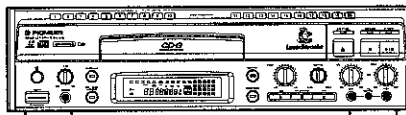


# Service Manual



ORDER NO.  
RRV1005

CD CDV LD PLAYER

# CLD-V121G

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Type	Model	Power Requirement	Remarks
KU/CA	CLD-V121G	AC 120 V	

- For the circuit and mechanism descriptions, refer to the service manual ARP2528 for CLD-S201.

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# CHAPTER 1

## 1.1 SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.



**WARNING**

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.



**NOTICE**

(FOR CANADIAN MODEL ONLY)

Fuse symbols  (fast operating fuse) and/or  (slow operating fuse) on PCB indicate that replacement parts must be of identical designation.

**REMARQUE**

(POUR MODÈLE CANADIEN SEULEMENT)

Les symboles de fusible  (fusible de type rapide) et/ou  (fusible de type lent) sur CCI indiquent que les pièces de remplacement doivent avoir la même désignation.

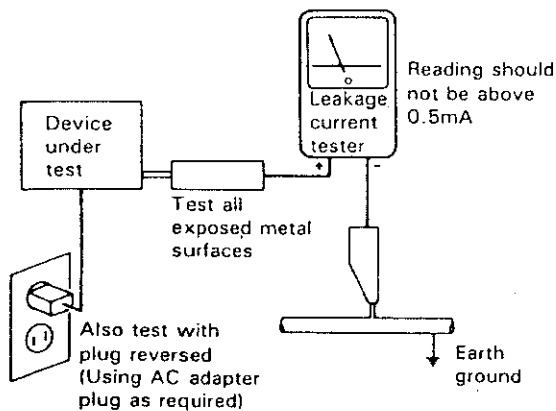
(FOR USA MODEL ONLY)

### 1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

#### LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

### 2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

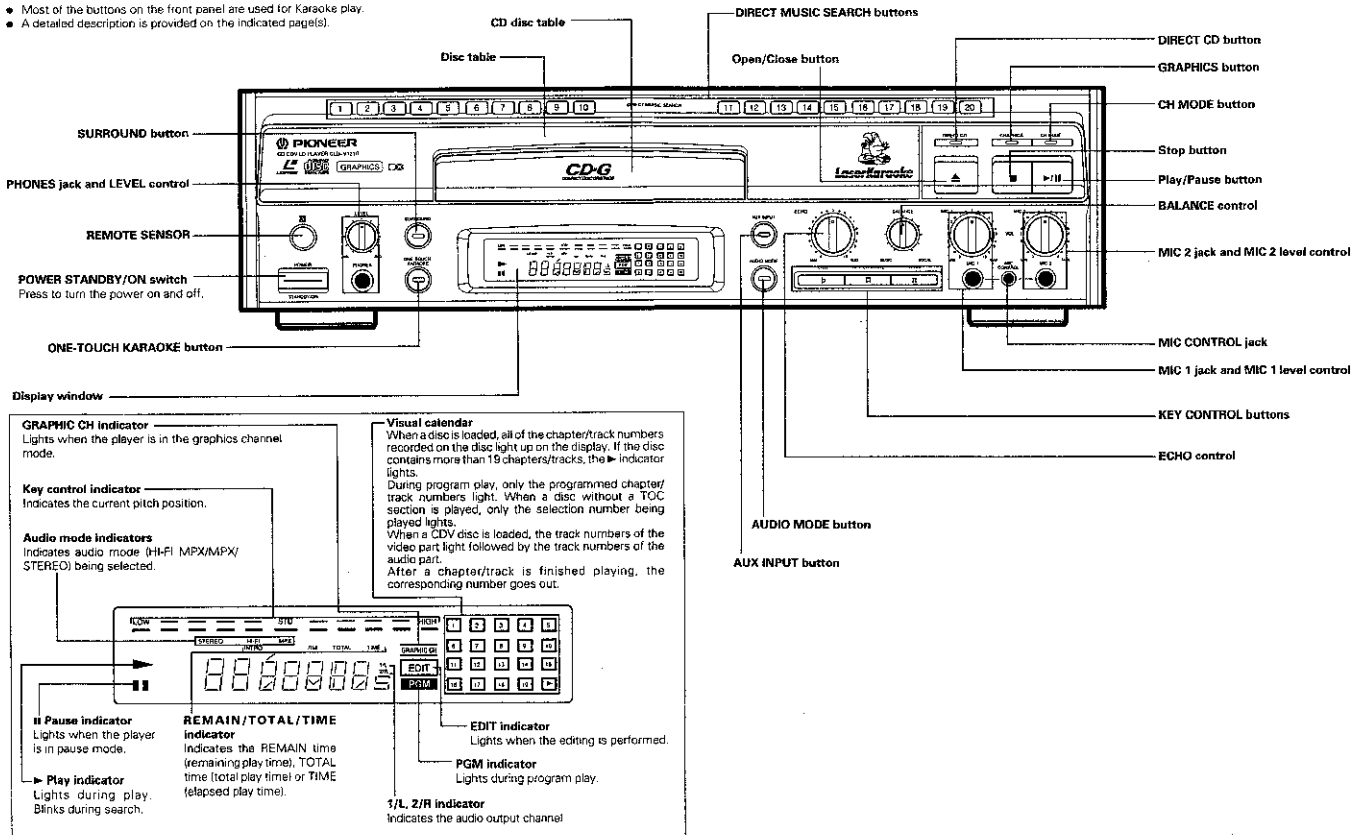
Electrical components having such features are identified by marking with a  $\Delta$  on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

# 1.2 PANEL FACILITIES

- Most of the buttons on the front panel are used for Karaoke play.
- A detailed description is provided on the indicated pages.



# 1.3 SPECIFICATIONS

- General**
  - System ..... LaserVision Disc system and Compact Disc digital audio system
  - Laser ..... Semiconductor laser wavelength 780 nm
  - Power requirements ..... AC 120 V, 60 Hz
  - Power consumption ..... 42 W
  - Weight ..... 7.6 kg (16 lbs 12 oz)
  - Dimensions ..... 420 (W) x 392 (D) x 122 (H) mm
  - Operating temperature ..... 15-30/16 (W) x 15-7/16 (D) x 4-13/16 (H) in
  - Operating temperature ..... +5°C ~ +35°C (41°F ~ 95°F)
  - Operating humidity ..... 5% ~ 85% (There should be no condensation of moisture.)
- Disc**
  - LaserVision Discs**
    - Maximum playing times
      - 12-inch standard play disc ..... 1 hour/both sides
      - 12-inch extended play disc ..... 2 hours/both sides
      - 8-inch standard play disc ..... 28 min/both sides
      - 8-inch extended play disc ..... 14 min/one side
      - 8-inch extended play disc ..... 40 min/both sides
      - 20 min/one side
    - Spindle motor speed
      - Standard play disc ..... 1,800 rpm
      - Extended play disc ..... 1,800 rpm (inner circumference) to 600 rpm (outer circumference) (For a 12-inch disc)
  - Compact Discs**
    - Disc ..... Diameter: 5-inch, 3-inch, Thickness: 1.2 mm
    - Rotation direction (pickup side) ..... Counterclockwise
    - Linear speed ..... 1.2 ~ 1.4m/sec
    - Maximum playing time ..... 74 min, 5-inch discs
    - 20 min, 3-inch discs (For stereo playback)
  - Compact Discs with Video**
    - Disc ..... Diameter: 5-inch, Thickness: 1.2 mm
    - Rotation direction (pickup side) ..... Counterclockwise
    - Linear speed ..... 1.2 ~ 1.4m/sec
    - Video portion: 11 ~ 12m/sec
    - Maximum playing time ..... Video portion: 5 min. (CLV)
    - Audio portion: 20 min. (Digital)
- Video characteristics (two pairs)**
  - Format ..... NTSC specifications
  - Video output
    - Level ..... 1 Vpp nominal, sync. negative, terminated
    - Impedance ..... 75Ω unbalanced
    - Jack ..... RCA jack
- Audio characteristics (two pairs)**
  - Output level
    - During analog audio output ..... 200 mVrms (1 kHz, 40%)
    - During digital audio output ..... 200 mVrms (1 kHz, -20 dB)
  - Jacks ..... Both RCA jacks
  - Number of channels ..... 2
- Other Terminals**
  - Microphone input ..... 2
  - MIC control input ..... miniature jack
  - Headphones output ..... 1
  - Control input/output ..... Both miniature jacks
  - VHF adapter output (Video/Audio) ..... Both RCA jacks
  - AUX input ..... RCA jacks
- Accessories**
  - Remote control unit ..... 1
  - Size "AAA" (IEC R03) dry cell batteries ..... 2
  - Video cord ..... 1
  - Audio cord ..... 1
  - Operating instructions ..... 1
- Functions**
  - Functions of the player
    - Direct CD
    - On-screen display, Visual Calendar Display
    - Compu Program/Auto Program Edit
    - Last Memory
    - Key Control, Surround, One-Touch Karaoke, Digital Echo
    - Applying to LaserVision Discs with Digital Audio
    - Applying to Sub-Code Graphics
    - Applying to CD Graphics

\* Actual playback time differs for each disc.

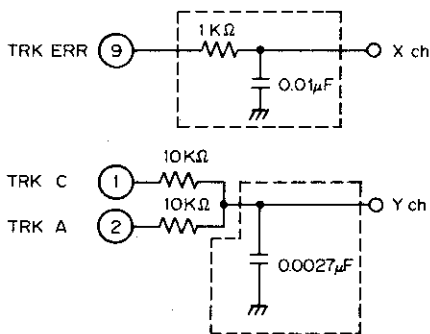
# 1.4 ADJUSTMENT

## 1.4.1 PRELIMINARIES

### ● JIGS FOR ADJUSTMENT

- CD test disc (STD-901 or STD-902)
- LD test disc (GGV1003)
- (-) Screwdriver (medium)
- (-) Screwdriver (small)
- Hexagonal wrench driver (straight type, size: 3 mm)
- Resistors (10 kΩ × 2, 47 kΩ)
- Dual-trace oscilloscope (with delay)
- AF oscillator
- Frequency counter
- Digital voltmeter
- TV monitor
- Low-pass filter

Use the low-pass filters below in the coarse centering adjustment 3. and fine centering adjustment 7. when the S/N of the waveform is hard to observe.



### ● ADJUSTMENT LOCATIONS

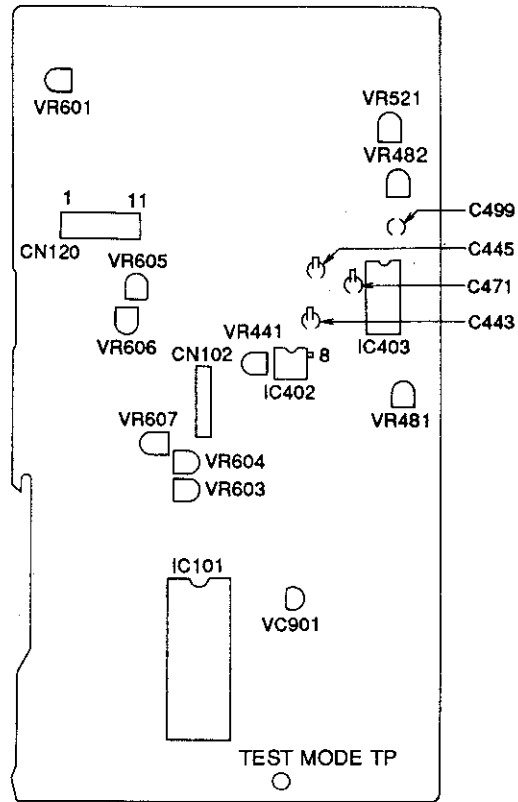


Fig. 2 MAIN assembly section

### ● RACK ASSEMBLY DURING CENTERING ADJUSTMENT

The S-IN position (without hitting the mechanism stopper) of the rack assembly during centering adjustment is indicated below.

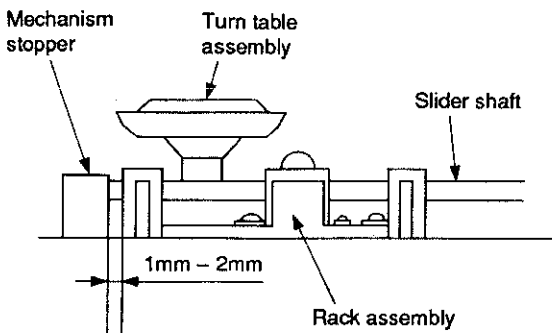
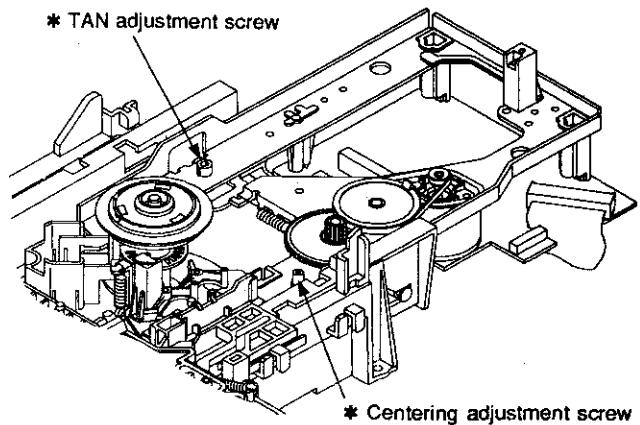


Fig. 1 Right side view



\* : As the adjustment range of both the TAN and centering adjustment screws is only ±90° from the center, do not turn the screws beyond this range.

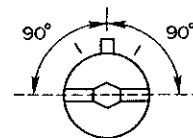


Fig. 3 TILT base section

● TEST MODE

1) Activating the Test Mode

1. While power is ON, connect the Test mode TP (Fig.2) to the GND for about one second.
2. After checking whether the FL display device is fully lit, disconnect the Test mode jumper wire from GND.

2) Canceling the Test Mode

1. Turn the power OFF.

● Key operation in the Test mode

Player Status	Key Operation	Function	Remarks
Tray Open	⏮ / ⏭ SKIP (Refer to Note 1)	⏮ : Shifts the tray in the closed direction and also raises the turn table while pressing the key. ⏭ : Shifts the tray in the open direction and also lowers the turn table while pressing the key.	
Tray Open	▶ PLAY	Clamps	
Clamp	▶ PLAY	Turns the disc through TRK Servo OFF	TRK- OFF
TRK Servo OFF	▶ PLAY	TRK Servo ON	TRK- ON
TILT Neutral	+ MULTI-SPEED	TRK Servo ON	T-□ : ON
TILT ON	- MULTI-SPEED	TILT Neutral	T-□ : N
TILT Neutral or ON	⏮ / ⏭ SKIP	Setting TILT Servo to OFF, can force TILT to move.	T-1 to T-E
Clamp	⏮ / ⏭ SCAN	Can force the slider to move	S - LD S - CDV S - CD S - IN
Play	⏸ PAUSE	Still	
Play	■ STOP	Stop	
Stop	▲ OPEN	Open	
Play	<div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">+10</div>  ↓  <div style="display: flex; justify-content: space-around; width: 100px;"> <span style="border: 1px solid black; padding: 2px;">0</span> to <span style="border: 1px solid black; padding: 2px;">9</span> </div>  ↓  <div style="border: 1px solid black; padding: 2px; display: inline-block;">▶ PLAY</div> </div>	<p>Sets to SEARCH Lead Address Input mode.</p> <p>Designates the SEARCH lead address through keys 0 to 9.</p> <p>Press the CLEAR <span style="border: 1px solid black; padding: 0 2px;">C</span> key if the designated address is incorrect.</p> <p>Searches the designated address upon pressing the PLAY key.</p>	

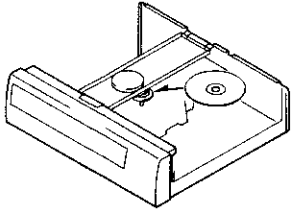
Note 1 : Press SKIP ( ⏮ / ⏭ ) Keys after the tray is set to open state by pressing Open ( ▲ ) key. Because, in tray open state, pressing PLAY ( ▶ ) key causes it to set to TILT control state and SKIP ( ⏮ / ⏭ ) keys can not function properly.

## ● PLAYER OPERATION IN THE TEST MODE

Operate the player by selecting a test mode function with the keys on the player or on the remote control unit.

### • CD PLAYBACK

- ① Place the CD disc on the turn table.



- ② Press the PLAY (▶) key once. (Twin gear starts to move.)
- ③ Push the cam plate (Fig. 4) in the direction of the arrow and wait until the CD disc is clamped.

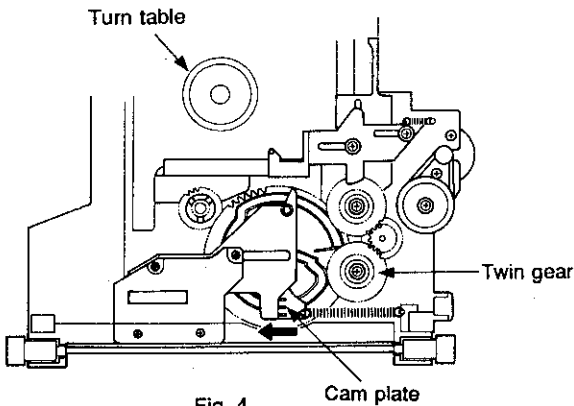
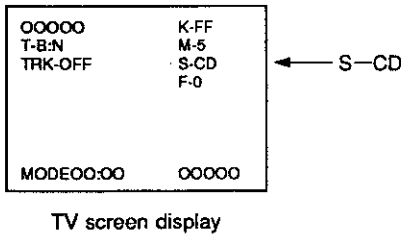


Fig. 4

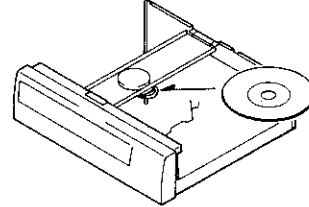
- ④ Press the ◀◀ or ▶▶ keys to appear "S-CD" on the TV screen display.



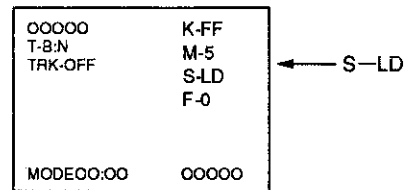
- ⑤ Press the PLAY (▶) key twice, disc will be normally playbacked.

### • LD PLAYBACK

- ① Place the LD disc on the turn table.



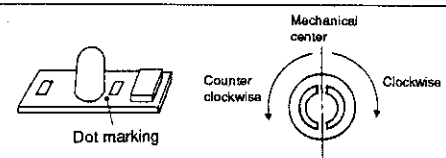
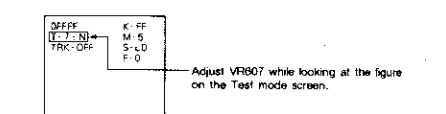
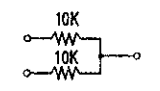
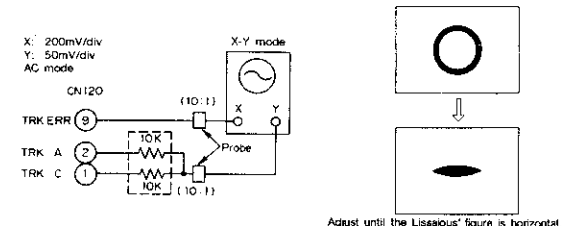
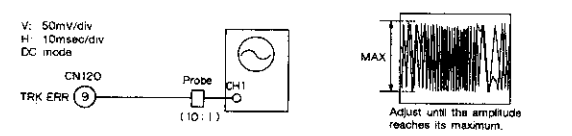
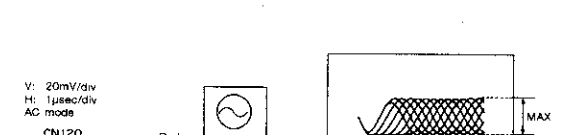
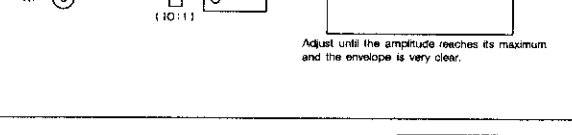
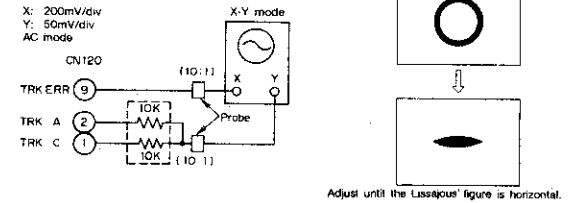
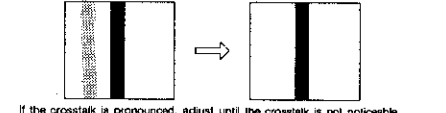
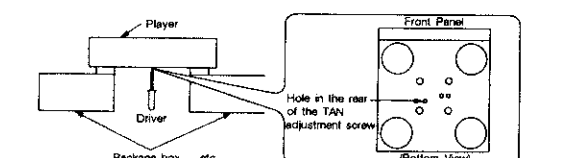
- ② Press the PLAY (▶) key once. (Twin gear starts to move.)
- ③ Press the SKIP REV (⏮) key to raise the turn table (spindle motor section) while pressing the cam plate (Fig. 4) in the direction of the arrow. Raise it to the position where the LD disc can be easily placed on the turn table. If the turn table is raised too high, lower it with the SKIP FWD (⏭) key.
- ④ Place the LD disc on the turn table and press the PLAY (▶) key once to clamp the disc.
- ⑤ Press the ◀◀ or ▶▶ keys to appear "S-LD" on the TV screen display.



TV screen display

- ⑥ Press the PLAY (▶) key twice, disc will be normally playbacked.

1.4.2 MECHANISM AND MAIN ASSY ADJUSTMENT  
ADJUSTMENT TABLE

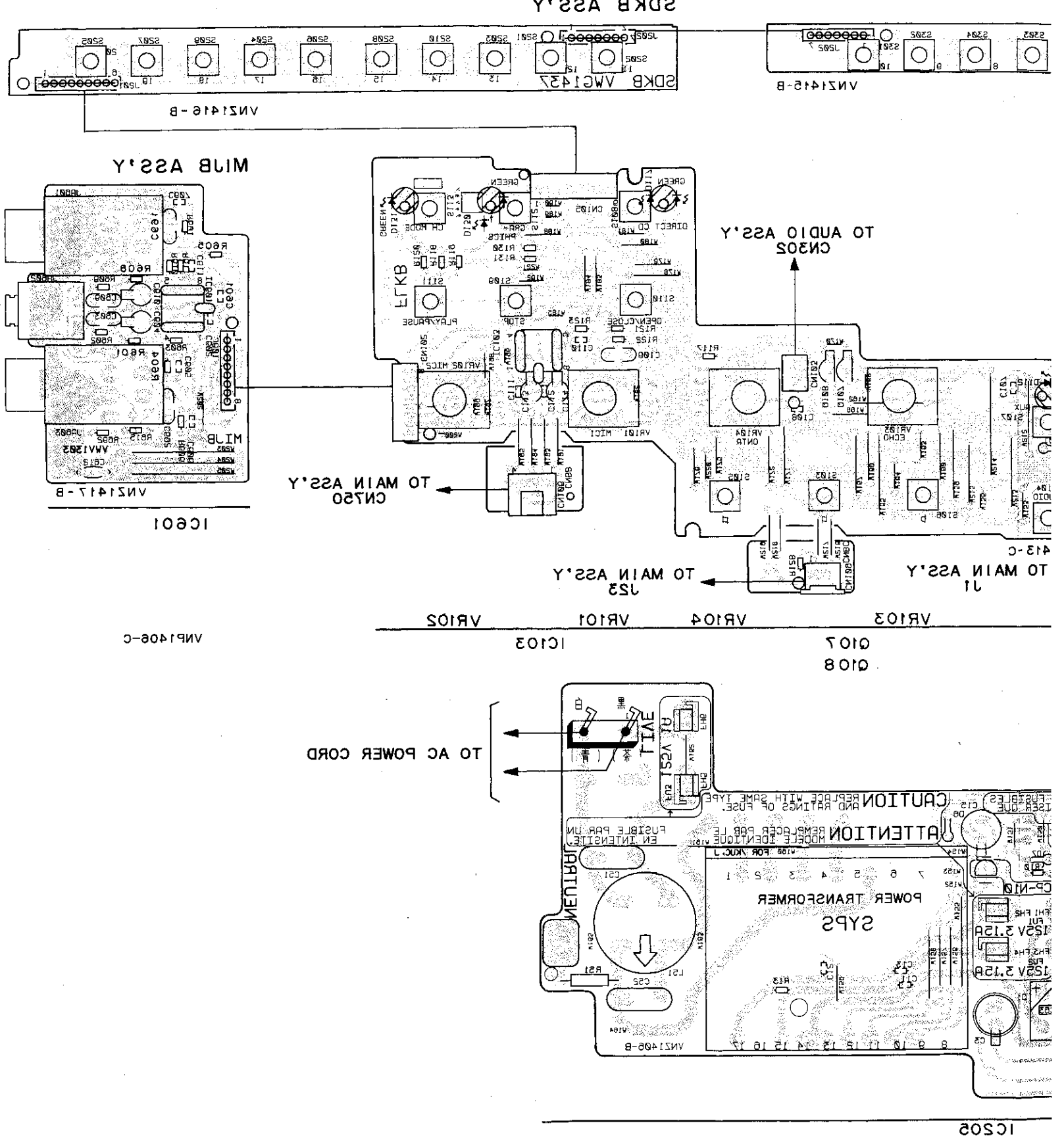
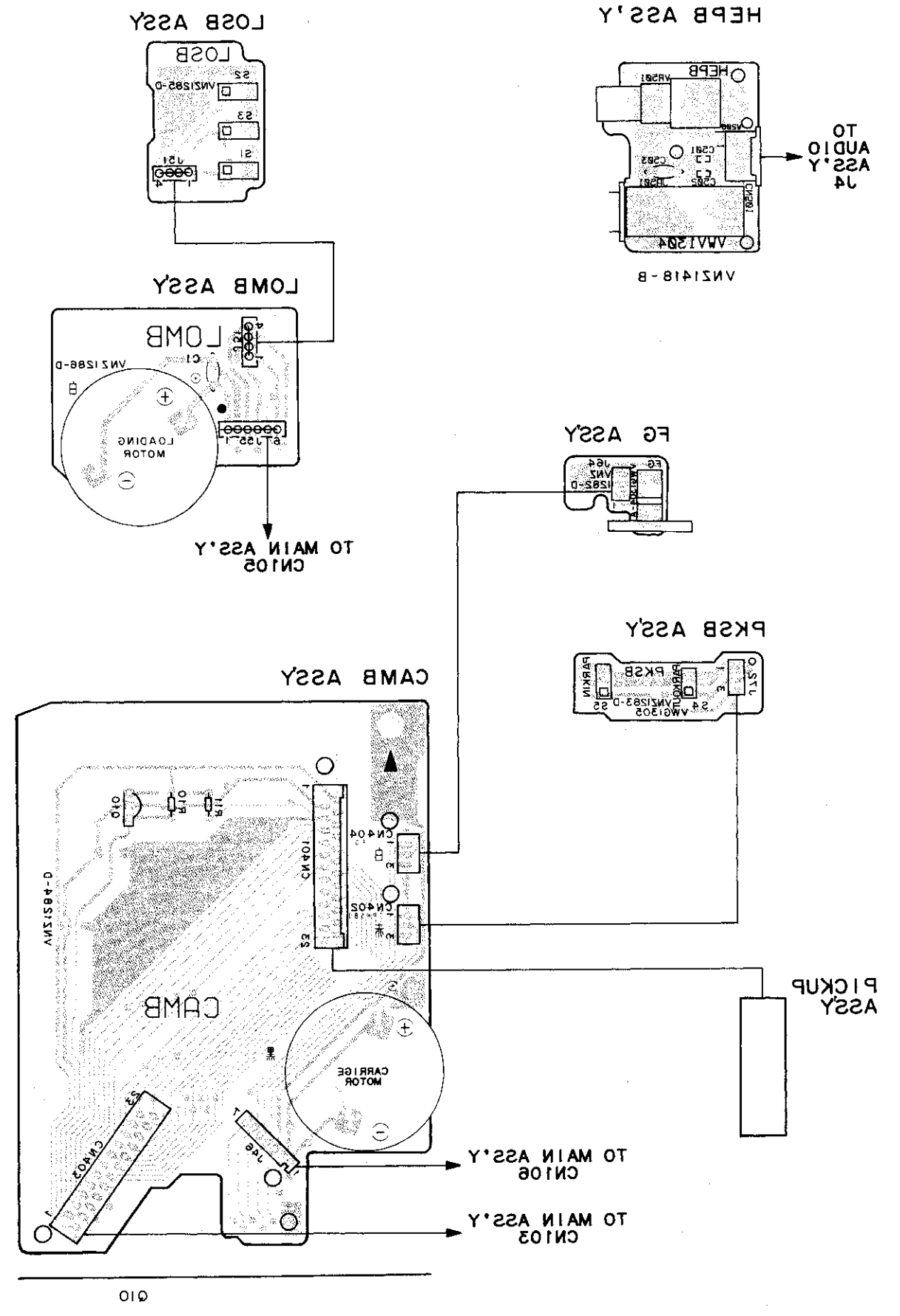
Adjustment name	Adjustment point	Measuring equipment and jigs	Measurement point	Player condition	Adjustment procedure	Waveform and connection diagram						
1 Tilt gain adjustment	MAIN ASSY VR608	—	Dot marking	• Power OFF	Check the dot marking on the side of tilt sensor and adjust the VR608 shown below. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Red</td> <td>White</td> <td>Blue</td> </tr> <tr> <td>Fully clockwise</td> <td>mechanical center</td> <td>Fully counter clockwise</td> </tr> </table>	Red	White	Blue	Fully clockwise	mechanical center	Fully counter clockwise	
Red	White	Blue										
Fully clockwise	mechanical center	Fully counter clockwise										
2 Tilt offset check and adjustment	MAIN ASSY VR607	TV monitor	Tilt indication on Test mode screen	• Power ON • Test mode • Disc not installed	1. Check if the tilt indication on the Test mode screen is at T-6 to T-8. 2. If the tilt indication is not at T-6 to T-8, adjust VR607 until the tilt indication reaches T-6 to T-8.							
3 Coarse centering adjustment	Tilt base Centering adjustment screw	• Oscilloscope • STD-901 or STD-902 • MIX resistor 	CN120 X: ① Pin (TRK ERR) Y: ② Pin (TRK SUM)	• Test mode TRK Servo OFF Tilt servo ON • Innermost track of STD-901 or STD-902 which does not come in contact with the mechanical stopper.	1. Move the slider until it does not come in contact with the mechanical stopper at the slider position indication S-IN. 2. Observe TRK ERR (Xch) and TRK SUM (Ych) at the X-Y mode during TRK Servo OFF. 3. Turn the centering adjustment screw until the Lissajous' figure is horizontal.							
4 FCS balance adjustment (1) TRK ERR MAX	MAIN ASSY VR605	• Oscilloscope • STD-901 or STD-902	CN120 ③ Pin (TRK ERR)	• Test mode TRK Servo OFF Tilt servo ON • Inner track of STD-901 or STD-902	1. Observe TRK ERR at CH1 of the oscilloscope during TRK Servo OFF. 2. Adjust VR605 until the amplitude of the waveform reaches its maximum.							
5 FCS balance adjustment (2) RF MAX	MAIN ASSY VR606	• Oscilloscope • STD-901 or STD-902	CN120 ③ Pin (RF)	• Test mode TRK Servo ON Tilt servo ON • Inner track of STD-901 or STD-902	1. Close the TRK Servo loop and observe RF at CH1 of the oscilloscope. 2. Adjust VR606 until the amplitude of the waveform reaches its maximum and the envelope is very clear.							
6 Tangential direction angle adjustment	Tilt base TAN adjustment screw	• Oscilloscope • STD-901 or STD-902	CN120 ③ Pin (RF)	• Test mode TRK Servo ON Tilt servo ON • Inner track of STD-901 or STD-902	1. Observe RF at CH1 of the oscilloscope during TRK Servo ON. 2. Adjust the TAN adjustment screw until the amplitude of the waveform reaches its maximum and the envelope is very clear.							
7 Fine centering adjustment	Tilt base Centering adjustment screw	• Oscilloscope • STD-901 or STD-902	CN120 X: ① Pin (TRK ERR) Y: ② Pin (TRK SUM)	• Test mode TRK Servo OFF Tilt servo ON • Innermost track of STD-901 or STD-902 which does not come in contact with the mechanical stopper.	Perform fine centering adjustment by following the same procedure as in "Coarse centering adjustment"(2).							
8 Crosstalk check and Tilt offset adjustment	MAIN ASSY VR607	• TV monitor • GGV1003	Crosstalk check screen	• Test mode TRK Servo ON Tilt servo ON • GGV1003 #115STILL	1. Search for address 115 of GGV1003 and still the address. 2. Check the crosstalk. If the crosstalk is pronounced, adjust VR607 until the crosstalk is not noticeable.							
When the crosstalk is still noticeable in spite of the adjustment in (7), use a hexagonal wrench driver (straight type, size : 3 mm) to adjust the TAN adjustment screw on the bottom side of the player through the GGV1003 #115 STILL screen. Afterwards, perform the adjustment procedures from (6).												

Adjustment name	Adjustment point	Measuring equipment and jigs	Measurement point	Player condition	Adjustment procedure	Waveform and connection diagram
9 FCS Servo loop gain adjustment	MAIN ASSY VR604	<ul style="list-style-type: none"> <li>Oscilloscope</li> <li>GGV1003</li> <li>AF Oscillator</li> <li>Resistor (47 kΩ)</li> </ul>	CN120 X: ⑦ Pin (FCS IN) Y: ⑥ Pin : (FCS ERR)	<ul style="list-style-type: none"> <li>Test mode</li> <li>TRK Servo ON</li> <li>Tilt servo ON</li> <li>GGV1003</li> <li>#15,000STILL</li> </ul>	<ol style="list-style-type: none"> <li>Search for address 15,000 of GGV1003 and still the address.</li> <li>Xch : Connect the resistor (47 kΩ) to the channel and connect to FCS IN. Ych : Connect to FCS ERR.</li> <li>Connect the AF oscillator between Xch (2.7kHz/10Vp-p) and the 47 kΩ resistor, and adjust VR604 until the Lissajous' figure is symmetrical.</li> </ol>	<p>Adjust until the Lissajous' figure is symmetrical.</p>
10 TRK Servo loop gain adjustment	MAIN ASSY VR603	<ul style="list-style-type: none"> <li>Oscilloscope</li> <li>GGV1003</li> <li>AF Oscillator</li> <li>Resistor (47 kΩ)</li> </ul>	CN120 X: ⑩ Pin (TRK IN) Y: ⑨ Pin : (TRK ERR)	<ul style="list-style-type: none"> <li>Test mode</li> <li>Stop mode or TRK Servo ON</li> <li>Tilt servo ON</li> <li>GGV1003</li> <li>#15,000STILL</li> </ul>	<ol style="list-style-type: none"> <li>Xch : Connect the 47 kΩ resistor to channel and connect to TRK IN. Ych : Connect to TRK ERR.</li> <li>Connect the AF oscillator between Xch and the 47 kΩ resistor and note the tilt angle against the horizon with the disc in the stopped state.</li> <li>Search for address 15,000 of GGV1003 and still the address.</li> <li>Set the disc in PLAY mode (TRK servo closed, TILT on) Adjust VR603 so that the tilt angle of the waveform <math>\theta'</math> will be the same as <math>\theta</math>.</li> </ol>	<p>Adjust until the Lissajous' figure is symmetrical.</p>
11 RF level adjustment	MAIN ASSY VR601	<ul style="list-style-type: none"> <li>Oscilloscope</li> <li>GGV1003</li> </ul>	CN120 ③ Pin (RF)	<ul style="list-style-type: none"> <li>Test mode</li> <li>TRK Servo ON</li> <li>Tilt servo ON</li> <li>GGV1003</li> <li>#15,000STILL</li> </ul>	<ol style="list-style-type: none"> <li>Search for address 15,000 of GGV1003 and still the address. Observe RF at CH1 of the oscilloscope.</li> <li>Adjust VR601 until the RF amplitude is 300 mV <math>\pm</math> 50 mVp-p.</li> </ol>	
12 REF—H adjustment	MAIN ASSY VC901	Frequency counter	IC402(PM0001) ⑧ Pin	<ul style="list-style-type: none"> <li>Power ON</li> <li>Stop mode</li> </ul>	Adjust VC901 so that the frequency of IC402—8 becomes 3.579545 MHz $\pm$ 10 Hz.	
13 Video level adjustment	MAIN ASSY VR482	<ul style="list-style-type: none"> <li>TV monitor</li> <li>Oscilloscope</li> <li>GGV1003</li> </ul>	Video output terminal	<ul style="list-style-type: none"> <li>Normal mode</li> <li>GGV1003</li> <li>#19,900STILL</li> </ul>	Connect a 75Ω resistor to the VIDEO output terminal (possibly by connecting to the monitor) and adjust VR482 until the sync chip to 100% white level is 1 Vp-p $\pm$ 5% at the composite TEST signal.	<p>Video level Oscilloscope range V: 20mV/div 10μs/div (Trigger) AC mode</p>
14 IH DLY video level adjustment	MAIN ASSY VR441	<ul style="list-style-type: none"> <li>Oscilloscope</li> <li>GGV1003</li> </ul>	CH1 : C443 lead wire CH2 : C445 lead wire	<ul style="list-style-type: none"> <li>Normal mode</li> <li>GGV1003</li> <li>#19,900STILL</li> </ul>	Adjust until the sync chip to 100% white level at the composite TEST signal is the same as in CH1 and CH2.	<p>Main video signal 1H delay video signal</p>
15 VCO center frequency adjustment	MAIN ASSY VR481	<ul style="list-style-type: none"> <li>Oscilloscope</li> <li>GGV1003</li> </ul>	CH1 : C471 lead wire CH2 : C499 lead wire	<ul style="list-style-type: none"> <li>Normal mode</li> <li>GGV1003</li> <li>#5,100STILL</li> </ul>	Place a trigger in CH1 and adjust until the center of the CH2 video signal jitter is 71 $\mu$ sec (1H+7.5 $\mu$ sec) $\pm$ 2 $\mu$ sec compared to the CH1 video signal.	<p>Jitter due to the eccentricity 12.5<math>\mu</math>s 71<math>\mu</math>s <math>\pm</math> 2<math>\mu</math>s</p>
16 VPS error level adjustment	MAIN ASSY VR521	<ul style="list-style-type: none"> <li>TV monitor</li> <li>GGV1003</li> </ul>	TV monitor	<ul style="list-style-type: none"> <li>Normal mode</li> <li>GGV1003</li> <li>#8,000STILL (Magenta screen)</li> </ul>	Adjust until the color irregularity on the magenta screen is minimized.	<p>Color irregularity on the magenta screen is minimized.</p>
17 FSC SUM level check	—	<ul style="list-style-type: none"> <li>Oscilloscope</li> <li>GGV1003</li> </ul>	CN120 ⑪ Pin (FCS SUM)	<ul style="list-style-type: none"> <li>Normal mode</li> <li>GGV1003</li> <li>PLAY</li> </ul>	+2.0V, $\pm$ 0.4V DC at the CN120 ⑪ Pin	<p>2.0V <math>\pm</math> 0.4V DC 0V</p>



This diagram is viewed from the foil side.

PCB-1



A

B

C

D

9

8

7

6

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4

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8

7

6

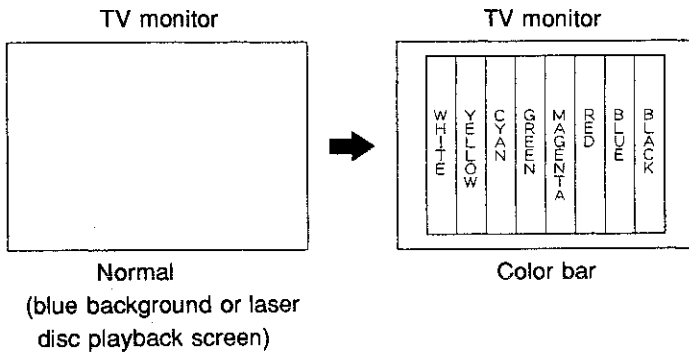
5

4

**1.4.3 GRPB ASS'Y ADJUSTMENT METHOD**

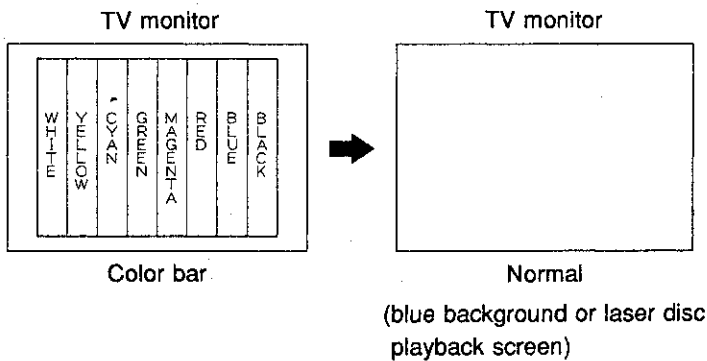
1. Entering the graphics board operating modes

① Normal → Color Bar :



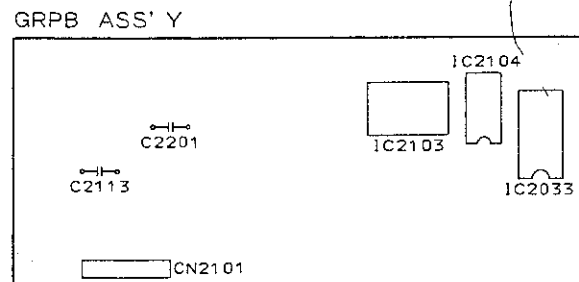
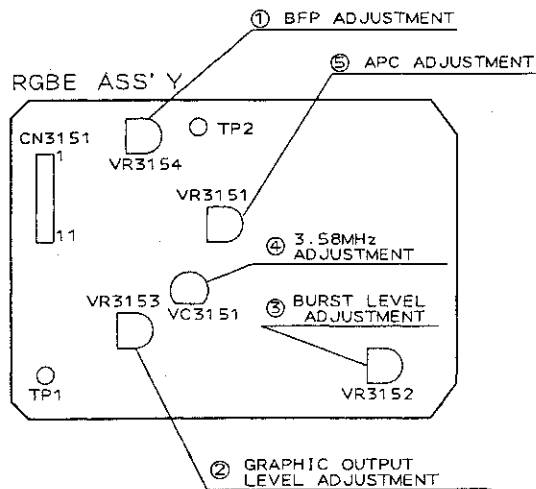
With the power on, if you press the **ESC** key on the dedicated test mode remote controller (GGF1067), then press the **GRAPHIC** button on the player itself or on the accessory remote controller, the color bars appear on the TV monitor screen. In this adjustment, this state is called Color Bar mode. These color bars are called subcode graphics to differentiate them from the color bars that appear when a laser disc is played.

② Color Bar → Normal :

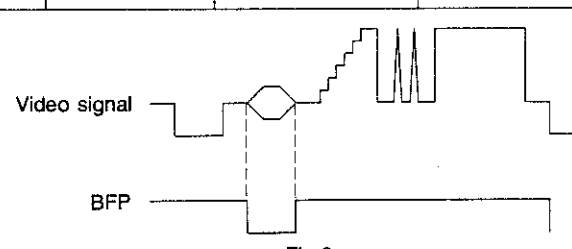
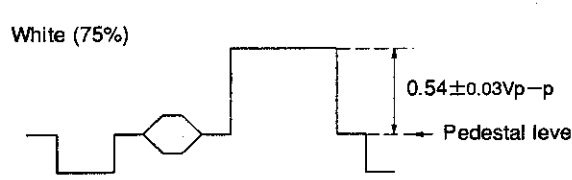
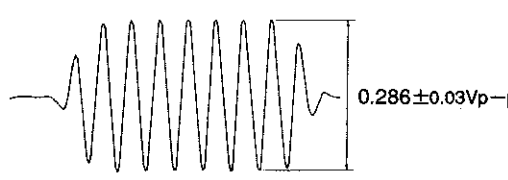


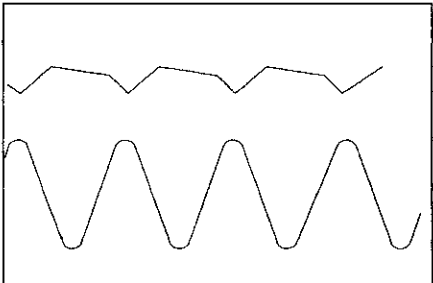

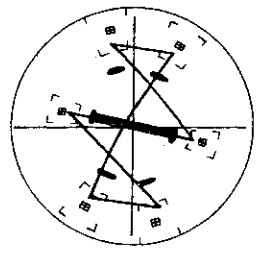
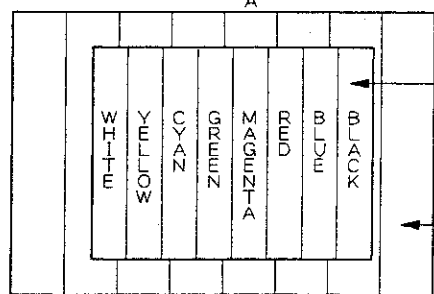
If you send with the same procedure as in ①, the subcode graphics disappear from the screen.

2. GRPB ASS'Y adjustment location

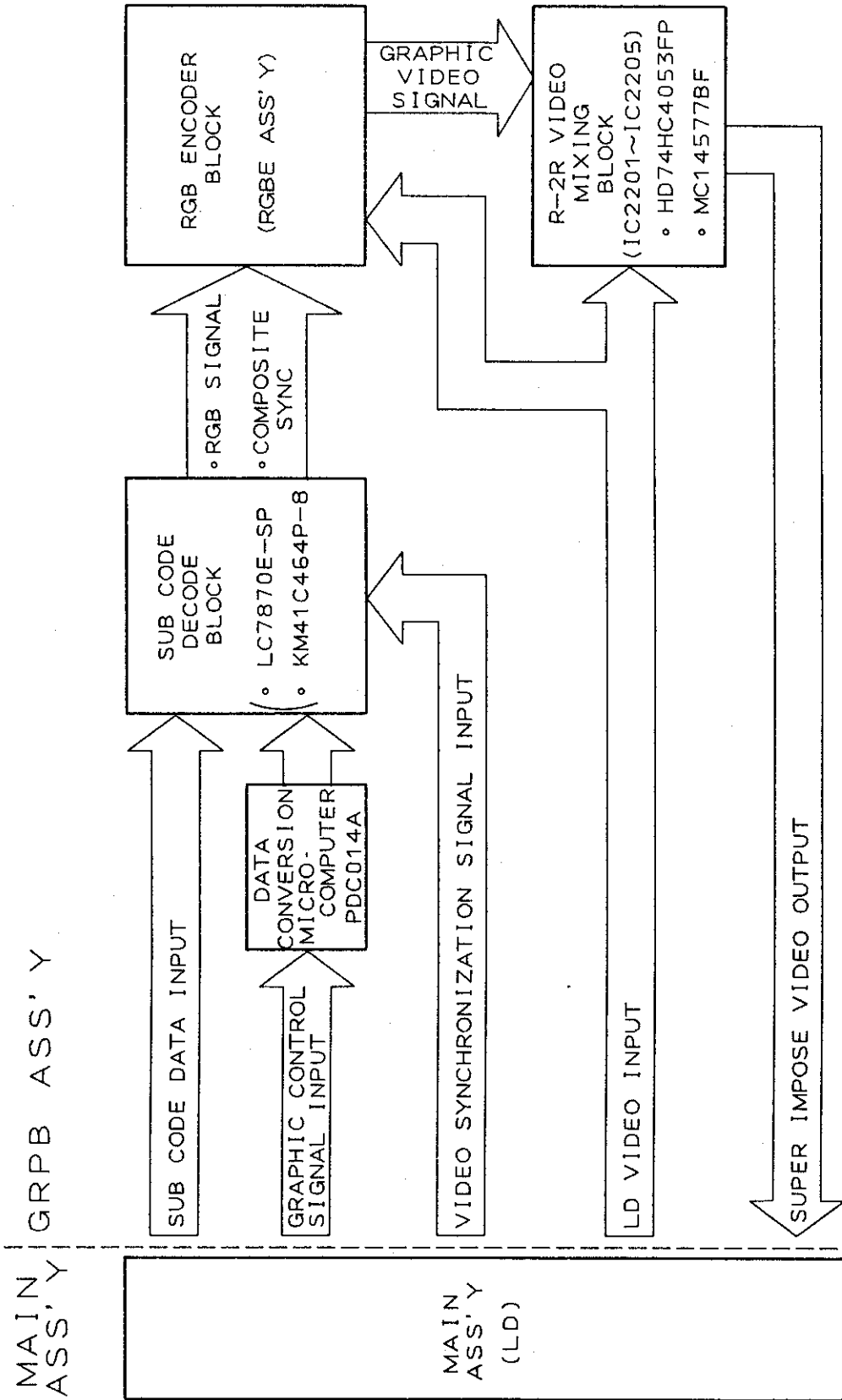


GRP B ASS'Y ADJUSTMENT TABLE

	Adjustment name	Adjustment point	Measuring equipment and jigs	Measurement point	Player condition	Adjustment procedure
1	BFP adjustment	VR3154	• Oscilloscope	CN3151-1 (C2113) TP-2	• NORMAL #19,900still	Observe the CN3151-1 (C2113) video signal and TP2 waveform when the system is put into still mode with # 19.900 of GGV1003. Adjust VR3154 so that the timing of the burst section of the video signal is as in Figure 2.
						 <p>Fig.2</p>
2	Graphic output level adjustment	VR3153	• Oscilloscope or • Waveform monitor	CN3151-3 (C2201)	• COLOR BAR	In Color Bar mode, connect the oscilloscope to CN3151-3 (C2201) and observe the subcode graphics waveform. Adjust VR3153 so that the voltage of the white level (75%) waveform from the pedestal level is $0.54 \pm 0.03 V_{p-p}$ . (Figure 3)
						 <p>Fig.3</p>
3	Burst level adjustment	VR3152	• Oscilloscope • Waveform • TV monitor	CN3151-3 (C2201)	• COLOR BAR	In Color Bar mode, connect the oscilloscope and CN3151-3 (C2201) and observe the subcode graphics waveform. Adjust VR3152 so that the color burst level is $0.286 \pm 0.03 V_{p-p}$ . (Figure 4)
						 <p>Fig.4</p>

Adjustment name	Adjustment point	Measuring equipment and jigs	Measurement point	Player condition	Adjustment procedure
3.58MHz free-run frequency adjustment	VC3151	<ul style="list-style-type: none"> <li>Frequency counter</li> <li>Oscilloscope (SIGNAL GENERATOR : S.G)</li> </ul>	TP-1	<ul style="list-style-type: none"> <li>NORMAL</li> <li>COLOR BAR</li> </ul>	Remove CN2101 from the GRPB assembly. With the system in Normal mode, connect the frequency counter to TP1 and adjust VC 3151 so that the frequency is 3.579545 MHz ± 3Hz. If it is difficult to adjust with the above method, use the following method. Set a signal generator to 3.579545 MHz and input it to CH2 of the oscilloscope. Connect TP1 and CH1 of the oscilloscope and trigger with CH2. Adjust VR3151 so that both the CH1 and CH2 waves stand still.
					<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">CH1</div>  <div style="margin-left: 10px;">TP1 waveform</div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="margin-right: 10px;">CH2</div>  <div style="margin-left: 10px;">3.579545 MHz from signal generator</div> </div> <p style="text-align: center;">Fig.5</p>
<p><b>Note :</b> During this adjustment, the video signal from the laser disc player must not be input to Pin 20 of IC3151. That is why the adjustment is made with CN2101 removed from the GRPB ass'y.</p>					
APC adjustment	VR3151	<ul style="list-style-type: none"> <li>TV monitor or</li> <li>Vector scope</li> </ul>	Video out	<ul style="list-style-type: none"> <li>COLOR BAR</li> </ul>	In Color Bar Mode, connect the player V output terminal and the vector scope. Set to still with #5450 of GGV1003 and adjust VR3151 so that the phase difference is no greater than ±5° between the subcode graphics color bars on the vector scope and the playback laser disc color bars. (Figure 6)
					<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>WHITE YELLOW CYAN GREEN MAGENTA RED BLUE BLACK</p>  <p style="text-align: center;">TV monitor screen</p> </div> <div style="margin-left: 20px;"> <p>SUB CODE GRAPHICS SCREEN</p> <p>LD SCREEN</p> </div> </div> <p style="text-align: center;">Fig.7</p>
<p>If you do not have a vector scope, display the subcode graphics and playback laser disc color bars together on the TV monitor, compare them, and adjust VR3151 so that there is no color phase distortion. (Figure 7)</p>					

### 1.5 BLOCK DIAGRAM (GRPB ASSY)



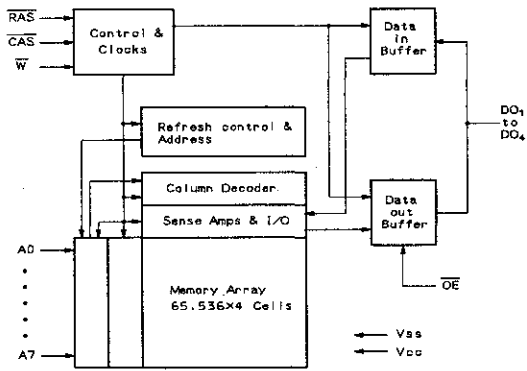
# 1.6 IC INFORMATION

• The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

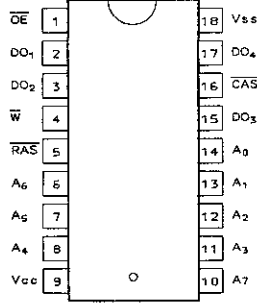
## ■ KM41C464P - 8 (IC2104)

### • DRAM

#### • Block Diagram



#### • Pin Assignment



(Top view)

#### • Pin Function

Pin	Function
A <sub>0</sub> - A <sub>7</sub>	Address input
DQ <sub>1</sub> - DQ <sub>4</sub>	Data input/output
W	Read/write input
OE	Data output enable
RAS	Row address strobe
CAS	Column address strobe
Vcc	Power supply(+5 V)
Vss	Ground
N.C.	Not connected

## ■ PDC014A (IC2053)

### • LC7870E-SP Control sub-microcomputer

This unit provides graphics control by converting the control commands from the mode controller (PD3242A) into LC7870E-SP control commands.

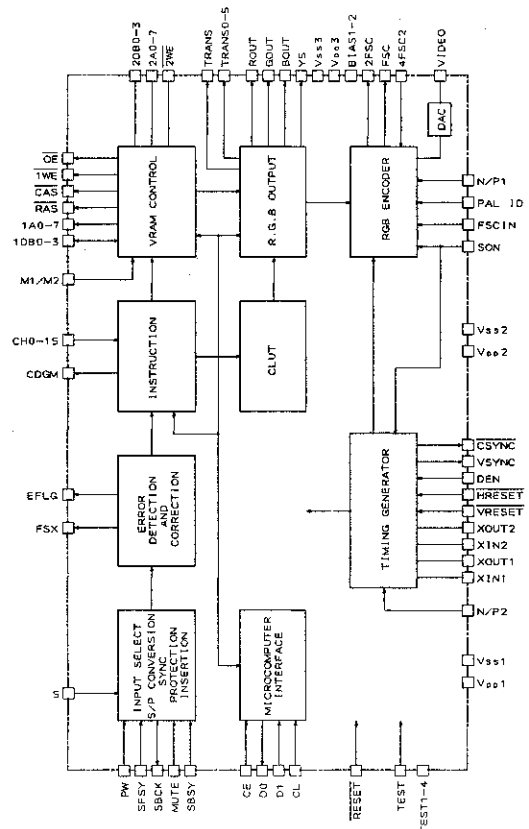
#### • Pin Function

No.	Pin	I/O	Function
1	—		Not connected
2	V <sub>DD</sub>	I	Power supply (5V)
3	SI	I	Serial data input from mode controller (PD3242A)
4	—		Not connected
5	SCK	I	Clock input for serial communications from mode controller (PD3242A)
6	CS	I	Serial communications request input from mode controller (PD3242A)
7	EN	O	Serial communications enable output to mode controller (PD3242A)
8~14	—		Not connected
15	OSC2	O	Oscillator (4MHz)
16	OSC1	I	
17	—		Not connected
18	GND	I	Ground
19	RST	I	Reset input
20	—		Not connected
21	CL	O	Clock output for serial communications to LC7870E
22	DI	O	Serial data output to LC7870E
23	CE	O	LC7870E select
24	—		Not connected
25	—		Not connected
26	LDG/CDG	O	Graphics mode control output 'H'=LD-G, 'L'=CD-G
27	VSYNC	I	V-Sync input
28	HRBLK	O	Not connected
29	VIDEO	O	Video output switching output 'H'=LD picture only, 'L'=graphics + LD picture
30	MUTE	O	LC7870E mute control output

## ■ LC7870E-SP (IC2103)

### • Subcode decode IC

#### • Block Diagram



● LC7870E—SP Pin function

No.	Pin	I/O	Function
1	S	I	DSP selection pin for CD "H"input:LC7861N/67, "M"input:LC7860K/63, "L"input:LC7868/69
2	SBCK	O	Subcode R/W read out clock
3	SFSY	I	Subcode block sync signal
4	PW	I	Subcode R/W data
5	SBSY	I	Subcode frame sync signal
6	V <sub>DD1</sub>	-	Digital power supply pin
7	CE	I	Pin controlling serial input or serial output
8	DO	O	Serial data output
9	DI	I	Serial data input
10	CL	I	Serial data output clock
11	MUTE	I	Control signal for disabling subcode data
12	V <sub>SS1</sub>	-	Digital ground pin
13	CH0	I	Channel select pins "H"enables (Built-in pull-down resistors)
14	CH1	I	
15	CH2	I	
16	CH3	I	
17	CH4	I	
18	CH5	I	
19	CH6	I	
20	CH7	I	
21	CH8	I	
22	CH9	I	
23	CH10	I	
24	CH11	I	
25	CH12	I	
26	CH13	I	
27	CH14	I	
28	CH15	I	
29	1WE	O	#1 DRAM control pin
30	RAS	O	#1, #2 DRAM common control pin
31	1A0	O	#1 DRAM address
32	1A1	O	
33	1A2	O	
34	1A3	O	
35	1A4	O	
36	1A5	O	
37	1A6	O	
38	1A7	O	
39	1DB0	I/O	#1 DRAM data pin
40	CAS	O	#1, #2 DRAM common control pin
41	1DB1	I/O	#1 DRAM data pin
42	OE	O	#1 DRAM control pin
43	1DB2	I/O	#1 DRAM data pin
44	1DB3	I/O	#1 DRAM data pin
45	2WE	O	#2 DRAM control pin
46	2A0	O	#2 DRAM address pin
47	2A1	O	
48	2A2	O	
49	2A3	O	
50	2A4	O	

No.	Pin	I/O	Function
51	2A5	O	#2 DRAM address pin
52	2A6	O	
53	2A7	O	
54	2DB0	I/O	#2 DRAM data pin
55	2DB1	I/O	
56	2DB2	I/O	
57	2DB3	I/O	
58	TEST	I	Test pin
59	CDGM	O	"H" output for CDG or CDEG disc
60	TRANS0	O	Digital output
61	TRANS1	O	
62	TRANS2	O	
63	TRANS3	O	
64	TRANS4	O	
65	TRANS5	O	
66	V <sub>SS2</sub>	-	Analog ground pin
67	V <sub>DD2</sub>	-	Analog power supply pin
68	BIAS1	O	Ripple elimination capacitor connection pin
69	TRANS	O	Define transparency 6-bit DAC output
70	ROUT	O	R data 6-bit output
71	GOUT	O	G data 6-bit output
72	BOUT	O	B data 6-bit output
73	V <sub>SS3</sub>	-	Analog ground pin
74	V <sub>DD3</sub>	-	Analog power supply pin
75	BIAS2	O	Ripple elimination capacitor connection pin
76	VIDEO	O	Composite video output pin (8-bit DAC output)
77	TEST1	I	Test pins
78	TEST2	I	
79	FSCIN	I	Subcarrier clock input pin
80	VSYNC	O	Vertical synchronization signal output pin
81	2FSC	O	2fsc output pin
82	YS	O	Superimposition control output
83	CSYNC	O	Composite synchronization signal output
84	SON	I	Superimposition on/off pin
85	EFLG	O	Error state monitor pin
86	FSX	O	Error state monitor trigger
87	M1/M2	I	256 DRAM 1 or 2 selection pin "H":1, "L":2
88	DEN	I	Disc information display enable pin "H":enable, "L":BGC
89	PALID	I	External control pin for PAL superimposition
90	HRESET	I	Horizontal timing external control pin
91	FSC	O	Subcarrier analog output NTSC mode:3.57954 MHz PAL mode:4.433619 MHz
92	VRESET	I	Vertical timing external control pin
93	4FSC2	I	External clock input pin for superimposition
94	RESET	I	Reset input pin
95	N/P1	I	NTSC/PAL select pin (RGB encoder) H:NTSC L:PAL
96	N/P2	I	NTSC/PAL select pin (CD-EG encoder) H:NTSC L:PAL
97	XIN2	I	Crystal oscillator connection pin 17.734476 MHz (PAL)
98	XOUT2	O	Crystal oscillator connection pin 17.734476 MHz (PAL)
99	XIN1	I	Crystal oscillator connection pin 14.31818 MHz (NTSC)
100	XOUT1	O	Crystal oscillator connection pin 14.31818 MHz (NTSC)

## 1.7 PARTS LIST FOR PACKING AND EXPLODED VIEWS

### NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "☉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

### • PACKING

Mark No.	Description	Parts No.
	1 .....	
	2 Caution(UC)	VRR1020
	3 .....	
	4 Operating instructions (English)	DRB1167
NSP	5 Polyethylene bag	VHL-014
	6 Pad(R)	VHA1113
	7 Audio cable	VDE-055
	8 Video cable	VDE-056
NSP	9 Battery(R03, AAA)	VEM-022
	10 Remote control unit	DXX2180
	11 Battery cover	VNK1293
NSP	12 Polyethylene bag	Z21-029
	13 Pad(F)	VHA1112
	14 Mirror mat	VHL1006
	15 Packing case	DHG1570

### • EXTERIOR SECTION

Mark No.	Description	Parts No.
	1 Guide plate(L)	VNE1805
	2 Guide plate(R)	VNE1806
	3 Lock plate spring	VBH1188
	4 Lock plate	VNL1513
	5 CD tray	VNK1992
	6 Tray assy - S	VXX1885
NSP	7 LD tray(ABS)	VNK1991
	8 Disc pad(L)	VEC1657
	9 Disc pad(C)	VEC1658
NSP	10 Carry label	VRW1289
	11 Bonnet - S	DXX2156
	12 Door spring	VBH1202
	13 CD door assy - S	DXX2172
	14 Carry cushion	VEC1578
NSP	15 CD door	DNK2922
	16 Tray panel assy	DXA1672
	17 Door holder	VNE1812
	18 Door shaft	VLL1441
	19 .....	
NSP	20 Spacer	VEC1585
	21 Damp cushion	VEC1110
NSP	22 Screw	BPZ30P080FCU
	23 Screw	BPZ30P060FCU
	24 Screw	VBA1034
	25 Screw	BBZ30P080FCC
	26 Screw	BCZ40P060FZK
	27 Screw	IPZ20P050FMC
	28 Screw	VBA1032
	29 Stop ring	VEB1091
NSP	30 Cushion	VEC1618

### • FRONT PANEL SECTION

Mark No.	Description	Parts No.
	1 Snap plate	VNE1102
	2 Jack holder(L)	VNE1818
	3 Volume holder	VNE1823
	4 FL filter	VNK1694
	5 PW Button	DNK2853
	6 FL lens	VNK2070
	7 Key con button	DNK2858
	8 VR knob(S)	DNK2856
	9 VR knob(L)	DNK2855
	10 Main key assy	DXA1673
	11 Ten key(L)	DNK2859
	12 Ten key(R)	DNK2860
	13 Sub panel	DNK2902
	14 L key(L) assy	VXA1971
	15 Front panel assy	DXA1659
	16 L key(R) assy	VXA1972
	17 FLKB assy	VWG1513
NSP	18 IRKB assy	VWG1435
NSP	19 FDKB assy	VWG1436
NSP	20 SDKB assy	VWG1437
	21 MIJB assy	VWV1303
NSP	22 HEPB assy	VWV1304
	23 Screw	BPZ26P060FCU
	24 Cushion	VEC1621
NSP	25 Main key	DNK2852
	26 LED lens	VNK2249

### • TOP VIEW SECTION

Mark No.	Description	Parts No.
	1 Clamper holder	VNL1514
	2 Rubber sheet	VEB1114
	3 Ball holder	VNL1289
	4 Clamper head	VNL1615
	5 Clamper	VNL1515
	6 Clamper spring	VBH1192
	7 Clamper arm	VNE1804
	8 Stabilizer	VNE1807
	9 Rack assy	VWT1103
	10 Carriage shaft	VLL1434
NSP	11 Side stay(R)	VNE1810
NSP	12 Front angle	VNE1808
	13 Screw	CPZ20P050FMC
	14 Screw	BBZ30P080FCC
	15 Screw	IBZ30P060FCC
	16 Screw	IPZ30P060FMC
NSP	17 Earth plate	VNE1518
	18 Screw	PCZ30P060FMC
	19 Screw	BBZ30P060FMC



## ● BASE SECTION

Mark No.	Description	Parts No.
NSP	1 MAIN assy	VWX1173
NSP	2 AUDIO assy	VWV1302
	3 SYPS assy	VWR1217
	4 Tray stopper	VNL1519
△	5 AC Power cord	PDG1015
△	6 AC cord stopper	CM--22C
NSP	7 Rear panel	DNA1144
	8 PCB cushion	VEC1573
△	9 FU3 Fuse(1A)	VEK1014
NSP	10 PCB hinge	VEC1174
△	11 Power transformer	VTT1119
△	12 FU1 · FU2 Fuse(3A/125V)	VEK1022
NSP	13 P plate holder	PNY--405
NSP	14 Side stay(L)	VNE1809
	15 .....	
	16 Insulator	PNW1912
NSP	17 Base chassis	VNA1255
	18 Insulator assy	VXA1881
	19 Screw	BBZ30P080FCC
	20 Screw	BBZ30P040FMC
	21 Screw	BCZ40P060FZK
	22 Screw	BCZ30P080FMC
	23 Screw	IBZ30P060FCC
NSP	24 Cord clasper	Z09--060
●	25 GRPB assy	VWV1317
NSP	26 Support cushion	VEC1601
	27 .....	
NSP	28 PCB holder (A)	VNE1875
NSP	29 PCB holder (B)	VNE1880
NSP	30 Rear angle	VNE1844
NSP	31 Earth plate	VNE1859
NSP	32 RGBE assy	VWV1335

## ● MECHANISM SECTION (1/2)

Mark No.	Description	Parts No.
	1 Mech. base	VNK1990
	2 Flexible cable	VDA1409
	3 Clamp cam	VNL1500
	4 Shaft holder	VNE1817
	5 Cam sand	VNL1511
	6 CAS Spring	VBH1190
	7 Cam gear	VNL1507
	8 CD Plate	VNL1512
	9 CDP Spring	VBH1191
	10 Rubber belt	VEB1184
	11 Gear pulley	VNL1510
	12 Twin gear	VNL1508
	13 Mid gear	VNL1509
	14 L-SW Lever	VNL1504
	15 C-SW Lever	VNL1505
	16 R-SW Lever	VNL1506
NSP	17 LOSB assy	VWG1307
	18 Synchronized gear assy	VXA1822
	19 Roller	VNL1042
NSP	20 LOMB assy	VWG1308

Mark No.	Description	Parts No.
	21 Loading motor assy	VXX1712
NSP	22 Carriage motor	VXM1033
	23 Motor pulley	PNW1643
	24 Screw	Z39-019
	25 Screw	BMZ26P040FMC

## ● MECHANISM SECTION (2/2)

Mark No.	Description	Parts No.
	1 CA belt	VEB1077
	2 CA pulley(2)	VNL1496
	3 CA gear(3)	VNL1497
	4 Tilt base	VNL1499
	5 CASW lever	VNL1498
NSP	6 CAMB assy	VWG1306
	7 Carriage motor assy	VXX1261
NSP	8 Carriage motor	VXM1033
	9 CA pulley(1)	VNL1197
NSP	10 PK.SB assy	VWG1305
	11 Radial spring	VBH1201
	12 Thrust spring	VBH1200
	13 Tilt pulling spring	VBH1187
NSP	14 FG assy	VWG1304
	15 FG base	VNL1503
	16 Y gear	VNL1501
	17 Tilt cam spring	VBH1189
	18 Tilt cam	VNL1502
	19 SPDL motor assy	VXA2010
	20 Centering hub	VNL1174
	21 Centering spring	VBH1083
NSP	22 Rubber sheet	VEB1103
NSP	23 Turn table assy	VXA1283
NSP	24 Oil washer	VBFI002
NSP	25 SPDL motor	VXM1053
	26 Motor base	VNE1803
	27 Screw	BMZ26P040FMC
	28 Screw	ABZ30P300FMC
	29 Screw	PMA30P050FMC
	30 Washer	WT26D060D025

## ● RACK SECTION

Mark No.	Description	Parts No.
NSP	1 Sensor stay	VBK1036
NSP	2 Tilt sensor	SG-302
NSP	3 Pick up assy	VWY1030
	4 Rack	VNL1495
	5 TAN base	VNL1494
	6 Screw	PBB26P080FMC
	7 Screw	PMA20P060FMC
	8 Screw	PMA20P080FMC
	9 Screw	PMH20P040FMC
	10 Screw	SMZ20H120FZK

# 1.8 PCB PARTS LIST

**NOTES:**

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 $\Omega$	$\rightarrow$	56 $\times 10^1$	$\rightarrow$	561	.....	RD1/8PM	<table border="1"><tr><td>5</td><td>6</td><td>1</td></tr></table> J	5	6	1
5	6	1								
47k $\Omega$	$\rightarrow$	47 $\times 10^3$	$\rightarrow$	473	.....	RD1/4PS	<table border="1"><tr><td>4</td><td>7</td><td>3</td></tr></table> J	4	7	3
4	7	3								
0.5 $\Omega$	$\rightarrow$	0R5	.....			RN2H	<table border="1"><tr><td>0</td><td>R</td><td>5</td></tr></table> K	0	R	5
0	R	5								
1 $\Omega$	$\rightarrow$	010	.....			RS1P	<table border="1"><tr><td>0</td><td>1</td><td>0</td></tr></table> K	0	1	0
0	1	0								

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k $\Omega$	$\rightarrow$	562 $\times 10^1$	$\rightarrow$	5621	.....	RN1/4PC	<table border="1"><tr><td>5</td><td>6</td><td>2</td><td>1</td></tr></table> F	5	6	2	1
5	6	2	1								

Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
------	-----	-------------	-----------	------	-----	-------------	-----------

**LIST OF ASSEMBLIES**

●	MOTHER ASS'Y	VWM1380
NSP	└─ MAIN ASS'Y	VWX1173
NSP	└─ AUDIO ASS'Y	VWV1302
NSP	FRPB ASS'Y	VWM1462
NSP	└─ FLKB ASS'Y	VWG1513
NSP	└─ IRKB ASS'Y	VWG1435
NSP	└─ FDKB ASS'Y	VWG1436
NSP	└─ SDKB ASS'Y	VWG1437
NSP	└─ MIJB ASS'Y	VWV1303
NSP	└─ HEPB ASS'Y	VWV1304
	SYPS ASS'Y	VWR1217
●	GRPB ASS'Y	VWV1317
NSP	└─ RGBE ASS'Y	VWV1335
●	MACB ASS'Y	VWM1250
NSP	└─ FG ASS'Y	VWG1304
NSP	└─ PKSB ASS'Y	VWG1305
NSP	└─ CAMB ASS'Y	VWG1306
NSP	└─ LOSB ASS'Y	VWG1307
NSP	└─ LOMB ASS'Y	VWG1308

IC403	TL8722P
Q456,Q496,Q511,Q581,Q608,Q611, Q613,Q614,Q619,Q802,Q812,Q909	2SA1037K
Q809	2SA1399
Q401	2SB1237X
Q431,Q432,Q497-Q500,Q541, Q582,Q583,Q601-Q605,Q607, Q609,Q617,Q620,Q760,Q762,Q801, Q803-Q805,Q807,Q811,Q813, Q915	2SC2412K
Q402	2SD1858X
Q908	2SK184
Q403,Q606,Q610,Q761,Q808,Q810, Q814,Q903,Q913	DTA124EK
Q612,Q615,Q750,Q901,Q902,Q911, Q912,Q914	DTC124EK
D805	1SR35-100AVL
D102,D401,D801-D803,D806,D807	1SS254
D810,D811	DA204K

**MAIN ASS'Y**

**SEMICONDUCTORS**

IC805	BA10393F
IC602,IC804	BA15218N
IC750	BA4560F
IC751	BU4053BF
IC801	CXA1081S
IC802	CXA1372S
IC807	LA6510L
IC803	NJM072L
IC404	PA0017
IC401	PA5013A
IC101	PD0133C
IC405	PD0175A
IC402	PM0001
IC601	PM3002
IC806	TA8464K

**COILS, FILTERS**

L414,L415,L521,L541	LAU120J
L801	LAU150J
L496	LAU180J
L497,L803	LAU181J
L802,L804	LAU151J
L412,L413,L523	LAU220J
L441	LAU270J
L411,L416	LAU330J
L433	LAU390J
L431	LAU430J
L522	LAU560J
L432	LAU620J
L511	LAU820J
L458	LFA221J
L457,L524	LFA561J

**CAPACITORS**

VC901 (20P)	VCM-008
C816,C844	CCSQCH050C50
C441	CCSQCH070D50





Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
C106		CKPUYB102K50	<b>RESISTORS</b>		
C102,C104		CKPUYF223Z25	R603,R605,R606,R610		RD1/6PM102J
C107,C108,C111,C112		CKPUYY103N16	R602,R609		RD1/6PM103J
<b>RESISTORS</b>			R691,R692		RD1/6PM104J
VR101-VR104 (10K)		VCS1027	R604,R611		RD1/6PM223J
R108 (100K)		RA5T104J	R615		RD1/6PM472J
R110 (10K)		RA7T103J			
R101,R102,R105,R118,R119,R127		RD1/6PM103J	R601,R608		RD1/6PM561J
R109		RD1/6PM104J	<b>OTHERS</b>		
			JA601,JA603 Headhone jack		RKB1014
R125		RD1/6PM105J	JA602 Headhone jack		RKN1006
R112,R114,R116,R117,R130,R131		RD1/6PM181J	Snap plate		VNE1102
R103		RD1/6PM182J	Jack plate(R)		VNE1822
R121,R122,R128		RD1/6PM223J			
R106,R123		RD1/6PM224J			
R104		RD1/6PM472J	<b>HEPB ASS'Y</b>		
R120		RD1/6PM473J	<b>CAPACITORS</b>		
<b>OTHERS</b>			C503		CKCYF473Z50
CN103 2MM Pitch bottom connector		BTMK04S	C501,C502		CKPUYB101K50
CN107 2MM Pitch bottom connector		BTMK05S			
CN101 2MM Pitch bottom connector		BTMK06S	<b>RESISTORS</b>		
CN105 2MM Pitch bottom connector		BTMK09S	VR501 (500)		VCS1020
			<b>OTHERS</b>		
V101 FL display tube		VAW1029	JA501 Headhone jack		RKN1002
Spacer		VEC1599	PCB binder		VEF1008
FL Holder		VNF1078			
X101 Oscillator		VSS1031			
			<b>SYPS ASS'Y</b>		
<b>IRKB ASS'Y</b>			<b>SEMICONDUCTORS</b>		
<b>SWITCHES</b>			△ IC205		ICP-N10
S401		RSG1030	△ IC201,IC202,IC204		ICP-N15
<b>OTHERS</b>			△ IC203		ICP-N20
Remote sensor		GPIU58X	△ IC2		IR3M03A
			△ IC1		NJM78M05FA
<b>FDKB ASS'Y</b>					
<b>SWITCHES</b>			Q22,Q23		2SA933S
S301-S310		RSG1030	△ Q1,Q2,Q25,Q27		2SB1185
			Q3		2SB1237
<b>SDKB ASS'Y</b>			Q21,Q24		2SC1740S
<b>SWITCHES</b>			△ Q26,Q28		2SD1762
S201-S210		RSG1030			
			Q5,Q6		DTA124ES
<b>MIJB ASS'Y</b>			Q4		DTC124ES
<b>SEMICONDUCTORS</b>			△ D3,D23,D26		10ELS2
IC601		NJM2068D	△ D6		11ES2
<b>CAPACITORS</b>			△ D24,D25		1SR35-100AVL
C604,C610		CEJA2R2M50			
C612		CKCYF473Z50	D4		1SS254
C605,C611		CKPUYB681K50	△ D21,D22		1SS254
C601,C602		CKPUYF223Z25	△ D2		ERA83-006
C606,C607		CKPUYY103N16	△ D7		MTZJ11B
			△ D1		S2VB20
C691,C692		CQMA104J50	<b>COILS, FILTERS</b>		
C603,C609		CQMA152J50	△ L51		VTL-262
			△ L1		VTL1043
			△ L2		VTL1045
			△ L3		VTL1046
			△ L4		VTL1053

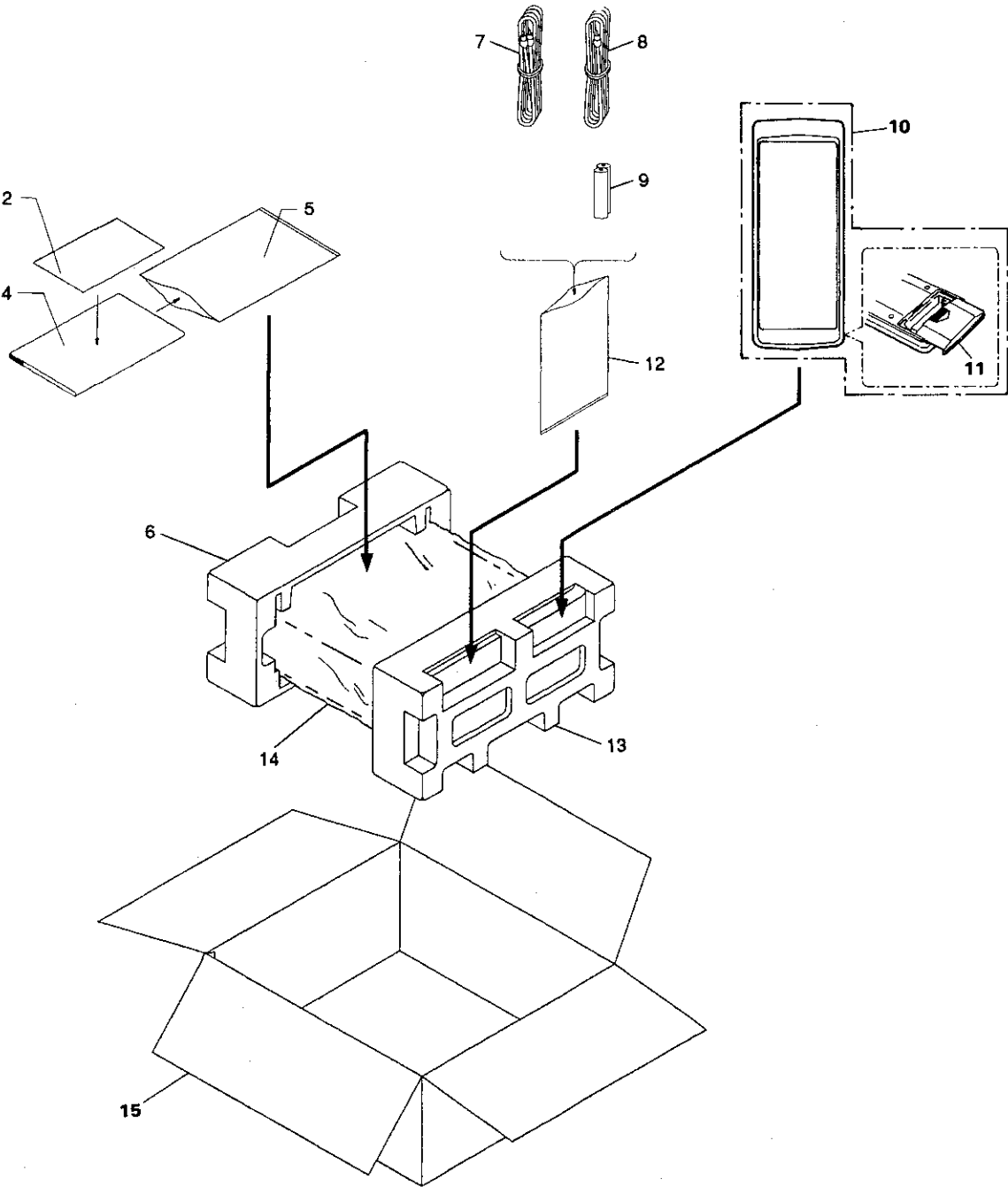
Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
<b>CAPACITORS</b>			<b>CAPACITORS</b>		
	C5	CEAS101M25		C2223,C2225	CCSQCH180J50
△	C15	CEAS101M50		C2116,C2117	CCSQCH470J50
	C29	CEAS101M50		C2171,C2173	CCSQSL101J50
	C3	CEAS102M16		C2001 - C2004,C2053,C2104,	CEAL101M6R3
	C25,C26	CEAS2R2M50		C2107,C2120,C2121,C2123,	
				C2215,C2216	
	C16	CEAS331M16		C2108	CEAL330M10
	C4,C9,C10	CEAS470M10		C2113,C2201	CEALNP010M50
	C7,C8	CEAS471M6R3		C2057,C2106,C2111	CKSQYF103Z50
△	C14	CGCYX473M25		C2058,C2059,C2101 - C2103,	CKSQYF104Z50
	C23,C24	CGCYX473M25		C2105,C2109,C2114,C2115,C2118,	
				C2119,C2211 - C2214,C2217,	
	C6	CKPUYB681K50		C2218,C2231,C2232	
△	C11 - C13	CKPUYF223Z25	<b>RESISTORS</b>		
	C27,C28	CQMA223J50		All resistors	RS1/10S□□□J
	C21,C22	CQMA272J50	<b>OTHERS</b>		
△	C51,C52 (10000PF)	RCG-009		CN2051 6P Jumper connector(2MMP)	52151 - 0610
△	C2 (6800μ/16V)	VCH1053		X2051 (4.19MHz)	VSS1014
△	C1 (10000μ/16V)	VCH1054	NSP	RGBE ASS'Y	VWV1335
				HOUSING ASS'Y	VKP2028
<b>RESISTORS</b>			<b>RGBE ASS'Y</b>		
△	R27 - R30 (47)	DCN1003	Note: RGBE ASS'Y is a part of GRPB ASS'Y.		
△	R23 - R26	RD1/2VM221J	<b>SEMICONDUCTORS</b>		
△	R8,R9	RD1/2VM391J		IC3151	BA7230LS
	R1	RD1/6PM101J		IC3152	HD74HC221FP - TB
	R5,R7	RD1/6PM102J		Q3157,Q3158	2SC2458
				Q3159	2SK30ATM
△	R51	RD1/2PM225J	<b>COILS, FILTERS</b>		
	R11	RD1/6PM103J		L3153	LFA100K
	R13	RD1/6PM104J		L3151,L3152	LFA122K
	R6	RD1/6PM122J	<b>CAPACITORS</b>		
	R31	RD1/6PM221J		VC3151	VCM1006
				C3157,C3158	CCSQCH220J50
	R4	RN1/6PQ1201F		C3159,C3160	CCSQCH330J50
	R2	RD1/6PM271J		C3167	CCSQCH680J50
	R12	RN1/6PQ3601F		C3166	CCSQCH820J50
	R10	RD1/6PM472J			
	R21,R22	RD1/6PM562J		C3184	CCSQSL102J50
△	R14 (0.2)	VCN1032		C3183	CCSQSL152J50
<b>OTHERS</b>				C3151 - C3154,C3161 - C3164	CEAL010M50
△	Terminal(power)	VKC-019		C3156,C3180	CEAL101M6R3
△	Fuse holder	VKR1001		C3165	CKSQYB473K25
	6P Cable holder	51048 - 0600		C3155,C3168,C3181,C3182	CKSQYF104Z50
	13P Cable holder	51048 - 1300	<b>RESISTORS</b>		
	Heat sink	VNE1929		VR3153 (1K)	VRTB6VS102
	CN31 KR connector	B2B - PH - K		VR3151	VRTB6VS103
				VR3152,VR3154 (4.7K)	VRTB6VS472
				Other resistors	RS1/10S□□□J
<b>GRPB ASS'Y</b>			<b>OTHERS</b>		
<b>SEMICONDUCTORS</b>				X3151 Crystal oscillator	PSS1012
	IC2101,IC2102,IC2201 - IC2204	HD74HC4053FP		(3.579545MHz)	
	IC2104	KM41C464P - 8		DL3151 Delay line	PTF1013
	IC2103	LC7870E - SP	<b>COILS, FILTERS</b>		
	IC2205	MC14577BF		L2001 - L2003	LFA100K
	IC2053	PDC014A	<b>RESISTORS</b>		
				VR3153 (1K)	VRTB6VS102
	IC2107,IC2108	TC7S04F		VR3151	VRTB6VS103
	IC2106	TC7W08F		VR3152,VR3154 (4.7K)	VRTB6VS472
	Q2103,Q2151,Q2203	2SA1037K		Other resistors	RS1/10S□□□J
	Q2101,Q2102,Q2201,Q2202	2SC2412K	<b>OTHERS</b>		
				X3151 Crystal oscillator	PSS1012
				(3.579545MHz)	
				DL3151 Delay line	PTF1013
<b>COILS, FILTERS</b>			<b>RESISTORS</b>		
	L2001 - L2003	LFA100K		VR3153 (1K)	VRTB6VS102
				VR3151	VRTB6VS103
				VR3152,VR3154 (4.7K)	VRTB6VS472
				Other resistors	RS1/10S□□□J
			<b>OTHERS</b>		
				X3151 Crystal oscillator	PSS1012
				(3.579545MHz)	
				DL3151 Delay line	PTF1013

<b>Mark No.</b>	<b>Description</b>	<b>Parts No.</b>
<b>FG ASS'Y</b>		
<b>SEMICONDUCTORS</b>		
D1		GP1S51V
<b>OTHERS</b>		
	HOUSING ASS'Y	VKP1950
<b>PKSB ASS'Y</b>		
<b>SWITCHES</b>		
S4,5		DSG1015
<b>OTHERS</b>		
	HOUSING ASS'Y	VKP1951
<b>CAMB ASS'Y</b>		
<b>SEMICONDUCTORS</b>		
Q10		2SC1740S
<b>RESISTORS</b>		
R10		RD1/6PM182J
R11		RD1/6PM470J
<b>OTHERS</b>		
CN401	23P Top connector	VKN1073
CN403	FFC connector 23P	HLEM23R-1
	HOUSING ASS'Y	VKP1949
CN404		B3B-PH-K
<b>LOSB ASS'Y</b>		
<b>SWITCHES</b>		
S1-3		DSG1015
<b>LOMB ASS'Y</b>		
<b>CAPACITORS</b>		
C1		CGCYX473M25
<b>OTHERS</b>		
J51	(2mm pitch 4P)	D20PWW0415G
J55	(2mm pitch 6P)	D20PWY0615G

# CHAPTER 2

## 2.1 PACKING AND EXPLODED VIEWS

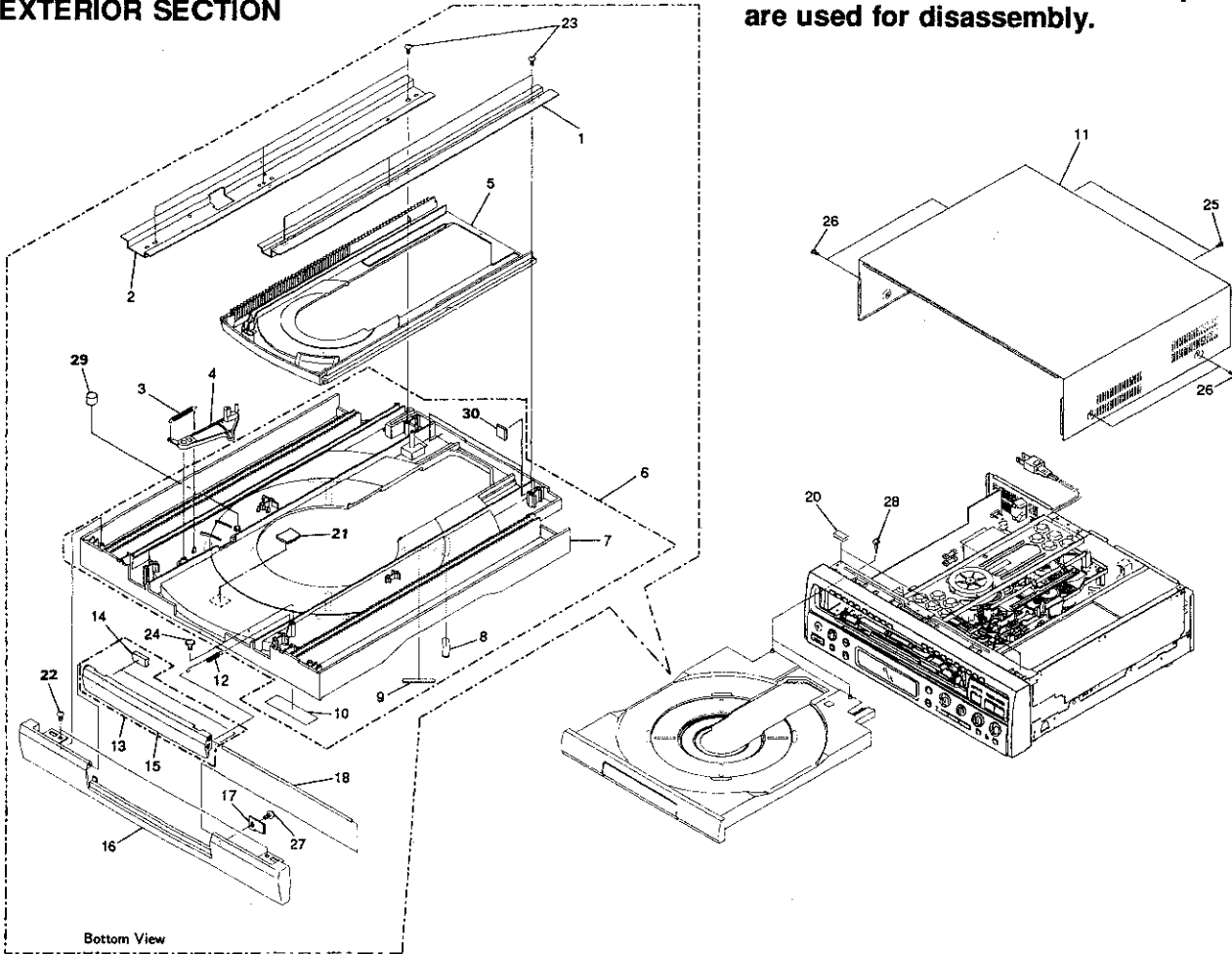
• PACKING





• EXTERIOR SECTION

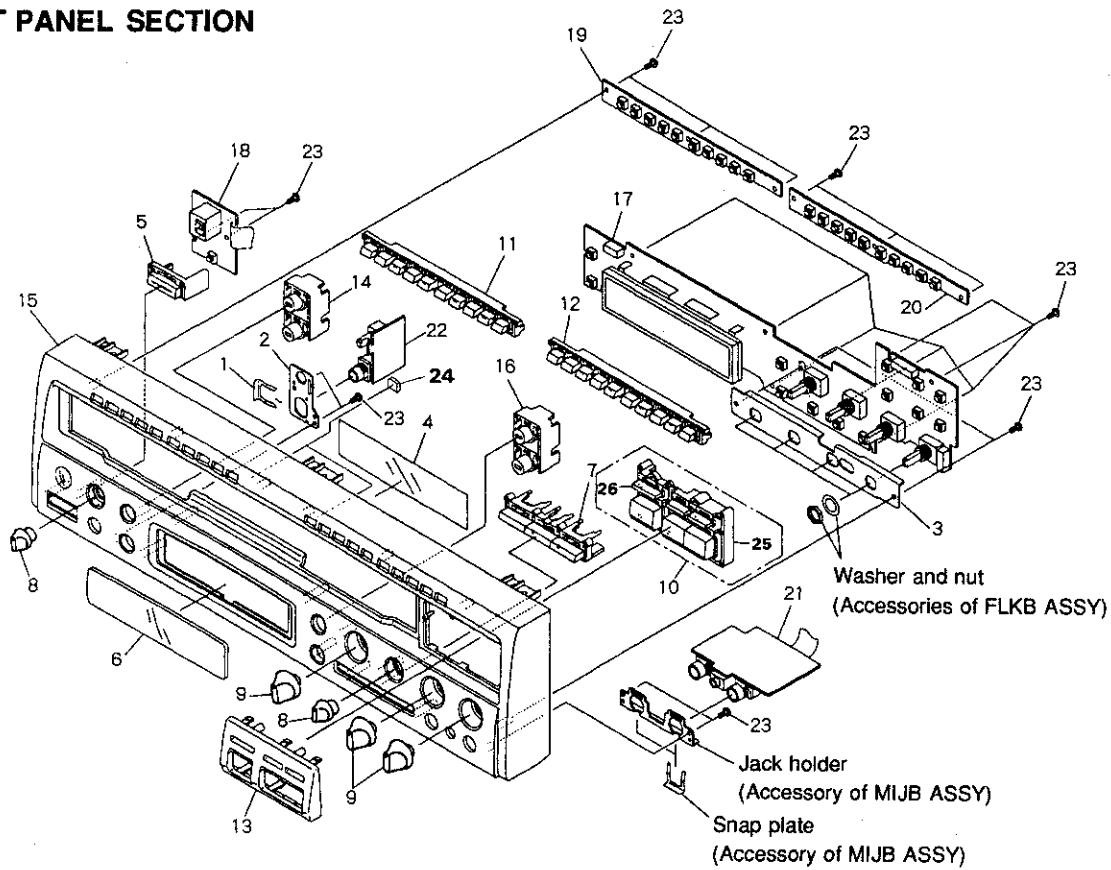
NOTE: Screws adjacent to ▼ mark on product are used for disassembly.



A

B

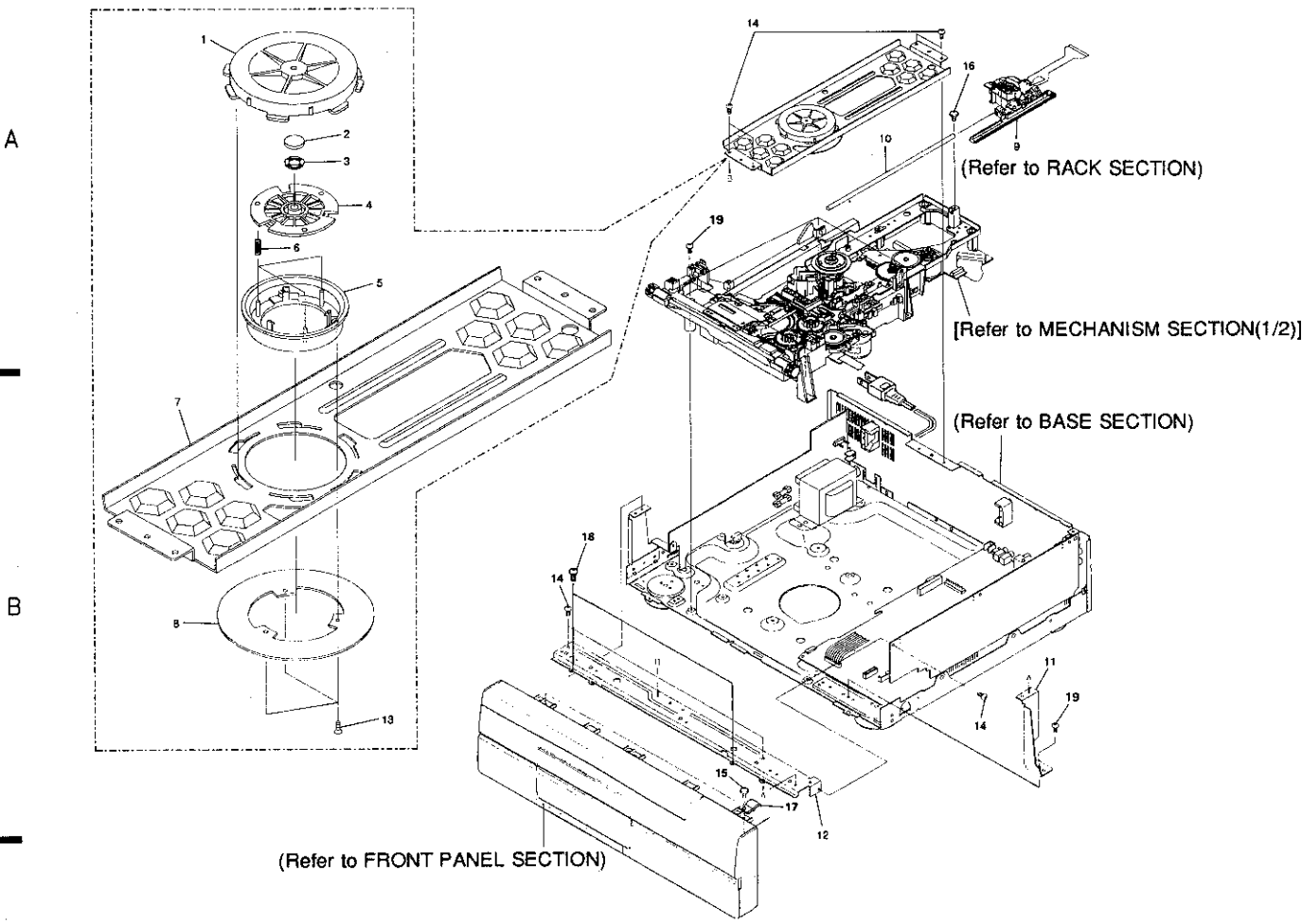
• FRONT PANEL SECTION



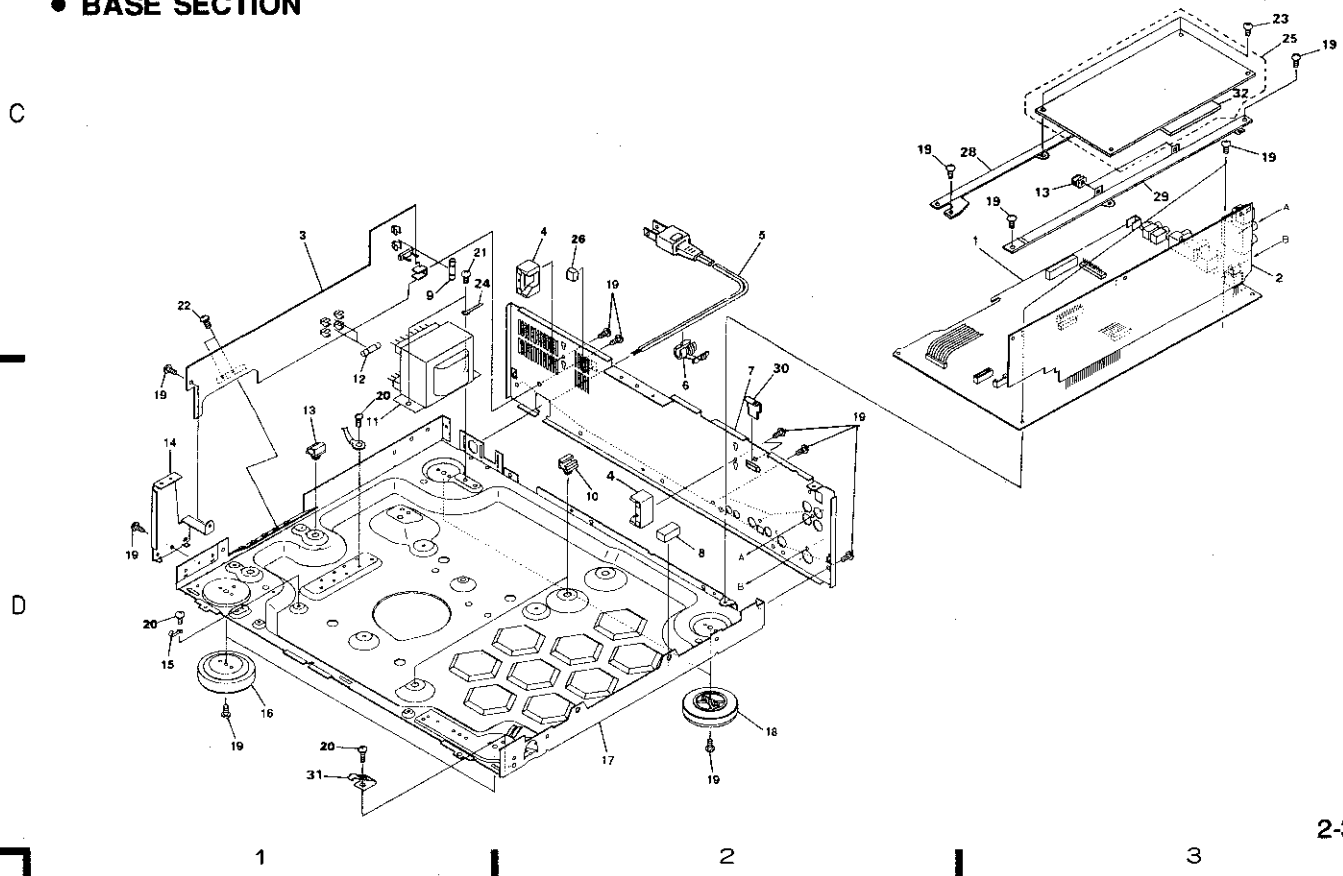
C

D

● TOP VIEW SECTION

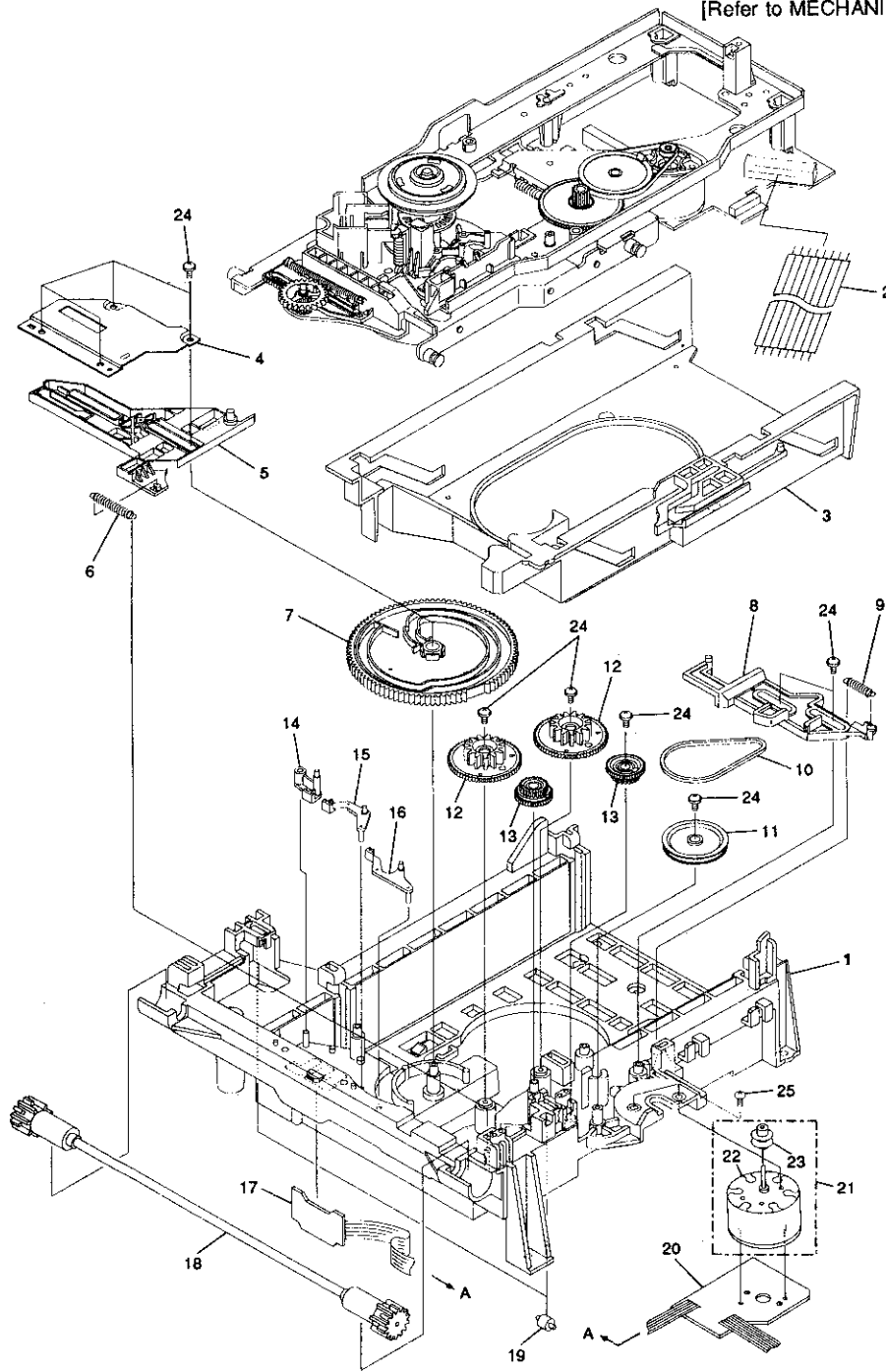


● BASE SECTION



• MECHANISM SECTION (1/2)

[Refer to MECHANISM SECTION(2/2)]



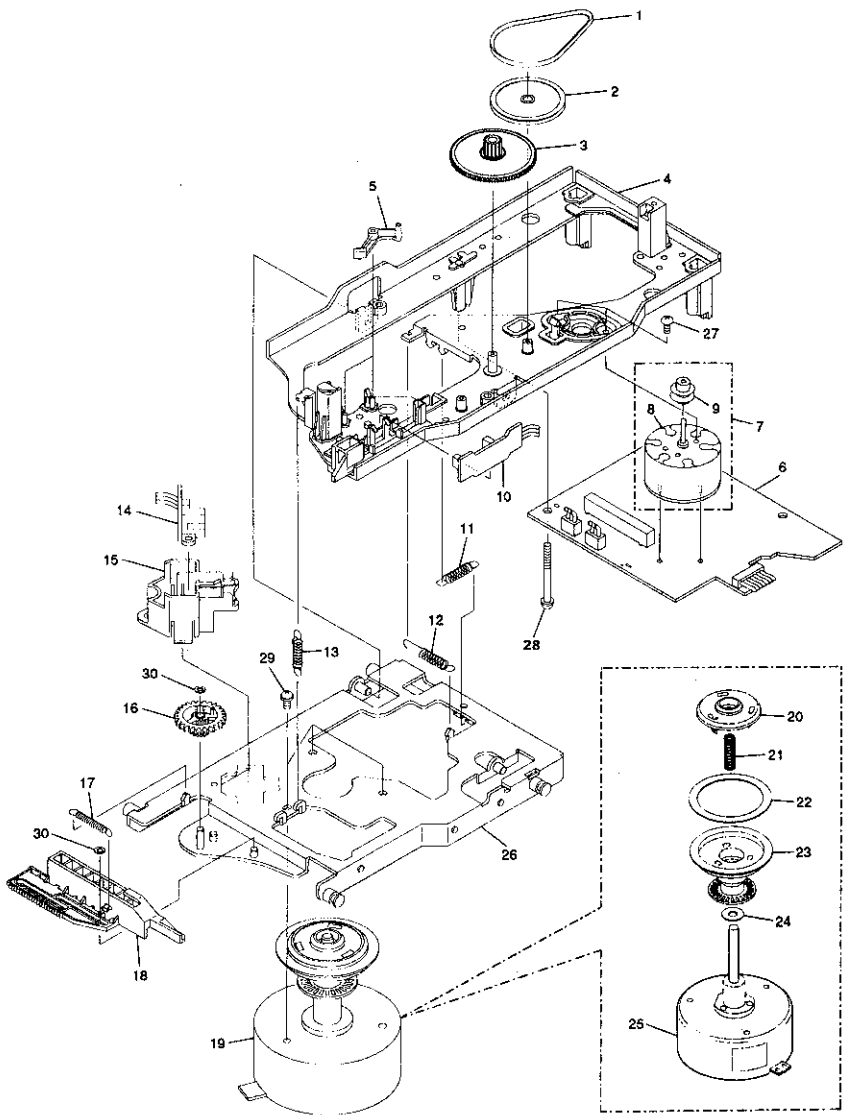
A

B

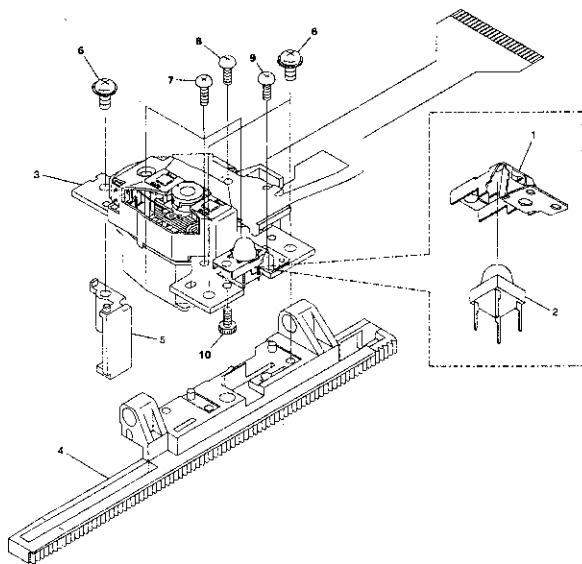
C

D

• MECHANISM SECTION (2/2)



• RACK SECTION



## 2.2 SCHEMATIC AND PCB CONNECTION DIAGRAMS

### NOTE FOR SCHEMATIC DIAGRAMS (Type 4A)



1. When ordering service parts, be sure to refer to "PARTS LIST of EXPLODED VIEWS" or "PCB PARTS LIST".





2. Since these are basic circuits, some parts of them or the values of some components may be changed for improvement.

3. **RESISTORS:**  
 Unit: k:kΩ, M:MΩ, or Ω unless otherwise noted.  
 Rated power: 1/4W, 1/6W, 1/8W, 1/10W unless otherwise noted.  
 Tolerance: (F): ±1%, (G): ±2%, (K): ±10%, (M): ±20% or ±5% unless otherwise noted.

4. **CAPACITORS:**  
 Unit: p:pF or μF unless otherwise noted.  
 Ratings: capacitor (μF)/ voltage (V) unless otherwise noted.  
 Rated voltage: 50V except for electrolytic capacitors.

5. **COILS:**  
 Unit: m:mH or μH unless otherwise noted.


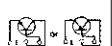



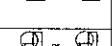

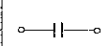

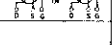





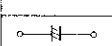



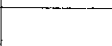

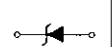

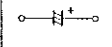



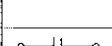





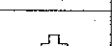

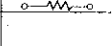

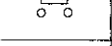



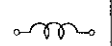

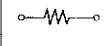

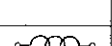


6. **VOLTAGE AND CURRENT:**  
 or  $-V$ :  
 DC voltage (V) in PLAY mode unless otherwise noted.  
 mA or  $-mA$ :  
 DC current in PLAY mode unless otherwise noted.  
 Value in ( ) is DC current in STOP mode.




7. **OTHERS:**  
 •  or  : Adjusting point.  
 •  : Measurement point.  
 • The  mark found on some component parts indicates the importance of the safety factor of the parts. Therefore, when replacing, be sure to use parts of identical designation.

8. **SCH-□ ON THE SCHEMATIC DIAGRAM:**  
 • SCH-□ indicates the drawing number of the schematic diagram. (SCH stands for schematic diagram.)

9. **SWITCHES (Underline indicates switch position):**

- |                  |                  |                       |
|------------------|------------------|-----------------------|
| <b>FLKB ASSY</b> |                  | <b>IRKB ASSY</b>      |
| S101:ONE - TOUCH | S205:20          | S401:POWER            |
| S102:SURROUND    | S206:16          |                       |
| S103: <u>h</u>   | S207:19          | <b>PKSB ASSY</b>      |
| S104:AUDIO       | S208:15          | SW4:PAK OUT           |
| S105:#           | S209:18          | SW5:PAK IN            |
| S106: <u>b</u>   | S210:14          |                       |
| S107:INT/EXT     |                  | <b>LOSB ASSY</b>      |
| S108:D.CD        |                  | SW1:S1                |
| S109:STOP        | <b>FDKB ASSY</b> | SW2:S2                |
| S110:OPEN/CLOSE  | S301:10          | SW3:S3                |
| S111:PLAY/PAUSE  | S302:9           |                       |
| S112:GRAPHICS    | S303:7           | <b>AUDIO ASSY</b>     |
| S113:G. CH       | S304:8           | S301:HEADPHONE ON/OFF |
|                  | S305:3           |                       |
|                  | S306:1           |                       |
| <b>SDKB ASSY</b> | S307:2           |                       |
| S201:12          | S308:4           |                       |
| S202:11          | S309:6           |                       |
| S203:13          | S310:5           |                       |
| S204:17          |                  |                       |

P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
		FET			Mylar capacitor
		Diode			Styrol capacitor
		Zener diode			Electrolytic capacitor (Non polarized)
		LED			Electrolytic capacitor (Polarized)
		Varactor			Electrolytic capacitor (Polarized)
		Tact switch			Power capacitor
		Inductor			Semi-fixed resistor
		Coil			Resistor array
		Transformer			Resistor
		Filter			Resonator
					Thermistor

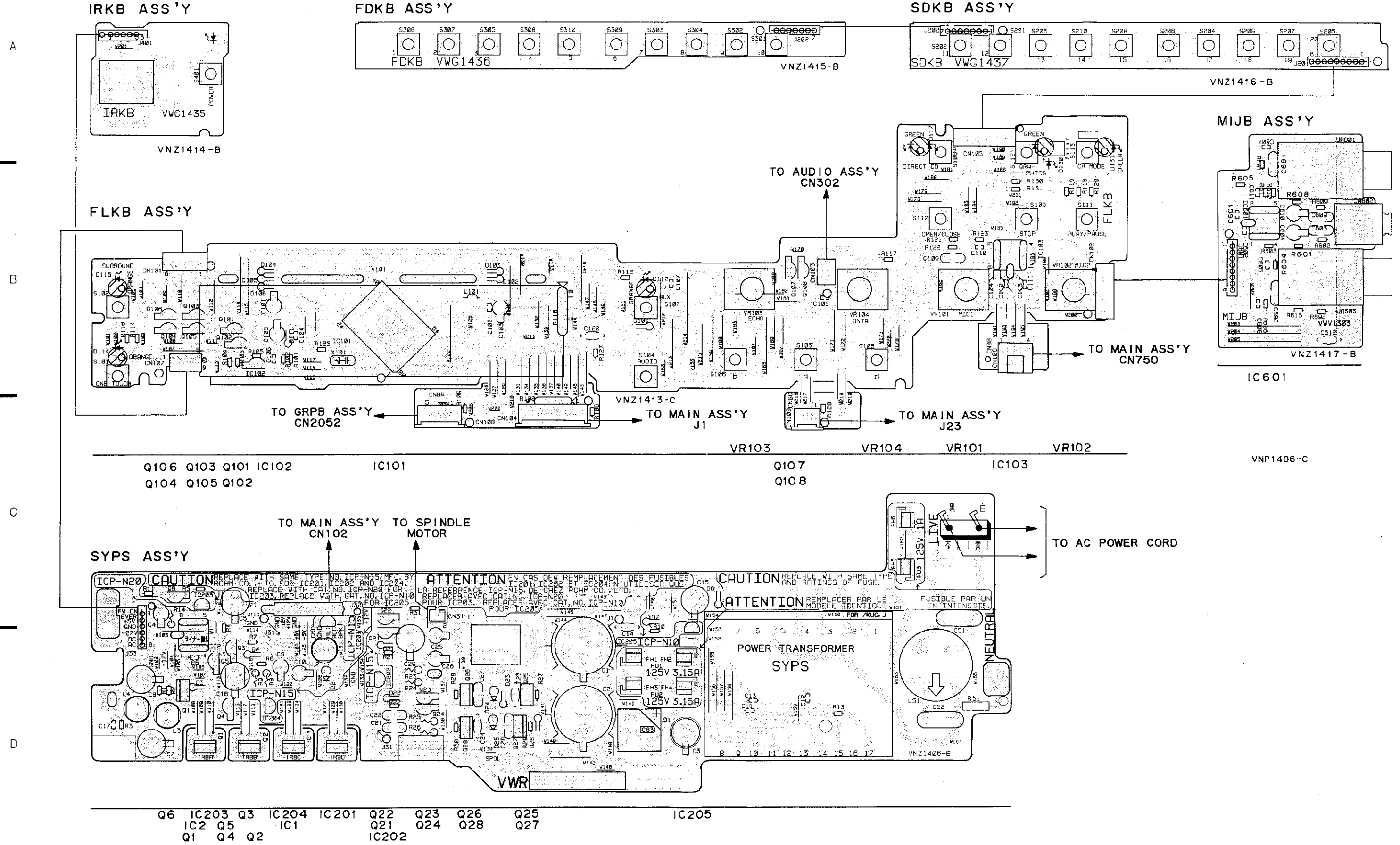
- This P.C.B. connection diagram is viewed from the parts mounted side.
- The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
- The capacitor terminal marked with  shows negative terminal.
- The diode marked with  shows cathode side.
- The transistor terminal marked with  shows emitter.



2.2.1 OVERALL AND FLKB, IRKB, FDKB, SDKB, MIJB, HEPB, SYPS, FG, PKSB, CAMB, LOSB, LOMB, PICKUP ASSEMBLIES

1) PCB CONNECTION DIAGRAMS

This diagram is viewed from the mounted parts side.

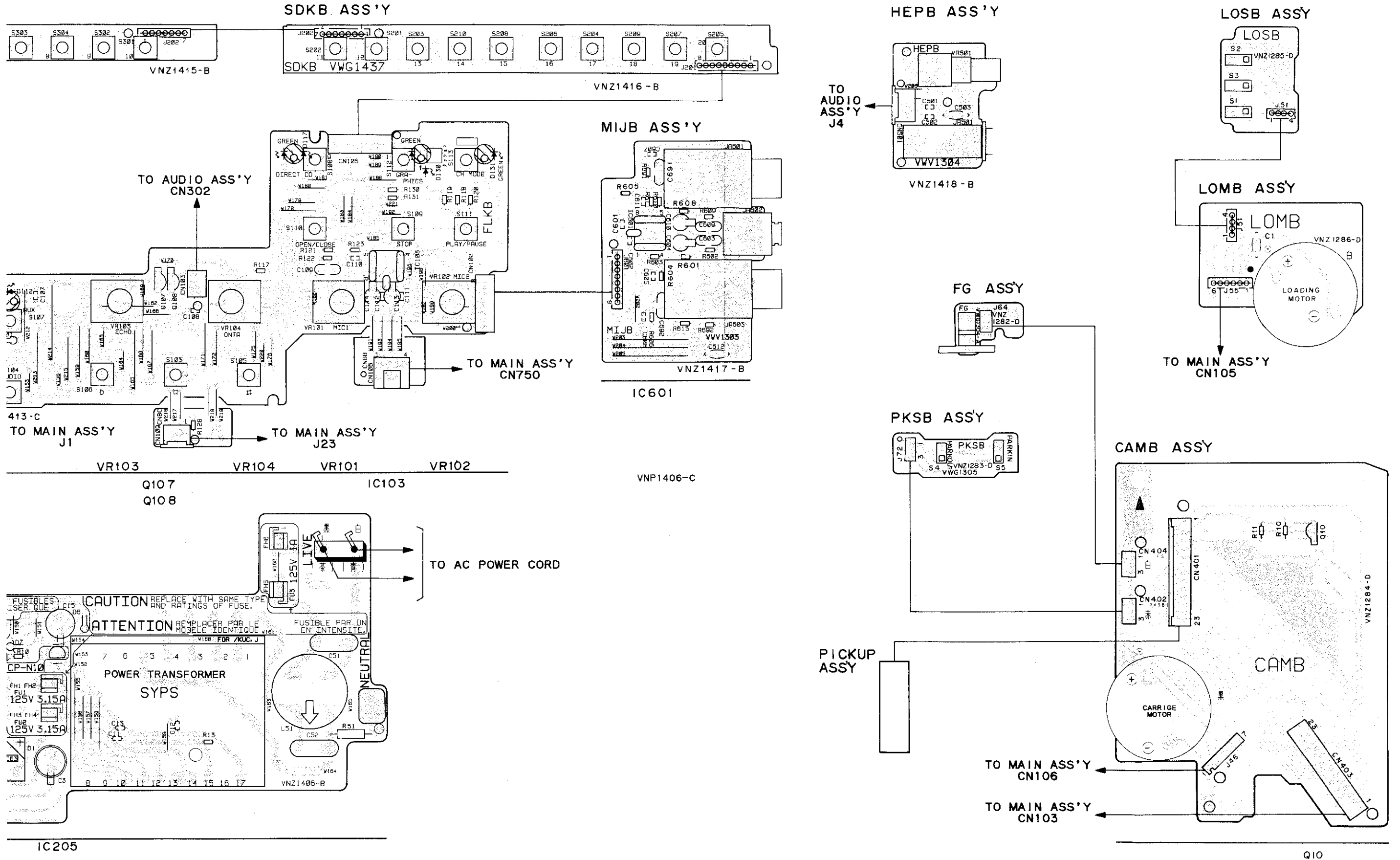


TI  
AUI  
AS:  
J:

PI  
AS

• This diagram is viewed from the mounted parts side.

PCB-1



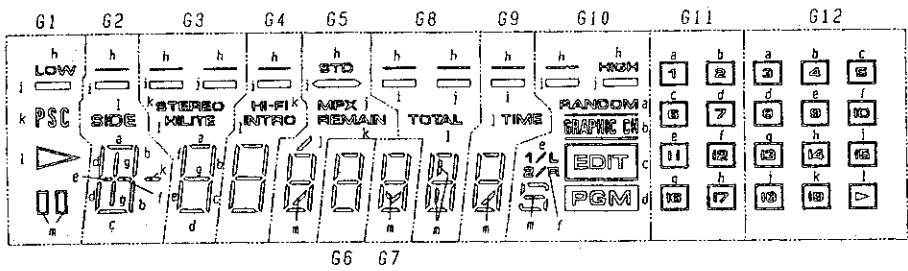
A  
B  
C  
D



## 2) OVERALL AND SCHEMATIC DIAGRAMS

### FL DISPLAY (VAW1029)

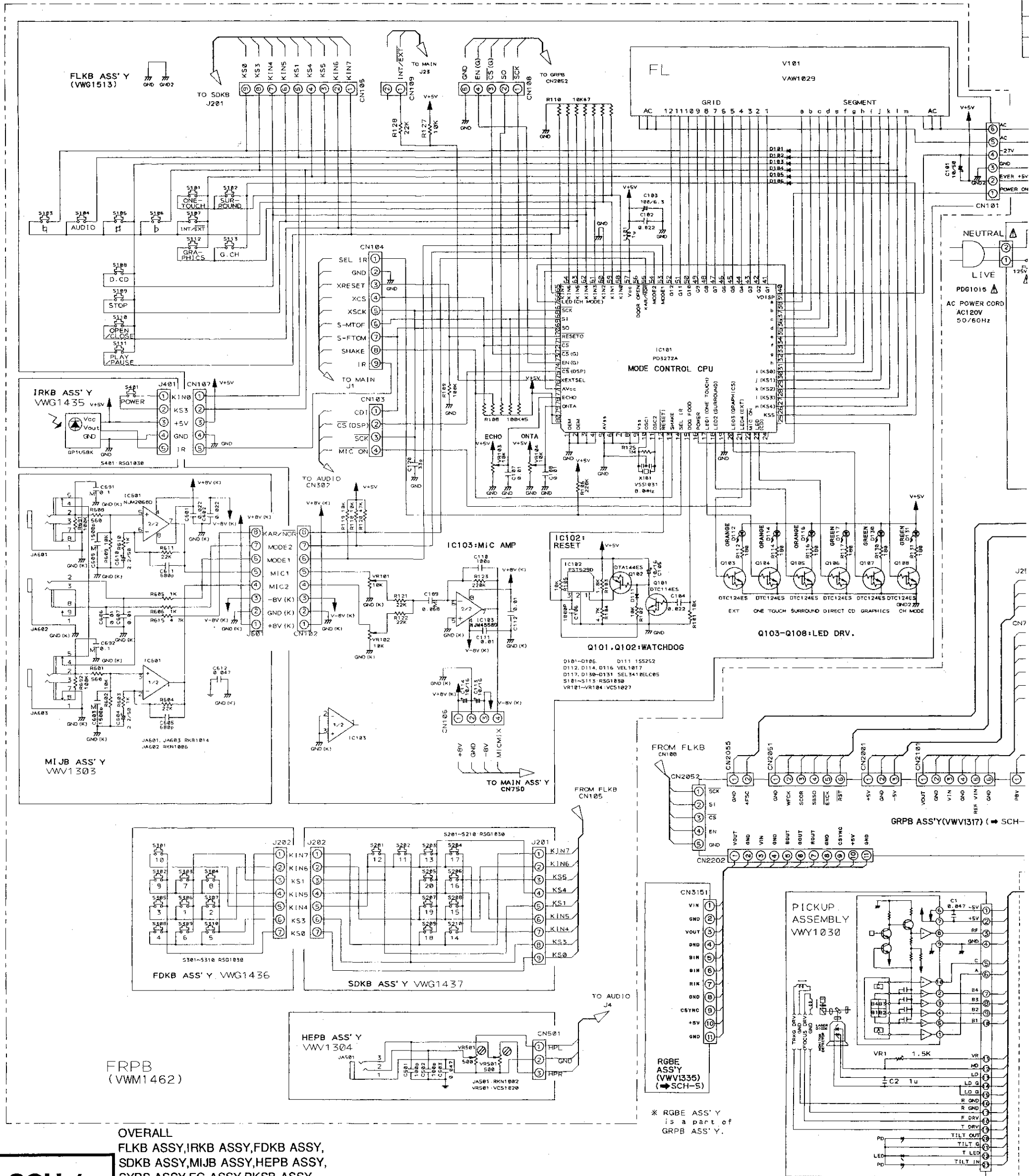
ANODE GRID ASSIGNMENT & PIN ASSIGNMENT



### PIN ASSIGNMENT

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Assignment	F	F	F	NP	NP	NP	NP	NP	NP	NP	NP	G12	G11	G10	G9	G8	G7	G6
Pin No.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Assignment	G5	G4	G3	G2	G1	NP	NP	NP	NP	NP	NP	a	b	c	d	e	f	g
Pin No.	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52		
Assignment	h	i	j	k	l	m	NP	NP	NP	NP	NP	NP	NP	F	F	F		

F: Filament G1-G12: Grid a-m: Anode NP: No pin



OVERALL  
 FLKB ASSY, IRKB ASSY, FDKB ASSY,  
 SDKB ASSY, MIJB ASSY, HEPB ASSY,  
 SYPS ASSY, FG ASSY, PKSB ASSY,  
 CAMB ASSY, LOSB ASSY,  
 LOMB ASSY, PICKUP ASSY

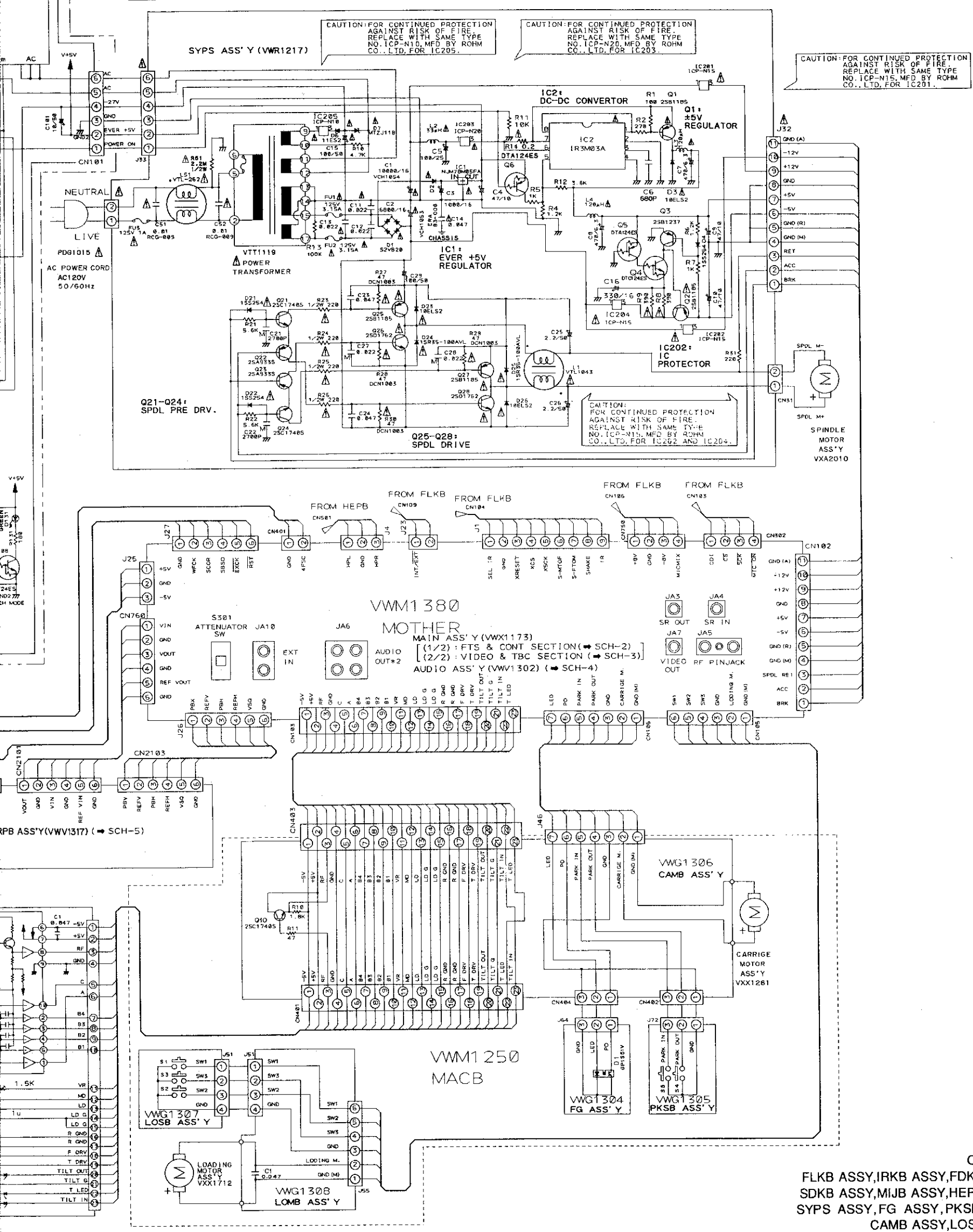
**SCH-1**

\* RGBE ASS'Y is a part of GRPB ASS'Y.

ANODE GRID ASSIGNMENT

	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
a		a	a	a	a	a	a	a	a	RANDOM	1	3
b		b	b	b	b	b	b	b	b	STATIC CH	2	4
c		c	c	c	c	c	c	c	c	EDIT	6	5
d		d	d	d	d	d	d	d	d	PGM	7	9
e		e	e	e	e	e	e	e	e	1/L	11	9
f		f	f	f	f	f	f	f	f	2/R	12	10
g		g	g	g	g	g	g	g	g		15	13
h	LOW				STD						17	14
i												15
j					MPX							18
k	PSC	STEREO	HI-FI	REMAIN								19
l		SIDE	HLNE	INTRO	(upper)			TOTAL	TIME			20
m					(lower)							21

SCH - 1



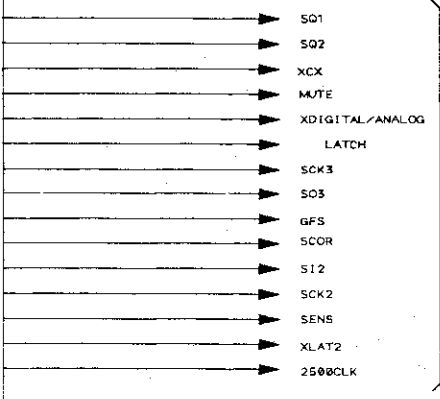
OVERALL  
 FLKB ASSY,IRKB ASSY,FDKB ASSY,  
 SDKB ASSY,MIJB ASSY,HEPB ASSY,  
 SYPS ASSY,FG ASSY,PKSB ASSY,  
 CAMB ASSY,LOSB ASSY,  
 LOMB ASSY,PICKUP ASSY

SCH-1



Note: (No) in the table correspond to the pin number.

2) (FTS & CONT SECTION)

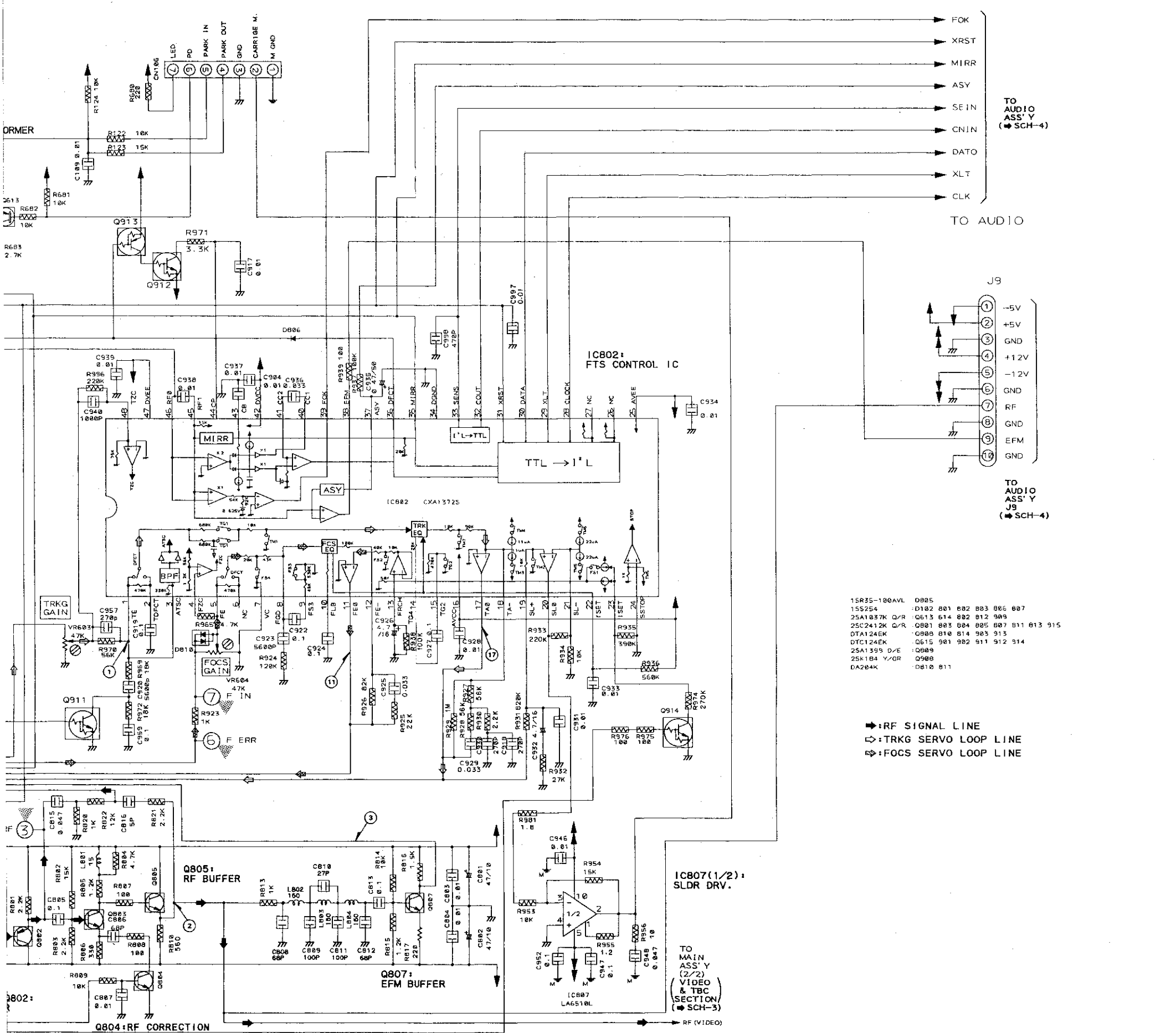


IC101(PD0133C)	IC801 (CXA1081S)	IC802 (CXA1372S)	CN120	Other points
(8) H: 5mS/Div. 2Vp-p DC mode	(16) H: 2mS/Div. 4.7Vp-p DC mode	(2) H: 10mS/Div. 1.7Vp-p AC mode	(1) H: 10mS/Div. 50mVp-p DC mode	(1) H: 10mS/Div. 130mVp-p DC mode
(10) H: 10mS/Div. 5Vp-p DC mode	(7) H: 5mS/Div. 50mVp-p DC mode	(22) H: 2µS/Div. 2.7Vp-p DC mode	(6) H: 10mS/Div. 2.3Vp-p AC mode	(1) Q615 Collector H: 1mS/Div. 5Vp-p DC mode
(11) H: 10mS/Div. 5Vp-p DC mode	(29) H: 2µS/Div. 2.7Vp-p DC mode	(11) H: 1mS/Div. 1.2Vp-p DC mode	(2) H: 10mS/Div. 130mVp-p AC mode	(2) Q805 Emitter H: 5mS/Div. 2Vp-p DC mode
(12) H: 10mS/Div. 2.3Vp-p DC mode	(8) H: 10mS/Div. 40mVp-p DC mode	(17) H: 1mS/Div. 2.5Vp-p DC mode	(3) H: 5mS/Div. 330mVp-p AC mode	(3) Q807 Collector H: 5mS/Div. 1Vp-p DC mode
(15) H: 0.5mS/Div. 5Vp-p DC mode	(12) H: 10mS/Div. 200mVp-p AC mode	(9) H: 10mS/Div. 1.3Vp-p AC mode	(4) H: 10mS/Div. 7.5Vp-p AC mode	
	(20) H: 10mS/Div. 0.35Vp-p DC mode	(10) H: 10mS/Div. 1.3Vp-p AC mode	(5) H: 10mS/Div. 13.6Vp-p AC mode	
		(11) H: 10mS/Div. 1.3Vp-p AC mode		

TO AUDIO

TO CAMB ASS'Y J46 (SCH-1)

SCH-2



TO AUDIO ASS'Y (SCH-4)

TO AUDIO

J9

1 -5V  
 2 +5V  
 3 GND  
 4 +12V  
 5 -12V  
 6 GND  
 7 RF  
 8 GND  
 9 EFM  
 10 GND

TO AUDIO ASS'Y J9 (SCH-4)

- 15R25-100AVL D885
- 15S254 D182 801 802 803 805 807
- 25A1837K Q/R Q613 614 802 812 909
- 25C2412K Q/R Q801 803 804 805 807 811 813 915
- DTA124EK Q808 810 814 903 913
- DTC124EK Q615 901 902 911 912 914
- 25A1395 D/E Q809
- 25K184 Y/GR Q908
- DA204K D810 811

- : RF SIGNAL LINE
- - - : TRKG SERVO LOOP LINE
- · · : FOCUS SERVO LOOP LINE

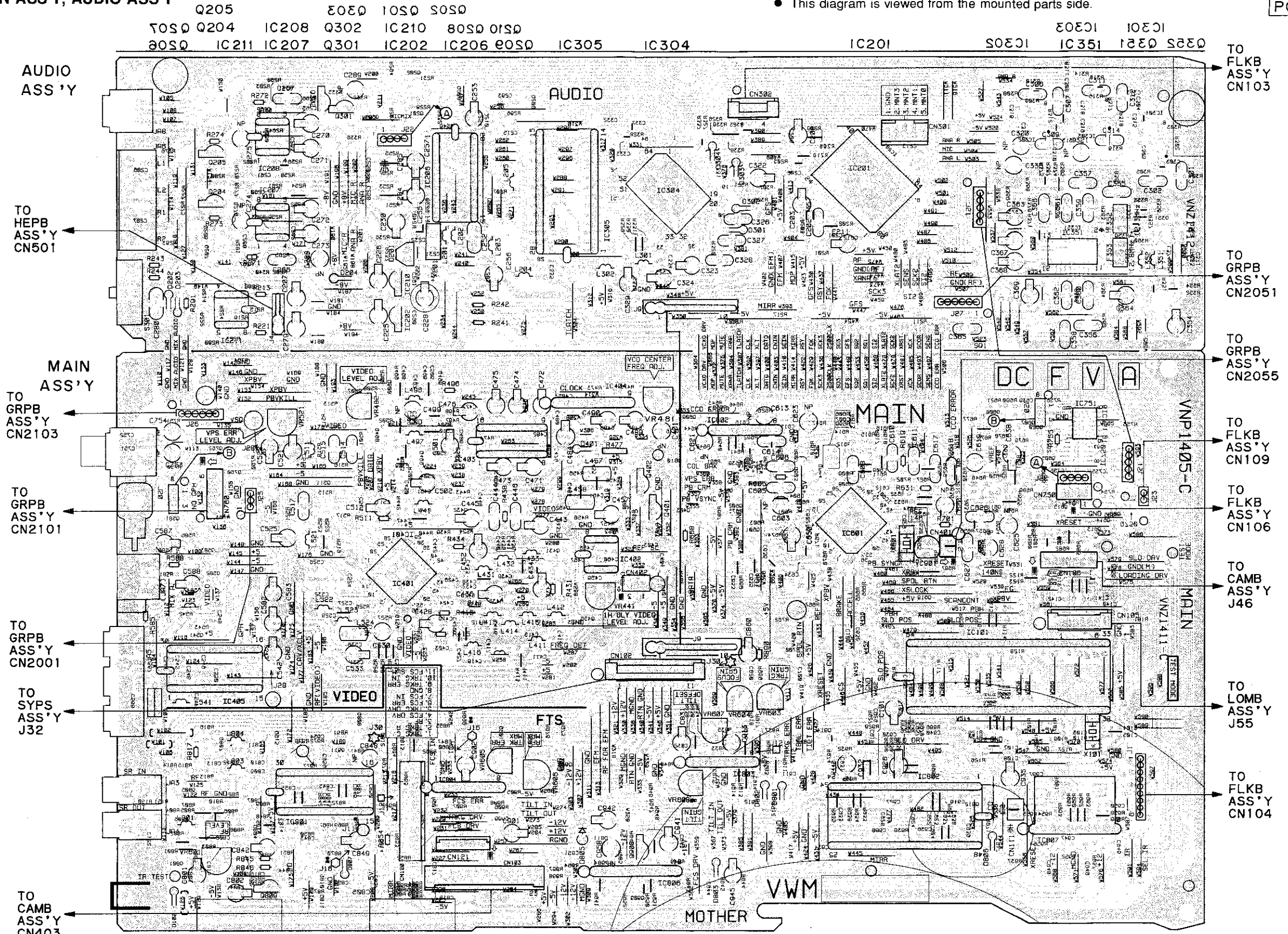
MAIN ASSY (1/2) (FTS, CONT)

SCH-2

MAIN ASS'Y, AUDIO ASS'Y

This diagram is viewed from the mounted parts side.

PCB-2



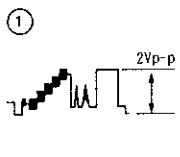
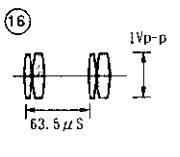
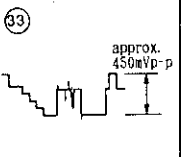
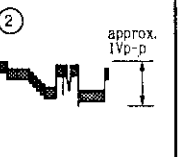
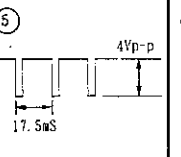
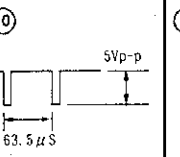
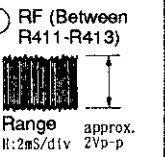
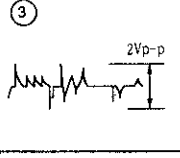
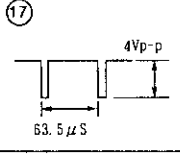
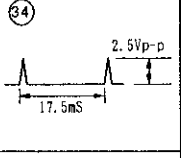
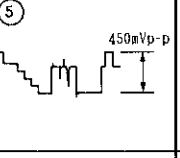
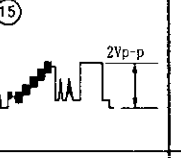
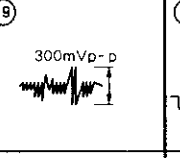
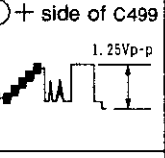
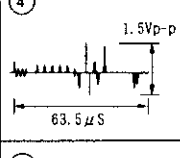
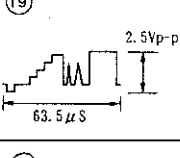
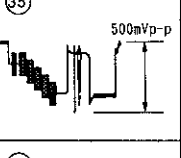
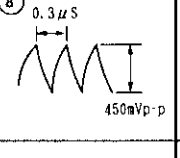
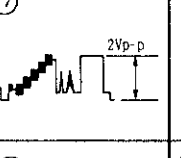
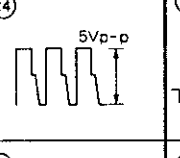
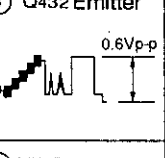
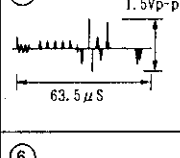
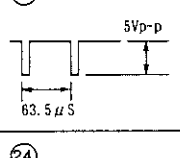
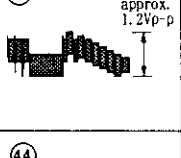
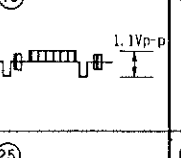
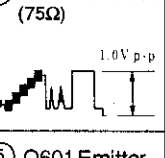
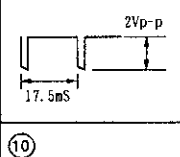
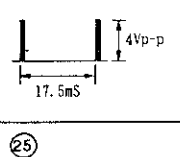
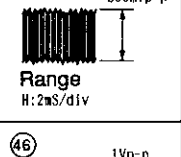
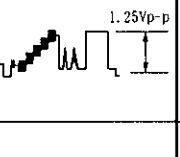
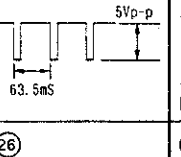
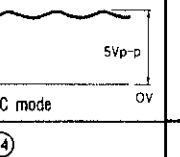
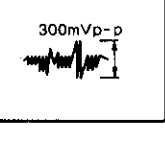
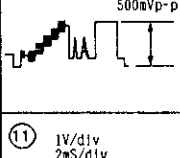
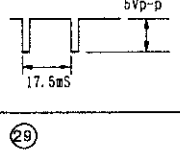
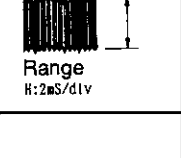
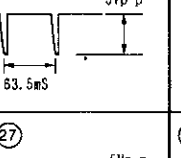
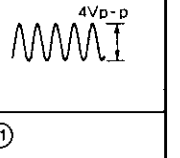
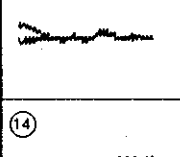
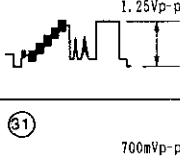
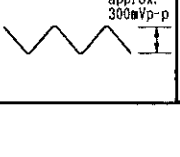
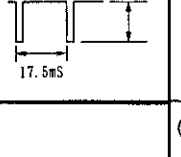
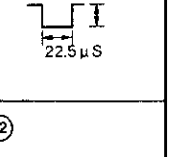
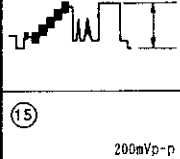
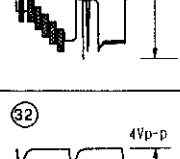
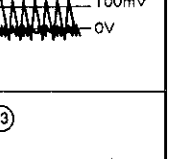
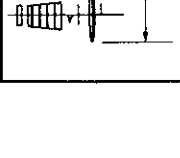
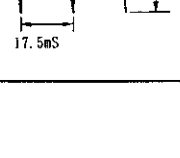
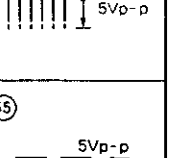
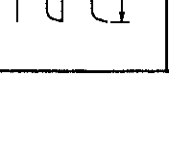
VR601	VR521	VR482	VR605	VR606	VR441	VR481	VR608	VR607	VR604	VR603	VC901
IC405	Q809	IC801	10A01	IC804	IC403	IC404	IC402	Q908	IC602	1180	10801
1820	Q810	Q811	Q812	Q813	Q814	Q815	Q816	Q817	Q818	Q819	Q820
1420	Q821	Q822	Q823	Q824	Q825	Q826	Q827	Q828	Q829	Q830	Q831
1020	Q832	Q833	Q834	Q835	Q836	Q837	Q838	Q839	Q840	Q841	Q842
0802	Q843	Q844	Q845	Q846	Q847	Q848	Q849	Q850	Q851	Q852	Q853
0803	Q854	Q855	Q856	Q857	Q858	Q859	Q860	Q861	Q862	Q863	Q864
0804	Q865	Q866	Q867	Q868	Q869	Q870	Q871	Q872	Q873	Q874	Q875
0805	Q876	Q877	Q878	Q879	Q880	Q881	Q882	Q883	Q884	Q885	Q886
0806	Q887	Q888	Q889	Q890	Q891	Q892	Q893	Q894	Q895	Q896	Q897
0807	Q898	Q899	Q900	Q901	Q902	Q903	Q904	Q905	Q906	Q907	Q908
0808	Q909	Q910	Q911	Q912	Q913	Q914	Q915	Q916	Q917	Q918	Q919
0809	Q920	Q921	Q922	Q923	Q924	Q925	Q926	Q927	Q928	Q929	Q930





**WAVEFORMS AND VOLTAGE VIDEO AND TBC SECTION**

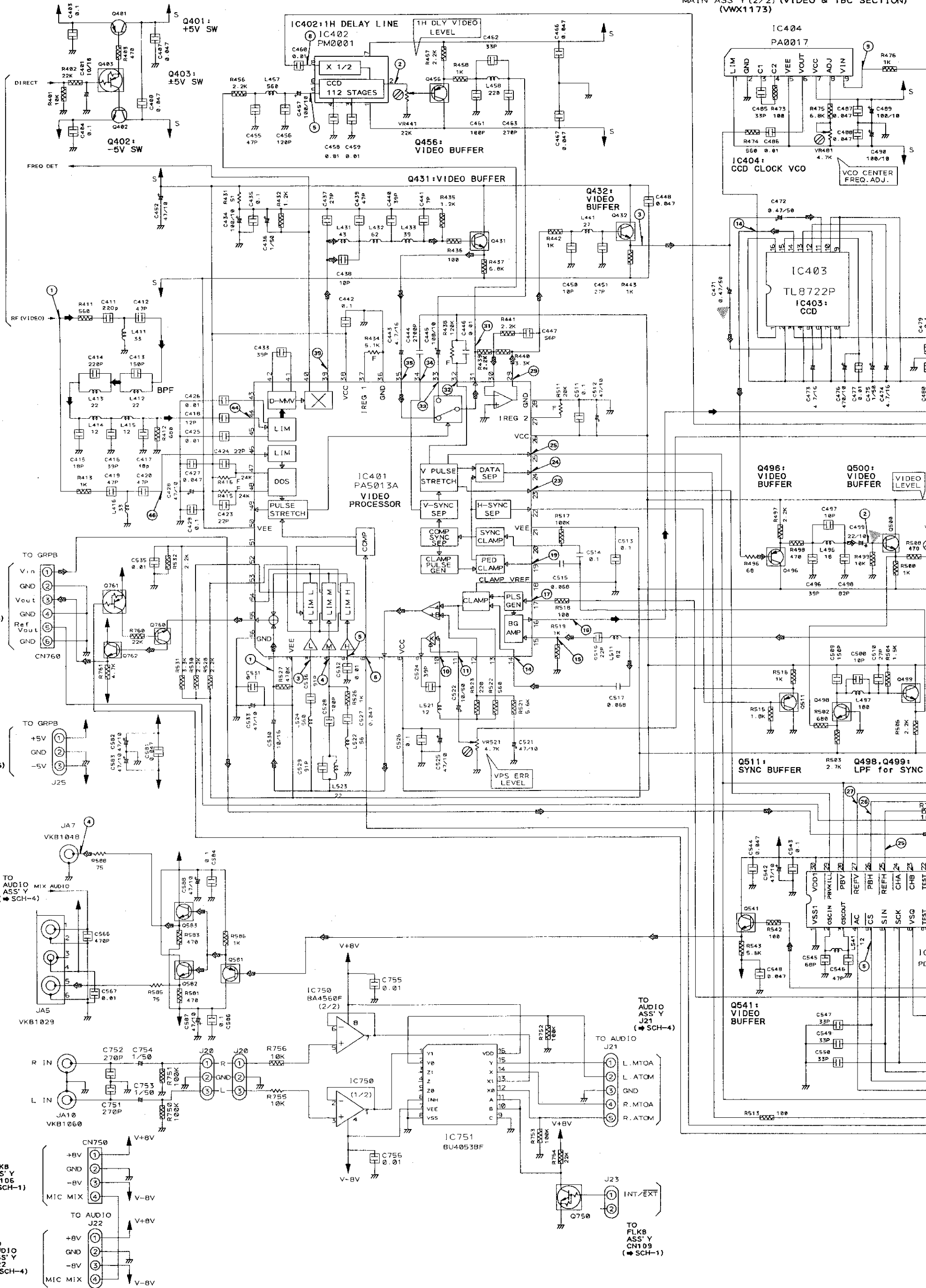
Note: (No.) in the table correspond to the pin number.

IC401 (PA5013A)			IC402 (PM0001)	IC405(PD0175A)	IC601 (PM3002)	Other points
① 	⑬ 	⑳ 	② 	⑤ 	⑩ 	① RF (Between R411-R413) 
③ 	⑭ 	㉑ 	⑤ 	⑮ 	⑲ 	② + side of C499 
④ 	⑲ 	㉓ 	⑧ 0.3 μs 	⑰ 	㉔ 	③ Q432 Emitter 
⑤ 	㉓ 	㉙ 	IC403(TL8722P)		⑲ 	④ VIDEO OUT Pin (75Ω) 
⑥ 	㉔ 	④④ 	⑭ 	⑲ 	⑳ 	⑤ Q601 Emitter 
⑩ 	㉕ 	④⑥ 	IC404(PA0017)		⑲ 	④④ 
⑪ 1V/div 2mS/div 	㉙ 		⑨ 	⑲ 	⑤① 	
⑭ 	⑤① 				⑤② 	
⑮ 	⑤② 				⑤③ 	
					⑤⑤ 	

2.2.3 MAIN ASS'Y (2/2) (VIDEO, TBC)

MAIN ASS'Y (2/2) (VIDEO & TBC SECTION)  
(VWX1173)

A  
B  
C  
D  
E  
F

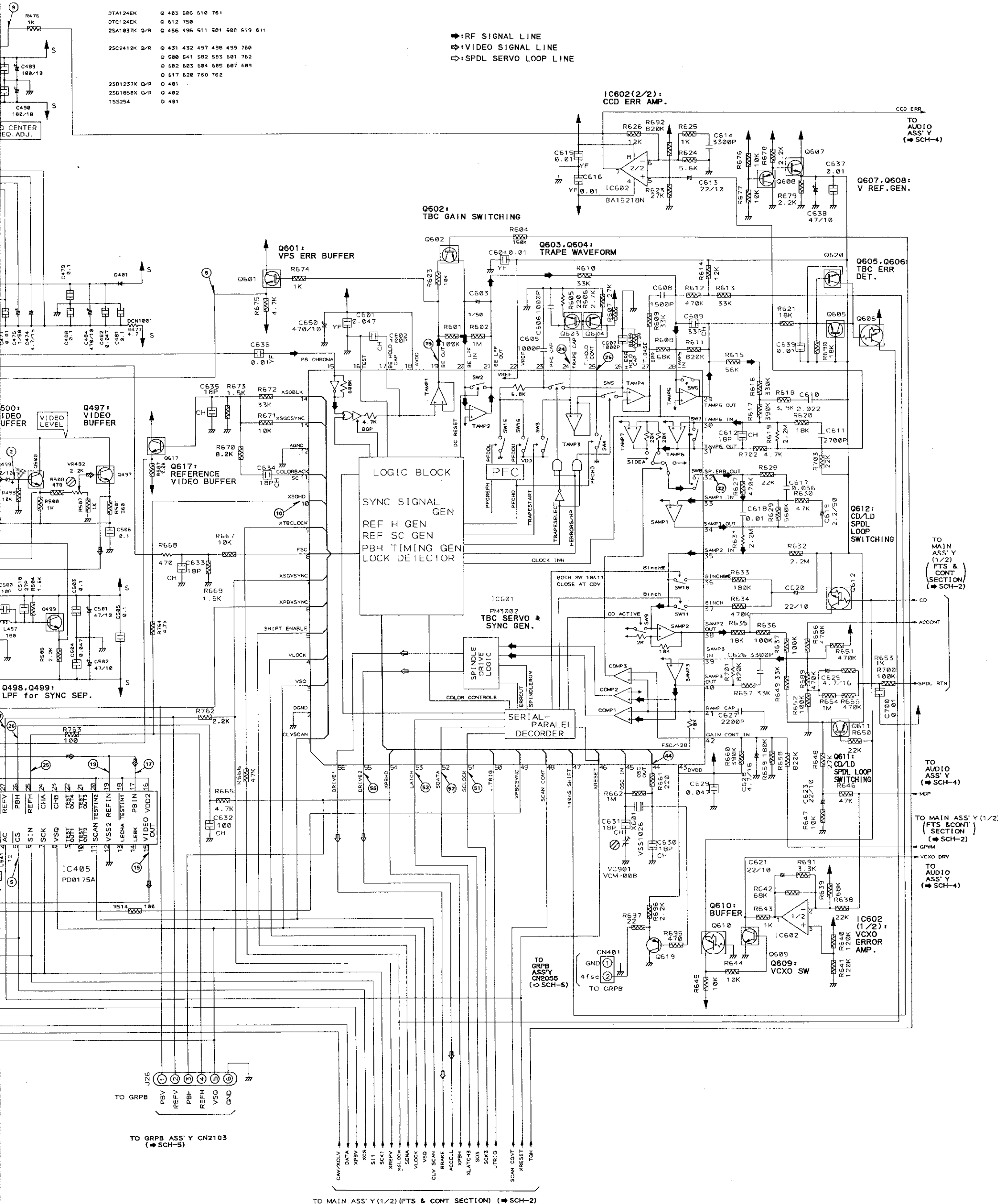


**SCH-3** MAIN ASSY (2/2) (VIDEO, TBC)



DTA124EK	Q 403 506 510 761
DTC124EK	Q 612 750
25A1037K Q/R	Q 456 496 511 581 508 519 611
25C2412K Q/R	Q 431 432 497 498 459 760
	Q 500 541 582 583 601 762
	Q 582 603 604 605 607 609
	Q 617 620 760 762
25B1237K Q/R	Q 401
25D1858K Q/R	Q 402
15S254	D 401

◆:RF SIGNAL LINE  
 ◀:VIDEO SIGNAL LINE  
 ◁:SPDL SERVO LOOP LINE



TO GRPB ASS'Y CN2103 (SCH-5)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO GRPB ASS'Y CN2055 (SCH-5)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

TO MAIN ASS'Y (1/2) (FTS & CONT SECTION) (SCH-2)

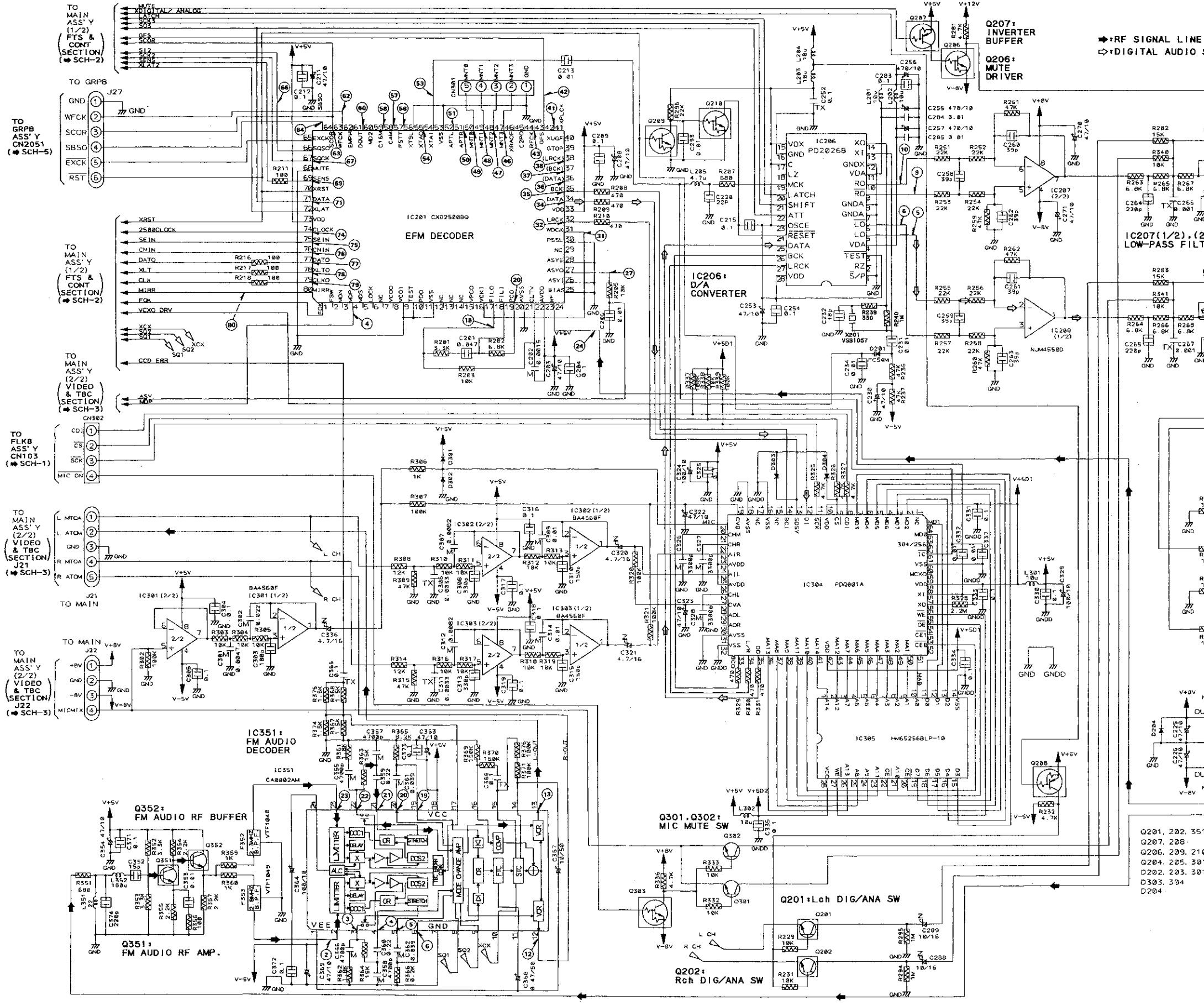
MAIN ASSY (2/2)  
(VIDEO, TBC)

**SCH-3**

2.2.4 AUDIO ASS'Y

AUDIO ASS'Y (VW1302)

A  
B  
C  
D  
E  
F



SCH-4

AUDIO ASSY



S.S.2 GRPB, RGRBE ASS.Y

- This diagram is viewed from the gray colored foil side.
- This PCB is double sided.

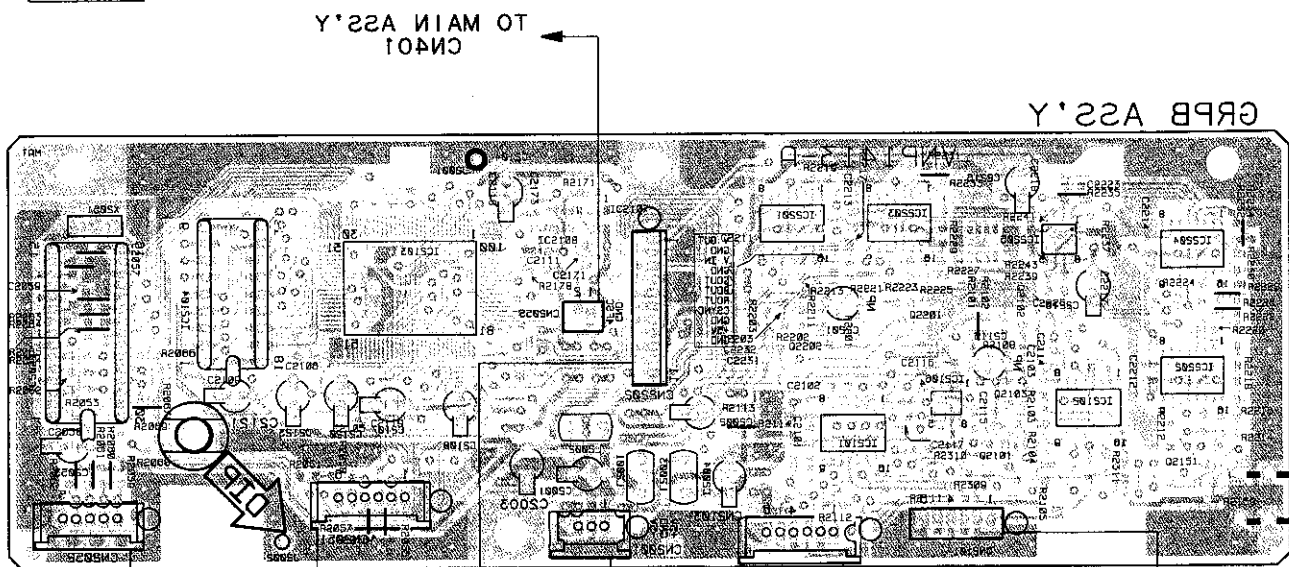
PCB-3

A

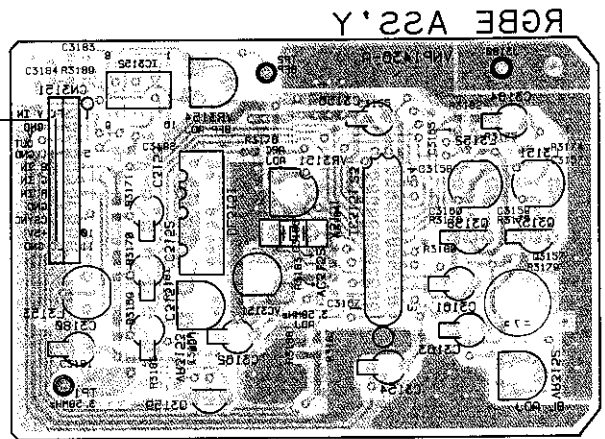
B

C

D



IC5023	IC5104	IC5103	801201	IC5501 701201	IC5101	IC5106	IC5502	IC5504	IC5505	IC5506
				2022Q	2022Q	2022Q	2021Q	2021Q	2021Q	1012Q
TO CN108 ASS.Y FLKB TO	TO J51 ASS.Y AUDIO TO	TO J52 ASS.Y MAIN TO	TO J53 ASS.Y MAIN TO	TO J54 ASS.Y MAIN TO	TO J55 ASS.Y MAIN TO	TO J56 ASS.Y MAIN TO	TO J57 ASS.Y MAIN TO	TO CN180 ASS.Y MAIN TO		

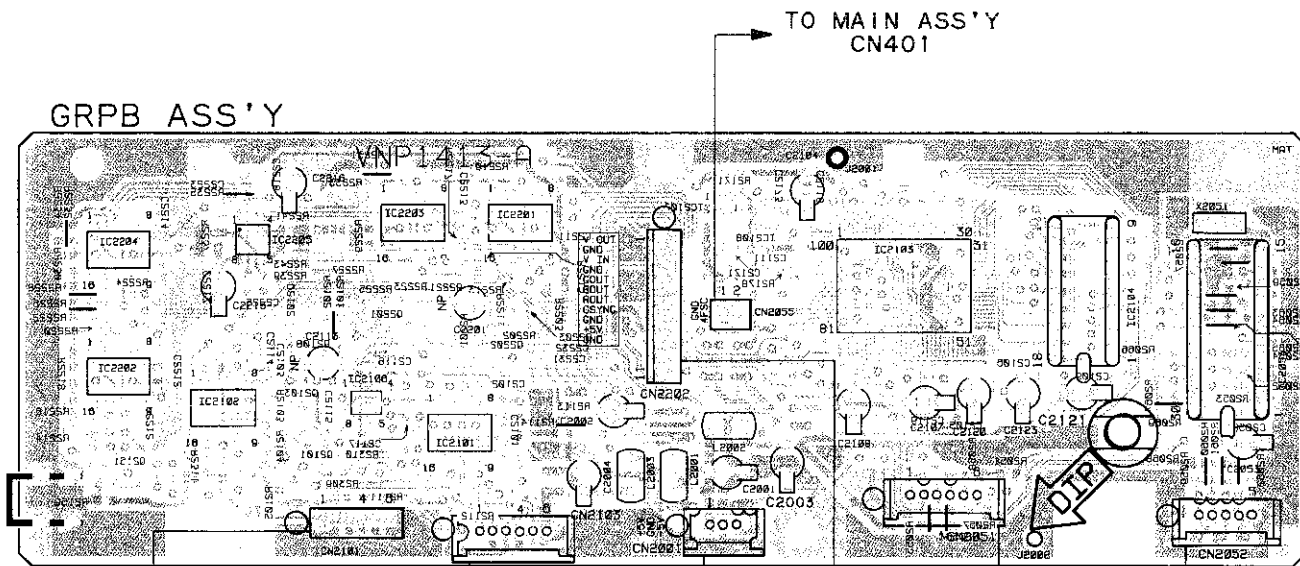


Q3152	Q3153	Q3154	Q3155	Q3156	Q3157	Q3158	Q3159	Q3160	Q3161	Q3162	Q3163	Q3164	Q3165	Q3166	Q3167	Q3168	Q3169	Q3170	Q3171	Q3172	Q3173	Q3174	Q3175	Q3176	Q3177	Q3178	Q3179	Q3180	Q3181	Q3182	Q3183	Q3184	Q3185	Q3186	Q3187	Q3188	Q3189	Q3190	Q3191	Q3192	Q3193	Q3194	Q3195	Q3196	Q3197	Q3198	Q3199	Q3200
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

### 2.2.5 GRPB, RGBE ASS'Y

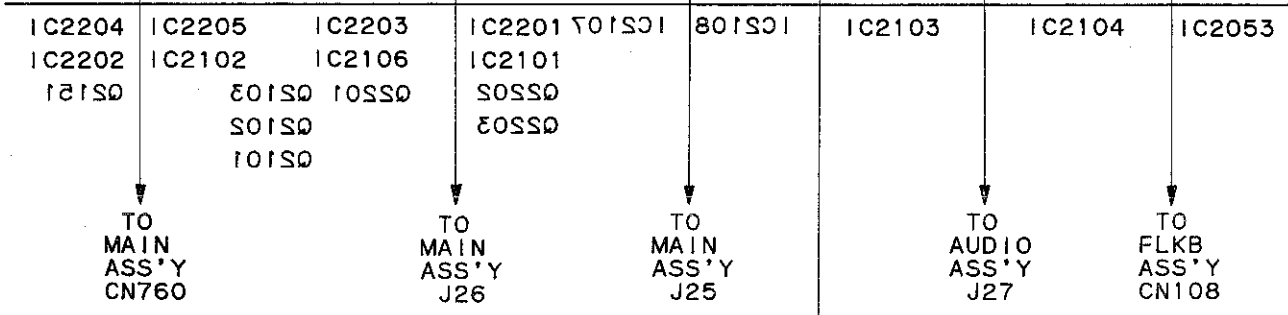
- This diagram is viewed from the pink colored foil side.
- This PCB is double sided.

PCB-3

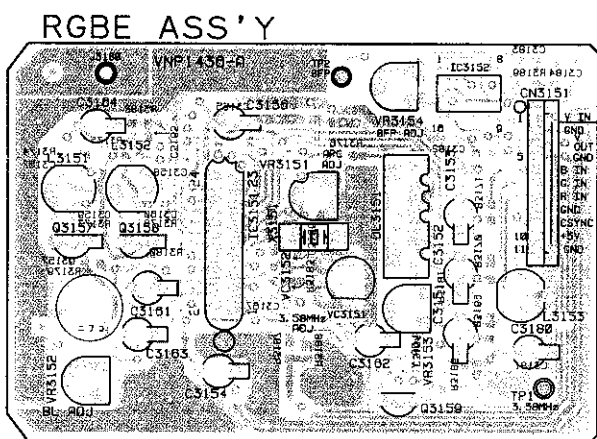


A

B

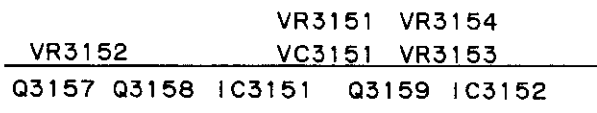


C

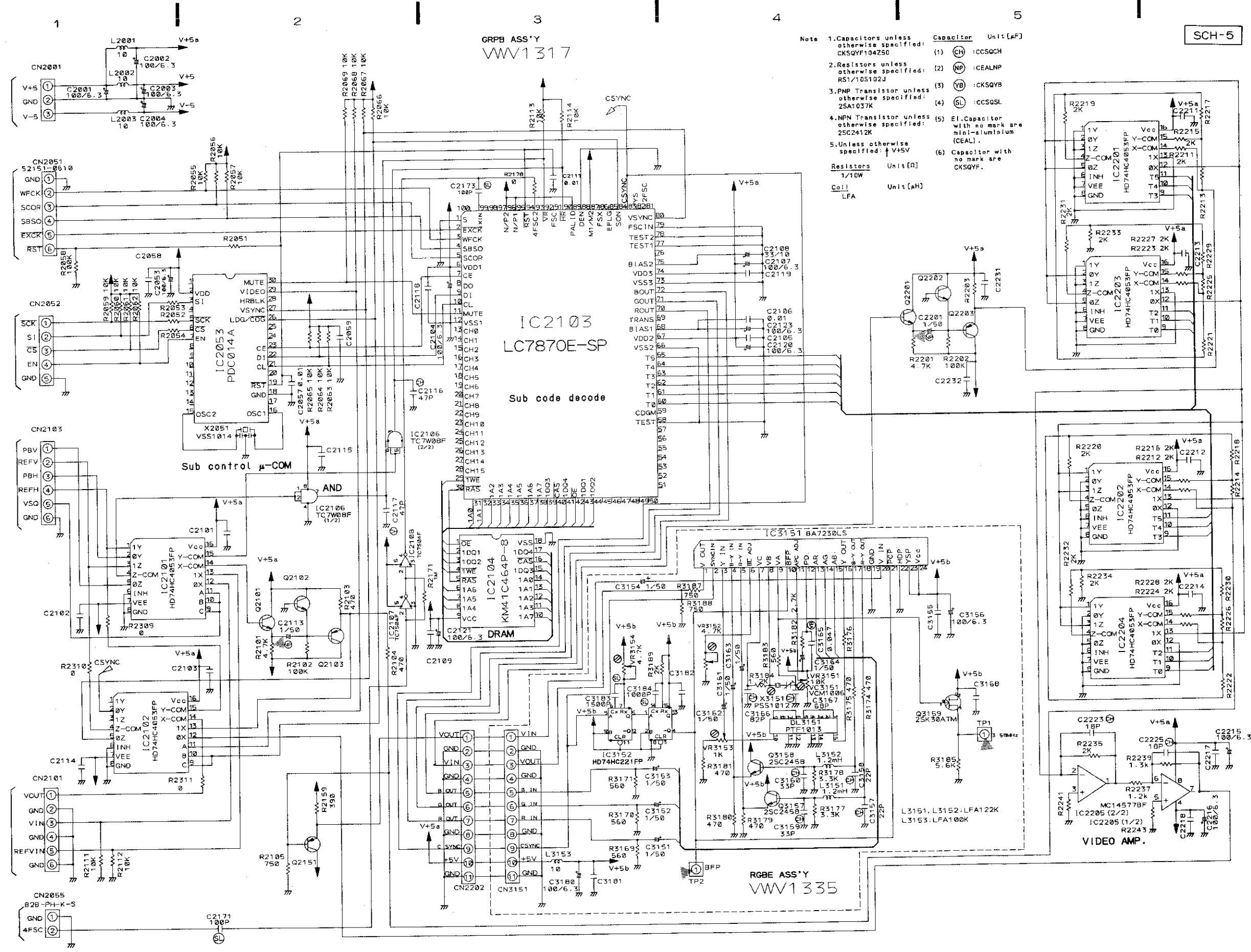


\* RGBE ASS'Y is a part of GRPB ASS'Y.

D



- Note 1. Capacitors unless otherwise specified: CKSQYF104Z50
2. Resistors unless otherwise specified: RS1/10S102J
3. PNP Transistor unless otherwise specified: 2SA1037K
4. NPN Transistor unless otherwise specified: 2SC2412K
5. Unless otherwise specified: +V5V
- Capacitor Unit [μF]
- (1) CH : CCSQCH
  - (2) NP : CEALNP
  - (3) YB : CKSQYB
  - (4) SL : CCSQSL
  - (5) EI: Capacitor with no mark are mini-aluminium (CEAL).
  - (6) Capacitor with no mark are CKSQYF.
- Resistors Unit [Ω]
- 1/10W Unit [μH]
- Coil LFA



TO MAIN ASS'Y (2/2) VIDEO & TBC SECTION J25 (SCH-3)

TO AUDIO ASS'Y J27 (SCH-4)

TO FLKB ASS'Y CN108 (SCH-1)

TO MAIN ASS'Y (2/2) VIDEO & TBC SECTION J26 (SCH-3)

TO MAIN ASS'Y (2/2) VIDEO & TBC SECTION CN760 (SCH-3)

TO MAIN ASS'Y (2/2) VIDEO & TBC SECTION CN401 (SCH-3)

**SCH-5** GRPB ASSY RGBE ASSY

GRPB ASSY RGBE ASSY **SCH-5**



*Service  
Manual*

**SERVICE GUIDE**

**ORDER NO.  
ARP2528**

**CD CDV LD PLAYER**

**CLD-S201**  
**CLD-S250**

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# 1. DISASSEMBLY

## • Removing the Tray Unit

1. Set DIRECT CD to OFF (indicator lamp goes OFF).
2. Remove the two fixing screws (Z) (Fig. 1-1).
3. Press the OPEN/CLOSE button to set the tray unit to its OPEN position.
- \* When manually setting the tray unit to its OPEN position, refer to Notes 1 and 2.
4. Pull out the tray unit while pressing the hook (A) (Fig. 1-1), located on the rear right side of the tray unit, to the left.

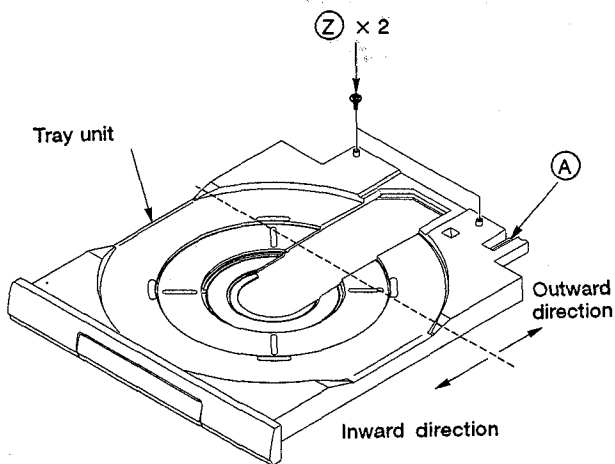


Fig. 1-1

Note 1. Manually setting the tray unit to its OPEN position

1. Remove the clamber unit (B) (Fig. 1-2) by loosening its four screws.

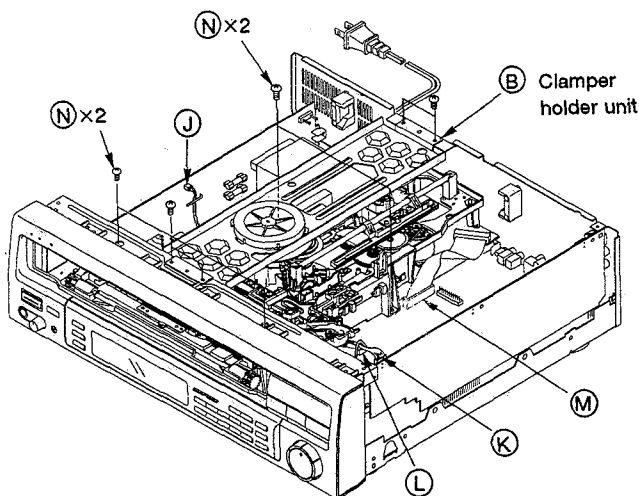


Fig. 1-2

2. Make sure that the position of the lens in the pickup assembly is such that the lens stops outside the position indicated by the dotted line in Fig. 1-1. When the lens stops inside the dotted line, slowly press the (Q) portion of the rack assembly (Fig. 1-3) to move the lens in the pickup assembly until the lens is outside the position indicated by the dotted line in Fig. 1-1. Note that by not going through this process, opening the CD tray and removing the tray ASS'Y would be more time-consuming.

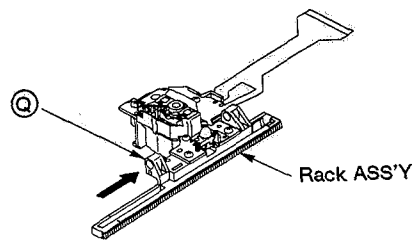


Fig. 1-3

3. Insert your hand through the right side of the tray unit and turn the gear pulley (C) (Fig. 1-4) in a clockwise direction until the servo-mechanism unit (D) (Fig. 1-5) lowers. Keep turning the pulley until the tray unit starts to move towards the front.

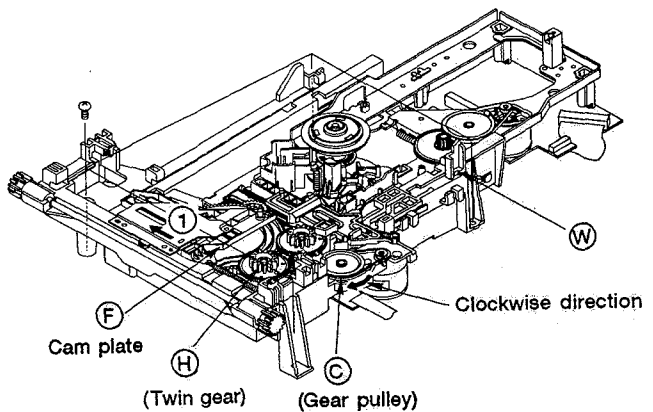


Fig. 1-4

4. Slowly pull out the tray unit to the OPEN position.



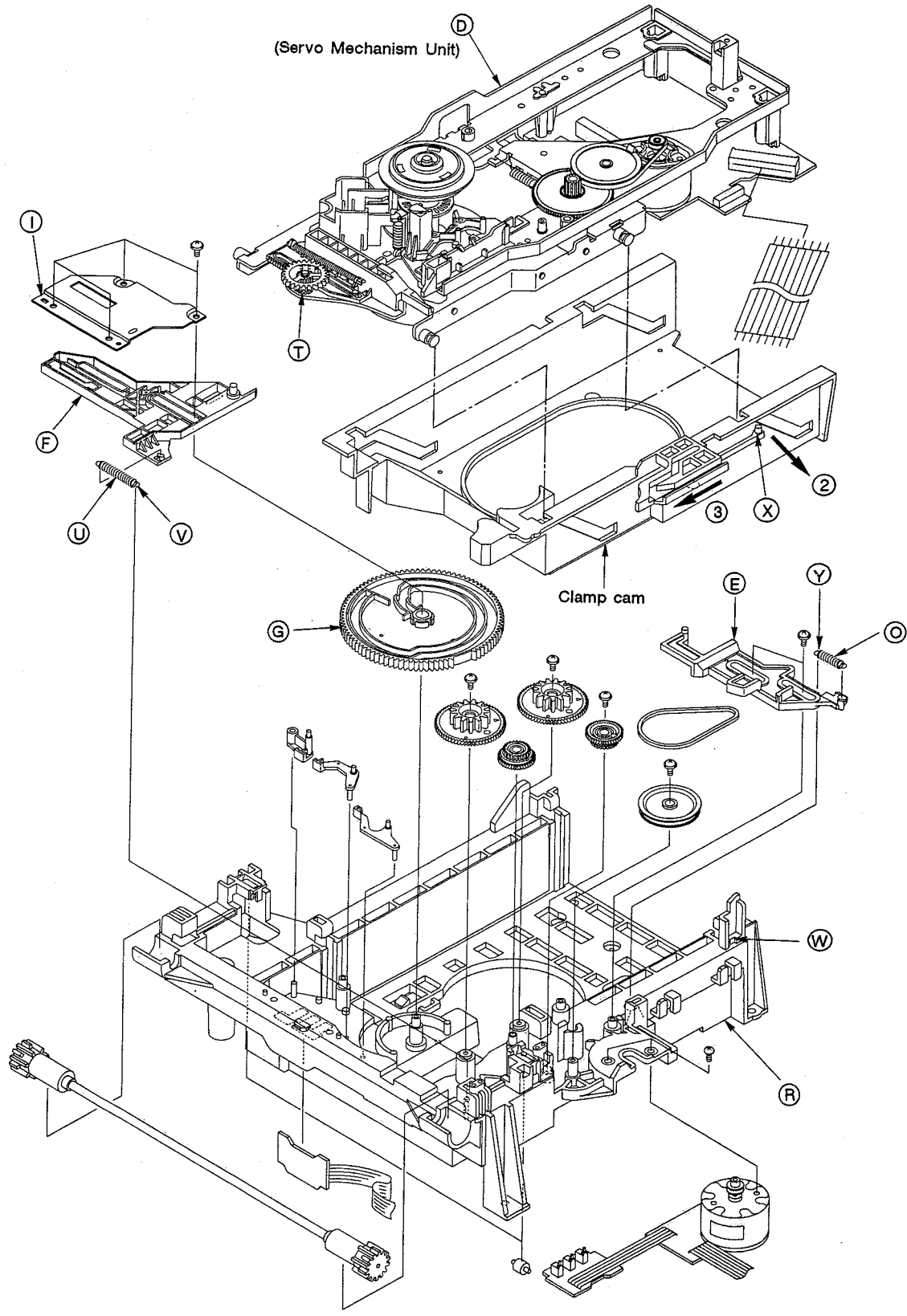


Fig. 1-5

Note 2. Setting the tray unit to its OPEN position when the CD tray is completely or partially OPEN

1. Remove the clamber unit ② (Fig. 1-2) by loosening its four screws.
2. Slowly push in the CD tray to the CLOSE position.
3. Slowly press the ③ portion of the rack assembly (Fig. 1-3) to move the lens in the pickup assembly until the lens is outside the position indicated by the dotted line in Fig. 1-1.
4. Insert your hand through the right side of the tray unit and turn the gear pulley ④ (Fig. 1-4) in a counterclockwise direction until the servo-mechanism unit ⑤ (Fig. 1-5) starts to move upward. Keep turning the pulley until the clamp position is reached (the LD tray and CD tray become one unit).
5. When the clamp position has been reached, turn the gear pulley ④ (Fig. 1-4) in a clockwise direction until the servo-mechanism unit ⑤ lowers. Keep turning the pulley until the tray unit starts to move towards the front.
6. Slowly pull out the tray unit to the OPEN position.

● Attaching the Tray Unit

1. Make sure that the CD plate ⑥ is positioned to the left (LD Tray mode) as in Fig. 1-6. When the CD plate ⑥ is positioned to the right (CD Tray mode) as in Fig. 1-6, perform steps 1) to 2).

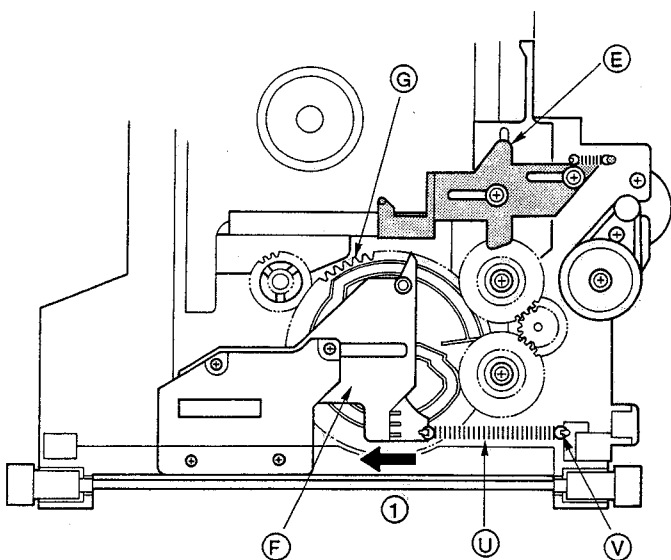


Fig. 1-6

- 1) Turn the power ON. While DIRECT CD is OFF, push cam plate ⑦ (Fig. 1-6) towards the direction of the arrow ①.
- 2) Wait until the cam gear ⑧ (Fig. 1-6) turns, the servo-mechanism unit ⑤ (Fig. 1-5) goes upward, and the pickup assembly stops moving.
2. Press the OPEN/CLOSE button to open the tray unit, or pull out the power cord from the AC outlet and turn the twin gear ⑨ (Fig. 1-4) in a counterclockwise direction until the cam gear ⑧ (Fig. 1-6) can no longer turn.
3. Keeping the tray unit parallel with the front panel, slowly insert the tray unit through the opening of the front panel.

Note that if you insert the tray unit in the front panel when the tray unit and the front panel are not parallel with each other, the tray unit might get stuck while being inserted.

● Removing the Servo-Mechanism Unit

1. Remove the clamber unit ② (Fig. 1-2) by loosening its four screws, and remove the tray unit.
2. Remove the four connectors ⑩ to ⑭ (Fig. 1-2).
3. Remove the four fixing screws ⑮ of the mechanism base and remove the whole servo-mechanism unit from its casing.
4. Remove the ⑶ side of the CDP spring ⑯ (Fig. 1-5) as well as the CD plate ⑥ by loosening the CD plate's two screws.
5. Remove the lead wire from the lead wire hook ⑰ (Fig. 1-7) for the spindle motor at the rear of the mechanism base ⑱.

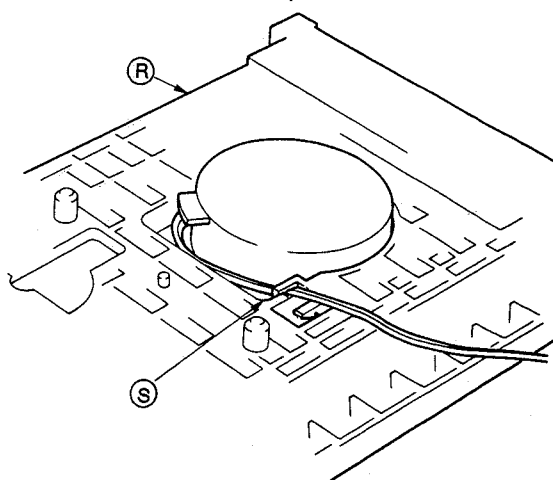


Fig. 1-7

6. While pushing the cam plate ⑥ (Fig. 1-4) towards the direction of the arrow ①, turn the twin gear ④ (Fig. 1-4) in a clockwise direction.
7. Stop turning the twin gear ④ (Fig. 1-4) when the servo-mechanism unit ① (Fig. 1-5) has gone upward and the Y-gear ① is engaged with the cam gear ③ by three to five teeth.
8. While bending the clamp cam hook ⑧ (Fig. 1-5) in the direction of the arrow ②, move the hook to its "built-in position" ⑦ (Fig. 1-4) towards the rear.
9. Lift the servo-mechanism unit ① straight up and remove the unit from the clamp cam (Fig. 1-5).

● **Attaching the Servo-Mechanism Unit**

1. Return the clamp cam and other parts to their original positions (when the servo-mechanism unit was removed).
2. While turning the Y-gear ① in a clockwise direction by three to five teeth (Fig. 1-8) in the same manner as when the Y-gear was removed, attach the servo-mechanism unit from above to the clamp cam (Fig. 1-5).
3. While bending the clamp cam hook ⑧ in the direction of the arrow ②, move the hook in the direction of the arrow ③ (Fig. 1-5).
4. While the servo-mechanism unit is raised, hook the lead wire from the spindle motor to hook ⑤ (Fig. 1-7) on the rear of the mechanism base ④.
5. Turn the twin gear ④ (Fig. 1-4) in a counterclockwise direction until the servo-mechanism unit lowers, the cam gear ③ (Fig. 1-5) stops turning, and the twin gear ④ (Fig. 1-4) runs idle.

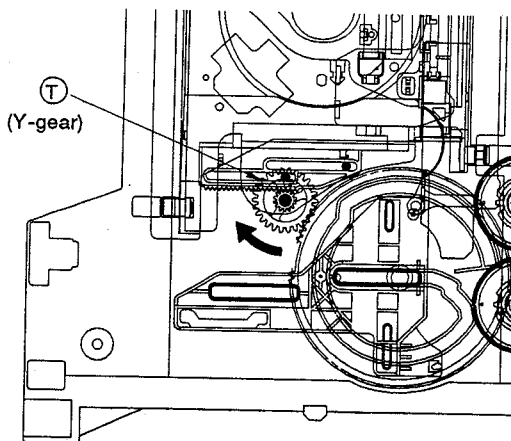


Fig. 1-8

● **Attaching the Cam Gear and Cam Plate**

1. Bring the clamp cam (Fig. 1-5) close towards you (while the servo-mechanism unit is being lowered).
2. Insert the cam gear ③ upon directing the rib horizontally as shown in Fig. 1-9.

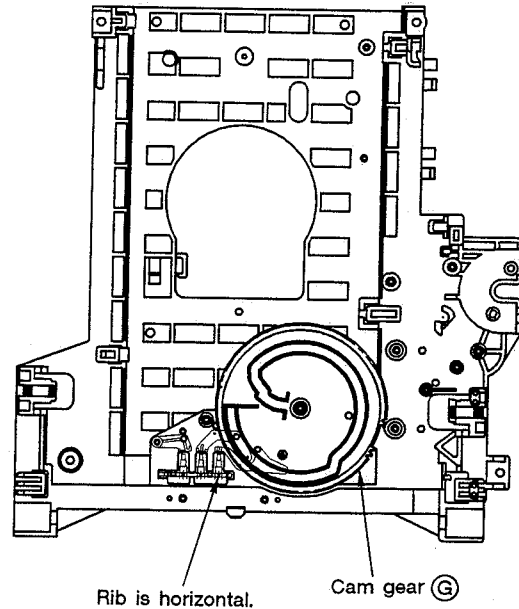


Fig. 1-9

3. Attach the CAS spring, ① (Fig. 1-6) to the cam plate ⑥, and hook the ② side of the CAS spring to the spring-latching part of the mechanism base.

- Slightly turn the cam gear ⑥ in a counterclockwise direction until the cam gear reaches the position shown in Fig. 1-10.

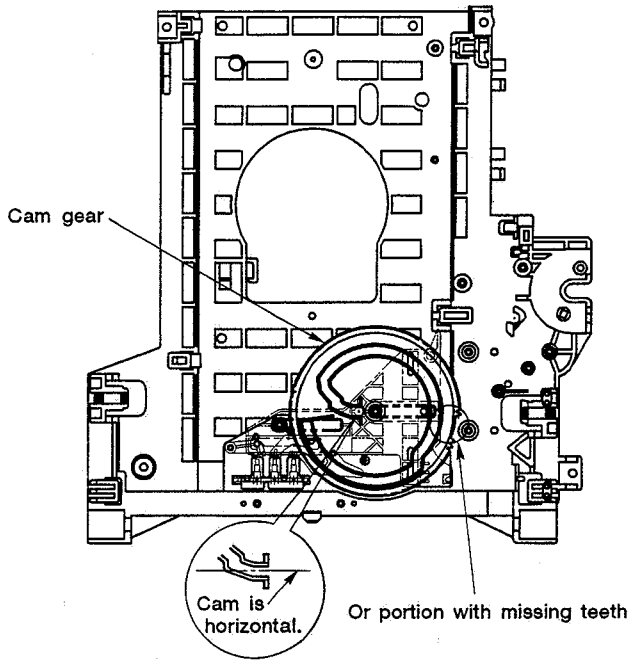


Fig. 1-10

- Attach the cam plate ⑦ on the cam gear ⑥ when the plate has moved to the rightmost position (Fig. 1-6).
- Fix the shaft holder ① using four screws (Fig. 1-5).

**• Matching the Position of the Gears**

- Attach the center gear ②, twin gears ③ and ④, and Y-gear ⑤ in the positions indicated in Fig. 1-11.

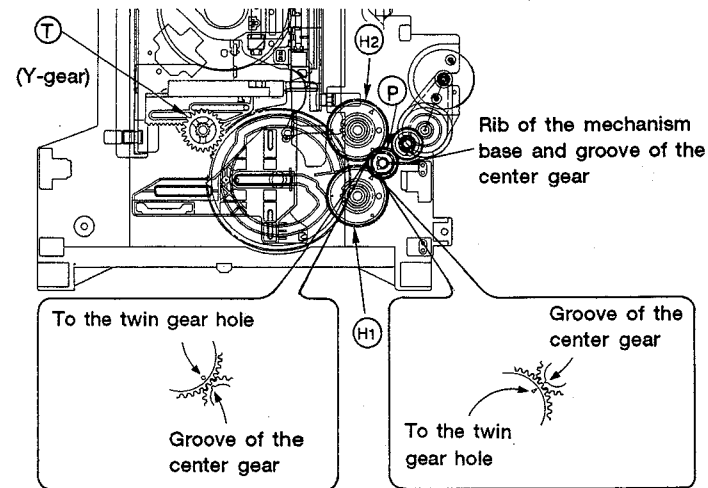


Fig. 1-11

**• Attaching the CD Plate**

- Upon attaching the CD spring ⑧ (Fig. 1-5) to the CD plate ⑨, hook the ⑩ side of the CD spring to the mechanism base hook.
- Attach the CD plate ⑨ (from the left side) into the position shown in Fig. 1-6.

## 2. DESCRIPTION OF MECHANISM

### 2.1 OUTLINE OF MECHANISM

The mechanism consists of the following four independent units:

- ① Loading mechanism unit (Fig. 2-2)
- ② Servo-mechanism unit (Fig. 2-3)
- ③ Tray unit (Fig. 2-4)
- ④ Clamper unit (Fig. 2-6)

The tray unit only moves in the horizontal direction (forward and backward) due to the ascending and descending movements of the servo-mechanism unit, while the clamper unit is fixed inside a casing. These are some of the distinct features of the mechanism. Moreover, a CD tray is added to the LD tray in the tray unit, a feature not found in previous models.

The major components of each unit are described below.

#### ① Loading Mechanism Unit (Refer to Fig. 2-2)

The loading mechanism unit consists of the following: a DC motor (carriage motor) which is the drive source of the mechanical base, a clamp cam which guides the ascending and descending movements of the servo-mechanism unit, a tray unit, a cam gear which engages the movement of the loading mechanism unit with that of the tray unit, a cam plate, and gears for reducing speed during operation. A detection system for each operation mode of the mechanism is included in the loading mechanism unit through the switch circuit board assembly and is connected together with the power supply of the DC motor.

By attaching the servo-mechanism unit and tray unit to the loading mechanism unit, the operations of the mechanism are completed without using the casing and other supporting components (Fig. 2-2) (excluding the operations of the clamper unit and clamp).

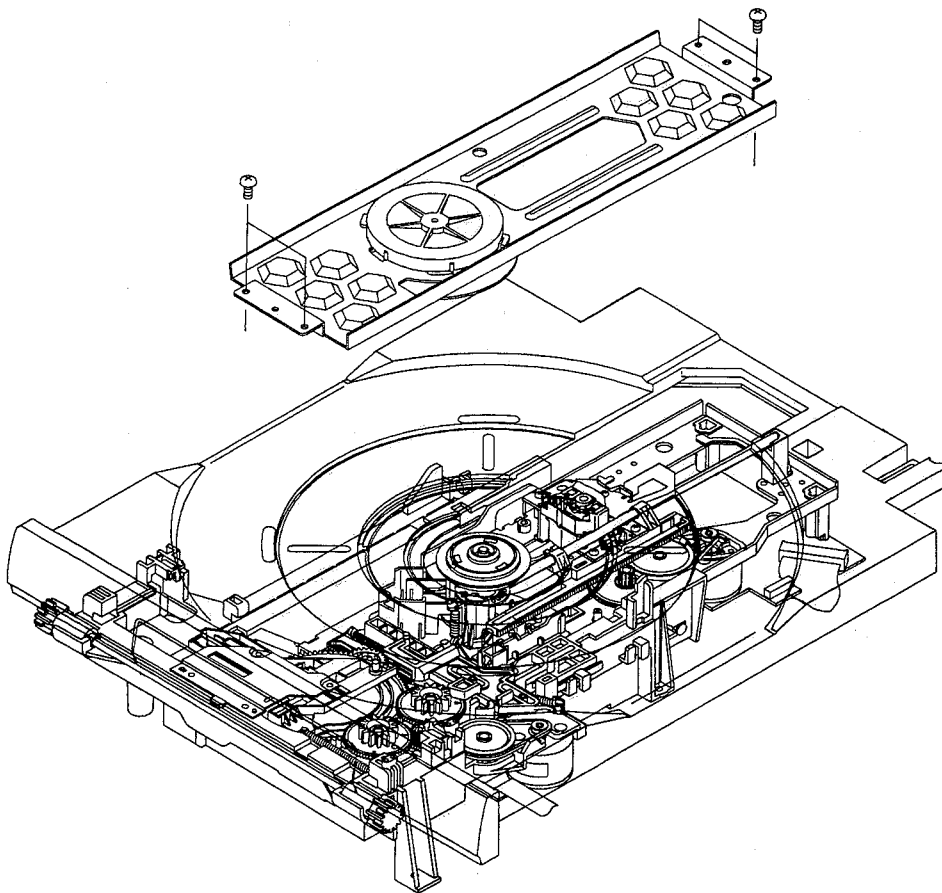


Fig. 2-1

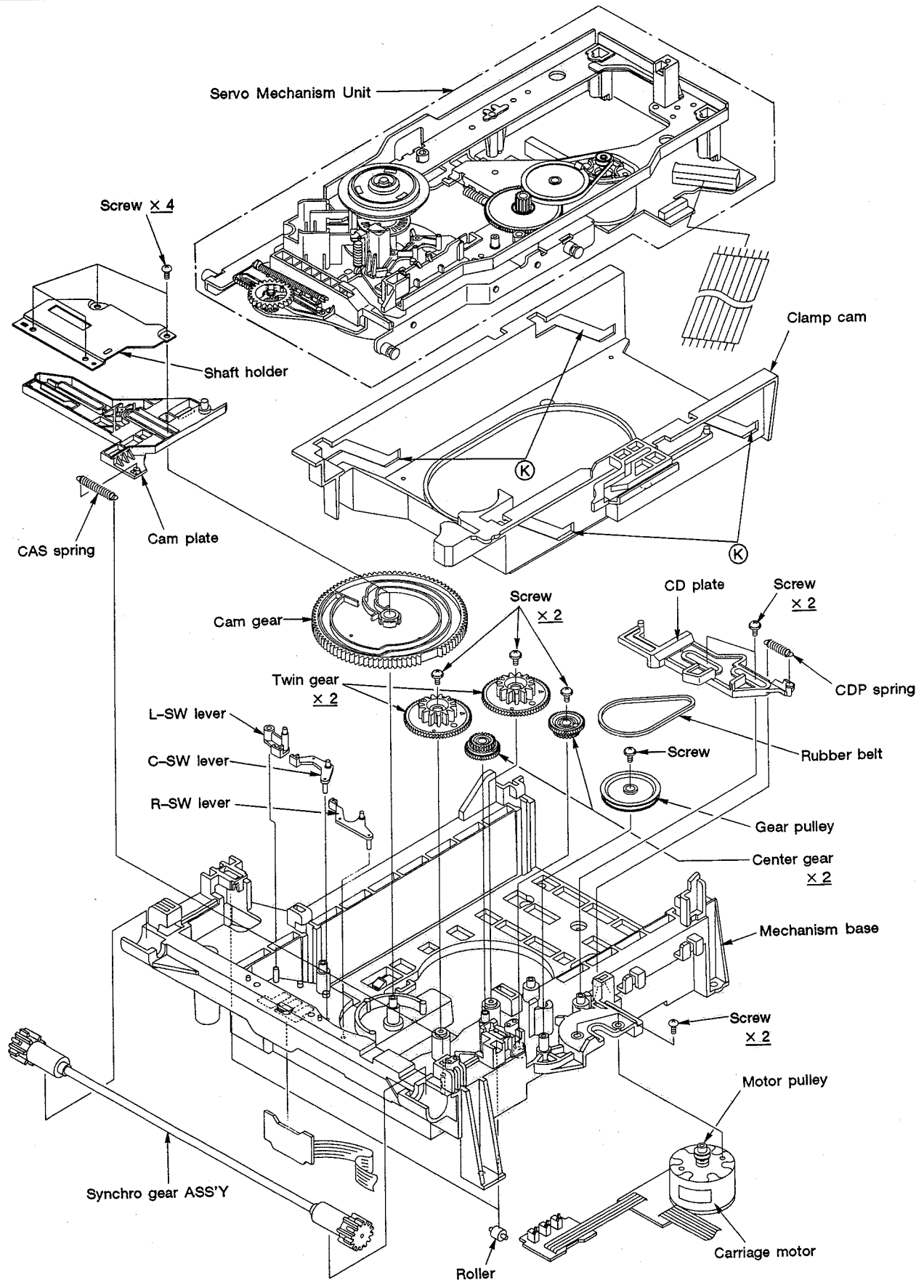


Fig. 2-2 Loading Mechanism unit

② Servo-Mechanism Unit (Refer to Fig. 2-3)

The servo-mechanism unit is mainly divided into two parts: one is related to the tilt base, while the other is related to the motor base.

The tilt base consists mainly of the following: a rack assembly which includes the pickup assembly, a carriage shaft for the guide of the rack assembly, a DC motor (shared with the loading mechanism unit) for driving the rack assembly, and various gears. Similar to the loading mechanism unit, a detection system for the pickup assembly is included through the switch circuit board

assembly and is connected to the exterior of the servo-mechanism unit, together with the signal lines from the DC motor power supply and pickup assembly, via the CAMB assembly.

The motor base consists of the following: a spindle motor assembly, a tilt cam which guides the tilt operation of the tilt base, and a Y-gear which engages the loading mechanism unit with the tilt cam.

The tilt base is set on top of the motor base. Both bases are fixed with screws in every direction (up/down, left/right, and front/rear).

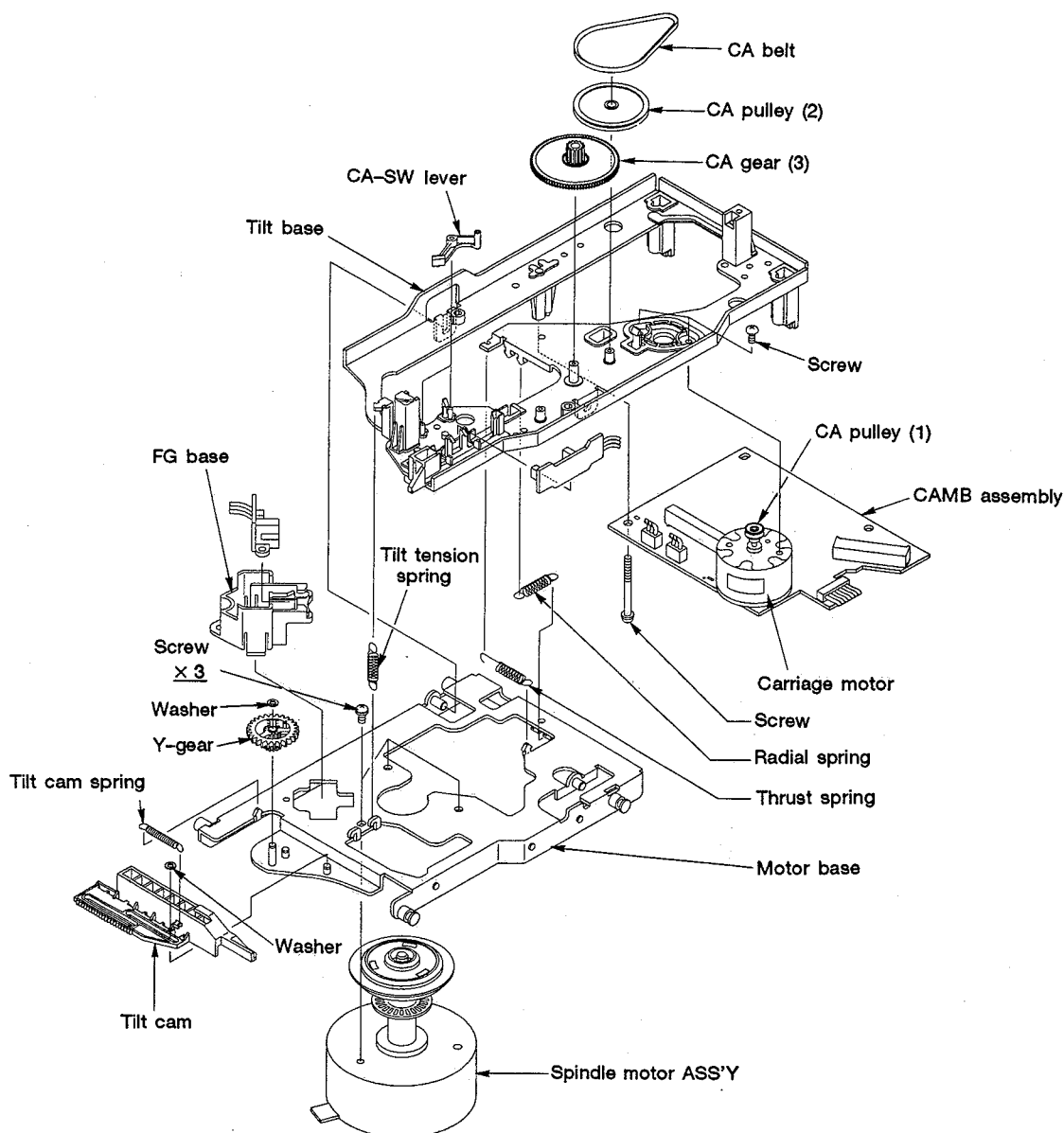


Fig. 2-3 Servo Mechanism unit

③ Tray Unit (Refer to Fig. 2-4 and Fig. 2-5)

Two guide plates (left and right) are attached on the bottom side of the LD tray. In between the guide plates is a lock plate used in CD/LD tray operation switching and a lock plate spring.

As a support system to the tray unit, two protruding portions ① (Fig. 2-5) are located on the front, left of the mechanism base, and a cam groove ② (Fig. 2-4) is located on the bottom side for the left/right movements

of the LD tray. Rollers ③ (Fig. 2-5) are located on the left and right of the mechanism base, and a synchro gear assembly ④ exists for the up/down movements of the LD tray. The synchro gear assembly ensures left/right synchronization. As for the CD tray, a protruding rib ⑤ (Fig. 2-4) is located on the bottom side of the LD tray for the left/right movements, while guide plates are located on the left and right of the rib for the up/down movements.

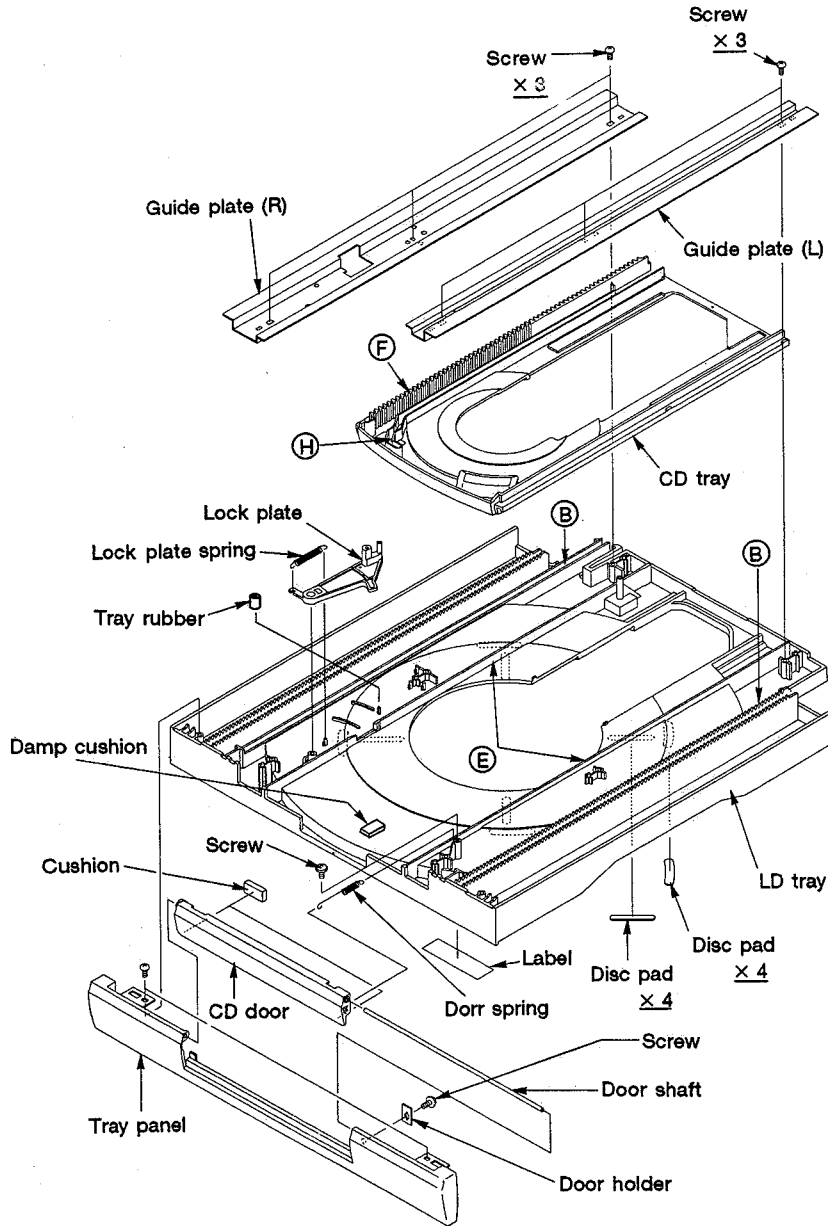


Fig. 2-4 Tray unit (Bottom view)



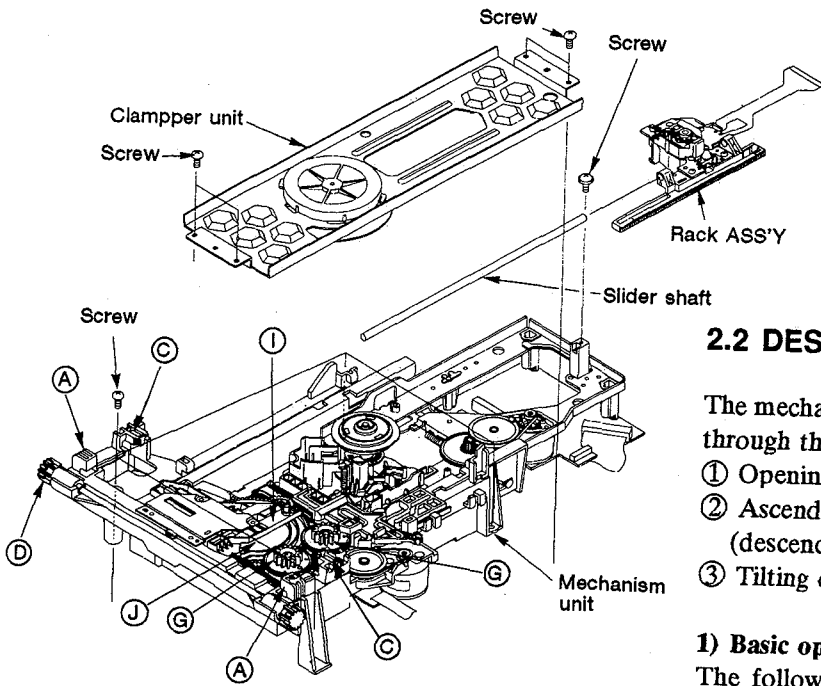


Fig. 2-5 Mechanical unit

**④ Clamper Unit (Refer to Fig. 2-6)**

A clamper head and three clamper springs are temporarily fixed onto the clamper. The clamper is fixed as a unit by the clamper holder via the clamper arm. The clamp is held in place by later attaching a stabilizer.

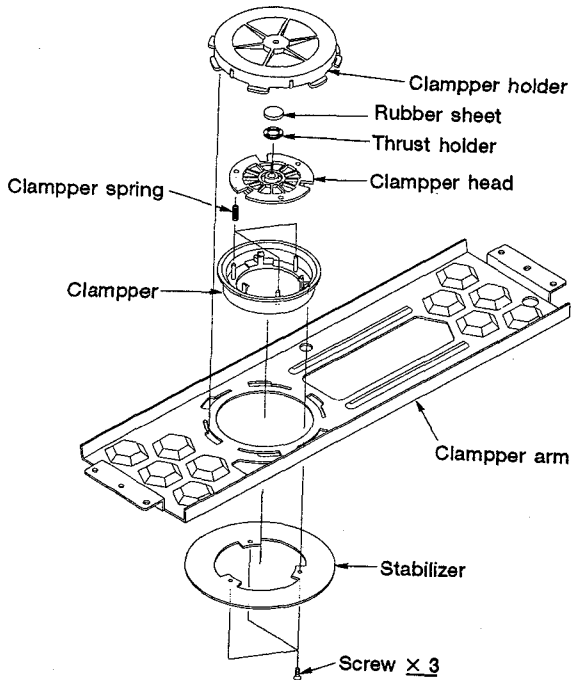


Fig. 2-6 Clamper unit

**2.2 DESCRIPTION OF OPERATION**

The mechanism performs the following operation modes through the loading motor:

- ① Opening/closing of tray unit
- ② Ascending/descending of servo-mechanism unit (descending: disc clamp)
- ③ Tilting of servo-mechanism unit

**1) Basic operations**

The following describes operations from ejecting the tray, loading the disc, to playback.

**① Loading the Tray**

While the rack gear ⑥ (Fig. 2-4) and twin gear ③ (Fig. 2-5) the bottom side of the CD tray are engaged, the cam gear ⑩ is engaged with the twin gear ③. by moving the cam plate ① through the cam ④ (Fig.2-4) on the bottom side of the CD tray. (The rack gear on the bottom side of the CD tray is separated from the twin gear.)

**② Ascending of the Servo-Mechanism Unit**

The clamp cam is moved towards the rear by engaging the cam and boss on the back side of the cam gear to the clamp cam (Fig. 2-7). The servo-mechanism assembly ascends through the cam ⑫ (Fig. 2-2) on the clamper cam.

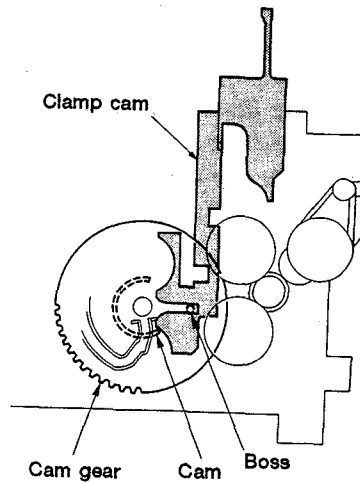


Fig. 2-7

**③ Clamping the Disc**

While the servo-mechanism unit is ascending, the disc on the tray is lifted and the clasper waiting on top is pushed up. Clamping force is generated (Fig. 2-6) from the force of the clamp spring between the clasper and clasper head.

**④ Tilting the Servo-Mechanism Unit**

The Y-gear on the motor base, from ascending of the servo-mechanism unit to clamping, and cam gear are engaged to drive the tilt cam (Fig. 2-8). Since support points from the tilt base are provided on the slanted side (L) (Fig. 2-8) of the tilt cam, tilting is performed by the left/right movements of the tilt cam.

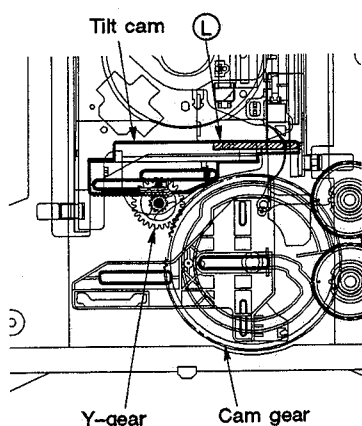


Fig. 2-8

**2) LD/CD Tray Identification → Eject Operations**

**① Selecting the LD Tray (Refer to Fig. 2-9)**

To unclamp (when the servo-mechanism unit is lowered), the clamp cam moves in reverse (towards the front panel). Since the CD plate is forced to the left by the CD spring (Fig. 2-9 a), the plate is inserted in the (LD) direction of the cam on the upper right side of the clamp cam. The lock plate on the tray is turned to the left by the lock plate spring (Fig. 2-9 b) and the CD tray and LD tray become one whole unit.

**② Ejecting the LD Tray → Pause (Refer to Fig. 2-9)**

After the clamp cam operation, the LD tray, which has become one whole unit with the CD tray, is ejected. While the LD tray is being ejected, the pin on the bottom side of the LD tray comes in contact with the cam (Fig. 2-9 c) on the right side of the cam plate. The cam plate is then moved to the right from a specified position by the CAS spring and the switch is detected by the cam on the bottom side of the cam plate via the left switch lever.

**③ Selecting the CD Tray (Refer to Fig. 2-10)**

Similar to "Selecting the LD tray" ①, when the CD plate is forced to the left, the rack assembly which has become one whole unit with the pickup assembly hits the lead edge of the CD plate in the CD mode (CD in playback position) and enters in the (C) direction of the clamp cam (Fig. 2-10 a). The lock plate is then turned to the right and the CD tray is separated from the LD tray. At the same time, the LD tray is fixed to the mechanism base by the lock plate (Figs. 2-10 b and 2-10 c).

**④ Ejecting the CD Tray to Pause (Refer to Fig. 2-10)**

In this case, the LD tray is fixed and only the CD tray is ejected and moved towards the front. When the CD tray has moved into the specified position (A), the cam plate is moved to the right by the cam on the bottom side of the CD tray and the switch is detected as in "Ejecting the LD tray to Pause" ② (Fig. 2-10 c and 2-10 d).

3) Each mode of Mechanism

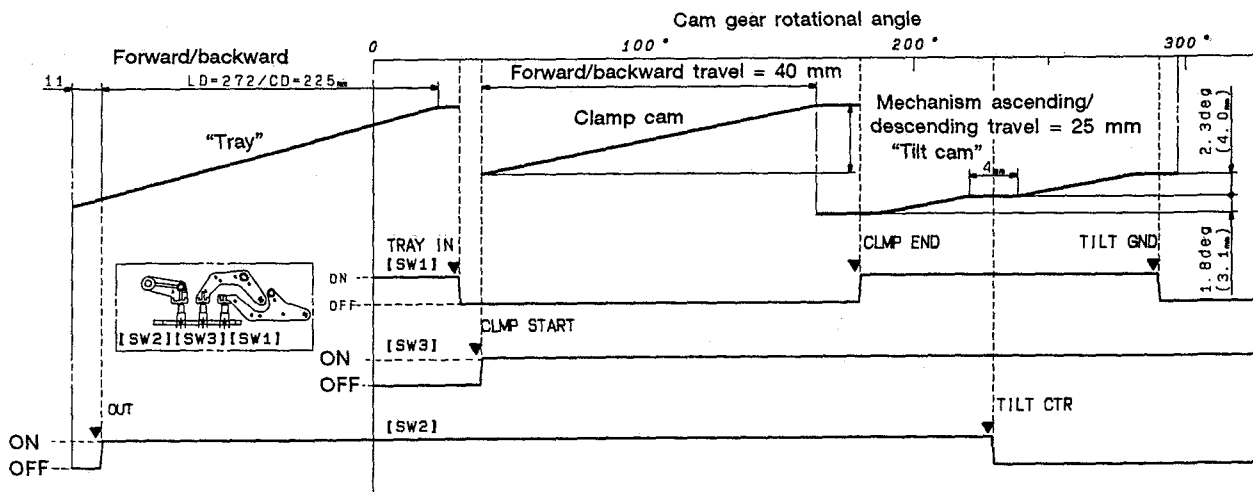


Fig. 2-11 Each mode of Mechanism

### 3. DESCRIPTION OF THE SYSTEM CONTROL

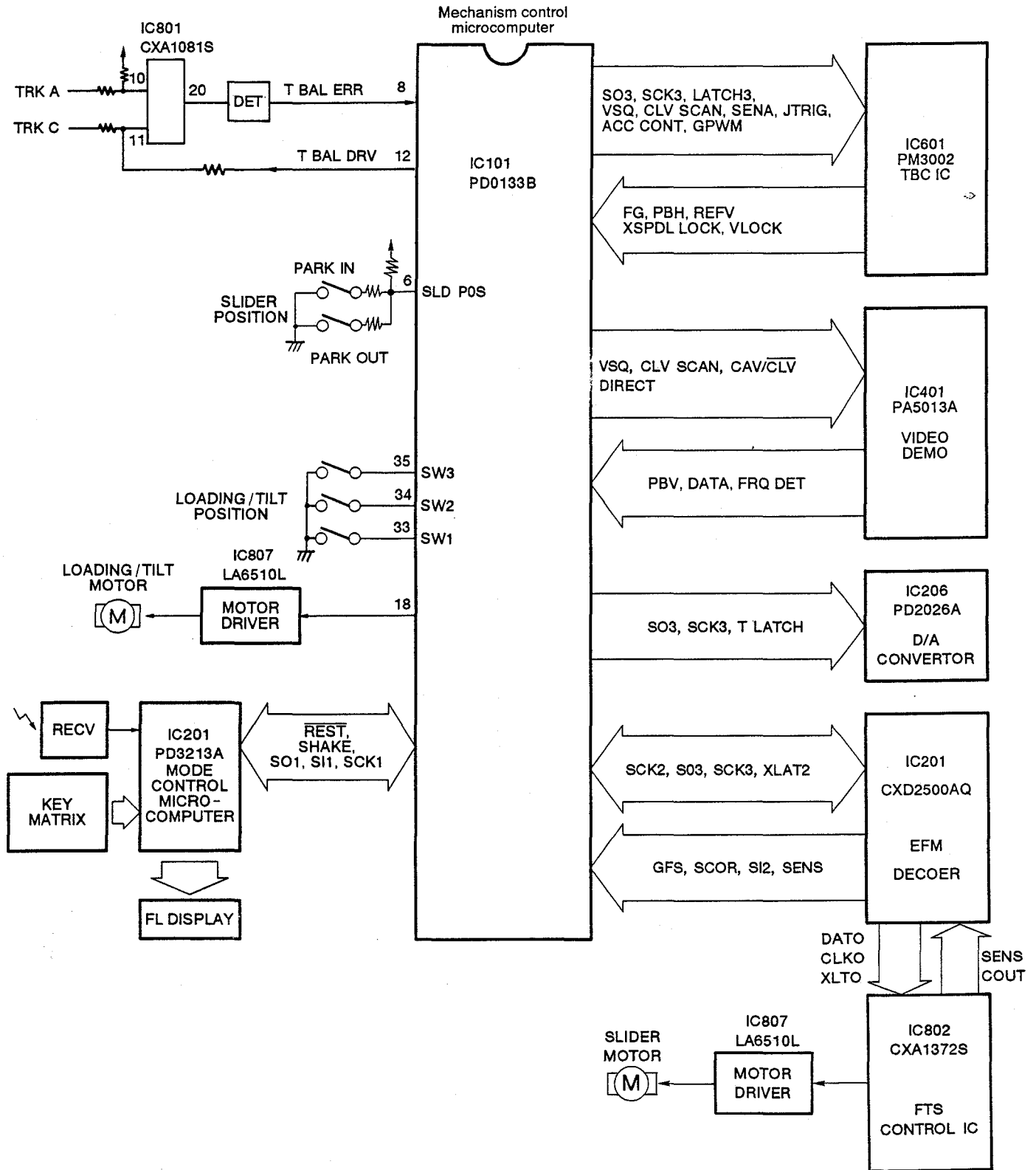


Fig. 3-1 Block diagram of the control system

### 3.1 MICROCOMPUTER INTERFACE

The microcomputer system of this model consists of two chips, an 8-bit microcomputer (IC101: PD0133B) which controls the mechanism and a 4-bit microcomputer (IC201: PD3213A) which controls the operations and displays.

These two microcomputers are connected via a serial interface. The communication lines are also used for controlling the character generator IC (IC405: PD0093A).

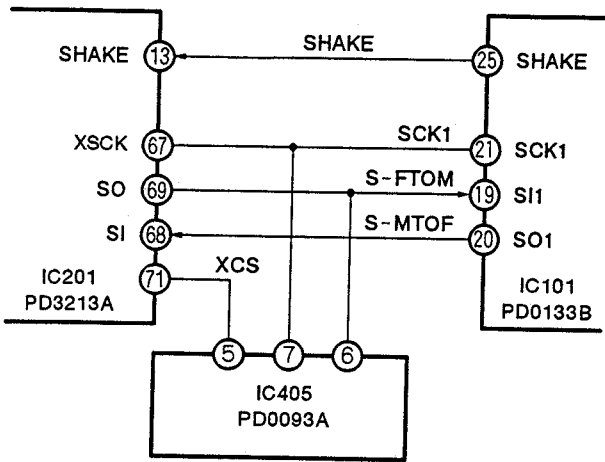


Fig. 3-2 Serial interface connection

5. When PD3213A receives data of 8 bits, it sets the SHAKE terminal (pin 13) to "H" and reports that a single communication is completed.
6. The PD0133B sets SCK1 (pin 21) to input mode, and the PD3213A sets XSCK (pin 67) to output mode. The communication line is thereby disconnected and a single communication is completed.

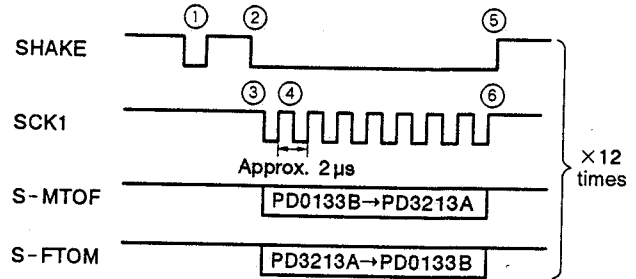


Fig. 3-3 Timing chart of the microcomputer interface

### 3.2 MICROCOMPUTER COMMUNICATION SEQUENCE

1. The PD0133B sets the SHAKE terminal (pin 25) to "L" for several microseconds as a request to the PD3213A for the start of a communication.
2. When the PD3213A receives the communication start request, it sets the SHAKE terminal (pin 13) to "L" and informs the PD0133B that it is ready for communication.
3. The PD0133B then sets SCK1 (pin 21), which has been used as an input port, to output mode. The PD3213A sets XSCK (pin 67) to the input mode, connecting the communication lines between the microcomputers.
4. The PD0133B sends the transfer clock (500KHz) in 8 bits. The data are then sent and received in synchronization with this clock.

- The communication takes place within a cycle between 10 and 30 ms. Twelve bytes of data are transmitted at one time.
- The handshake is done on a single line. Both the PD0133B and the PD3213A use a single port for both input and output. The port is set to output mode when the output is "L". In other conditions, it will be set to input mode (high impedance). Before "L" is output, both ports mutually confirm that the SHAKE terminal is "H". This is to prevent signal interference between tray output signals.
- The communication data is appended with a check code to prevent transfer errors. If sixteen consecutive transfer errors are detected, the PD3213A will send the reset signal to the PD0133B to reset it to its initial state. This will also happen when the communication is not executed for 300 ms or longer.

### 3.3 OUTLINE OF THE MECHANISM CONTROL SYSTEM

#### 1) Processing immediately after power ON

When power is applied, the mechanism-control micro-computer (IC101: PD0133B) will execute initialization in the following sequence upon reset cancellation (pin 28: L to H).

1. The internal RAM and ports are initialized.
2. The CXD2500AQ is initialized.
3. The tray position is detected.
4. The FTS-IC CXA1372S is initialized.
5. The TBC-IC PM3002 is initialized.
6. Communication with the PD3213A is confirmed.  
(If any trouble is found, the subsequent initialization procedures will not be performed.)
7. The pickup position is initialized.
8. Disc rotation stops.
9. Loading mode is initialized.

After all the initialization procedures are completed, normal operations can begin.

#### 2) Control of the loading motor

Driving of the loading motor is controlled by a PWM signal supplied via the OP amplifier (IC807) from pin 18 of the mechanism-control CPU (IC101) in the CONT section. The voltage applied to the loading motor is switched according to the duty of the PWM signal as follows. The PWM cycle is approximately 910 $\mu$ sec.

##### • Loading/clamp operation

For the disc tray open/close and disc clamp and stop operations, the motor is operated while the position of the cam gear is detected by the loading/tilt-position detection switch connected to pins 33 through 35 of the IC101.

##### • Tilt servo operation

When an LD disc or a CDV disc (video portion) is played back and when a CDV disc is started up, the loading motor is used for the tilt servo. The loading motor is driven by a PWM drive in this mode as well.

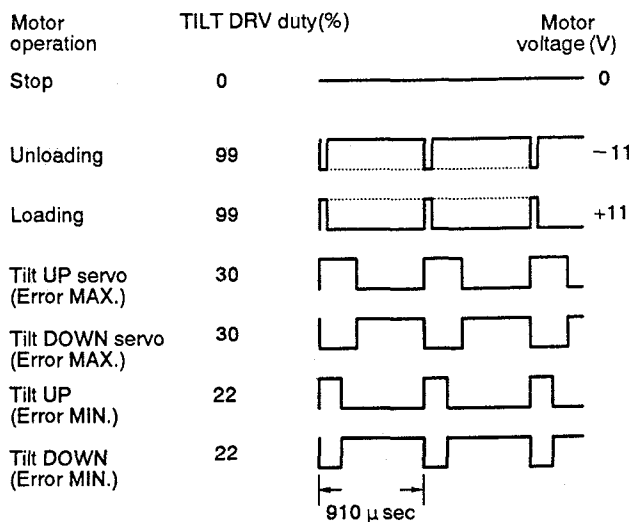


Fig. 3-4

The tilt servo operates the loading motor so that the input voltage at pin 9 (TILT ERR) of the IC101 becomes 2.5 V.

The tilt servo operates in the following ranges during normal playback.

- CAV disc (12-inch) : Frames 0 - 40999
- (8-inch) : Frames 0 - 16999
- CLV disc (12-inch) : 0 min. - 44 min. 59 sec.
- (8-inch) : 0 min. - 13 min. 59 sec.
- CDV disc (video portion) : 0 min. 0 sec. -  
(Recording time - 1 min. 23 sec.)
- CD disc : The tilt servo is ON only at start-up.

If some trouble occurs with the disc or tilt sensor circuit which prevents the input voltage at the TILT terminal from being within the specified range even if the pickup inclines to more than  $\pm 2^\circ$  (degrees), the loading motor will be stopped upon detection of the state of the mechanism switch.

The tilt servo switches the duty of the PWM signal in 2 levels according to the error value. When the error value is small (1.25 V - 3.75 V), a PWM signal for small duty 22% is output, and when the error value is large (0 V - 1.25 V, 3.75 - 5 V), a PWM signal for large duty 30% is output. (See Fig. 3-4.)

• **Automatic tracking balance operation**

The tracking balance error signal is obtained firstly by detecting the waves, for both the top and bottom sides at the time of TRK open, of the tracking error signals output from CXA10815 (IC801 (20) pin) then by adding them. This error signal, after being smoothed and level-converted, is input as the TBAL ERR into the IC101 (8) pin. After the duty pulse, that is based upon this error is output from the IC101 (12) pin and smoothed, it is then added to the IC801 (11) pin TRK C side so that the tracking balance becomes 0V center. Every time a disc is started up the tracking balance is obtained in between the tracking open distance and then maintains the voltage thereafter. It always operates at the time of tracking open in the test mode.

**3) Slider motor control**

The mechanism-control IC (IC101) controls the drive signal output from pin 20 of the FTS servo IC CXA1372S (IC802) by the serial command. The voltage applied to the slider motor is switched according to the duty of the PWM signal as follows. The PWM cycle is 36mS.

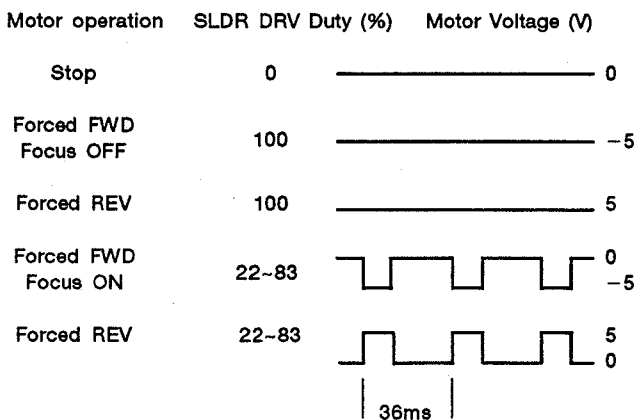


Fig. 3-5

**4) Audio control**

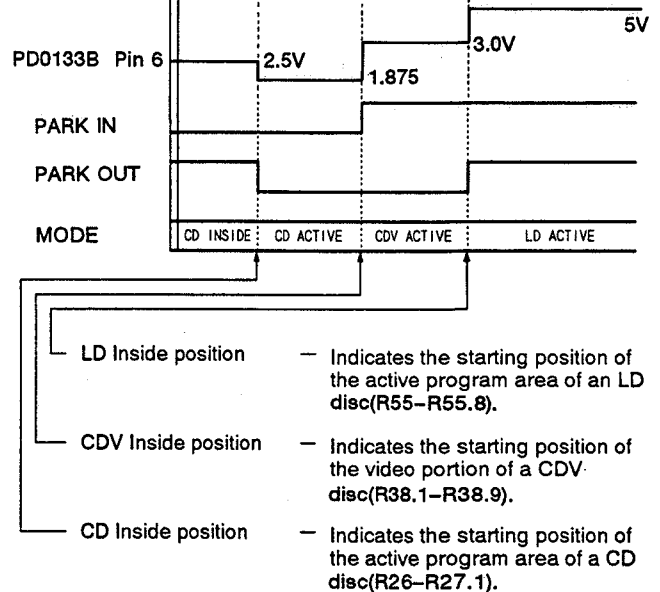
Digital audio channel switching is performed by the CXD2500AQ by using a command from the microcomputer.

DIGITAL 45	SQ1 14	SQ2 13	L - ch Line Out	R - ch Line Out
L	L H L H	L L H H	Analog L ch Analog L ch Analog R ch Mute	Analog R ch Analog L ch Analog R ch Mute
H	L	L	Digital L ch Digital L ch Digital R ch Digital - 12dB - L	Digital R ch Digital L ch Digital R ch Digital - 12dB - L

Table 3-1

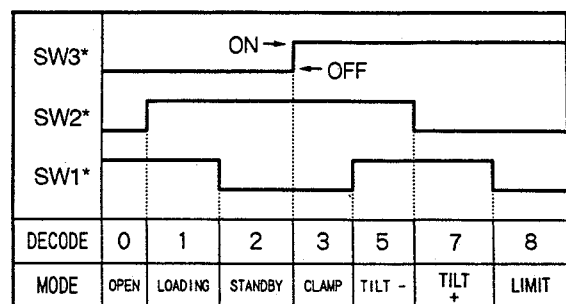
• **SLDR POSITION**

\* The following positions can be detected by using two switches in combination.



R: The distance from the center of the spindle motor.

Fig. 3-6



\*For the places where SW1 - SW3 are attached, refer to Figure 2-10 (a).

Fig. 3-7 LOADING / TILT POSITION

**5) Direct CD Mode**

When the direct CD switch is turned ON for CD playback, the following operations are performed (controlled by a microcomputer).

1. The power supply to the video system which is not required for CD playback is turned OFF. (No picture is obtained.)
2. The self-illuminating switch lights, and direct CD mode is activated.
3. The slider changes its park position for starting up a CD.
4. **If the tray is in the closed condition, the CD tray will also open when the tray opens.**

With these operations, the time required from the pressing of the PLAY button to the start of the CD playback can be shortened to 2/3. In addition, purer audio playback is possible by turning off the unnecessary power supply. Direct CD mode cannot be activated in LD playback or when an LD is set.

When LD playback is started in direct CD mode, the mode is automatically canceled to enable normal LD play back. Direct CD mode can be selected in playing back the video portion as well as the audio portion of the CDV disk.

Disc	Direct CD	Video System Power	Tray Open
CD	ON	OFF	CD Tray
CD	OFF	ON	LD Tray
LD	OFF	ON	LD Tray
CDV video portion	OFF	ON	LD Tray
CDV video portion	ON	ON	CD Tray
CDV audio portion	ON	OFF	CD Tray
CDV audio portion	OFF	ON	LD Tray

Table 3-2



## 6) CLV Clear Scan

Clear scan without picture distortion is possible also for CLV discs by using the shuttle ring (either on the player or the remote control unit).

The conventional color-lock scan and the clear scan can be switched depending on the angle of the shuttle ring rotation. In a clear-scan operation, scanning is performed while outputting digital audio at  $-12$  dB (the same as scanning on CD). (No audio is output when analog audio is selected.)

The principle of the operation is as follows.

1. When clear scan mode is activated, the specified number of tracks is skipped in a multitrack jump operation.
2. Measures the time lag (phase difference) between PB - V and REF - V and when the measured value is within a certain range, decreases REF - H by 7 H until the phase difference between PB - V and REF - V is lost (VLOCK), then cancels squelch, displaying the video portion of the disc for a certain period. Returns to step 1 and repeats steps 1 and 2.

When the time lag between PB - V and REF - V exceeds a certain range, performs a 1-track jump (2-track jump in the REV direction) and measures the lag again. When the measured value is within a certain range, decreases REF - H by 7.H waiting for VLOCK between PB - V and REF - V. Otherwise, repeats a 1-track jump and time-lag measurement.

If the time lag does not enter a certain range even after repeating the 1-track jump and time-lag measurement operation three times, a multitrack jump is performed for a larger skip and is repeated step 2 from the beginning.

If the lag persists in not entering a certain range, VLOCK wait state is activated.

\* Gray-background video is output when no disc video is supplied.

\* Digital audio to be played during clear scan is output while the disc video is being supplied and in VLOCK wait state.

\* For CAV discs, nearly the same operation is performed.

\* PB - V (playback V) means V - sync of the playback video signal.

\* REF - V (reference V) means V - sync used as the reference.

\* VLOCK means the signal generated when the PB - V and REF - V are in a certain range.

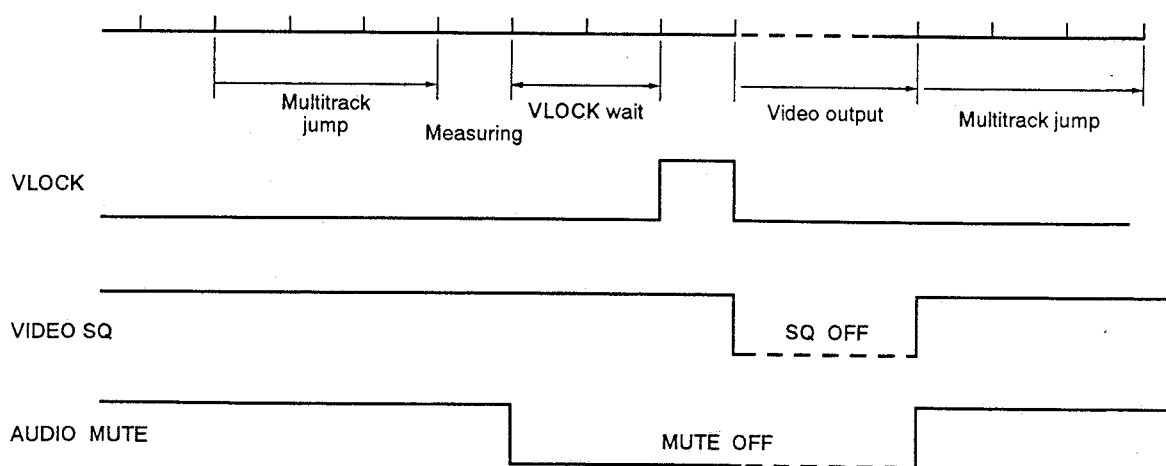
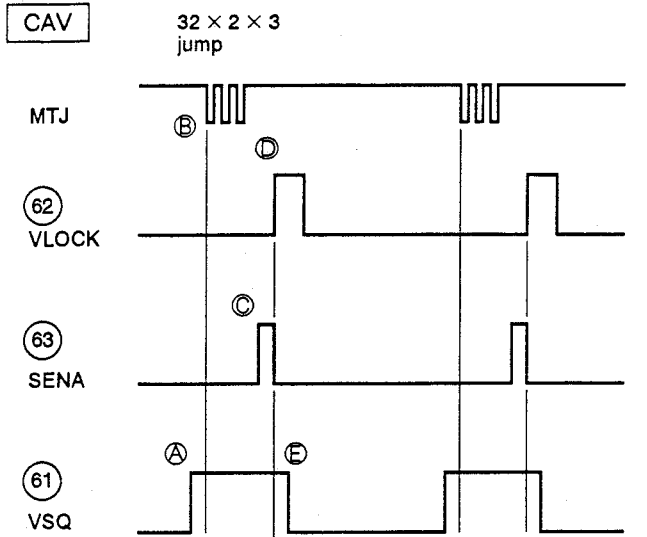


Fig. 3-8

● **Timing Chart of the Clear Scan**



The audio mute signal is applied at the same time with VSQ but is canceled before VSQ is canceled.

- (A) :Activates video squelch.
- (B) :Executes a multitrack jump  $32 \times 2 \times 3$ .
- (C) :Decreases Reference H to match the playback V-sync phase and the reference V-sync phase. Shift enable (SENA) ON.
- (D) :As the phases have matched (VLOCK).
- (E) :Cancels video squelch and plays the disc for a certain time.

**CLV**

Compared with CAV, a longer time is required to match the phases after a jump operation. (C)

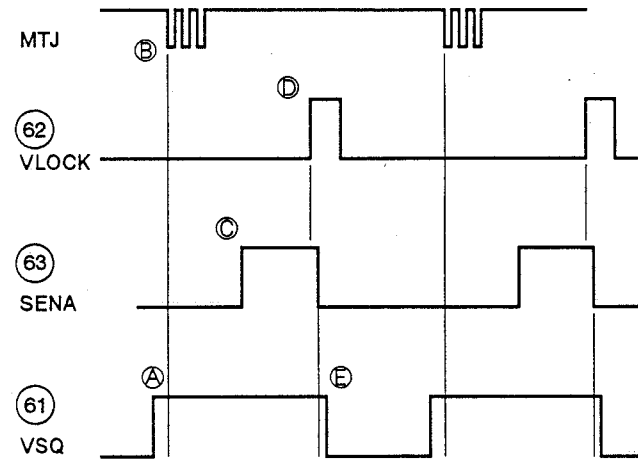
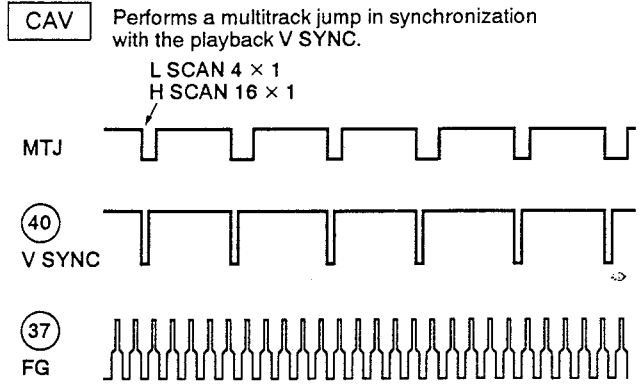


Fig. 3-9

● **Timing Chart of the Normal Scan**



**CLV** Performs a multitrack jump in synchronization with FG.

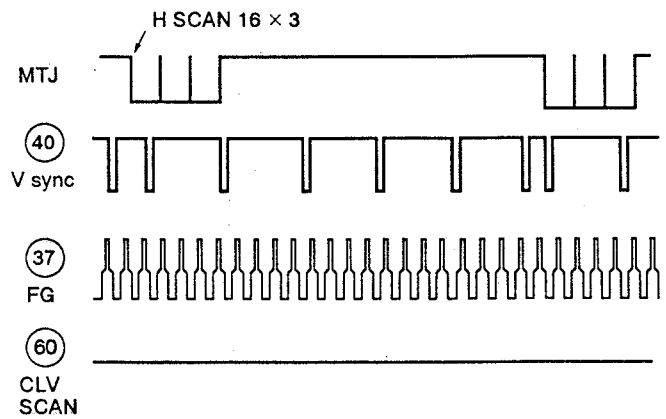
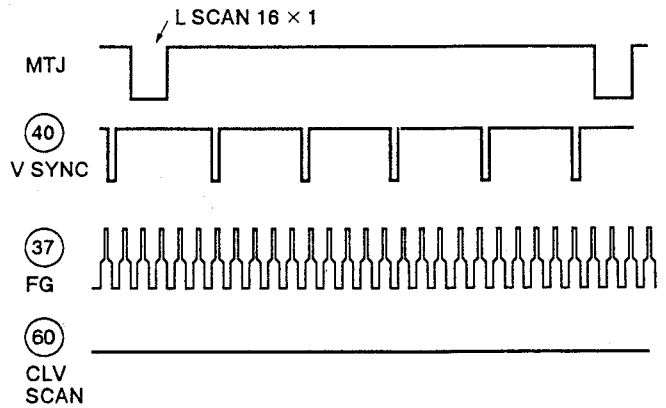


Fig. 3-10

## 7) Description of the Mechanism-control IC (IC101: PD0133B)

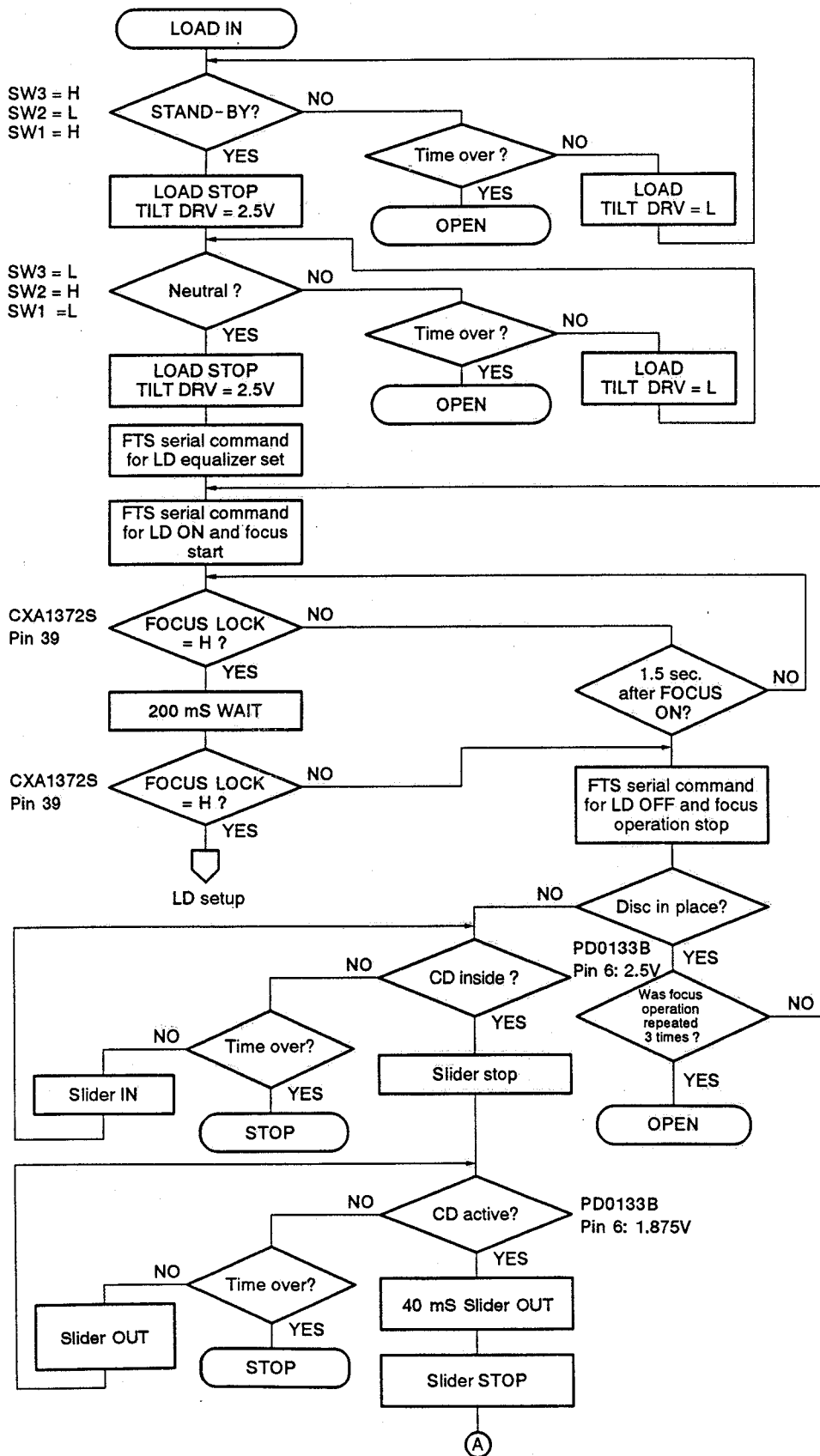
No.	Pin name	I/O	Function
1	VCC	-	Power supply connection pin. Set to 5 V $\pm$ 10%.
2	DIRECT	O	CD DIRECT video system power OFF signal output pin "H" = video system power OFF, "L" = ON
3	CAV/XCLV	O	CAV/CLV switching signal output pin "H" = CAV, "L" = CLV Connected to Pin 6 of PA5013A and used as a VIDEO NR switching signal.
4	XLD ON	O	Laser video ON/OFF switching signal output L: ON, H: OFF
5	TGH	O	Tracking operation control signal output pin The control signal supports ON/OFF of the tracking servo-mechanism operation. "H" = OFF, "L" = ON
6	SLDR POS	I	Pick-up position detection switch input pin (analog signal) Divides the resistance among the switches, reads the value of the A/D input, and detects the position.
7	FREQ DET	I	RF detection signal input pin (analog signal) Inputs the A/D conversion of the RF detection output and is used in the spindle luff servo-mechanism. Voltage and frequency are proportional.
8	TBAL ERR	I	Tracking balance error signal input pin (analog signal) Signal is A/D converted and is input as the tracking offset control.
9	TILT ERR	I	Tilt sensor output signal input pin (analog signal) Inputs (0 to 5 V) the tilt sensor output amplified to a 40 to 50 dB signal. The signal is A/D converted and is input as the tilt sensor control. Controls the tilt motor until the signal is 2.5 V.
10	XREF-V	I	Clear scan reference V-SYNC signal input pin
11	GFS	I	CD (EFM signal) frame lock signal input pin Connected to Pin 12 of the EFM decoder IC: CXD2500AQ. "H" = Lock, "L" = Unlock GFS is an abbreviation for Good Frame Sync.
12	TBAL DRV	O	Tracking offset control signal output pin Outputs the tracking offset after PWM and is used in auto tracking offset. Cycle: 910 $\mu$ sec; 3-value control H, L, Z.
13	SQ2	O	Analog audio switching signal output pin 2/R Squelch: H
14	SQ1	O	Analog audio switching signal output pin 1/L Squelch: H When in digital audio mode, the signal is output through the control of the EFM decoder IC: CXD2500AQ.
15	SI2	I	EFM decoder IC: CXD2500AQ subcode input pin Reads the subcodes of SCK2 and the signal.
16	XLAT2	O	EFM decoder IC: CXD2500AQ control latch signal output pin Sends the control command using SO3 and 2500CLK.
17	SCK2	O	EFM decoder IC: CXD2500AQ subcode read clock signal output pin Sets the clock to 96 and reads the subcode.

No.	Pin name	I/O	Function
18	TILT/ LOAD DRV	O	Loading and tilt control signal output pin Output in PWM format to control loading and tilt servo-mechanism.
19	S-FTOM	I	Input pin of data from the mode control IC Serial Used with the data signal to the carriage generating IC.
20	S-MTOF	O	Serial data output to the mode control IC Serial
21	SCK1	I/O	Clock for serial communication with the mode control IC In the input mode except during serial communication with the mode control IC Used with the clock signal to the carriage generating IC
22	SENS	I	SENS signal input pin All of the following signals from 2500 are switched and are output to the signal: SEIN, FZC, A.S, TZC, XBUSY, FOK, GFS, COMP, COUT, and OV64.
23	SCOR	I	Subcode SYNC signal input pin Inputs the subcode signal from the EFM decoder IC: CXD2500AQ when the signal is "H." Supervises the disc playback depending on the presence of the signal.
24	XCX	O	Analog audio CX noise reduction switching signal output pin ON: L, OFF: H
25	SHAKE	I/O	Pin of hand shake signal for data communication with the mode control IC This pin is a bi-directional data path which sends the data transfer timing through the I/O mode switching of the respective microcomputers.
26	XPBV	I	LD/CDV playback V-SYNC signal input pin IC basically operates in sync hronization (rising and leading edges) with the signal. Setting the signal as standard in the special CAV playback mode, generates jump timing. "L"= V-SYNC ongoing
27	CN VSS	-	GND for A/D conversion
28	XRESET	I	Reset signal input pin "L" = Reset, "H" = Cancel reset
29	XTAL IN	I	9 MHz clock generation input pin
30	XTAL OUT	O	9 MHz clock generation output pin
31	N. C.	O	Not used
32	VSS	-	GND
33	SW1	I	Loading/tilt position detection switch input pin
34	SW2	I	Loading/tilt position detection switch input pin
35	SW3	I	Loading/tilt position detection switch input pin
36	N.C.	I	Not used Processing needed when used for input
37	FG	I	Spindle motor-FG signal input pin 24 pulses per signal Divided into thirds and used inside the microcomputer.
38	DATA	I	Input pin for Philips code decoder in the mechanism controller
39	XPBH	I	Playback H-SYNC input for Philips code decoder
40	XPBV	I	Playback V-SYNC input for Philips code decoder

No.	Pin name	I/O	Function
41	GI. MIRR	O	False MIRR signal output pin to jump 1 track for LD.
42	N.C.	-	Not used
43	N.C.	-	Not used
44	MUTE	O	Audio system audio mute control output pin "H" = MUTE ON, "L" = MUTE OFF
45	XANA	O	Digital/analog audio switching signal output pin "H" = digital, "L" = analog Signals output by the line out and headphone are switched by the signal.
46	XT LATCH	O	DAC & Digital PD2026 serial control latch signal output pin
47	N.C.	-	Not used
48	N.C.	-	Not used
49	N.C.	-	Not used
50	2500CLK	O	2500 command clock signal output pin The commands for 2500 are the following: 2500CLK; SO3 and XLAT2.
51	RFCORR	O	RF correction switching signal output pin "H" = gain up. Increases gain (#8000 to #8100) within the CAV.
52	SCAN CONT	O	TBC control signal output pin H: multi-track jump ongoing, L: others
53	CD	O	CD/LD switching signal output pin H: CD, CDV-A, L: LD, CDV-V
54	ACC CONT	O	Spindle acceleration signal output pin H= acceleration, L= deceleration, Z= CD, stop, and play
55	GPWM	O	Spindle gain switching duty pulse signal output pin CLV inner circumference: L, outer circumference: H, CAV: L, CDV: H
56	J.TRIG	O	Track jump signal output pin Used for single track jump H: start of track, L: others, Width of "H": approx. 20 $\mu$ sec
57	SCK3	O	Serial 3 clock signal output pin Reads the leading edge "H" = within 2 $\mu$ sec, "L" = within 20 $\mu$ sec
58	SO3	O	Serial 3 data signal output pin With the serial signal as the common signal, divides the signals into three types of latch signals (XLAT3, XLAT2, and XT LATCH). LSB first
59	XLATCH3	O	Spindle servo-mechanism IC latch signal output pin
60	CLV SCAN	O	CLV V-SYNC scan mode signal output pin
61	VSQ	O	Video output switching signal output pin "H" = squelch, "L" = playback video
62	VLOCK	I	V-SYNC lock detection signal input pin. Is used in CLV clear scan and is set to "H" for a period of time if the REF-V is in phase with PBV.
63	SENA	O	Shift enable signal output pin. Is used in CLV clear scan. Thinning out H, is set to "H" while REF-V approaches PBV.
64	XSLOCK	I	Spindle lock signal input pin L: lock, H: unlock

### 3.4 FLOW CHARTS OF VARIOUS OPERATIONS

Flow from the tray-opening to tray-IN operations



- From the state that the tray is open to the completion of the tray-IN operation.

- If the loading operation does not enter the stand-by position within five seconds, it is judged as an abnormal condition, and the tray opens.

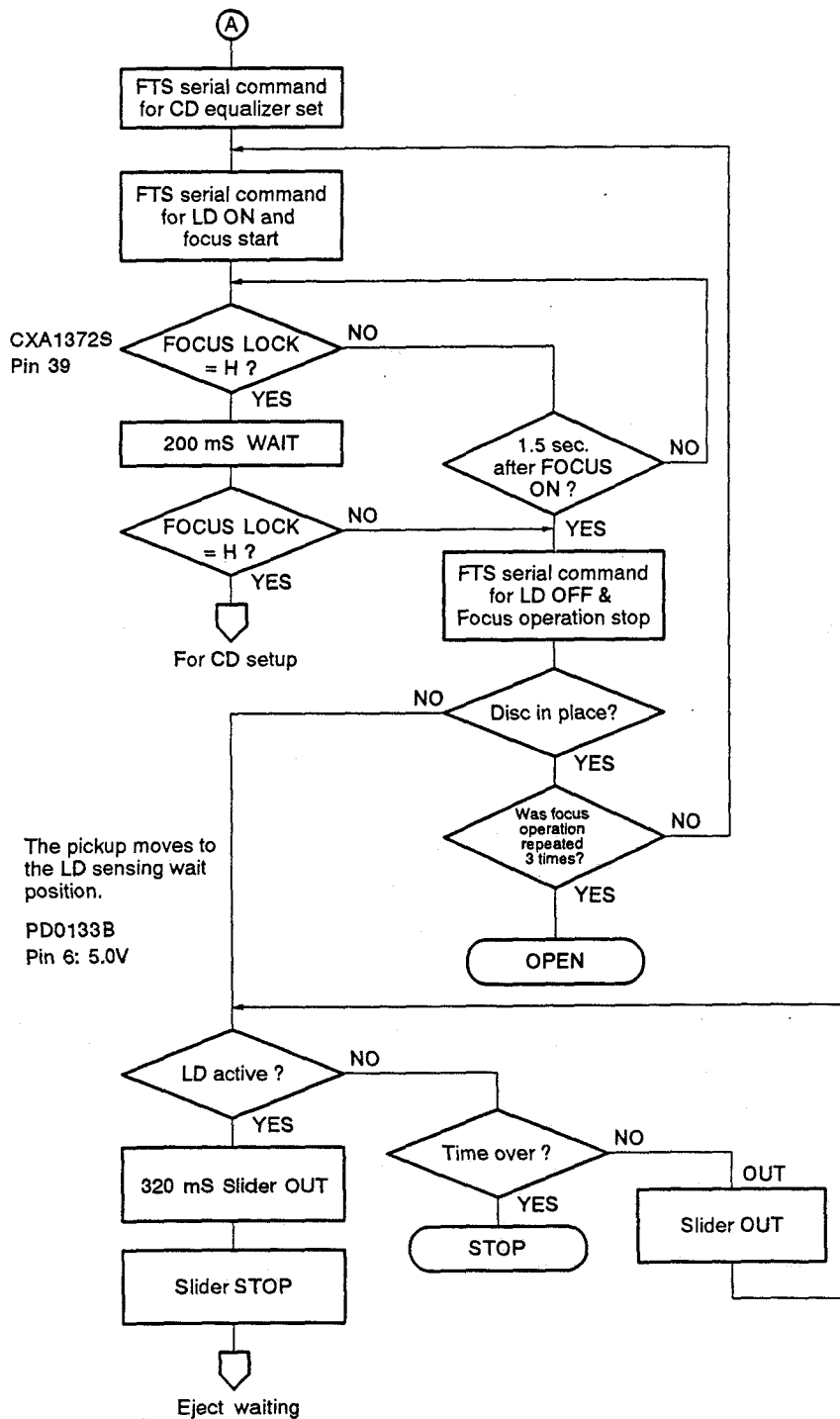
- Clamp operation  
Timer = 10 seconds

- Pickup position in LD focusing ≈ around R65  
R: Distance from the center of the spindle motor.

- Judged as "Disc in place" when FOCUS LOCK becomes "L" during focus sweeping.
- If the focus is not locked even if focus sweeping is repeated three times with the disc in place, the tray opens, judging it to be an abnormal condition.
- Slider operation limit timer ≈ approx. 10 seconds.

- If the slider operation is not completed within a certain time, the operation stops and any key other than OPEN is not accepted.

Fig. 3-11



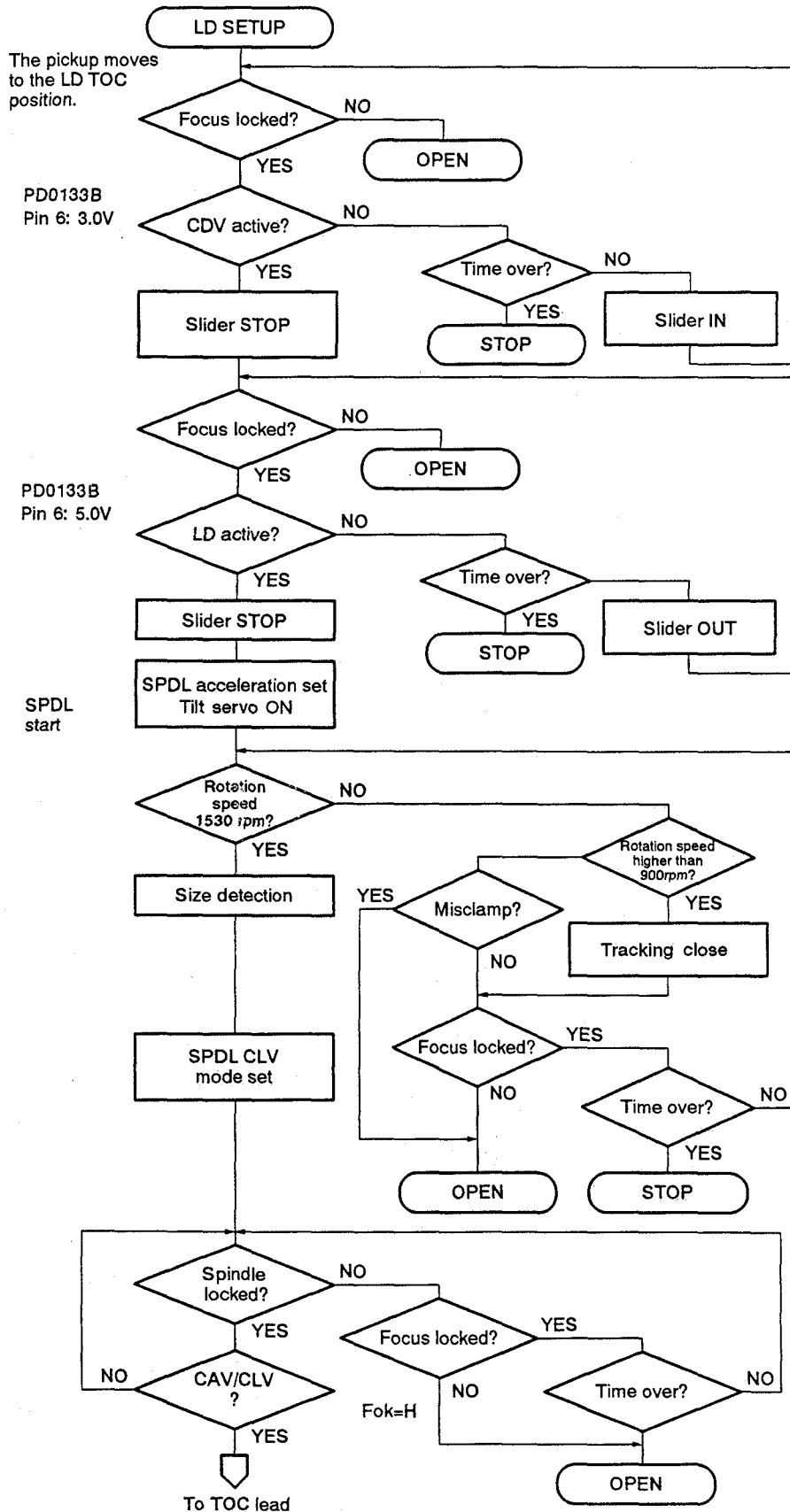
- Pickup position for CD focusing = R30
- CD focusing is the same as LD focusing.
- R:Distance from the center of the spindle motor.

• R65, the LD sensing position  
R:Distance from the center of the spindle motor.

- Timer for 10 seconds  
Timer indicates the time over.

Fig. 3-12

Flow of the LD Setup Operation



- If focus is lost while the pickup is moving to the spindle startup position, the tray opens, judging it to be CD and LD disc-stacking error.

- Timer for approx. 10 seconds  
Timer indicates the time over.

- Timer for approx. 10 seconds.

- Tracking servo open mode is active until disc rotation exceeds 900 rpm.

- The disc rotation is forcibly accelerated until it reaches 1530 rpm, and the disc size is determined by the time required to reach 1200rpm.

- If 800 or more tracks are crossed in a single rotation of the disc, the tray opens, regarding it to be a misclamp.

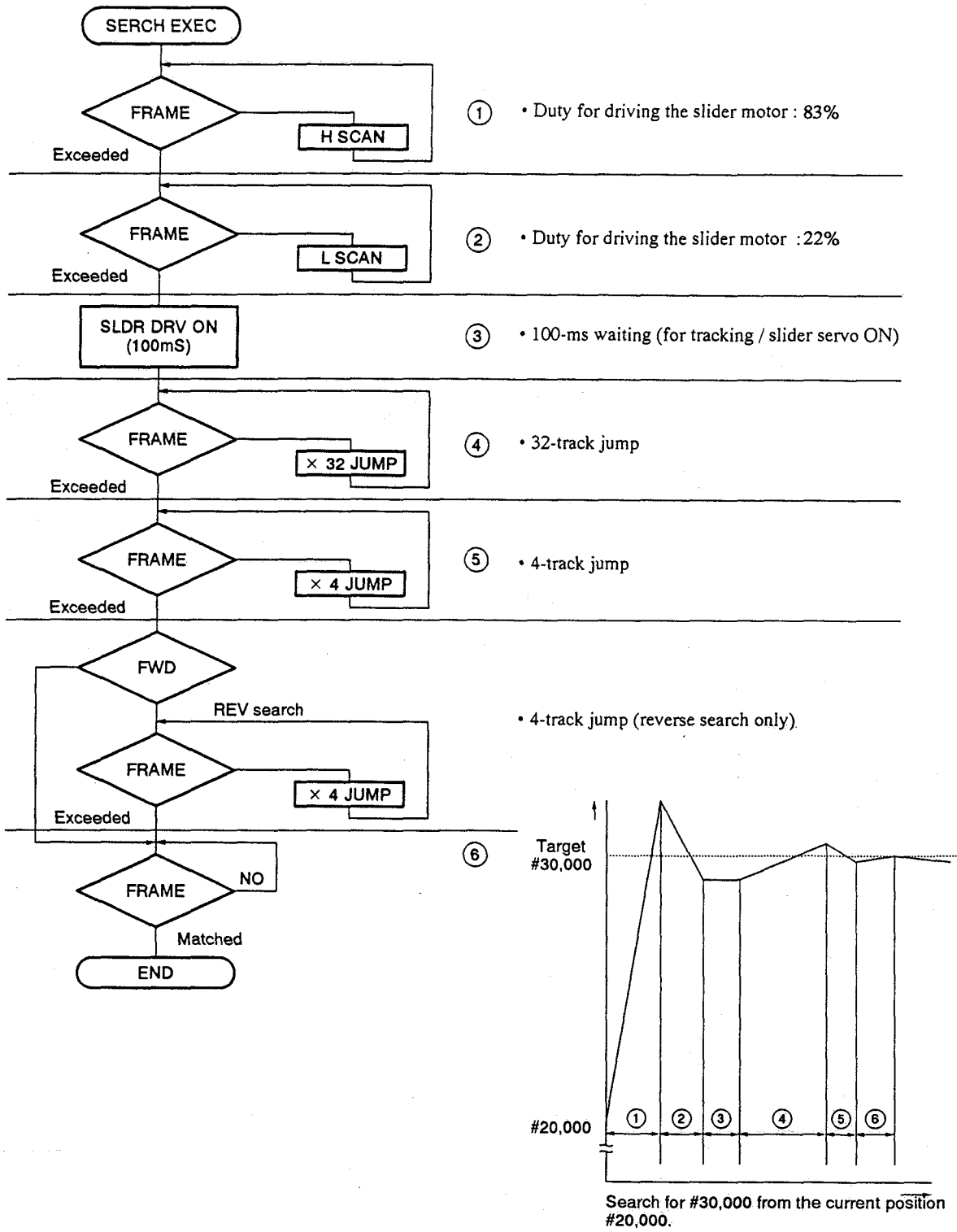
- If focus is lost during the startup operation, the tray opens, assuming a damaged disc or the flip side of a single-sided disc.

- If the spindle is not locked within 60 seconds after beginning SPDL acceleration, the operation stops.

Fig. 3-13



Flow of the Frame Search Operation



Frame search operation

Fig. 3-14

● **Player Operation Modes**

**MODE 1 – OPEN**

Step	Operation
0	Clears internal registers, sets the spindle to STOP and waits for focus OFF.
1	
2	
3	
4	
5	
6	
7	
8	
9	Starts to move the slider to the LD sensing position.
A	Waits for the spindle to stop.
B	Waits for the slider to reach the LD sensing position.
C	Starts unloading.
D	Performs unloading until the OUT SW activates.
E	Sets the 100 ms timer.
F	Waits for 100 ms.
	Completed

**MODE 3 – STOP**

Step	Operation
0	Clears internal registers, sets the spindle to STOP and waits for focus OFF.
1	
2	
3	
4	
5	
6	
7	
8	
9	Starts to move the slider to the LD sensing position.
A	Waits for the spindle to stop.
B	Waits for the slider to reach the LD sensing position.
C	Starts to move the tilt to the neutral position.
D	↓
E	Waits for the tilt to reach the neutral position.
	Completed

**MODE 2 – STANDBY**

Step	Operation
0	Clears internal registers, sets the spindle to STOP and waits for focus OFF.
1	
2	
3	
4	
5	
6	
7	
8	
9	Starts to move the slider to the LD sensing position.
A	Waits for the spindle to stop.
B	Waits for the slider to reach the LD sensing position.
C	Starts to move the tilt to the neutral position.
D	Waits for the tilt to reach the neutral position.
	Completed

MODE 4 - DISC SENSING

Step	Operation	
0	Waits for the tilt to be neutral.	
	<table border="1"> <tr> <td>Normal</td> <td>CD direct mode</td> </tr> </table>	Normal
Normal	CD direct mode	
1	LD sensing	
	CD sensing	
1	Starts to move the slider to the LD sensing position. Clears the focus-try counter.	
2	Waits until the slider reaches the LD sensing position.	
3	Tries focusing.	
	Focus unlocked	
	Focus locked	
3	LD presence assured. Completed.	
4	Focus OFF	
5	Starts to move the slider to the CD sensing position.	
6	Waits until the slider reaches the CD sensing position.	
7	Tries focusing.	
	Focus unlocked	
7	Focus locked	
	CD presence assured. Completed.	
8	Focus OFF	
9	Starts to move the slider to the LD sensing position. Clears the focus-try counter.	
A	Starts to move the slider to the LD sensing position.	
B	Checks for CD direct mode.	
	CD direct mode.	
C	Normal	
	Tries focusing.	
	Focus unlocked	
C	Focus locked	
	LD presence assured. Completed.	
D	Focus OFF	
E	No disc assured. Completed.	

MODE 5 - SETUP

Step	Operation	
0	Waits for the tilt to be neutral. Sets the slider target position.	
	<table border="1"> <tr> <td>CD</td> <td>LD</td> </tr> </table>	CD
CD	LD	
0	Starts to move the slider to the CD TOC position.	
	Starts to move the slider to the LD TOC position.	
1	Checks focus. Simultaneously checks for disc stacking (LD + CD)	
	Focus locked (OK)	
	Focus unlocked (NG)	
	Waits until the slider reaches the target position.	
1	LD	
	CD	
1	Ends with the focus error status.	
	Ends with the focus error after three unsuccessful tries.	
2	Sets the spindle.	
	CD set   CDV set   LD set	
2	Sets the 60-second timer. Starts to run the spindle.	
3	Checks focus.	
	Focus locked (OK)	
	Focus unlocked (NG)	
	Waits until the spindle locks while checking for misclamping.	
3	Time over. Ends with the spindle error status.	
	Ends with the clamping error status.	
3	Sets the 80-second timer.	
4	LD	
	CD, CDV	
	Distinguishes CAV / CLV.	
4	Not distinguished	
	Distinguished	
5	Checks focus.	
	Focus locked (OK)	
	Focus unlocked (NG)	
	Waits the codes to be read.	
5	Time over.	
	Ends with the focus error.	
5	Slowly moves the slider to the inner or outer periphery until the PGM area code is read. After reading the code, sets the 80-second timer and returns to step 4.	
	Ends with the code error.	
6	Completed.	

MODE 6 – TOC READ

Step	Operation			
0	Diverges depending on the disc type.			
	LD			CD, CDV
1	Clears 1st address. Sets the 15-second timer.			
2	Moves to the lead-in area and checks the focus time.			
	A 24-bit code read.		Not read	
	Lead-in area	PGM area, lead-out area		
3	↓		32-track REV jump	Playback
	Moves to the PGM area and checks the focus time.			
3	A 24-bit code read.		Not read	
	PGM area	Lead-in area		
	↓	16-track FWD jump	Playback	
4	Moves to the lead-in area and checks the focus time.			
	A 24-bit code read.		Not read	
	Lead-in area	PGM area		
5	↓		4-track REV jump	Playback
	Plays to the PGM area and checks the focus time.			
5	A 24-bit code read.		Not read	
	PGM area	Lead-in		
	Sets the 0.5-second timer.	↓	Playback	
6	Stores the 1st address (CH, time) in memory and checks the focus time.			
	After 0.5 seconds, checks for CH and the seconds.			
	Sets the 0.5-second timer. ↓			
7	Checks for TOC (subcodes) and checks the focus time.			
	TOC available ↓	Ends with no TOC if no subcode can be read in 0.5 seconds.		
8	Sets the 15-second timer.			
9	Waits until TOC is read.		Time over.	TOC reading completed
	PGM area	Lead-in area, Subcode NG.	Ends with the TOC error status.	
A	↓		Playback	
	Subcode OK and focus check NG.			
B	↓		Playback	
	Subcode OK and focus check NG			
C	↓		Playback	
	Subcode OK and focus check NG			
D	↓		Playback	
	Subcode OK and focus check NG			
E	Returns to step 9.			

MODE 8 – SEARCH

Step	Operation			
0	Focus ON		Focus OFF	
	Sets the 15-second timer.		Ends with the recovery error.	
	Diverges depending on the disc search target.			
0	CDV		CD	LD
	Track search	(Absolute time wait)		
	A ↔ V	A ↔ V V ↔ A		
1	Clears the focus-try counter and starts the spindle STOP operation. Starts to move the slider.			
	To A → V CDV TOC position.		To V → A CD TOC position.	
	Waits until the slider reaches the specified position.			
2	Waits for spindle STOP. → Ends with the disc stack (clamp) error if the spindle does not stop in 1.8 seconds.			
	Focus locked (Sets the 15-second timer.)		Tries focusing.	
	Sets the spindle for CD audio.	Sets the spindle for CDV video.	Ends with the recovery error after four unsuccessful tries.	
3	Waits until the spindle locks.			
	Waits until the subcode is read. ↓			
4	Sets the 10-time track counter.			
5	Drives the slider while counting tracks.			
	When the lag from the target address is more than 1 minute.		When the slider comes close to the target within about 1 minute.	
	Drives the slider.			
7	Drives the slider to cross the target address (H SCAN).			
8	Drives the slider to cross the target address (L SCAN). ↓			
9	Performs 32-track jumps to cross the target address.			
A	Performs 4-track jumps to cross the target address. Sets the 5-second timer.			
B	Performs 4-track jumps to reach the front of the target address.		Time check NG → Ends with the search error.	
C	Plays until the target address is reached.			
	Time out		Reached	
	LD, CDV - V	CD, CDV - A	LD, CDV - V	CD, CDV - A
C	Ends with the search error.		Spindle locked	Unlocked
			Completed	LD CDV - V
			To step B	REV jump
D	Performs 4-track jumps to a point before the target address. Time check NG → Ends with the search error.			
E	Plays until the target address is reached.			
F	If another new search target is specified during search, waits the spindle to lock and returns to step 0.			

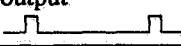

### 3.5 OUTLINE OF THE MODE CONTROL SYSTEM

#### 1) Description of the Mode Microcomputer (IC201)

The mode microcomputer performs the following processing:

1. Key data/remote control signal processing  
Accepts the key switch and remote control signals and processes them for the specified keys.
2. FL (fluorescent) display operation  
Operates the FL tube (VAW1026) display.
3. Screen-display control  
Controls the character generator IC (IC405: PD0093A) and superimposes characters on the screen.  
The blue-background screen is also controlled.
4. Mechanism-control IC control  
Gives operational instructions to the mechanism control microcomputer (IC101: PD0133B) and simultaneously reads the time data, etc.
5. System reset management  
If any problem occurs in communication with the mechanism-control IC, activates system reset to return the IC to its initial state.

#### • Description of the Mode microcomputer (IC201: PD3213A)

Pin	Pin name	Signal name	I/O	Function
01	P04/AN4	NC	I	Not used
02	P05/AN5	NC	I	Not used
03	P06/AN6	NC	I	Not used
04	P07/AN7	NC	I	Not used
05	AVss	AVss	-	Connected to standard power supply (Vss) for A/D conversion
06	TEST	TEST	I	Test pin Connected to Vss
07	X2	X2	O	Subclock Release
08	X1	X1	I	Subclock Connected to Vcc
09	Vss	Vss	-	Ground
10	OSC1	OSC1	I	System clock Connects 8 MHz ceramic lock
11	OSC2	OSC2	O	System clock Connects 8 MHz ceramic lock
12	RESET	RESET	I	Reset
13	P10/IRQ0	SHAKE	I/O	Communication timing clock with mechanism control
14	P11/IRP1	SEL IR	I	Remote control signal (including SR)
15	P12/IRQ2	W.D.F	O	For watchdog timer Pulse output 
16	P13/IRQ3	POWER On	O	Power ON  Power OFF
17	P14/IRQ4	NC	O	Not used
18	P15/IRQ5	NC	O	Not used
19	P16/EVENT	NC	I	Not used
20	P33/FS27	NC	O	Not used

Pin	Pin name	Signal name	I/O	Function
21	P32/FS26	NC	O	Not used
22	P31/FS25	NC	O	Not used
23	P30/FS24	STANBY LED	O	Standby LED drive output
24	P47/FS23	NC	O	Not used
25	P46/FS22	NC	O	Not used
26	P45/FS21	NC	O	Not used
27	P44/FS20	NC	O	Not used
28	P43/FS19	seg l / KS3	O	FL segment l output and key scan 3 output
29	P42/FS18	seg k / KS2	O	FL segment k output and key scan 2 output
30	P41/FS17	seg j / KS1	O	FL segment j output and key scan 1 output
31	P40/FS16	seg i / KS0	O	FL segment i output and key scan 0 output
32	P50/FS15	seg h	O	FL segment h output
33	P51/FS14	seg g	O	FL segment g output
34	P52/FS13	seg f	O	FL segment f output
35	P53/FS12	seg e	O	FL segment e output
36	P54/FS11	seg d	O	FL segment d output
37	P55/FS10	seg c	O	FL segment c output
38	P56/FS9	seg b	O	FL segment b output
39	P57/FS8	seg a	O	FL segment a output
40	P17/V disp	-30V	-	FL drive power supply
41	P60/FD0/FS7	G9	O	FL grid 9 output
42	P61/FD1/FS6	G8	O	FL grid 8 output
43	P62/FD2/FS5	G7	O	FL grid 7 output
44	P63/FD3/FS4	G6	O	FL grid 6 output
45	P64/FD4/FS3	G5	O	FL grid 5 output
46	P65/FD5/FS2	G4	O	FL grid 4 output
47	P66/FD6/FS1	G3	O	FL grid 3 output
48	P67/FD7/FS0	G2	O	FL grid 2 output
49	P70/FD8	G1	O	FL grid 1 output
50	P71/FD9	NC	O	Not used
51	P72/FD10	NC	O	Not used
52	P73/FD11	NC	O	Not used
53	P74/FD12	NC	O	Not used
54	P75/FD13	D.CD LED	O	DIRECT CD LED drive output
55	P76/FD14	S-SCAN	I/O	SHUTTER SCAN output
56	P77/FS15	NC	O	Not used
57	Vcc	Vcc	-	Power supply

Pin	Pin name	Signal name	I/O	Function
58	P80	KIN0	I	Key input 0
59	P81	KIN1	I	Key input 1
60	P82	KIN2	I	Key input 2
61	P83	KIN3	I	Key input 3
62	P84	KIN4	I	Key input 4
63	P85	KIN5	I	Key input 5
64	P86	KIN6	I	Key input 6
65	P87	NC	-	Not used
66	P90/PWM	SYNCHRO OUT	O	SYNCHRO REC output
67	P91/SCK1	XSCK	I/O	Communication clock with mechanism control/OSD
68	P92/SI1	SI	I	Receive data from mechanism control
69	P93/SO1	SO	O	Send data to mechanism control/OSD
70	P94/SCK2	XRESET	O	RESET output from other than mechanism control/OSD
71	P95/SI2/CS	XCS	O	OSD chip select
72	P96/SO2	SYNCHRO IN	I	SYNCHRO REC input
73	P97/UD	NC	O	Not used
74	PA0	NC	O	Not used
75	PA1	NC	O	Not used
76	AVcc	AVcc	-	Connection to Vcc of standard power supply for A/D conversion
77	P00/AN0	NC	I	Not used
78	P01/AN1	NC	I	Not used
79	P02/AN2	NC	I	Not used
80	P03/AN3	NC	I	Not used

## 2) Hilite Scan

The middle (regarded as the hilite or climax) of each recording on a disc is played back for about 8 seconds.

During a hilite scan operation, the Hilite/intro FL indication lights, and the Hilite indication appears on the screen.

When the Hilite/Intro key on the player is pressed, the following operations are performed depending on the player's status.

1. When the key is pressed during disc playback, the time (e.g. 1 min. 30 sec.) from the beginning of the recording when the key is pressed is stored in memory and 8 seconds from that specified time (e.g. 1 min. 30 sec. to 1 min. 38 sec.) for all the recordings from track 1 to the end are played back.
2. When the key is pressed in stop, tray-open or search modes, the parts from 1 min. 00 sec. to 1 min. 08 sec. of all the recordings on the disc are played back.

3. When the key is pressed during CDV video portion playback, an introduction scan is executed for the video portion, and the highlight scan is performed for the audio portion as in 2 above.

4. When the key is pressed during playback of the audio portion of a CDV, an introduction scan is executed for the video portion, and the highlight scan is performed for the audio portion as in 1 above.

This function is enabled only for CDs and the audio portions of CDV discs. For LDs and the video portions of CDV discs, introduction scanning is performed.