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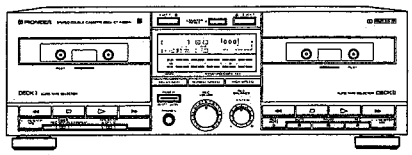
Service Manual



ORDER NO.
ARP1729

STEREO DOUBLE CASSETTE DECK

CT-X450W

CT−X450W HAS TWO VERSIONS :

Type	Power requirement	Export destination
HEM	AC220V, 240V	European continent
HB	AC220V, 240V	United Kingdom

*Change the power transformer.

- **This manual is applicable to the CT-X450W/HEM and HB types.**
- **Ce manuel pour le service comprend les explications en français de réglage.**
- **Este manual de servicio trata del método ajuste escrito en español.**

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1. EXPLODED VIEWS AND PARTS LIST

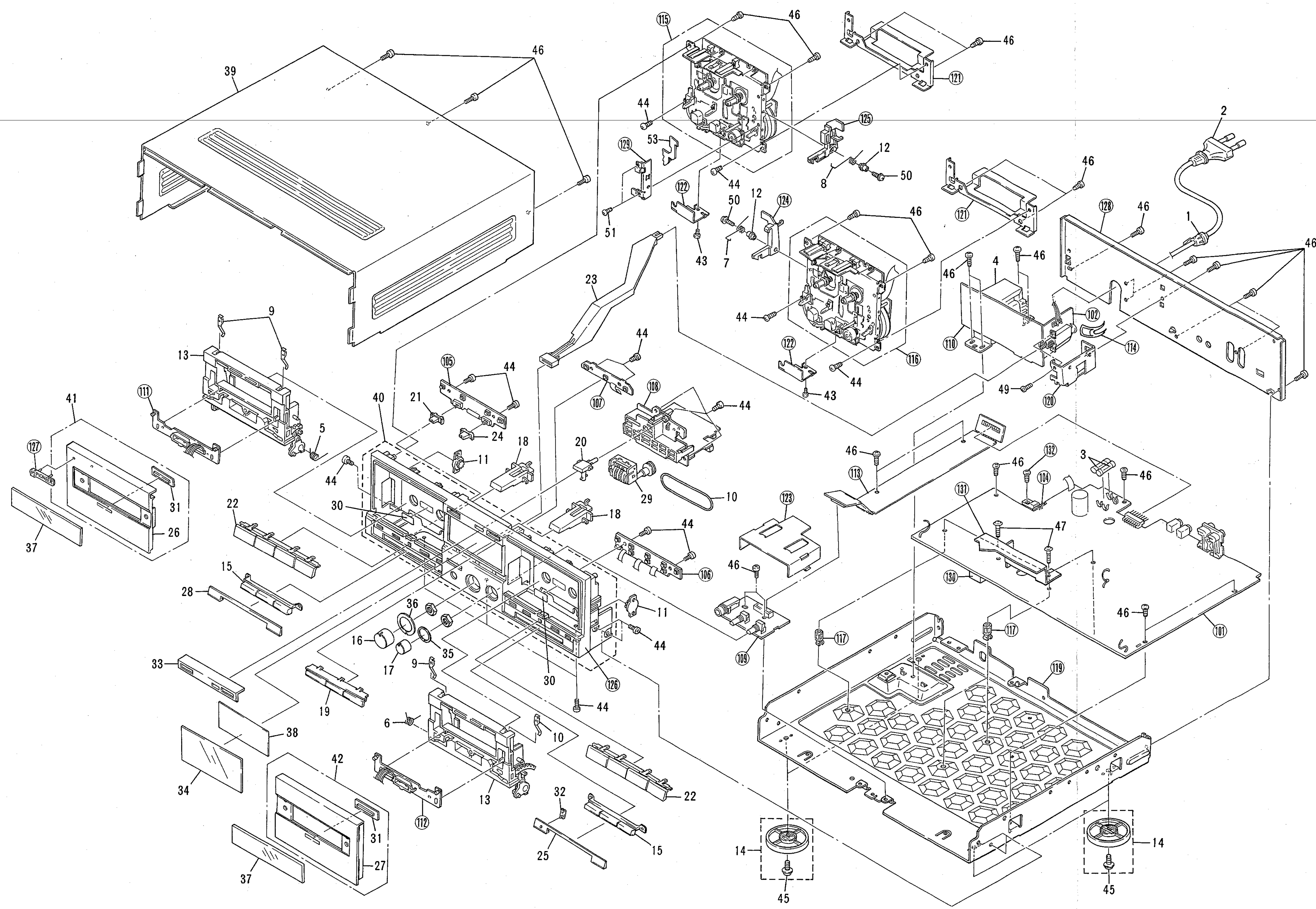
NOTES :

- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the impotance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

1.1 PARTS LIST OF EXTERIOR

Mark	No.	Part No.	Description
⚠	1	CM−22B	Strain relife
⚠	2	PDG1008	AC Power cord (HEM only)
⚠		PDG1021	AC Power cord (HB only)
⚠	3	REK−102	Fuse
⚠	4	RTT1096	T1 Power transformer (HEM only)
⚠		RTT1097	T1 Power transformer (HB only)
	5	RBH1187	Door spring (L)
	6	RBH1188	Door spring (R)
	7	RBH1201	Eject lever spring (L)
	8	RBH1202	Eject lever spring (R)
	9	RBK1004	Half pressure spring
	10	REB1050	Counter belt
	11	REC1013	Damper assembly
	12	RLA1119	Collar
	13	RNT1013	Door pocket
	14	AMR1459	Insulator assembly
	15	RAC1187	Function knob (B) (⏏, ⏸, ●)
	16	RAC1210	VR knob (A) (REC VOLUME)
	17	RAC1211	VR knob (B) (REC BALANCE)
	18	RAC1214	Knob (EJECT)
	19	RAC1233	Function knob (D) (RELAY/SKIP, NORMAL SPEED, HIGH SPEED)
	20	RAC1234	Counter reset knob (COUNTER RESET)
	21	RAC1236	Slide knob (A) (TIMER REC OFF PLAY−REPEAT)
	22	RAC1288	Function knob (A) (⏮, ■, ▶, ⏭)
	23	RAC1338	PWR knob (POWER)
	24	RAC1357	Slide knob (A) (DOLBY NR B OFF C)
	25	RAH1258	Operation display (R)
	26	RAH1479	Door panel (L)
	27	RAH1480	Door panel (R)
	28	RAH1481	Operation display (L)
	29	RAW1025	Counter
	30	REE−113	Remain display paper
	31	RNK1174	IND lens (A)
	32	RNK1175	IND lens (B)
	33	RAH1255	Front panel (upper)
	34	RAH1265	Meter lens
	35	RAH1266	VR panel (A)
	36	RAH1267	VR panel (B)
	37	RAH1366	Door lens
	38	RAH1482	Meter panel
	39	RXX1155	Bonnet
	40	RXX1188	Panel stay assembly
	41	RXX1189	Door panel (L) assembly
	42	RXX1190	Door panel (R) assembly
	43	BBZ20P040FMC	Screw
	44	BBZ30P060FZK	Screw
	45	IBZ30P100FCC	Screw
	46	BBZ30P080FMC	Screw
	47	IBZ30P150FCU	Screw
	48	PBZ30P060FMC	Screw
	49	PMA30P060FMC	Screw
	50	PSZ20P060FMC	Screw
	51	PCZ20P040FMC	Screw
	52	REC1044	Sheet
	53	RNK1452	Eject lock
	101		Main unit
	102		Power SW unit
	103		Pin jack unit
	104		Transistor unit
	105		Control SW (1) unit
	106		Control SW (2) unit
	107		Control SW (C) unit
	108		Display unit
	109		VR unit
	110		Transformer unit
	111		Door display (1) unit
	112		Door display (2) unit
	113		Connector unit
	114		Capacitor cover (A)
	115		Mechanism unit I
	116		Mechanism unit II
	117		PCB spacer
	118		.....
	119		Main chassis
	120		Power SW holder
	121		Mechanism mount plate
	122		Shield plate
	123		Shield case
	124		Eject lever (L)
	125		Eject lever (R)
	126		Panel stay
	127		Name plate
	128		Rear panel
	129		Eject bracket
	130		PCB spacer (2)
	131		PCB bracket
	132		Screw

Exterior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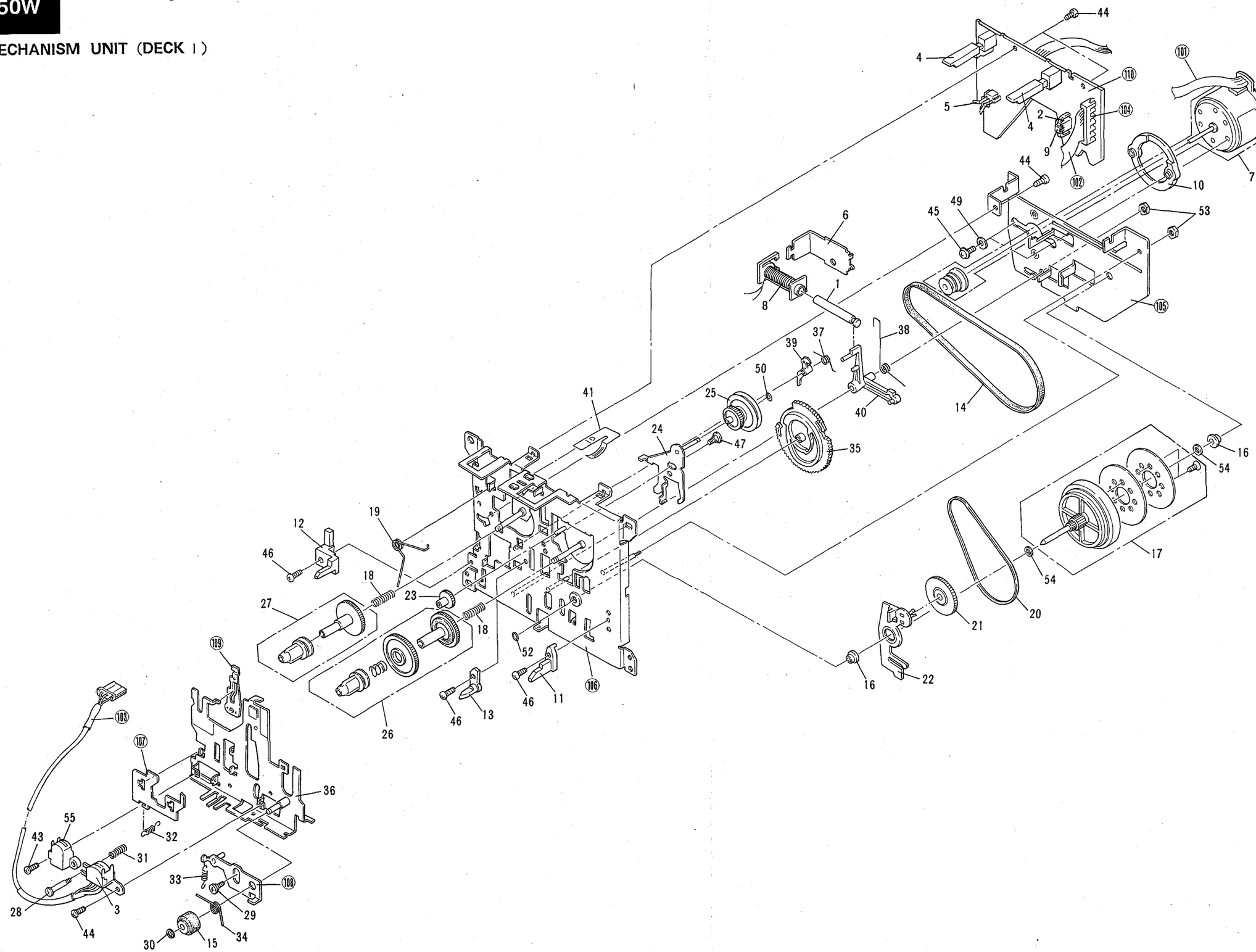
CT-X450W

1.2 MECHANISM UNIT (DECK I)



Parts List of Mechanism Unit (DECK I)

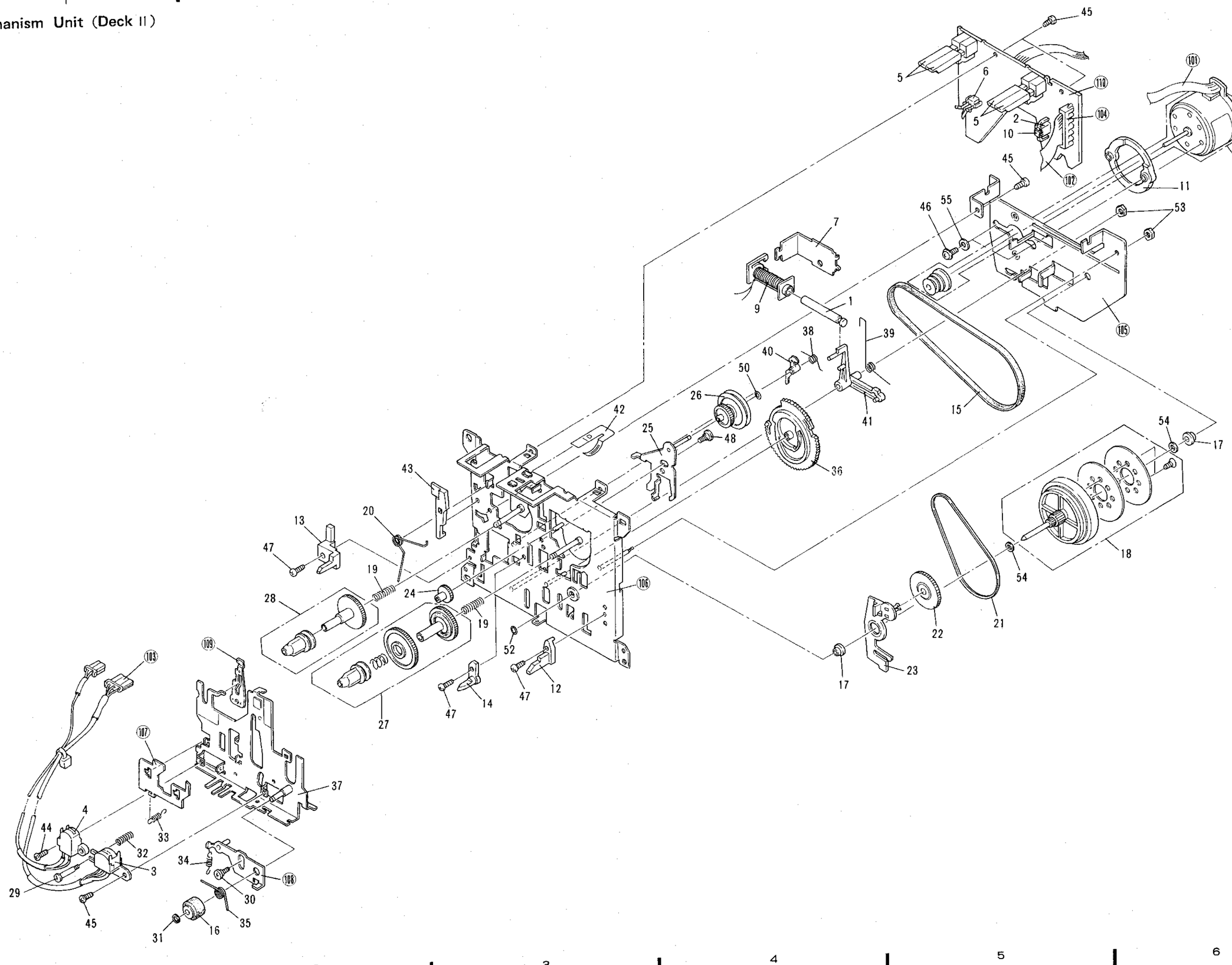
Mark	No.	Part No.	Description
	1	RLA1120	Plunger
	2	RNK1461	Holder
	3	RPB1026	R/P Head
	4	RSN1016	Leaf switch
	5	RSN1017	Leaf switch
	6	RXA1264	Yoke assembly
	7	RXM1026	Motor assembly
	8	RXP1009	Solenoid
	9	SPI31504BC	Photo sensor
	10	RNK1460	Spacer
	11	RNK1468	Guide (R)
	12	RNK1469	Guide (L)
	13	RNK1470	Guide
	14	REB1086	Main belt
	15	REB1088	Pinch roller
	16	RNG1035	Metal
	17	RXA1263	Frywheel assembly
	18	RBH1208	Spring
	19	RBH1209	Spring
	20	REB1087	Belt (FR)
	21	RNK1465	Gear (A)
	22	RNK1466	Play arm
	23	RNK1467	Gear (FF)
	24	RXA1266	FR arm assembly
	25	RXA1267	FR pully assembly
	26	RXA1268	T-Reel assembly
	27	RXA1269	S-Reel assembly
	28	RBA1070	Azimuth screw
	29	RBA1071	Screw
	30	RBF1030	Washer
	31	RBH1205	Azimuth spring
	32	RBH1210	Spring
	33	RBH1211	Spring
	34	RBH1212	Spring
	35	RNK1462	Assist gear
	36	RXA1270	Head chassis assembly
	37	RBH1206	Spring
	38	RBH1207	Spring
	39	RNK1463	Arm cue lock
	40	RNK1464	Trigger arm
	41	RBK1026	Cassette spring
	42		.....
	43	BCZ20P060FMC	Screw
	44	PCZ20P040FMC	Screw
	45	RBA1028	Screw
	46	RBA1029	Screw
	47	RBA1072	Screw
	48		.....
	49	RBF1027	Washer
	50	RBF1028	Washer
	51		.....
	52	RBF1031	Washer
	53	RBN1001	Nut
	54	WA21D040D013	Washer
	55	RNK1458	Dummy head

Mark	No.	Part No.	Description
	101		Motor wire
	102		Wire 13P
	103		Connector assembly
	104		Cable holder
	105		Motor bracket
	106		Chassis assembly
	107		Select lever
	108		Assist arm assembly
	109		Arm switch
	110		P.C. Board

1.3 Parts List of Mechanism Unit (DECK II)

Mark	No.	Part No.	Description
	1	RLA1120	Planger
	2	RNK1461	Holder
	3	RPB1026	R/P Head
	4	RPB1027	E Head
	5	RSN1016	Leaf switch
	6	RSN1017	Leaf switch
	7	RXA1264	Yoke assembly
	8	RXM1026	Motor assembly
	9	RXP1009	Solenoid
	10	SPI31504BC	Photo sensor
	11	RNK1460	Spacer
	12	RNK1468	Guide (R)
	13	RNK1469	Guide (L)
	14	RNK1470	Guide
	15	REB1086	Main belt
	16	REB1088	Pinch roller
	17	RNG1035	Metal
	18	RXA1263	Frywheel assembly
	19	RBH1208	Spring
	20	RBH1209	Spring
	21	REB1087	Belt (FR)
	22	RNK1465	Gear (A)
	23	RNK1466	Play arm
	24	RNK1467	Gear (FF)
	25	RXA1266	FR arm assembly
	26	RXA1267	FR pully assembly
	27	RXA1268	T-Reel assembly
	28	RXA1269	S-Reel assembly
	29	RBA1070	Azimuth screw
	30	RBA1071	Screw
	31	RBF1030	Washer
	32	RBH1205	Azimuth spring
	33	RBH1210	Spring
	34	RBH1211	Spring
	35	RBH1212	Spring
	36	RNK1462	Assist gear
	37	RXA1270	Head chassis assembly
	38	RBH1206	Spring
	39	RBH1207	Spring
	40	RNK1463	Arm cue lock
	41	RNK1464	Trigger arm
	42	RBK1026	Cassette spring
	43	RNK1451	Eject lock (L)
	44	BCZ20P060FMC	Screw
	45	PCZ20P040FMC	Screw
	46	RBA1028	Screw
	47	RBA1029	Screw
	48	RBA1072	Screw
	49		.....
	50	RBF1028	Washer
	51		.....
	52	RBF1031	Washer
	53	RBN1001	Nut
	54	WA21D040D013	Washer
	55	RBF1027	Washer
	101		Motor wire
	102		Wire 14P
	103		Connector assembly
	104		Cable holder
	105		Motor bracket
	106		Chassis assembly
	107		Select lever
	108		Assist arm assembly
	109		Arm switch
	110		P.C. Board

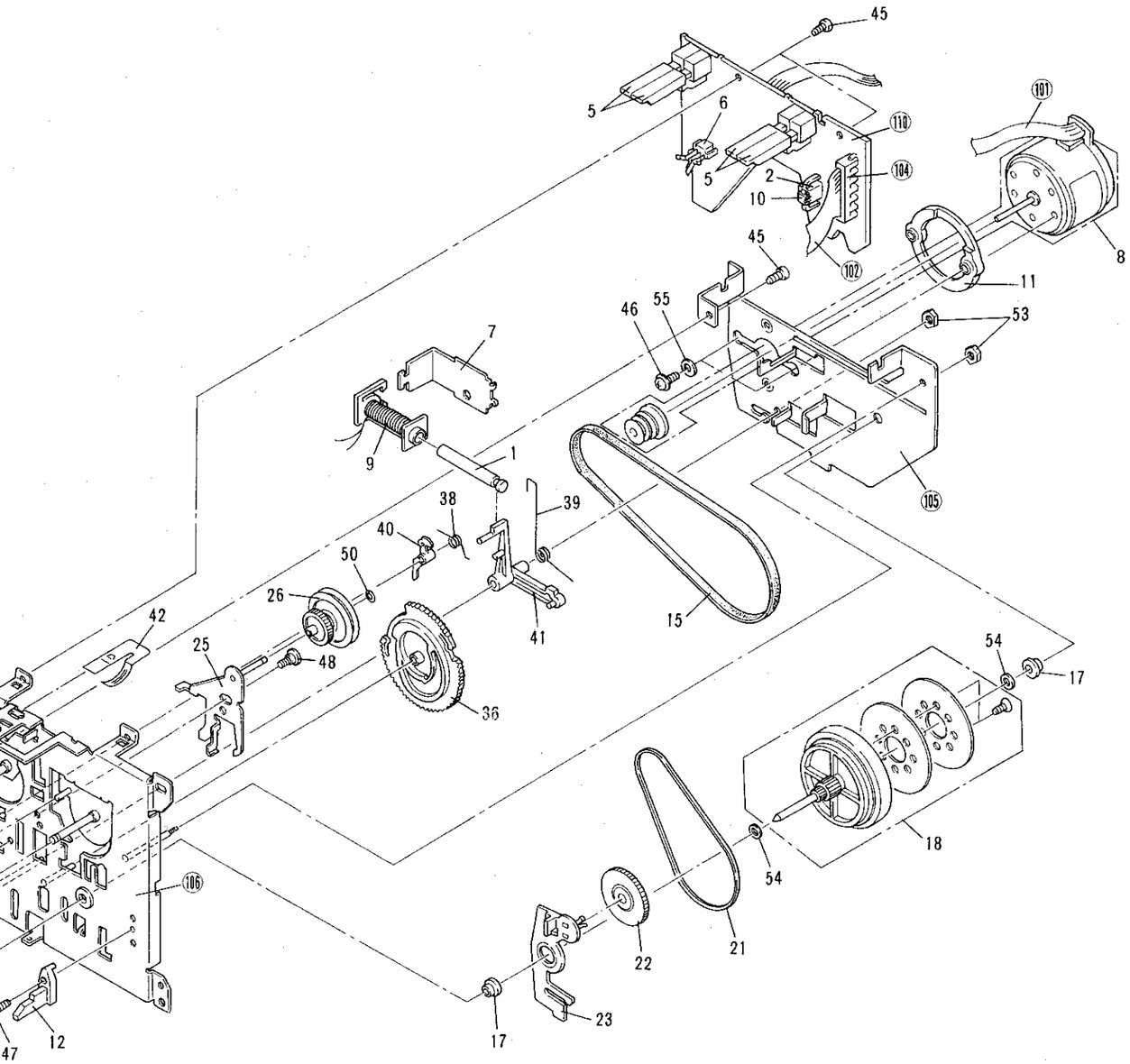
Mechanism Unit (Deck II)



2. PA

Parts Lis

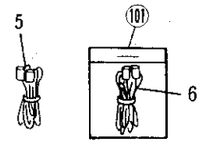
Mark N

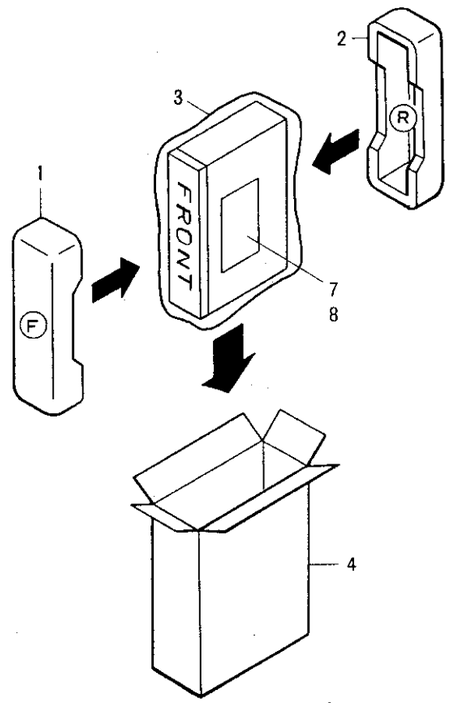


2. PACKING

Parts List

Mark	No.	Part No.	Description
	1	RHA1018	Pad (A)
	2	RHA1019	Pad (B)
	3	RHC1002	Styrene paper
	4	RHG1103	Packing case
	5	PDE-319	Connection cord (Mini)
	6	RDE-010	Connection cord
	7	RRB1041	Operating instructions (English)
	8	RRD1061	Operating instructions (French/German/Italian/ Dutch/Swedish/Spanish/ Portuguese)
	101		Connection cord assembly



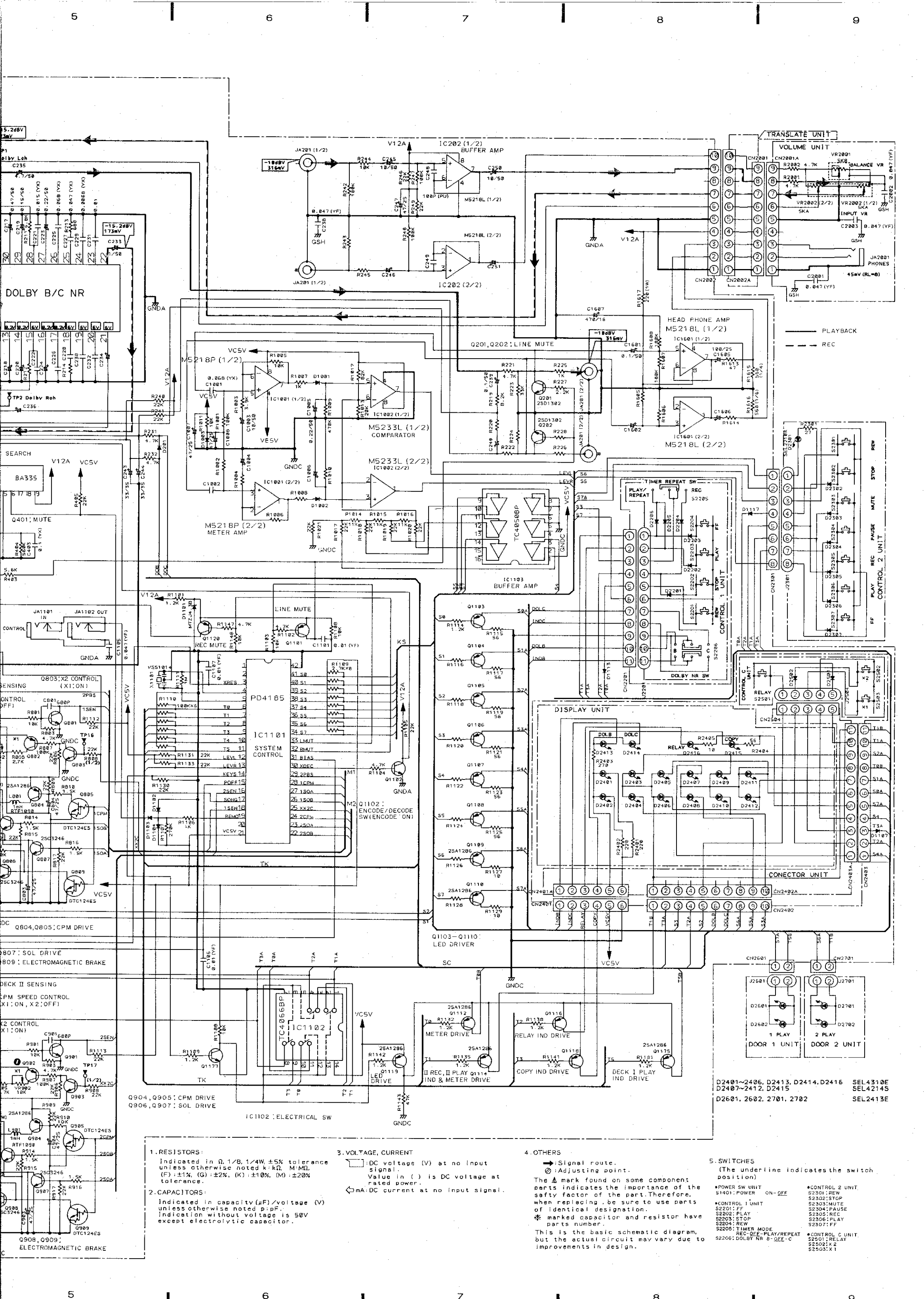


3. SCHEMATIC DIAGRAM

Voltage Selection

1. Disconnect the AC power cord.
2. Remove the Bonnet case.
3. Change the power transformer.
4. Stick the line voltege label on the rear panel.

Part No.	Description
AAX-193	220v label
AAX-192	240V label



1. RESISTORS:
Indicated in Ω, 1/8, 1/4W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%, (M) : ±20% tolerance.

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF.
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT
□ : DC voltage (V) at no input signal.
Value in ( ) is DC voltage at rated power.
⇦mA : DC current at no input signal.

4. OTHERS
→ : Signal route.
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safty factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitor and resistor have parts number.
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES
(The underline indicates the switch position)

•POWER SW UNIT
S1401 : POWER ON-OFF

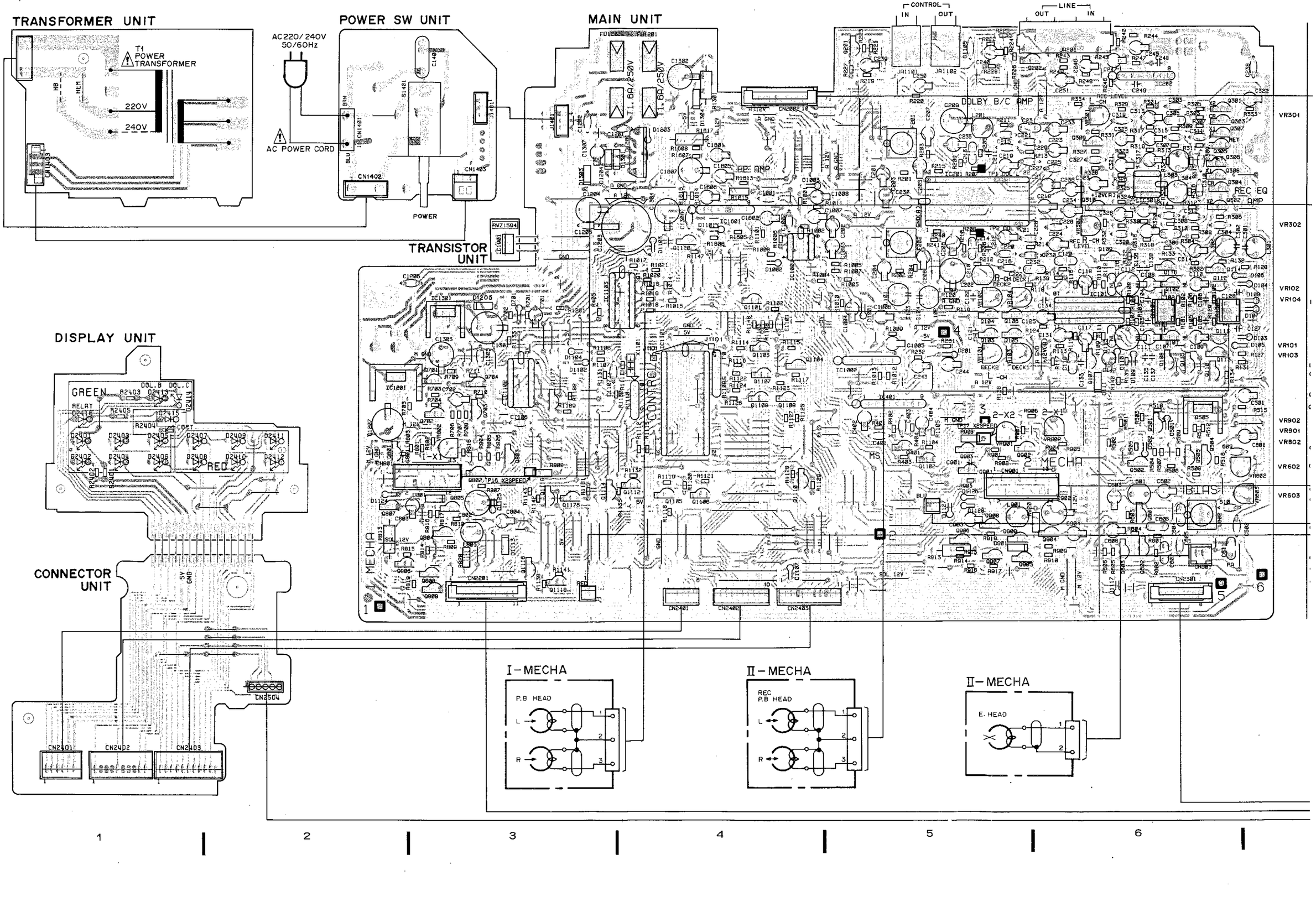
•CONTROL 1 UNIT
S2201 : FF
S2202 : PLAY
S2203 : STOP
S2204 : REW
S2205 : TIMER MODE REC-OFF-PLAY/REPEAT
S2206 : DOLBY NR B-OFF-C

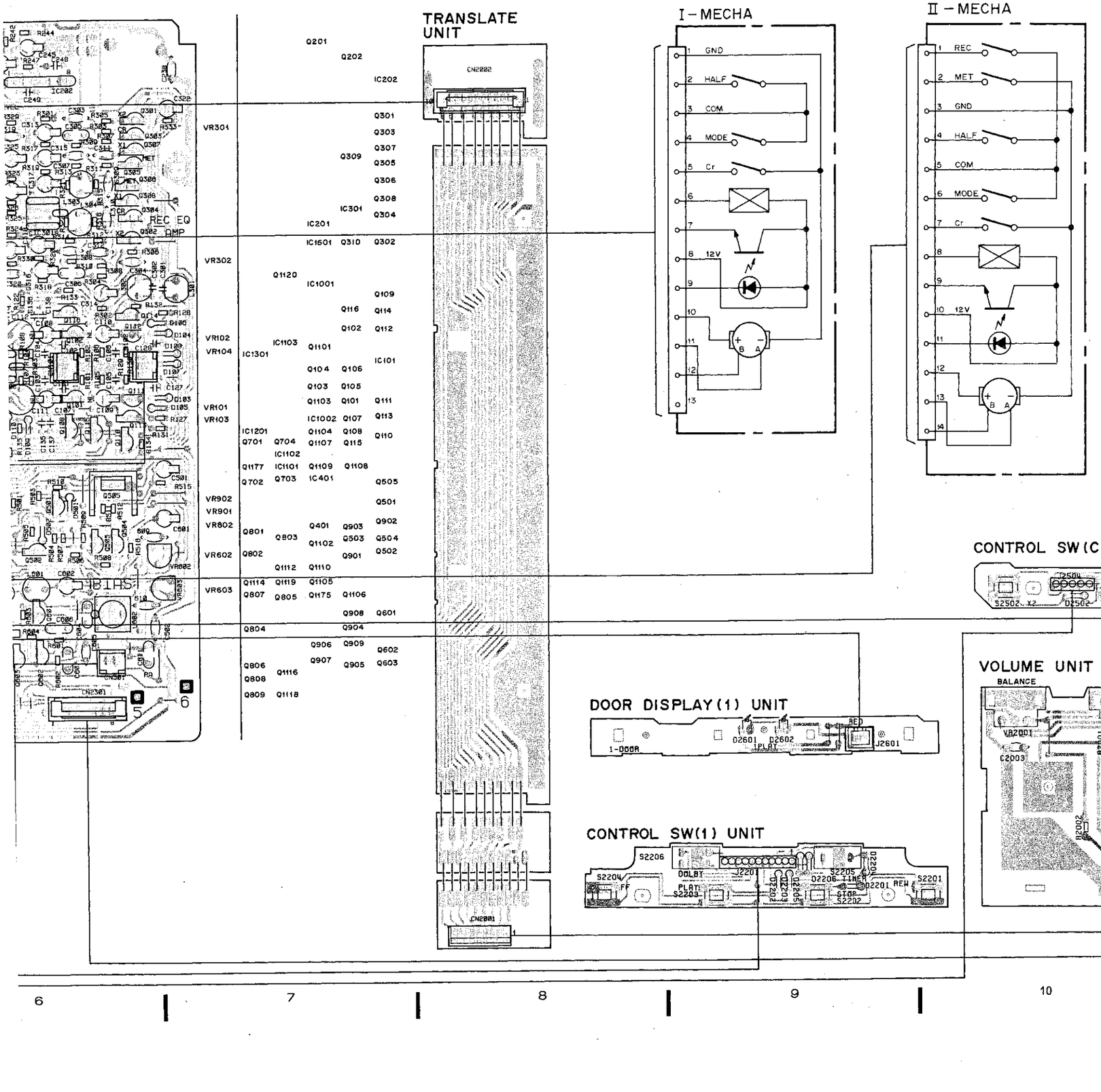
•CONTROL 2 UNIT
S2301 : REW
S2302 : STOP
S2303 : MUTE
S2304 : PAUSE
S2305 : REC
S2306 : PLAY
S2307 : FF

•CONTROL C UNIT
S2501 : RELAY
S2502 : X2
S2503 : X1

4. P.C. BOARDS CONNECTION DIAGRAM

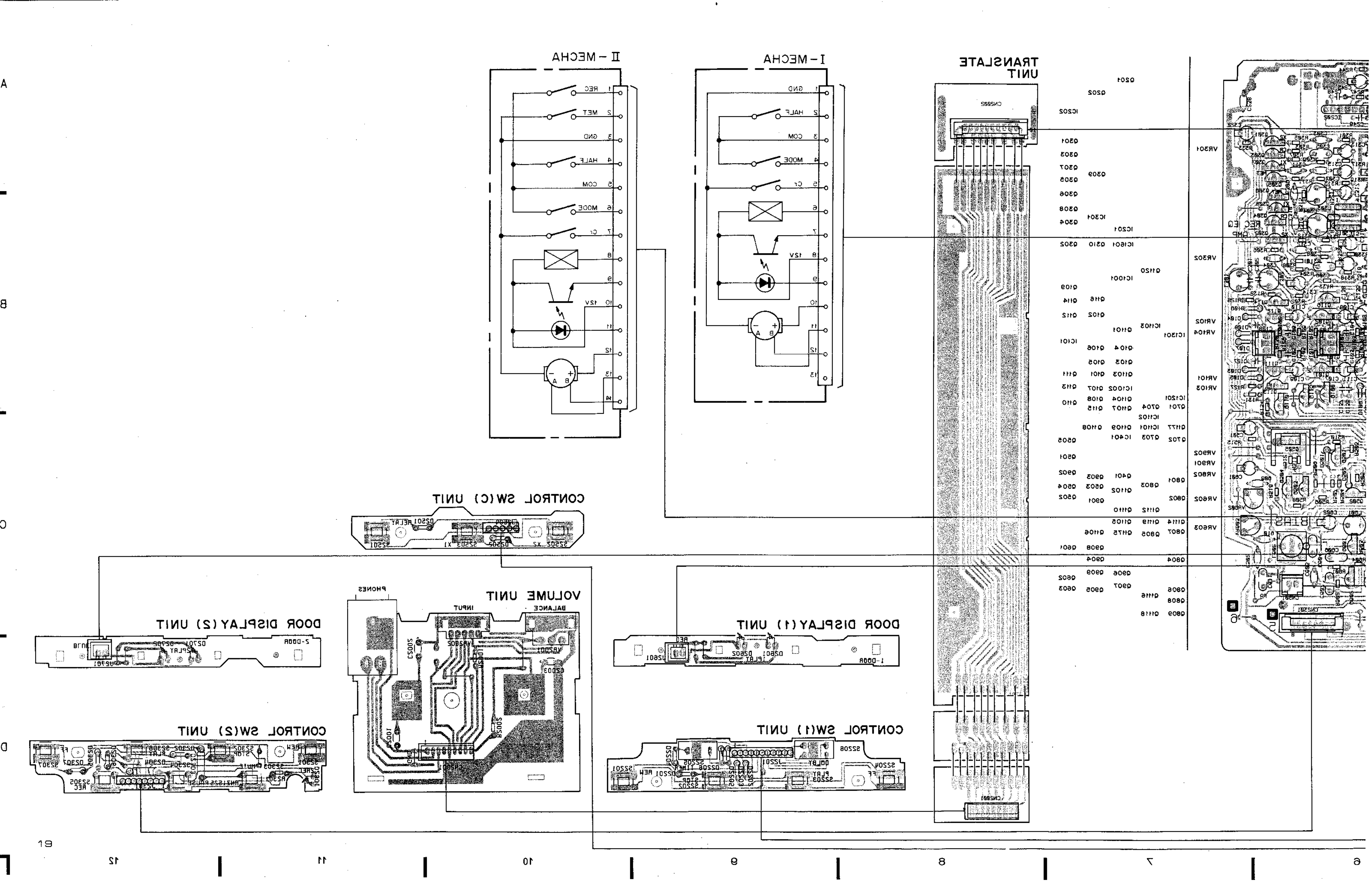
- View from component side





P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
		FET			Mylar capacitor
		Diode	SA		Styrol capacitor
			NP		Electrolytic capacitor (Non polarized)
			NL		Electrolytic capacitor (Noiseless)
		Zenner diode			Electrolytic capacitor (Polarized)
					Electrolytic capacitor (Polarized)
		LED			Power capacitor
		Varactor			Semi-fixed resistor
		Tact switch			Resistor array
					Resistor
		Inductor			
		Coil			Resonator
		Transformer			Thermistor
		Filter			

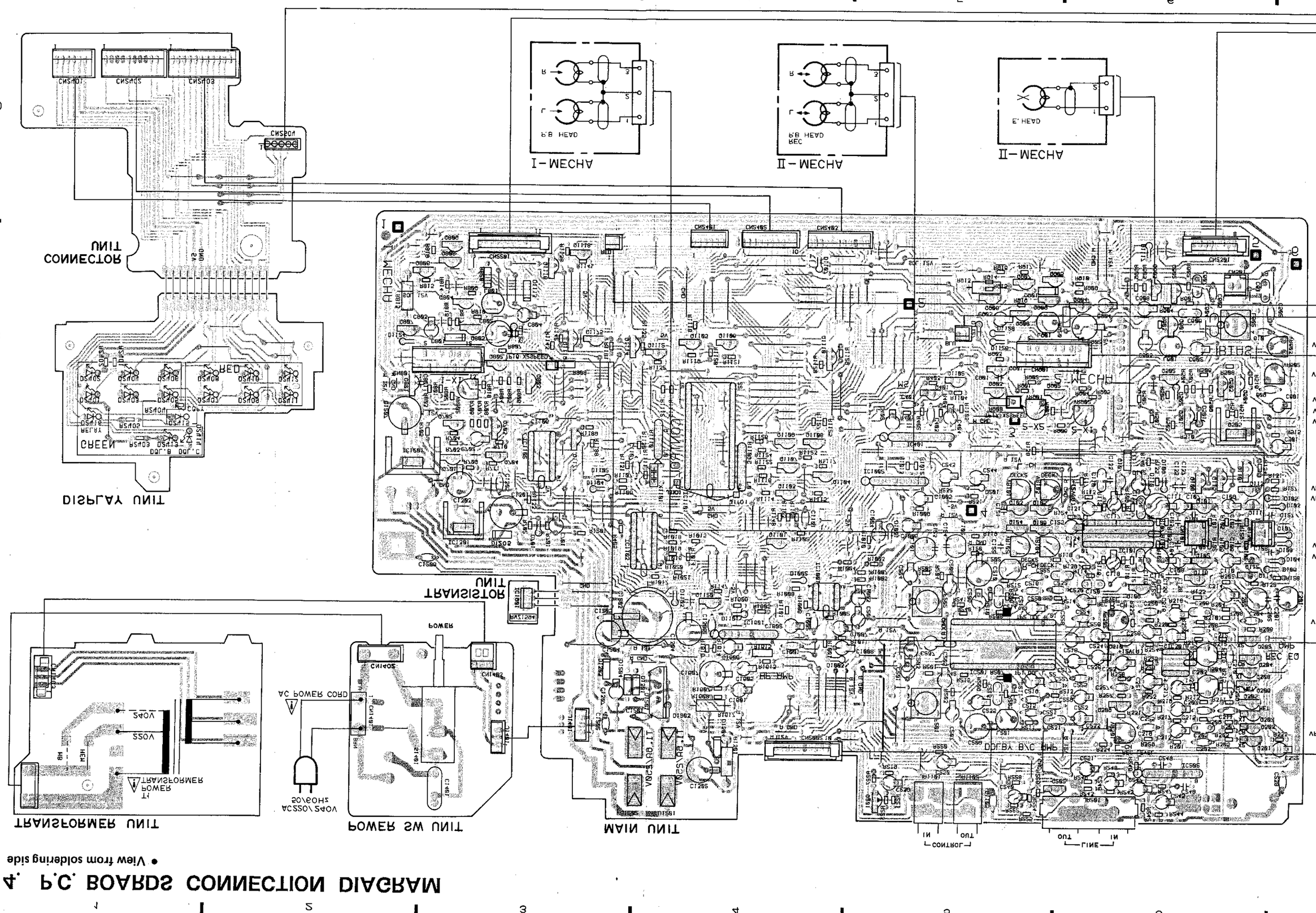
1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.



I-MECHA
II-MECHA
TRANSLATE UNIT
CONTROL SW(C) UNIT
VOLUME UNIT
DOOR DISPLAY(2) UNIT
DOOR DISPLAY(1) UNIT
CONTROL SW(2) UNIT
CONTROL SW(1) UNIT

4. P.C. BOARDS CONNECTION DIAGRAM

• View from soldering side



5. ELECTRICAL PARTS LIST

NOTES :

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the impotance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω	56×10^{1}	561	RD1/4PS 5 6 1 J
47k Ω	47×10^{3}	473	RD1/4PS 4 7 3 J
0.5 Ω	0R5		RN2H 0 R 5 K
1 Ω	010		RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω	562×10^{1}	5621	RN1/4SR 5 6 2 1 F

Miscellaneous Parts

P. C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Main unit	
	Power SW unit	
	Pin jack unit	
	Transistor unit	
	Control SW (1) unit	
	Control SW (2) unit	
	Control SW (C) unit	
	Display unit	
	Volume unit	
	Transformer unit	
	Door display (1) unit	
	Door display (2) unit	
	Connector unit	

OTHERS

Mark	Symbol & Description	Part No.
⚠	Strain relife	CM-22B
⚠	AC Power cord	PDG1008 (HEM only)
⚠	AC Power cord	PDG1021 (HB only)
⚠	FU1201, FU1202 Fuse (1.6A)	REK-102
⚠	T1 Power transformer	RTT1096 (HEM only)
⚠	T1 Power transformer	RTT1097 (HB only)
	R/P Head	RPB1026
	E Head	RPB1027
	Leaf switch	RSN1016
	Leaf switch	RSN1017
	Yoke assembly	RXA1264
	Motor assembly	RXM1026
	Solenoid	RPX1009
	Photo sensor	SP131504BC

Main Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC401	BA335
	IC101	CXA1115BP
	IC201	CX20187
	IC202, IC1601	M5218L
	IC301, IC1001	M5218P
	IC1002	M5233L
⚠	IC1301	NJM78M05FA
⚠	IC1201	NJM7812FA
	IC1101	PD4185A
	IC1103	TC4050BP
	IC1102	TC4066BP
	Q110	DTA124ES
	Q103-Q106	DTC114ES
	Q301-Q308	DTC114TS
	Q101, Q102, Q107-Q109, Q115, Q116, Q805, Q809, Q905, Q909	DTC124ES
	Q804, Q904, Q1109, Q1110, Q1112, Q1114, Q1119, Q1175	2SA1286
	Q501, Q502, Q701, Q704, Q802, Q902, Q1101, Q1103-Q1108, Q1116, Q1118, Q1120	2SA1309A
	Q601, Q602	2SC3243
	Q806-Q808, Q906-Q908	2SC3246
	Q113, Q114, Q401, Q503, Q504, Q702, Q703, Q801, Q803, Q901, Q903, Q1102, Q1177	2SC3311A
	Q201, Q202, Q309, Q310, Q603	2SD1302
⚠	Q505	2SD1796
	Q111, Q112	2SK373
	D1101	MTZJ4.3B
	D501	MTZ3.6A
⚠	D1304	MTZ5.1B
⚠	D1201	RB-152LF
	D801, D901	1SS252
⚠	D1301, D1303	1SS252
	D103-D111, D201, D502, D701, D1001-D1003, D1102-D1104, D1107, D1113, D1117, D1124-D1128, D1203, D1204	1SS254
⚠	D1205	1SR35-100A

COILS AND FILTER

Mark	Symbol & Description	Part No.
	L601 Radial inductor	LFA121K
	L602 Oscillator coil	RTD1017
	F201, F202 MPX filter	RTF1059
	L801, L901 Coil (1mH)	RTF1090
	L101, L102 Coil (5.6mH)	RTF1099
	L301, L302 Coil (10mH)	RTF1102
	L201, L202 Coil (19mH)	RTF1111
	L303, L304 Coil (12mH)	RTF1124

CAPACITORS

Mark	Symbol & Description	Part No.
	C609, C610	CCCSL101K500
	C127, C128	CCPUSL100J50
	C107–C110	CEANL100M16
	C111, C112	CEANL330M16
	C239, C240, C402, C1601, C1602	CEASR10M50
	C219, C220, C315, C316	CEASR15M50
	C223, C224, C1005, C1006	CEASR22M50
	C217, C218, C404	CEASR47M50
	C201–C204, C207, C208, C233, C234, C322, C325, C326	CEAS010M50
	C205, C206, C245, C246, C250, C251, C317, C318, C608, C1003, C1004, C1307	CEAS100M50
	C1204, C1605, C1606	CEAS101M25
	C1303	CEAS102M16
	C1302, C1304	CEAS221M16
	C1301, C1207	CEAS222M16
	C243, C244, C501, C601–C603	CEAS330M35
	C209, C210, C802, C902	CEAS331M16
	C1203	CEAS332M35
	C117, C118, C142, C235, C236, C313, 314, C701	CEAS4R7M50
	C125, C131, C237, C247, C321, C323, C702, C803, C804, C903, C904, C1007, C1008	CEAS470M25
	C1607	CEAS471M16
	C113, C116, C119, C120, C231, C232	CFTXA103J50
	C305, C306	CFTXA123J50
	C604	CFTXA223J50
	C213, C214, C606, C607	CFTXA332J50
	C403	CGCYX104K25
	C221, C222	CGCYX153K25
	C307, C308	CGCYX183K25
	C309, C310, C319, C320	CGCYX272K25
	C215, C216, C303, C304, C605	CGCYX472K25
	C227, C228, C401	CGCYX473K25
	C311, C312	CGCYX562K25
	C229, C230	CGCYX682K25
	C225, C226, C1001, C1002	CGCYX683K25
	C327, C1101, C1106, C1107, C1205, C1305, C1306	CKCYF103Z50
	C238, C502, C1105, C1201, C1202, C1206	CKCYF473Z50
	C135–C138, C248, C249	CKPUYB101K50
	C121, C122, C301, C302	CKPUYB221K50
	C103, C104	CKPUYB331K50
	C123, C124	CKPUYB391K50
	C101, C102	CKPUYB561K50
	C133, C134, C211, C212, C801, C901	CKPUYB681K50
	C105, C106	CKPUYB821K50
	C611	CQPA822J100

RESISTORS

Mark	Symbol & Description	Part No.
	R1110	RA6T104J
	R1109	RA8T272J
	R1617	RS1LF221J
⚠	R1301	RS2LMF221J
	R813, R913	RS2LMF390J
	VR602, VR603 Semi-fixed (100k)	VRTB6VS104
	VR101–VR104, VR301, VR302 Semi-fixed (22k)	VRTB6VS223
	VR802, VR902 Semi-fixed (10k)	VRTG6VS103
	VR901 Semi-fixed (4.7k)	VRTS6VS472
	R808, R908	RD½LF223J
	R820, R920, R1615	RD¼PM□□□J
	Other resistors	RD⅙PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA201 Pin jack 4P (LINE IN/OUT)	RKB1001
	JA1101, JA1102 Jack φ 3.5 (CONTROL IN/OUT)	RKN-071
	CN2401 Connector 6P	RKP1281
	CN2402 Connector 10P	RKP1283
	CN2403 Connector 11P	RKP1285
	X1101 Ceramic resonator	VSS1014

Power SW Unit

SWITCH

Mark	Symbol & Description	Part No.
⚠	S1401 Push switch (POWER)	RSA-063

CAPACITOR

Mark	Symbol & Description	Part No.
⚠	C1401 (10000P/AC400V)	RCG-009

Pin Jack Unit

OTHER

Mark	Symbol & Description	Part No.
	CN2001 Connector 9P	RKP1279

Transistor Unit

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
⚠	IC1901	NJM7812FA

Control SW (1) Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D2201 – D2206	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
	S2201 – S2204 Tact switch (▶▶, ▶, ■, ◀◀)	RSG – 155
	S2206 Slide switch (DOLBY NR B OFF C)	RSH1001
	S2205 Slide switch (TIMER REC OFF PLAY – REPEAT)	RSH1014

Control SW (2) Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D2301	SEL2210R
	D2302 – D2307	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
	S2301 – S2307 Tact switch (◀◀, ■, O, II, ●, ▶, ▶▶)	RSG – 155

RESISTOR

Mark	Symbol & Description	Part No.
	R2301	RD 1/6 PM270J

Control SW (C) Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D2501, D2502	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
	S2501 – S2503 Tact switch (RELAY/SKIP, HIGH SPEED, NORMAL SPEED)	RSG – 155

Display Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D2407 – D2412, D2415	SEL4214S
	D2401 – D2406, D2413, D2414, D2416	SEL4310E

RESISTORS

Mark	Symbol & Description	Part No.
	All resistors	RD 1/6 PM□□□J

Volume Unit

CAPACITORS

Mark	Symbol & Description	Part No.
	C2001 – C2003	CKCYF473Z50

RESISTORS

Mark	Symbol & Description	Part No.
	VR2002 Variable resistor (5kA×2) (REC BALANCE)	RCV1037
	VR2001 Variable resistor (5kB) (REC VOLUME)	RCV1038
	R2001, R2002	RD 1/6 PM472J

OTHERS

Mark	Symbol & Description	Part No.
	JA2001 Jack (PHONES)	RKN1002
	CN2001 Connector	RKP1278

Transformer Unit

There is no supply part in this unit.

Door Display (1) Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D2601, D2602	SEL2413E

Door Display (2) Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D2701, D2702	SEL2413E

Connector Unit

OTHERS

Mark	Symbol & Description	Part No.
	CN2401 Connector 6P	RKP1280
	CN2402 Connector 10P	RKP1282
	CN2403 Connector 11P	RKP1284

6. ADJUSTMENTS

6.1 MECHANICAL ADJUSTMENT

1. Tape Speed Adjustment and Check						
No.	Deck	Mode	Test tape	Adjusting points	Specifications/Ratings (playback frequency)	Remarks
1	I	Normal speed PLAY	STD-301 (3 kHz)	After playing back for 1 minute, ground TP16.		
2		Double speed PLAY		check	6000 Hz ±600 Hz	
3		Normal speed PLAY		After checking, disconnect TP16 from ground.		
4	II			After playing back for 1 minute, ground TP17.		
5		Double speed PLAY		VR901	Within ±10Hz of step 2 (deck I) check value.	
6		Normal speed PLAY		After checking, disconnect TP17 from ground.		
7				VR902	3000 Hz ±5 Hz	
8	I			VR802	Within ±5 Hz of step 7 (deck II) adjustment value.	

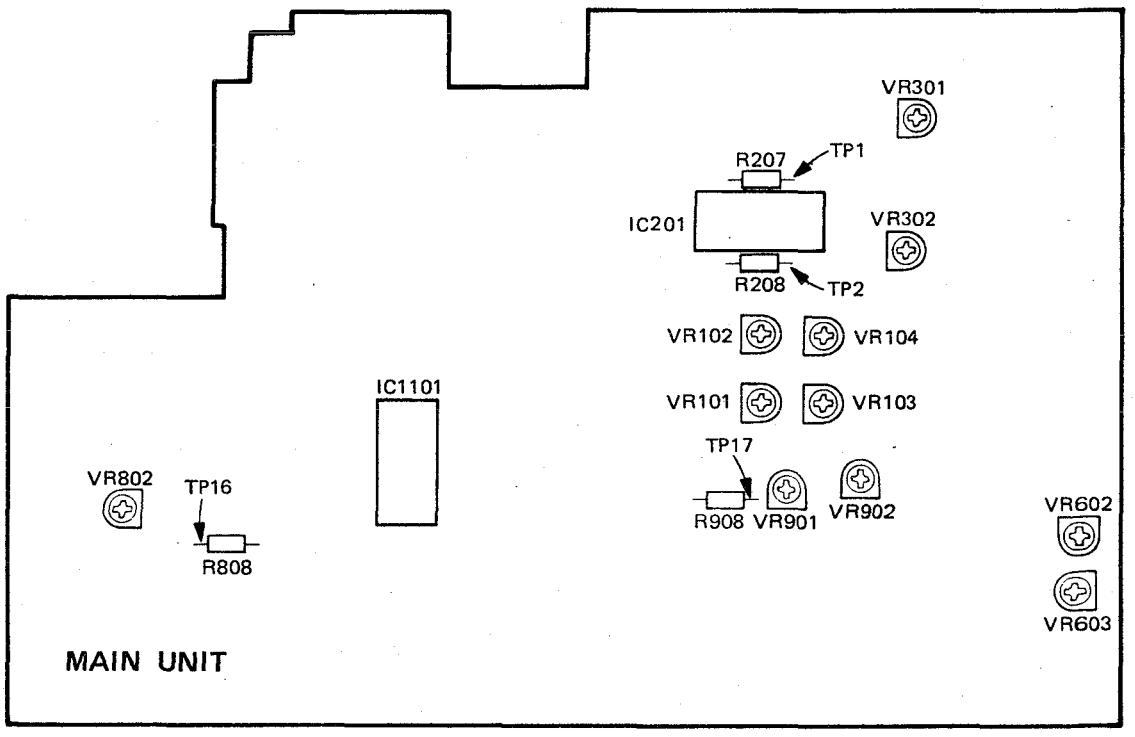


Fig. 6-1 Adjusting points

6.2 ELECTRICAL ADJUSTMENTS

Adjustment Conditions

1. The mechanical adjustments must be completed first.
2. The head must be cleaned and demagnetized.
3. Turn power on allow the deck to warm up for at least a few minutes before commencing any electrical adjustments.
4. The reference signal is 0dBv=1Vrms.
5. Connect a 50 kilo-ohm (or between 47 to 52 kilo-ohm) load resistance to the OUTPUT terminals.
6. Unless otherwise specified, the switches listed below are left in the positions indicated.
   DOLBY NR : OFF
   TAPE SELECTOR : NORM

Test Tapes

STD-331B : Playback adjustments (See Fig. 6-2)
STD-630 : NORMAL blank tape
STD-620 : CrO_2 blank tape
STD-610 : METAL blank tape

List of Adjustments

Playback sections

1. Head azimuth adjustment.
2. Playback level adjustment.

Recording sections

1. Recording bias adjustment.
2. Recording level adjustment.
3. Level meter check.

NOTE: This unit has an automatic tape selection feature.

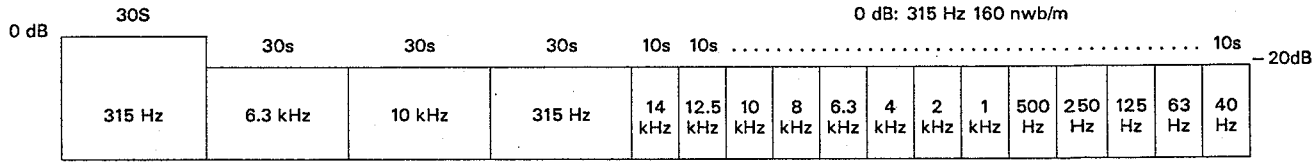


Fig. 6-2. Constants of the test tape STD-331B

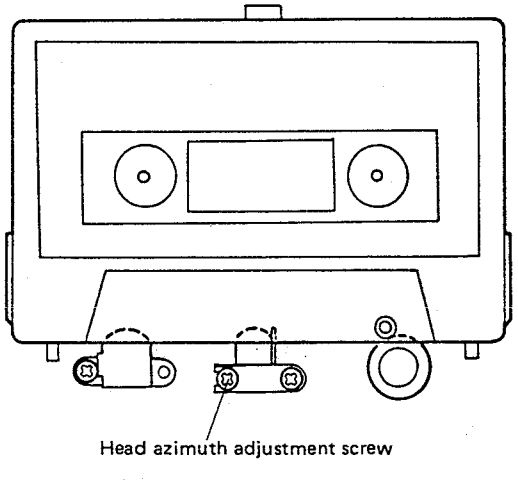


Fig. 6-3. Head azimuth adjustment

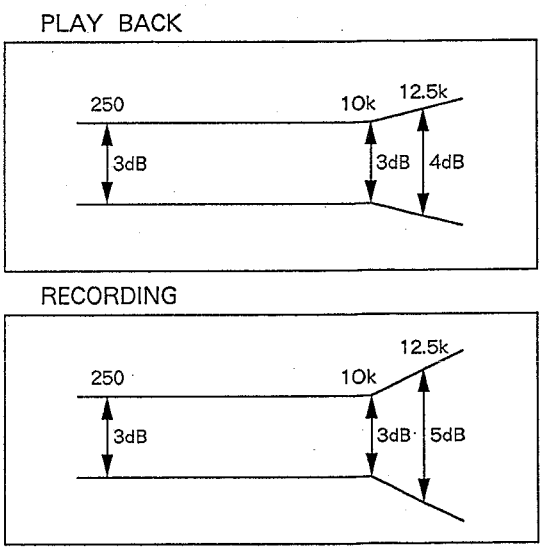


Fig. 6-4. Allowable playback frequency response zone

PLAYBACK SECTION

1. Head Azimuth Adjustment

• Turn VR103, 104 (Deck I) or VR101, 102 (Deck II) to mechanical center positions.

No.	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1.	PLAY	Play the 10 kHz/−20 dB section of STD-331B test tape.	Head azimuth adjustment screw. (See Fig. 6-3)	LINE OUT	Maximum playback signal level.	
2.	STOP	Lock the screw with screw lock after completing adjustment.				

2. Playback level Adjustment

• This adjustment determines the DOLBY NR level, and must be performed with great care.

No.	Mode	Input signal & test tape	Adjustment location		Measuring location	Adjustment value	Remarks
1.	PLAY	Play the 315 Hz/0 dB section of the STD-331B test tape.	Deck I	VR103 (Lch) VR104 (Rch)	TP. 1 (Lch) TP. 2 (Rch)	−15.2 dBv	
			Deck II	VR101 (Lch) VR102 (Rch)			

RECORDING SECTION

1. Recording Bias Adjustment

• After the adjustment, caution should be exercised so as not to become under bias by checking the distortion rate.

No.	Mode	Input signal & test tape	Adjustment location		Measuring location	Adjustment value	Remarks
1.	STOP	Set the TAPE SELECTOR switch to the NORM position.					
2.	REC	Record the 315 Hz and 6.3 kHz signals at −20 dBv input level and playback. (use the STD-630)	Deck II	VR602 (Lch) VR603 (Rch)	LINE OUT	Repeatedly record, playback and adjust so that the playback level of 6.3 kHz signal becomes +1.0 dB±0.5 dB when compared with the 315 Hz signal.	

2. Recording Level Adjustment

No.	Mode	Input signal & test tape	Adjustment location		Measuring location	Adjustment value	Remarks
1.	STOP	Set the TAPE SELECTOR switch to the NORM position.					
2.	REC PAUSE	Apply a 315 Hz/0 dBv signal to the line Input terminals, load the STD-630 test tape.	Rec Level control volume		TP. 1 (Lch) TP. 2 (Rch)	−15.2 dBv	
3.	STOP	Set the DOLBY NR switch to the ON position. (DOLBY B)					
4.	REC/ PLAY	Record the above signal onto the STD-630 test tape, and playback.	Deck II	VR301 (Lch) VR302 (Rch)	TP. 1 (Lch) TP. 2 (Rch)	Repeatedly record, playback and adjust so that the playback signal level becomes −15.2 dB.	
5.	STOP	Set the TAPE SELECTOR switch to the CrO_2 position.					
6.	REC/ PLAY	Record the above signal onto the STD-620 test tape, and playback.	Check		TP. 1 (Lch) TP. 2 (Rch)	−15.2 dBv ±1.5 dB	
7.	STOP	Set the TAPE SELECTOR switch to the METAL position.					
8.	REC/ PLAY	Record the above signal onto the STD-610 test tape, and playback.	Check		TP. 1 (Lch) TP. 2 (Rch)	−15.2 dBv ±1.5 dB	

3. Level Meter Check

No.	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1.	REC PAUSE	Apply a 315 Hz/−10 dBv (316 mV) signal to the Line Input terminals.	Rec Level control volume	TP. 1 (Lch) TP. 2 (Rch)	Check that the level meters "0 dB" light up within −15.2 dBv ±2 dB of the signal output level.	

6. RÉGLAGE

6.1 RÉGLAGES MECANIQUES

1. Réglage et vérification de la vitesse de defilement de la bande						
No.	Platine	Mode	Bande test	Points de réglage	Spécifications/valeurs (fréquence de lecture)	Remarques
1	I	Lecture à vitesse normale	STD-301 (3 kHz)		Aprés une lecture pendant 1 minute, mettre TP16 à la terre.	
2		Lecture à vitesse double		Vérifier	6000 Hz ± 600 Hz	
3		Lecture à vitesse normale			Aprés vérification, déconnecter TP16 de la terre.	
4	II				Aprés une lecture pendant 1 minute, mettre TP17 à la terre.	
5		Lecture à vitesse double		VR901	Dans la limite de ± 10 Hz de la valeur de vérification de 1' étape 2 (platine I)	
6		Lecture à vitesse normale			Après vérification, déconnecter TP17 de la terre.	
7				VR902	3000 Hz ± 5 Hz	
8	I			VR802	Dans la limite de ± 5 Hz de la valeur de réglage de 1'étape 7 (platine II).	

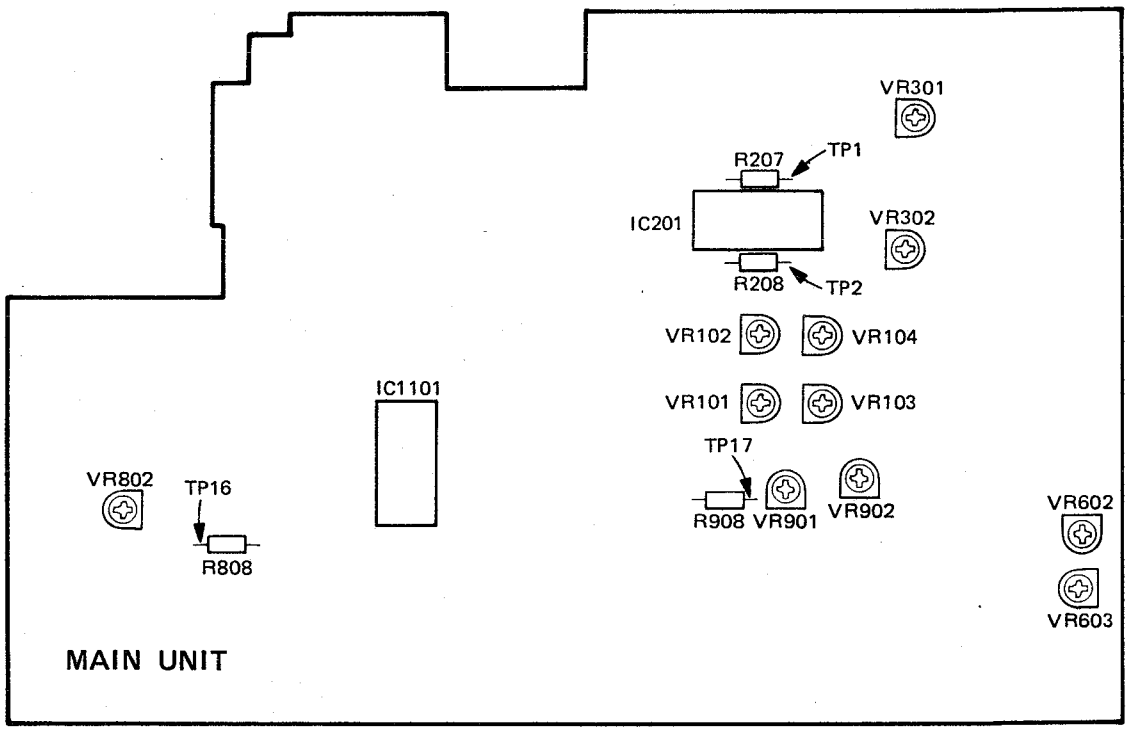


Fig. 6-1 Points de réglage

6.2 REGLAGES ELECTRIQUES

Conditions de réglage

1. Les réglages mécaniques doivent tout d'abord être terminés.
2. Les têtes doivent être nettoyées et démagnétisées.
3. Mettre la platine sous tension et la laisser chauffer pendant au moins quelques minutes avant de commencer les réglages électriques.
4. Le signal de référence est de dBv=1 Vrms.
5. Connecter une résistance de charge de 50 kohms (tolérance 47 à 52 kohms) aux bornes de sortie (OUTPUT).
6. Sauf indication contraire, les commutateurs ci-dessous doivent être laissés sur les positions indiquées.
   DOLBY NR : OFF
   Sélecteur de bande : NORM
   (TAPE SELECTOR)

Bandes d'essai

STD-331B : Réglages de la lecture (Voir fig.6-2)
STD-630 : Bande vierge de type normal
STD-620 : Bande vierge de type chrome
STD-610 : Bande vierge de type métal

Liste des réglages

Sections de lecture

1. Réglage de l'azimut de la tête.
2. Réglage du niveau de lecture.

Sections d'enregistrement

1. Réglage de la polarisation d'enregistrement.
2. Réglage du niveau d'enregistrement.
3. Vérification de l'indicateur de niveau.

REMARQUE:
Cette unité est dotée d'une sélection automatique de bande.

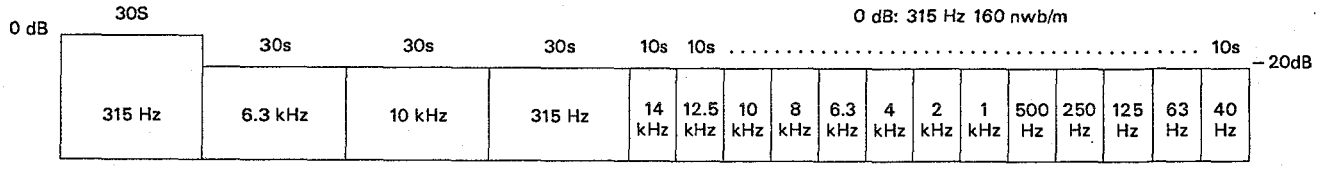


Fig. 6-2 Constantes de la bande d'essai STD-331B

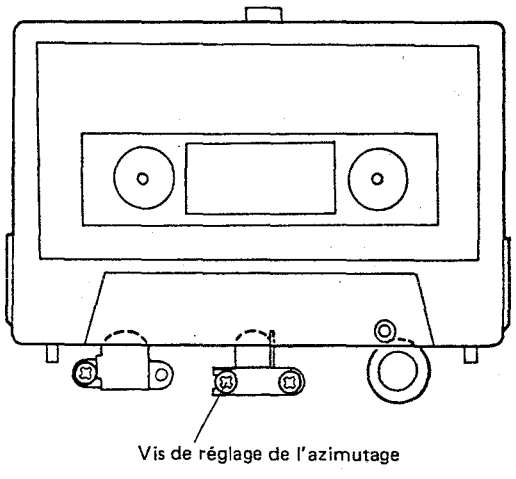


Fig. 6-3 Réglage de l'azimut de la tête

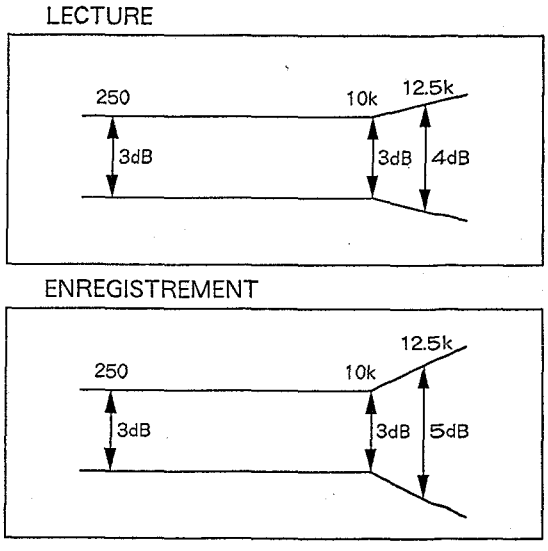


Fig. 6-4 Tolérance de la zone de réponse en fréquence de lecture

SECTION DE LECTURE

1. Réglage de l'azimut de la tête

• Tourner VR 103, 104 (Platine I) ou VR 101, 102 (Platine II) sur leur position centrale mécanique.

No.	Mode	Signal d'entrée et bande d'essai	Points de réglage	Points de mesure	Valeur de réglage	Remarques
1.	PLAY	Reproduire la section 10 kHz/−20 dB de la bande d'essai STD-331B.	Vis de réglage de l'azimut de la tête. (Voir fig. 6-3)	Sortie de ligne (LINE OUT)	Niveau du signal de reproduction maximum.	
2.	STOP	Verrouiller la vis avec le verrouillage de vis après avoir terminé le réglage.				

2. Réglage du niveau de lecture

• Ce réglage détermine le niveau DOLBY NR et il doit être effectué très soigneusement.

No.	Mode	Signal d'entrée et bande d'essai	Points de réglage		Points de mesure	Valeur de réglage	Remarques
1.	PLAY	Reproduire la section 315 Hz/0 dB de la bande d'essai STD-331B.	Platine I	VR103 (can. G) VR104 (can. D)	TP. 1 (can. G) TP. 2 (can. D)	−15.2 dBv	
			Platine II	VR101 (can. G) VR102 (can. D)			

SECTION D'ENREGISTREMENT

1. Réglage de la polarisation d'enregistrement

• Après le réglage, des précautions doivent être prises pour éviter une sous-polarisation en vérifiant le taux de distorsion.

No.	Mode	Signal d'entrée et bande d'essai	Points de réglage		Points de mesure	Valeur de réglage	Remarques
1.	STOP	Régler le sélecteur de bande (TAPE SELECTOR) sur la position NORM.					
2.	REC	Enregistrer les signaux 315 Hz et 6,3 kHz à un niveau d'entrée de −20 dBv et les reproduire. (Utiliser STD-630)	Platine II	VR602 (can. G) VR603 (can. D)	Sortie de ligne (LINE OUT)	Enregistrer, reproduire et régler de manière répétée de sorte que le niveau de lecture du signal 6,3 kHz devienne +1.0 dB ±0.5 dB lorsqu'il est comparé avec le signal 315 Hz.	

2. Réglage du niveau d'enregistrement

No.	Mode	Signal d'entrée et bande d'essai	Points de réglage		Points de mesure	Valeur de réglage	Remarques
1.	STOP	Régler le sélecteur de bande (TAPE SELECTOR) sur la position NORM.					
2.	REC PAUSE	Appliquer un signal de 315 Hz/0 dBv aux bornes d'entrée de ligne, charger la bande d'essai STD-630.	Volume de la commande de niveau d'enregistrement.		TP. 1 (can. G) TP. 2 (can. D)	−15.2 dBv	
3.	STOP	Régler le commutateur DOLBY NR sur la position ON. (DOLBY B)					
4.	REC/ PLAY	Enregistrer le signal cidessus sur la bande d'essai STD-630 et le reproduire.	Platine II	VR301 (can. G) VR302 (can. D)	TP. 1 (can. G) TP. 2 (can. D)	Enregistrer, reproduire et régler de manière répétée de sorte que le niveau du signal devienne −15.2 dB.	
5.	STOP	Régler le sélecteur de bande (TAPE SELECTOR) sur la position CrO_2.					
6.	REC/ PLAY	Enregistrer le signal cidessus sur la bande d'essai STD-620 et le reproduire.	Vérifier		TP. 1 (can. G) TP. 2 (can. D)	−15.2 dBv ±1.5 dB	
7.	STOP	Régler le sélecteur de bande (TAPE SELECTOR) sur la position METAL.					
8.	REC/ PLAY	Enregistrer le signal cidessus sur la bande d'essai STD-610 et le reproduire.	Vérifier		TP. 1 (can. G) TP. 2 (can. D)	−15.2 dBv ±1.5 dB	

3. Vérification de l'indicateur de niveau

No.	Mode	Signal d'entrée et bande d'essai	Points de réglage	Points de mesure	Valeur de réglage	Remarques
1.	REC PAUSE	Appliquer un signal de 315 Hz/−10 dBv (316 mV) aux bornes d'entrée de ligne.	Volume de la commande de niveau d'enregistrement	TP. 1 (can. G) TP. 2 (can. D)	Vérifier que les indicateurs de niveau "0 dB" s'allument dans la limite de −15.2 dBv ±2 dB du niveau de sortie du signal.	

6. AJUSTE

6.1 AJUSTE MECANICO

1. Ajuste y verificación de la velocidad de cinta						
No.	Platina	Modo	Cinta de prueba	Puntos de ajuste	Especificaciones/valores nominales (frecuencia de reproducción)	Comentarios
1	I	PLAY (velocidad normal)	STD-301 (3 kHz)	Después de reproducir por 1 minuto, conectar TP16 a tierra.		
2		PLAY (velocidad doble)		Verificar	6000 Hz ± 600 Hz	
3		PLAY (velocidad normal)		Después de verificar, desconectar TP16 de tierra.		
4	II			Después de reproducir por 1 minuto, conectar TP17 a tierra.		
5		PLAY (velocidad doble)		VR901	Dentro de un margen de ± 10 Hz del valor de verificación del paso 2 (platina I).	
6		PLAY (velocidad normal)		Después de verificar, desconectar TP17 de tierra.		
7				VR902	3000 Hz ± 5 Hz	
8	I			VR802	Dentro de un margen de ± 5 Hz del valor de verificación del paso 7 (platina II).	

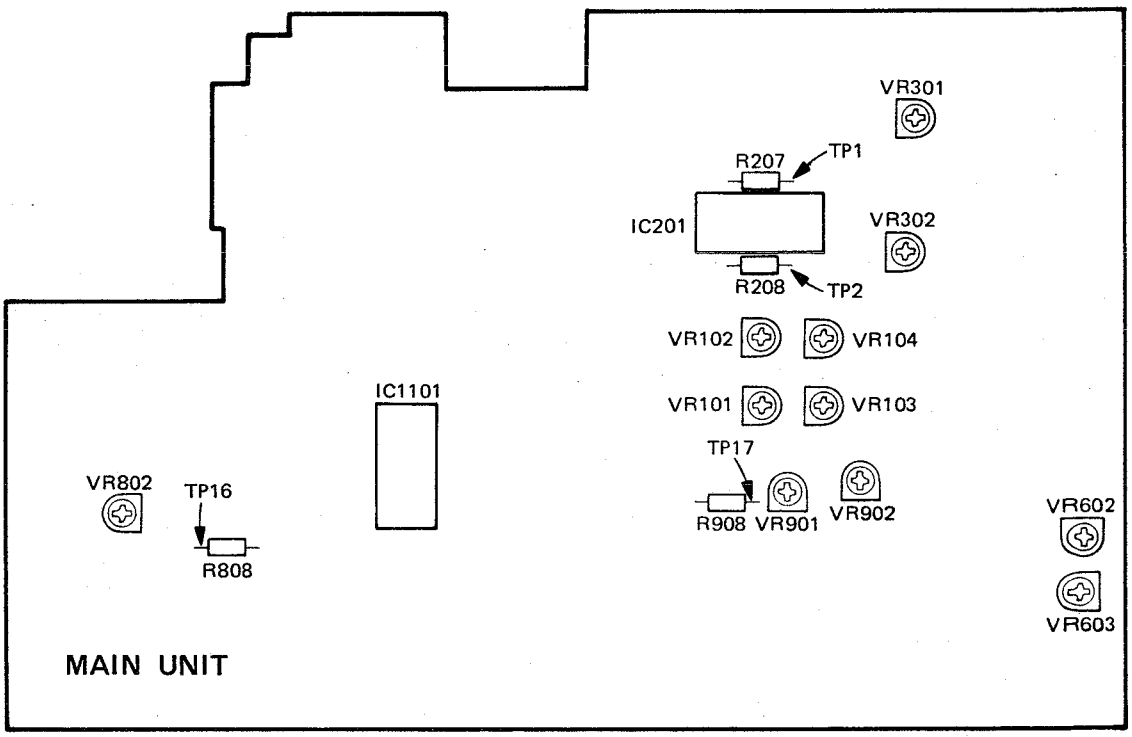


Figura 6-1 Puntos de ajuste

6.2 AJUSTES ELÉCTRICOS

Condiciones de ajuste

1. Los ajustes mecánicos deben haberse completado primero.
2. La cabeza debe estar limpia y desmagnetizada.
3. Encienda la alimentación para permitir que la platina se caliente durante unos pocos minutos por lo menos antes de realizar cualquier ajuste eléctrico.
4. La señal de referencia es de 0 dBv=1 Vrms.
5. Conecte una resistencia de 50 kΩ (o entre 47 y 52 kΩ) en los terminales OUTPUT.
6. A menos que se especifique lo contrario, los conmutadores indicados más abajo deben dejarse en las posiciones indicadas.
   DOLBY NR : OFF
   TAPE SELECTOR : NORM

Cintas de prueba

STD-331B : Ajustes de reproducción (Consulte la figura 6-2)
STD-630 : Cinta virgen NORMAL
STD-620 : Cinta virgen de CrO_2
STD-610 : Cinta virgen de METAL

Lista de ajustes

Secciones de reproducción

1. Ajuste de azimut de la cabeza
2. Ajuste del nivel de reproducción

Secciones de grabación

1. Ajuste de la polarización de grabación
2. Ajuste del nivel de grabación
3. Verificación del medidor de nivel

NOTA:
Esta unidad posee una función de selección automática de cinta.

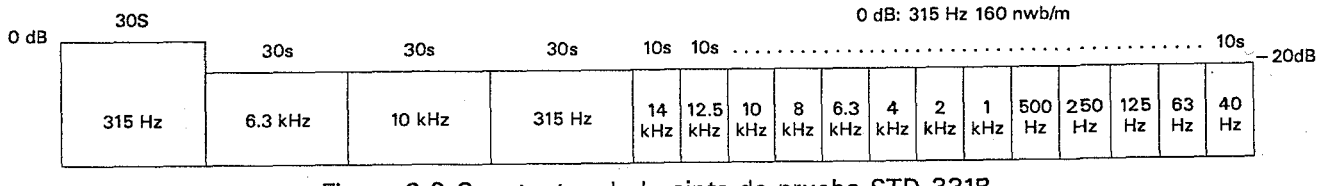


Figura 6-2 Constantes de la cinta de prueba STD-331B

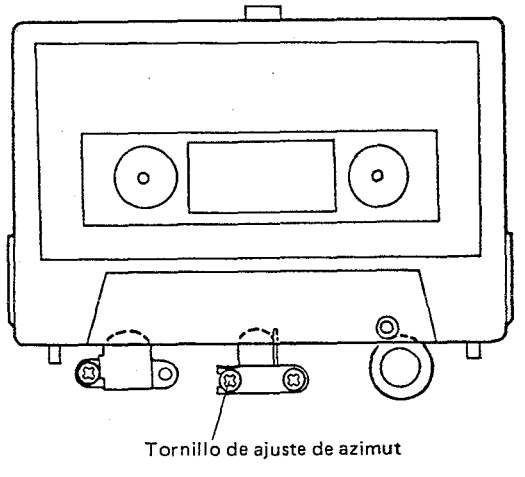


Figura 6-3 Ajuste de azimut de la cabeza

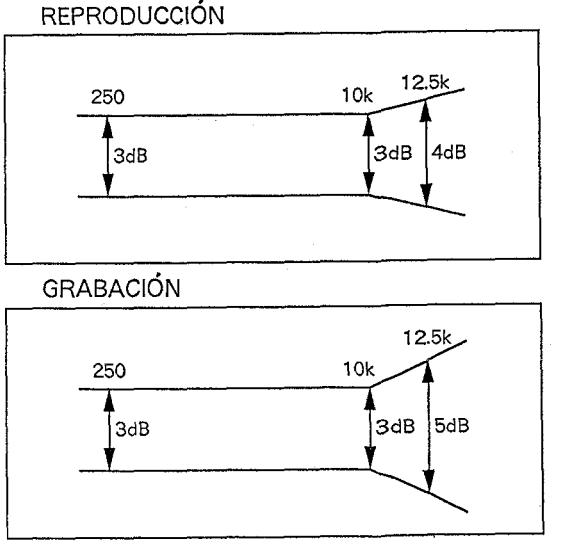


Figura 6-4 Zona permisible de respuesta de frecuencia de reproducción

SECCIÓN DE REPRODUCCIÓN

1. Ajuste del azimut de la cabeza

• Poner VR 103, 104 (platina I) o VR 101, 102 (platina II) en las posiciones del centro mecánico.

N.°	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Comentarios
1.	PLAY	Reproduzca la sección de 10 kHz/– 20 dB de la cinta de prueba STD-331B.	Tornillo de ajuste del azimut de la cabeza. (Vea la figura 6-3)	LINE OUT	Nivel máximo de la señal de reproducción.	
2.	STOP	Bloquee el tornillo con su cierre una vez finalizado el ajuste.				

2. Ajuste del nivel de reproducción

• Este ajuste determina el nivel DOLBY NR y debe realizarse con mucho cuidado.

N.°	Modo	Señal de entrada y cinta de prueba	Punto de ajuste		Punto de medición	Valor de ajuste	Comentarios
1.	PLAY	Produzca la parte de 315 Hz/0 dB de la cinta de prueba STD-331B.	Platina I	VR 103 (Lch) VR 104 (Rch)	TP. 1 (Lch) TP. 2 (Rch)	– 15.2 dBv	
			Platina II	VR 101 (Lch) VR 102 (Rch)			

SECCIÓN DE GRABACIÓN

1. Ajuste de polarización de grabación

• Una vez finalizado el ajuste, compruebe el porcentaje de distorsión para no obtener subpolarización.

N.°	Modo	Señal de entrada y cinta de prueba	Punto de ajuste		Punto de medición	Valor de ajuste	Comentarios
1.	STOP	Ponga el conmutador TAPE SELECTOR en la posición NORM.					
2.	REC	Grabe la señal de 315 Hz y 6,3 kHz a un nivel de entrada de – 20 dBv y reprodúzcala. (Use la cinta STD-630.)	Platina II	VR 602 (Lch) VR 603 (Rch)	LINE OUT	Grabe, reproduzca y ajuste repetidamente para que el nivel de la señal de reproducción de 6,3 kHz sea de + 1.0 dB ± 0.5 dB cuando se compare con la señal de 315 Hz.	

2. Ajuste del nivel de grabación

N.°	Modo	Señal de entrada y cinta de prueba	Punto de ajuste		Punto de medición	Valor de ajuste	Comentarios
1.	STOP	Ponga el conmutador TAPE SELECTOR en la posición NORM.					
2.	REC PAUSE	Aplique una señal de 315 Hz/0 dBv a los terminales de entrada de línea e introduzca la cinta de prueba STD-630.	Control de nivel de grabación.		TP. 1 (Lch) TP. 2 (Rch)	– 15.2 dBv	
3.	STOP	Ponga el conmutador DOLBY NR en la posición ON. (DOLBY B)					
4.	REC/ PLAY	Grabe la señal de arriba en la cinta de prueba STD-630 y reprodúzcala.	Platina II	VR 301 (Lch) VR 302 (Rch)	TP. 1 (Lch) TP. 2 (Rch)	Grabe, reproduzca y ajuste repetidamente para que el nivel de la señal de reproducción sea de – 15.2 dB.	
5.	STOP	Ponga el conmutador TAPE SELECTOR en la posición CrO_2.					
6.	REC/ PLAY	Grabe la señal de arriba en la cinta de prueba STD-620 y reprodúzcala.	Verifique		TP. 1 (Lch) TP. 2 (Rch)	– 15.2 dBv ± 1.5 dB	
7.	STOP	Ponga el conmutador TAPE SELECTOR en la posición METAL.					
8.	REC/ PLAY	Grabe la señal de arriba en la cinta de prueba STD-610 y reprodúzcala.	Verifique		TP. 1 (Lch) TP. 2 (Rch)	– 15.2 dBv ± 1.5 dB	

3. Verificación del medidor de nivel

N.°	Modo	Señal de entrada y cinta de prueba	Punto de ajuste	Punto de medición	Valor de ajuste	Comentarios
1.	REC PAUSE	Aplique una señal de 315 Hz/– 10 dBv (316 mV) a los terminales de entrada de línea.	Control de nivel de grabación	TP. 1 (Lch) TP. 2 (Rch)	Verifique si se encienden los medidores de nivel "0 dB" cuando el nivel de salida de la señal sea – 15.2 dBv ±2 dB.	

7. SPECIFICATIONS

System ..... 4 track, 2-channel stereo
Heads ..... "Hard Permalloy" playback head ×1
"Hard Permalloy" recording/playback head ×1
"Ferrite" erasing head ×1
Motor ..... DC servo capstan motor ×2
Wow and Flutter ..... No more than 0.075% (WRMS)
No more than ±0.19% (DIN)
Fast winding Time ..... Approximately 110 seconds
(C-60 tape)
Frequency Response
—20 dB recording:
Normal tape ..... 25 to 15,000 Hz
Chrome tape ..... 25 to 16,000 Hz
Metal tape ..... 25 to 16,000 Hz
Signal-to-Noise Ratio
Dolby NR OFF ..... More than 57 dB

Noise Reduction Effect
Dolby B-type NR ON ..... More than 10 dB (at 5 kHz)
Dolby C-type NR ON ..... More than 19 dB (at 5 kHz)

Harmonic Distortion ..... No more than 0.7% (0 dB)
Input (Sensitivity)
LINE (INPUT) ..... 63 mV (Input impedance 54 kΩ)
Output (Reference level)
LINE (OUTPUT) ..... 316 mV (Output impedance 3.8 kΩ)
Headphone ..... 45 mV (Load impedance 8 Ω)

Subfunctions

- DOLBY B/C NR
- Music search over ±15 selections (DECK I & DECK II)
- High-speed and normal-speed synchro copy (DECK I→DECK II)
- Relay playback/blank skip
- Synchronized copy start
- One-touch REC/PAUSE
- 3-digit mechanical tape counter (DECK II)
- Peak level meter
- 5 segments/+ ∞ LED level meter with peak hold
- Automatic space record muting
- Automatic tape selector
- Headphones jack
- System remote control compatible
- TIMER recording/playback (Automatic relay on)
- REPEAT playback

Miscellaneous

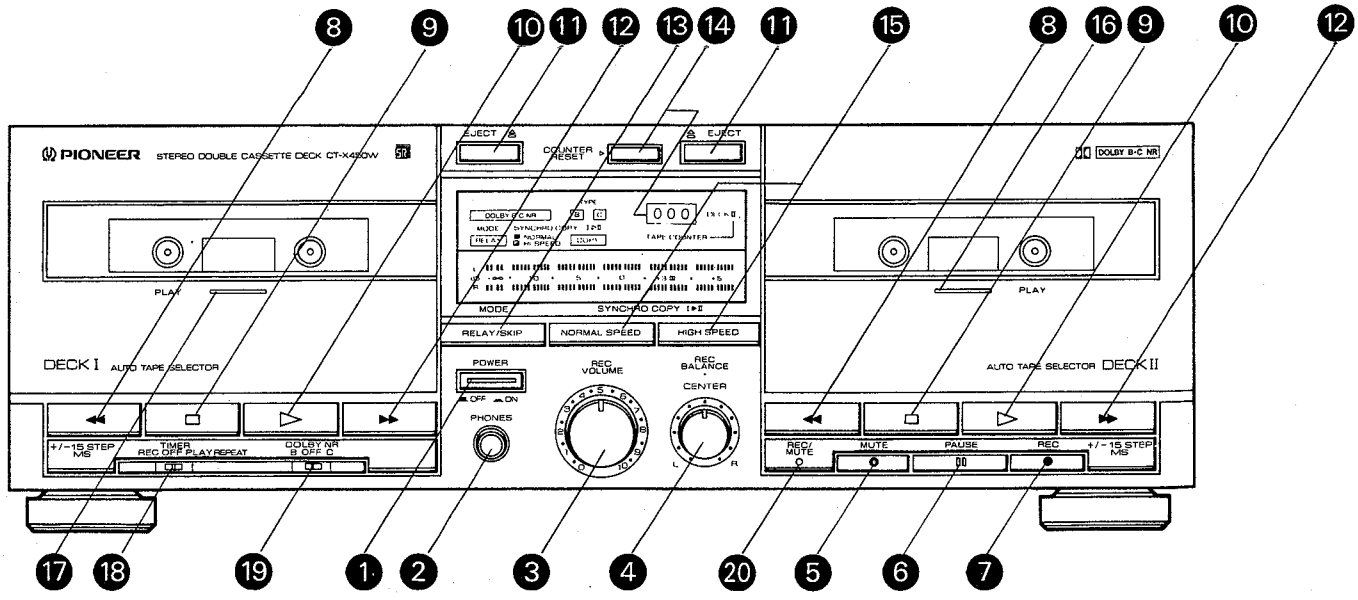
Power Requirements
U.S., Canadian models ..... AC 120V, 60 Hz
European model ..... AC 220V, 50/60 Hz
U.K., Australian models ..... AC 240V, 50/60 Hz
U.S. military and other destination models .....
AC 110V/120V—127V/220V/240V, 50/60 Hz
(switchable)
Power Consumption
European U.K. and Australian models 22W
Dimensions ..... 360(W) ×120(H) ×325(D) mm
14-3/16(W) ×4-3/4(H) ×2-13/16(D) in
Weight (without package) ..... 4.2 kg (10 lb 2 oz)

Accessories

Operating instructions 1
Connection cord with pin plugs 2
Control cord 1

NOTE:
Specifications and design are subject to possible modifications without notice due to improvements.

8. PANEL FACILITIES



❶ POWER switch

❷ PHONES jack

❸ REC VOLUME control

❹ REC BALANCE control

Balancing the recording level between left (L) and right (R) channels.

❺ Record muting (MUTE) button (O)

Press this button during recording to create a blank portion of approx. 4 seconds on the tape. The unit will then enter the recording pause mode.

❻ PAUSE button (⏸)

Press once to stop tape transport momentarily during recording or playback. Press the button again to resume operation (this can also be done by pressing the play (▶) button). This button does not work during fast-forward and rewind.

❼ Recording (REC) button (●)

The unit will not enter the recording mode if loaded with a cassette having broken off erasure prevention tabs.
Only deck II is equipped with a recording function.

❽ Rewind button (◀◀)

To rewind the tape in the direction of the arrows. When pressed during playback, the unit will skip one selection each time the button is pressed, then start playback from the beginning of the next selection.

❾ Stop button (■)

Press to stop all operations, including tape copy.

❿ Play button (▶)

Press to playback the front side of the tape, which is the side whose label is visible.

⓫ EJECT button (⏏)

Press to open the cassette door after you have pressed the stop button (■) and the tape has stopped.

NOTE:
If the power is turned off while the tape is moving, the cassette door may remain locked. In this case, turn the power on before pressing the EJECT (⏏) button.

⓬ Fast forward button (▶▶)

Press to fast-forward the tape in the direction of the arrows. When pressed during playback, the unit will skip one selection each time the button is pressed, then start playback from the beginning of the next selection.

⓭ RELAY/SKIP button

Press this button (turning the RELAY indicator on) to perform relay playback from deck I to deck II or from deck II to deck I.
It also activates the blank skip function, which fast-forwards the tape to the beginning of the next selection, resuming playback from there, when mute playback continues for more than 15 seconds.

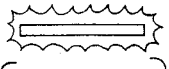
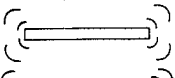
⓮ DECK II tape COUNTER/RESET button

Press to reset the tape counter reading to "000"
(The TAPE COUNTER works for deck II only.)

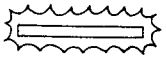
⓯ SYNCHRO COPY I ▶ II buttons

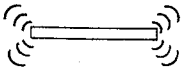
NORMAL SPEED:
Starts tape copy at normal speed from deck I to deck II.
HIGH SPEED:
Starts tape copy at double speed (half time) from deck I to deck II.

⓰ Deck II tape transport mode indicators (PLAY)

PLAY MODE		PLAY Lights
PAUSE MODE		PLAY Flashing slowly
MS MODE		PLAY Flashing quickly

⓱ Deck I tape transport mode indicators (PLAY)

PLAY MODE PLAY  Lights

MS MODE PLAY  Flashing quickly

⓲ TIMER switch

OFF:
Normally, be sure to leave the switch in this position.
REC:
For timer recording
PLAY REPEAT:
For timer playback

- Recording or playback will begin approximately 4 seconds after power comes on with this switch set in the REC or PLAY position.

⓳ DOLBY* NR switch

Set this switch to B or C for recording with the built-in Dolby Noise Reduction system and for playback of tapes which have been recorded using the Dolby Noise Reduction system. For other tapes, set the DOLBY NR switch to OFF.

NOTE:

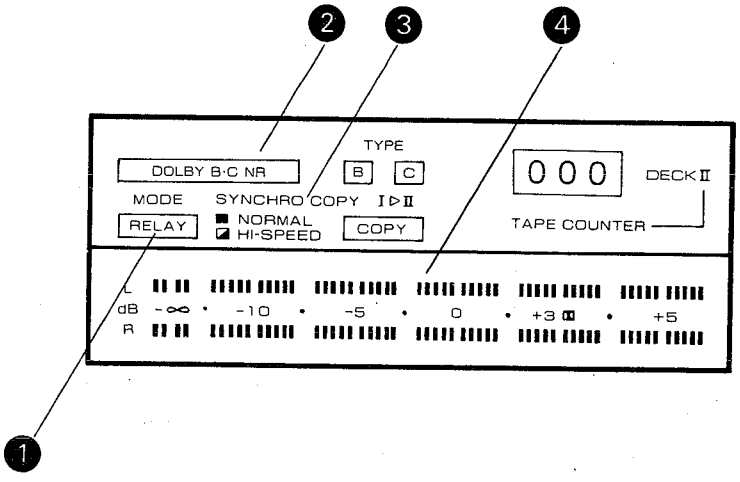
- *When playing back Dolby NR-encoded tapes, always set this switch to the same position (B-type or C-type) used for recording.*

*

- *Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.*
- *"DOLBY" and the double-D symbol ⊡⊡ are trademarks of Dolby Laboratories Licensing Corporation.*

⓴ REC/MUTE indicator

This indicator will be lit in the recording mode and will flash in the record muting mode.



OPERATING DISPLAY

❶ RELAY Play indicator

Lights up when the RELAY/SKIP button is pressed to start relay playback.

❷ DOLBY NR B/C indicator

Indicates the selected Dolby Noise Reduction systems, B-type or C-type.

- When Dolby NR is off

- Dolby B-type NR on

- Dolby C-type NR on

❸ SYNCHRO COPY I ▶ II indicator

Lights up during the tape copy operation.

- Normal-speed copy

NORMAL  Lights

- High-speed copy

HI-SPEED  Flashes

❹ Level meter

The ⊡⊡ beside the +3 dB mark indicates the Dolby NR system standard level.

NOTE:
When a power failure or another sudden change in power supply (caused by lightning, etc.) occurs during operation of the unit, it will be reset to OFF state. To restart operation, please repeat the steps described above.