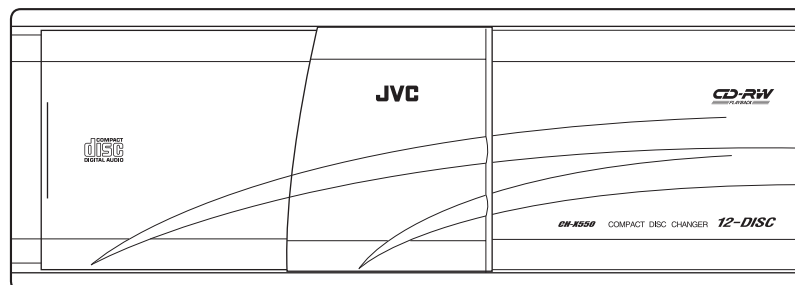


# JVC

# SERVICE MANUAL

## CD CHANGER

## CH-X550



### Area Suffix

E ----- Continental Europe

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## SECTION 1

### Important Safety Precautions

#### 1.1 Safety Precautions



**CAUTION** Burrs formed during molding may be left over on some parts of the chassis. Therefore, pay attention to such burrs in the case of performing repair of this system.



**CAUTION** Please use enough caution not to see the beam directly or touch it in case of an adjustment or operation check.

## 1.2 Preventing static electricity

Electrostatic discharge (ESD), which occurs when static electricity stored in the body, fabric, etc. is discharged, can destroy the laser diode in the traverse unit (optical pickup). Take care to prevent this when performing repairs.

### 1.2.1 Grounding to prevent damage by static electricity

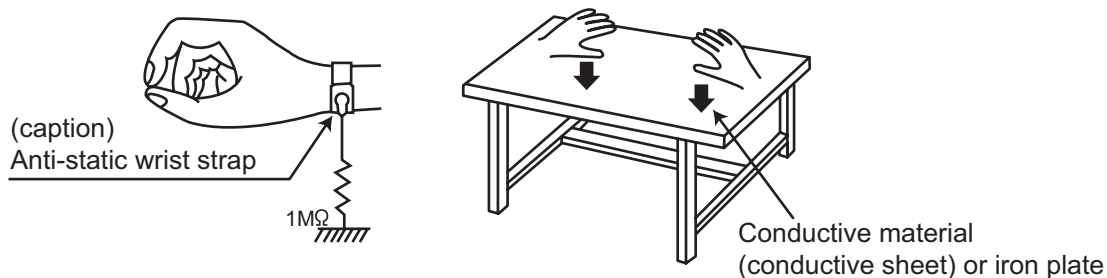
Static electricity in the work area can destroy the optical pickup (laser diode) in devices such as DVD players. Be careful to use proper grounding in the area where repairs are being performed.

(1) Ground the workbench

Ground the workbench by laying conductive material (such as a conductive sheet) or an iron plate over it before placing the traverse unit (optical pickup) on it.

(2) Ground yourself

Use an anti-static wrist strap to release any static electricity built up in your body.



(3) Handling the optical pickup

- In order to maintain quality during transport and before installation, both sides of the laser diode on the replacement optical pickup are shorted. After replacement, return the shorted parts to their original condition. (Refer to the text.)
- Do not use a tester to check the condition of the laser diode in the optical pickup. The tester's internal power source can easily destroy the laser diode.

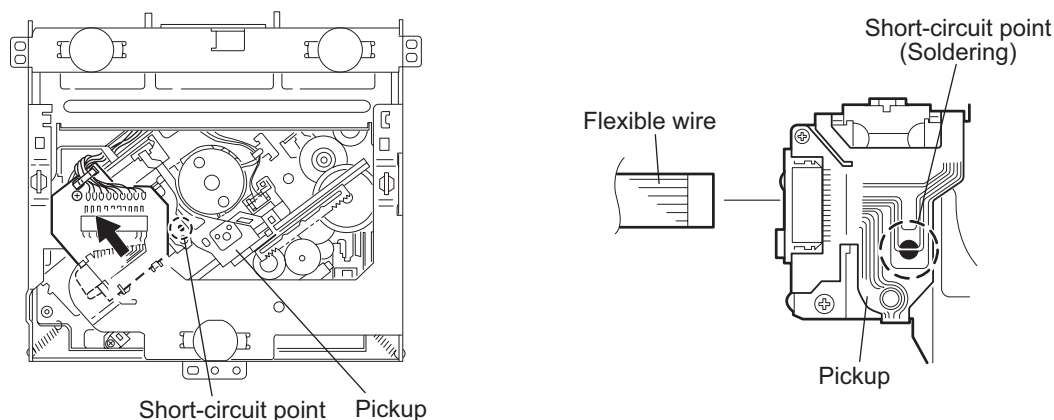
## 1.3 Handling the traverse unit (optical pickup)

- (1) Do not subject the traverse unit (optical pickup) to strong shocks, as it is a sensitive, complex unit.
- (2) Cut off the shorted part of the flexible cable using nippers, etc. after replacing the optical pickup. For specific details, refer to the replacement procedure in the text. Remove the anti-static pin when replacing the traverse unit. Be careful not to take too long a time when attaching it to the connector.
- (3) Handle the flexible cable carefully as it may break when subjected to strong force.
- (4) It is not possible to adjust the semi-fixed resistor that adjusts the laser power. Do not turn it.

## 1.4 Attention when traverse unit is decomposed

**\*Please refer to "Disassembly method" in the text for the CD pickup unit.**

- Apply solder to the short land before the flexible wire is disconnected from the connector on the CD pickup unit. (If the flexible wire is disconnected without applying solder, the CD pickup may be destroyed by static electricity.)
- In the assembly, be sure to remove solder from the short land after connecting the flexible wire.



## SECTION 2

### Disassembly method

#### 2.1 Replacement of the pickup

- (1) After removing the exterior (top and bottom).
- (2) Proceed to the pickup replacement section.
- (3) When applying grease, refer to the exploded view.  
Use new grease.

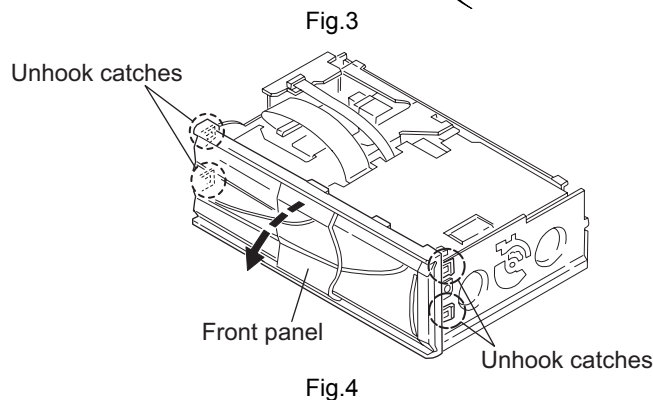
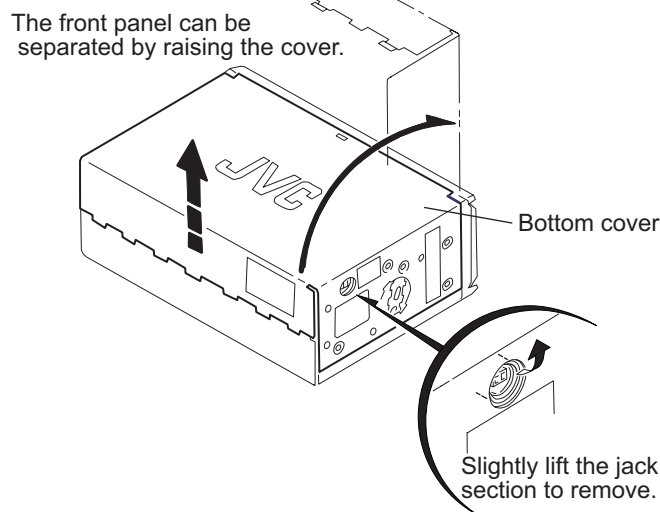
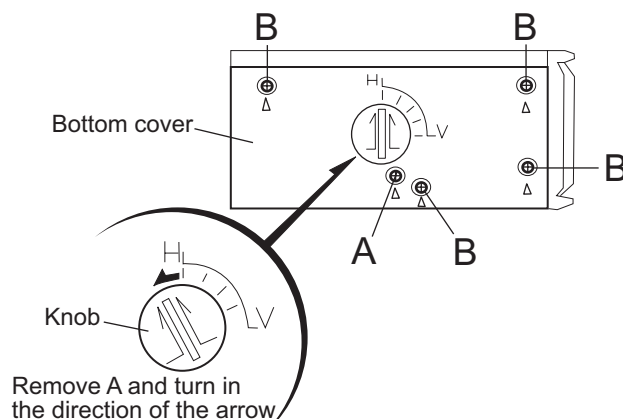
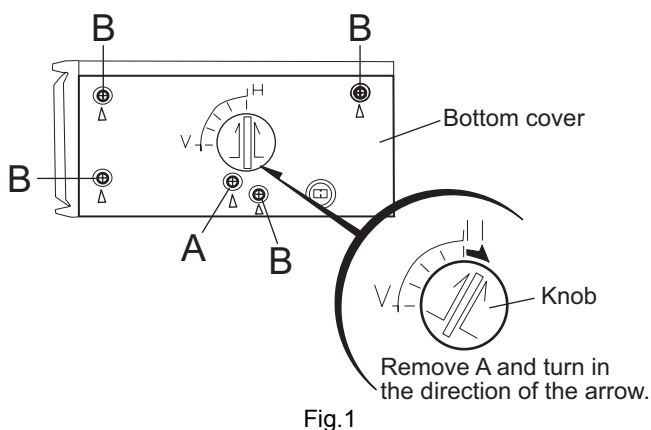
#### 2.2 Mechanism section

- (1) Remove the exterior (required section only).
- (2) The mechanism section is designed so that each unit can be removed separately.
- (3) When reassembling, refer to the assembling precautions  
(Use new grease when applying grease.)

#### 2.3 Exterior section

##### 2.3.1 Removing the bottom cover and front panel assembly (See Fig.1 to 4)

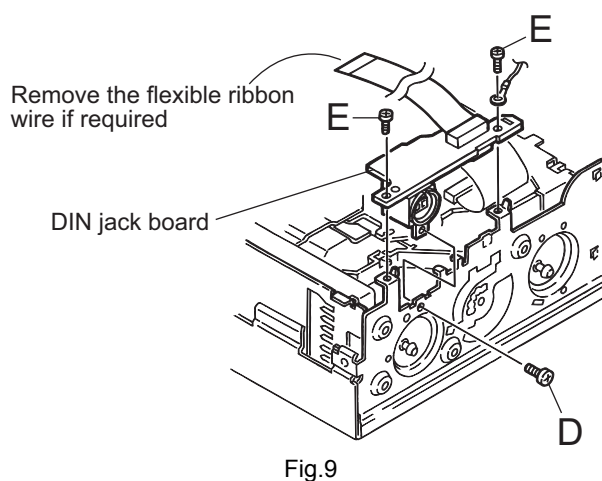
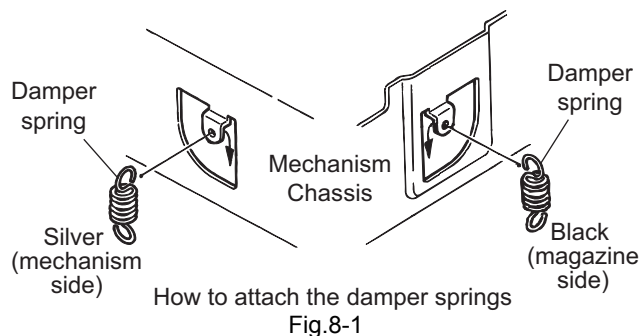
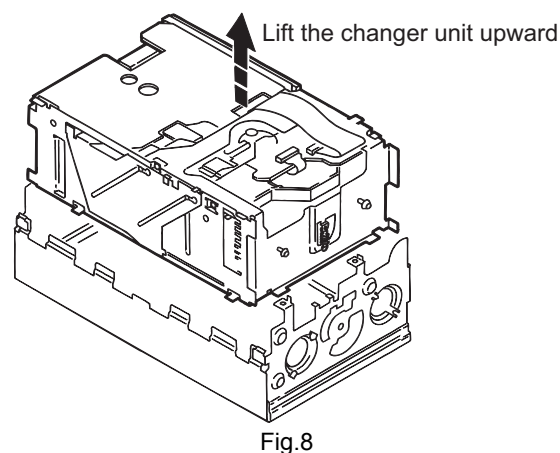
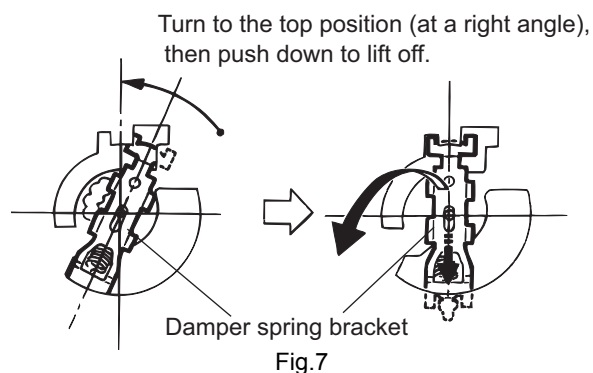
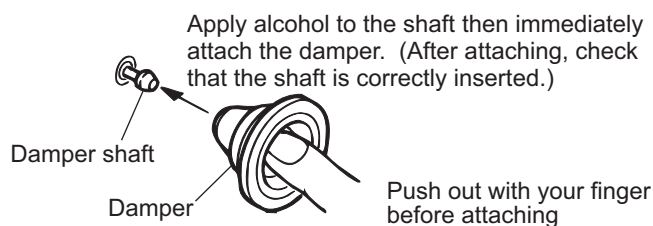
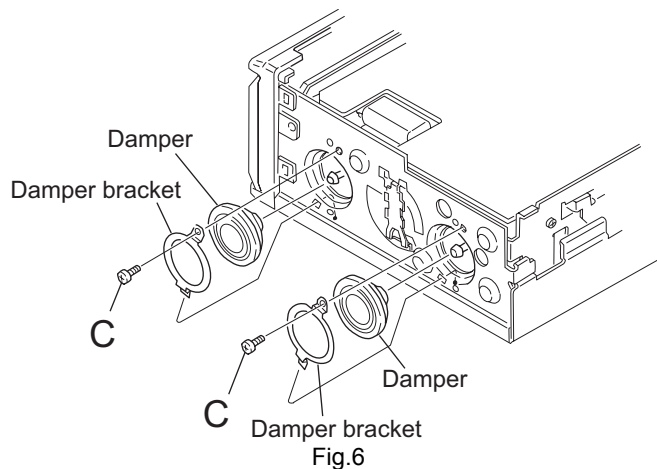
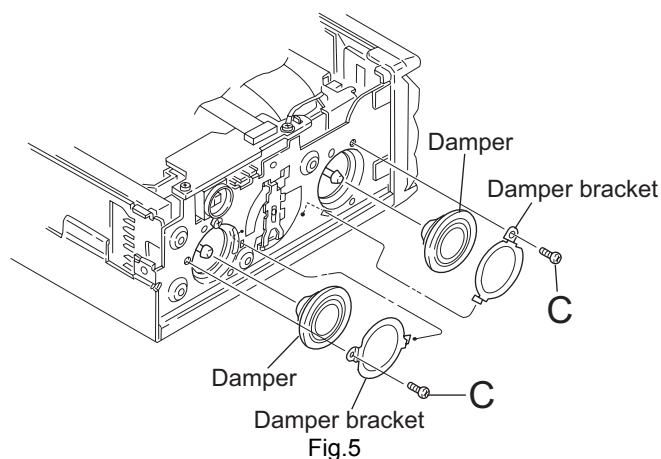
- (1) Remove the two screw **A** to unlock the mounting direction knob located on the side of the main unit.
- (2) Turn the mounting direction knob in the direction of the arrow using a coin, etc. to remove it. (The knob can be removed only when it is set to this position.)
- (3) Remove the four top cover fixing screws **B** at the triangle  $\Delta$  marks on the side of the main unit. (Perform the same operation on both sides.)
- (4) Turn the unit upside down so the bottom surface is facing upward.
- (5) Lift the rear edge of the bottom cover slightly and lift the side by grasping the DIN jack section on the side panel, then turn it toward the front (raise upward) to remove the bottom cover.
- (6) Unhook the four catches located on both sides of the front panel, and turn the front panel toward the top cover (lower down) to remove the front panel.



### 2.3.2 Removing the top cover

(See Fig.5 to 9)

- (1) Remove the four damper bracket fixing screws **C** to remove the damper brackets.
- (2) Pull out the dampers, being careful not to damage them. When reattaching a damper, insert your finger to push out the center of the damper to mount it on the damper shaft, as shown in Fig. 6-1.
- (3) Turn the damper spring bracket toward the top at a right angle as shown in Fig. 7, then push down the lower side of the damper spring bracket to lift it off.
- (4) Remove the three fixing screws **D** and **E** on the DIN jack board assembly.
- (5) Lift the changer unit upward.
- (6) Remove the damper springs from the mechanism chassis if required. To reassemble, refer to the diagram below.



### 2.3.3 Removing the fittings (See Fig.10)

- (1) Remove the fixing screw **F**.
- (2) Unhook the two catches **a** on the top edge of the fitting, then unhook the two catches **b** at the left/right bottom edges.

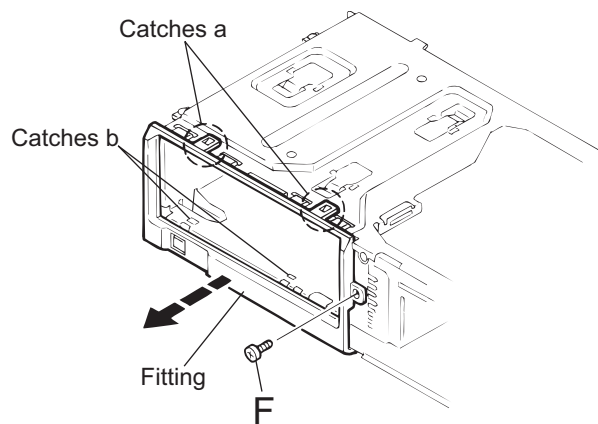


Fig.10

### 2.3.4 Removing the main PCB assembly (See Fig.11)

- (1) Remove the power IC fixing screw **G**.
- (2) Remove the four screws **H** securing the main board assembly.
- (3) Disconnect position motor wire connector CN504 from the main board assembly.
- (4) Disconnect sensor board assembly wire connector CN601 from the main board assembly.
- (5) Remove the flexible ribbon wire from CN502 on the traverse mechanism board assembly. When reinstalling the board boards, refer to the reassembling procedures for protecting switches, etc.

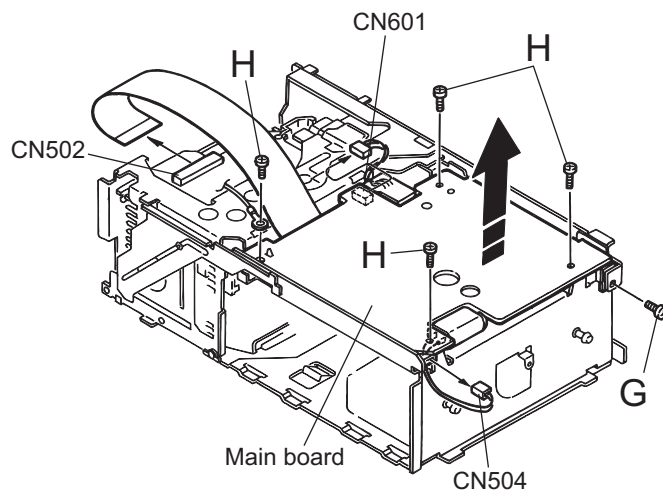


Fig.11

## 2.4 CD mechanism assembly

### 2.4.1 Sensor assembly unit

(See Fig.1)

- (1) Remove the two screws **I** securing the sensor assembly unit.
- (2) Unhook the spring on the back of the sensor assembly unit from the holes on the chassis.

### 2.4.2 Magazine lock arm

(See Fig.1 and 2)

- (1) Remove the magazine lock spring from the front side of the chassis.
- (2) Remove the poly-washer **c** securing the magazine lock arm.
- (3) Turn the magazine lock arm in the direction of the arrow until the notch is at the **d** position to remove it from the chassis.

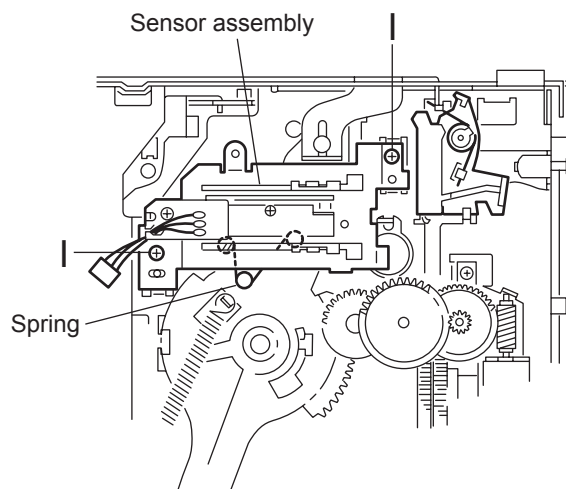


Fig.1

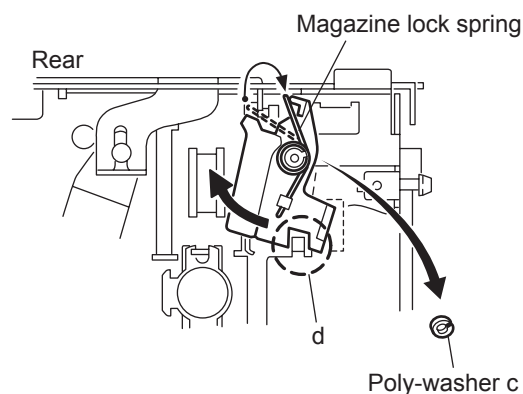


Fig.2

### 2.4.3 Positioning motor assembly

(See Fig.3)

- (1) Remove the two screws **J** securing the positioning motor.
- (2) Slightly lift the positioning motor assembly to remove it from the two burrs on the chassis.

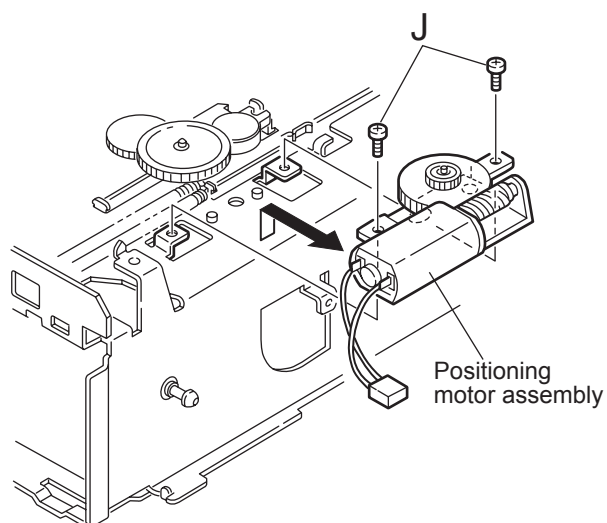


Fig.3

**2.4.4 Rear slider**  
**(See Fig.4)**

- (1) Position the unit with the front section facing down. Rotate the third gear located on the back of the main unit in the direction of the arrow (clockwise).
- (2) Shift the rear slider in the direction of the arrow and remove it at the rear slider mounting position (at the widest hole).

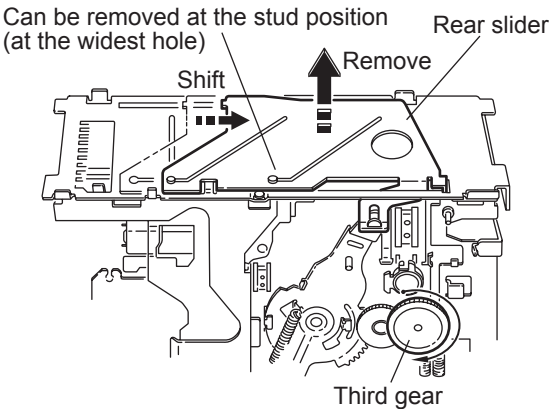


Fig.4

**2.4.5 Front slider**  
**(See Fig.5)**

- (1) Position the unit with the rear section facing down. Rotate the third gear located on the bottom of the unit in the direction of the arrow (clockwise) until the front slider is shifted to the outermost position.
- (2) Remove the E-washer securing the front slider to remove the front slider from the chassis

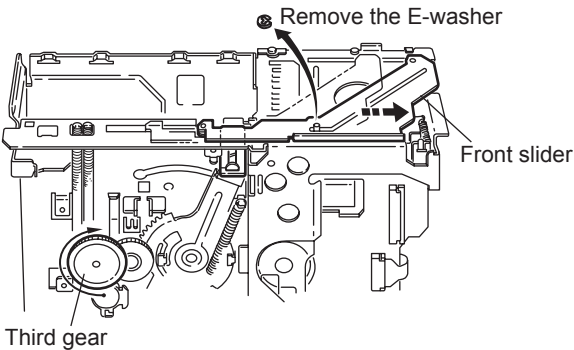


Fig.5

**2.4.6 Top plate**  
**(See Fig.6 and 7)**

- (1) Remove the nine screws **K** securing the top plate.
- (2) Disconnect the section **e** attached to the rear of the unit, then lift the top plate slightly.
- (3) Slide the top plate toward the rear of the unit to remove the upper rod from the top plate.

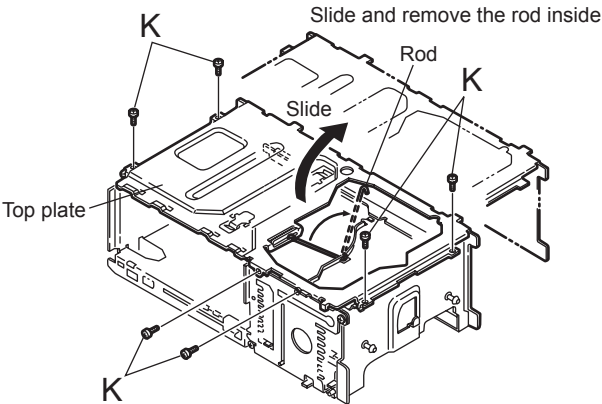


Fig.6

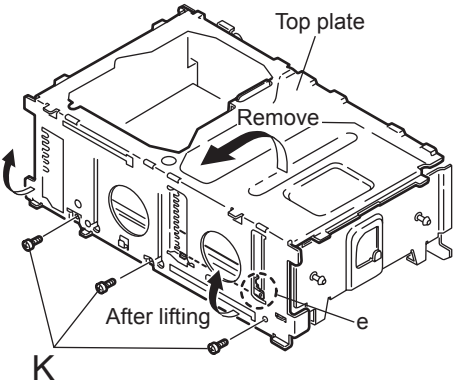


Fig.7



### 2.4.7 Lifter unit (See Fig.8 and 9)

- (1) Unhook the elevator spring located on the front side of the unit. (Be sure to first unhook the spring from the lifter side as shown in the upper part of the diagram.)
- (2) Lift the lifter unit upward, then remove the lower rod to remove the lifter unit from the chassis.

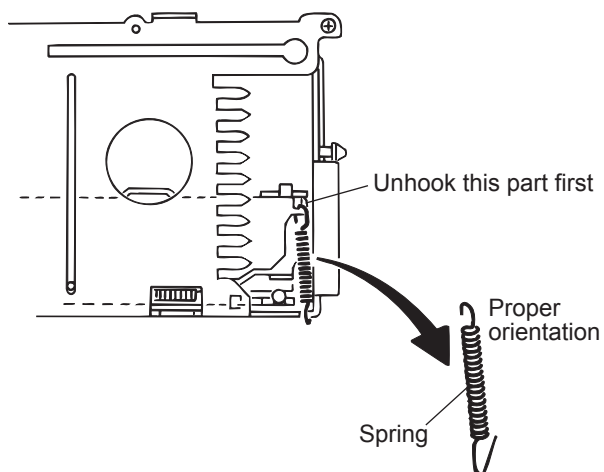


Fig.8

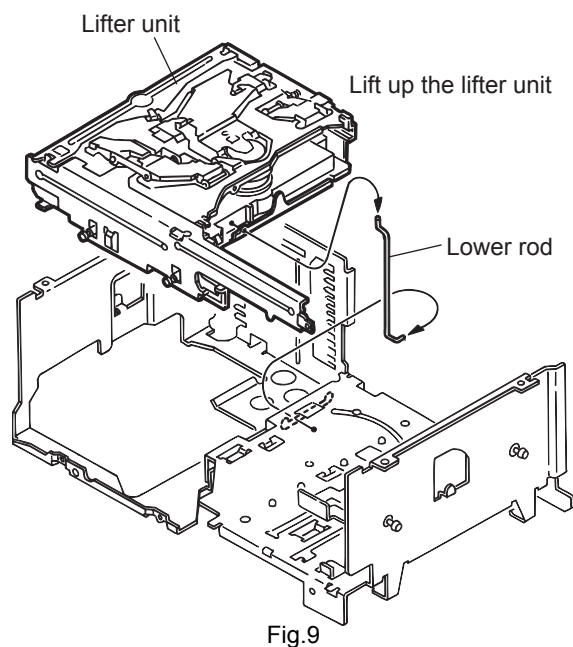


Fig.9

### 2.4.8 Lifter bracket (See Fig.10)

- (1) Remove the two lifter bracket fixing screws **L** located on the back of the lifter unit.
- (2) Remove the lower rod.

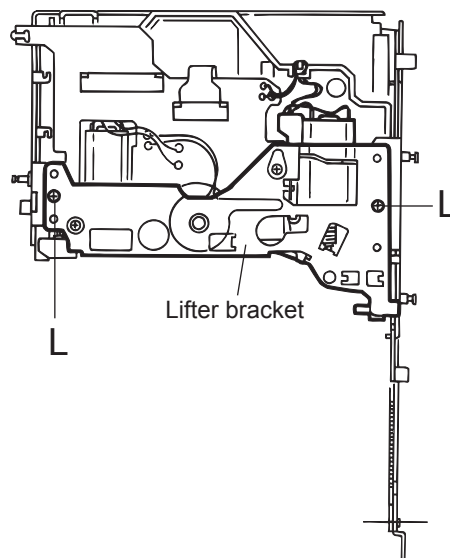


Fig.10

### 2.4.9 Side bracket and traverse mechanism assembly (See Fig.11)

- (1) Remove the two side bracket unit fixing screws **M** to disconnect the side bracket unit from the lifter unit.
- (2) Remove the three shafts on the traverse mechanism assembly from the lifter unit.

#### CAUTION:

For reassembling, refer to the reassembling procedures.

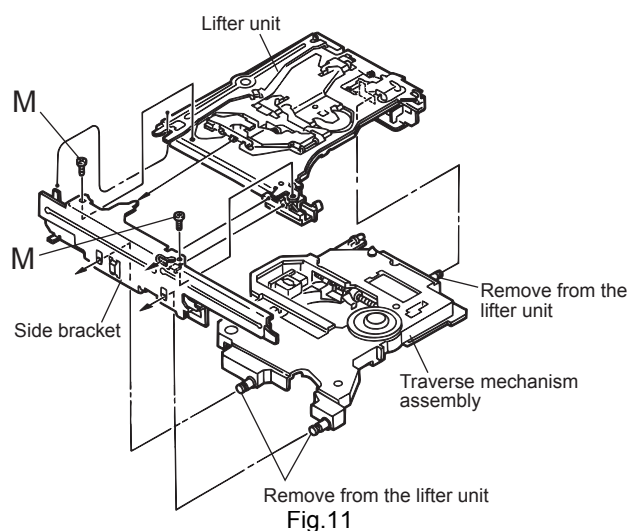


Fig.11

**2.4.10 Removing the mechanism board / pickup assembly**  
(See Fig.12 to 15)

- (1) Remove the three screws **N** fixing the mechanism board on the back of the traverse mechanism.
- (2) Disconnect the two feed motor wires (blue and white), two spindle motor wires (red and black) and two tray motor wires (brown and black) that are soldered to the mechanism board.
- (3) Short-circuit the grounding point on the mechanism board. Move the mechanism board without disconnecting the wire from connector CN501. Solder the short circuit round on the pickup assembly.
- (4) Disconnect the wire from connector CN501 on the mechanism board.
- (5) Remove the screw **O** to remove the feed motor assembly.
- (6) Remove the screw **P** to remove the shaft holder retaining the feed slide shaft assembly and the middle gear.
- (7) Move the middle gear.
- (8) Move the pickup assembly upward from the gear section and remove it from the traverse chassis assembly.
- (9) Remove the two screws **Q** to remove the rack arm.
- (10) Pull out the feed slide shaft assembly.
- (11) Remove the screw **R** to remove the spring.

**CAUTION:**

To reattach the mechanism board, connect the pickup flexible wire to connector CN501 on the mechanism board before unsoldering the short circuit round. Subsequently, fix the mechanism board using screws.

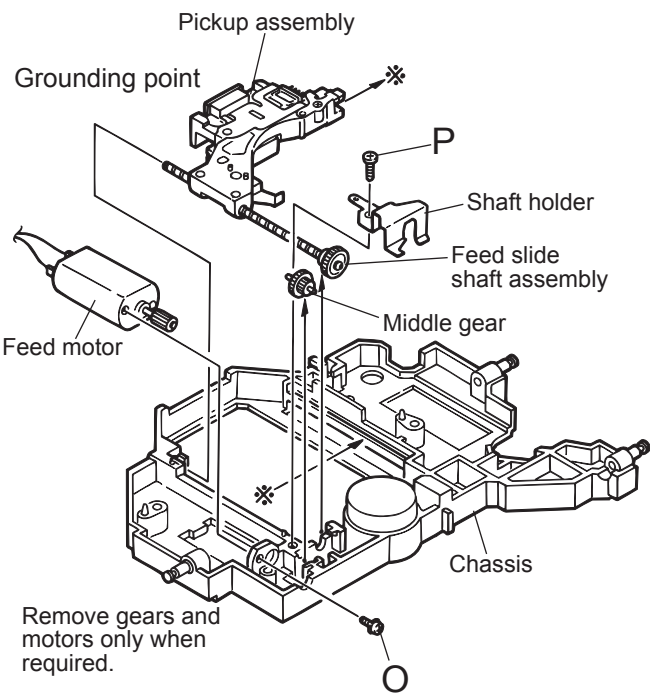


Fig.14

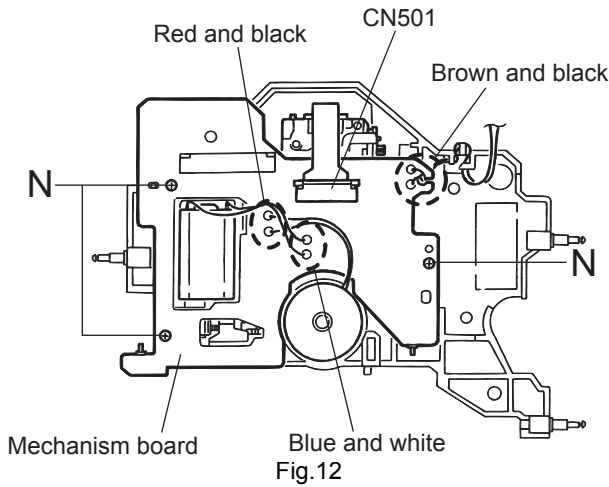


Fig.12

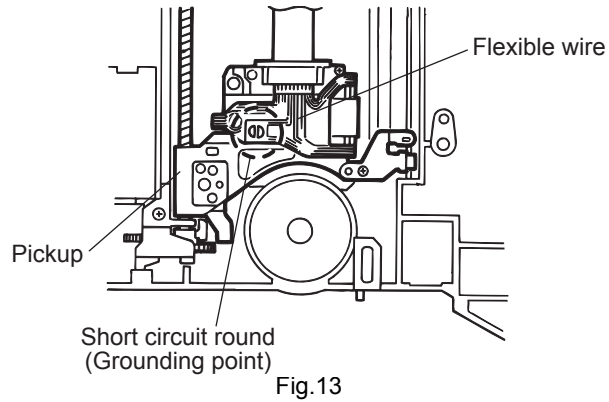


Fig.13

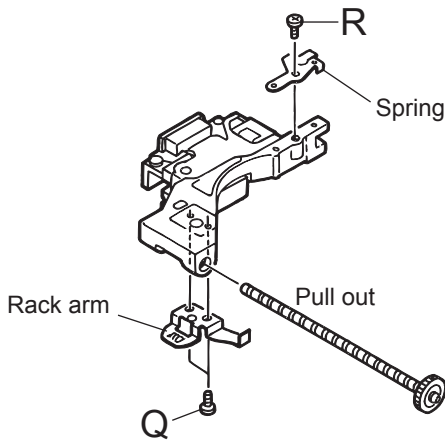


Fig.15

### 2.4.11 Tray motor

(See Fig.16 and 17 )

- (1) Remove the two screws **S** securing the tray motor.
- (2) Remove the two screws **T** to remove the tray motor assembly from the tray motor holder.

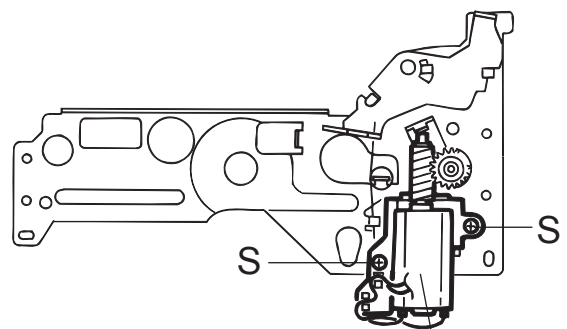


Fig.16  
Tray motor assembly

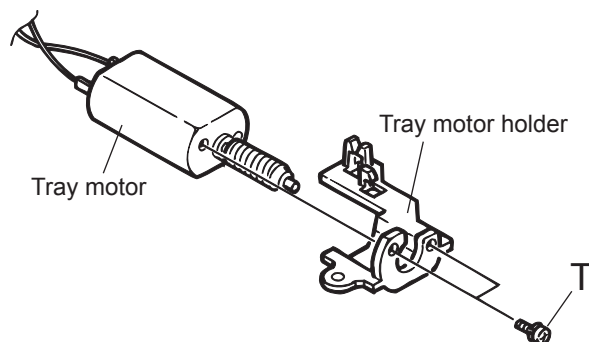


Fig.17

### 2.4.12 Separation of the chassis (L) assembly and chassis (R) assembly

(See Fig.18 )

- (1) Remove the two screws **U** retaining the chassis (L) and (R) assemblies.
- (2) Slide the chassis (L) assembly toward the front and detach it, then remove the chassis (L) upward.

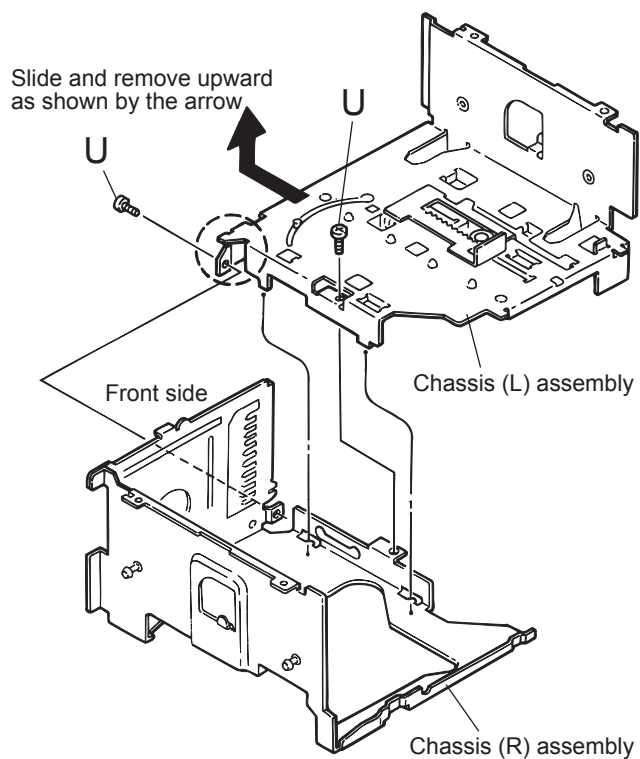


Fig.18

2.4.13 Precautions on reassembling

CAUTION:

When reassembling, also refer to the disassembling procedures.

2.4.13.1 Mounting the traverse mechanism  
(See Fig.19 to 23)

- (1) When mounting the pickup assembly, attach the feed slide shaft assembly to the traverse chassis. Apply E-JC-525 grease to the shaft.
- (2) Mount the middle gear and the feed slide shaft to the traverse chassis and secure them with the screw **P** through the shaft holder.
- (3) Before mounting the mechanism board, move the pickup to the outer edge position, then secure the board assembly using the screw **N**.  
At this time, check that the rest switch is correctly placed.
- (4) To mount the rack arm, first move the pickup to the middle position and secure it with the screws **Q**.

CAUTION:

To reattach the mechanism board, connect the pickup flexible wire to connector CN501 on the mechanism board before unsoldering the short circuit round. Subsequently, fix the mechanism board using screws.

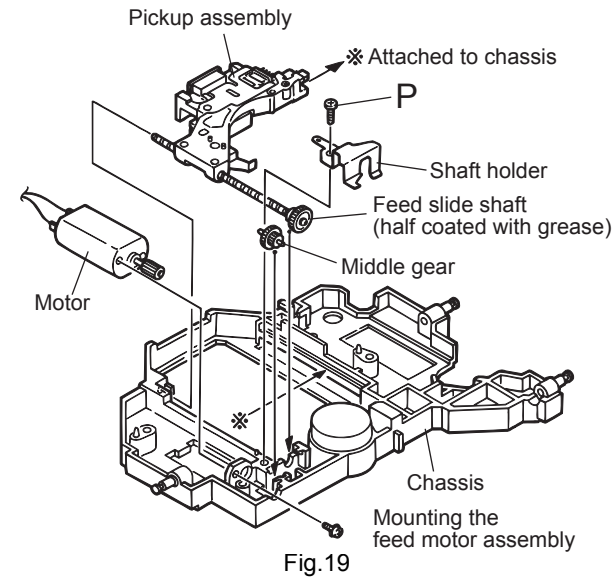


Fig.19

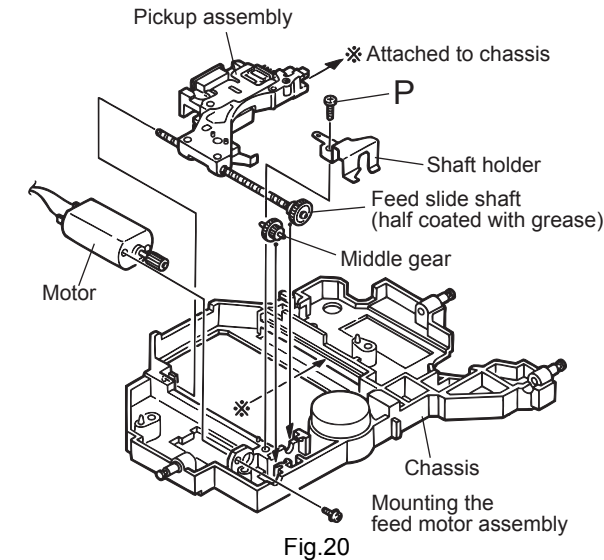


Fig.20

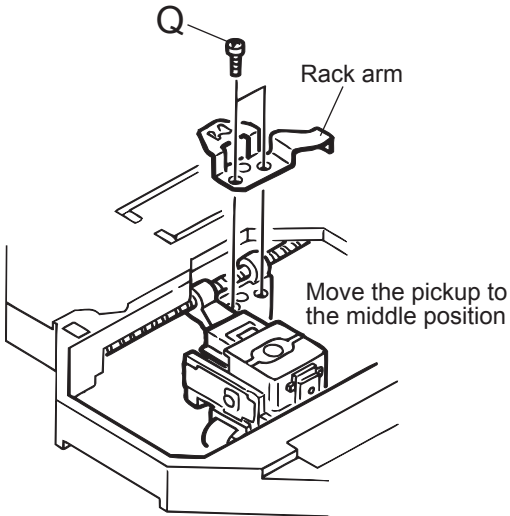


Fig.21

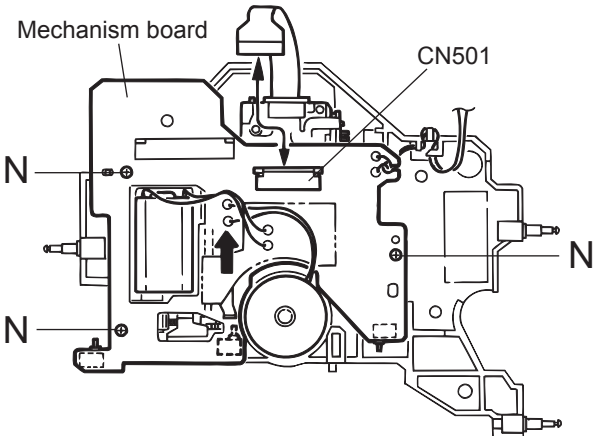


Fig.22

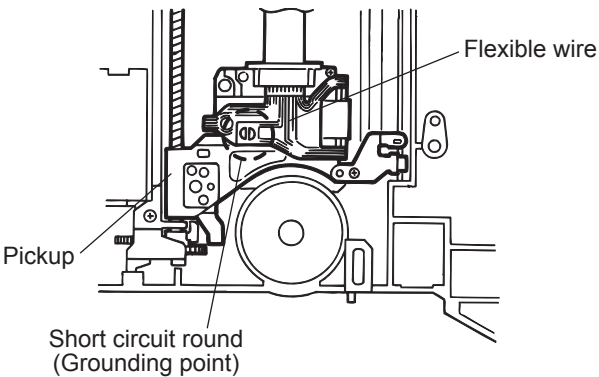


Fig.23

### 2.4.13.2 Mounting the lifter unit (See Fig.24 to 26)

- (1) Insert the shafts **f** of the traverse mechanism assembly into the slide grooves **g** on the lifter unit.
- (2) Shift the hook of the lifter unit to the edge, and shift the sliding lever inside the side bracket unit to the edge as well.
- (3) With each hole and lever shifted to the edge, mount the lifter unit and side bracket unit from the side.  
(Check each attached section, and check that the two shafts **h** of the lifter unit are correctly inserted into the holes **i** of the side bracket unit. After mounting, check that the levers move together. )
- (4) Turn the lifter unit upside down.  
As shown in Fig. 35, slide the lever 30mm away from the edge, then mount the lifter bracket assembly.

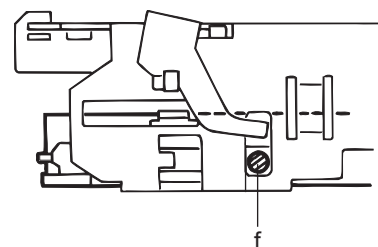


Fig.24

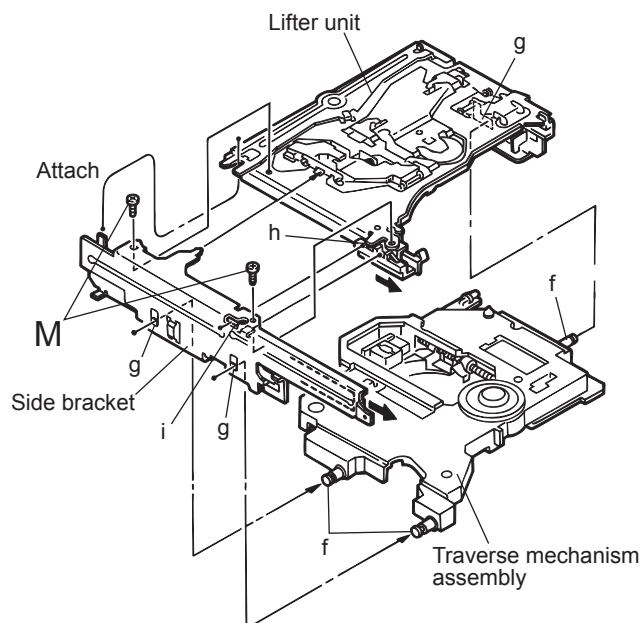


Fig.25

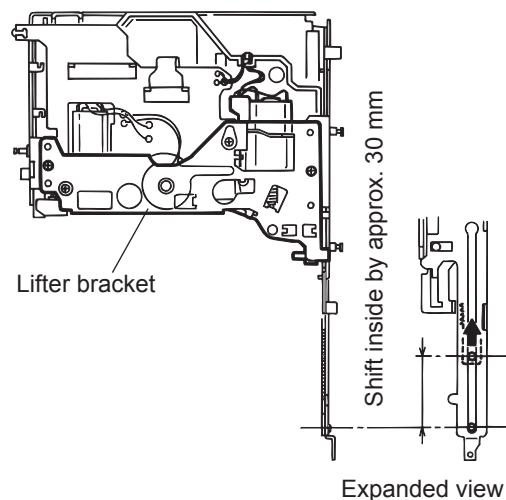


Fig.26

**2.4.13.3 Connection of the chassis (L) assembly and chassis (R) assembly**  
**(See Fig.27 to 29)**

- (1) Attach the lower rod to the chassis (R) assembly. While shifting the rod toward the front side, mount the rod on the lifter unit.  
 With the rod mounted, place the lifter unit on the chassis (R) assembly.
- (2) Combine the chassis (L) and (R) assemblies so that the hook section **j** of the chassis (L) assembly is inserted into the notch of the chassis (R) assembly by sliding it from the front side.
- (3) After engaging, secure with the two screws **U**.
- (4) Attach the tension spring between the lifter unit and the chassis.

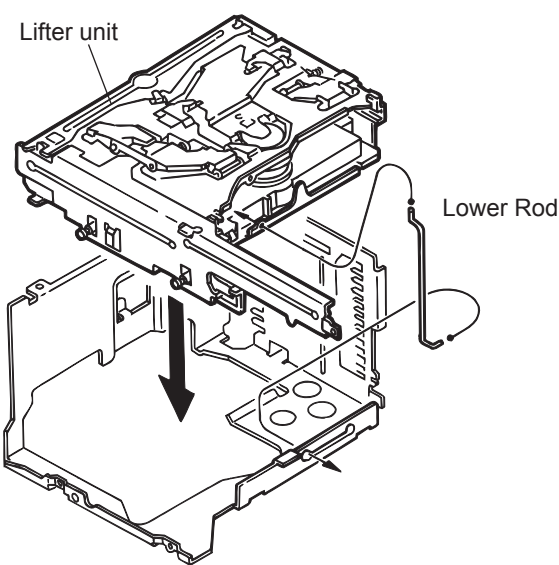


Fig.27

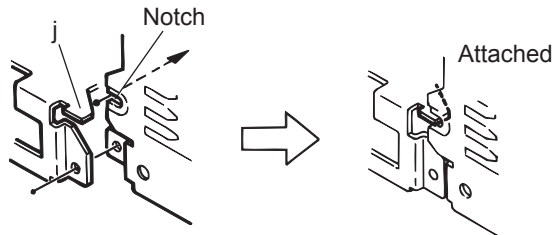


Fig.28

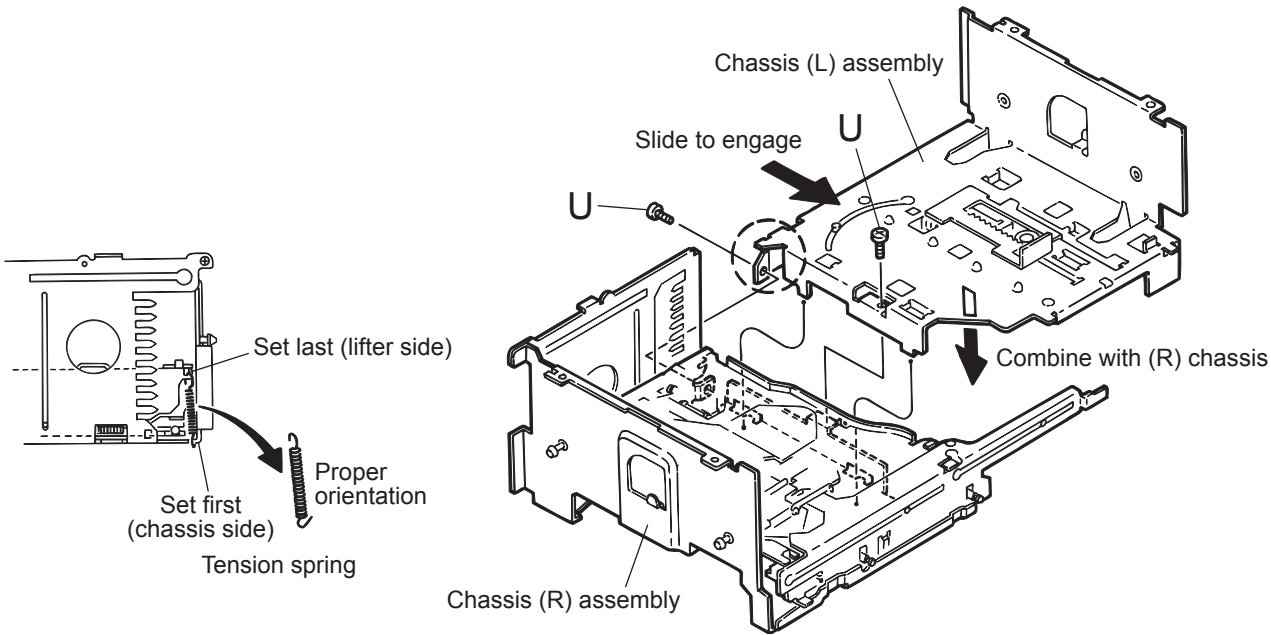


Fig.29



#### 2.4.13.4 Mounting the top plate (See Fig.30 to 33)

- (1) Mount the upper rod on the lifter side **l** and set it on the rear of the top plate, then mount the other end of the upper rod to **m**.
- (2) Check that the five points (**n**, **o**, **p**, **s** and **r**) are correctly positioned.  
When mounting section **s**, set it so that section **t** of the lifter unit is pinched by the bending section of the top plate.
- (3) Secure the top plate with six fixing screws **K**.

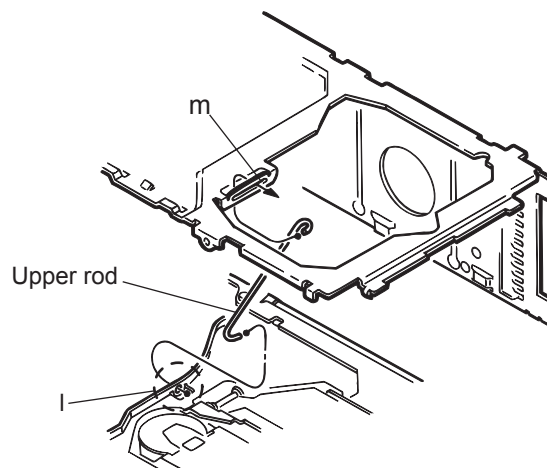


Fig.30

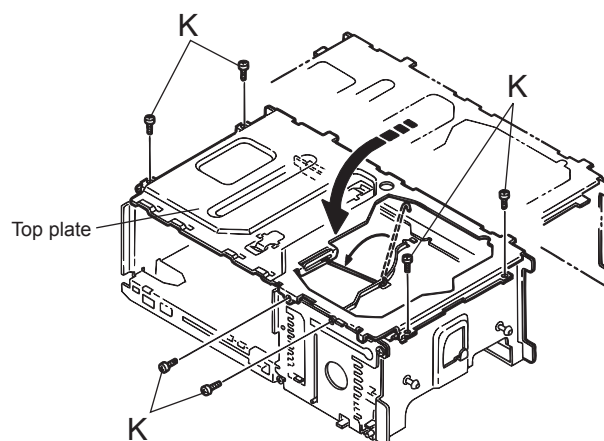


Fig.31

Expanded view of mounting s

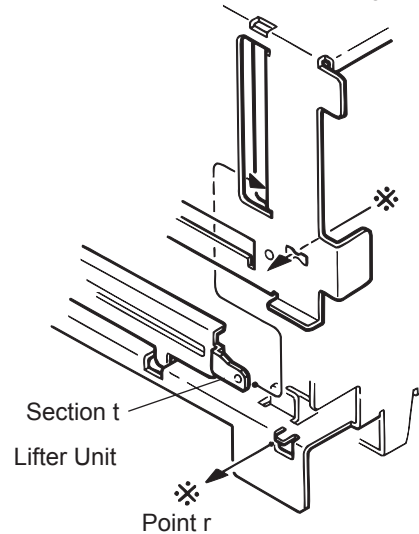


Fig.32

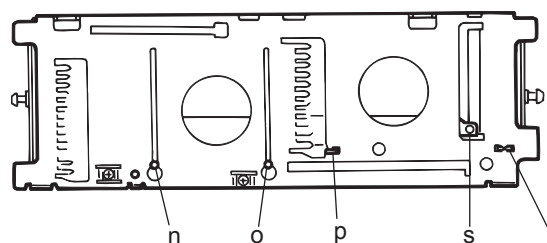


Fig.33

**2.4.13.5 Mounting the front slider and rear slider**  
**(See Fig.45 and 46)**

- (1) Position the unit with the rear side facing down, then rotate the third gear in the direction of the arrow (clockwise) until the lift arm comes to the position at which the holes are exposed, as shown in Fig. 34
- (2) Mount the front slider from the top.  
 Rotate the third gear counterclockwise until the hole of the slider is lined up with the right hole of the stud, as shown in Fig. 34
- (3) Mount the E-washer on the shaft.
- (4) Position the unit with the front side facing down, then mount the rear slider. Check that the **u**, **v** and **w** positions are correctly mounted as shown in Fig. 35.
- (5) Rotate the third gear in the direction of the arrow (counterclockwise) until the lifter unit is at the top position.

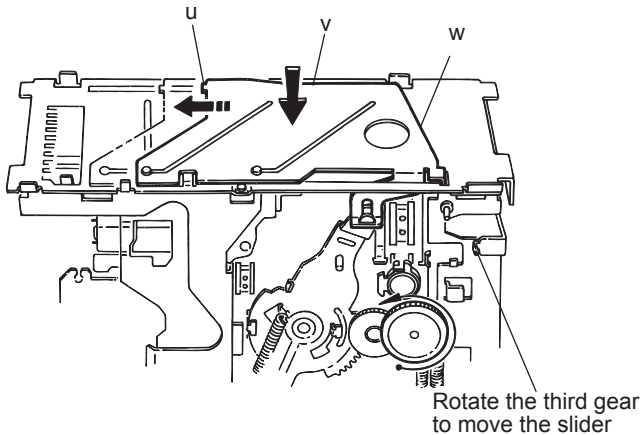
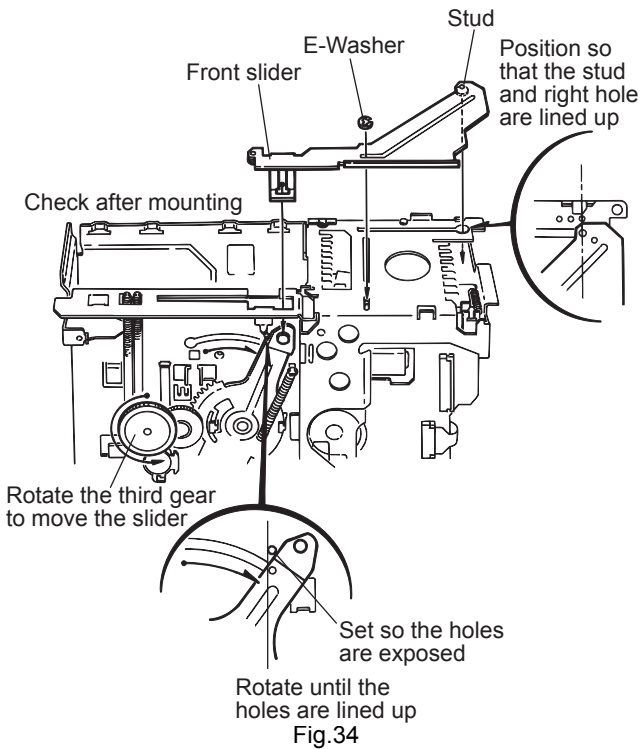


Fig.35



#### 2.4.13.6 Mounting the sensor board assembly

(See Fig.36)

- (1) Attach the longer spring to the white resin, and attach the shorter spring temporarily to the sensor assembly bracket.
- (2) Mount the sensor assembly so that the shaft of the lift arm is inserted into the longer hole on the white resin located on the back of the sensor board assembly.
- (3) Attach the shorter spring to the hook of the lift arm.

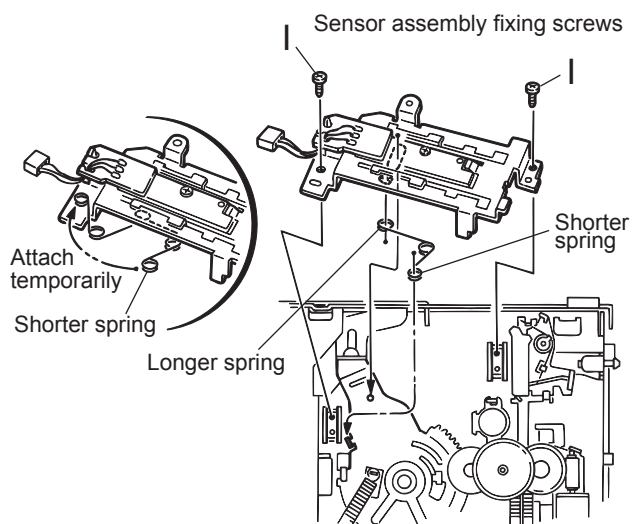


Fig.36

#### 2.4.13.7 Mounting the main PC board assembly

(See Fig.37)

- (1) Rotate the third gear clockwise until section x of the front slider and the third hole from the right are lined up.  
(Be sure to set properly. If incorrectly set, the switches on the board assembly may be damaged.)
- (2) After they are correctly positioned, mount the main board assembly.

Position so that the slider hole and third hole from the right are lined up

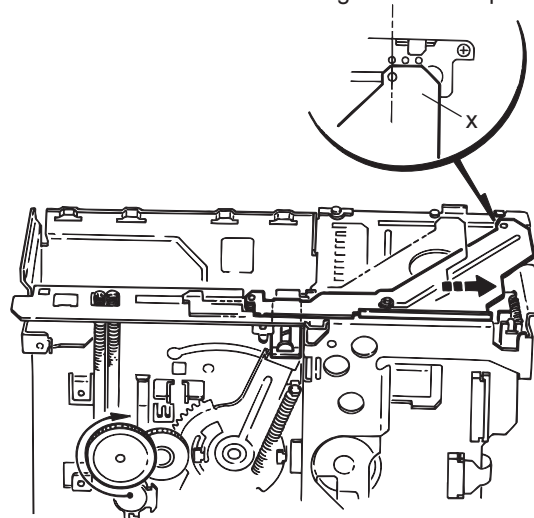


Fig.37

### 2.4.13.8 Pickup replacement procedure

(See Fig.38 to 44)

- (1) Remove the bottom cover, front panel and top cover from the exterior section.
- (2) Unplug the flexible ribbon wire from connector CN502 on the traverse mechanism PC board assembly.
- (3) Turn the rear slider and third gear in the lifter section counterclockwise until the traverse mechanism assembly is in the lowermost (bottom) position.
- (4) Unsolder the two wires (black and brown) connected to the tray motor.
- (5) Remove the two screws **M** from the round holes on the chassis (**R**) assembly to remove the lifter bracket (**L**).
- (6) Remove the lower rod.
- (7) Disconnect the two feed motor wires (blue and white), two spindle motor wires (red and black) and two tray motor wires (brown and black) that are soldered to the mechanism board.
- (8) Short-circuit the grounding point on the mechanism board. Move the mechanism board without disconnecting the wire from connector CN501. Solder the short circuit round on the pickup assembly.
- (9) Disconnect the wire from connector CN501 on the mechanism board.
- (10) Remove the three fixing screws **N** from the round holes on the chassis (**R**) assembly to remove the traverse mechanism board assembly.
- (11) Remove the pickup shaft holder fixing screw **P** to remove the pickup assembly.

#### CAUTION:

When replacing the pickup, be sure to apply counter-measures against static electricity (grounding the operation table, wrist band and soldering iron). To remove it, first short-circuit the grounding point on the mechanism board, then lift the mechanism board assembly with CN501 connected. Next, short-circuit the grounding point on the pickup main unit, then unplug the pickup flexible board from connector CN501.

#### CAUTION:

When reassembling, perform in the reverse order.

- (12) Remove the two rack arm fixing screws **Q**. Pull out the feed slide shaft. Remove the shaft holder fixing screw **R**.
- (13) When mounting the lifter bracket after replacing the pickup, shift the lifter unit lever approx. 30 mm towards the inside, then mount the lifter bracket.

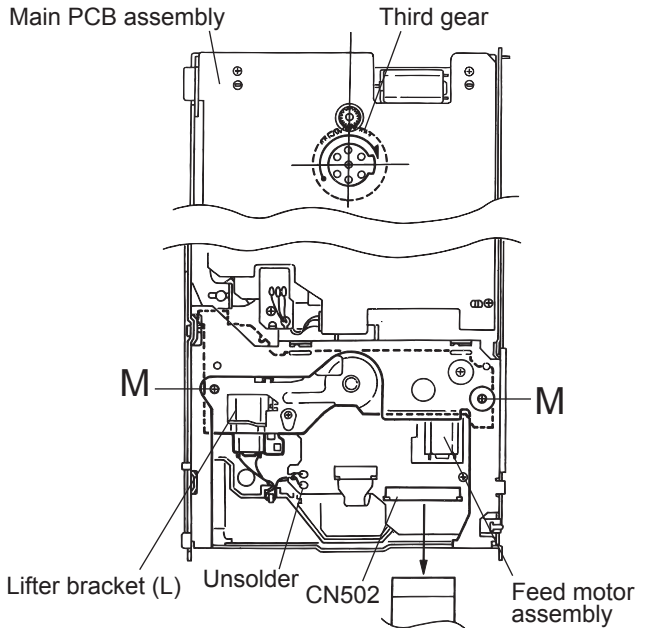


Fig.38

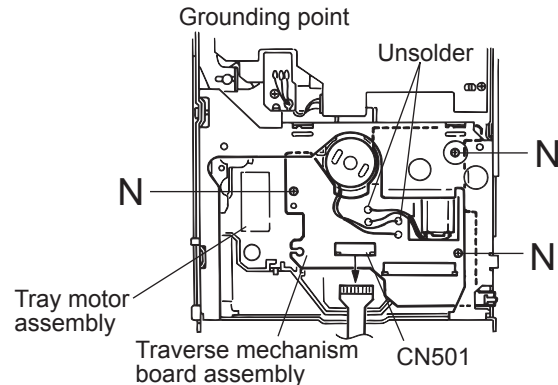


Fig.39

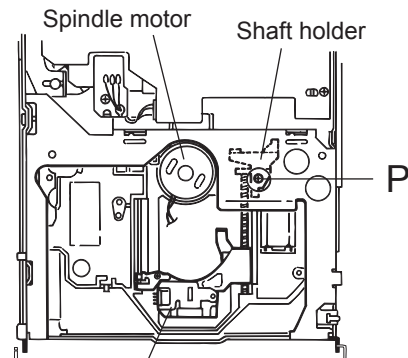


Fig.40

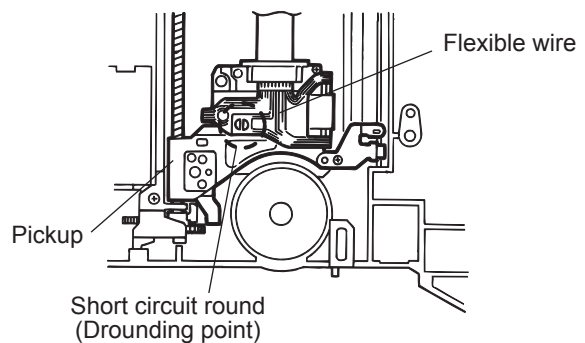


Fig.41

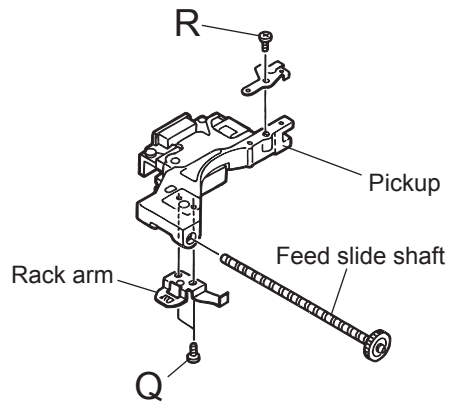


Fig.42

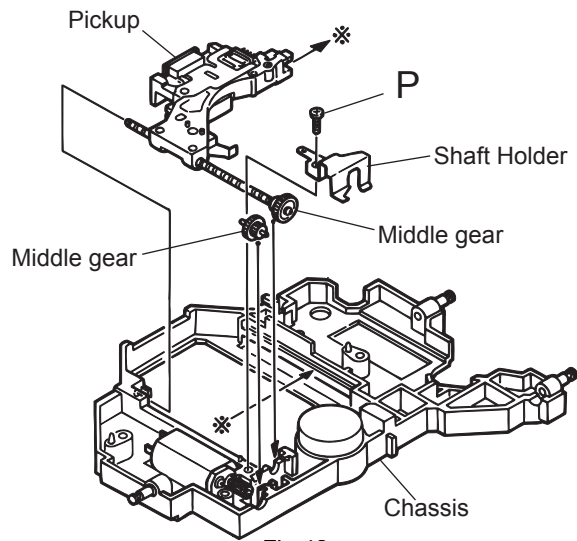


Fig.43

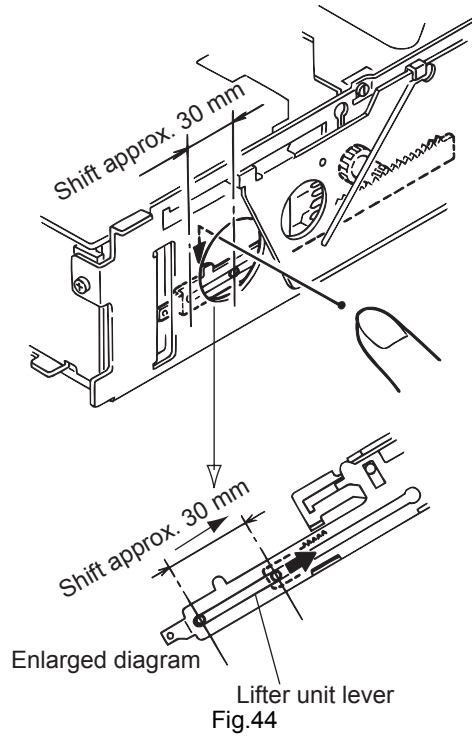
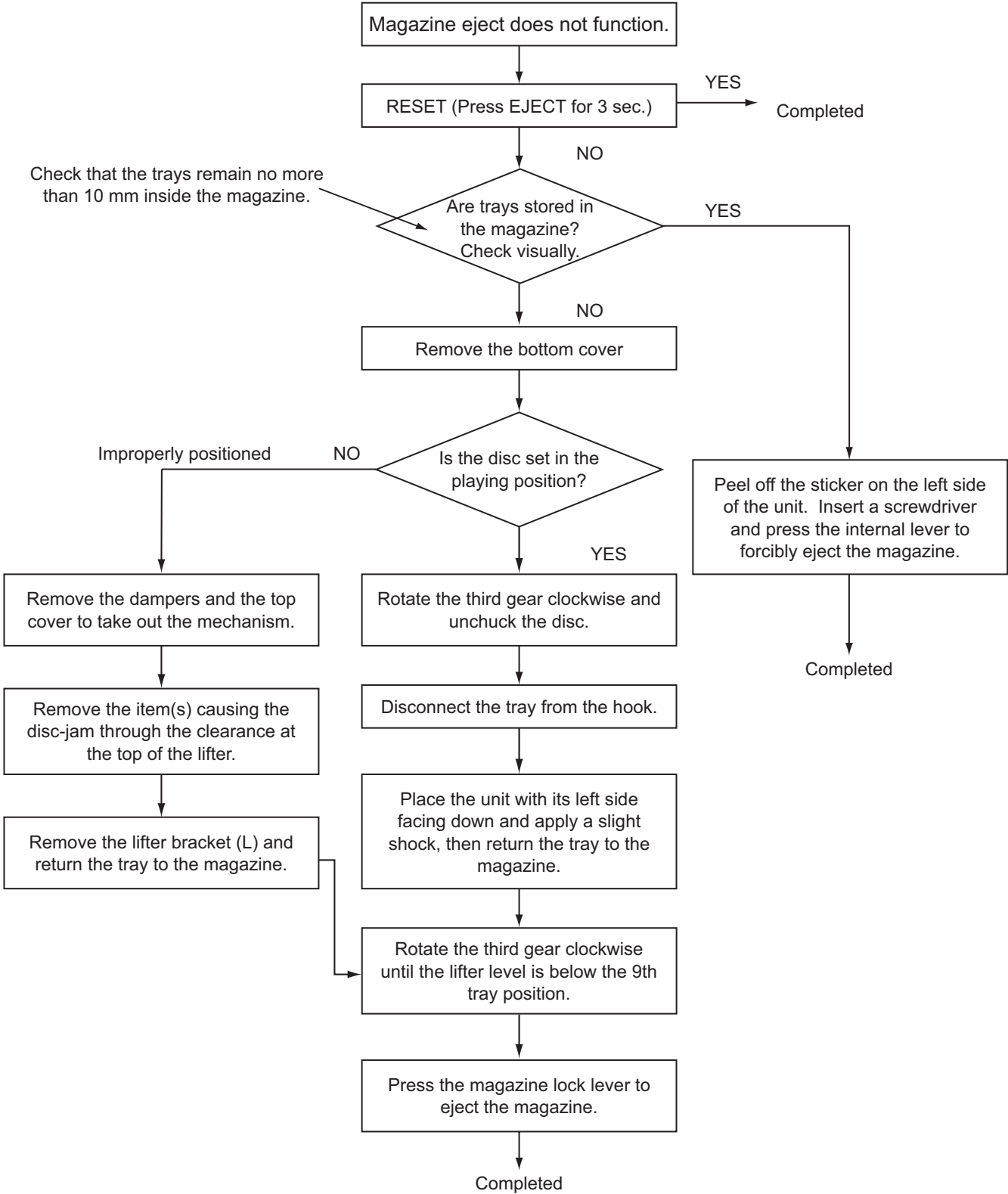


Fig.44

## SECTION 3 Adjustment

### 3.1 Forced eject procedures



## 3.2 Troubleshooting

### 3.2.1 Servicing procedures for CH-X550 error displays

#### Error display

#### Servicing procedure

E1: Eject error      The magazine cannot be ejected until S601 (magazine switch) turns off.  
Can the magazine be ejected? YES → 1, NO → 2  
1. The magazine switch (S601) does not turn off even though the magazine is completely ejected.  
2. Check that the magazine is not engaged with the mechanism assembly.

E2: Position motor error      The lifter does not move up and down when exchanging or ejecting discs.  
After resetting, check whether or not the lifter moves. YES → 3, NO → 4  
3. If the lifter exceeds the required disc position, check the lift position input. (IC601 pin 76)  
If the lifter does not reach the required disc position, check the mechanism (mainly the lifter elevation mechanism)  
4. Check that voltage is present at the motor terminal.  
If voltage is present, check the lifter elevation mechanism. If voltage is not present, separate the motor from the circuit and check again whether or not voltage is present.  
If voltage is present, next check that the armature resistance of the position motor (resistance between motor terminals) is approx. 12Ω.  
If the resistance is excessively low (1 - 2Ω), the motor is defective.

E3: Tray motor error      Trays cannot be opened or closed when exchanging or ejecting discs.  
Does the tray move when changing or ejecting discs? YES → 5, NO → 6  
5. Check that TRAY OUT SW (S602) and TRAY IN SW (S603) function correctly.

	S602 & IC601 pin (46)	S603 & IC601 pin (45)
When opening	H	L
When closing	L	H

6. Check that the drive voltage is applied to the motor terminal.  
If the voltage is present, check the tray mechanism.  
If the voltage is not present, separate the motor from the circuit and check again whether or not the voltage is present.

E4: Pick returning      Does the feed (pickup unit) return to the inner area of the disc when ejecting?  
YES → 7, NO → 8, 9  
7. Check the rest switch.  
8. If the feed gear is rotated, check the feed transfer mechanism  
9. If the feed gear is not rotated, check the motor driver and the pattern.

#### Other errors occurring in the receiver or controller.

E8: Connection error      When selecting the CD Changer mode using function keys, etc., the unit does not enter the CD changer mode, or the E8 error display appears. This signifies trouble relating to communications.  
a. Check the connection cables between the CD changer and the receiver (CD changer controller).  
b. Check the CD changer power cord and the fuse (including F901 on the PC board).  
c. Check IC651 and its peripheral circuits.

★ The E1 ~ E8 error displays described above may appear as E-1 ~ E-8, 1E1 ~ 1E8, R-1 ~ R-8, or RST1 ~ RST8, depending on the product.

### 3.2.2 Error code

The following error codes can be displayed and stored in up to 3 memories when the KD-MX3000 is used with the controller. Refer to the KD-MX3000 service manual regarding error code indication.

The error code indication when using the earlier controller is the same as the CH-X99, KD-MK88 and other 12CD changer models.

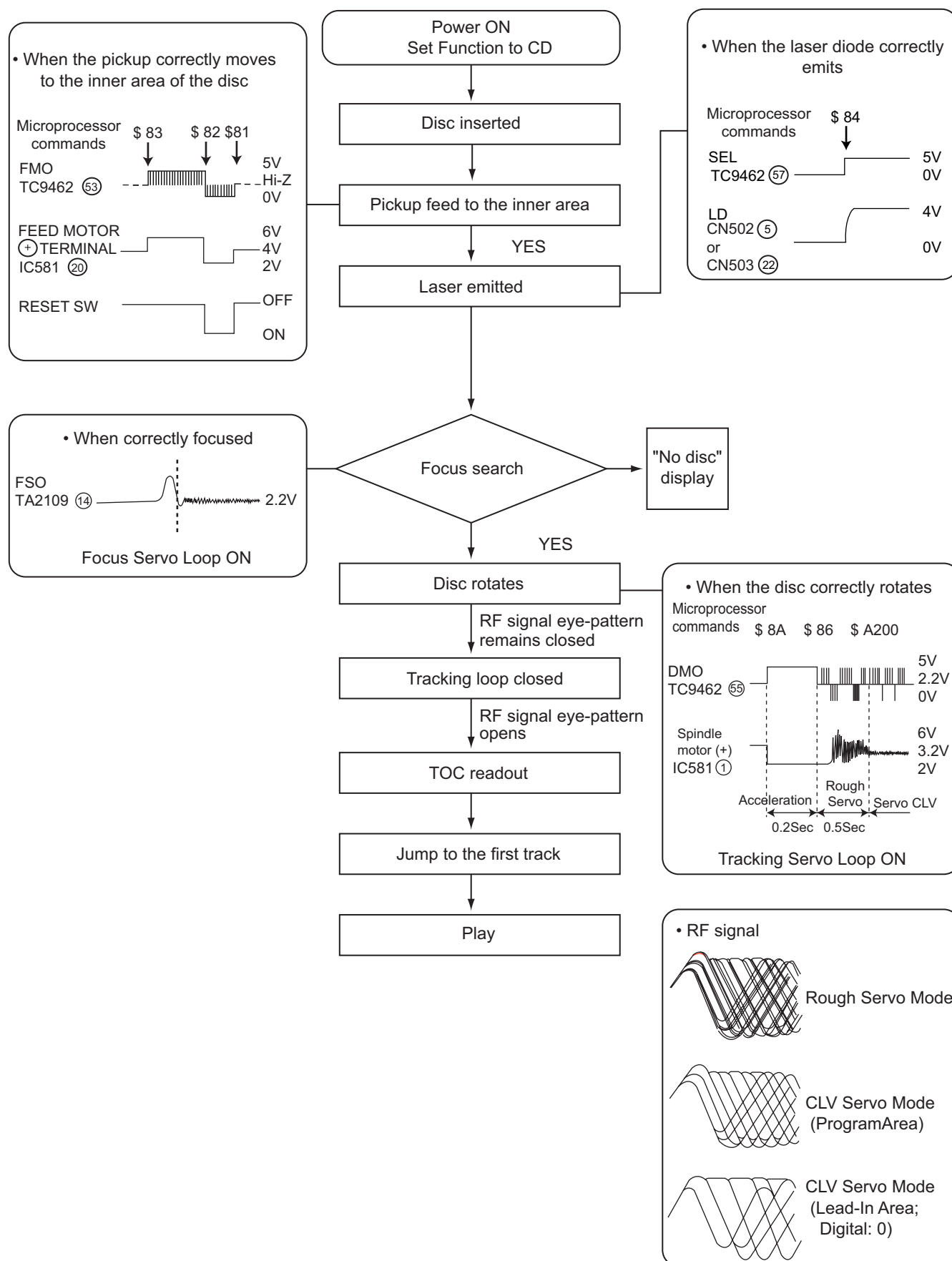
CH-1 error code table

	Generating condition	Description	Error code
Tray extension error	Tray-in switch time out (Tray-in switch Low, Tray-out switch High)	Tray stops part way	E1 03 00 11
	Tray-out switch time out (Tray-in switch High, Tray-out switch High)	Tray stops part way	E1 03 00 12
	Tray-in switch time out (Tray-in switch Low, Tray-out switch Low)	Tray-in switch faulty or other defect	E1 03 00 13
	MAG-in switch Low to High	Magazine removed when tray partly extended	E1 03 00 14
Tray retraction error	Tray-in switch time out (Tray-in switch Low, Tray-out switch Low)	Tray motor inoperative	E1 03 00 16
	Tray-out switch time out (Tray-in switch High, Tray-out switch High)	Tray retraction stops part way	E1 03 00 17
	Tray-in switch time out (Tray-in switch Low, Tray-out switch Low)	Tray-in switch faulty or other defect	E1 03 00 18
	MAG-in switch Low to High	Magazine removed when tray partly retracted	E1 03 00 19
Lifter raise error	Wait position time out	Position motor inoperative	E1 02 00 21
	Wait position time out	Position not stable in fine adjust mode	E1 02 00 22
	Wait position time out	Other fault	E1 02 00 23
Lifter lower error	Wait position time out	Position motor inoperative	E1 02 00 26
	Wait position time out	Position not stable in fine adjust mode	E1 02 00 27
	Wait position time out	Other fault	E1 02 00 28
Chuck error	Play position time out	Position motor inoperative	E1 02 00 31
	Play position time out	Position not stable in fine adjust mode	E1 02 00 32
	Play position time out	Other fault	E1 02 00 33
Unchuck error	Wait position time out	Position motor inoperative	E1 02 00 36
	Wait position time out	Position not stable in fine adjust mode	E1 02 00 37
	Wait position time out	Other fault	E1 02 00 38
Eject error	Eject position time out	Position motor inoperative	E1 02 00 41
	Eject position time out	Eject position not attained	E1 02 00 42
	MAG in switch time out	Magazine not ejected	E1 02 00 43
Initialize error	Mechanism switch time out21	Both Tray-in and Tray-out Low	E1 03 00 46
	Absolute position time out	Not stable at absolute position	E1 03 00 47

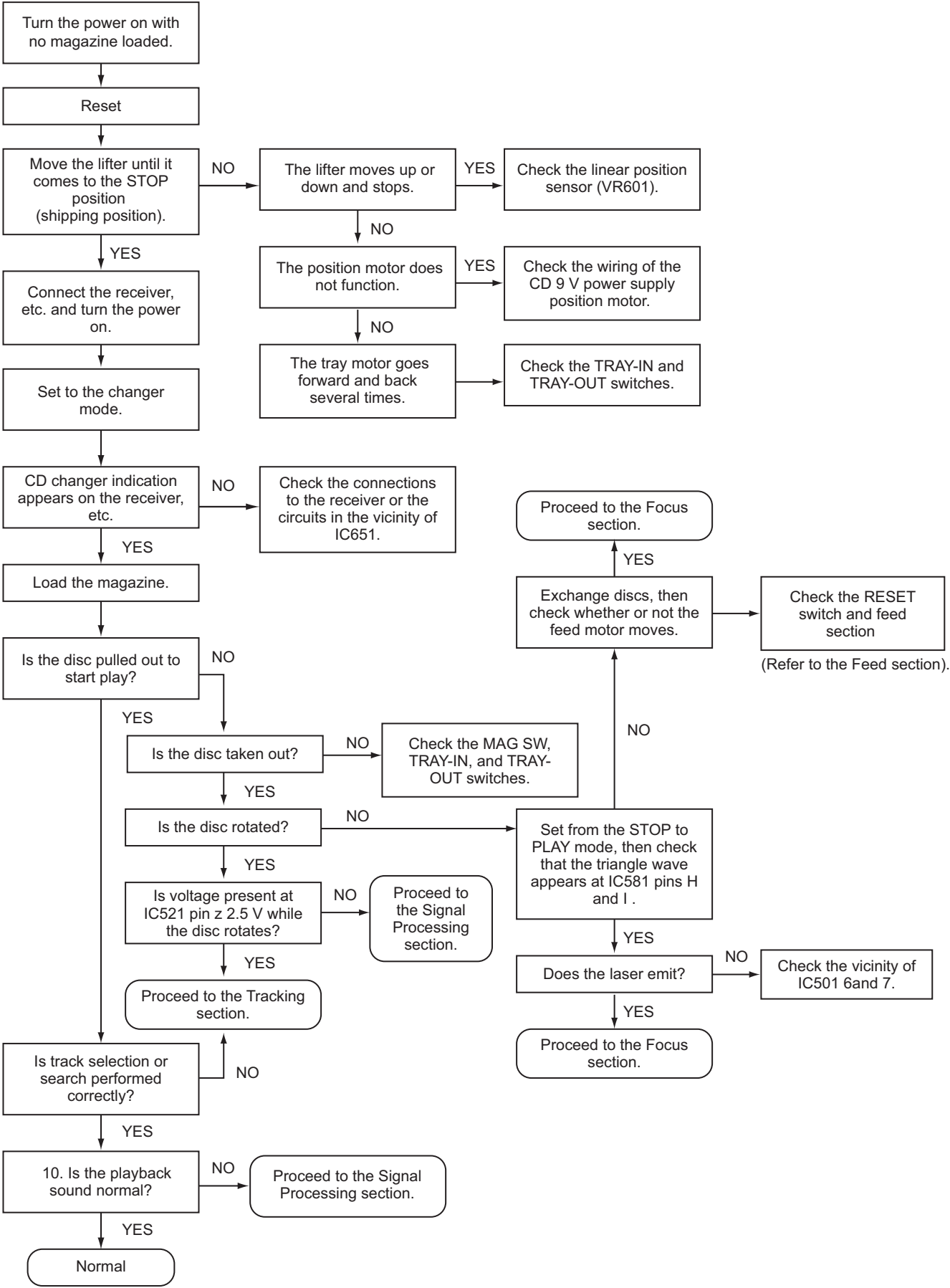
**Note:**

The 1st error code is indicated by E1, while the 2nd and 3rd error codes are respectively indicated by E2 and E3.

### 3.3 Flow of functional operation until TOC read

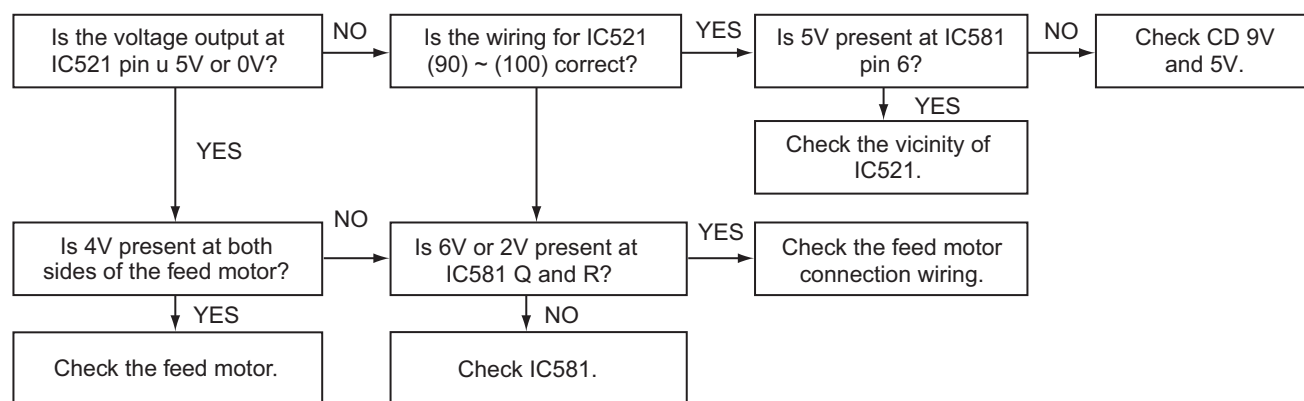


3.3.1 General section

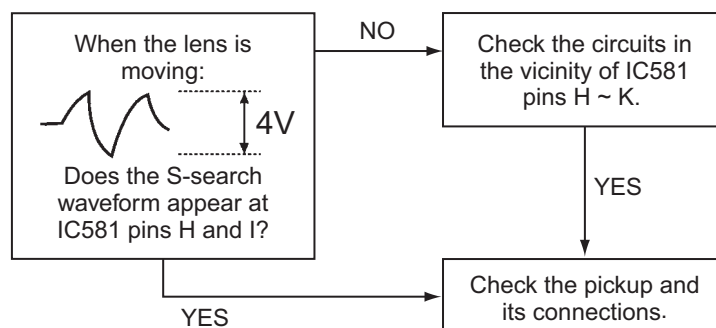




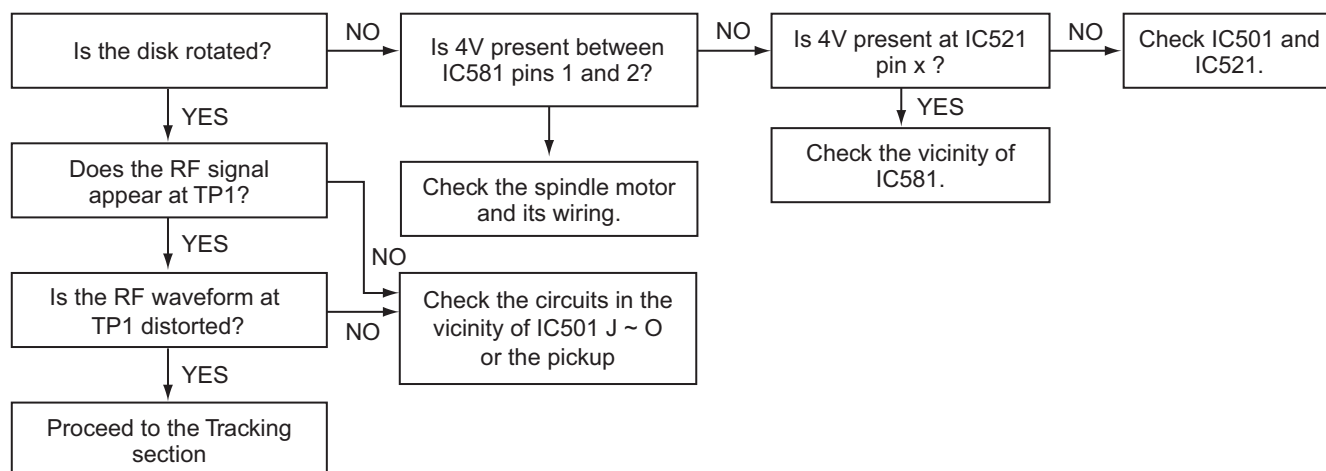
### 3.3.2 Feed section



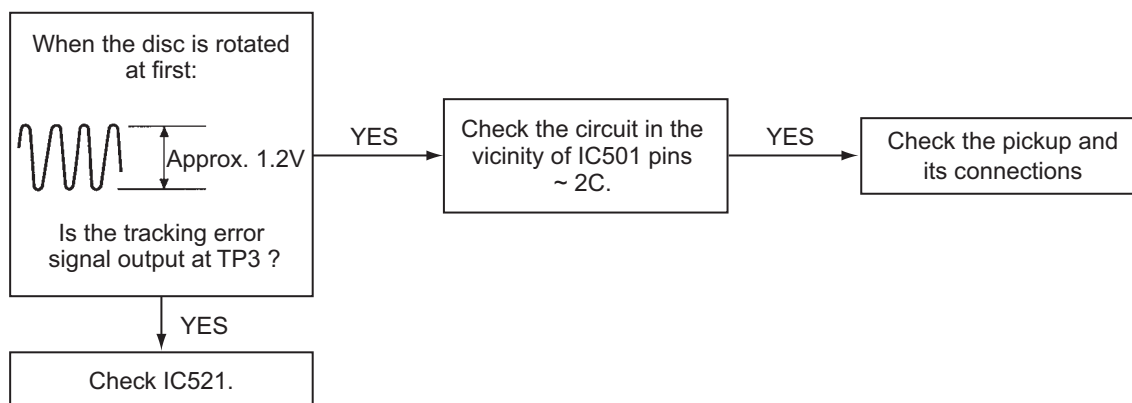
### 3.3.3 Focus section



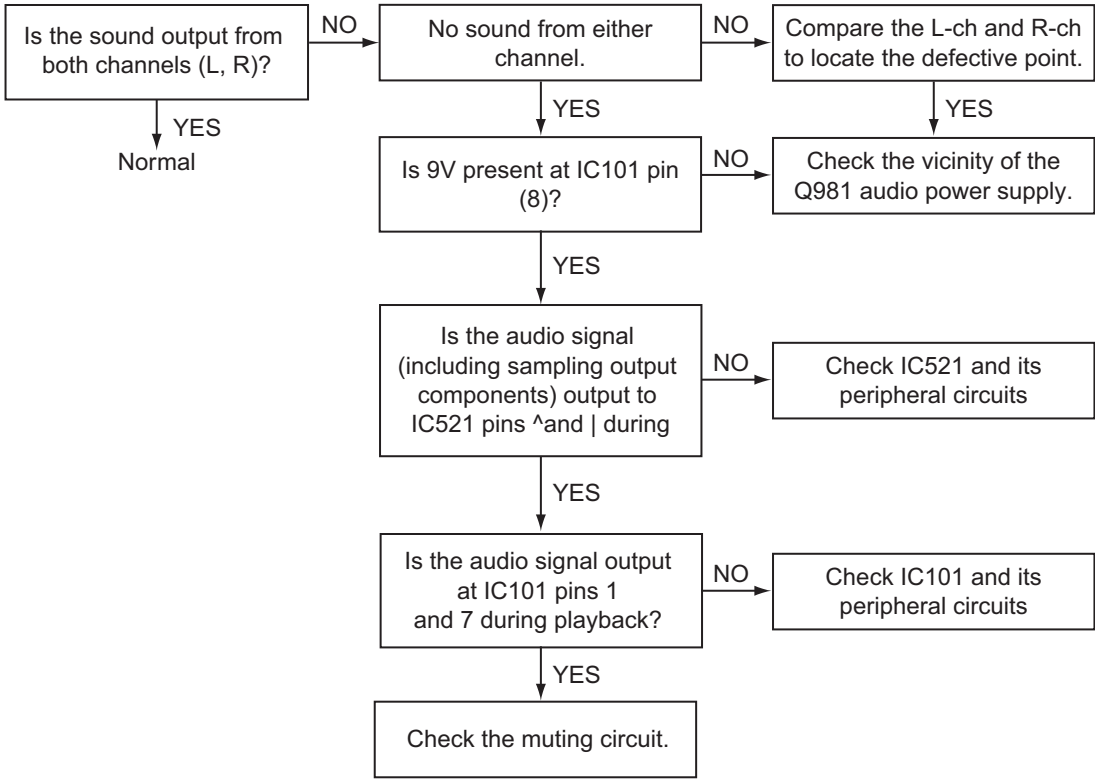
### 3.3.4 Spindle section



### 3.3.5 Tracking section



3.3.6 Signal processing section

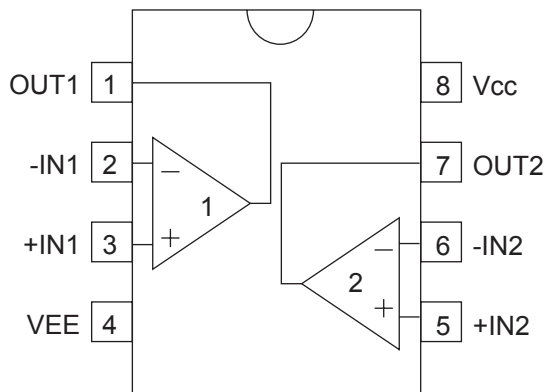


## SECTION 4

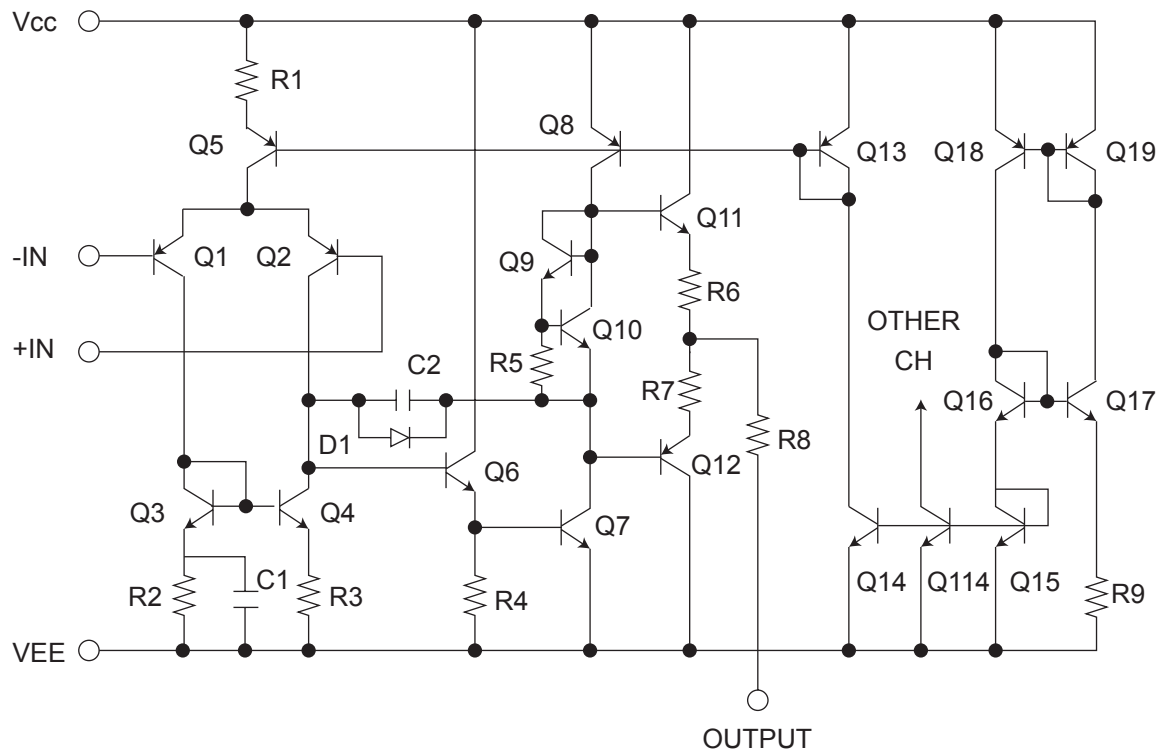
### Description of major ICs

#### 4.1 BA15218F-XE (IC101) : Dual operation amplifier

- Pin layout

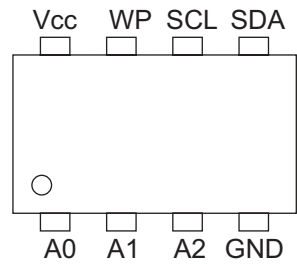


- Block diagram



4.2 BR24C01AF-W-X (IC604) : EEPROM

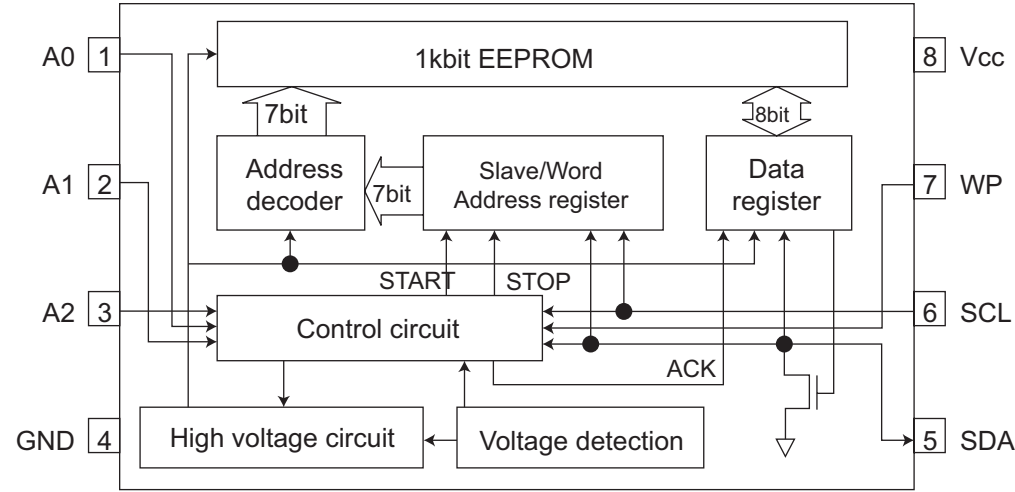
• Pin layout



• Pin function

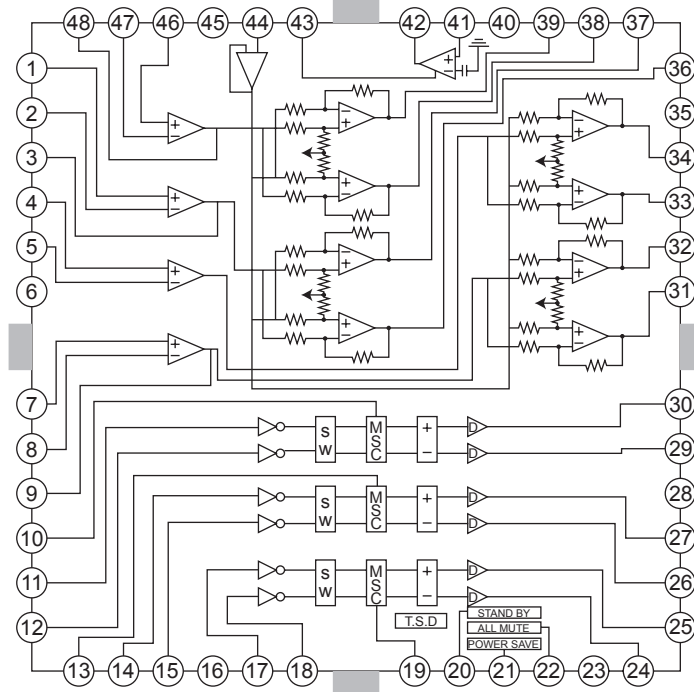
Symbol	I/O	Description
Vcc	-	Power supply
GND	-	GND
A0, A1, A2	I	Slave address setting terminal
SCL	I	Serial clock input terminal
SDA	I/O	Slave/word address serial data input/output
WP	I	Write protect terminal

• Block diagram



### 4.3 FAN8037 (IC581) : CD driver

- Pin layout & Block diagram



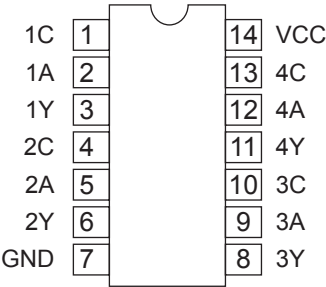
- Pin function

Pin No.	Symbol	I/O	Function
1	IN2+	I	CH2 op-amp input(+)
2	IN2-	I	CH2 op-amp input(-)
3	OUT2	O	CH2 op-amp output
4	IN3+	I	CH3 op-amp input(+)
5	IN3-	I	CH3 op-amp input(-)
6	OUT3	O	CH3 op-amp output
7	IN4+	I	CH4 op-amp input(+)
8	IN4-	I	CH4 op-amp input(-)
9	OUT4	O	CH4 op-amp output(+)
10	CTL1	I	CH5 motor speed control
11	FWD1	I	CH5 forward input
12	REV1	I	CH5 reverse input
13	CTL2	I	CH6 motor speed control
14	FWD2	I	CH6 forward input
15	REV2	I	CH6 reverse input
16	SGND	-	Signal ground
17	FWD3	I	CH7 forward input
18	REV3	I	CH7 reverse input
19	CTL3	I	CH7 motor speed control
20	SB	I	Stand by
21	PS	I	Power save
22	MUTE	I	All mute
23	PVCC2	-	Power supply voltage
24	DO7-	O	CH7 drive output(-)

Pin No.	Symbol	I/O	Function
25	DO7+	O	CH7 drive output(+)
26	DO6-	O	CH6 drive output(-)
27	DO6+	O	CH6 drive output(+)
28	PGND2	-	Power ground2
29	DO5-	O	CH5 drive output(-)
30	DO5+	O	CH5 drive output(+)
31	DO4-	O	CH4 drive output(-)
32	DO4+	O	CH4 drive output(+)
33	DO3-	O	CH3 drive output(-)
34	DO3+	O	CH3 drive output(+)
35	PGND1	-	Power ground1
36	DO2-	O	CH2 drive output(-)
37	DO2+	O	CH2 drive output(+)
38	DO1-	O	CH1 drive output(-)
39	DO1+	O	CH1 drive output(+)
40	PVCC1	-	Power supply voltage
41	REGOX	I	Regulator feedback input
42	REGX	O	Regulator output
43	RESX	I	Regulator reset input
44	VREF	I	Bias voltage input
45	SVCC	-	Signal supply voltage
46	IN1+	I	CH1 op-amp input(+)
47	IN1-	I	CH1 op-amp input(-)
48	OUT1	O	CH1 op-amp output

4.4 HD74HC126FP-X (IC651) : Buffer

• Pin layout

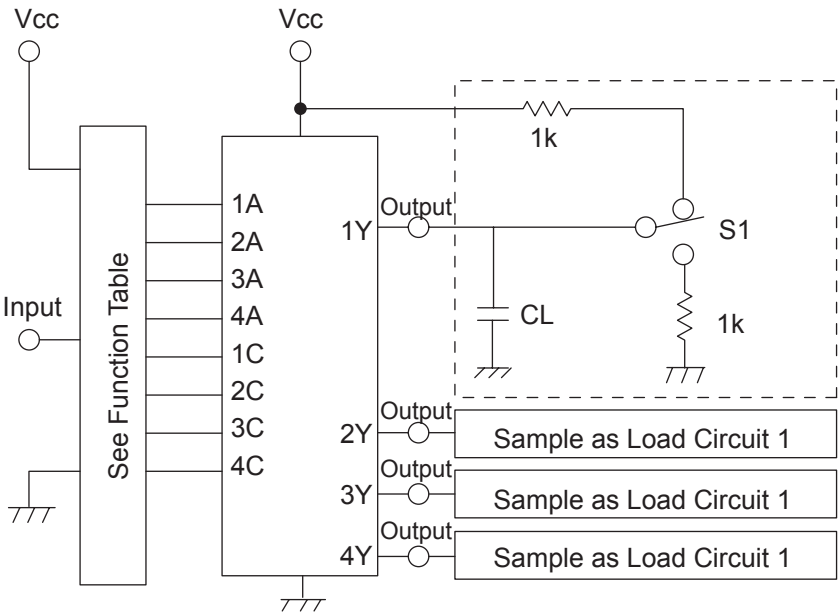


• Pin function

Input		Output
C	A	Y
L	X	Z
H	L	H
H	H	L

**Note:**  
H:High level  
L:Low level  
X:Irrelevant  
Z:Off(High-impedance)  
State a 3-state input

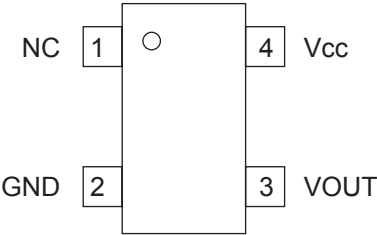
• Block diagram



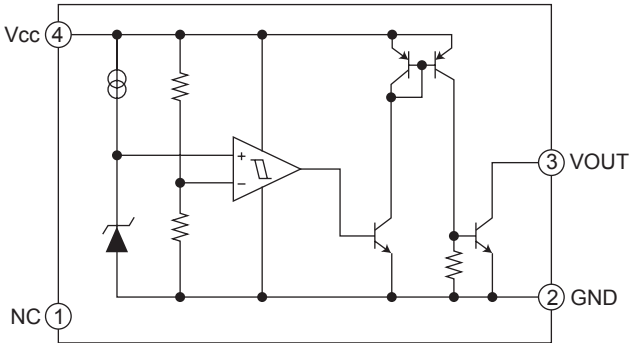
**Note:**  
CL includes probe and jig capacitance

4.5 IC-PST9333U-X (IC602) : Regulator

• Pin layout



• Block diagram

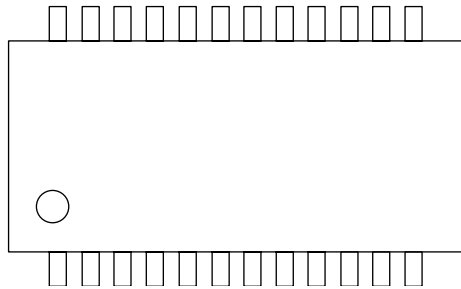


• Pin function

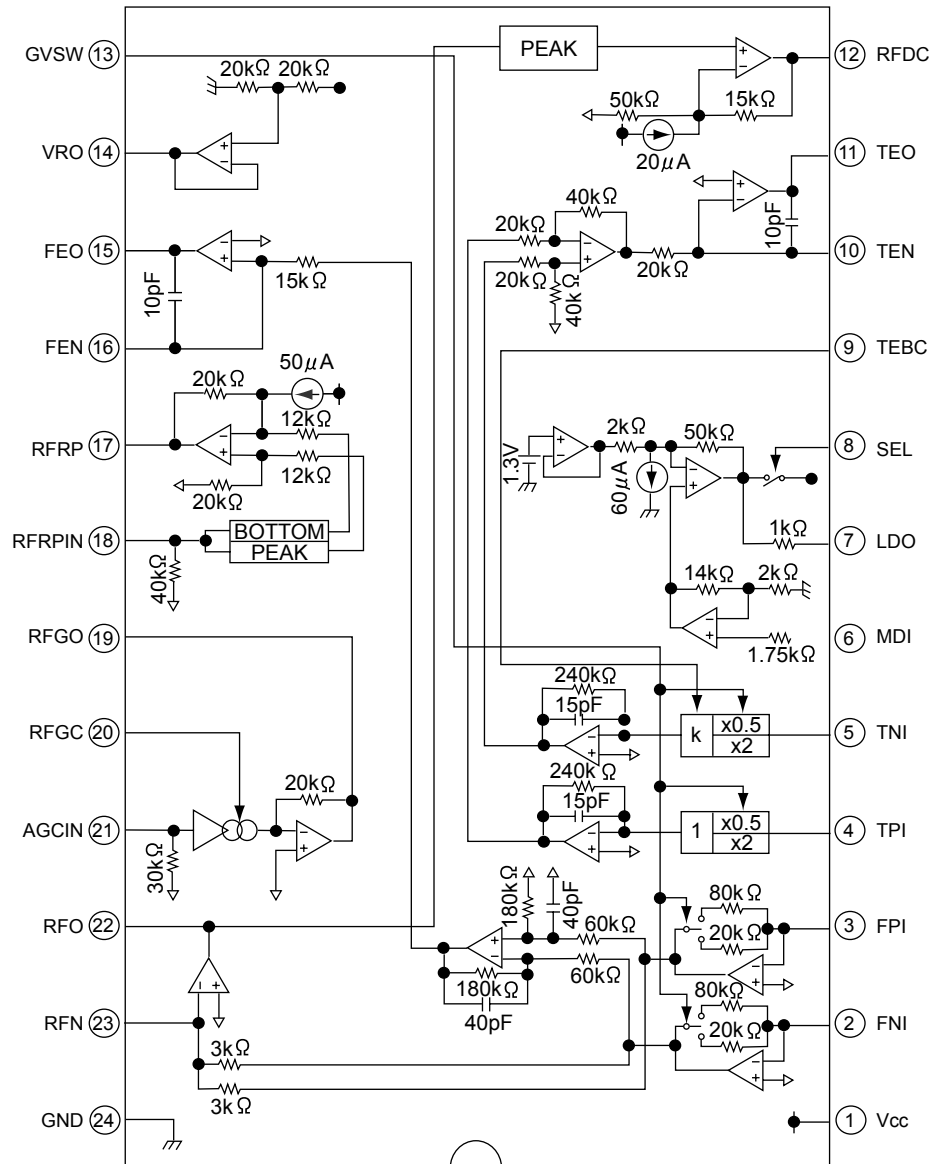
Pin No.	Symbol	Function
1	NC	Non connect
2	GND	GND terminal
3	VOUT	Reset signal output terminal
4	Vcc	Vcc terminal/Voltage detect terminal

#### 4.6 TA2147F-X (IC501) : RF amp.

- Terminal layout



- Block diagram



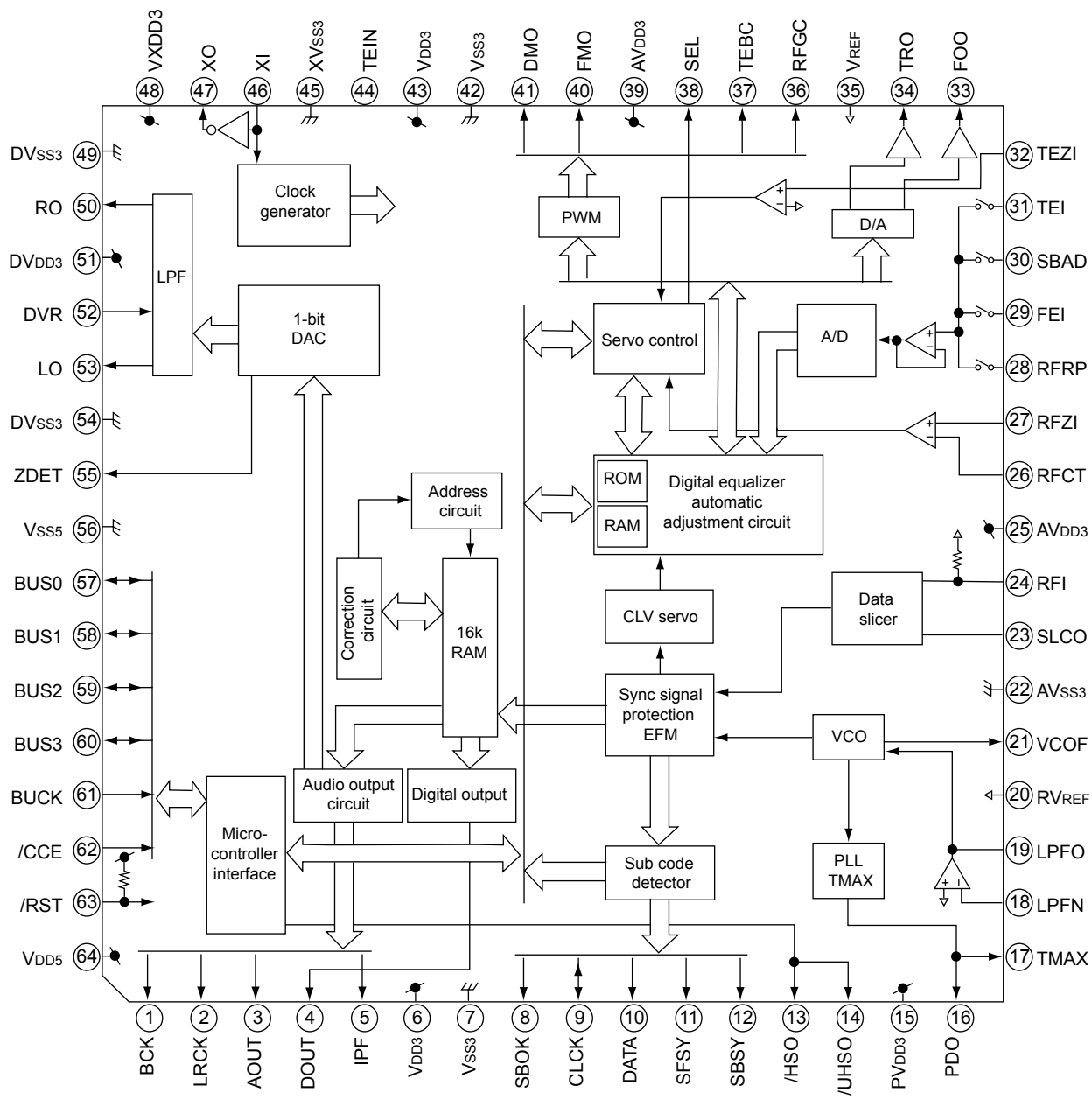


## • Pin function

Pin No.	Symbol	I/O	Function												
1	Vcc	-	3.3V Power supply pin												
2	FNI	I	Main-beam amp input pin												
3	FPI	I	Main-beam amp input pin												
4	TPI	I	Sub-beam amp input pin												
5	TNI	I	Sub-beam input pin												
6	MDI	I	Monitor photo diode amp input pin												
7	LDO	O	Laser diode amp output pin												
8	SEL	I	"APC circuit ON/OFF control signal laser diode (LDO) control signal, input or bottom/peak detection frequency change pin." <table><tr><td>SEL</td><td>APC circuit</td><td>LDO</td></tr><tr><td>GND</td><td>OFF</td><td>Connected to Vcc through 1kΩresistor</td></tr><tr><td>HIZ</td><td>ON</td><td>Control signal output</td></tr><tr><td>Vcc</td><td>ON</td><td>Control signal output</td></tr></table>	SEL	APC circuit	LDO	GND	OFF	Connected to Vcc through 1kΩresistor	HIZ	ON	Control signal output	Vcc	ON	Control signal output
SEL	APC circuit	LDO													
GND	OFF	Connected to Vcc through 1kΩresistor													
HIZ	ON	Control signal output													
Vcc	ON	Control signal output													
9	TEBC	I	"Tracking error balance adjustment signal pin Adjusts TE signal balance by eliminating carrier component from PWM signal(3-state output, PWM carrier = 88.2kHz) output from TC9490F/FA TEBC pin using RC-LPF and inputting DC. TEBC input voltage:GND~Vcc"												
10	TEN	I	Tracking error signal generation amp negative-phase input pin												
11	TEO	O	Tracking error signal generation amp output pin.Combining TEO signal and RFRP signal with TC9490F/FA configures tracking search system.												
12	RFDC	O	RF signal peak detection output pin												
13	GVSW	I	AGC/FE/TE amp gain change pin <table><tr><td>GVSW</td><td>Mode</td></tr><tr><td>GND</td><td>CD-RW</td></tr><tr><td>HIZ</td><td>CD-DA</td></tr><tr><td>Vcc</td><td>CD-DA</td></tr></table>	GVSW	Mode	GND	CD-RW	HIZ	CD-DA	Vcc	CD-DA				
GVSW	Mode														
GND	CD-RW														
HIZ	CD-DA														
Vcc	CD-DA														
14	VRO	O	Reference voltage (VRO) output pin *VRO = 1/2 Vcc when Vcc = 3.3V												
15	FEO	O	Focus error signal generation amp output pin												
16	FEN	I	Focus error signal generation amp negative-phase input pin												
17	RFRP	O	Signal amp output pin for track count Combining RFRP signal TEO signal with TC9490F/FA configures tracking search system.												
18	RFRPIN	I	Signal generation amp input pin for track count												
19	RFGO	O	RF signal amplitude adjustment amp output pin												
20	RFGC	I	"RF amplitude adjustment control signal input pin Adjusts RF signal amplitude by eliminating carrier component from PWM signal (3-state output, PWM carrier = 88.2kHz) output from TC9490F/FA RFGC pin using RC-LPF and inputting DC.*RFGC input voltage : GND-Vcc"												
21	AGCIN	I	RF signal amplitude adjustment amp input pin												
22	RFO	O	RF signal generation amp output pin												
23	RFN	I	RF signal generation amp input pin												
24	GND	-	GND pin												

4.7 TC9490FA (IC521) : DSP & DAC

- Pin layout & Block daiagram



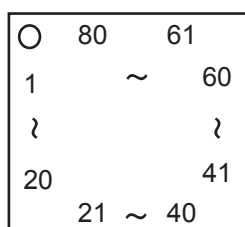
- Pin function

Pin No.	Symbol	I/O	Function															
1	BCK	O	Bit clock outputpin 32fs, 48fs, or 64fs selectable by command.															
2	LRCK	O	L/R channel clock output pin."L" for L channe and "H" for R channel. Output polarity can be inverted by command.															
3	AOUT	O	Audio data output pin. MSB-first or LSB-first selectable by command.															
4	DOUT	O	Digital data output pin. Outputs up to double-speed playback.															
5	IPF	O	Correction flag output pin.When set to "H", AOUT output cannot be corrected by C2 correction processing.															
6	VDD3	-	Digital 3.3V power supply voltage pin.															
7	VSS3	-	Digital GND pin.															
8	SBOK	O	Subcode Q data CRCC result output pin."H" level when result is OK.															
9	CLCK	I/O	Subcode P-W data read clockI/O pin. I/O polarity selectable by command.															
10	DATA	O	Subcode P-W data output pin.															
11	SFSY	O	Playback frame sync signal output pin.															
12	SBSY	O	Subcode block sync signal output pin. "H" level at S1 when subcode sync is detected.															
13	/HSO	O	Playback speed mode flag output pins.															
14	/UHSO	O	<table><tr><td>/UHSO</td><td>/HSO</td><td>Playback speed</td></tr><tr><td>H</td><td>H</td><td>Normal</td></tr><tr><td>H</td><td>L</td><td>Double</td></tr><tr><td>L</td><td>L</td><td>4 times</td></tr><tr><td>--</td><td>--</td><td>---</td></tr></table>	/UHSO	/HSO	Playback speed	H	H	Normal	H	L	Double	L	L	4 times	--	--	---
/UHSO	/HSO	Playback speed																
H	H	Normal																
H	L	Double																
L	L	4 times																
--	--	---																
15	PVDD3	-	PLL-only 3.3V power supply voltage pin.															
16	PDO	O	EFM and PLCK phase difference signal output pin.															
17	TMAX	O	TMAX detection result output pin. <table><tr><td>TMAX Detection result</td><td>TMAX Output</td></tr><tr><td>Longer than fixed period</td><td>"PVDD3"</td></tr><tr><td>Within fixed period</td><td>"HIZ"</td></tr><tr><td>Shorter than fixed period</td><td>"AVSS3"</td></tr></table>	TMAX Detection result	TMAX Output	Longer than fixed period	"PVDD3"	Within fixed period	"HIZ"	Shorter than fixed period	"AVSS3"							
TMAX Detection result	TMAX Output																	
Longer than fixed period	"PVDD3"																	
Within fixed period	"HIZ"																	
Shorter than fixed period	"AVSS3"																	
18	LPFN	I	Inverted input pin for PLL LPF amp.															
19	LPFO	O	Output oin for PLL LPF amp.															
20	PVREF	-	PLL-only VREF pin.															
21	VCOF	O	VCO filter pin.															
22	AVSS3	-	Analog GND pin.															
23	SLCO	O	DAC output pin for data slice level generation.															
24	RFI	I	RF signal input pin.Zin selectable by command.															
25	AV	-	Analog 3.3V power supply voltage pin.															
26	RFCT	I	RFRP signal center level input pin.															
27	RFZI	I	RFRP signal zero-cross input pin.															
28	RFRP	I	RF ripple signal input pin.															
29	FEI	I	Focus error signal input pin.															
30	SBAD	I	Sub-beam adder signal input pin.															
31	TEI	I	Tracking error input pin. Inputs when tracking servo is on.															
32	TEZI	I	Tracking error signal zero-cross input pin.															
33	FOO	O	Focus equalizer output pin.															

Pin No.	Symbol	I/O	Function
34	TRO	O	Tracking equalizer output pin.
35	VREF	-	Analog reference power supply voltage pin.
36	RFGC	O	RF amplitude adjustment control signal output pin.
37	TEBC	O	Tracking balance control signal output pin.
38	SEL	O	APC circuit ON/OFF signal output pin. At laser on, high impedance with UHS="L", H output with UHS="H".
39	AVDD3	-	Analog 3.3V power supply voltage pin.
40	FMO	O	Feed equalizer output pin.
41	DMO	O	Disc equalizer output pin.
42	VSS3	-	Digital GND pin.
43	VDD3	-	Digital 3.3V power supply voltage pin.
44	TESIN	I	Test input pin. Normally, fixed to "L".
45	XVSS3	-	System clock oscillator GND pin.
46	XI	I	System clock oscillator input pin.
47	XO	O	System clock oscillator output pin.
48	XVDD3	-	System clock oscillator 3.3V power supply voltage pin.
49	DVSS3	-	DA converter GND pin.
50	RO	O	R-channel data forward output pin.
51	DVDD3	-	DA converter 3.3V power supply pin.
52	DVR	-	Reference voltage pin.
53	LO	O	L-channel data forward output pin.
54	DVSS3	-	DA converter GND pin.
55	ZDET	O	1 bit DA converter zero data detection flag output pin.
56	VSS5	-	Microcontroller interface GND pin.
57 58 59 60	BUS0 BUS1 BUS2 BUS3	I/O	Microcontroller interface data I/O pins.
61	BUCK	I	Microcontroller interface clock input pin.
62	/CCE	I	Microcontroller interface chip enable signal input pin. At "L", Bus0 to BUS3 are active.
63	/RST	I	Reset signal input pin. At reset, "L".
64	VDD5	-	Microcontroller interface 5V power supply pin.

#### 4.8 UPD780058GC-291(IC601):CPU

##### • Terminal layout



##### • Pin function

Pin No.	PORT Name	I/O	Function
1	LCDDA	O	LCD driver data output
2	LCDSCK	O	LCD driver clock output
3	LCDCE	O	LCD driver chip enable output
4	GND	-	Connect to ground
5	VREF	-	Reference voltage output
6	POSCON	O	Position control output
7	AVREF1	-	Connect to 5V
8	NC	-	Unused output port
9	NC	-	Unused output port
10	CDCHECK	I	CD check mode input. Reset only.
11	EPROMDI	I/O	EEPROM data input
12	EOROMDO	O	EEPROM data output. Hi durring input.
13	EPROMCK	I/O	EEPROM clock input/output
14	NC	-	Unused output port
15	BUS I/O	O	JVC bus input/output control(Lo:input)
16	BUS SI	I	JVC bus data input
17	BUS SO	O	JVC bus data output
18	BUS SCK	I/O	JVC bus clock input/output
19	NC	-	Unused output port
20	NC	-	Unused output port
21	NC	-	Unused output port
22	NC	-	Unused output port
23	NC	-	Unused output port
24	NC	-	Unused output port
25	NC	-	Unused output port
26	CD ON	O	CD power control Hi:on
27	PWR CONT	O	Power supply control output Hi:on
28	POSMO+	O	Position motor control output
29	POSMO-	O	Position motor control output
30	TRAYMO+	O	Tray motor control output
31	TRAYMO-	O	Tray motor control output
32	BUCK	-	CD LSI data clock
33	GND	-	Connect to ground
34	LSI RESET	O	CD LSI reset
35	CCE	I/O	CD LSI chip enable
36	BUS0	I/O	CD LSI data 0(open drain)
37	BUS1	I/O	CD LSI data 1 (open drain)
38	BUS2	I/O	CD LSI data 2 (open drain)
39	BUS3	O	CD LSI data 3 (open drain)
40	NC	-	Unused output port
41	CD RW	O	CD-RW Detect signal output
42	NC	-	Unused output port

Pin No.	PORT Name	I/O	Function
43	NC	-	Unused output port
44	MAG IN	-	Magazine switch Lo:magazine inserted
45	TRAY OUT	O	Tray extend switch Lo:extension complete
46	TRAY IN	O	Tray retract switch Lo:retraction complete
47	REST	I	Resr switch
48	DISC SEL	O	Disc select output
49	EMPH	O	Emphasis select output Hi:on
50	NC	-	Unused output port
51	OE	-	Unused output port
52	SHOCK SW	I	Shock proof switch signal input
53	SHOCK	O	Shock proof output
54	NC	-	Unused output port
55	A.MUTE	-	Unused output port
56	MUTE PWR	O	Power supply for mute
57	STAGE	I	LCD,AD key,remote inhibit selector Low:inhibit
58	STAGE2	-	Unused output port
59	EPROM CLR	I	EEPROM clear input Functional only durring reset
60	RESET	I	Reset input (includes flash write in function)
61	REMOCON	I	Remote controller signal input
62	PWR DET	I	Memory power detect input
63	PWR SW	I	CRTL+B detect input
64	BUS INT	I	JVC bus com start interrupt input
65	EJECT	I	Eject key input
66	NC	-	Unused output port
67	GND	-	Connect to ground
68	VDD0	-	Conneto to VDD
69	X2	O	Oscillater (4.19430 MHz)
70	X1	I	Oscillater (4.19430 MHz)
71	GND	-	Connect to ground
72	XT2	O	Open
73	XT1	I	Connect to VDD
74	VDD	-	Connect to 5V
75	AVREF0	-	Connect to ADCONT
76	L SENSOR	I	Linear sensor input(8 bit A/D input)
77	KEY1	I	Key input 1 (8 bit A/D input)
78	KEY2	I	Key input 2 (8 bit A/D input)
79	KEY3	I	Key input 3 (8 bit A/D input)
80	KEY0	I	Key input 0 (8 bit A.D input)



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