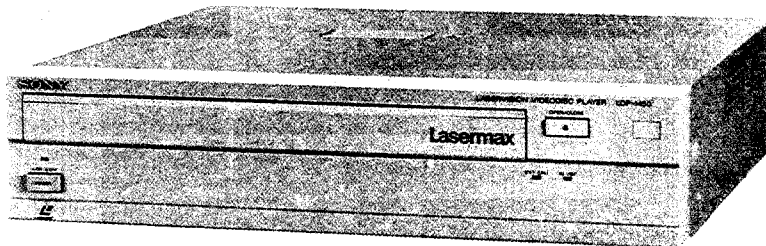


# LDP-1450

## SERVICE MANUAL

US Model  
Canadian Model



### Lasermax

#### SPECIFICATIONS

##### Playback system

Disc format	Laser Vision
Pick-up method	Laser beam (reflective)
Laser	Diode laser ( $\lambda = 7800\text{\AA}$ )
Emission duration	Continuous
Laser output	0.4 mW* max.
Videodisc	12" and 8"
Maximum playing time	CAV: 30 min/side CLV: 60 min/side
Spindle revolution	CAV: 1800 r.p.m. CLV: 1800 to 600 r.p.m.
Access time	CAV: 2 sec (full stroke average by frame) 10 sec (by chapter) CLV: 10 sec

##### Video

Signal	EIA standards, NTSC color
Output	1.0 V p-p, 75 ohms unbalanced, sync negative
Resolution	400 lines

##### Audio

Output	Line out: -3.7 dBV (1 kHz, 100% MOD, load impedance 47 kilohms) load impedance 2 kilohms and more unbalanced
Signal-to-noise ratio	CX ON: 70 dB and more CX OFF: 56 dB and more
Frequency response	40 Hz to 20kHz

##### General

Power requirements	120 V AC, 60 Hz
Power consumption	39 W
Operating temperature	5°C to 35°C (40°F to 95°F)
Operating humidity	25% to 80%
Storage temperature	-20°C to 60°C (-4°F to 140°F)
Dimensions	Approx. 430 x 100 x 410 mm (w/h/d) (16 <sup>15</sup> / <sub>16</sub> x 3 <sup>15</sup> / <sub>16</sub> x 16 <sup>1</sup> / <sub>8</sub> inches)
Weight	Approx. 9.7 kg (21 lb 6 oz)
Optional accessories	Interface Manual LDM-G1000 Rack Mount Kit RMM-121 Remote Control Unit RM-2001

Design and specifications subject to change without notice.

\* This output is the value measured at a distance of about 1.6 mm from the objective lens surface on the Optical Pick-up Block.



 **VIDEODISC PLAYER**  
**SONY®**

# SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.

2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.

Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.

6. Check the B+ voltage to see it is at the values specified.

Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

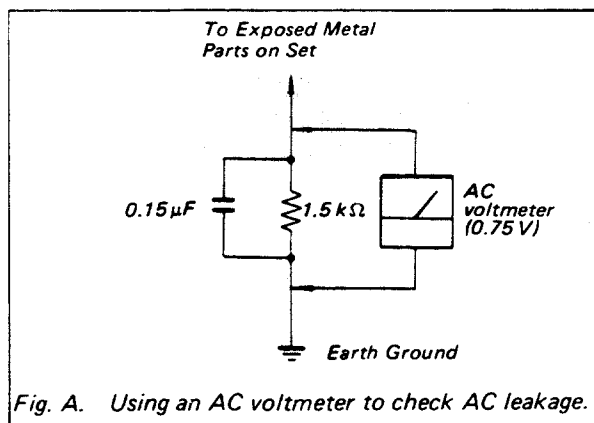


Fig. A. Using an AC voltmeter to check AC leakage.

## LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.


1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

## CAUTION


Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

AS the laser beam used in this videodisc player is harmful to eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.

## SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

## ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÉS PAR UN TRAME ET UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY. LES RÉGLAGES DU CIRCUIT QUI SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT SONT IDENTIFIÉS DANS CE MANUEL. SUIVRE LES PROCÉDURES QUAND LES COMPOSANTS CRITIQUES SONT REMPLACÉS OU LE FONCTIONNEMENT IMPROPRE EST SUSPECTÉ.

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This section is extracted from instruction manual.

## SECTION 1 GENERAL

### 1-1. FEATURES

LDP-1450 is designed to be controlled mainly by an external microcomputer with an RS-232C interface connector. Control codes from the computer allow various operations such as playback in varied speeds, repeat, pause, or search on the videodisc player. Also, the OPTIONAL FUNCTION selector at the rear allows the videodisc player to operate in ways other than in the standard operation mode set at the factory.

#### No physical contact between pick-up and disc

A laser beam acts as the signal pick-up for contact-free playback and no wear on your valuable videodiscs. The audiovisual pit pattern is recorded below the surface of the videodisc for safe handling. There is no more need to be constantly on your guard against fingerprints and dust.

#### High speed access

Full stroke search on the disc is approximately 2 seconds (CAV, by frame).

#### Search operation by the second on CLV disc

Desired picture address on a CLV disc can be searched for by specifying the time (second) number recorded on the disc.

#### Remote control operation

By using the RM-2001 optional remote control unit, playback both in forward and reverse directions or special operations such as search and repeat are available. RM-2001 can be used with LDP-1450 only in wired mode.

#### Character generator incorporated

Character generator is incorporated in the LDP-1450 so that it can display a desired character according to a character code given by the connected computer. There are three character modes: 20 characters x 1 line, and 10 characters x 3 lines.

#### Automatic front loading

Videodiscs are inserted in front of the LDP-1450, which saves space when compared to top loading models.

#### Mountable on 19" rack

The videodisc player can be mounted on an EIA standard 19" rack. An optional RMM-121 rack mount kit is available to install the videodisc player into the 19" rack.

#### Black burst video out signals in the search mode

The characters or pictures output from the computer are superimposed over the videodisc picture, and they can even be seen in the search mode as the videodisc player uses the black burst video out signals to adjust the picture.

#### Screw-less mechanism for transportation

This new mechanism eliminates the need to tighten special screws to fix the laser pick-up before transporting the videodisc player.

#### Extended operation modes

By using the OPTIONAL FUNCTION selector, the LDP-1450 operates in extended operation modes. For example, the videodisc player stays in still or stop mode until it receives any operational commands, regardless of how the player is controlled. There are three extended operation modes you can use.

## 1-2. TIPS ON VIDEODISCS

### TYPES OF VIDEODISCS

#### CAV (constant angular velocity) disc

The CAV disc always rotates at a constant speed of 1800 r.p.m. and the laser beam moves from the inner part of the disc to the outer. Up to 30 minutes of playback (54,000 frames) is possible on one side of the disc. Each frame of the playback picture is recorded on one track and is reproduced in one rotation. The frame number is recorded on the track. Flexible playback operation such as variable speed playback, repeat play is possible using the frame numbers as reference.

#### CLV (constant linear velocity) disc

With the CLV disc, the rotational speed varies from 600 r.p.m. to 1800 r.p.m. so that a constant linear velocity is maintained. The laser beam moves from the inner part of the disc to the outer as with CAV discs. Playback of up to one hour is possible on one side of the disc, although only normal play, scan and search operations are possible. The elapsed playback time or the chapter number being played can be displayed on the monitor screen. Searches to the beginning of chapters or specified time codes is possible.

#### \* 1) Frames

The CAV discs have up to 54,000 "frames" which are numbered in sequence. One frame is recorded on one track, that is, a frame is played back with one rotation of the disc. You can search for a particular frame quickly or repeat a particular sequence of frames.

#### \* 2) Picture stop

When the player detects this code the playback enters the still mode. This code may be ignored in the scan and search modes.

#### \* 3) Chapters

There are CAV and CLV discs on which "chapters", as the chapter of a book, are pre-recorded. If a chapter number is displayed after a frame number has been displayed (on a CAV disc) or after playback time is displayed in minutes (on a CLV disc) when you change the display mode, the data are pre-recorded in chapters.

#### \* 4) Lead-in/Lead-out

When the player detects the lead-out code, it returns to the beginning of a disc, detects the lead-in code and repeats playback. When the player detects the lead-in code or lead-out code in SCAN mode, the same result will be obtained.

## COMPARISON OF SONY VIDEODISC CODE TYPES

Type	purpose	location on disc	capacity	customer's creation method	encoding method
<b>I. CAV Discs</b>					
Vertical blanking (partial listing)					
— frame number * 1) (picture numbers)	frame access	all vertical blankings	00001 to 54000	not available	added automatically during mastering
— picture stop * 2)	automatic stop on a frame during "play" and "slow" modes	designated vertical intervals	up to 54000	list of time codes on a master tape to have stops	added during mastering
— chapter number * 3)	divide content into chapters	designated vertical blankings	00 to 79; min chapter = 30 tracks	list of first/last time codes on a master tape of all chapters	added during mastering
<b>II. CLV Discs</b>					
Vertical blanking					
— time code number	time code access	all vertical blankings	00 hr 00 mins 00 sec to 01 hr 00 mins	not available	added automatically during mastering
— chapter number	divide content into chapters	designated vertical blankings	00 to 79; minimum = 30 tracks	list of first/last time codes on a master tape of all chapters	added during mastering
<b>III. CAV/CLV Discs</b>					
Vertical blanking					
— Lead-in * 4)	locate the beginning of the program on a disc	designated vertical blankings		not available	added during mastering
— Lead-out * 4)	locate the end of the program on a disc	designated vertical blankings		not available	added during mastering

### 1-3. PRECAUTIONS

#### On safety

- Operate the unit with 120V AC, 60 Hz.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time.
- To disconnect a cord, pull it out by the plug. Never pull the cord itself.

#### On installation

- Avoid placing the player in a location subject to:
  - high humidity
  - high temperature
  - excessive dust
  - mechanical vibration
  - direct sunlight
- Allow adequate air circulation to prevent internal heat buildup. Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation holes.
- Do not place any objects on the videodisc player.

#### On operation

- Do not operate the unit right after having transported it from a cold location directly to a warm location or in a room where the temperature rises suddenly because moisture may condense in the operating section of the unit. Wait for about an hour before turning the power on in the new location or keep the rise in room temperature gradual. If the unit is operated with moisture condensation, the unit and the disc may be damaged. Therefore remove the disc immediately when there is a possibility of moisture condensation and no picture is obtained.
- To evaporate the moisture rapidly, leave the player turned on without a disc loaded.
- Remove the disc from the compartment after playing it, if the unit will not be used for any length of time. Do not transport the set with a disc in place.
- To open or close the disc compartment, press the OPEN/CLOSE button. Do not pull or push the disc compartment forcibly.
- When the disc compartment is in the open position, do not press down on it strongly, or place heavy objects.

#### On cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which may damage the finish.

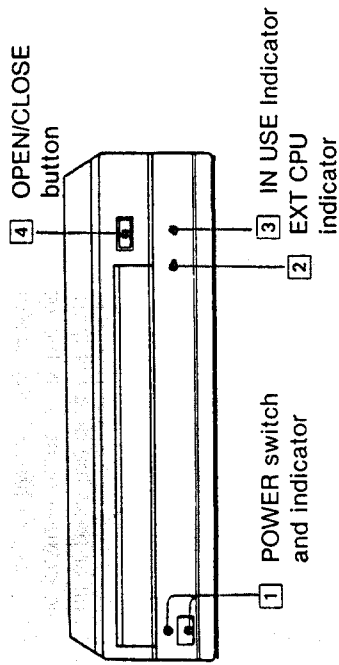
#### On packing

Do not throw away the carton and packing materials. They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it as illustrated on the carton.

If you have any questions about this unit, contact your authorized Sony service facility.

## 1-4. PARTS IDENTIFICATION

### FRONT PANEL



#### 1 POWER switch and indicator

Press to turn the videodisc player on. The POWER indicator will be lit when the player is turned on. Press the button again to turn off the power.

#### 2 EXT CPU indicator

Lights up when the player is controlled by an external computer through the RS-232C interface connector. In this mode, RM-2001 remote control unit cannot be used. The videodisc player will automatically respond to commands given by the external computer.

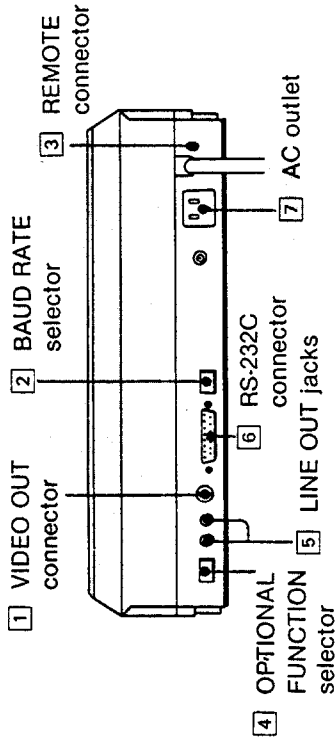
#### 3 IN USE indicator

Blinks while loading or unloading a videodisc, or lights up when the videodisc is being played back within the player. This indicator is not lit when the disc is not loaded on the player even if the power to the player is on.

#### 4 OPEN/CLOSE button

Press to open the disc compartment, and press again to close it. The compartment will also close automatically when it is pushed lightly. Be sure to push the center of the compartment for proper operation of the player.

### REAR PANEL

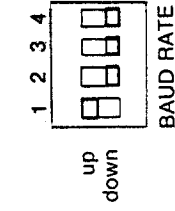


#### 1 VIDEO OUT connector

BNC connector for output of composite video signals.

#### 2 BAUD RATE selector

Select the data transmission speed on the RS-232C line. The baud rate can be set to 9600, 4800, 2400, or 1200 baud. Be sure that the speed set on the videodisc player is matched to that on the connected computer. The data speed is initially set to 1200 at the factory.



Switch setting				Baud rate
1	2	3	4	
up	down	down	down	1200
down	up	down	down	2400
down	down	up	down	4800
down	down	down	up	9600

Set the switches to the desired positions using the tip of a ball-point pen or a similar object.

#### 3 REMOTE connector

Connect to the RM-2001 optional remote control unit. Without the wire the remote control unit is not effective with the videodisc player.

#### 4 OPTIONAL FUNCTION selector

Set the selector so that the videodisc player operates in an extended operation mode. To select an extended operation mode, this selector should be set to the desired position before turning the power on. For details, see page 10.



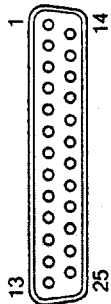
### 5. LINE OUT jacks

Phono jacks (RCA-type) for audio signal output. The audio signals of the channel 1 (CH-1) are output from the 1/L jack, and the signals of the channel 2 are output from the 2/R jack.

### 6. RS-232C connector

Standard 25-pin RS-232C interface connector for communication with an external computer. Refer to page 25 for making connections with an external computer.

### Pin assignment



Pin No.	Signal
1	FG (Frame ground)
2	TxD (Transmit data)
3	RxD (Receive data)
4	RTS (Request to send)
5	CTS (Clear to send)
6	DSR (Data set ready)
7	GND
20	DTR (Data terminal ready)

Each signal conforms to the RS-232C specifications.  
(Output level ON: more than +5V, OFF: less than -5V)

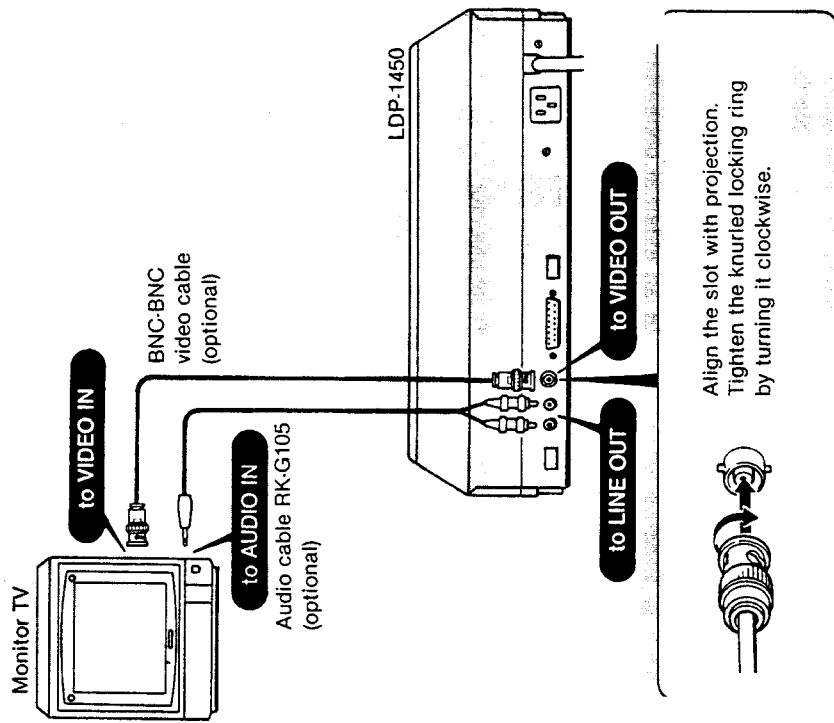
Note: Check the RS-232C pin assignment of the external computer to be connected. There is a modem mode and terminal mode for pin assignment. The RS-232C pin assignment for LDP-1450 is for the terminal mode.

### 7. AC outlet

This outlet supplies ac power to other video equipment whose power consumption is no more than 300 watts. The power is constantly supplied to the connected equipment regardless of the power switch setting of the player.

### 1-5. CONNECTIONS

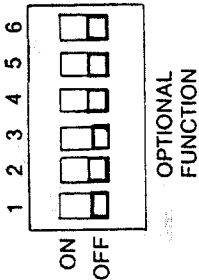
The video monitor which has a BNC video input can be used with LDP-1450. Use a BNC-BNC coaxial cable for video signal connection, and a cable with phono plugs for audio signal connection.



- To play back the audio on a stereo system, connect the LINE OUT connectors to the auxiliary (or tape or tuner) inputs of the amplifier.
- Use the red plug of the audio cable for the right channel (R) connection.

## 1-6. EXTENDED OPERATION MODES

The LDP-1450 is equipped with the OPTIONAL FUNCTION selector at its rear.



The three switches, from 1, 2 and 4, of the OPTIONAL FUNCTION selector enable the use of extended operation modes.

### Notes

- All switches of the OPTIONAL FUNCTION selector are set to the OFF position at the factory. To use an extended operation mode, set the corresponding switch to the ON position.
- Switches 3, 5 and 6 are not used.

### Precaution

Be sure to set the switch while the power is turned off, and then turn on the power. Changing the switch position while the power is turned on does not affect the current operation mode.

## TO ENTER STILL OR STOP MODE WHEN POWER IS TURNED ON

Use switch 1 of the OPTIONAL FUNCTION selector.

- 1 Turn the power off, if it is turned on.
- 2 Set switch 1 to ON.
- 3 Turn the power on.

The videodisc player will enter the still mode at the first track of the CAV disc, or the stop mode at the first track of the CLV disc when the power is turned on. This mode prevents the videodisc player from starting playback automatically. This mode will be convenient in case the host computer needs certain period of time for its initialization, for example.

### Note

This switch is effective whether or not an external computer is connected to the videodisc player.

## TO EXECUTE COMMANDS FROM THE COMPUTER WITHOUT RETURNING CODES

Use switch 2 of the OPTIONAL FUNCTION selector.

- 1 Turn the power off, if it is turned on.
- 2 Set switch 2 to ON.
- 3 Turn the power on.

The videodisc player will not return codes in response to the commands sent from the external computer. For the videodisc player in such a state, a simplified control program will do, since no interrupt processing will be required.

### Notes

- Even when switch 2 is set to ON, the videodisc player will return the required information in response to the ADDR INQ, CHAPTER # INQ, ROM VERSION INQ and STATUS INQ commands.
- An interval of at least 33 msec is required between two different commands so that the videodisc player can distinguish a command from the preceding one.

## TO USE THE REMOTE CONTROL UNIT WHILE THE VIDEO DISC PLAYER IS CONTROLLED BY AN EXTERNAL COMPUTER

In the standard operation mode, the videodisc player does not accept the signal from the remote control unit when it is controlled by an external computer. However, you can make the player accept the remote control unit signal while it is under the control of external computer.

Use switch 4 of the OPTIONAL FUNCTION selector.

- 1 Turn the power off, if it is turned on.
- 2 Set switch 4 to ON.
- 3 Turn the power on.

### Note

Switch 2 of the OPTIONAL FUNCTION selector should be set to OFF.

In this state, the videodisc player accepts the signal issued by the remote control unit, and returns the code to the external computer. The codes returned correspond to the keys on the remote control unit pressed as follows:

Key pressed	Code returned	Key pressed	Code returned
0	10H	REV SCAN	1FH
1	11H	FWD SCAN	20H
2	12H	REV PLAY	21H
3	13H	FWD FAST	22H
4	14H	REV FAST	23H
5	15H	FWD STEP	24H
6	16H	REV STEP	25H
7	17H	ENTER	26H
8	18H	CL	27H
9	19H	MODE	28H
INDEX	1AH	REPEAT	29H
CH1	1BH	SEARCH	2AH
CH2	1CH	SKIP	2BH
STOP	1DH	MENU	2CH
PLAY	1EH		

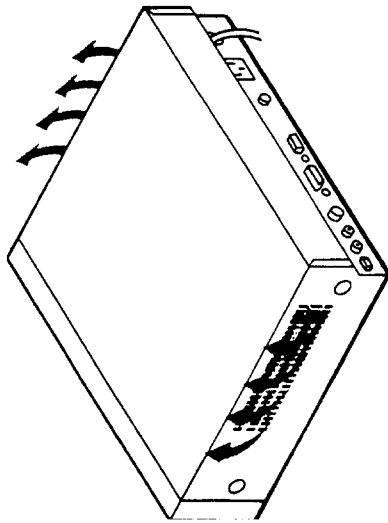
### Note

Pressing a key on the remote control unit does not cause immediately the corresponding operation of the player. The player simply returns the code listed above. For example, pressing the PLAY key does not start playback, but the player will return the code 1EH to the computer. A control program should be prepared so that the player starts playback when the computer receives the code 1EH from the player.

## 1-7. NOTE ON INSTALLING THE PLAYER IN A RACK

When the videodisc player(s) is(are) installed in a rack, special consideration should be taken to prevent internal heat buildup.

Ventilation holes on the LDP-1450

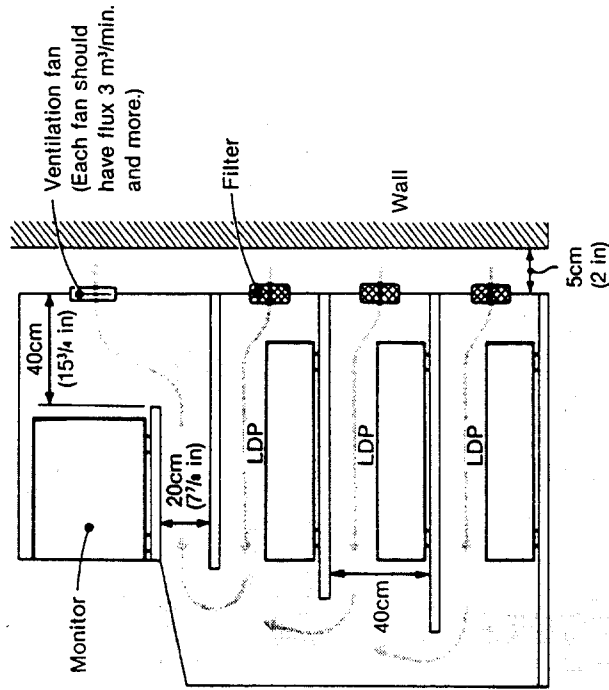


- The air in the rack should be circulated from the bottom to the top as indicated.
- The temperature in the rack should not be over 35°C (95°F).
- Allow at least 5 cm (2 inches) behind the rack when installing it against the wall.
- The distance between each shelf should be at least 40 cm (15¾ inches).
- The holes located at the back of the rack should have filters to prevent dust from being drawn into the rack.
- At least two ventilation fans should be used and should be installed in the back of the rack as indicated in the figure.
- If a monitor is installed in the same rack, care should be taken to prevent the heat from the monitor affecting the players.

### Recommended ventilation when installed in a standard 19" rack

- Use the optional RMM-121 rack mount kit to install the player(s) in a standard 19" rack.
- Three ventilation fans with flux 3 m<sup>3</sup>/min should be used for five players installed in a standard 19" rack. If you have any questions regarding ventilation in a rack, consult your authorized Sony representative.

### Recommended ventilation when installed in a closed rack



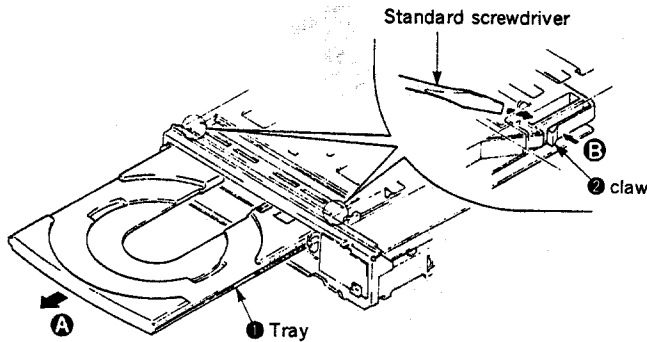
### Note

When the player is used in a dusty place, powdery dust will be drawn in the player and contaminate the objective lens in the optical pick-up system. Ask your nearest Sony service facility for lens cleaning.

## SECTION 2 DISASSEMBLY

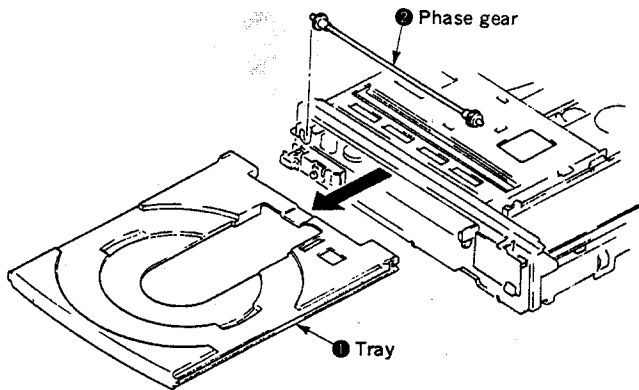
### 2-1. REMOVAL OF TRAY AND CHUCK ARM. . . (1)

- 1) Turn on power supply and set to eject state.  
\*When not ejecting, see "2-4. METHOD TO EJECT MANUALLY".
- 2) Insert a standard screwdriver, etc. into the left and right notch section as shown in Fig. and remove the claw ② of tray in the direction of arrow ③ while pulling the tray ① in the direction of arrow ④.



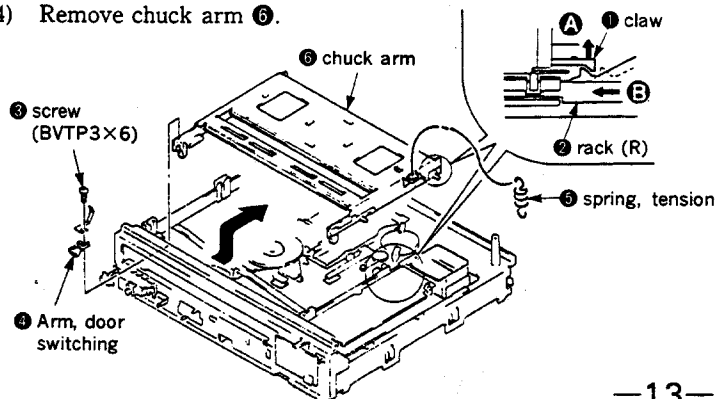
### 2-2. REMOVAL OF TRAY AND CHUCK ARM. . . (2)

- 1) Remove the tray ① and then remove the phase gear ②.



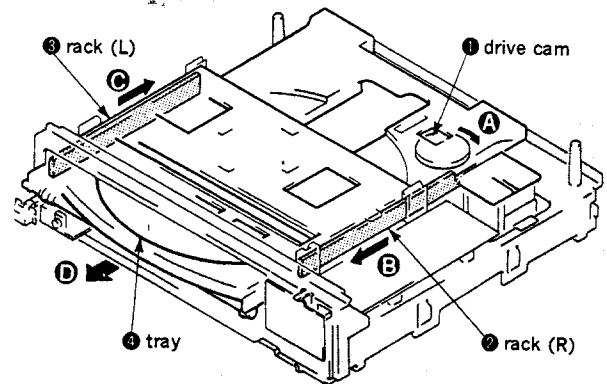
### 2-3. REMOVAL OF TRAY AND CHUCK ARM. . . (3)

- 1) While pushing the claw ① in the direction of arrow ④, move the rack (R) ② in the direction of arrow ③ so that it is positioned to where it is shown in Fig.
- 2) Remove screw ⑤ and remove arm, door switching ④.
- 3) Remove spring tension ⑥.
- 4) Remove chuck arm ⑦.



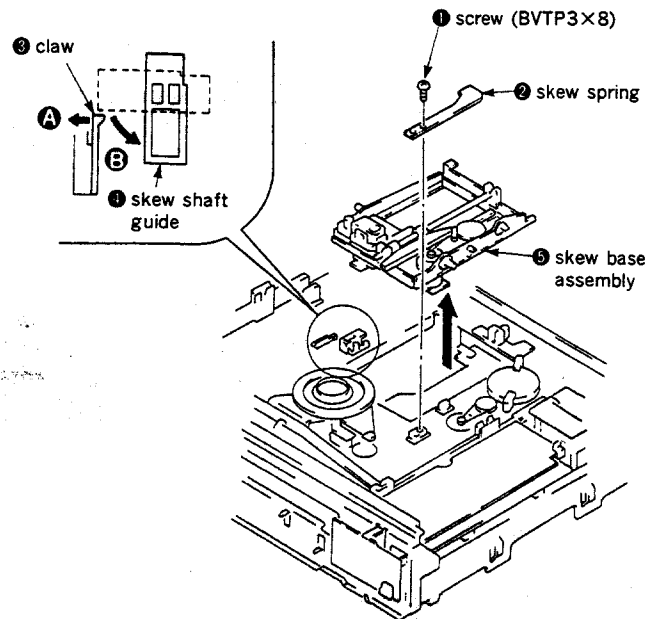
### 2-4. METHOD TO EJECT MANUALLY

- 1) Rotate drive cam ① in the direction of arrow ④ until rack (R) ② begins to move.
- 2) Move rack (R) ② and rack (L) ③ respectively in the directions of arrows ⑤ and ⑥ simultaneously and lift up tray ④.
- 3) Pull out tray ④ in the direction of arrow ⑦.



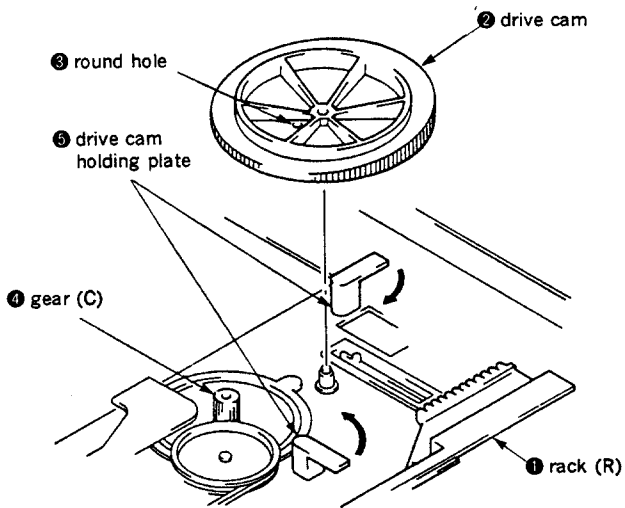
### 2-5. REMOVAL OF SKEW BASE ASSEMBLY

- 1) Remove screw ① and remove skew spring ②.
- 2) Rotate skew shaft guide ④ in the direction of arrow ③ while pushing the claw ③ in the direction of arrow ④.
- 3) Remove skew base assembly ⑤.



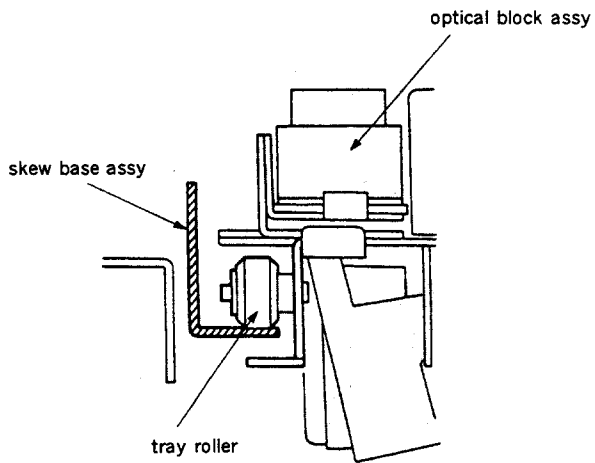
## 2-6. INSTALLATION OF DRIVE CAM

- 1) Confirm that the rack (R) ① has been slid until it contacts the rear side.
- 2) Install by setting the round hole ③ of the drive cam ② to face the front side and by engaging it to the gear (C) ④.
- 3) Rotate the two drive cam holding plates ⑤ to the respective directions of arrow and secure the drive cam ②.



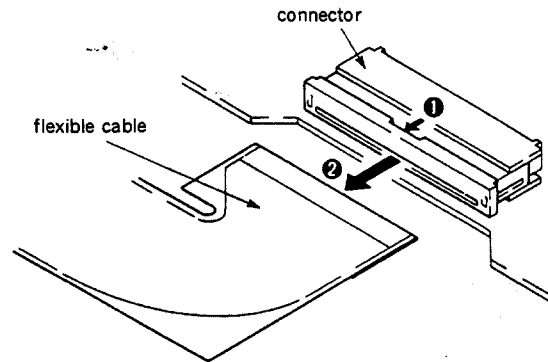
### <Caution on Optical Block Ass'y Installation>

Be sure to set the tray roller to the skew basw assy correctly, when installing optical block assy.

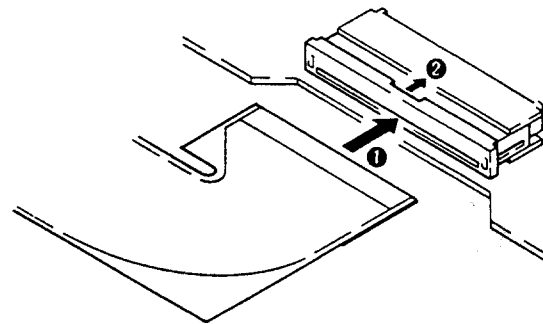


<Normal setting >

Remove or connect the flexible cable of optical block assy from or the connector by sliding it as shown below. The cable may be damaged by the forced handing.

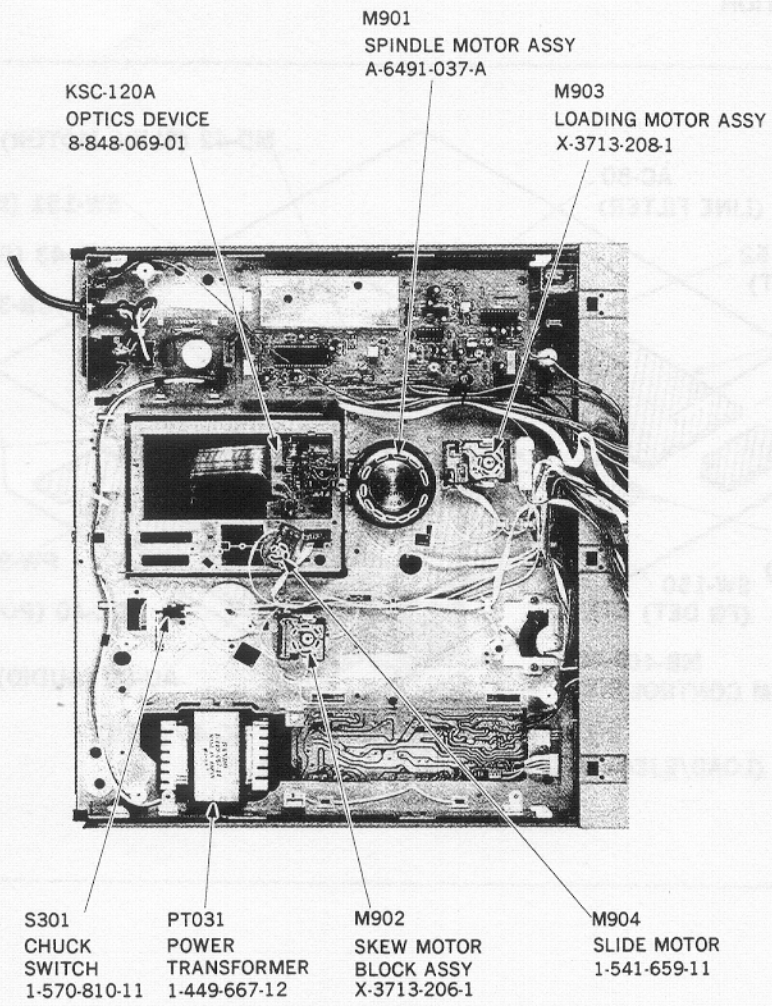


(Removal)



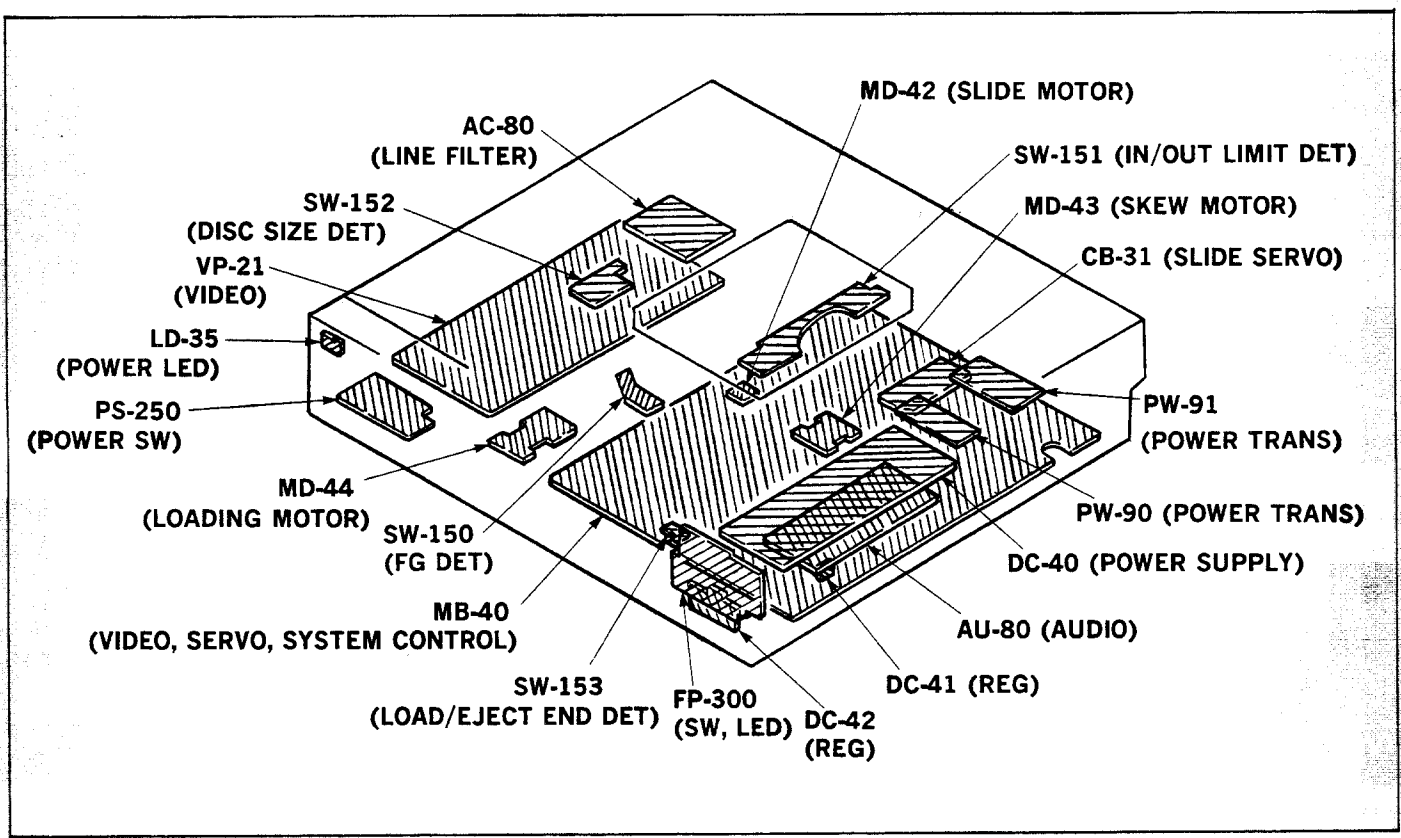
(installation)

2-7. INTERNAL VIEWS

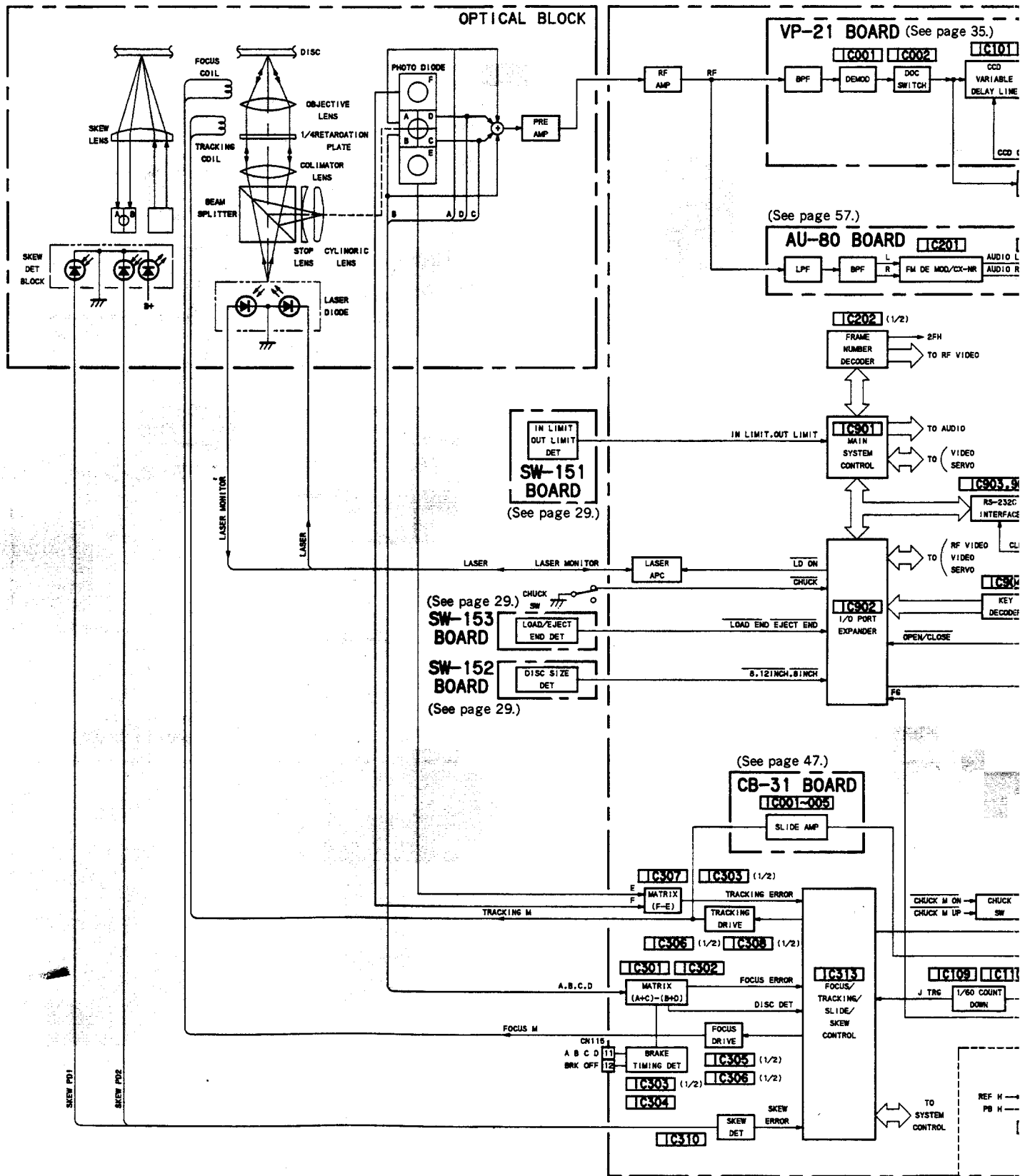


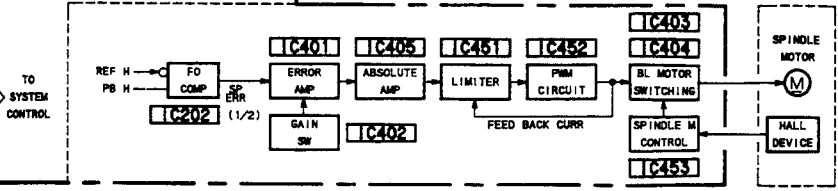
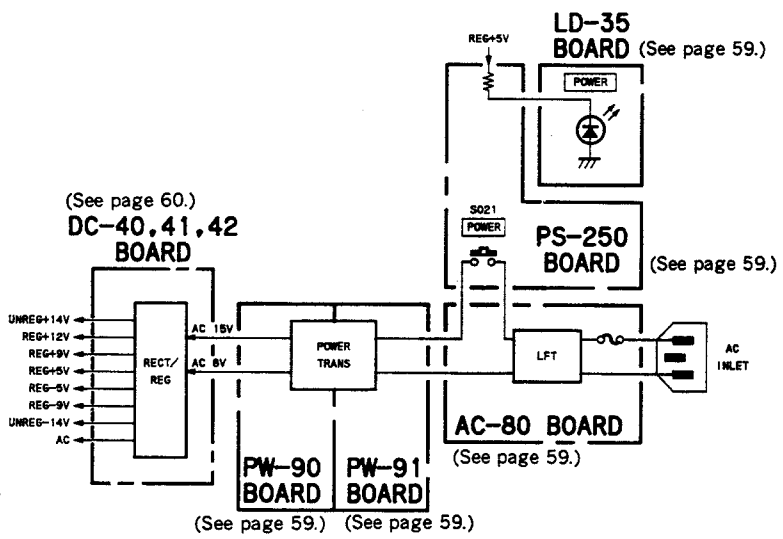
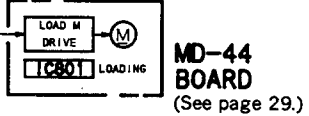
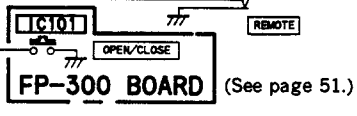
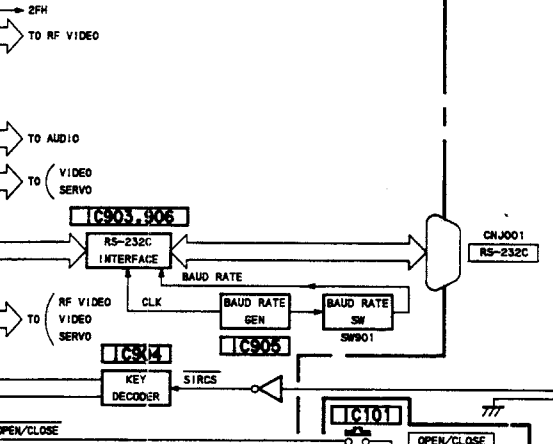
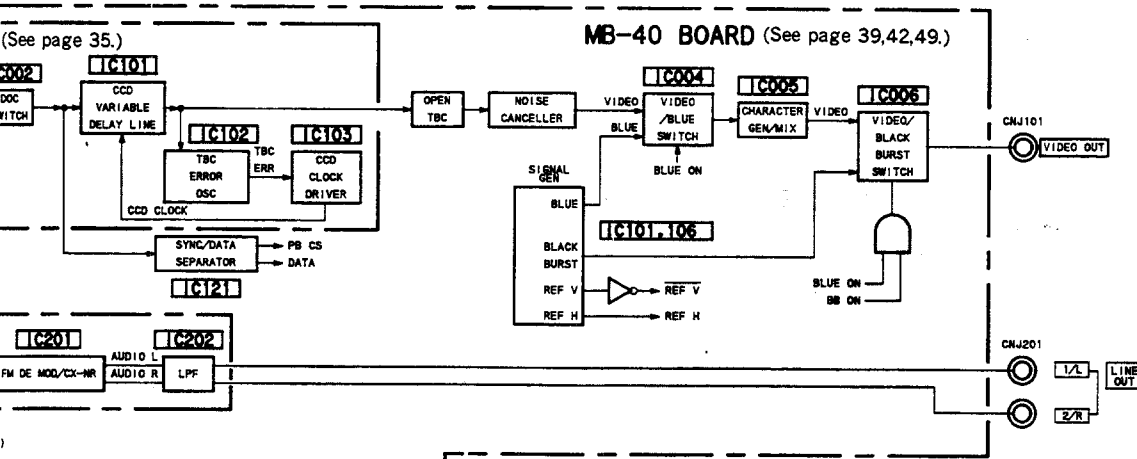
SECTION 3  
DIAGRAMS

3-1. CIRCUIT BOARDS LOCATION

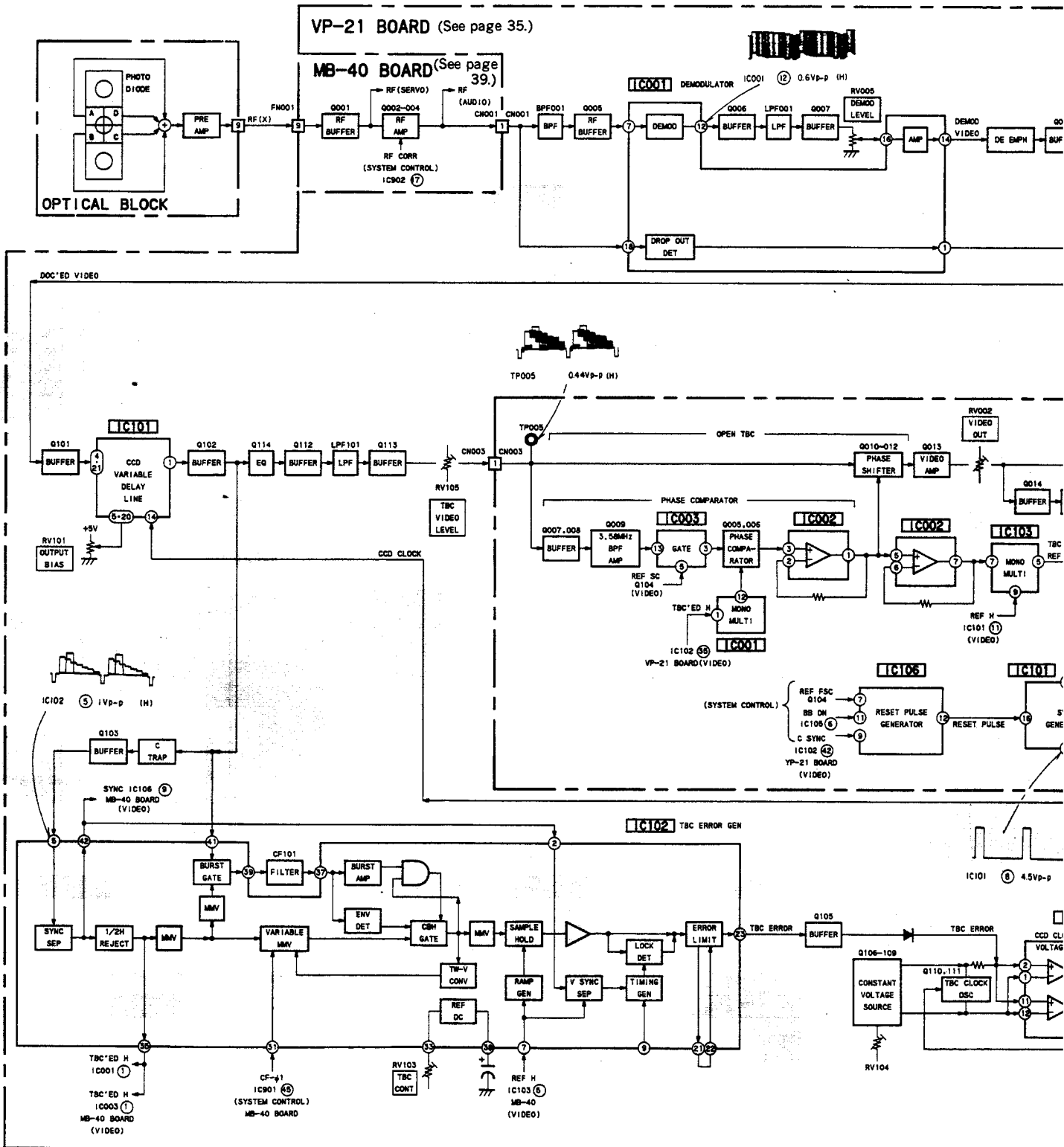


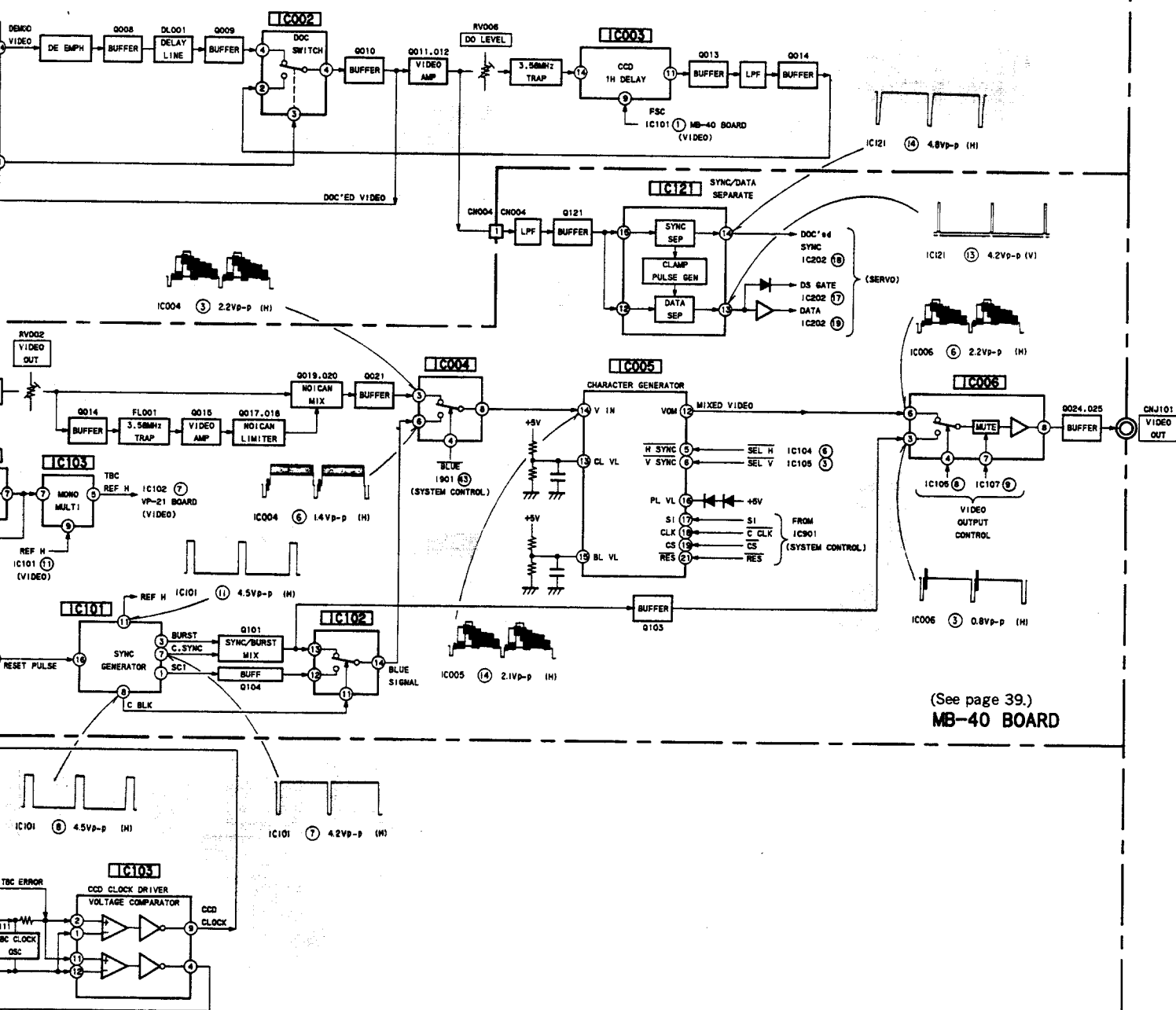






## 3-3. VIDEO BLOCK DIAGRAM

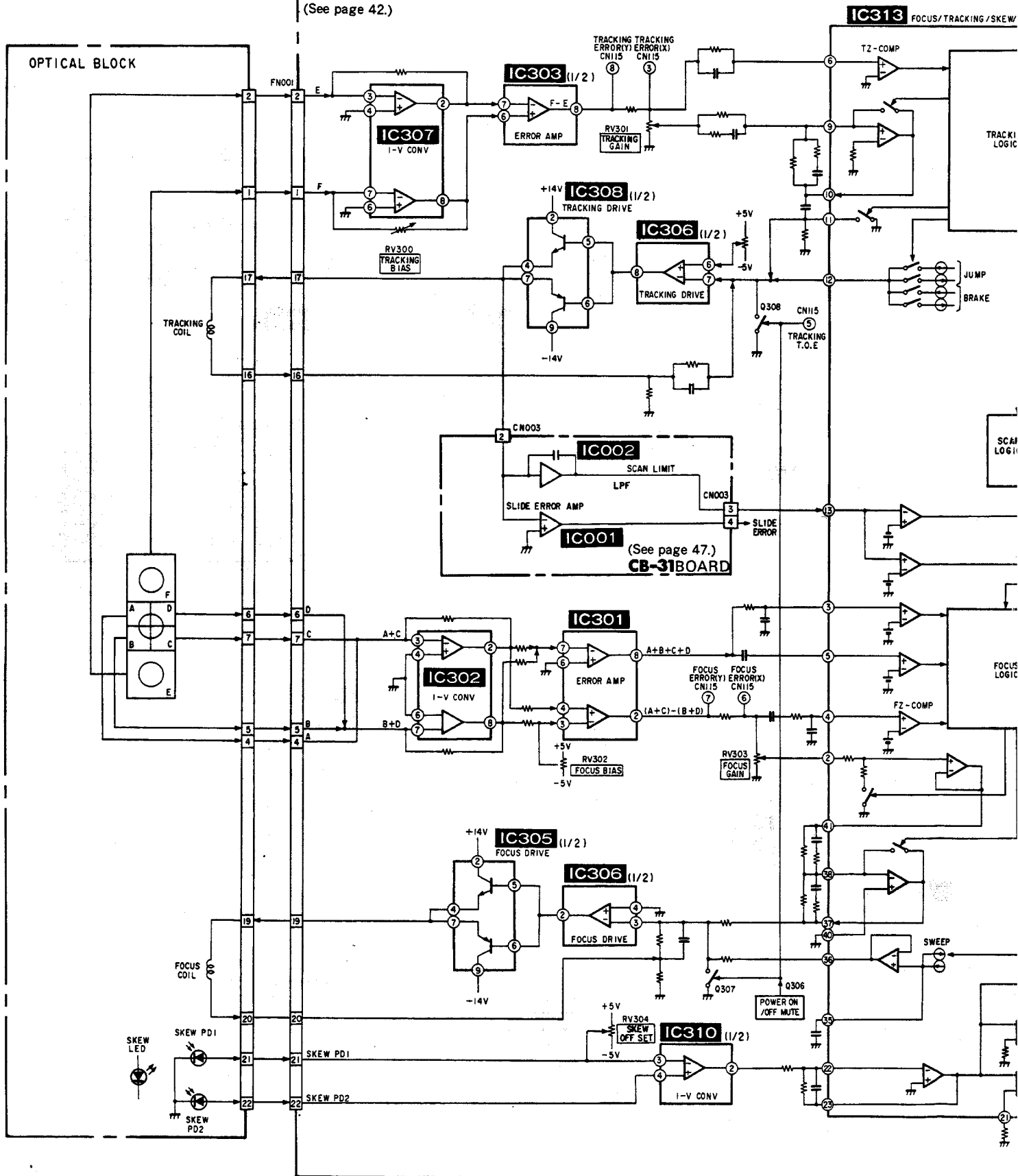




(See page 39.)  
MB-40 BOARD

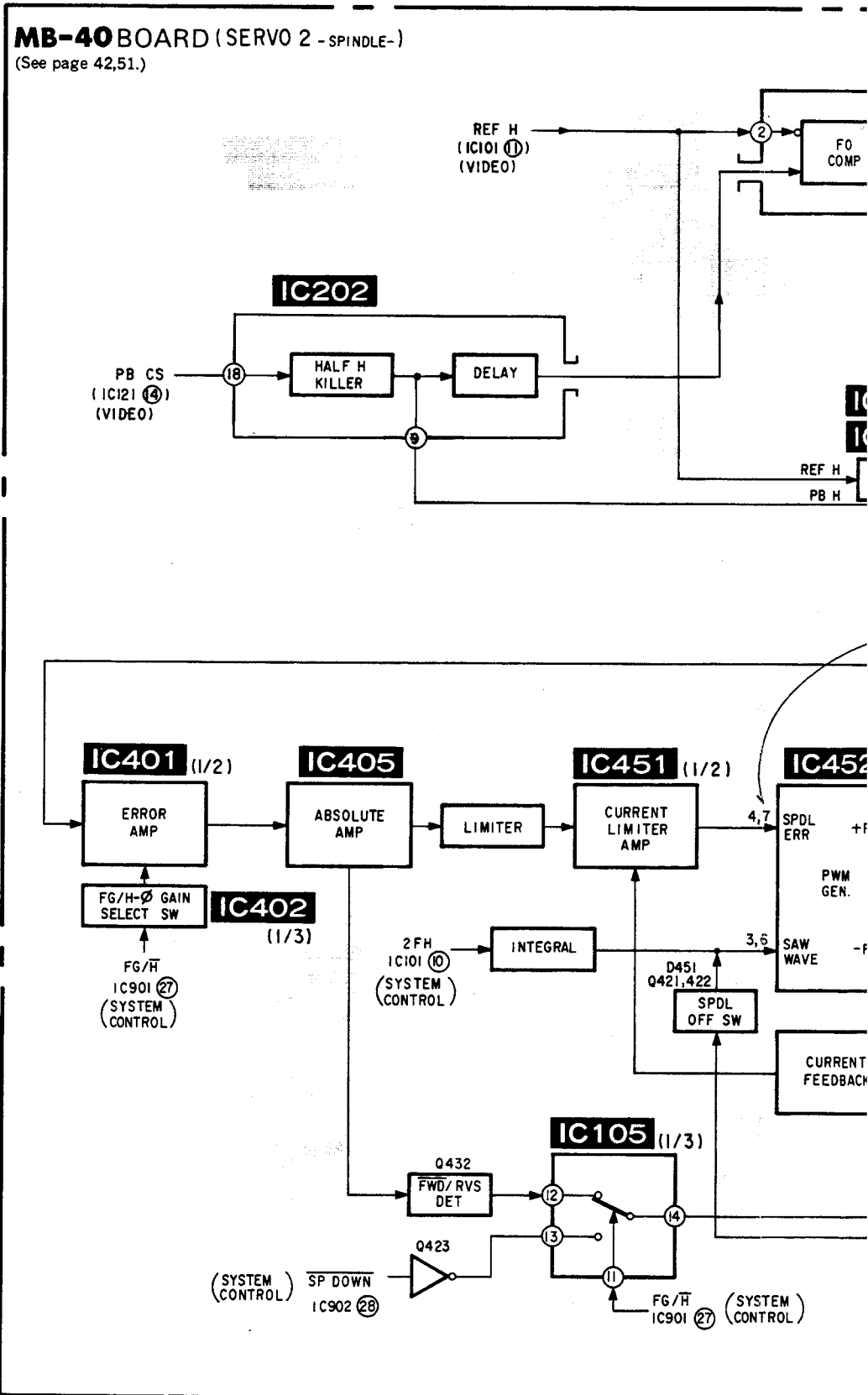
3-4. SERVO 1 BLOCK DIAGRAM

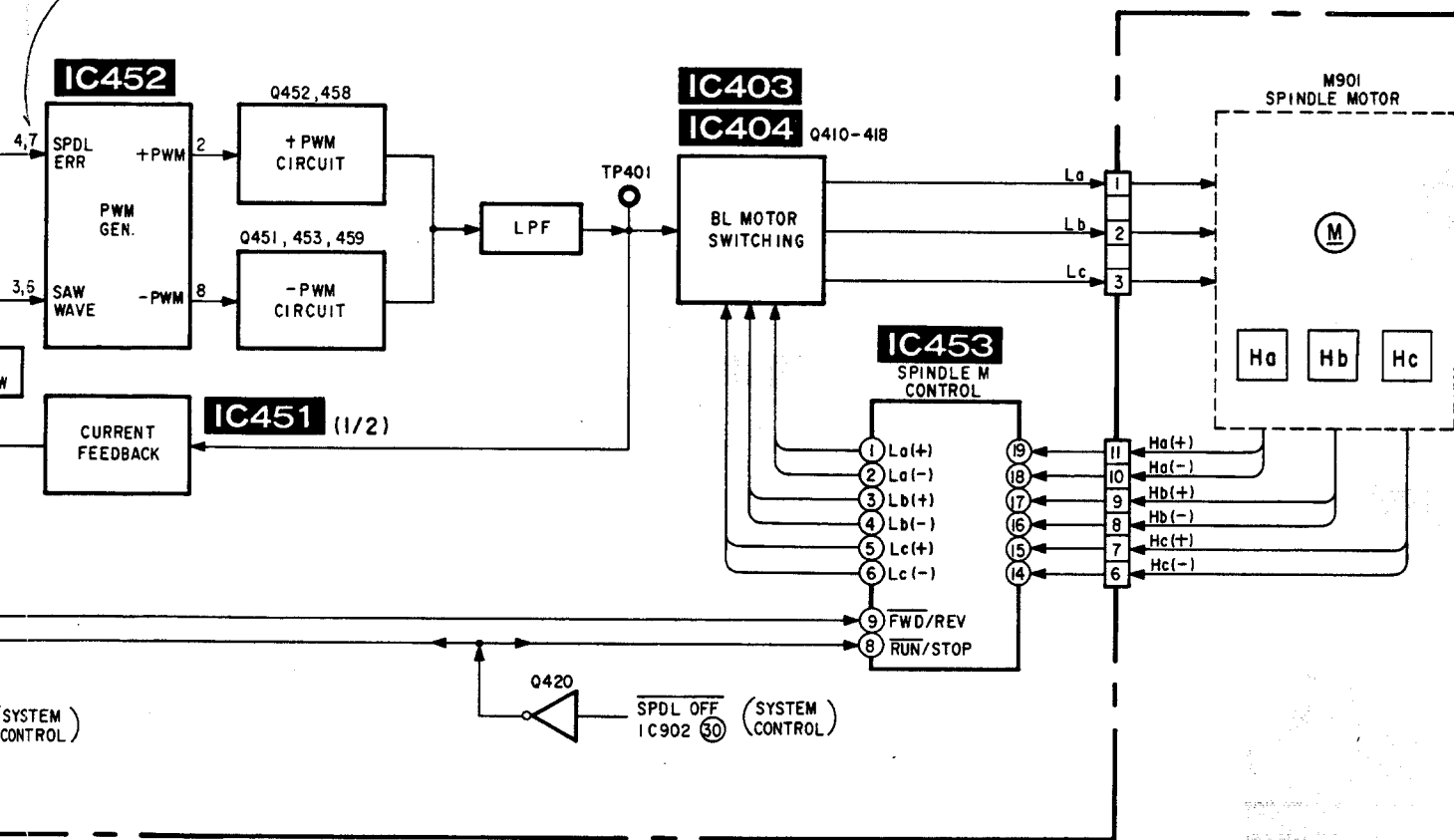
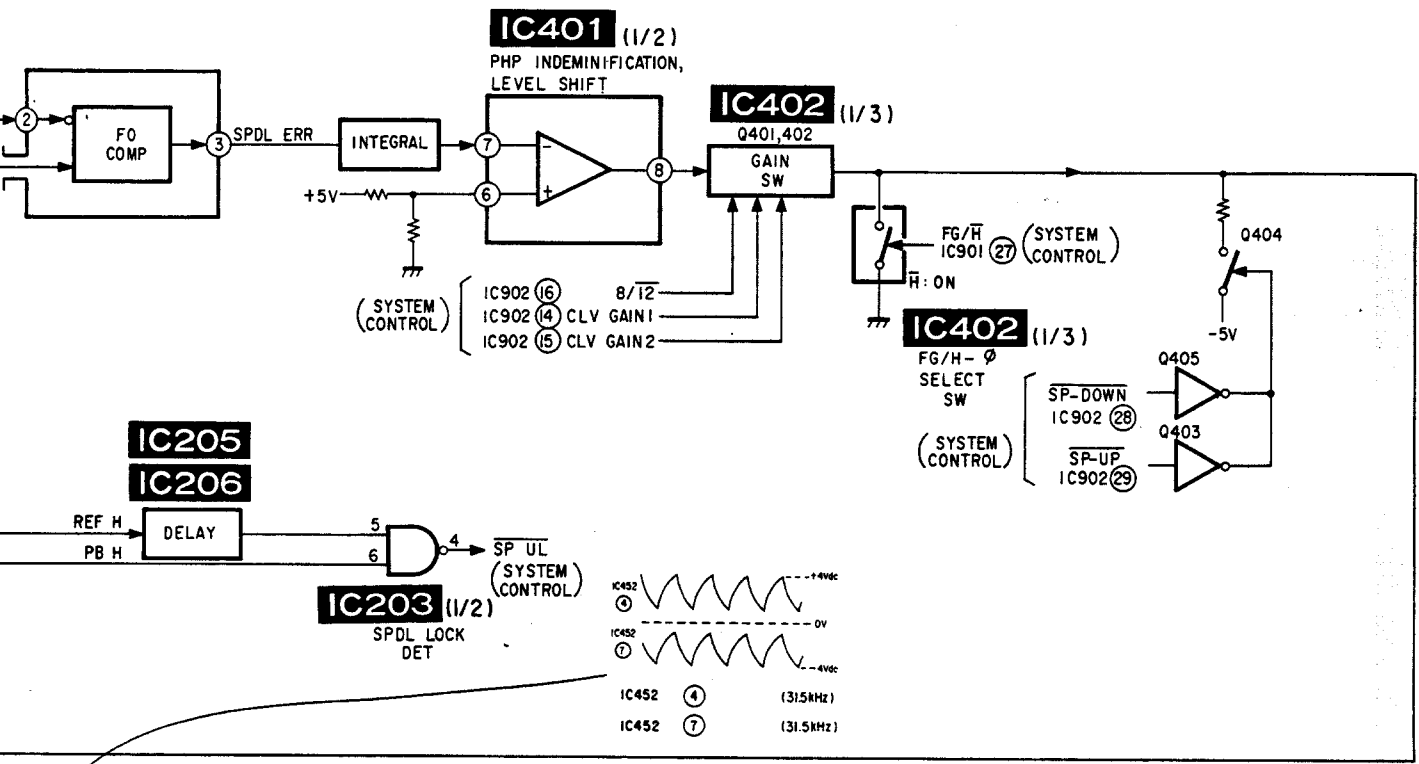
**MB-40BOARD** (SERVO 1- FOCUS/TRACKING/SKEW/SLIDE SERVO)  
(See page 42.)





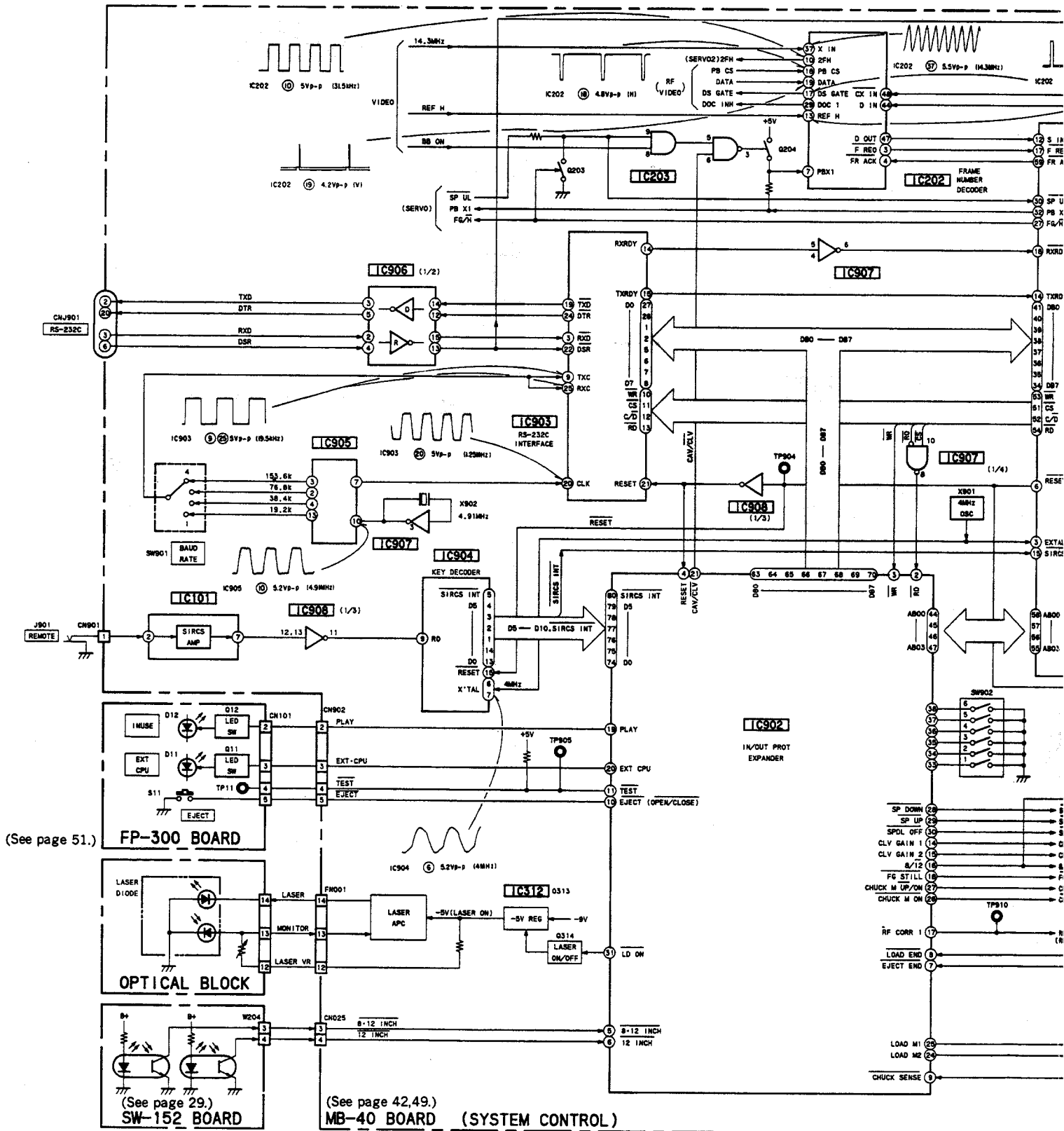
## 3-5. SERVO 2 BLOCK DIAGRAM







3-6. SYSTEM CONTROL BLOCK DIAGRAM



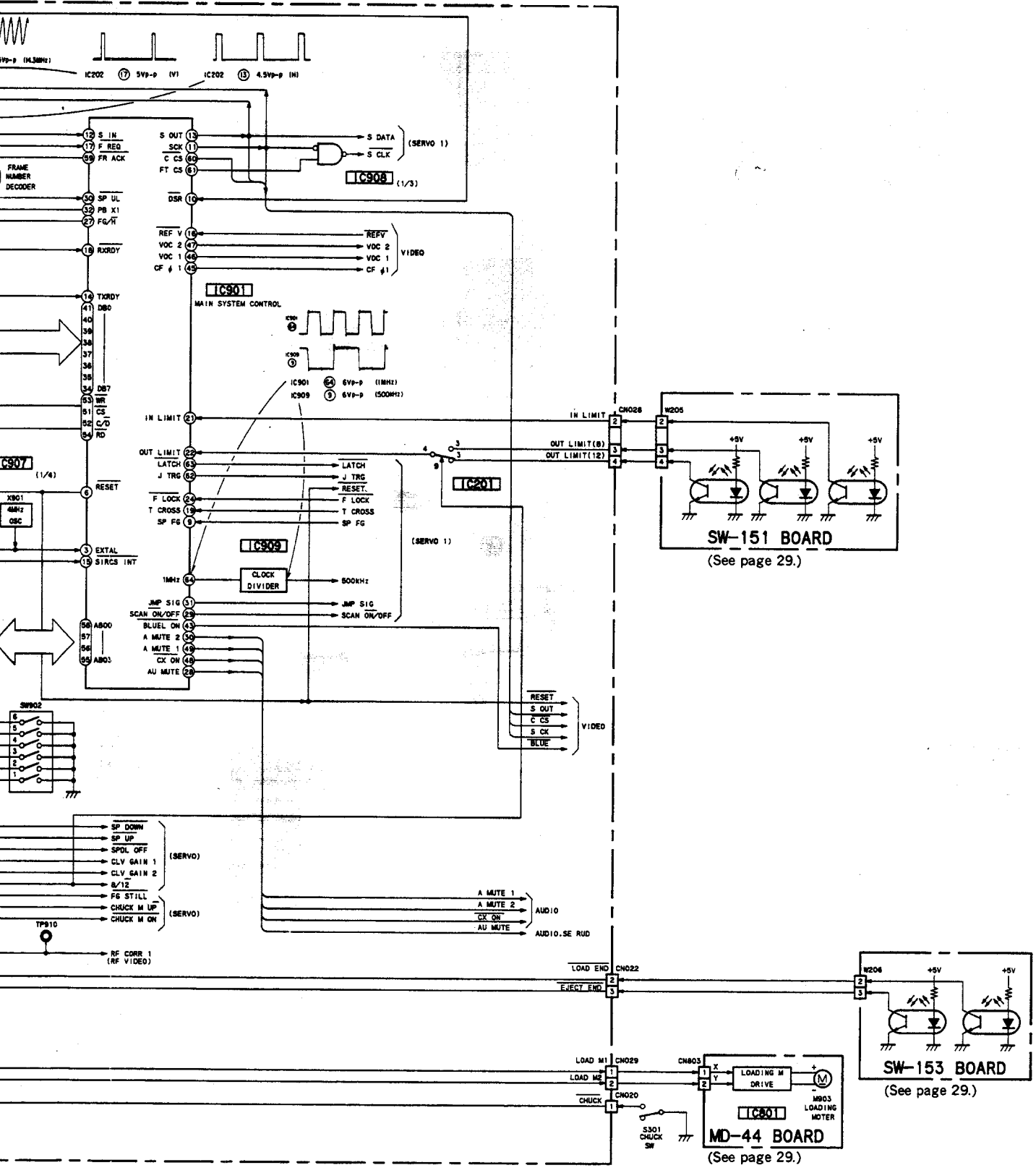
(See page 51.)

**FP-300 BOARD**

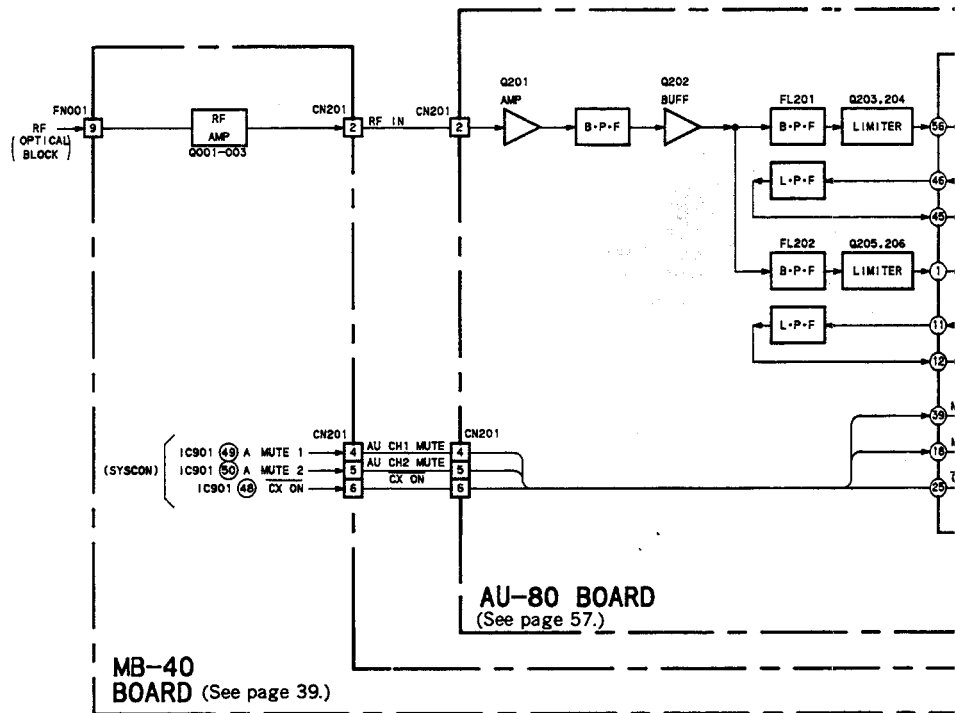
**OPTICAL BLOCK**

(See page 29.)  
**SW-152 BOARD**

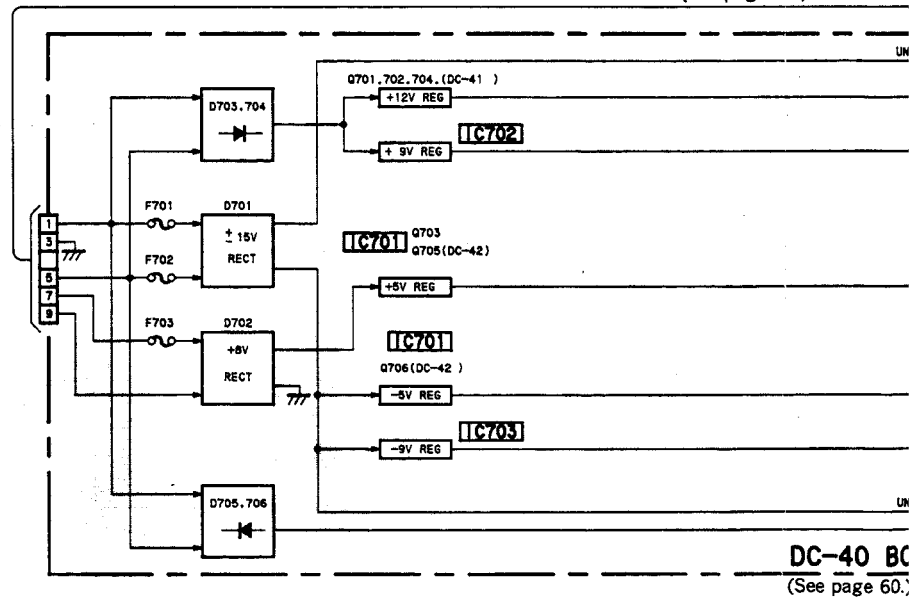
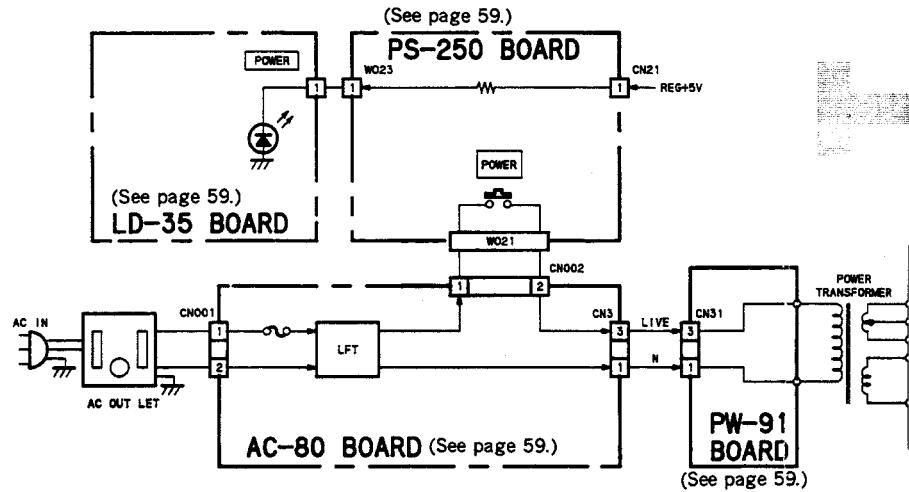
(See page 42.49.)  
**MB-40 BOARD (SYSTEM CONTROL)**

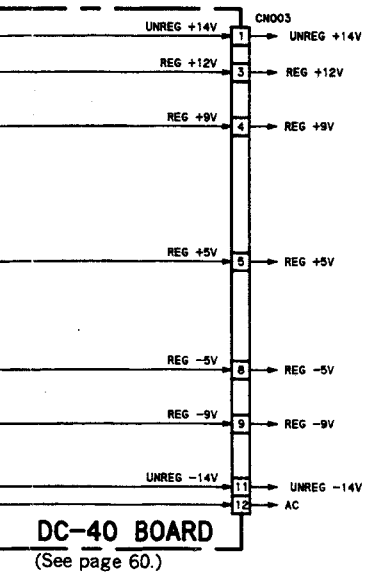
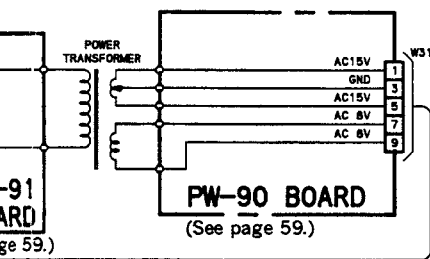
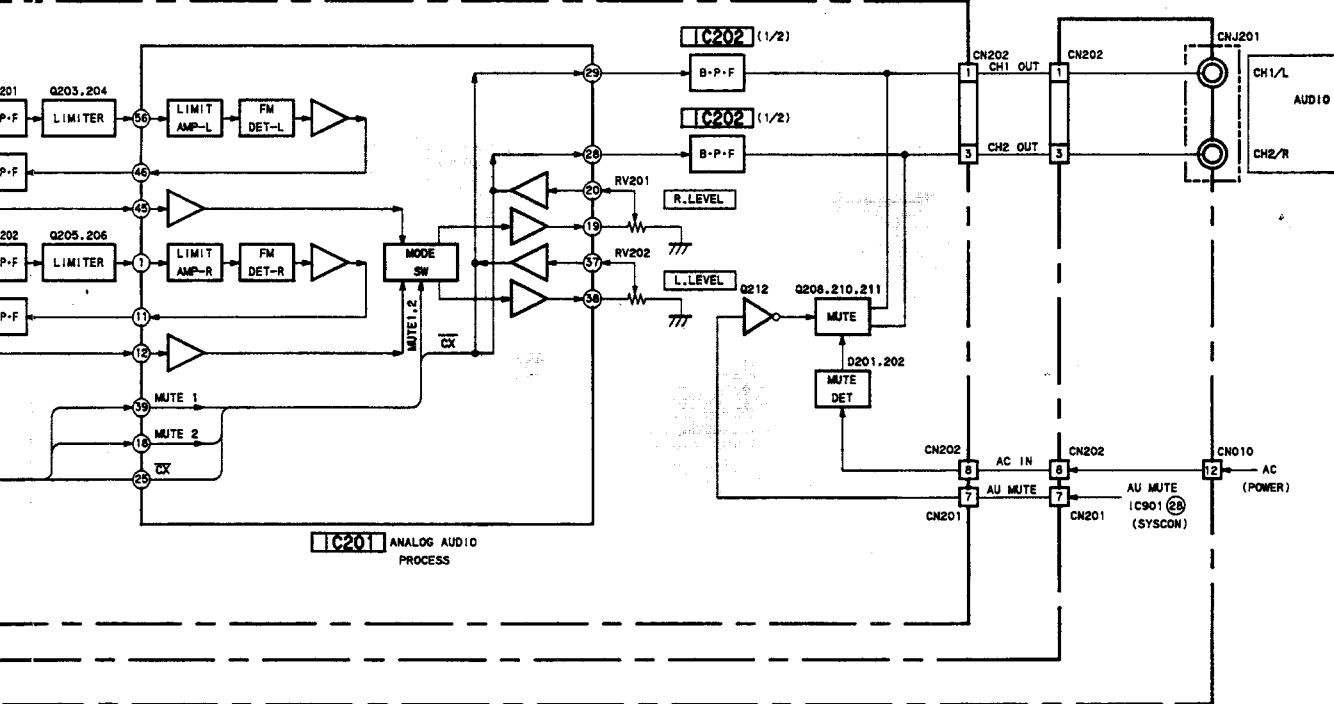


## 3-7. AUDIO BLOCK DIAGRAM



## 3-8. POWER BLOCK DIAGRAM





PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

FRAME SCHEMATIC DIAGRAM AND MD-42 (SLIDE MOTOR), MD-43 (SKEW MOTOR), MD-44 (LOADING MOTOR), SW-150

—Ref. No. MD-42, MD-43, MD-44, SW-150, SW-151, SW-152 and SW-153 BOARDS: 1,000 series—

