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Service Manual

ORDER NO.
CRT 1177

COMPACT DISC PLAYER

CDX-3 UC, EW

COMPACT disc DIGITAL AUDIO

Note:

- **See the separate manual CX-173 (CRT1161) for the CD mechanism description.**
- **Refer to the service manual CDX-M100 (CRT1136) for finding circuit description which are not shown in this manual.**

- **The following power supply parts differ according to the unit's serial number.**

	Serial No.	Serial No.
	00001 ~ 00500	00501 ~
IC951	KHA1001B D/D Converter	L780S05-LR Regulator
C957	—	CKSYF334Z25
C958	—	CKSYF104Z25

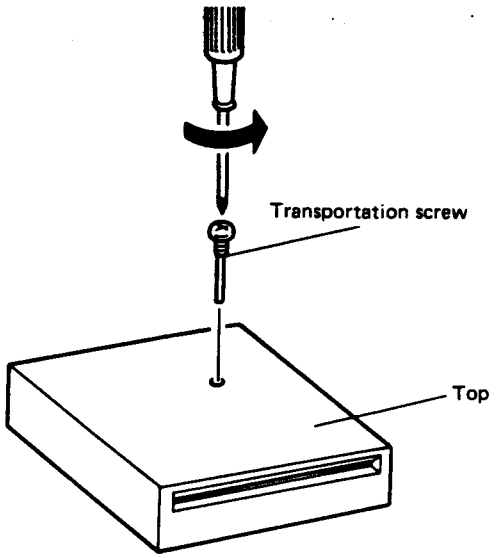
CONTENTS

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

FS OCT. 1988 Printed in Japan

• CD Player Service Precautions

1. Since these screws protects the mechanism during transport, be sure to affix it when it is transported for repair, etc.
2. For pickup unit (CGY1007) handling, please refer to "Disassembly"(Fig. 13) During replacement, handling precautions shall be taken to prevent an electrostatic discharge (protection by a short pin).
3. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.



SPECIFICATIONS

General

System ..... Compact disc audio system
Usable discs ..... Compact discs
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Power source ..... 14.4 V DC (10.8–15.6 V allowable)
Grounding system ..... Negative type
Power consumption ..... 5.5 W
Maximum power consumption ..... 9 W
Dimensions (chassis) ..... 180(W) × 50(H) × 150(D) mm
(nose) ..... 170(W) × 46(H) × 7(D) mm
Weight ..... 1.3 kg(2.9 lbs.)

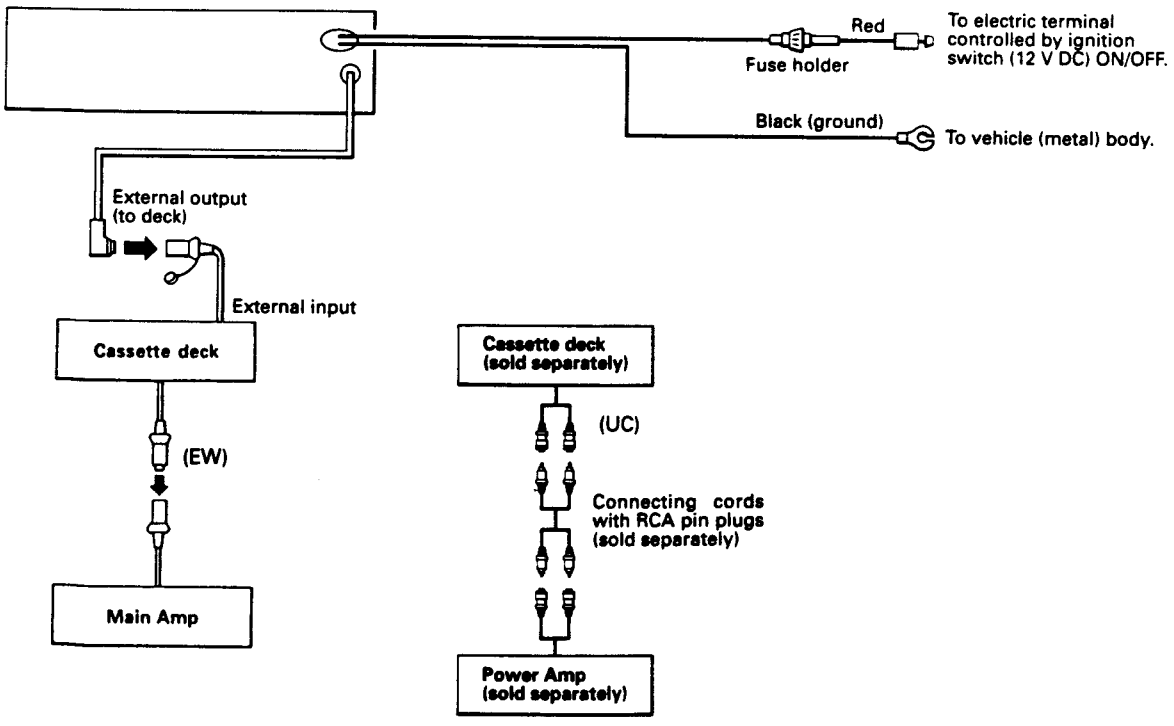
Audio

Frequency characteristics ..... 5–20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 85 dB (1 kHz) (IEC-A network)
Dynamic range ..... 87 dB (1 kHz)
Wow and flutter ..... Below measurement range
Distortion factor ..... 0.008% (1 kHz, 0 dB)
Output voltage ..... 250 mV (1 kHz, 0 dB)
Number of channels ..... 2 (stereo)

Note:
Specifications and the design are subject to possible modification without notice due to improvements.

1. CONNECTION

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the instruction manual for details on connecting the various cords of the deck and power amp then make connections correctly.



2. SAFETY INFORMATION (CDX-3/EW)

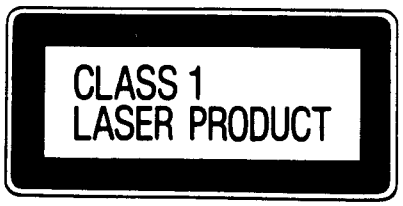
1. Safety Precautions for those who Service this Unit.

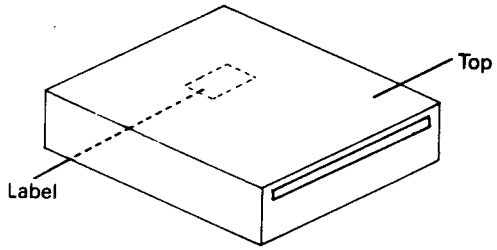
- Follow the adjustment steps (see pages 14 through 35) in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

Caution:

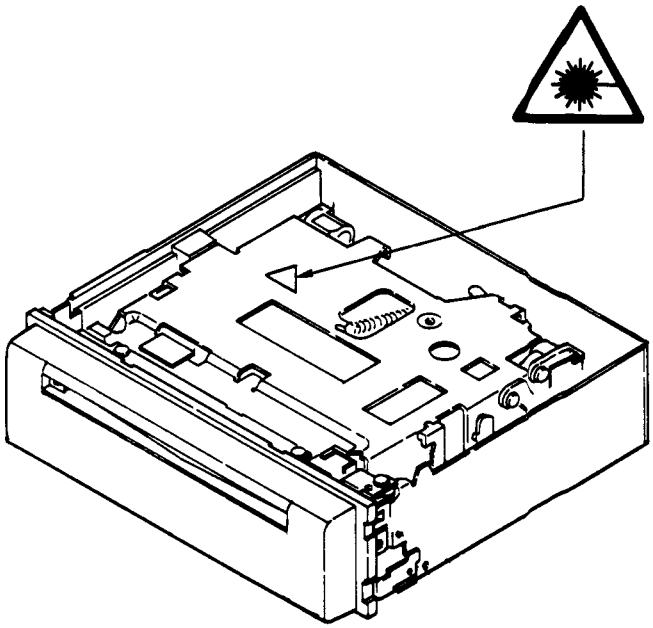
1. **During repair or tests, minimum distance of 13cm from the focus lens must be kept.**
2. **During repair or tests, do not view laser beam for 10 seconds or longer.**

2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.





3. The triangular label is attached to the mechanism unit plate unit.



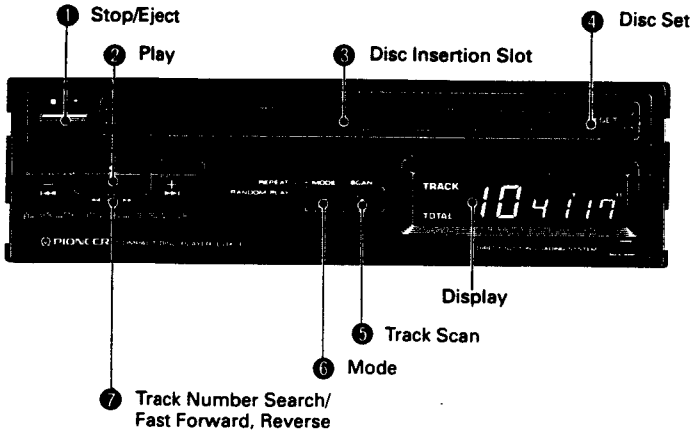
4. Specifications of Laser Diode

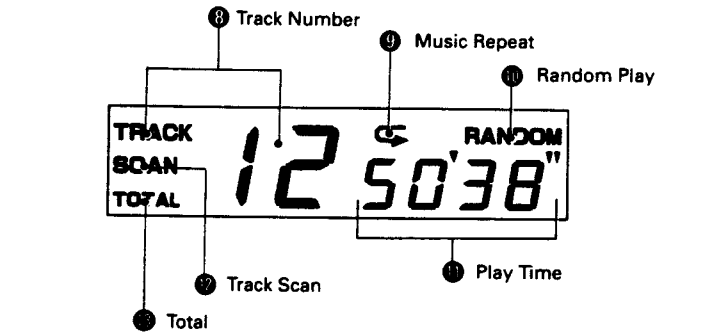
Specifications of laser radiation fields to which human access is possible during service.

Wavelength = 780 nanometers
Radiant power = 69.7 microwatts
(Through a circular aperture stop having a diameter of 80 millimeters)

0.55 microwatts
(Through a circular aperture stop having a diameter of 7 millimeters)

3. PLAYING COMPACT DISCS





- When a space of a few seconds exists between the selections of the disc being used, ● will show –'02, –'01 when the spaces are passed.

Using Track Scan

This function lets you scan through the tracks on a disc by playing only the first ten seconds of each track.

1. Press button 5 ("SCAN" ● will appear on the display).
2. To cancel track scan and continue playing the current track, press button 5 again.

- After track scan has played through all of the tracks, disc play resumes from the beginning of the track from which track scan was started.

Using Music Repeat and Random Play

Each time 10 is pressed, the mode is changed in the following order: Repeat ("⇆" 9 appears)→Random Play ("RANDOM"● appears)→ Release.

Music Repeat

To repeat the music you are listening to, select the repeat mode ("⇆" 9 appears).

- When music repeat is not operational, the whole disc will be played repeatedly.

Random Play

To play music randomly, select the random play mode ("RANDOM" ● appears). Once the current track has been played, the microprocessor will randomly select the next and subsequent tracks.

- Since selections are played in random order, the same selection may be played twice in succession.

- Turn the cassette deck power switch or the tuner power switch to the OFF position.

1 When a disc is inserted half-way into the disc insertion slot 3 with its label side upward, the disc is automatically loaded and played.

During the first five seconds after loading the disc, the "TOTAL" indicator ● appears in the display, and the total number of tracks 8 and their total playing time ● are indicated.

2 Use track number search to select a track.

Press the (+) side of button 7 to increase the number at position 8, or the (–) side to decrease the number. Holding either side of button 7 down changes the track number at high speed.

3 Set the volume, balance, bass and treble to the desired level using the cassette deck controls.

4 To stop CD play, press button 1.

(To restart CD play, press button 2. CD play restarts from the point where it was stopped.) To eject the disc, press button 1 again. If the ejected disc is pushed back in, it is loaded and played again.

Note:

- It takes a short time after a disc is loaded before it is played. This is because the CD player requires a setup time to read digital signals from the disc.
- When ◄ SET 3 is displayed, a disc is loaded. If another disc is inserted into the slot at this time, the discs may be damaged or the player may malfunction.
- Do not insert two discs into the slot at the same time. This may cause a malfunction.
- The cassette tape deck and tuner can be used while a disc is in the set position.
- If the engine is started during CD play, or if the ignition key is turned OFF and is then turned to ACC or ON, CD play stops. Press button 2 to restart CD. Playing will resume close to where it left off.

Using Fast Forward and Reverse

To fast forward, hold down button 2 and press the (+) side of button 7. To reverse, hold down button 2 and press the (–) side of button 7.

- Sound is output during fast forward and reverse operations.

4. CIRCUIT DESCRIPTION

(1) DIB, AUXB Signals

These signals are used to control the operations of the CD player. The DIB signal is output from the main unit (tuner, cassette deck, etc.), and goes high while the main unit is operating. When this signal is received, IC751 pin ㉝ goes low; the CDX-3 stops operation then enters the standby mode.

When the main unit stops operation, the DIB signal goes low to enable the operation of the CDX-3. At this time, if the CDX-3 is stopped during playing, play starts automatically from the tune which was being played when the CDX-3 was stopped.

The same operation is also performed when the ACC function is deactivated.

When the DIB signal goes high while the CDX-3 is operating, the CDX-3 stops operation and enters the stop mode.

The AUXB signal is output at high level while the CDX-3 is operating, signaling to the main unit that the CDX-3 is operating.

(Note: Low = 0 V, High = 14.4 V)

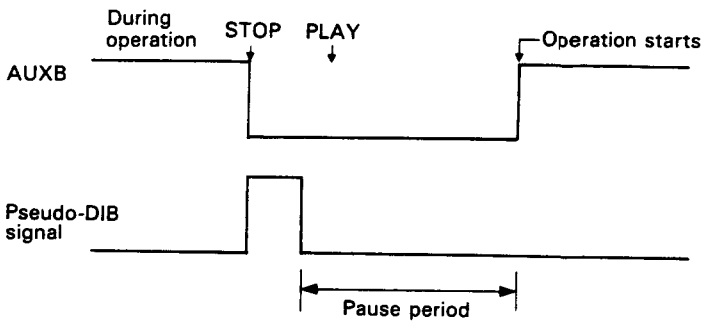
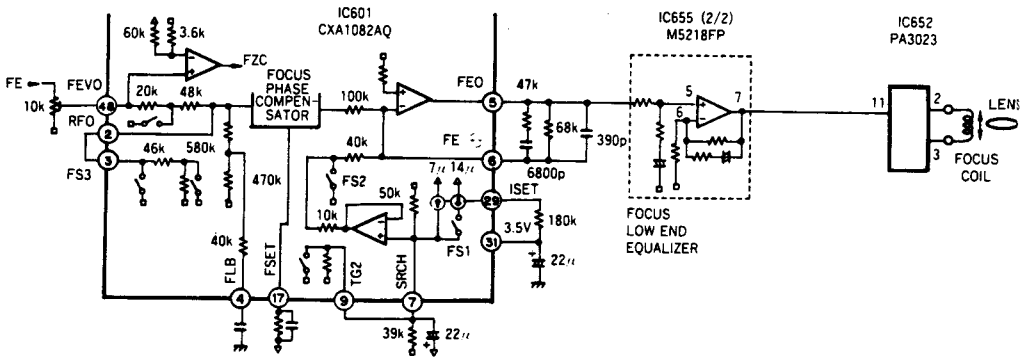


Fig. 1

(2) Focus Servo Circuit



FEVO and FEO are in phase.

Fig. 2 Focus Servo Section Block Diagram

A block diagram of the focus servo circuit is shown above. The capacitor connected to pin ④ provides a time constant to boost the low-frequency response in the continuous play mode. The internal constant current (ISET current) is determined by the resistance connected to pins ㉙ and ㉛ : 7 µA when a 180-kohm resistor is connected.

ISET current = 1.276 V/R

This current is used for the focus search, tracking jump and the carriage kick operations. The reference voltage for the inverted input of the FZC comparator is set to (VCC-VC) × 5.7% (approx. 140 mV).

a) In-focus (search voltage):

An in-focus sequence is used to drive the laser lens within the focus S-curve (approx. 10 μm) to close the servo loop when it is focused. The search voltage is determined by the sensitivity of the focus actuator which is designed so that the lens drive distance is set to ± 1mm. In this system, the following voltages are obtained at pin ⑦.

When FS1 is OFF:

−7 [μA] × 22 [kohms] × 0.63 = −0.097 ≃ −0.1 [VC]: → Lens UP

(22 kohms = 50kohm//37 kohm)

When FS1 is ON:

(14 − 7) [μA] × 22 [kohms] × 0.63 ≃ +0.1 [VC]: → Lens DOWN

As above, FS1 is turned ON and OFF alternately to move the lens up and down. (The time constant for moving up/down is determined by the resistor and capacitor connected to pin ⑦.)

The focus operation is not designed for auto sequence operation. It is executed by following the timing chart (see Fig. 3). This is because the "focus close" command is output only when the lens is moved up to prevent the focus operation from malfunctioning.

* "Lens UP" shows that the lens is moved up close to the disc surface.

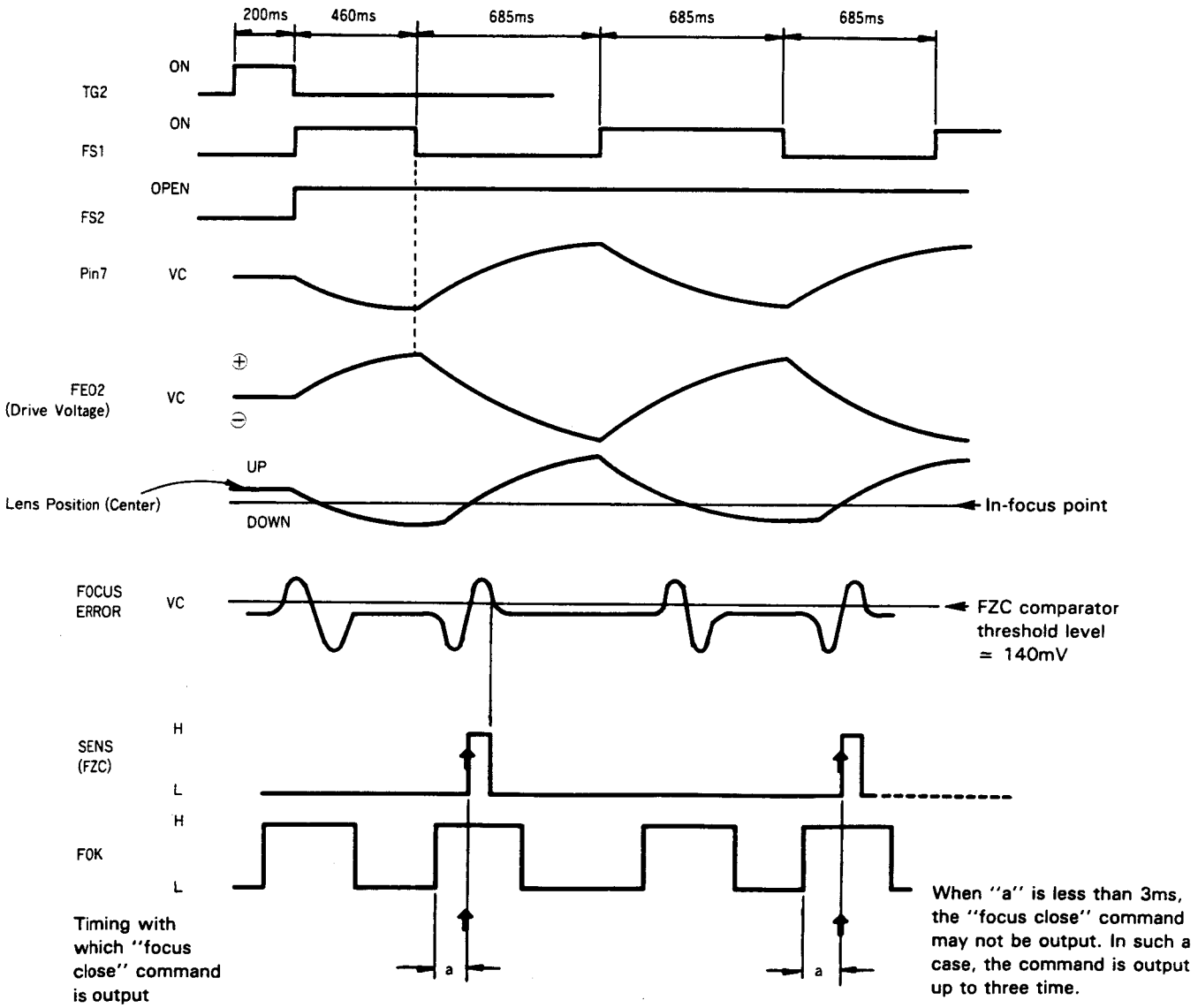


Fig. 3 Focus Close Timing Chart

(4) APC (Automatic Power Control) Circuit

As the laser diode has negative temperature characteristics as well as high-level optical output when driven by a constant current, it is necessary to control the current using a monitoring photodiode to stabilize the output power. For this purpose, an APC (Automatic Power Control) circuit is employed. In this system, an LDI of approx. 50 — 60 mA is used.

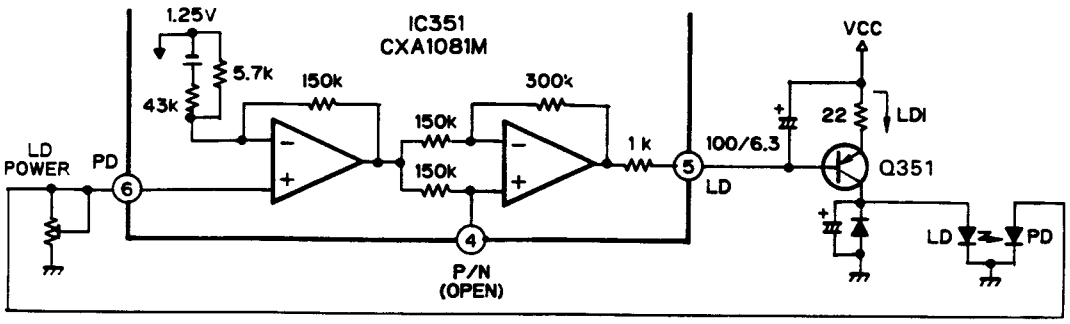


Fig. 5 APC Circuit

(5) Search Sequence

Example: To search the 4th tune when playing the 3rd tune

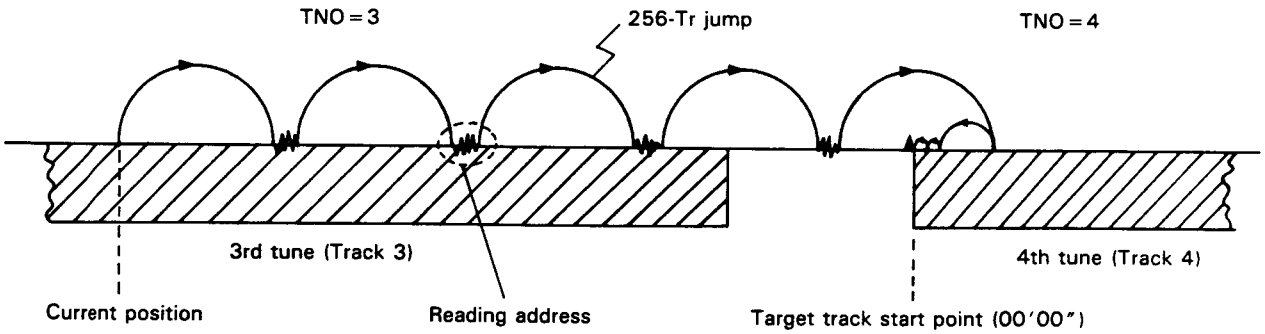


Fig. 6

① After comparing the current track number with the target track number, since the target track number is higher than the current one, the laser pick-up jumps outward by 256 Tr.
② The address of the current position is read to compare the track numbers again.
③ Since the target number is higher, the laser pick-up jumps outward by 256 Tr again.
When operations ② — ③ are repeated, the current track number will become the same as the target track number.
④ Then the number of tracks between the relative address and the beginning of the next tune is calculated and the laser pick-up jumps.
⑤ The relative address at the current position is read to compare it with the target (00'00"). If both addresses are the same, the searching sequence finishes. If not, the calculation and jump operation will be performed again.
When the operations in ④ and ⑤ are repeated, [00'00"] is obtained, the search sequence will be released and the player enters the PLAY mode.

* In actual operation, the laser pick-up returns by 1 Tr to prevent missing the beginning of the tune before starting play.

(3) Tracking, Carriage Servo Circuit

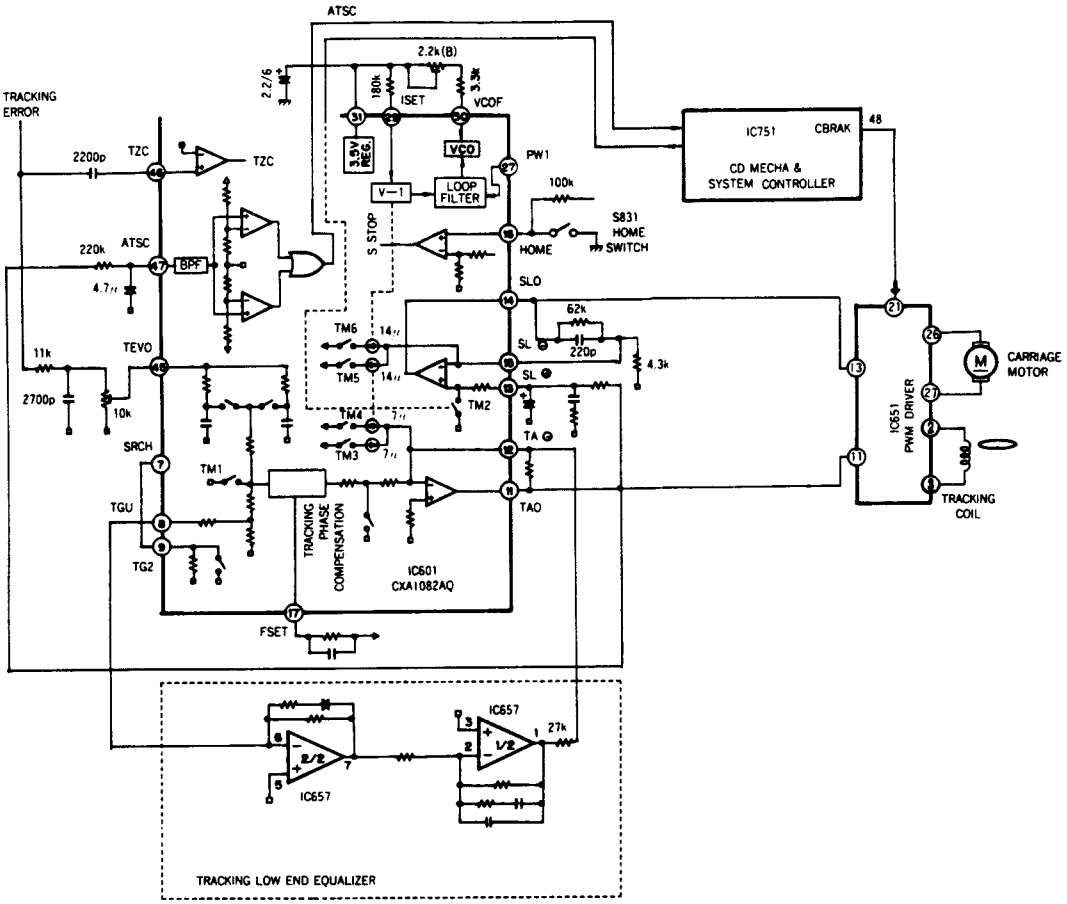


Fig. 4 Tracking, Carriage Servo System Block Diagram

The above figure is a block diagram of the tracking/carriage servo circuit. To perform tracking jump operation (of the laser pick-up) in the FWD (forward) or REV (reverse) direction, TM1 is turned ON and at the same time, TM3 and TM4 are turned ON and OFF. At this time, the voltage generated at pin ⑪ TAO is determined by the current flowing in TM3/TM4 and the feedback resistance from pin ⑫.
That is:

Track jump peak voltage (TAO) = ISET i (tracking) × R_{TAO} = 7 [μA] × 82 (kohms) = 0.57 [VC]

To perform carriage kick operation in the FWD (forward) or REV (reverse) direction, TM2 is turned ON and at the same time, TM5 and TM6 are turned ON and OFF. At this time, the voltage generated at pin ⑭ SLO is determined by the current flowing in TM5/TM6 and the feedback resistance from pin ⑮.
That is:

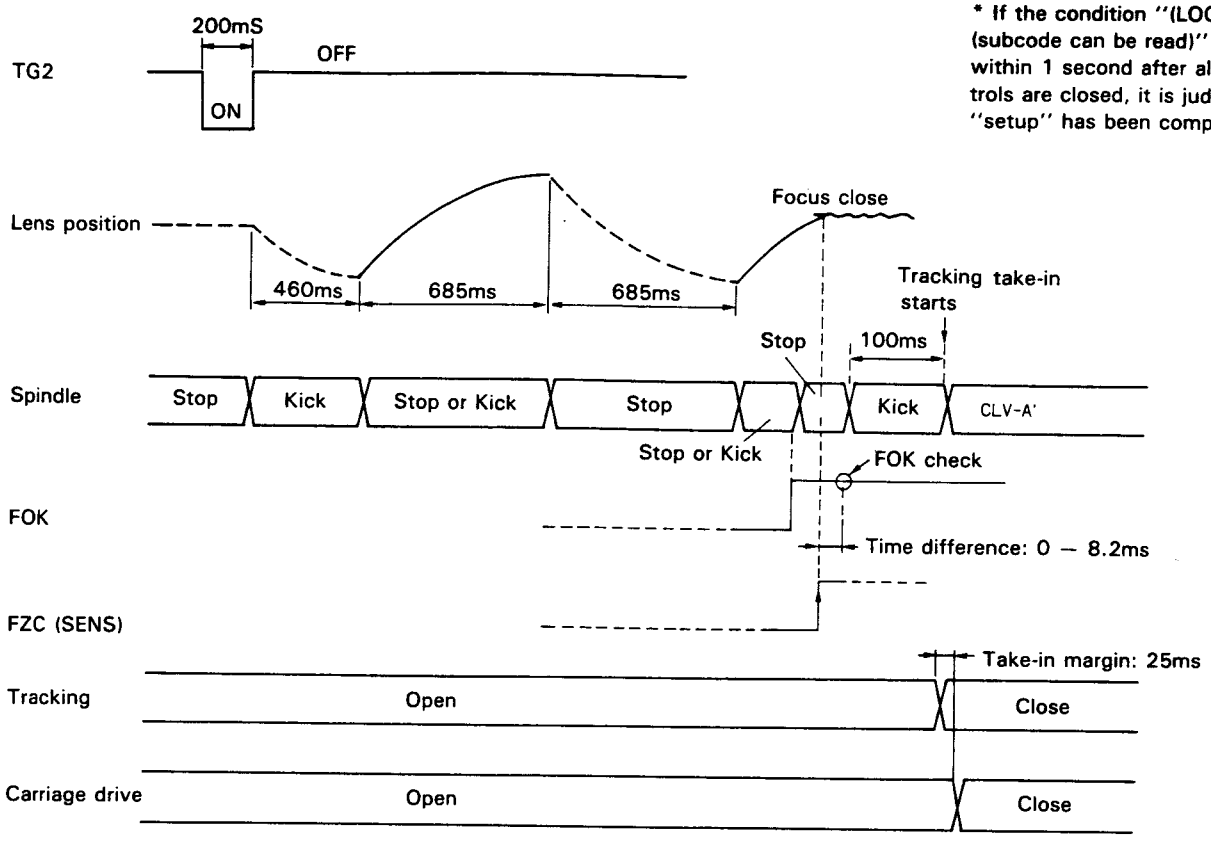
Carriage kick voltage (SLO) = ISET i (carriage) × R_{SLO} = 14 [μA] × 62 [kohms] = 0.87 [VC]

The polarities of pin ㊺ TEVO and pin ⑪ TAO are reversed.

a) Tracking Equalizer:

This circuit is constructed in 2 stages and consists of a phase compensator (for high frequencies) incorporated in an IC and externally connected low-frequency compensator connected in parallel. The former is the main path and the latter from the side path. These signals are added in pin ⑫ of the TAO amp so that the specified equalization characteristics are obtained.

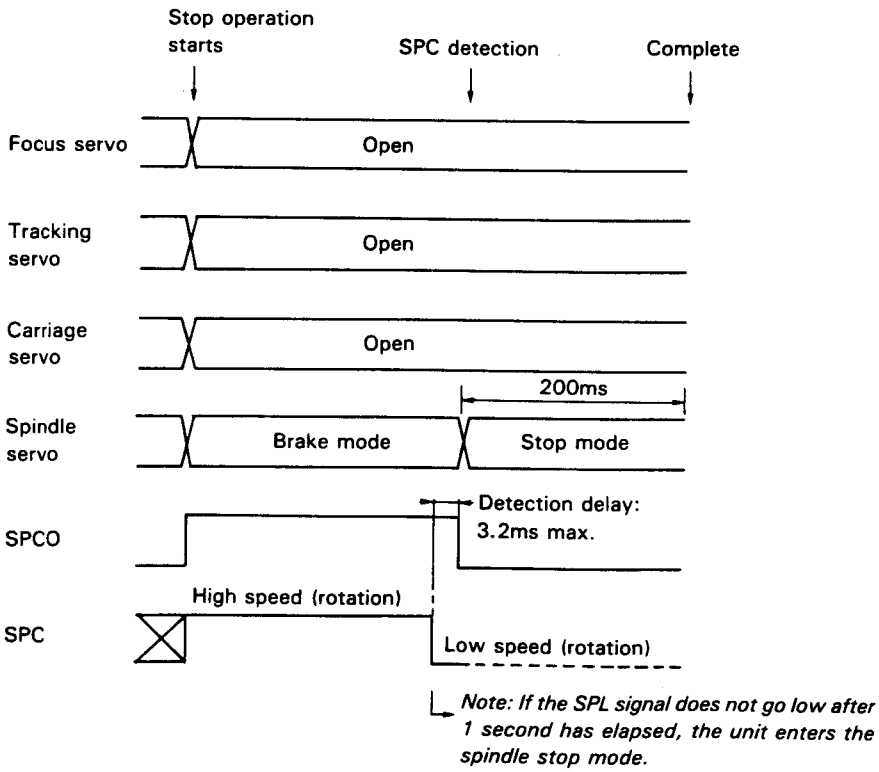
(6) SETUP Sequence



* If the condition "(LOCK = H) AND (subcode can be read)" is satisfied within 1 second after all servo controls are closed, it is judged that the "setup" has been completed.

Fig. 7

(7) Spindle Stop Sequence



Note: If the SPL signal does not go low after 1 second has elapsed, the unit enters the spindle stop mode.

Fig. 8

(8) Flow Chart

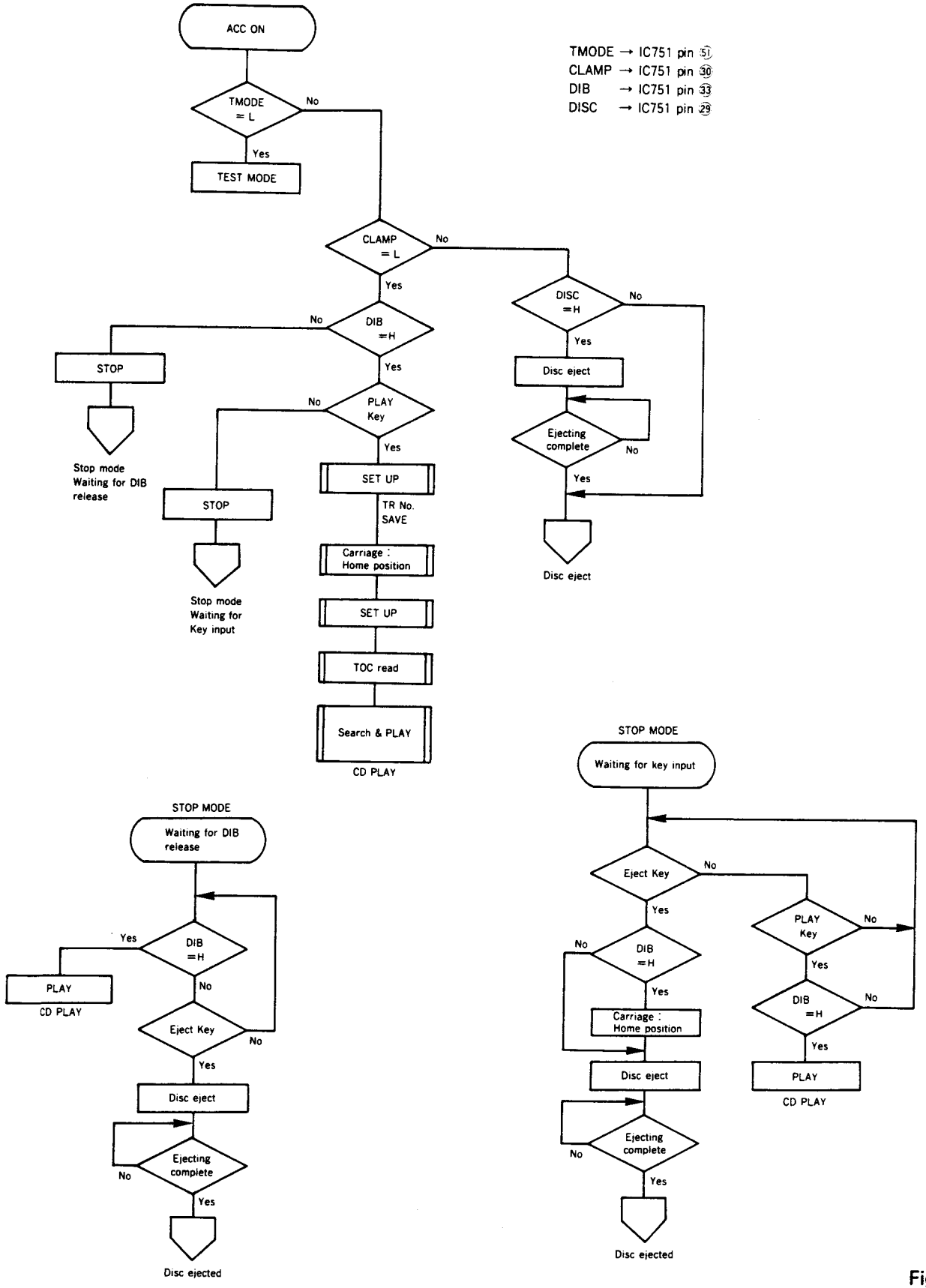
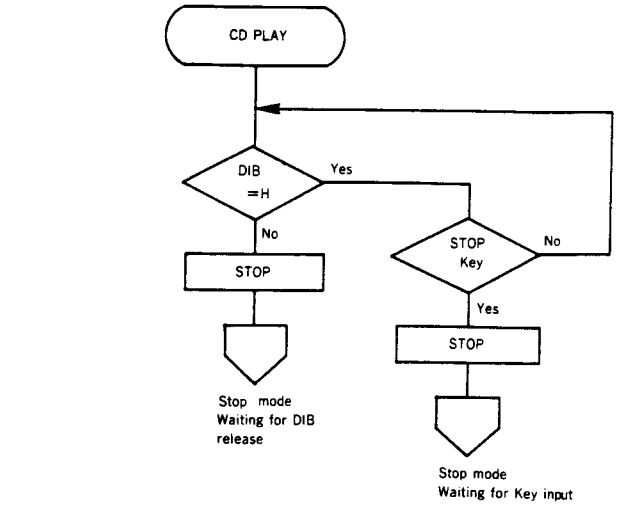


Fig. 9



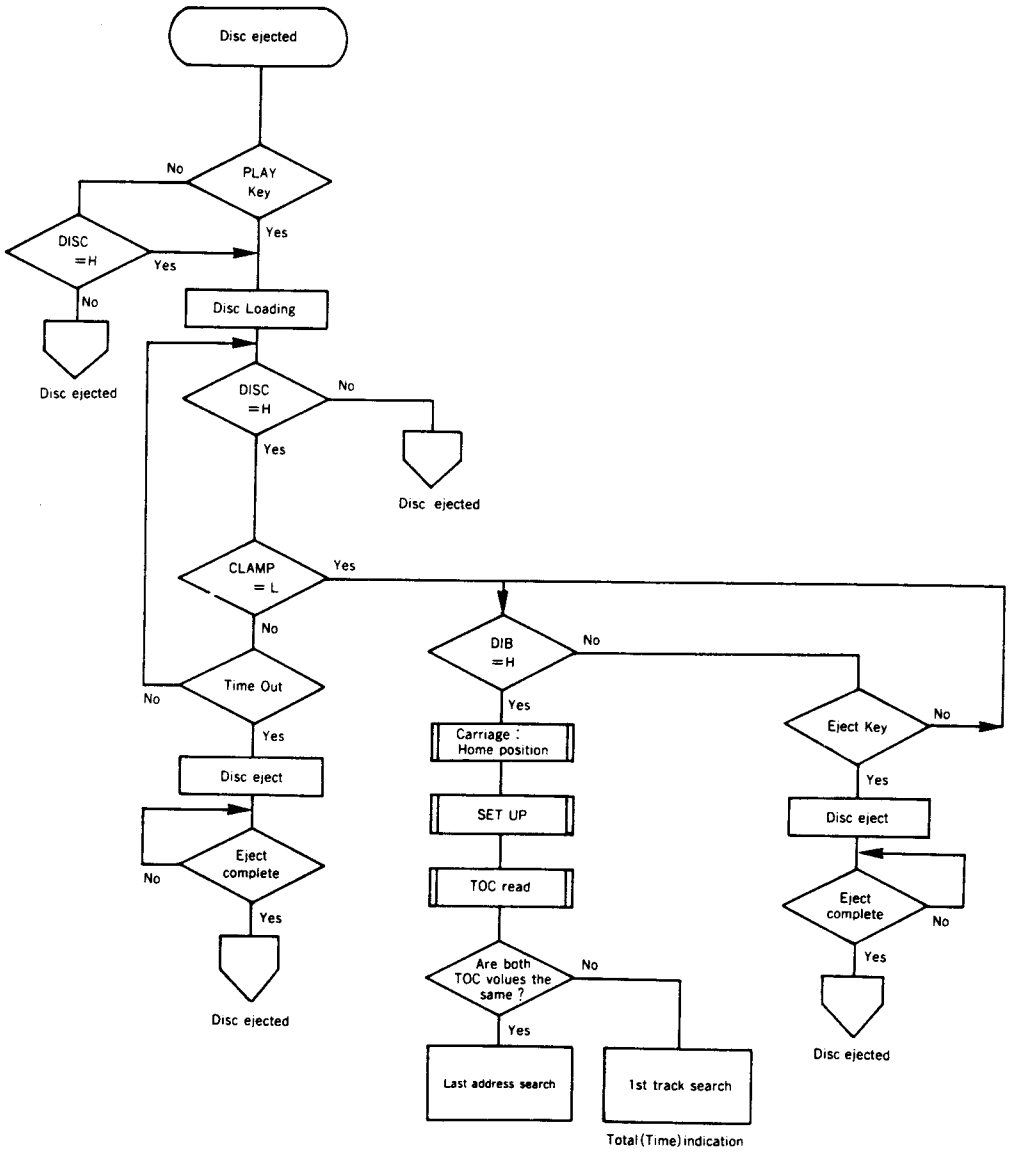


Fig. 10

5. DISASSEMBLY

- **Removing the Case**

1. Insert and turn a flat screwdriver to remove the case.

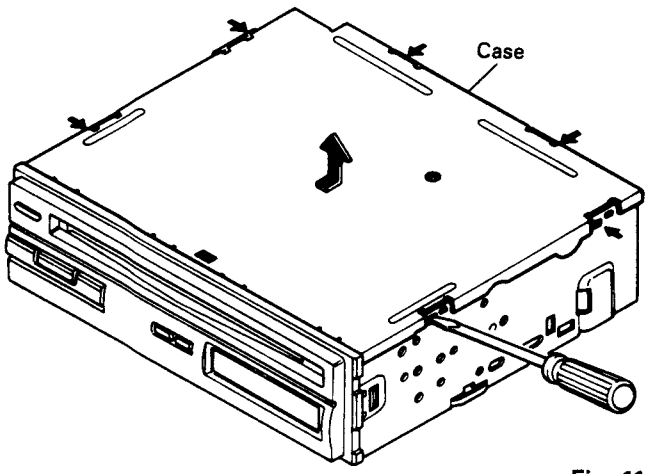


Fig. 11

- **Removing the Grille Assy**

1. Press claws at three locations indicated by arrows, and pull out grille assy.
2. Disconnect the connector, and then remove the grille assy.

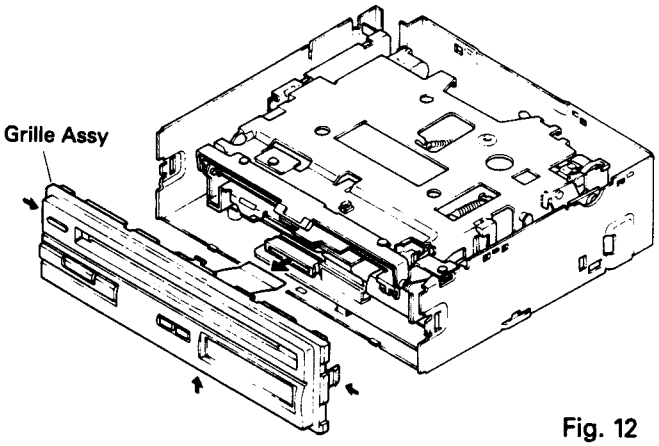


Fig. 12

- **Removing the CD Mechanism Unit**

1. Remove the four screws.
2. Disconnect the two connectors, and then remove the CD mechanism unit.

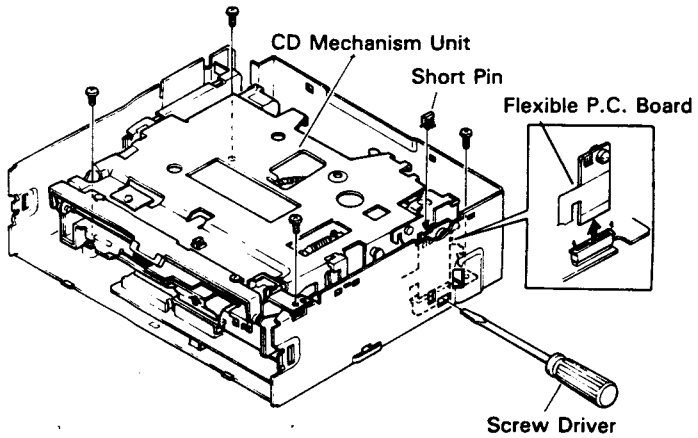


Fig. 13

NOTE: When remove the flexible p.c. board, always insert a shorting pin or insert an inter-pattern short (jumper) before disconnecting the flexible p.c. board from the connector.

6. BLOCK DIAGRAM

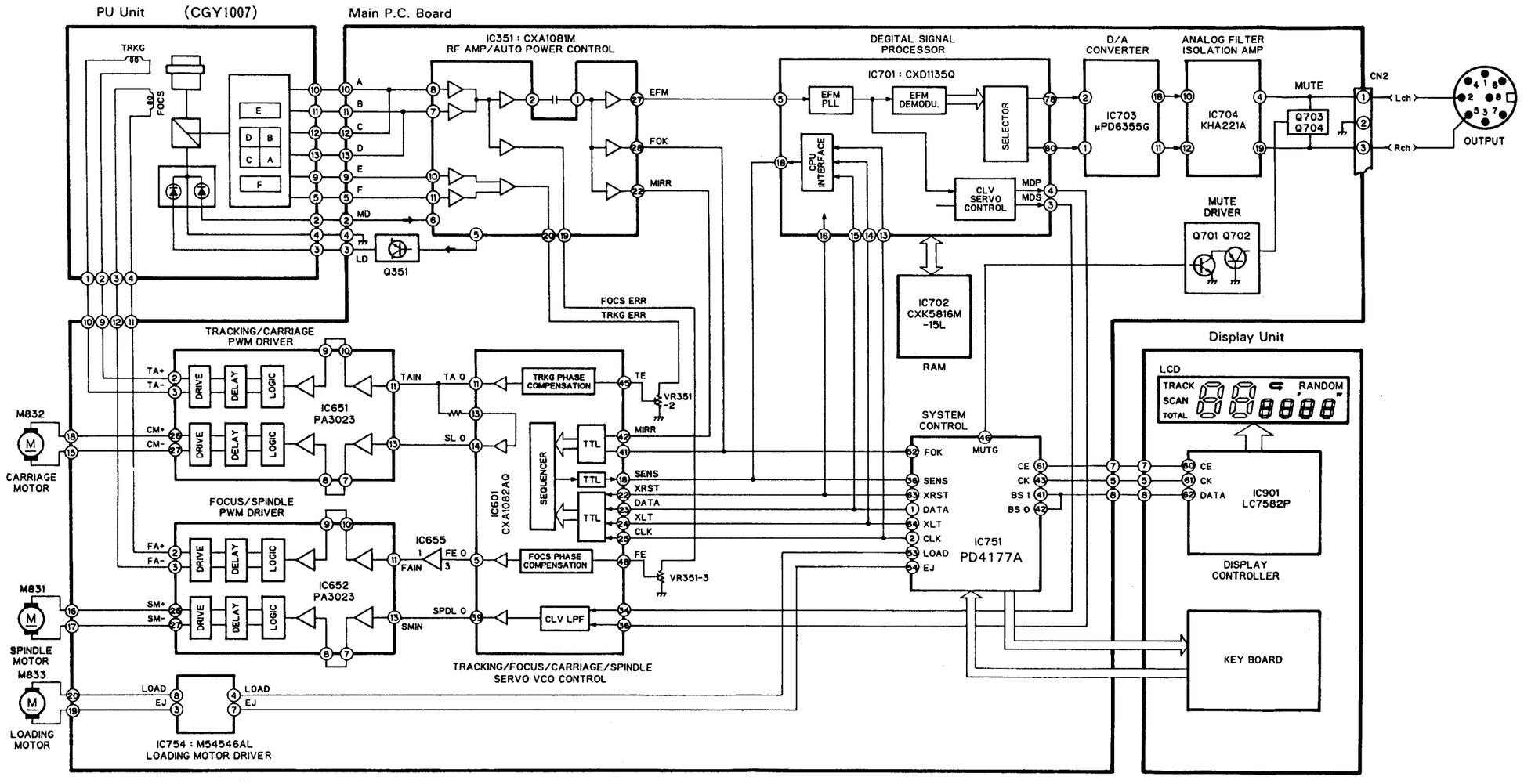


Fig. 14

7. ADJUSTMENT

1) Precautions

- CDX-3 uses a single power supply (+5V) of the regulator. The signal reference botanical, therefore, is connected to pin no. 14 (approx. 2.5V) of IC351 (CXA1081M) instead of GND. (VC at test point)

If VC and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.

Do not connect the negative probe of the measuring equipment to VC and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to VC with the channel 2 negative probe connected to GND.

And since the frame of the measuring instruments is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.

If by accident VC comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.
- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and/or electrical shocks to the system when making adjustments.
- Test mode starting procedure

1. Connect test point TMODE to GND.
2. Turn ACC ON.

- Test mode cancelation

1. Disconnect test point TMODE from GND.
2. Turn ACC ON.

- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit. Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
  - ○ During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.
  - ○ The unit will not load a disc.

When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

2) Adjustment Point

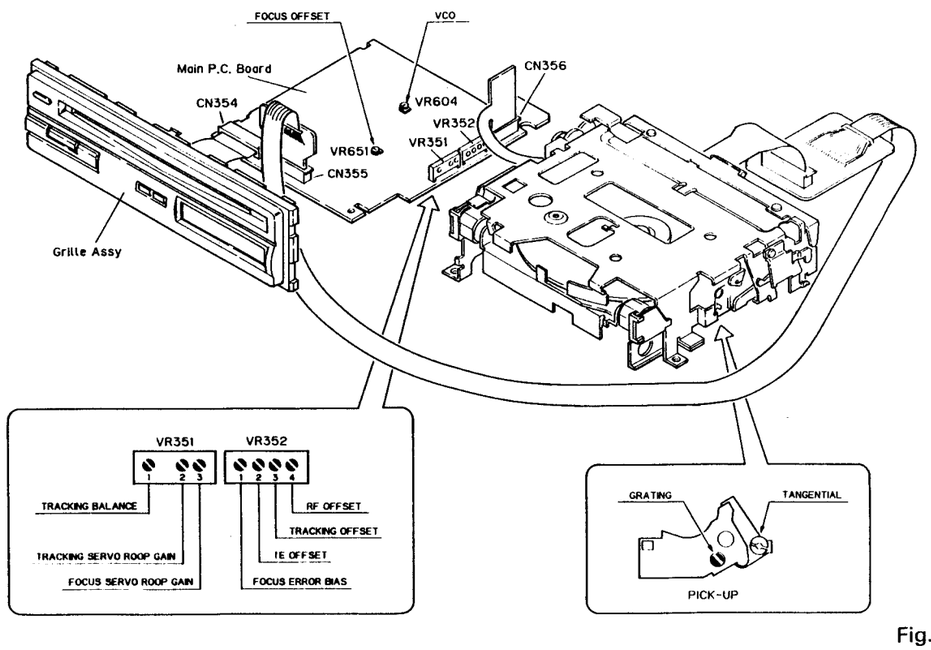
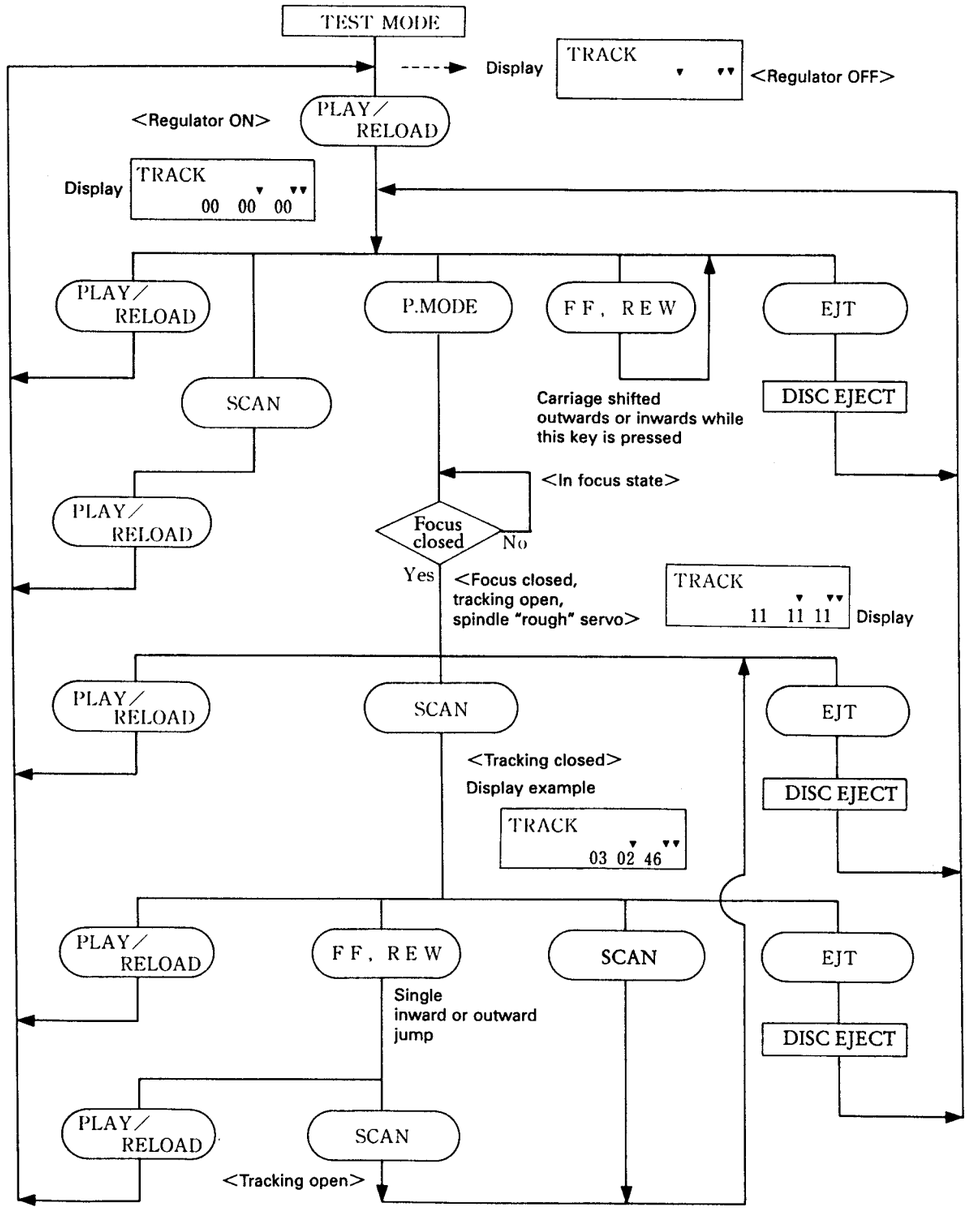


Fig. 15

- **Flow Chart**



● Test Point

Main P.C. Board

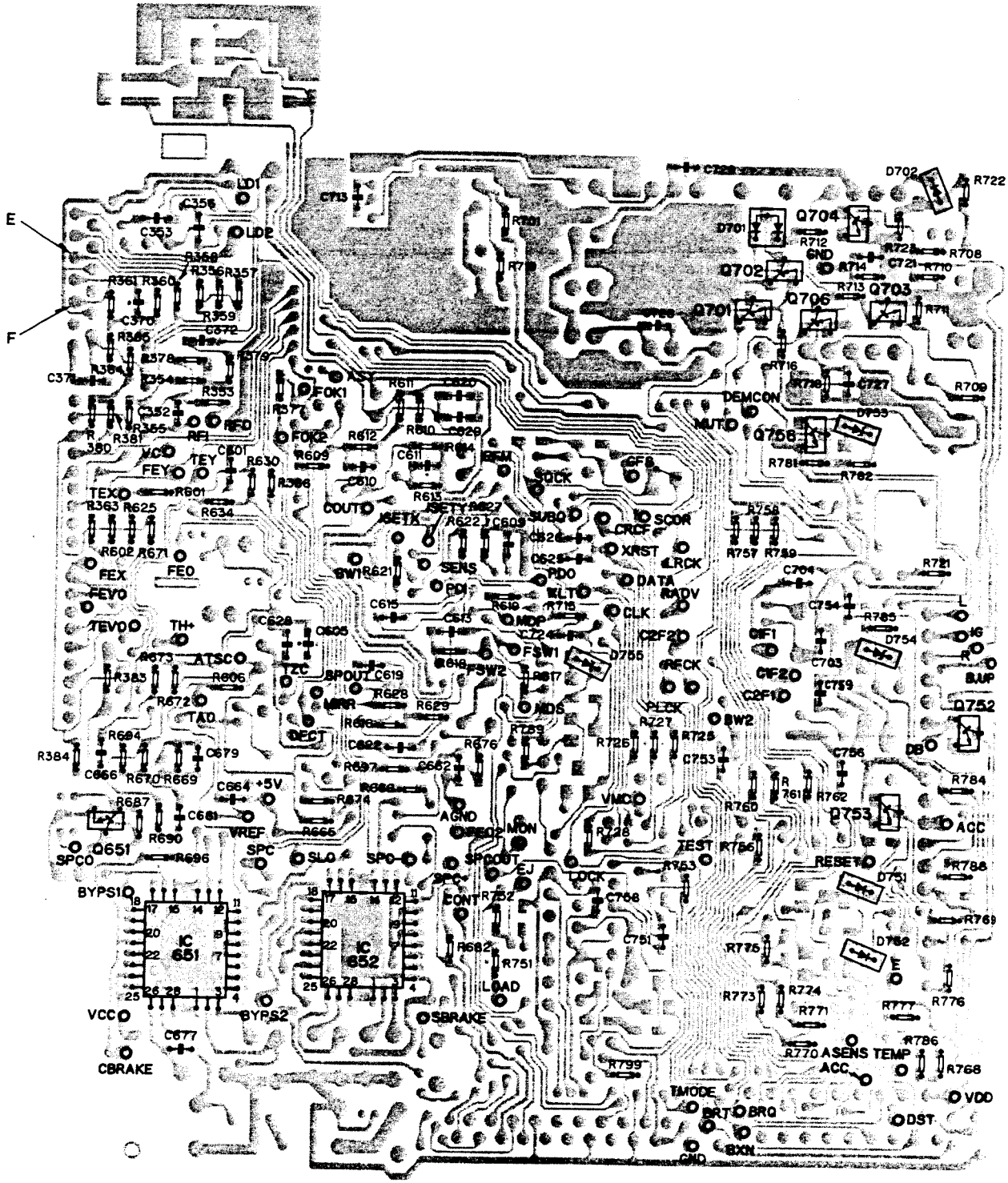


Fig. 16

7.1 Focus Offset Adjustment

● Purpose: To adjust the electrical offset of the focus amplifier to zero.

● Maladjustment symptoms: No focus closing

● Measuring equipment/ jigs	• Multi-meter or oscilloscope
● Measuring point	• FEO2
● Test disc and setting	• No disc, test mode
● Adjustment position	• VR651

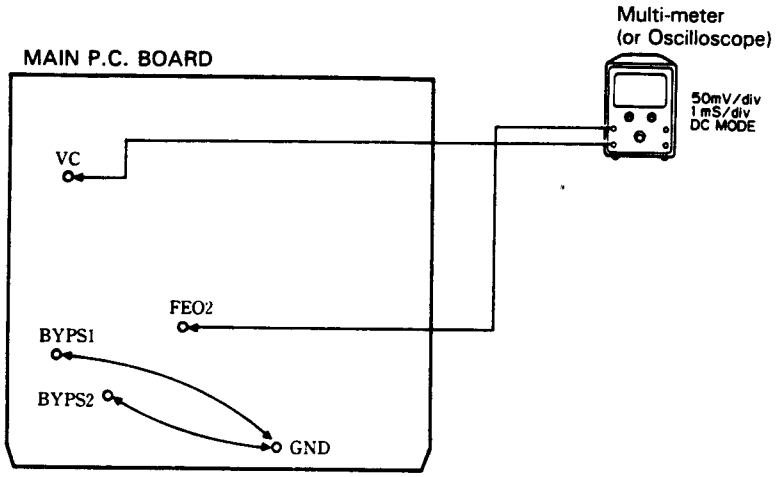


Fig. 17

Adjustment Procedure

1. Connect BYPS 1 and BYPS 2 to GND.
   (Perform the following steps to stop the PWM drive.)
2. Switch regulator ON.
3. Using VR651, adjust the FEO2 DC voltage in reference to VC to a value of 0 ±25mV.
4. Perform the following steps while BYPS 1 and BYPS 2 are connected to GND.

7.2 VCO Free Run Frequency Adjustment

● Purpose: To adjust the EFM decoder reference clock free- run frequency to a suitable value

● Maladjustment symptoms: Spindle lock not possible, distorted sound or no sound at all

● Measuring equipment/ jigs	• Frequency counter, extension cables
● Measuring point	• Pin no.70 (PLCK) of IC701 (CXD1135Q)
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR604

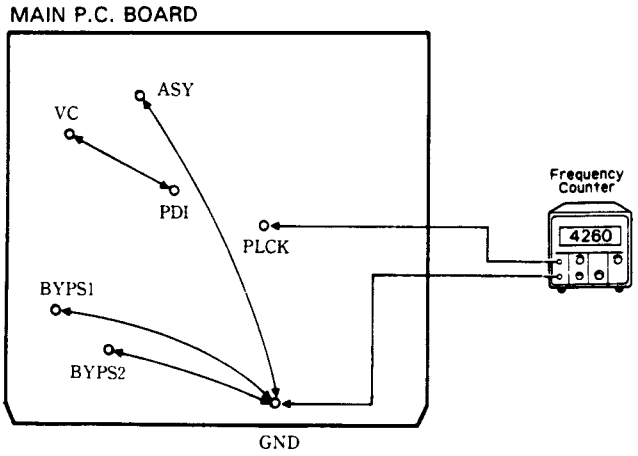


Fig. 18

Adjustment Procedure

1. Connect pin no.26 (TP ASY) of IC351 to GND. Connect BYPS 1 and BYPS 2 to GND.
2. Connect pin no.1 (TP VC) of IC601 to pin no.28 (TP PDI).
3. Switch regulator ON while in test mode.
4. Connect the frequency counter to pin no.70 (TP PLCK) of IC701 (CXD1135Q).
5. Adjust VR604 to obtain a frequency of 4.26 ±0.005MHz.
6. Switch regulator OFF.
7. Disconnect the leads connecting TP VC to TP PDI, and TP ASY to GND.

Note: Connect TP VC and TP PDI with leads kept as short as possible.

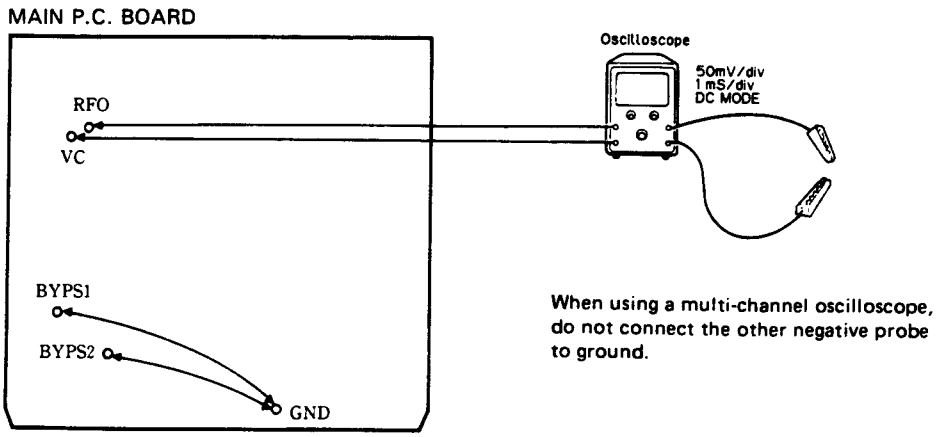
Note: Connect the frequency counter ground to TP GND as shown in the figure.

7.3 RF Offset Adjustment

● Purpose: To adjust the RF amplifier offset to a suitable value

● Maladjustment symptoms: Focus closure fails readily

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• RFO
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR352-4 (RFO)



When using a multi-channel oscilloscope, do not connect the other negative probe to ground.

Fig. 19

Adjustment Procedure

1. Connect BYPS 1 and BYPS 2 to GND.
2. Switch regulator ON.
3. Using the oscilloscope, measure the RFO DC voltage in reference to VC, and adjust VR352-4 (RFO) to obtain a reading of +250 ± 25mV.

7.4 Tracking Offset Adjustment

● Purpose: To adjust the electrical offset of the tracking amplifier to zero

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR352-3 (TO)

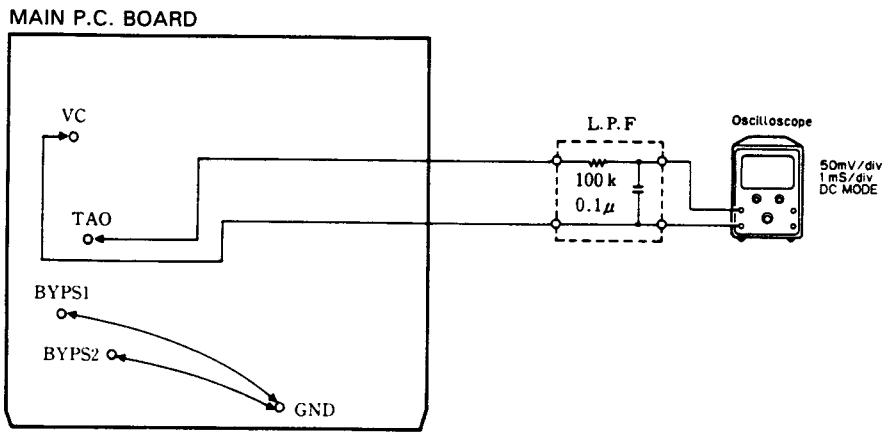


Fig. 20

Adjustment Procedure

1. Insert a low-pass filter between TAO and VC.
2. Check that BYPS 1 and BYPS 2 are connected to GND.
3. Switch regulator ON.
4. Using the oscilloscope, measure the TAO LPF output DC voltage in reference to VC, and adjust VR352-3 (TO) to obtain a reading of 0 ± 25mV.
   The low-pass filter may be left in place for later adjustments.

7.5 TE Offset Adjustment - I

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR352-2 (TEO)

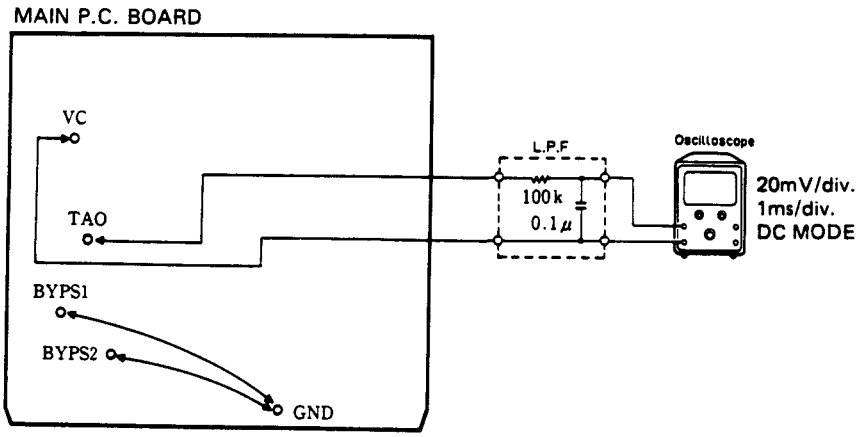


Fig. 21

Adjustment Procedure

1. Check that BYPS 1 and BYPS 2 are connected to GND.
2. Switch regulator ON while in test mode.
3. Press the SCAN key to close tracking.
4. Using VR352-2 (TEO), adjust the TAO LPF output DC voltage in reference to VC to a value of 0 ± 10mV.
5. Switch regulator OFF.

7.6 Tracking Balance Adjustment - 1

● Purpose: To adjust the tracking servo offset to zero.

● Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TEY (Tracking error signal), low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• VR351-1 (T. BAL)

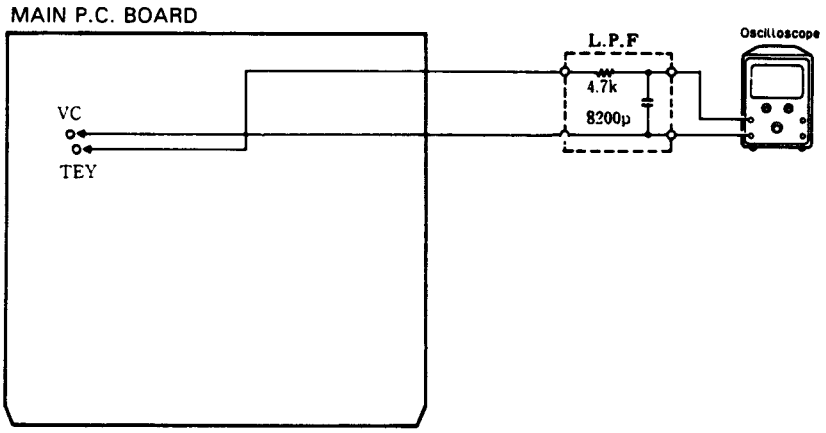
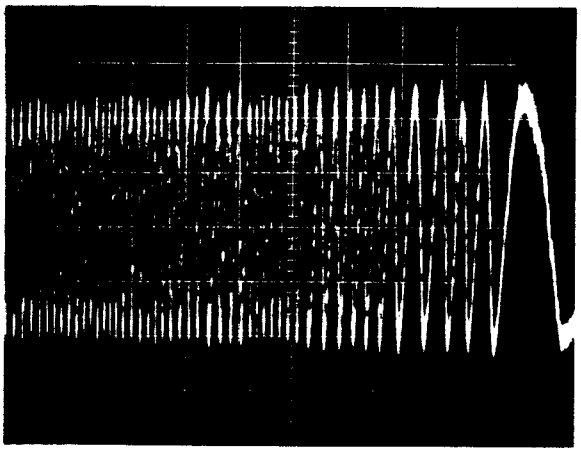


Fig. 22

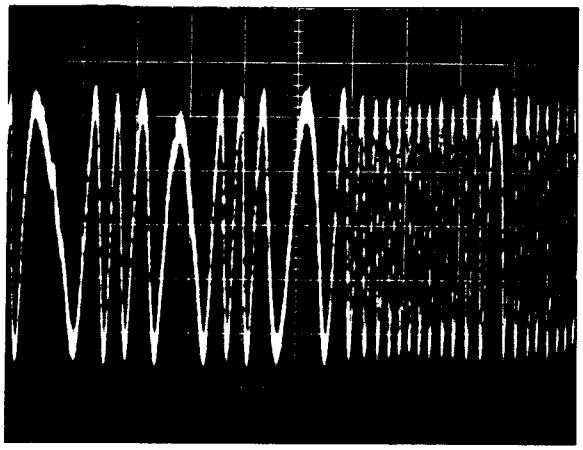
Adjustment Procedure

1. After checking that regulator is OFF, connect the low-pass filter as shown in the diagram.
2. Disconnect BYPS 1 and BYPS 2 from ground.
3. Load the test disc (SONY TYPE 4). Switch regulator ON.
4. Using the [FF] or [REW] key, move the pick-up to about the center of the signal surface.
5. Press the [P.MODE] key to close focus.
6. Using an oscilloscope, observe the TEY signal in respect to VC. Then adjust VR351-1 (T.BAL) to set the positive and negative amplitudes to the same levels. (See Fig. 23-25)
7. Switch the power OFF.
   The low-pass filter may be left in place for later adjustments.



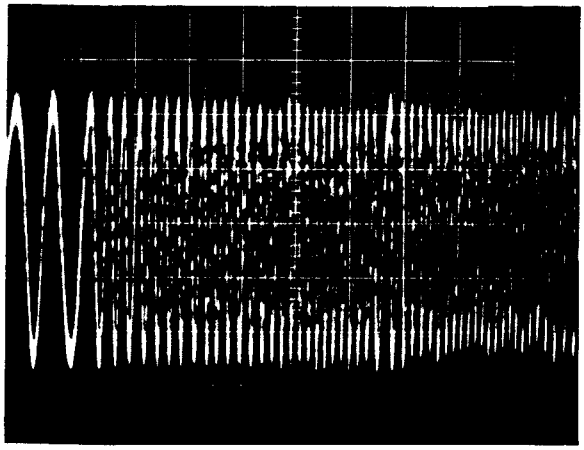
+5% NG

Fig. 23



±0% OK

Fig. 24



−5% NG

10ms/div.
0.2V/div.
DC Mode

Fig. 25

7.7 Tangential Skew Check

● Purpose: To check whether tangential skew has been misaligned or not when replacing the pick-ip unit.

● Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/ jigs	• Oscilloscope, extension connectors, screwdriver
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• Pick-up tangential adjustment screw

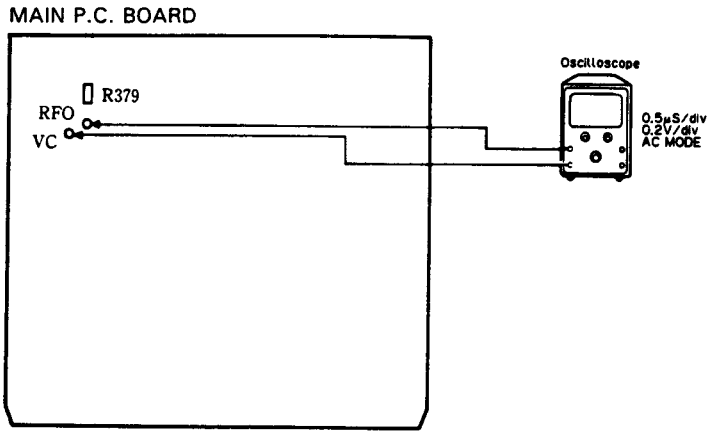


Fig. 26

Adjustment Procedure (with R379 removed)

1. Remove R379 (but reconnect after completing adjustment).
2. Play tune TNO 7 in normal mode. (TYPE 3: TNO 23)
3. Check that the valley at the 11T section of the RF waveform is flat.
4. If out of adjustment, readjust to obtain a flat RF waveform. (See Fig. 27-32) Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.)
5. Switch the power OFF and reconnect R379.
6. Apply "screw-lock" to the tangential adjustment screw.
7. After adjusting tangential skew, also adjust the grating.
8. If tangential skew is seriously out of adjustment, carriage stopping and run-away tend to occur in normal mode. In this case,

a) Switch to test mode,

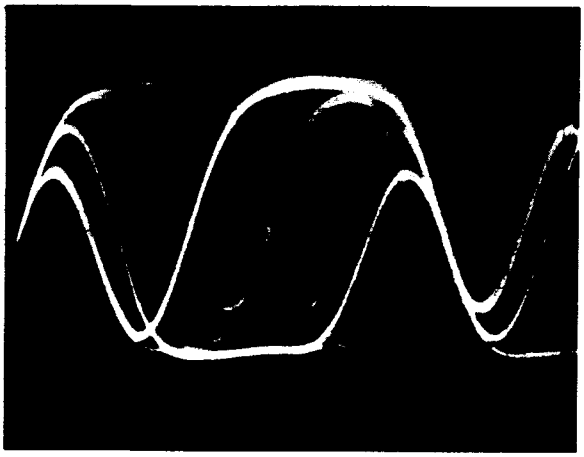
b) Shift the pick-up to signal surface center using [FF] or [REW] key.

c) Press the [P.MODE] key to close focus.

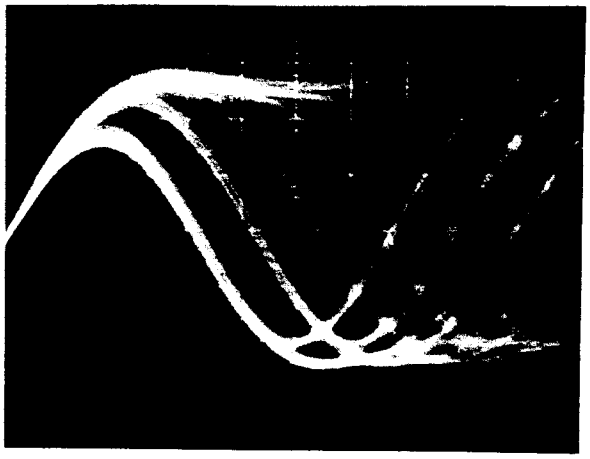
d) Press the [SCAN] key to close the tracking.

e) Observe RFO in respect to VC, and turn the tangential adjustment screw to obtain a flat waveform at the 11T section.

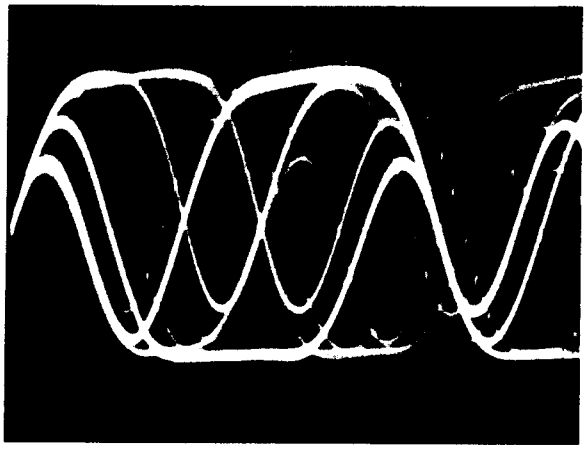
f) Repeat the adjustment resuming from step 2.



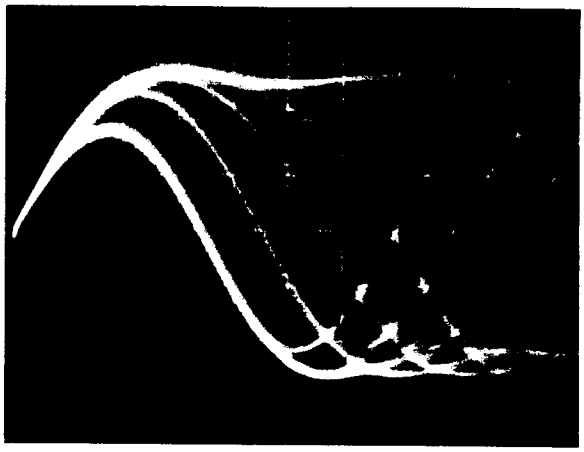
NG Fig. 27



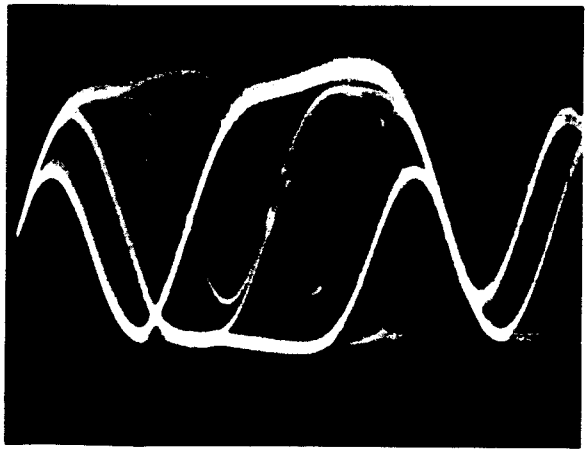
NG Fig. 28



OK Fig. 29

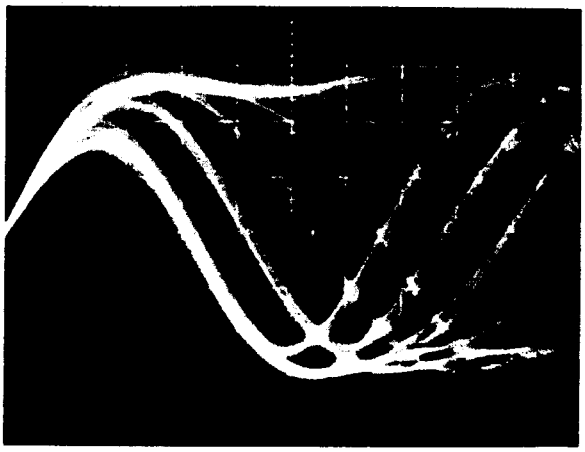


OK Fig. 30



NG Fig. 31

Play tune TNO 7 (TYPE4)

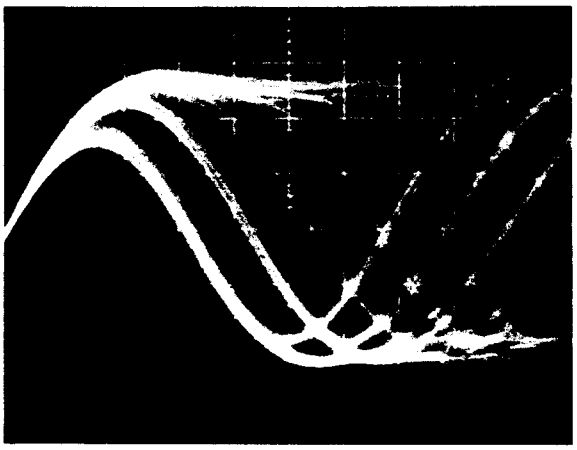


NG Fig. 32

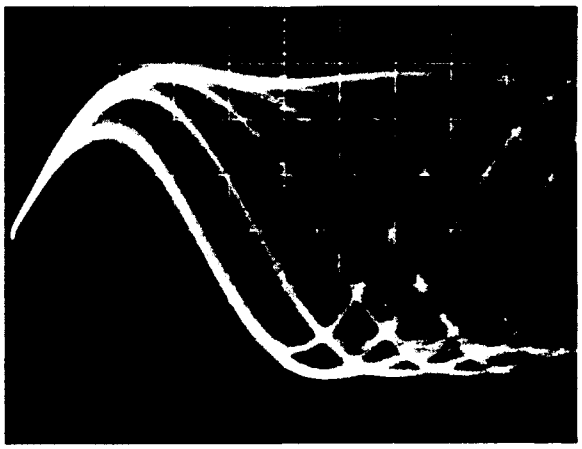
Play tune TNO 12 (TYPE4)

Adjustment Procedure (without R379 removed)

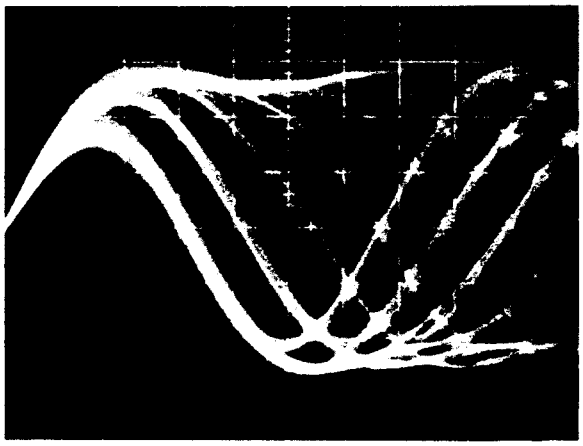
1. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
2. Turn the tangential adjustment screw to obtain a good RF waveform eye pattern. Turn the adjustment screw both clockwise and counterclockwise to points where the eye pattern deteriorates, and take the midway point as the adjustment point. As a general guide, look for an overall clear waveform, and one of the diamond shapes in the eye pattern. The diamond shapes should appear in fine lines at the point of optimum adjustment. Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.) (See Fig. 33-35)
3. Apply "screw-lock" to the tangential adjustment screw.
4. After adjusting tangential skew, also adjust the grating.



NG Fig. 33



OK Fig. 34



NG Fig. 35

7.8 Grating Adjustment

● Purpose: The grating may need adjustment in a replaced pick-up assembly.

● Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/ jigs ● Measuring point ● Test disc and setting ● Adjustment position	• Oscilloscope, clock driver, grating adjustment filter (bandpass filter), AC millivoltmeter, two low-pass filters • TEY, E LPF output, F LPF output • SONY TYPE 4 (or TYPE 3) • Test mode • Pick-up grating adjustment hole

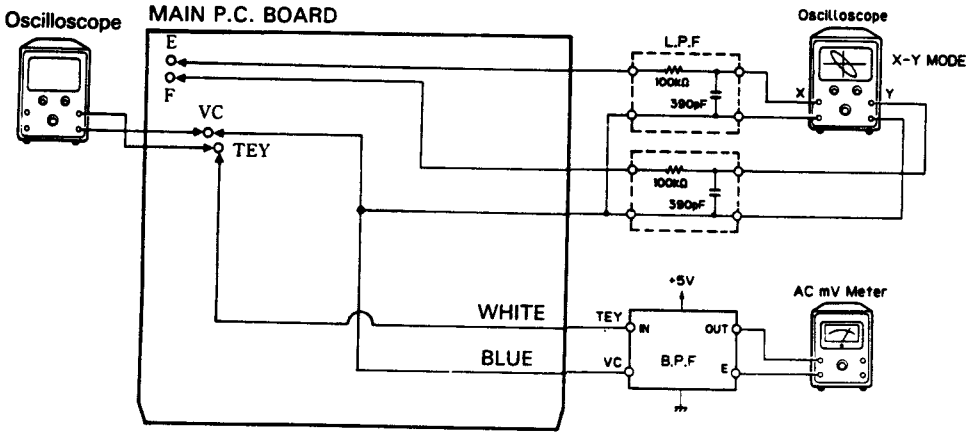


Fig. 36

Adjustment Procedure

1. Connect a low-pass filter (100k, 390p) to test points E, F, and VC as shown in the above diagram.
2. Switch regulator ON in test mode, and load a disc.
3. Press the [P.MODE] key to close focus.
4. Press the [SCAN] key to close tracking.
5. Press the [FF] or [REW] key, move the pick-up to about the center of the signal surface (tune TNO 6). (TYPE 3: TNO 7)
6. Press the [SCAN] key to open tracking.
7. While monitoring the TEY filter output by AC milli- voltmeter, turn the grating adjustment hole slowly. The AC voltage increases and decreases while turning the screw. Search for the minimum voltage level. (This corresponds to the position where the grating is on a track, and is referred to as the null point.)
8. Then while monitoring TEY by oscilloscope, turn the driver slowly clockwise from the null point (as seen from under the lens) until the first waveform peak amplitude is reached. (See Fig. 38-43)

9. With the E low-pass filter output connected to the X axis of the oscilloscope, and the F low-pass filter output connected to the Y axis, apply an input in AC mode and observe the Lissajous figure.
10. Using the driver, adjust the Lissajous figure to a single line (or as close as possible).
11. Switch regulator OFF and remove the filters.

B.P.F.

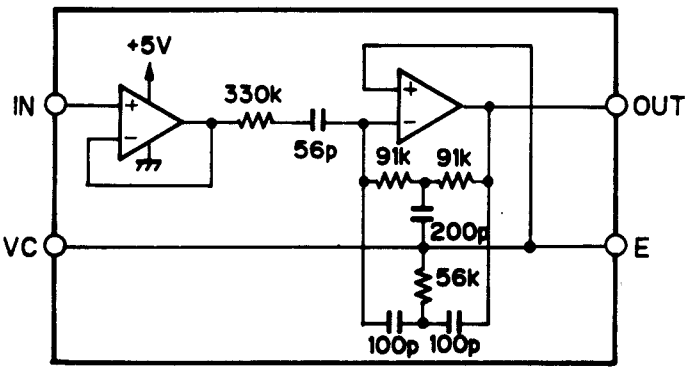


Fig. 37

TEY waveform 10ms/div, 500mV/div

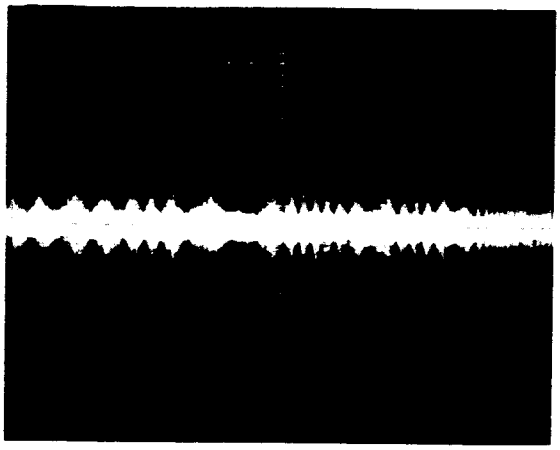


Fig. 38

Null Point

Lissajous figure (AC input)
Horizontal axis E 20mV/div
Vertical axis F 20mV/div

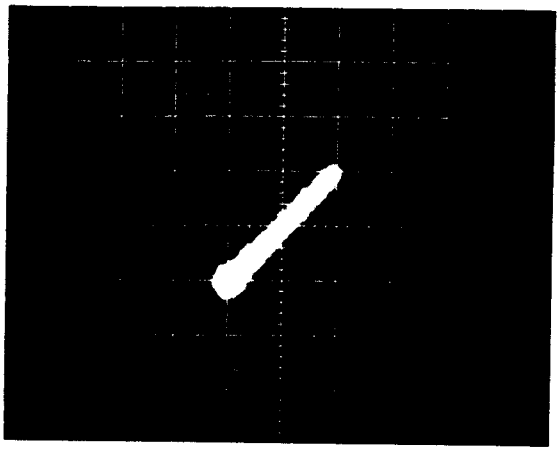


Fig. 39

"Rough" adjustment

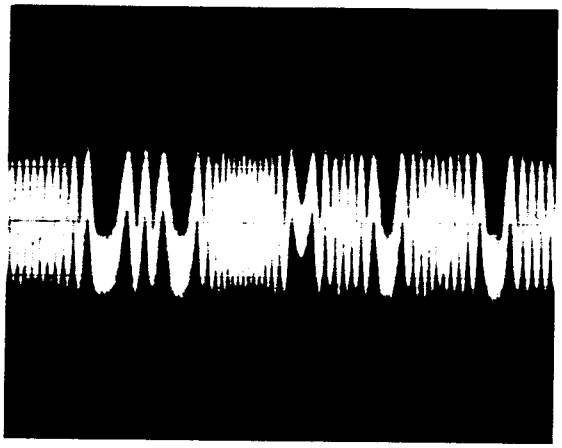


Fig. 40

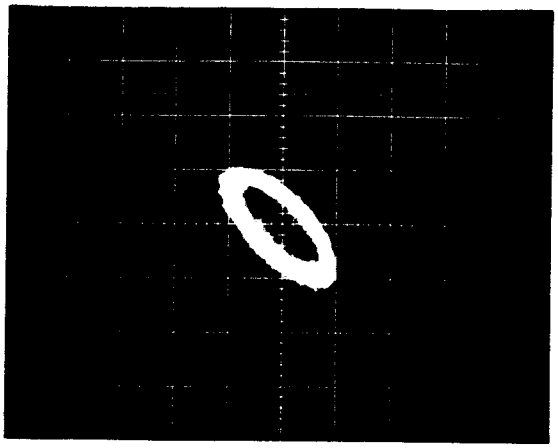


Fig. 41

Final adjustment

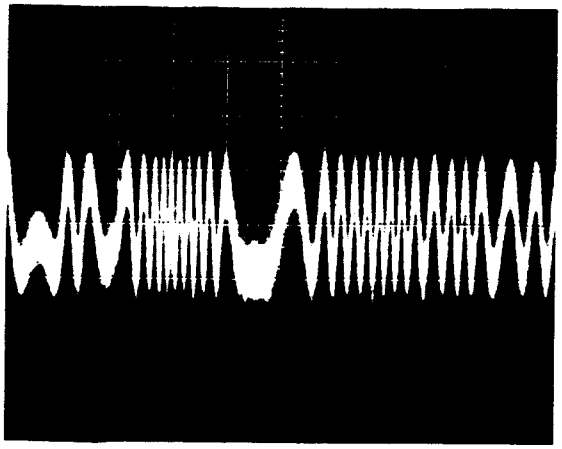


Fig. 42

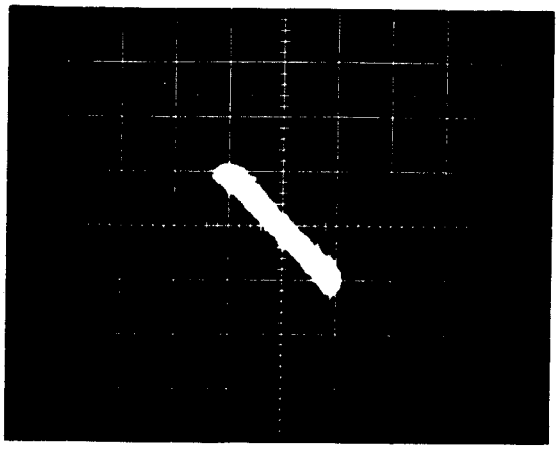


Fig. 43

7.9 Focus Bias Adjustment

● Purpose: To adjust the focus servo bias to an optimum value

● Maladjustment symptoms: Focus closing difficulty, poor playability

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR352-1 (FEB)

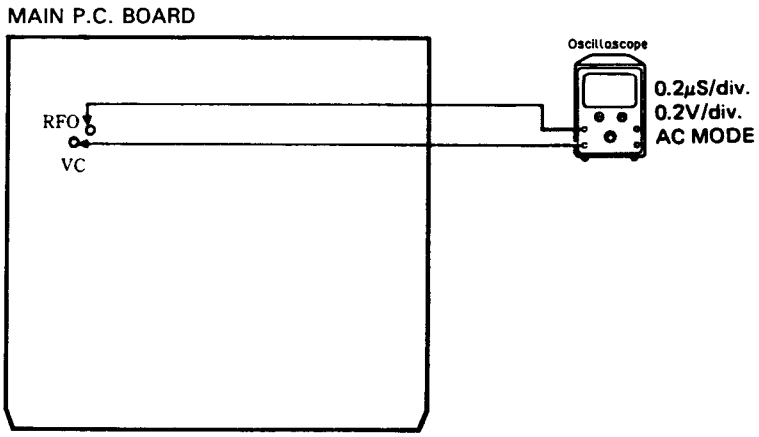
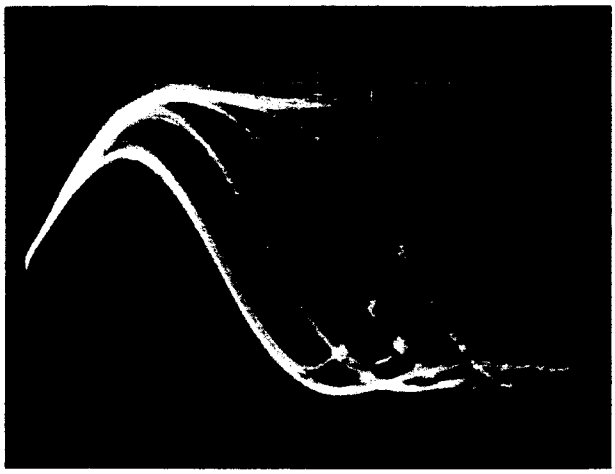


Fig. 44

Adjustment Procedure

1. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
2. Observe RFO in respect to VC in the oscilloscope, and adjust VR352-1 (FEB) to obtain maximum RF and optimum eye pattern. (See Fig. 45 and 46)



OK Fig. 45

0.2μs/div.
0.2V/div.
AC Mode

Before adjustment Fig. 46

7.10 Focus Servo Loop Gain Adjustment

● Purpose: To adjust the focus servo loop gain to an optimum value

● Maladjustment symptoms: Poor playability, reduced resistance to vibration, focus closure fails readily

● Measuring equipment/ jigs	• Oscillator, gain adjustment filter, dual meter milli-voltmeter (Same as for CDX-2)
● Measuring point	• FEX, FEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR351-3 (FG)

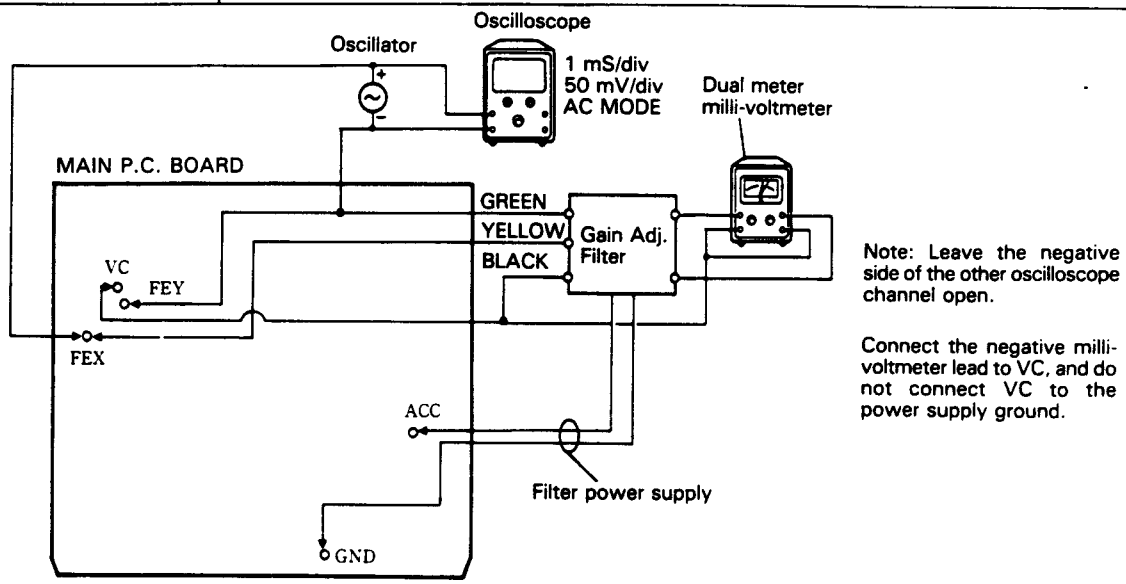


Fig. 47

Adjustment Procedure

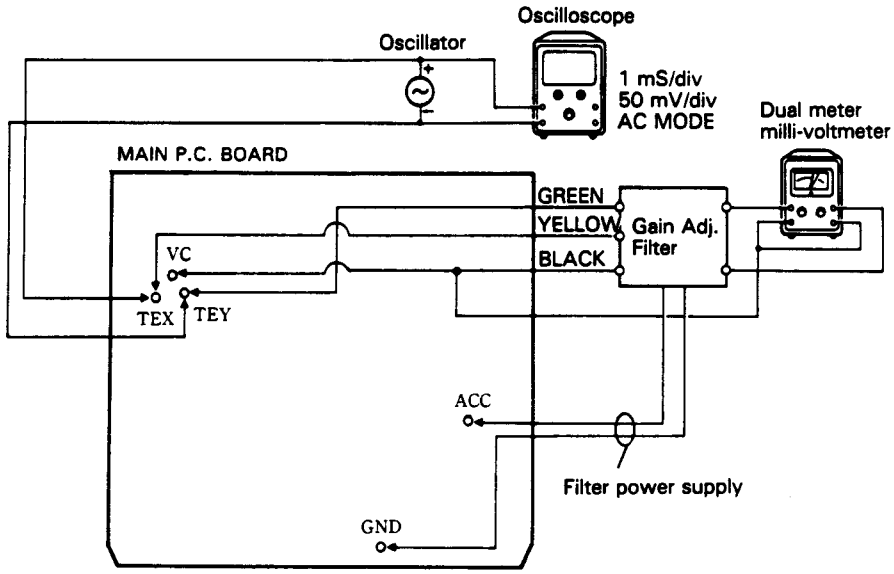
1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
3. Set the oscillator to 1kHz, and observe the FEX/FEY output in the oscilloscope. Adjust the oscillator output to obtain a FEX/FEY output of 200mVp-p.
4. Adjust VR351-3 (FG) to obtain a milli-voltmeter difference of 0 ± 0.5dB.

7.11 Tracking Servo Loop Gain Adjustment

● Purpose: To adjust the tracking servo loop gain to an optimum value

● Maladjustment symptoms: Poor playability, reduced resistance to vibration

● Measuring equipment/ jigs	• Oscillator, gain adjustment filter, dual meter milli-voltmeter
● Measuring point	• TEX, TEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR351-2 (TG)



Note: Leave the negative side of the other oscilloscope channel open.

Connect the negative milli-voltmeter lead to VC, and do not connect VC to the power supply ground.

Fig. 48

Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
3. Set the oscillator to 1.4kHz, and observe the TEX/TEY output in the oscilloscope. Adjust the oscillator output to obtain a TEX/TEY output of 200mVp-p.
4. Adjust VR351-2 (TG) to obtain a milli-voltmeter difference of 0 ± 0.5dB.

7.12 TE Offset Adjustment - II

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR352-2

Adjustment Procedure

Same as for TE offset adjustment - I, but with the DC voltage of the TAO LPF output adjusted to 0 ± 50mV.
The purpose of this additional adjustment is to correct any deviations generated when carrying out the tracking balance and tracking servo loop gain adjustments after completing TE offset adjustment - I.

7.13 Tracking Balance Adjustment - II

● Purpose: To adjust the tracking servo offset to zero.

● Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TEY low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• VR351-1

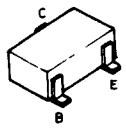
Adjustment Procedure

Steps 1 thru 5 same as tracking balance adjustment-I.

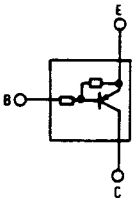
6. Check that the level difference between the positive and negative amplitudes of the TEY signal is within 5% (See Fig. 23-25). If greater than 5%, adjust with VR351-1.
7. If further adjustment was necessary in step 6, repeat TE offset adjustment - II.

● ICs and Transistors

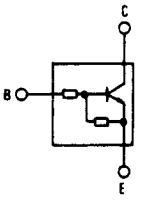
UN2211
UN2111



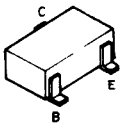
UN2111



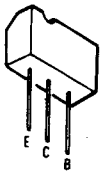
UN2211



2SD1048

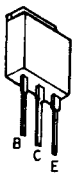


2SB822F

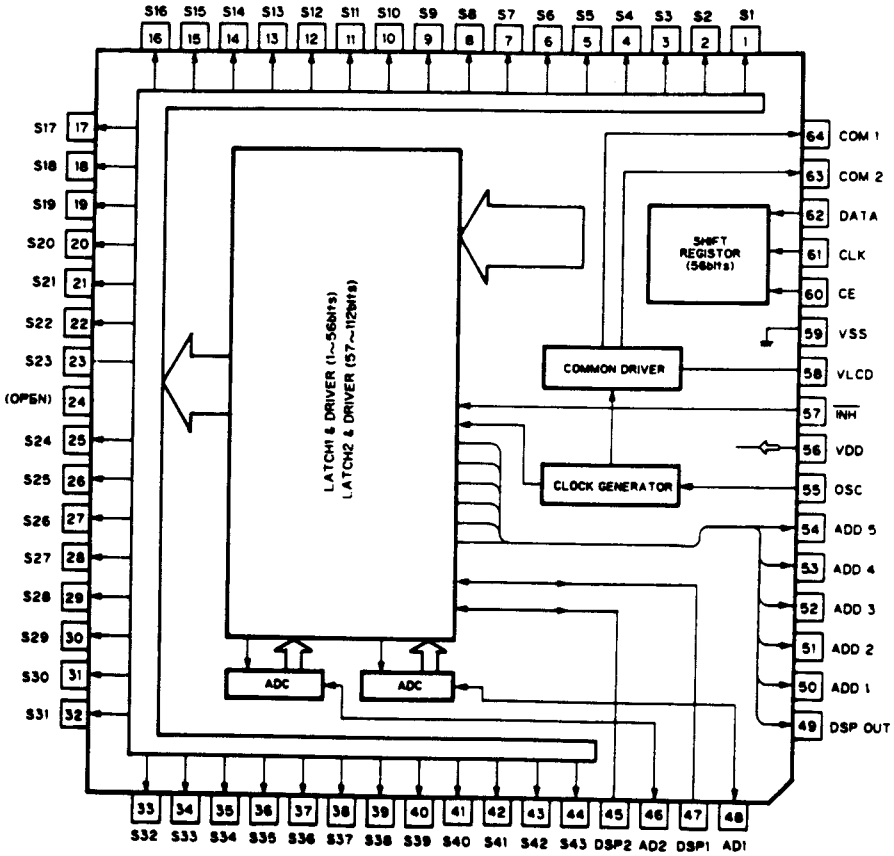


2SD1226M

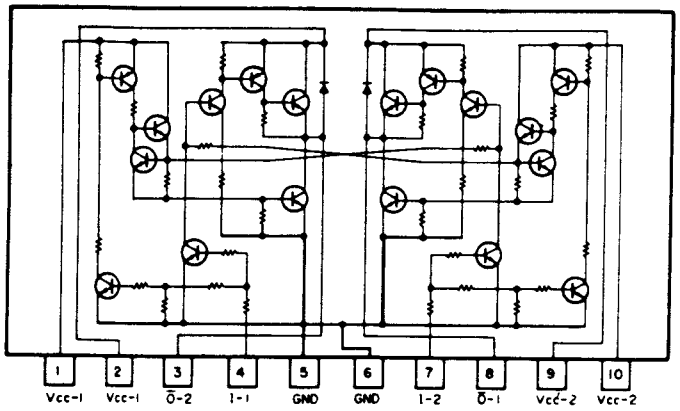
2SD1760F5



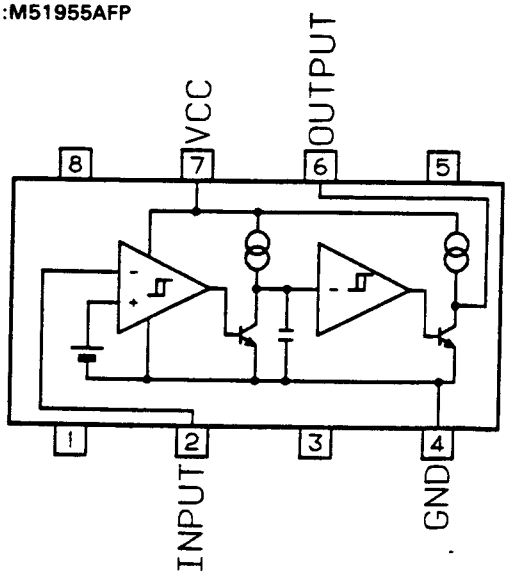
IC901:LC7582P



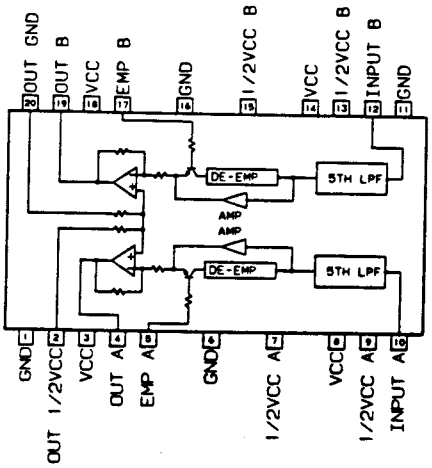
IC754:M54546L



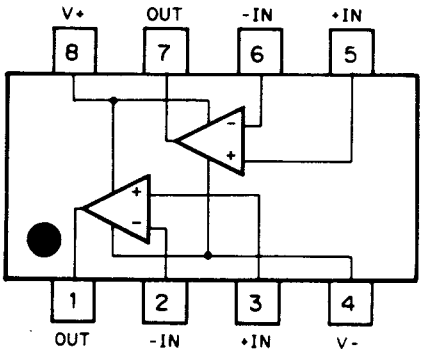
IC752:M51955AFP



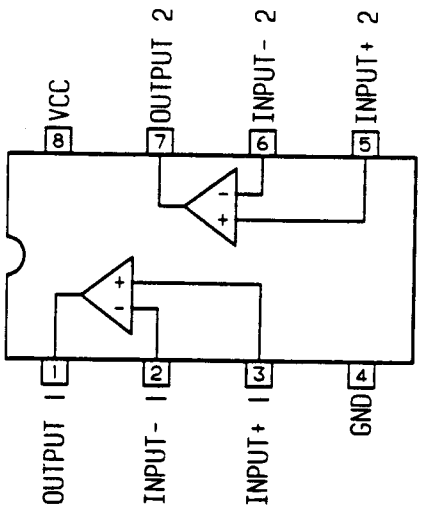
IC704:KHA221A



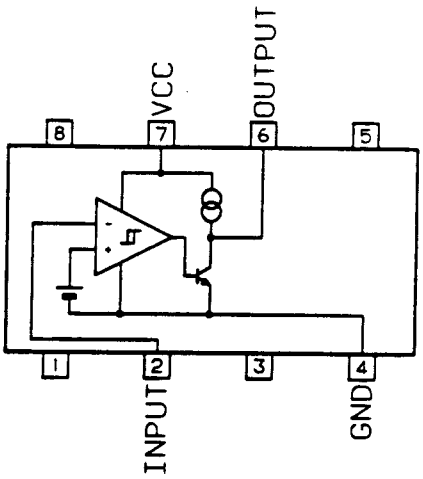
IC655,657,658:M5218FP



IC656:M5233FP

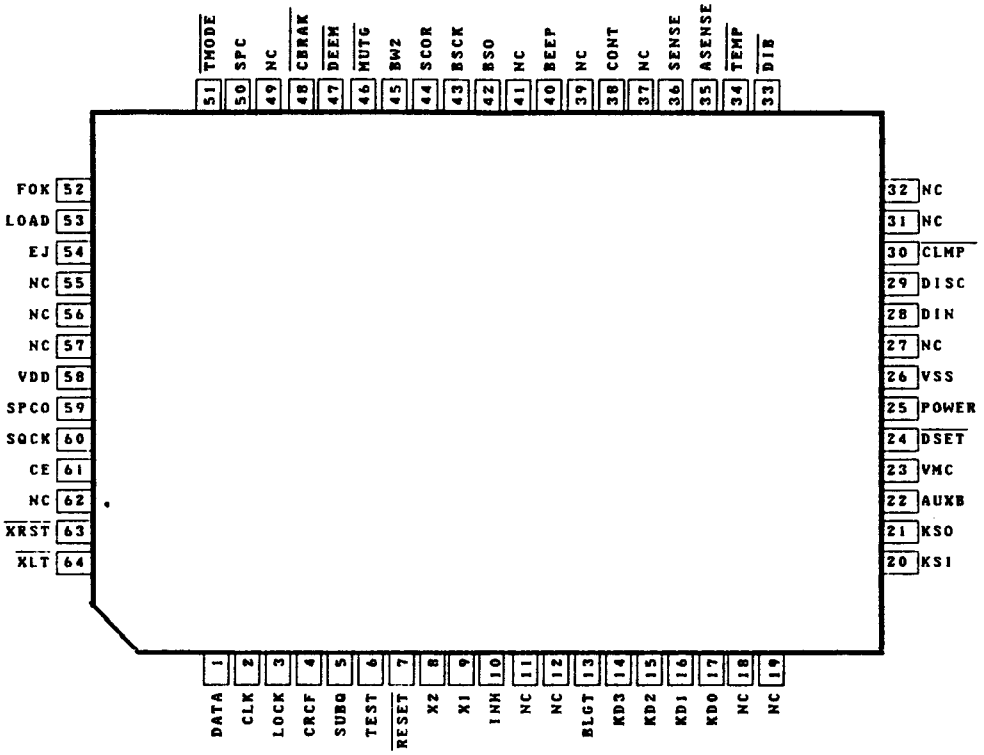


IC753:M51945AFP



*IC751:PD4177A

*IC's marked by * are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.



• Pin Functions (PD4177A)

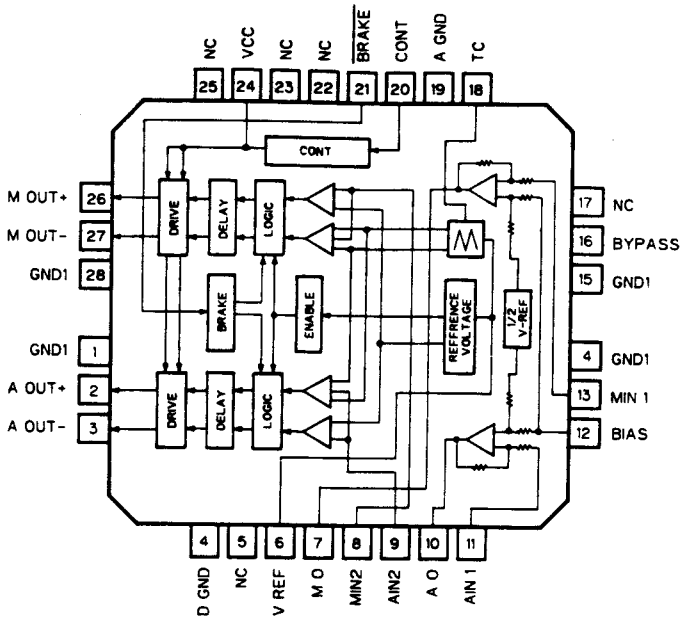
Pin No.	Pin Name	I/O	Function and Operation
1	DATA	CMOS OUT	Serial data output.
2	CLK	CMOS OUT	Serial data clock output.
3	LOCK	CMOS IN	Spindle lock monitor. "H" = Lock
4	CRCF	CMOS IN	CRC check result input. "H" = CRC OK
5	SUBQ	CMOS IN	Sub-code data input.
6	TEST	CMOS IN	Test input.
7	$\overline{\text{RESET}}$	CMOS IN	Reset input.
8	X2	CMOS OUT	Oscillator output.
9	X1	CMOS IN	Oscillator input.
10	INH	CMOS OUT	Display driver control "L" = Light OFF
13	BLGT	CMOS OUT	LCD back light control output. "H" = ON
14	KD3	INPUT	Key matrix input.
15	KD2	INPUT	
16	KD1	INPUT	
17	KD0	INPUT	
20	KS1	CMOS OUT	Key matrix output.
21	KS0	CMOS OUT	
22	AUXB	CMOS OUT	AUXB output.
23	VMC	CMOS OUT	Loading power supply control.
24	$\overline{\text{DSET}}$	CMOS OUT	Disc set LED control.
25	POWER	CMOS IN	Regulator ON/OFF control. "H" = Regulator ON

	KD3, KD2	KD1	KD0
KS0	TR+	TR−	PLAY
KS1	P•MODE	SCAN	EJ/STOP

Pin No.	Pin Name	I/O	Function and Operation
26	VSS		
28	DIN	CMOS IN	Door switch input. "H" = Door open
29	DISC	CMOS IN	Disc sensor input. "H" = Disc loaded
30	$\overline{\text{CLMP}}$	CMOS IN	Disc clamped input. "L" = Disc clamped
33	$\overline{\text{DIB}}$	INPUT	DIB input. Disable +B sense.
34	$\overline{\text{TEMP}}$	INPUT	High temperature detector.
35	ASENSE	CMOS IN	ACC sense input. "H" = ACC ON
36	SENSE	CMOS IN	CD LSI internal status monitor input.
38	CONT	CMOS OUT	PWM driver ON/OFF. "H" = ON
40	BEEP	CMOS OUT	Beep output. f = 4kHz
42	BSO	CMOS OUT	Display driver serial data output.
43	BSCK	CMOS OUT	Display driver serial clock output.
44	SCOR	CMOS IN	Sub-code synchronization input.
45	BW2	OUTPUT	Spindle motor output filter time constant selection output. High resistivity N channel open drain
46	$\overline{\text{MUTG}}$	OUTPUT	Muting output. "L" = Mute ON High resistivity N channel open drain
47	$\overline{\text{DEEM}}$	OUTPUT	Emphasis selector output. "H" = Emphasis ON High resistivity N channel open drain
48	$\overline{\text{CBRAK}}$	OUPUT	PWM driver brake control. "L" = Brake ON High resistivity N channel open drain
50	SPC	CMOS IN	Spindle motor rpm sensor circuit. "L" = Low speed
51	$\overline{\text{TMODE}}$	OUTPUT	Test mode input.
52	FOK	CMOS IN	Indication that focus is closed and RF input is active.
53	LOAD	OUTPUT	Motor drive output. High resistivity N channel open drain
54	EJ		
58	VDD	–	
59	SPCO	CMOS OUT	Spindle motor rpm sensor circuit ON/OFF. "H" = Brake
60	SQCK	CMOS OUT	Sub-code clock.
61	CE	CMOS OUT	Display driver select.
63	$\overline{\text{XRST}}$	CMOS OUT	CD LSI reset output . "L" = Reset
64	$\overline{\text{XLT}}$	CMOS OUT	Serial data latch output.

LOAD	H	L	H	
EJ	L	H	H	
	Load	Eject	Stop	

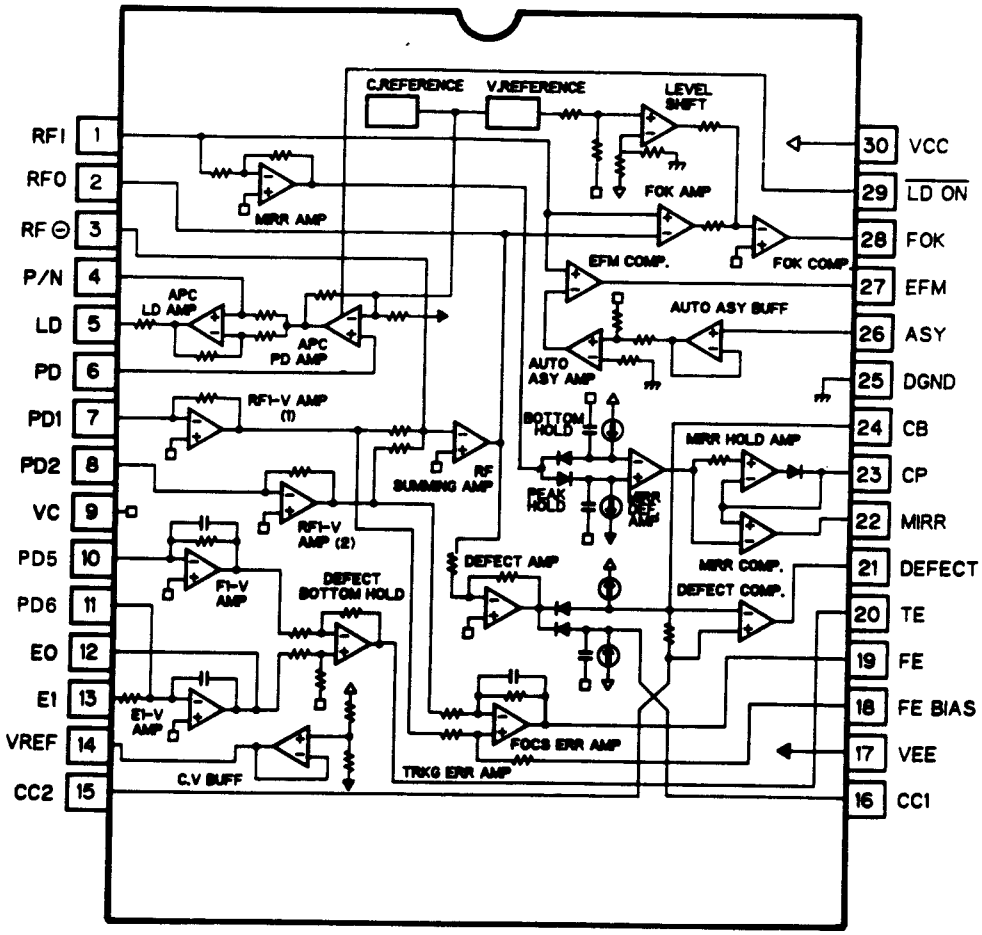
IC651,652:PA3023



Pin Functioons (PA3023)

Pin	Pin Name	I/O	Function and Operation
1	GND1	—	Sub GND.
2	AOUT +	Output	Positive actuator drive output.
3	AOUT −	Output	Negative actuator drive output.
4	DGND	—	Power stage GND.
5	NC	—	
6	Vref	—	IC stabilizing reference voltage output.
7	MO	Output	Analog signal output for motor.
8	MIN2	Input	Analog signal input 2 for motor.
9	AIN2	Input	Analog signal input 2 for the actuator.
10	AO	Output	Analog signal output for the actuator.
11	AIN1	Input	Analog signal input 1 for the actuator.
12	BIAS	—	External bias input pin.
13	MIN1	Input	Analog signal input 1 for the motor.
14	GND1	—	Sub GND.
15	GND1	—	Sub GND.
16	BYPASS	—	Ripple filter condensor connection pin for IC stabilizing reference voltage.
17	NC	—	
18	TC	—	Condenser connection pin for obtaining triangle waveform.
19	AGND	—	Small signal GND.
20	CONT	Input	Circuit operation/standby switch input. Active H
21	$\overline{\text{BRAKE}}$	Input	Motor operation/non-operation switch input. Active L
22	NC	—	
23	NC	—	
24	Vcc	—	ACC power supply.
25	NC	—	
26	MOUT +	Output	Positive motor driver output.
27	MOUT −	Output	Negative motor driver output.
28	GND1	—	Sub GND

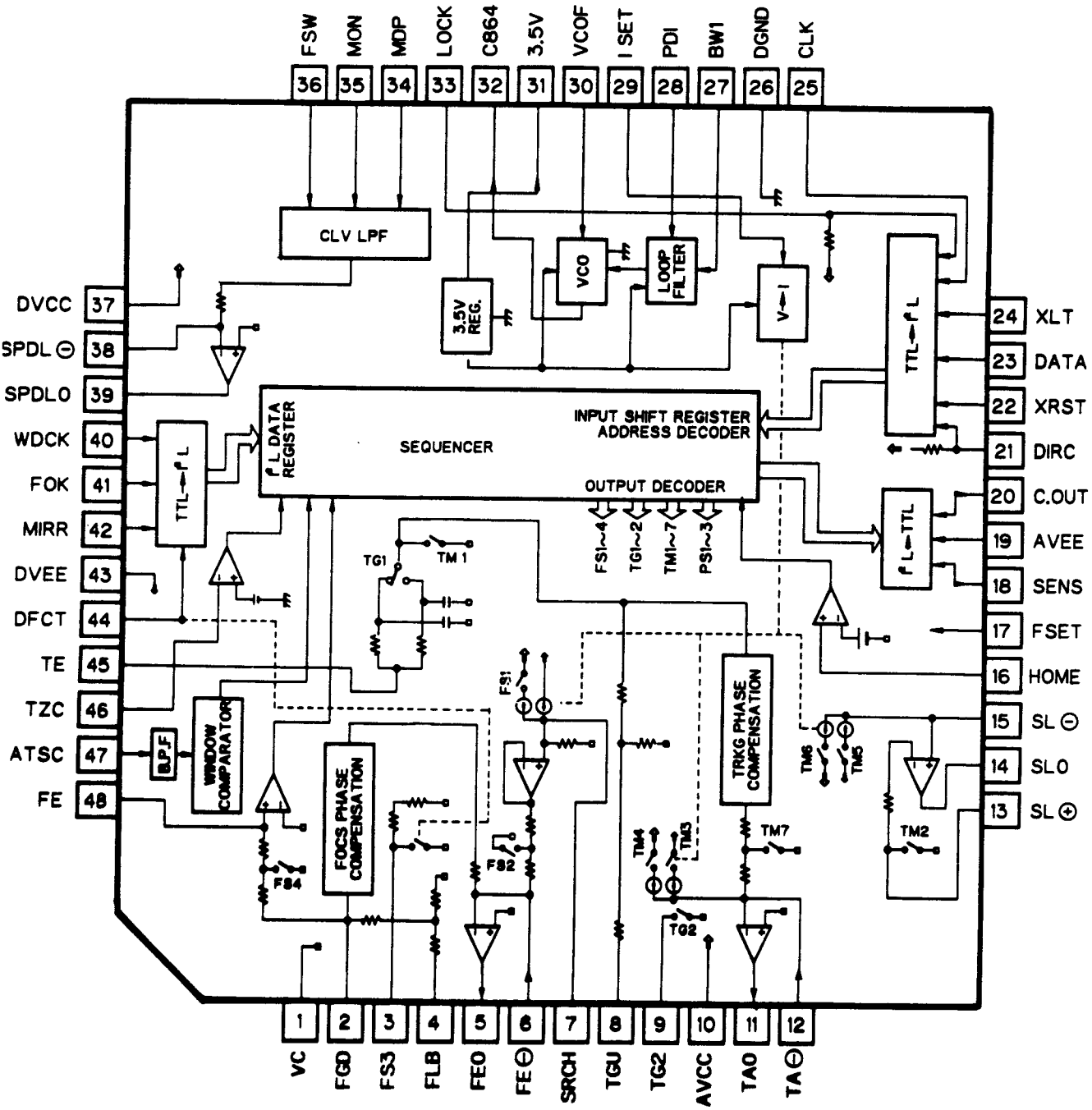
*IC351 : CXA1081M



● Pin Functions (CXA1081M)

Pin No.	Pin Name	I/O	Function and Operation
1	RFI	Input	Input of capacitance-coupled RF summing amplifier output
2	RFO	Output	RF summing amplifier output pin - eye pattern check point
3	RF –	Input	RF summing amplifier feedback input pin
4	P/N	Input	Laser diode P-sub/N-sub selector pin
5	LD	Output	APC LD amplifier output pin
6	PD	Input	APC PD amplifier input pin
7	PD1	Input	RF I-V amplifier (1) inverter input pin - connected to photodiode A + C pin for current input
8	PD2	Input	RF I-V amplifier (2) inverter input pin - connected to photodiode B + D pin for current input
9	VC		Connected to VR
10	F	Input	I-V amplifier inverter input pin - connected to photodiode for current input
11	E	Input	I-V amplifier inverter input pin - connected to photodiode for current input
12	EO	Output	E I-V amplifier output pin
13	EI	Input	E I-V amplifier feedback input pin for E I-V amplifier gain adjustment
14	VR	Output	$(V_{CC} + V_{EE})/2$ DC voltage output pin
15	CC2	Input	Input of capacitance-coupled DEFECT bottom hold output
16	CC1	Output	DEFECT bottom hold output pin
17	VEE		Ground connection
18	FE BIAS	Input	Focus error amplifier non-inverting bias pin Used in focus error amplifier CMR adjustment
19	FE	Output	Focus error amplifier output pin
20	TE	Output	Tracking error amplifier output pin
21	DEFECT	Output	DEFECT comparator output pin
22	MIRR	Output	MIRR comparator output pin
23	CP	Input	MIRR hold capacitor connector pin - MIRR comparator non-inverting input pin
24	CB	Input	DEFECT bottom hold capacitor connector pin
25	DGND		Ground connection
26	ASY	Input	Auto asymmetry control input pin
27	EFM	Output	EFM comparator output pin
28	FOK	Output	Focus OK comparator output pin
29	$\overline{\text{LDON}}$	Input	Laser diode ON/OFF switching
30	VCC		Positive power supply pin

*IC601:CXA1082AQ

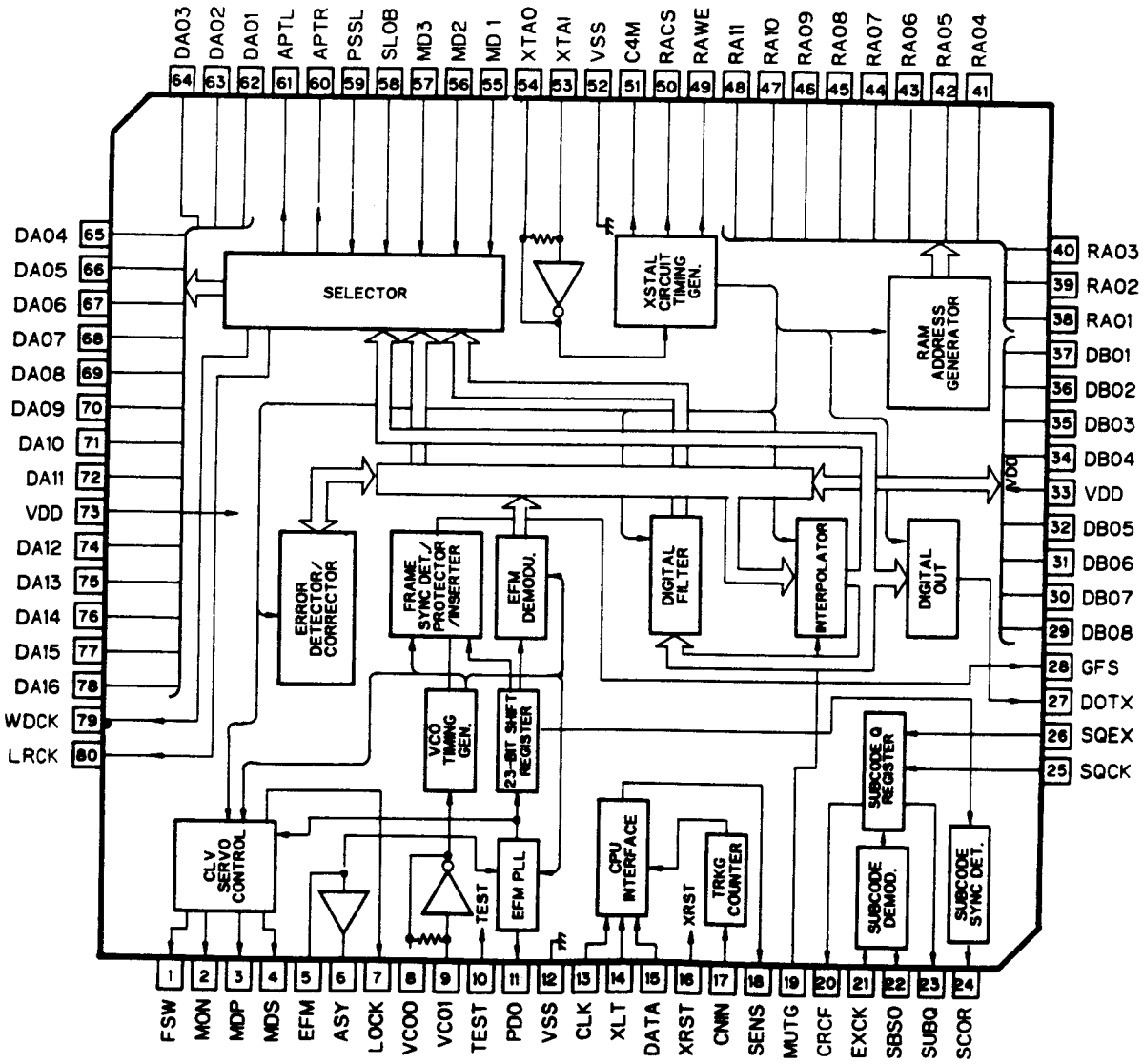


● Pin Functions (CXA1082AQ)

Pin No.	Pin Name	I/O	Function and Operation
1	VC		Servo reference voltage input pin
2	FGD		Connect to pin 3 to switch focus servo OFF when defect occurs
3	FS3		Internal DFCT switch closed when pin 44 is high
4	FLB		Focus servo low region boost external time constant pin
5	FEO	Output	Focus drive output - connect to low-end equalizer
6	FE –	Input	Focus amplifier inverter input pin
7	SRCH		Focus search waveform generation external time constant connector pin
8	TGU	Output	Tracking low-end equalizer connection output pin
9	TG2		Pin 7 discharge switch for starting focus search from lens center
10	AVCC		+ 5V connection
11	TAO	Output	Tracking drive output
12	TA –	Input	Tracking amplifier inverter input pin
13	SL +	Input	Sled amplifier non-inverting input pin
14	SLO	Output	Sled drive output
15	SL –	Input	Sled amplifier inverter input pin
16	HOME	Input	Sled home position detector switch input pin
17	FSET		Focus/tracking phase compensation peak and CLV low-pass filter f_O setting pin
18	SENS	Output	Output of FZC, AS, TZC, SSTOP, and $\overline{\text{BUSY}}$ depending on command from CPU
19	AVEE		AGND connection
20	COUT	Output	Track counter signal output
21	DIRC		Not used
22	XRST	Input	Reset input pin - reset when "L"
23	DATA	Input	Serial data input from CPU
24	XLT	Input	Latch input from CPU
25	CLK	Input	Serial data transfer clock input from CPU
26	DGND		DGND connection
27	BW1		Loop filter external time constant pin
28	PDI	Input	Input of CXD1135 phase comparator output PDO
29	ISET		Current which determines focus search, track jump, and sled kick height
30	VCOF		VCO free-running frequency more or less inversely
31	3.5V	Output	Proportional to resistance value between pins 30 and 31
32	C864	Output	8.64MHz VCO output pin
33	LOCK		Not used
34	MDP		Connect to MDP pin of CXD1135
35	MON		Connect to MON pin of CXD1135
36	FSW		CLV servo error signal low-pass filter external time constant pin
37	DVCC		+ 5V connection
38	SPDL –	Input	Spindle drive amplifier inverter input pin

Pin No.	Pin Name	I/O	Function and Operation
39	SPDLO	Output	Spindle drive output
40	WDCK	Input	Auto-sequence clock input 176.4kHz
41	FOK	Input	FOK signal input pin
42	MIRR	Input	Mirror signal input pin
43	DVEE		DGND connection
44	DFCT	Input	DEFECT signal input pin - defect countermeasure circuit activated when this input is high
45	TE	Input	Tracking error signal input pin
46	TZC	Input	Tracking zero-cross comparator input pin
47	ATSC	Input	Tracking lens offset detector window comparator input pin
48	FE	Input	Focus error signal input pin

*IC701: CXD1135Q

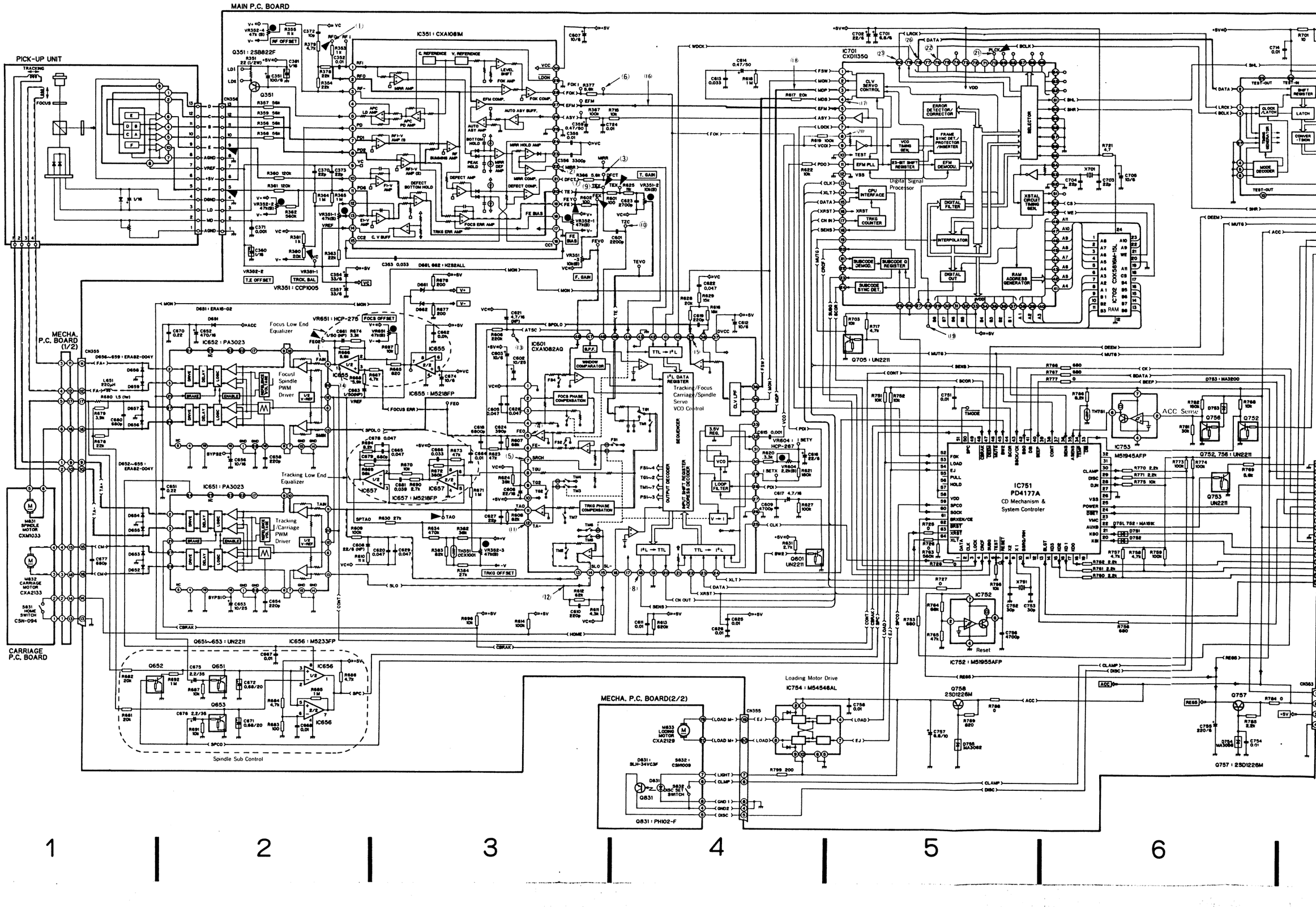


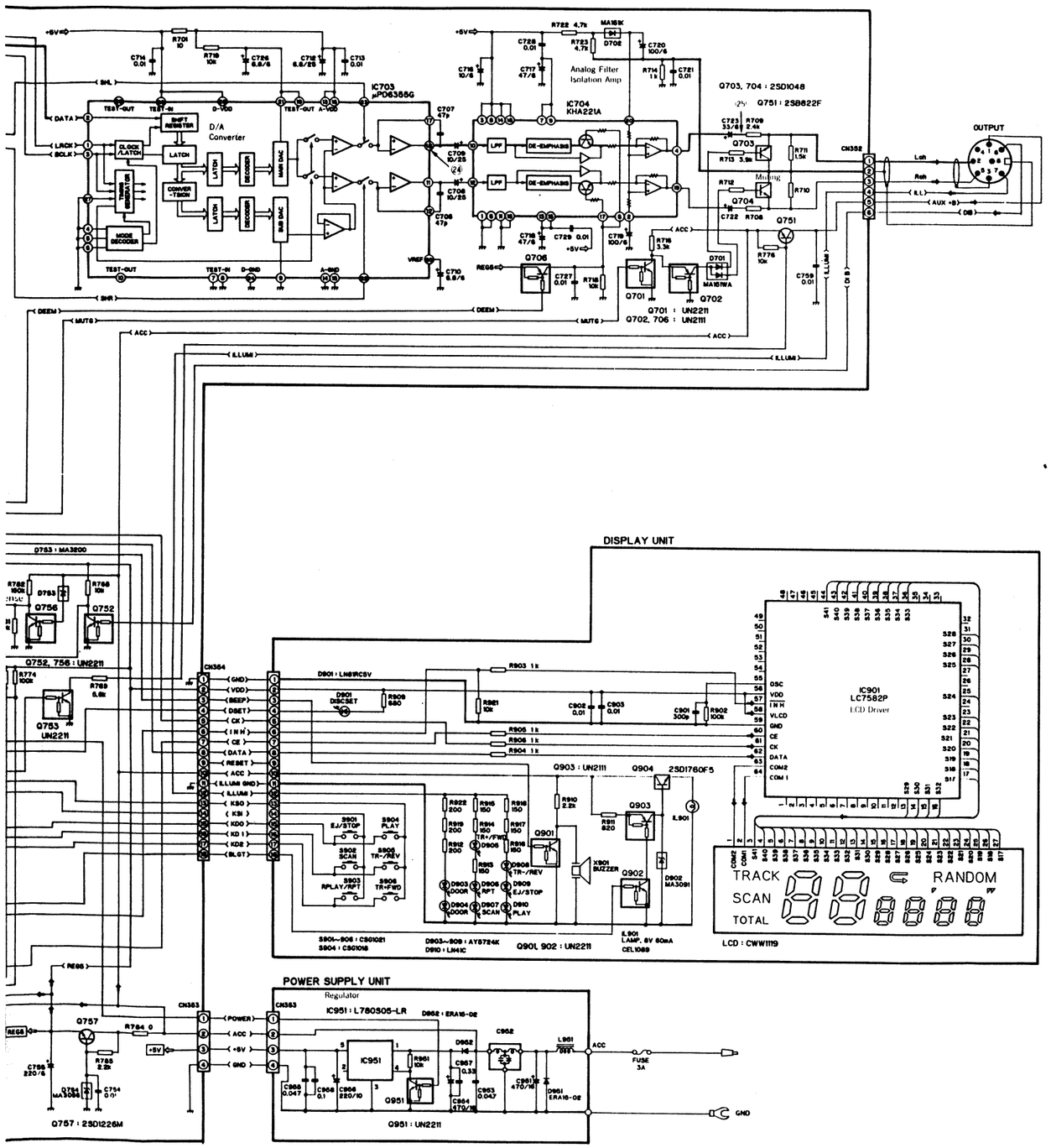
● Pin Functions (CXD1135Q)

Pin No.	Pin Name	I/O	Function and Operation
1	FSW	Output	Spindle motor output filter time constant selector output
2	MON	Output	Spindle motor ON/OFF control output
3	MDP	Output	Spindle motor drive output - "rough" control in CLV-S mode, and phase control in CLV-P mode
4	MDS	Output	Spindle motor drive output - speed control in CLV-P mode
5	EFM	Input	EFM signal input from RF amplifier
6	ASY	Output	EFM signal slice level control output
7	LOCK	Output	Sampling of GFS signal by WFCK/16 - "H" output if "H", "L" output if "L" detected eight times in succession
8	VCOO	Output	VCO output - f = 8.6436MHz when EFM signal is locked
9	VCOI	Input	VCO input
10	TEST	Input	(0V)
11	PDO	Ouptut	EFM signal and VCO/2 phase comparison output
12	V_{SS}	–	Ground (0V)
13	CLK	Input	Serial data transfer clock input from CPU - data latched by clock leading edge
14	XLT	Input	Latch input from CPU - 8-bit shift register data (serial data from CPU) is latched in each register.
15	DATA	Input	Serial data input from CPU
16	XRST	Input	System reset signal input - reset when "L"
17	CNIN	Input	Tracking pulse input
18	SENS	Output	Output of internal status according to address
19	MUTG	Input	Muting input - when ATTM of internal register A is "L", MUTG "L" denotes normal status, and "H" muted status
20	CRCF	Output	Sub-code Q CRC check result output
21	EXCK	Input	Clock input for sub-code serial output
22	SBSO	Output	Sub-code serial output
23	SUBQ	Output	Sub-code Q output
24	SCOR	Output	Sub-code synchronizing S0 + S1 output
25	SQCK	Input/Output	Sub-code Q read clock
26	SQEX	Input	SQCK selector input
27	DOTX	Output	Digital out output ($\overline{\text{WFCK}}$ output)
28	GFS	Output	Frame synchronizing lock status indicator output
29	DB08	Input/Output	External RAM data pin - DATA8 (MSB)
30	DB07	Input/Output	External RAM data pin - DATA7
31	DB06	Input/Output	External RAM data pin - DATA6
32	DB05	Input/Output	External RAM data pin - DATA5
33	V_{DD}	–	Power supply (+5V)
34	DB04	Input/Output	External RAM data pin - DATA4
35	DB03	Input/Output	External RAM data pin - DATA3

Pin No.	Pin Name	I/O	Function and Operation
36	DB02	Input/Output	External RAM data pin - DATA2
37	DB01	Input/Output	External RAM data pin - DATA1 (LSB)
38	RA01	Output	External RAM address output - ADDR01 (LSB)
39	RA02	Output	External RAM address output - ADDR02
40	RA03	Output	External RAM address output - ADDR03
41	RA04	Output	External RAM address output - ADDR04
42	RA05	Output	External RAM address output - ADDR05
43	RA06	Output	External RAM address output - ADDR06
44	RA07	Output	External RAM address output - ADDR07
45	RA08	Output	External RAM address output - ADDR08
46	RA09	Output	External RAM address output - ADDR09
47	RA10	Output	External RAM address output - ADDR010
48	RA11	Output	External RAM address output - ADDR011 (MSB)
49	RAWE	Output	External RAM write enable signal output (active "L")
50	RACS	Output	External RAM chip select signal output (active "L")
51	C4M	Output	X'tal frequency division output (f = 4.2336MHz)
52	V_{SS}	–	Ground (0V)
53	XTAI	Input	Crystal oscillator input (f = 8.4672MHz)
54	XTAO	Output	Crystal oscillator output (f = 8.4672MHz)
55	MD1	Input	Mode selector input 1
56	MD2	Input	Mode selector input 2
57	MD3	Input	Mode selector input 3
58	SLOB	Input	Audio data output code selector input - 2's complement output if "L", offset binary output if "H"
59	PSSL	Input	Audio data output mode selector input - serial output if "L", parallel output if "H"
60	APTR	Output	Aperture correction control output - "H" when right channel
61	APTL	Output	Aperture correction control output - "L" when left channel
62	DA01	Output	C1F1 output
63	DA02	Output	C1F2 output
64	DA03	Output	C2F1 output
65	DA04	Output	C2F2 output
66	DA05	Output	C2FL output
67	DA06	Output	C2PO output
68	DA07	Output	RFCK output
69	DA08	Output	WFCK output
70	DA09	Output	$\overline{\text{PLCK}}$ output
71	DA10	Output	UGFS output
72	DA11	Output	GTOP output

8. SCHEMATIC CIRCUIT DIAGRAM





Signal Route
Focus Servo Line
Spindle Servo Line
Tracking Servo Line
Carriage Servo Line

NOTE :

- indicates a chip resistor.
- indicates a chip capacitor.
- indicates a chip transistor.
- indicates a chip diode.

SWITCHES

S831 : HOME SWITCH ..... ON —— OFF
S832 : DISC SET SWITCH..... ON —— OFF
The underlined indicates the switch position.

- **Serial No.00001 – 00500**

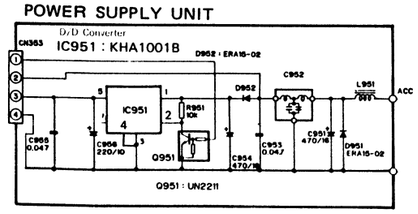
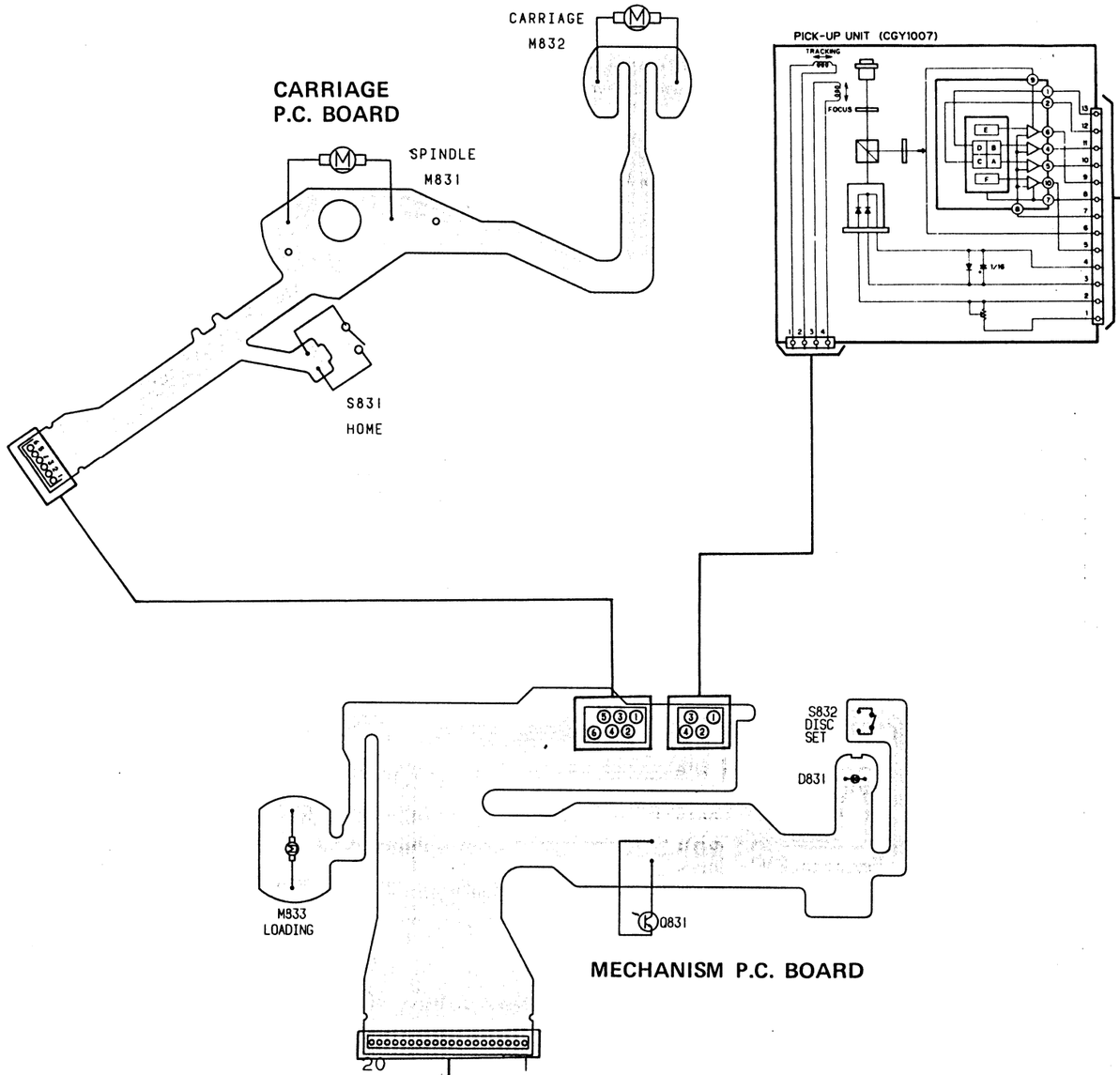
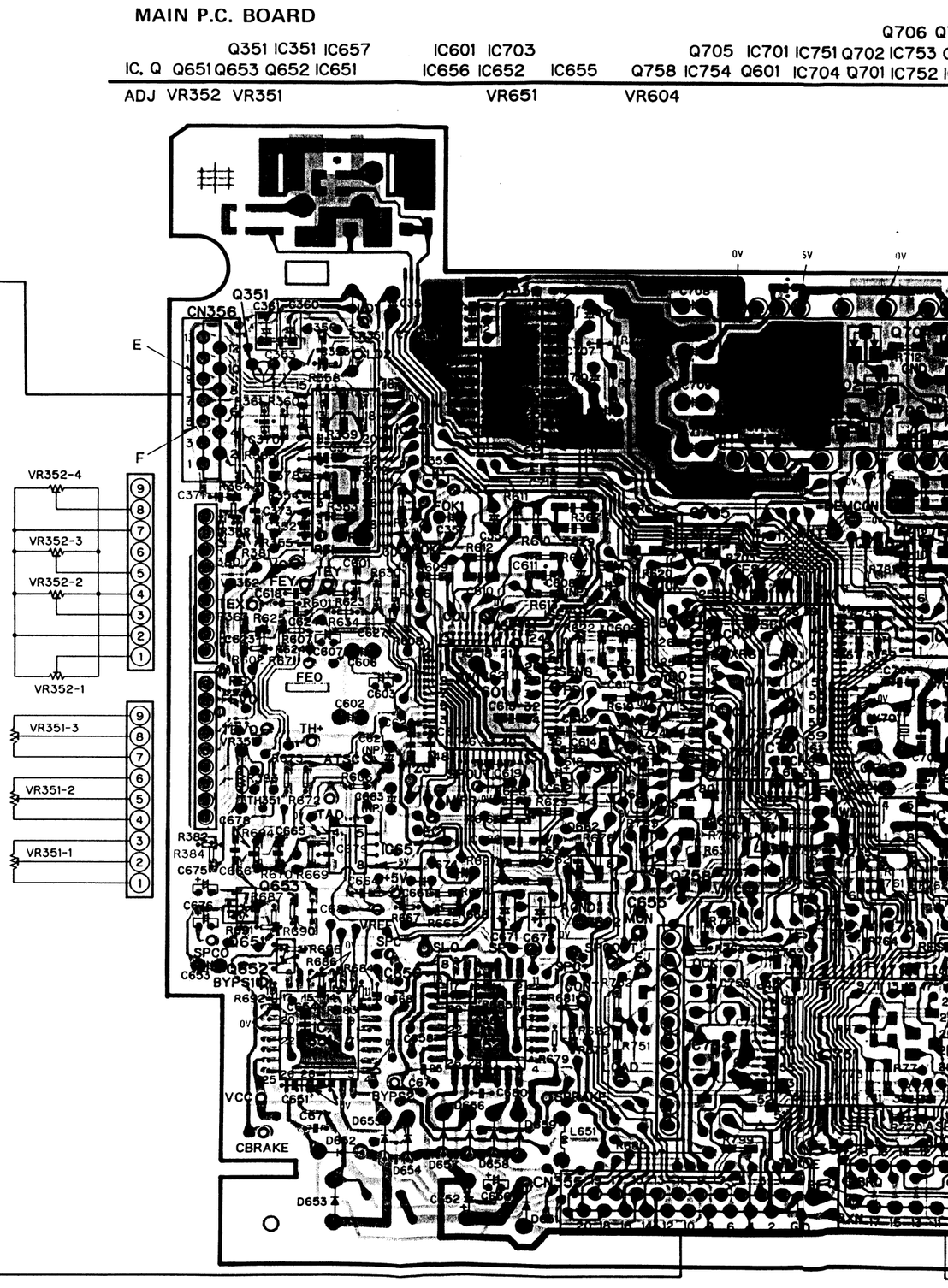


Fig. 49

9. CONNECTION DIAGRAM

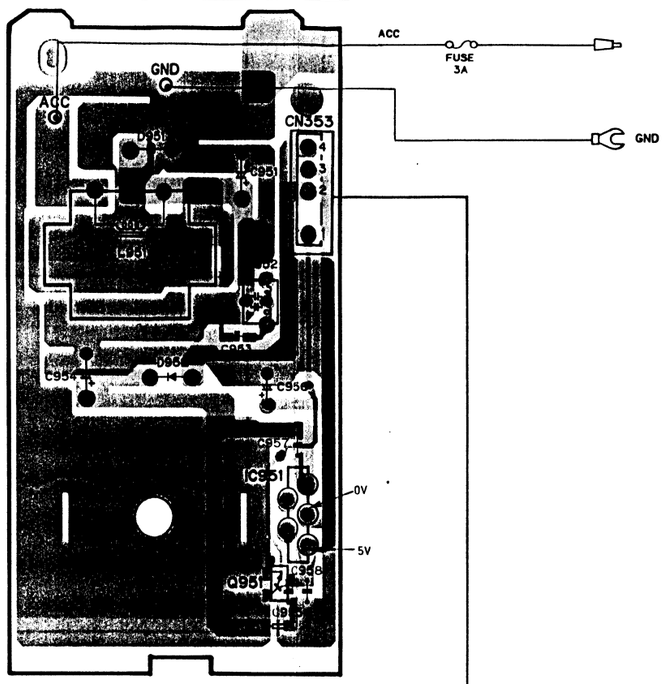




Q706 Q756 Q703
IC751 Q702 IC753 Q704 Q757 Q752
IC704 Q701 IC752 IC702 Q753 Q751

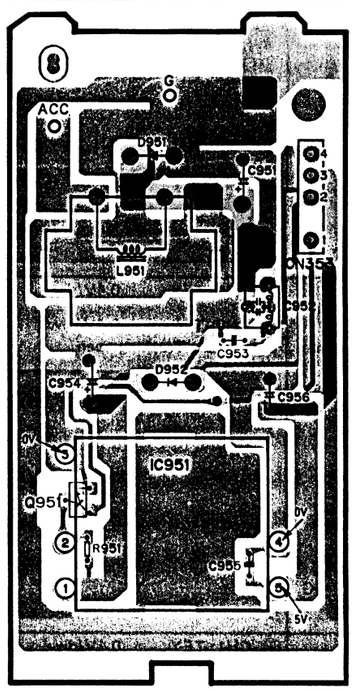
POWER SUPPLY UNIT
(Serial No.00501 –)

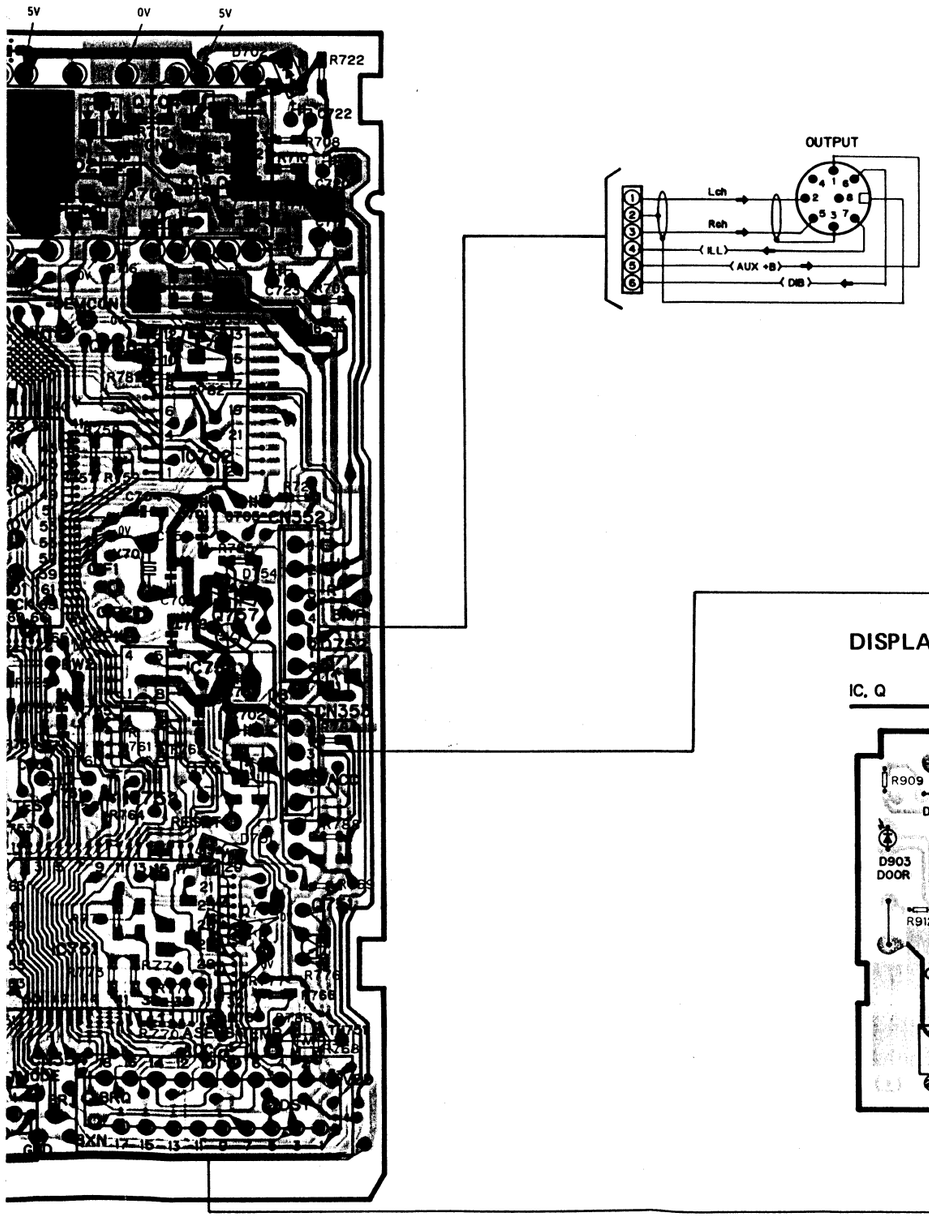
IC, Q Q951 IC951



POWER SUPPLY UNIT
(Serial No.00001 – 00500)

IC, Q Q951 IC951





DISPLAY UNIT

IC, Q Q904 IC901 Q903 Q902 Q901

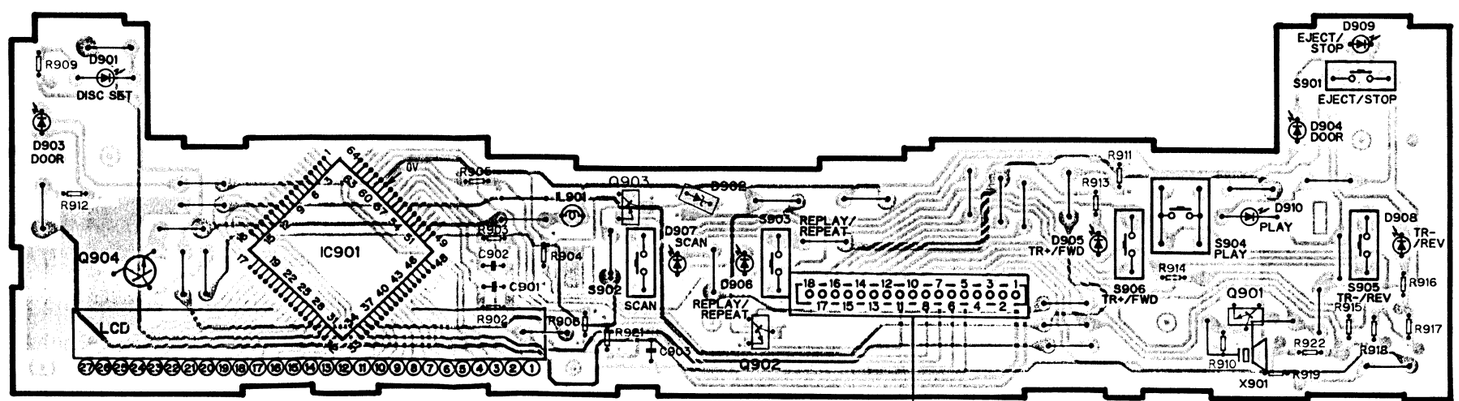


Fig. 50

- Chassis

Refer to the following diagram for units having a serial number of 00501 or higher.

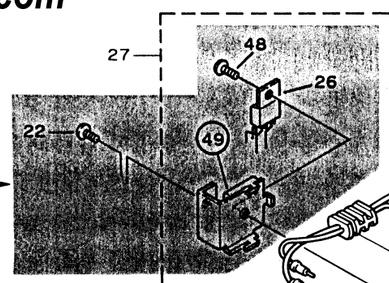


Fig. 51

11. CD MECHANISM UNIT EXPLODED VIEW

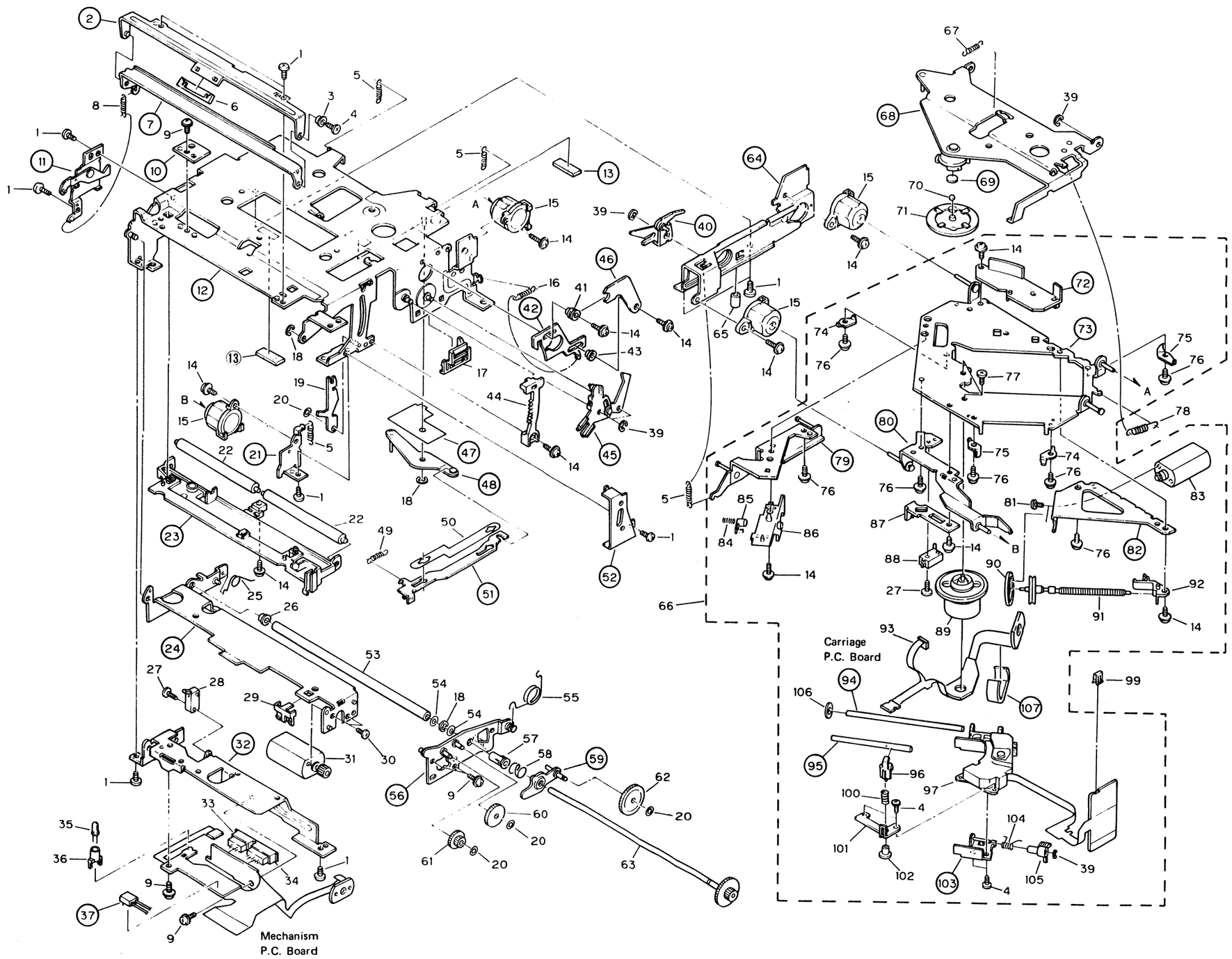


Fig. 52

Pin No.	Pin Name	I/O	Function and Operation
73	V_{DD}	–	Power supply (+5V)
74	DA12	Output	RAOV output
75	DA13	Output	C4LR output
76	DA14	Output	$\overline{\text{C21O}}$ output
77	DA15	Output	C21O output
78	DA16	Output	DATA output
79	WDCK	Output	Strobe signal output (176.4kHz)
80	LRCK	Output	Strobe signal output (88.2kHz)

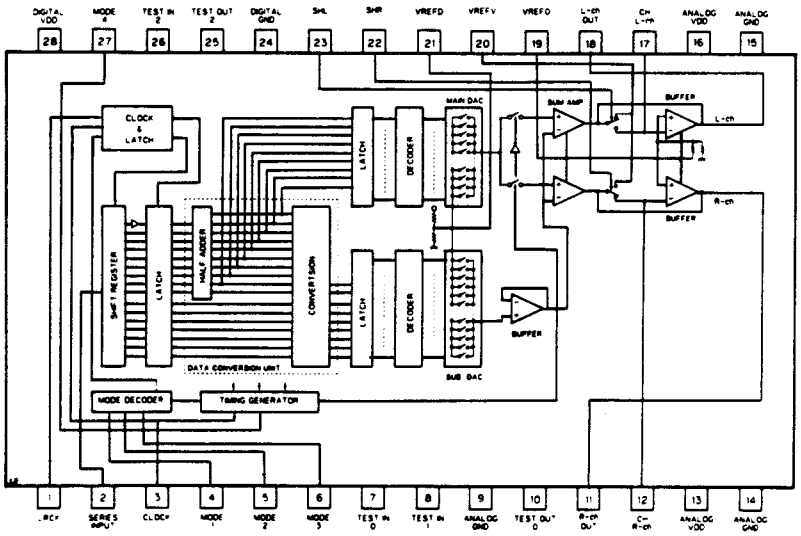
Note:

C1F1: ┐
C1F2: ┘ C1 decoding error correction status monitor output

C2F1: ┐
C2F2: ┘ C2 decoding error correction status monitor output

C2FL: Corrected status output - "H" if C2 system currently being corrected cannot be corrected
C2PO: C2 pointer indication output - synchronized with audio data output
RFCK: Read frame clock output - crystal oscillator 7.35kHz
WFCK: Write frame clock output - f = 7.35kHz when crystal oscillator is locked
PLCK: VCO/2 output - f = 4.3218MHz when EFM signal is locked
UGFS: Unprotected frame synchronizing pattern output
GTOP: Frame synchronization protection status indicator output
RAOV: ±4 frame jitter absorption RAM overflow and underflow indicator output
C4LR: Strobe signal - 176.4kHz
$\overline{\text{C21O}}$: C21O inverting output
C21O: Bit clock output - 2.1168MHz
DATA: Audio signal serial data output

*IC703: μPD6355G

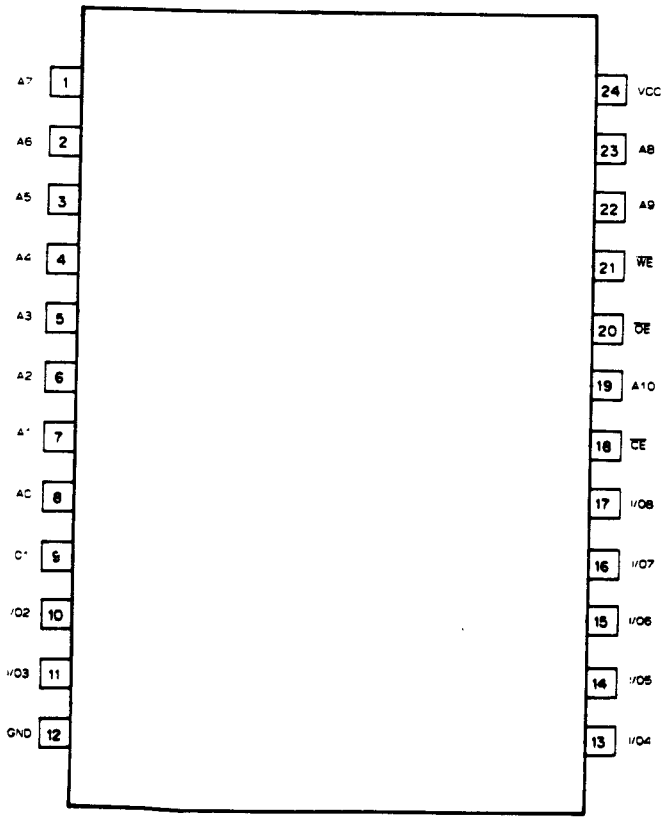


● Pin Functions (μPD6355G)

Pin No.	Pin Name	I/O	Function and Operation
1	LRCK	Input	Input data left/right discriminator signal input pin "L" = Left, "H" = Right
2	SI	Input	Serial data input pin
3	CLK	Input	Serial input data read clock input pin
4-6	M1-M3	Input	Input data mode selector pin

Pin No.	Pin Name	I/O	Function and Operation
7,8	TI_0, TI_1	Input	Test pins
9	A·GND		Analog stage ground pin
10	TOO	Output	Test pin
11	ROUT	Output	Right channel analog signal output pin
12	CHR	Output	Right channel analog signal sample hold capacitor pin
13	A·VDD		Analog stage power supply pin
14,15	A·GND		Analog stage ground pins
16	A·VDD		Analog stage power supply pin
17	CHL	Output	Left channel analog signal sample hold capacitor pin
18	LOUT	Output	Left channel analog signal output pin
19	VREFO		Operation amplifier reference connection
20	VREFV		Connection to AGND via capacitor
21	VREFD		Connection to resistance ladder
22	SHR	Input	Right channel analog output sample hold timing signal Active high
23	SHL	Input	Left channel analog output sample hold timing signal Active high
24	D·GND		Logic stage ground pin
25	TO2	Output	Test pin
26	TI2	Input	Test pin
27	M4	Input	Internal logic clock selection which determines whether input from CLK pin is to be divided or not "H": No division, "L": Divide by 2
28	D·VDD		Logic stage power supply pin

*IC702 : CXK5816M-15L



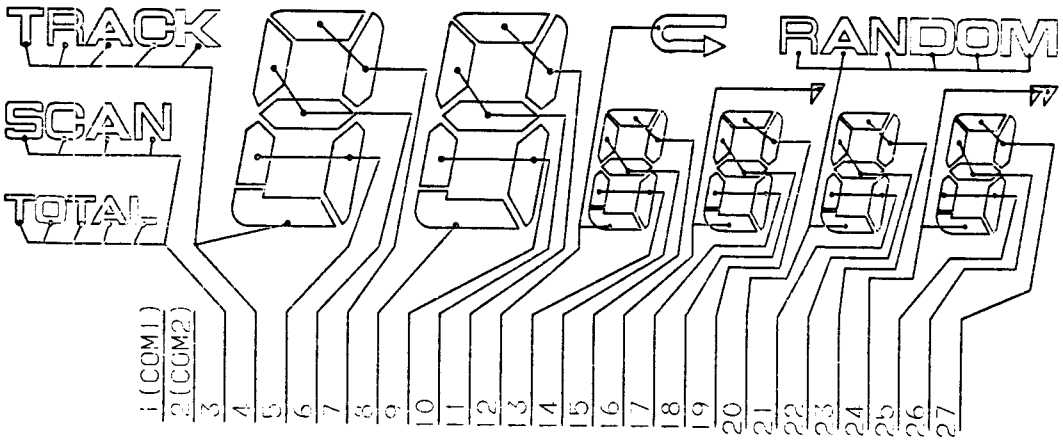
Circuit Diagram Symbols

Symbol	Function
A	1/4 division detector output used in detection of RF and focus signal
ACC	14.4V
AGND	Analog ground
ASY	Asymmetry
ATSC	Anti-shock (carriage motor control during playback)
B	1/4 division detector output used in detection of RF and focus signal
BATT	14.4V (Constant power supply)
BDATA	Bus data signal
BRST	Bus reset signal
BRXEN	Bus line busy signal
BSCK	Bus synchronizing shift clock
BSRQ	Bus service request line
BYPS1	Bypass 1 (non-drive enabled by connecting to ground during PWM IC651 operation)
BYPS2	Bypass 2 (non-drive enabled by connecting to ground during PWM IC652 operation)
C	1/4 division detector output used in detection of RF and focus signal
CBRAKE	PWM driver brake control signal (brake on when "L")
CLAMP	Disc set detect signal
CM +	Carriage motor drive signal (PWM OUT)
CM −	
CONT	PWM driver ON/OFF signal (ON when "H")
D	1/4 division detector output used in detection of RF and focus signal
DEEM	Emphasis selector switch (emphasis ON when "H")
DFCT	DEFECT signal ("H" when defect)
DGND	Digital ground
DISC	Disc presence detector signal
E	Tracking signal start detector
EFM	8-14 modulation
EJ	Eject key
END	Carriage mechanism END position detector signal
F	Tracking signal end detector
FA +	Focus actuator drive signal (PWM OUT)
FA −	
FAIN	Focus drive PWM input signal
FEO	Focus signal output (IC601, CXA1082AQ pin no.5)

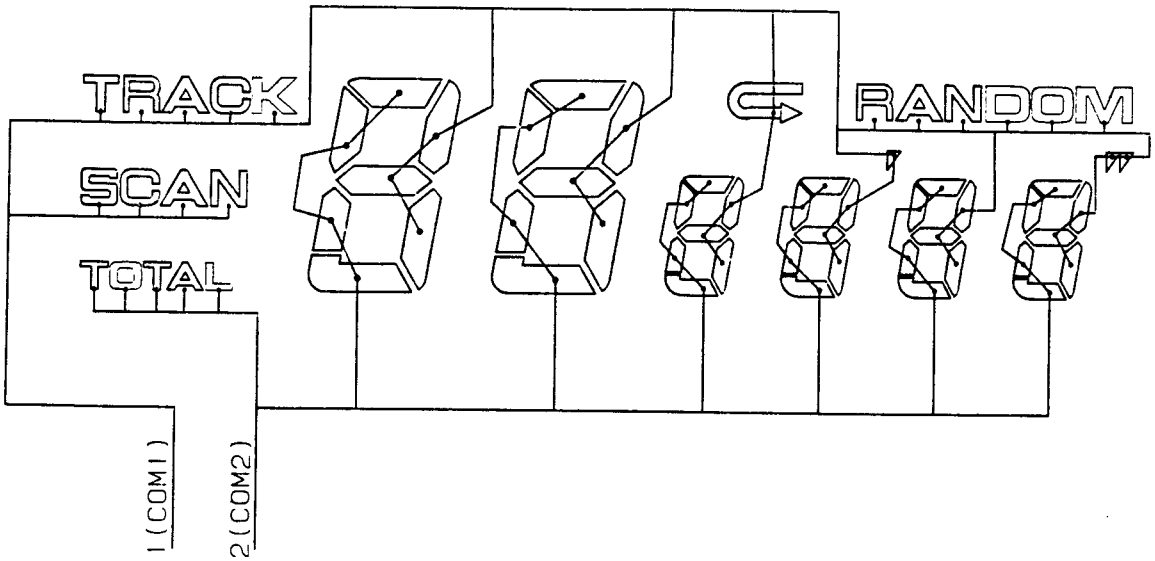
Symbol	Function
FEO2	Focus 2 (IC655 pin no.1)
FLOAT	Carriage mechanism play position detector signal
HOME	Home position detector signal (pick-up at home position when "L")
IN1	Motor control signal 1
IN2	Motor control signal 2
IN3	Motor control signal 3
ISETY	ISET resistance pin (IC601 pin no.31)
LAMP	Photo-interrupter drive signal
LD	Laser diode
LOAD	Disc loading power supply ON/OFF signal
MON	Motor ON (spindle forward or reverse when "H")
MD	Monitor diode
$\overline{\text{MUTG}}$	Mute signal (muting ON when "L")
POWER	Power supply control signal
REG5	+ 5V
SLO	Carriage output signal (IC601 pin no.14)
SM +	Spindle motor drive signals (PWM OUT)
SM −	
SPC	Spindle motor rpm detector signal (low speed when "L", IC656 pin nos.1 & 7)
SPCO	Spindle brake (spindle brake when "H", IC751 pin no. 59)
SPDLO	Spindle motor error signal (IC601 pin no.39)
SPTAO	Tracking side path signal output
SMIN	Spindle motor drive PWM input signal
STBY	Standby position detector signal
TA +	Tracking actuator drive signals (PWM OUT)
TA −	
TAIN	Tracking actuator drive PWM input signal
TEND	Mechanism clamped switching line
TGU	Tracking side path input
TIG	Switch ground
TOG	Switch ground
TZC	T.E zero-cross signal
VC	Signal reference voltage (2.5V)
VREF	Signal reference voltage buffer output (2.5V)

●LCD : CWW1119

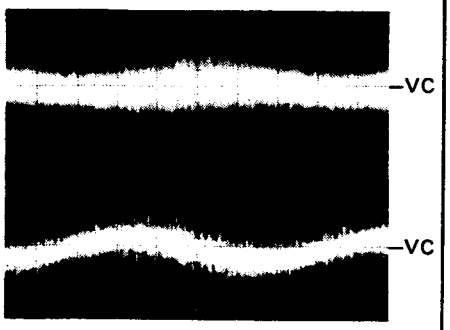
● SEGMENT



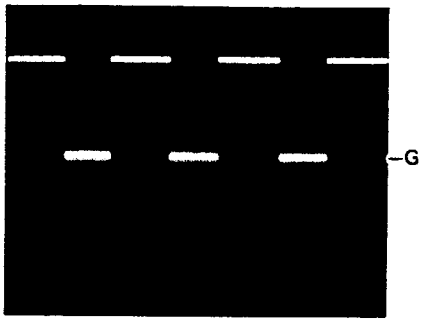
● COMMON



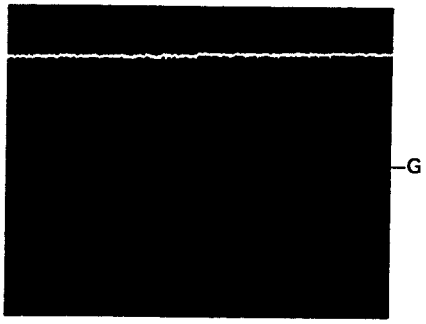
⑨ CH1: TEY 0.5V/div.
⑪ CH2: TAO 0.5V/div.
20ms/div.
Normal mode: PLAY



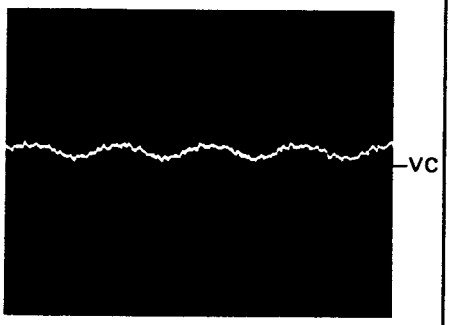
⑰ MDS 2V/div. 50μs/div.
PLAY



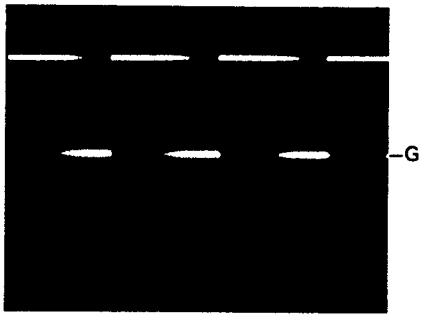
⑲ GFS 2V/div. 200μs/div.
PLAY



⑮ SPDLO 2V/div. 50ms/div.
PLAY



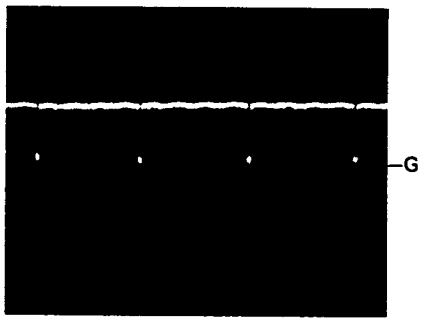
⑰ MDS 2V/div. 50μs/div.
SEARCH



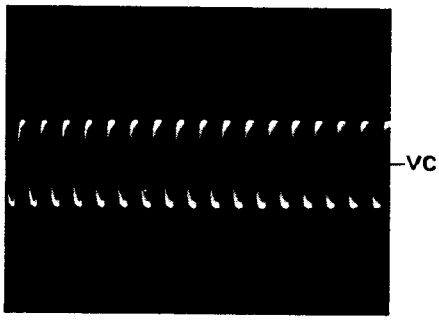
⑲ GFS 2V/div. 20ms/div.
SEARCH

⑮ SPDLO 2V/div. 50ms/div.
SEARCH

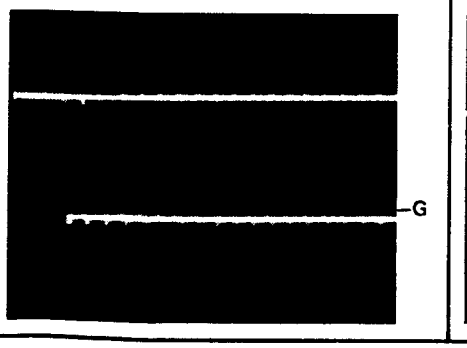
⑱ MDP 2V/div. 200μs/div.
PLAY



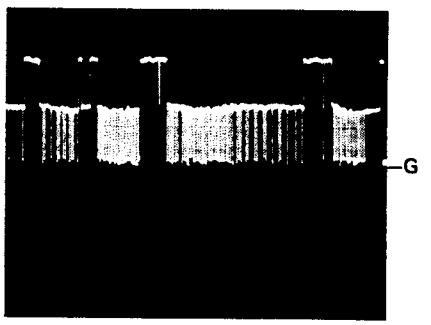
⑳ VCOO 2V/div. 0.2μs/div.
PLAY



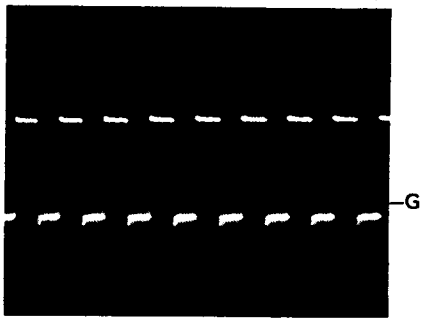
⑯ EFM 2V/div. 0.5μs/div.
PLAY



⑱ MDP 2V/div. 10ms/div.
SEARCH



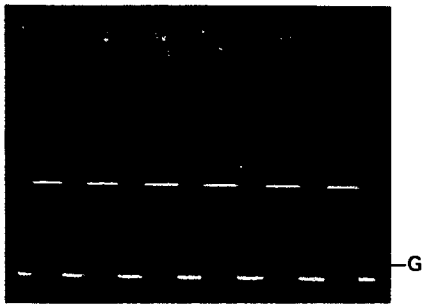
㉑ PLCK 2V/div. 0.2μs/div.
PLAY



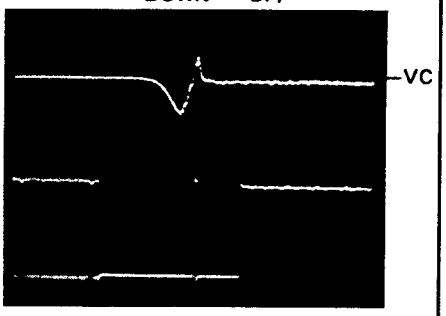
Note: 1. The encircled numbers denote measuring points in the circuit diagram.
2. Reference voltage.
G: GND VC: Pin 14 of CXA1081M (2.5V)

• Wave Forms

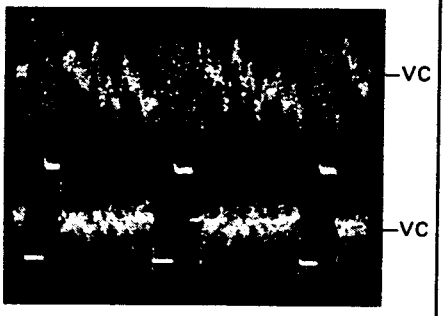
① CH1: RFO 0.4V/div. 0.4ms/div.
② CH2: MIRR 2V/div.
Test mode: Tracking open



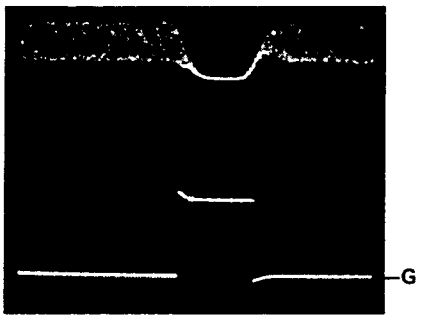
⑦ CH1: FEY 1V/div. 4ms/div.
⑧ CH2: SENS 2V/div.
Normal mode: Focus close (The lens moves DOWN → UP)



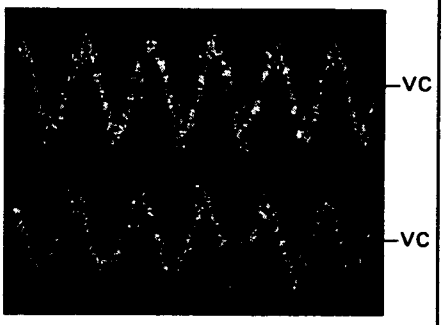
⑨ CH1: TEY 0.4V/div. 4ms/div.
⑪ CH2: TAO 0.4V/div.
Normal mode: Track search (80 track jump)



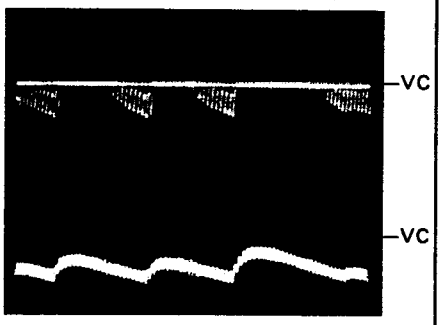
① CH1: RFO 1V/div. 0.4ms/div.
③ CH2: DEFECT 2V/div.
Normal mode: The defect part passes 800μm.



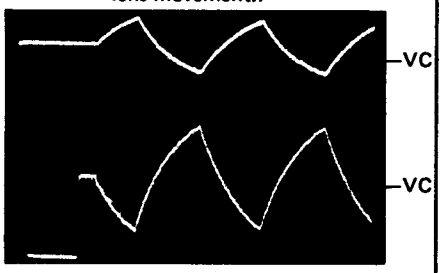
⑨ CH1: TEY 0.4V/div. 0.4ms/div.
⑩ CH2: TZC 0.4V/div.
Test mode: Tracking open



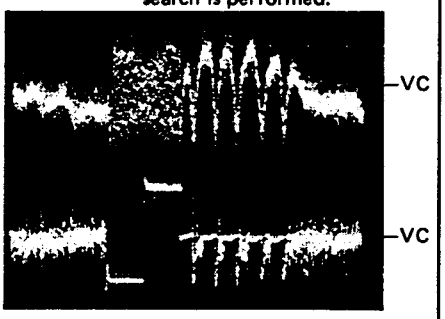
⑫ CH1: SLO 0.4V/div. 2S/div.
⑬ CH2: ATSC 0.02V/div.
Normal mode: PLAY



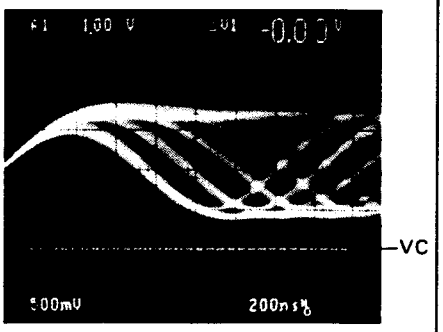
④ CH1: FEO 0.2V/div. 0.4S/div.
⑤ CH2: Pin 7 of CXA1082AQ 0.04V/div.
Test mode: Connect the FOK2 to GND. Focus search is performed. (CH2 is the same phase as the lens movement.)



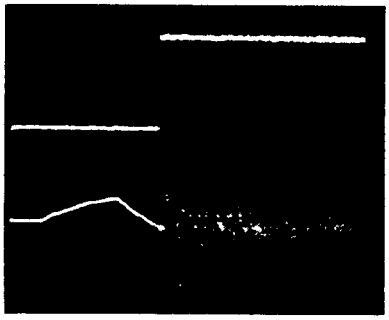
⑨ CH1: TEY 0.4V/div. 2ms/div.
⑪ CH2: TAO 0.4V/div.
Normal mode: Brake wave form when track search is performed.



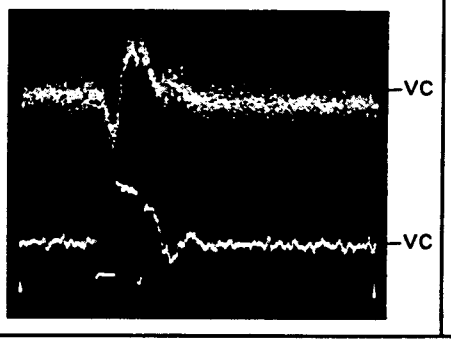
① RFO 0.5V/div. 200ns/div.
Normal mode: PLAY



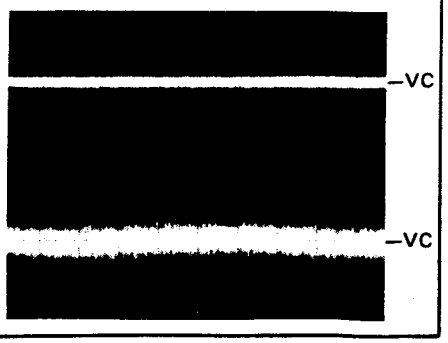
⑥ CH1: FOK2 2V/div. 0.2S/div.
④ CH2: FEO 0.2V/div.
Normal mode: Focus close



⑨ CH1: TEY 0.4V/div. 0.4ms/div.
⑪ CH2: TAO 0.4V/div.
Test mode: Single jump



⑦ CH1: FEY 0.5V/div. 20ms/div.
⑭ CH2: FEO2 0.5V/div.
Normal mode: PLAY



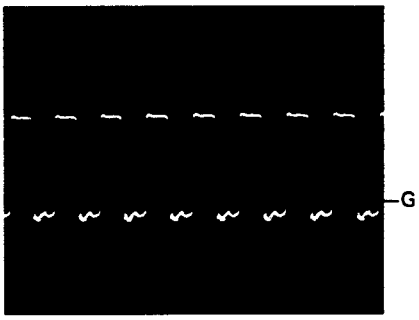
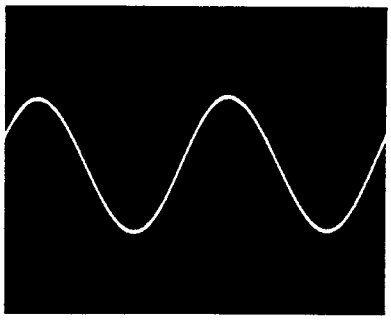
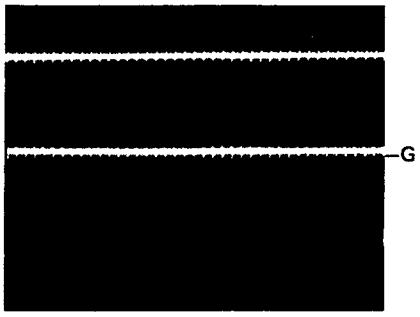
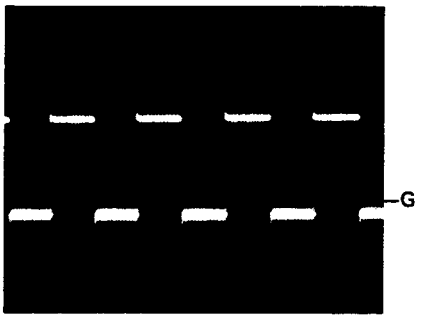
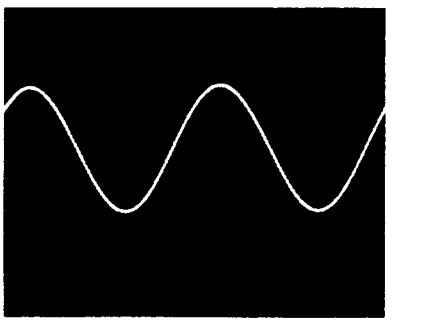
10. CHASSIS EXPLODED VIEW

NOTE:

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

● Parts List

Mark	No.	Part No.	Description
★	1	CAC1543	Button(UC)
		CAC1784	Button(EW)
	2		Cushion
	3	CXA2520	Grille Unit(UC)
		CXA2521	Grille Unit(EW)
★	4	CAC1439	Button
★	5	CAC1541	Button(UC)
		CAC1785	Button(EW)
★	6	CAC1542	Button
◉	7	CWX1160	Display Unit
	8	CNV1610	Spacer
★	9	LN41C	LED
★★	10	CEL1089	Lamp
	11		Holder
	12		Lens
	13		Plate
	14	CWW1119	LCD
	15	CNC2301	Contact
	16		Holder
	17	BPZ20P060FMC	Screw
	18		Spacer
	19	CNP1593	P.C.Board
	20		Spacer
★	21	LN81RC5V	LED
	22	BMZ26P040FMC	Screw
	23	PMF26P060FMC	Screw
	24		Cushion
◉	25	CXK2200 (CXK2240)	CD Mechanism Unit
★★	26	L780S05-LR	IC
◉	27	CWX1159	Main Unit(UC)
		CWX1161	Main Unit(EW)
★	28	CDE2254	Cord(UC)
		CDE2255	Cord(EW)
	29		Connector
	30		Insulator
	31		Insulator
	32		Holder
	33	CKS-470	Plug
	34		Plug
	35	CKS1087	Connector
	36	CKS1415	Connector
	37		Case
	38	CBA1094	Screw
	39	CDE2133	DIN Cord
	40	.....	
	41	.....	
	42	CKS1328	Connector
	43		Insulator
	44		Chassis Unit
	45		Bracket
	46		Bracket
	47	CRP1031	Caution Card
	48	BMZ30P050FMC	Screw
	49		Bracket
	50	CNC1484	Holder
	51	CNS1403	Panel
	52	CNC1631	Handle
	53	CBH-865	Spring

㉒ BCLK 2V/div. 0.2μs/div.  	㉕ L or R L.P.F. 0.5V/div. 0.2ms/div. PLAY (1kHz: FS) 	
㉖ DATA 2V/div. 0.2μs/div.  		
㉓ LRCK 2V/div. 5μs/div. PLAY  		
㉔ L or R OUT 0.5V/div. 0.2ms/div. PLAY (1kHz: FS) 		

Mark	No.	Part No.	Description
	91	CXA2375	Screw Unit
	92	CNV1781	Holder
	93	CNP1709	P.C.Board
	94		Shaft
	95		Shaft
	96	CNV1512	Holder
	97	*******	PU Unit
	98	.....	
	99	CBL1010	Short Pin
	100	CBH1105	Spring
	101	CNC1736	Holder
	102	CLA1319	Screw
	103		Holder Unit
	104	CBH1106	Spring
	105	CNV1513	Rack
	106	CNV1863	Cushion
	107		Cover

****

Mark	No.	CD Mechanism Unit		Description
		CXK2200	CXK2240	
◉	66	CXA1910	CXA2650	Carriage Unit
	97	CGY1007	CGY1008	PU Unit

● **Parts List**

Mark	No.	Part No.	Description
	1	BMZ26P030FMC	Screw
	2		Bracket
	3	CLA1311	Collar
	4	CBA1062	Screw
	5	CBH1182	Spring
	6	CNV1641	Holder
	7		Arm
	8	CBH1137	Spring
	9	CBA1076	Screw
	10		P.C.Board
	11		Bracket Unit
	12		Chassis Unit
	13		Cushion
	14	CBA1075	Screw
	15	CXA2148	Damper Unit
	16	CBH1139	Spring
	17	CNV1633	Holder
	18	YE20FUC	Washer
	19	CNV1631	Cam
	20	CBF-166	Washer
	21		Bracket
	22	CNV1636	Roller
	23		Guide
	24		Arm Unit
	25	CBH1135	Spring
	26	CNV1884	Bearing
	27	CBA1070	Screw
★★	28	CSN1009	Switch(Disc Set)
	29	CNV1644	Holder
	30	HBA-175	Screw
★★	31	CXA2129	Motor Unit(Loading)
	32		Bracket
	33	CKS-719	Connector
	34	CKS-721	Connector
★	35	SLH-34VC3F	LED
	36	CNV1639	Holder
	37		Connector
	38	CNP1711	P.C.Board
	39	YE15FUC	Washer
	40		Arm Unit
	41	CLA1472	Collar
	42		Lever
	43	CLA1309	Collar
	44	CNV1630	Gear
	45		Arm Unit
	46		Holder
	47		Spacer
	48		Arm Unit
	49	CBH1134	Spring
	50	CNM2152	Spacer
	51		Lever Unit
	52		Bracket
	53	CNV1634	Roller
	54	CBF1002	Washer
	55	CBH1133	Spring
	56		Bracket Unit
	57	CNV1632	Bearing
	58	CBH1181	Spring
	59		Arm Unit
	60	CNV1628	Gear
	61	CNV1627	Gear
	62	CNV1629	Gear
	63	CXA2456	Gear Unit
	64		Bracket Unit
	65	CNY-265	Cushion
◉	66	*******	Carriage Unit
	67	CBH1136	Spring
	68		Arm Unit
	69		Spacer
	70	CNR1079	Ball
	71	CNV1643	Clamper
	72		Guide
	73		Chassis Unit
	74	CNC1738	Holder
	75	CNC1739	Holder
	76	PMS20P030FMC	Screw
	77	HBA-163	Screw
	78	CBH1138	Spring
	79		Bracket Unit
	80		Holder Unit
	81	CBA-098	Screw
	82		Bracket
★★	83	CXA2133	Motor Unit(Carriage)
	84	CBH1104	Spring
	85	CNV1844	Spacer
	86	CNV1780	Holder
	87	CNV1674	Holder
★★	88	CSN-094	Switch(Home)
★★	89	CXM1033	Motor Unit(Spindle)
★★	90	CNT1020	Belt

12. ELECTRICAL PARTS LIST

NOTE:

- *For your parts Stock Control, the fast moving items are indicated with the marks ‡‡ and ‡.*
  ‡‡ : GENERALLY MOVES FASTER THAN ‡.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*
  Chip Resistor
  RS1/8S □□□J, RS1/10S □□□J
  Chip Capacitor (except for CQS.....)
  CKS....., CCS....., CSZS.....

Unit Number :
Unit Name : Main P.C.Board

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
‡‡	IC 351		CXA1081M
‡‡	IC 601		CXA1082AQ
‡‡	IC 651 652		PA3023
‡‡	IC 655 657		M5218FP
‡‡	IC 656		M5233FP
‡‡	IC 701		CXD1135Q
‡‡	IC 702		CXK5816M
‡‡	IC 703		μPD6355G
‡‡	IC 704		KHA221A
‡‡	IC 751		PD4177
‡‡	IC 752		M51955AFP
‡‡	IC 753		M51945AFP
‡‡	IC 754		M54546AL
‡‡	Q 351 751		2SB822F
‡‡	Q 601 652 653 705	Chip Transistor	UN2211
‡‡	Q 651 701 752 753 756	Chip Transistor	UN2211
‡‡	Q 702 706	Chip Transistor	UN2111
‡‡	Q 703 704	Chip Transistor	2SD1048
‡‡	Q 757 758		2SD1226M
‡	D 651		ERA15-02
‡	D 652		ERA82-004Y
‡	D 653 654 655 656 657 658 659		ERA82-004VH
‡	D 661 662		HZS2A1L
‡	D 701	Chip Diode	MA151WA
‡	D 702 751 752	Chip Diode	MA151K
‡	D 753	Chip Diode	MA3200
‡	D 754	Chip Diode	MA3056
‡	D 755	Chip Diode	MA3062
	L 651	Choke Coil	CTH1035
	TH 351	Thermister	CCX1001
	TH 751	Thermister	CCX-021
	X 701	Crystal Resonator	CSS1027
	X 751	Ceramic Resonator	CSS-042
‡‡	VR 351	Semi-fixed 47kΩ(B), 10kΩ(B)×2	CCP1005
‡‡	VR 352	Semi-fixed 47kΩ(B)×4	CCP1006
‡‡	VR 604	Semi-fixed 2.2kΩ(B)	HCP-267
‡‡	VR 651	Semi-fixed 47kΩ(B)	HCP-275

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 351		RS1/2P220JL
	R 353 381 714		RS1/10S102J
	R 354 363 378		RS1/10S223J
	R 355 610 625		RS1/10S113J
	R 356 357 358 359 669		RS1/10S563J
	R 360 361		RS1/10S124J
	R 362 763		RS1/10S564J
	R 364 365 618 671		RS1/10S105J
	R 366 377 666 769		RS1/10S562J
	R 367		RS1/10S104J
	R 379 722 723 757 758		RS1/10S472J
	R 380 617 628 682		RS1/10S203J
	R 382		RS1/10S363J
	R 383		RS1/10S823J
	R 384 630		RS1/10S273J
	R 601 602		RS1/10S101J
	R 606		RS1/10S224J
	R 607 764		RS1/10S683J
	R 608		RS1/10S823J
	R 609 614 619 627 759 773 774		RS1/10S104J
	R 611		RS1/10S432J
	R 612		RS1/10S623J
	R 613		RS1/10S624J
	R 616		RS1/10S183J
	R 620		RS1/10S332J
	R 621		RS1/10S184J
	R 622 670 687 696 697 715 718 719 751 752		RS1/10S103J
	R 623 765		RS1/10S473J
	R 624		RS1/10S393J
	R 629		RS1/10S153J
	R 631		RS1/10S272J
	R 634		RS1/10S474J
	R 665 789		RS1/10S821J
	R 667 684 686 717		RS1/10S472J
	R 668 679		RS1/10S392J
	R 672		RS1/10S364J
	R 673		RS1/10S473J
	R 674 716		RS1/10S332J
	R 676 799		RS1/10S201J
	R 677		RS1/10S201J

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 678		RS1/10S223J
	R 680		RS1P1R5JL
	R 681		RS1/10S203J
	R 683		RS1/10S101J
	R 685 692		RS1/10S105J
	R 690		RS1/10S272J
	R 691 703 755		RS1/10S103J
	R 694 786		RS1/10S822J
	R 701		RS1/10S100J
	R 708 709		RS1/10S242J
	R 710 711		RS1/10S152J
	R 712 713		RS1/10S392J
	R 721		RS1/10S4R7J
	R 724 725 726 727 728 777 784 788		RS1/10S0R0J
	R 753 756		RS1/10S681J
	R 760 761 762 770 771 785		RS1/10S222J
	R 766 767		RS1/10S681J
	R 768 775 776		RS1/10S103J
	R 781		RS1/10S303J
	R 782		RS1/10S154J

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 351 720		CEA101M6R3LS
	C 352 611 625 626 662 664 713 721 724 727		CKSQYB103K50
	C 353 613 666		CKSYB333K25
	C 354 357		CASA330M6R3
	C 355 667 668 714		CKSQYB103K50
	C 356		CKSYB332K50
	C 359 614		CEAR47M50LS
	C 360 361		CSZS010M16
	C 370 703 704		CCSQCH220J50
	C 371 615		CKSQYB102K50
	C 372		CCSQCH100D50
	C 373 627		CCSQCH220J50
	C 601		CKSQYB222K50
	C 602 653 708 709		CEA100M25LS
	C 603 607 612 716		CEA100M6R3LS
	C 605 620 622 628 629		CKSYB473K25
	C 606		CEA220M16LS
	C 608		CEA220M6R3NPLL
	C 609 756		CKSQYB472K50
	C 610 619		CCSQCH221J50
	C 616		CEA220M6R3LS
	C 617		CEA4R7M16LS
	C 618		CKSQYB682K50
	C 621		CEA4R7M16NPLL
	C 623		CKSQYB272K50
	C 624		CCSQCH391J50
	C 651 670		CKSYF224Z25
	C 652	470μF/16V	CCH-114
	C 654 658		CCSQCH221J50
	C 656		CEA100M16LS
	C 661 663		CEA010M50NPLL
	C 665 678		CKSYB473K25
	C 671 672		CSZSR68M20
	C 674 705		CASA100M6R3
	C 675 676		CEA2R2M35LS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 677 679		CCSQSL681J50
	C 680		CCSQSL681J50
	C 681		CKSYB393K25
	C 701 710 712 726		CASA6R8M6R3
	C 702		CASA220M6R3
	C 706 707		CCSQCH470J50
	C 717 718		CEA470M6R3LS
	C 719		CEA101M6R3LS
	C 722 723		CEA330M6R3LS
	C 728 729 751 754 758 759		CKSQYB103K50
	C 752		CCSQCH300J50
	C 753		CCSQCH300J50
	C 755		CEA221M6R3LL
	C 757		CASA6R8M10

Unit Number :
Unit Name : Power Supply Unit (Serial No.00501～)

Mark	Circuit Symbol & No.	Part Name	Part No.
##	IC 951	Regulator	L780S05-LR
##	Q 951	Chip Transistor	UN2211
#	D 951 952		ERA15-02VH
	L 951	Choke Coil	CTF-002
	R 951		RS1/10S103J
	C 951 954		CEA471M16L2
	C 952		CCG-105
	C 953 955		CKSQYF473Z50
	C 956		CEAUH221M10
	C 957		CKSYF334Z25
	C 958		CKSYF104Z25

Unit Number :
Unit Name : Power Supply Unit (Serial No.00001～00500)

Mark	Circuit Symbol & No.	Part Name	Part No.
##	IC 951	D/D Converter	KHA1001B
##	Q 951	Chip Transistor	UN2211
#	D 951 952		ERA15-02VH
	L 951	Choke Coil	CTF-002
	R 951		RS1/10S103J
	C 951 954		CEA471M16L2
	C 952		CCG-105
	C 953 955		CKSQYF473Z50
	C 956		CEAUH221M10

Unit Number :
Unit Name : Display Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
##	IC 901		LC7582P
##	Q 901 902	Chip Transistor	UN2211
##	Q 903	Chip Transistor	UN2111
##	Q 904	Chip Transistor	2SD1760F5
#	D 901	LED	LN81RC5V
#	D 902	Chip Diode	MA3091
#	D 903 904 905 906 907 908 909		AY5724K
#	D 910	LED(PLAY)	LN41C
	X 901	Buzzer	CPV1005
##	S 901 902 903 905 906	Switch	CSG1021

Mark	Circuit Symbol & No.	Part Name	Part No.
##	S 804	Switch(PLAY)	CSG1018
##	IL 901	Lamp	CEL1089
		LCD	CWW1119

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 902		RS1/10S104J
	R 903 904 905 906		RS1/10S102J
	R 909		RS1/10S681J
	R 910		RS1/10S222J
	R 911		RS1/10S821J
	R 912 919 922		RS1/10S201J
	R 913 914 915 916 917 918		RS1/10S151J
	R 921		RS1/10S103J

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 901		CCSCH301J50
	C 902 903		CKSYB103K50

Unit Number :
Unit Name : Carriage P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
##	M 831	Motor Unit(Spindle)	CXM1033
##	M 832	Motor Unit(Carriage)	CXA2133
##	S 831	Switch(Home)	CSN-094

Unit Number :
Unit Name : Mechanism P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
##	Q 831	Photo-transistor	PH102-F
#	D 831	LED(DISC Detect)	SLH-34VC3F
##	M 833	Motor Unit(Loading)	CXA2129
##	S 832	Switch(DISC Set)	CSN1009

Miscellaneous Parts List

Mark	Circuit Symbol & No.	Part Name	Part No.
		PU Unit	CGY1007 (CGY1008)

13. PACKING METHOD

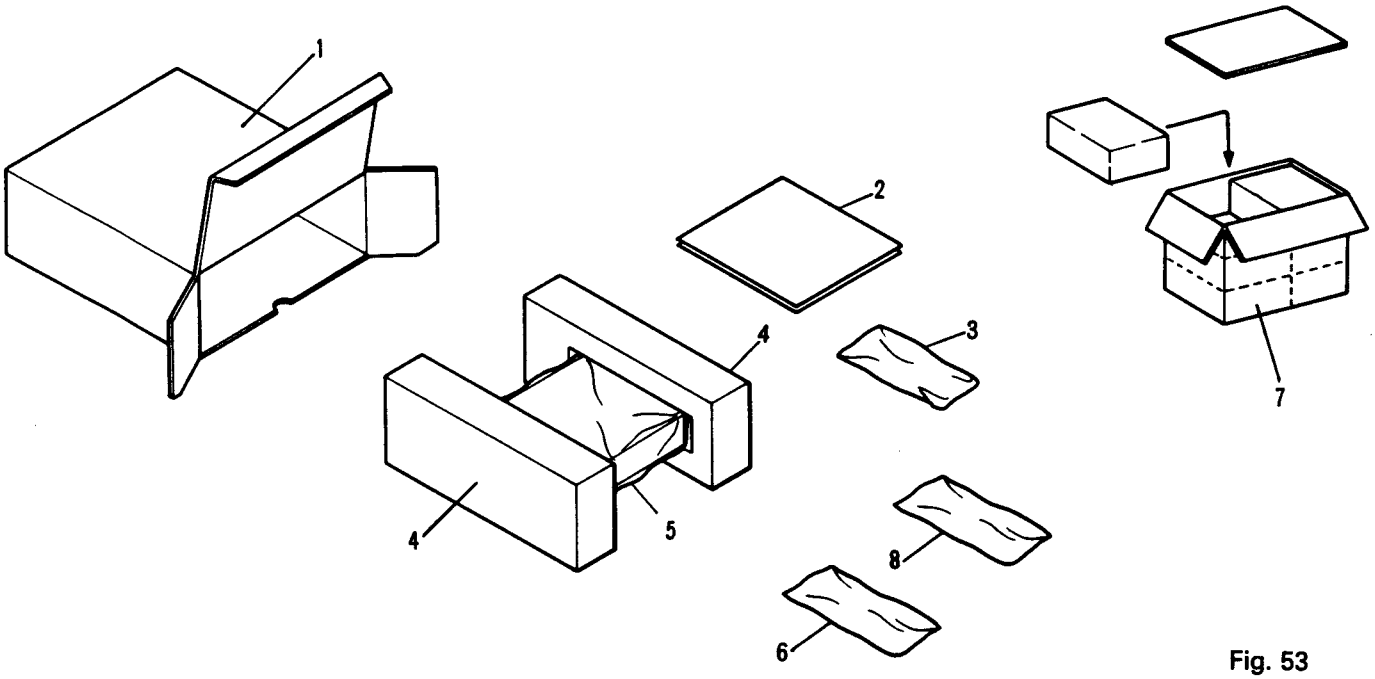


Fig. 53

● Parts List

Mark	No.	Part No.	Description
	1	CHG1534	Carton (UC)
		CHG1533	Carton (EW)
	2	CRD1238	Owner's Manual (UC)
		CRD1237	Owner's Manual (EW)
		CRD1255	Installation Manual (EW)
			Caution Card
			Card
	3	CEA1401	Accessory Assy (UC)
		CEA1421	Accessory Assy (EW)
	3 1	CBH-865	Spring
	3 2	CNC1631	Handle
	3-3	CNP-111	Strap
	3-4		Spacer Unit
	3-5	CNV1917	Bush
	3-6		Screw Assy
	3-6-1	BMZ30P050FMC	Screw (×2) (UC)
	3-6-2	BMZ40P080FMC	Screw (×4) (UC)
	3-6-3	BMZ50P080FMC	Screw (×4) (UC)
	3-6-4	IMF40P080FUC	Screw (×1) (UC)
	3-6-5	CBA-102	Screw (×1)
	3-6-6	CBA1002	Screw (×1)
	3-6-7	NF50FMC	Nut (×2)
	3-7		Screw Assy (EW)
	3-7-1	CBA-102	Screw (×4) (EW)
	3-7-2	HMF40P080FUC	Screw (×1) (EW)
	3-7-3	HMF40P080FZK	Screw (×4) (EW)
	3-7-4	NF50FMC	Nut (×4) (EW)
	4	CHP1186	Styrofoam
	5	CEG-162	Polyethylene Bag
	6	CNS1403	Panel
	7	CHL1534	Contain Box (UC)
	8	CNB1159	Mounting Bracket (EW)

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Service Manual

SERVICE GUIDE
ORDER NO.
CRT 1161

CD MECHANISM UNIT

CX-173

- This service manual is a description of the CD mechanism found in the model numbers listed in the table below.
- When performing repairs use this manual together with the specific manual for the model under repair.

Model	Service Manual
DEH-66/UC	CRT1166
DEH-66SDK/WG	
DEH-66/EW	
DEH-66/EI	

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

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1. DISASSEMBLY

- **Disassembly of the Carriage Unit**

Note: There may be times when the names of parts used in this manual are not the same as those used in the lists accompanying the Exploded View. If a different name is used here, the part name given in the Exploded View is also provided in parentheses ( ).

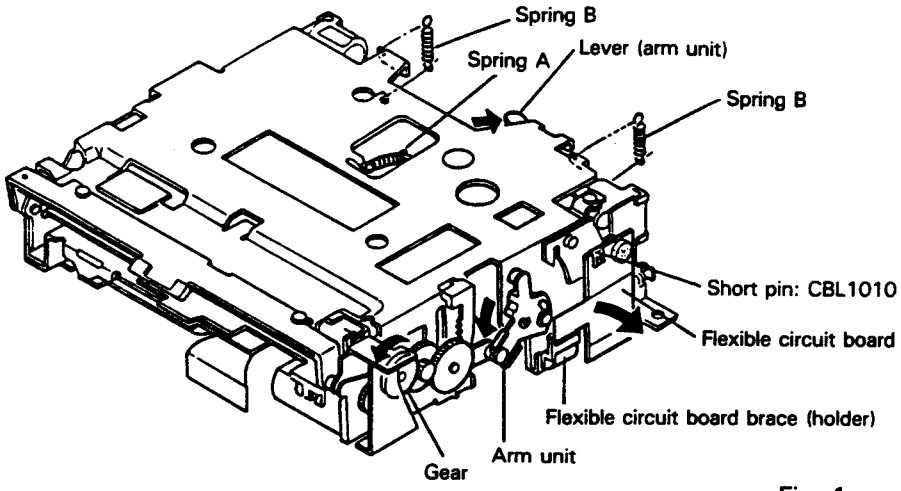


Fig. 1

1. Put the mechanism unit into a loading complete state. (Move the lever back and rotate the gear while pressing down lightly on the arm unit. Rotate the gear until the three carriage unit shafts are free and the unit is supported by the four damper units.
2. Remove Spring A and two Springs B.
3. Remove the flexible circuit board from the flexible circuit board brace.

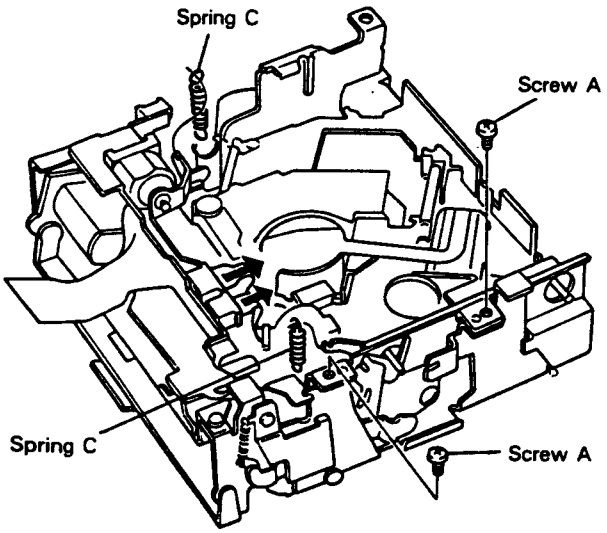


Fig. 2

4. Turn the mechanism unit upside down.
5. Remove the two Springs C.
6. Remove the two flexible circuit boards from their connectors.
7. Remove the two Screws A.

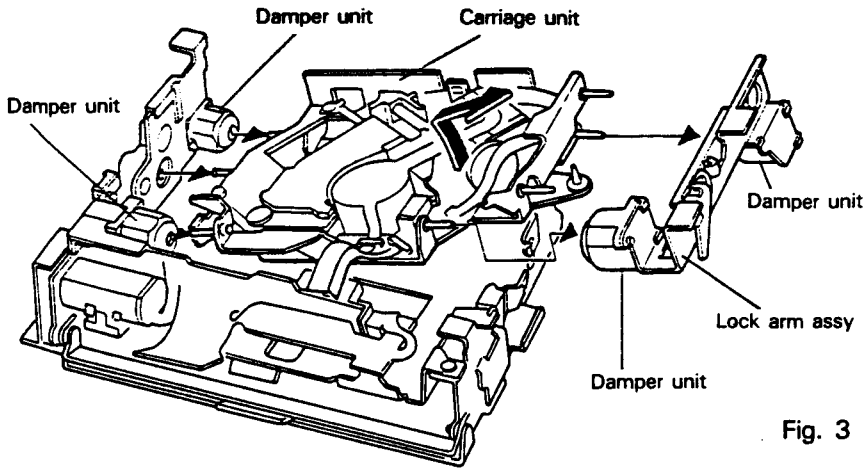


Fig. 3

8. Lift the lock arm assembly and then pull out the carriage unit.
9. Remove the carriage unit from the lock arm assembly.
   Note: The damper units are lined with a thin rubber film. Be careful not to damage this when disassembling.

● Disassembly of the Carriage Motor Unit

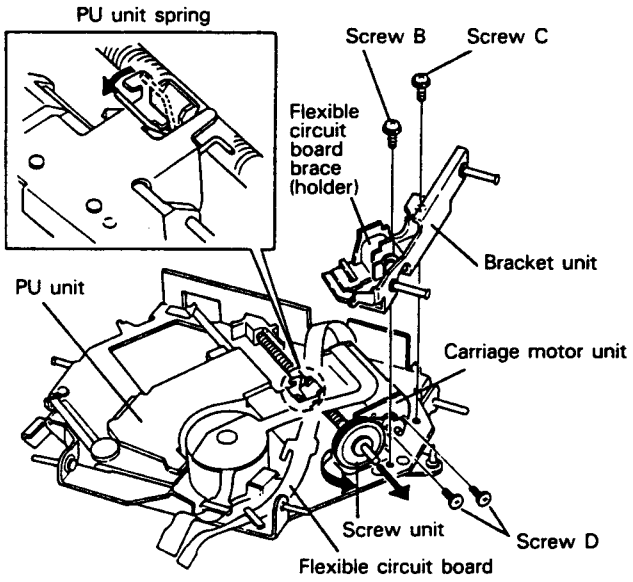


Fig. 4

1. After removing the Screw B and Screw C, remove the bracket unit. At this time remove the flexible circuit board from the flexible circuit board brace.
2. Remove the belt.
3. Cock the PU unit spring as shown in Fig. 4 and then move the PU unit to its outermost position.
   (Cocking the spring disengages the screw unit so that the PU unit can be moved by hand from above.)
4. Pull the screw unit out of the assembly.
5. Remove the two Screws D and then the carriage motor unit.
   Note: When reinstalling the carriage motor unit, tighten Screw D and seal it.

● Disassembly of the PU Unit

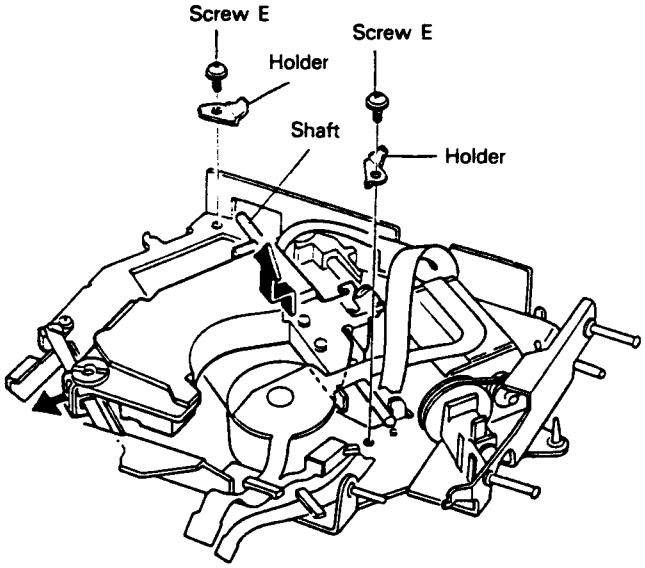


Fig. 5

1. Cock the PU unit spring as shown in Fig. 4. Move the PU unit to the center of the shaft for easy removal.
2. Remove the two Screws E and then the holders.
3. Remove the PU unit, lifting it from the shaft side where the holders have been removed and being careful not to catch the shaft on the opposite side.
4. Pull the shaft out of the PU unit.

● Disassembly of the Spindle Motor Unit

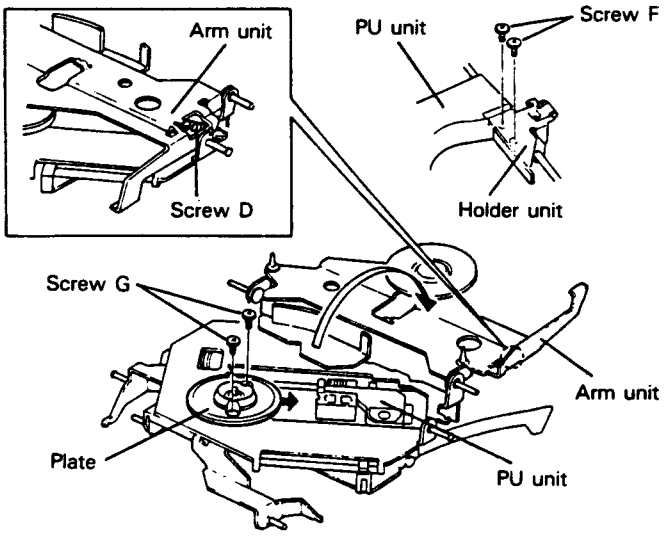


Fig. 6

1. Remove the two Screws F and then remove the holder unit from the PU unit.
2. Cock the PU unit spring as shown in Fig. 4 and move the PU unit to its outermost position.
3. Turn the whole carriage unit right side up.
4. Remove Screw D and turn the arm unit upside down.
5. Turn the spindle motor plate so that the holes on the plate are at the position of the screws underneath.
6. Remove the two Screws G.
   Note: When reinstalling the spindle motor unit, tighten the Screws G and seal them.
7. Slide the spindle motor unit onto its side and remove it.

● Disassembly of the Loading Motor Unit

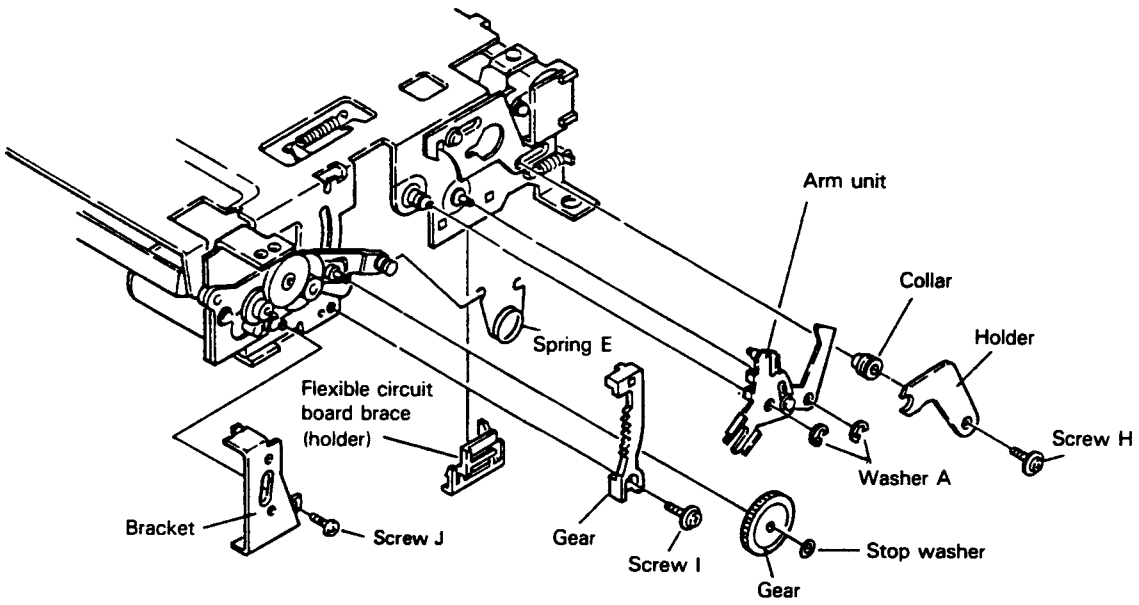


Fig. 7

1. Remove the carriage unit.
   (Refer to the previous section entitled, "Disassembly of the Carriage Unit.")
2. Remove the flexible circuit board brace.
3. Remove Screw H and then the holder.
   Note: When Screw H is removed, the collar will also come free. Be sure not to lose it.
4. Remove the Screw E.
5. Remove the two Washers A and then the arm unit.
6. Remove the stop washer and then the gear.
7. Remove Screw I and then the gear.
8. Remove Screw J and then the bracket.

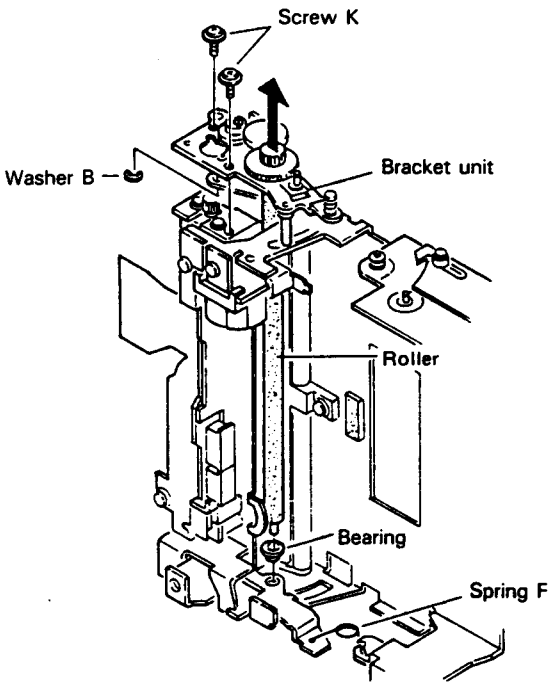
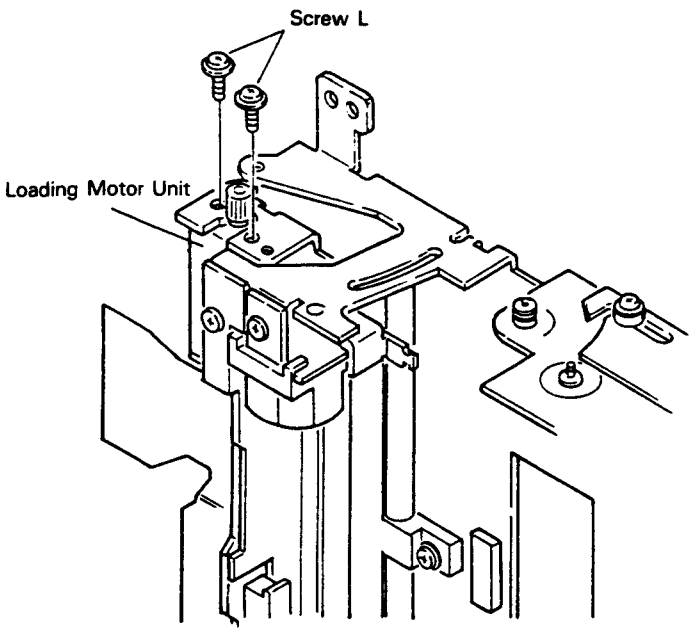


Fig. 8

9. Remove Spring F.
10. Remove washer B.
11. Remove the two Screws K and then pull out the bracket unit.
    Note: The bearing at the tip of the roller will also come loose. Be careful not to lose it.



12. Remove the two Screws L and then the loading motor unit.

Fig. 9

2. MECHANISM DESCRIPTION

- **Loading Operation**

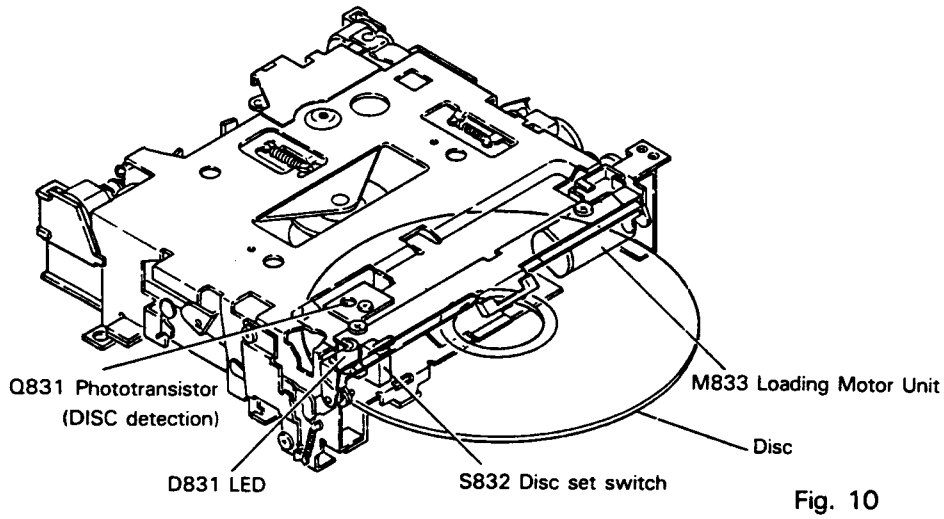


Fig. 10

1. When a disc is inserted into the unit, it enters between the LED and the phototransistor with the result that the light from the LED to the phototransistor is blocked.
2. When the phototransistor detects a disc presence in the unit, the loading motor begins to rotate and loading begins.
3. When the loading motor rotates, the roller is turned and the disc is moved into the unit. (Fig. 11)

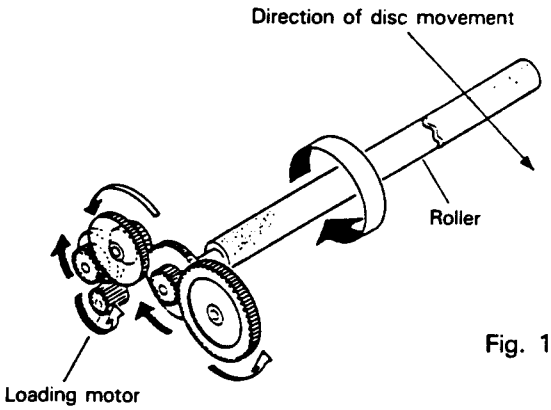


Fig. 11

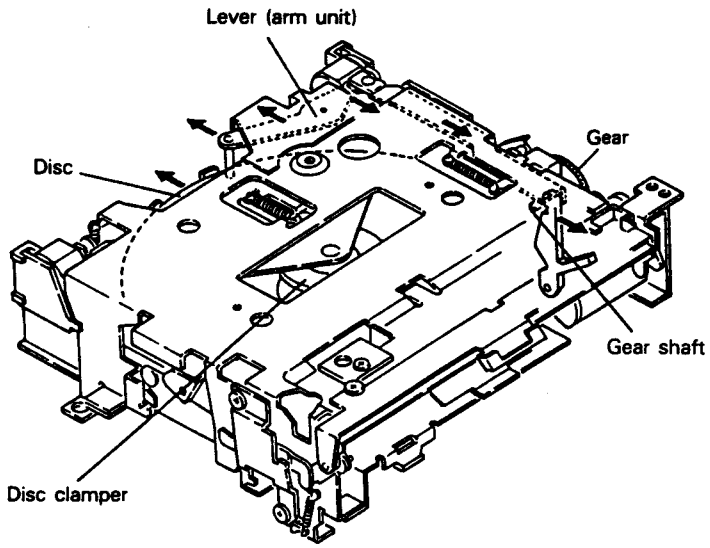


Fig. 12

4. When the disc pushes on the lever, the gear shaft lock is released. The gear meshes with another internal toothed gear and is lowered. (See Figs. 12, 13)
5. The action of the gear shaft moving down lowers the disc clamp and the disc is held in place.
6. As the gear is lowered when it meshes with the internal toothed gear, the gear unit also is lowered and the disc set switch pressed.
7. At the same time, the disc door is lowered and the disc insert door is blocked to prevent the introduction of another disc.
   The three shafts of the carriage unit are in a free mode and the carriage unit is in an anti-vibration mode supported by the four damper units. (Fig. 14)
   When the disc set switch is turned on, loading motor rotation stops and the loading operation is complete.

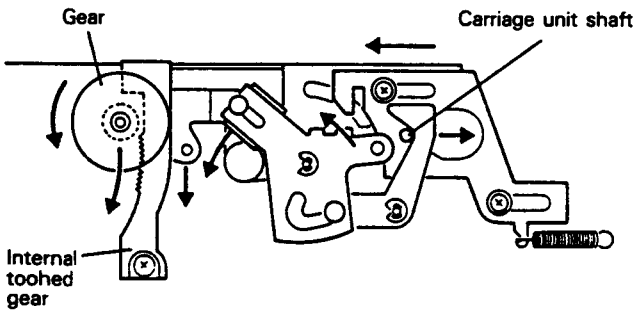


Fig. 13

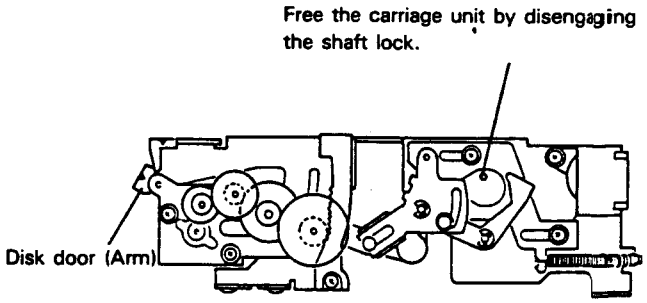
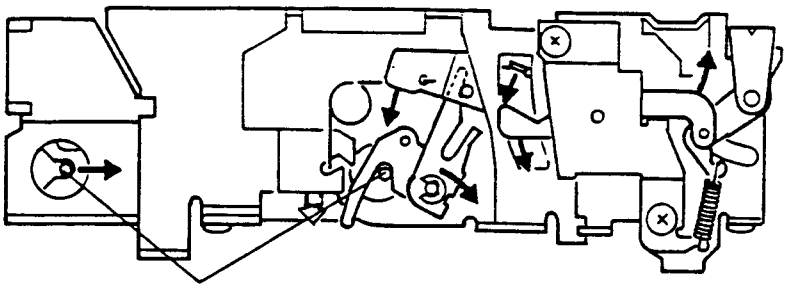


Fig. 14

(view of reverse side)



Free the carriage unit by disengaging the shaft lock.

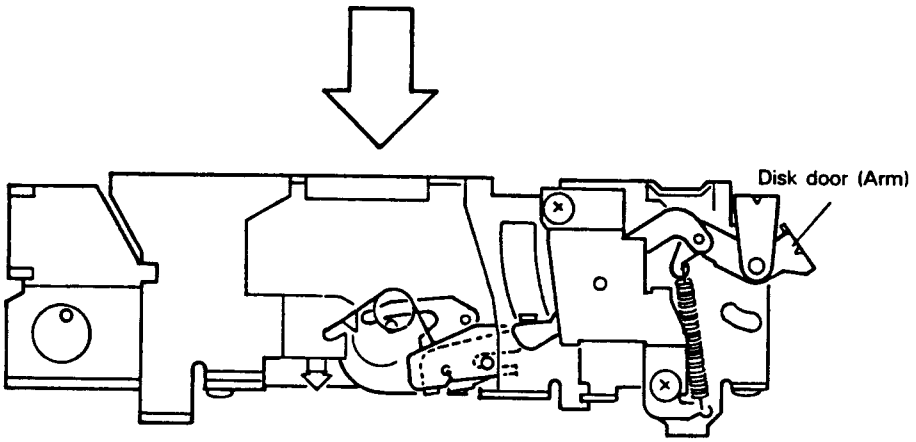


Fig. 15