F4ZF-19B160

SERVICE MANUAL

US Model

Version: –AA

Model Name Using Similar Mechanism	MDX-U1
Optical Pick-Up Name	KMS-150A

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使用時は添付資料も参照のこと
Refer to the additional documents.

MINI DISC PLAYER

SONY

TABLE OF CONTENTS

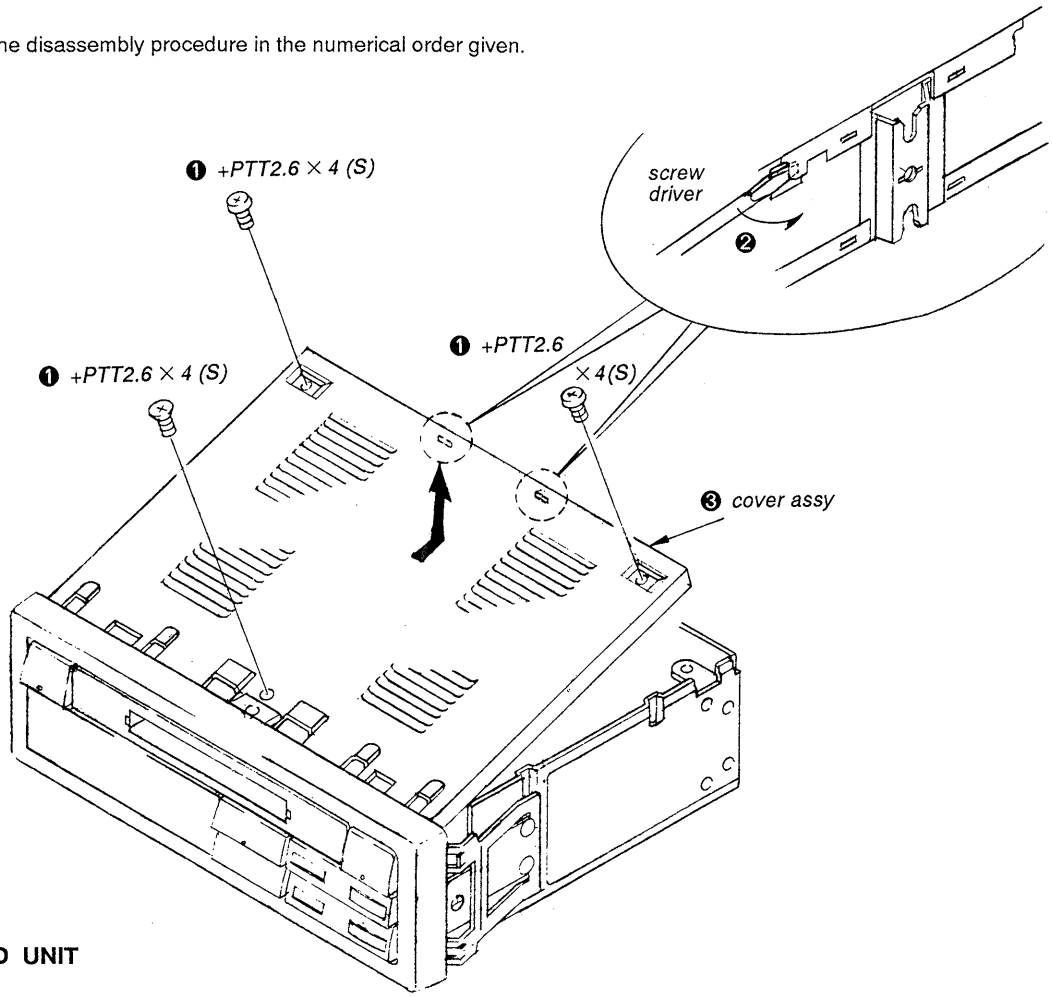
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

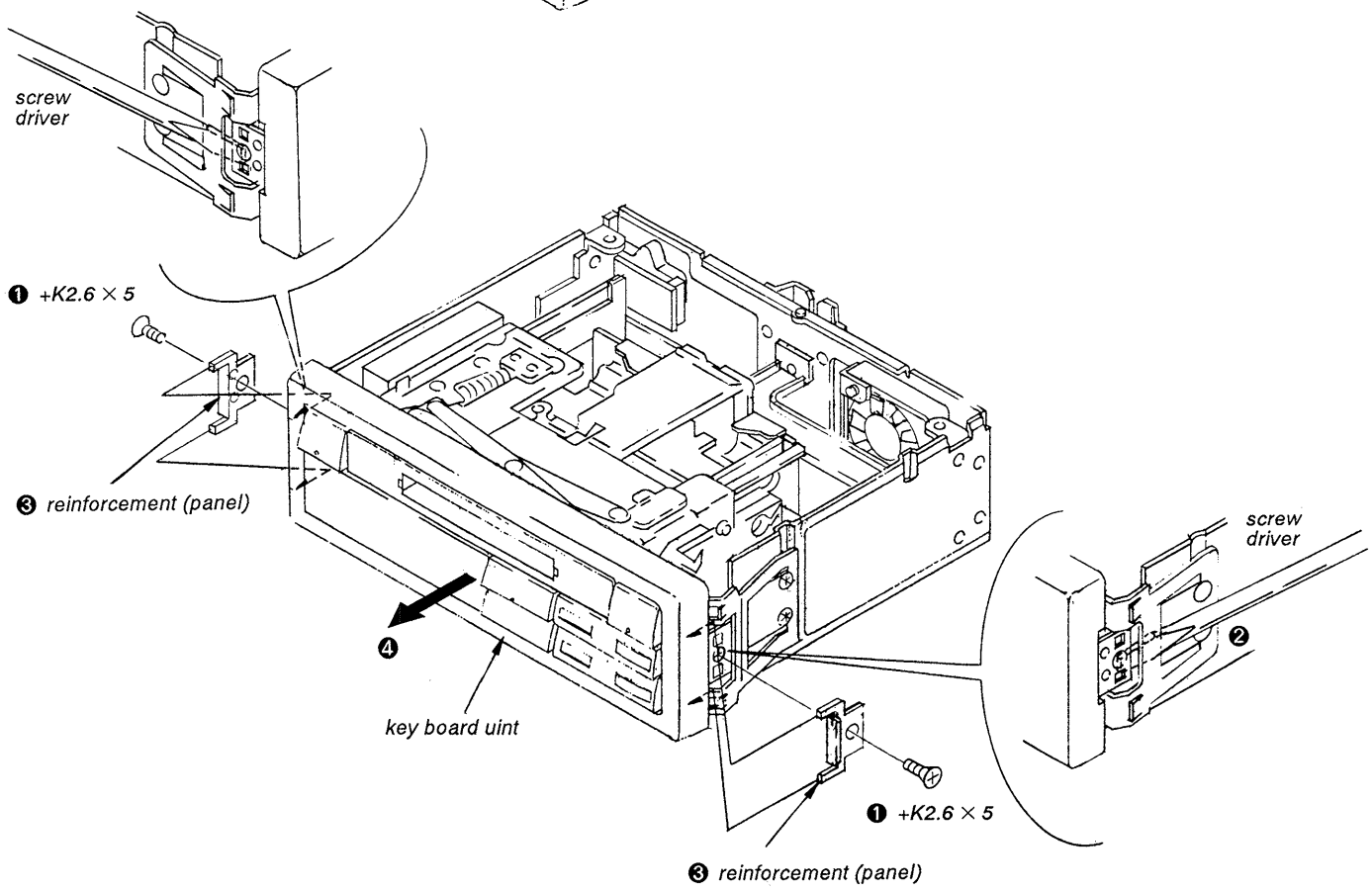
SECTION 1
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

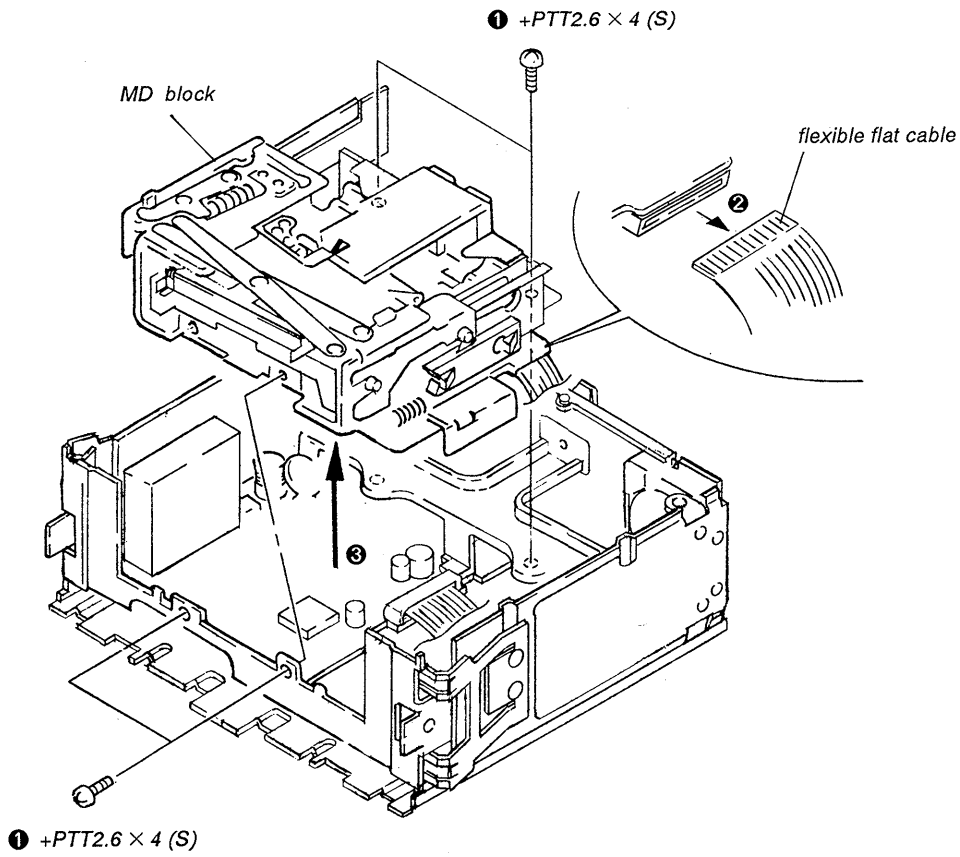
COVER



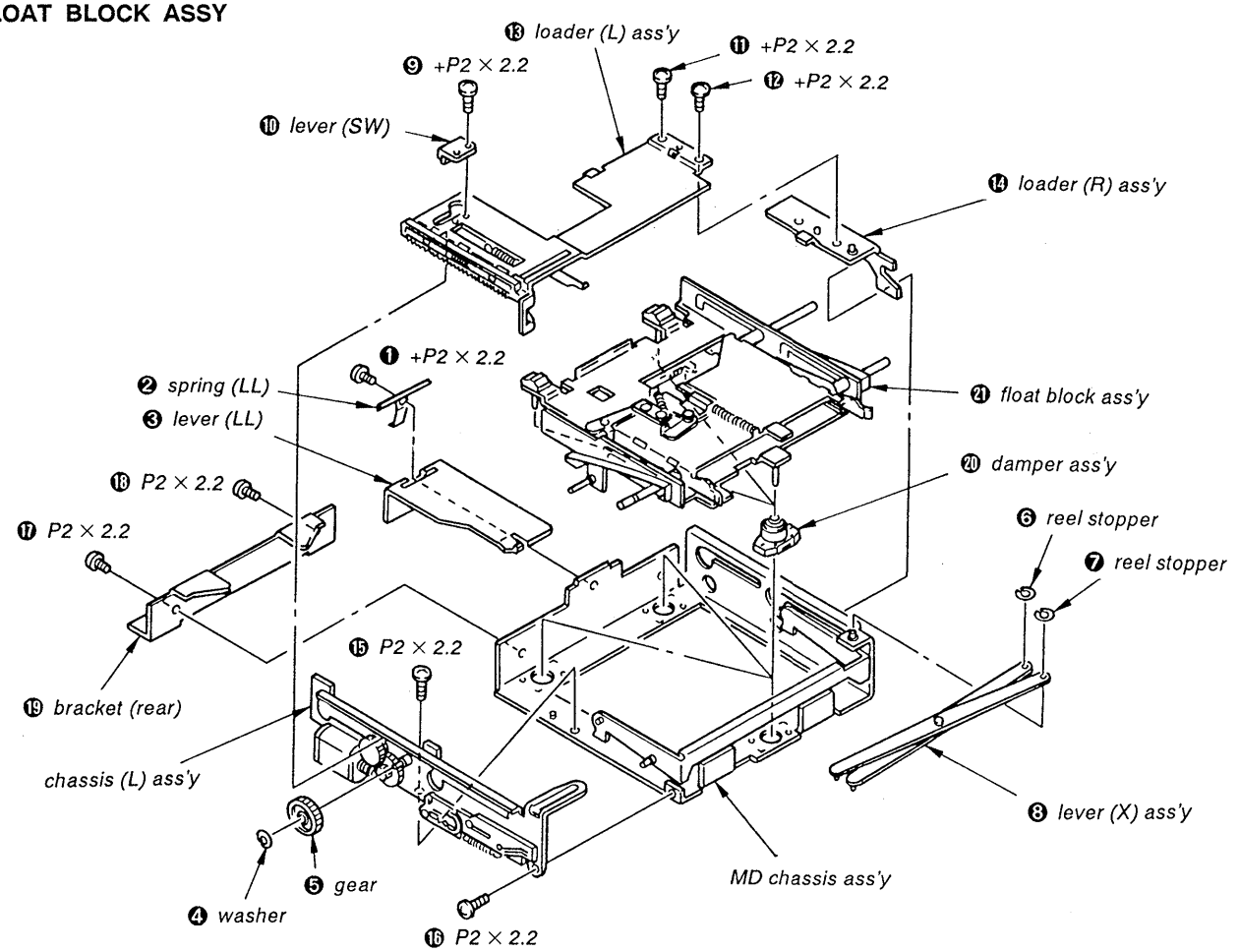
KEY BOARD UNIT



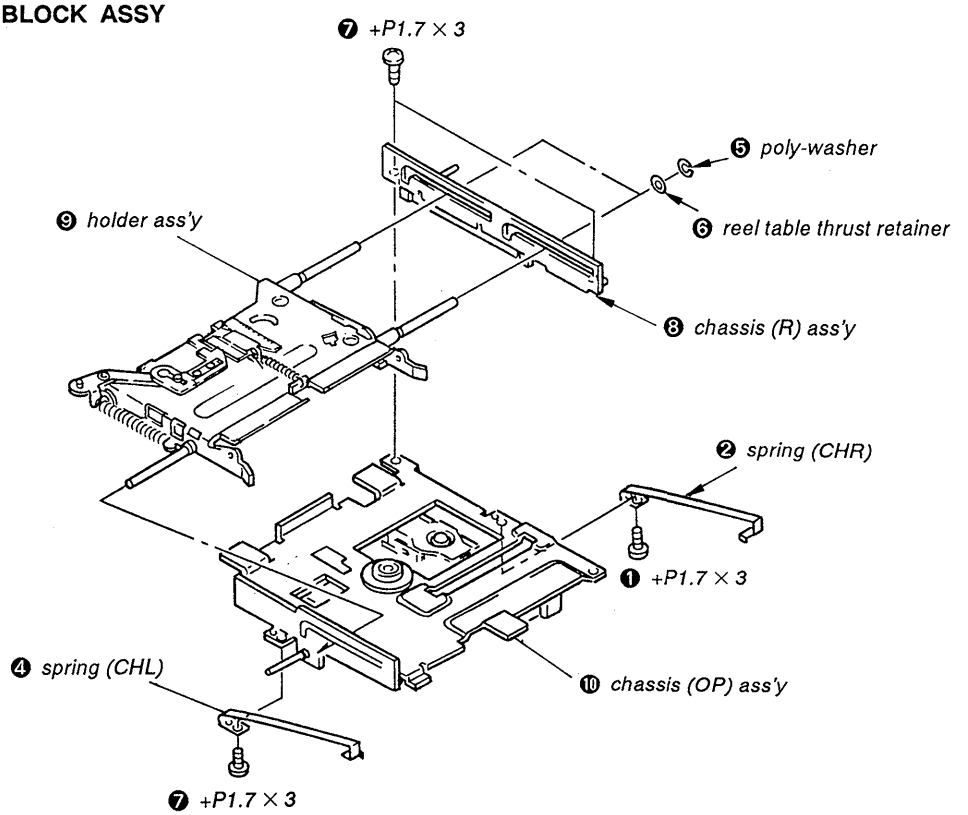
MD BLOCK



FLOAT BLOCK ASSY



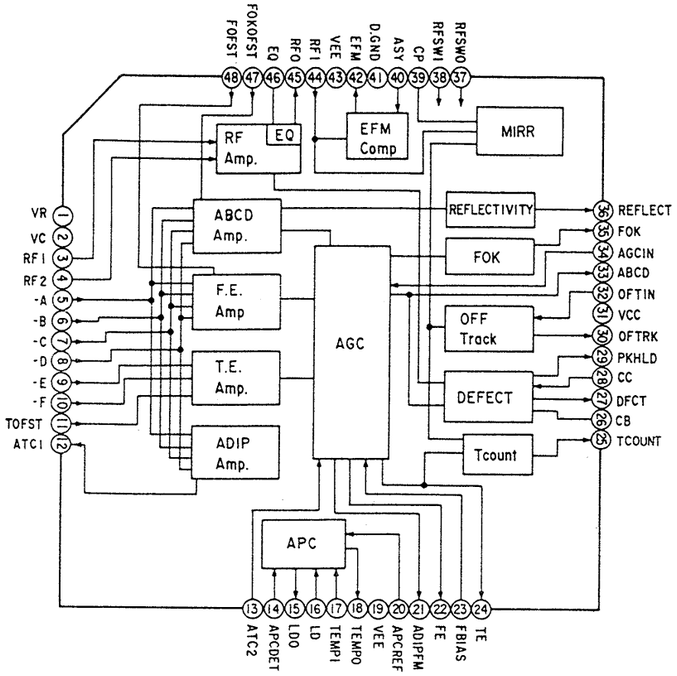
CHASSIS (OP) BLOCK ASSY



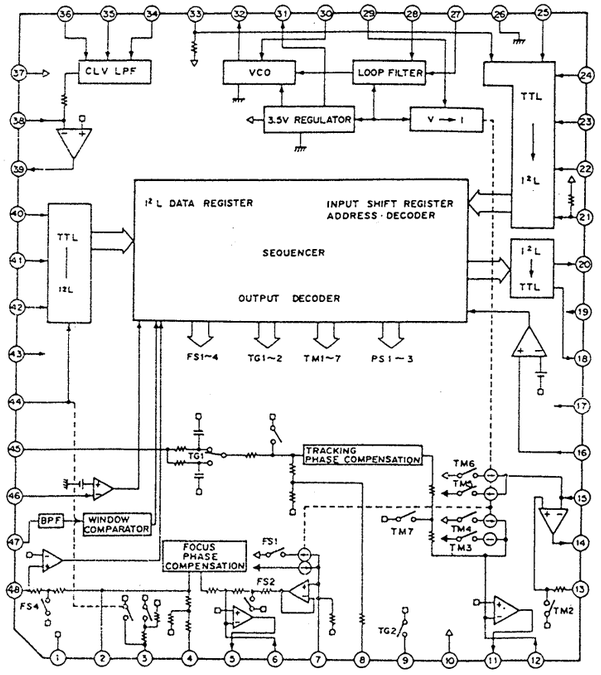
SECTION 2
DIAGRAMS

- IC Block Diagrams

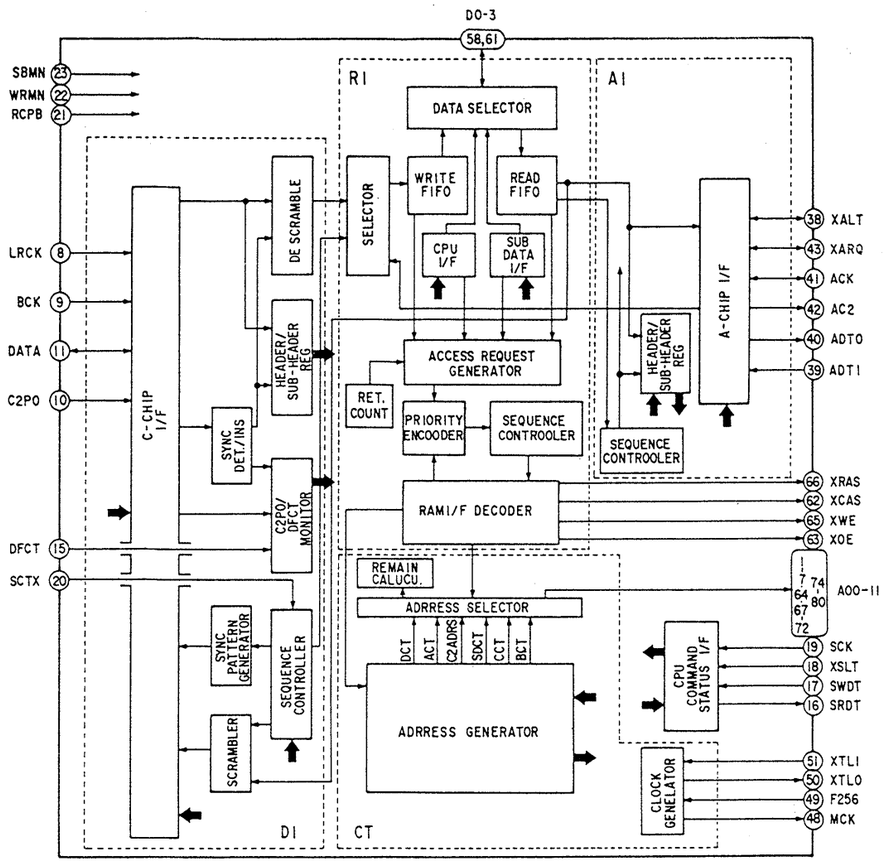
IC502 CXA1381R



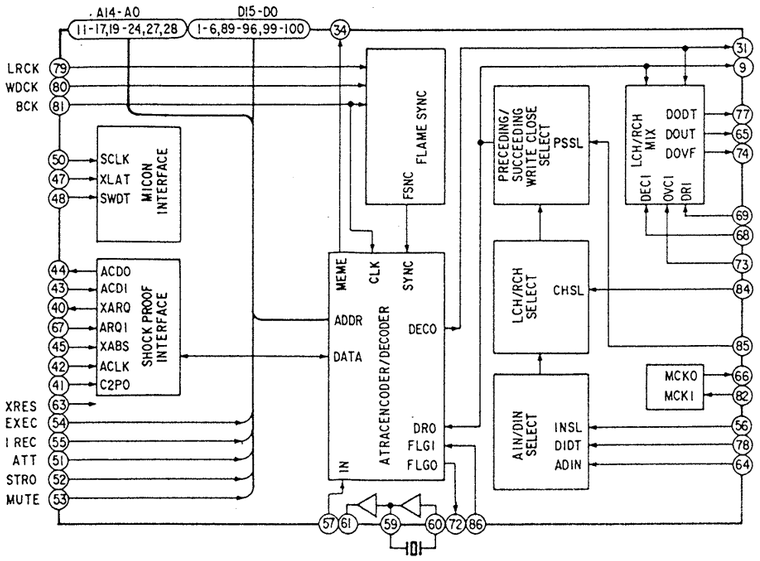
IC503 CXA1082BQ



IC505 CXD2526Q



IC507, 510 CXD2527R



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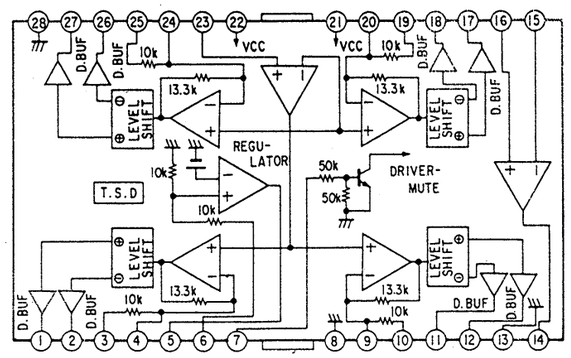
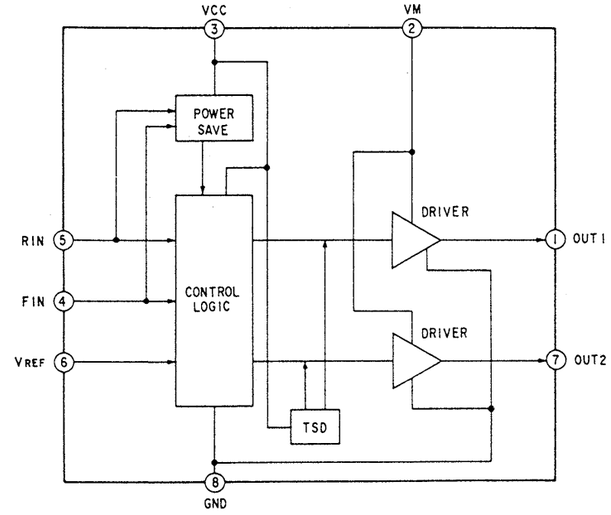
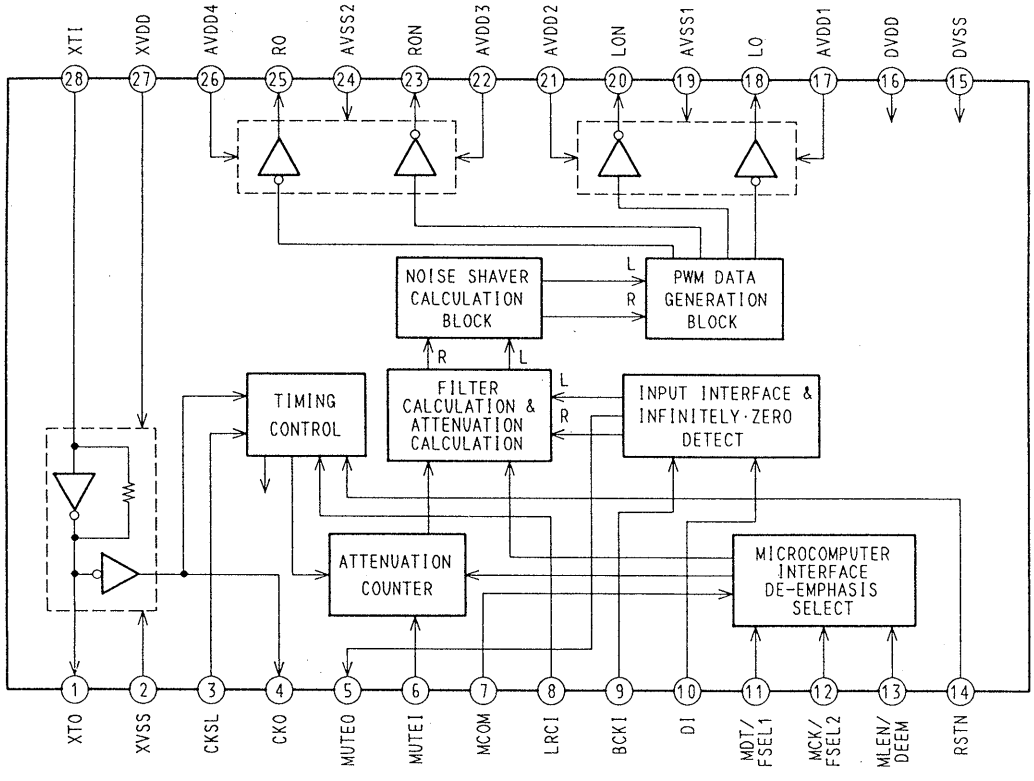


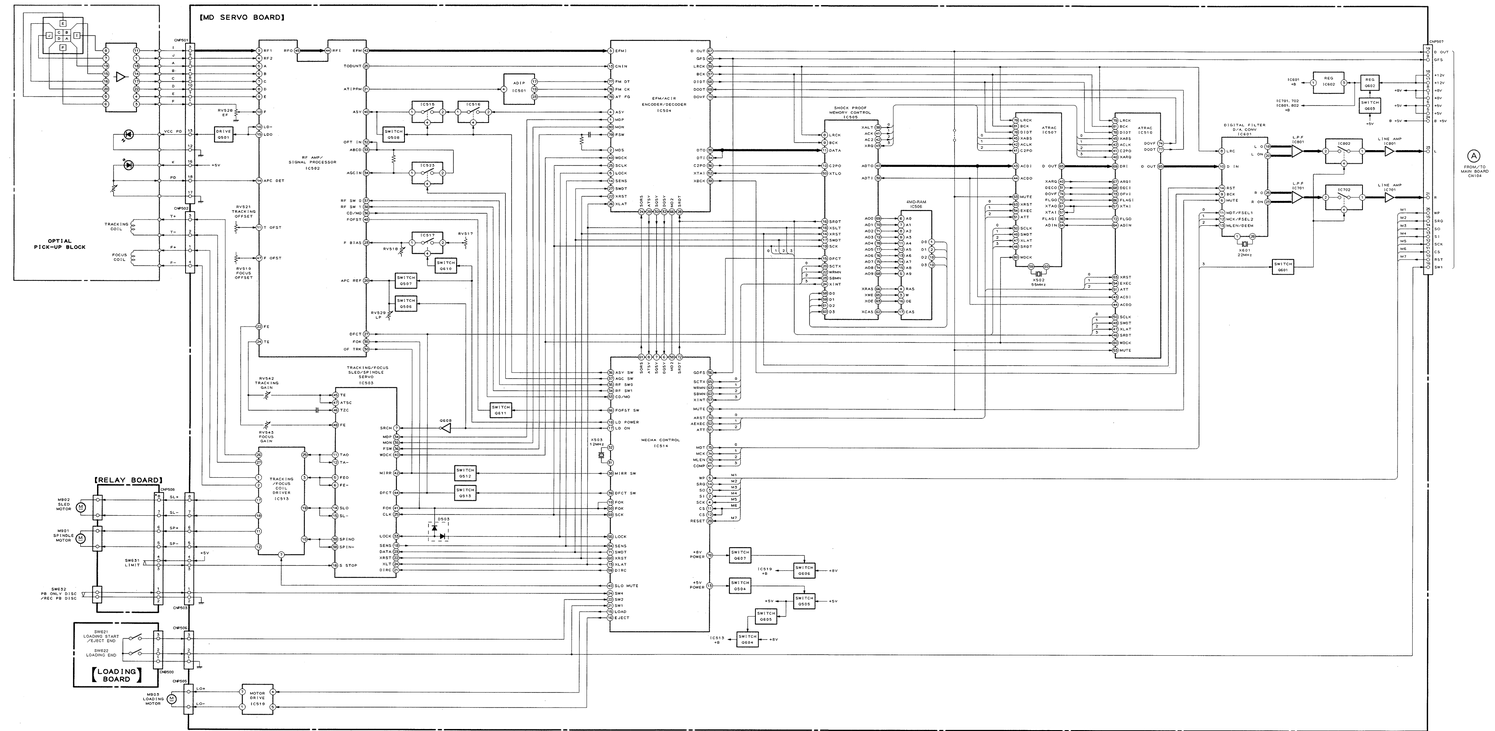
IC519 BA6287F

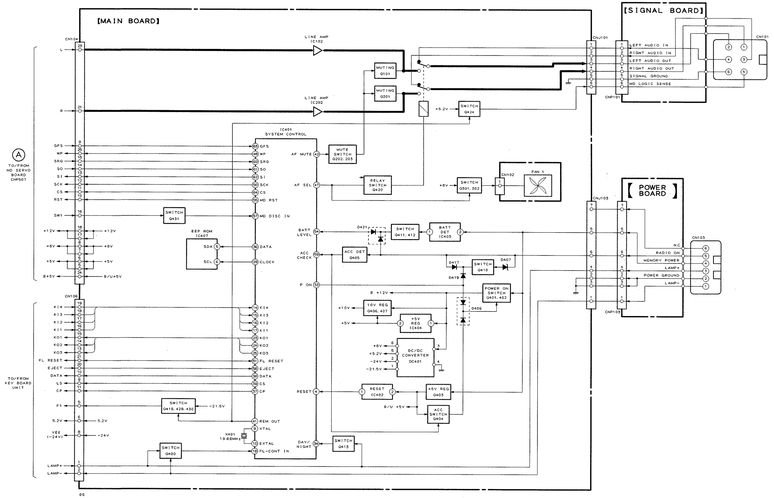


IC601 SM5872AS-ET



2-1. BLOCK DIAGRAM

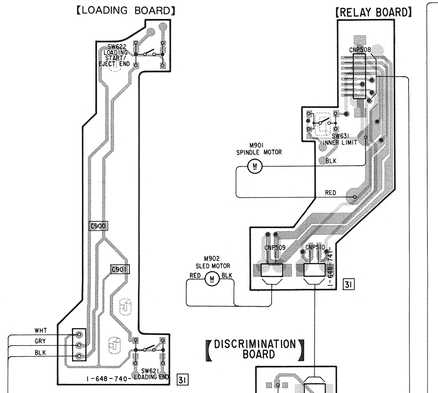




2-2. MECHANISM SECTION PRINTED WIRING BOARDS

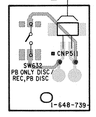
• See page 34 for semiconductor lead layouts.

【LOADING BOARD】

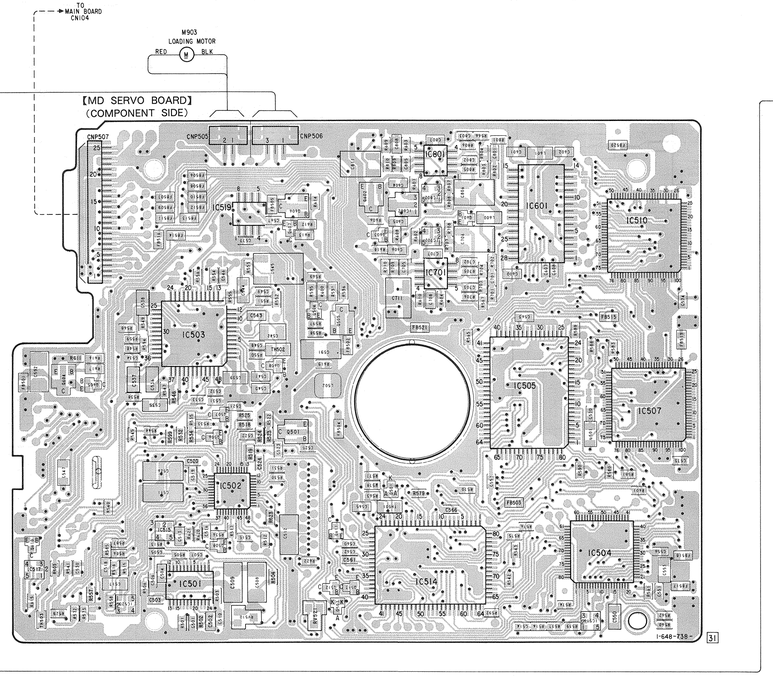


【RELAY BOARD】

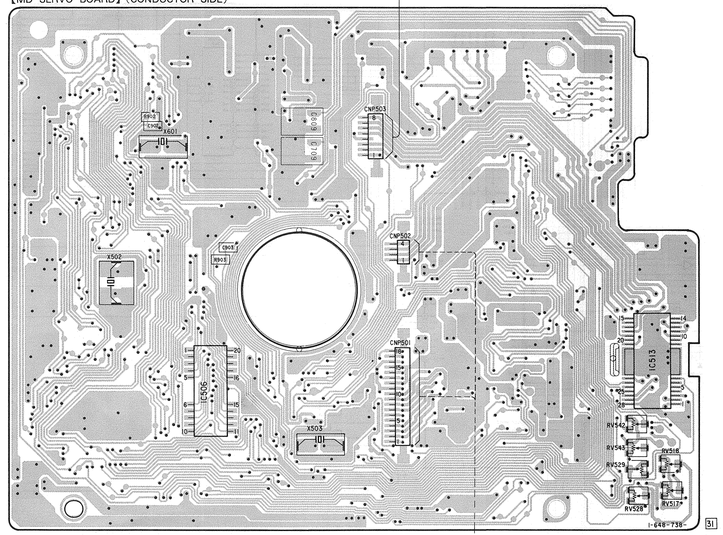
【DISCRIMINATION BOARD】



【MD SERVO BOARD】(COMPONENT SIDE)



【MD SERVO BOARD】(CONDUCTOR SIDE)



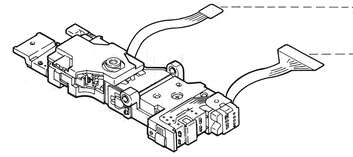
Note on Printed Wiring Board:

- ●—○— : parts extracted from the component side.
- ● : Through hole.
- ▨ : Pattern of the rear side.
- ▨ : Pattern from the side which enables seeing.

Caution:

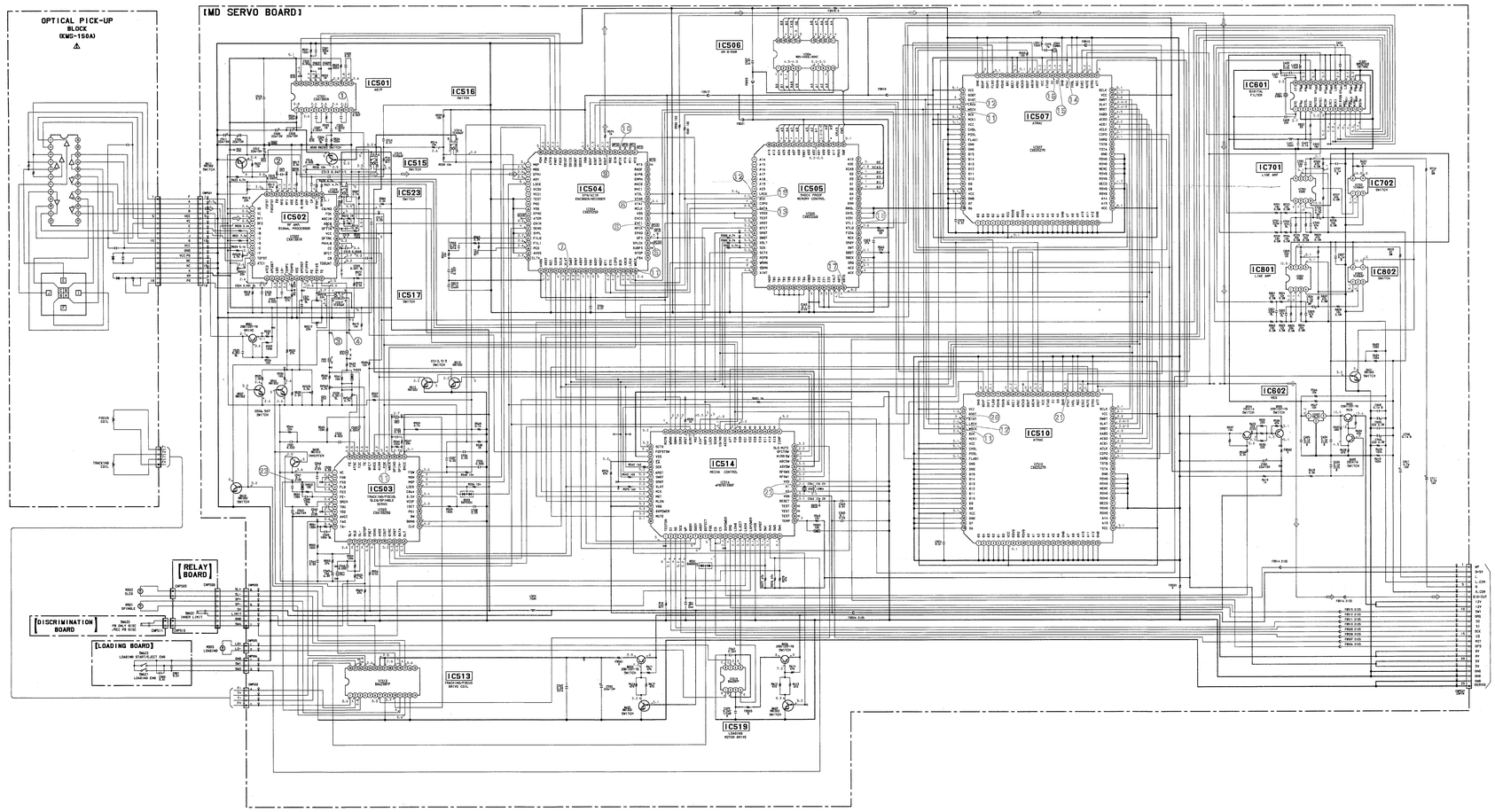
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

OPTICAL PICK – UP BLOCK (KMS – 150A)



• **Semiconductor Location**

Ref. No.	Location	Ref. No.	Location
D501	F-10	IC801	B-10
D503	G-9	IC902	C-10
IC501	G-8	Q501	E-9
IC502	F-8	Q504	D-9
IC503	D-7	Q505	D-9
IC504	G-12	Q506	E-8
IC505	E-11	Q507	E-8
IC506	F-17	Q508	G-8
IC507	E-13	Q512	G-9
IC510	C-13	Q513	G-9
IC513	F-22	Q601	C-11
IC514	G-10	Q602	C-10
IC518	F-7	Q603	C-10
IC516	G-12	Q604	E-6
IC517	G-6	Q605	E-6
IC519	C-8	Q606	C-9
IC523	G-7	Q607	C-9
IC601	C-11	Q608	E-8
IC602	C-10	Q610	C-6
IC701	D-10	Q611	F-9
IC702	C-10		



• MD Servo Board Wave forms

❶ IC501 ⑪ 0.5V/DIV 2ms/DIV

❷ IC504 ㊶ 2V/DIV 2 μs/DIV

❸ IC505 ㊽ 2V/DIV 5 μs/DIV

❹ IC502 ㉘ 1V/DIV (TP RF) 50 μs/DIV

❺ IC504 ㊷ 2V/DIV (TP WFCK) 50 μs/DIV

❻ IC505 ㊾ 2V/DIV 20ns/DIV

❼ IC502 ㉙ 1V/DIV (TP TE) 500 μs/DIV

❽ IC503 ㊱, IC504 ㊸, IC507 ㊽ 2V/DIV 5 μs/DIV

❾ IC505 ㊿ 1V/DIV 100ns/DIV

❿ IC502 ㉗ 0.1V/DIV (TP FE) 500 μs/DIV

⓫ IC507 ㊻, IC510 ⑰ 2V/DIV 10 μs/DIV

⓬ IC507 ㊻, IC510 ⑰ 0.1V/DIV 5 μs/DIV

⓭ IC504 ㊹ 2V/DIV (TP PLCK) 100ns/DIV

⓮ IC505 ① 2V/DIV 50 μs/DIV

⓯ IC510 ㊽ 1V/DIV 10ns/DIV

⓰ IC504 ㊺ 2V/DIV (TP RFCK) 50 μs/DIV

⓱ IC507 ㊼ 1V/DIV 10ns/DIV

⓲ IC514 ㊸, ㊹ 1V/DIV 20ns/DIV

⓳ IC504 ㊻ 2V/DIV 200 μs/DIV

⓴ IC507 ㊾ 1V/DIV 10ns/DIV

㉑ IC503 ⑤ 0.05V/DIV 50ns/DIV

㉒ IC504 ㊼ 2V/DIV 20ns/DIV

㉓ IC507 ㊿ 0.5V/DIV 10ns/DIV

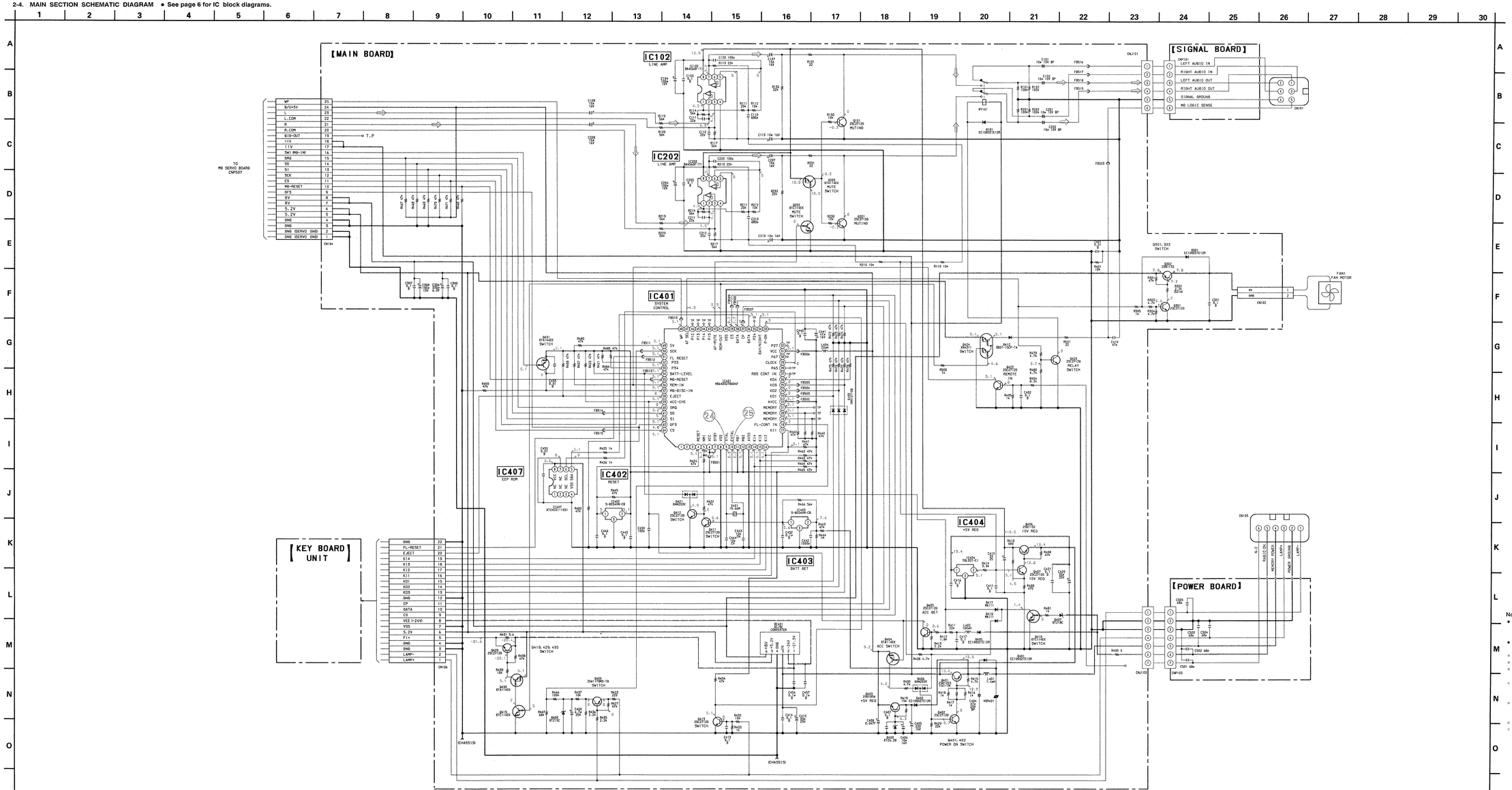
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

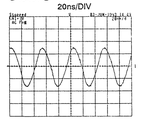
- ⏚ : B + Line.
- Power voltage is dc 14.4 V and fed with regulated dc power supply from MEMORY POWER and RADIO ON terminals.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark : MD PLAY
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : MD

2-4. MAIN SECTION SCHEMATIC DIAGRAM • See page 6 for IC block diagrams.

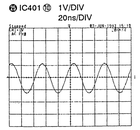


• Main Board Waveforms

① IC401 ⑳ 1V/DIV 20ns/DIV



② IC401 ㉕ 1V/DIV 20ns/DIV



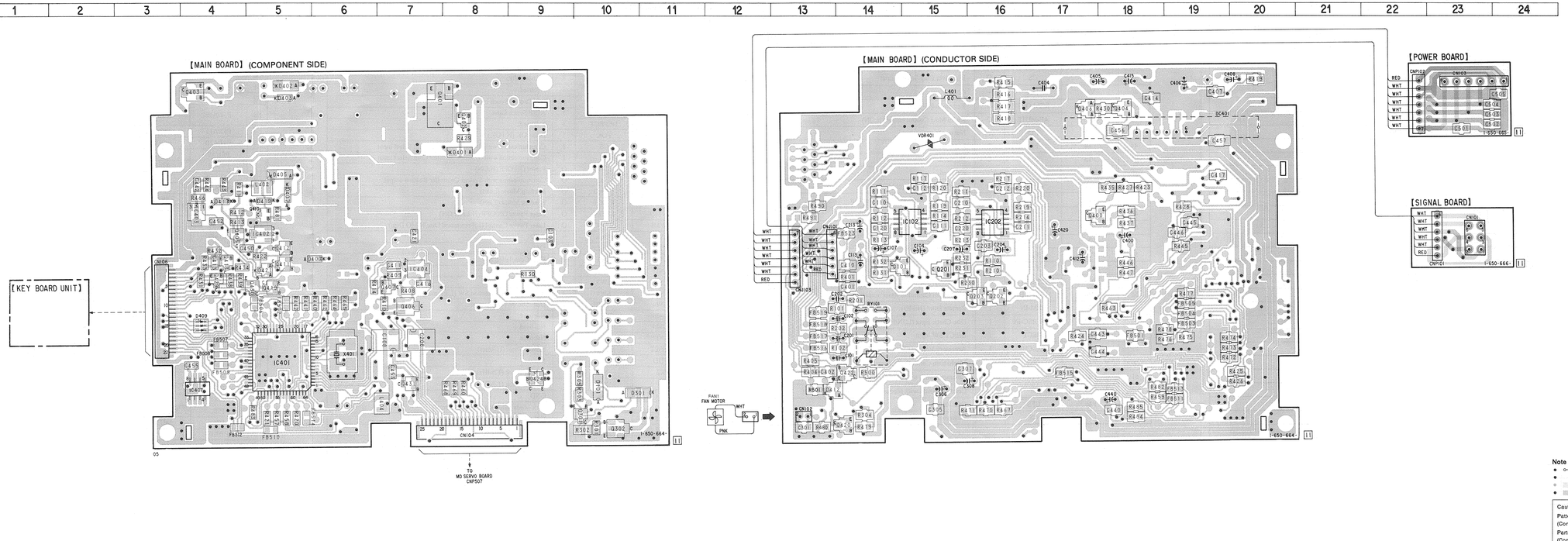
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⎓ : B+ Line.
- ⎓ : B+ Line.
- Power voltage is dc 14.4 V and fed with regulated dc power supply from MEMORY POWER and RADIO ON terminals.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark : MD PLAY
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : MD

2-5. MAIN SECTION PRINTED WIRING BOARDS • See page 34 for semiconductor lead layouts.

• Semiconductor Location

Ref. No.	Location
D101	F-10
D301	F-10
D400	D-5
D401	C-8
D402	B-5
D403	B-5
D405	C-5
D406	B-17
D407	C-5
D409	E-4
D412	F-13
D417	C-4
D419	C-5
D421	D-5
IC102	D-15
IC202	D-16
IC401	E-5
IC402	D-5
IC403	D-4
IC404	D-7
IC407	F-4
Q101	D-14
Q201	D-15
Q202	E-16
Q203	E-16
Q301	G-10
Q302	G-10
Q400	C-17
Q401	B-17
Q402	B-8
Q403	B-4
Q404	B-18
Q405	D-4
Q406	E-7
Q407	E-7
Q410	C-5
Q411	D-5
Q412	D-5
Q413	D-4
Q419	E-5
Q420	G-14
Q422	F-14
Q424	F-9
Q429	D-4
Q430	E-5
Q431	F-7



Note on Printed Wiring Board:

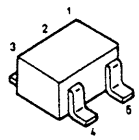
- ○—— : parts extracted from the component side.
- ● : Through hole.
- ▒▒▒ : Pattern of the rear side.
- ▒▒▒ : Pattern from the side which enables seeing.

Caution:

Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

• Semiconductor Lead Layouts

TC4S66F



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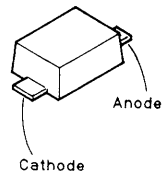

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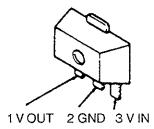
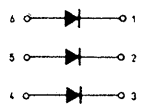


IMN10



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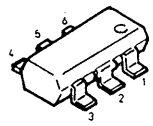
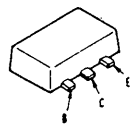
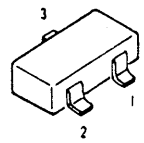
2SB1123-T
2SD1834

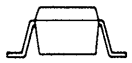


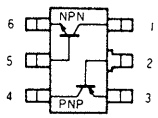


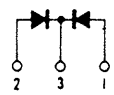
MA152WK



XN4311







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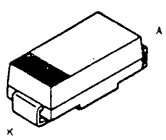
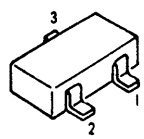
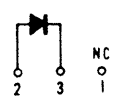
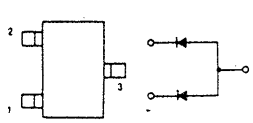


SB01-15CP

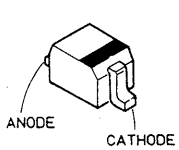




DAP202U



DTZ6.2B
DTZ15C-TT11
DTZ18C-TT11



2-6. IC PORT FUNCTION DESCRIPTION

• EXPLANATION OF IC TERMINAL FUNCTION

IC401 (HD6433288A08F) MAIN BOARD

No.	Port Name	Name	I/O	Description
1	P50/TXD	TXD	O	Not used.
2	P51/RXD	RXD	I	Not used.
3	P52/SCX	REQ	I/O	Not used.
4	RES	RESET	I	Main System Reset input
5	NMI	NMI	I	Not used.
6	Vcc	Vcc	–	Vcc
7	STBY	STBY	I	Not used.
8	Vss	Vss	–	GND
9	XTAL	XTAL	I	Main System Clock (19.66MHz)
10	EXTAL	EXTAL	I	Main System Clock (19.66MHz)
11	MD1	MD1	I	Not used.
12	MD0	MD2	I	Not used.
13	AVss	AVss	–	GND
14	P70	K14	I	Key Scan input
15	P71	K13	I	Key Scan input
16	P72	K12	I	Key Scan input
17	P73	KI1	I	Key Scan input
18	AN4	FL-CONT-IN	I	FL Illumination Control input
19	P75	MEMORY	I	Memory input
20	P76	MEMORY	I	Memory input
21	P77	MEMORY	I	Memory input
22	AVcc	AVcc	–	AVcc
23	P60	KO1	O	Key Scan output
24	P61	KO2	O	Key Scan output
25	P62	KO3	O	Key Scan output
26	P63	KO4	O	Key Scan output
27	P64	RDS-CONT-IN	I	Not used
28	P65	P65	O	Not used.
29	P66	CLOCK	O	EEP-ROM-Clock output
30	P67	P67	O	Not used.
31	Vcc	Vcc	–	Vcc
32	P27	P27	O	Not used.
33	P26	P-ON	O	System Power ON/OFF output (H:ON)
34	P25	DAY/NIGH	I	Illumination Control input (H:Day/L:Night)
35	P24	P24	O	Not used.

No.	Port Name	Name	I/O	Description
36	P23	DATA	O	EEP-ROM Data output
37	P22	CP	O	FL Driver Clock output
38	P21	DATA	O	FL Driver Data output
39	P20	CS	O	FL Driver Chip Select output
40	Vss	Vss	–	GND
41	P17	REM-OUT	O	Remote output (L:MD)
42	P16	AF-MUTE	O	Audio Mute Control output (H:ON)
43	P15	P15	O	Not used.
44	P14	P14	O	Not used.
45	P13	P13	O	Not used.
46	P12	P12	O	Not used.
47	P11	AFSEL	O	AF Changing output (H:MD/L:CD)
48	P10	WP	O	Mechanism Controller Wake-Up output
49	P30	5V	–	Not used.
50	P31	SCK	O	Communication with Mechanism Controller Clock output
51	P32	FL RESET	O	FL Driver Reset
52	P33	P33	I	Not used.
53	P34	P34	I	Not used.
54	P35	BATT-LEVEL	I	Battery Voltage Check input
55	P36	MD-RESET	O	Mechanism Controller Reset output
56	P37	REM-IN	I	Remote input (H:MD)
57	P40	MD-DISC-IN	I	Disc Check input (L:IN/H:OUT)
58	P41	EJECT	I	EJECT SW input
59	P42	ACC-CHE	I	Accessory Voltage Check input (L:IN)
60	P43	SRQ	I	Mechanism Controller Request
61	P44	SO	I	Communication with Mechanism Controller Data input
62	P45	SI	O	Communication with Mechanism Controller Data output
63	P46	GFS	I	GFS input
64	P47	CS	O	Communication with Mechanism Controller Chip Select output

IC514 (μPD78136GF033-389)

No.	Port Name	Name	I/O	Description
1	P34/	TESTON	I	Switching of Test Mode ON/OFF (H:ON)
2	P35/SI	SI	I	Communication with system Controller Data input
3	P36/SO/	SO	O	Communication with System Controller Data output
4	P37/SCK	SCK	I	Communication with System Controller Clock input
5	P20/NMI	WP	I	5V normally.
6	P21/INTP	DQSY	I	Not used.
7	P22/INTP	SQSY	I	Sub Code Q Synch input.
8	P23/INTP	ADSY	I	ADIP Synch input.
9	P24/CTI –	DEFECT	I	Not used.
10	P25/CTI –	FOK	I	Focus OK (H:FOK)
11	P26/CTI –	CS	I	Communication with System Controller Chip Select input
12	P27/CLRI	CS	I	Communication with System Controller Chip Select input
13	P30/PTO –	POWER	O	Power ON/OFF (H:ON)
14	P31/PTO –	SRQ	O	Communication with System Controller Request output
15	P32/PTO –	LOAD	O	Loading Motor (Load)
16	P33/PTO –	EJECT	O	Loading Motor (Eject)
17	PWMO	LDON	O	Laser Power ON/OFF (H:Laser ON)
18	PWMI	LDPOWER	O	Laser Power Control (L:Premasterd Disc/H:MO Disc)
19	AVss	AVss	–	GND
20	AVRFE	AVREF	–	5V
21	ANI0	SW1	I	Eject Completion SW
22	ANI1	SW2	I	Loading Completion SW
23	ANI2	SW3	I	Not used.
24	ANT3	SW4	I	Reflection Rate Detection SW (L:Premasterd Disc/H:MO Disc)
25	ANI4	TEMP	I	Detection of Temperature
26	ANI5	TEST	I	Not used.
27	ANI6	TEST	I	Not used.
28	ANI7	TEST	I	Not used.
29	RESET	RESET		System Reset (L:Reset)
30	VDD	VDD	–	5V
31	X2	X2		System Clock (12MHz)
32	X1	X1		System Clock (12MHz)
33	Vss	Vss	–	GND
34	P00	RFSW1	O	Disk Mode Selection (H:Pit/L:Groove)
35	P01	RFSW0	O	Disk Mode Selection (H:Premastered/L:MO)
36	P02	ASYSW	O	Asymmetry ON/OFF Control
37	P03	AGCSW	O	AGC Time Constant Selection
38	P04	MIRR	O	MIRR Selection
39	P05	DFCTSW	O	Defect Selection
40	P06	SLOMUTE	O	Sled Motor Driver Power Control
41	P07	COMP	O	Not used.
42	P67	KI3	I	Key Scan input
43	P66	KI2	I	Key Scan input
44	P65	KI1	I	Key Scan input
45	P64	KI0	I	Key Scan input

No.	Port Name	Name	I/O	Description
46	P63	KO3	O	Key Scan output
47	P62	KO2	O	Key Scan output
48	P61	KO1	O	Key Scan output
49	P60	KO0	O	Key Scan output
50	P57/A15	POK	I	Focus OK input
51	P56/A14	ATT	O	Attenuator ON/OFF Control to CXD2527 (H:ATT ON)
52	P55/A13	AEXEC	O	Start/Stop Command output to CXD2527 (H:Start)
53	P54/A12	CD/MO	I	Reflection Rate Judgement input (H:High Reflection Rate/L:Low Reflection Rate)
54	P53/A11	SENS	I	SENS input from CXA1082, CXD2525
55	P52/A10	LOCK	I	CLV Lock Safe input (H:CLV Lock)
56	P51/A9	GDFS	I	Guard Frame Synch. OK at "H"
57	P50/A8	XINT	I	Input for Interrupt Requirement of CXD2526
58	P47/AD7	MD2	O	Digital Out ON/OFF Control (H:ON)
59	P46/AD6	DIRC	O	Output for Servo IC duuring 1 Track Jump
60	P45/AD5	XRST	O	Reset of CXA1082, CXD2525, CXD2526
61	P44/AD4	SORS	O	Not used.
62	P43/AD3	SBMN	O	Not used.
63	P42/AD2	WRMN	O	Output of Writing Permission to RAM (H:Playback Mode /L:Moniter Mode)
64	P41/AD1	RCPB	O	Not used.
65	P40/AD0	SCTX	O	Not used.
66	ASTB/CLO	FOSTSW	O	Offset Changing output of Focus Error
67	Vss	Vss	–	GND
68	EA	EA	I	Not used.
69	P10	SCK	O	Clock to CXA1082, CXD2525, CXD2526, CXD2527
70	P11	ARST	O	Reset of CXD2527
71	P12	SWDT	O	Data to CXA1082, CXD2525, CXD2526, CXD2527
72	P13	SRDT	I	Data from CXD2525, CXD2526
73	P14	XLAT	O	Latch to CXA1082, CXD2525, CXD2526, CXD2527
74	P15	MCK	O	Digital Filter Interface Clock output
75	P16	MDT	O	Digital Filter Interface Data output
76	P17	MLEN	O	Digital Filter Interface Latch Enable output
77	VDD	VDD	–	5V
78	P70	8VPOWER	O	Mechanism Power ON/OFF Control (H:ON)
79	P71	MUTE	O	Audio Mute output (H:Mute ON)
80	PT010		–	Not used.

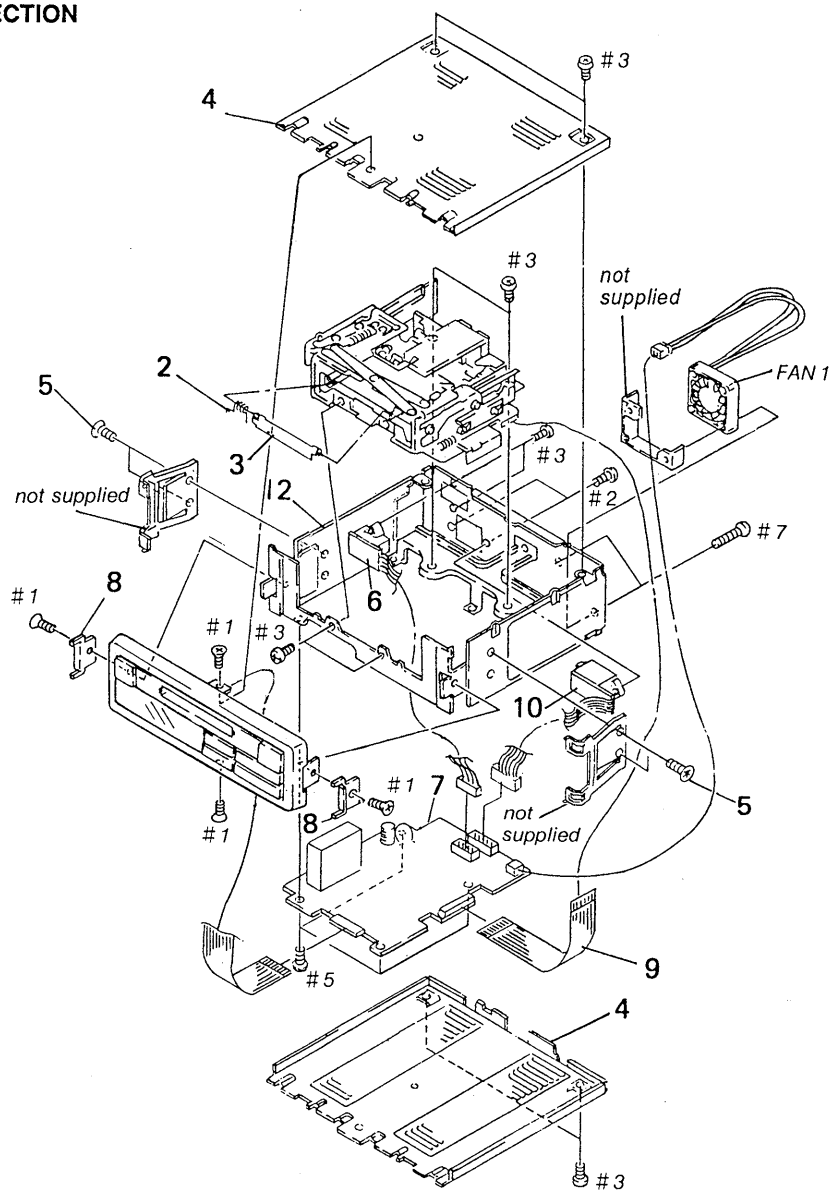
SECTION 3
EXPLODED VIEWS

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

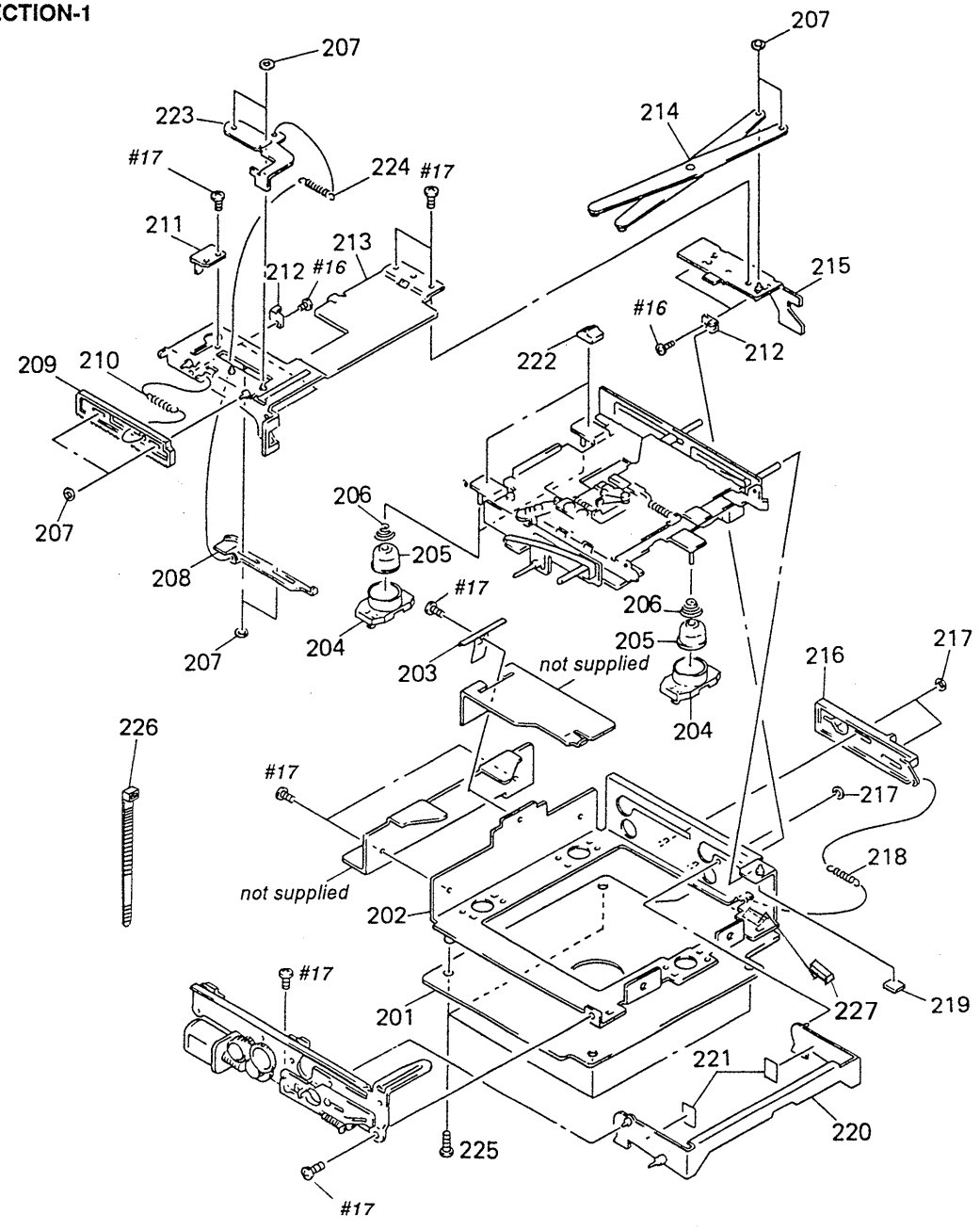
(1) CHASSIS SECTION



Ref. No.	Part No.	Description	Remark
2	3-384-527-01	SPRING (DOOR)	
3	3-384-525-01	DOOR (HOLDER)	
* 4	X-3367-334-1	COVER ASSY	
5	3-342-659-01	SCREW (SPRING CLIP)	
* 6	1-650-665-11	POWER BOARD	
* 7	A-3295-878-A	MAIN BOARD, COMPLETE	
* 8	3-362-079-01	REINFORCEMENT (PANEL)	

Ref. No.	Part No.	Description	Remark
9	1-751-553-11	CABLE, FLEXIBLE FLAT (25 CORE)	
* 10	1-650-666-11	SIGNAL BOARD	
* 12	X-3367-333-1	CHASSIS ASSY	
13	3-906-619-01	SPACER	
FAN1	1-541-973-11	MOTOR (FAN)	

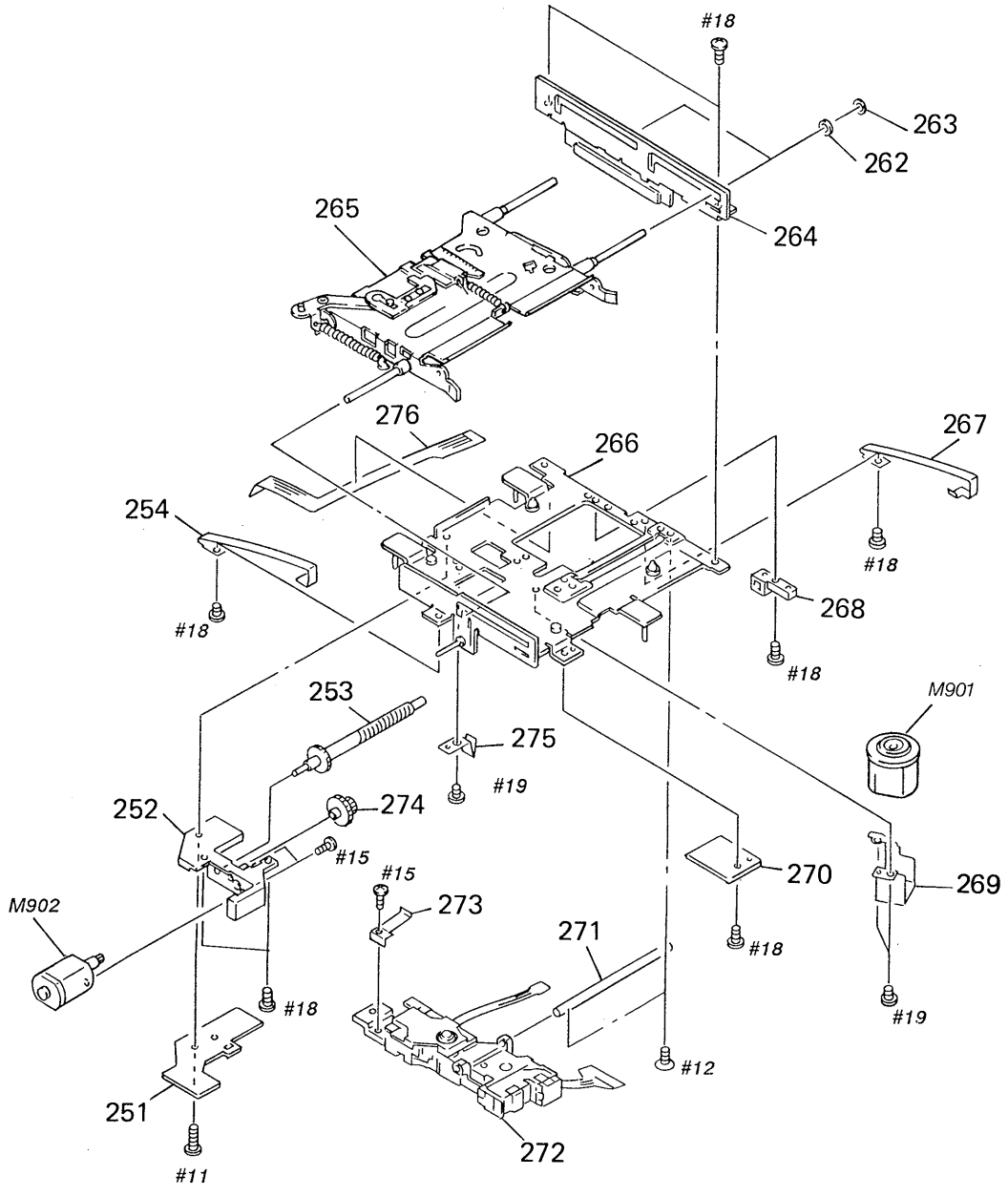
(2) MD SECTION-1



Ref. No.	Part No.	Description	Remark
* 201	A-3295-986-A	MD SERVO BOARD, COMPLETE	
* 202	X-3365-841-1	CHASSIS ASSY, MD	
203	3-906-425-01	SPRING (LL)	
204	3-906-451-01	DAMPER (NKZ)	
* 205	3-384-484-01	COVER (NKZ)	
206	3-384-456-01	SPRING (FL), CONE COIL	
207	3-341-753-01	WASHER (M)	
208	3-904-025-01	SLIDER (CL)	
209	3-384-442-11	RACK	
210	3-389-366-01	SPRING (POWER TENSION), TENSION	
* 211	3-384-426-01	LEVER (SW)	
212	3-384-436-01	GUIDE (LOADER)	
* 213	X-3365-838-1	LOADER (L) ASSY	
214	X-3365-840-1	LEVER (X) ASSY	
* 215	X-3365-837-1	LOADER (R) ASSY	
216	3-384-438-01	LEVER (LOCK R)	
217	3-377-719-01	WASHER, POLYETHYLENE	
218	3-567-110-00	SPRING, TENSION	
* 219	3-387-131-01	CUSHION	
220	X-3367-406-1	SHUTTER ASSY	
221	3-348-750-01	CUSHION (DAMPER)	
* 223	3-385-638-01	LEVER (RT)	
224	3-376-341-01	SPRING, TENSION	
225	3-905-283-02	SCREW (+PSW)	
226	3-905-744-01	BAND	
227	3-908-233-01	SPACER	

(3) MD SECTION-2

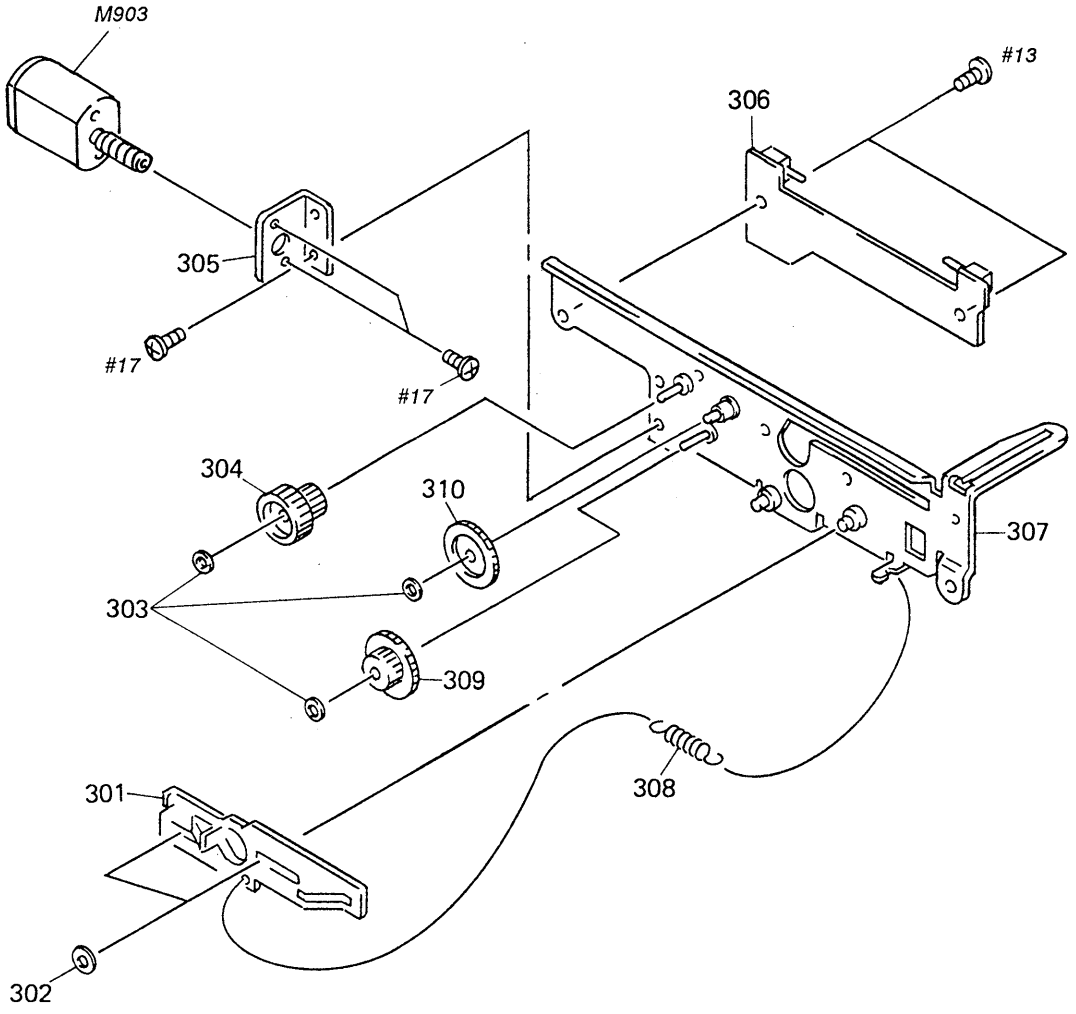
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.



Ref. No.	Part No.	Description	Remark
* 251	1-648-741-31	RELAY BOARD	
252	X-3365-843-1	HOLDER (SL) ASSY	
253	X-3365-846-1	SHAFT (FEED) ASSY	
254	3-384-466-01	SPRING (CHL)	
261	3-384-457-01	SPRING, TENSION	
262	3-738-212-11	RETAINER, THRUST, REEL TABLE	
263	3-385-409-01	WASHER, POLYETHYLENE	
* 264	X-3365-847-1	CHASSIS (R) ASSY	
* 265	X-3366-742-1	HOLDER ASSY	
* 266	X-3365-844-1	CHASSIS (OP) ASSY	
267	3-384-467-01	SPRING (CHR)	
268	3-384-464-01	BEARING (FEED)	

Ref. No.	Part No.	Description	Remark
269	3-384-472-01	RTAINER (SP)	
* 270	1-648-739-31	DISCRIMINATION BOARD	
271	3-384-460-01	SHAFT (KJ)	
⚠272	8-848-271-11	DEVICE, MINI-DISC KMS-150A	
273	3-384-475-01	SPRING (RACK 3)	
274	3-384-836-01	GEAR (SLB)	
275	3-384-465-01	SPRING (FEED SHAFT)	
276	1-645-960-11	SENSOR FLEXIBLE BOARD	
M901	X-3365-848-1	MOTOR ASSY, SPINDLE	
M902	X-3365-845-1	MOTOR ASSY, SLED	

(4) MD SECTION-3



Ref. No.	Part No.	Description	Remark
301	3-384-437-01	LEVER (LOCK L)	
302	3-377-719-01	WASHER, POLYETHYLENE	
303	3-573-936-00	STOPPER, REEL	
304	3-384-440-01	WHEEL, WORM	
* 305	3-384-419-01	BRACKET (M)	
* 306	1-648-740-31	LOADING BOARD	
* 307	X-3365-836-1	CHASSIS (L) ASSY	
308	3-567-110-00	SPRING, TENSION	
309	3-384-441-01	GEAR (A)	
310	3-384-435-01	GEAR (B)	
M903	X-3365-849-1	MOTOR ASSY, LOADING	

SECTION 4
ELECTRICAL PARTS LIST

DISCRIMINATION | LOADING | MD SERVO

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref.No.	Part No.	Description			Remark
*	1-648-739-31	DISCRIMINATION BOARD			
		**********			
		< CONNECTOR >			
* CNP511	1-580-055-21	PIN, CONNECTOR 2P			
		< SWITCH >			
SW632	1-692-373-21	SWITCH, PUSH (1 KEY) (PB ONLY DISC/REC, PB DISC)			
**********					
*	1-648-740-31	LOADING BOARD			
		**********			
		< CAPACITOR >			
C900	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C901	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		< SWITCH >			
SW621	1-572-467-61	SWITCH, PUSH (1 KEY) (LOADING END)			
SW622	1-572-467-61	SWITCH, PUSH (1 KEY) (LOADING START/EJECT END)			
**********					
*	A-3295-986-A	MD SERVO BOARD, COMPLETE			
		**********			
*	3-904-493-01	HEAT SINK (3A)			
		< CAPACITOR >			
C501	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C502	1-164-343-11	CERAMIC CHIP	0.056uF	10%	25V
C503	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C504	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C505	1-164-676-11	CERAMIC CHIP	2200PF	5%	16V
C506	1-162-946-11	CERAMIC CHIP	27PF	5%	50V
C507	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C508	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C509	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C510	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C511	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C512	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C513	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C514	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C515	1-162-979-11	CERAMIC CHIP	0.0027uF	10%	50V
C516	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C517	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C518	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C519	1-162-969-11	CERAMIC CHIP	0.0068uF	10%	25V
C520	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C521	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C522	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C523	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C524	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C525	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C526	1-135-161-21	TANTALUM CHIP	22uF	10%	10V
C530	1-164-357-11	CERAMIC CHIP	1000PF	5%	50V
C531	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C532	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V
C533	1-162-968-11	CERAMIC CHIP	0.0047uF	10%	50V
C534	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C535	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C536	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C537	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C538	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C539	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C540	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C541	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C542	1-135-216-11	TANTALUM CHIP	10uF	20%	10V
C543	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C544	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C545	1-107-469-21	ELECT	10uF	20%	6.3V
C546	1-164-677-11	CERAMIC CHIP	0.033uF	10%	16V
C547	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C548	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C549	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C550	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C551	1-104-700-11	CERAMIC CHIP	0.027uF	10%	16V
C553	1-162-568-11	CERAMIC CHIP	0.33uF	10%	16V
C556	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V

MD SERVO

Ref.No.	Part No.	Description				Remark
C557	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C560	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C561	1-162-916-11	CERAMIC CHIP	12PF	5%	50V	
C562	1-162-916-11	CERAMIC CHIP	12PF	5%	50V	
C563	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C565	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C566	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C567	1-164-227-11	CERAMIC CHIP	0.022uF	10%	25V	
C570	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V	
C573	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C574	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V	
C577	1-165-176-11	CERAMIC CHIP	0.047uF	10%	16V	
C591	1-135-161-21	TANTALUM CHIP	22uF	10%	10V	
C592	1-135-161-21	TANTALUM CHIP	22uF	10%	10V	
C600	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C601	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C602	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C604	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C605	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C606	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C607	1-162-916-11	CERAMIC CHIP	12PF	5%	50V	
C608	1-162-919-11	CERAMIC CHIP	22PF	5%	50V	
C701	1-162-957-11	CERAMIC CHIP	220PF	5%	50V	
C702	1-162-949-11	CERAMIC CHIP	47PF	5%	50V	
C703	1-162-949-11	CERAMIC CHIP	47PF	5%	50V	
C705	1-162-919-11	CERAMIC CHIP	22PF	5%	50V	
C706	1-128-309-11	ELECT	4.7uF	20%	6.3V	
C707	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C708	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C709	1-128-022-11	ELECT CHIP	22uF	20%	6.3V	
C711	1-126-592-11	ELECT CHIP	4.7uF	20%	16V	
C801	1-162-957-11	CERAMIC CHIP	220PF	5%	50V	
C802	1-162-949-11	CERAMIC CHIP	47PF	5%	50V	
C803	1-162-949-11	CERAMIC CHIP	47PF	5%	50V	
C805	1-162-919-11	CERAMIC CHIP	22PF	5%	50V	
C806	1-128-309-11	ELECT	4.7uF	20%	6.3V	
C807	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C808	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	
C809	1-128-022-11	ELECT CHIP	22uF	20%	6.3V	
C811	1-126-592-11	ELECT CHIP	4.7uF	20%	16V	
C902	1-162-918-11	CERAMIC CHIP	18PF	5%	50V	
C903	1-162-920-11	CERAMIC CHIP	27PF	5%	50V	
		< CONNECTOR >				
CNP501	1-568-740-11	CONNECTOR, FPC (1.0MM) (ZIF) 18P				
CNP502	1-580-438-21	CONNECTOR, FPC 4P				
CNP503	1-691-799-11	SOCKET, CONNECTOR 8P				
* CNP505	1-580-055-21	PIN, CONNECTOR 2P				
* CNP506	1-580-056-21	PIN, CONNECTOR 3P				
CNP507	1-750-992-21	CONNECTOR, FPC 25P				
		< DIODE >				
D501	8-719-941-86	DIODE DAN202U				
D503	8-719-941-09	DIODE DAP202U				
		< FERRITE BEAD >				
FB501	1-216-295-11	METAL GLAZE 0		5%	1/10W	
FB502	1-216-295-11	METAL GLAZE 0		5%	1/10W	
FB503	1-543-948-11	BEAD, FERRITE (CHIP)				
FB504	1-543-948-11	BEAD, FERRITE (CHIP)				
FB505	1-216-295-11	METAL GLAZE 0		5%	1/10W	
FB506	1-543-948-11	BEAD, FERRITE (CHIP)				
FB507	1-543-948-11	BEAD, FERRITE (CHIP)				
FB508	1-543-948-11	BEAD, FERRITE (CHIP)				
FB509	1-543-948-11	BEAD, FERRITE (CHIP)				
FB510	1-543-948-11	BEAD, FERRITE (CHIP)				
FB511	1-543-948-11	BEAD, FERRITE (CHIP)				
FB512	1-543-948-11	BEAD, FERRITE (CHIP)				
FB513	1-543-948-11	BEAD, FERRITE (CHIP)				
FB514	1-543-948-11	BEAD, FERRITE (CHIP)				
FB515	1-543-948-11	BEAD, FERRITE (CHIP)				
FB516	1-543-948-11	BEAD, FERRITE (CHIP)				
FB517	1-543-948-11	BEAD, FERRITE (CHIP)				
FB518	1-216-295-11	METAL GLAZE 0		5%	1/10W	
FB519	1-543-948-11	BEAD, FERRITE (CHIP)				
FB520	1-216-295-11	METAL GLAZE 0		5%	1/10W	
FB521	1-543-948-11	BEAD, FERRITE (CHIP)				
		< IC >				
IC501	8-752-064-33	IC CXA1380N				
IC502	8-752-064-34	IC CXA1381R				
IC503	8-752-057-45	IC CXA1082BQ				
IC504	8-752-352-18	IC CXD2525R				
IC505	8-752-354-57	IC CXD2526Q				
IC506	8-752-360-59	IC CXK414400TM-12U				
IC507	8-752-355-96	IC CXD2527R				
IC510	8-752-355-96	IC CXD2527R				
IC513	8-759-071-62	IC BA6298FP				
IC514	8-759-254-20	IC uPD78P138GF-033-3B9				
IC515	8-759-234-77	IC TC4S66F				
IC516	8-759-234-77	IC TC4S66F				
IC517	8-759-234-77	IC TC4S66F				
IC519	8-759-040-83	IC BA6287F				
IC523	8-759-234-77	IC TC4S66F				
IC601	8-759-173-51	IC SM5872AS-ET				
IC602	8-759-150-61	IC uPC78L05T				
IC701	8-759-711-85	IC NJM4580E-D				

Ref. No.	Part No.	Description				Remark
IC702	8-759-234-77	IC	TC4S66F			
IC801	8-759-711-85	IC	NJM4580E-D			
IC802	8-759-234-77	IC	TC4S66F			
		< COIL >				
L501	1-410-204-31	INDUCTOR CHIP	10uH			
L502	1-414-237-21	INDUCTOR	10uH			
L600	1-410-204-31	INDUCTOR CHIP	10uH			
L601	1-410-204-31	INDUCTOR CHIP	10uH			
		< TRANSISTOR >				
Q501	8-729-807-35	TRANSISTOR	2SB1123-T			
Q504	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q505	8-729-807-35	TRANSISTOR	2SB1123-T			
Q506	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q507	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q508	8-729-014-16	TRANSISTOR	RN2302-TE85L			
Q512	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q513	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q601	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q602	8-729-807-35	TRANSISTOR	2SB1123-T			
Q603	8-729-230-63	TRANSISTOR	2SC4116-YG			
Q604	8-729-807-35	TRANSISTOR	2SB1123-T			
Q605	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q606	8-729-807-35	TRANSISTOR	2SB1123-T			
Q607	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q608	8-729-421-26	TRANSISTOR	UN5216QRS			
Q610	8-729-013-88	TRANSISTOR	RN1302-TE85L			
Q611	8-729-013-88	TRANSISTOR	RN1302-TE85L			
		< RESISTOR >				
R501	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R502	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R503	1-220-372-11	METAL GLAZE	200K	5%	1/16W	
R504	1-220-372-11	METAL GLAZE	200K	5%	1/16W	
R505	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R506	1-218-448-11	METAL GLAZE	430K	5%	1/16W	
R512	1-218-347-11	METAL GLAZE	91K	5%	1/16W	
R513	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R514	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R515	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R516	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R517	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R518	1-216-849-11	METAL CHIP	220K	5%	1/16W	
R519	1-216-813-11	METAL CHIP	220	5%	1/16W	
R522	1-216-800-11	METAL GLAZE	18	5%	1/16W	
R523	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R524	1-218-354-11	METAL GLAZE	160	5%	1/16W	
R525	1-218-331-11	METAL GLAZE	51K	5%	1/16W	

Ref. No.	Part No.	Description				Remark
R529	1-218-272-11	METAL GLAZE	5.1K	5%	1/16W	
R530	1-216-993-11	METAL GLAZE	2.4K	5%	1/16W	
R531	1-218-344-11	METAL GLAZE	7.5K	5%	1/16W	
R532	1-216-838-11	METAL CHIP	27K	5%	1/16W	
R533	1-216-825-11	METAL CHIP	2.2K	5%	1/16W	
R534	1-216-809-11	METAL CHIP	100	5%	1/16W	
R535	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R536	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R537	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R538	1-216-857-11	METAL CHIP	1M	5%	1/16W	
R539	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R540	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R541	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R542	1-218-354-11	METAL GLAZE	160	5%	1/16W	
R543	1-218-354-11	METAL GLAZE	160	5%	1/16W	
R544	1-216-837-11	METAL CHIP	22K	5%	1/16W	
R545	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R546	1-216-846-11	METAL CHIP	120K	5%	1/16W	
R547	1-216-839-11	METAL CHIP	33K	5%	1/16W	
R548	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R549	1-216-848-11	METAL CHIP	180K	5%	1/16W	
R550	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R551	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R552	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R553	1-216-838-11	METAL CHIP	27K	5%	1/16W	
R554	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R555	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R556	1-218-273-11	METAL GLAZE	510K	5%	1/16W	
R557	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R558	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R559	1-216-829-11	METAL CHIP	4.7K	5%	1/16W	
R560	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R561	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R562	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R563	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R565	1-218-331-11	METAL GLAZE	51K	5%	1/16W	
R566	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R567	1-216-833-11	METAL CHIP	10K	5%	1/16W	
R568	1-218-272-11	METAL GLAZE	5.1K	5%	1/16W	
R569	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R570	1-216-845-11	METAL CHIP	100K	5%	1/16W	
R572	1-216-824-11	METAL CHIP	1.8K	5%	1/16W	
R573	1-216-827-11	METAL CHIP	3.3K	5%	1/16W	
R574	1-216-821-11	METAL CHIP	1K	5%	1/16W	
R575	1-218-354-11	METAL GLAZE	160	5%	1/16W	
R576	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R577	1-216-841-11	METAL CHIP	47K	5%	1/16W	
R578	1-216-841-11	METAL CHIP	47K	5%	1/16W	

MD SERVO MAIN

Ref. No.	Part No.	Description			Remark
R579	1-216-841-11	METAL CHIP	47K	5%	1/16W
R580	1-216-809-11	METAL CHIP	100	5%	1/16W
R581	1-216-809-11	METAL CHIP	100	5%	1/16W
R583	1-216-809-11	METAL CHIP	100	5%	1/16W
R585	1-216-845-11	METAL CHIP	100K	5%	1/16W
R586	1-216-825-11	METAL CHIP	2.2K	5%	1/16W
R587	1-216-826-11	METAL CHIP	2.7K	5%	1/16W
R588	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R589	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R590	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R591	1-216-033-00	METAL CHIP	220	5%	1/10W
R592	1-216-821-11	METAL CHIP	1K	5%	1/16W
R594	1-216-833-11	METAL CHIP	10K	5%	1/16W
R595	1-216-033-00	METAL CHIP	220	5%	1/10W
R596	1-216-841-11	METAL CHIP	47K	5%	1/16W
R597	1-216-833-11	METAL CHIP	10K	5%	1/16W
R598	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R599	1-216-833-11	METAL CHIP	10K	5%	1/16W
R600	1-216-033-00	METAL CHIP	220	5%	1/10W
R601	1-216-821-11	METAL CHIP	1K	5%	1/16W
R602	1-216-841-11	METAL CHIP	47K	5%	1/16W
R603	1-216-845-11	METAL CHIP	100K	5%	1/16W
R604	1-216-845-11	METAL CHIP	100K	5%	1/16W
R605	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R606	1-216-841-11	METAL CHIP	47K	5%	1/16W
R607	1-216-819-11	METAL CHIP	680	5%	1/16W
R608	1-216-817-11	METAL CHIP	470	5%	1/16W
R609	1-216-845-11	METAL CHIP	100K	5%	1/16W
R610	1-216-845-11	METAL CHIP	100K	5%	1/16W
R611	1-216-841-11	METAL CHIP	47K	5%	1/16W
R612	1-216-041-00	METAL CHIP	470	5%	1/10W
R613	1-216-041-00	METAL CHIP	470	5%	1/10W
R614	1-216-841-11	METAL CHIP	47K	5%	1/16W
R615	1-216-833-11	METAL CHIP	10K	5%	1/16W
R616	1-216-041-00	METAL CHIP	470	5%	1/10W
R617	1-216-041-00	METAL CHIP	470	5%	1/10W
R618	1-216-827-11	METAL CHIP	3.3K	5%	1/16W
R619	1-216-821-11	METAL CHIP	1K	5%	1/16W
R620	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R621	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R622	1-216-835-11	METAL CHIP	15K	5%	1/16W
R623	1-216-829-11	METAL CHIP	4.7K	5%	1/16W
R701	1-216-994-11	METAL CHIP	13K	0.50%	1/16W
R702	1-216-994-11	METAL CHIP	13K	0.50%	1/16W
R703	1-218-873-11	METAL CHIP	12K	0.50%	1/16W
R704	1-218-873-11	METAL CHIP	12K	0.50%	1/16W
R705	1-218-723-11	METAL CHIP	20K	0.50%	1/16W
R706	1-218-723-11	METAL CHIP	20K	0.50%	1/16W
R707	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R708	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R709	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R710	1-216-805-11	METAL CHIP	47	5%	1/16W
R801	1-216-994-11	METAL CHIP	13K	0.50%	1/16W
R802	1-216-994-11	METAL CHIP	13K	0.50%	1/16W
R803	1-218-873-11	METAL CHIP	12K	0.50%	1/16W
R804	1-218-873-11	METAL CHIP	12K	0.50%	1/16W
R805	1-218-723-11	METAL CHIP	20K	0.50%	1/16W
R806	1-218-723-11	METAL CHIP	20K	0.50%	1/16W
R807	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R808	1-218-716-11	METAL CHIP	10K	0.50%	1/16W
R809	1-218-732-11	METAL CHIP	47K	0.50%	1/16W
R810	1-216-805-11	METAL CHIP	47	5%	1/16W
R902	1-216-803-11	METAL CHIP	33	5%	1/16W
R903	1-216-803-11	METAL CHIP	33	5%	1/16W

< VARIABLE RESISTOR >

RV510	1-238-091-11	RES, ADJ, CERMET	22K	
RV517	1-238-091-11	RES, ADJ, CERMET	22K	
RV518	1-238-091-11	RES, ADJ, CERMET	22K	
RV521	1-238-091-11	RES, ADJ, CERMET	22K	
RV528	1-238-089-11	RES, ADJ, CERMET	4.7K	
RV529	1-238-089-11	RES, ADJ, CERMET	4.7K	
RV542	1-238-089-11	RES, ADJ, CERMET	4.7K	
RV543	1-238-089-11	RES, ADJ, CERMET	4.7K	

< THERMISTOR >

TH501	1-808-656-11	THERMISTOR
TH502	1-808-656-11	THERMISTOR
TH503	1-810-421-21	THERMISTOR NTH5G36B103K01TE

< VIBRATOR >

X502	1-579-871-21	VIBRATOR, CRYSTAL (55MHz)
X503	1-579-875-21	VIBRATOR, CRYSTAL (12MHz)
X601	1-579-876-21	VIBRATOR, CRYSTAL (22MHz)

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* A-3295-878-A MAIN BOARD, COMPLETE

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< CAPACITOR >

C101	1-124-967-11	ELECT	10uF	20%	10V
C102	1-124-967-11	ELECT	10uF	20%	10V
C103	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C104	1-124-584-00	ELECT	100uF	20%	10V
C107	1-126-157-11	ELECT	10uF	20%	16V
C108	1-128-313-11	ELECT CHIP	10uF	20%	16V
C110	1-163-137-00	CERAMIC CHIP	680PF	5%	50V
C111	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C112	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C113	1-126-157-11	ELECT	10uF	20%	16V

Ref. No.	Part No.	Description			Remark
C120	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C201	1-124-967-11	ELECT	10uF	20%	10V
C202	1-124-967-11	ELECT	10uF	20%	10V
C203	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C204	1-124-584-00	ELECT	100uF	20%	10V
C207	1-126-157-11	ELECT	10uF	20%	16V
C208	1-128-313-11	ELECT CHIP	10uF	20%	16V
C210	1-163-137-00	CERAMIC CHIP	680PF	5%	50V
C211	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C212	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C213	1-126-157-11	ELECT	10uF	20%	16V
C220	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C301	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C305	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C306	1-128-057-11	ELECT	330uF	20%	6.3V
C307	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C308	1-124-584-00	ELECT	100uF	20%	10V
C400	1-126-163-11	ELECT	4.7uF	20%	50V
C401	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C402	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C404	1-107-701-91	ELECT	47uF	20%	25V
C405	1-126-934-11	ELECT	220uF	20%	16V
C406	1-126-157-11	ELECT	10uF	20%	16V
C407	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C408	1-125-701-11	CAP, DOUBLE LAYER		0.047F	
C410	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C411	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C412	1-124-242-00	ELECT	33uF	20%	25V
C413	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C414	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C415	1-124-242-00	ELECT	33uF	20%	25V
C416	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C417	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C420	1-124-242-00	ELECT	33uF	20%	25V
C421	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C440	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C441	1-124-589-11	ELECT	47uF	20%	16V
C442	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C443	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C444	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C445	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C446	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C450	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C452	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C453	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C455	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C456	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V
C457	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V

Ref. No.	Part No.	Description	Remark
		< CONNECTOR >	
* CN102	1-506-998-11	PIN, CONNECTOR (PC BOARD) 2P	
CN104	1-750-992-21	CONNECTOR, FPC 25P	
* CN106	1-750-884-21	CONNECTOR, FPC 22P	
* CNJ101	1-506-988-11	PIN, CONNECTOR (PC BOARD) 6P	
* CNJ103	1-506-989-11	PIN, CONNECTOR (PC BOARD) 7P	
		< DIODE >	
D101	8-719-210-33	DIODE EC10DS2	
D301	8-719-210-33	DIODE EC10DS2	
D400	8-719-978-66	DIODE DTZ15C-TT11	
D401	8-719-210-33	DIODE EC10DS2	
D402	8-719-210-33	DIODE EC10DS2	
D403	8-719-977-07	DIODE DTZ6.2B	
D405	8-719-210-33	DIODE EC10DS2	
D406	8-719-914-43	DIODE DAN202K	
D407	8-719-978-74	DIODE DTZ18C-TT11	
D409	8-719-951-22	DIODE IMN10	
D412	8-719-987-86	DIODE SB01-15CP	
D417	8-719-404-49	DIODE MA111	
D419	8-719-404-49	DIODE MA111	
D421	8-719-914-43	DIODE DAN202K	
		< DC/DC CONVERTER >	
DC401	1-467-193-11	CONVERTER UNIT, DC/DC	
		< FERRITE BEAD >	
FB501	1-543-948-11	BEAD, FERRITE (CHIP)	
FB502	1-543-948-11	BEAD, FERRITE (CHIP)	
FB503	1-543-948-11	BEAD, FERRITE (CHIP)	
FB504	1-543-948-11	BEAD, FERRITE (CHIP)	
FB505	1-543-948-11	BEAD, FERRITE (CHIP)	
FB506	1-543-948-11	BEAD, FERRITE (CHIP)	
FB507	1-543-948-11	BEAD, FERRITE (CHIP)	
FB508	1-543-948-11	BEAD, FERRITE (CHIP)	
FB509	1-543-948-11	BEAD, FERRITE (CHIP)	
FB510	1-543-948-11	BEAD, FERRITE (CHIP)	
FB511	1-543-948-11	BEAD, FERRITE (CHIP)	
FB512	1-543-948-11	BEAD, FERRITE (CHIP)	
FB513	1-543-948-11	BEAD, FERRITE (CHIP)	
FB514	1-543-948-11	BEAD, FERRITE (CHIP)	
FB515	1-543-948-11	BEAD, FERRITE (CHIP)	
FB516	1-543-948-11	BEAD, FERRITE (CHIP)	
FB517	1-543-948-11	BEAD, FERRITE (CHIP)	
FB518	1-543-948-11	BEAD, FERRITE (CHIP)	
FB519	1-543-948-11	BEAD, FERRITE (CHIP)	
FB523	1-543-948-11	BEAD, FERRITE (CHIP)	

MAIN

Ref. No.	Part No.	Description			Remark
		< IC >			
IC102	8-759-924-46	IC BA4560F			
IC202	8-759-924-46	IC BA4560F			
IC401	8-759-248-81	IC HD6433288A08F			
IC402	8-759-940-45	IC S-8054HN-CB-T1			
IC403	8-759-940-45	IC S-8054HN-CB-T1			
IC404	8-759-150-61	IC uPC78L05T			
IC407	8-759-179-59	IC AT24C01-10SI			
		< COIL >			
* L401	1-424-507-11	COIL, CHOKE	1.4mH		
L402	1-410-393-11	INDUCTOR CHIP	100uH		
L404	1-410-385-11	INDUCTOR CHIP	22uH		
		< TRANSISTOR >			
Q101	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q201	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q202	8-729-900-53	TRANSISTOR	DTC114EK		
Q203	8-729-901-04	TRANSISTOR	DTA114EK		
Q301	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q302	8-729-106-60	TRANSISTOR	2SB1115A-YQ		
Q400	8-729-216-22	TRANSISTOR	2SA1162-G		
Q401	8-729-821-63	TRANSISTOR	2SB1203FAT		
Q402	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q403	8-729-921-12	TRANSISTOR	2SD1834		
Q404	8-729-901-04	TRANSISTOR	DTA114EK		
Q405	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q406	8-729-106-60	TRANSISTOR	2SB1115A-YQ		
Q407	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q410	8-729-900-53	TRANSISTOR	DTC114EK		
Q411	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q412	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q413	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q419	8-729-900-53	TRANSISTOR	DTC114EK		
Q420	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q422	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q424	8-729-011-47	TRANSISTOR	XN4311		
Q429	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q430	8-729-901-04	TRANSISTOR	DTA114EK		
Q431	8-729-901-06	TRANSISTOR	DTA144EK		
		< RESISTOR >			
R101	1-216-097-00	METAL CHIP	100K	5%	1/10W
R102	1-216-097-00	METAL CHIP	100K	5%	1/10W
R110	1-216-073-00	METAL CHIP	10K	5%	1/10W
R111	1-216-080-00	METAL CHIP	20K	5%	1/10W
R112	1-216-073-00	METAL CHIP	10K	5%	1/10W
R113	1-216-081-00	METAL CHIP	22K	5%	1/10W
R114	1-216-091-00	METAL CHIP	56K	5%	1/10W
R117	1-216-091-00	METAL CHIP	56K	5%	1/10W
R119	1-216-091-00	METAL CHIP	56K	5%	1/10W
R120	1-216-091-00	METAL CHIP	56K	5%	1/10W
R130	1-216-073-00	METAL CHIP	10K	5%	1/10W
R131	1-216-009-00	METAL CHIP	22	5%	1/10W
R132	1-216-081-00	METAL CHIP	22K	5%	1/10W
R201	1-216-097-00	METAL CHIP	100K	5%	1/10W
R202	1-216-097-00	METAL CHIP	100K	5%	1/10W
R210	1-216-073-00	METAL CHIP	10K	5%	1/10W
R211	1-216-080-00	METAL CHIP	20K	5%	1/10W
R212	1-216-073-00	METAL CHIP	10K	5%	1/10W
R213	1-216-081-00	METAL CHIP	22K	5%	1/10W
R214	1-216-091-00	METAL CHIP	56K	5%	1/10W
R217	1-216-091-00	METAL CHIP	56K	5%	1/10W
R219	1-216-091-00	METAL CHIP	56K	5%	1/10W
R220	1-216-091-00	METAL CHIP	56K	5%	1/10W
R230	1-216-073-00	METAL CHIP	10K	5%	1/10W
R231	1-216-009-00	METAL CHIP	22	5%	1/10W
R232	1-216-081-00	METAL CHIP	22K	5%	1/10W
R301	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R302	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R303	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R304	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R305	1-216-049-00	METAL CHIP	1K	5%	1/10W
R401	1-216-073-00	METAL CHIP	10K	5%	1/10W
R404	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R405	1-216-049-00	METAL CHIP	1K	5%	1/10W
R408	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R409	1-216-041-00	METAL CHIP	470	5%	1/10W
R410	1-216-045-00	METAL CHIP	680	5%	1/10W
R411	1-216-081-00	METAL CHIP	22K	5%	1/10W
R412	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R413	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R414	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R415	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R416	1-216-198-00	METAL GLAZE	1K	5%	1/8W
R417	1-216-198-00	METAL GLAZE	1K	5%	1/8W
R418	1-216-198-00	METAL GLAZE	1K	5%	1/8W
R419	1-216-077-00	METAL CHIP	15K	5%	1/10W
R420	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R421	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R422	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R423	1-216-033-00	METAL CHIP	220	5%	1/10W
R424	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R425	1-216-049-00	METAL CHIP	1K	5%	1/10W
R426	1-216-049-00	METAL CHIP	1K	5%	1/10W
R427	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R428	1-216-065-00	METAL CHIP	4.7K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R429	1-216-081-00	METAL CHIP	22K	5%	1/10W
R430	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R431	1-216-309-00	METAL CHIP	5.6	5%	1/10W
R432	1-216-073-00	METAL CHIP	10K	5%	1/10W
R433	1-216-049-00	METAL CHIP	1K	5%	1/10W
R434	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R435	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R436	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R437	1-216-073-00	METAL CHIP	10K	5%	1/10W
R438	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R439	1-216-073-00	METAL CHIP	10K	5%	1/10W
R440	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R441	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R442	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R443	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R444	1-216-121-00	METAL CHIP	1M	5%	1/10W
R445	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R446	1-216-097-00	METAL CHIP	100K	5%	1/10W
R447	1-216-093-00	METAL CHIP	68K	5%	1/10W
R457	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R458	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R459	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R460	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R462	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R463	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R464	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R465	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R466	1-216-091-00	METAL CHIP	56K	5%	1/10W
R467	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R468	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R469	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R470	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R471	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R472	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R473	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R474	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R475	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R476	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R477	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R478	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R479	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R480	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R481	1-216-049-00	METAL CHIP	1K	5%	1/10W
R482	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R483	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R484	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R485	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R490	1-216-295-11	METAL GLAZE	0	5%	1/10W
R500	1-216-049-00	METAL CHIP	1K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R501	1-216-009-00	METAL CHIP	22	5%	1/10W
		< RELAY >			
RY101	1-515-614-11	RELAY			
		< VARISTOR >			
VDR401	1-807-601-11	VARISTOR, CERAMIC			
		< VIBRATOR >			
X401	1-760-040-21	VIBRATOR, CRYSTAL (19.66MHz)			

****

* 1-650-665-11 POWER BOARD

****

< CAPACITOR >

C501	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C502	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C503	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C504	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C505	1-163-113-00	CERAMIC CHIP	68PF	5%	50V

< CONNECTOR >

CN103 1-569-522-11 PIN, CONNECTOR 6P
* CNP102 1-506-989-11 PIN, CONNECTOR (PC BOARD) 7P

****

* 1-648-741-31 RELAY BOARD

****

< CONNECTOR >

CNP508 1-568-164-11 CONNECTOR, FPC (1.0MM) (ZIF) 8P
CNP509 1-580-055-21 PIN, CONNECTOR 2P
* CNP510 1-580-055-21 PIN, CONNECTOR 2P

< SWITCH >

SW631 1-572-467-61 SWITCH, PUSH (1 KEY) (INNER LIMIT)

****

* 1-650-666-11 SIGNAL BOARD

****

< CONNECTOR >

CN101 1-565-094-11 SOCKET, CONNECTOR 6P
* CNP101 1-506-988-11 PIN, CONNECTOR (PC BOARD) 6P

****

Ref. No.	Part No.	Description	Remark
		MISCELLANEOUS	
		**********	
9	1-751-553-11	CABLE, FLEXIBLE FLAT (25 CORE)	
⚠272	8-848-271-11	DEVICE, MINI-DISC KMS-150A	
276	1-645-960-11	SENSOR FLEXIBLE BOARD	
FAN1	1-541-973-11	MOTOR (FAN)	
M901	X-3365-848-1	MOTOR ASSY, SPINDLE	
M902	X-3365-845-1	MOTOR ASSY, SLED	
M903	X-3365-849-1	MOTOR ASSY, LOADING	

****

ACCESSORIES & PACKING MATERIALS

****

*	3-366-113-01	CUSHION (UPPER)	
*	3-366-114-01	CUSHION (LOWER)	
*	3-909-205-01	CARTON, 4 SETS	
	3-909-531-01	PROTECTOR	

****

****

HARDWARE LIST

****

#1	7-621-559-30	SCREW +K 2.6X5
#2	7-685-133-19	SCREW +P 2.6X6 TYPE2 SLIT
#3	7-621-773-86	SCREW +PTT 2.6X4 (S)
#4	7-628-253-15	SCREW +PS 2X5
#5	7-685-861-01	SCREW +BVTT 2.6X5 (S)
#6	7-627-850-27	SCREW, PRECISION +P 1.4X3
#7	7-621-775-78	SCREW +P 2.6X14
#11	7-627-852-68	SCREW, PRECISION +P 1.7X6 TYPE3
#12	7-621-555-10	SCREW +K 2X3
#15	7-627-551-58	SCREW, PRECISION +P 1.4X3
#16	7-627-552-87	SCREW, PRECISION +P 1.7X2.2
#17	7-627-554-07	SCREW, PRECISION +P 2X2.2
#18	7-627-852-28	+P 1.7X3
#19	7-627-852-37	PRECISION SCREW +P1.7X1.8TYPE3

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

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F4ZF-19B160

SONY

SERVICE MANUAL

US Model

Version: –AA

SUPPLEMENT-1

File this supplement with the service manual.

Subject:

- **Test Mode**
- **Electrical Adjustments**
- **Keyboard Unit Informations**

1. TEST MODE

Setting the Test Mode

Operate the step 1 to 3 shown below within 1.5 seconds without a disc.

1. Press [SCROLL] and [▶▶|] at the same time.
2. Press [▶▶] twice.
3. Press [◀◀] twice.

The display indicates [1: agng 590 ↓] and the test mode is set.

Note: 30 seconds after the state of [1: agng 590 ↓], the test mode is canceled and the power supply is OFF.

Choosing the Test Mode

The test mode has the items shown on the table 1. from which to be chosen by operating as shown below.

1. Press [◀◀] or [▶▶].

Adjusting this machine should be performed with [Servo Adjustment Mode], [5: srvo 0Fon ↓] unless otherwise noted.

Canceling the Test Mode

Press the [EJECT] Key.

Table 1: Test Mode Table

No.	Indication	Mode	Function
1	1 : agng 590 ↓	Aging Mode	Not Used
2	2 : acssi < o00 ↓	Access Time Measureing Mode	Not Used
3	3 : ------	(Not Resistered)	
4	4 : gfs 0000 ↓	GFS Monitor Mode	Not Used
5	5 : srvo 0Fon ↓	Servo Adjustment Mode	(See the Function of Servo Adjustment Mode.)
6	6 : ver ******	Micro computer Version Indication Mode	Not Used
7	7 : err ------ ↓	Error Indication Mode	Indicating the error made in the end. f-err : Focusing Error gfs-e : GFS High Error sub-q : SUB-Q Unreadable syn-e : Sync Unreadable m-err : Loading, Eject Error hot-e : High Temperature (over 80 ℃)

Function of Servo Adjustment Mode

1) Insert the disc to start playing.
   Indication: 5 srvo $\frac{\text{0Fon}}{\text{Command}}$ $\frac{\downarrow}{\text{G F S}}$
2) Function of the each key.
   a. [PLY/STP] : Play
   b. [DISPLAY] : Stop (each servo OFF)
   c. [◀◀] : Move while pressing the sled to the inner circumference.
   d. [▶▶] : Move while pressign the sled to the outer circumference.
   e. [▶▶|] [|◀◀] : Choose Command. (See Table 2)
   f. [SCROLL] : Operate Command.
   g. [EJECT] : Cancel Eject and Test Mode.

Note: i) c. to f. work except for the play immediately after the disc loading or that by the pressing the [PLY/STP] button. When it is playing, [DISPLAY] button will stop the operation.

ii) The play by a., like the normal play, is the mode accessing all the time for reading the data from the disc. In the state of servo by the command shown on the table 2, the access is not operated. Use this mode for the adjustment.

Table 2: Command Table

No.	Indication	Command	Function, Summary
1	5 1 0Fon ↓	Focus ON	Focus, Sled and Spindle Servo (CLV-A) ON.
2	5 1 1Ton ↓	Tracking ON	Tracking Servo ON.
3	5 1 2Lcd ↓	Pit Laser Power ON	Pit Laser Power ON.
4	5 1 3Lmo ↓	MO Laser Power ON	MO Laser Power ON.
5	5 1 4Lof ↓	Laser Power OFF	Laser Power OFF.
6	5 1 5CLs ↓	CLV-S	CLV-S Set
7	5 1 6CLa ↓	CLV-A	CLV-A Set
8	5 1 7slp		Move the Sled 1 step (500 ms) to the outer circumference.
9	5 1 8slm		Move the Sled 1 step (500 ms) to the inner circumference.

* Press [SCROLL] button for the operation after choosing the right command.

Laser ON Mode

The laser lights by pressing the button below before inserting a disc after the test mode starts operating. It is used for the adjustment of laser power.

[▶▶|] : MO Laser Power ON
[|◀◀] : Pit Laser Power ON

Focus ON Mode

When the focus is on, GFS (the arrow shown on the right side) becomes ↑ (High).

[5 1 0Fon ↑] Focus ON
[5 1 0Fon ↓] Focus OFF

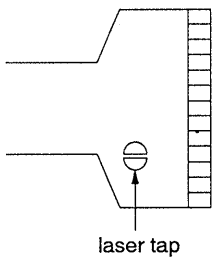
2. ELECTRICAL ADJUSTMENTS

2-1. PRECAUTION IN THE CONFIRMATION OF LASER DIODE RADIATION

Do not look in from the top in confirming the radiation of Laser Diode for fear of the loss of eyesight.

2-2. PRECAUTION IN THE HANDLING OF MINI-DISC DEVICE (KMS-150A)

Solder-bridge the laser tap of flexible board in handling the Laser Diode in the optical pick-up since it is very easy to be destroyed in the static electricity. Be fully prepared for the prevention of electrostatic destruction. Be careful in handling the flexible board since it is easy to be cut.



Optical Pick-Up Flexible Board

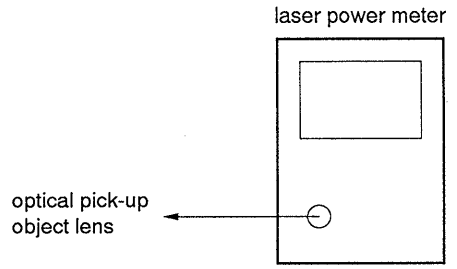
2-3. PRECAUTION IN THE ADJUSTMENT

1) Adjustment should be performed in the Test Mode. Cancel the Test Mode after the adjustment.
2) Adjustment should be performed in the order given.
3) Adjustment should be performed in [Servo Adjustment Mode] unless otherwise noted.
4) Instrument and measure are shown below.
   - CD Test Disc TDYS-1 (Parts Code : 4-963-646-01)
   - Continued recorded MO Disc PTDM-1 (Parts Code : J-2501-054-A)
   - Laser Power Meter LPM-8001 (Parts Code: J-2501-046-A)
   - Oscilloscope (Band over 40MHz. Measure after performing CAL of probe.)
   - Digital Voltmeter
5) Cancel the error indication after the adjustment.

2-4. LASER POWER ADJUSTMENT

2-4-1. Adjustment by Laser Power Meter

Connection:

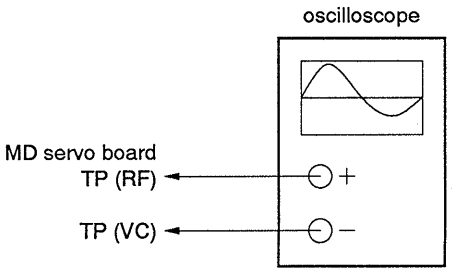


Procedure:

1. Turn RV529 fully counterclockwise.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Set the Laser Poser Meter on the object lens of the optical pick-up.
4. Press [▶▶|] button.
5. Adjust RV529 for a laser output of 820 ± 5 μW.
6. Press [DISPLAY] button.

2-4-2. Adjustment by an eye pattern

Connection:

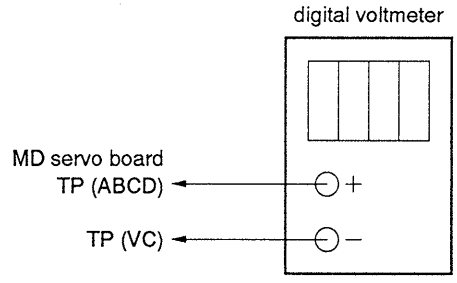


Procedure:

1. Turn RV529 fully counterclockwise.
2. Load and playback the CD Test Disc.
3. Adjust RV529 for an eye pattern of 1.5Vp-p.

2-5. FOK OFFSET ADJUSTMENT

Connection:

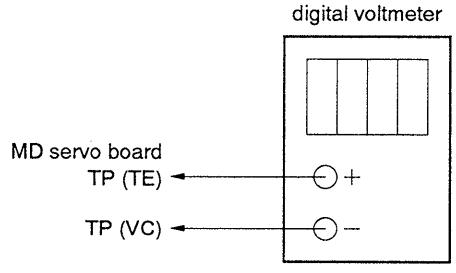


Procedure:

1. Connect a Digital Voltmeter between TP (ABCD) and TP (VC) of MD Servo Board.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Press [▶▶|] button.
4. Adjust RV510 for − 200 ± 5 mV on the Voltmeter.
5. Press [DISPLAY] button.

2-6. TRACKING OFFSET ADJUSTMENT

Connection:

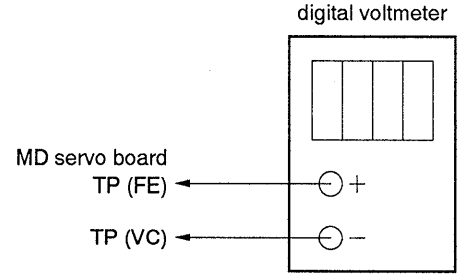


Procedure:

1. Connect a Digital Voltmeter between TP (TE) and TP (VC) of MD Servo Board.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Press [▶▶|] button.
4. Adjust RV521 for 0 ± 50 mV on the Voltmeter.
5. Press [DISPLAY] button.

2-7. PREMASTERED FOCUS BIAS ADJUSTMENT

Connection:

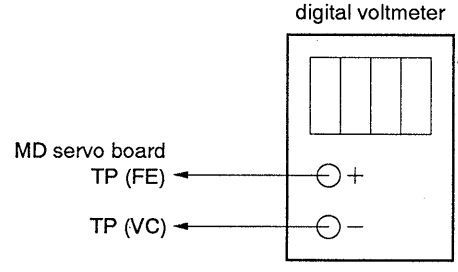


Procedure:

1. Connect a Digital Voltmeter between TP (FE) and TP (VC) of MD Servo Board.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Press [|◀◀] button.
4. Adjust RV518 for 0 ± 10 mV on the Voltmeter.
5. Press [DISPLAY] button.

2-8. MO FOCUS BIAS ADJUSTMENT

Connection:

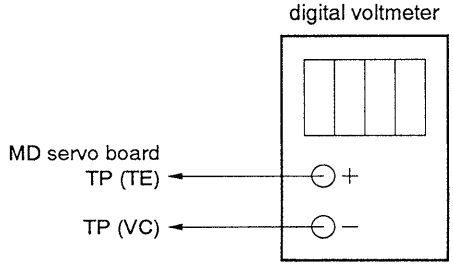


Procedure:

1. Connect a Digital Voltmeter between TP (FE) and TP (VC) of MD Servo Board.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Press [▶▶|] button.
4. Adjust RV517 for − 300 ± 10 mV on the Voltmeter.
5. Press [DISPLAY] button.

2-9. E-F BALANCE ADJUSTMENT

Connection:

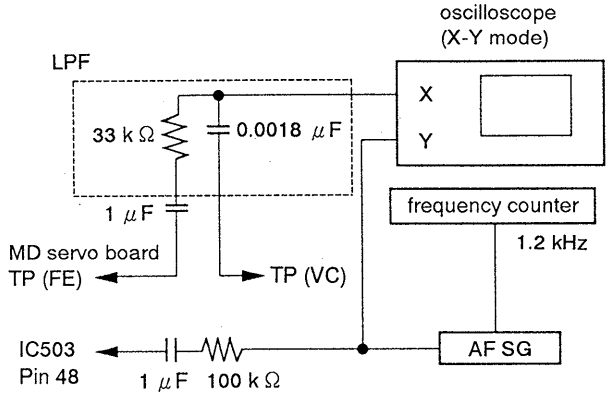


Procedure:

1. Connect the Digital Voltmeter between TP (TE) and TP (VC) of MD Servo Board.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Load the CD Test Mode.
4. Press [DISPLAY] button.
5. Move the optical Pick-up to the most inside by keeping pressing [◀◀] button.
6. Press [▶▶|] or [|◀◀] button to make [51 7slp] on the mode indication and press [SCROLL] button twice. (The SLED moves 2 steps to the outer circumference)
7. Press [▶▶|] or [|◀◀] button to make [51 0Fon ↓] on the mode indication. Press [SCROLL] button for focus servo ON. (See Test Mode on the Table 2.)
8. Adjust RV528 for 0 ± 100 mV on the Voltmeter.
9. Press [DISPLAY] button.

2-10. FOCUS GAIN ADJUSTMENT

Connection:



Procedure:

1. Connect as shown above.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Load the Continued Recorded MO Disc.
4. Press [DISPLAY] button.
5. Move the optical pick-up to the most inside by keeping [◀◀] button.
6. Press [▶▶|] or [|◀◀] button to make [51 7slp] on the mode indication and press [SCROLL] button twice. (The Sled moves 2 steps to the outer circuimference).
7. Press [▶▶|] or [|◀◀] button to make [51 0Fon ↓] on the mode indication. Press [SCROLL] button for focus servo ON. (See Test Mode on the Table 2.)
8. Press [▶▶|] or [|◀◀] button to make [51 1Ton ↓] on the mode indication and press [SCROLL] for tracking servo ON .
9. Adjust RV543 so that the waveform observed on the oscilloscope is symmetrical to the vertical line at the center, as shown in (b) in the figure.

   Note: The level of ch. 1 (X) and ch. 2 (Y) are different by 10 times. Adjust the range of the oscilloscope so that observation is done in the same level.

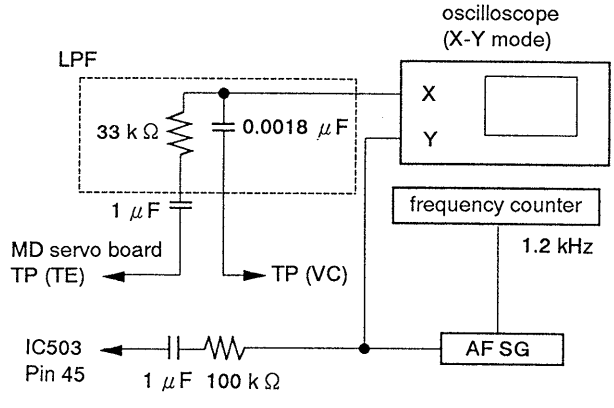
(Lissajous Waveform)
(Range: ch. 1 (X) = 20 mV
ch. 2 (Y) = 200 mV)

(a) Gain is too low. (b) Gain is appropriate. (c) Gain is too high.

2-11. TRACKING GAIN ADJUSTMENT

2-11-1. Method by the Lissajous Waveform

Connection:



Procedure:

1. Connect as shown above.
2. Make it Servo Adjustment Mode of the Test Mode.
3. Load the Continued Recorded MO Disc.
4. Press [DISPLAY] button.
5. Move the optical pick-up to the most inside by keeping pressing [◀◀] button.
6. Press [▶▶|] or [|◀◀] button to make [51 7slp] on the mode indication and press [SCROLL] button twice. (The Sled moves 2 steps to the outer circumference.)

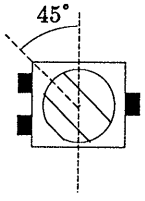
7. Press [▶▶|] or [|◀◀] button to make [51 0Fon ↓] on the mode indication. Press [SCROLL] button for focus servo ON. (See Test Mode on the Table 2.)
8. Press [▶▶|] or [|◀◀] button to make [51 1Ton ↓] on the mode indication and press [SCROLL] button for tracking servo ON.
9. Adjust RV542 so that the Lissajous Waveform on the oscilloscope is circle.

Note: 1. The level of ch. 1 (X) and ch. 2 (Y) are different by 10 times. Adjust the range of the oscilloscope so that observation is done in the same level.
2. In case that the Lissajous Waveform is not confirmed with the method shown above, perform with the summary adjustment method.

2-11-2. Tracking Gain Summary Adjustment

Procedure:

1. Set RV542 on the slope which is declined by 45 degrees, as shown below.



2-12. CANCELING THE ERROR INDICATION

When the error indication apprears, cancel the error indication with the method below after all the adjustments are done.

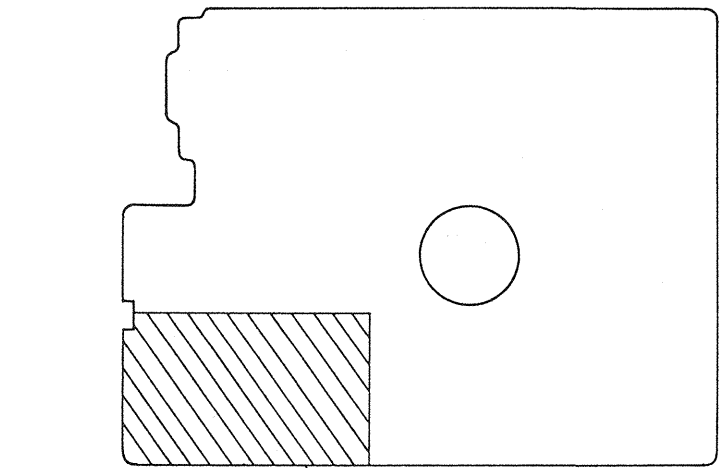
1. Make it Test Mode.
2. Choose the mode of [7: err × × × × × ↓].
3. Insert the disc to press [SCROLL] button.
4. Completion of canceling the error indication.

[7: err m_err ↓]	[7: err - - - - ↓]
Error Indication	No Error Indication

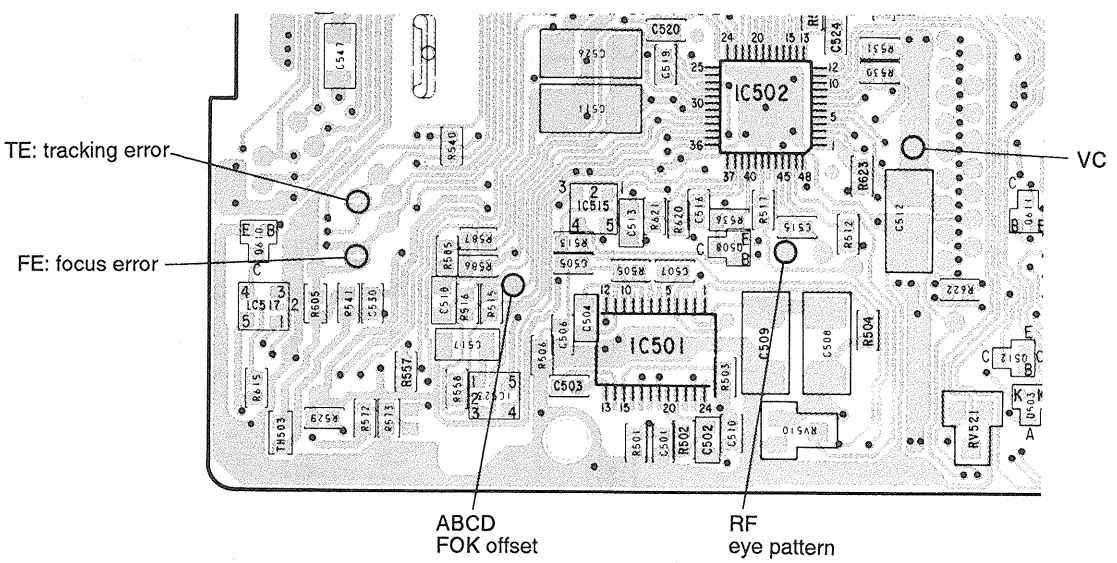
(See Test Mode Table 1.)

● Adjustment Location

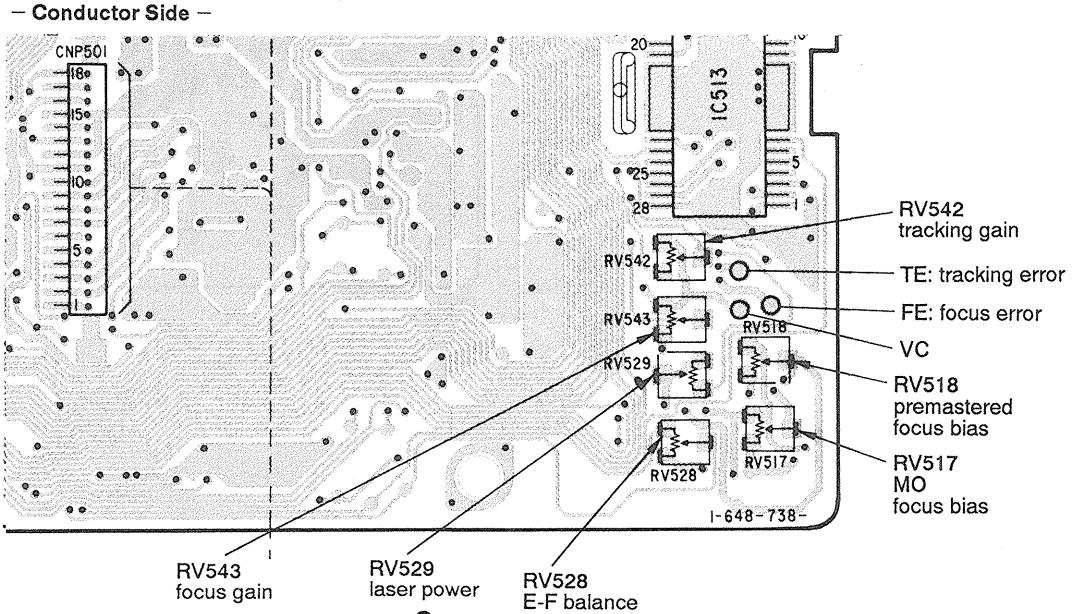
【MD SERVO BOARD】



– Component Side –



– Conductor Side –

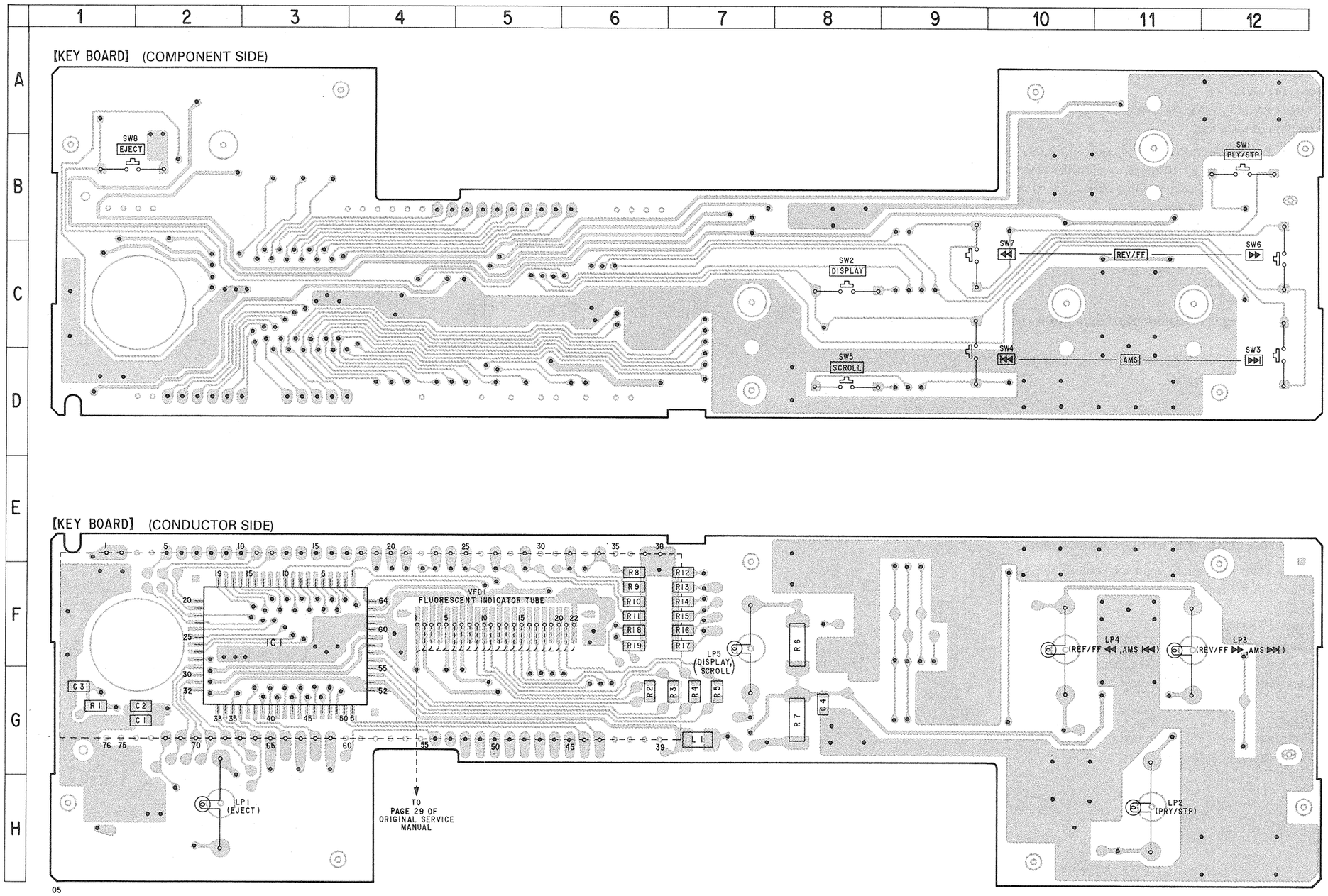


3. KEYBOARD UNIT INFORMATIONS

3-1. KEYBOARD UNIT PRINTED WIRING BOARD

- **Semiconductor Location**

Ref. No.	Location
IC1	F-2



Note:

- ○——— : parts extracted from the component side.
- ● : Through hole.
- ▒▒▒ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

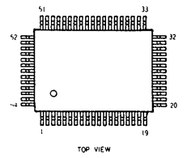
Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

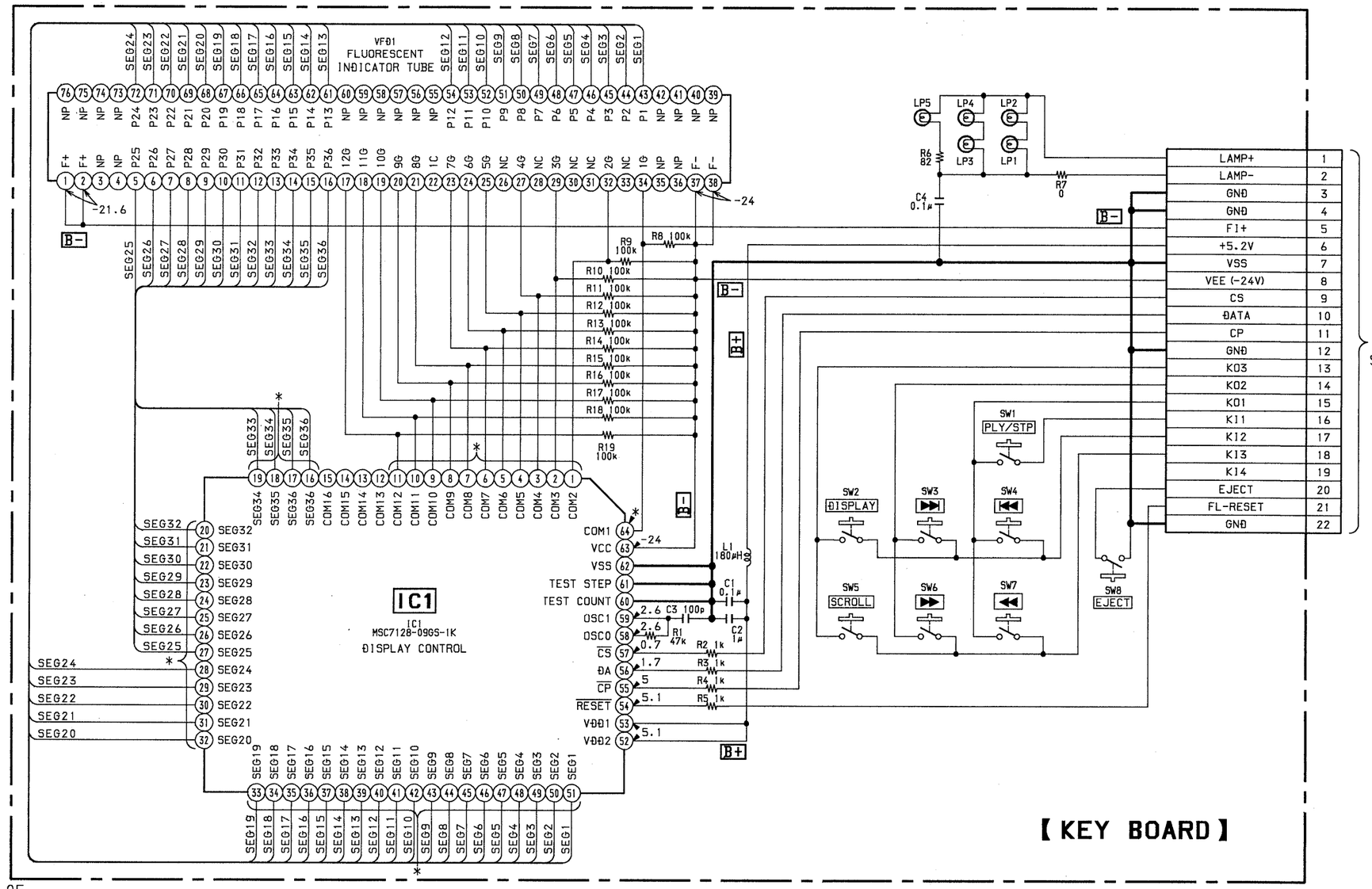
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

A B C D E F G H I J

- Semiconductor Lead Layouts

MSC7128-09GS-1K





05

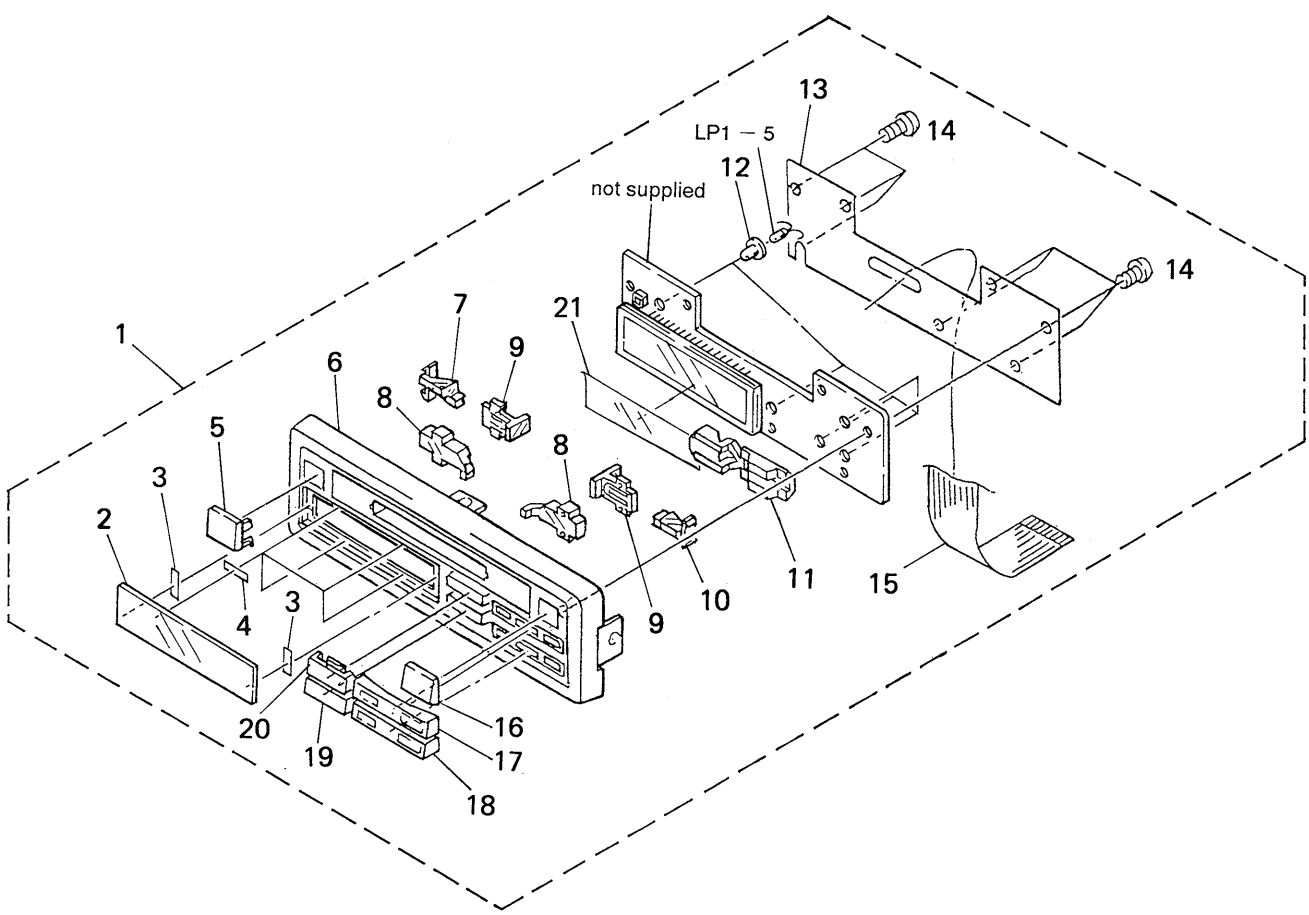
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- B+ : B + Line.
- B− : B − Line.
- ▭ : panel designation.
- Voltages and waveforms are dc with respect to ground under no-signal conditions.
  no mark : MD PLAY

3-3. KEYBOARD UNIT EXPLODED VIEW

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.



Ref. No.	Part No.	Description	Remark
* 1	1-467-460-11	KEY BOARD UNIT	
2	9-906-953-01	FILTER	
3	9-906-959-01	SHEET	
4	9-905-990-01	SHEET	
5	9-906-960-01	EJECT BUTTON	
6	9-906-952-01	CASE	
7	9-906-955-01	LIGHT GUIDE	
8	9-906-957-01	LIGHT GUIDE	
9	9-906-951-01	SUB CASE	
10	9-906-956-01	LIGHT GUIDE	
11	9-906-954-01	LIGHT GUIDE	
12	9-906-967-01	FILTER (CAP)	
13	9-906-958-01	INSULATOR	
14	9-905-996-01	T SCREW	
15	9-906-968-01	FLEXBLE CABLE	
16	9-906-961-01	PLY/STP BUTTON	
17	9-906-964-01	AMS BUTTON	
18	9-906-965-01	REV/FF BUTTON	
19	9-906-963-01	SCROLL BUTTON	
20	9-906-962-01	DISPLAY BUTTON	
21	9-906-977-01	FILTER (FILM)	
LP1-5	9-906-003-01	LAMP	

KEY

3-4. KEYBOARD UNIT ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description	Remark
		KEY BOARD	
		*********	
		< CAPACITOR >	
C1	9-906-024-01	CERAMIC CHIP 0.1uF	
C2	9-906-025-01	CERAMIC CHIP 1uF	
C3	9-906-974-01	CERAMIC CHIP 100PF	
C4	9-906-024-01	CERAMIC CHIP 0.1uF	
		< IC >	
IC1	8-759-178-49	IC MSC7128-09GS-1K	
		< COIL >	
L1	9-906-975-01	INDUCTOR 180uH	
		< LAMP >	
LP1-5	9-906-003-01	LAMP	
		< RESISTOR >	
R1	9-906-016-01	METAL CHIP 47K	
R2-5	9-906-971-01	METAL CHIP 1K	
R6	9-906-973-01	METAL CHIP 82	
R7	9-906-972-01	METAL CHIP 0	
R8-19	9-906-970-01	METAL CHIP 100K	
		< SWITCH >	
SW1	9-905-994-01	TACT SWITCH (PLY/STP)	
SW2	9-905-994-01	TACT SWITCH (DISPLAY)	
SW3	9-905-994-01	TACT SWITCH (⏭)	
SW4	9-905-994-01	TACT SWITCH (⏮)	
SW5	9-905-994-01	TACT SWITCH (SCROLL)	
SW6	9-905-994-01	TACT SWITCH (▶▶)	
SW7	9-905-994-01	TACT SWITCH (◀◀)	
SW8	9-905-994-01	TACT SWITCH (EJECT)	

Ref. No.	Part No.	Description	Remark
		< INDICATOR >	
VFD1	9-906-966-01	INDICATOR TUBE, FLUORESCENT	

9-959-172-81

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Mobile Electronics Group

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