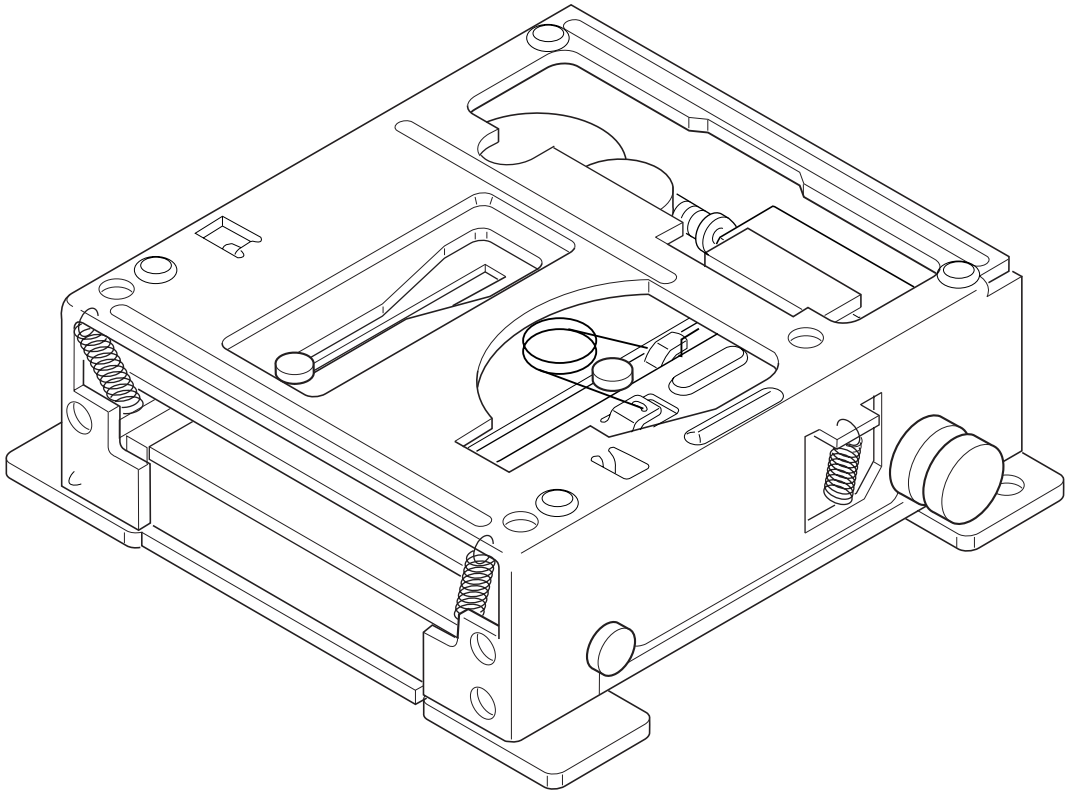
MD MECHANISM ASSY

X92-3770-00,0-01
X92-3780-00,0-01

KENWOOD

SERVICE MANUAL

B51-7623-00 (4) 3360

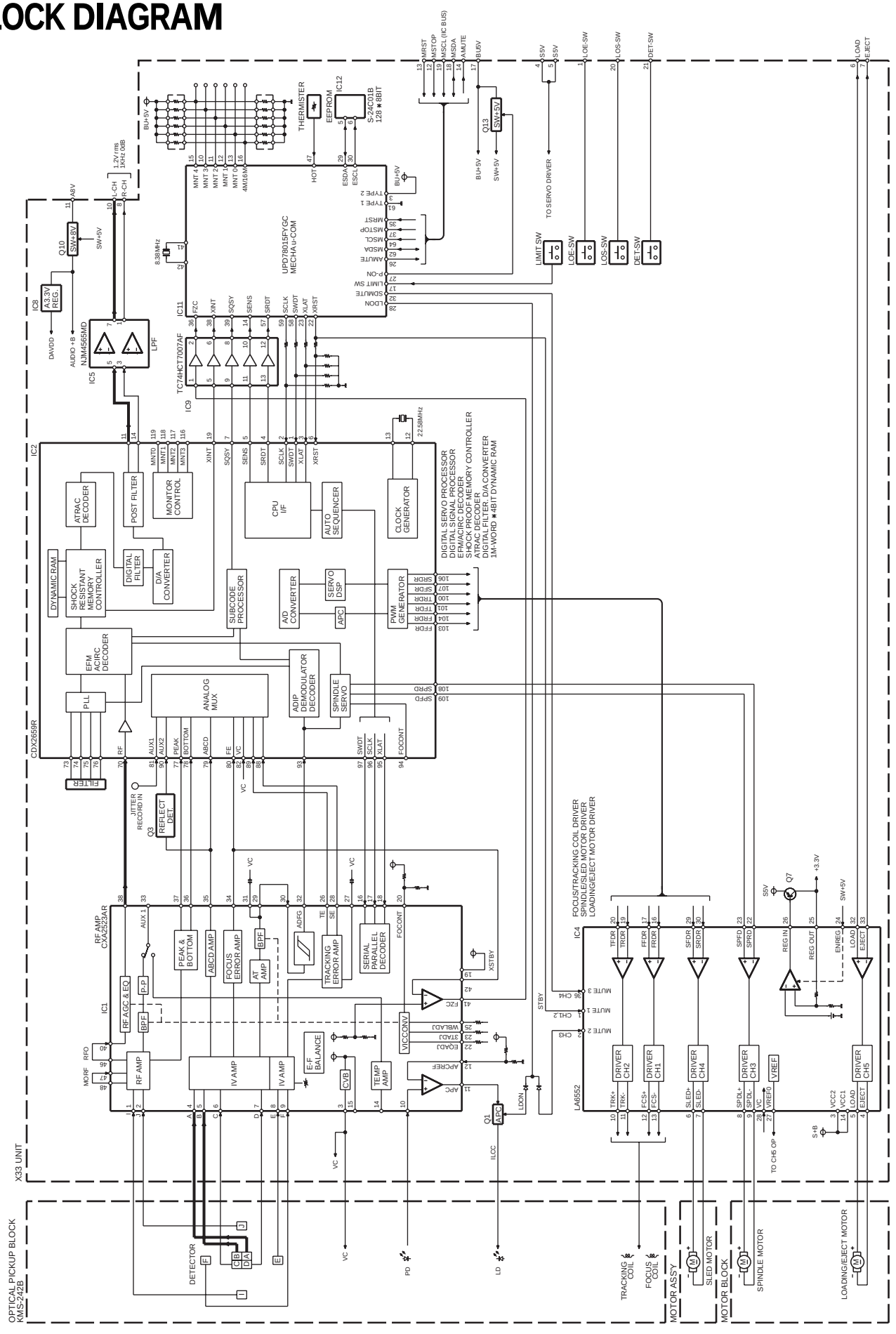


CONTENTS

40%

X92-3770-00,0-01/X92-3780-00,0-01

BLOCK DIAGRAM



COMPONENT DESCRIPTION

● **MD PLAYER UNIT (X33-3040-00/0-01)**

Ref. No.	Component Name	Application/Function	Operation/Condition/Compatibility
IC1	CXA2523AR	RF matrix amp.	RF amplifier (pit and groove switching, AGC, EQ), gain switching I-V amplifier. Amplification of the light intensity signal output, peak hold output, bottom hold output, FE output, TE output, SE output, ADIP binary output, VREF output and APC PD
IC2	CXD2659R	Digital signal processor	EFM decording, EFM digital PLL, ACIRC decording, auto link processing, ADIP decording. Digital servos (focusing, tracking, sled, spindle CLV). ATRAC decording, 1bit D/A, analog post-filtering, memory control.
IC4	LA6552	5ch BTL driver	Drives actuators and motors, +3.3V REGULATOR
IC5	NJM4565MD	LPF	Third active filter
IC8	LP2982-3.3	3.3V AVR	D/A audio +B
IC9	TC74HCT7007AF	CMOS buffer	Level shifting from 3.3V to 5.0V
IC11	78015FYGC-R08	MD mechanism MI-COM.	Servo control, memory control, system control and interfacing
IC12	S-24C01B	E2PROM	Servo coefficients and servo adjustment data backup memory
Q1	2SA1362(Y)	APC	Laser power control.
Q2	DTA114EUA	LD SW	On at base"L" while laser is OFF.
Q3	2SC4116(Y)	Disc reflection detection	On when focusing point is passed during upward search.
Q7	MCH6101	3.3V AVR	Servo +B
Q10	2SA1576A	A 8VSW	Analog 8V power supply.
Q12	DTC143EUA		
Q13	2SA1576A	P ON 5V SW	On at base"L"

MICROCOMPUTER'S TERMINAL DESCRIPTION

● **Microprocessor : 78015FYGC-R08 (X33 : IC11)**

Pin No.	Pin Name	I/O	Description	Processing Operation
1	TEST0	I	Test mode input 0	"H" turns normal test mode ON.
2	JTIME	I	Groove area jump time selection input	"L": 200ms, "H": 300ms
3	TYPE2	I	Destination selector 2	"L": 2655R, 2652AR, "H": 2655BR, 2654R
4	TEST3	I	Test mode input 3	"H" turns special test mode ON.
5	TESTE	I	E2PROM external input test mode	"H" turns external input mode ON.
6	M REM	O	Test mode memory remainder output	75% or more remains at "H"
7	NC	O	OPEN	
8	NC	O	OPEN	
9	VSS			
10	IVRTBAL PASS	I	No auto align mode input	IVR-TBAL auto align bus at "H"
11	AGC PASS	I	No auto align mode input	AGC auto align bus at "H"
12	C1 COUNT	I	C1 error count mode input	Error count mode at "H"(When it's in text mode)
13	NC	I	GND	
14	SENS	I	Internal status input from DSP LSI	
15	AUDIO INV	I	DAC output polarity reversal input	Reverse polarity at "H".
16	$\overline{4M/16M}$	I	DRAM size selection input	"H" turns 16M bit operation (fixed on RESET)
17	LIMSW	I	Pickup innermost limit detection	"L" when innermost limit is detected.
18	NC	O	OPEN	
19	NC	O	OPEN	
20	NC	O	OPEN	
21	DEEM	O	De-emphasis output to external DAC	During 2652AR : ON at "H", during 2654R : ON at "L"
22	$\overline{XRST}$	O	Reset output to DSP LSI and servo driver IC	Active : "L"
23	XLAT	O	Latch output to DSP LSI	Latch at falling edge
24	VSS			
25	NC	O	OPEN	

MICROCOMPUTER'S TERMINAL DESCRIPTION

Pin No.	Pin Name	I/O	Description	Processing Operation
26	$\overline{\text{AMUTE}}$	O	Audio mute output	Active : "L"
27	$\overline{\text{P-ON}}$	O	Unit internal system power control output	Active : "L"
28	LDON	O	Laser APC control output	Active : "H"
29	ESDA	I/O	E2PROM serial data line	(I2C-BUS)
30	ESCL	I/O	E2PROM serial clock line	(I2C-BUS)
31	NC	O	OPEN	
32	$\overline{\text{SDMUTE}}$	O	Sled driver mute output	Active : "L"
33	NC	O	OPEN	
34	NC	O	OPEN	
35	$\overline{\text{MRST}}$	I	Reset input from system μ-COM.	Active : "L"
36	FZC	I	FZC interrupt request input	"H"for interrupt request generation
37	$\overline{\text{M-STOP}}$	I	Standby control input from system μ-COM.	Active : "L"
38	XINT	I	Interrupt request from DSP LSI	"L"for interrupt status generation
39	SQSY	I	Sub-code Q sync or ADIP sync input	
40	VDD			
41	X2		Connect crystal oscillator as main system clock.	
42	X1		Connect crystal oscillator as main system clock.	
43	IC			
44	XT2			
45	NC	I	(not used : BU5V connection)	
46	AVSS			
47	HOT	I	Temperature detection input	Vth On : 3.87V, Vth Off : 3.74V, Vth Low : 0.43V
48	AUX1/NC	I/O	AUX1 input durring 2654R mode/ others not used	Jitter input during FBAL alignment
49	NC	O	OPEN	
50	NC	O	OPEN	
51	NC	O	OPEN	
52	NC	O	OPEN	
53	NC	O	OPEN	
54	AVCON	O	AVREF terminal control output	"H"with AVREF reference voltage
55	AVDD			
56	AVREF		Connected to AVCON terminal	
57	SRDT	I	Serial data input from DSP LSI	
58	SWDT	O	Serial data output to DSP LSI	
59	SCLK	O	Shift clock output to DSP LSI	
60	LADJ1	I	Manual adjustment mode input	"H"for manual adjustment mode
61	TYPE1	I	Destination selector 1	"L": 2655R, 2655BR, "H": 2652AR, 2654R
62	MSDA	I/O	Serial data line with system μ-COM.	(I2C-BUS)
63	NC	O	OPEN	
64	MSCL	I/O	Serial clock line with system μ-COM.	(I2C-BUS)

ADJUSTMENT

Service Test Mode (Manual Adjustment Mode) of the MDS-2200

The focusing bias (balance) adjustment of the MDS-2200 has been subjected to automatic adjustment at the factory and the obtained bias value has been written in the E2PROM, and the set performs adjustment by reading the E2PROM data. Consequently, after the pickup has been replaced in servicing, it is required to adjust the focusing bias again. This can be done automatically if the dedicated commander for the MDS-2200 and a jitter meter are available, but the set also incorporates a service test mode (manual adjustment mode) for use in case these instruments are not available.

• Adjustment procedure (Be sure to begin setup while the power of the set is off.)

1. Pull up pin 60 (LADJ1 (check land 1)) of lC11 in the X33-unit to BU5V (check land BU5).
2. Lead wires from check land ARF and check land SAG (servo GND) in the X33-unit so that they an be monitored with an oscilloscope.
3. Turn the set on and perform the reset power-ON operation.
   ∗ The adjustment includes three modes ; the Iow-reflection pit and groove modes for recordable discs and the high-reflection pit mode for premastered discs.
4. Load a disc to enter the adjustment mode.

<With a recordable disc>

5. The low-reflection pit play mode starts when TNo.1 is displayed.
   The time code display shows “50”.
6. While monitoring ARF with an oscilloscope, vary the focusing bias using the Track UP and DOWN keys.
7. The optimum values can be obtained by varying the bias in the UP and DOWN directions, locating the upper and lower values at which the ARF waveform is disturbed or the 3T waveform level drop, and calculating the center value of the two values. For example, when the value located in the UP direction is 58 and that located in the DOWN direction is 46, the optimum value is their center value, i. e. 52.
8. When the optimum value is obtained, set the focusing bias to that value and press the Manual UP or DOWN key to enter the value.
   (With normal sets, press and hold the Track UP or DOWN key.)
9. After the low-reflection pit adjustment in step 8, the pickup automatically moves to the groove area.
10. The groove play mode starts when TNo.2 is displayed.
11. Perform the same operations as steps 6, 7 and 8.
12. The disc stops after the groove area adjustment .
    Eject the disc and complete adjustment.
    ∗ Since the low-reflection pits are present only in the TOC area, their total play time is about 40 seconds. When the pit area is over, the retry operation starts and the adjustment is invalid in this period.

<With a premastered disc>

13. When the high-reflection play mode starts, perform operations in steps 5, 6, 7 and 8.
14. The disc stops after the adjustment. Eject the disc and complete adjustment.
    ∗ The coarse adjustment of the EF balance is also performed during this test mode.
    However, it is an automatic adjustment and does not require external poeration.

ADJUSTMENT

• Display in service test mode (Display on the set)

Start of pit adjustment mode	[01-_ : _]
Pit adjustment enabled	[01-_ : 50]
Pit adjustment in progress (** =Adjustment data)	[01-_ : **]
Pit adjustment result entered (Start of groove adjustment mode)	[02-_ : _]
Groove adjustment enabled	[02-_ : 50]
Groove adjustment in progress (** =Adjustment data)	[02-_ : **]
Groove adjustment result entered (Normal completion)	[02-_ : _]

• Error display (=Error status)[**_ : _]**

** = 03 : Error during low-reflection pit EF balance adjustment
** = 04 : Error during low-reflection pit focusing bias adjustment
** = 05 : Error during low-reflection pit data write in E2PROM
** = 19 : Error during groove EF balance adjustment
** = 20 : Error during groove focusing bias adjustment
** = 21 : Error during groove data write in E2PROM
** = 35 : Error during high-reflection pit EF balance adjustment
** = 36 : Error during high-reflection pit focusing bias adjustment
** = 37 : Error during high-reflection pit data write in E2PROM

• Adjustment parameters

Adjustment condition : Setting the LADJ 1 pin to Hi then reset-starting the set.
Adjustment keys : Track UP/DOWN keys.
Entry key : Pressing the Manual UP/DOWN key (or pressing and holding the adjustment key with some sets).

** **Notes** **

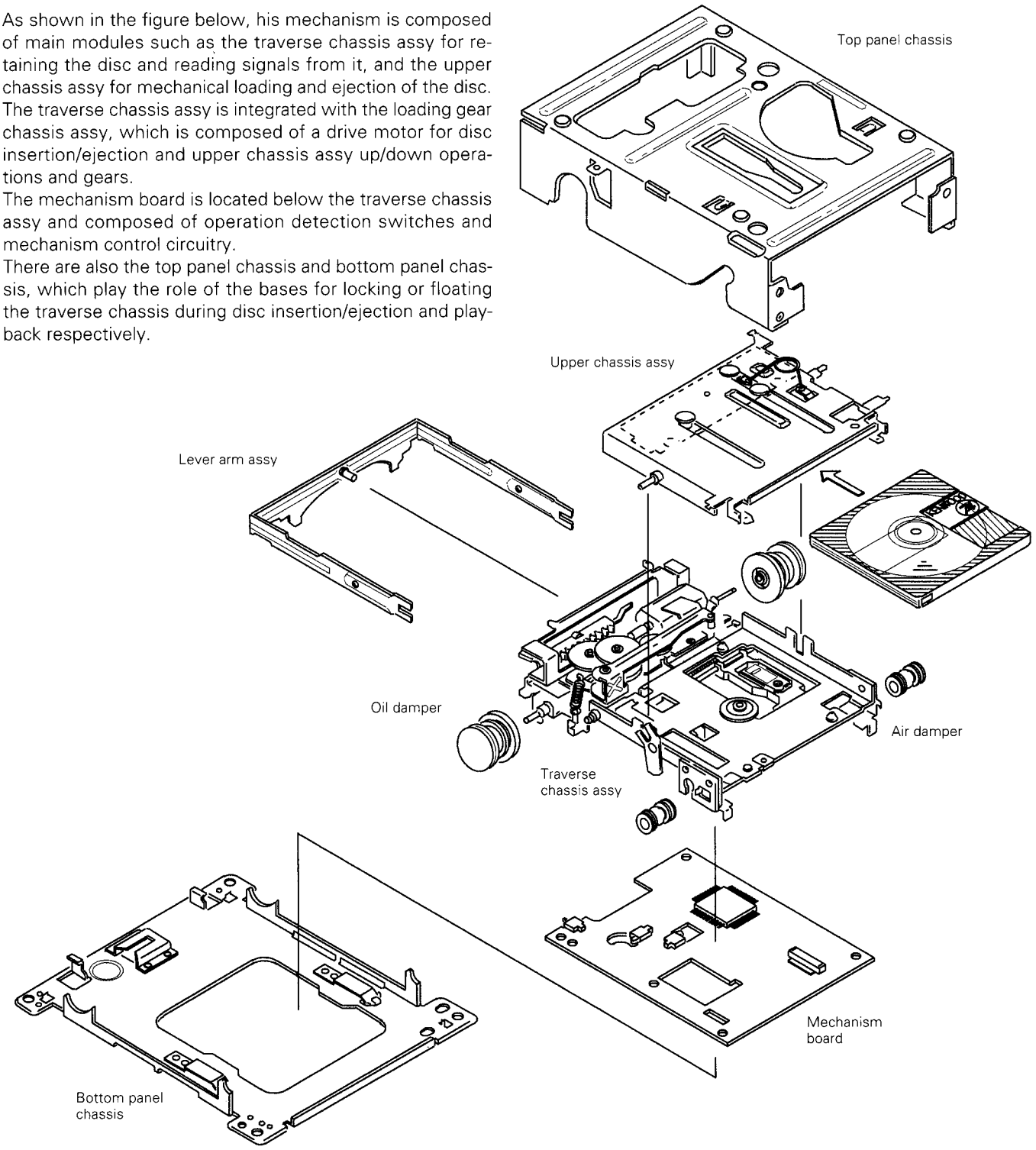
1. Always be sure to enter the results obtained with each medium.
   If the medium is ejected without entering the results and the adjustments of another medium is started, the E2PROM data will be destroyed.
2. Varying the focusing bias value extremely in the UP or DOWN direction degrades the focusing performance.
   Although this degradation can usually be recovered by retrying, there is also a potential of error occurrence or keys becoming invalid.
   In such a case, restart adjustment by reset-starting the set.
   (This also applies to the case in which data has been entered using an extreme value.)
3. Note on “E-99”
   “E-99” which usually indicates a mechanism error is also displayed when E2PROM data is destroyed.
   If a wire is attached or removed while the set’s power is on (BU UP), the E2PROM data could be destroyed ; be sure to attach or remove wire while the power is on (BU UP).
   This also applies to the attaching and removal of the card cable (flexible cable) to or from the mechanism.
   (Unlike the MDS-1000, normal operation cannot be resumed by turning the T0 pin Hi.)
4. Note on E2PROM
   The E2PROM stores a variety of initial data for the MD DSP, and some of the initial data is rewritten at the time of adjustment.
   As a result, note that an error occurs if the E2PROM in use does not store the initial data.

MECHANISM OPERATION DESCRIPTION

① This mechanism has the capability to play back a Mini Disc (MD).
② This mechanism has been developed by emphasizing the low cost.
③ This mechanism is capable of reloading a disc after having ejected it.
④ When it is attempted to force insert a disc in this mechanism,it has been designed to reject the disc (to prevent damage to the mechanism parts).

1. Main Module Configuration

As shown in the figure below, his mechanism is composed of main modules such as the traverse chassis assy for retaining the disc and reading signals from it, and the upper chassis assy for mechanical loading and ejection of the disc. The traverse chassis assy is integrated with the loading gear chassis assy, which is composed of a drive motor for disc insertion/ejection and upper chassis assy up/down operations and gears.
The mechanism board is located below the traverse chassis assy and composed of operation detection switches and mechanism control circuitry.
There are also the top panel chassis and bottom panel chassis, which play the role of the bases for locking or floating the traverse chassis during disc insertion/ejection and playback respectively.



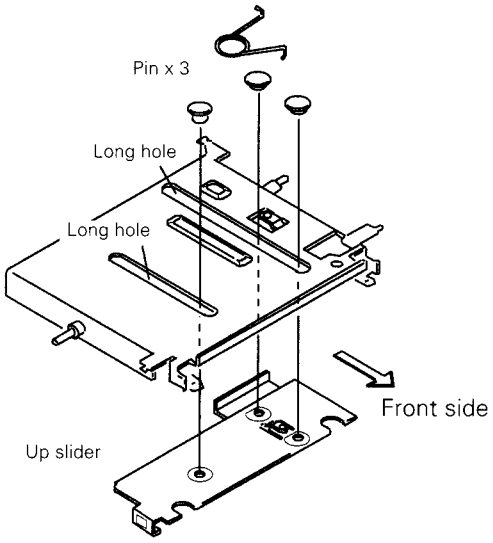
MECHANISM OPERATION DESCRIPTION

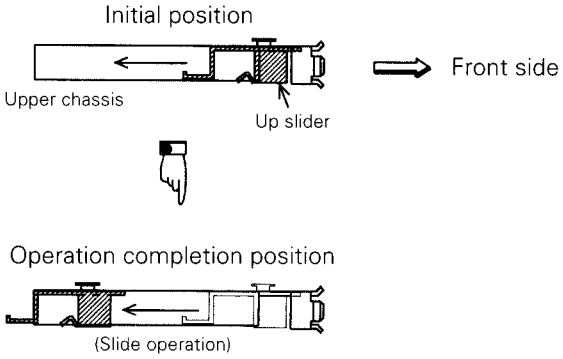
2. Operation Description

[1] Disc loading

(1) Upper chassis construction

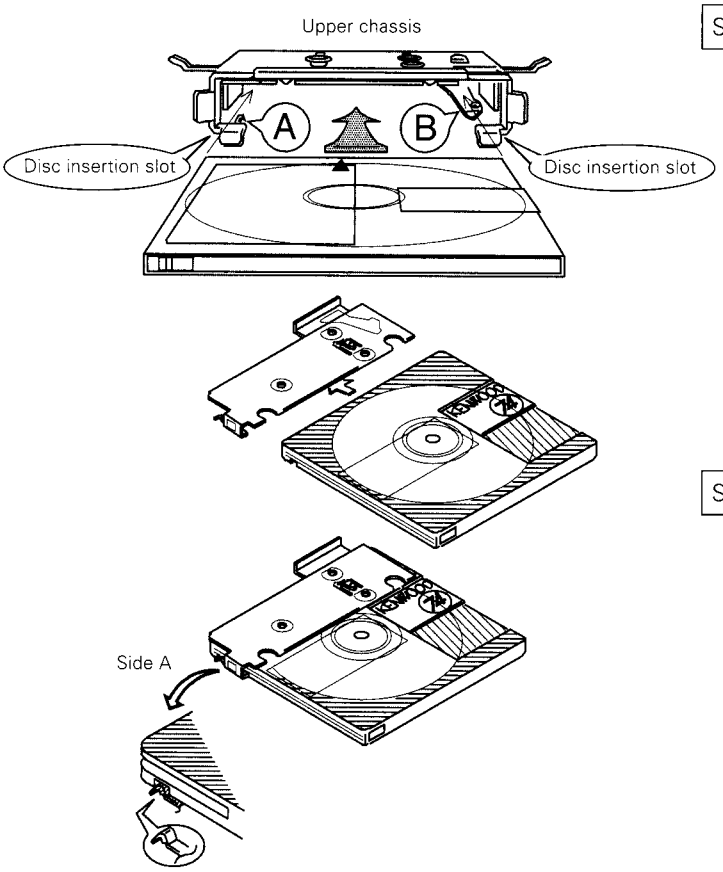
The upper chassis assy includes the up slider which retains the disc and pulls it in till the loading completion position, and the upper chassis which moves mechanically up and down to open the disc shutter and make it ready for playback. The lock sliders are caulked onto the upper chassis with 3 pins and capable of sliding along the long holes on the upper chassis.

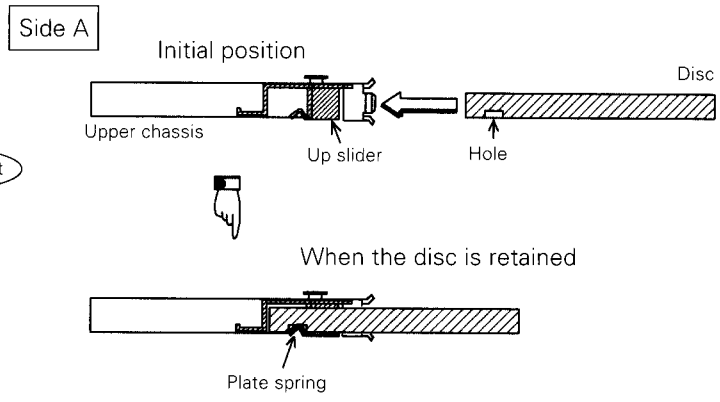


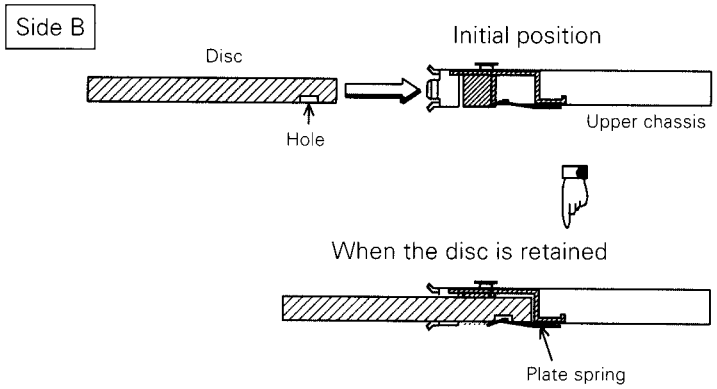


(2) Disc insertion

The disc is inserted into the U-shaped insertion slot on the upper chassis. When the disc is pushed in further, holes on the disc cartridge are engaged with and retained by 2 plate springs on the up slider.



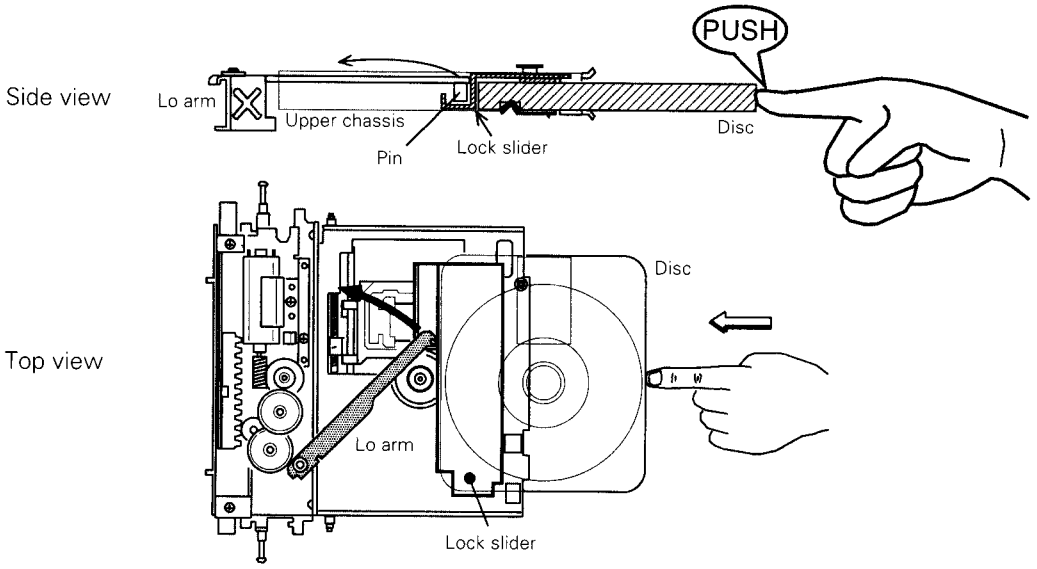




MECHANISM OPERATION DESCRIPTION

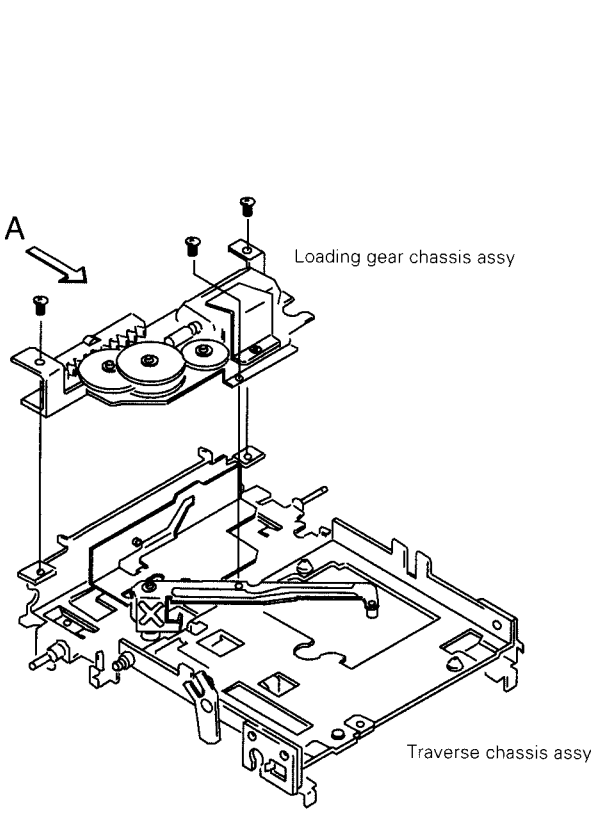
(3) Lo arm operation

At the tip of the Lo arm is a pin which is coupled with the recess on the lock slider. When the disc is pushed in, the wall of the lock slider pushes the Lo arm pin and causes it to move.

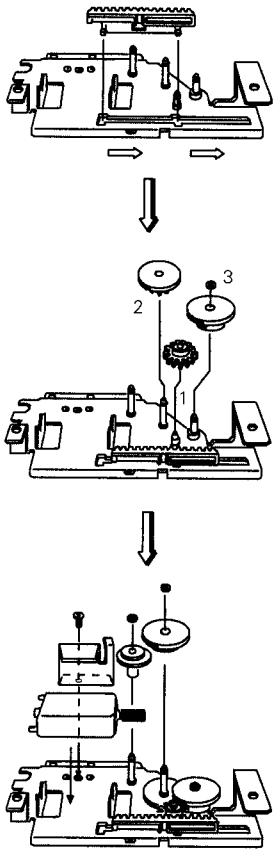


(4) Loading gear chassis assy construction

The loading gear chassis assy incorporates the loading motor, gears and rack, and the rack slide according to the loading motor rotation.
This action of the rack becomes the basis of other operations such as the Lo arm pulling and disc chucking.
The loading gear chassis assy is integrated in the traverse chassis assy.



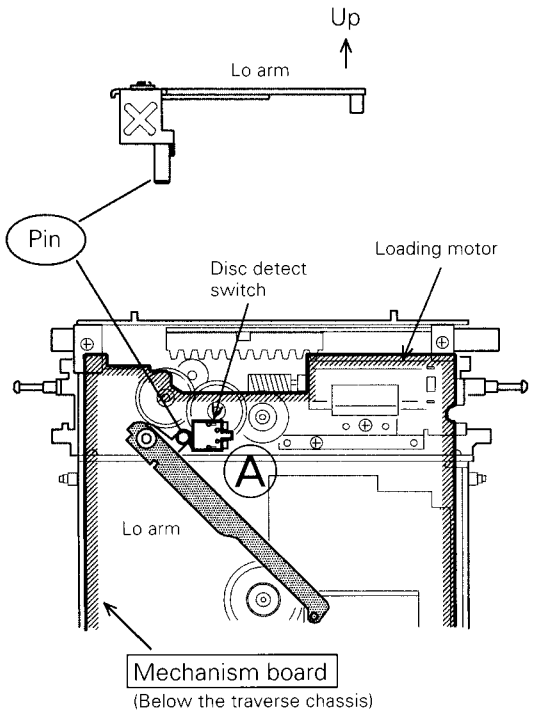
View in the direction of arrow A

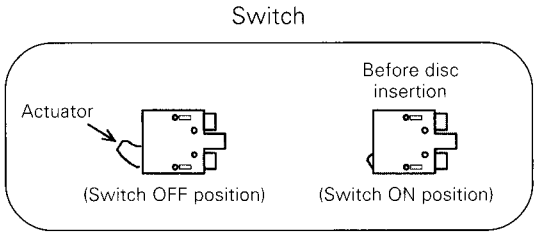


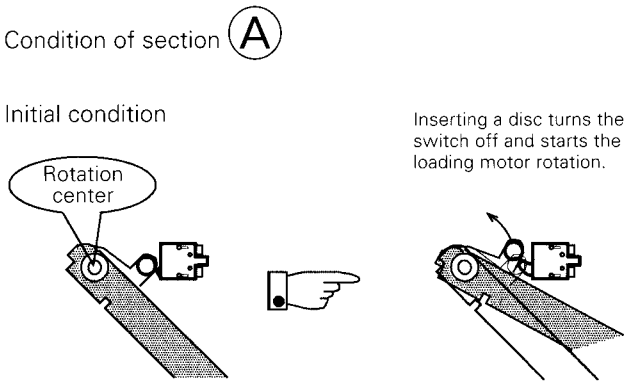
MECHANISM OPERATION DESCRIPTION

(5) Loading motor rotation

When no disc is inserted yet, the pin at the bottom of the Lo arm pushes the actuator of the disc detect switch on the Mechanism board (turning the switch on). The disc eject condition is detected under this condition.
When a disc is inserted and the Lo arm is pressed, the pin displaces so the actuator of the disc detect switch is released. This turns the switch off, thereby starting the loading motor rotation.





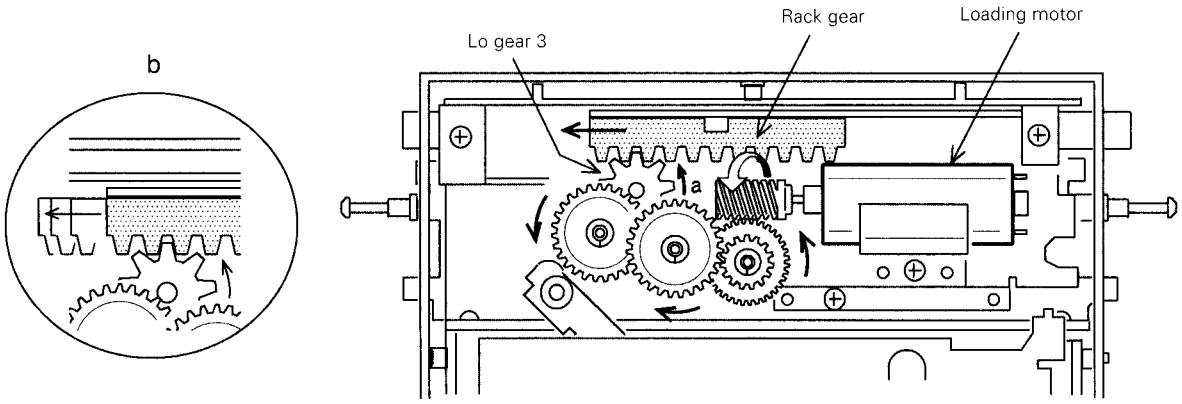


The loading motor and the series of mechanisms associated with it are used to chuck a pulled-in disc or eject a disc.

(6) Disc pulling

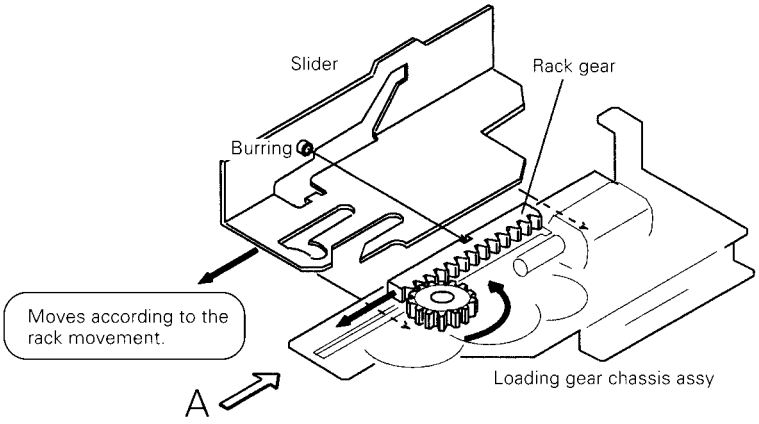
When the loading motor starts rotation, the rotation force is transmitted via the gear rotation, rack's sliding and the slider operation. When the Lo arm eventually pulls in the lock slider, the retained disc is pulled inside the mechanism. This series of operations occur as described below.

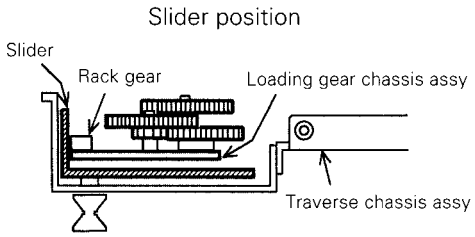
① Disc insertion turns the disc detect switch OFF. (See page 9.)
② The loading motor rotates and causes the gear train to rotate.
③ The rotation force of "Lo gear 3" is transmitted to the rack gear. (a)
④ The rack gear slides. (b)



MECHANISM OPERATION DESCRIPTION

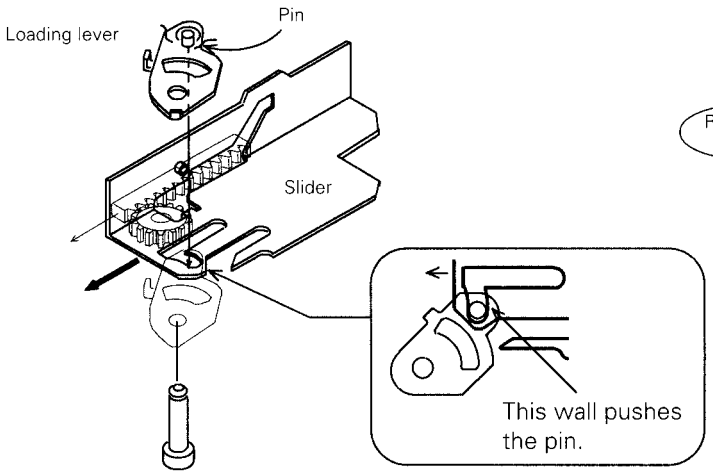
⑤ The slider coupled with the rack gear moves according to the sliding movement of the rack gear. (The burring on the slider is engaged with a groove on the rack gear.)

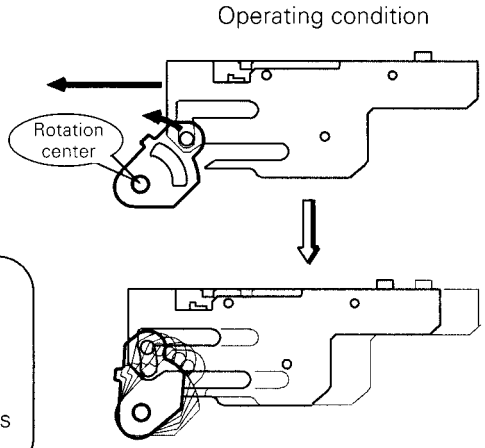




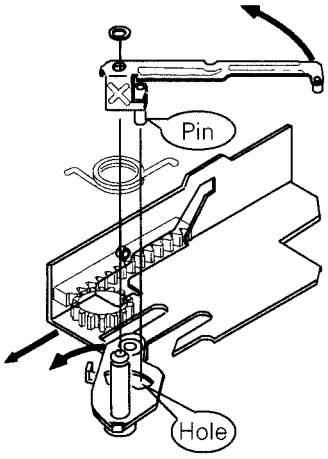
View in the direction of arrow A

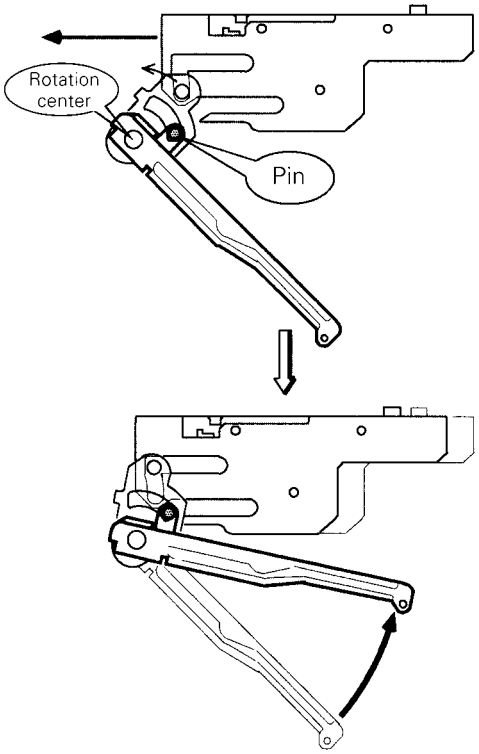
⑥ The movement of the slider pushes the pin on the loading lever which is fitted into a hole on the slider, and the pin starts rotating movement.





⑦ The pin on the Lo arm, fitted into a hole on the loading lever, moves according to the loading lever rotation and causes the Lo arm to move.

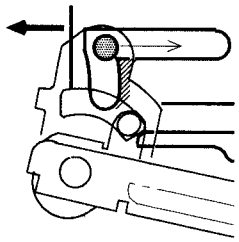


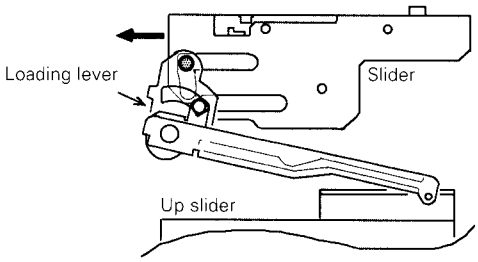


MECHANISM OPERATION DESCRIPTION

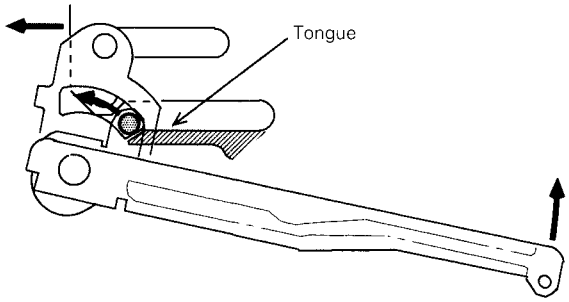
⑧ The pin of the loading lever is released from the pushing force of the slider.
(At this time, the Lo arm has not pulled in the Up slider completely and is in the middle of loading.)

The loading lever pin separates from the wall (on the slider) which is shown as the hashed section in the figure.

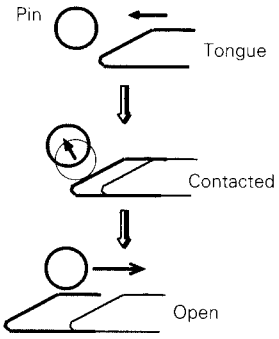




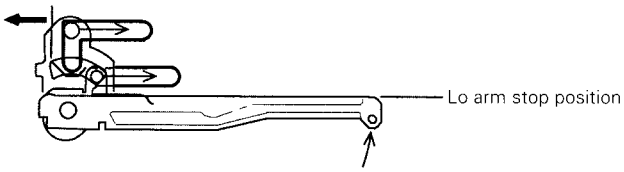
⑨ When the slider moves further, the pin on the Lo arm is pushed by a tongue (projection) on the slider so the Lo arm is moved. (The Lo arm pulls the Up slider further.)



Operating condition

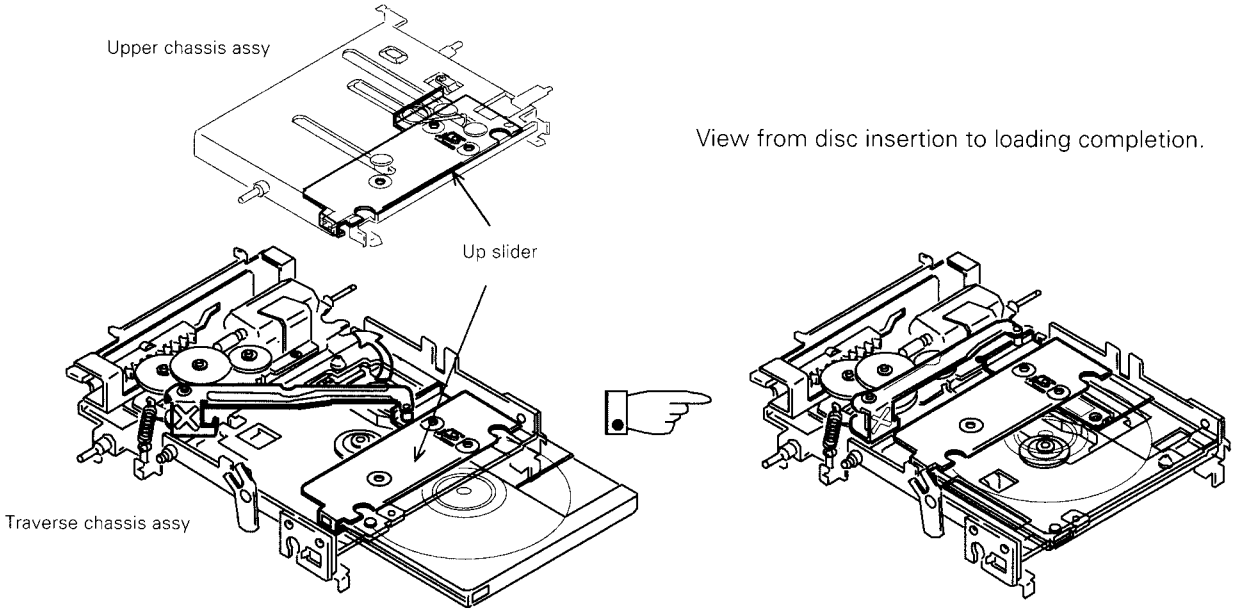


⑩ The Lo arm pin separates from the slider tongue and the Lo arm stops operation (opened).
(Because the pins of the loading lever and Lo arm enters the long hole on the slider.)



Now the disc pulling based on the Lo arm operation is complete.

* The loading motor is still rotating and the slider continues the sliding movement.

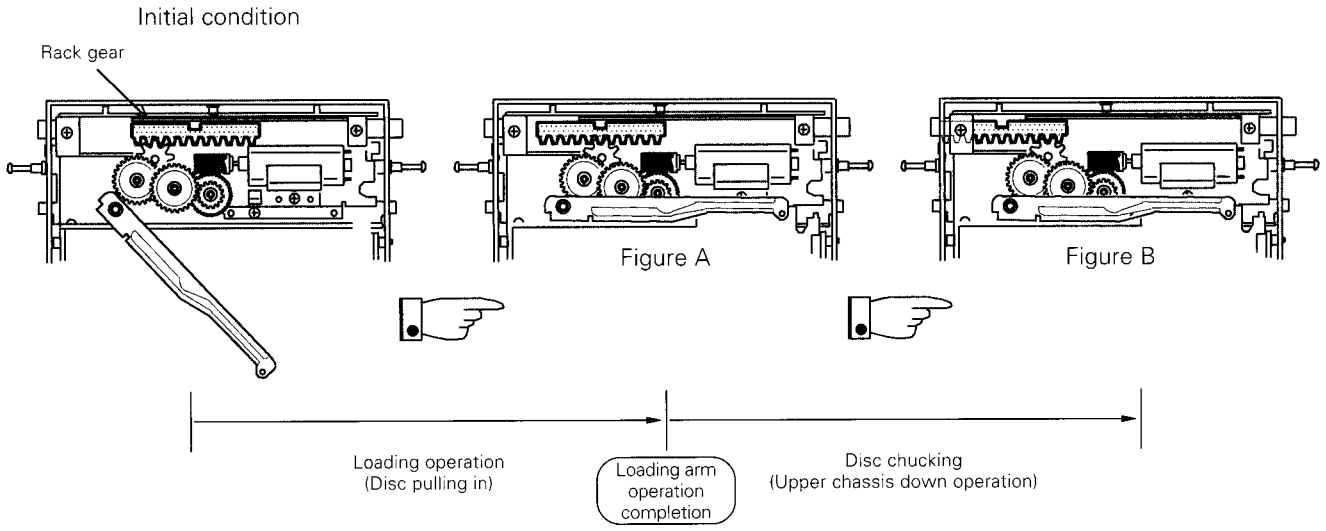


View from disc insertion to loading completion.

MECHANISM OPERATION DESCRIPTION

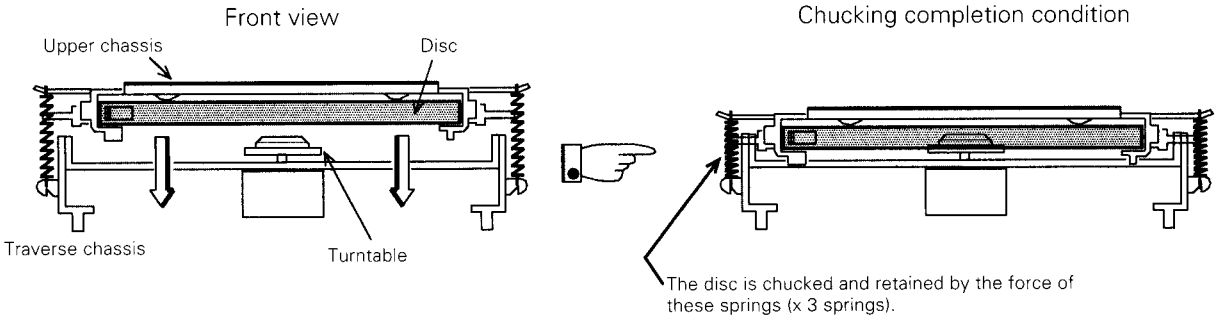
Figure A below shows the loading completion condition in which the Lo arm has pulled in the Up slider.
The rack gear is still in an intermediate position and the loading gear keeps on rotating until the disc is placed in the playback position.

While section [1] "Disc loading" described the mechanism from the initial condition to the condition shown in Figure A, the next section will give description of the operation modes occurring in the process from Figure A to Figure B below.



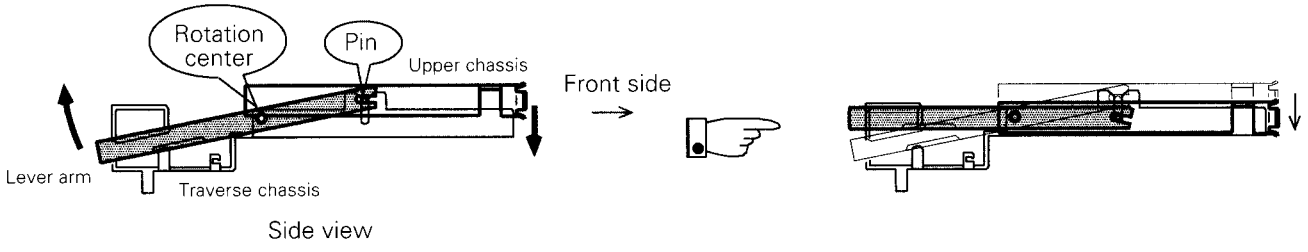
[2] Disc chucking

After the disc has been loaded, the operations for placing the disc on the turntable are required.
Since the disc is retained on the Up slider, it can be placed on the turntable by moving the disc in the lower direction together with the upper chassis assy.



(1) Structure lowering the upper chassis

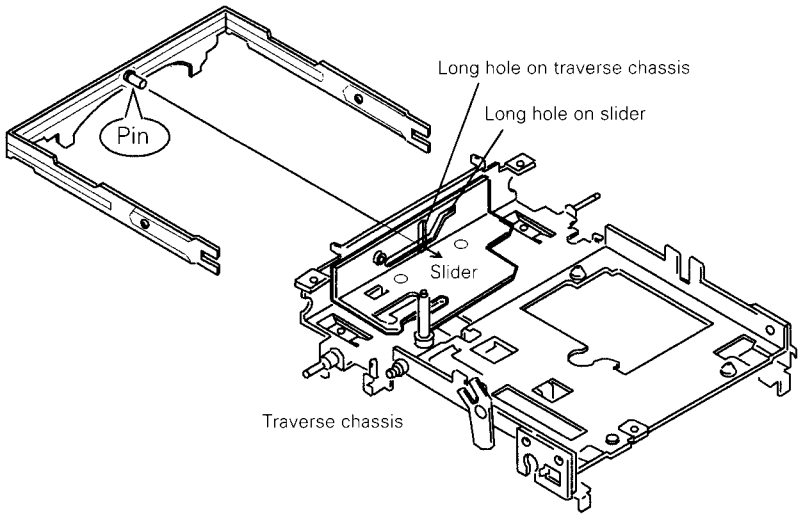
The upper chassis has a pin on each side. These pins are coupled with recesses on the extremities of the lever arm.
The lever arm is attached onto pins on the traverse chassis and each of these attaching points becomes the rotation center of the lever arm's up/down movement (see-saw operation). This up/down movement causes the coupled upper chassis to move up and down.



MECHANISM OPERATION DESCRIPTION

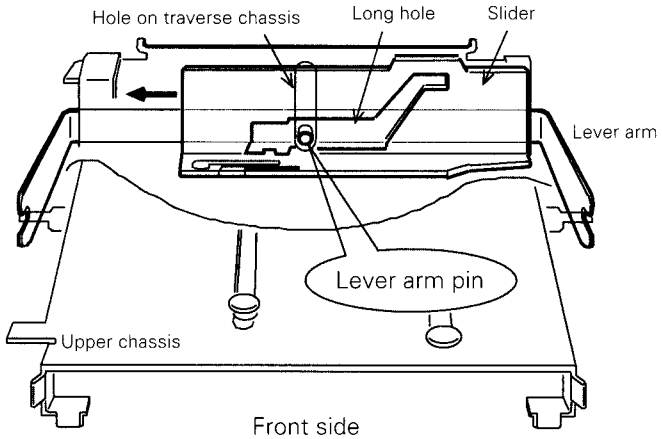
(2) Position relationship between lever arm and

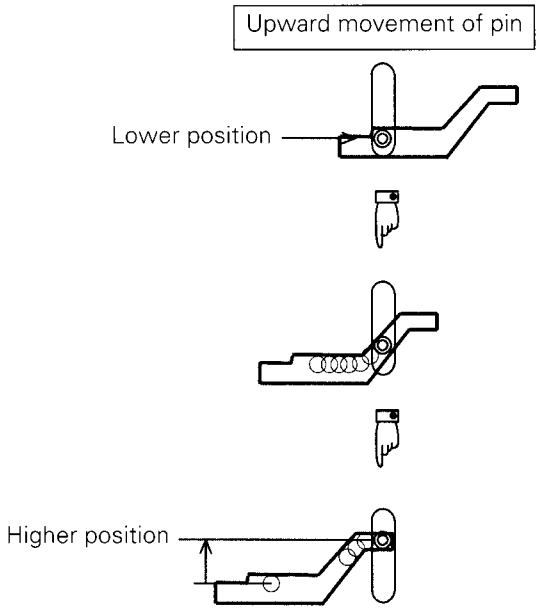
The lever arm has a pin on the rear side. This pin passes through a hole on the traverse chassis and coupled with the long hole on the slider.



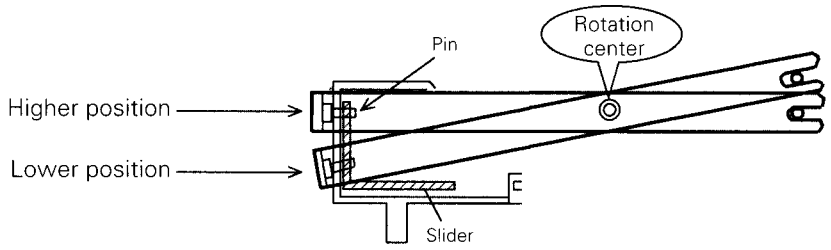
(3) Lever arm movement

The pin on the lever arm is located in the lower position of the slider's long hole until the loading completion position (the condition shown in Figure A on page 13). As the slider continues movement after this position, the lever arm pin moves gradually upward along the long hole.





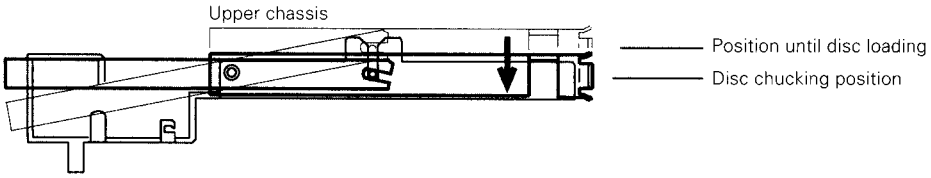
As a result, the rear part of the lever arm is lifted up around the rotation centers which are coupled with the traverse chassis.



MECHANISM OPERATION DESCRIPTION

(4) Upper chassis down movement

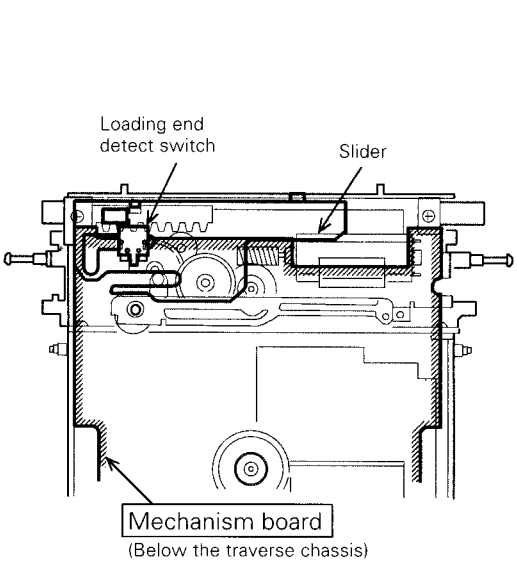
When the rear part of the lever arm moves up, the front part lowers so the coupled upper chassis moves down.

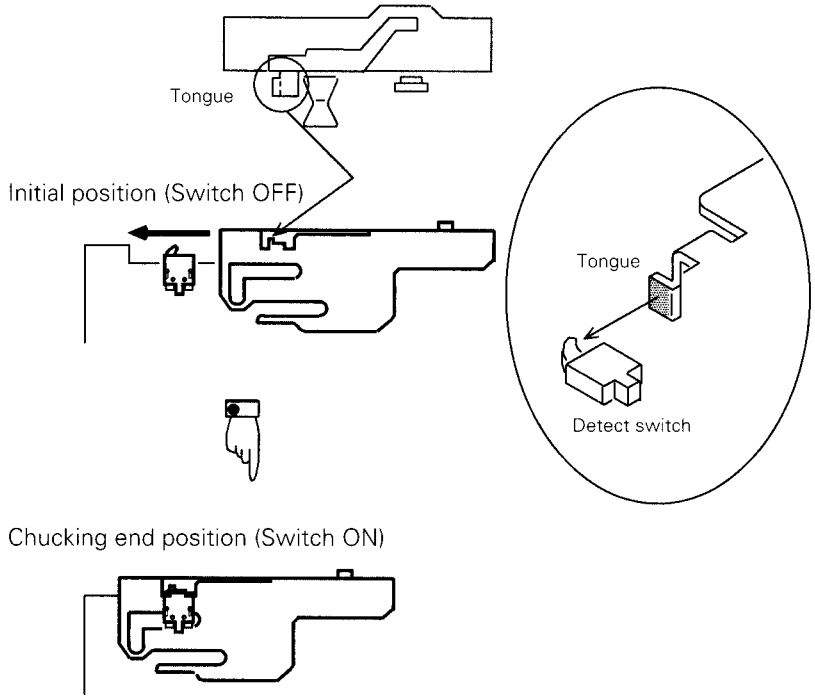


This movement places the disc on the turntable and makes it ready for playback. (Chucking completion)

(5) Loading motor stopping

When the operations until the positioning of the disc in the chucking position, which occur thanks to the loading motor rotation and slider movement, have completed, the loading motor should be stopped.
The mechanism board as a loading end detect switch, which stops the loading motor rotation when the switch is turned on by the tongue on the slider.
(The slider stops movement at this point.)

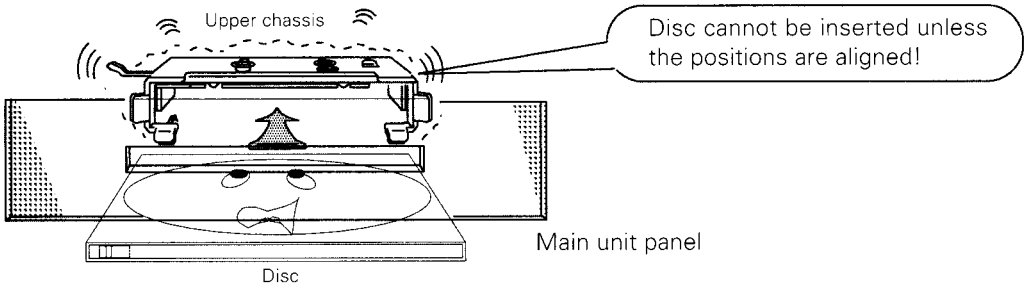




MECHANISM OPERATION DESCRIPTION

3. Mechanism Lock Position and Floating Position

The disc enters the mechanism through the disc insertion location on the upper chassis.
The positions of the disc insertion slot and the opening (entrance) on the main unit front panel should be aligned when a disc is inserted.
Therefore, when a disc is inserted, the upper chassis should be locked (mechanism lock condition). And when the loaded disc is played, the upper chassis should be in a floating position (a condition in which the entire traverse chassis is suspended) in order to prevent sound skipping due to vibrations and impact during the vehicle driving.



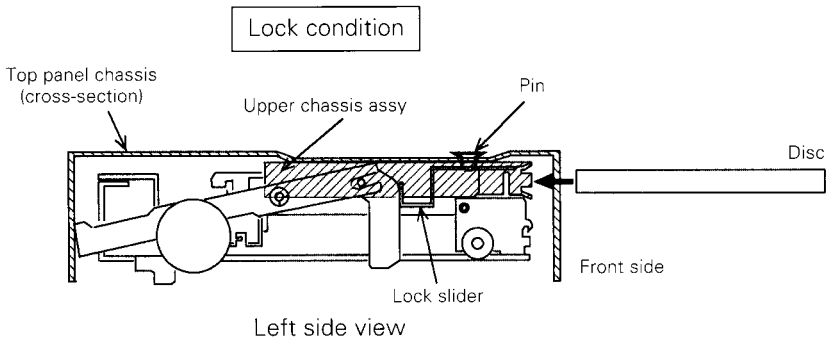
The mechanism lock condition is achieved by restricting four points. In this condition, the entire traverse chassis is locked by position restrictions.

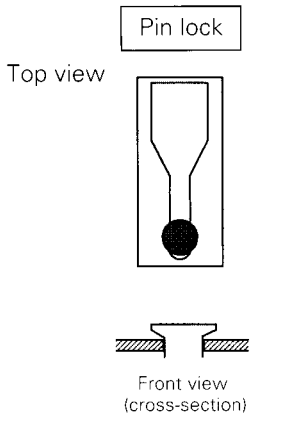
[1] Mechanism lock position (Initial position restrictions)

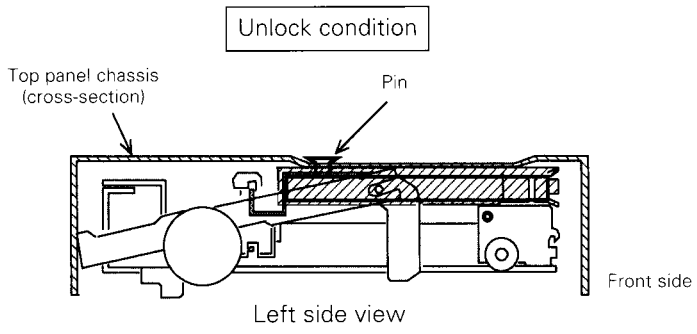
(1) Restriction by upper chassis assy and top panel chassis

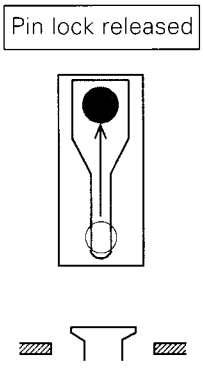
(Restriction in the up/down and left/right directions at the disc insertion opening)

The lock slider inside the upper chassis assy is initially located on the front side in order to retain the disc.
At this time, the pin on the top of the lock slider is fitted into a groove of the long hole on the top panel chassis to provide restrictions in the up/down and left/right directions.
After the disc is inserted, the lock slider moves on the deeper position (rear side). This disengages the pin from the top panel chassis and releases the locking.









MECHANISM OPERATION DESCRIPTION

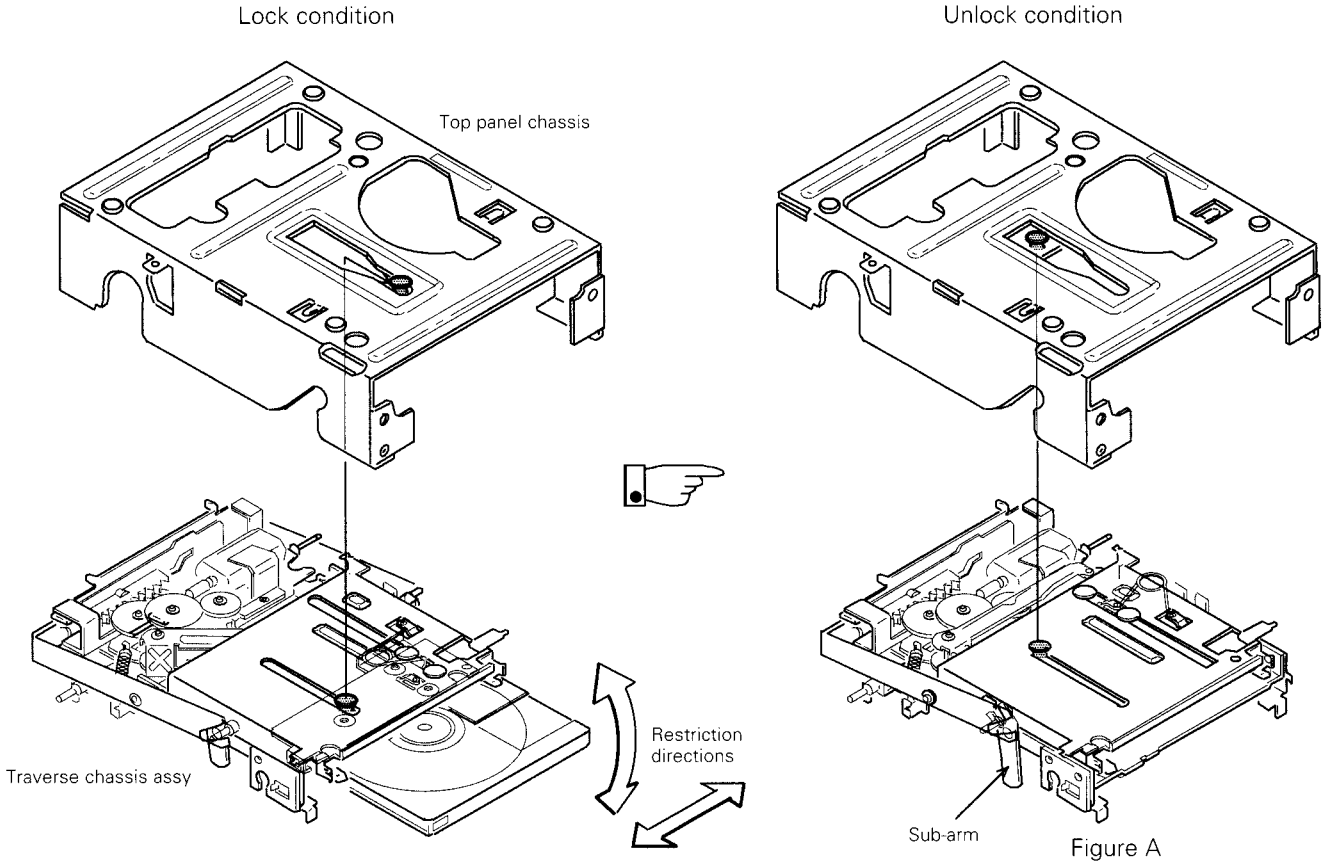
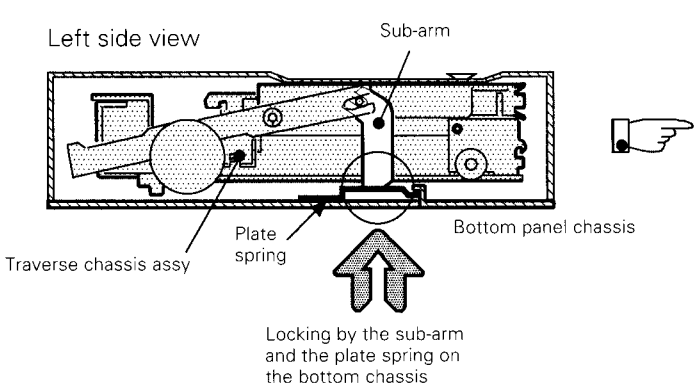
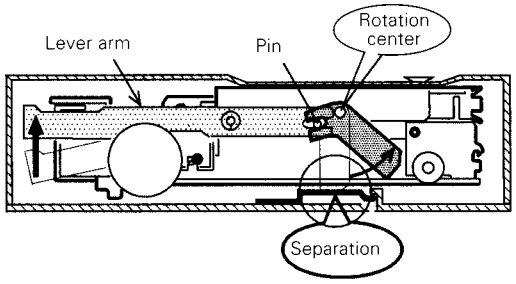


Figure A

(2) Restriction by sub-arms and bottom panel chassis (Restriction in the up/down direction)

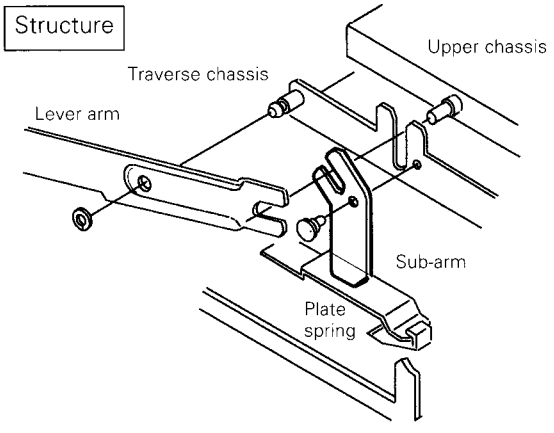
The sub-arms are caulked on the left and right of the traverse chassis. When the mechanism is in the lock position, the sub-arms locks the traverse chassis by keeping contact with plate springs on the bottom panel chassis.





(Unlocked : Floating condition)

The sub-arms are coupled with the lever arm via pins on the upper chassis. After the disc has been loaded, the upper chassis pins move downward so the sub-arms rotate and become separated from the bottom panel chassis.



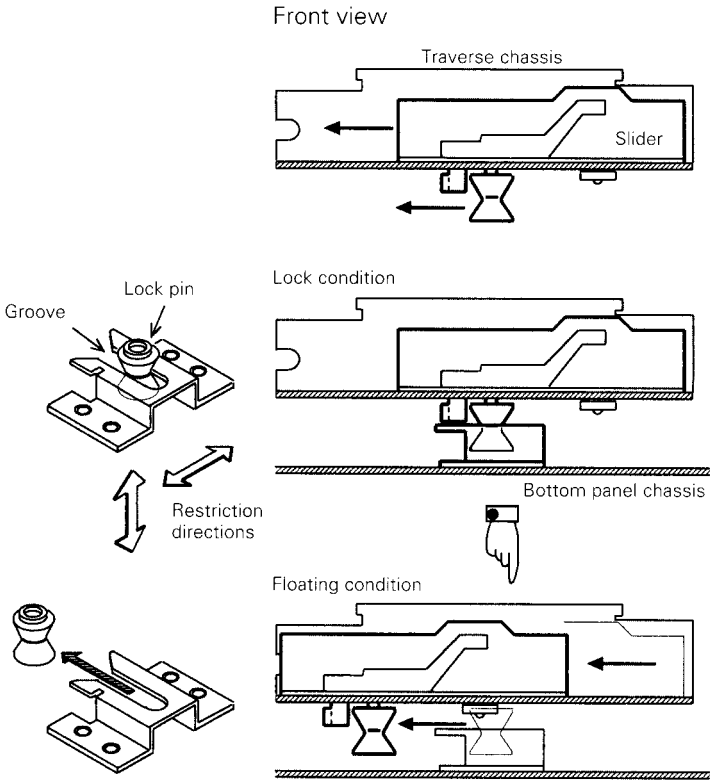
MECHANISM OPERATION DESCRIPTION

(3) Restriction by lock pin and bottom panel chassis

The lock pin is attached on the lower part of the slider and moves according to the slider movement.

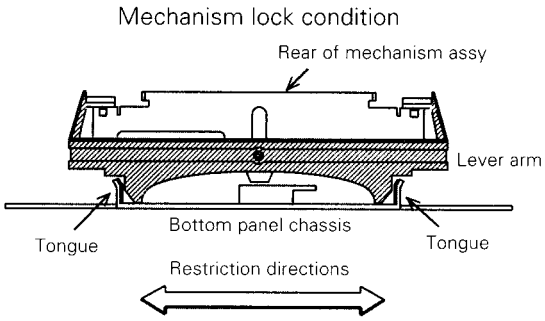
In the mechanism lock condition, the lock pin enters a groove on the bottom panel chassis to provide the restriction in the up/down and front/rear directions.

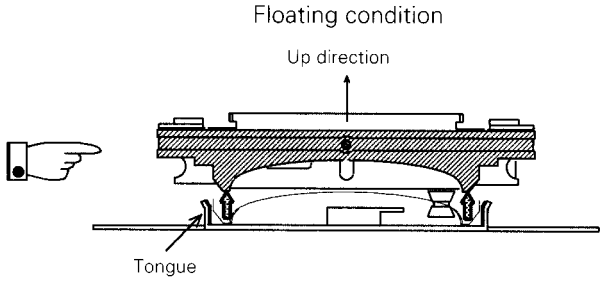
After the completion of loading, as the slider continues movement, the pin also moves together with the slider and separates from the groove on the bottom panel chassis, thereby releasing the locking.



(4) Restriction by lever arm and bottom panel chassis

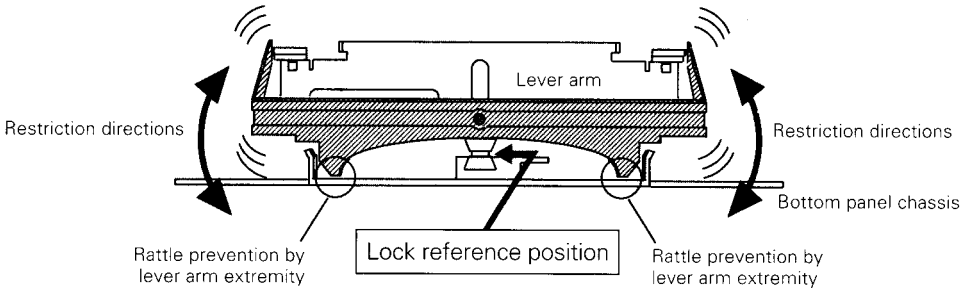
The restriction in the left/right directions on the rear is provided by the lever arm and a tongue on the bottom panel chassis.





After the disc has been loaded, the lever arm is separated from the tongue on the bottom panel chassis by moving upward.

The lock pin inside the mechanism assy is located at the almost center position and locked with the bottom panel chassis. As a result, it would not be possible to prevent the mechanism from rattling by using only the lock pin.
To prevent rattling, two points on the extremities of the lever arm come in contact with the bottom panel chassis in the mechanism lock condition.



MECHANISM OPERATION DESCRIPTION

[2] Floating position

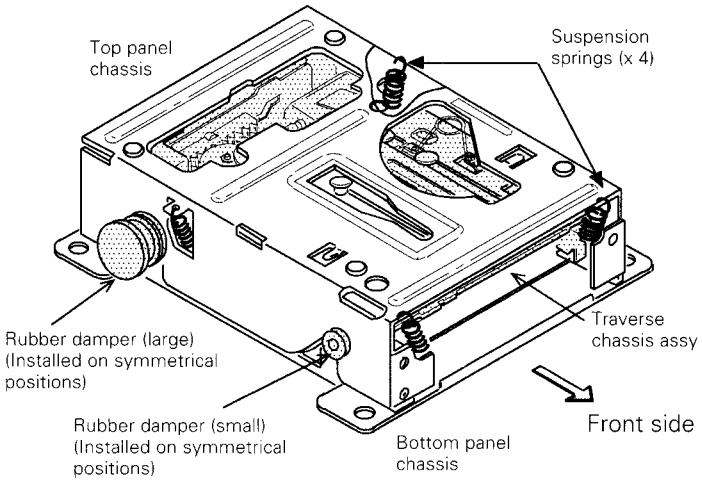
When the mechanism locking (initial position) is released as described in [1] above, the mechanism enters the floating condition as described below.

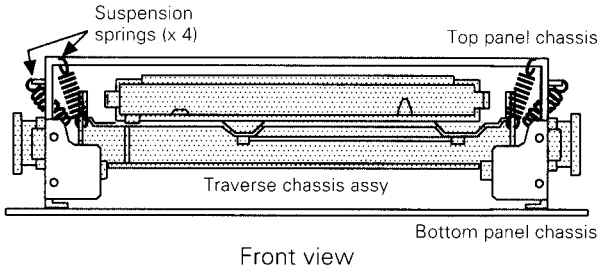
(1) Traverse chassis suspension by springs

The traverse chassis is suspended from the top panel chassis by means of 4 springs.

(2) Traverse chassis retention by damper

Two kinds of rubber damper pairs are attached on the symmetrical positions on the left and right of the traverse chassis. The top panel chassis and bottom panel chassis fix these rubber dampers by sandwiching them in order to retain the traverse chassis.



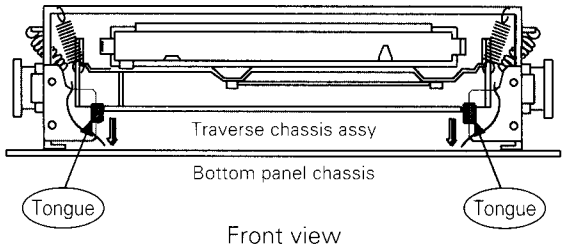


Front view

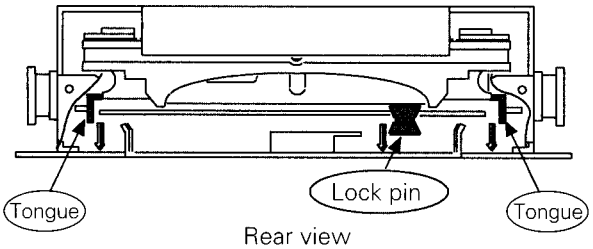
(3) Floating stroke

To prevent the mechanism damage due to vibrations of and impact to the vehicle when the traverse chassis is in the floating condition, it is required to install stoppers.
The distance from the traverse chassis to the stoppers, that is, the range where the traverse chassis can move freely is referred to as the floating stroke.
The stoppers are installed in the following locations.

① Downward restriction stoppers
1. Two tongues (bent sections on the damper bracket inside the traverse chassis) on the front.
2. A mechanism lock pin and two tongues (bent sections on the loading gear chassis inside the traverse chassis) on the rear.

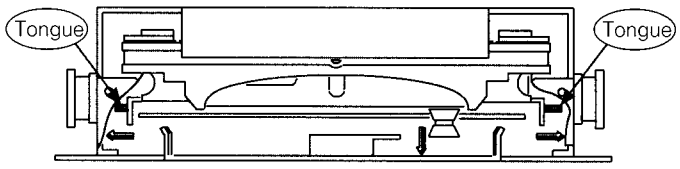


Front view



Rear view

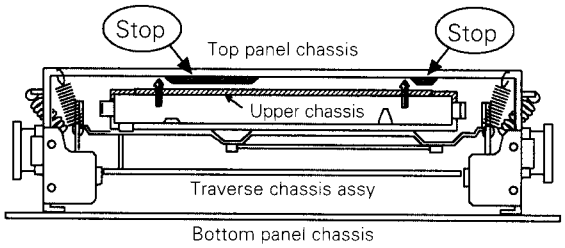
② Left/right direction stoppers
1. Two tongues (bent sections on the loading gear chassis inside the traverse chassis) on the rear.



Rear view

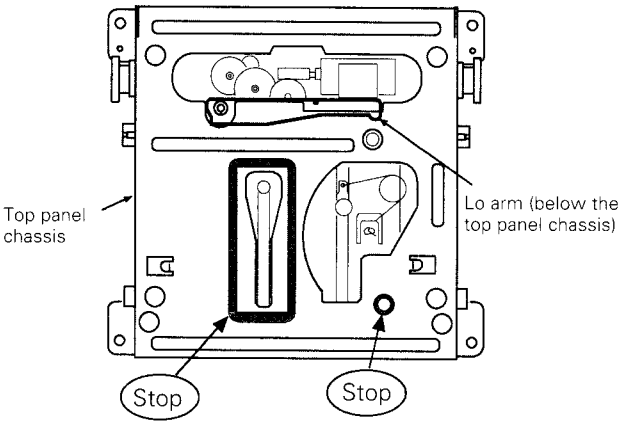
MECHANISM OPERATION DESCRIPTION

③ Upward restriction stoppers (contact between the top panel chassis and upper chassis)
1. Two stops on the top panel chassis.
2. Contact between the top panel chassis and Lo arm.

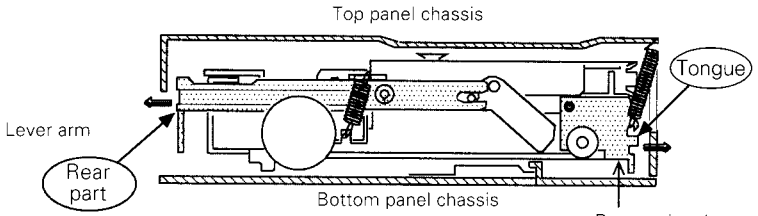


Front view

Top view



④ Front/rear direction stoppers (contact between the front/rear of top panel chassis and traverse chassis)
1. Two tongues (bent sections on the damper bracket inside the traverse chassis) on the traverse chassis.
2. Contact between the top panel chassis and the rear of the lever arm.



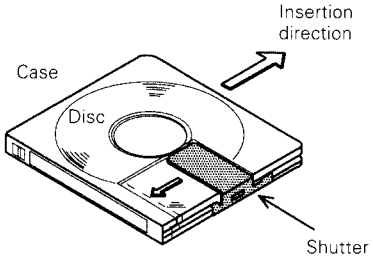
Side view (Cross-section)

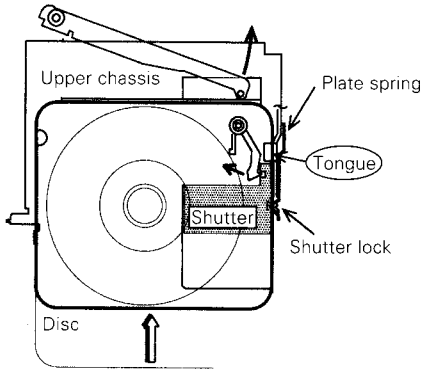
4. Disc Shutter Opening/Closing Structure

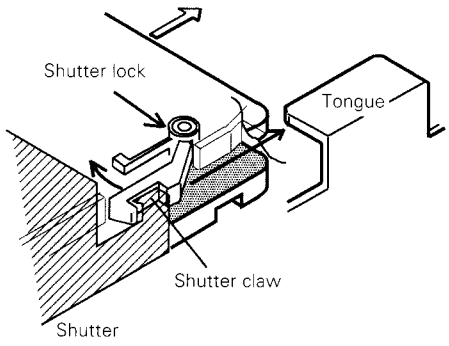
The MD (Mini Disc) is entirely covered with a plastic case to protect the disc itself.
It is usually impossible to touch the disc itself directly, but the disc should be exposed during recording or playback so that the laser beam can scan the disc surface.
The shutter is provided to make this possible. When the disc cartridge is inserted in a recorder/player, the shutter is opened to expose a part of the disc itself.

The shutter is locked by the shutter lock.
The shutter is opened and closed by a plate spring located on the right side inside the upper chassis.

① The retained disc is pulled in by the upper slider (see page 8), and slid inside the upper chassis (see pages 8 and 12). At this time, a tongue on the upper chassis pushes the disc's shutter lock to disengage it claw.

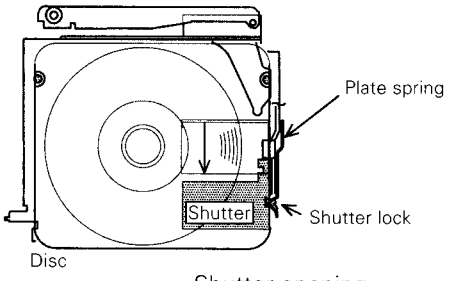




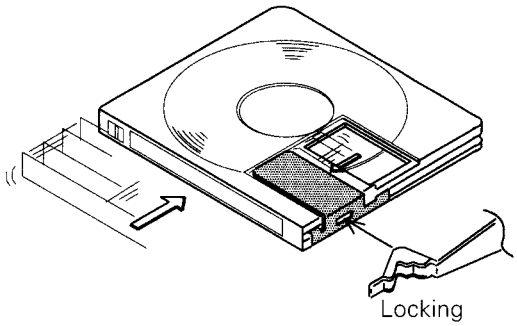


MECHANISM OPERATION DESCRIPTION

② The plate spring on the upper chassis then enters the shutter opening to retain the shutter, and only the disc itself continues to move and opens the shutter.
(The tongue hits the shutter and becomes its stopper, and the shutter is opened.)



Shutter opening

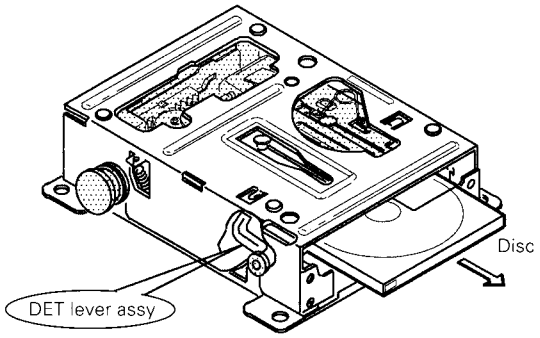


Locking

5. Ejection Detection Mechanism (X92-3780-XX)

In order to enable reloading of a disc after it has been ejected, it is required to detect the position of the disc in the standby condition.
The ejected disc position is detected by the "reload detect switch", which is turned on/off by the DET lever assy.

Standby condition



When the disc is in the standby condition, the detection switch is turned ON by the disc so reloading is possible. (Figure A)

When the disc is taken out, the DET lever assy is separated from the disc, and the reload detect switch is turned OFF, thereby detecting the absence of the disc. (Figure B)

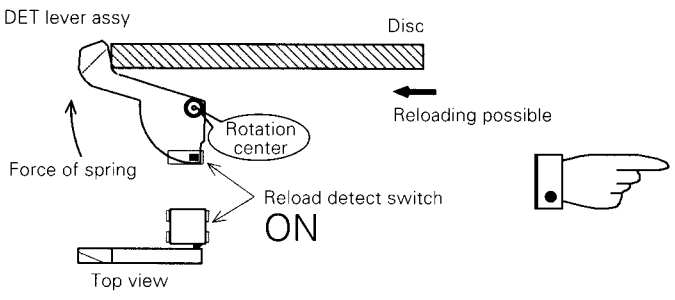


Figure A

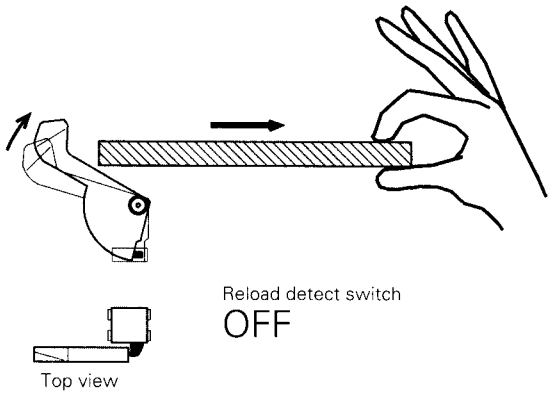
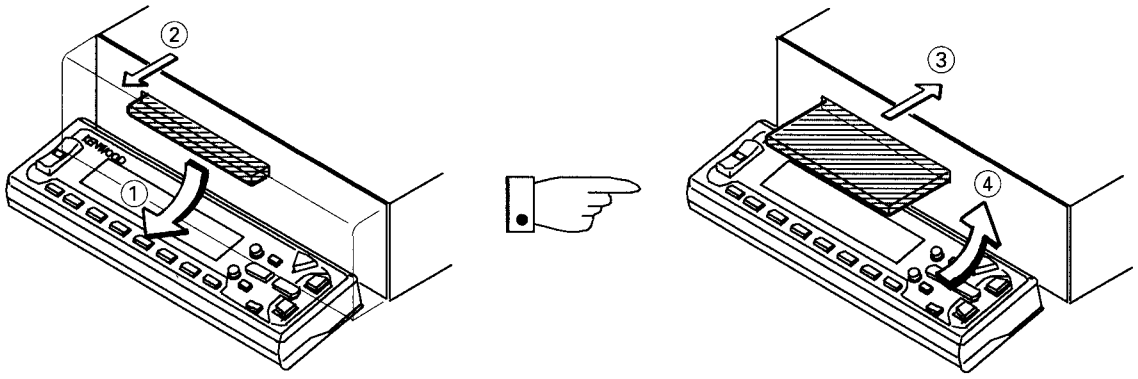


Figure B

This mechanism has been provided for use with main units based on the motorized panel system (including the MASK). It prevents the disc from being caught when the play key or panel close key of the main unit is pressed while the disc is in the standby condition.

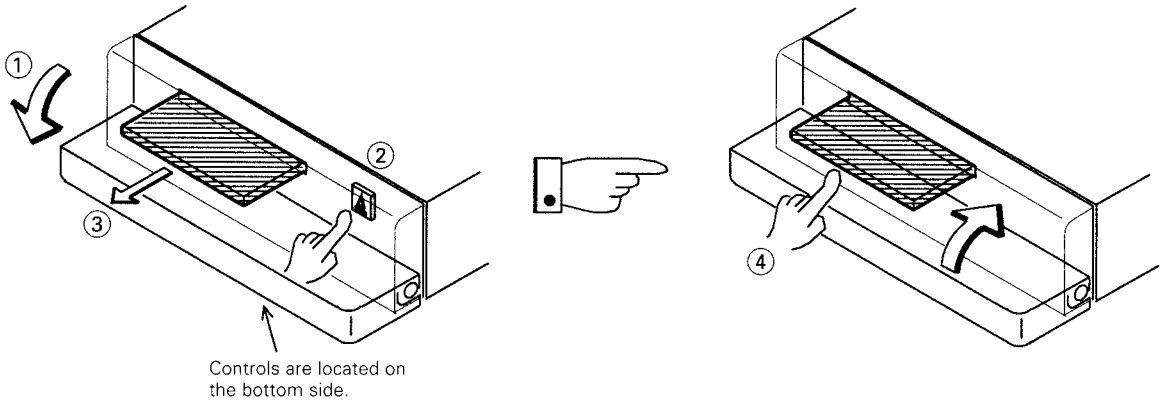
MECHANISM OPERATION DESCRIPTION

(1) Motorized panel system (System using the DET lever assy and reload detect switch)



① The panel opens (slides toward the front).
② The disc is ejected (until the standby condition).
③ When the user presses the panel close key or play key, the standby condition of the disc is detected and the disc is pulled in for reloading.
④ The panel closes.

(2) Flip-down panel system (System without the DET lever assy and reload detect switch)



① The user opens the front panel.
② The user presses the disc eject key.
③ The disc is ejected. (Standby condition)
④ The user changes the disc and pushes it in (or reloads the same disc).
⑤ The user closes the front panel.

[In case of a flip-down panel system]
When the disc is in the standby condition, the user should inevitably push in the disc before any other operation. This makes the ejection detection mechanism unnecessary.

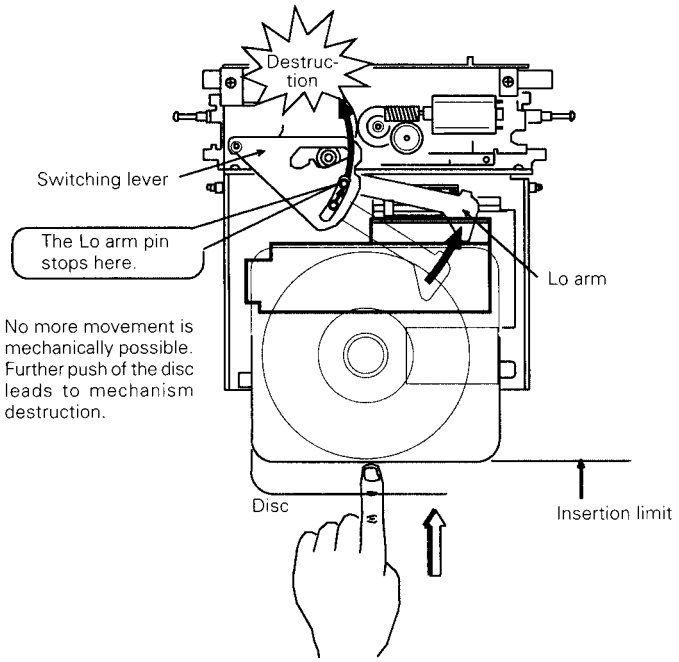
MECHANISM OPERATION DESCRIPTION

6. Disc Ejection at Power OFF

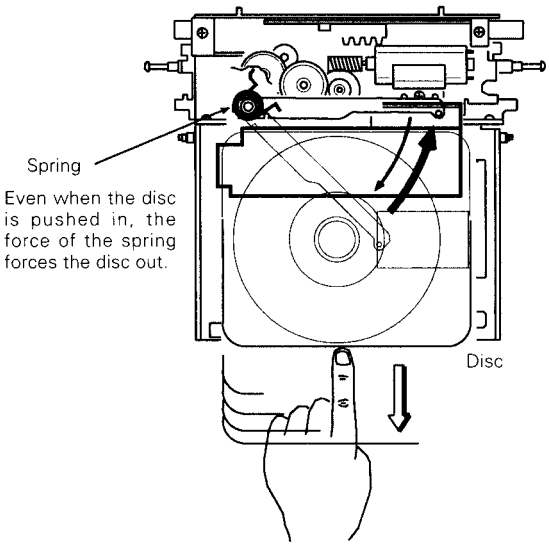
With the mechanism used with the previous M505 type models, there has been a trouble in which, when a disc is pushed in while the main unit is off, the inserted disc is stopped in the middle and further push of the disc caused the mechanism destruction due to the stress applied to the switch lever which is directly coupled with the Lo arm. (After the start of mass-production, this trouble has been treated by an electrical method so that the power is turned on and disc is pulled in when a disc is inserted while the main unit power is off).

With the present mechanism, the mechanism destruction when an inserted disc is pushed in entirely while the main unit is off is prevented by forcing the disc out with the mechanical springing back of the Lo arm.

M505 type

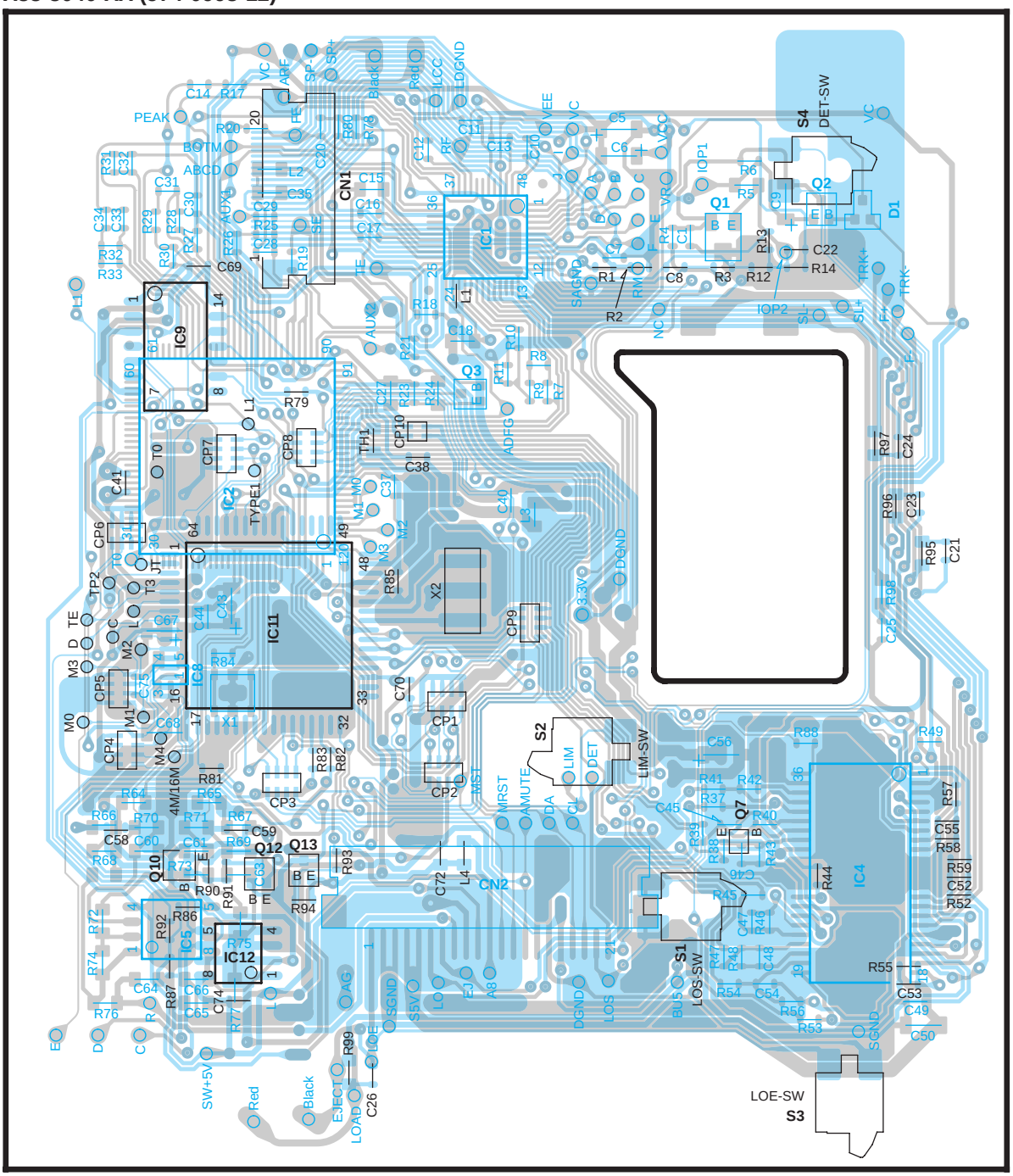


MDS-2200



PC BOARD (COMPONENT SIDE VIEW)

X33-3040-XX (J74-0998-12)



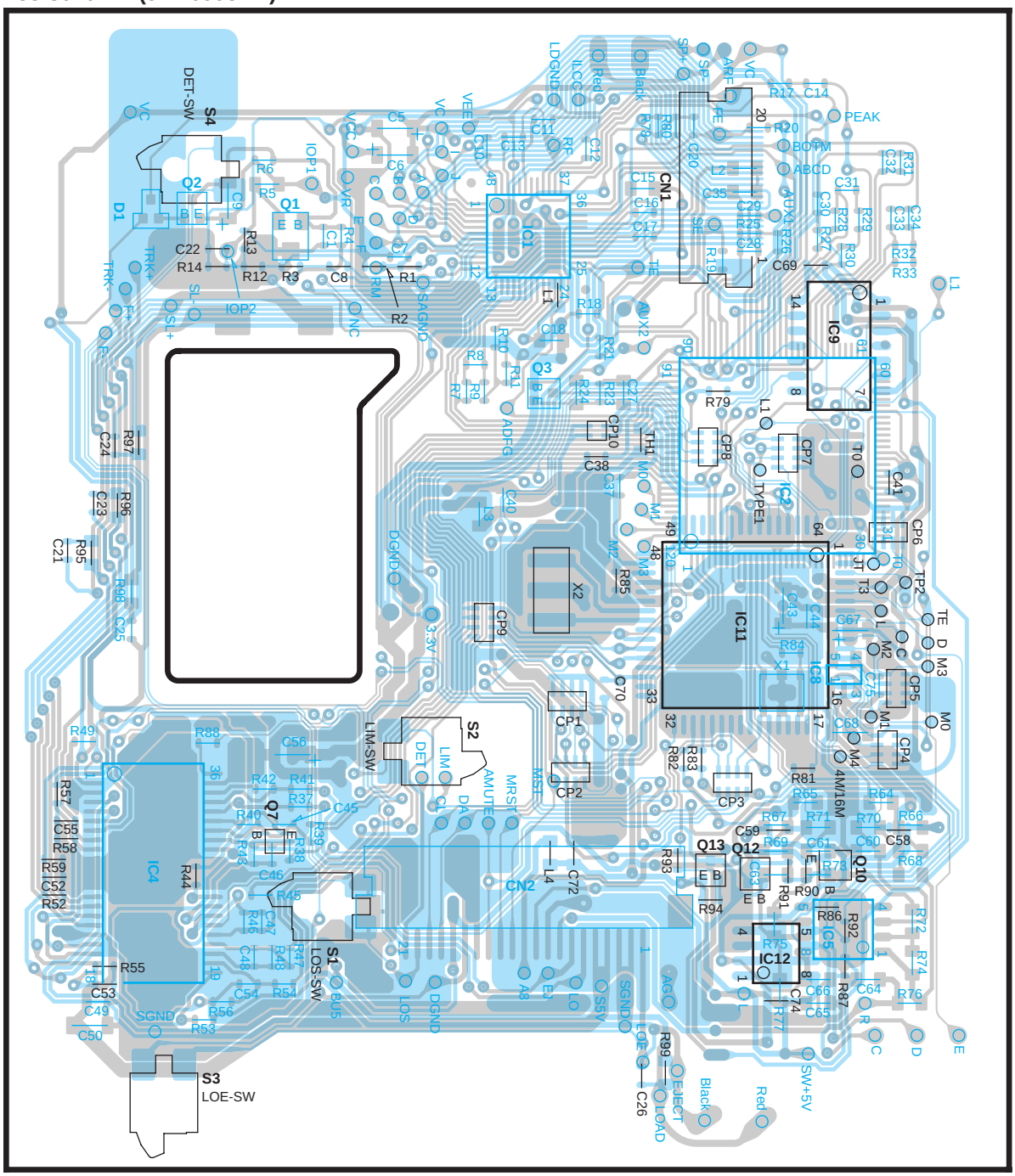
(X33-3040-00/0-01)

Ref. No.	IC1	IC2	IC4	IC5	IC8	IC9	IC11	IC12
Address	2C	3B	5E	5B	4B	3B	4B	5B
Ref. No.	Q1	Q2	Q3	Q7	Q10	Q12	Q13	
Address	2D	2D	3C	5D	5B	5B	5B	

Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD (FOIL SIDE VIEW)

X33-3040-XX (J74-0998-12)



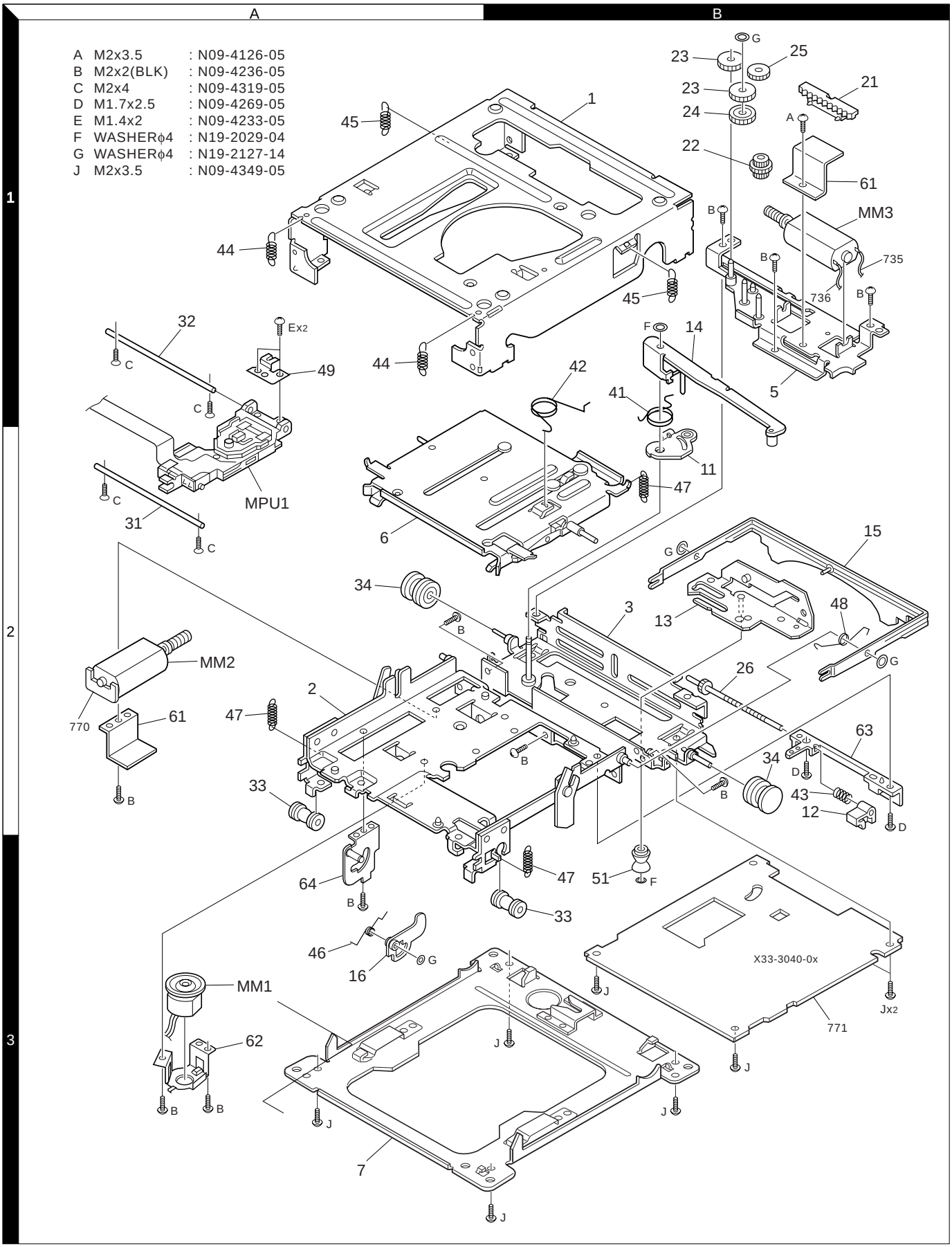
(X33-3040-00/0-01)

Ref. No.	IC1	IC2	IC4	IC5	IC8	IC9	IC11	IC12
Address	2H	3I	5G	5I	4I	3I	4I	5I
Ref. No.	Q1	Q2	Q3	Q7	Q10	Q12	Q13	
Address	2G	2G	3H	5G	5I	5I	5I	

Refer to the schematic diagram for the values of resistors and capacitors.

EXPLODED VIEW

A	M2x3.5	: N09-4126-05
B	M2x2(BLK)	: N09-4236-05
C	M2x4	: N09-4319-05
D	M1.7x2.5	: N09-4269-05
E	M1.4x2	: N09-4233-05
F	WASHERϕ4	: N19-2029-04
G	WASHERϕ4	: N19-2127-14
J	M2x3.5	: N09-4349-05



Parts with the exploded numbers larger than 700 are not supplied.

MODEL NAME	DESTINATION	S4	MODEL No.
MDS-2200	0-00	YES	X92-3770-00
MDS-2201			X92-3770-01
MDS-2210	0-01	NO	X92-3780-00
MDS-2211			X92-3780-01

IC1 : CXA2523AR
IC2 : CXD2659R
IC4 : LA6552
IC5 : NJM4565MD
IC8 : LP2982-3.3
IC9 : TC74HCT7007AF
IC11 : 78015FYGC-R08
IC12 : S-24C01B

Q1 : 2SB1295 or 2SA1362(Y)
Q2 : DTA114EUA or KRA302
Q3 : 2SC4116(Y)
Q7 : MCH6101
Q10,13 : 2SA1576A or KTA2014(Y,GR)
Q12 : DTC143EUA or KRC401

D1 : KDS121 or DAN202U

SIGNAL LINE
+ B LINE

(X33-3040-XX)

PU1 (X92-)

IC1 RF AMP

IC2 SIGNAL PROCESSOR

IC4 SERVO DRIVER

IC5 (1/2)

IC5 (2/2)

IC8 3.3V AVR

IC9 BUFFER

IC11 CONTROLLER

IC12 MEMORY

Q3 DISC REFLECT LEVEL DETECTOR

8V SW

5V SW

+3.3V AVR

L.P.F.

DET-SW
LOS-SW
LIM-SW
LOE-SW

MSCL
MSDA
BUSV
DGND
DGND
AMUTE
MRST
MSTOP
A8V
LCH
AGND
RCH
EJECT
LOAD
S5V
S5V
SGND
SGND
LOE-SW

M1 SPINDLE MOTOR
M2 SLED MOTOR
M3 LOADING MOTOR

2SA1362
2SA1576A
2SC4116

2SC4081

NJM4565MD

DAN202U

X33-3040

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refor to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to tha customer.

•DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.

X92-3770-00/0-01
X92-3780-00/0-01

KENWOOD

PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohane Parts No. werden nicht geliefert.

Ref. No.	Add	New	Parts No.	Description			Destination
MD UNIT (X33-3040-00/01)							
C1			CK73GB1H102K	CHIP C	1000PF	K	
C5 ,6			C92-0628-05	CHIP-TAN	10UF	10WV	
C7			CK73GB1H103K	CHIP C	0.010UF	K	
C8			CK73GB1E223K	CHIP C	0.022UF	K	
C9			C92-0628-05	CHIP-TAN	10UF	10WV	
C10			CK73GB1C104K	CHIP C	0.10UF	K	
C11			CK73GB1H103K	CHIP C	0.010UF	K	
C12			CK73GB1C104K	CHIP C	0.10UF	K	
C13			CK73GB1E223K	CHIP C	0.022UF	K	
C14			CK73GB1H472K	CHIP C	4700PF	K	
C15 ,21			CK73EB1C105K	CHIP C	1.0UF	K	
C16			CK73GB1H472K	CHIP C	4700PF	K	
C17			CK73FB1C224K	CHIP C	0.22UF	K	
C18			CK73FF1A475Z	CHIP C	4.7UF	Z	
C20			CK73GB1C104K	CHIP C	0.10UF	K	
C22			CK73GB1H103K	CHIP C	0.010UF	K	
C23 -27			CK73EB1C105K	CHIP C	1.0UF	K	
C28			CK73GB1C104K	CHIP C	0.10UF	K	
C29			CK73GB1H103K	CHIP C	0.010UF	K	
C30			CK73GB1E153K	CHIP C	0.015UF	K	
C31			CK73FB1C474K	CHIP C	0.47UF	K	
C32			CC73GCH1H101J	CHIP C	100PF	J	
C33			CK73FB1C474K	CHIP C	0.47UF	K	
C34			CK73GB1H103K	CHIP C	0.010UF	K	
C35			CK73FF1A475Z	CHIP C	4.7UF	Z	
C37			CK73GB1C104K	CHIP C	0.10UF	K	
C38			CK73GB1H103K	CHIP C	0.010UF	K	
C40			CK73FF1A475Z	CHIP C	4.7UF	Z	
C41 ,42			CK73GB1C104K	CHIP C	0.10UF	K	
C43			C92-0628-05	CHIP-TAN	10UF	10WV	
C44			CK73GB1H103K	CHIP C	0.010UF	K	
C45 -48			CK73GB1E223K	CHIP C	0.022UF	K	
C49			CK73GB1H103K	CHIP C	0.010UF	K	
C50			C93-1099-05	CERAMIC	10UF	K	
C51			C92-0628-05	CHIP-TAN	10UF	10WV	
C52 -55			CK73GB1H222K	CHIP C	2200PF	K	
C56			C92-0628-05	CHIP-TAN	10UF	10WV	
C58 ,59			CK73GB1H101J	CHIP C	100PF	J	
C60 ,61			CK73FB1H102K	CHIP C	1000PF	K	
C62 ,63			CC73FCH1H821J	CHIP C	820PF	J	
C64 ,65			C93-1044-05	CERAMIC	2200PF	K	
C66			CK73FB1C104K	CHIP C	0.10UF	K	
C67			C92-0628-05	CHIP-TAN	10UF	10WV	
C68			CK73EB1C105K	CHIP C	1.0UF	K	
C69 ,70			CK73GB1C104K	CHIP C	0.10UF	K	
C72			CK73FF1A475Z	CHIP C	4.7UF	Z	
C74			CK73GB1C104K	CHIP C	0.10UF	K	
C75			CK73GB1H103K	CHIP C	0.010UF	K	
CN1			E40-9521-05	FLAT CABLE CONNECTOR			
CN2			E40-5499-05	FLAT CABLE CONNECTOR			
L1 -4			L92-0322-05	CHIP FERRITE			
X1			L78-0594-05	RESONATOR (22.58MHZ)			

Ref. No.	Add	New	Parts No.	Description			Destination
X2			L78-0571-05	RESONATOR (8.388MHZ)			
CP1			R90-0722-05	MULTI-COMP	2.2K X4		
CP2			R90-0724-05	MULTI-COMP	1K X4		
CP3 ,8			R90-1014-05	MULTI-COMP	100 X4		
CP4 -7			R90-0720-05	MULTI-COMP	100K X4		
CP9			R90-0720-05	MULTI-COMP	100K X4		
CP10			R90-0726-05	MULTI-COMP	10K X2		
R1			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R2 ,3			RK73GB1J474J	CHIP R	470K	J 1/16W	
R4			RK73GB1J151J	CHIP R	150	J 1/16W	
R5			RK73FB2A4R7J	CHIP R	4.7	J 1/10W	
R6			RK73GB1J104J	CHIP R	100K	J 1/16W	
R7			RK73GB1J103J	CHIP R	10K	J 1/16W	
R8			RK73GB1J913J	CHIP R	91K	J 1/16W	
R9 -11			RK73GB1J133J	CHIP R	13K	J 1/16W	
R12			RK73GB1J222J	CHIP R	2.2K	J 1/16W	
R13			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R14			RK73GB1J161J	CHIP R	160	J 1/16W	
R17			RK73GB1J101J	CHIP R	100	J 1/16W	
R18			RK73GB1J563J	CHIP R	56K	J 1/16W	
R19			RK73GB1J101J	CHIP R	100	J 1/16W	
R20			RK73GB1J331J	CHIP R	330	J 1/16W	
R21			RK73GB1J681J	CHIP R	680	J 1/16W	
R23			RK73GB1J394J	CHIP R	390K	J 1/16W	
R24			RK73FB2A681J	CHIP R	680	J 1/10W	
R25			RK73GB1J103J	CHIP R	10K	J 1/16W	
R26			RK73GB1J101J	CHIP R	100	J 1/16W	
R27			RK73GB1J151J	CHIP R	150	J 1/16W	
R28 ,29			RK73GB1J102J	CHIP R	1.0K	J 1/16W	
R30			RK73GB1J332J	CHIP R	3.3K	J 1/16W	
R31			RK73GB1J684J	CHIP R	680K	J 1/16W	
R32			RK73GB1J104J	CHIP R	100K	J 1/16W	
R33 -35			RK73GB1J103J	CHIP R	10K	J 1/16W	
R37			RK73GB1J363J	CHIP R	36K	J 1/16W	
R38 ,39			RK73GB1J133J	CHIP R	13K	J 1/16W	
R40 ,43			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R41			RK73GB1J363J	CHIP R	36K	J 1/16W	
R42 ,44			RK73GB1J912J	CHIP R	9.1K	J 1/16W	
R45			RK73GB1J153J	CHIP R	15K	J 1/16W	
R46			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R47			RK73GB1J153J	CHIP R	15K	J 1/16W	
R48 ,49			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R50			RK73GB1J102J	CHIP R	1.0K	J 1/16W	
R51			RK73GB1J473J	CHIP R	47K	J 1/16W	
R52			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R53 ,54			RK73GB1J183J	CHIP R	18K	J 1/16W	
R55 ,56			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R57			RK73GB1J183J	CHIP R	18K	J 1/16W	
R58			RK73GB1J472J	CHIP R	4.7K	J 1/16W	
R59			RK73GB1J183J	CHIP R	18K	J 1/16W	
R60			RK73GB1J151J	CHIP R	150	J 1/16W	
R61 ,62			RK73GB1J822J	CHIP R	8.2K	J 1/16W	
R63			RK73GB1J103J	CHIP R	10K	J 1/16W	
R64 ,65			RK73FB2A222J	CHIP R	2.2K	J 1/10W	

A : X92-3770-00 **B** : X92-3770-01 **C** : X92-3780-00 **D** : X92-3780-01

⚠ indicates safety critical components.

PARTS LIST

∗ **New Parts**
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohane Parts No. werden nicht geliefert. **(X33-3040-XX)**

Ref. No.	Add	New	Parts No.	Description	Destination
R66 ,67			RK73FB2A243J	CHIP R 24K J 1/10W	
R68 ,69			RK73FB2A272J	CHIP R 2.7K J 1/10W	
R70 ,71			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R72 -75			RK73FB2A103J	CHIP R 10K J 1/10W	
R76 ,77			RK73FB2A681J	CHIP R 680 J 1/10W	
R78 ,79			RK73GB1J473J	CHIP R 47K J 1/16W	
R80			RK73GB1J333J	CHIP R 33K J 1/16W	
R81			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R82 ,83			RK73GB1J101J	CHIP R 100 J 1/16W	
R84			RK73GB1J221J	CHIP R 220 J 1/16W	
R85			RK73GB1J103J	CHIP R 10K J 1/16W	
R86 -88			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R90			RK73GB1J103J	CHIP R 10K J 1/16W	
R91 ,92			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R93			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R94			RK73GB1J103J	CHIP R 10K J 1/16W	
R95 -99			RK73FB2A100J	CHIP R 10 J 1/10W	
R107			RK73GB1J472J	CHIP R 4.7K J 1/16W	
W5			R92-2053-05	CHIP R 0 J 1/8W	
W7 -10			R92-2053-05	CHIP R 0 J 1/8W	
S1 -3			S68-0838-05	PUSH SWITCH	AB
S1 -4			S68-0838-05	PUSH SWITCH	CD
D1 ,2			DAN202U	DIODE	
D1 ,2			KDS121	DIODE	
D3			1SR154-400	DIODE	
D4 ,5			DAN202U	DIODE	
D4 ,5			KDS121	DIODE	
IC1			CXA2523AR	ANALOGUE IC	
IC2			CXD2659R	MOS-IC	
IC4			LA6552	ANALOGUE IC	
IC5			NJM4565MD	IC(OP AMP X2)	
IC8			LP2982-3.3	ANALOGUE IC	
IC9			TC74HCT7007AF	MOS-IC	
IC11		∗	78015FYGC-R08	MI-COM IC	
IC12			S-24C01B	MEMORY IC	
Q1			2SA1362(Y)	TRANSISTOR	
Q2			DTA114EUA	DIGITAL TRANSISTOR	
Q3			2SC4116(Y)	TRANSISTOR	
Q7			2SB1188	TRANSISTOR	
Q10			2SA1576A	TRANSISTOR	
Q11 ,12			DTC143EUA	DIGITAL TRANSISTOR	
Q13			2SA1576A	TRANSISTOR	
TH1			NT732ATD33KJ	THERMISTOR	

Ref. No.	Add	New	Parts No.	Description	Destination
MD MECHANISM (X92-3770/3780)					
1	1B		A10-4480-01	CHASSIS (TOP CHASSIS)	
2	2A		A10-4485-03	CHASSIS CALKING ASSY (TR CALK.)	
3	2B		A10-4486-03	CHASSIS CALKING ASSY (LO CALK.)	
5	1B		A10-4488-04	CHASSIS CALKING ASSY (UPPER)	
6	2A		A10-4489-23	CHASSIS ASSY (UPPER CHASSIS)	
7	3A		A10-4491-23	CHASSIS CALKING ASSY (LOWER)	
11	2B		D10-4278-14	LEVER (LO LEVER)	
12	2B		D10-4283-04	LEVER (SW LEVER)	
13	2B		D10-4288-14	SLIDER ASSY (CAM SLIDER)	
14	1B		D10-4290-04	ARM ASSY (LO ARM)	
15	2B		D10-4291-14	ARM ASSY (LEVER ARM)	
16	3A		D10-4331-03	LEVER (DET SW LEVER)	CD
21	1B		D13-1433-03	RACK (GEAR)	
22	1B		D13-1434-04	GEAR (LO HELICAL)	
23	1B		D13-1435-04	GEAR (LO GEAR 1)	
24	1B		D13-1436-04	GEAR (LO GEAR 2)	
25	1B		D13-1437-04	GEAR (LO GEAR 3)	
26	2B		D13-1443-04	GEAR ASSY (LEAD SCREW)	
31	2A		D21-2296-04	SHAFT (PU GAIDE PIN F)	
32	1A		D21-2297-04	SHAFT (PU GAIDE PIN R)	
33	2A		D39-0235-04	DAMPER (AIR DAMPER)	
34	2A		D39-0236-04	DAMPER (OIL DAMPER)	
41	1B		G01-2914-04	TORSION COIL SPRING (LO ARM)	
42	1B		G01-2915-04	TORSION COIL SPRING (LOCK)	
43	2B		G01-2917-04	COMPRESSION SPRING (SW)	
44	1A		G01-2918-04	EXTENSION SPRING (F SUSPENSION)	
45	1A		G01-2919-04	EXTENSION SPRING (R SUSPENSION)	
46	3A		G01-2935-04	TORSION COIL SPRING (DET)	CD
47	2A		G01-2948-14	EXTENSION SPRING	
48	2B		G01-2964-04	TORSION COIL SPRING	
49	1A		G02-1298-03	FLAT SPRING (LEAD)	
-			H25-1103-04	PROTECTION BAG (200X250X0.05)	
51	3B		J12-1022-04	PIN (CHASSIS LOCK PIN)	
61	1B		J19-4866-04	HOLDER (MOTOR HOLDER)	
62	3A		J19-4867-03	HOLDER (SPINDLE MOUNT)	
63	2B		J19-4868-03	HOLDER (SCREW HOLDER)	
64	3A		J19-4901-04	HOLDER ASSY (HOLDER CALKIG)	CD
A	3A		N09-4126-05	MACHINE SCREW (2X3.5,C TIGHT)	
B	1B		N09-4236-05	MACHINE SCREW (M2X 2)	
C	1A		N09-4319-05	MACHINE SCREW (M2X4)	
D	2B		N09-4269-05	MACHINE SCREW (M1.7X2.5)	
E	1A		N09-4233-05	MACHINE SCREW (M1.4X 2)	
F	1B		N19-2021-04	FLAT WASHER	
G	1B		N19-2127-14	FLAT WASHER	
MM1	3A	∗	T42-0791-14	MOTOR ASSY (SPINDLE MOTOR)	
MM2	2A	∗	T42-0787-14	MOTOR ASSY (SLED MOTOR)	
MM3	1B	∗	T42-0790-14	MOTOR ASSY (LO MOTOR)	
MPU1	2A		T25-0211-05	OPTICAL PICKUP HEAD	

A : X92-3770-00 **B** : X92-3770-01 **C** : X92-3780-00 **D** : X92-3780-01

⚠ indicates safety critical components.