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Service Manual

ORDER NO.
CRT3394

CD MECHANISM MODULE(S10.1AAC)

CX-3158

- This service manual describes the operation of the CD 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	CD Mechanism Module
DEH-P770MP/XN/UC	CRT3333	CXK5617
DEH-P7700MP/XN/EW	CRT3334	CXK5663
DEH-P670MP/XN/UC	CRT3335	CXK5663
DEH-3730MP/XN/EW	CRT3395	CXK5663
DEH-3700MP/XN/EW		
DEH-2750MP/XN/GS	CRT3396	CXK5663
DEH-2790MP/XN/ID		
DEH-2770MP/XN/CS		
DEH-3700MP/XU/UC	CRT3397	CXK5668
DEH-4700MP/XU/EW	CRT3398	CXK5668
DEH-4700MPB/XU/EW		
DEH-3750MP/XU/GS	CRT3399	CXK5668
DEH-3770MP/XU/CS		CXK5669
DEH-3750MP/XU/CN		
DEH-P470MP/XM/UC	CRT3400	CXK5668
DEH-P4700MP/XM/UC		
DEH-P4750MP/XM/GS	CRT3401	CXK5668
DEH-P4790MP/XM/ID		
DEH-P4770MP/XM/CS		
DEH-P3700MP/XU/UC	CRT3402	CXK5668

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1. CIRCUIT DESCRIPTIONS

Recently, most CD LSI's have included DAC, RF amplifier and other peripheral circuits, as well as the core circuit DSP. This series of mechanisms employ a multi-task LSI UPD63763GJ, which has CD-ROM decoder and MP3/WMA decoder in addition to the CD block as shown in the Fig.1.0.1. This enables to reproduce a CD-ROM where MP3/WMA data is recorded.

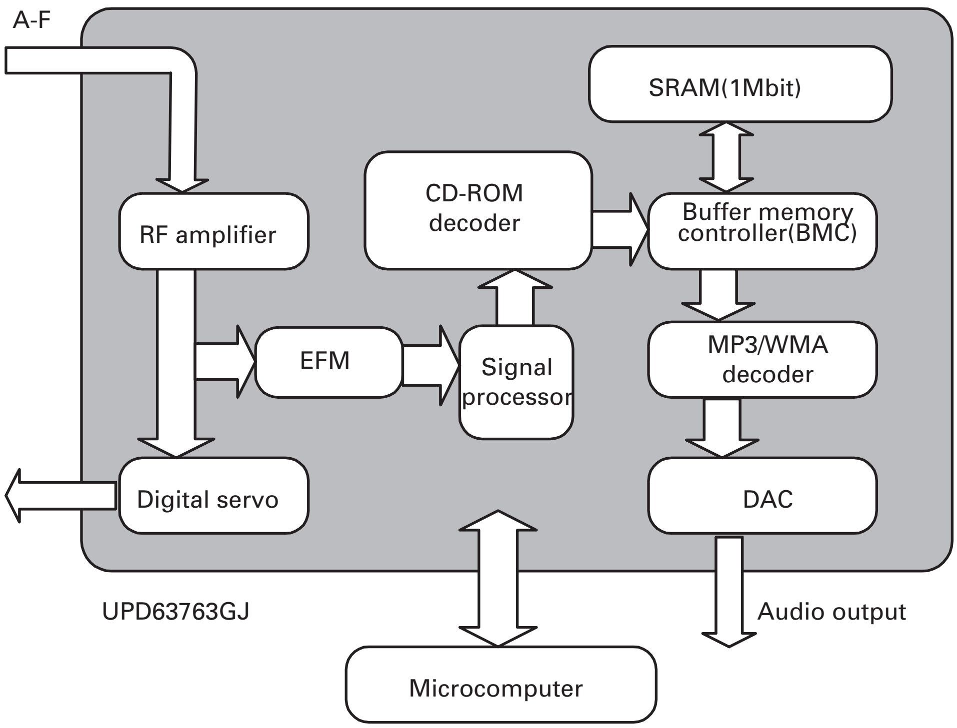


Fig.1.0.1 Block diagram of CD LSI UPD63763GJ

1.1 PREAMPLIFIER BLOCK (UPD63763GJ: IC201)

In the preamplifier block, the pickup output signals are processed to generate signals that are used for the next-stage blocks: the servo block, demodulator, and control.

After I/V-converted by the preamplifier with built-in photo detectors (inside the pickup), the signals are applied to the preamplifier block in the CD LSI UPD63763GJ (IC201). After added by the RF amplifier in this block, these signals are used to produce necessary signals such as RF, FE, TE, and TE zero-cross signals.

The CD LSI employs a single power supply system of + 3.3V. Therefore, the REFO (1.65V) is used as the reference voltage both for this CD LSI and the pickup. The LSI produces the REFO signal by using the REFOUT via the buffer amplifier and outputs from the pin 133. All the measurements should be made based on this REFO.

Caution: Be careful not to short the REFO and GRD when measuring.

1.1.1 APC (Automatic Power Control)

A laser diode has extremely negative temperature characteristics in optical output at constant-current drive. To keep the output constant, the LD current is controlled by monitor diodes. This is called the APC circuit. The LD current is calculated at about 30mA, which is the voltage between LD1 and V3R3D divided by 7.5 (ohms).

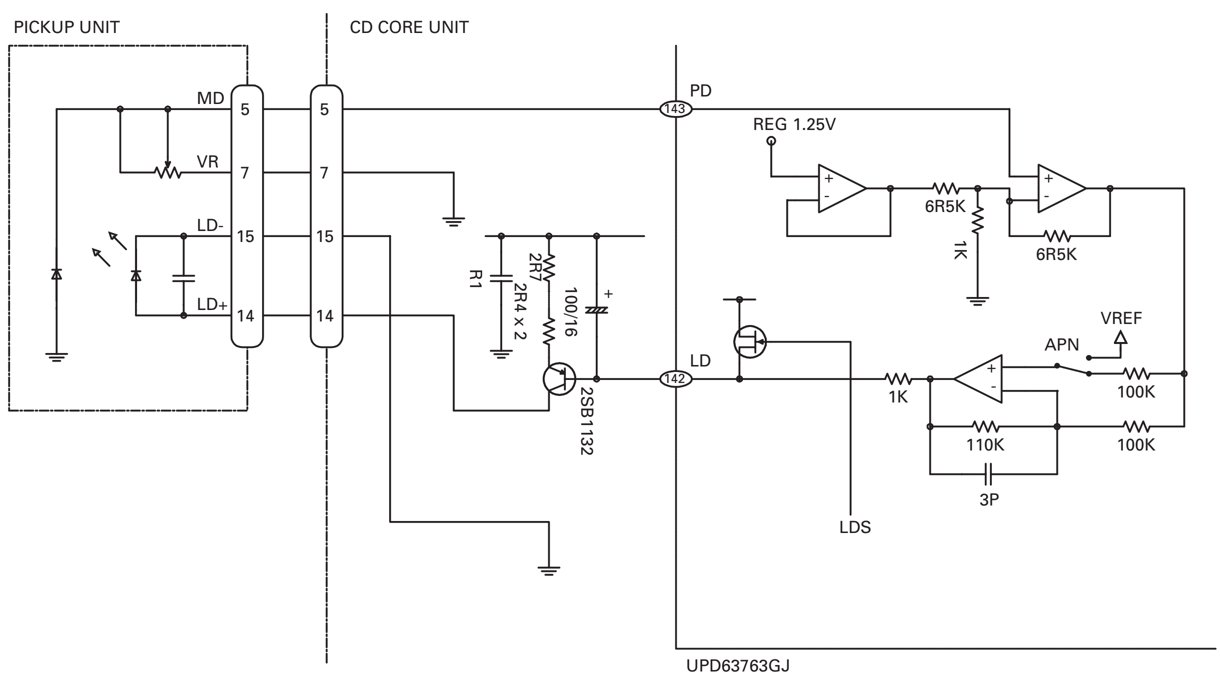


Fig. 1.1.1 APC

1.1.2 RF and RFAGC amplifiers

The photo-detector outputs (A + C) and (B + D) are added, amplified, and equalized inside this LSI, and then provided as the RF signal from the RFI terminal. The RF signal can be used for eye-pattern check.

The low frequency component of the RFO voltage is:

RFO = (A + B + C + D) x 2

The RFO is used for the FOK generation circuit and RF offset adjustment circuit.

The RFI output from the pin 119 is A/C-coupled outside this LSI, and returned to the pin 118 of this LSI. The signal is amplified in the RFAGC amplifier to obtain the RFAGC signal. This LSI is equipped with the RFAGC auto-adjustment function as explained below. This function automatically controls the RFO level to keep at 1.5V by switching the feed-back gain for the RFAGC amplifier.

The RFO signal is also used for the EFM, DFCT, MIRR, and RFAGC auto-adjustment circuits.

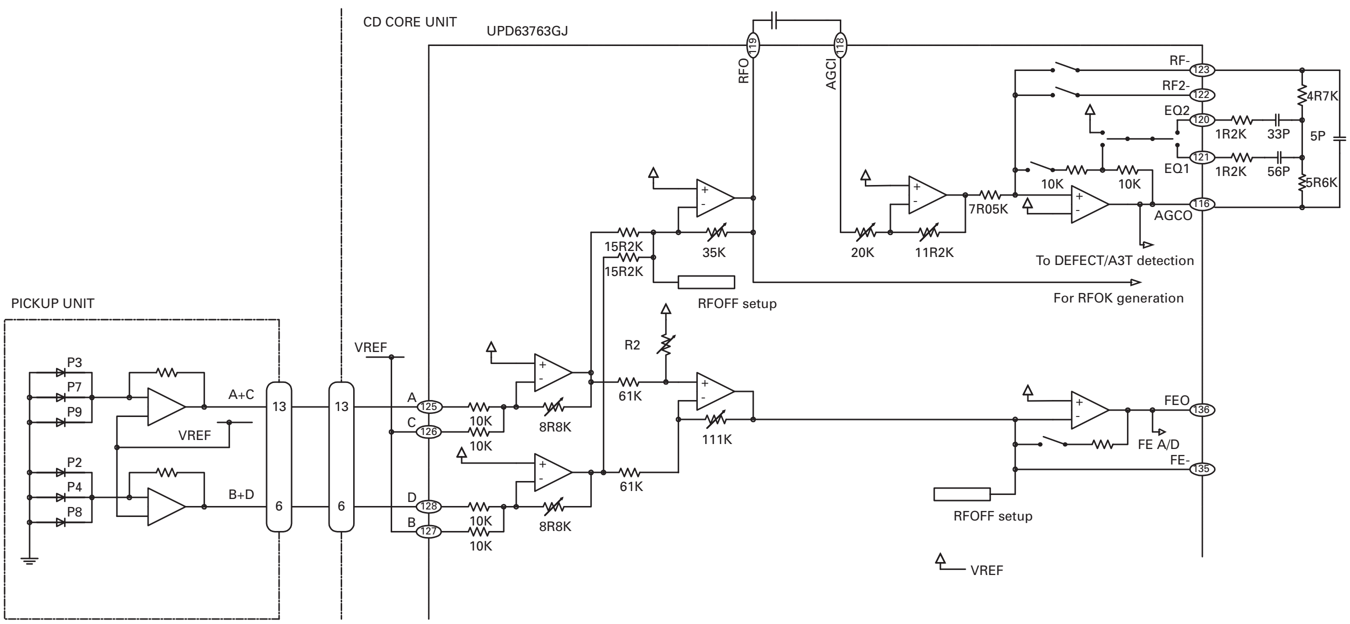


Fig. 1.1.2 RF/AGC/FE

1.1.3 Focus error amplifier

The photo-detector outputs (A + C) and (B + D) are applied to the differential amplifier and the error amplifier to obtain the (A + C - B - D) signal, which is then provided from the pin 91 as the FE signal.

The low frequency component of the FE voltage is:

FE = (A + C - B - D) x 8.8/10k x 111k/61k x 160k/72k

= (A + C - B - D) x 3.5

The FE output shows 1.5Vp-p S-shaped curve based on the REFO. For the next-stage amplifiers, the cutoff frequency is 14.6kHz.

1.1.4 RFOK

The RFOK circuit generates the RFOK signal, which indicates focus-close timing and focus-close status during the play mode, and outputs from the pin 55. This signal is shifted to "H" when the focus is closed and during the play mode.

The DC level of the RFI signal is peak-held in the digital block and compared with a certain threshold level to generate the RFOK signal. Therefore, even on a non-pit area or a mirror-surface area of a disc, the RFOK becomes "H" and the focus is closed.

This RFOK signal is also applied to the microcomputer via the low-pass filer as the FOK signal, which is used for protection and RF amplifier gain switching.

1.1.5 Tracking error amplifier

The photo-detector outputs E and F are applied to the differential amplifier and the error amplifier to obtain the (E - F) signal, and then provided from the pin 136 as the TE signal.

The low frequency component of the TE voltage is:

TEO = (E - F) x 63k/112k x 160k/160k x 181k/45.4k x 160k/80k

= (E - F) x 4.48

The TE output provides the TE waveform of about 1.3Vp-p based on the REFO. For the next-stage amplifiers, the cut-off frequency is 21.1kHz.

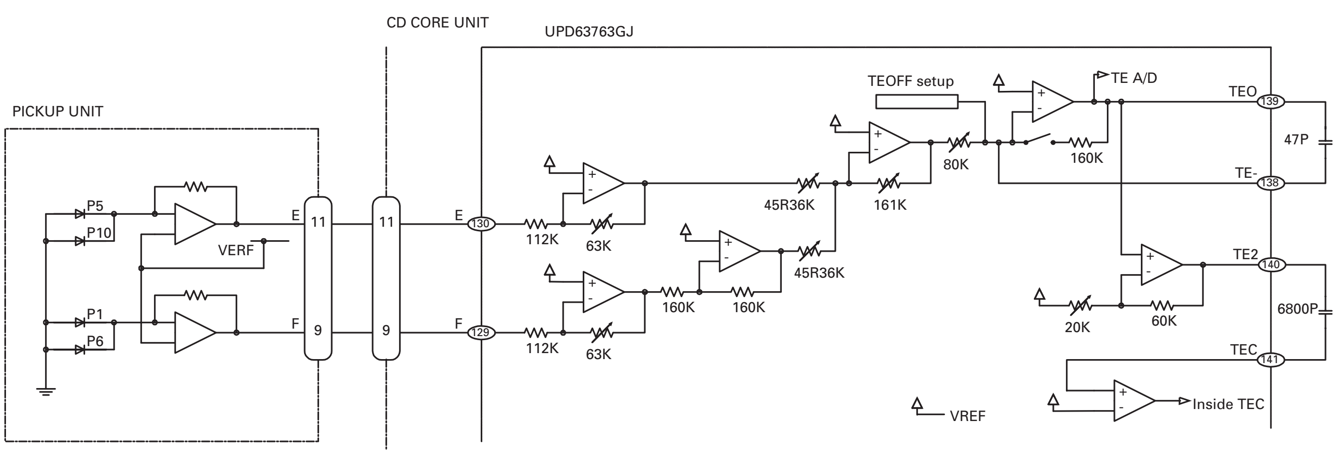


Fig. 1.1.3 TE

1.1.6 Tracking zero-cross amplifier

The tracking zero-cross signal (hereinafter TEC signal) is obtained by amplifying the TE signal 4 times, and used to detect the tracking-error zero-cross point.
By using the information on this point, the following two operations can be performed:
1. Track counting in the carriage move and track jump modes
2. Sensing the lens-moving direction at the moment of the tracking close (The sensing result is used for the tracking brake circuit as explained below.)
The frequency range of the TEC signal is between 300Hz and 20kHz.
TEC voltage = TE level x 4
The TEC level can be calculated at 4.62V. This level exceeds the D range of the operational amplifier, and the signal gets clipped. However, it can be ignored because the CD LSI only uses the signal at the zero-cross point.

1.1.7 EFM

The EFM circuit converts the RF signal into a digital signal expressed in binary digits 0 and 1. The AGCO output from the pin 116 is A/C-coupled in the peripheral circuit, fed back to the LSI from the pin 114, and sent to the EFM circuit inside the LSI.
On scratched or dirty discs, part of the RF signal recorded may be missing. On other discs, part of the RF signal recorded may be asymmetric, which was caused by dispersion in production quality. Such lack of information cannot be completely eliminated by this AC coupling process. Therefore, by utilizing the fifty-fifty occurrence ratio of binary digits (0 and 1) in the EFM signal, the EFM comparator reference voltage ASY is controlled, so that the comparator level always stays around the center of the RFO signal. The reference voltage ASY is made from the EFM comparator output via the low-pass filter. The EFM signal is put out from the pin 111.

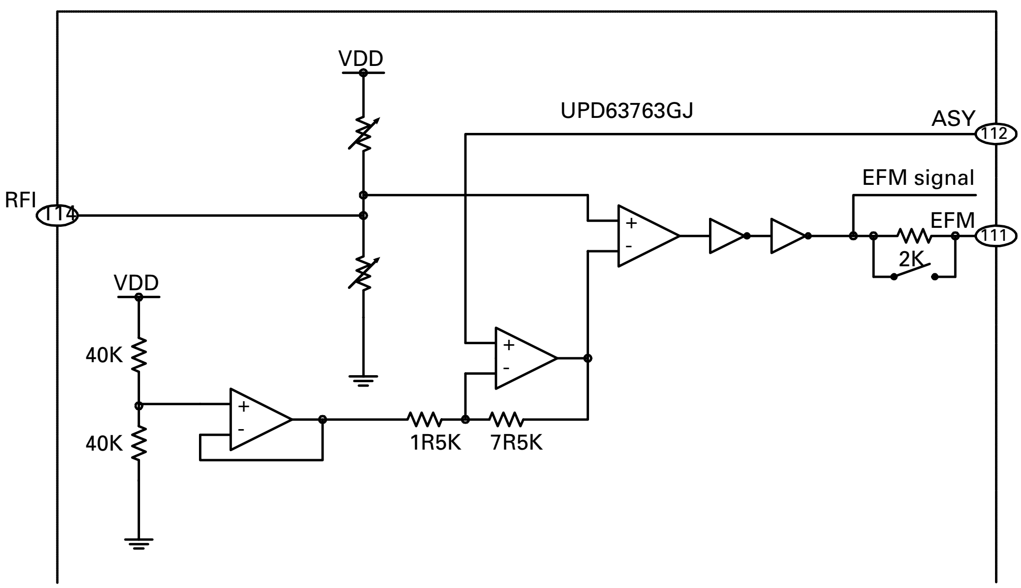


Fig. 1.1.4 EFM

1.2 SERVO BLOCK (UPD63763GJ: IC201)

The servo block controls the servo systems for error signal equalizing, in-focus, track jump and carriage move and so on. The DSP block is a signal-processing block, where data decoding, error correction, and compensation are performed.
After A/D-converted, the FE and TE signals (generated in the preamplifier block) are applied to the servo block and used to generate the drive signals for the focus, tracking, and carriage servos.
The EFM signal is decoded in the DSP block, and finally sent out as the audio signal after D/A-converted. In this decoding process, the spindle servo error signal is generated, supplied to the spindle servo block, and used to generate the spindle drive signal.
The drive signals for focus, tracking, carriage, and spindle servos (FD, TD, SD, and MD) are provided as PWM3 data, and then converted to the analog data by the low-pass filter embedded in the driver IC BA5835FP (IC301). These analog drive signals can be monitored by the FIN, TIN, CIN, and SIN signals respectively. Afterwards, the signals are amplified and applied to each servo's actuator and motor.

1.2.1 Focus servo system

In the focus servo system, the digital equalizer block works as its main equalizer. The figure 1.2.1 shows the block diagram of the focus servo system.
To close the focus loop circuit, the lens should be moved to within the in-focus range. While moving the lens up and down by using the focus search triangular signal, the system tries to find the in-focus point. In the meantime, the spindle motor rotation is kept at the prescribed one by using the kick mode.
The servo LSI monitors the FE and RFOK signals and automatically performs the focus close operations at an appropriate timing. The focus loop will close when the following three conditions are satisfied at the same time:
1) The lens moves toward the disc surface.
2) The RFOK signal is shifted to "H".
3) The FE signal is zero-crossed. At last, the FE signal comes to the zero level (or REFO).
When the focus loop is closed, the FSS bit is shifted from "H" to "L". The microcomputer starts monitoring the RFOK signal obtained through the low-pass filter 10msec after that.
If the RFOK signal is detected as "L", the microcomputer will take several actions including protection.
The timing chart for focus close operations is shown in fig. 1.2.2.
(This shows the case where the system fails focus close.)
In the test mode, the S-shaped curve, search voltage, and actual lens movement can be confirmed by pressing the focus close button when the focus mode selector displays 01.

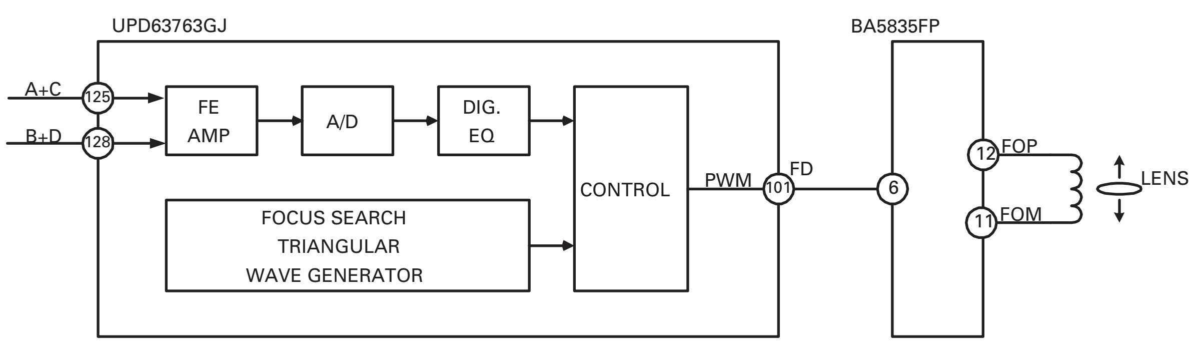


Fig. 1.2.1 Block diagram of the focus servo system

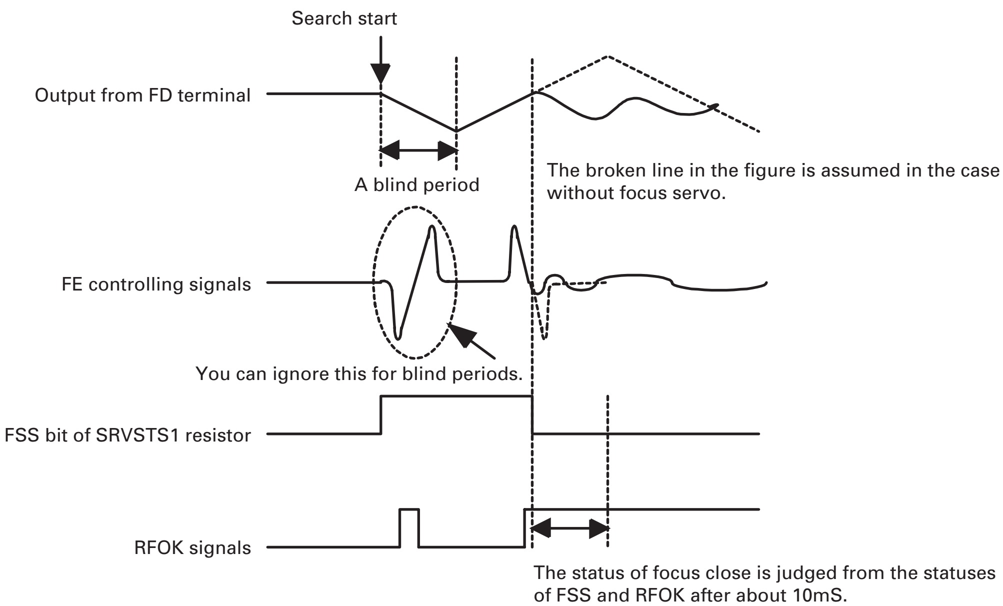


Fig. 1.2.2 Timing chart for focus close operations

1.2.2 Tracking servo system

In the tracking servo system, the digital equalizer block is used as its main equalizer. The figure 1.2.3 shows the block diagram of the tracking servo system.

(a) Track jump

Track jump operation is automatically performed by the auto-sequence function inside the LSI with a command from the microcomputer. In the search mode, the following track jump modes are available: 1, 4, and 100

In the test mode, 1, 32, and 32*3 track jump modes, and carriage move mode are available and can be switched by selecting the mode.

For track jumps, first, the microcomputer sets about half the number of tracks to be jumped as the target. (Ex. For 10 track jumps, it should be 5 or so.) Using the TEC signal, the microcomputer counts up tracks. When the counter reaches the target set by the microcomputer, a brake pulse is sent out to stop the lens. The pulse width is determined by the microcomputer. Then, the system closes the tracking loop and proceeds to the normal play. At this moment, to make it easier to close the tracking loop, the brake circuit is kept ON for 50msec after the brake pulse, and the tracking servo gain is increased.

In the normal operation mode, the FF/REW operation is realized by continuously repeating single jumps about 10 times faster than the normal single jump operation.

(b) Brake circuit

The brake circuit stabilizes the servo-loop close operation even under poor conditions, especially in the setting-up mode or track jump mode. This circuit detects the lens-moving direction and emits only the drive signal for the opposite direction to slow down the lens. Thus, this makes it easier to close the tracking servo loop. The off-track direction is detected from the phases of the TEC and MIRR signals.

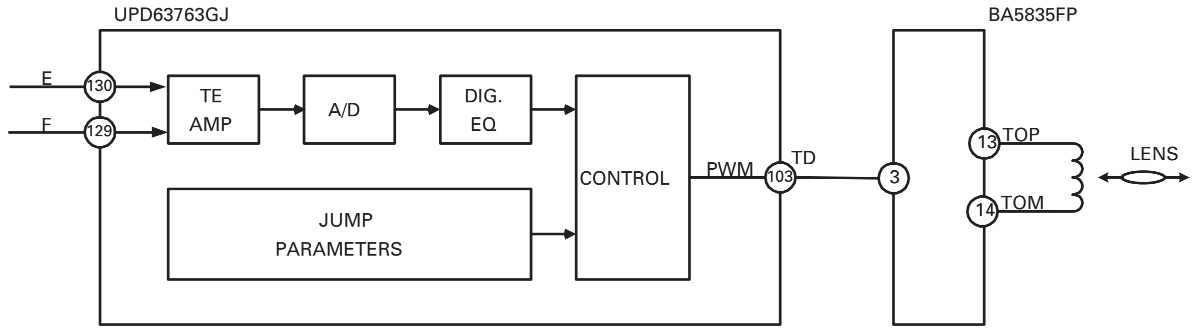


Fig. 1.2.3 Block diagram of the tracking servo system

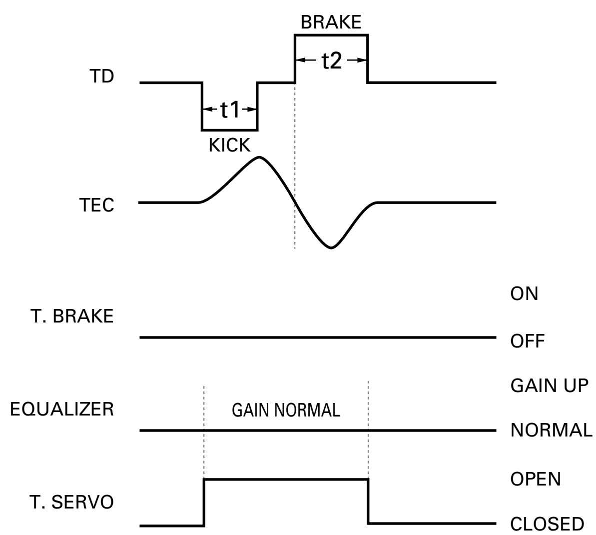


Fig. 1.2.4 Single-track jump

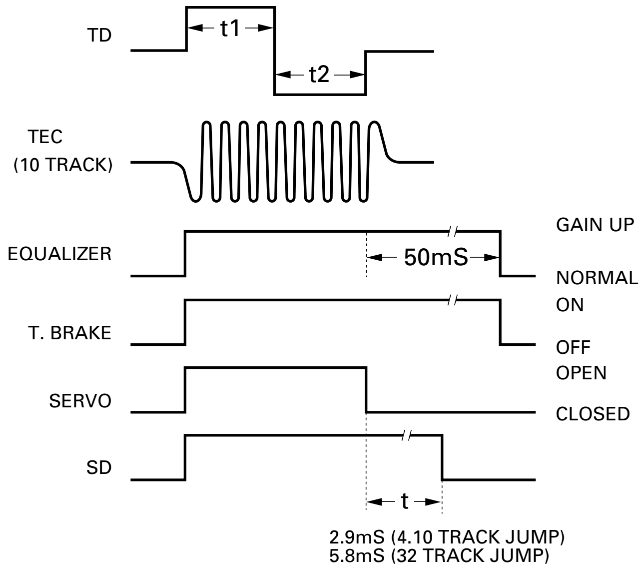


Fig. 1.2.5 Multi-track jump

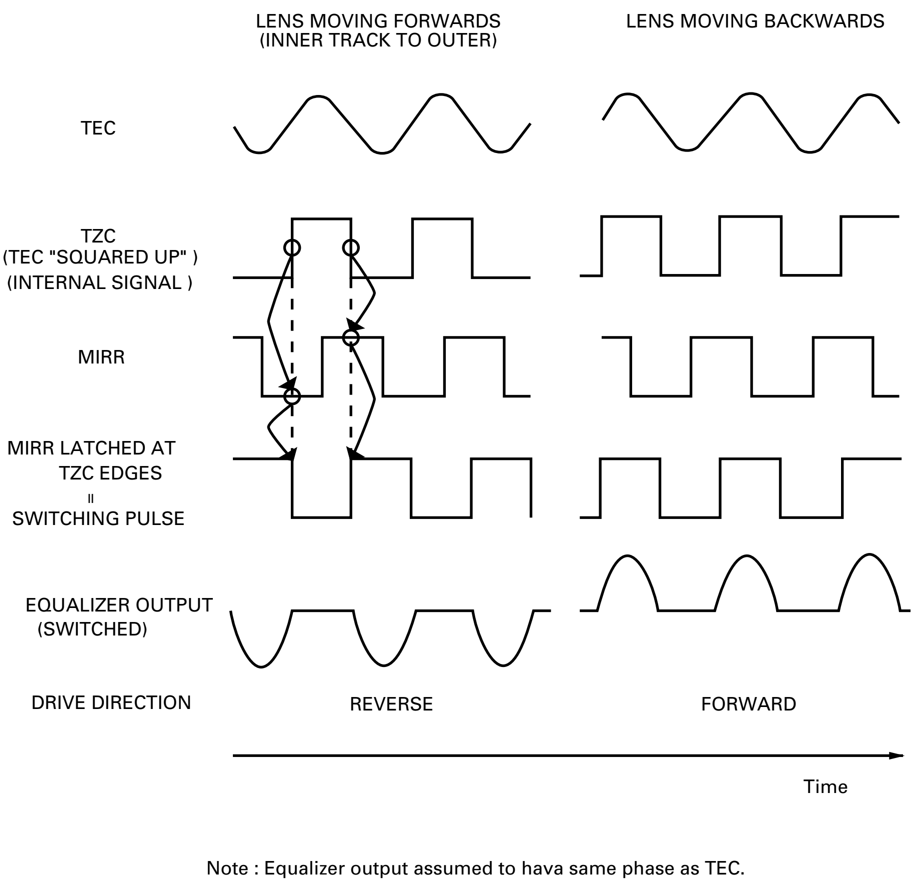


Fig. 1.2.6 Track brake

1.2.3 Carriage servo system

In the carriage servo system, the low frequency component from the tracking equalizer (the information on the lens position) is transferred to the carriage equalizer, where the gain is increased to a certain level, and then sent out from the LSI as the carriage drive signal. This signal is applied to the carriage motor via the driver IC.
During the play mode, when the lens offset reaches a certain level, it is necessary to move the pickup toward the FORWARD direction. The equalizer gain is adjusted so that the output over the carriage motor starting voltage is sent out in such a case. In actual operations, only when the equalizer output exceeds the threshold level preset in the servo LSI, the drive signal is sent out. This can reduce the consumption power.
With an eccentric disc loaded, before the whole pickup starts moving, the equalizer output may exceed the threshold level a few times. In this case, the drive signal applied from the LSI shows pulse-like waveforms.

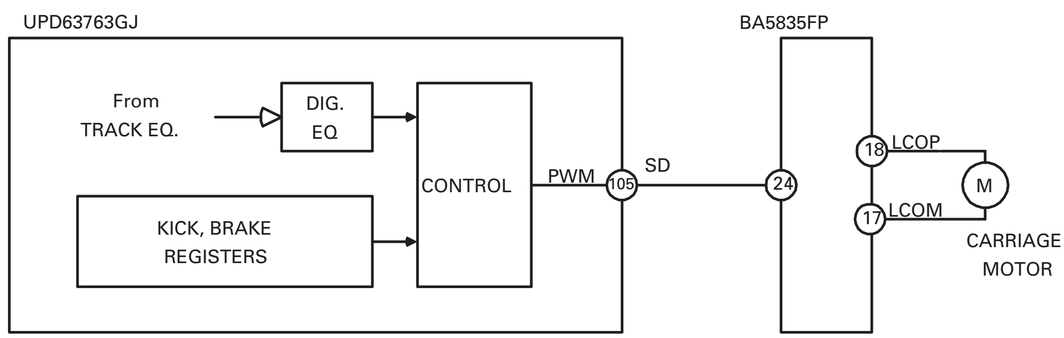


Fig. 1.2.7 Block diagram for the carriage servo block

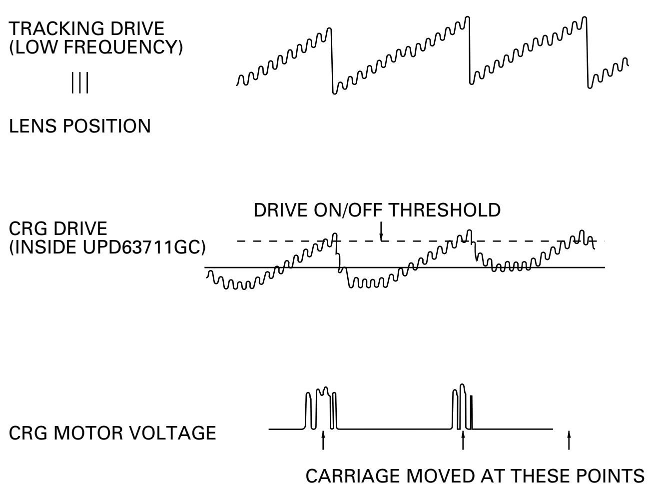


Fig. 1.2.8 Waveforms of the carriage signal

1.2.4 Spindle servo system

In the spindle servo system, the following seven modes are available:

1) Kick

Used to accelerate the disc rotation in the setting-up mode.

2) Offset

a. Used in the setting-up mode until the TBAL adjustment completes after the kick mode.

b. Used when the focus loop is unlocked during the play mode and until it is locked again.

In both cases, the mode is to keep the disc rotation near to the appropriate one.

3) Applicable servo

In the normal operation, the CLV servo mode is used.

The EFM demodulation block detects through WFCK/16 sampling whether or not the frame sync signal and the internal frame counter output are synchronized, and generates the status signal based on the sampling result, synchronized or non-synchronized. If eight consecutive "non-sync" signals are obtained, the system senses the status as "non-sync". If not, the system senses as "sync". In the applicable servo mode, the leading-in servo mode is automatically selected at the non-sync status, and the normal servo mode is at the sync status.

4) Brake

Used to stop the spindle motor.

In accordance with the microcomputer's command, the brake voltage is sent out from the servo LSI. At this moment, the EFM waveform is being monitored in this LSI. When the longest EFM pattern exceeds a certain cycle (or the rotation slows down enough), a flag is set inside the LSI, and the microcomputer switches off the brake voltage. If a flag is not set within a certain period, the microcomputer shifts the mode from the brake mode to the stop mode, and keeps this for a certain period. In the eject mode, after the mode is shifted to the stop mode and a certain period passes, the loaded disc is ejected.

5) Stop

Used when the power is turned on and during the eject mode. At this moment, the voltage through the spindle motor is 0V.

6) Rough servo

Used when the carriage is moved (or in the carriage move mode such as long search).

By obtaining the linear velocity from the EFM waveform, "H" or "L" is applied to the spindle equalizer. In the test mode, this mode is used for grating confirmation.

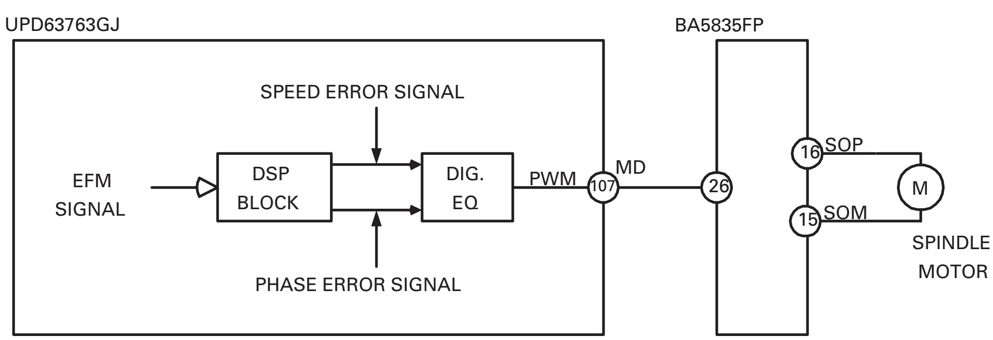


Fig.1.2.9 Block diagram of the spindle servo system

1.3 AUTOMATIC ADJUSTMENT FUNCTION

This system automatically handles the circuit adjustment inside the CD LSI. All adjustments are performed whenever a disc is inserted or the CD mode is selected by pressing the source key. Each adjustment will be explained below.

1.3.1 TE, FE, and RF offset auto-adjustment

This adjustment is made to adjust the offsets of the TE, FE, and RF amplifiers in the preamplifier block to their target values on the basis of the REFO when the power is turned on. (The target values for TE, FE, and RE offsets are 0V, 0V, and -0.8V respectively.)

<Adjusting procedures>

1) With the LD OFF status, the microcomputer reads each offset through the servo LSI.

2) The microcomputer calculates the voltages for correction from the measured values, and inputs the calculated results as the offset adjustment values.

1.3.2 Tracking balance (T.BAL) auto-adjustment

This adjustment is to equalize the pickup output offsets for E-ch and F-ch by changing the amplifier gain inside the LSI. Actually, the gain is adjusted so that the TE waveform becomes symmetrical on each side of the REFO.

<Adjusting procedures>

1) The focus loop is closed.

2) The lens is kicked in the radial direction to make certain that the TE waveform is generated.

3) The microcomputer reads the TE offset calculated in the LSI through the servo LSI.

4) The microcomputer takes either of the following steps depending on the calculated offset:

• When the offset is 0, the adjustment completes.

• When the offset is positive or negative, the amp gains for E-ch and F-ch should be changed.

The steps 2) to 4) are repeatedly taken until the offset becomes 0 or the repeating time reaches the limit frequency.

1.3.3 EF bias auto-adjustment

This adjustment obtains the best focus point during the play mode and maximizes the RFI level by utilizing the phase difference between the 3T level of the RF signal and that of the signal obtained when focus error disturbance is applied to the focus loop. At this moment, the auto-gain control (AGC), where focus error disturbance is applied to the focus and tracking loops, is also performed as explained below.

<Adjusting procedures>

1) The microcomputer transmits the command to apply disturbance component to the focus loop (inside the servo LSI).

2) In the LSI, the 3T-offset component of the RF signal is detected.

3) From the relation between the 3T detected component and the disturbance, the LSI obtains the volume and direction of the focus offset.

4) The microcomputer transmits the command and reads out the detecting result from the servo LSI.

5) The microcomputer calculates the necessary correction and inputs the result as the bias adjustment value to the servo LSI.

The adjusting steps are repeated a few times for higher adjustment accuracy as same as those for the AGC.

1.3.4 Focus and tracking AGC

This function automatically adjusts the focus and tracking servo loop gains.

<Adjusting procedures>

1) Disturbance component is applied to the servo loop.

2) The error signals (FE and TE) are extracted through the band pass filter as the G1 and G2 signals.

3) The microcomputer reads the G1 and G2 signals through the servo LSI.

4) The microcomputer calculates the necessary correction and performs the loop gain adjustment inside the servo LSI.

For higher adjustment accuracy, the above steps are repeated a few times.

1.3.5 RF level auto-adjustment (RFAGC)

This adjustment minimizes the dispersion of the RF level (RFO), which may be caused by disc-related errors, for more stable signal transmission by changing the amp gain between RFI and RFO.

<Adjusting procedures>

1) The microcomputer sends the command to the servo LSI to read out the output from the RF level detecting circuit inside the servo LSI.

2) The microcomputer calculates the appropriate amp gain by using the output read out to adjust the RFO level at the prescribed one.

3) The microcomputer sends the command to the servo LSI to adjust the amp gain into the calculated one.

This adjustment is automatically performed when:

1) During the setting-up mode, only the focus close operation ends.

2) Immediately before the setting-up ends (or right before the play mode starts)

1.3.6 Preamplifier gain adjustment

In this adjustment, when the reflected beams from disc surface are extremely weak (ex. when the lens is dirty, and a CD-RW is loaded), the whole gain in the RFAMP block (FE, TE, and RF amplifiers) is increased by +6dB or +12dB.

<Adjusting procedures>

When the system senses that the reflected beams from disc surface are extremely weak during the setting-up mode, the whole RFAMP gain is increased by +6dB or +12dB.

After the gain is changed, the setting-up mode is restarted.

1.3.7 Initial values in adjustment

All automatic adjustments immediately after inserting a disc are conducted from the initial value. Automatic adjustments by source change or ACC ON are conducted basically using the previous adjustment value as the initial value.

1.3.8 Adjustment result display

For some of the adjustments (FE and RF offset, FZD cancel, F and T gain, and RFAGC), the adjustment results can be displayed and confirmed in the test mode.

1) FE and RF offset
Reference coefficient = 32 ("32" indicates no adjustment required)
The display is expressed in the unit of about 32mV.
Ex. When the FE offset coefficient is 35:
35 - 32 = 3 x 32mV = 96mV
This means that the correction is about +96mV, and the FE offset before adjustment is -96mV.

2) F and T gain adjustment
Reference coefficient for focus and tracking = 20
The displayed coefficient / the reference coefficient indicates the adjusted gain.
Ex. When the AGC coefficient is 40:
40/20 = 2 times (+6dB)
That is, the gain was adjusted by +6dB.
(The original loop gain was half the target one. So, the whole gain was doubled.)

3) RF level adjustment (RFAGC)
Reference coefficient = 8
The coefficient 9 to 15 indicates increasing the RF level.
The coefficient 0 to 7 indicates decreasing the RF level.
When the coefficient display changes by 1, the gain changes by 0.7 to 1dB.
When the coefficient is 15, the gain is maximum or TYP + 7.9dB.
When the coefficient is 0, the gain is minimum or TYP - 4.6dB.

1.4 POWER SUPPLY AND LOADING BLOCK

The VD (7.5 ± 0.5V), the VD2 (7.5 ± 0.5V) and the VDD (5.0 ± 0.25V), which are supplied from the main unit, are used for the power supply. In this system, the following four power-supply signals are available: the VD (for the drive system), the V3R3 obtained from the VD2 via the 3.3V regulator (for the control system: 3.3V), the VDD (for the microcomputer: 5V), and the 3VDD obtained from the VDD via the 3.3V regulator (for the microcomputer: 3.3V).
ON/OFF of other than Load/Eject of CD driver and 5V ON/OFF are controlled by “CONT” and “CD5VON”, respectively, with microcomputer. Loading drive ON/OFF is not equipped with a control terminal, but the input signal “LOEJ” has an equivalent role. LCO output switches LOADING MODE and CARRIAGE MODE by “CLCONT.”

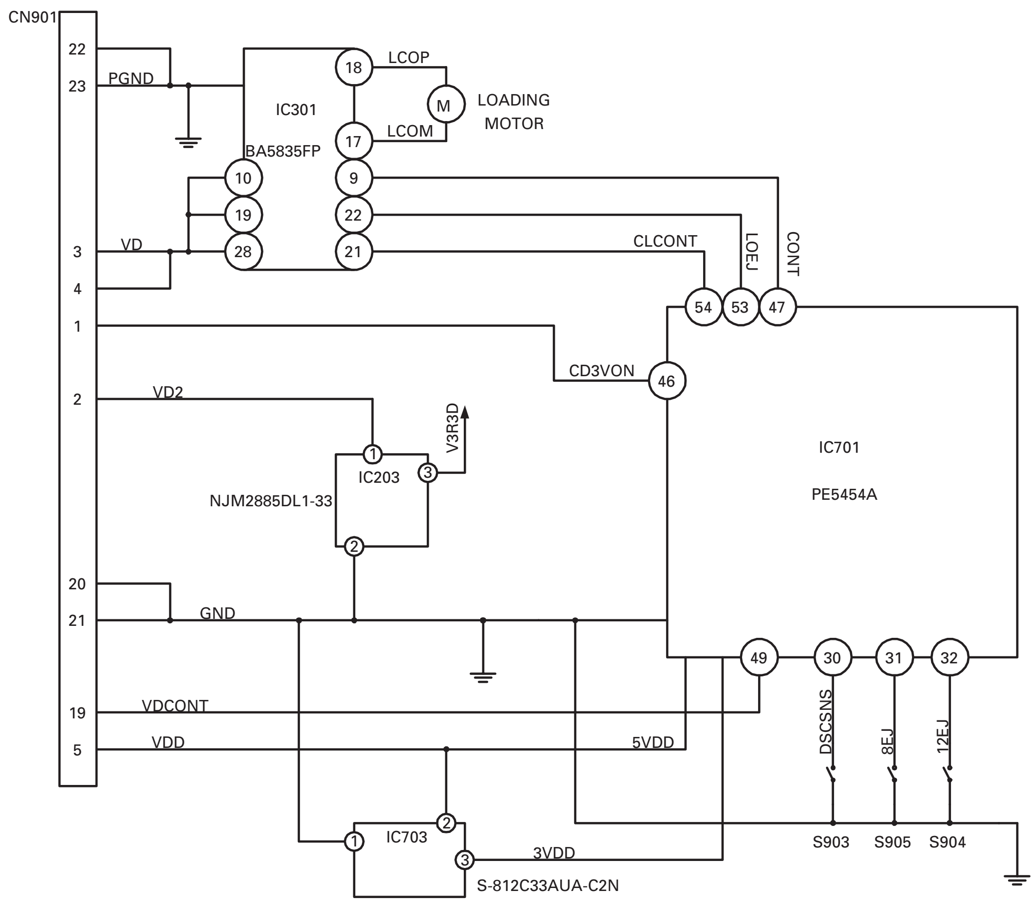


Fig. 1.4.1 Power supply/loading block

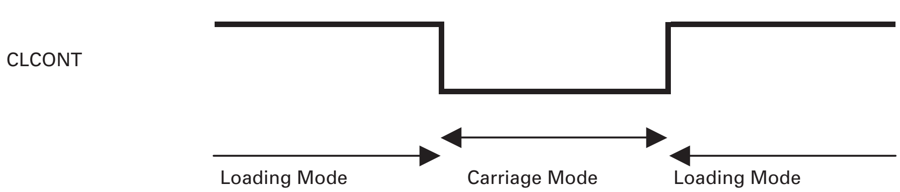


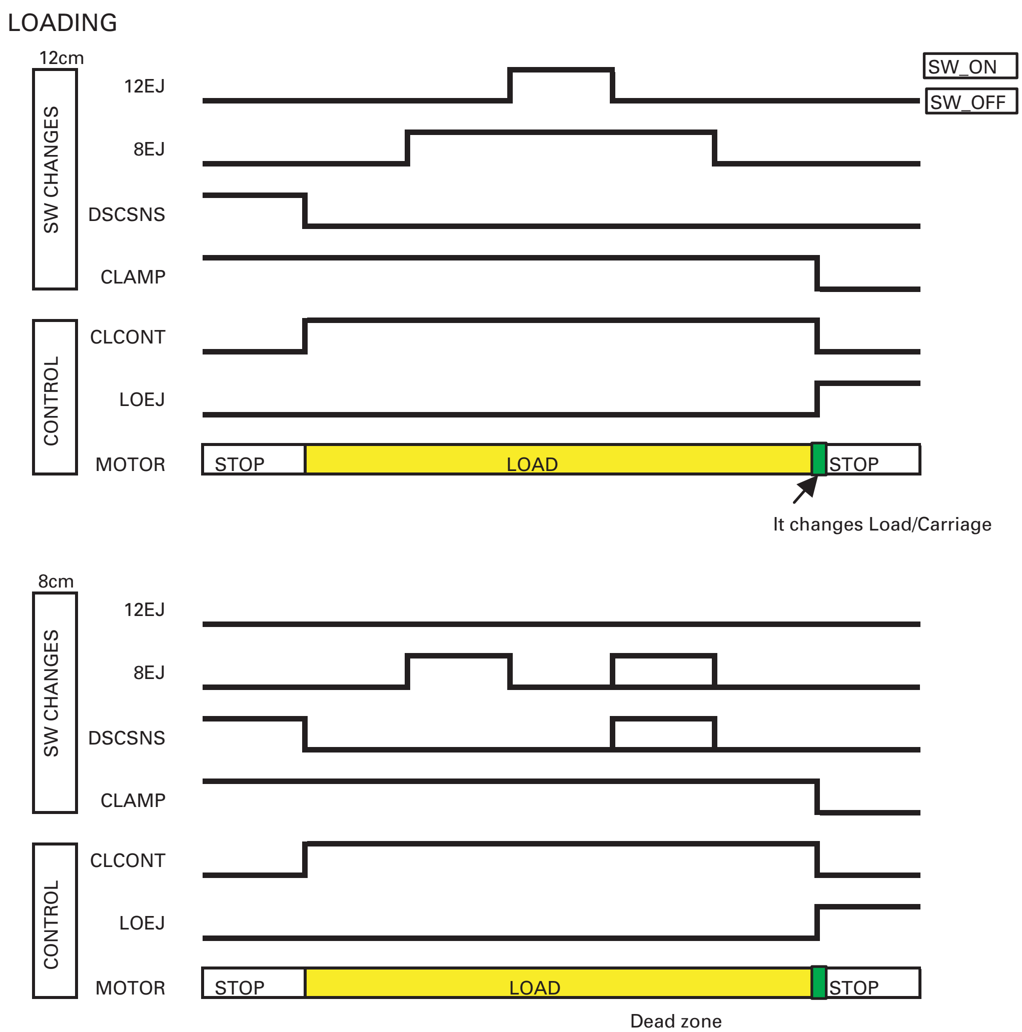
Fig. 1.4.2 Loading/carriage mode shift

To control the load and eject operations, the clamp switch located in the mechanism unit and the three detecting switches located in the control unit are used. Depending on the combination of these switches' ON/OFF status, the DSCSNS voltage changes.

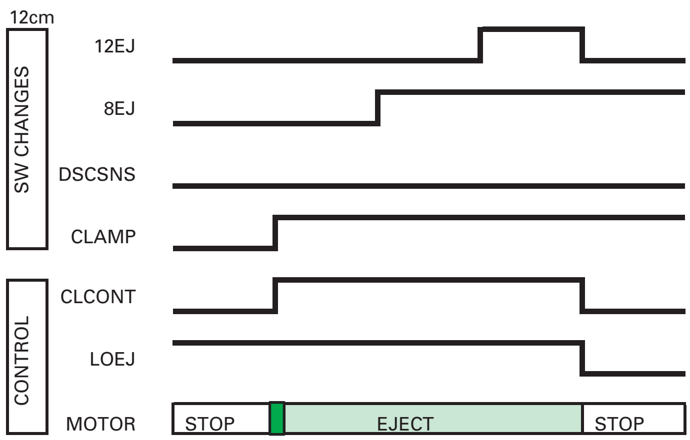
The microcomputer can detect the status (A to E) by observing the voltage at the A/D port. The disc size detection (8 or 12cm) is also performed through this status change. The DSCSNS status and the status change in the load and eject modes are shown in the figures 1.4.3 and 1.4.4 respectively.

Status	A	B	C	D	E
SW1(S903)	ON	OFF	OFF	OFF	ON
SW2(S905)	OFF	OFF	ON	ON	OFF
SW3(S904)	OFF	OFF	OFF	ON	OFF
SW4(S901)	OFF	OFF	OFF	OFF	ON
Mechanism state	With no disk				Clamp state

Fig.1.4.3 DSCSNS status



EJECT



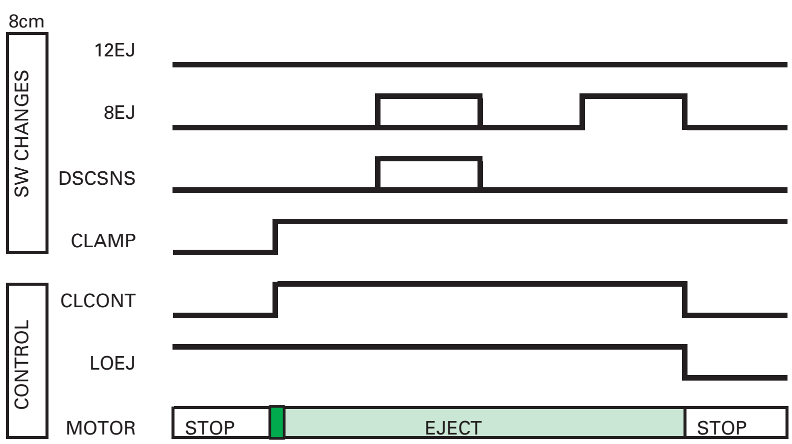
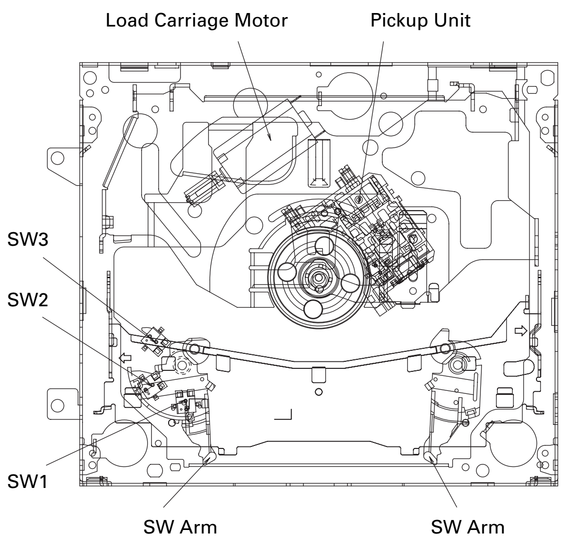


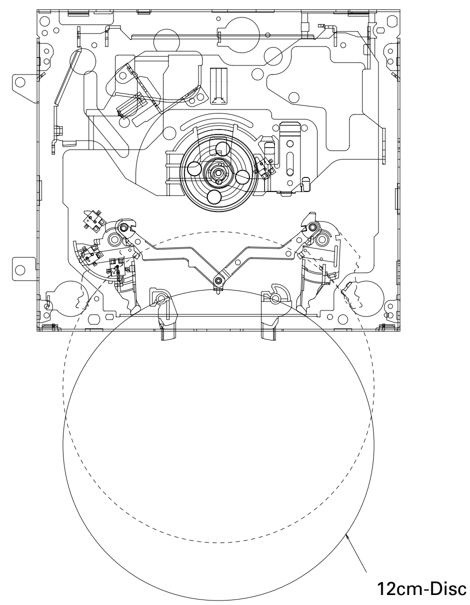
Fig.1.4.4 Status change in LOAD and EJECT modes

2. MECHANISM DESCRIPTIONS

● Loading actions

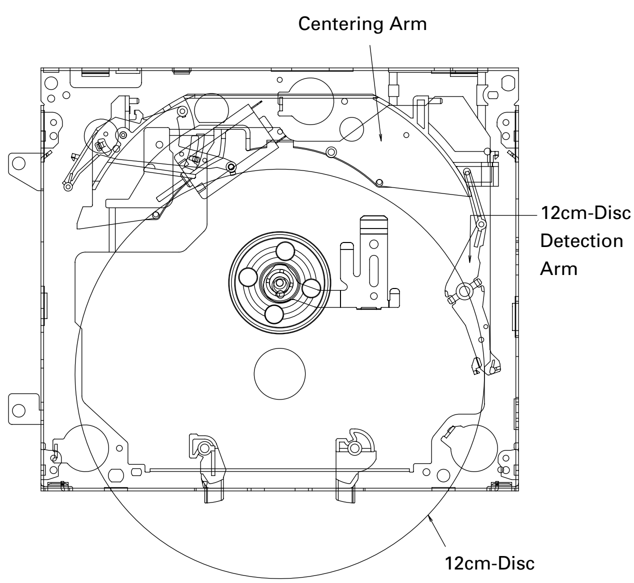
1. When a disc is inserted, SW Arm L and R rotate. Due to the rotation of Arm L, SW1 is switched from ON to OFF and the Load Carriage Motor starts.
2. If the disc is 12cm-disc, when it is carried to the position shown with the dotted line in the drawing, SW 3 switches to ON due to such rotation of Arm. Then, the microcomputer judges that the disc is 12cm-disc.
3. In case of 8cm-disc, the disc cannot reach such dotted line position, and from such limitation of approach, the microcomputer judges that the disc is 8cm-disc and simply triggers clamp actions.
   (Movement of SW Arm L and R are connected together. So, if pushing force is fed to only one arm, the distance between tow arms cannot be widened beyond the specific degree, because the coupling part is locked in such case.)

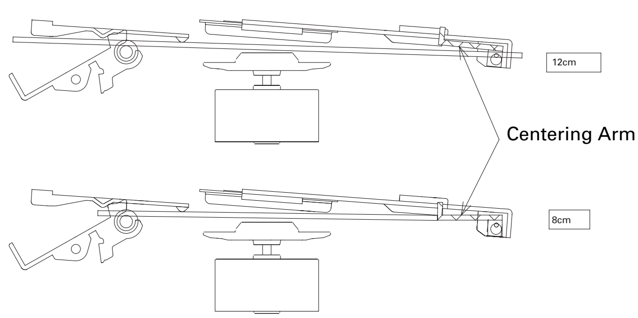




● Disc centering mechanism

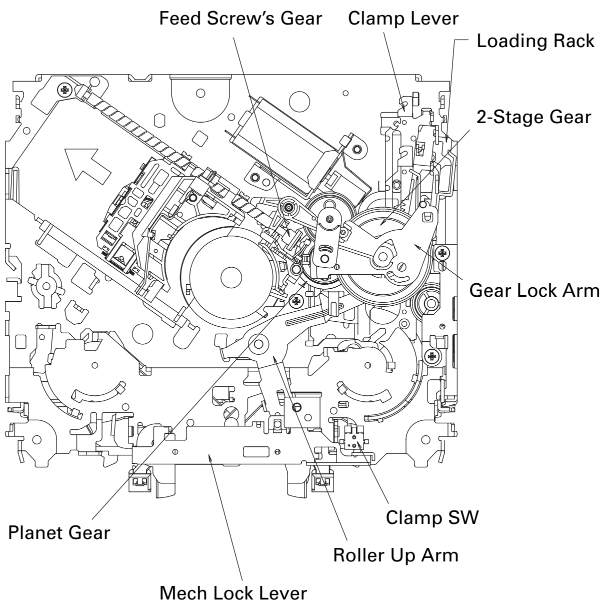
1. In case of 12cm-disc, the 12cm-Disc Detection Arm rotates, and with such rotation, it raises the Centering Arms to retreat the arms from disc's trace. The disc passes through under the arms, and at the inner part, it is centered.
2. In case of 8cm-disc, it is just centered at the position where its edge touches the front portion of the Centering Arm.

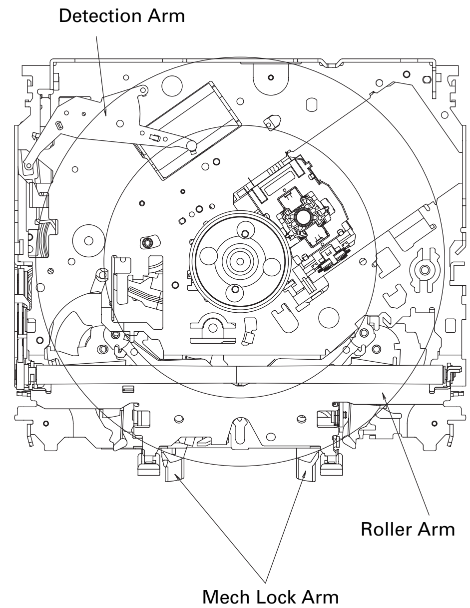




● Clamp actions

1. When an 8 or 12cm disc is placed on the center of the spindle, the detection arm starts moving.
2. The movement of the detection arm engages the loading rack with the 2-stage gear.
3. The clamp lever slides to lower the clamp arm. At this time, the roller up arm rotates to separate the roller arm from the disc. The roller arm moves the mech lock lever and turns the mech lock arm to release the mech lock. At the position where the clamp switch is turned off, the clamp operation ends.
4. After the clamp operation, the clamp lever moves to rotate the gear lock arm. The planet gear separates from the 2-stage gear to get engaged with the pickup feed screw's gear. Then the carriage operation will start.





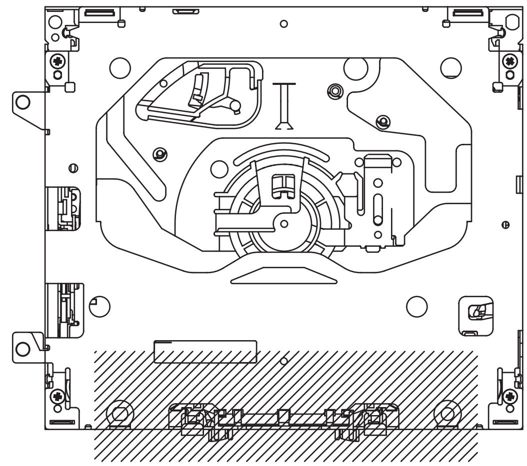
● Eject actions

1. Eject actions start when the Pickup is fed to the position inner than "Home SW ON" point in the internal circumference of the circle, caused by backward rotation of the Load Carriage Motor. Eject actions follow the foregoing procedures (steps taken in loading, centering and clamping actions), but each action in those steps is performed in reversed manner.
2. In case of 12cm-disc, Eject is completed when SW3 completes its condition- transition of OFF → ON → OFF.
3. For 8cm-disc, Eject is completed when SW2 completes its condition-transition of OFF → ON → OFF.

3. DISASSEMBLY

● How to hold the Mechanism Unit

1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.

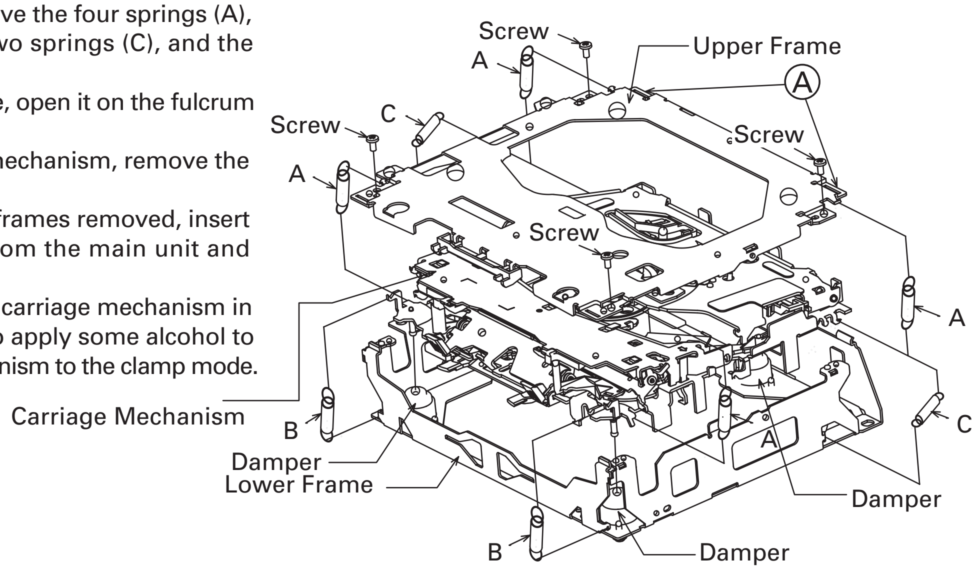


Do not squeeze.

● Removing the Upper and Lower Frames

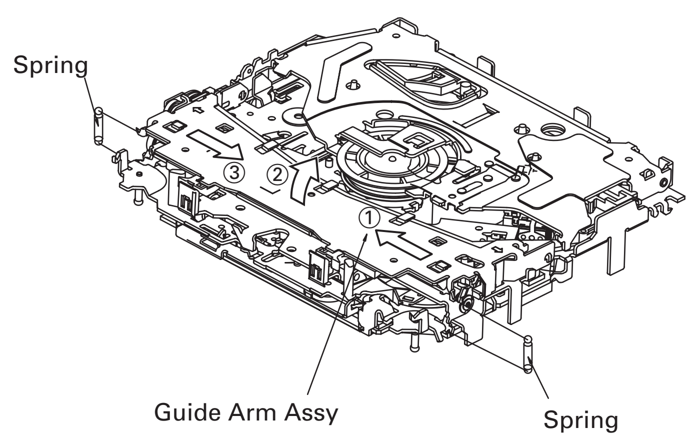
1. With a disc clamped, remove the four springs (A), the two springs (B), the two springs (C), and the four screws.
2. To remove the upper frame, open it on the fulcrum Ⓐ.
3. While lifting the carriage mechanism, remove the three dampers.
4. With the upper and lower frames removed, insert the connectors coming from the main unit and eject the disc.

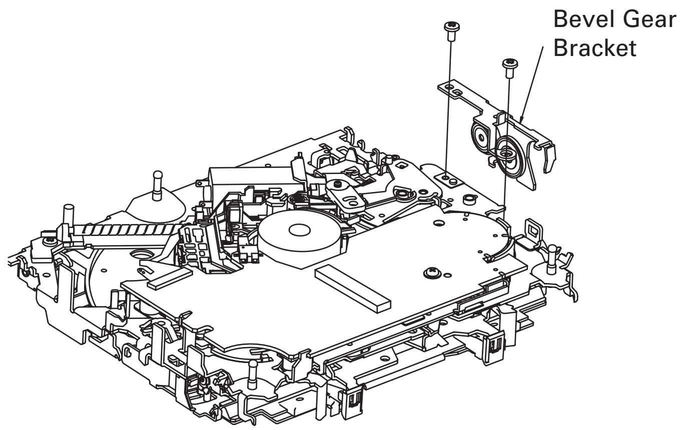
Caution: Before installing the carriage mechanism in the lower frame, be sure to apply some alcohol to dampers and set the mechanism to the clamp mode.



● Removing the Guide Arm Assy

1. Remove the upper and lower frames and set the mechanism to the clamp mode.
2. Remove the two springs.
3. Remove the two screws and bevel gear bracket. (See page 22.)
   Note that the gears come off.
4. Slide the guide arm assy in the direction marked with the arrow ① and open it upwards.
5. At the angle of about 45 degrees, slide the guide arm assy in the direction marked with the arrow ③ to remove it.

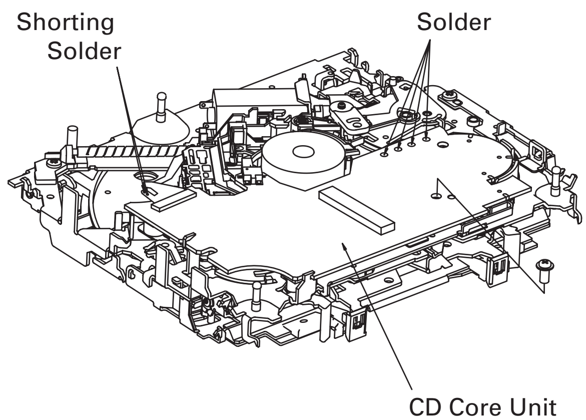




● Removing the CD Core Unit

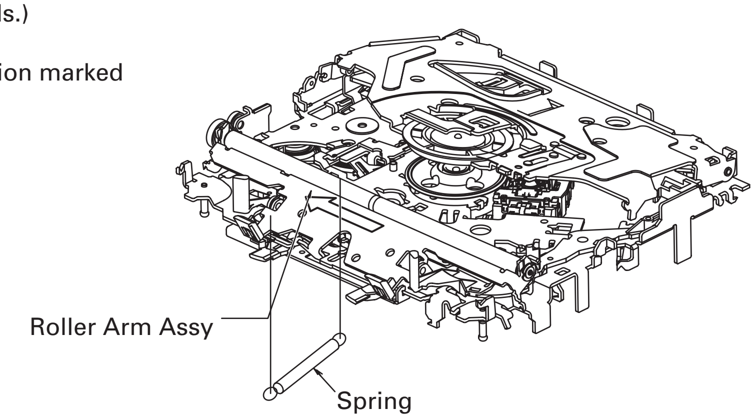
1. Apply shorting solder to the Pickup flexible cable. Disconnect the cable.
2. Remove the solder from the four leads, and loosen the screw.
3. Remove the CD core unit.

Caution: When assembling the CD core unit, set the mechanism to the clamp mode to protect the switches from any damage.



● Removing the Roller Arm Assy

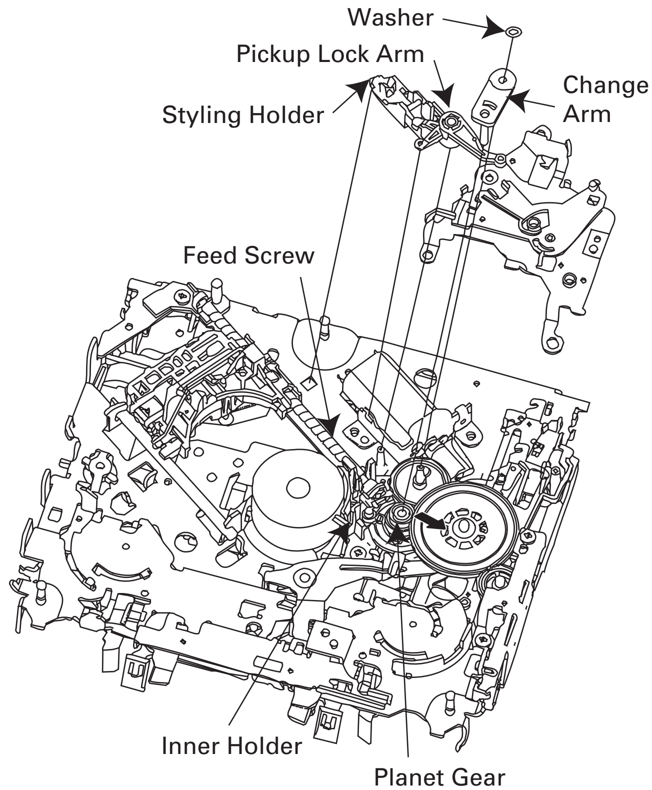
1. Remove the guide arm assy and set the mechanism to the eject mode.
2. Remove the CD core unit. (You do not have to remove the solder from the four leads.)
3. Remove the spring.
4. Slide the roller arm assy in the direction marked with an arrow.



● Removing the Pickup Unit

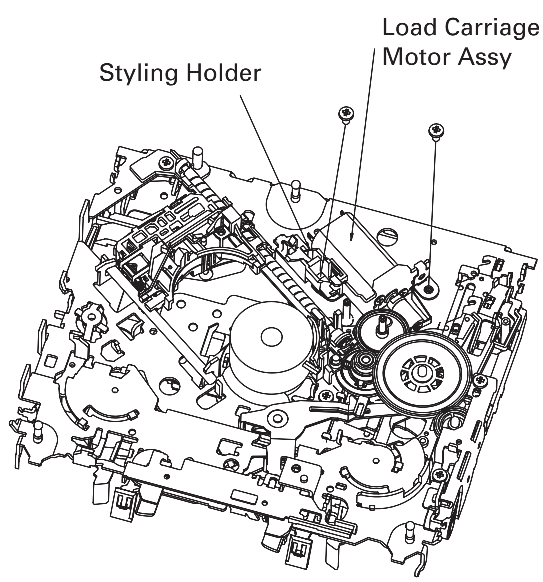
1. Set the mechanism to the clamp mode.
2. Remove the lead wires from the inner holder.
3. Remove the washer, styling holder, change arm, and pickup lock arm.
4. While releasing from the hook of the inner holder, lift the end of the feed screw.

Caution: In assembling, move the planet gear to the load/eject position before setting the feed screw in the inner holder.



● Removing the Load Carriage Motor Assy

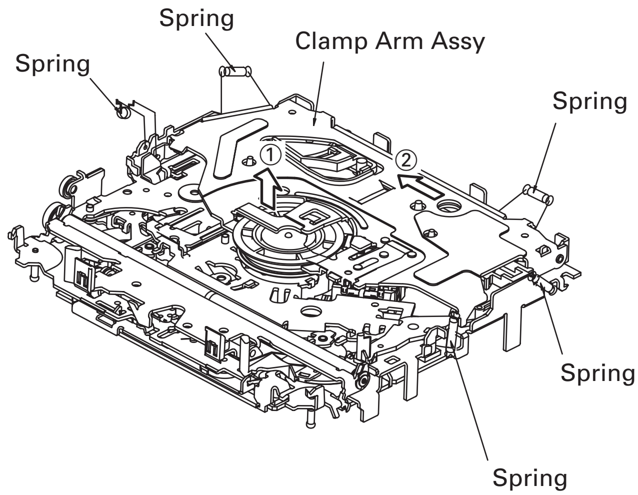
1. Release the leads from the styling holder and remove the holder.
2. Remove the two screws.
3. Remove the load carriage motor assy.



A

● Removing the Clamp Arm Assy

1. Remove the five springs.
2. While lifting the clamp arm assy, slide it in the direction marked with the arrow ② to remove it.

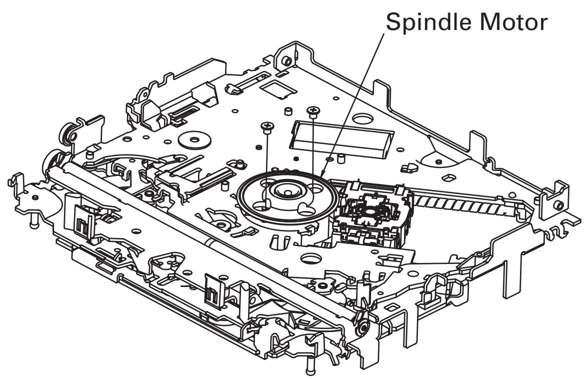


B

● Removing the Spindle Motor

1. Remove the two screws. Take off the spindle motor.

C



D

E

F