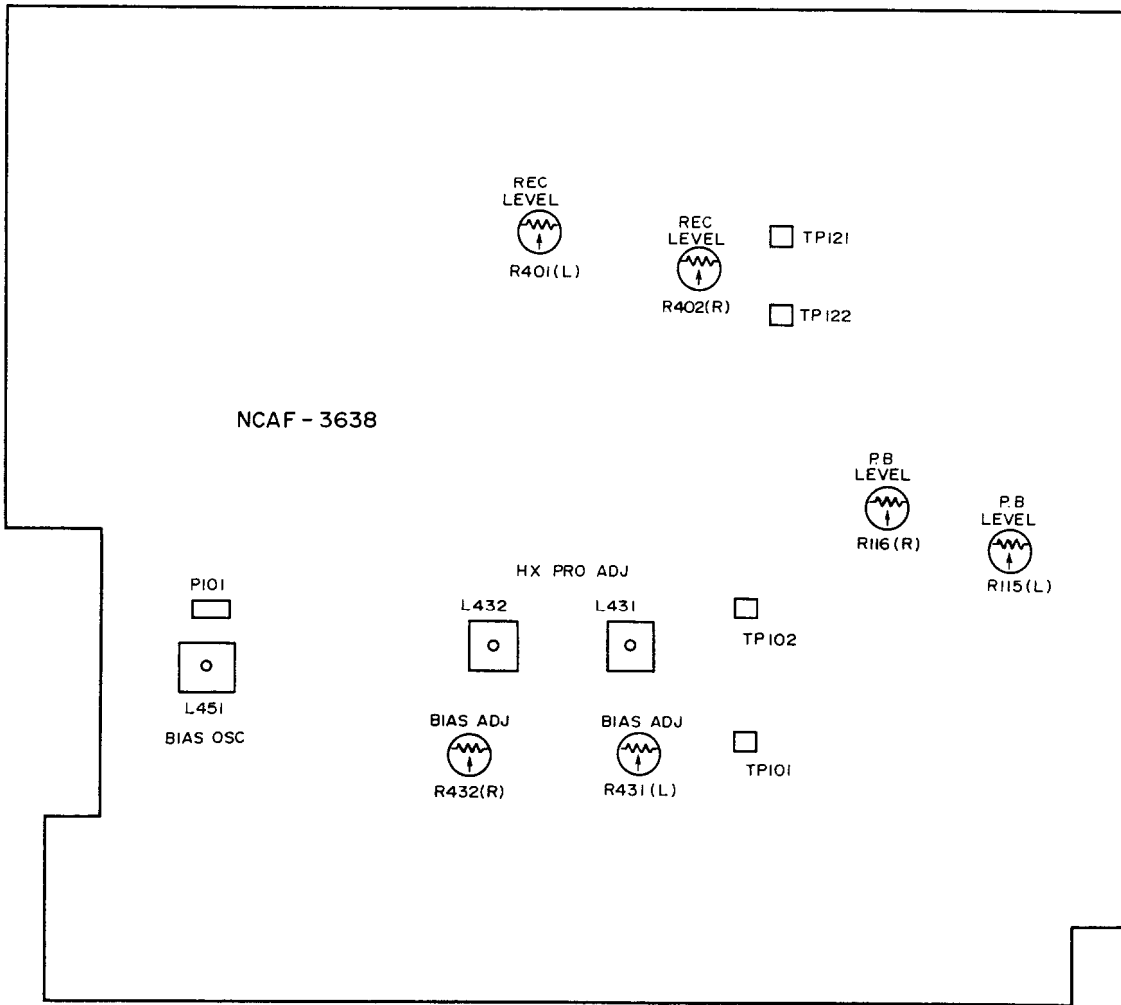
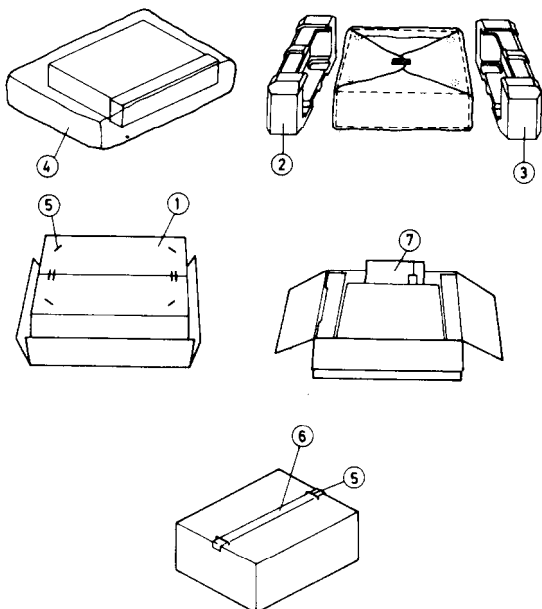


fig-2



PACKING VIEW



PACKING PART LIST

REF NO.	PART NO.	DESCRIPTION
1	29051959	master carton box
2	29091235A	Pad (L)
3	29091236A	Pad (R)
4	29100037A	650×500 Poly bag
5	282301	Sealing hook
6	260012	Damp tape
7		Accessory bag ass'y
	29341440	Instruction manual
	2010098A	Connection cable
	29365019	Waranty card (N)
	29358002G	Service station list (N)
	29100006A	350×250 Ply bag
	25055018	CV-K-1 (W)

NOTE: (N): Only U.S. A. model
(W): Only worldwide model

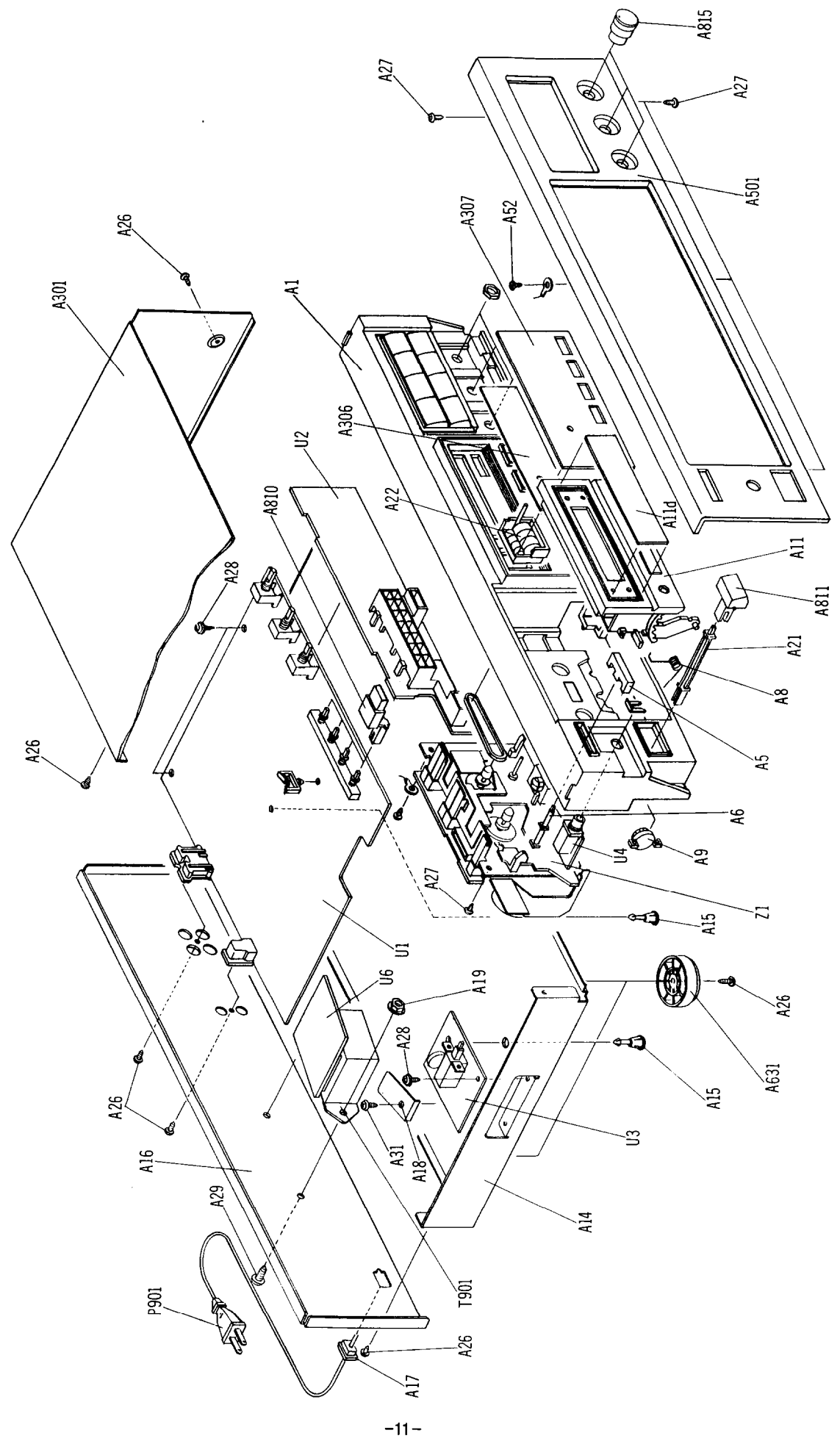
CHASSIS-EXPLODED NEW PART LIST

REF.NO.	PART NO.	DESCRIPTION
A1	27110511A	FRONT BRACKET AS
A5	28323758A	KNOB (EJ)
A6	27273056-1A	JOINT
A8	27180333-1	SPRING (T2)
A9	28400282	DAMPER
A11	28400504	CASSETTE LID AS
A11a	28400505	FRAME (CASSETTE)
A11b	28400502	CASSETTE LID
A11c	27180272	SPRING (CA)
A11d	28400503	WINDOW
A14	27100184C	CHASSIS
A15	27190266	HOLDER
A16	27121284	BACK PANEL (D)
	27121284-1	BACK PANEL (W)
	27121284-2	BACK PANEL (Q)
A17	27300750	BUSHING (CORD)
A18	27141351	BRACKET (ZE)
A19	86414010	FLANGE NUT FWN4×10FN
A21	27273122	JOINT (POW)
A22	24601234	TAPE COUNTER
A26	834430088	TAP-TIGHT SCREW 3TTS+8B(BC)
A27	833430080	TAP-TIGHT SCREW 3TTP+8P(BC)
A28	831130088	TAP-TIGHT SCREW 3TTW+8B
A29	830440089	TAP-TIGHT SCREW 4TTC+8C(BC)
A30	831430100	TAP-TIGHT SCREW 3TTW+10P(BC)
A31	838440089	TAP-TIGHT SCREW 4TTB+8C(BC)
A52	838130108	TAP-TIGHT SCREW 3TTB+10B
A301	28184388	TOP COVER
A306	28133227	BACK PLATE
A307	28191520A	CLEAR PLATE
A501	1N072121	FRONT PANEL
A631	27175219A	LEG
A810	28323759	KNOB (PUSH)
A811	28323241-1A	KNOB (POW)
A815	28323297	KNOB (VOL)
P901	253099C	ACCORD, AS-UC3 (D)
	253148	ACCORD, AS-CEE (W)
	253118	ACCORD, AS-SAA (Q)
T901	△ 2300474	NPT-1041D (D)
	△ 2300476	NPT-1041DG (W)
	△ 2300477	NPT-1041Q (Q)
S902	△ 25065123	NSS-1258P (W)
U1	1N072538-1	NAAF-3638-1
U2	1N072539-1	NADIS-3639-1
U3	1N072540-1	NASW-3640-1
U4	1N072541-1	NAETC-3641-1
U5	1N072542-1	NAETC-3642-1
U6	1N072542-1A	NAETC-3642-1A (W)
Z1	244129A	CASSETTE DECK MECAHNISM, NDM-121

NOTE: [D]: Only 120V models
[W]: Only 120V/220V models
[Q]: Only 240V models

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

CHASSIS-EXPLODED VIEW



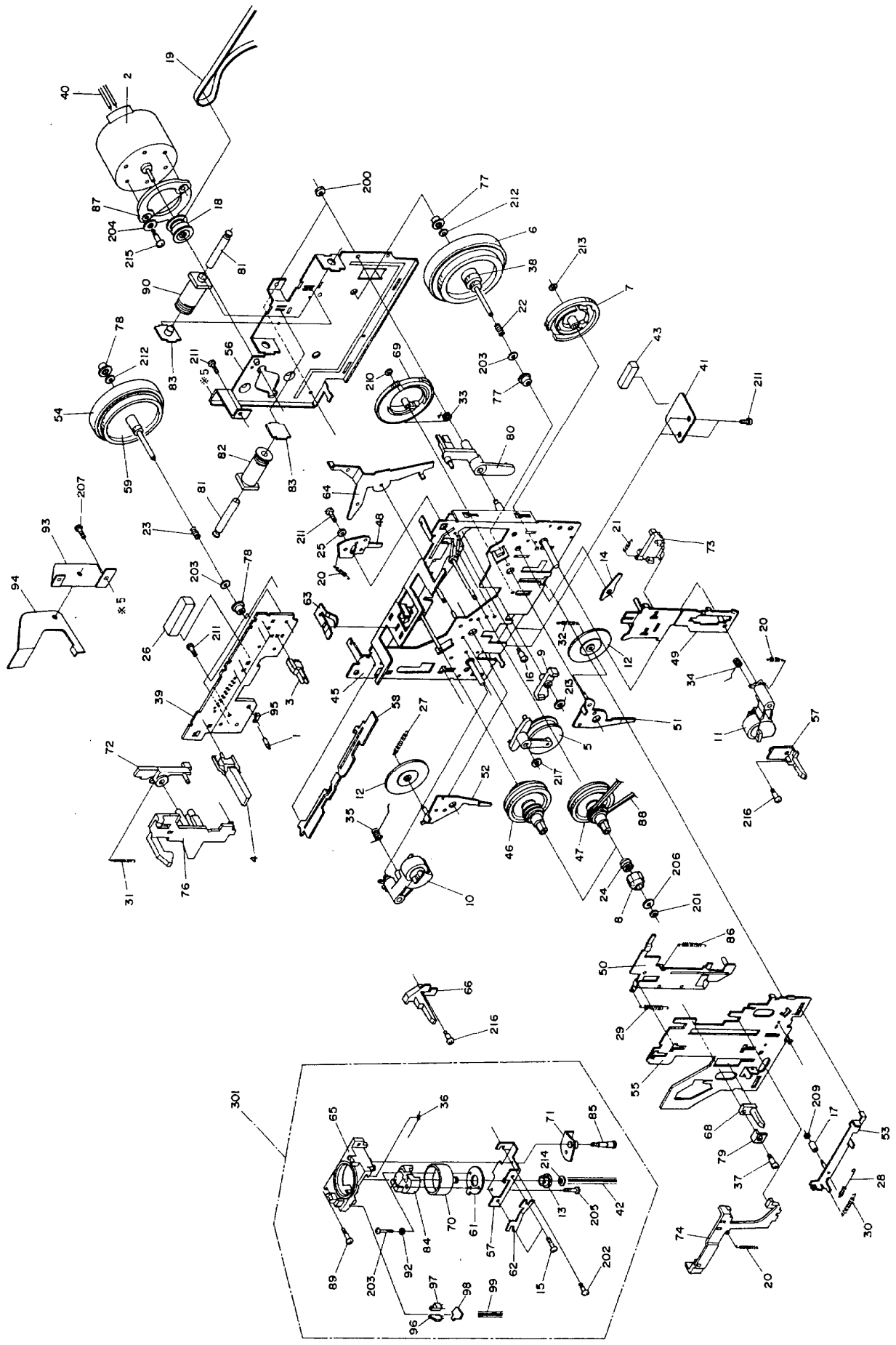
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TAPE MECHANISM PART LIST

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
1	24606374	HALL IC, DN6851A	69	24602508	GEAR (CAM)
2	24601251	CAPSTAN MOTOR AS (NO.2, NO.18)	70	24611409	HOLDER (HEAD)
3	24606375	LEAF SWITCH	71	24602509	GEAR (HEAD)
4	24606376	LEAF SWITCH	72	24607114	ARM (EJECT) 2
5	24602492	TENSION AS	73	24603375	LEVER (SELECT)
6	24602512	FLYWHEEL	74	24611410	BRAKE
7	24602493	CAM (GEAR)	75	24604097	TUBE
8	24602494	CAP (REEL)	76	24603376	LEVER (LATCH) L
9	24607104	ARM (FR)	77	24602510	METAL
10	24602495	PINCH ROLLER AS (L)	78	24602511	METAL
11	24602496	PINCH ROLLER AS (R)	79	24611411	CUSHION
12	24602497	GEAR	80	24607115	ARM (TRIGGER)
13	24602498	GEAR (H)	81	24606379	PLUNGER
14	24607105	ARM (QUE)	82	24606380	BOBBIN
15	24609021	SCREW	83	24606381	PLATE AS
16	24609022	SCREW	85	24609024	SCREW
17	24604095	COLLAR	86	24605736	SPRING
18	24602499	PULLEY	87	24604098	COLLAR
19	24602500	BELT	88	24602491	COUNTER BELT
20	24605719	SPRING	89	24609025	SCREW
21	24605720	SPRING	90	24606382	BOBBIN
22	24605721	SPRING	91	24609026	SCREW
23	24605722	SPRING	92	24605737	SPRING WASHER
24	24605723	SPRING	93	24607109	BRACKET (EJECT)
25	24604096	COLLAR	94	24607110	ARM (EJECT)
26	24611400	HOUSING	95	24611412	HOLDER
27	24605724	SPRING	96	24606383	DIODE
28	24605725	SPRING	97	24606384	DIODE
29	24605726	SPRING	98	24606385	PRINTED CIRCUIT BOARD
30	24605727	SPRING	99	24606386	WIRE
31	24605728	SPRING	200	863126	NUT N-2.6F
32	24605729	SPRING	201	893020	E WASHER E2
33	24605730	SPRING	202	833120067	TAP-TIGHT SCREW M2×6
34	24605731	SPRING	203	24611413	WASHER
35	24605732	SPRING	204	24611414	WASHER
36	24605733	SPRING	205	24609027	SCREW
37	24609023	SCREW	206	24611415	WASHER
38	24602501	GEAR (FLYWHEEL)	207	83112652	SCREW
39	24606389	PRINTED CIRCUIT BOARD	209	24611416	WASHER
40	24606390	LEAD WIRE	210	24611417	WASHER
41	24606377	PRINTED CIRCUIT BOARD	211	833120047	SCREW 2TTP+4S
42	24606378	LEAD WIRE	212	24611418	WASHER
43	24611399	HOUSING	213	24611419	WASHER
45	24611401	CHASSIS	214	24611420	WASHER
46	24602502	REEL AS (R)	215	24609028	SCREW
47	24602503	REEL AS (L)	216	24609029	SCREW
48	24607106	ARM AS (REVERSE)	217	24611421	WASHER
49	24603372	LEVER AS (FR)	301	24600092	HEAD AS
50	24603373	LEVER AS (PLAY)			
51	24607107	ARM AS (GEAR) R			
52	24607108	ARM AS (GEAR) L			
53	24603374	LEVER AS (HEAD)			
54	24602513	FLYWHEEL			
55	24611402	CHASSIS (HEAD)			
56	24611403	PLATE (FW)			
57	24611404	PLATE (AZIMUTH)			
58	24607111	ARM (SW)			
59	24602504	GEAR (FLYWHEEL)			
61	24607112	ARM (HEAD)			
62	24605734	SPRING (AZIMUTH)			
63	24605735	SPRING (CASSETTE)			
64	24607113	ARM (TRIGGER)			
65	24611405	FRAME (HEAD)			
66	24611406	GUIDE (CASSETTE) L			
67	24611407	GUIDE (CASSETTE) R			
68	24611408	GUIDE (CASSETTE)			

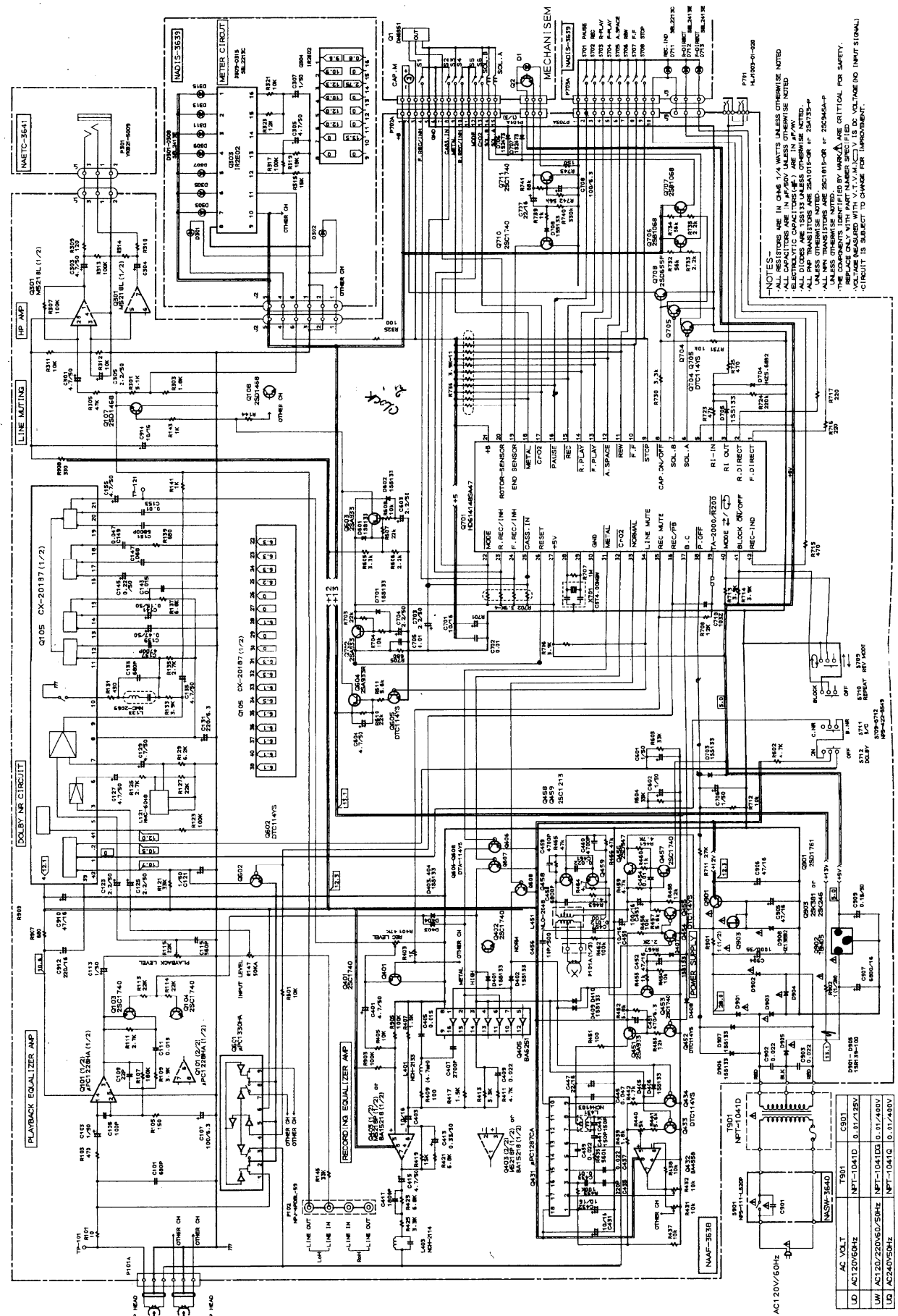
A B C D E F G

TAPE MECHANISM-EXPLODED VIEW



1 2 3 4 5

A B C D E F G



NOTES -
 ALL CAPACITORS ARE IN OHMS UNLESS OTHERWISE NOTED
 ALL ELECTROLYTIC CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE NOTED
 ALL PART TRANSISTORS ARE 2N4107-OR 2N4107-P UNLESS OTHERWISE NOTED
 ALL PART TRANSISTORS ARE 2N4107-OR 2N4107-P UNLESS OTHERWISE NOTED
 THE COMPONENTS IDENTIFIED BY MARKINGS ARE CRITICAL FOR SAFETY.
 VOLTAGE MEASURED WITH V.T.V.A.C. V IS DC VOLTAGE (NO INPUT SIGNAL)
 CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.