Ref. No.3609

ONKYO® SERVICE MANUAL

MINIDISC RECORDER

MODEL MD-2321

Black and Silver models

BUD	120V AC 60Hz
BUP, SUP	230V AC 50HZ

SAFETY-RELATED COMPONENT WARNING!!

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

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

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

System:	MiniDisc digital audio system
Recording system:	Magnetic field modulation overwrite system
Signal read out system:	Optical non-contact
Recording time:	Max. 74 min. (STEREO) (when using MDW-74) Max. 148 min. (MONAURAL)
Number of revolutions:	About 400-900 rpm (constant linear velocity)
Error correction system:	Advanced Cross Interleave Reed-solomon code
Sampling frequency:	44.1 kHz
Number of channels:	2 (stereo)
Frequency response:	10 Hz - 20 kHz
Signal to noise ratio:	98 dB or more when playing
Output level:	2.0 V r.m.s.
Power supply rating:	AC 230 V, 50 Hz AC 120 V, 60 Hz
Power consumption:	14W
Dimensions (W× H ×D):	435 × 91 × 307 mm (17-1/8" × 3-9/16" × 12-1/16")
Weight:	4.2 kg (9.3 lbs.)

Specifications and features are subject to change without notice.

SERVICE SAFETY PRECAUTIONS

Replacing the battery

CAUTION
Danger of explosion f battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Discard used batteries according to the manufacturer's instructions.

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CAUTION ON REPLACEMENT OF OPTIONAL PICKUP

The laser diode in the optical pickup block is sensitive to static electricity, surge current and etc. The components are liable to be damaged or its reliability remarkably deteriorated.

During repair,carefully take the following precautions. (The following precautions are included in the service parts.)

PRECAUTIONS

1.Ground for the work-desk.
Place a conductive sheet such as a sheet of copper (with impedance lower than 10Mohm) on the work-desk and place the set on the conductive sheet so that the chassis can be grounded.

2.Grounding for the test equipments and tools.
Test equipments and toolings should be grounded in order that their ground level is the same the ground of the power source.

3. Grounding for the human body.
Be sure to put on a wrist-strap that is properly grounded.
Be particularly careful when wearing synthetic fiber clothes, or air is dry.

4. Select a soldering iron that permits no leakage and have the tip of the iron well-grounded.

5. Do not check the laser diode terminals with the probe of a circuit tester or oscilloscope.

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to carefully follow the instructions below when servicing.

WARNING !!

SERVICE WARNING: DO NOT APPROACH THE LASER EXIT WITH THE EYES TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

Laser Diode Properties

Material:	GaAlAs
Wavelenghth:	780nm
Emission Duration:	continuous
Laser output:	max. 5mW*

* This output is the value measure at a distance about 1.8mm from the objective lens surface on the Optical pick-up Block.

LASER WARNING LABEL

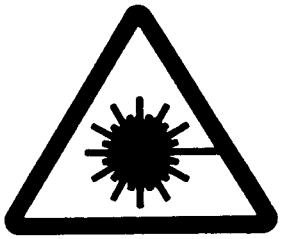
These labels are located on the mechanism.

The label shown below are affixed.

1. Warning label

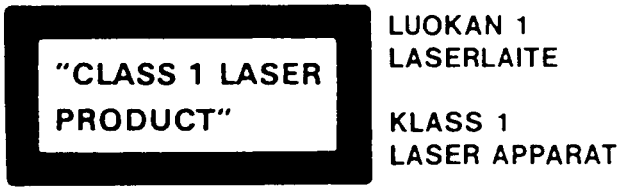
This label is location on the chassis.

DANGER —INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK FAILED OR DEFEATED. AVOID DIRECT EXPOSURE TO BEAM.
CAUTION —HAZARDOUS LASER AND ELECTROMAGNETIC RADIATION WHEN OPEN AND INTERLOCK DEFEATED
ATTENTION —RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT AVEC L'ECLENCHEMENT DE SECURITE ANNULE.

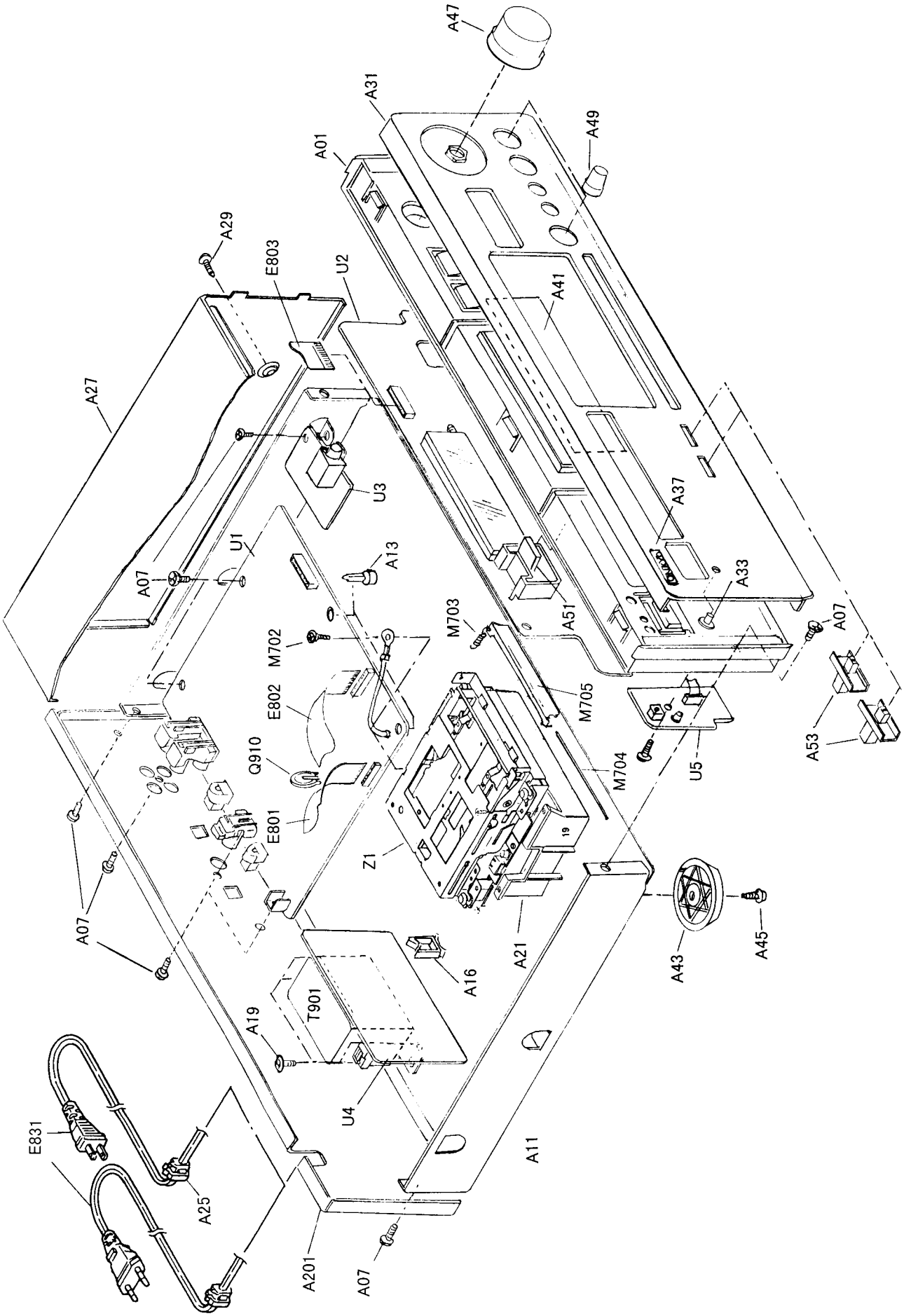


2. Class 1 label

This label is location on the left side of rear panel.



CHASSIS EXPLODED VIEW



CHASSIS EXPLODED VIIEW PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
A01	27111097A	Front bracket <B>
	27111096A	Front bracket <S>
A07	838130088	3TTB+8B,Self-tapping screw
A11	27100333D	Chassis
A13	27190657	KGLS-18RF,Holder
A15	27190965	Holder
A16	27300243	WS-2W,Clamp
A19	830440089	4TTC+8C(BC),Self-tapping screw
A21	27191061	Holder M
A25	27300750	⚠ Bushing,cord
A27	28184670B	Top cover <B>
	28184748	Top cover <S>
A29	838430088	3TTB+8B(BC),Self-tapping screw <B>
	838230088	3TTB+8B(NI),Nickel screw <S>
A31	27212049A	Front panel <B>
	27212048A	Front panel <S>
A33	28198864	Facet
A37	28135244	Badge <B>
	28135245	Badge <S>
A41	28191840	Clear plate <B>
	28191839	Clear plate <S>
A 43	27175311A	Leg
A 45	831430088	3TTW+8B(BC),Self-tapping screw
A 47	28325626	Knob AMCS <B>
	28325625	Knob AMCS <S>
A 49	28325452	Knob MIC <B>
	28325515	Knob MIC <S>
A 51	28325629	Knob, open <B>
	28325628	Knob, open <S>
A 53	28325632	Knob, timer <B>
	28325631	Knob, timer <S>

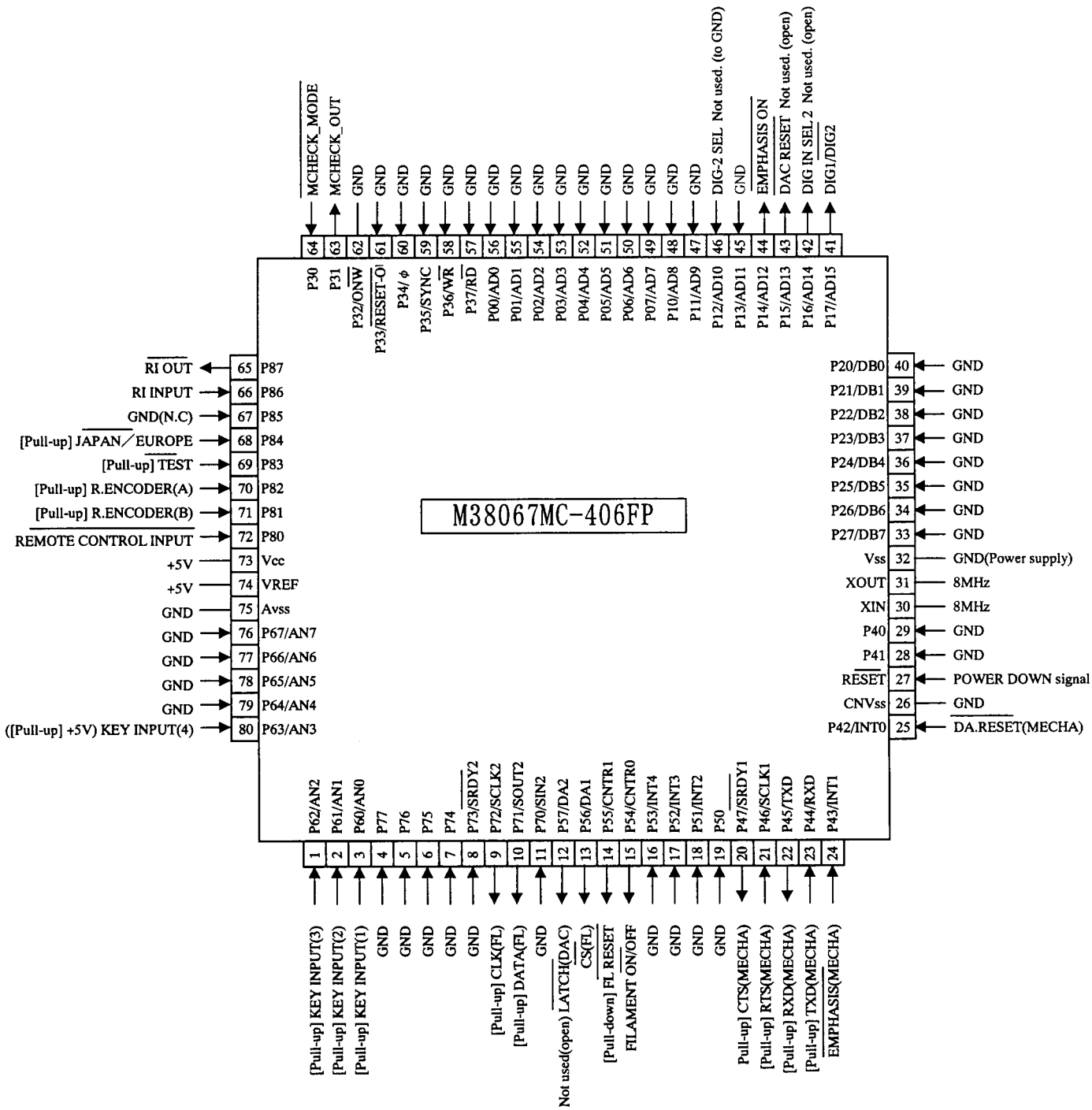
REF. NO.	PART NO.	DESCRIPTION
A201	27122519	Rear panel <P>
	27122520	Rear panel <D>
Z1	24650028	KMK-260AAB,MD mechanism ass'y
M702	833130100	3TTP+10P,Self-tapping screw
M703	24605828	Spring, door
M704	24604139	Shaft, door
M705	24611654	Door <B>
	24611655	Door <S>
E801	2045162012	NCFC5-162012,Flexible flat cable
E802	2045192012	NCFC5-192012,Flexible flat cable
E803	2045191512	NCFC5-191512,Flexible flat cable
E831	253193HIT	⚠ AS-CEE,Power supply cord <P>
E831	253277MIL	⚠ AS-UC-2#18,Power supply cord <D>
	29362285	Label
Q910	3010277	⚠ IVR2025TVB, Battery
T901	2301373	⚠ NPT-1354P,Power transformer <P>
	2301372	⚠ NPT-1354D,Power transformer <D>
U1	1H393546-1A	NAAR-6446-1A,Main circuit PC board ass'y <P>
	1H393546-1B	NAAR-6446-1B,Main circuit PC board ass'y <D>
U2	1H393547-1A	NADIS-6447-1A,Display circuit PC board ass'y <P>
	1H393547-1B	NADIS-6447-1B,Display circuit PC board ass'y <D>
U3	1H393548-1A	NAAF-6448-1A,Headphone amplifier PC board ass'y <P>
	1H393548-1B	NAAF-6448-1B,Headphone amplifier PC board ass'y <D>
U4	1H393549-1A	NAPS-6449-1A,Power supply circuit PC board ass'y <P>
	1H393549-1B	NAPS-6449-1B,Power supply circuit PC board ass'y <D>
U5	1H393550-1A	NAETC-6450-1A,Power switch PC board ass'y <P>
	1H393550-1B	NAETC-6450-1B,Power switch PC board ass'y <D>

NOTE: <P>: 230V model only
<D>: 120V model only
<B>: Black model only
<S>: Silver model only

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

MICROPROCESSOR TERMINAL DESCRIPTIONS

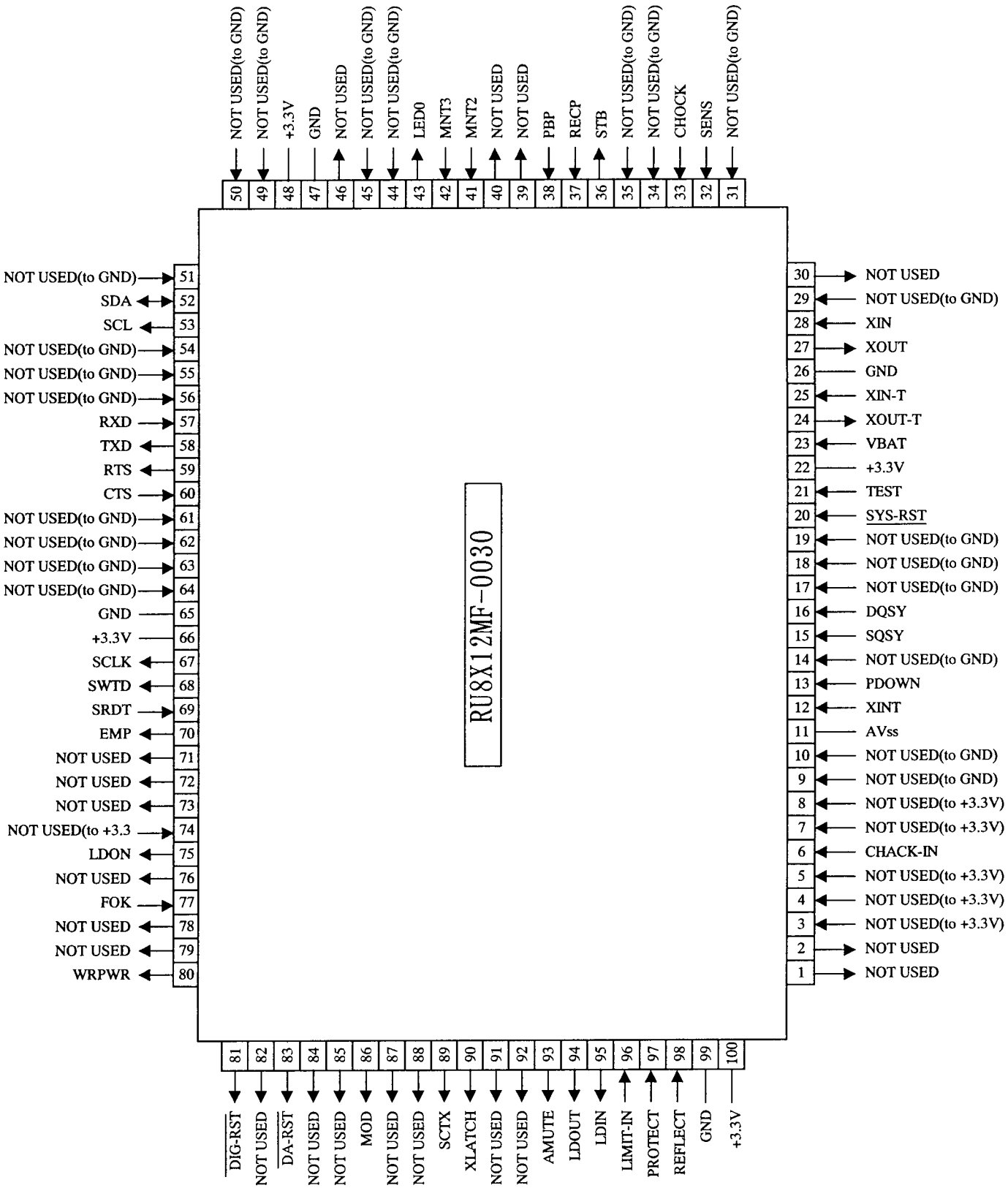
Q701:M38067MC (SYSTEM CONTROL MICROPROCESSOR)



Q701:M38067MC

PIN No.	SYMBOL	I/O	DESCRIPTION
1	KEY INPUT(3)	I	A/D key input terminal (3)
2	KEY INPUT(2)	I	A/D key input terminal (2)
3	KEY INPUT(1)	I	A/D key input terminal (1)
4	NOT USED	I	N.C (to GND)
5	NOT USED	I	N.C (to GND)
6	NOT USED	I	N.C (to GND)
7	NOT USED	I	N.C (to GND)
8	NOT USED	I	N.C (to GND)
9	CLK	O	Clock output terminal for serial communications to FL driver (M66004FP)
10	DATA	O	Data output terminal for serial communications to FL driver (M66004FP)
11	NOT USED	I	N.C (to GND)
12	~LATCH(DAC)	O	Not used. (open)
13	~CS	O	Chip selection signal output terminal to FL driver (M66004FP)
14	~FL_RESET	O	Reset signal output terminal to FL driver (M66004FP) Active low
15	~FILAMENT	I	Filament control signal output terminal (Active low)
16	NOT USED	I	N.C (to GND)
17	NOT USED	I	N.C (to GND)
18	NOT USED	I	N.C (to GND)
19	NOT USED	I	N.C (to GND)
20	CTS	O	CTS output terminal for mechanism microprocessor
21	RTS	I	RTS input terminal for mechanism microprocessor
22	RXD	O	RXD output terminal for mechanism microprocessor
23	TXD	I	TXD input terminal for mechanism microprocessor
24	~EMPHASIS	I	Emphasis Information input terminal from mechanism
25	~DA.RESET(Mecha)	I	Request signal input terminal of retransfer from the data of DAC.
26	CNVss		GND
27	~RESET	I	System reset input terminal
28	NOT USED	I	N.C (to GND)
29	NOT USED	I	N.C (to GND)
30	XIN		connect to clock(8MHz)
31	XOUT		connect to clock(8MHz)
32	Vss		Power supply (to GND)
33-40	NOT USED	I	N.C (to GND)
41	DIGITAL1/2	O	Digital input select signal output terminal (at High : DIGITAL 1)
42	DIG IN SEL 2	O	Not used. (open)
43	~DAC RESET	O	Not used. (open)
44	~EMPHASIS ON	O	Emphasis control output terminal
45	NOT USED	I	N.C (to GND)
46	DIG-2 SEL	I	Not used. (to GND)
47-61	NOT USED	I	N.C (to GND)
62	KISYU SEL		GND
63	MCHECK_OUT	O	Test output terminal for system microprocessor (not used) (open)
64	~MCHECK_MODE	I	Test input terminal for system microprocessor (at Low : Test mode)
65	~RI_OUT	O	RI code output terminal (Active low)
66	RI INPUT	I	RI code input terminal
67	NOT USED	I	N.C (to GND)
68	~JAPAN/EUROPE	I	Europe/Japan select input terminal (at High : Europe)
69	~TEST_MODE	I	Test mode input terminal for mechanism microprocessor (at Low: Test mode)
70	R.ENCODER(A)	I	Pulse input terminal for rotary encoder
71	R.ENCODER(B)	I	Pulse input terminal for rotary encoder
72	~REMOCON IN	I	Remote control signal input terminal (Active low)
73	Vcc		Power supply (+5V)
74	VREF		Reference voltage terminal for A/D transfer(to +5V)
75	AVss		Reference voltage terminal for A/D transfer(to GND)
76-79	NOT USED	I	N.C (to GND)
80	KEY INPUT(4)	I	Not used. (to +5V)

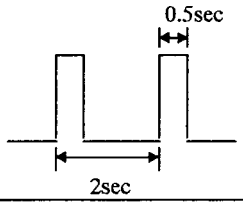
IC201:RU8X12MF-0030 (MECHANISM CONTROL MICROPROCESSOR)



IC201:RU8X12MF

PIN No.	SYMBOL	I/O	DESCRIPTION
1	–	O	Not used
2	–	O	Not used
3	–	I	Not used (fixed at "H")
4	–	I	Not used (fixed at "H")
5	–	I	Not used (fixed at "H")
6	CHACK-IN	I	Detection input from the disc chucking-in detect switch (SW1)
7	–	I	Not used (fixed at "H")
8	–	I	Not used (fixed at "H")
9	–	I	Not used (fixed at "L")
10	–	I	Not used (fixed at "L")
11	AVSS	–	Ground terminal
12	XINT	I	Interrupt status input from the CXD2652AR(IC121)
13	PDOWN	I	Power down detection signal input terminal "L":power down,normally:"H"
14	–	I	Not used (fixed at "L")
15	SQSY	I	Subcode Q sync (SCOR) input from the CXD2652AR(IC121) "L" is input every 13.3msec Almost all,"H" is input
16	DQSY	I	Digital In U-bit CD format subcode Q sync (SCOR) input from the CXD2652AR(IC121) "L" is input every 13.3msec Almost all,"H" is input
17	–	I	Not used (fixed at "L")
18	–	I	Not used (fixed at "L")
19	–	I	Not used (fixed at "L")
20	$\overline{\text{SYS-RST}}$	I	System reset signal input from the master controller "L":reset For several hundreds msec after the power supply rises,"L" is input,then it changes to "H"
21	TEST	I	Input terminal for the test Fixed at "L" in this set
22	+3.3V	–	Power supply terminal (+3.3V)
23	VBAT	I	Power supply terminal for the backup (for internal RAM)
24	XOUT-T	O	Sub system clock output terminal (32.768kHz)
25	XIN-T	I	Sub system clock input terminal (32.768kHz)
26	GND	–	Ground terminal
27	XOUT	O	Main system clock output terminal (12MHz)
28	XIN	I	Main system clock input terminal (12MHz)
29	–	I	Not used (fixed at "L")
30	–	O	Not used
31	–	I	Not used (fixed at "L")
32	SENS	I	Internal status (SENSE) input from the CXD2652AR (IC121)
33	SHOCK	I	Track jump detection signal input from the CXD2652AR (IC121)
34	–	I	Not used (fixed at "L")
35	–	I	Not used (fixed at "L")
36	STB	O	Strobe signal output to the main power supply circuit "H":power on,"L":standby mode
37	REC P	I	Detection input from the recording position detect switch (SW3)
38	PB P	I	Detection input from the playback position detect switch (SW2)
39	–	O	Not used
40	–	O	Not used
41	MNT2	I	Monitor 2 signal input from the CXD2652AR (IC121)
42	MNT3	I	Monitor 3 signal input from the CXD2652AR (IC121)
43	LED0	O	LED drive signal output terminal
44	–	I	Not used (fixed at "L")
45	–	I	Not used (fixed at "L")
46	–	O	Not used
47	GND	–	Ground terminal
48	+3.3V	–	Power supply terminal (+3.3V)
49	–	I	Not used (fixed at "L")
50	–	I	Not used (fixed at "L")
51	–	I	Not used (fixed at "L")
52	SDA	I/O	Two-way data bus for the EEPROM (IC171)
53	SCL	O	Clock signal output to the EEROM (IC171)
54	–	I	Not used (fixed at "L")
55	–	I	Not used (fixed at "L")
56	–	I	Not used (fixed at "L")

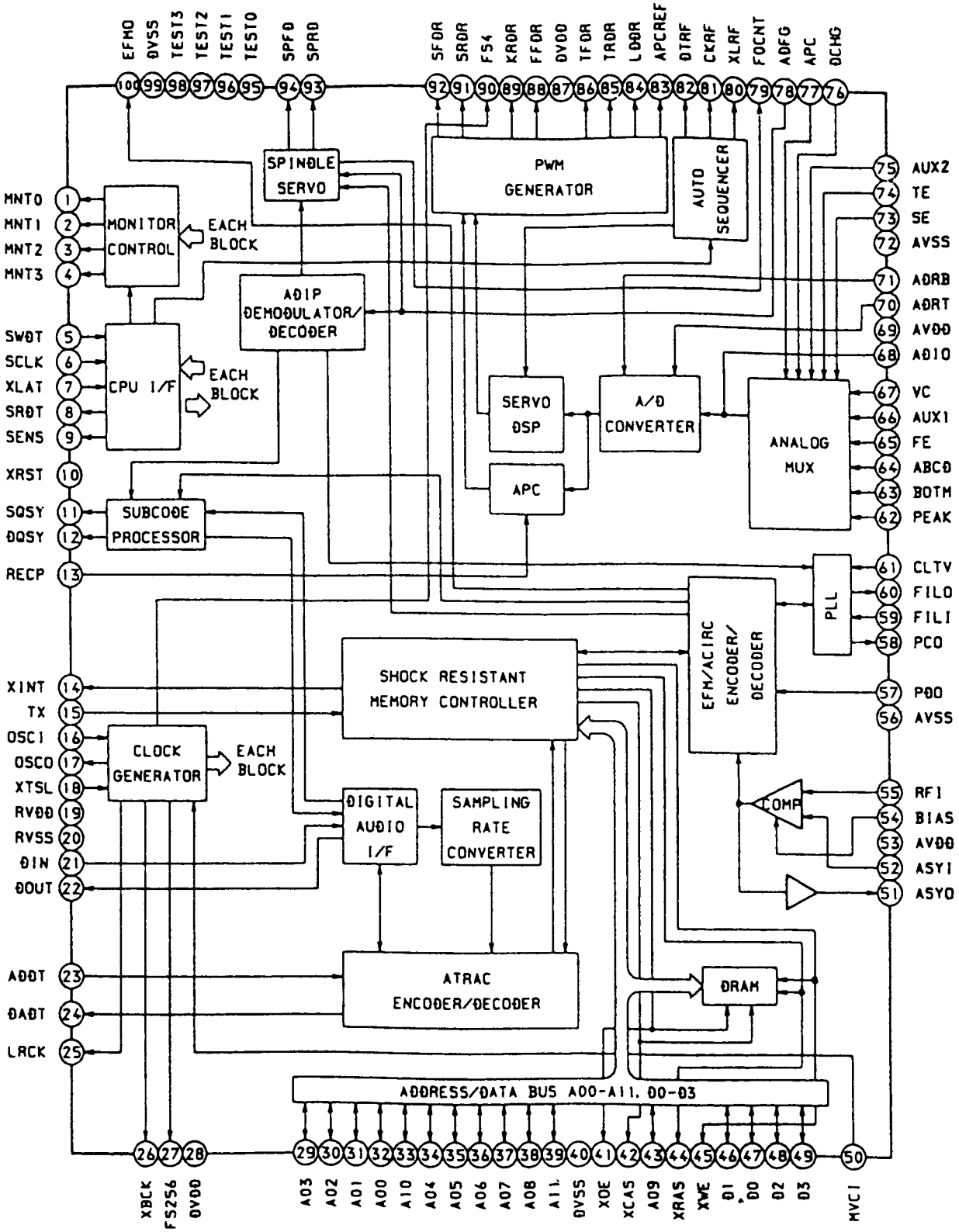
IC201:RU8X12MF

PIN No.	SYMBOL	I/O	DESCRIPTION
57	RXD	I	UART data input from the master controller
58	TXD	O	UART data output from the master controller
59	RTS	O	Output of signal to inhibit data transmission to the master controller
60	CTS	I	Input of signal to reject data from the master controller
61	—	I	Not used (fixed at "L")
62	—	I	Not used (fixed at "L")
63	—	I	Not used (fixed at "L")
64	—	I	Not used (fixed at "L")
65	GND	—	Ground terminal
66	+3.3V	—	Power supply terminal (+3.3V)
67	SCLK	O	Serial clock signal output to the CXD2652AR (IC121) and A/D,D/A converter
68	SWDT	O	Writing data output to the CXD2652AR (IC121) and A/D,D/A converter
69	SRDT	I	Reading data input to the CXD2652AR (IC121)
70	EMP	O	Emphasis control signal output terminal
71	—	O	Not used
72	—	O	Not used
73	—	O	Not used
74	—	I	Not used (fixed at "H")
75	LDON	O	Laser diode on/off control signal output to the automatic power control circuit "H": laser on
76	—	O	Not used
77	FOK	I	Focus OK signal input from the CXD2652AR (IC121) "H" is input when focus is on
78	—	O	Not used
79	—	O	Not used
80	WRPWR	O	Laser power select signal output to the CXD2652AR (IC121) H: recording mode,"L": playback mode
81	$\overline{\text{DIG-RST}}$	O	Reset signal output to the CXD2652AR (IC121) and BH6511FS (IC152) "L":reset
82	—	O	Not used
83	$\overline{\text{DA-RST}}$	O	Reset signal output to the A/D,D/A converter "L":reset
84	—	O	Not used
85	—	O	Not used
86	MOD	O	Laser power modulation select signal output Playback power:"L",Stop:"H" Recording power: 
87	—	O	Not used
88	—	O	Not used
89	SCTX	O	Recording data output enable signal output to the CXD2652AR (IC121) Writing data transmission timing output (Also serves as the magnetic head on/off output)
90	XLATCH	O	Serial latch signal output to the CXD2652AR (IC121) and A/D,D/A converter
91	—	O	Not used
92	—	O	Not used
93	AMUTE	O	Mute control signal output terminal
94	LDOUT	O	Motor control signal output to the loading motor driver (IC202) *1
95	LDIN	O	Motor control signal output to the loading motor driver (IC202) *1
96	LIMIT-IN	I	Detection input from the sled limit-in detect switch (SW4) The optical pick-up is inner position when "L"
97	PROTECT	I	Rec-proof claw detect input from the protect detect switch (SW5)
98	REFLECT	I	Detection input from the disc reflection rate detect switch (SW5) "L":high reflection rate disc,"H":low reflection rate disc
99	GND	—	Ground terminal
100	+3.3V	—	Power supply terminal (+3.3V)

*1 Loading Motor Control

Operation / Terminal	IN	OUT	BRAKE	RUN IDLE
LDIN (pin 95)	"H"	"L"	"H"	"L"
LDOUT (pin 94)	"L"	"H"	"H"	"L"

IC121:CXD2652AR (ENCODER/DECODER,ATRAC)

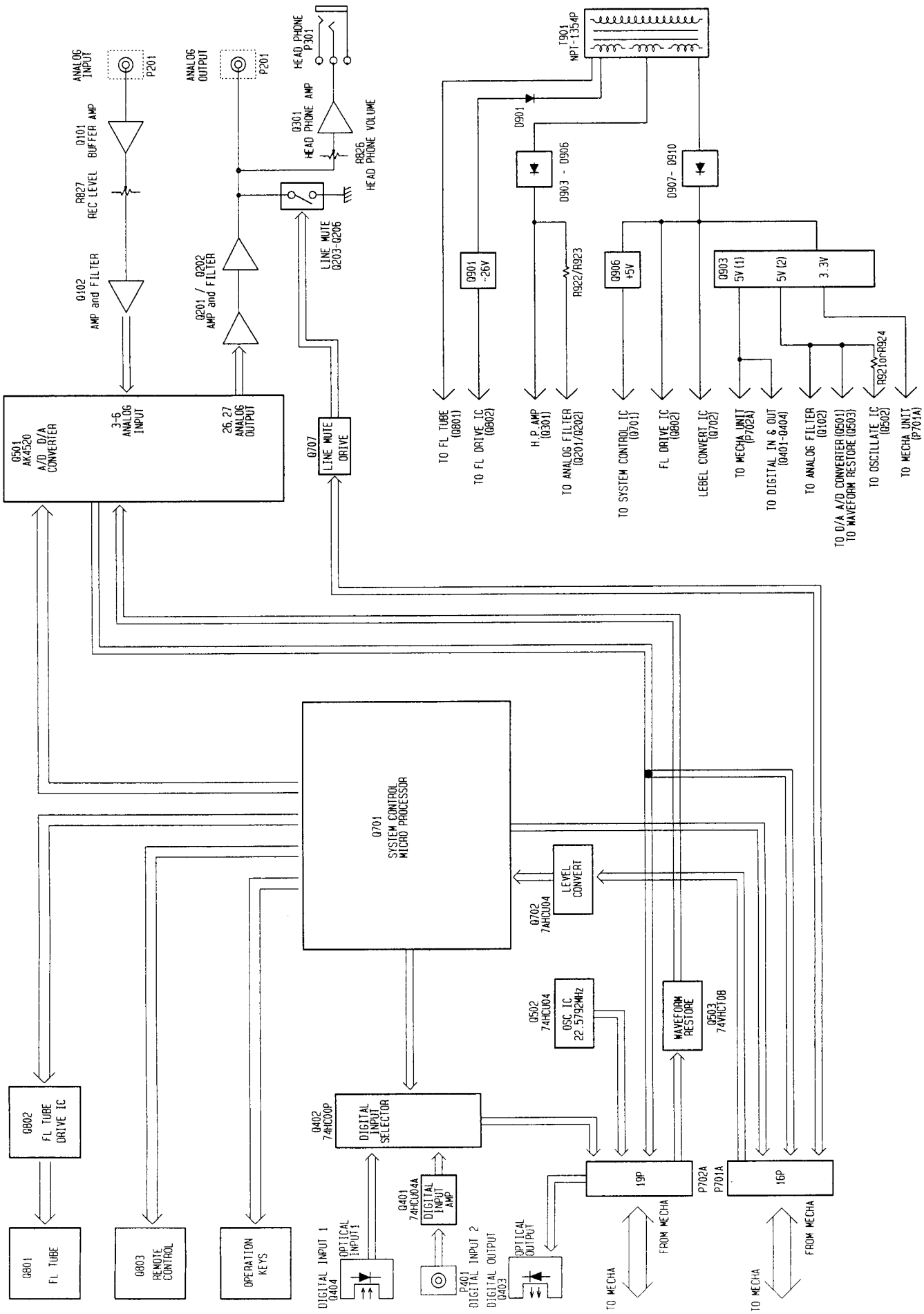


IC121:CXD2652AR (1/2)

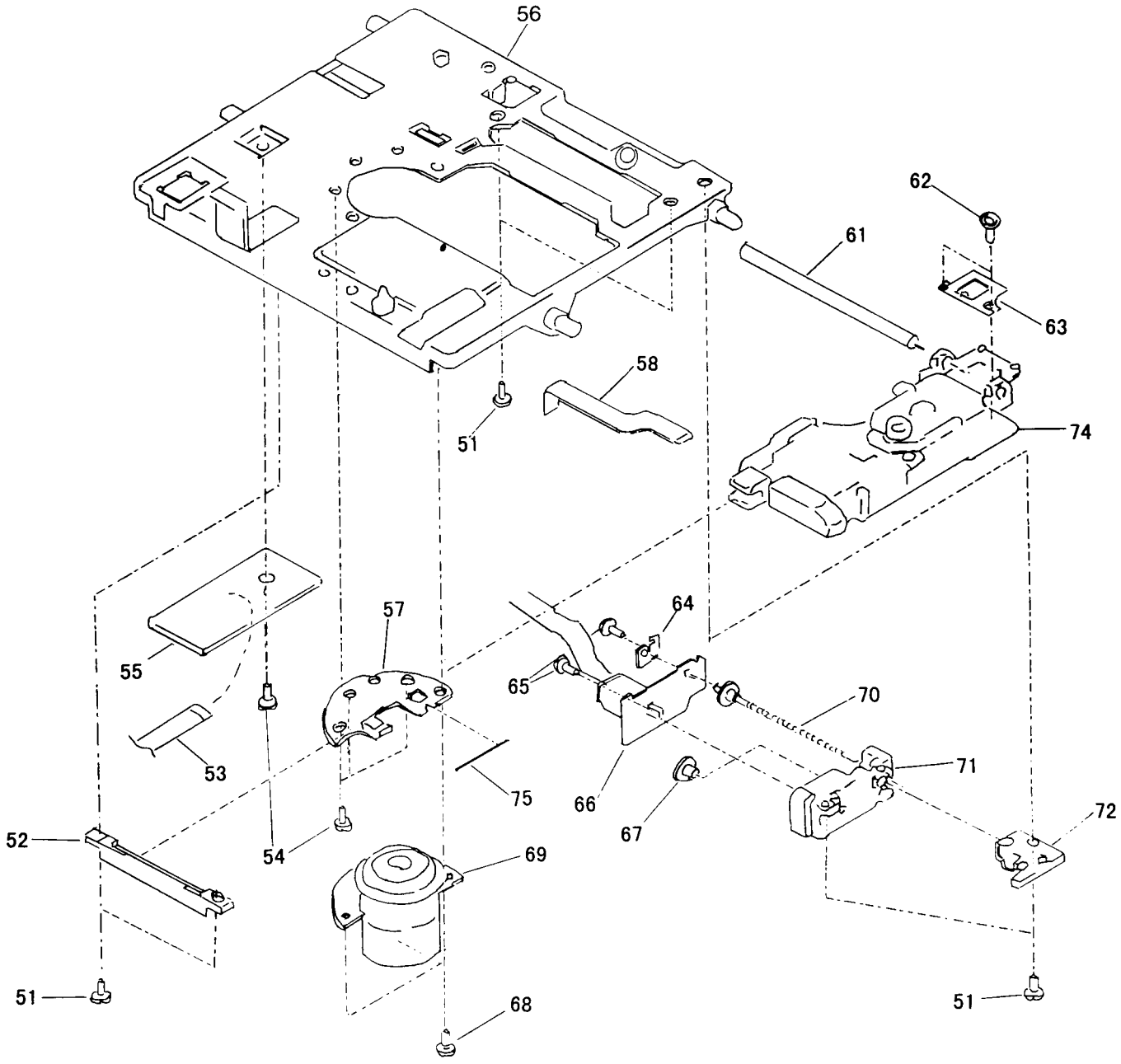
PIN No.	SYMBOL	I/O	DESCRIPTION
1	MNT0(FOK)	O	"In focus" signal output to the mechanism controller (IC201). When in focus ,.output "H".
2	MNT1(SHCK)	O	Track jump detection signal output to the mechanism controller (IC201).
3	MNT2(XBUSY)	O	Monitor2 output to the mechanism controller (IC201).
4	MNT3(SLOC)	O	Monitor3 output to the mechanism controller (IC201).
5	SWDT	I	Write data signal input from the mechanism controller (IC201).
6	SCLK	I(S)	Serial clock signal input from the mechanism controller (IC201).
7	XLAT	I(S)	Serial latch signal input from the mechanism controller (IC201).
8	SRDT	O(3)	Read data signal output to the mechanism controller (IC201).
9	SENS	O(3)	Internal status (SENSE) output to the mechanism controller (IC201).
10	XRST	I(S)	Reset signal input from the mechanism controller (IC201). When reset : "L".
11	SQSY	O	Sub-code Q sync(SCOR) output to the mechanism controller (IC201). "L" every 13.3 msec. Almost "H".
12	DQSY	O	Digital in U-bit CD format sub-code Q sync(SCOR) output to the mechanism controller (IC201) . "L" every 13.3 msec. Almost "H".
13	RECP	I	Laser power selection signal input from the mechanism controller (IC201).
14	XINT	O	Interrupt status output to the mechanism controller (IC201).
15	TX	I	Recording data output permission input from mechanism controller (IC201).
16	OSCI	I	System clock (512Fs = 22.5792 MHz) signal input from TC7WU04F (IC123).
17	OSCO	O	System clock (512Fs = 22.5792 MHz) signal output. Not used in this unit (OPEN).
18	XTSL	I	System clock frequency setting terminal. "L": 45.158MHz "H":22.5792MHz (at "H")
19	DVDD	-	Power supply terminal (+ 3 V).(Digital system)
20	DVSS	-	GND terminal. (Digital system)
21	DIN	I	Input terminal of the digital audio signal.(for optical in)
22	DOUT	O	Output terminal of the digital audio signal.(for optical out)
23	ADDT	I	Data input from the A/D converter.
24	DADT	O	Data output to the D/A converter.
25	LRCK	O	L/R clock (44.1 kHz) signal output to the A/D,D/A converter.
26	XBCK	O	Bit clock (2.8224 MHz) signal output to the A/D,D/A converter.
27	FS256	O	11.2896 MHz clock signal output.
28	DVDD	-	Power supply terminal (+ 3 V).(Digital system)
29~32	A03~A00	O	Address output to the DRAM.
33	A10	O	
34~38	A04~A08	O	
39	A11	O	Address output to the DRAM (not used).
40	DVSS	-	GND terminal. (Digital system)
41	XOE	O	DRAM output enable output.
42	XCAS	O	$\overline{CAS}$ signal output to the DRAM.
43	A09	O	Address output to the DRAM.
44	XRAS	O	$\overline{RAS}$ signal output to the DRAM.
45	XWE	O	Write enable output to the DRAM.
46	D1	I/O	Data input/output to the DRAM.
47	D0	I/O	
48,49	D2,D3	I/O	
50	MVCI	I(S)	Clock input from the outside VCO.(Fixed at "L").
51	ASYO	O	Playback EFM full-swing output . (L=VSS, H=VDD)

* I(S) of I/O shows the Schmidt input, I(A) shows the analog input, O(3) shows three status output, and O(A) shows an analog output.

BLOCK DIAGRAM



MD MECHANISM EXPLODED VIEW(KMK-260AAB)

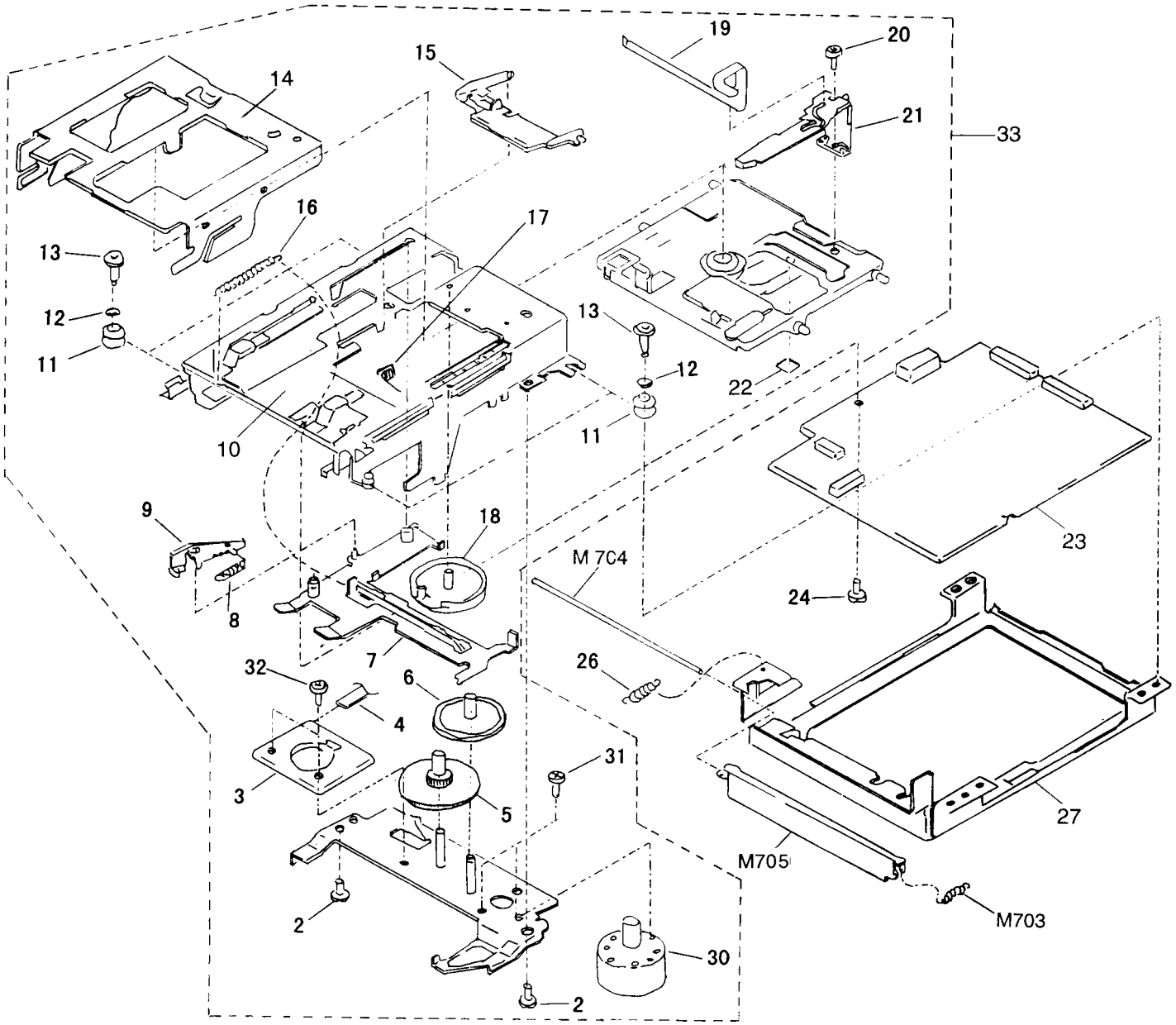


MD MECHANISM EXPLODED VIEW PARTS LIST

REF. No.	PART No.	DESCRIPTION	NOTE
51	2627-404-01	Screw (+P1.4X3.5 Type3)	
52	2646-453-01	Sub Guide	
53	1783-387-11	Flexible flat cable(7 core)	
54	7627-850-79	Special screw(+P1.4X1.8 Type 3)	
55	1668-262-11	D-SW pc board	
56	2646-575-01	Mechanical Chassis	NSP
57	2646-566-01	Bracket, Spindle motor	
58	1669-180-11	Flexible pc board, Optical pick-up	
61	2646-452-01	Guide Shaft	
62	2627-530-01	Screw (+P1.4X1.4 Type2)	
63	4963-914-02	Rack (Inserter)	

REF. No.	PART No.	DESCRIPTION	NOTE
64	2646-567-01	Pre road Plate	
65	2627-431-01	Special screw(1.2X3.3)	
66	X2626-329-1	Slid motor ass'y	
67	2646-571-01	Gear (MD)	
68	7627-852-18	Special screw(+P1.7X4 Type 3)	
69	X2626-327-1	Spindle motor Ass'y	
70	X2626-330-1	Lead screw Ass'y	
71	X2626-331-1	Lead holder Ass'y	
72	2646-573-01	Lead holder(B)	
74	A4672-541-A	Optical pick-up, KMS-260A/JIN	
75	2646-564-01	Spring, Spindle motor Tension	

NSP: No Spare parts



REF. No.	PART No.	DESCRIPTION	NOTE
1	X2646-247-1	Motor Plate ass'y	NSP
2	7627-854-28	Special screw(+P2.5X4.5Type 3)	
3	1668-261-11	L-SW pc board	
4	1783-386-11	Flexible flat cable(6 core)	
5	2646-555-02	Gear(Relay B)	
6	2646-554-01	Gear(Relay A)	
7	X2646-249-1	Slot Frame ass'y	
9	2646-556-01	Slot Arm	
10	X2646-248-2	Load Frame ass'y	NSP
11	2646-548-01	Insulator	
12	7688-002-11	Spacer W2.6, Middle	
13	4628-167-01	Screw, Step	
14	2646-557-01	Slide Frame	NSP
15	2646-559-02	Head Arm,	
16	2646-561-01	Spring, SP Tension	
17	2646-562-01	Spring, Tension coil	
18	2646-560-02	Mode Cam,	

REF. No.	PART No.	DESCRIPTION	NOTE
19	1669-181-11	Head flexible pc board	
20	2627-529-01	Screw (+P1.7X2.5)	
21	1500-518-11	MD Over light head	
22		Double-face adhesive Sheet	NSP
23	A4617-020-A	MD mount	NSP
24	2643-228-01	Screw, Toothed lock	
M704	24604139	Shaft(door)	
26	2646-545-01	Spring(Door arm), Tension coil	
27	2646-547-02	Main frame	NSP
M703	24605828	Spring(Door), Tension coil	
M705	24611654	Door<B>	
M705	24611655	Door<S>	
30	X2626-328-1	Loading motor ass'y	
31	7627-852-38	Special screw(+P1.7X1.8 Type 3)	
32	7627-553-37	Special screw(+P2X3 Type 3)	
33	A4912-117-A	Loading ass'y	NSP

NSP: No Spare parts

MD MECHANISM PC BOARD PARTS LIST

REF. No.	PART No.	DESCRIPTION	NOTE
	A4917-020-A	MD Mount	NSP
L101,L102,L103 L104,L105,L106 L107,L121,L122 L161,L162	1414-235-11	Inductor, Ferrite bead	
CN101	1691-385-21	Connector, FFC/FPC 21P	
X201	1760-174-31	Vibrator, Ceramic,12MHz	
X202	1760-872-11	Vibrator, Crystal, 32,768KHz	
CN103	1770-425-11	Connector, FFC/FPC 16P	
	1771-092-21	Push Switch, (1Ker)	
	1771-326-11	Push lever Switch, (1Ker)	
	1771-327-11	2pin Push Switch, (2Ker)	
CN110	1774-731-21	Pin, 5P Connector (PC Board)	
CN106	1776-336-21	Connector, FFC/FPC 6P	
CN104	1778-283-11	Connector, FFC/FPC 4P	
CN102	1778-460-11	Connector, FFC/FPC 19P	
CN105	1779-345-11	Connector, FFC/FPC 7P	
D181,D183	8719-046-87	Diode, F1J6	
D101	8719-914-43	Diode, DAN202K-T-146	
Q182	8729-017-65	Transistor, 2SK1764KY	
Q181	8729-018-75	Transistor, 2SJ278MY	
Q102	8729-026-49	Transistor, 2SA1037AK-T146-QR	
Q101,Q163	8729-027-38	Transistor, DTA144EKA-T146	
Q103,Q104,Q180	8729-027-43	Transistor, DTC114EKA-T146	
Q162	8729-101-07	Transistor, 2SB798-T1DK	
IC103	8729-903-10	Transistor, FMW1-T-148	
IC101	8752-080-95	IC, CXA2523AR	
IC121	8752-384-47	IC, CXD2652AR	
IC122	8759-234-20	IC, TC7S08F	
IC123	8759-242-70	IC, TC7WU04F	
IC192	8759-426-95	IC, L88MS33T-FA-TL	
IC152	8759-430-25	IC, BH6511FS-E2	
IC171	8759-484-73	IC, BR24C01AF-E2	
IC125	8759-498-44	IC, MSM51V4400D-70TSK	
IC181	8759-523-48	IC, TC74ACT540FT(EL)	
IC201	8759-567-04	IC, RU8X12MF-0030	
IC202	8759-823-87	IC, LB1638MTE-L	

NSP: No Spare parts

MD MECHANISM DISASSEMBLY

· Remove the parts in numerical order.

[Main frame]

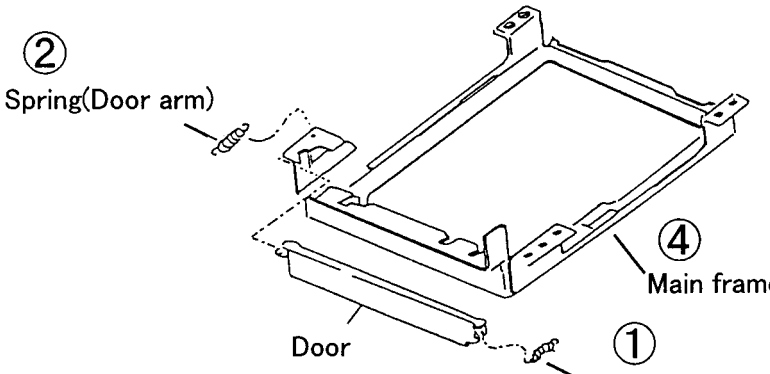


Fig. 1

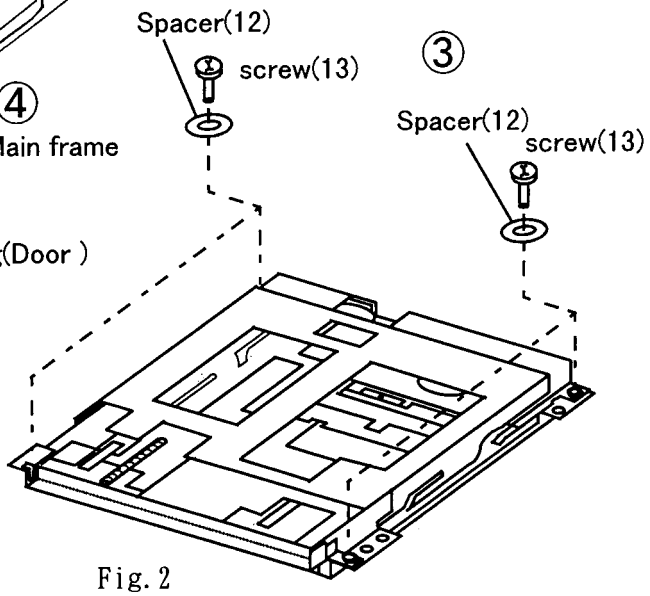


Fig. 2

[MD mount]

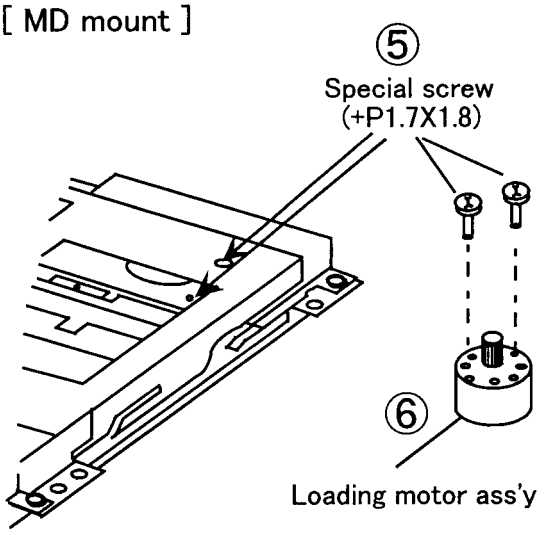


Fig. 3

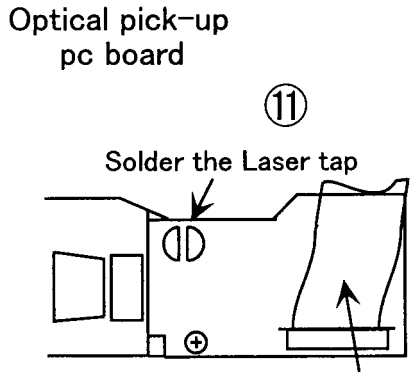


Fig. 5

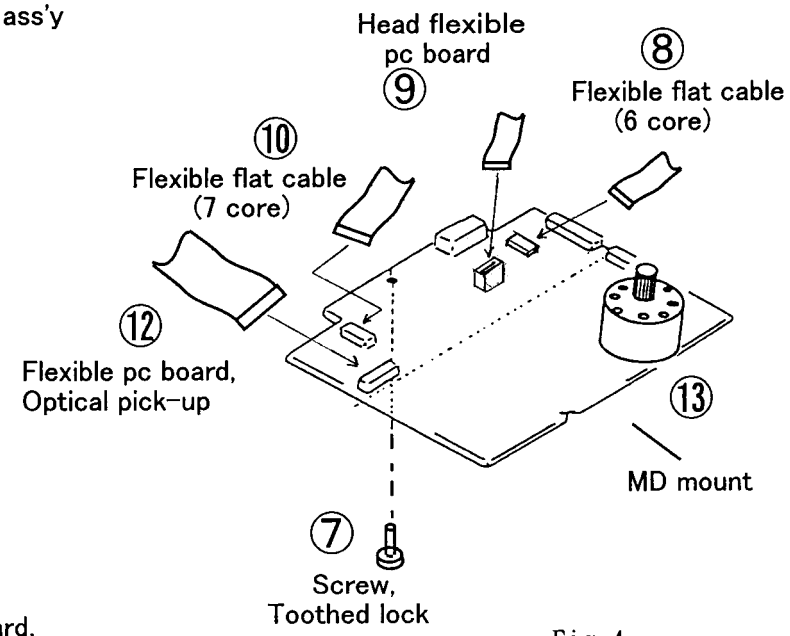
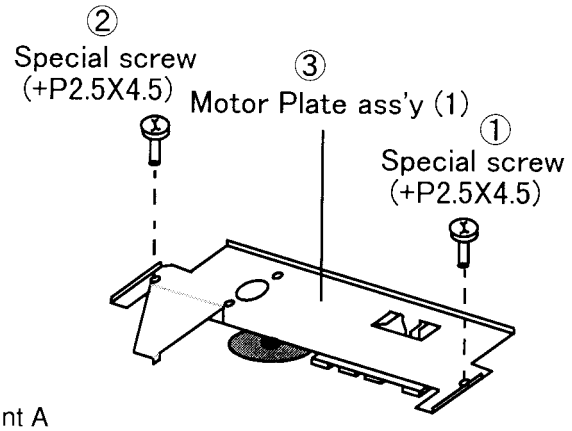
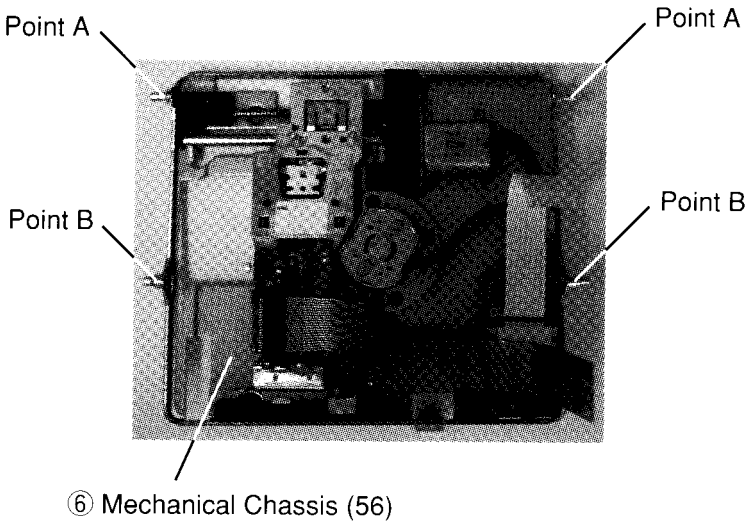


Fig. 4

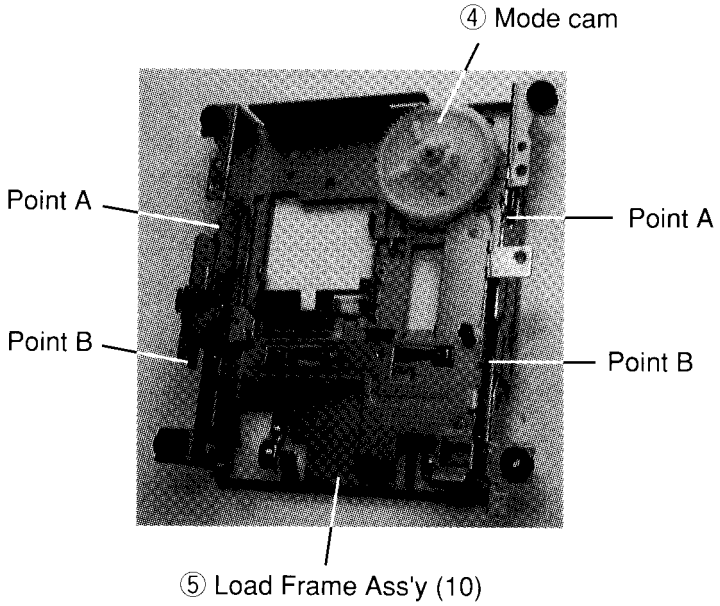
[Mechanical Chassis]



(Fig. 6)



(Fig. 8)



(Fig. 7)

[Overwrite head]

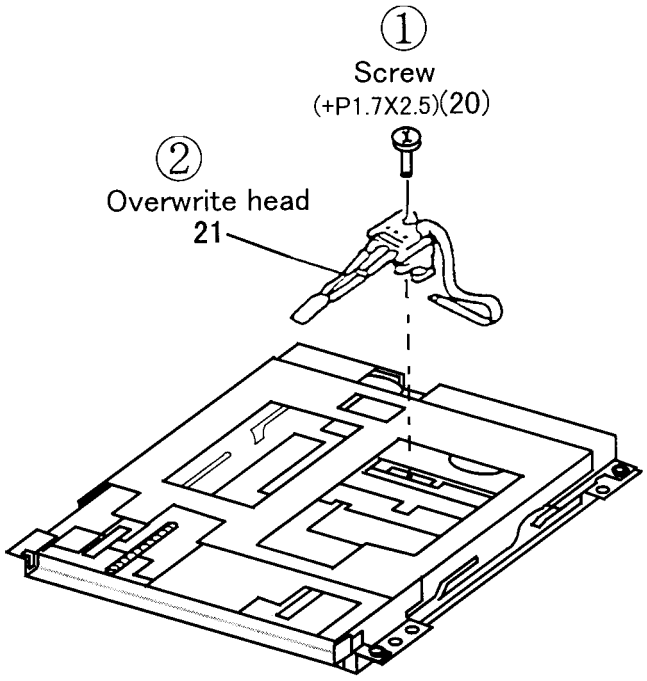


Fig. 1

[Optical pick-up,]
KMS-260A/JIN

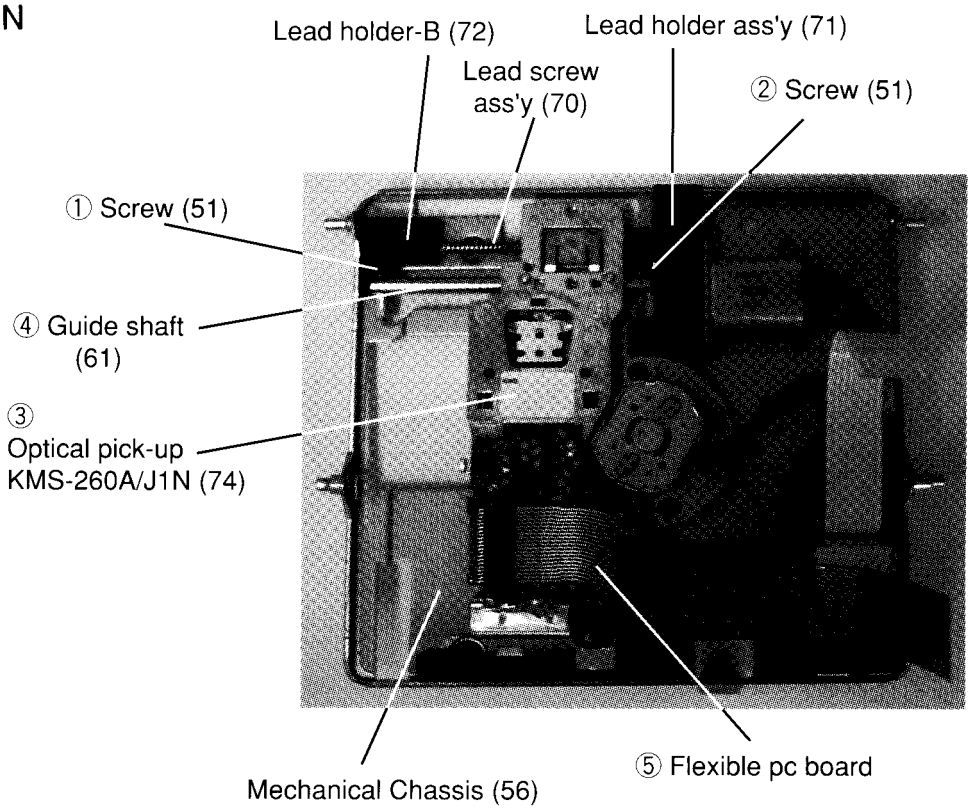


Fig. 2

ADJUSTMENTS

1. TEST MODE

1.1 Precaution for Using the Test Mode

1. In the test mode, the loading related movement does not correspond with the test operation. Be sure that the disc is stopped completely before replacing the disc. Pressing the EJECT key when a disc is rotating in continuous play/recording, etc. does not stop the rotation of the disc, causing the rotating disc to be ejected. Push the EJECT key after the rotation of the disk stops after pushing the EDIT/NO key. Be sure to press the EJECT key while pressing the EDIT/NO key.
2. In the test mode, the open/close state of the record-protect tab is not detected and therefore, if the unit enters a laser power emitting mode such as continuous recording mode (REC MODE) and traverse adjustment mode (FBAL ADJUST), the recorded contents will be erased regardless of the position of the record-protect tab. If a disc whose contents must not be erased is used in the test mode, be careful not to select the continuous recording mode or traverse adjustment mode.

1.2 Setting the Test Mode

1. Connect the right side of R718 (TEST MODE) and GND. Or, during push the DISPLAY key, then push the REC key .
2. Plug in the power cord of the unit into a wall outlet.
3. Push the STANDBY key to enter the TEST mode.

1.3 Canceling the Test Mode

Unplug the power cord of the unit from the wall outlet.

1.4 Basic Operation in the Test Mode

In the test mode, all operations are made through three controls: AMCS knob, YES key and EDIT/NO key. The functions of these controls are shown below.

Function name	Function
AMCS knob	Changes the parameter and test item.
YES key	Proceeds to the next step or finalizes the operation.
EDIT/NO key	Returns to the previous step or aborts the operation.

1.5 Selecting the Test Item

Select the desired test item from the following eight items by turning the AMCS knob.

Display information	Test item
EMP ADJUST	Temperature compensation offset adjustment
DPWR ADJUST	Laser power adjustment
DPWR CHECK	Laser power adjustment
FBAL ADJUST	Traverse adjustment
BIAS ADJUST	Focus bias adjustment
BIAS CHECK	Focus bias adjustment
PLAY MODE	Continuous play mode
REC MODE	Continuous recording mode

For details of individual test items, see the applicable section in "2. Electrical Adjustments".
If you select a wrong test item, press the EDIT/NO key to deselect the item.
* EP MODE (non-volatile memory mode) is not used for servicing.
If you select this item by mistake, press the EDIT/NO key immediately to deselect the item.

1.6 Functions of Other Controls

Control name	Function
▷II	Causes continuous playing when stopped; Turns ON/OFF the tracking servo when in continuous play.
■	Stops continuous playing/recording.
▷▷	Moves the sled to outside while the key is pressed.
◁◁	Moves the sled to inside while the key is pressed.
●	Starts/stops recording during continuous play.
PLAY MODE	Switches spindle servo mode (between "CLV-S" and "CLV-A") each time the key is pressed.
DISPLAY	Switches display mode each time the key is pressed.

Note: The open/close state of the record-protect tab will not be detected during the test mode.
Remember that pressing the ● (REC) key erases the recorded contents regardless of the position of the record-protect tab.

1.7 Meanings of Other Display Information

Display information	Mode		
	Lit	Not Lit	Flashing
▷	In continuous play	Stopped	
II	Tracking servo OFF	Tracking servo ON	
REC	Recording mode ON	Recording mode OFF	
CLOCK	CLV LOCK	CLV UNLOCK	
TRACK	Bit	Group	
DISC	High reflection	Low reflection	
DATE	CLV-S	CLV-A	
A.SPACE	ABCD adjustment completed		
A-B	Focus auto gain successful		Focus auto gain successful
	Tracking auto gain successful		Tracking auto gain failed

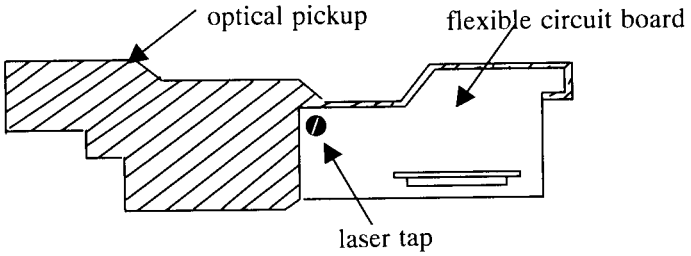
2. ELECTRICAL ADJUSTMENTS

2.1 Precautions for Checking Laser Emission from the Laser Diode

When checking the emission of laser from the laser diode during adjustments, never it from directly above the laser diode. Doing so may cause loss of your eyesight.

2.2 Precautions for Handling the Optical Pickup (KMS-260A)

The laser diode inside the optical pickup is easily damaged by static electricity.
When handling the optical pickup, solder-bridge the laser tap located on the flexible circuit board.
If you are disconnecting the optical pickup, provide solder-bridging before removing it;
Do not remove the solder bridging before reconnecting the optical pickup.
Also, tape sufficient preventive measures against static electricity when working on it.
It is also noted that the flexible circuit board must be handled carefully because its wiring is easily broken.



2.3 Precautions for Adjustments

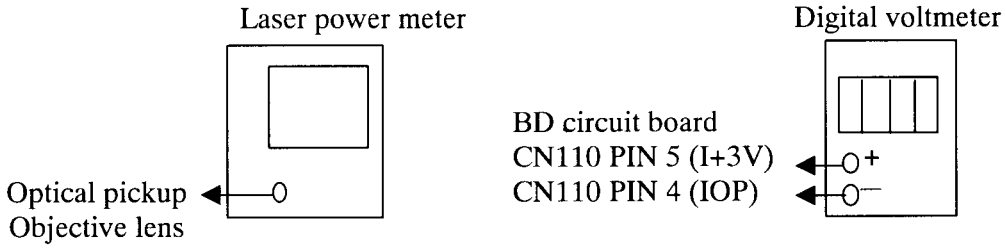
1) Whenever you have replaced the optical pickup, adjust the laser power.
2) Conduct adjustments in the test mode.
   Exit from the test mode if you have finished adjustments.
3) Use the following test disc and measuring instruments.

   MD test disc: TGYS-1
   Laser power meter: LPM-8001 (manufactured by LEADER)
   Oscilloscope (with 40MΩ band or more; Conduct probe CAL before measurement.)
   Digital voltmeter

4) If you monitor two or more signals on an oscilloscope, do not connect VC to GND inside the oscilloscope.
   (Otherwise, short-circuit will occur between VC and GND.)

2.4 Adjusting the Laser Power

Connection:



Adjustment:

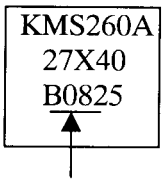
1. Install the laser power meter on the objective lens of the laser pickup.
   (If it cannot be installed properly, move the pickup using the << or >> key.)
   Connect the digital voltmeter to CN110 Pin 5 (I+3V) and CN110 pin 4 (IOP).
2. Turn the AMCS knob until "DPWR ADJUS" is displayed.
   (Laser power: For adjustment)
3. Press the YES key to display "LD 0.9mW $□□".
4. Adjust AMCS knob such that the laser power reading becomes 0.86mW~0.92mW.
   Press the YES key to display "LD SAVE $□□".
5. Press the YES key to display "LD 7.0mW $□□".
6. Adjust AMCS knob such that the laser power reading becomes 6.9mW~7.1mW.
   Press the YES key to display "LD SAVE $□□".
7. Turn the AMCS knob until "DPWR CHECK" is displayed.
8. Press the YES key to display "LD 0.9mW $□□".
   Laser power meter reading: 0.85mW ~ 0.91mW
9. Press the YES key to display "LD 7.0mW $□□".
   Verify that the readings on the laser power meter and the digital voltmeter are within the value specified below:

Standard value:

Laser power meter reading: 7.0mW±0.1mW

Digital voltmeter reading: Optical pickup displayed value ±10%

(Optical pickup label)



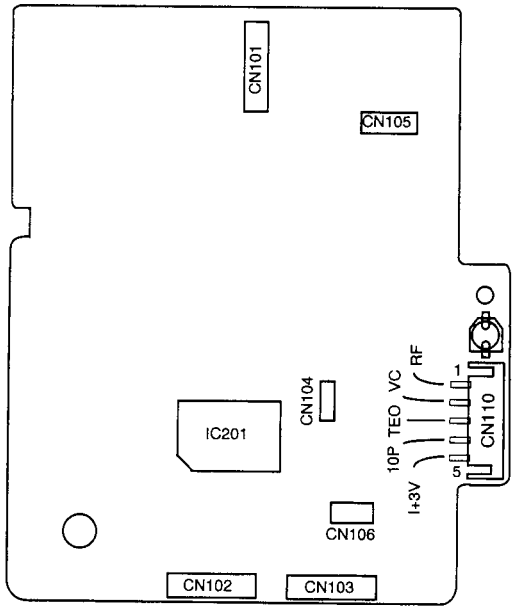
In this case, Iop=82.5mA

Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

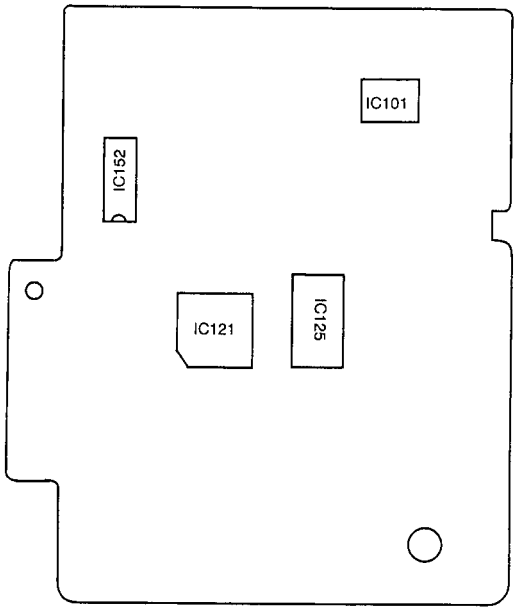
10. Press the EDIT/NO key to display "DPWR CHECK", then stop the laser emission.
(The EDIT/NO key is always accepted to stop the laser emission.)

2.5 Adjustment point

BD pc board (siad A)



BD pc board (siad B)

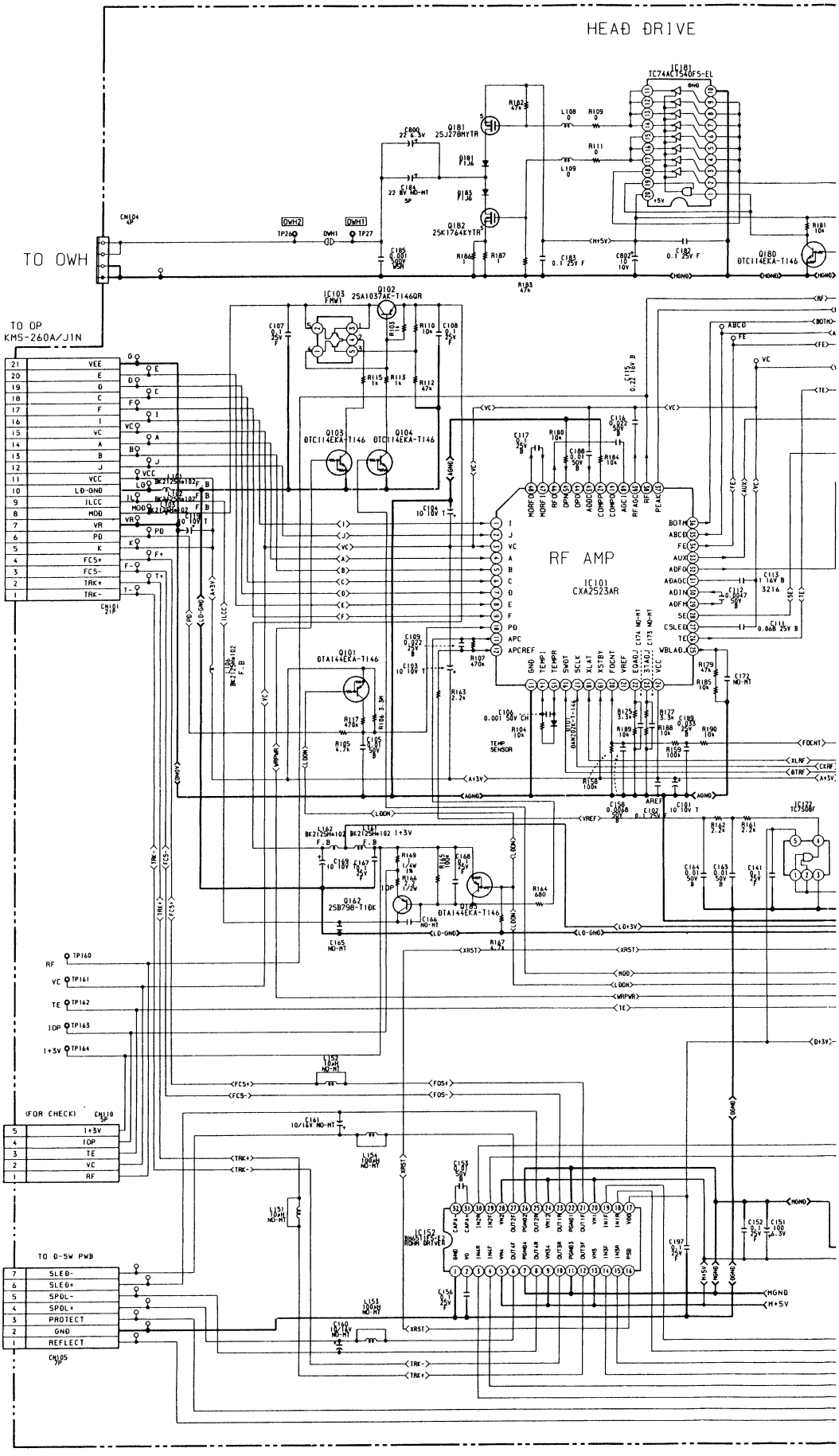


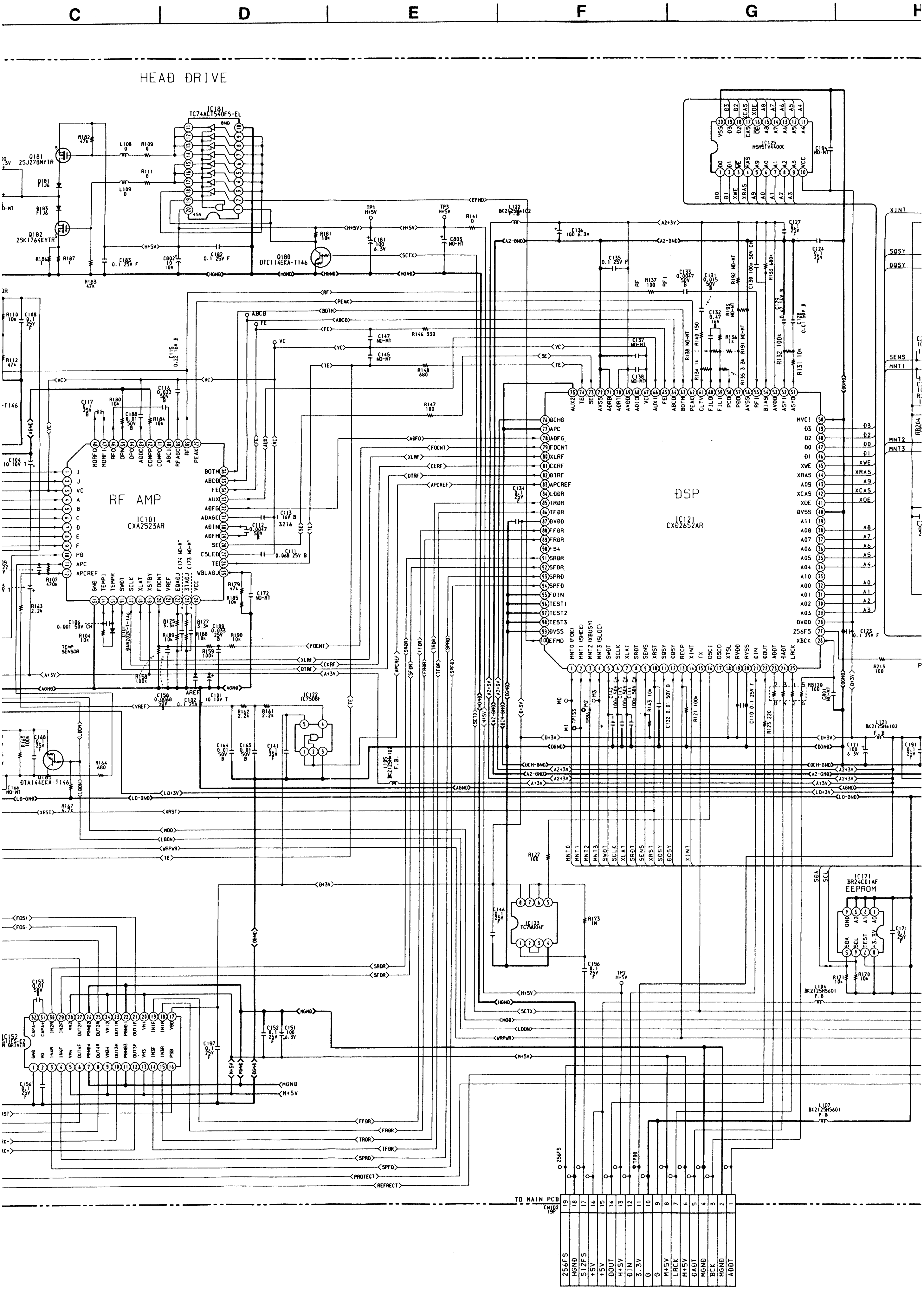
MESSAGE LIST

The following table explains the various messages that appear in the display.

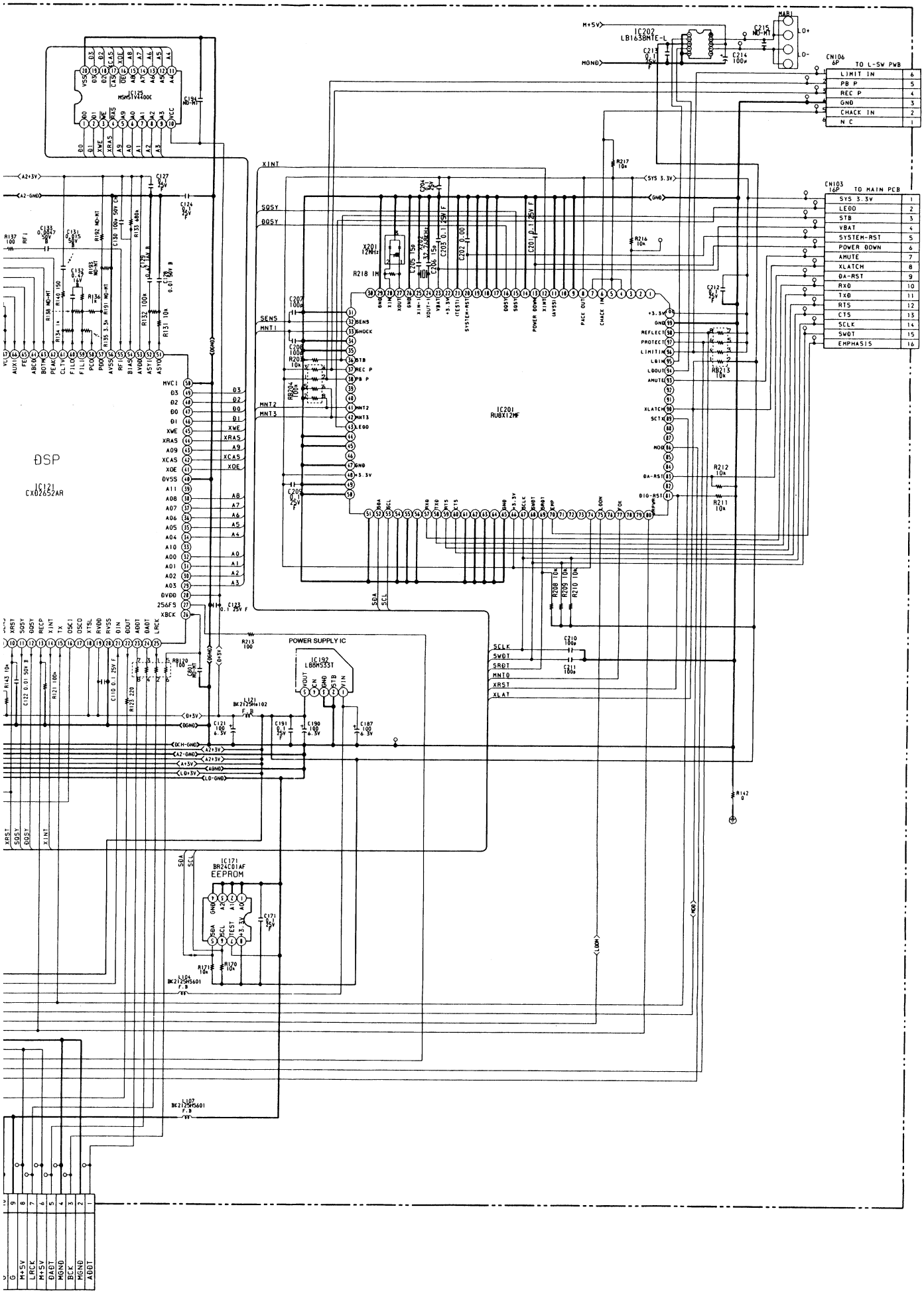
Message	meaning
All Erase!!	An attempt was made to record onto a faulty MD.
Blank Disc	A new recordable MD or a recordable MD without disc or track names is inserted.
Cannot Copy	An attempt was made to make a second copy from a digitally dubbed MD.
Cannot Edit	An attempt was made to edit the disc during MEMORY or RANDOM play.
Cannot Rec	An attempt was made to record onto a premastered (read-only) disc.
D. In Unlock	The digital equipment (CD player, DAT,etc) has not been connected properly.
Disc Error	The disc is abnormal (scratched or missing a TOC).
Disc Full	The disc is full.
Impossible	The disc could not be edited.
Memory Full	An attempt was made to record a 26th track.
Name Full	The number of characters has reached the limit for input to one MD.
No Change	The disc or track name was not changed.
No Disc	There is no disc in the unit.
No Track	The inserted disc has a disc title but no tracks.
Over	In pause mode (when playing is paused) : the Fast Forward button (▶▶) was pressed to the end of the disc.
Protected	The inserted disc is record-protected.
Retry	The first recording attempt failed due to a disturbance or scratches on the MD,and a second recording is being made.
Retry Error	The recording attempt failed due to a consecutive disturbance or scratches on the MD.
Sorry	An attempt was made to combine tracks that cannot be combined or to divide a track at the beginning.

SCHEMATIC DIAGRAM

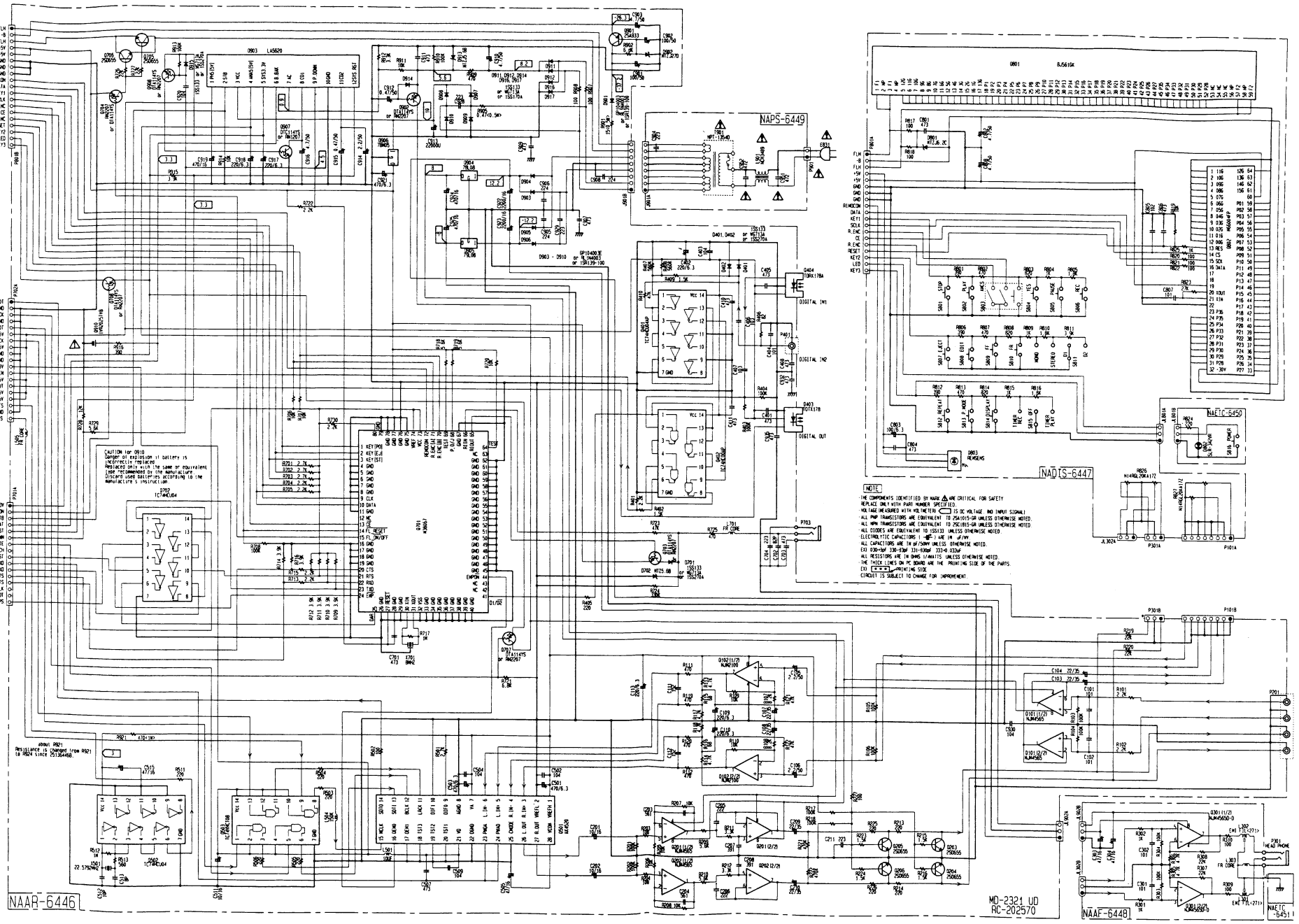



C
D
E
F
G
HEAD DRIVE
IC181
TC74ACT540FS-EL
Q181
2SJ278MYTR
Q182
2SK1764KYTR
Q180
DTC114EKA-T146
RF AMP
IC101
CXA2523AR
DSP
IC121
CXD2652AR
IC125
MSM51V4400C
IC122
TC7S08F
IC123
TC7WU04F
IC171
BR24C01AF
EEPROM
Q183
DTA144EKA-T146
TEMP SENSOR
TO MAIN PCB
CN102
19P
256FS
HGND
512FS
+5V
+5V
DOUT
M+5V
DIN
3.3V
G
M+5V
LRCK
M+5V
DADT
MGND
BCK
MGND
ADDT

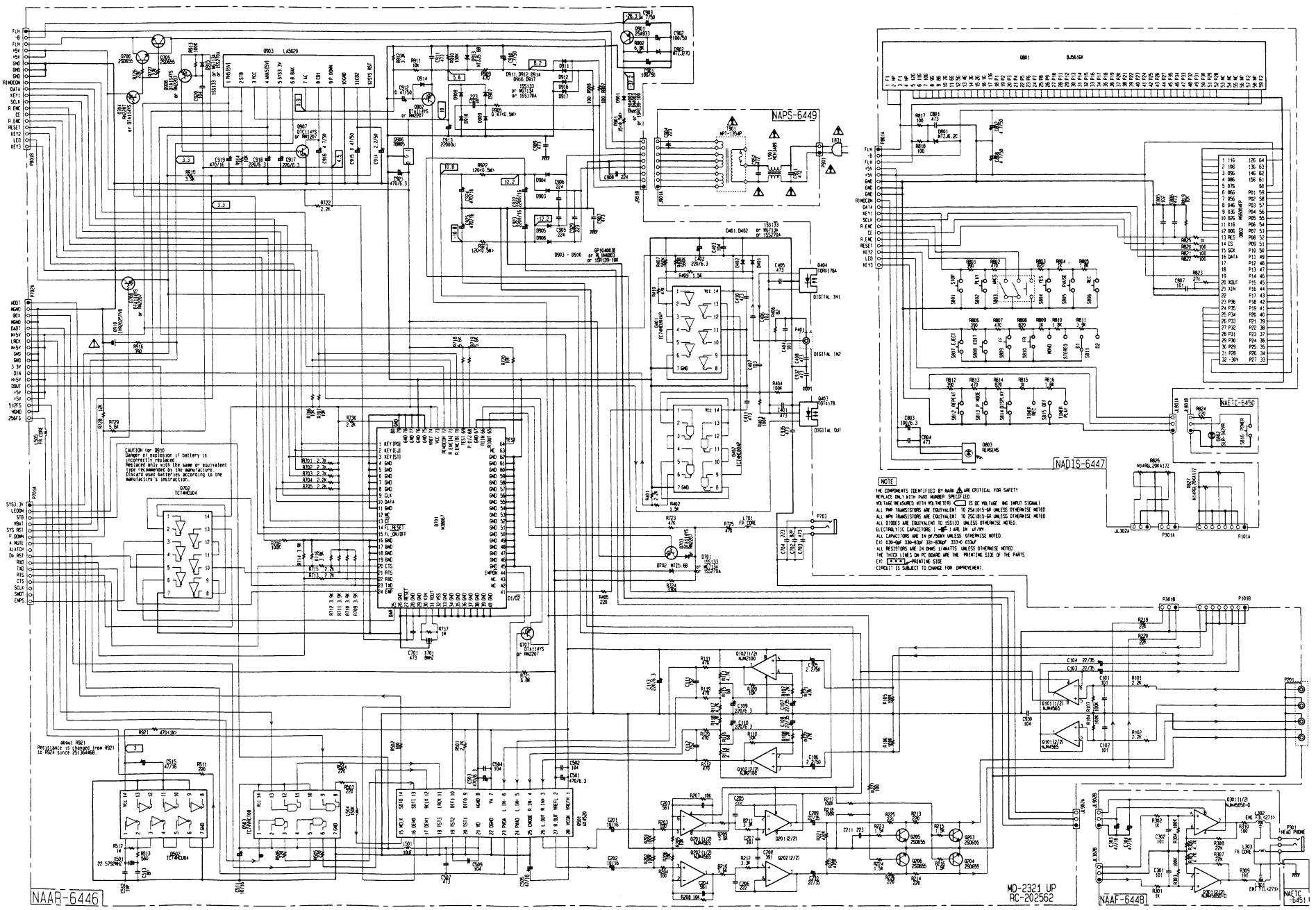
G H I J K


IC202
LB1638NTE-L
CN106
6P TO L-SW PWB
LIMIT IN
PB P
REC P
GND
CHACK IN
N C
CN103
16P TO MAIN PCB
SYS 3.3V
LED0
STB
VBAT
SYSTEM-RST
POWER DOWN
AMUTE
XLATCH
DA-RST
RX0
TX0
RTS
CTS
SCLK
SWDT
EMPHASIS
IC201
RU8X12MF
DSP
IC121
CXD2652AR
IC192
L88HS33T
POWER SUPPLY IC
IC171
BR24C01AF
EEPROM
X201
12MHz
XINT
SQSY
QQSY
SENS
MNT1
MNT2
MNT3
SCLK
SWDT
SRDT
MNT0
XRST
XLAT
SDA
SCL

SCHEMATIC DIAGRAM <D>:120V model only



SCHEMATIC DIAGRAM <D>:230V model only



PRINTED CIRCUIT BOARD PARTS LIST

MAIN CIRCUIT PC BOARD(NAAR-6446-1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q101	22240191	NJM4565D-D
Q102	22241016	NJM-2100D
Q201,Q202	22240191	NJM4565D-D
Q401,Q702	222755	TC74HCU04P
Q402	222740005	74HC00P
Q501	22241129R9	AK4520A-VF
Q502	222740046R9	74HCU04
Q503	22241029	TC74VHC08F
Q701	22241279R3	M38067MC-406FP
Q903	22241077	LA5620
Q904	222780083	78L08 <D>
Q905	222790083	79L08 <D>
Q906	222780055JRC	NJM78M05FA
	Photo couplers	
Q404	24120037	TORX178A
Q403	24120031	TOTX178
	Transistors	
Q203-Q206	2211705 or	2SD655-E or
Q705,Q706	2211706	2SD655-F
Q703,Q704	2213090 or	DTA114YS or
Q707,Q708	2213590	RN2207
Q901	2213355 or	2SA933S-S or
	2213354	2SA933S-R
Q902,Q908	2213590 or	RN2207 or
	2213090	DTA114YS
Q907	2213570 or	RN1207 or
	221281	DTC114YS
	Diodes	
D401,D402	223163,	1SS133,
D701	223205 or	1SS270A or
D911,D912	223222	WG713A
D702,D913	224470562	MTZJ5.6B
D901	22380032,	1SR139-100,
D903-D910	22380035 or	GP104003E or
	22380260	RL1N4003
D902	224472704	MTZJ27D
D914-D917	223163,	1SS133,
	223205 or	1SS270A or
	223222	WG713A
	Battery	
Q910	3010277	⚠ IVR2025TVB, Battery
	Cores	
L505,L701	230906	BL02RN2-R62
	Coils	
L501	233454K100	NCH-1452 100K
L504	233454K150	NCH-1452 150K
	Oscillators	
X501	3010274	HC-49/UC3,22.5792MHz,Crystal
X701	3010190	CST8.00MTW,Ceramic
	Capacitors	
C101,C102	374721015	100pF±10%,50V,Plastic
C103,C104	354762209	22μF,35V,Elect.
C105,C106	354780229	2.2μF,50V,Elect.
C107.C108	354762209	22μF,35V,Elect.
C109,C110	354722219	220μF,6.3V,Elect.
C111.C112	374721524	1500pF±5%,50V,Plastic
C113,C402	354722219	220μF,6.3V,Elect.
C201,C202	354741009	10μF,16V,Elect.
C203,C204	374725614	560pF±5%,50V,Plastic
C205,C206	374722224	2200pF±5%,50V,Plastic
C207,C208	374723915	390pF±10%,50V,Plastic
C209,C210	354762209	22μF,35V,Elect.
C211	374722234	0.022μF±5%,50V,Plastic
C403	374721044	0.1μF±5%,50V,Plastic
C501,C503	354724719	470μF,6.3V,Elect.
C505,C515	354744709	47μF,16V,Elect.
C511	354741009	10μF,16V,Elect.
C901,C902	354781019	100μF,50V,Elect.
C903,C910	354780479	4.7μF,50V,Elect.
C905,C906	374722244	0.22μF±5%,50V,Plastic
C908	374722244	0.22μF±5%,50V,Plastic
C908,C929	374722234	0.022μF±5%,50V,Plastic
C912,C915	354784799	0.47μF,50V,Elect.
C913	3500181 or	22000μF,16V or
	3504348	22000μF,16V,Elect.
C914	354780229	2.2μF,50V,Elect.
C916	354780479	4.7μF,50V,Elect.
C917,C918	354722219	220μF,6.3V,Elect.
C919	354744719	470μF,16V,Elect.
C920	374721044	0.1μF±5%,50V,Plastic
C921	354724719	470μF,6.3V,Elect.
C922	354742229S	2200μF,16V,Elect.
C923	354742229S	2200μF,16V,Elect.
C924,C925	354744719	470μF,16V,Elect.
	Resistors	
R901	443521504	RS1/2WBJ-15
R905	453534794	RNU1/2WCJ-0.47
R922,R923	443521214	120Ω±5%,1/2W,Metal oxide <P>
	Terminals	
P201	25045397	NPJ-4PDWR222
P401	25045237	NPJ-1PDOR111
P703	25045330 or	NPJ-2PDBL184 or
	25045481	NPJ-2PDBL299
	Plugs	
P101B	25055446	NPLG-8P428
P301B	25055441	NPLG-3P423
	Sockets	
JL901B	25050272	NSCT-8P100
JL902A	25050267	NSCT-3P95
P701A	25051974	NSCT-16P1761
P702A,P801B	25051977	NSCT-19P1764
P301A	2009990524	NSAS-6P0687
	Radiator	
Q903A	27160381	RAD-108
	Screws	
Q903B	82143010	3P+10FN(BC),Pan head

DISPLAY CIRCUIT PC BOARD(NADIS-6447-1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	FL tube	
Q801	212164	BJ561GK
	IC	
Q802	22240685R9	M66004FP
	Remote sensor	
Q803	241306	RPM6938-V4

	Diode	
D801	224470623	MTZJ6.2C
	Capacitors	
C802,C808	355780479	4.7μF,50V,Elect.
C803	355721019	100μF,6.3V,Elect.
	Resistors	
R826,R827	5132436	N14RGL20KA17Z,Variable
	Switches	
S801,S802	25035652	NPS-111-S604
S803	25065507	EC11B15244
S804-S810	25035652	NPS-111-S604
S811	25065570	NSS-14199
S812-S814	25035652	NPS-111-S604
S815	25065459	NSS-13163
	Wire holders	
JL302A,JL801A	25051087	NSCT-3P874
	Sockets	
P101A	2009990461	NSAS-16P0615
P801A	25051799	NSCT-19P1586
	Holder	
Q801A	27191017A	FL tube

HEADPHONE AMPLIFIER PC BOARD (NAAF-6448-1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q301	22240191	NJM4565D-D,IC
L301,L302	3030012	DSS306-93B271M100,Filters
L303	230906	BL02RN2-R62,Core
C301,C302	374721015	100pF±10%,50V,Plasticcapacitors
C303,C304	354744709	47μF,16V,Elect. Capacitors
P301	25045255	YKB26-5009,Headphone
JL302B	25055624	NPLG-3P586,Wire trap
JL902B	25051107	NSCT-3P894,Wire holder

POWER SUPPLY CIRCUIT PC BOARD (NAPS-6449-1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
L901	231252	⚠ NCH-3489,Coil
C951,C952	3300030	⚠ DE1307E472M-KH,Plastic capacitors
P901	25055675	⚠ NPLG-2P631,Plug
JL901A	25051112	NSCT-8P899,Wire holder

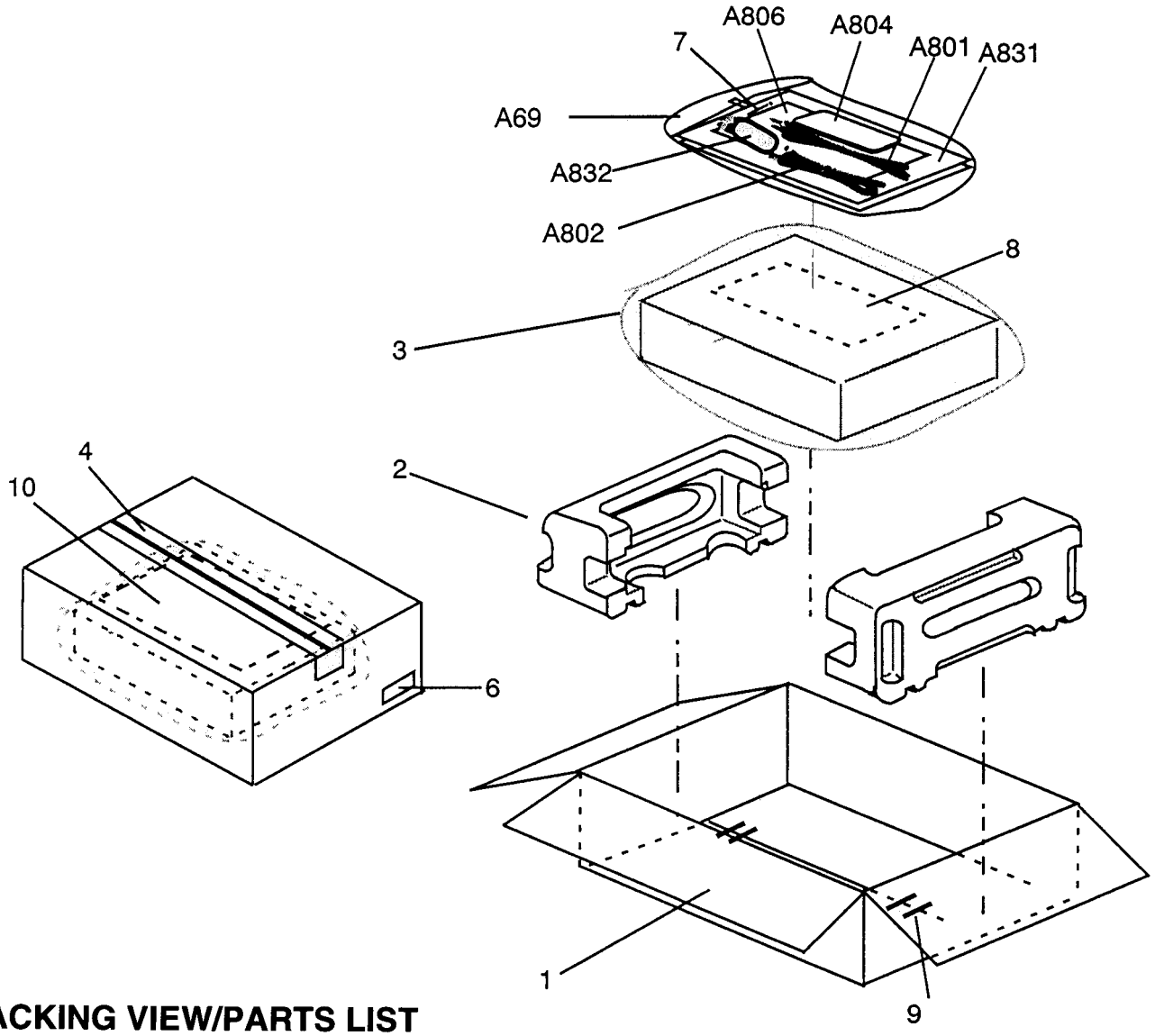
POWER SWITCH PC BOARD (NAETC-6450-1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION
D802	225321	SLR-342VR,LED
S816	25035652	NPS-111-S604,Switch
JL801B	25051087	NSCT-3P874,Wire holder

NOTE: <P>: 230V model only
<D>: 120V model only

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

PACKING VIEW



PACKING VIEW/PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1	29053362	Carton box <B>
1	29053361	Carton box <S>
2	29091834A	Pad ass'y
3	29100034-1A	850*650,Styrene bag
4	29110071	PP tape
5	261504	Paper tape
6	29362360	Label EAN <BP>
6	29362361	Label UPC <D>
6	29362359	Label EAN <S>
8	29355294	Instruction sheet U9
9	282301	Staple

REF. NO.	PART NO.	DESCRIPTION
10	Accessary bag assembly	
A69	29100097-1A	350*250,Styrene bag
A801	2010098A	Audio connection cable
A801 or	2010326	Audio connection cable
A802	2010200	RI cord
A804	24140339	RC-339MD,Remote control
A805	3010054	UM-3,Battery
7	29365019B	Warranty card <D>
A806	29358002K	Service station list <D>
A831	29342638	Instruction manual E
A831	29342639	Instruction manual FIS <P>
A831	29342640	Instruction manual GSwD <P>
A832	2050039	NCS-1P104,Optical cable

NOTE: <P>: 230V model only
<D>: 120V model only
<B>: Black model only
<S>: Silver model only

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