

# ONKYO® SERVICE MANUAL

## MINIDISC RECORDER MODEL MD-185X



Silver model

UP/ UPT	230V AC,50Hz
D/UDT	120V AC,60Hz

### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\triangle$  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE 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.

### 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. (when using MDW-74)
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 ( $\pm$ 0.5dB)
Signal to noise ratio:	98 dB or more when playing
Output level:	1.3 volts r.m.s.
Power supply rating:	AC 230 V, 50 Hz AC 120 V, 60 Hz
Power consumption:	12W (AC230V, 50Hz) 14W (AC120V, 60Hz)
Dimensions (W $\times$ H $\times$ D):	185 $\times$ 131 $\times$ 298 mm (7-5/16" $\times$ 5-3/16" $\times$ 11-3/4")
Weight:	2.9 kg (6.4 lbs.)

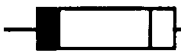
Specifications and features are subject to change without notice.



**SERVICE SAFETY PRECAUTIONS**

**1. Replacing the fuses**

 This symbol located near the fuse indicates that the fuse used is fast operating type. For continued protection against fire hazard, replace with same type fuse. For fuse rating refer to the marking adjacent to the symbol.

 Ce symbole indique que le fusible utilise est a rapide.  
 Pour une protection permanents, n'utiliser que des fusibles de meme type.  
 Ce dernier est indique la qu le present symbol est appose.

CIRCUIT NO.	PART NO.	DESCRIPTION
F901	252075	2.5A-SE-EAK,Primary<P,PT>

NOTE: <P>230V model only  
 <PT>Asian model only

**TABLE OF OCNTENTS**

Specifications	1
Service safety precautions	2
Caution on replacement of optional pickup	2
Protection of eyes from laser beam during servicing	3
Laser warning label	3
Chassis exploded view	4
Chassis exploded view parts list	5
MD mechanism exploded view	6
MD mechanism exploded view parts list	7
Block diagram	8
Microprocessor terminal descriptions	9
IC block diagrams and descriptions	11
MD mechanism replacing	23
MD mechanism disassembly	29
MD mechanism section	30
Message list	32
Printed circuit board view from bottom side	33
Schematic diagram	35
Printed circuit board parts list	37
Packing view/parts list	39

**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**

- |   |  |
|---|--|
| <p>1.Ground for the work-desk.<br/>                 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.</p> <p>2.Grounding for the test equipments and tools.<br/>                 Test equipments and toolings should be grounded in order that their ground level is the same the ground of the power source.</p> | <p>3. Grounding for the human body.<br/>                 Be sure to put on a wrist-strap that is properly grounded.<br/>                 Be particularly careful when wearing synthetic fiber clothes, or air is dry.</p> <p>4. Select a soldering iron that permits no leakage and have the tip of the iron well-grounded.</p> <p>5. Do not check the laser diode terminals with the probe of a circuit tester or oscilloscope.</p> |
|---|--|

# PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

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

## Laser Diode Properties

- Material: GaAlAs
- Wavelength: 780nm
- Emission Duration: continuous
- Laser output: max. 0.5mW\*

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

### 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 WARNING LABEL

These labels are located on the mechanism.

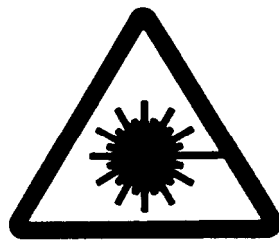
The label shown below are affixed.

- 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'ECLANCHEMENT DE SECURITE ANNULE.

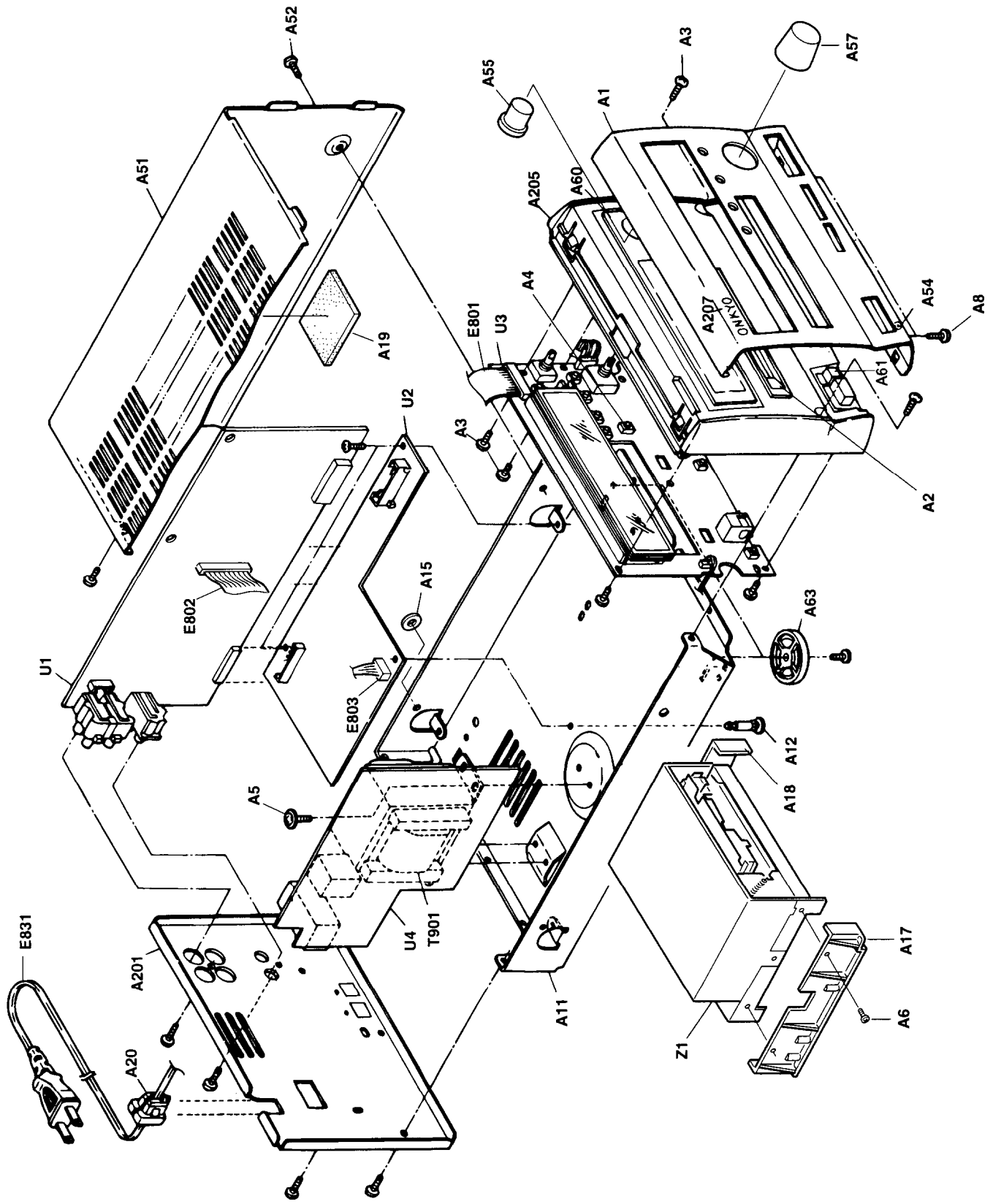


- 2. Class 1 label  
This label is located on the left side of rear cover.



LUOKAN 1  
LASERLAITE  
KLASS 1  
LASER APPARAT

CHASSIS EXPLODED VIEW



## CHASSIS EXPLODED VIEW PARTS LIST

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
A1	27212028	Front panel	A205	27111086A	Front bracket
A2	28148404	Door	A207	28135247Y	Badge
A3	838130088	3TTB+8B,Self-tapping screw	E801	2045191522	NCFC5-191522,Flexible flat cable
A4	28325616	Knob, Open	E802	2045241512	NCFC5-241512,Flexible flat cable
A5	830440089	4TTC+8C(BC),Self-tapping screw	E803	2009990427	NSAS-8P0571,Socket
A6	838430107	3TTB+10S(BC),Self-tapping screw	E804	260208	Wire tie
A8	838430088	3TTB+8B(BC),Self-tapping screw	E831	253193HIT	△ AS-CEE,Power supply cord <P/PT>
A11	27100307B	Chassis	E831	253192HIT	△ AS-UC-6#18(SPT-2), Power supply cord <D/DT>
A12	27190266	KGLS-12RF,Holder	F901	252075	△ 2.5A-SE-EAK, Fuse <P/PT>
A13	27270393	Spacer	T901	2301353	△ NPT-1347P,Power transformer <P/PT>
A17	27191058	Holder ML	T901	2301352	△ NPT-1347D,Power transformer <D/DT>
A18	27191059	Holder MR	U1	1H389519-1B	NAAR-6419-1B,Main circuit PC board ass'y <P/PT>
A19	28141165	t2X40X40, Cushion	U1	1H389519-1C	NAAR-6419-1C,Main circuit PC board ass'y <D/DT>
A20	27300750	△ Bushing, Cord	U2	1H389520-1B	NAAR-6420-1B,Power supply circuit PC board ass'y <P/PT>
A51	28184626A	Top cover	U2	1H389520-1C	NAAR-6420-1C,Power supply circuit PC board ass'y <D/DT>
A52	838230088	3TTB+8B(NI), Self-tapping screw	U3	1H389521-1B	NADIS-6421-1B,Display circuit PC board ass'y <P/PT>
A54	28198831	Facet	U3	1H389521-1C	NADIS-6421-1C,Display circuit PC board ass'y <D/DT>
A54	28191712	Clear plate RE	U4	1H389522-1B	NAPS-6422-1B,Power transformer PC board ass'y <P/PT>
A55	28325614	Knob, recording	U4	1H389522-1C	NAPS-6422-1C,Power transformer PC board ass'y <D/DT>
A57	28325615	Knob, AMCS	U5	1H389523-1B	NAETC-6423-1B,AC outlet terminal PC board ass'y <P/PT>
A59	28133362	Back plate	Z1	24650029	MDM-97B
A60	28191835	Clear plate		27190970-1	Holder FA
A63	27175252-1B	Leg		29362285	Label, Caution
A201	27122500	Rear panel <P/PT>			
A201	27122499A	Rear panel <DT>			
A201	27122532	Rear panel <D>			

NOTE: &lt;P&gt;230V model only

&lt;D&gt;120V model only

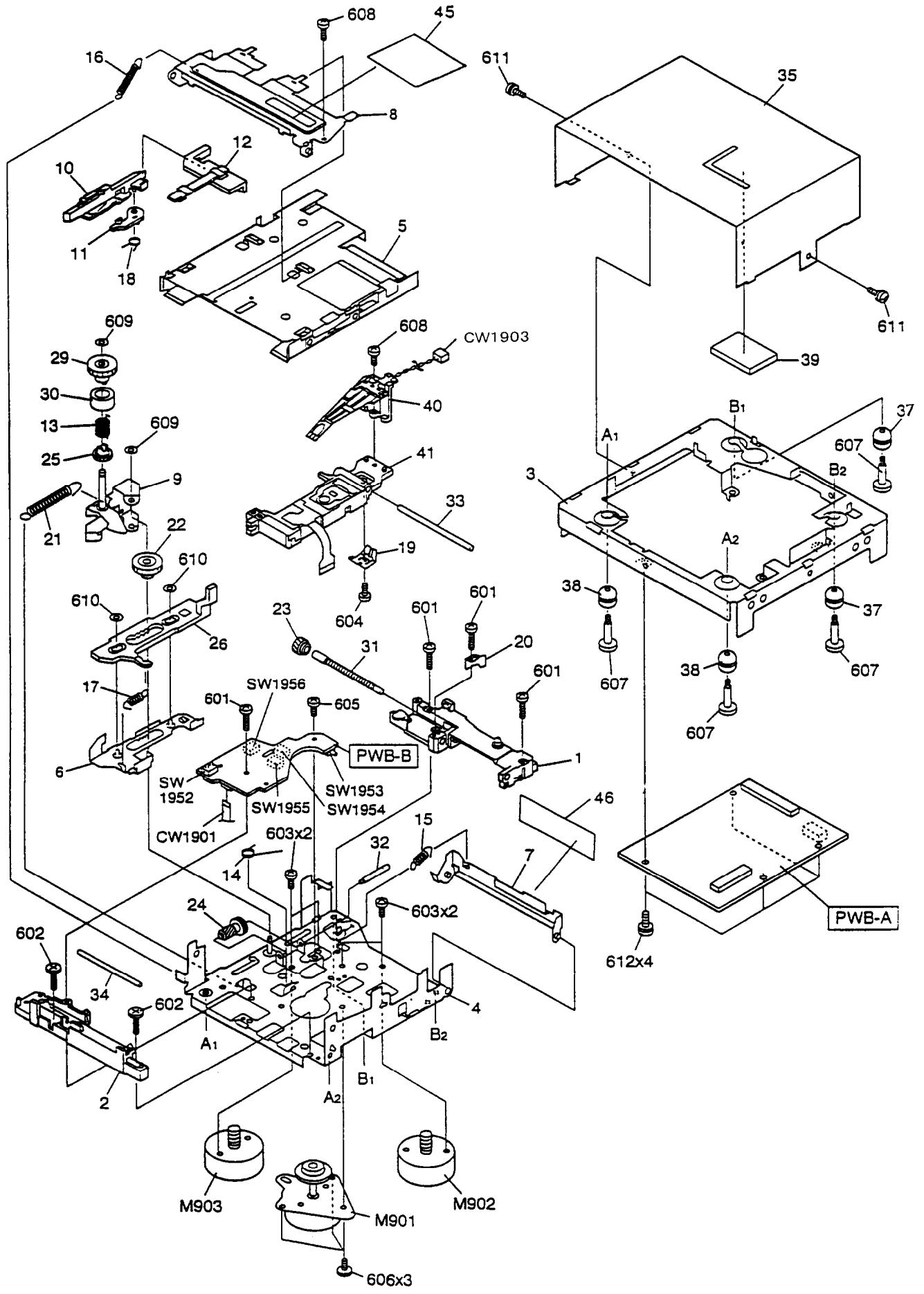
&lt;DT&gt;Taiwanes model only

&lt;PT&gt;Asian model only

NOTE: THE COMPONENTS IDENTIFIED BY MARK

△ ARE CRITICAL FOR RISK OF FIRE AND  
ELECTRIC SHOCK. REPLACE ONLY WITH  
PART NUMBER SPECIFIED.

MD MECHANISM EXPLODED VIEW

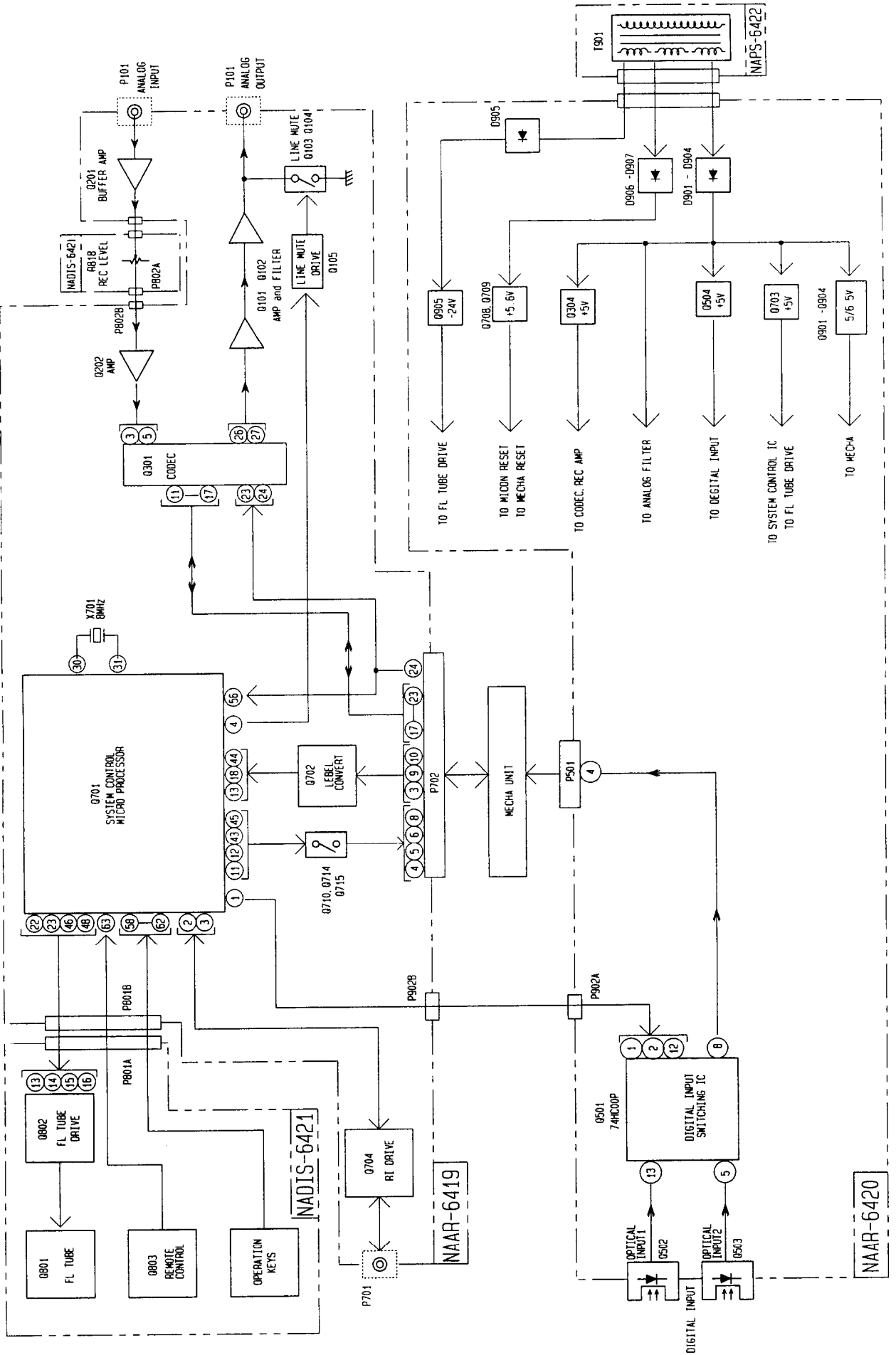


## MD MECHANISM PARTS LIST

24650029(MDM-97B)

Ref.No.	Part No.	Description	Mechanism PC board-Parts list		
			CIRCUIT NO.	PART NO.	DESCRIPTION
1	1242000208	MD guide A			Ics
2	1242000209	MD guide B	IC1101	1245730345	1R3R55
3	1242000210	Base frame	IC1201	1245730418	LR376481
4	1242070047	Driver chassis	IC1202	1245730207	IX2474AF
5	1242140138	Cartridge holder	IC1251	1245730043	74ACT02F
6	1242480122	Cam plate lever	IC1401	1245730480	IX0261AW
7	1242480123	Shift arm	IC1402	1245730301	S29294A
8	1242480124	Arm, holder	IC1601	1245730354	M56758FP
9	1242480125	Lever, roller arm	IC1801	1245730367	XC62EP32
10	1242480126	Lever, clamp	IC1906	1245730152	TC7ST08F
11	1242480127	Catcher	IC1907	1245730153	TC9246F
12	1242480128	Lever, slider	IC1915	1245730368	74VHC08FT
13	1242580157	Spring, roller holder	IC1990	1245730044	74AC04FS
14	1242580159	Spring			Transistors
15	1242580053	Spring	Q1251,Q1252	1245760042	2SK2909
16	1242580054	Spring, holder	Q1253,Q1254	1245760016	2SK1473
17	1242580055	Spring, rack	Q1401,Q1403	1245760032	RN2404
18	1242580094	Spring, catcher	Q1402,Q1404	1305760402	RNC1404
19	1242580160	Spring A	Q1451	1245760031	RNC1407
20	1242580161	Spring, drive shaft	Q1601,Q1801	1245760001	2SA1314C
21	1242580093	Spring, roller holder	Q1802,Q1803	1245760047	RN1406
22	1242810063	Loading gear B	Q1807	1245760001	2SA1314C
23	1242810064	Drive gear	Q1820	1305760552	2SA1162G
24	1242810065	Loading gear A	Q1821,Q1822	1245760031	RNC1407
25	1242810066	Gear, roller			Diodes
26	1242810067	Gear, rack	D1251,D1252	1245700005	SB02-09CP
29	1242860001	Holder, roller	D1999	1245700008	1SS372
30	1242870014	Roller, transfer			Coils
31	1242900105	Shaft, drive	L1101	1245850024	10 $\mu$ H
32	1242900108	Shaft, loading gear	L1102,L1201	1245850026	0.47 $\mu$ H
33	1242900039	Shaft,pickup guide	L1203	1245850025	4.7 $\mu$ H
34	1242900040	Shaft,pickup guide	L1251	1245850002	47 $\mu$ H
35	1242000225	Cover, top	L1601,L1950	1246140023	1 $\mu$ H
37	1243260020	Cushion A			Crystal
38	1243260021	Cushion B	XL1201	1246160018	33.8688MHz
39	1243260108	Cushion, head			Plugs
40	1246100008	Head	CN1101	1245100161	23P
41	1246170019	Optical pickup	CN1252	1425100204	2P
42	1245120301	MD flexible cable	CN1601	1245100162	5P
43	1245120299	Connector	CN1602	1245100163	2P
45	1244030163	Sheet, head	CN1603	1425100236	2P
46	1244030168	Sheet lead wire	CN1604	1245100164	2P
601	1249700161	1.7x9.5mm,Machine screw	CN1901	1245100160	5P
602	1249700162	1.7x7.5mm,Machine screw	CN1902	1245100165	24P
603	1249700163	1.7x2mm,Machine screw	CN1904	1425100223	4P
604	1249700011	M1.4*2.2,Machine screw			Cable
605	1249700061	M1.7*3,Machine screw	CW1901	1245120287	
606	1249700065	M1.7*2.5,Machine screw			Connector
607	1249700076	M1.7*8.9,Machine screw	CW1903	1245120288	
608	1249700108	M1.7*5,Machine screw			
609	1249900005	1.5W3.2-.5,Washer			
610	1249900006	1.2W3-0.25,Waseh			
611	1189700020	M2.0*4,Machine screw			
612	1249700077	M1.7*3,Machine screw			
PWB-A	1246840193	Main PC board ass'y			
PWB-B	1245210149	Mechanism PC			
M901	1246300048	Spindle motor			
M902	1246300049	Sled motor			
M903	1246300050	Loading motor			
SW1954,SW1955	1245300026	Push switch			
SW1952	1245300027	Push switch			
SW1956	1305301313	Loading switch			
SW1953	1305301315	Lead-in switch			

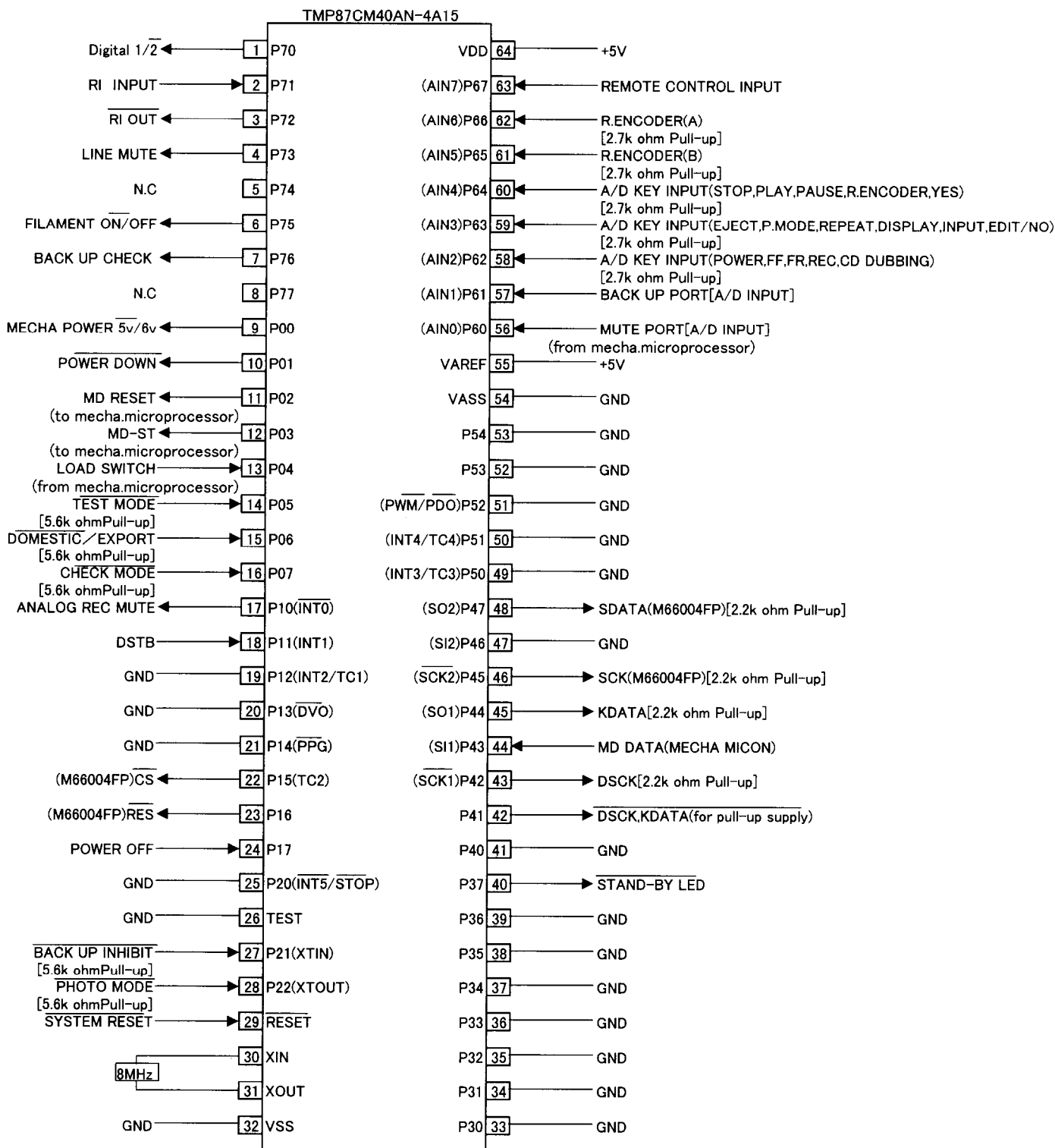
**BLOCK DIAGRAM**





# MICROPROCESSOR TERMINAL DESCRIPTION

## Q701:TMP87CM40AN-4A15 (SYSTEM CONTROL MICROPROCESSOR)

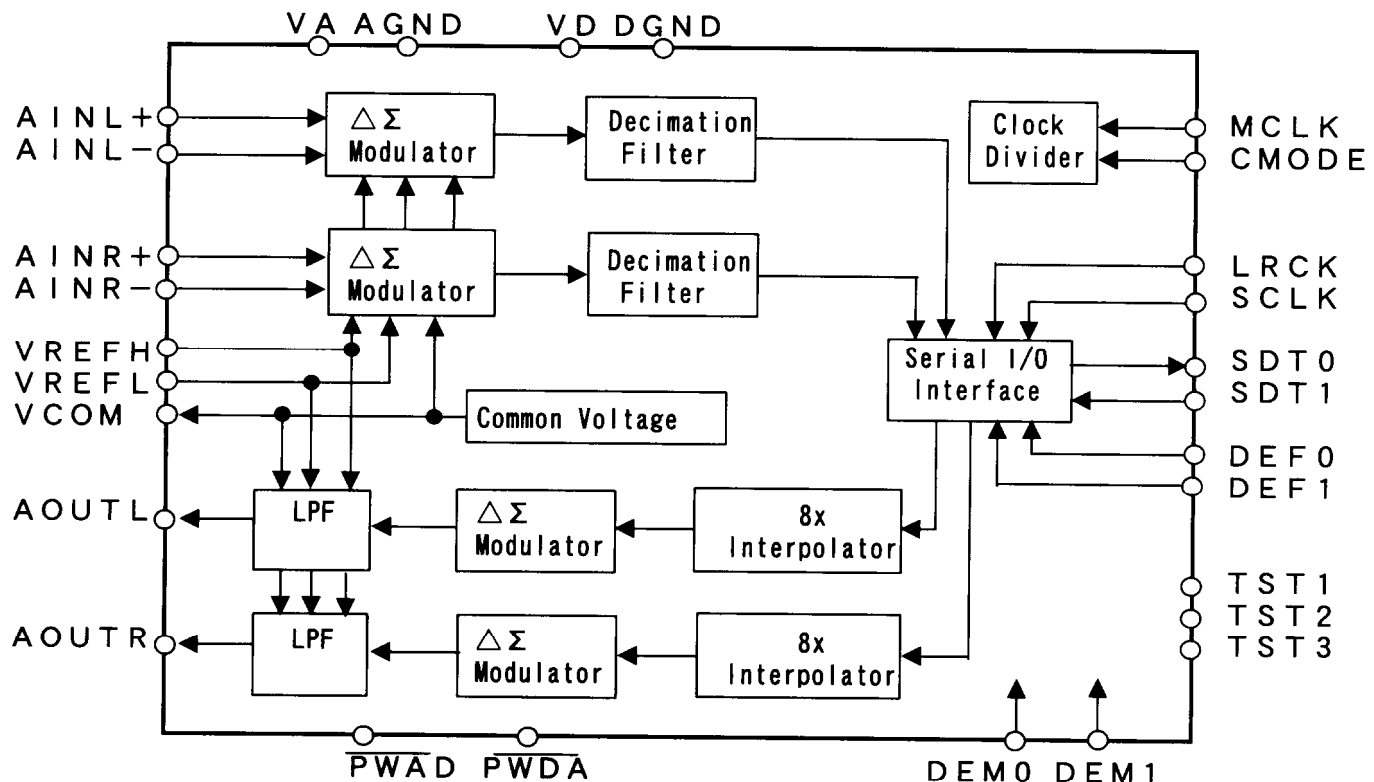


## Q701:TMP87CM40AN-4A15

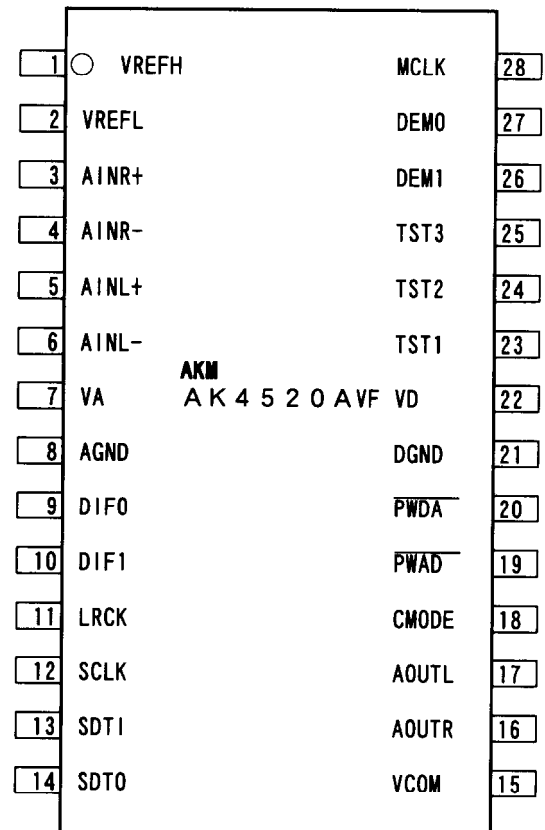
PIN No.	SYMBOL	DESCRIPTION
1	DIGITAL 1/2	Digital input select signal output terminal
2	RI INPUT	RI signal input terminal
3	RI OUT	RI signal output terminal(Active low)
4	LINE MUTE	Signal output terminal for LINE MUTE control. (Active high)
5	NOT USED	N.C
6	FILAMENT	Filament control signal output terminal(Active low)
7	BACKUP CHECK	Demand signal output terminal for backup voltage confirmation.
8	NOT USED	N.C
9	MECHA POWER	Mechanism drive voltage switch signal output terminal.
10	POWER DOWN	Signal output terminal for power failure detection(active low)
11	MD RESET	Reset signal output terminal to mecha microprocessor
12	MD-ST	Command signal output terminal for mecha microprocessor
13	LOAD SWITCH	Signal input terminal for lording switch
14	TEST MODE	Test mode detect input terminal (active low)
15	DOMESTIC/EXPORT	Dome./Ex-area detect input terminal
16	CHECK MODE	Check mode input terminal
17	ANALOG REC MUTE	Analogue recording mute output terminal
18	DSTB	Communication input terminal for mech.microprocessor
19	NOT USED	N.C (to GND)
20	NOT USED	N.C (to GND)
21	NOT USED	N.C (to GND)
22	CS	Chip selection signal output terminal to FL driver(M66004FP)
23	RES	Reset signal output terminal to FL driver(M66004FP) active low
24	POWER OFF	Detection signal input terminal for power failure
25	NOT USED	N.C (to GND)
26	TEST	Test terminal for microprocessor (connect to GND)
27	BACKUP INHIBIT	Back up suppression input terminal
28	PHOTO MODE	Input terminal for taking a picture mode detection.
29	SYSTEM RESET	System reset signal input terminal
30	XIN	connect to clock(8MHz)
31	XOUT	connect to clock(8MHz)
32	Vss	Power supply terminal (to GND)
33	NOT USED	N.C (to GND)
34	NOT USED	N.C (to GND)
35	NOT USED	N.C (to GND)
36	NOT USED	N.C (to GND)
37	NOT USED	N.C (to GND)
38	NOT USED	N.C (to GND)
39	NOT USED	N.C (to GND)
40	STAND-BY LED	Output terminal for stand-by LED control
41	NOT USED	N.C (to GND)
42	PULL UP VCC	Signal output terminal (voltage control ) for DSCK,KDATA
43	DSCK	Serial communication terminal to mecha microprocessor(output terminal)
44	MD DATA	Serial communication terminal to mecha microprocessor(input terminal)
45	KDATA	Serial communication terminal to mecha microprocessor(output terminal)
46	SCK	Clock output terminal for serial communications to FL driver(M66004FP)
47	NOT USED	N.C (to GND)
48	SDATA	Data output terminal for serial communications to FL driver(M66004FP)
49	NOT USED	N.C (to GND)
50	NOT USED	N.C (to GND)
51	NOT USED	N.C (to GND)
52	NOT USED	N.C (to GND)
53	NOT USED	N.C (to GND)
54	VASS	Reference voltage terminal for A/D transfer(to GND)
55	VAREF	Reference voltage terminal for A/D transfer(to +5V)
56	MUTE PORT	A/D input terminal for mute control (Active high)
57	BACK UP PORT	A/D input terminal for backup voltage
58	KEY INPUT(1)	A/D key input terminal (1)
59	KEY INPUT(2)	A/D key input terminal (2)
60	KEY INPUT(3)	A/D key input terminal (3)
61	R.ENCODER(B)	Pulse input terminal for rotary-encoder
62	R.ENCODER(A)	Pulse input terminal for rotary-encoder
63	REMOCON	Signal input terminal for remote control
64	VDD	Power supply terminal (to +5V)

# IC BLOCK AND DESCRIPTIONS

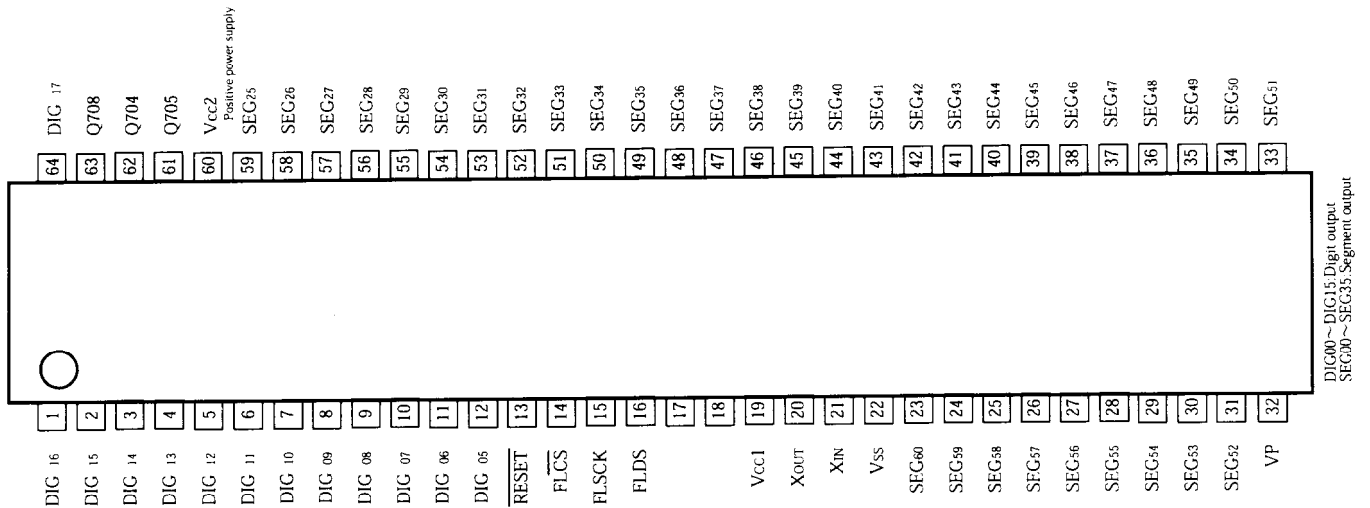
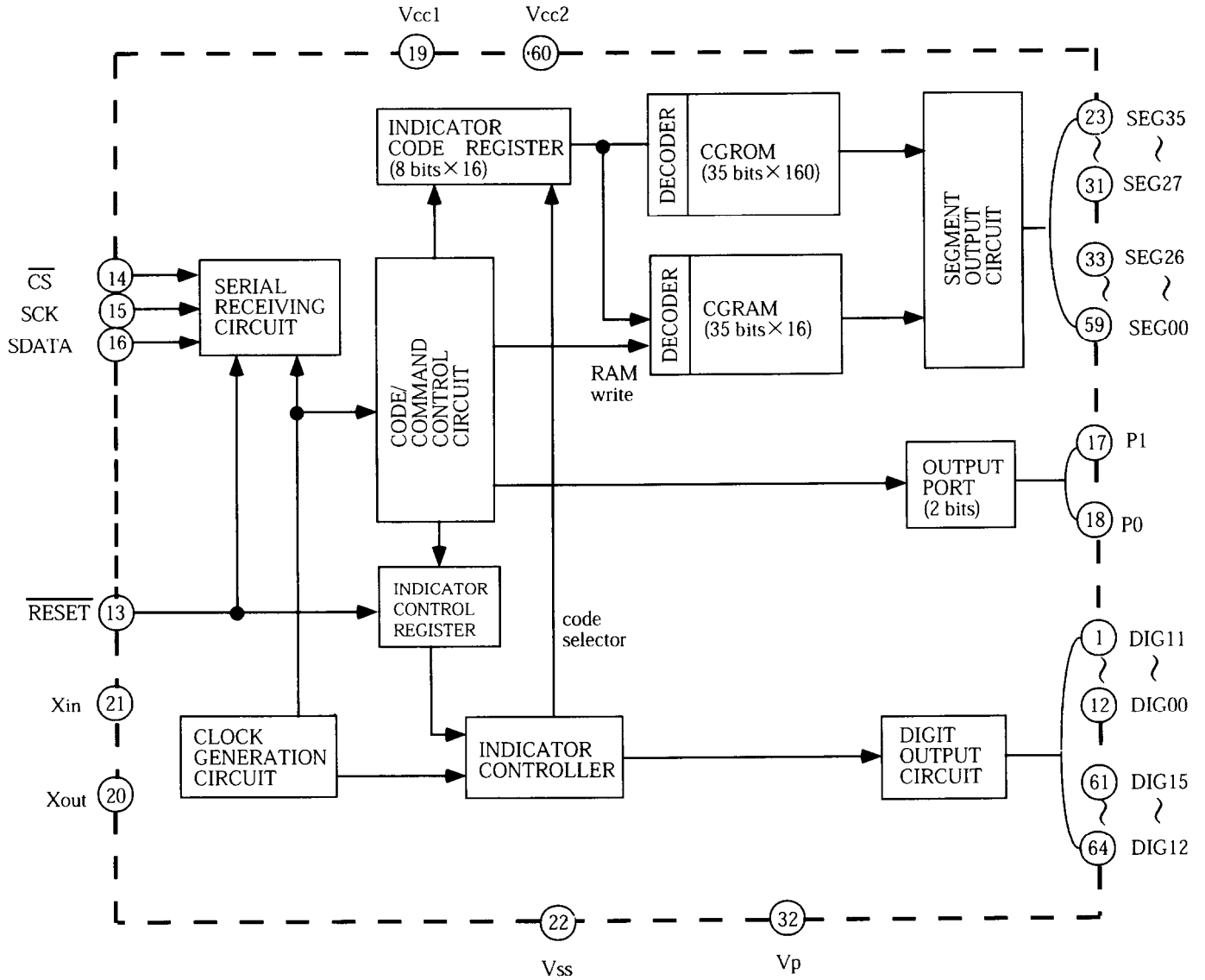
## Q301:AK4520A (A/D, D/A CONVERTER)



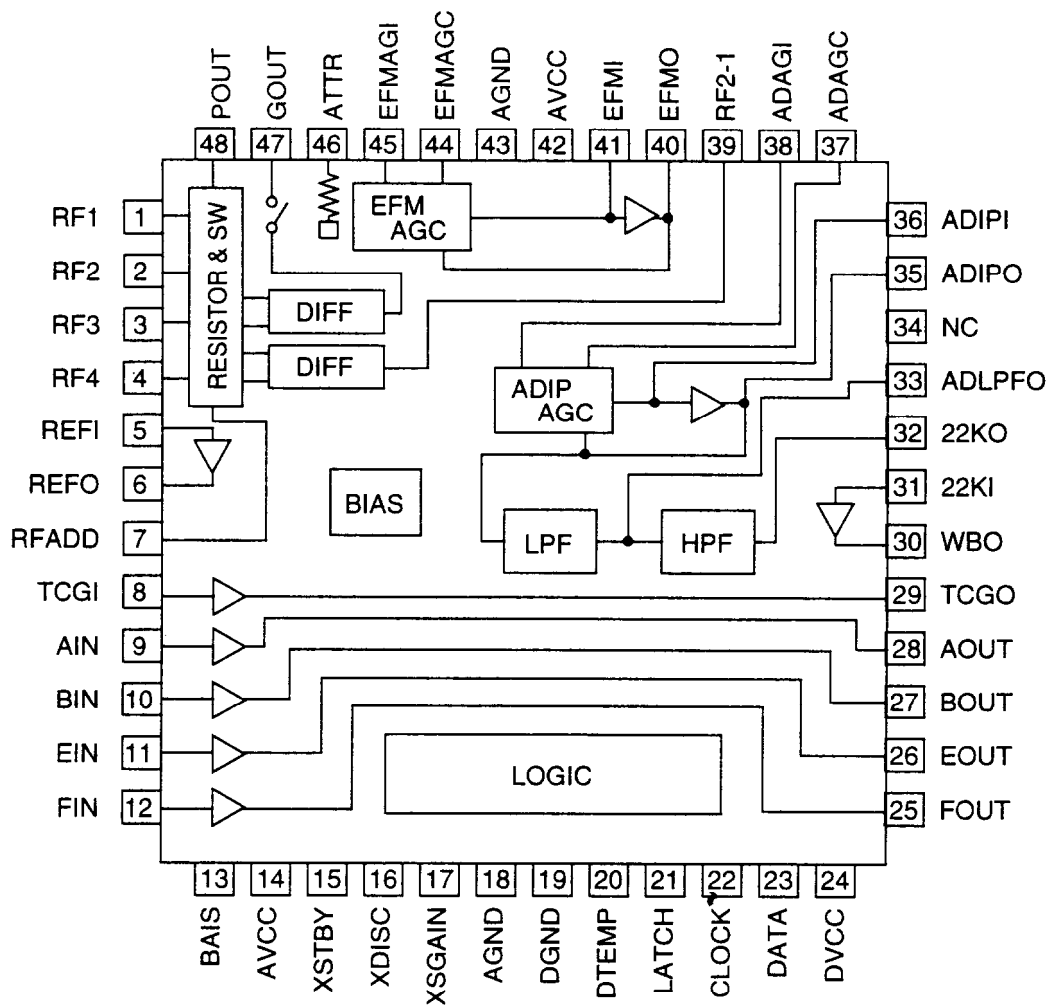
PIN No.	SYMBOL	DESCRIPTION
1	VREFH	Positive Voltage Reference Input Pin,VA
2	VREFL	Negative Voltage Reference Input Pin,AGND
3	AINR+	Rch Analog Positive Input Pin
4	AINR-	Rch Negative Positive Input Pin
5	AINL+	Lch Analog Positive Input Pin
6	AINL-	Lch Negative Positive Input Pin
7	VA	Analog Power Supply Pin
8	AGND	Analog Ground Pin
9	DIF0	Audio Data Interface Format Pin
10	DIF1	Audio Data Interface Format Pin
11	LRCK	Input/Output Channel Clock Pin
12	SCLK	Audio Serial Data Clock Pin
13	SDTI	Audio Serial Data Input Pin
14	SDTO	Audio Serial Data Output Pin
15	MCLK	Master Clock Input Pin
16	DEM0	De-emphasis Frequency Select Pin
17	DEM1	De-emphasis Frequency Select Pin
18	TST3	Test Pin
19	TST2	Test Pin
20	TST1	Test Pin
21	VD	Digital Power supply Pin
22	DGND	Digital Ground Pin
23	PWDA	DAC Power-Down Mode Pin
24	PWAD	ADC Power-Down Mode Pin
25	CMODE	Master Clock Select Pin "H":384fs,"L":256fs
26	AOUTL	Lch Analog Output Pin
27	AOUTR	Rch Analog Output Pin
28	VCOM	Common Voltage Output Pin VA/2



Q802:M66004FP (FL TUBE DRIVER)



IC1101:IR3R55 (RF SIGNAL PROCESSOR AMP)

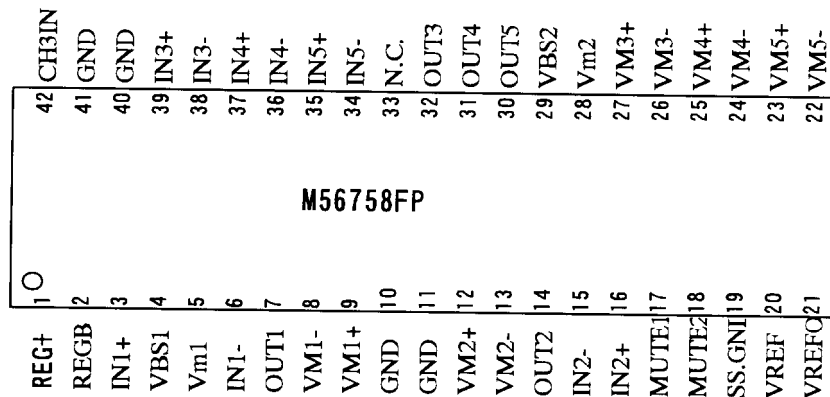


## IC1101:IR3R55 (RF AMP)

PIN No.	SYMBOL	DESCRIPTION
1	RF1	RF signal input port1(to pick up)
2	RF2	RF signal input port2(to pick up)
3	RF3	RF signal input port3(to pick up)
4	RF4	RF signal input port4(to pick up)
5	REF1	Reference voltage (input)
6	REF0	Reference voltage (output)
7	RFADD	Add output ports of RF1 to RF4
8	TCGI	Track cross detect input port
9	AIN	Focus-servo signal amplifire
10	BIN	Focus-servo signal amplifire
11	EIN	Tracking-servo signal amplifire
12	FIN	Tracking-servo signal amplifire
13	BIAS	Bias signal input port
14	AVCC	Power supply for analogue part
15*	VSTBY	Logic-signal output(STBY signal)
16*	XDISC	Logic-signal output(DISC signal)
17*	XSGAIN	Logic-signal output(SGAIN signal)
18	AGND	GND port (analogue part)
19	DGND	GND port (digital part)
20	DTEMP	Detect a chip-emperature
21	LATCH	Latch signal input
22	CLOCK	Clock signal input
23	DATA	Serial data input
24	DVCC	Power supply for digital ports
25	FOUT	Output signal port for tracking servo
26	EOUT	Output signal port for tracking servo
27	BOUT	Output signal port for focus servo
28	AOUT	Output signal port for focus servo
29	TCGO	Track cross detect output port
30	WBO	Comparetor output port (ADIP signal)
31	22KI	Comparetor input port (ADIP signal)
32	22KO	HPF signal output port (ADIP signal)
33	ADLPFO	LPF signal output port (ADIP signal)
34*	NC	NC
35	ADIPO	Pre-amp output port (ADIP signal)
36	ADIPI	AGC-amp output port (ADIP signal)
37	ADAGC	Conect a across-capacitor for AGC (ADIP signal)
38	ADAGI	AGC-amp input port (ADIP signal)
39	RF2-1	Difference signal of RF1 to RF2
40	EFMO	Pre-amp output port (RF signal)
41*	EFMI	AGC-amp output port (RF signal)
42	AVCC	Power supply of analogue part
43	AGND	GND port of analogue part
44	EFMAGC	AGC capacitor connect port (EFM signal)
45	EFMAGI	AGC-amp input port (EFM signal)
46*	ATTR	Output signal adjust port (47 and 48pin)
47	GOUT	RF1+RF2+RF3+RF4 signals output
48	POUT	RF1 to RF4 output

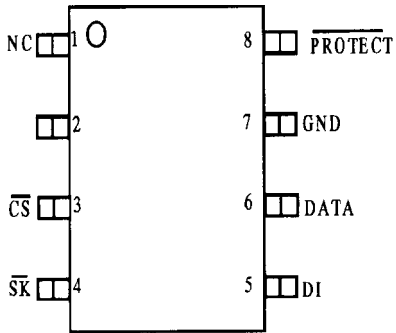
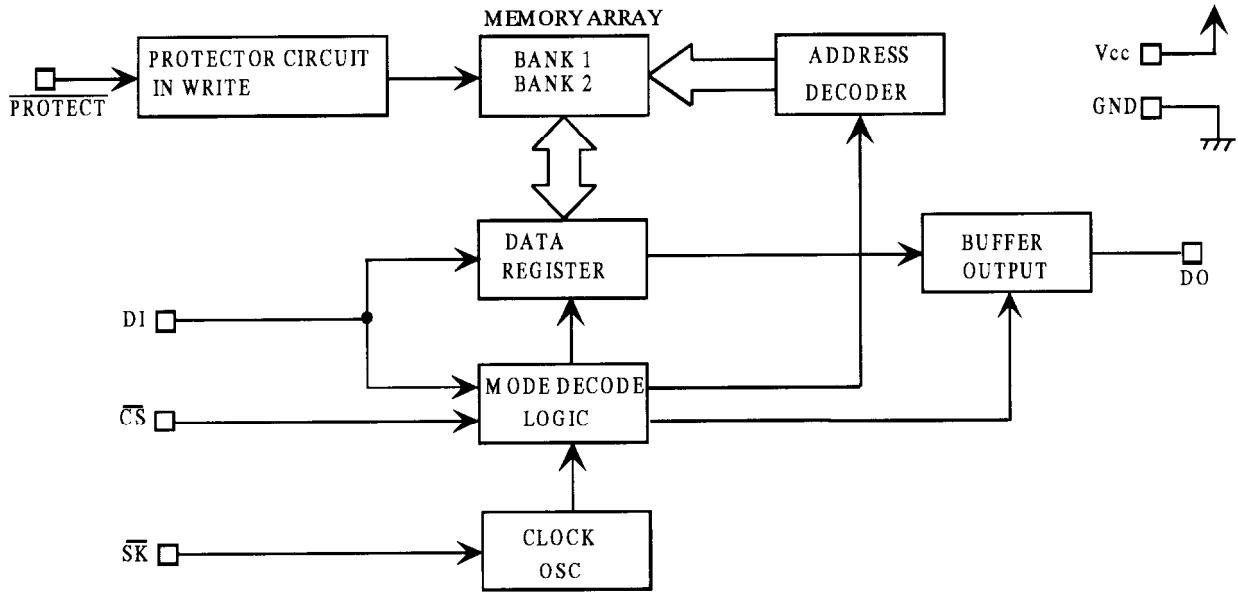
\*This mark terminals is open port.

# IC1601:M56758FP (5 CHANNEL ACTUATOR DRIVER IC)



PIN No.	SYMBOL	DESCRIPTION	PIN No.	SYMBOL	DESCRIPTION
1	REG+	Voltage setting port for regulator	42	CH3IN	Non-inverted input port of CH3
2	REGB	Connect base position for regulator	41	OUT3	Output port of E3-amp.
3	IN1+	Non-inverted input port of E1-amp.	40	IN3-	Inverted input port of E3-amp.
4	VBS1	Power supply for boost-trap	39	VBS2	Power supply for boost-trap
5	Vm1	Power supply of motor	38	Vm2	Power supply of motor
6	IN1-	Inverted input port of E1-amp.	37	IN3+	Non-inverted input port of CH3
7	OUT1	Output port of E1-amp.	36	N.C.	N.C
8	VM1-	Inverted output port of CH1	35	VM3-	Inverted output port of CH3
9	VM1+	Non-inverted output port of CH1	34	VM3+	Non-inverted output port of CH3
10	GND	Ground(motor)	33	GND	Ground(motor)
11	GND	Ground(motor)	32	GND	Ground(motor)
12	VM2+	Non-inverted output port of CH2	31	VM4+	Non-inverted output port of CH4
13	VM2-	Inverted output port of CH2	30	VM4-	Inverted output port of CH4
14	OUT2	Output port of E2-amp.	29	VM5+	Non-inverted output port of CH5
15	IN2-	Inverted input port of E2-amp.	28	VM5-	Inverted output port of CH5
16	IN2+	Non-inverted input port of E2-amp.	27	OUT5	Output port of E5-amp.
17	MUTE1	Mute ports of CH1 to CH4	26	IN5-	Inverted input port of E5-amp.
18	MUTE2	Mute port of CH5	25	IN5+	Non-inverted input port of E5-amp.
19	SS.GND	Ground(signal)	24	IN4+	Non-inverted input port of E4-amp.
20	VREF	Input port of voltage reference	23	IN4-	Inverted input port of E4-amp.
21	VREFO	Output port of voltage reference	22	OUT4	Output port of E4-amp.

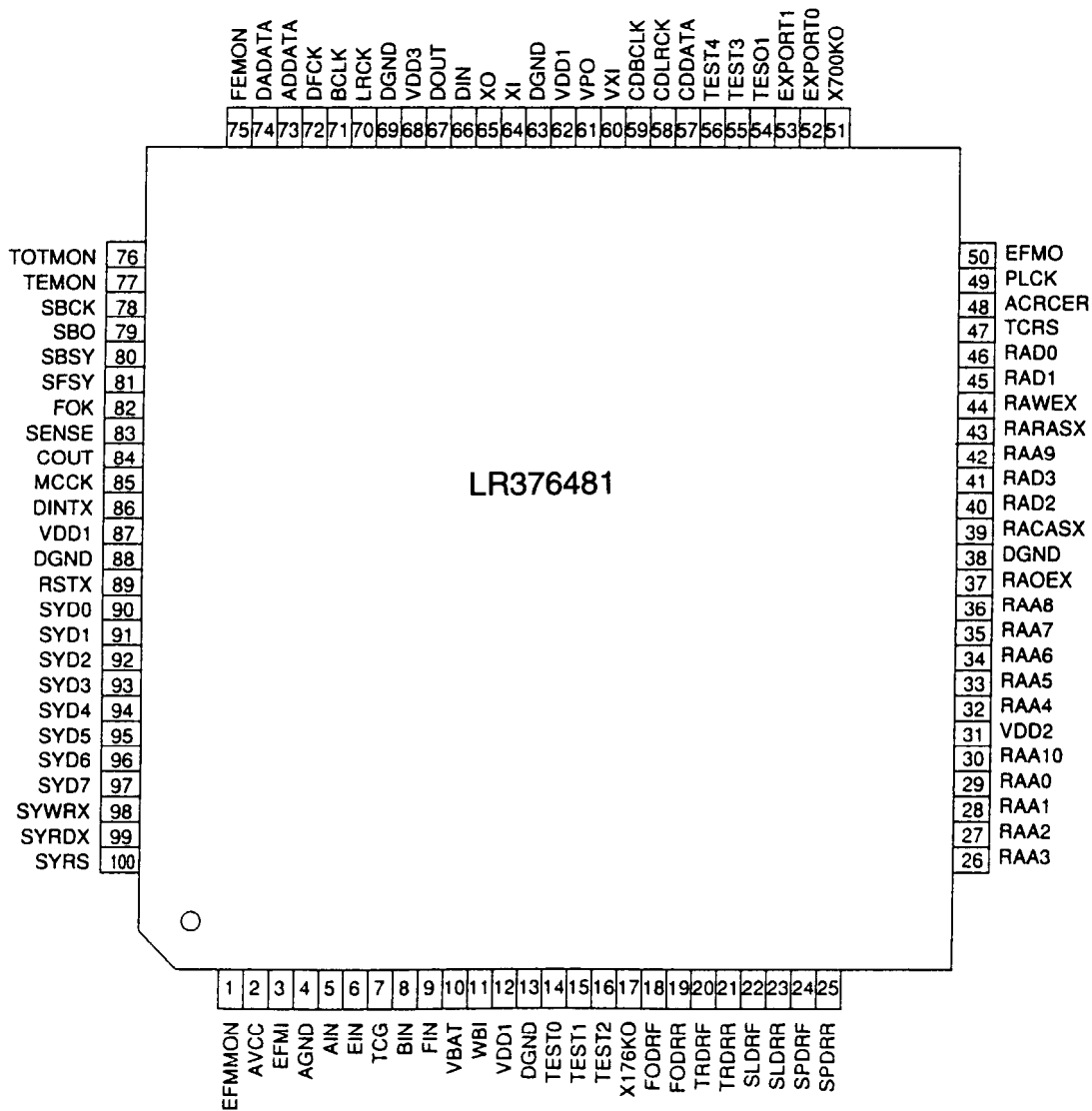
IC1402:S29294A (EEP-ROM) PROGRAMMABLE ROM



PIN	PIN No.	DESCRIPTION
$\overline{CS}$	3	Chip select(Input)
$\overline{SK}$	4	Serial clock(input)
DI	5	Serial data(input)
DATA	6	Serial data(output)
GND	7	Ground
$\overline{PROTECT}$	8	Protect controlled of memory(input) Connect GND or open :Effective protect To Vcc :Ineffective protect
NC	1	Open
Vcc	2	Supply voltage



IC1201:LR376481 (ENCODER/DECODER)



## IC1201:LR376481 (ENCODER/DECODER)

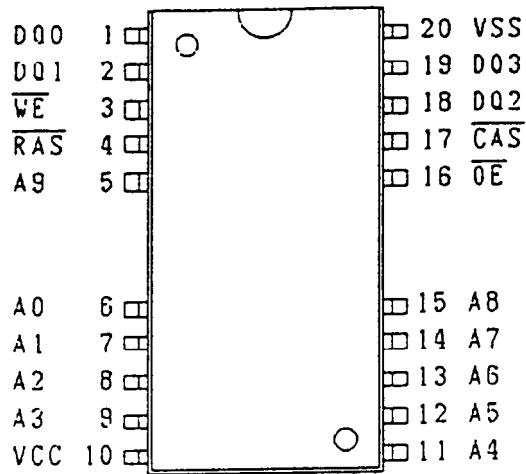
PIN No.	PIN NAME	I/O	DESCRIPTION
1	EFMMON	0	EFM monitor
2	AVCC	-	Power supply for analogue use
3	EFMI	1	EFM signal from RF amplifier
4	AGND	-	GND (analogue)
5	AIN	1	Focus error signal A
6	EIN	1	Tracking error signal E
7	TCG	1	Tracking loss signal
8	BIN	1	Focus error signal B
9	FIN	1	Tracking error signal F
10*	VBAT	1	Detect signal for power supply(servo regulator)
11	WBI	1	ADIP wobble signal
12	VDDI	-	Power supply for digital use
13	DGND	-	Ground for digital use
14/15	TEST0,TEST1	1	Test port(normally,connect to GND)
16	TEST2	1	Test port(normally,connect to GND)
17	X176KO	0	Clock output(f=176.4kHz)
18	FODRF	0	Focus servo forward output. PWM
19	FODRR	0	Focus servo reverse output. PWM
20	TRDRF	0	Tracking servo forward output.PWM
21	TRDRR	0	Tracking servo reverse output.PWM
22	SLDRF	0	Slide servo forward output.PWM
23	SLDRR	0	Slide servo reverse output.PWM
24	SPDRF	0	Spindle servo reverse output or switching motor's rotation
25	SPDRR	0	Spindle servo forward output or switching motor's rotation
26	RAA3	0	Address to D-RAM(ADR3)
27	RAA2	0	Address to D-RAM(ADR2)
28	RAA1	0	Address to D-RAM(ADR1)
29	RAA0	0	Address to D-RAM(ADR0) LSB
30*	RAA10	0	Address to D-RAM(ADR10) MSB
31	VDD2	-	Power supply for interface ( D-RAM)
32	RAA4	0	Address output to external D-RAM ADR4
33	RAA5	0	Address output to external D-RAM ADR5
34	RAA6	0	Address output to external D-RAM ADR6
35	RAA7	0	Address output to external D-RAM ADR7
36	RAA8	0	Address output to external D-RAM ADR8
37	RAOEX	0	Data output signal(enable) to external D-RAM
38	DGND	-	Digital section GND
39	RACASX	0	Column address signal output to external D-RAM
40	RAD2	1/0	Data I/O port of external D-RAM D2
41	RAD3	1/0	Data I/O port of external D-RAM D3(MSB)
42	RAD9	0	Data I/O port to D-RAM ADR9
43	RARASX	0	Low address strobe signal to external D-RAM
44	RAWEX	0	Data write enable signal to external D-RAM
45	RAD1	1/0	Data I/o port with external D-RAM D1
46	RAD0	1/0	Data I/O port with external D-RAM D1
47*	TCRS	0	Truck cross signal
48*	ACRCER	0	CRC error Flag monitor output for ADIP
49*	PLCK	0	EFM PLL clock signal output at playback
50	EFM0	0	EFM signal output at recording,CIF monitor output at playback

note : \* marks is open port.

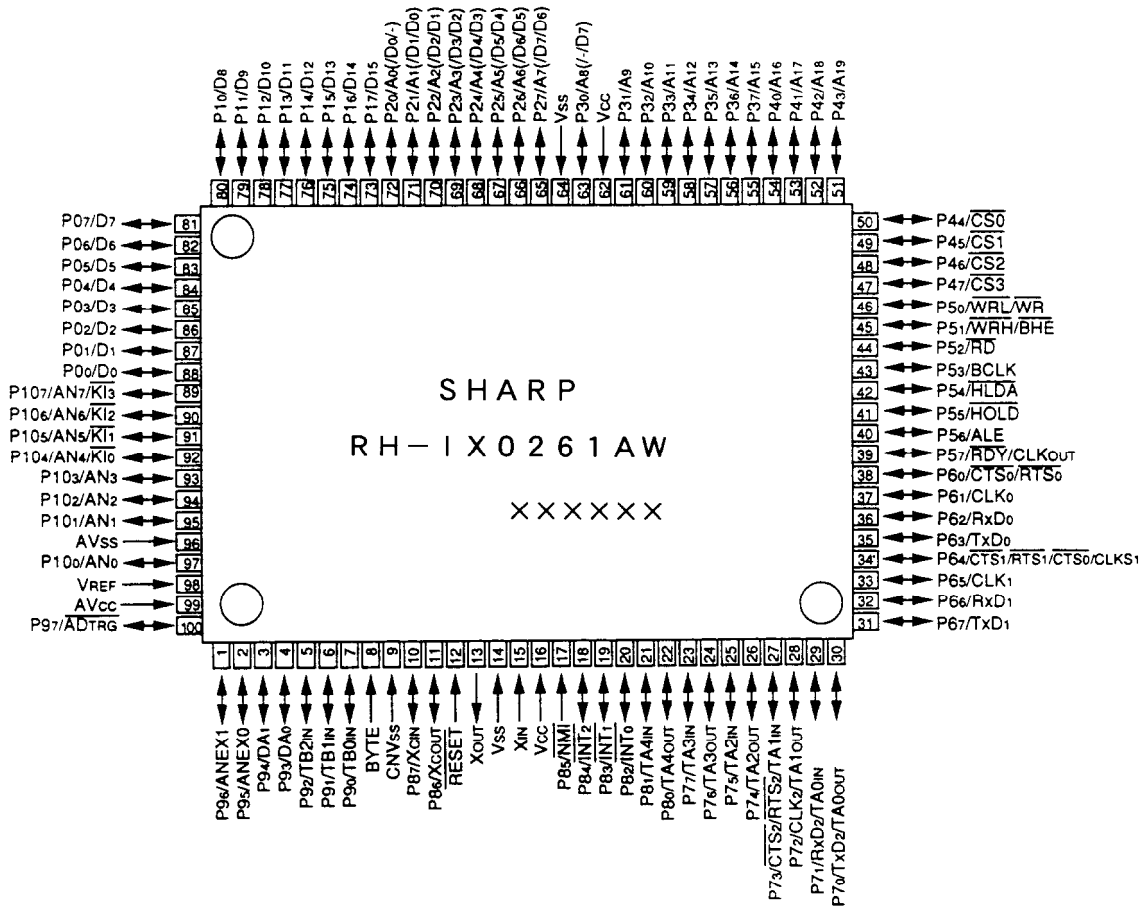
PIN No.	PIN NAME	I/O	DESCRIPTION
51*	X700KO	0	Clock output.f=705.6kHz
52*	EXPORT0	0	Micon.expander output "0"port
53*	EXPORT1	0	Micon.expander output "1"port
54	TESO1	0	When change the PLLR, MICON.expander output port 2
55	TEST3	1/0	When change the PLLOSC, MICON.expander output port 3
56	TEST4	1/0	When change the EXTCLK, MICON.expander output port 4
57	CDDATA	1/0	CD data input port for fast dubbing.
58	CDLRCK	1/0	CDLR clock input for fast dubbing.
59	CDBCLK	1/0	CD bit clock input for fast dubbing.
60	VXI	1	PLL clock input for variable-pitch.
61*	VPO	0	PLL phase deference output for variable-pitch.
62	VDD1	-	Power supply for digital
63	DGND	-	Ground(digital)
64	XI	1	Oscillation circuit (input) 33.8688MHz
65	X0	0	Oscillation circuit (output) 33.8688MHz
66	DIN	1	Digital input signal
67	DOUT	0	Digital output signal
68	VDD3	-	Power supply for internal PLL
69	DGND	-	Ground(digital)
70	LRCK	0	Lch/Rch select output port for music data
71	BCLK	0	Shift clock for music data
72	DFCK	0	Clock for AD/DA converter(digital filter) 256Fs
73	ADDATA	1	Voice input data
74	DADATA	0	Voice output data
75*	FEMON	0	Monitor output for focus error signal
76*	TOTMON	0	Monitor output port for total signal
77*	TEMON	0	Monitor output port for tracking error signal
78*	SBCK	1	Reading clock sub-code
79*	SBO	0	Serial sub DIN code
80*	SBSY	0	Synchronized block sub-code signal
81*	SFSY	0	Synchronized frame sub-code signal
82	FOK	0	Focus detect signal. Focus good is "0" code
83	SENSE	0	Servo condition detect signal
84	COUT	0	Truck cross output signal
85	MCCK	0	Clock output signal for micon.
86	DINTX	0	Interruption output port to system interface
87	VDD1	-	Digital power supply
88	DGND	-	Ground(digital)
89	RSTX	1	Chip reset input(L = reset)
90	SYD0	1/0	Data buss port of interface (LSB)
91 to 96	SYD1 to SYD6	1/0	Data buss port of interface
97	SYD7	1/0	Data buss port of interface (MSB)
98	SYWRX	1	Pulse input port of writing resister
99	SYRDX	1	Pulse input port of reading resister
100	SYRS	1	Resister input select port of interface

note : \* marks is open port.

IC12202:IX2474AF (D-RAM)



IC1401:RH-IX0261AW



## IC1401:RH-IX0261AW (MECHANISM CONTROL MICROPROCESSOR)

PIN No.	PIN NAME	I/O	DESCRIPTION
1*	P96/ANEX1	O	I/O port P96
2*	P95/ANEX0	O	I/O port P95
3	P94/DA1	O	Adjustment output of laser power
4*	P93/DA0	O	ADJS for auto adjusting step check
5*	P92/TB2IN	O	I/O port P92
6	P91/TB1IN	I	LD SW CK input
7	P90/TB0IN	I	$\overline{\text{ERR}}$ input
8	BYTE	I	GND
9	CNVss	I	GND
10*	P87/XCIN	O	ST-ID output
11*	P86/Xout	O	MD search output
12	$\overline{\text{RESET}}$	I	Reset input
13*	Xout	-	Clock output
14	Vss	-	GND
15	XIN	I	Crystal (8.4672MHz)
16	Vcc	-	+3.15V
17	P85/ $\overline{\text{NM}}$ I	I	I/O port P85
18	P84/ $\overline{\text{INT}}$ 2	I	D INT
19	P83/ $\overline{\text{INT}}$ 1	I	D SENSE(Servo-sens. input from MD-LSI)
20	P82/ $\overline{\text{INT}}$ 0	I	ST-ID (MD on)
21	P81/TA4IN	I	CD search input
22	P80/TA4OUT	O	MD RSW input
23*	P77/TA3IN	I	Frequency select for switching power supply
24	P76/TA3OUT	O	Variable pitch output port
25	P75/TA2IN	I	Power failure detect port P-DOWN
26	P74/TA2OUT	O	On/off output for magnetic-head current HDON
27	P73/TA1IN	O	Loading motor output and control signal output LD+
28	P72/TA1OUT	O	Loading motor output and control signal output LD-
29	P71/TA0IN	I	Truck counts signal input CIN
30	P70/TA0OUT	I	Inner switch detect input INN SW
31	P67/TXD1	O	R-DATA
32	P66/RXD1	O	R-LATCH
33	P65/CLK1	O	R-CLK
34	P64/ $\overline{\text{CTS}}$ 1/ $\overline{\text{RTS}}$ 1/ $\overline{\text{CTS}}$ 0/ $\overline{\text{CLK}}$ S1	O	Communication's possible to system
35	P63/TXD0	O	MD data output MD DATA
36	P62/RXD0	I	System control data output K DATA
37	P61/CLK0	I	System communication clock input
38	P60/ $\overline{\text{CTS}}$ 0/ $\overline{\text{CLK}}$ OUT	I	D RAM(4M/16M) input select
39	P57/RDY/CLKOUT	O	REC/PLAY select output port $\overline{\text{R/P}}$
40	P56/ALE		Monitor input for focus servo condition FOK
41*	P55/ $\overline{\text{HOLD}}$	O	I/O port P55
42	P54/ $\overline{\text{HLDA}}$	O	S2 output
43	P53/ $\overline{\text{BCLK}}$	O	S1 output
44	P52/ $\overline{\text{RD}}$	O	Resister select signal (MD-LSI) output SYRS
45	P51/ $\overline{\text{WRH}}$ / $\overline{\text{BHE}}$	O	Lead signal output (MD-LSI) SYRD
46	P50/ $\overline{\text{WRL}}$ / $\overline{\text{WR}}$	O	Write signal output (MD-LSI) SYWR
47	P47/ $\overline{\text{CS}}$ 3	I/O	Data bus 7 SYS D7
48	P46/ $\overline{\text{CS}}$ 2	I/O	Data bus 6 SYS D6
49	P45/ $\overline{\text{CS}}$ 1	I/O	Data bus 5 SYS D5
50	P44/ $\overline{\text{CS}}$ 0	I/O	Data bus 4 SYS D4

note : \* mark is open port

PIN No.	PIN NAME	I/O	DESCRIPTION
51	P43/A19	I/O	Data bus 3 SYS D3
52	P42/A18	I/O	Data bus 2 SYS D2
53	P41/A17	I/O	Data bus 1 SYS D1
54	P40/A16	I/O	Data bus 0 SYS D0
55*	P37/A15	O	I/O port P37
56*	P36/A14	O	I/O port P36
57*	P35/A13	O	I/O port P35
58	P34/A12	O	EEPROM protect mode cancel EEPRO
59	P33/A11	O	EEPROM chip selector output EEPD
60	P32/A10	I/O	EEPROM serial data output
61	P31/A9	O	EEPROM serial clock output
62	Vcc	1	+3.15V
63*	P30/A8	O	I/O port P30
64	Vss	-	Ground
65	P27/A7	O	Soft serial communication ,LSB fast,and 2-mode output L3 DATA
66	P26/A6	O	Soft serial communication ,LSB fast,and 2-mode output L3 MODE
67	P25/A5	O	Soft serial communication ,LSB fast,and 2-mode output L3 CLK
68*	P24/A4	O	I/O port P24
69*	P23/A3	O	I/O port P23
70	P22/A2	O	PCNT0 output
71*	P21/A1	O	I/O port P21
72	P20/A0	O	LDON output
73	P17/D15	O	ANLPTR output
74*	P16/D14	O	ADPON output (for CK)
75*	P15/D13	O	DAPON output (for CK)
76*	P14/D12	O	
77*	P13/D11	O	DSS1 output
78*	P12/D10	O	DIG EX output (for CK)
79*	P11/D9	O	DIG CD output (for CK)
80	P10/D8	O	System reset output XRST
81*	P07/D7	O	ADMUTE output
82*	P06/D6	O	EMPHA output
83*	P05/D5	O	DAMUTE output
84*	P04/D4	O	Mute output
85*	P03/D3	O	DOUTM output
86	P02/D2	1	TEST2 (select special mode12)
87	P01/D1	1	TEST1 (select special mode11)
88	P00/D0	1	TEST0 (select special mode10)
89	P107/AN7/ $\overline{K13}$	1	AVCK3 (special monitor mode input)
90	P106/AN/ $\overline{K12}$	1	Monitor(3.1V) input for AD/DA sections AVCK2
91	P105/AN5/ $\overline{K11}$	1	Monitor(5V) input for DOUT section AVCK1
92	P104/AN4/ $\overline{K10}$	1	Detect input port for temperature DTEMP
93	P103/AN3	1	Rec-input detect MINF
94	P102/AN2	1	Test key input1 TEST K1
95	P101/AN1	1	Test key input2 TEST K2
96	AVss	-	Ground
97	P100/AN0	1	Mecha. and head position detect port HINF
98	VREF	-	+3.15V
99	AVcc	-	+3.15V
100	P97/ $\overline{ADTRG}$	1	I/O port P97

note : \* mark is open port

## Check before & after replacing the mechanism parts and how to replace it

### 1. Type Number of Mechanism: MDM-97B

### 2. Optical Pickup replacement

#### 2-1. Conditions to replace optical pickup

Before replacing the optical pickup, be sure to confirm below listed points and perform the replacement only when abnormal symptom is found. Ask detail analysis with the Disc attached if the cause is uncertain for the problem such as skipping sound. In that case, carefully examine if the Disc is not wrong.

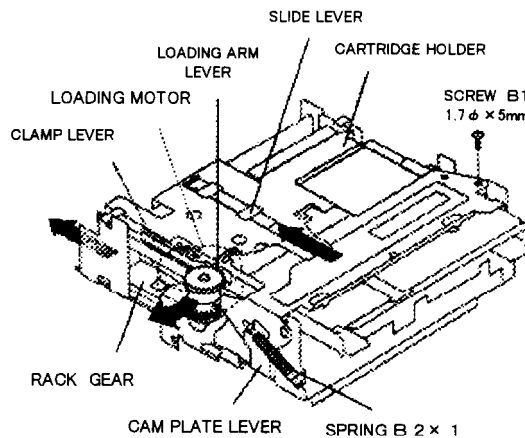
- 1). If error signal at focus or tracking is found abnormal.
- 2). If focus and tracking actuator does not work. (Tracking actuator can be observed by Circuit Tester at #8 and #9 pin of IC M56758FP.)
- 3). Motion of actuator is not smooth enough. (Focus actuator can be confirmed during Search operation by using transparent Disc. Tracking can not be checked with this method.)
- 4). Use Pre-mastered Disc and check if jitters is more than 9.5nsec with KIKUSUI 6135 or if jitters is more than 24nsec with LEADER LJM-1851.
- 5). Use Recordable Disc and check if jitters is more than 11.0nsec with KIKUSUI 6135 or if jitters is more than 28nsec with LEADER LJM-1851.  
\* If jitters can not be measured at MDM-97B test point, observe the RF wave form by using Oscilloscope with the 10:1 probe.
- 6). If C1 error rate is more than 40 by Pre-mastered Disc.
- 7). If C1 error rate is more than 200 by Recordable Disc.
- 8). If value of Laser Power meter is too low at play mode and recording mode.
- 9). Grating is out of spec, even if the position of spindle motor is aligned.

#### 2-2. How to check

- 1). Check by using separate document "MD-185X MD mechanism measurement methods" for above item 4). to 9). of 2-1.

#### 2-3. Replacement process of optical pickup

- 1). Disconnect 4 sockets (white x2, red and blue colored) and CN1601 (FFC 5 leads ) on the PCB.
- 2). Unscrew the 4 screws which fix the PCB. Raise the PCB from the right side of front view, leaving the left side (pick up FFC side) in place. Unlock the CN1101 socket and pull out the FFC.
- 3). Open the roller-arm lever toward the arrow shown in illustration and push back the clamber lever.
- 4). Add 5 volts to the blue color socket of loading motor, push the rack gear toward the arrow and move the cam plate lever until it clatters. (Refer to Fig. 2-1)
- 5). Add 2 volts (Circuit Tester can be used) to the red color socket of pick motor, move the pick to the outermost position and remove the magnetic head. (M1.7 x5 screw)
- 6). Unscrew the screw (M1.7x5) that fix the spring on arm holder and remove the spring at the left side.
- 7). Move the holder arm to the left side and remove it together with cartridge holder.
- 8). Unscrew the 3 screws (M1.7x10) on the molded parts that fix the shaft of the pick up and remove the pick.  
If possible, do not remove the mechanism switch PCB by unscrewing the screws (front M1.7x10, back M1.7x3), since it will result difficult work to build the PCB with all of the 3 switches at ON position.
- 9). Install a new pick and confirm the motion. Then, remove the metal fitting from the back side of defective pick and attach it on the new pick by using M1.4x2 screw.
- 10). Attach the holder arm and cartridge holder which were removed at above item 7 and also attach the screws and spring which were removed at above item 6.
- 11). Insert and lock the pick up FFC to the socket CN1101, and fix the PCB by using screws.
- 12). Insert the 2 sockets of the motor (except the blue color) and insert the FFC at CN1601.
- 13). Attach the magnetic head and insert the socket to the PCB.
- 14). Add 5 volts at the blue color socket to move back the mechanism to the EJECT position.



(Fig 2-1)

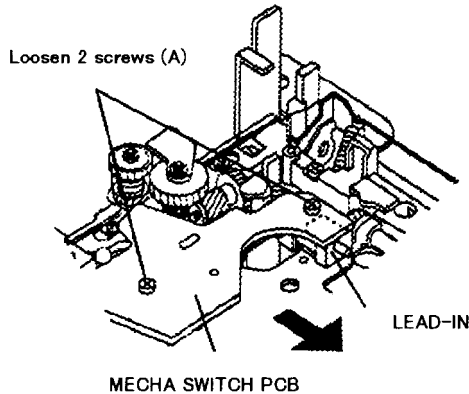
## 2-4. Check after the replacement

After the replacement, confirm that the following points are within the specifications.

- 1) 1). Write of EEPROM
  - a). Short between pin 2 and pin 8 of IC402 on the MD mechanism PC board. Attach the mechanism on the unit.
  - b). Set the unit to "TEST MODE". (Refer to "How to set test mode " on page 26. (EJECT is displayed)
  - c). Insert the recordable reference disc (TEAC MMD-317 corresponding).
  - d). As AUTO YOBI is displayed, push PLAY/PAUSE key to enter the automatic mode.
  - e). After COMPLETE is displayed, push STOP key.(The indicator is not constant.)
  - f). After wait for approx. 3 seconds, turn the STANDBY key to OFF.
  - g). After wait for approx. 3 seconds, push the ENTER key of the remote control.
  - h). Press EJECT key to take off the disc.

When the disc is not ejected, perform from step b).

  - i). Disconnect the shorted circuit between pins 2 and 8 of IC402 on the mechanism PC board and attach the mechanism assembly on the unit.
- 2). Error rate measured by Pre-mastered Disc must be within the specification.
- 3). Error rate measured by Recordable Disc must be within the specification.
- 4). Error rate at self recording/playback must be within the specification.
- 5). Measurements for the location of lead-in switch must be within the specification. If not, adjust it referring to Fig. 2-2.
- 6). Confirm the Grating is within the specification.



(Fig 2-2)

## 3. MD Mecha PCB replacement

### 3-1. Check after the replacement

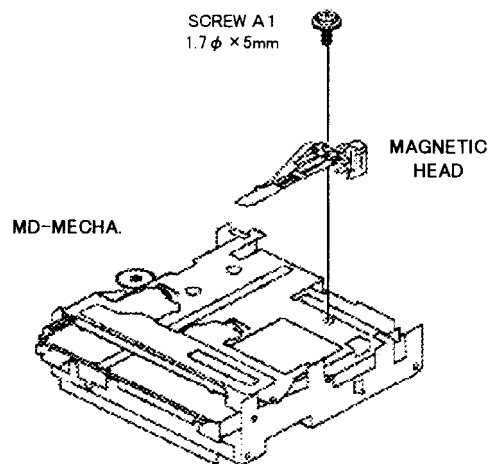
Compatibility with pickup is changed after replacement of MD mechanism PCB.

Please rewrite EEPROM, refer to the item 2-4(1).

## 4. Magnetic head replacement

### 4-1. Replacement process

- 1). Pull out the red color socket( CN1604) of slide motor and head(CN1252), add 5 volts at the socket(CN1604) to move the pick up to the outermost position.
- 2). Pull out the socket of magnetic head, unscrew and replace the head. (refer to Fig. 2-3)
- 3). Insert the sockets of magnetic head and slide motor.



(Fig 2-3)

### 4-2. Check after the replacement

Make recording and measure the error rate by using the recorded disc. Error rate must be within the specification.

(Note). Refer to separate document (MD-185X MD mechanism measurements methods) for the measurement methods and the specifications.



5. Replace the spindle motor

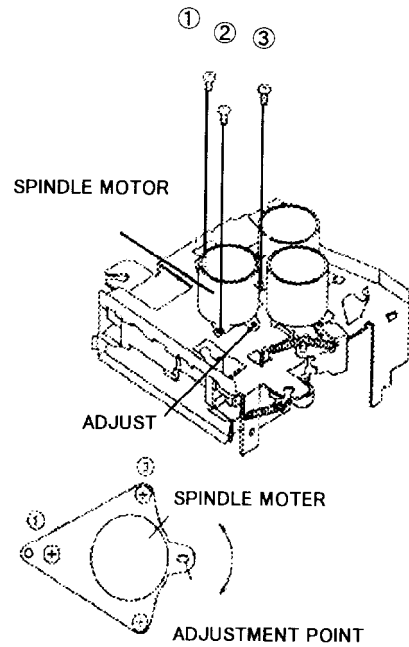
When a motor get old, metallic dust will adhere around the brush and it will decrease the impedance by causing a shor circuit on the coil. This will result an insufficient capability of the driving circuitry andunstable rotating. To detect this, connect a digital multi meter (Circuit Tester is not good) to the moter and rotate the moter may cause skipping etc. slowly by hand. If the resistance decreases at paticular point, the motor is defective. Defective motormay cause skipping sound, etc..

5-1. Procedure to replace the spindle motor

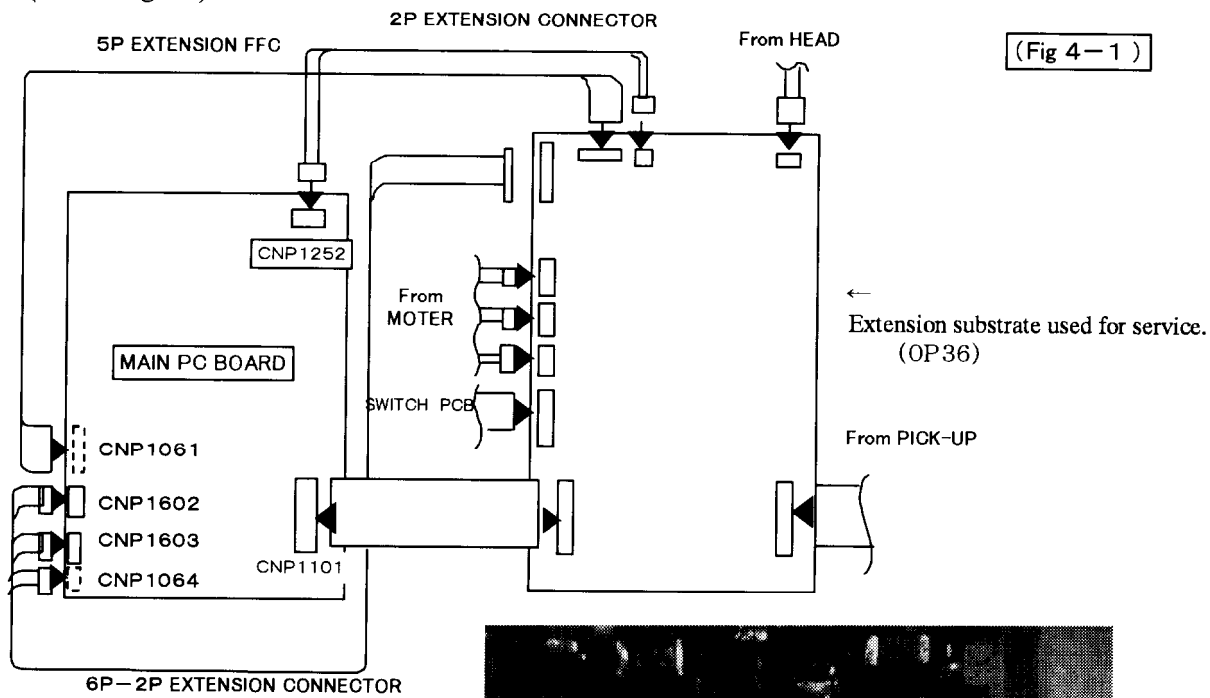
- 1). Disconnect four sockets (white x2, red and blue) and CN1601 (FFC 5 leads) on the PCB.
- 2). Unscrew the four screws which fix the PCB. Raise the PCB from the right side of front view,leaving the left side (pick up FFC side) in place. Unlock the CN1101 socket and pull out the FFC.
- 3). Unscrew the three screws that fix the spindle motor and replace the motor. Fasten the screw temporarily for alignment.

5-2. Alignment after the replacement

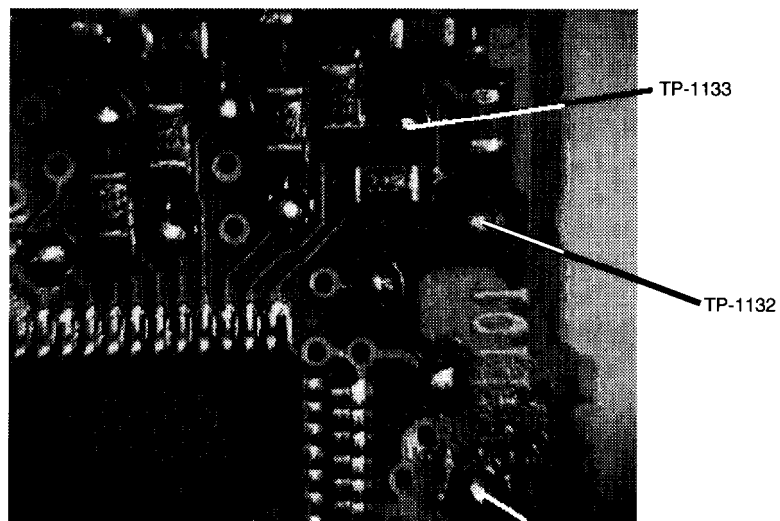
- 1). Use an extension JIG and connect it as shown in Fig. 4-2.
- 2). Connect an oscilloscope to the test points of the PCB as shown in Fig. 4-3. (Refer to Fig. 4-4 for the wirings.) (on page 28)
- 3). Adjust the position of spindle motor while observing the lissajous' figure,by using a screw driverput into the hole for adjustment. (Refer to Fig. 4-4)



(Fig 4-1)



(Fig 4-2)



(Fig 4-3)

## MD mechanism measurement items and measurement methods

### 1. Type number of Mechanism: MDM-97B

**CAUTION: When replace the optical pick-up, you are not necessary to adjust the "AUTO YOBI".**

**CAUTION: The automatic adjustment of test mode "AUTO YOBI" is used the reference disc and is performed by the mechanism maker. Do not perform this adjustment.**

**After "AUTO AJST" is performed every measurement disc, measure the all items.**

#### How to set test mode:

During push the YES key, then push the DISPLAY key and plug in AC plug to the wall outlet.

Or, connect the upper side of R710 (5.6k ohms, at Q701 side) and the chassis. Plug in the AC plug to the wall outlet.

Push the ENTER key of remote control (RC-301MD or RC-339MD) to enter the TEST mode.

### 2. Error rate

#### 2-1. Pre-mastered Disc

1). During push the YES key, then push the DISPLAY key and plug in AC plug to the wall outlet.

Or, connect the upper side of R710 (5.6k ohms, at Q701 side) and the chassis. Plug in the AC plug to the wall outlet.

2). Push the ENTER key of remote control (RC-301MD or RC-339MD) to enter the TEST mode.

Confirm the display shows "tsm\*\*\*\*e\*\*\*" and then it changes to "EJECT".

3). Insert the Pre-mastered Disc (TMD-381) and confirm the display shows "AUT YOBI".

4). Turn the AMCS knob counterclockwise by one click and confirm the display shows "TEST PLAY".

5). Push INPUT key and confirm the display shows "ADRES 0050".

ADRES shows the location of the pick and lager number means outer location of the disc.

Turning the AMCS knob counterclockwise will change the ADRES number to measure the error rate of desired point.

0050 is the inner, 03C0 is the middle, 0700 is the outer and 08A0 is the outermost position.

6). Push PLAY/PAUSE key. The display shows "s\*\*\*\*c\*\*\*\*" and error rate measurement will start.

Four digit numerals following the "s" show the subcode address and four digit numerals following the "c" show C1 error rate.

Ascertain the quality of MD mechanism and Disc by the value of error rate. Error rate is defined to be less than 220 in RAINBOW BOOK, although there is no error rate specified for the Pre-mastered Disc. Onkyo has an internal specification for the Pre-mastered Disc error rate, as a criterion to ascertain the MD mechanism.

Pre-mastered Disc error rate =< 40

Just after starting playback, error rate is displayed as if it is big. However, this is no problem.

#### 2-2. Low reflectivity disc(Recordable Disc and self recording/playback) SONY MDW-74B.

\*\*[TEST REC]->[TEST PLAY]

1). Push the EJECT key and exchange the disc to Recordable Disc.

2). Confirm the display indicates "AUT YOBI". Turn the AMCS knob counterclockwise and confirm the display shows "TEST REC".

3). Push INPUT key and confirm the display shows "a0050 pw0D". 0050 is address.

If record at inner area, Push the PLAY key.

\*How to change address, refer 2-1.5.

\*Do not record more than five minutes without interval. It gives serious damage to laser.

4). Push STOP key and confirm the display indicates "TEST REC". Turn the AMCS knob counterclockwise and confirm the display shows "TEST PLAY".

5). Push INPUT key and confirm the display shows "ADRES 0050".

The AMCS knob is turned, and the address recorded in clause 2). is set.

6). Push PLAY/PAUSE key and confirm the display shows "a\*\*\*\*c\*\*\*\*". Error rate measurement will start.

Four digit numerals following the "a" show the address and four digit numerals following the "c" show C1 error rate.

Similarly, Onkyo has an internal specification as shown below.

Self recording/playback disc error rate =< 200

\* In case of self recording/playback disc, rewriting might have been done many times and the song with larger track number is not necessarily located at outer side. Be careful for this when measure the error rate by designating the address.

### 3. Jitter

#### 3-1. Pre-mastered Disc

- 1). Solder a lead wire at the RF-TP point shown in the Fig. 3-1 PCB picture and connect it to Jittermeter.
- 2). Measure the jitter while playing at the same test modes as error rate measurements.
- 3). Onkyo internal specifications
  - KIKUSUI 6135: Less than 9.5nsec
  - LEADER LJM-1851: Less than 24.0nsec
 \* Jitter might not be able to measure for MDM-97B mechanism when jitter meter is connected at the test point, due to the unstable RF signal. In that case, observe the wave form by oscilloscope to ascertain the quality.

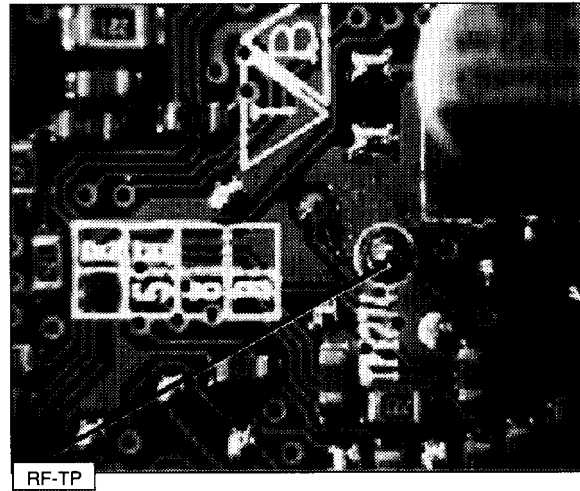


Fig 3-1

#### 3-2. Recordable Disc and Self recording/playback disc

Use the SONY MDW-74B.

- 1). Use same procedure as Pre-mastered Disc for measurements.
- 2). Onkyo internal specifications
  - KIKUSUI 6135: Less than 11.0nsec
  - LEADER LJM-1851: Less than 28.0nsec

(Note): Refer Fig. 6-1 for GND connection.

### 4. Measurement for Read-in position

- 1). During push the YES key, then push the DISPLAY key and plug in AC plug to the wall outlet. Or, connect the upper side of R710 (5.6k ohms, at Q701 side) and the chassis. Plug in the AC plug to the wall outlet.
- 2). Push the ENTER key of remote control (RC-301MD or RC-339MD) to enter the TEST mode. Confirm the display shows "tsm\*\*\*e\*\*\*" and then it changes to "EJECT".
- 3). Inset the disc and confirm the display shows "AUT YOBI". Push the STOP key and the display will change to "tsm\*\*\*e\*\*\*".
- 4). Push DISPLAY key and confirm the display shows "INNER".
- 5). Push PLAY/PAUSE key and confirm the display shows "s\*\*\*\*c\*\*\*\*\*". Four digit numerals following the "s" show the position of read-in switch. The specification is in between FF85 and FFD2.

### 5. Laser power measurement

- 1). During push the YES key, then push the DISPLAY key and plug in AC plug to the wall outlet. Or, connect the upper side of R710 (5.6k ohms, at Q701 side) and the chassis. Plug in the AC plug to the wall outlet.
- 2). Push the ENTER key of remote control (RC-301MD or RC-339MD) to enter the TEST mode. Confirm the display shows "tsm\*\*\*e\*\*\*" and then it changes to "EJECT".
- 3). Put the optical sensor of laser power meter (LEADER 8001 or 8010) to the objective lens of pick up.
- 4). Each time to push INPUT key will change the display to "xpw", "rpw" and "ppw". Measure the power for each position. Do not keep the "rpw" and "xpw" conditions for long. Especially, measure the power for "xpw" within 15 seconds.

Reference value: "xpw" 6.8 mW +/- 5%  
 "rpw" 5.2 mW +/- 5%  
 "Ppw" 0.62mW +/- 5%

### 6. Grating check

- 1). Solder lead wires at the points shown in the Fig. 6-1 PCB picture and connect them to oscilloscopeas shown in Fig. 4-4. Set the oscilloscope as shown in Fig.4-4. Set the oscilloscope at AC input, 20mV/DIV range.

- 2). During push the YES key, then push the DISPLAY key and plug in AC plug to the wall outlet.  
Or, connect the upper side of R710 (5.6k ohms, at Q701 side) and the chassis. Plug in the AC plug to the wall outlet.
- 3). Push the ENTER key of remote control (RC-301MD or RC-339MD) to enter the TEST mode.  
Confirm the display shows "tsm\*\*\*e\*\*" and then it changes to "EJECT".
- 4). Insert the Pre-mastered Disc and confirm the display shows "AUT YOBI". Push STOP key and the display will change to "tsm\*\*\*e\*\*".
- 5). Turn the AMCS knob clockwise by two clicks and confirm the display shows "AUTO AJST". Push PLAY/PAUSE key.
- 6). Confirm the display changes to "PEG:", "HAG:" and then "COMPLETE". Wave form of the Gratings shown in the oscilloscope.

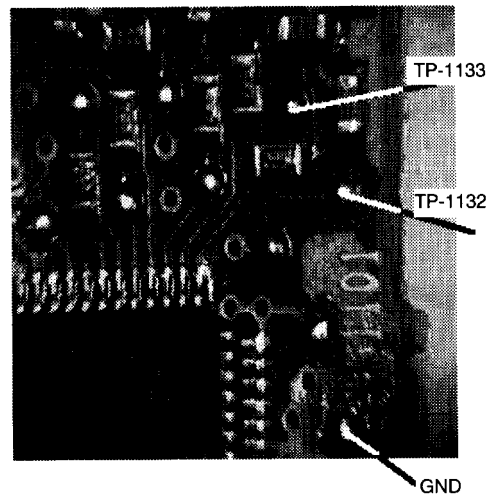
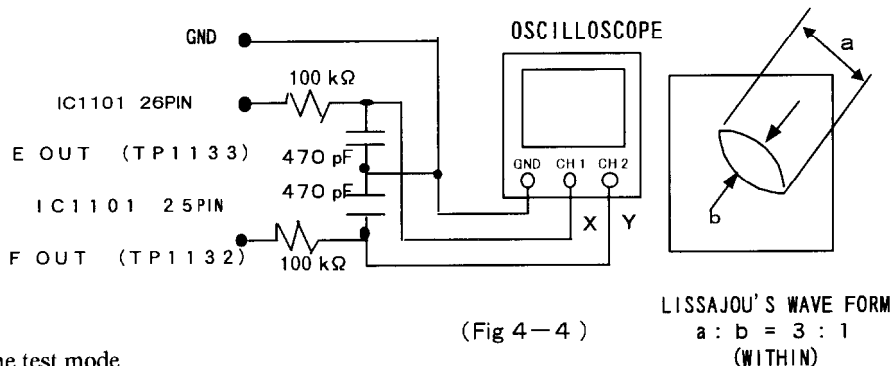


Fig 6-1

- 7). When adjust the grating, refer to the item 5-1 and the figure 4-1 on page 25.  
3 screws of spindle motor few loosen, then readjusting screws while look at the oscilloscope.

**Pick-up grating measurement**



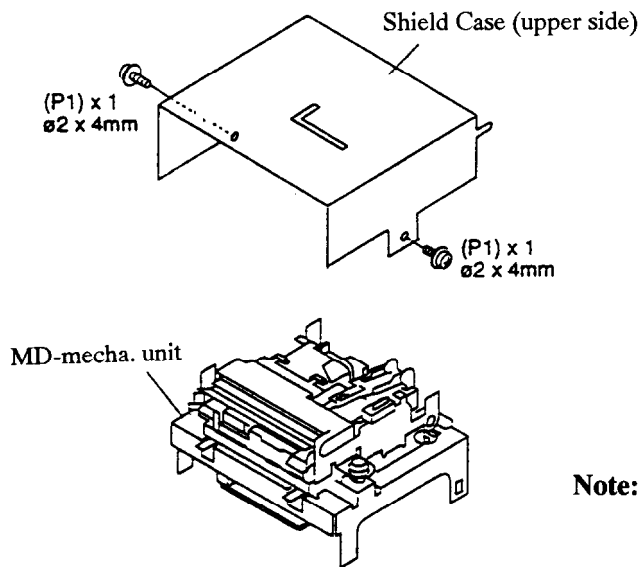
7. Cancel the test mode  
Unplug the AC plug from wall outlet to cancel the test mode.

**Message List**

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

Message	meaning
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, or in recording standby mode, or an attempt to edit a premastered disc was made.
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. Otherwise, the connected digital equipment is not operating 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.
Mecha Error	An error occurred in the unit's internal mechanism.
Memory Full	An attempt was made to record a 26th track.
Full	The titling capacity of the disc has reached its limit.
Name Full	Number of characters has reached the limit for input to one MD.
No Change	The naming attempt failed.
No Disc	There is no disc in the unit.
No Track	The inserted disc has a disc title but no tracks.
Not Audio	An attempt was made to play a non-audio disc.
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 Error	The recording attempt failed due to a consecutive disturbance or scratches on the MD.
Temp Over	An abnormally high temperature is detected in the unit's internal mechanism.
TOC Error	The reading of the TOC failed.
TOC Writing	The unit is writing the recorded or edited contents to the MD.
U-TOC Error	The writing of the recorded or edited contents failed.

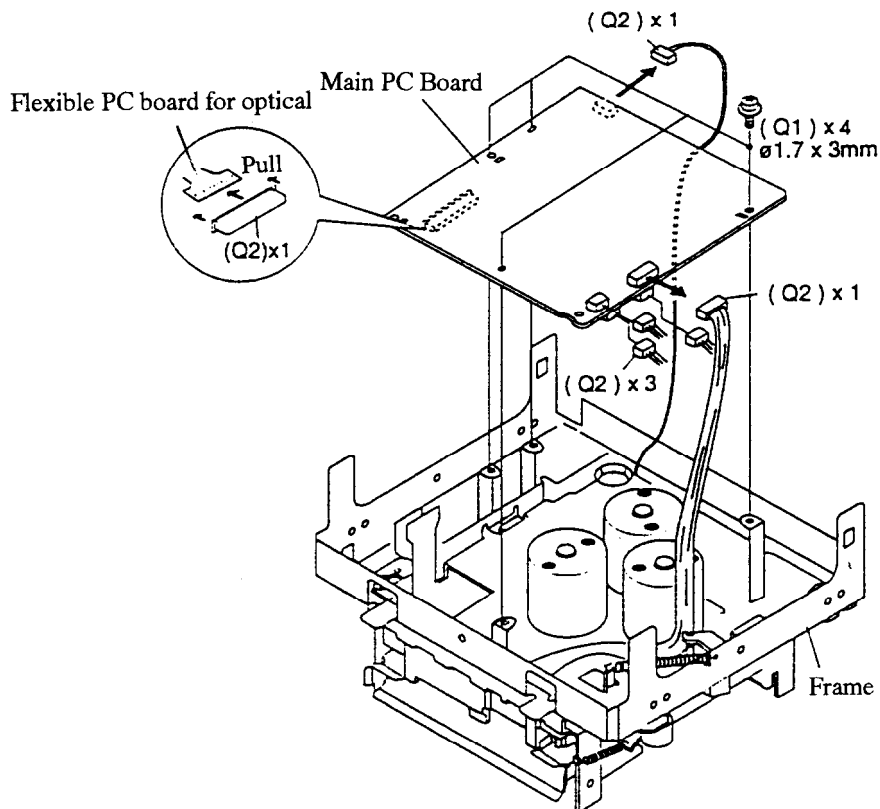
## MD MECHANISM DISASSEMBLY



### Procedure to reset the Mechanism

**Note:** Be sure to reset the mechanism, when you exchanged it. Follow next procedure for the reset.

- 1) Remove the top cover of the unit.
- 2) Temporarily connect either of RESET MECHA terminals (2p terminal) on the main PCB (NAAR-6419) to the chassis (GND) by using a lead wire with clips at each side.
- 3) Plug in the AC plug to the wall outlet, keeping above lead wire connected.
- 4) Disconnect above lead wire.
- 5) Turn on the unit.



## MD MECHANISM SECTION

- Remove the optical head  
(refer to Fig.1)
- 1.The screw(A1) is taken off.

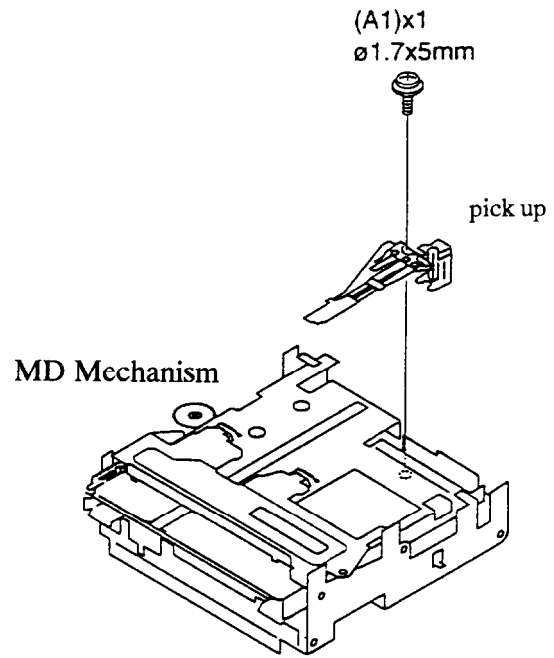


Fig.1

- Cartridge holder is taken off.  
(refer to Fig.2)

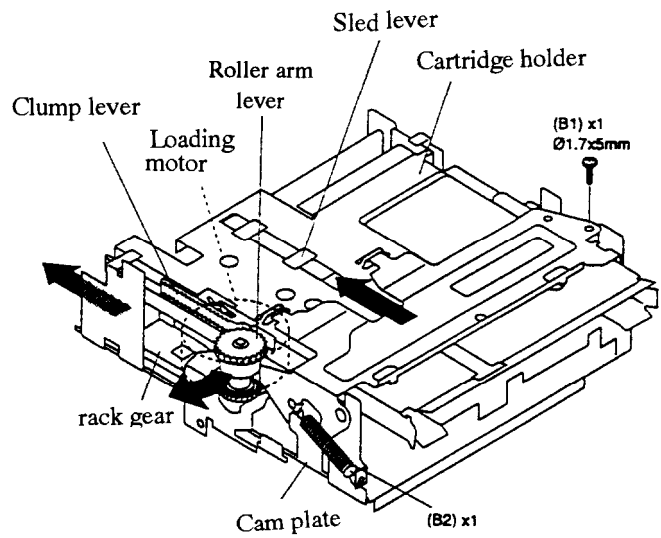


Fig.2

- Mecha switch PC board is taken off.  
(refer to Fig.3)

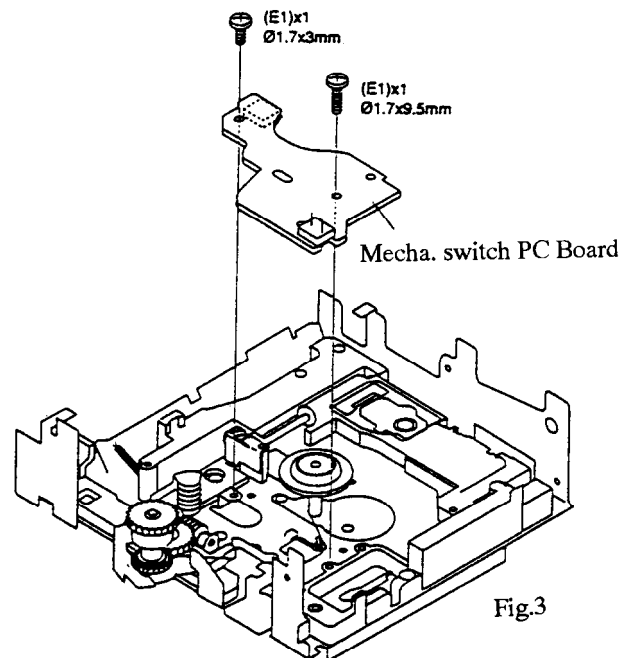


Fig.3

- Sled motor and Loading motor is taken off.  
(refer to Fig.4)

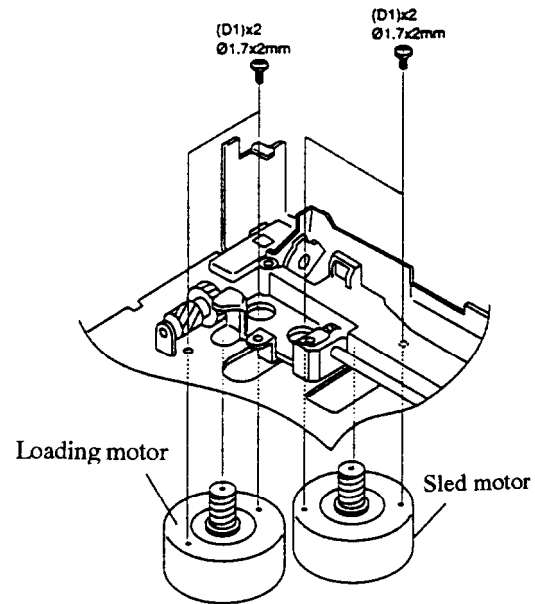


Fig.4

- Spindle motor is taken off.  
(refer to Fig.5)

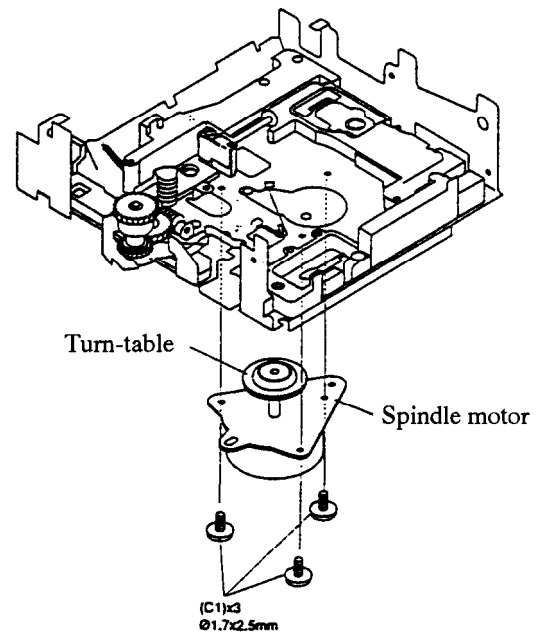


Fig.5

- Optical pick up is taken off.  
(refer to Fig.6)

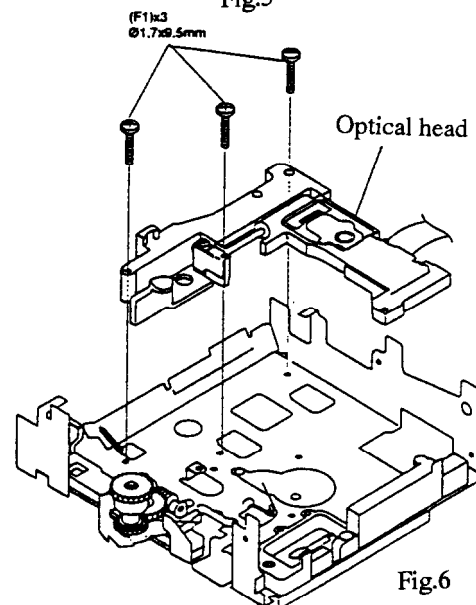


Fig.6

● Mechanism Adjustment

Pick-up grating measurement

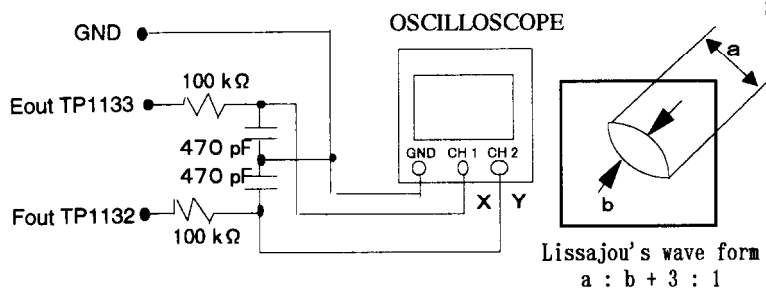


Fig.7

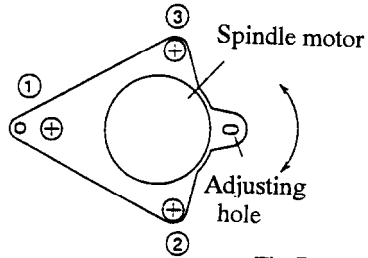
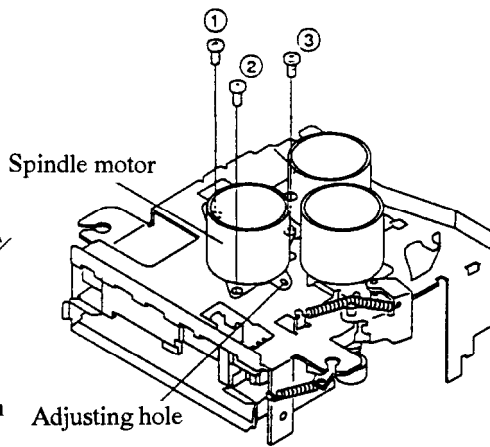


Fig.7

JITTER CHECKING

- 1) Insert the Pre-mastered disc.
- 2) Setting is AUTO Mode (TEST MODE) and then auto adjust. (Indicate on display "COMPLETE")
- 3) 3 screws of spindle motor few loosen, then re-adjusting screws while look at the oscilloscope.

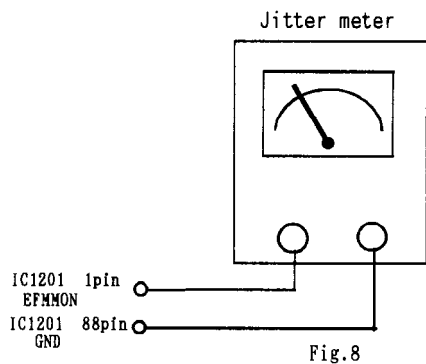


Fig. 8

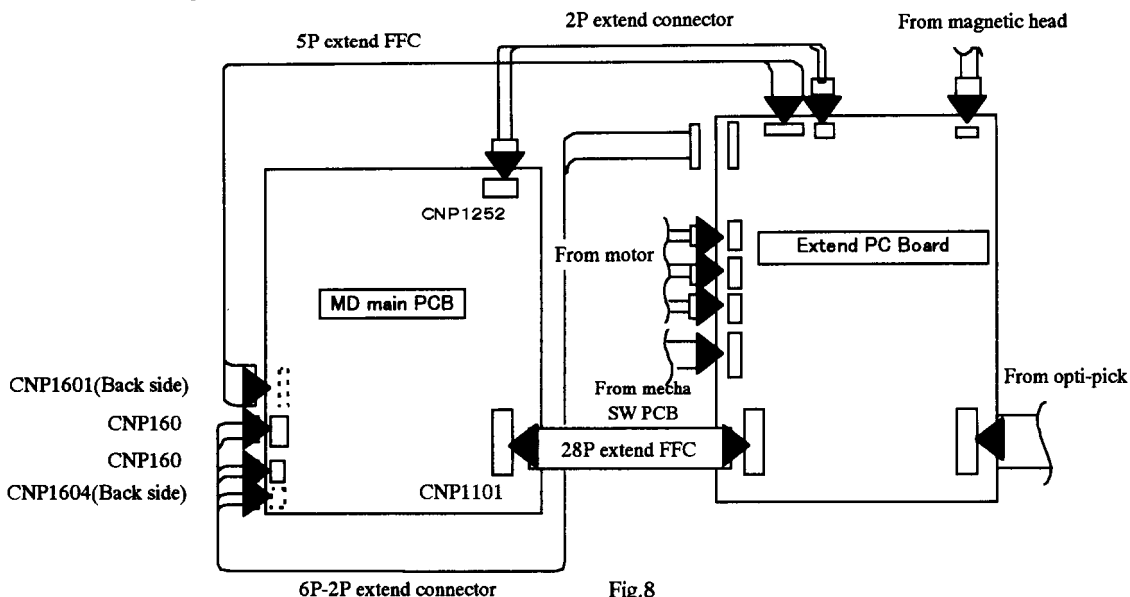


Fig.8