

Service Manual

ORDER NO.
CRT4300

DVD MECHANISM MODULE(LS1)

CX-3250

- This service manual describes the operation of the DVD mechanism module incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for model under repair.

Model	Service manual	DVD Mechanism Module
DVH-P4100UB/XN/EW5 DVH-P4100UB/XN/UW5	CRT4256	CXK6800
DVH-P4150UB/XN/RC DVH-P4150UB/XN/RD DVH-P4150UB/XN/RI DVH-P4190UB/XN/ID	CRT4282	CXK6800

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1. CIRCUIT DESCRIPTIONS

1. Front end section (MN2DS0018MAUB : IC1501)

MN2DS0018MAUB is a 1 chip LSI for DVD-Player. A DVD-Player system can be constructed by connecting this LSI, driver IC, SDRAM, Flash-ROM, Audio-DAC, etc.

This LSI includes a front end (SODC/FE) which executes RF signal processing, servo processing and decode processing, a AV decoder(back end/BE) which executes video decode processing such as MPEG1/MPEG2/JPEG and audio decode processing such as DVD-Audio/Dolby Digital² /DTS/MP3, and a system controller which controls the system.

The front end section realizes optical head signal computation processing and RF signal processing, digital signal processing (16-8 demodulation, error correction) for DVD-ROM playback according to the DVD specifications, digital signal processing of CD-DA/CD-ROM (error correction), AV decoder transfer, servo control, spindle motor control and seek control.

In the case of MN2DS0018MAUB, the front end servo system waveforms, such as FE, TE and AS, are not observed as in the case of DVD mechanism module (MS5) CX-3212. Please pay attention.

1.1 Analog block (MN2DS0018MAUB : IC1501)

The functions of the analog block are as described below.

1. Reference power circuit
2. SERVO system/DPD system signal processing circuit
Gain switching amplifier and Low Pass Filter (LPF)
3. RF signal processing circuit
RF adding circuit, circuit to make inline, Variable Gain Amplifier (VGA) circuit
4. Laser power control (LPC) circuit
5. A/D converter for SERVO (10 bit, DPD system-4ch),DPD converter, PWM

1.1.1 APC circuit

The optical output of the laser diode (LD) has a large negative temperature characteristic.

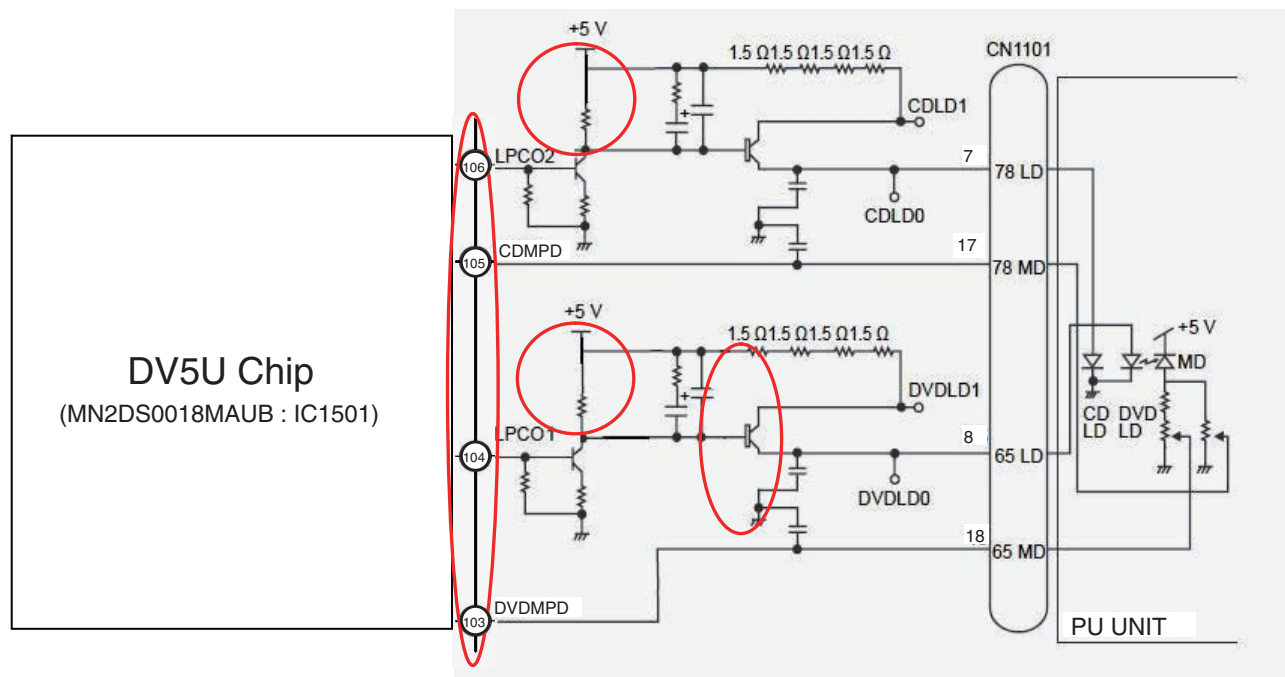
Therefore, if the LD is driven by a constant current, a constant optical output cannot be obtained.

APC circuit is a circuit to control the current so that the output at the monitor diode (MD) will be constant.

MN2DS0016AAUB includes 2 types of APC circuit, one for DVD and the other for CD.

The LD current can be obtained by dividing the measured voltage between DVDLD1 (CDLD1) and 5 V by 6 Ω ($1.5 \Omega \times 4 = 6 \Omega$), in the case of DVD (CD). It will be approximately 50 mA (45 mA) in the case of DVD (CD).

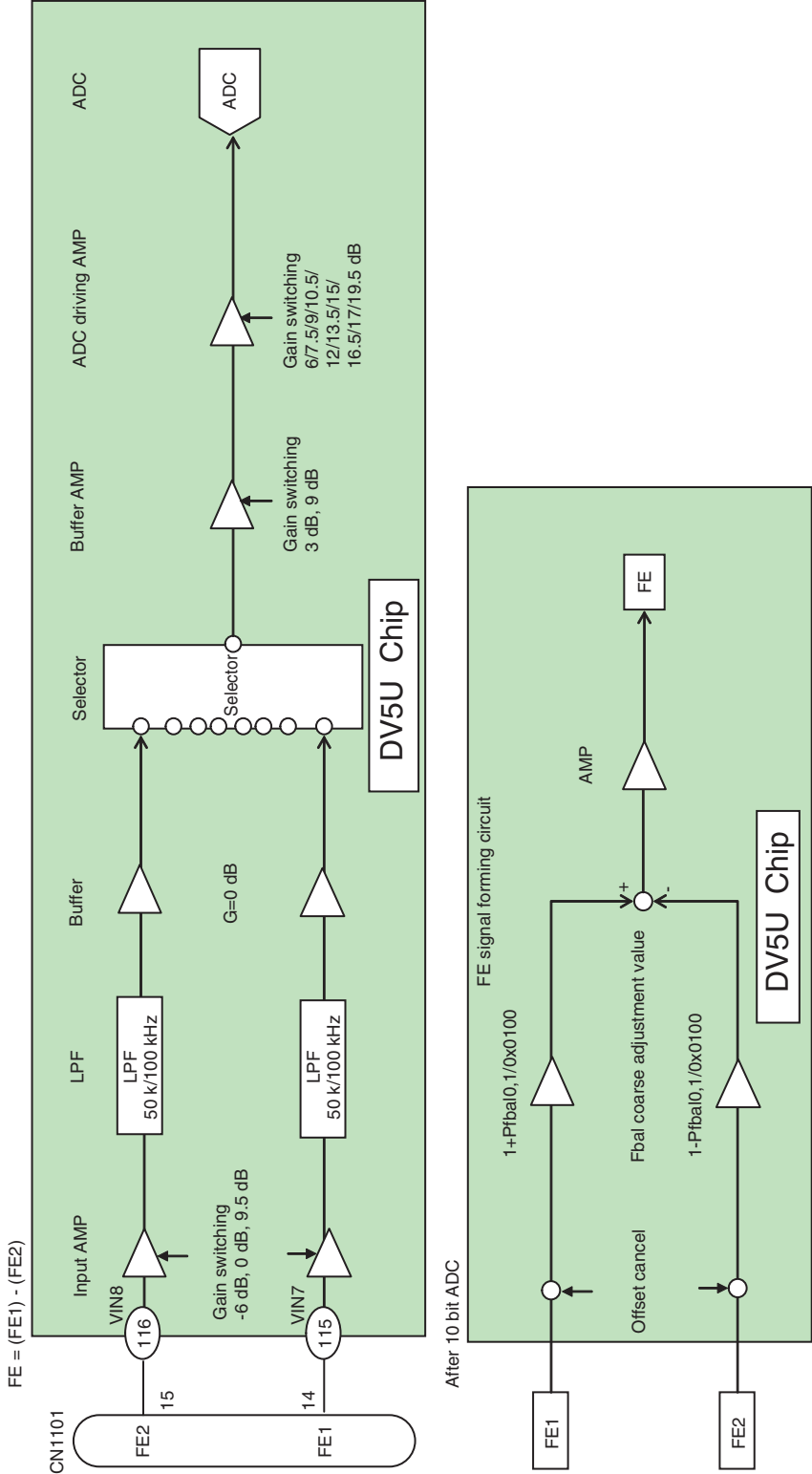
The potential difference between DVDLD1(CDLD1) and 5 V is set to approx. 300 mV(270 mV).



1.1.2 FE forming circuit

Focus error (FE) forming circuit

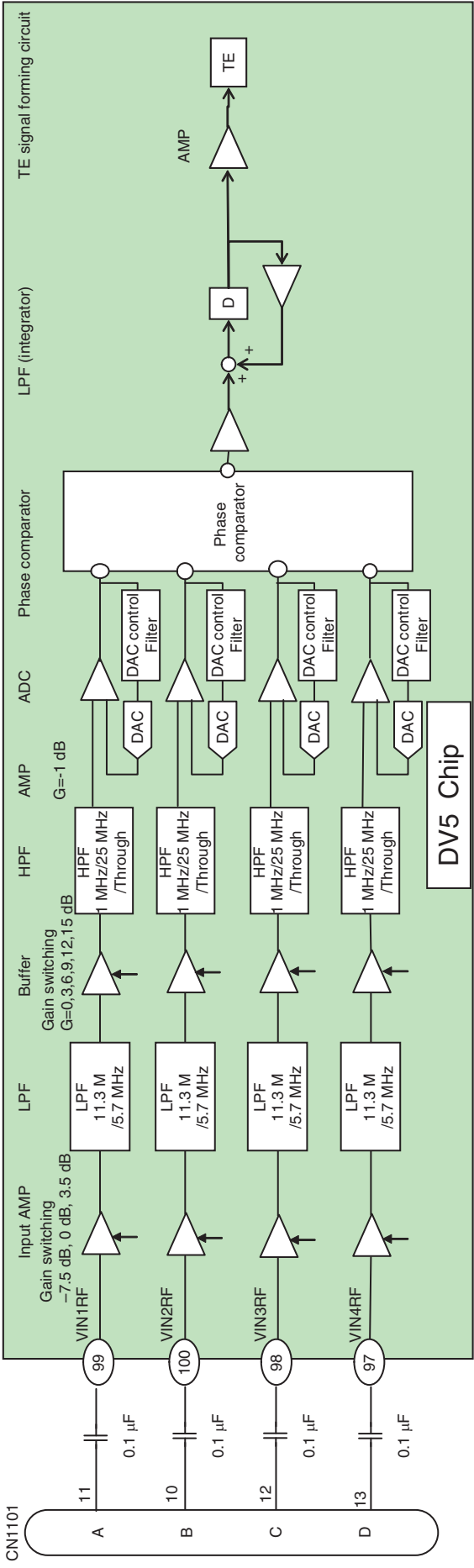
The signal from PU, FE1 and FE2, are AD converted inside IC1501 and captured. After that, a differential is obtained by taking the offset cancellation into consideration, and FE is obtained.



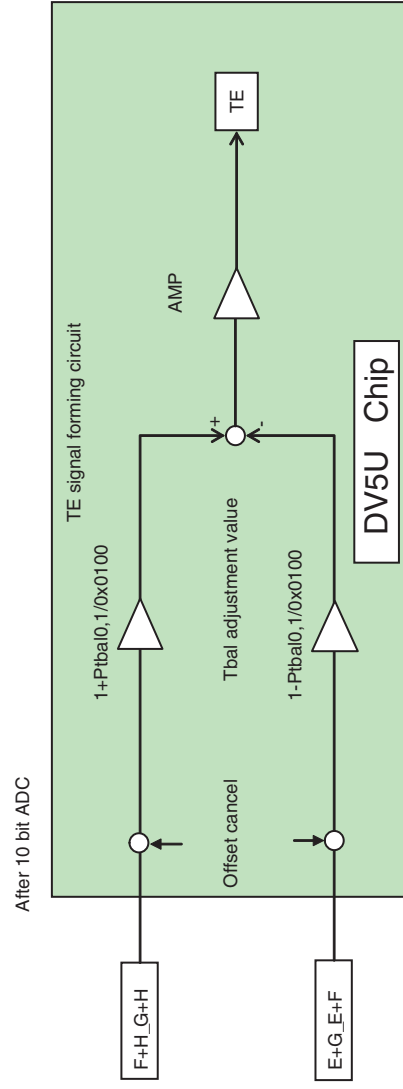
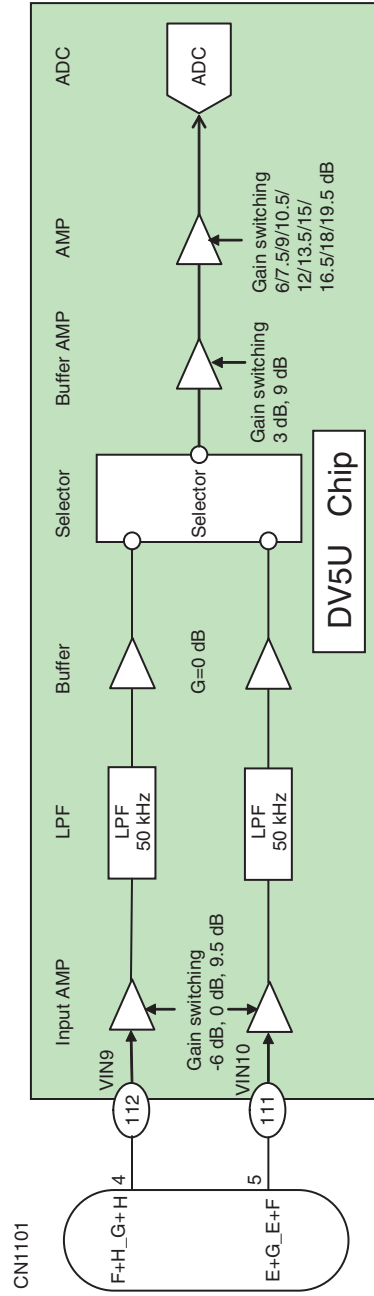
1.1.3 TE forming circuit

Tracking error (TE) forming circuit
In the case of a DVD, the phase difference method is used for TE forming, and the TE is formed from the phase difference among (A+C) and (B+D).
In the case of a CD, 3 beam method is used, and after entering the signal into a variable amplifier, it is AD converted, and a TE is formed by the equation of $TE = (F + H_G + H) - (E + G_E + F)$.

• DVD (phase difference TE)



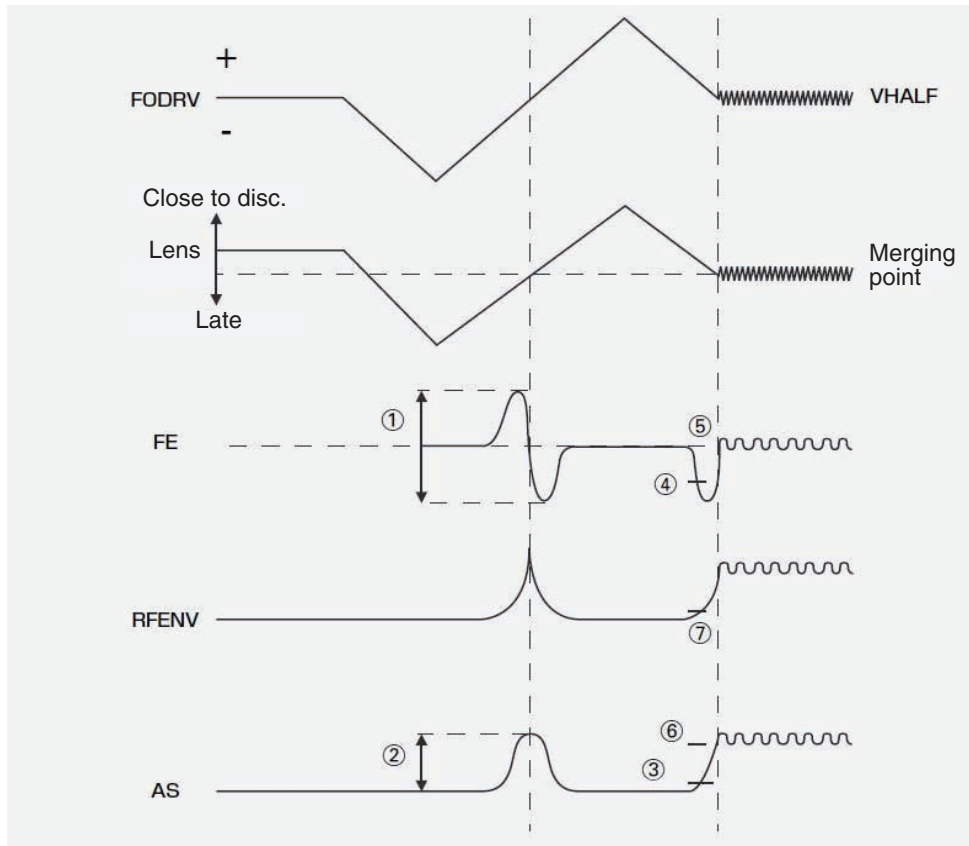
• CD (3 beam TE)



1.2 Servo block (MN2DS0018MAUB : IC1501)

At the servo block, focusing, tracking, servo control of traverse, spindle motor control and seek control are performed.

1.2.1 Focus close



After issuing the focus close command, both the DVD and the CD will perform the following processing.

1. Measurement and optimization of the signal level.

First the PU lens is driven in the direction getting away from the disc, then it is driven in the direction getting close to the disc. At this time, each signal level of FE, AS and RFENV are measured at the focused focal point that the lens passes, and the levels of FE and AS are optimized. (1 and 2 in the figure)

2. Focus adjustment

Next, after detecting the drawing level of FE and AS by driving the lens away from the disc, the focus loop filter is activated and the focus is drawn. (3~6)

3. Confirmation of adjustment

Confirm the drawing at the signal level of AS and RFENV. (6, 7)

The signal levels of FE, AS and RFENV and the focus drive voltage can be checked by the focus search in the test mode.

1.2.2 Tracking close

After issuing the tracking close command, both the DVD and the CD will perform the following processing.

1. Tracking brake

1/2 cycle of the track cross is measured and if the cycle is within the specified range, the brake pulse is output.

The output direction of the brake pulse is determined by the phase relationship of the OFTR and the TKC (binary signal of TE) signals. When it is confirmed that the swinging of the lens against the disc has been controlled, braking will be stopped and enters into drawing. If the drawing conditions are not met within 10 msec, after the brake output, the brake will be ended and entered into drawing.

2. Tracking adjustment

Tracking drive hold processing by the OFTR signal will be performed.

3. Confirmation of adjustment

Checking is made that the number of track jumps within the specified period of time are at the designated numbers or less. The time out for confirmation of adjustment is 8.4 msec. and retry is performed by the command from the microcomputer.

1.2.3 Track jump

In this system, one of the three methods, interval jump, multi jump or traverse seek, is selected depending on the number of target moving tracks.

1. Interval jump

Detailed seek can be performed to execute repeated track jump of 1 track, and it is used when the target track gets close or at the time of seek operation to the adjacent track.

2. Multi jump

Both edges of the track cross signal TKC are counted, and track count move of the designated number is executed. Furthermore, the CRG motor is driven according to the number of jumps.

3. Traverse seek

Track count by TKC is performed, and I control movement speed and seek it.

I minimize vibration of PU occurring for movement.

It indicates the setting for jump switching common to DVD and CD.

Types of target move number of jumps.

DVD

1~10 Interval jump

11~500 Multi jump

501~1000 Combination of multi jump and interval jump

1001~ Traverse seek (short)

CD

1~10 Interval jump

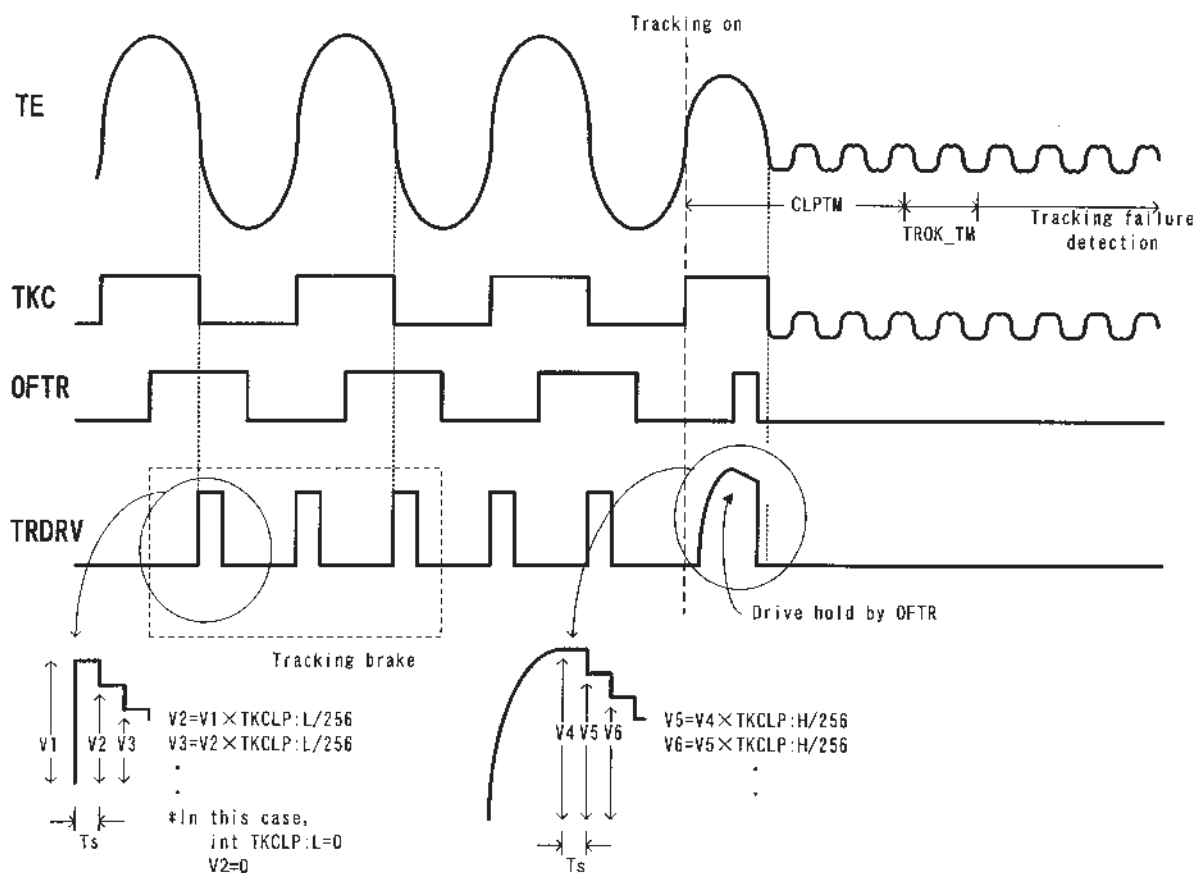
11~100 Multi jump

101~500 Combination of multi jump and interval jump

501~ Traverse seek (short)

The waveform of track jump is shown on the next page.

Tracking-on process

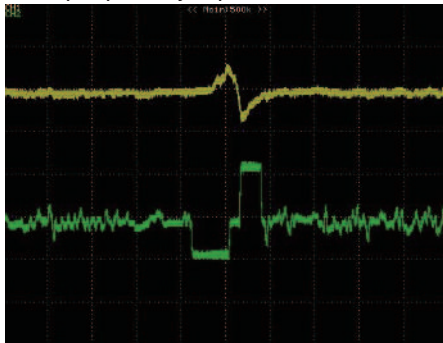


Interval jump (1 track) DVD

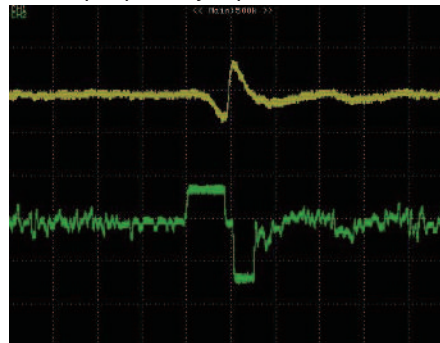
Outer peripheral jump

TE

TD



Inner peripheral jump

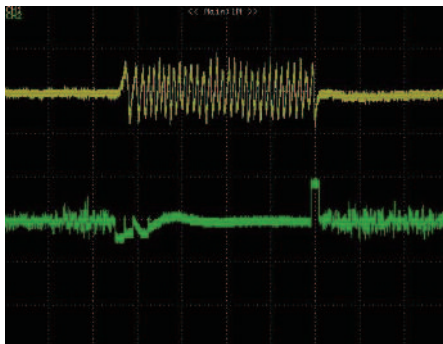


Multi jump (32 track) DVD

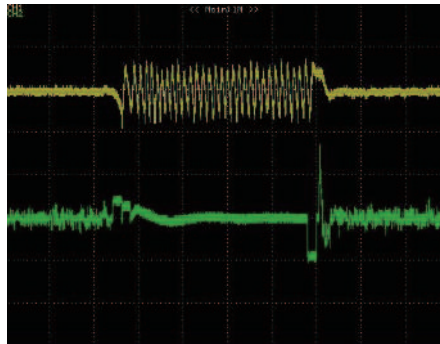
Outer peripheral jump

TE

TD



Inner peripheral jump



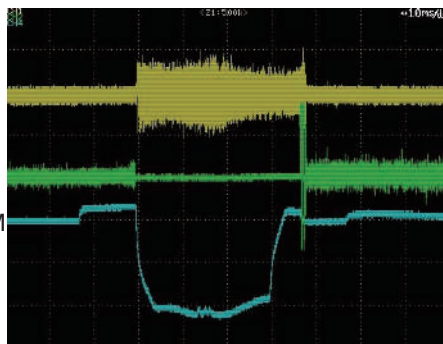
Traverse seek (1001 tracks) DVD

Outer peripheral jump

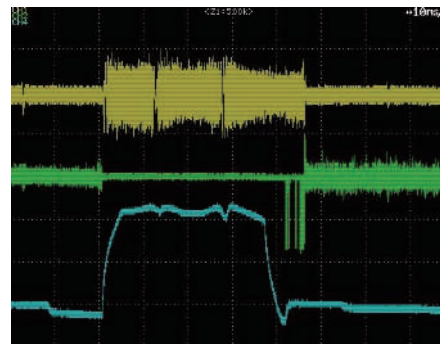
TE

TD

COP-COM



Inner peripheral jump



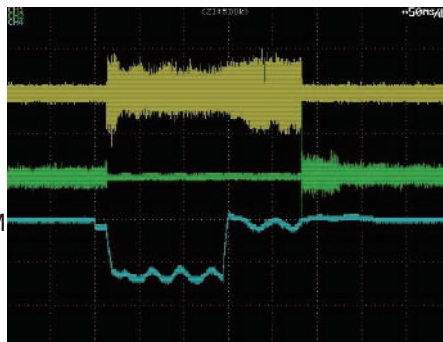
Traverse seek (10 000 tracks)

Outer peripheral jump

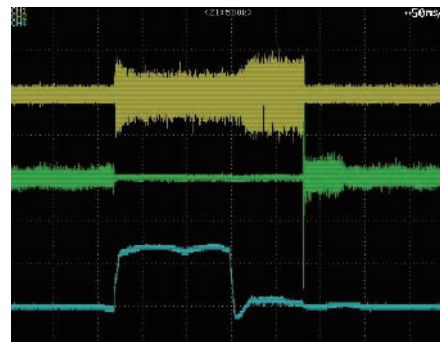
TE

TD

COP-COM

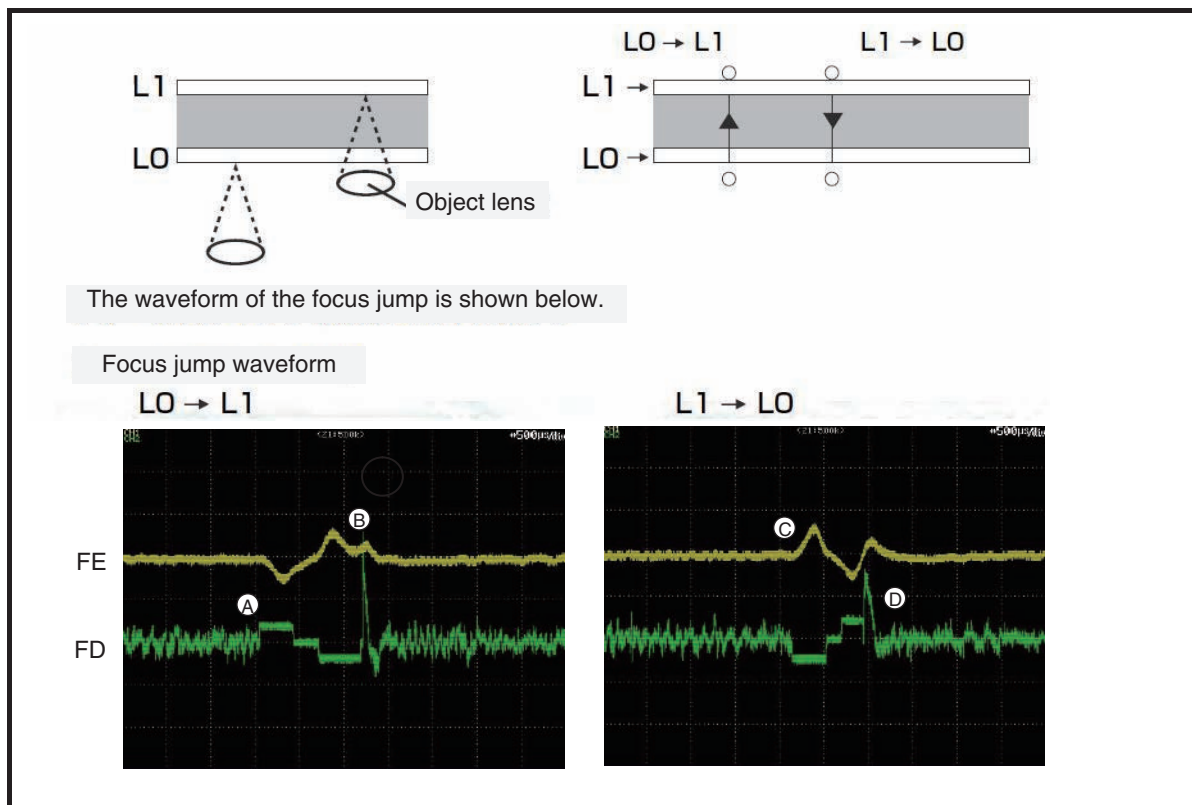


Inner peripheral jump



1.2.4 Focus jump

Focus jump is a function compatible to 2 layers on one side or 2 layers on both sides. Looking from the object lens, the layer close to the lens is called "layer 0" (L0) and the layer away from the lens is called "layer 1" (L1).



The flow of the focus jump is shown below.

1. The tracking is opened by the layer being played back.
2. A command is issued to execute jump to the target layer.
3. The tracking is closed at the layer after the jump and the playback is resumed.

Incidentally, the process when the jump command is issued is as described below.

1. The lens is accelerated to the target layer until the FE signal detects the focus jump acceleration end level. Acceleration will be ended by force, however, if the time for acceleration timeout has elapsed before detecting the acceleration end level.
2. The drive voltage is not output until the FE signal detects the speed reduction start level, and the lens is moved by inertia.
3. The lens speed is reduced from detection of the speed reduction start level until detection of the speed reduction end level. Speed reduction will be ended by force, however, if the time for speed reduction timeout has elapsed before detecting the speed reduction end level.

1.3 Auto adjustment function

All circuit adjustments are automated in this system.

Details of each auto adjustment are explained below.

1.3.1 VIN7, VIN8, VIN9, VIN10 offset cancel

Each signal from VIN7,8, 9 and 10 output by PU is converted to a digital signal by the AD converter in the servo block. Offset cancel is a function to cancel input offset of the AD converter at the time of power ON.

1.3.2 VCO gain adjustment (VARI adjustment)

It has a function to absorb variation of VCO gain among individual LSI by learning so that auto adjustment is made to maintain the VCO gain at a certain level. VCO is locked against the reference frequency for learning.

And, a frequency control value (FCNT) is read, and VARI register is adjusted so that the read value becomes the same as the target FCNT value.

1.3.3 FE normalization adjustment

FE signal level measured at the time of focus close is adjusted so that it will become 190LSB at the digital equalizer input stage.

1.3.4 Focus balance (FBAL) adjustment

The focus position is adjusted so that the RFENV will be the maximum at the time of focus close tracking open and tracking close.

1.3.5 DPD amplitude adjustment

I perform the gain adjustment of the analog step so that the input signal of the DPD comparator of the TE generation circuit of the DVD becomes constant.

1.3.6 Learning of tracking error amplitude

At the time of focus close and tracking open, the lens is oscillated in the track direction and adjusted so that the TE amplitude level becomes 190 LSB at the digital equalizer input stage.

1.3.7 Tracking balance (TBAL) adjustment

At the time of focus close and tracking open, the lens is oscillated in the track direction and the balanced point where the DC offset becomes zero is searched and adjusted by using the Newton-Raphson method.

1.3.8 OFTR adjustment

The binary threshold level is adjusted to make the OFTR signal into a binary digit.

1.3.9 AS normalization adjustment

The AS signal level is measured for the designated number of samples at the time of track closing, and after A/D conversion at the ADSC, it is fine adjusted to become 64 LSB at the digital equalizer input stage.

1.3.10 Focus gain adjustment, tracking gain adjustment

At the time of tracking close, a disturbance is entered into the servo loop to adjust to the target gain intersection.

All auto adjustments can be confirmed by displaying the adjustment result in the test mode.
The list of auto adjustment coefficient

State	Coefficient	DVD	CD
Power ON	VIN7 offset	05FB~0A17	←
	VIN8 offset	05FB~0A17	←
	VIN9 offset	-	0533~0B0C
	VIN10 offset	-	0533~0B0C
F close	FEPP(FEMAX-FEMIN)	1D84~6C08	2E18~A8CF
	AS MAX	No standard	←
	FE normalization	No standard	←
F close (after TBAL)	TEPP(TEMAX-TEMIN)	2328~59D8	1E91~98D1
	TE normalization	No standard	←
T close	F gain	0100~0400	←
	T gain	0100~0400	←
	AS normalization	No standard	←

Note) Coefficient values are indicated in hexadecimal. In all cases, specifications at the production line are described. For discs, TDV-582 is used for DVD and TCD-792 is used for CD.

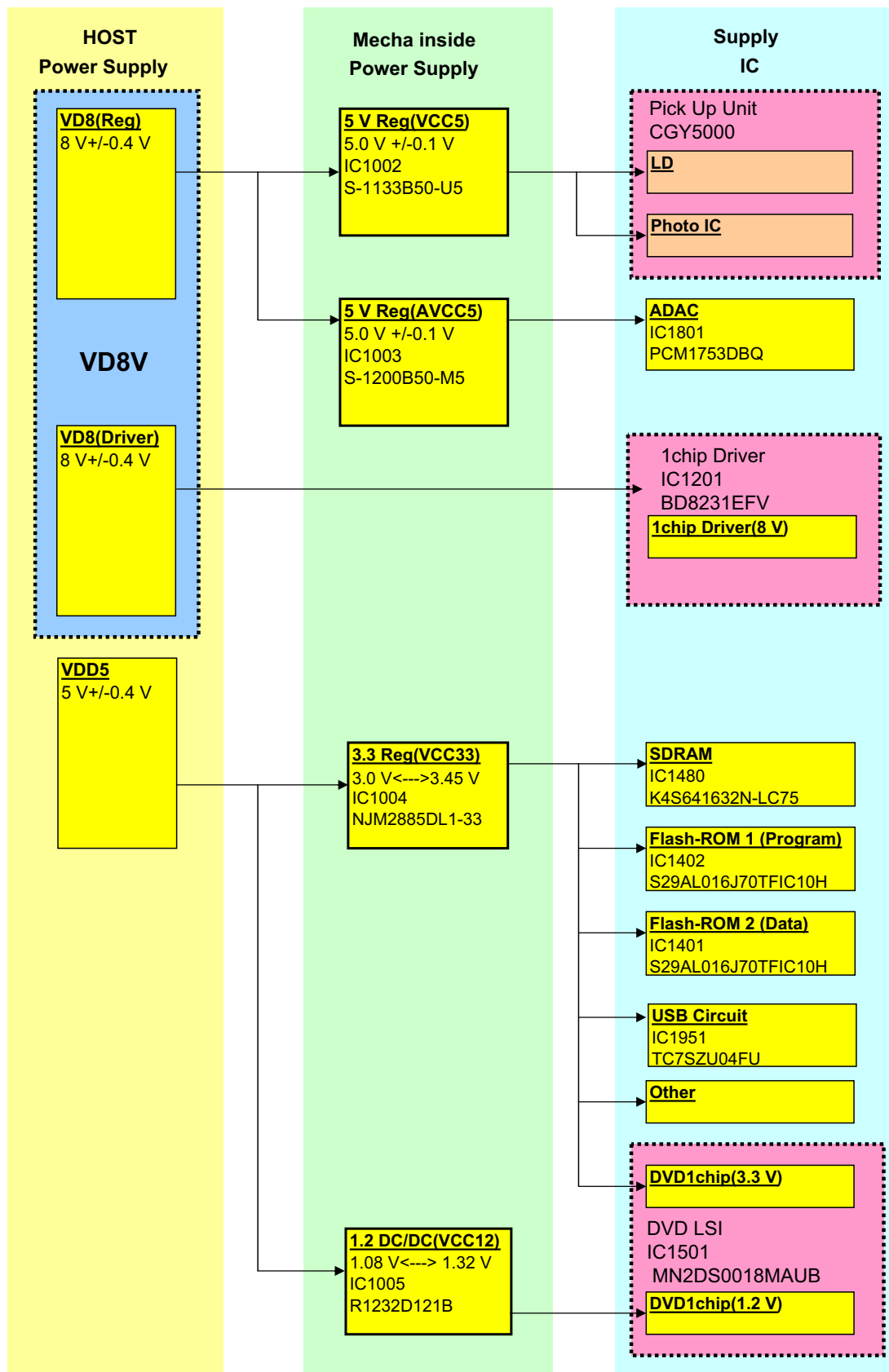
1.4 CIRC block (MN2DS0018MAUB : IC1501)

The CIRC block includes the digital signal processing function (EFM modulation and error correction) of CD-DA and CD-ROM and the digital servo processing function of the spindle motor.

1.5 DRC block (MN2DS0018MAUB : IC1501)

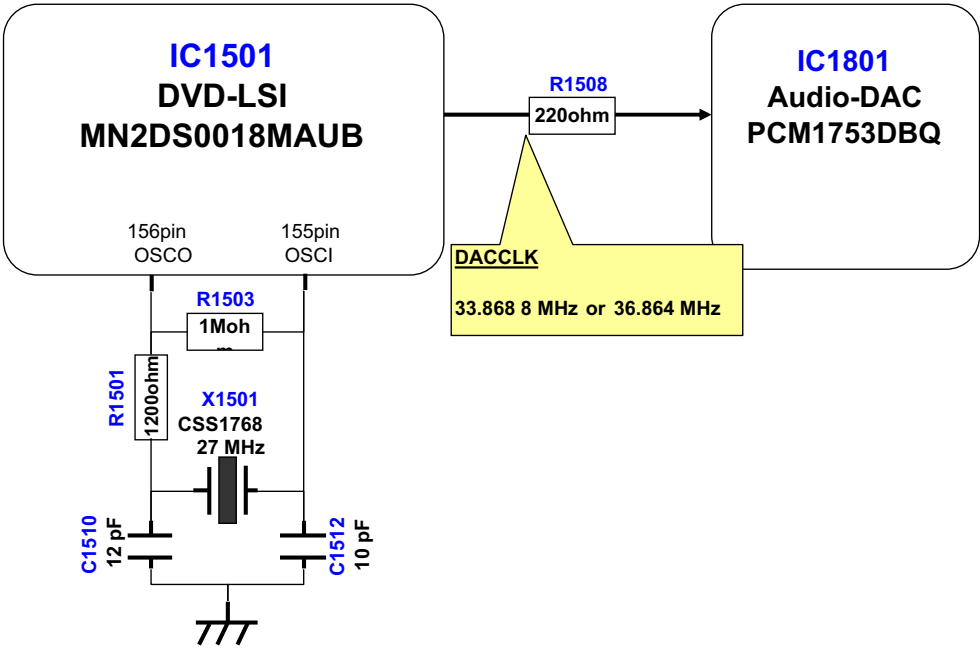
The digital read channel (DRC) is equipped with A/D converter, digital equalizer (DEQ), Adaptive filter, Viterbi detector, digital PLL circuit, RISC interface and periphery circuits for reading of signal on optical disc.

1.6 LS1 Power Supply Map

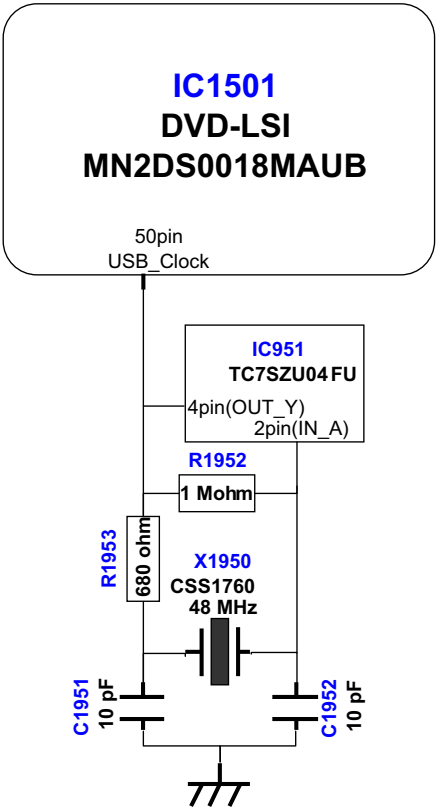


1.7 LS1 Clock circuit

[Outline]
By connecting a 27 MHz crystal oscillator to DVD-LSI (IC1501), DACCLK for externally connected Audio-DAC is formed and supplied by the clock generator inside the DVD-LSI in addition to the clock used inside the LSI.



[USB_Clock outline]
By connecting a 48 MHz crystal oscillator to DVD-LSI (IC1501), clock is formed and supplied by the clock generator inside the DVD-LSI in addition to the clock used inside the USB circuit.



1.8 LS1 Audio circuit

[Outline]

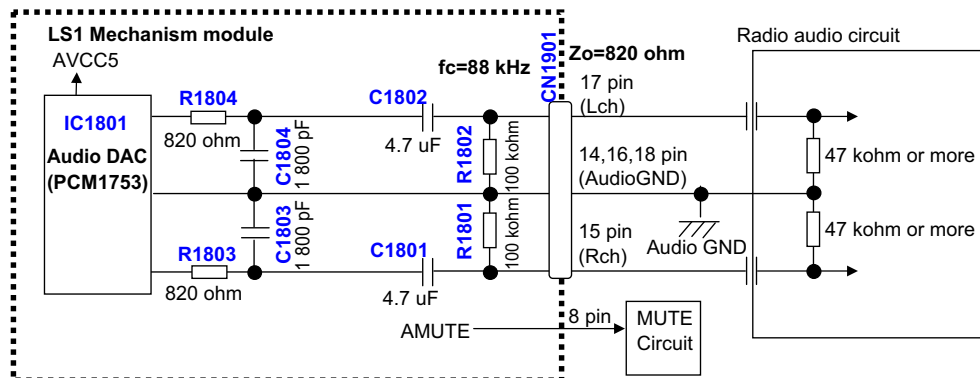
1 Analog audio signal

Serial 3 line digital output + DACCLK (audio clock) output from DVD-LSI (IC1501) are converted to analog audio signal by Audio-DAC (IC1801), and are output from HOST IF connector (CN1901). Furthermore, analog MUTE signal is also output from DVD-LSI (IC1501) via HOST IF connector (CN1901) simultaneously.

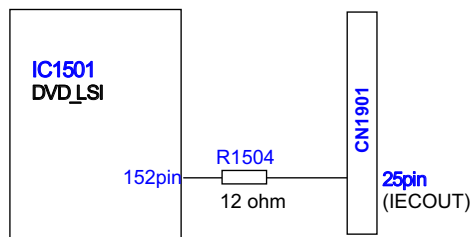
2 Digital audio signal (IEC60958/IEC61937)

Digital audio signal (IEC60958/IEC61937), output from DVD-LSI (IC1501), is output via Multi-ch/Ripping IF connector (CN1901).

[Analog audio signal]

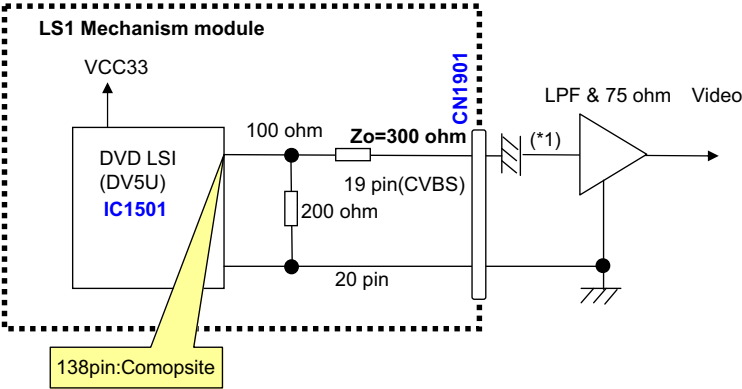


[Digital audio signal]



1.9 LS1 Video circuit

[Outline]
Composite signal is output from DVD-LSI (IC1501), and output from HOST IF (CN1901).



1.10 LS1 SDRAM I/F

[Outline]

It is a memory for realizing the AV decoding function of DVD-LSI (IC1501). It is used for various purposes such as buffering of stream data before decoding, working area for decoding, and storing of AV data or output data after decoding.

SDRAM interface

*When viewed from DVD-LSI

Signal Name	Bits	I/O	Description
MDQ[15:0]	16	I/O	Data bus of external SDRAM
MA[11:0]	12	O	SDRAM address
BA[1:0]	2	O	SDRAM bank address
NRAS	1	O	RAS signal of SDRAM
NCAS	1	O	CAS signal of SDRAM
NEW	1	O	Write enable signal of SDRAM
NCS	1	O	Chip select signal of SDRAM
DQM[0]	1	O	SDRAM data mask 0
DQM[1]	1	O	SDRAM data mask 1
MCK	1	O	Clock input to SDRAM
MCKI	1	I	Clock input for data input from SDRAM

SDRAM specifications

Data bus width: 32 bit

Operating frequency: 121.5 MHz

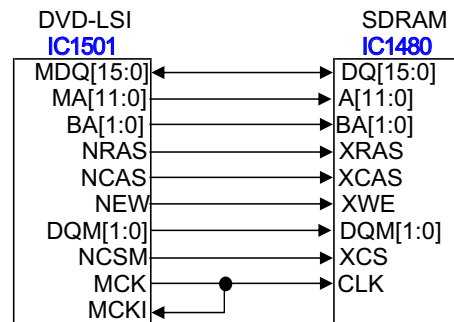
CAS latency=3

8 word burst transfer

Manual precharge

CAS before RAS refresh (Auto refresh)

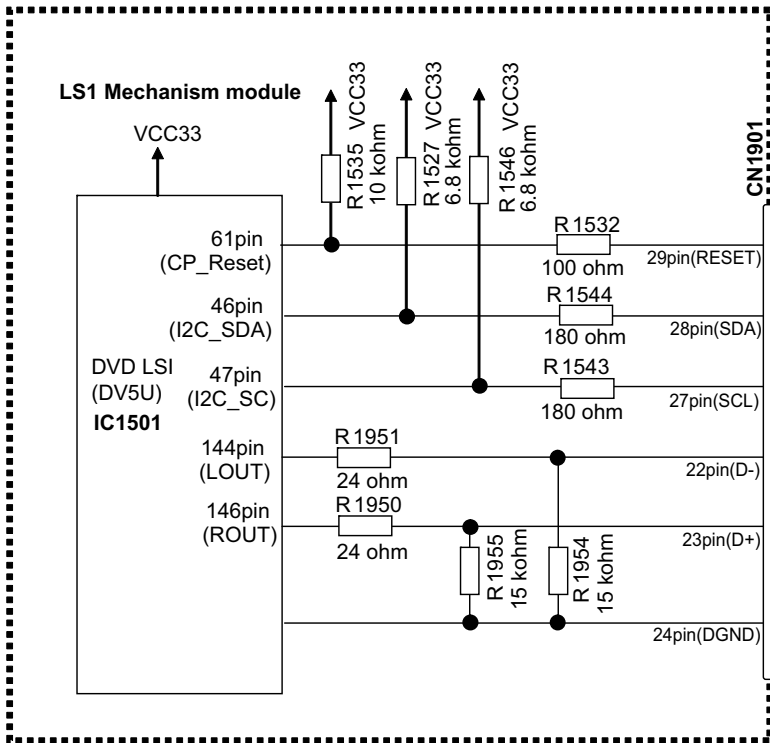
SDRAM connection configuration



1.11 LS1 USB(iPod)circuit

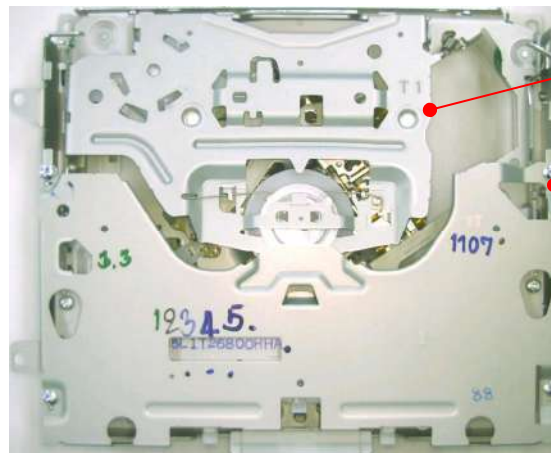
[Outline]

It inputs a D-/D+ signal into DVD - LSI (IC1501) than HOST IF (CN1901).
It uses CP_RESET, SDA, SCL by the iPod certification.



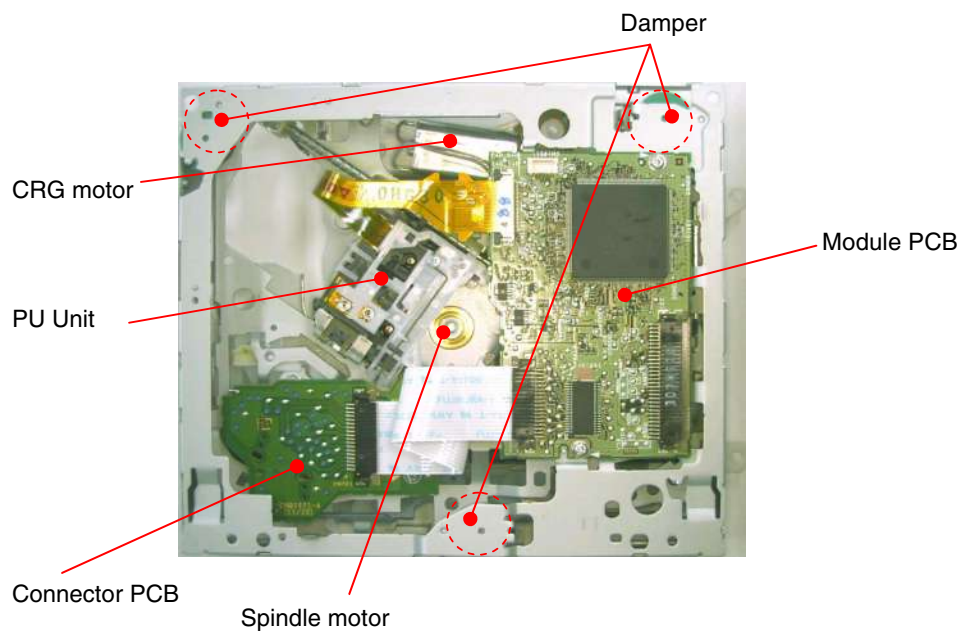
2. MECHANISM DESCRIPTIONS

Construction



CRG mechanism

Upper/Under Frame



Damper

CRG motor

PU Unit

Connector PCB

Spindle motor

Module PCB

State of CRG mechanism

Clamper arm assy

A

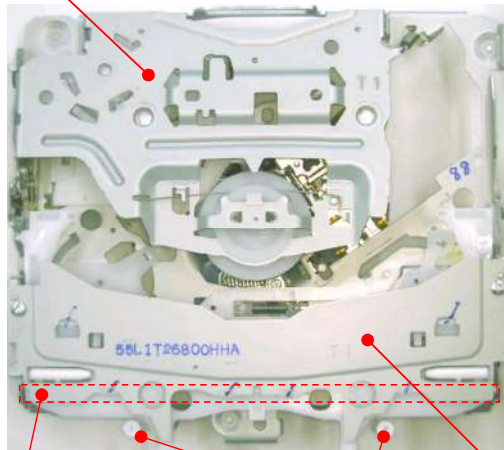
B

C

D

E

F



Roller arm assy

SW arm

Disc guide assy



Disc loading operation

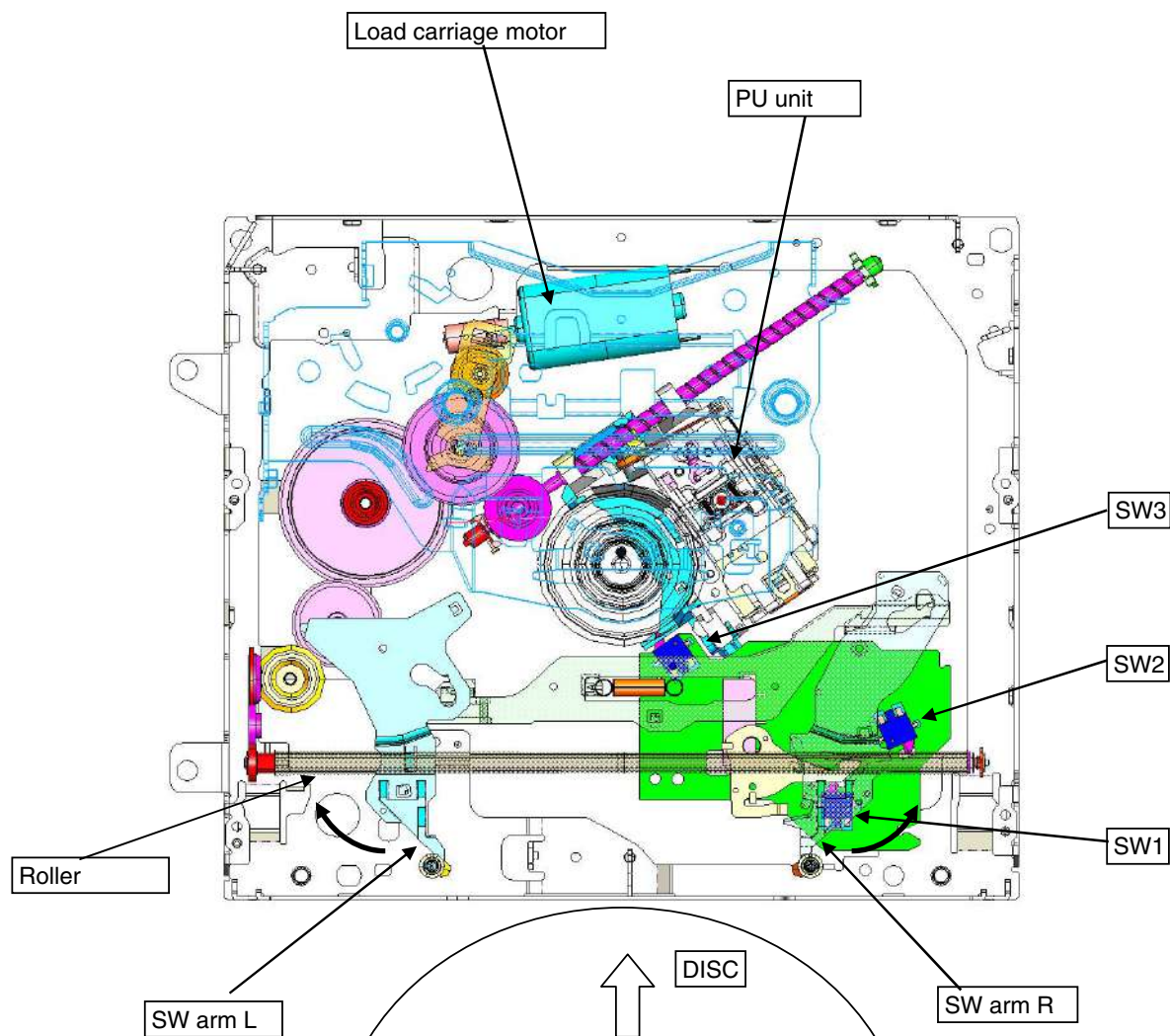
1. When the disc is inserted, the SW arm L and R rotate and then SW1 turns ON from OFF.

By the SW1 turning ON from OFF, the load carriage motor starts and then the rubber roller rotates.

2. In the case for a 12cm disc, SW1 is turned OFF from ON by the SW arm being opened widely and then the microcomputer determines that the disc is 12cm.

3. In the case for a 8cm disc, SW arm does not open widely, so SW1 is not turned OFF from ON but goes into the clamp movement and then the microcomputer determines the disc to be 8cm.

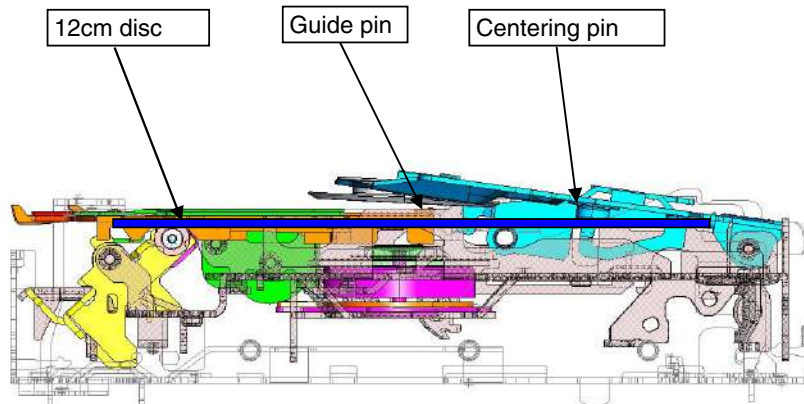
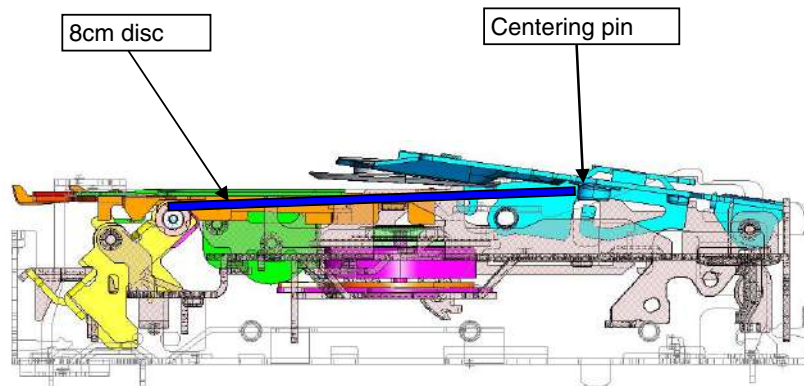
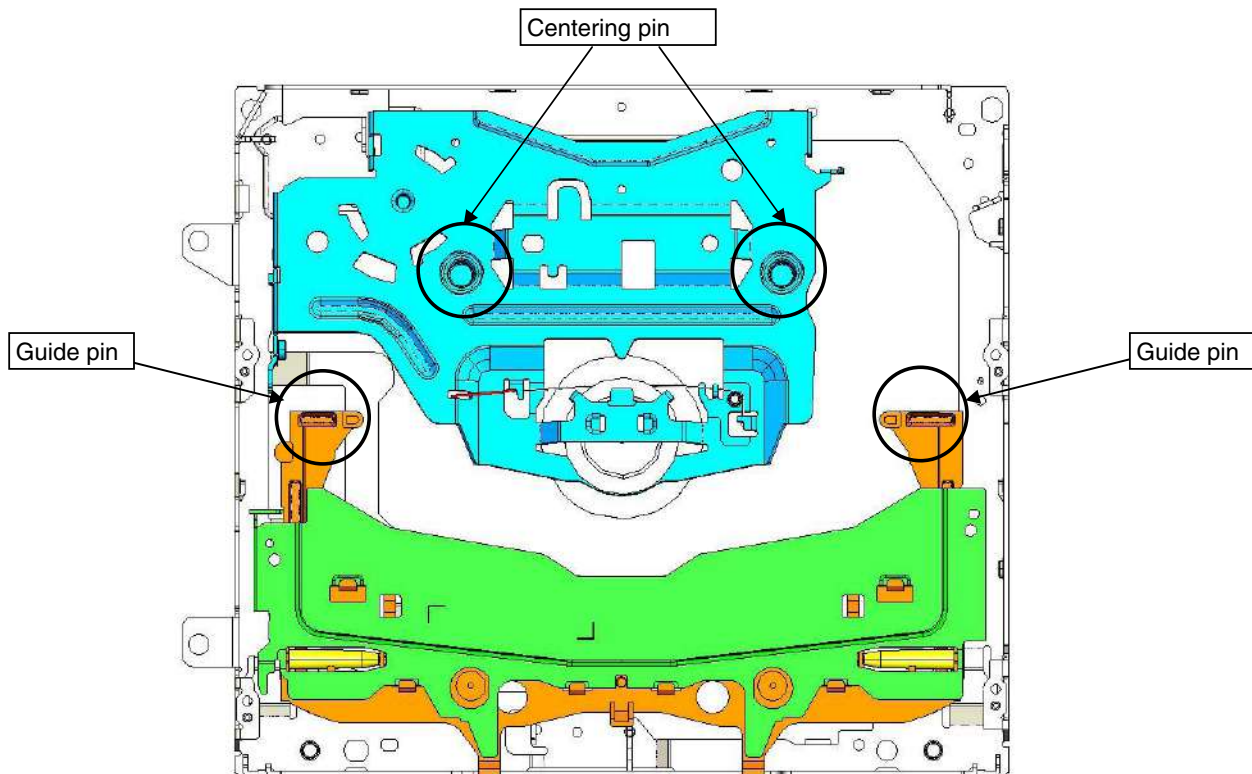
(SW arms are jointed on both sides, and even if one side is pushed, the joint part is locked and the arms do not open more than a fixed width. (SW1 is not turned OFF from ON.))



Disc centering mechanism

1. 8cm disk is centered with the guide pin and the centering pin.

2. 12cm disk passes under the guide pin and the centering pin, and is centered at the mechanism interior position.



Clamp Operation Structure

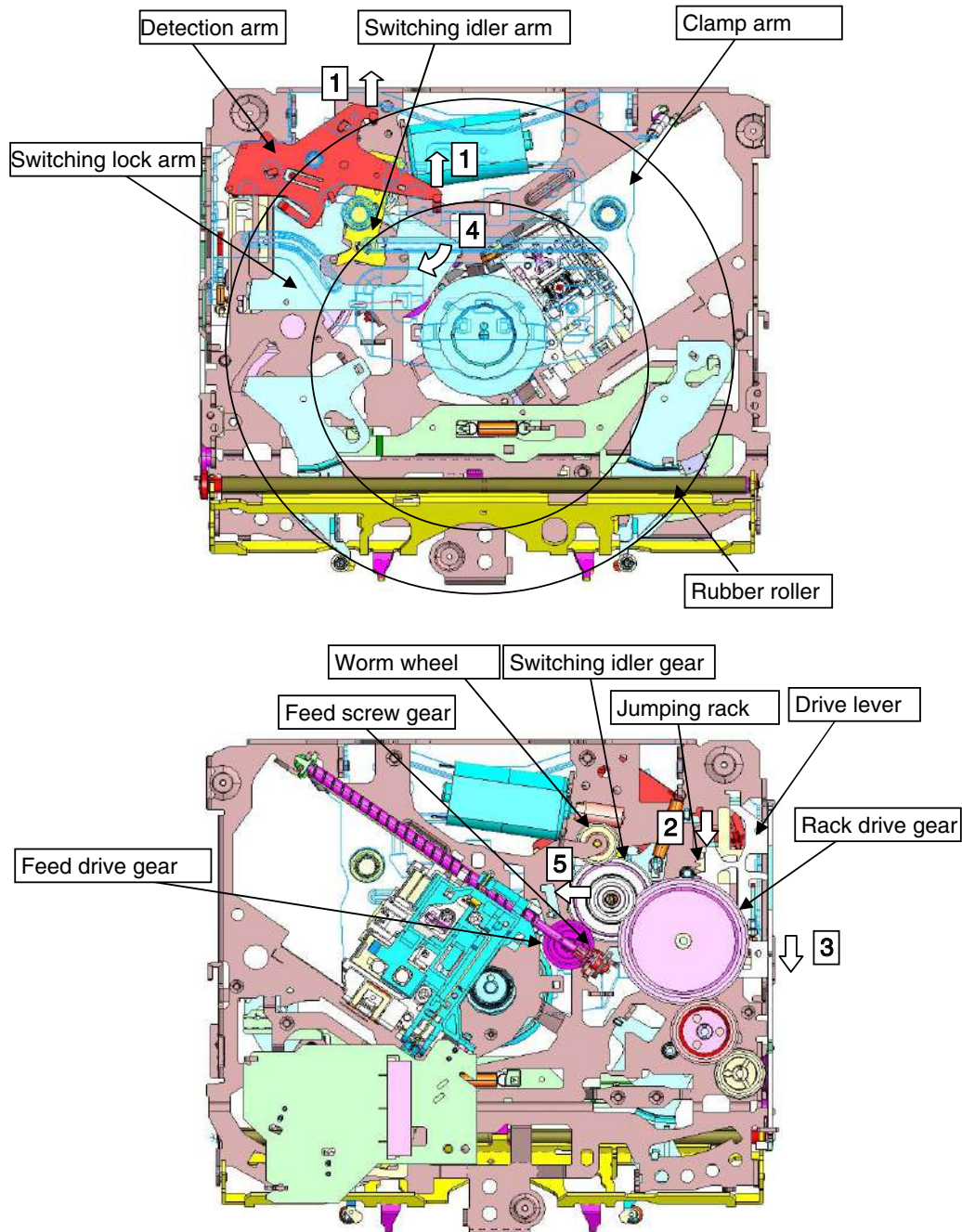
1. Drive the detection arm at the position where 8 or 12 cm disc is centered on the spindle.

2. Detection arm matches the jumping rack with the rack drive gear.

3. The drive lever that was jointed with the jumping rack slides and then lowers the clamp arm (it clamps the disc.).
At the same time, it rotates the roller arm and separates the rubber roller from the disc.

Moreover, rotation of the roller arm releases the upper and lower mecha locks and completes the clamp operation.
4. After the completion of the clamp operation, the control by the cam above the drive lever is released and then the switching lock arm rotates.

When the same arm rotates, the switching idler gear is separated from the rack drive gear and meets with the feed screw drive gear and then the carriage operation is executed.



Ejecting Operation

1. It starts the ejecting operation in the reverse order of above procedures when the load carriage motor rotates in the reverse direction and the pick up is sent to the inner periphery with the home SW ON or more.

2. Ejection is completed when SW1 goes OFF->ON->OFF for 12cm disc.

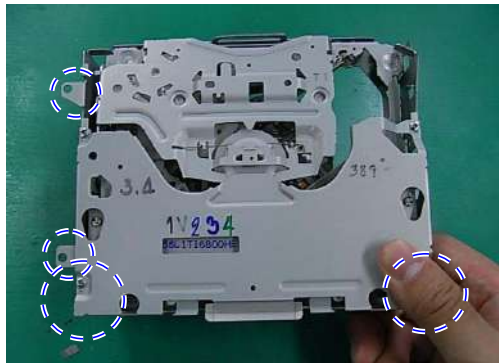
3. Ejection is completed when SW1 goes ON->ON->OFF for 8cm disc.

3. DISASSEMBLY

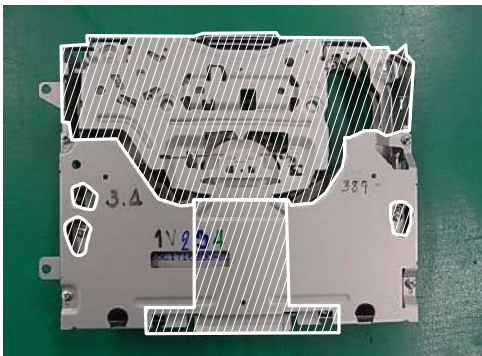
How to have it

1. Have a specified part.
Please note that holding the front part of the upper frame or the CRG mechanical part, or inserting a foreign substance could cause deformation.

Handling OK



Handling NG



Mecha Module_Bringing into the Clamp State with No Disc Loaded

1. Remove the relay FFC from the connector on the module PCB side (Fig. 1).

(Precaution) When it is difficult to apply 4V to the motor in procedure 2 below, remove the connector on the relay PCB side, then remove the FFC, and remove the solder of the CRG motor lead and apply voltage to the lead.

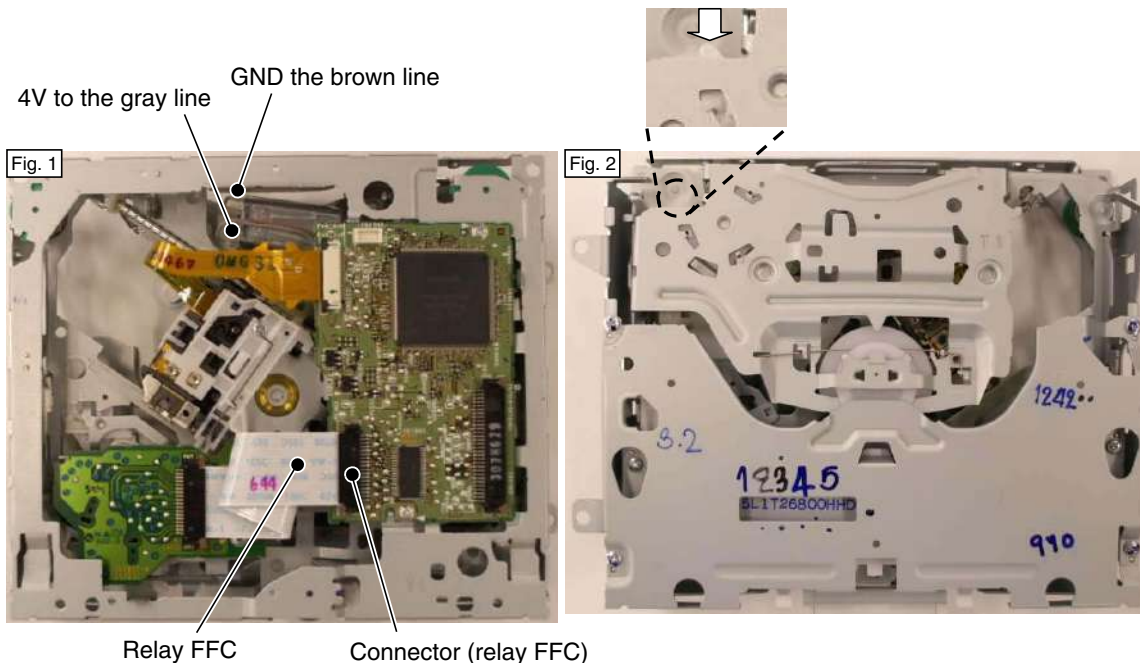
2. Push the Disc detection arm while applying 4V to the CRG motor (Fig. 2)

By this action, the mecha moves to the clamp state and the PU moves to the outer periphery.

3. Stop the motor when the PU comes to the vicinity of the intermediate periphery.

(Precaution) If the PU goes to the outer most periphery, it idles.

It is not a problem, but please try not to let it idle as much as possible.



CRG Mecha_Bringing into the Clamp State with No Disc Loaded

1.Remove the CRG mecha assy according to the “Removing the CRG Mecha assy” manual (mecha is in the ejecting state).

2.Remove the T-case washer and then remove the drive gear. (Fig. 1)

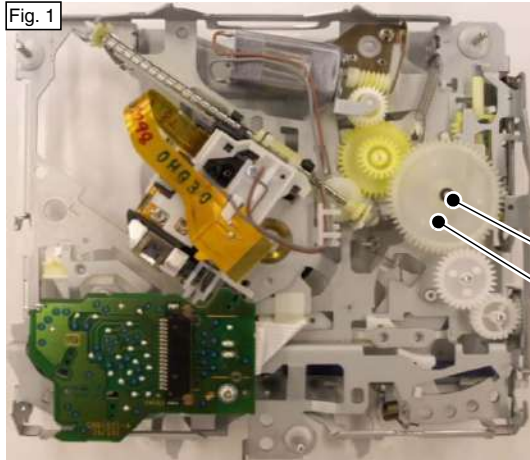
3.Lift the clamp arm assy until it is in the state shown in Fig. 2_b (open-lock state).

4.Put your finger on the area A of Fig. 2_c and then slide it to the direction of the arrow (the direction of the playing state).

5.Push down the clamp arm.

(Precaution) When bringing the CRG mecha into the ejecting state again, install the drive gear after sliding the drive lever and bringing it to the ejecting state, in order to prevent the cog of the pinion in the drive gear from chipping at the time of its installation.

Fig. 1

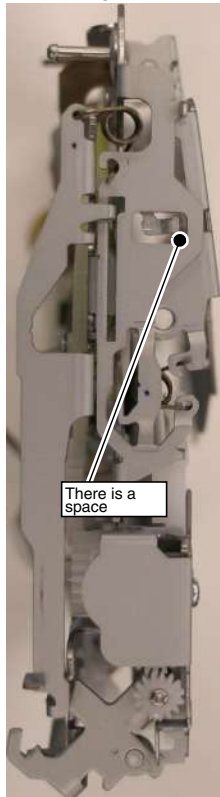


T-case washer

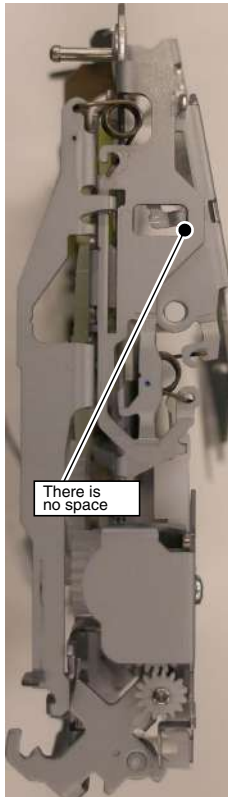
Drive gear

Fig. 2

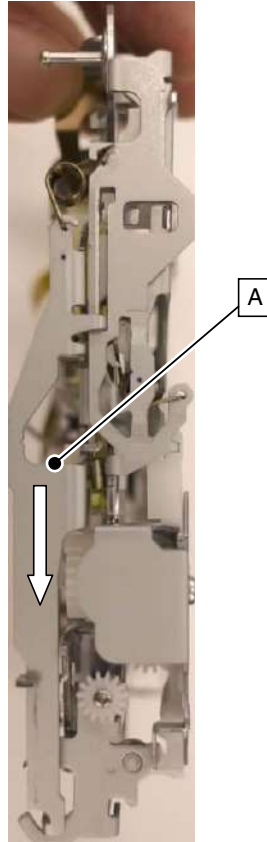
a.Ejecting state



b.Open-lock state



c.Clamp state with no disc loaded



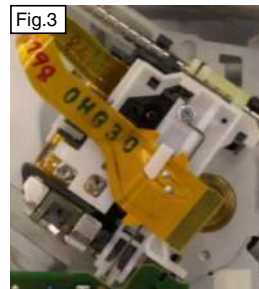
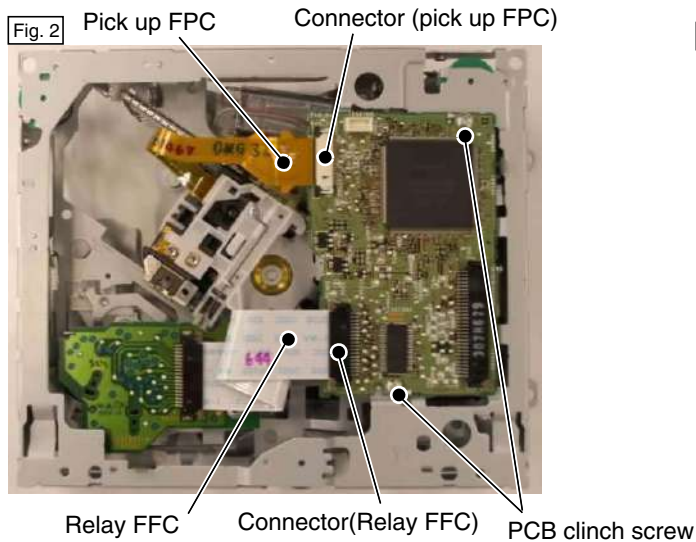
A

There is a space

There is no space

Removing the Module PCB

1. Short-circuit two spots on the land of the pick up FPC. (Fig. 1)
2. Remove the pick up FPC and the relay FFC from the connector. (Fig. 2)
3. Temporarily attach the pick up FPC to the pick up rack. (Fig. 3)
(in order to prevent the damage to the pick up FPC)
4. Remove the two PCB clinch screws and then remove the module PCB. (Fig. 2)



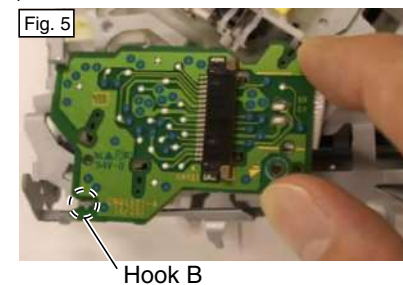
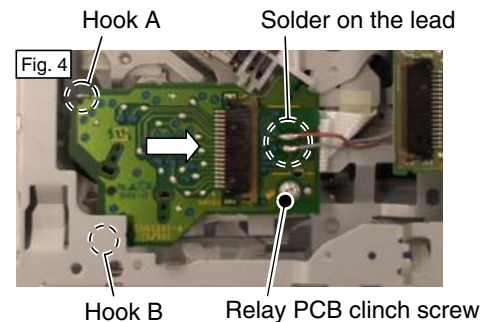
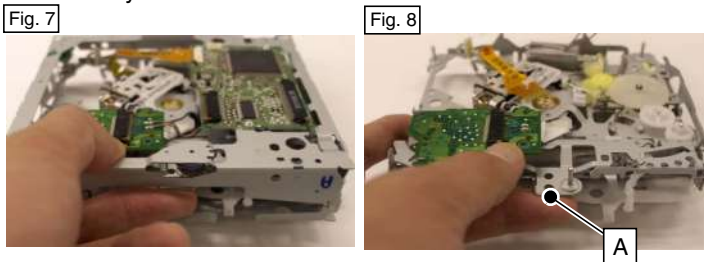
Removing/Installing the Relay PCB

Removing)

1. Remove the relay FFC from the connector (remove both sides so that the entire FFC will be removed). (Fig. 2)
2. Remove the solder on the lead for the CRG motor. (Fig. 4)
3. Remove the one relay PCB clinch screw. (Fig. 4)
4. Slide the relay PCB to the direction of the arrow and then remove the relay PCB from the hook A and the hook B. (Fig. 4)
5. Turn the relay PCB over and then remove the SPDL motor FFC from the connector.

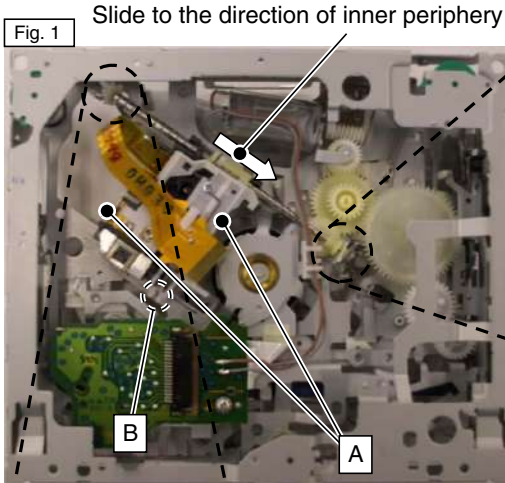
Installing)

1. Check the mecha is in the ejecting state (disc-load suspended state). When it is not in the ejecting state, apply 4V to the lead (motor) and then bring it to the ejecting state (4V to the brown line and GND the gray line).
2. Fit the SPDL motor FFC to the connector (back of the relay PCB).
3. Hold the relay PCB so that it does not touch the SW knob as in Fig. 5.
4. Insert it into the hook B as it is a little off to the clockwise direction. (Precaution) This is to prevent the SW knob from getting into the NG position as in Fig. 6.
5. Push down the relay PCB lightly and then rotate it to the counterclockwise direction. It sets the relay PCB in the hook A and the positioning dowel. (Precaution) Pay attention so the SW knob will not get onto the PU rack. (Fig. 6)
6. As in the Figures, while supporting the location A with your fingers, screw the relay PCB. (Fig. 7 / Fig. 8)
7. Solder the lead for the CRG motor.
8. Fit the relay FFC to the connector.

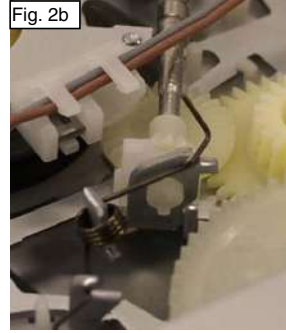
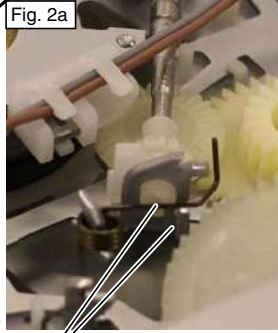


Removing the PU Unit

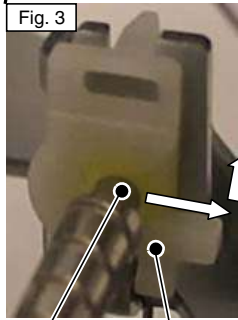
1. Bring to the clamp state with no disc loaded according to the "Bringing into the Clamp State with No Disc Loaded (Motor Drive)" manual.
 2. Remove the module PCB according to the "Removing the Module PCB" manual.
 3. Hook the feed screw biasing spring on the temporary hook (Fig. 2b). Be careful not to get injured by the tip of the spring.
 4. Hold the PU at the location A in Fig. 1 and slide and scoot it to the direction of the inner periphery.
 5. As in Fig. 3, shift the back end of the feed screw to the side and then to above and remove it from the outside holder.
 6. Remove the tucking joint for the chassis at the location B and the PU unit by lifting them up without changing their position and then remove the PU unit.
- (Precaution) When installing the PU again, make sure to tuck the chassis in B and the PU unit (Fig. 4) first. Moreover, do not forget to permanently hook the feed screw biasing spring (Fig. 2a). Adjustments to the PU after its installation should be made according to the service manual.



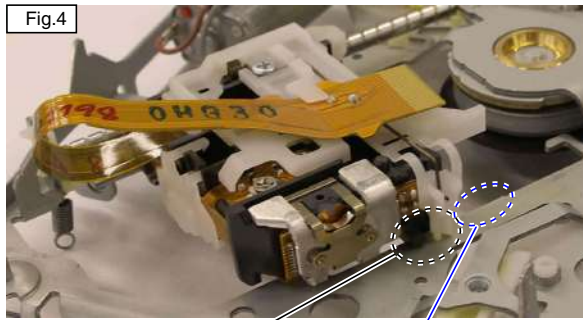
Permanently hooked position Temporary hooked position



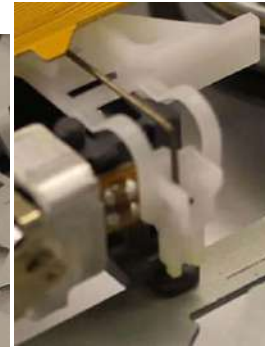
The spring is installed under the resin flange and inside the bended metal plate.



Back end of the feed screw Outside holder



Regularly installed position Install avoiding the area with blue broken line (the connected metal plate part)



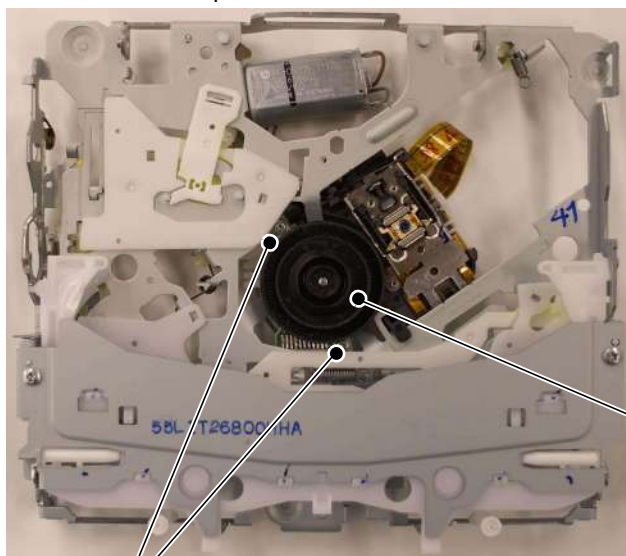
[Installation NG]
The chassis is not tucked between the PU case and the PU rack.

Sending the PU to the outer periphery

1. Bring to the clamp state with no disc loaded according to the "Mecha Module_Bringing into the Clamp State with No Disc Loaded" manual.
 2. Apply 1.5V to the CRG motor and then transfer the PU to the outer periphery.
- (Precaution) The relay FFC must be removed for certainty in order to prevent the IC damage.
- (Precaution) Do not forget to reinstall the relay FFC after sending the PU to the outer periphery and take the necessary measures.

Removing the Spindle Motor

1. Remove the CRG mecha assy according to the "Removing the CRG Mecha assy" manual (mecha is in the ejecting state).
2. Bring to the clamp state with no disc loaded according to the "Bringing into the Clamp State with No Disc Loaded (Manual)" manual.
3. Remove the clamp arm according to the procedure 3 and after of the "Removing the Clamp Arm" manual.
4. Remove the relay PCB according to the "Removing the Relay PCB" manual.
5. Remove the two spindle motor clinch screws and then remove the spindle motor assy.



Spindle motor clinch screws

Spindle motor

Removing the Clinch of the Bottom Frame

1. Use the needle-nose pliers when removing the clinch on the right side. Nip the clinch at the location in Fig. 1a and then open it until it is in the position circled by the red broken line in Fig. 2a.

2. Also to remove the clinch on the left side, use the needle-nose pliers, nip the clinch at the location in Fig. 1b and then open it until it is in the position circled by the red broken line in Fig. 2b.

(Precaution) When clinching again, use Fig. 2a and Fig. 2b as a guide.

It is okay as long as the tip of the clinch does not come off from the side a and the side b by the vibration stroke (from front to back and from side to side).

Check Fig. 3a and Fig. 3b for the height of the clinch.

Correct the height with the needle-nose pliers when the height does not meet the standard listed in those Figures.

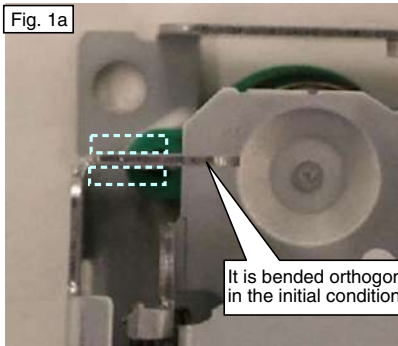
In case of metal fatigue on the clinch part, exchange the lower frame.

Clinch on the left side

Clinch on the right side

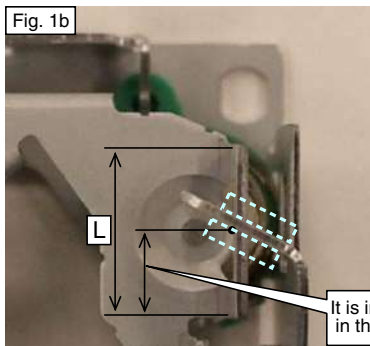


Fig. 1a



It is bent orthogonally in the initial condition

Fig. 1b



It is in the L/2 position in the initial condition

Fig. 2a

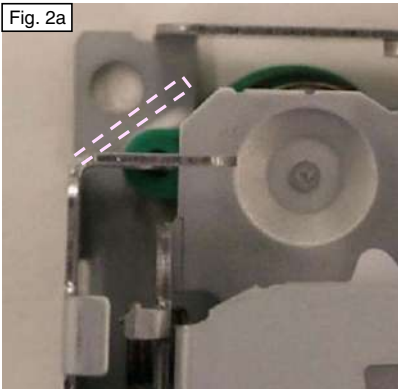


Fig. 2b

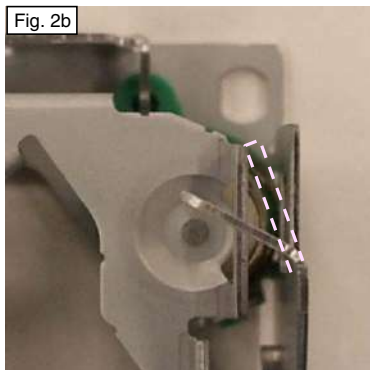
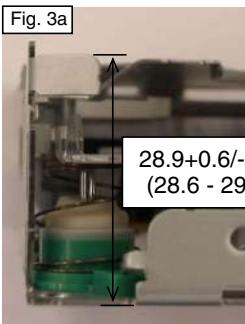
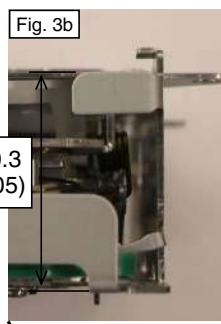


Fig. 3a



$28.9 \pm 0.6 / -0.3$
(28.6 - 29.5)

Fig. 3b



$25.45 \pm 0.6 / -0.3$
(25.15 - 26.05)



Removing the CRG Mecha Assy

1. Follow up to the procedure 3 of the "Removing the Module PCB" manual and then remove the PU FPC from the connector.

2. Remove the relay FFC from the connector (both ends) and then remove the FFC. (Fig. 1)

3. Open the clinch of the bottom frame according to the "Removing the Clinch of the Bottom Frame" manual.

4. Remove the front-pulling springs on both sides. (Fig. 2a & Fig. 2b)

5. Remove four clinch screws of the top frame and then remove the top frame. (Fig. 3)

6. As lifting the carriage mecha, remove it from the dampers at three locations. (Fig. 3)

(Precaution) When assembling the CRG mecha Assy again, apply alcohol on the dampers.

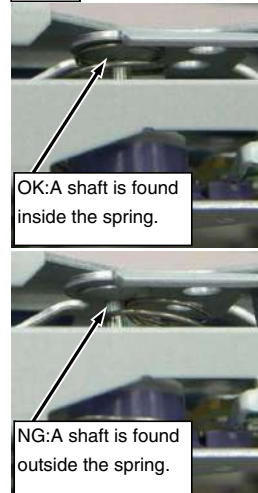
Make sure that the damper shafts are inside the three neutral springs (Fig. 4) and that the springs on both sides are hooked.

Before connecting to the module PCB after installing the CRG mecha, bring to the clamp state with no disc loaded according to the "Mecha Module_Bringing into the Clamp State with No Disc Loaded" manual, push the upper part of the damper of the CRG mecha by the finger and then make sure that the damper and the CRG mecha are jointed with certainty. (Fig. 5)

Fig. 1



Fig. 4



Caution : After repairing, make sure to clinch to the lower frame again.

Caution : After repairing, make sure to clinch to the lower frame again.

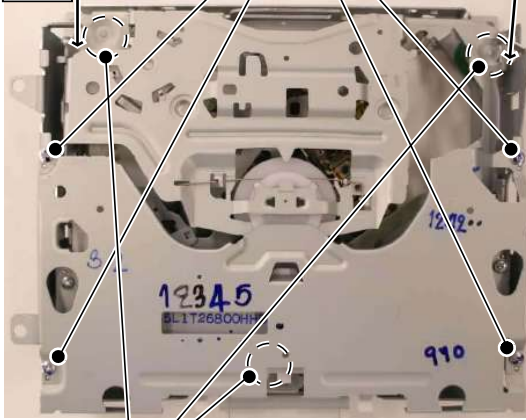
Clinch screw of the top frame

Front-pulling spring

Fig. 2a



Fig. 3



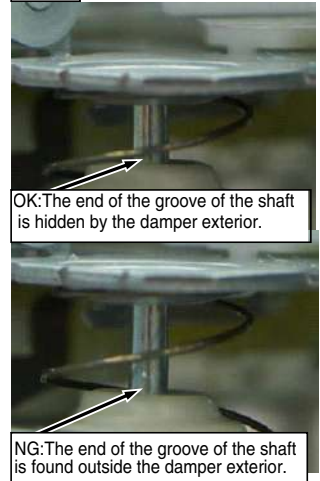
Dampers

Front-pulling spring

Fig. 2b



Fig. 5

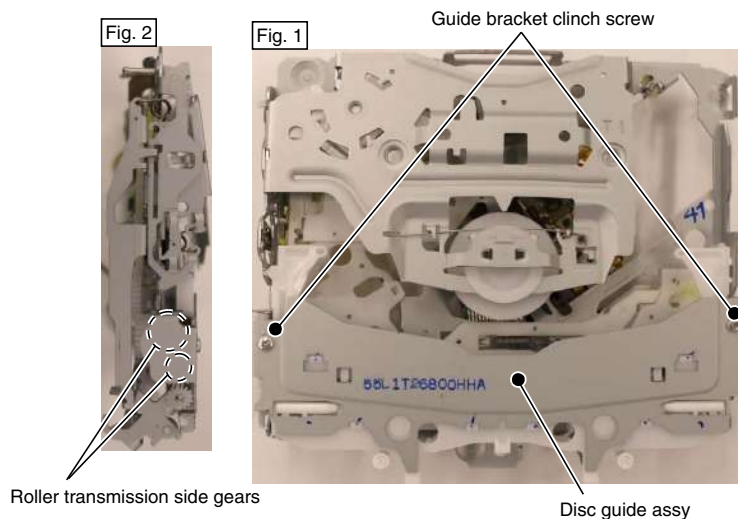


Removing the Disc Guide assy

(Removing the Roller Transmission Side Gear)

- 1.Remove the CRG mecha assy according to the “Removing the CRG Mecha assy” manual (mecha is in the ejecting state).
- 2.Remove the two guide bracket clinch screws and then remove the Disc guide assy. (Fig. 1)
- 3.Remove the two roller transmission side gears. (Fig. 2)

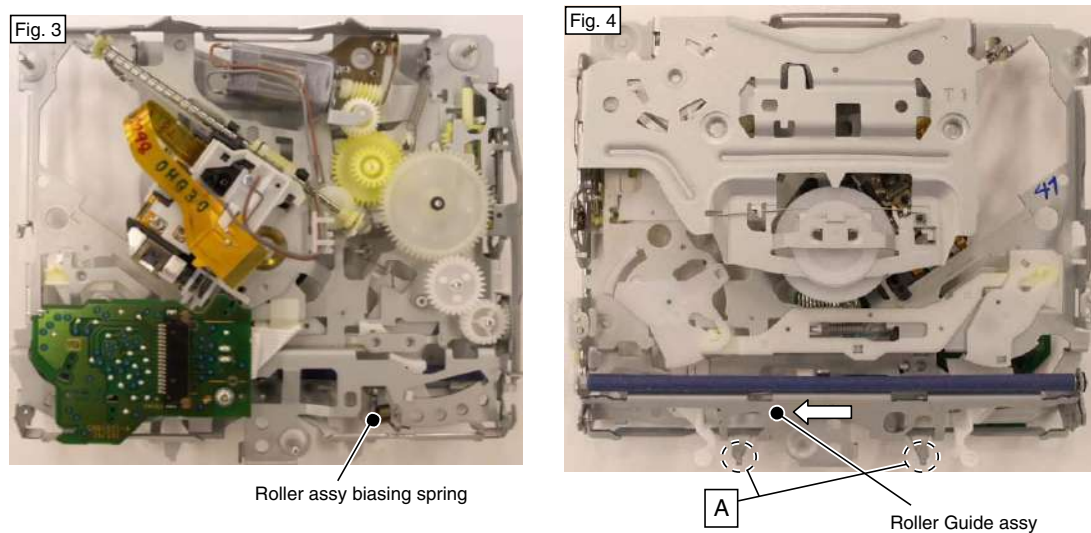
(Precaution) When assembling the Disc guide assy again, do not forget to install two gears on the side panel.



Removing the Roller assy

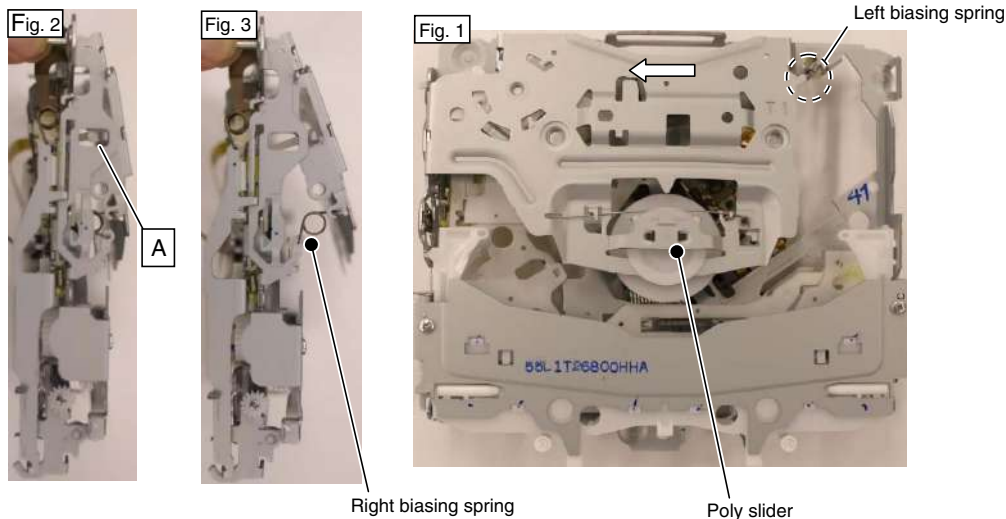
- 1.Remove the CRG mecha assy according to the “Removing the CRG Mecha assy” manual (mecha is in the ejecting state).
- 3.Remove the Roller assy biasing spring. (Fig. 3)
- 4.Remove the Disc guide assy according to the procedure 2 and after of the “Removing the Disc Guide assy” manual.
- 5.Hold the Roller assy at the locations A, slide it to the left and then remove it. (Fig.4)

(Precaution) When assembling the Disc guide assy again, do not forget to install two gears on the side panel.



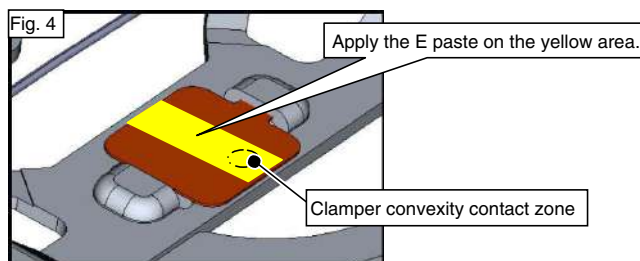
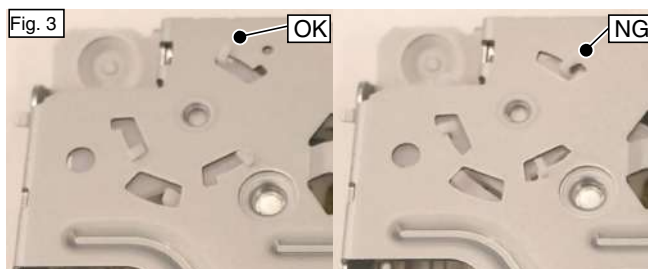
Removing/Reassembling the Clamp Arm assy

1. Remove the CRG mecha assy according to the "Removing the CRG Mecha assy" manual (mecha is in the ejecting state).
2. Bring to the clamp state with no disc loaded according to the "Bringing into the Clamp State with No Disc Loaded (Manual)" manual.
3. Remove the right clamp arm biasing spring. (Just on the clamp-arm side. Do not remove on the chassis side.)
4. Lift the clamp arm assy until it is in the state shown in Fig. 2 (open-lock state).
5. Lightly push the part A and lift the clamp arm assy further to the position in Fig. 3.
6. Remove the left clamp arm biasing spring.
7. Lift the clamp arm assy further to 45-60 degrees, slide it to the left and then remove it. (Fig. 1)



Installing

1. With the clamp arm assy tilted at 45-60 degrees, install it to the rotation fulcrum by sliding it from the left.
 2. Bring down the clamp arm assy to the position in Fig. 3 (position where it meets the chassis and then stops).
 3. Install the left clamp arm biasing spring.
 4. Completely turn the detection arm to the position OK in Fig. 4 and then push the clamp arm assy to the bottom.
 5. Install the right clamp arm biasing spring.
- (Precaution) –When replacing the clamp arm assy, replace the poly slider with a new part as well.
Do not forget to apply the E paste on the poly slider (Fig. 4).



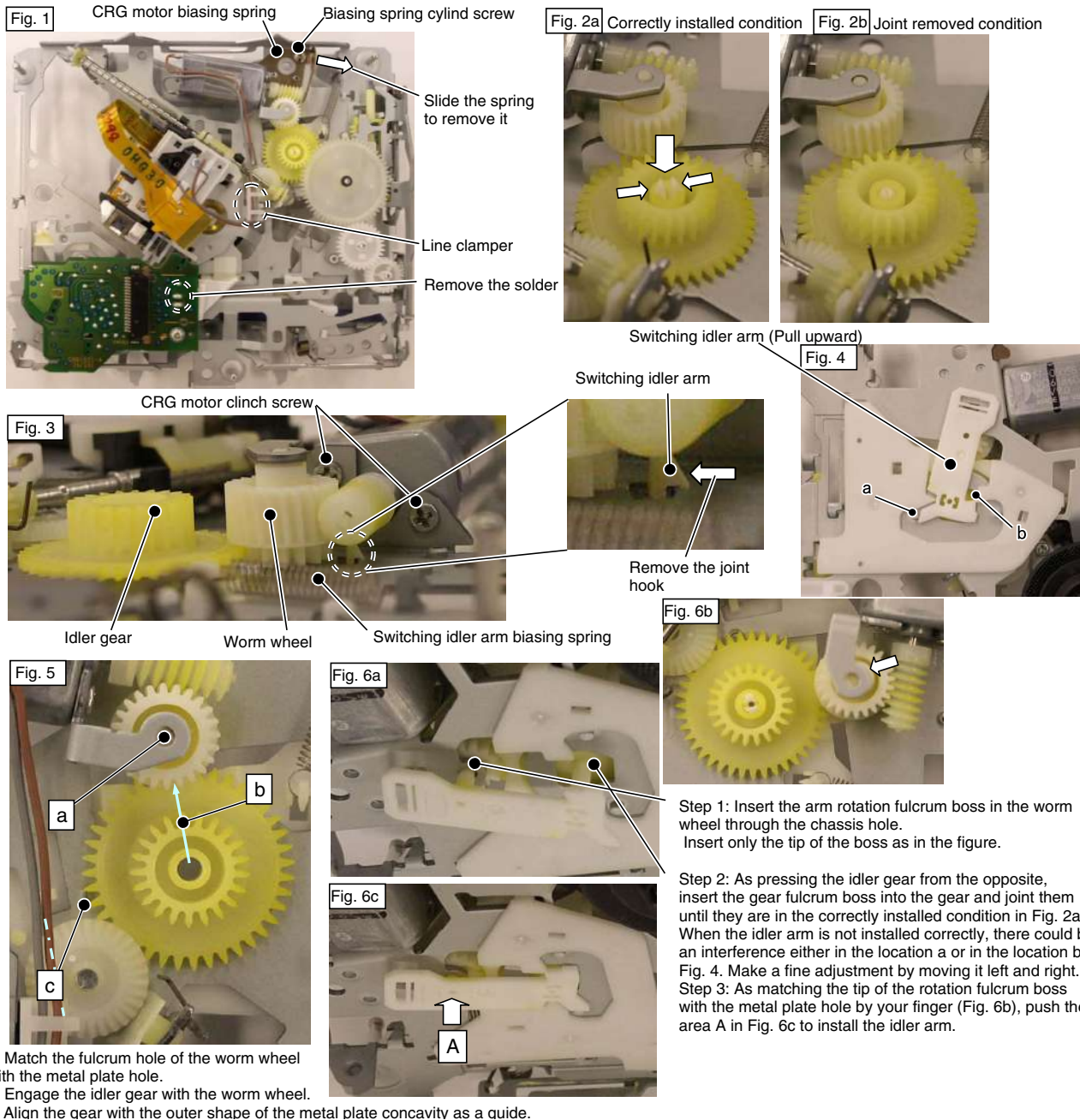
Removing the CRG Motor assy

(Removing the Drive Transmission Gear)

1. Remove the CRG mecha assy according to the "Removing the CRG Mecha assy" manual (mecha is in the ejecting state).
 2. Remove the clamp arm assy according to the "Removing the Clamp Arm assy" manual.
 3. Remove the solder of the CRG motor lead and then remove the lead from the line clasper. (Fig. 1)
 4. Remove the clinch screw of the CRG motor biasing spring and then slide the biasing spring to the direction of the arrow to remove it. (Fig. 1)
 5. Nip the gear hook of the switching idler arm by the tips of your fingers and then push it below from the top of the gear. (Fig. 2a -> Fig. 2b)
 6. Bend the hook on the chassis side of the switching idler arm to the direction of the arrow by tweezers and then remove the joint with the chassis. (Fig. 3)
 7. Pull off the switching idler arm from the top of the mecha (Fig. 4) and then remove the worm wheel and the idler gear. (Fig. 3)
 8. Remove the switching idler lock arm biasing spring. (Fig. 3)
 9. Remove two CRG motor clinch screws and then remove the CRG motor. (Fig. 3)
- (Precaution) When installing the switching idler arm again, temporarily set the idler gear and the worm wheel as in Fig. 5, press the idler gear from its top by your finger and then install the switching idler arm according to the steps in Fig. 6 from the opposite side of the chassis.
- Do not forget to install the switching idler arm biasing spring.

Since the idler arm is in the snap fit structure, do not use them again.

When installing the CRG motor, scoot it to the center of the mecha in order to ensure that the gear engages.



Removing the Drive Lever Assy

1. Remove the CRG mecha Assy according to the "Removing the CRG Mecha Assy" manual (mecha is in the ejecting state).
2. Remove the clamp arm Assy according to the "Removing the Clamp Arm Assy" manual.
3. Remove the drive lever biasing spring. (Fig. 1)
4. Slide the drive lever to the direction of the arrow (the direction of ejecting), lift it to the direction of upper right and then remove it. (Fig. 2)

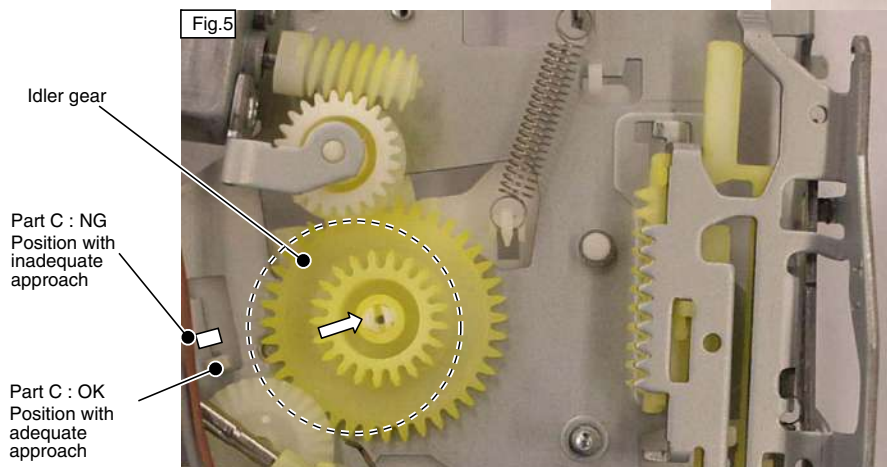
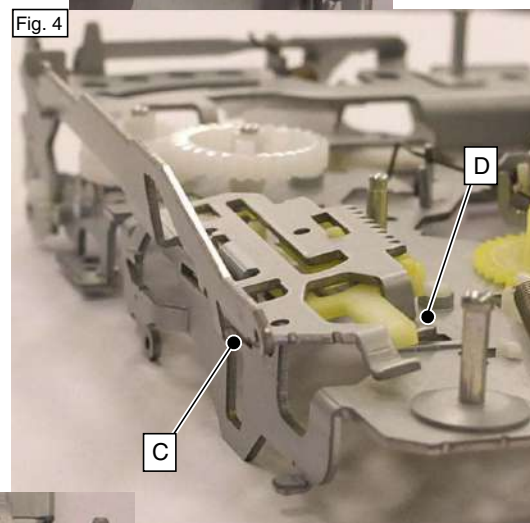
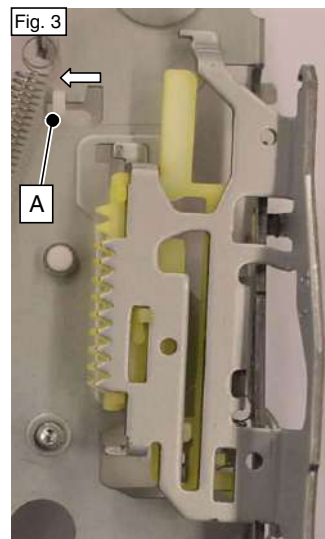
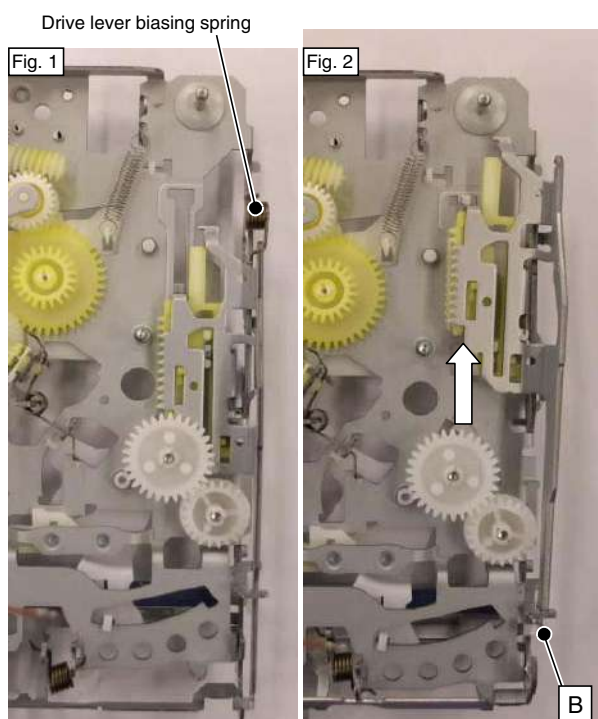
(Precaution) When installing the drive lever Assy again, install the part B (Fig. 2) first with the part A in Fig. 3 scooped to the direction of the arrow(*1). Next, install the part C (Fig. 4) of the drive lever in the channel bending the side of the chassis, and in the end, install the part D (Fig. 4) into the L-shaped channel of the chassis and then slide the drive lever to the position in Fig. 1.

*1: If approach of Part A (Fig 3) is inadequate, the drive lever will not be able to be well incorporated.

In this case, the idler gear might be located at the red dashed line (Fig 5).

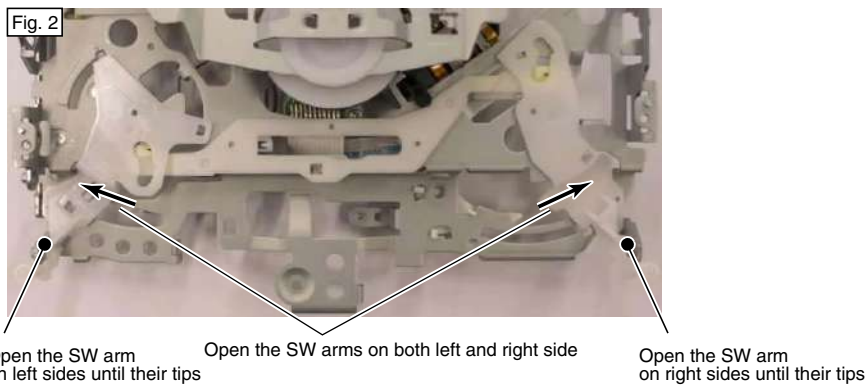
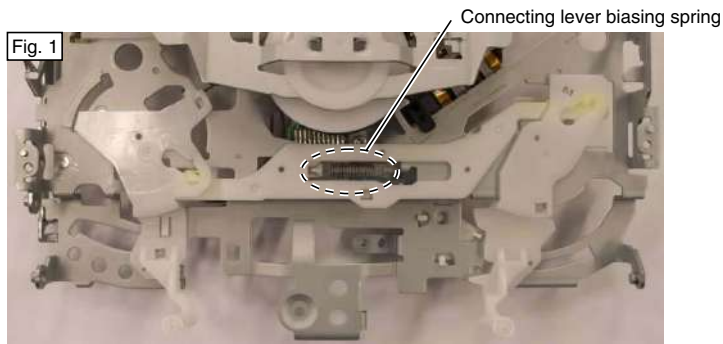
Therefore, approach Part A (Fig 3) to the direction of the arrow as approaching the idler gear to the direction of the arrow (Fig 5).

Determine, with the position of Part C in Fig 5, if the approach of Part A is adequate.



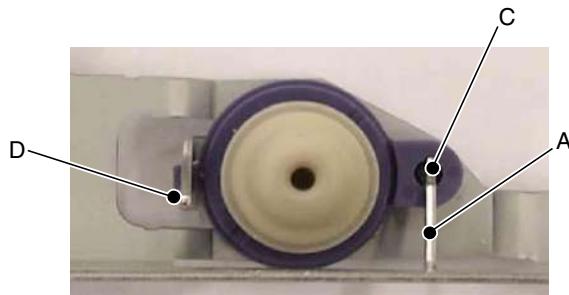
Removing the SW Arm

1. Remove the roller arm assy according to the "Removing the Roller Arm assy" manual.
2. Remove the SW arm connecting lever biasing spring. (Fig. 1)
3. Open the SW arms on both left and right sides until their tips touch the chassis. (Fig. 2)
4. Keep the SW arms open, lift them upward and then remove them.



Removing the Damper

1. Remove the CRG mecha according to the "Removing the CRG Mecha assy" manual
 2. Insert the screwdriver under the part A of the metal plate configuration which joints the damper, lift the metal plate to release the damper from being clinched by the part C.
 3. Insert the screwdriver under the part D as well. Lift the metal plate, release the damper from being clinched to remove it.
- Caution: When mounting a damper, hold it tight with a clinch in order to avoid backlash.
In case of metal fatigue on the clinch part, exchange the frame.



Caution: After repairing, make sure to clinch to the lower frame again.

Removing the PU Rack

1.Remove the PU unit according to the “Removing the PU Unit” manual.

2.Remove the PU rack clinch screw. (Fig. 1)

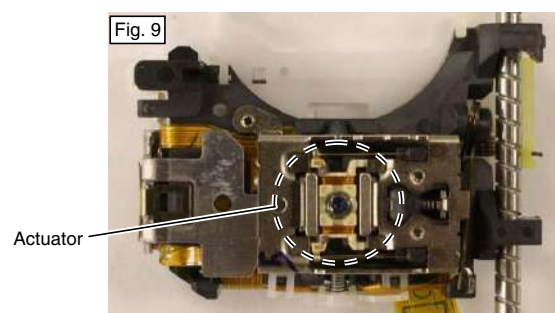
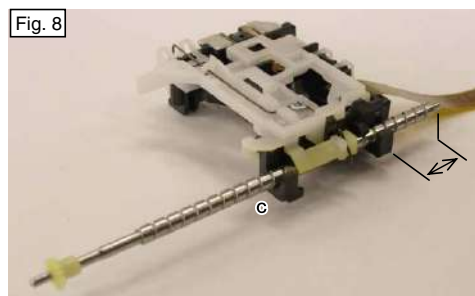
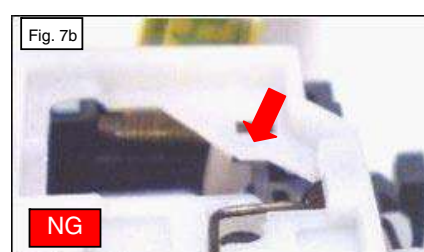
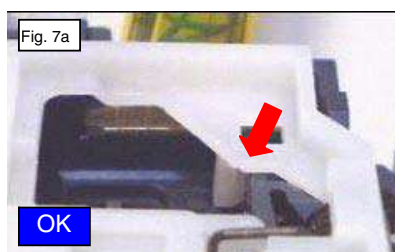
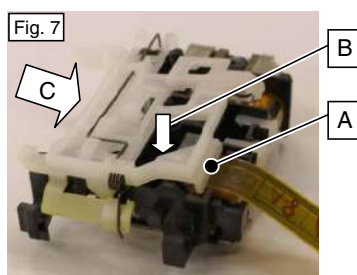
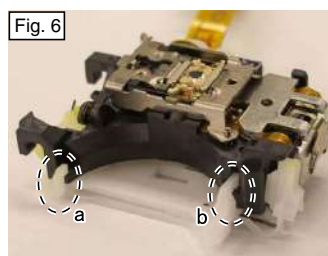
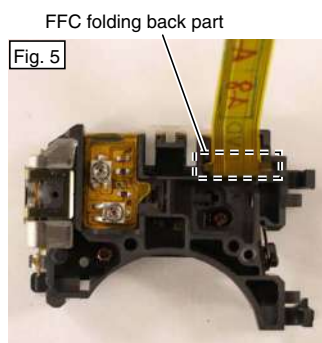
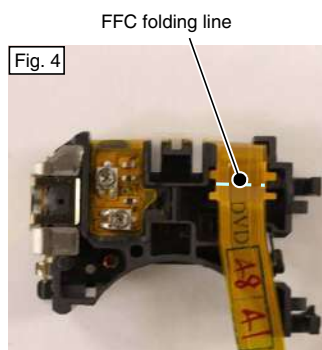
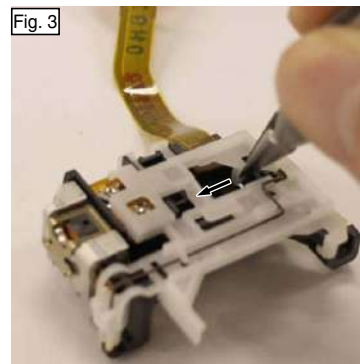
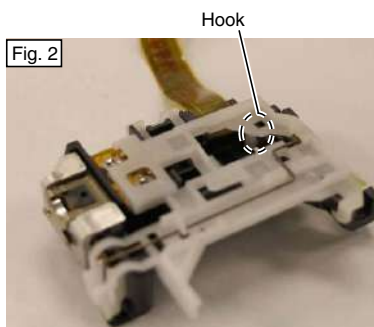
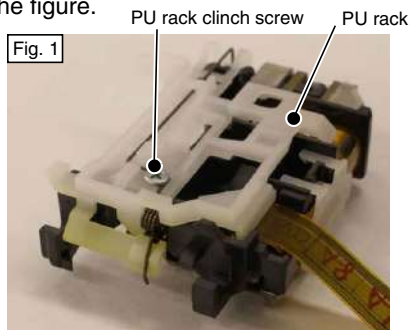
3.Pick up the root of the hook on the PU rack (Fig. 2) with tweezers as in Fig. 3. While bending it so the tip of the hook would open to the direction of the arrow (unhooked direction), pull out the PU rack upward.

(Precaution) When handling the PU unit, do not “touch the actuator in Fig. 9 or hit the desk with it during the operation.” Handle the PU and the PU unit according to “Holding the PU” manual.

When installing the PU rack into the PU again, fold back the PU FPC as in Fig. 5 according to the folding line in Fig. 4 before installing the rack and settle it in the channel on the PU case. To install the PU rack, first install the part a and the part b in Fig. 6 into the PU case, install the FPC folding back part in Fig. 5 so that it is held by the part A in Fig. 7, and push the part B (top of the snap fit) to fit the PU rack.

When it is hard to fit the PU rack, try again as scooting it to the direction of the arrow C in Fig. 7.

After installing the PU rack, insert the feed screw from the side c in Fig. 8. Insert approximately 18mm on the part shown in the figure.

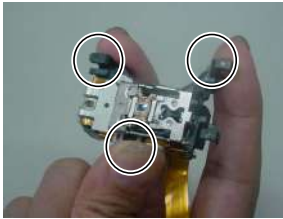


A

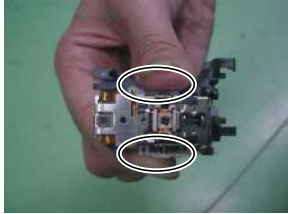
Holding the PU

1. Hold the "Handling OK" area of the PU indicated by the figure. Do not hold the "Handling NG" area.

Handling OK



B



C

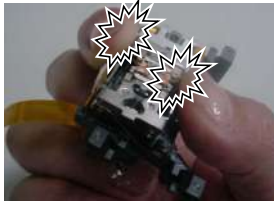


D

Handling NG



Do not touch the object lens.



Do not touch the ACT.



Do not touch the Hologram.



Do not pull the FPC.

E

F