MDP-V10

RMT-M48A

SERVICE MANUAL

E Model
Chinese Model

* "DOLBY", "AC-3", and the double-D symbol ⧈ are trademarks of Dolby Laboratories Licensing Corporation.

Model Name Using Similar Mechanism	MDP-V1
Optical Pick-up Type	KHS-150A

SPECIFICATIONS

System

Type
VIDEO CD/CD/LD player

Signal readout
Optical (Laser beam reflection)

Signal format system
EIA standard, NTSC color system
CCIR standard, PAL color system (for VIDEO CDs only)

Playing time
See "Optical discs" on page 2.

Digital audio specifications

Signal-to-noise ratio
More than 115 dB (EIAJ)*

Dynamic range
More than 99 dB (EIAJ)

Wow and flutter
Below measurement limit (± 0.001 % W.PEAK) (EIAJ)

Video specification

Horizontal video resolution
425 lines

Signal-to-noise ratio
More than 50 dB

* Measured according to EIAJ (Electric Industries Association of Japan) standards.

Input and Output

LINE OUT 1, 2
VIDEO output, Phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced
AUDIO output, Phono jacks (2)
Stereo L, R
Analog: 200 mVrms
(1 kHz, 40 % modulation)
Digital: 200 mVrms
(1 kHz, –20 dB)

DIGITAL RF OUT (AC-3)
Phono jack (1)
Output level: 400 m Vp-p
Output impedance: 75 ohms

OPTICAL DIGITAL OUT
–18 dBm, wavelength 660 nm

General

Power requirements
110–240 V AC, 50/60 Hz

Power consumption
45 W

Operating temperature
5°C to 35°C

Ambient humidity
5% to 90 %

Dimensions
Approx. 355 × 122.5 × 401.6 mm (w/h/d)
including projecting parts and controls

Mass
Approx. 5.6 kg

Supplied accessories

Remote Commander RMT-M48A (1)
R6 (size AA) batteries (2)
Audio/Video Cable
(phono plug 3 ⟷ phono plug 3) (1)
AC plug adaptor (supplied with models other than China model) (1)
Cushions (4)

Design and specifications are subject to change without notice.

VIDEO CD/CD/LD PLAYER

MICROFILM

SONY®

Optical discs

The MDP-V10 can play optical discs currently available for home entertainment, laser discs (LD) and compact discs (CD and VIDEO CD). The table below shows the discs available for this player.*

Disc class	Disc logo	Disc type	Size	Sides	Play time	
Laser Discs For movies, animation, operas, concerts, and karaoke		LD Single (NTSC)	8 in. (20 cm)	Single	CAV	14 min
					CLV	20 min
		8-inch LD (NTSC)	8 in. (20 cm)	Double	CAV	28 min
					CLV	40 min
		12-inch LD (NTSC)	12 in. (30 cm)	Double	CAV	1 hr
					CLV	2 hr
Compact Discs For music, movies, animation, karaoke, and photographs		CD Single	3 in. (8 cm)	Single	20 min (audio only)	
		CD	5 in. (12 cm)	Single	74 min (audio only)	
		VIDEO CD (NTSC and PAL)	3 in. (8 cm)	Single	20 min	
			5 in. (12 cm)	Single	74 min	

* The MDP-V10 cannot play discs other than those shown above.

Multi audio discs

Discs with these logos contain separate analog and digital tracks which may differ in content.

VIDEO CD standards to which the player conforms

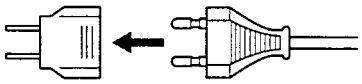
This player conforms to Ver. 1.0, Ver. 1.1 and Ver. 2.0 of the VIDEO CD specifications. If you use a Ver. 2.0 CD, Play Back Control (PBC) functions and high-resolution still pictures (the new part of Ver. 2.0 of the VIDEO CD specifications) are available as well as normal playback of moving pictures and sound.

Discs conforming to the Dolby Digital system

With this type of disc, the player outputs only the left channel signals as monaural sound, muting the sound of the right channel when analog audio is selected. Thus, you cannot alternate the right and left channels of analog audio with the Audio Monitor function.

Operating voltage and AC plug
This unit does not have a voltage selector. You can operate the unit between 110 and 240 V AC, 50/60Hz.

Models other than China model
If the AC plug of your unit does not fit into the wall outlet, attach the supplied AC plug adaptor.



Model for China
The model for China has an AC plug as shown below. The AC plug adaptor is not supplied with these units.

If you have any questions or problems concerning your unit, please contact your nearest Sony dealer.

Thank you for purchasing the Sony Laser Disc Player.

The MDP-V10, an easy-to-operate laser disc player, allows you to:
- Play many types of optical discs (LDs, CDs and VIDEO CDs)
- Play a double sided LD without turning it over
- Play VIDEO CDs which conform to Ver. 2.0 of VIDEO CD standards, using its Play Back Control (PBC) functions which allow you to:
  – Perform interactive playback using menu screens
  – View high-resolution still pictures
- Locate the desired scene on a VIDEO CD by observing several scenes at one time — Digest Play
- Reduce distortion of the picture on a VIDEO CD — DNR: Digital Noise Reduction
- The COLOR SYSTEM selector allows you to play all VIDEO CDs regardless of the TV system (PAL, NTSC or Multi Monitor system)
- Continue an LD/VIDEO CD from the point at which you stopped— Auto Resume
- Use enjoyable functions such as Program, Auto Program, Shuffle, or Repeat play

Conforming to Ver. 2.0 of VIDEO CD standards

This player conforms to Ver. 1.0, Ver. 1.1 and Ver. 2.0 of the VIDEO CD standards. If you use a Ver. 2.0 VIDEO CD, Play Back Control (PBC) functions (the new part of Ver. 2.0 of the VIDEO CD standards) enable you to play the disc interactively following menus on the screen. You can also enjoy high-resolution still pictures, as well as normal playback of moving pictures and sound.

Compatible color systems

This player plays video discs recorded in the NTSC color system, and VIDEO CDs in both the NTSC and PAL color systems.

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

Notes on chip component replacement
- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS 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.

SERVICING NOTE

SELF-DIAGNOSIS

This model has the self-diagnosis function for the video and audio decoder sections.
Immediately after the power on, the self-diagnosis function searches each operation of IC's around the mode microcomputer (IC305).
The LED (D301) on the VX-97 board indicates their results.

LED (D301) INDICATION	SYMPTOM
Light	No error
1 time blinking (Repeatedly)	Transmission error between IC305 and IC101.

[VX-97 BOARD] — SIDE B —

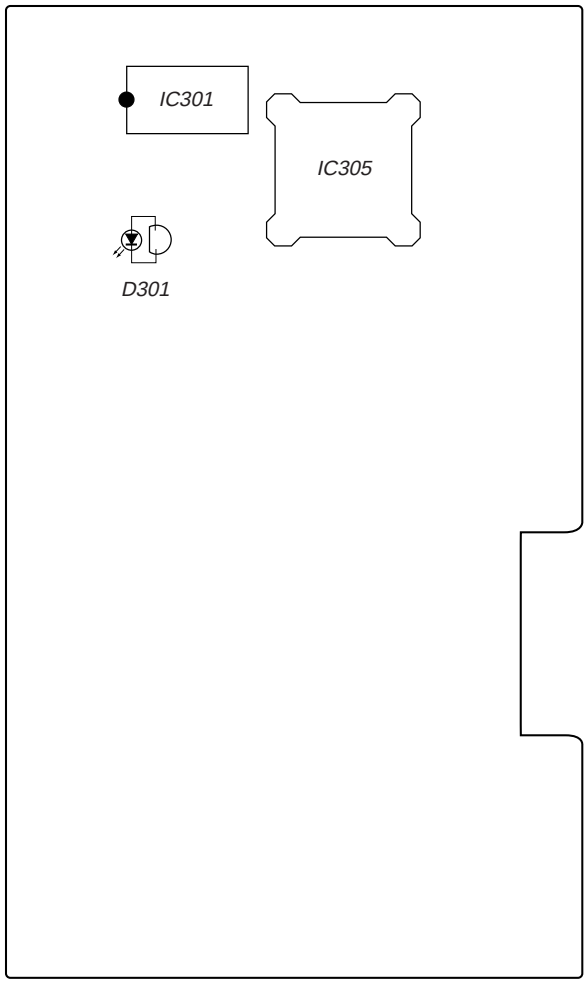


TABLE OF CONTENTS

1. GENERAL

2. DISASSEMBLY

3. BLOCK DIAGRAMS

4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

5. REPAIR PARTS LIST

6. IC PIN DESCRIPTION

7. ADJUSTMENTS

8. EVALUATION OF OPTICAL PICK-UP BLOCK (KHS-150A)

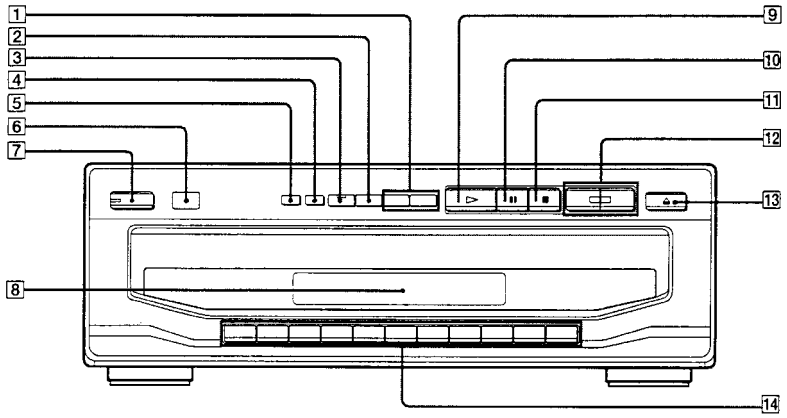
9. INSTRUCTION MANUAL FOR SPECIAL FUNCTIONS

(For the contents of section 9, refer to page 9-1.)

Index to parts and controls

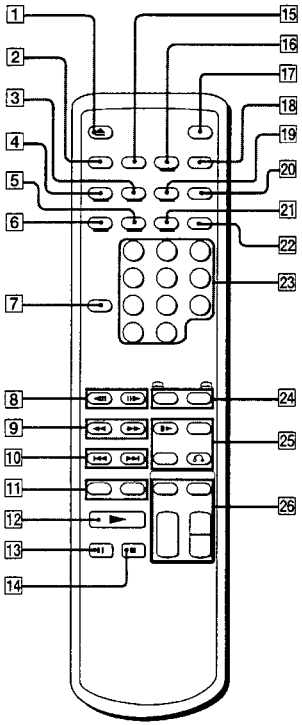
See the pages indicated in ( ) for details.

Front



1 PREV/NEXT (ACS/AMS) buttons (11) (13) (18)
2 RETURN button (13)
3 PBC ON/OFF button and indicator (13)
4 VIDEO CD DIGEST button (20)
5 VIDEO CD DNR indicator-button (32)
6 Remote sensor (5) (33)
7 POWER switch and indicator (10) (23)
During STANDBY : Lights up red
While ON : Goes off
8 Display (12)
9 ▷ SELECT (Play) button (10) (11)
10 ❚❚ (Pause) button (11)
11 ■ (Stop) button (11) (23)
12 SIDE A/B buttons (11)
13 ⏏ OPEN/CLOSE button (10)
14 Number buttons (11) (13) (16) (17) (20) (28)

Remote commander

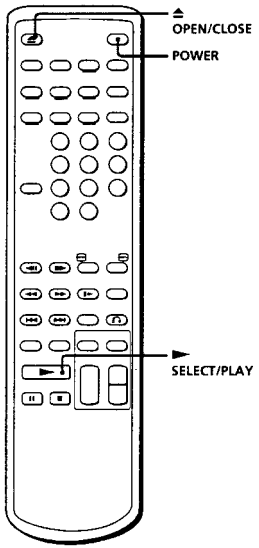


1 ⏏ OPEN/CLOSE button (10)
2 ANALOG/▣ button (31)
3 1/SIDE/ALL button (24)
4 REPEAT button (24)
5 SHUFFLE button (26)
6 PROGRAM button (28)
7 VIDEO CD DNR button (32)
8 ◀II/IIB STILL/STEP buttons (11) (22)
9 ◀◀/▶▶ SCAN buttons (11) (18)
10 I◀◀/▶▶I PREV/NEXT (ACS/AMS) buttons (11) (13) (18)
11 DISC SIDE A/B buttons (11)
12 ▷ SELECT/PLAY button (10) (11)
13 ❚❚ PAUSE button (11)
14 ■ STOP button (11) (23)
15 AUDIO MONITOR button (31)
16 FRAME/TIME/SCENE button (17)
17 POWER switch (10) (23)
18 DISPLAY button (12) (14)
19 REPEAT A⟷B button (25)
20 AV TIME button (15)
21 AUTO PGM button (29)
22 CLEAR button (24) (27) (28) (30)
23 Number buttons (11) (13) (16) (17) (20) (28)
24 ▲/▼ V. INDEX buttons (19)
25 VIDEO CD buttons
IB SLOW button (18)
DIGEST button (20)
↩ RETURN button (13)
PBC ON/OFF button (13)
26 Television buttons (available for Sony TVs which have ▣ mark)
TV POWER button
TV/VIDEO button
VOL (volume) +/– buttons
CH (channel) +/– buttons

⬭ A function activated by pressing a button with an orange mark can be canceled by pressing the CLEAR button.

Basic Operations

Playing a disc



Tip

- You can also turn on the player by pressing ≜ OPEN/CLOSE or ▻ SELECT on the player.

Notes

- If you place more than one disc on the tray, or if the disc is not seated properly, the disc may not start playing, and may cause damage to the disc or player.
- Do not transport the player while playing a disc as doing so may damage your disc or player. Be sure to remove the disc, turn the power off, and then unplug the AC power cord when transporting the player.
- Do not use a CD stabilizer when playing a CD or VIDEO CD as doing so may damage your disc or player.

This section shows you how to play an LD, CD or VIDEO CD.

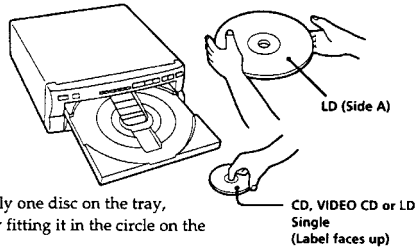
Before you start...
Connect the player to your TV and set the input selector on the TV to "Video" (see "Connecting the player" on page **6**).

Loading and playing a disc

1 **Press POWER to turn on the player.**
You can also directly turn on the player by pressing ► SELECT/PLAY on the remote commander or player.

2 **Press ≜ OPEN/CLOSE to open the disc tray.**
The front cover of the player automatically slides down and the disc tray comes out.

3 **Place a disc on the disc tray.**



Place only one disc on the tray, carefully fitting it in the circle on the tray.

4 **Press ► SELECT/PLAY.**
The disc tray closes and the disc starts playing. You can also start playing by pressing the disc tray to close it.

When you play a double-sided LD
The upper side of the LD (side A) starts playing. When the upper side ends, the other side (side B) starts playing automatically.

To play a VIDEO CD with Play Back Control (PBC) functions (Ver. 2.0 VIDEO CD)
Ver. 2.0 VIDEO CDs have Play Back Control (PBC) functions, which allow you to play them interactively. To play a VIDEO CD using PBC functions, see "Playing a VIDEO CD using PBC functions" on page **13** for details.

Tips

- When playing a double-sided LD, the player determines that the upper side of the disc is side "A" and the other side is "B," regardless of the label "A" or "B" printed on the disc.
- When playing side A of an LD, "SIDE A" appears on the front panel display. When playing side B of an LD, "SIDE B" appears on the front panel display.
- When LD playback of side B ends, the player stops.
- When playing a CD, LD single or VIDEO CD, the DISC SIDE B button does not function.

Note

- When you press II PAUSE, the picture goes blue when playing a CLV LD, and the picture freezes when playing a CAV LD or VIDEO CD (see "Viewing frame-by-frame action" on page **22**).

To	Press
Stop play	■ STOP
Pause play	II PAUSE
Resume play after pause	II PAUSE or ► SELECT/PLAY
Scan forward or backward	◄◄/►► SCAN
Skip chapters or tracks	I◄◄/►►I PREV/NEXT (ACS/AMS)
Play step by step	◄II/II► STILL/STEP (CAV LDs only)
Go to a chapter/track	Number button During PBC VIDEO CD playback, press number buttons to select items in the on-screen menu (see page **13** for details).
Remove the disc	≜ OPEN/CLOSE

To start playing from the beginning of either LD side
Press DISC SIDE A to play the upper side of the LD from the beginning.
Press DISC SIDE B to play the other side of the LD from the beginning.

To pause playing just before starting
Press II PAUSE instead of pressing ► SELECT/PLAY after you place the disc on the tray. (If you want to start from side B of an LD, press II PAUSE and then DISC SIDE B.)
The disc tray closes and the player waits at the start of the disc until you press ► SELECT/PLAY or II PAUSE.

To stop playing and turn off the player
Press POWER.
You can resume playback of an LD or VIDEO CD from the point you stopped at by simply pressing ► SELECT/PLAY (see "Resuming LD/VIDEO CD playback" on page **23**).

To stop playing and remove the disc
Press ≜ OPEN/CLOSE.
Remove the disc and press ≜ OPEN/CLOSE again to close the empty tray.

Playing a disc (continued)

Tips

- The AV calendar shows the tracks remaining on the disc. As tracks are played, the corresponding numbers on the calendar disappear.
- While playing a Ver. 2.0 VIDEO CD using PBC functions, the AV calendar shows the numbers you can use to select items from the menu.
- When there is no disc in the player, "NO dISC" appears on the front panel display.

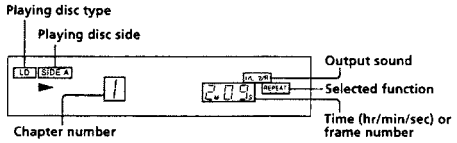
Note

- The AV calendar is not available for LDs.

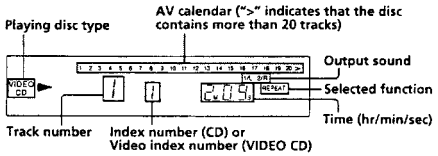
Reading the front panel display

The illustration below is an example of what is displayed on the front panel of the player.

When playing an LD

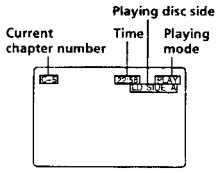


When playing a VIDEO CD or CD

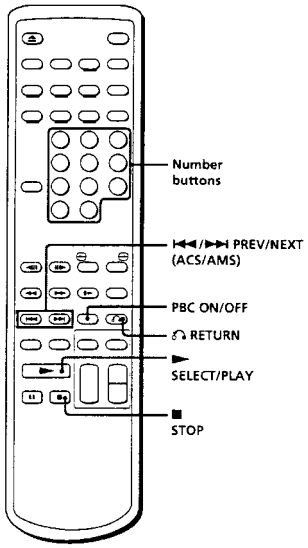


Viewing the on-screen display

Press DISPLAY. The on-screen display appears (see "About on-screen indications" on page **14**).



Playing a VIDEO CD using PBC functions (PBC Playback)



Tips

- To select a track over 10, press >10, then press two number buttons, first the tens digit, then the ones digit (see page **16**).
- You can view high-resolution still pictures on some Ver. 2.0 VIDEO CDs.

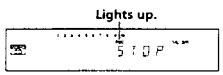
Note

- If no menus appear on the screen:
  - check that the disc is a Ver. 2.0 VIDEO CD ("PBC" is lit on the front panel display when a Ver. 2.0 VIDEO CD is in the player.)
  - turn on the PBC ON/OFF button indicator on the player
  - press ► SELECT/PLAY to display a menu

VIDEO CDs conforming to Ver. 2.0 of the VIDEO CD standards have Play Back Control (PBC) functions, which enable you to play the VIDEO CD interactively, following menus on the screen. Operation methods may differ depending on the disc. For details, refer to the instructions supplied with the disc. Use the number buttons, ► SELECT/PLAY, ⏮/⏭ PREV/NEXT (ACS/AMS), and ↩ RETURN during PBC playback.

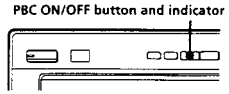
1 Place a Ver. 2.0 VIDEO CD (with PBC functions) on the disc tray, then press ► SELECT/PLAY to close the disc tray.

"PBC" lights up when a Ver. 2.0 VIDEO CD is in the player.



2 Check to see that the PBC ON/OFF button indicator on the player lights up.

A menu appears on the screen and the player waits for you to select a number on the menu. On some discs, moving pictures may play for a while before the menu appears.



3 Enter a number to select the item in the menu.

4 Play the VIDEO CD interactively, following the menus.

Playing a Ver. 2.0 VIDEO CD interactively

To	Press
Select an item in the menu	Number button
Jump to another scene when "SELECT" flashes on a moving picture	► SELECT/PLAY or a number button
Go back to the menu	↩ RETURN Operation methods may differ depending on the disc. For details, refer to the instructions supplied with the disc.
Scroll the menu	⏮/⏭ PREV/NEXT (ACS/AMS)

If " ✋ NOT VALID NOW" appears on the screen

You have pressed an unoperable button. Use the operable buttons, following the menu.

Canceling PBC playback

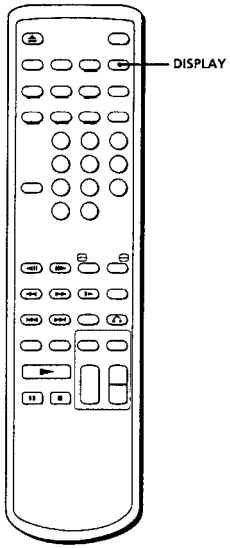
Press ■ STOP to stop playing the VIDEO CD, then press PBC ON/OFF on the remote commander or on the player to turn off the PBC ON/OFF button indicator. Now you can play the VIDEO CD continuously but menus for interactive playback are not displayed.

To turn on PBC playback again

The PBC ON/OFF button indicator must be lit to use PBC functions. If it is not lit, press ■ STOP to stop playing the disc, then press the PBC ON/OFF button to turn it on. Press ► SELECT/PLAY to display a menu.

Additional Operations

About on-screen indications



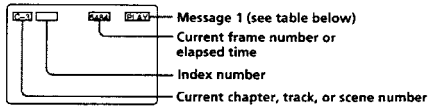
Notes

- When playing an LD without chapters, the chapter number does not appear.
- When playing a CLV LD without time data to the second, a two-digit number such as "22:", meaning 22 minutes, appears.
- Messages concerning sound control functions such as "1/L, 2/R" or "♪ DIGITAL, ♪ ANALOG" appear only briefly when you press the AUDIO MONITOR or ANALOG/◻◼ button.

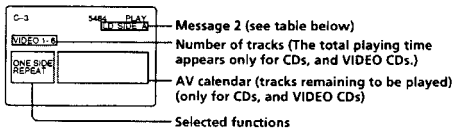
You can view the operating status of the player or disc information on the screen.

Displaying on-screen indications

Press DISPLAY.
The operating status of the player is displayed on the screen.



Press DISPLAY again.
Operating status and disc information are displayed on the screen.



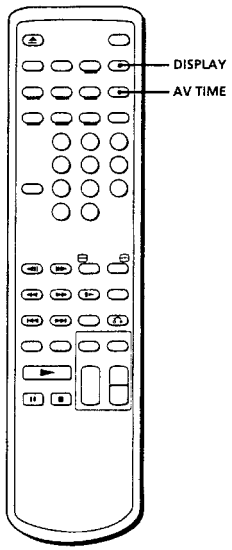
Press DISPLAY once again to turn off the indications.

Message 1

Display	Current status of the player
OPEN	Disc tray open
CLOSE	Disc tray closed
PLAY	Playing a disc
STOP	Operation stopped
PAUSE	Operation momentarily stopped
◀◀/▶▶	Speed scanning
SEARCH	Searching

Message 2

Display	Currently playing
LD SIDE A	Side A of LD
LD SIDE B	Side B of LD
CD	CD
VIDEO CD	VIDEO CD
1/L	First soundtrack/left channel
2/R	Second soundtrack/right channel
♪ DIGITAL	Digital sound
♪ ANALOG	Analog sound



Notes

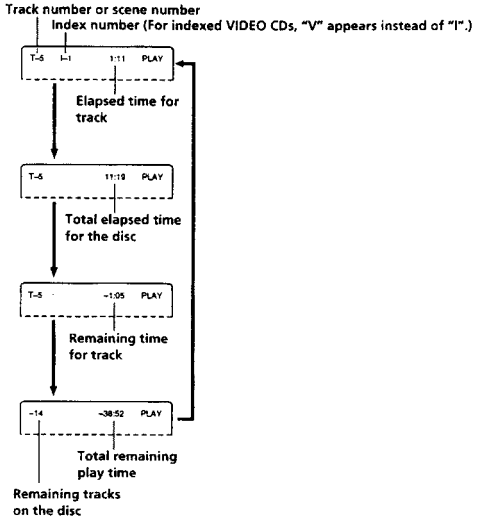
- When playing a Ver. 2.0 VIDEO CD using PBC functions:
  - the scene number (such as "S-5") is displayed instead of the track number
  - you can only view the elapsed time for the current scene
- The display does not show remaining time for tracks that are 51 or more tracks away from the beginning of the disc.

Checking the elapsed or remaining time of the disc

You can check the elapsed or remaining time on the screen.

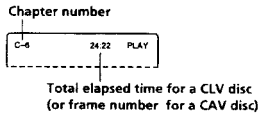
CDs/VIDEO CDs

Press DISPLAY, then press AV TIME repeatedly.
Each time you press AV TIME, the on-screen display changes as follows:

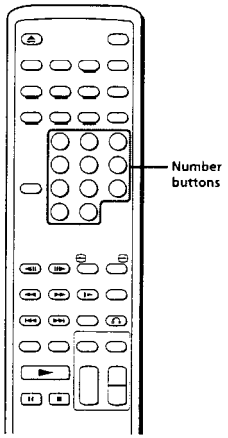


LDs

Press DISPLAY. You can only view the total elapsed time (for a CLV disc) or current frame number (for a CAV disc).



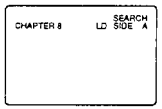
Selecting a chapter or track directly (Chapter/Track Search)



LDs are divided into sections called "chapters." CDs and VIDEO CDs are divided into sections called "tracks." Simply enter the desired chapter/track number to start playing it immediately.

Locating a particular chapter/track

Press one of the number buttons to enter the chapter/track number.



To play a chapter on the opposite side of the LD, press DISC SIDE B (or A), then enter the chapter number.

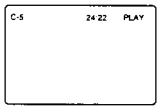
To enter a number greater than 10

Press >10, then press two number buttons in sequence, first the tens digit, then the ones digit. If you press >10 by mistake, press >10 again, then enter the correct one digit number.

To	Press
Enter 10	0/10
Enter 14	>10, then 1, then 4
Enter 20	>10, then 2, then 0/10
Enter 25	>10, then 2, then 5

To check the current chapter/track number on the screen

Press DISPLAY to display the chapter/track number.
The number appears in the upper left-hand corner of the screen. If the LD does not contain chapter numbers, no number is displayed.



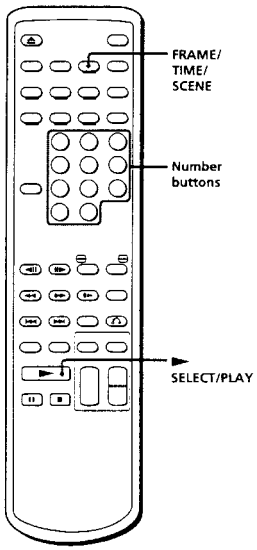
Tips

- In addition to normal play mode, you can do Chapter/Track Search while in Freeze Frame (CAV LDs or VIDEO CDs), Repeat, or Pause mode. When the selected chapter or track is located after the search, playback continues in the same mode.
- You can enter 0 to select chapter 0 on LDs. To enter 0, press >10, then press 10/0.

Notes

- Chapter Search does not function properly if the LD does not contain chapter numbers, or if the chapter number entered does not exist.
- You cannot use Track Search when you play a Ver. 2.0 VIDEO CD using PBC functions. Entering a number selects an item in the menu.
- If you do Track Search on a Ver. 2.0 VIDEO CD using the PBC functions before the AV calendar appears on the front panel display, the PBC function is turned off.

Searching by frame, time, or scene number (Frame/ Time/Scene Search)



Tip

- In addition to normal play mode, you can do Frame/ Time/Scene Search while in Freeze Frame, Repeat, or Pause mode. When the specified frame, time, or scene is located after the search, playback continues in the same mode.

Video scenes are counted as a series of still pictures or "frames." When playing a CAV (standard-play) LD, the player keeps track of the number of frames, allowing you to locate a scene on the CAV disc by specifying the frame number.

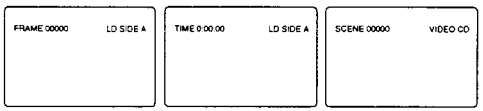
When playing a CLV (extended-play) LD, the player keeps track of the elapsed playing time, allowing you to locate a particular point on the CLV LD by specifying the total elapsed time.

On Ver. 2.0 VIDEO CDs (with PBC functions), "scene numbers" are assigned to some points on moving pictures and to each still picture, allowing you to locate a scene you want to view on the VIDEO CD by specifying the scene number. This is only available during PBC playback (when the PBC ON/OFF button indicator on the player is lit). You can check the scene number by pressing the DISPLAY button during PBC playback (see "Checking the elapsed or remaining time of the disc" on page **15**).

Entering the frame number, elapsed time, or scene number

1 Press FRAME/TIME/SCENE while playing the disc.

When playing	Indication
CAV LD	FRAME 00000
CLV LD	TIME 0:00:00
Ver. 2.0 VIDEO CD (with PBC functions)	SCENE 00000



2 Enter the multi-digit number corresponding to the frame, time or scene you want to locate.

To locate frame number 12340 on the CAV LD, press 1, 2, 3, 4 and 0.
To locate the 12 minutes, 5 second point on the CLV LD, press 1, 2, 0 and 5.
To locate scene 123 on the VIDEO CD, press 1, 2 and 3.

If you enter the wrong number, press FRAME/TIME/SCENE to clear the number, then enter the correct number.

3 Press ► SELECT/PLAY.

Playback starts from the frame, time, or scene you entered.

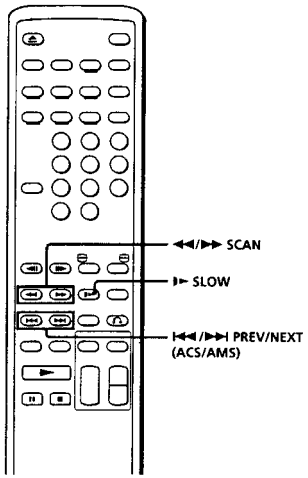
To check the frame number, scene number or time

Press DISPLAY.
The current frame number, time, or scene number is displayed.

To cancel Frame/Time Search

Press CLEAR before pressing ► SELECT/PLAY.

Searching for a particular point on a disc



Tips
- ACS/AMS is the abbreviation for Automatic Chapter Sensor/Automatic Music Sensor.
- In addition to normal play mode, you can also do Speed Scan and Skip Search while in Freeze Frame (CAV LDs or VIDEO CDs), Repeat, or Pause mode. After the scan or search, playback continues in the same mode.
- If you hold down ◀◀/▶▶ SCAN after pressing II PAUSE while playing a VIDEO CD, the scanning speed increases. The picture where you pressed II PAUSE freezes and remains on the screen. Navigate by using the time display. Release ◀◀/▶▶ SCAN to display the picture at the indicated time. The new picture freezes. Press ► SELECT/PLAY to resume playback.

Notes
- When scanning a CLV LD or VIDEO CD, frames are skipped.
- A certain amount of visual noise and instability is inevitable when scanning an LD.

You can locate a particular point on a disc by scanning scenes, skipping chapters/tracks, playing back slowly or using the video index.

Scanning a disc quickly (Speed Scan)

Hold down ◀◀/▶▶ SCAN while playing the disc.

To	Hold down
Scan forward	▶▶ SCAN
Scan backward	◀◀ SCAN

To resume normal playback, release ◀◀/▶▶ SCAN.

Skipping chapters or tracks (Skip Search)

Press or hold down I◀◀ /▶▶I PREV/NEXT (ACS/AMS).

To go to the beginning of	Press
Next chapter/track	▶▶I NEXT (ACS/AMS) once
Current chapter/track	I◀◀ PREV (ACS/AMS) once
Previous chapter/track	I◀◀ PREV (ACS/AMS) twice before the picture or sound resumes

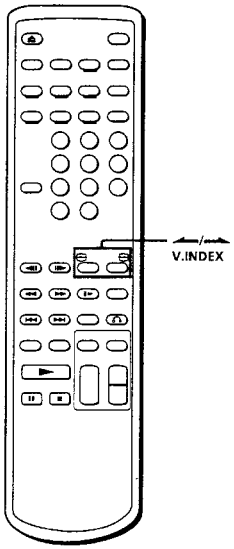
Hold down ▶▶I or I◀◀ to skip chapters/tracks continuously.

Skip Search on Ver.2.0 VIDEO CDs
If the PBC function is turned on, Skip Search may not be operated properly on some VIDEO CDs. The PBC function should be set to off (the PBC ON/OFF button indicator on the player is turned off) when operating Skip Search.

Locating a point slowly by observing the screen (Slow-motion Play)

You can use this function only for VIDEO CDs.
Press I► SLOW while playing a VIDEO CD. You will not hear the sound during the operation. When you find the point, press ► SELECT/PLAY to return to the normal speed.
Each time you press the I► SLOW button during Slow-motion Play, the playback speed changes. Three speeds are available. With each press, the on-screen indication changes as follows:

I► SLOW 1 → SLOW 2 → SLOW 3



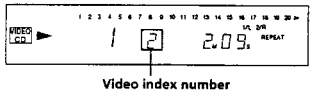
What is an index?
It is the division of a track or disc into numbered sections. It allows you to easily locate a desired point on the disc. To determine whether or not a disc has an index, look at the disc's packaging.

Locating a point using the video index (Video Index Search)

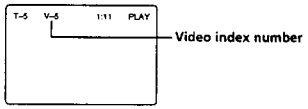
This function is available only on indexed VIDEO CDs. You can locate any point on the disc using the video index.

While playing a track, press ◄— V.INDEX or —► V.INDEX repeatedly.
- To locate the current or preceding video index numbers, press ◄— V.INDEX.
- To locate the next or subsequent video index numbers, press —► V.INDEX.

Front panel display

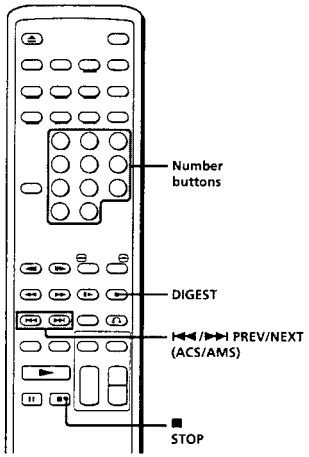


Screen



Video Index Search on Ver. 2.0 VIDEO CDs
To operate Video Index Search on a VIDEO CD, the PBC ON/OFF button indicator on the player should not be lit. Press ■ STOP to stop playback, then press PBC ON/OFF on the remote, or PBC ON/OFF on the player to turn off the PBC ON/OFF button indicator.

Locating by observing several scenes at one time (Digest Play)



Tip

- While the still pictures are displayed in Step 1, you can start playing the track you want right away before all the still pictures are displayed. Press ► SELECT/PLAY when the picture of the track you want appears on the screen.

Notes

- You cannot do Digest Play while using PBC functions on a Ver. 2.0 VIDEO CD. To do Digest Play on a Ver. 2.0 VIDEO CD, press ■ STOP to stop playing, then press the PBC ON/OFF button to turn off the PBC ON/OFF button indicator on the player.
- If you start Disc Digest before you start playing in Shuffle or Program Play mode, the player automatically enters normal play mode.

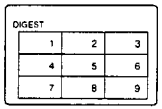
You can locate the track or scene you want by observing several still pictures at one time on the screen. Two kinds of Digest Plays are available: Disc Digest (for discs which contain two or more tracks) and Track Digest (for discs which contain one track only). When you press DIGEST, the player automatically enters Disc Digest mode or Track Digest mode according to the number of the track.
This function is available only on VIDEO CDs.
In Digest Play mode, you will not hear the sound.

Locating the track you want on a disc (Disc Digest)

You can locate the track you want by observing the first picture of up to 9 tracks on the disc at one time on the screen.

1 Press DIGEST in stop mode.

The screen shows still pictures of the first scenes of tracks 1 to 9 on the disc.



To view still pictures of the tracks numbered over 9, press ⏭ NEXT. The screen shows still pictures of tracks 10 to 18.
If there are more tracks, "►►■" is displayed on the upper right side of the screen.
To go back to the previous screen, press ⏮ PREV.

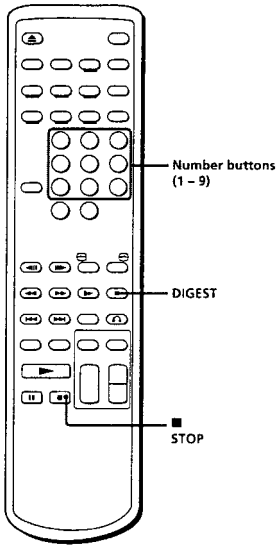
2 Press the number button to select the track.

The player starts playing from the selected track.

To select a track over 10, press >10, then press two number buttons, first the tens digit, then the ones digit (see page 15).

Canceling Disc Digest Play

Press ■ STOP.



Tip

- You can select a point which isn't displayed yet on the screen in Step 1.

Note

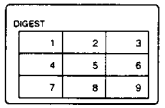
- If you start Track Digest before you start playing in Shuffle or Program Play mode, the player automatically enters normal play mode.

Locating the point you want in a track (Track Digest)

You can have the player divide a track into 9 sections. You can locate the point you want by viewing the first picture of each section at one time on the screen.

1 Press DIGEST in stop mode.

The player divides the track into 9 sections and the screen shows still pictures of each section in order.



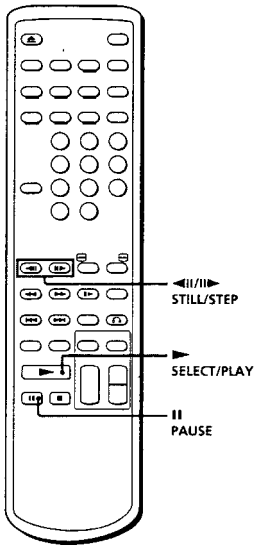
2 Press the number button (1 – 9) to select the point you want.

The player starts playing from the selected point.
The player may start playing from a point which is a little different from the one displayed during Track Digest.

Canceling Track Digest Play

Press ■ STOP.

Viewing frame-by-frame action



Tip

- When you play a CLV LD, Freeze Frame and Step Play are not available. When you press II PAUSE, the screen goes blue. If you press ◄II/II► STILL/STEP, "CLV SIDE A" appears briefly.

During any scene, you can freeze play into a still picture, and then advance or reverse the action frame-by-frame.

Freezing the action (Freeze Frame)

You can use this function for CAV LDs and VIDEO CDs.
Press II PAUSE while playing a CAV LD or VIDEO CD.
The sound mutes and the picture freezes.

To resume normal playback
Press ► SELECT/PLAY.

Playing frame-by-frame (Step Play)

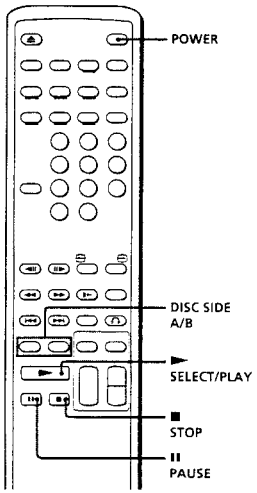
You can use this function only for CAV LDs.

1 **Press ◄II/II► STILL/STEP while playing a CAV LD.**
The sound mutes and the picture freezes.

2 **Press ◄II/II► STILL/STEP repeatedly to advance or reverse the action frame-by-frame.**
Hold down ◄II/II► STILL/STEP to view continuous frame-by-frame action.

To resume normal playback
Press ► SELECT/PLAY.

Resuming LD/VIDEO CD playback (Auto Resume)



Tips

- Each time you stop playing, the point at which you stopped last is memorized.
- The point at which you stopped playing is cleared when:
  - you press ⏏ OPEN/CLOSE, DISC SIDE A/B or I◄◄ / ►►I PREV/NEXT (ACS/AMS)
  - you do a Chapter Search
  - you do a Frame/Time Search
  - you unplug the AC power cord of the player

  If an LD is in the player and you press ⏏ OPEN/CLOSE to close the disc tray while it is opening, the point at which you stopped is retained.

Notes

- For VIDEO CDs, the player memorizes the point at which you stopped regardless of the PBC ON/OFF setting.
- If you press ► SELECT/PLAY when the power is off, the player turns on automatically. If a disc is loaded, playback resumes where you last stopped.

This function operates automatically only for LDs and VIDEO CDs. Once you press ■ STOP or POWER to stop playing an LD or VIDEO CD, the player memorizes the point you stopped at so that you can continue viewing from the same point.

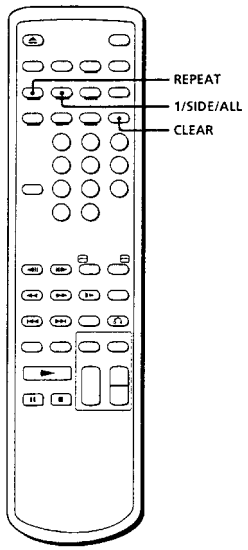
1 **Press ■ STOP (or POWER) to stop playing an LD or VIDEO CD.**
The "A. RESUME" appears on the screen and the point you stopped at is stored.

2 **Press ► SELECT/PLAY.**
The player searches for the scene at which you stopped playing, then playback starts.

To pause playing just before starting
If the player is turned on, press II PAUSE instead of ► SELECT/PLAY.
If the player is turned off, press POWER or ► SELECT/PLAY to turn on the player, then press II PAUSE.

To view from the beginning of the disc
For LDs, press DISC SIDE A to start playing from the beginning of side A. Press DISC SIDE B to start playing from the beginning of side B.
For VIDEO CDs, press DISC SIDE A to start playing from the beginning of the disc.
The point at which you stopped is cleared.

Playing a section repeatedly (Repeat Play)



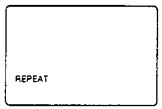
Note

- You cannot use Repeat while using PBC functions on a Ver. 2.0 VIDEO CD. To use Repeat on a Ver. 2.0 VIDEO CD, press ■ STOP to stop playing, then press the PBC ON/OFF button to turn off the PBC ON/OFF button indicator on the player.

Repeat play allows you to play the disc over and over. You can replay both sides, a single side, or one chapter of an LD; a whole disc or a single track on a CD or VIDEO CD; or a selected portion of the disc.

Repeating the whole disc (All Disc Repeat)

Press REPEAT.
"REPEAT" appears on the screen briefly. "REPEAT" lights up on the front panel display. When playing an LD, the player plays through both sides of the LD repeatedly. When playing a CD or VIDEO CD, the player plays all the tracks on the disc repeatedly.



Repeating the selected chapter/track (Single Repeat)

Press 1/SIDE/ALL once, then press REPEAT.
"SINGLE" and "REPEAT" appear on the screen briefly. "REPEAT 1" lights up on the front panel display. The player plays the selected chapter/track repeatedly.

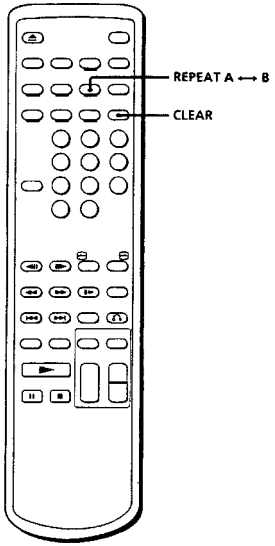
Repeating the current side of the LD (One Side Repeat)

Press 1/SIDE/ALL twice, then press REPEAT.
"ONE SIDE" and "REPEAT" appear on the screen briefly. "REPEAT 1 SIDE" lights up on the front panel display. The player plays the selected disc side repeatedly.

To check the repeat status
Press DISPLAY twice.

Canceling Repeat Play

Press CLEAR.



Tip

- You can scan the disc between points A and B by holding down ◀◀/▶▶ SCAN.

Note

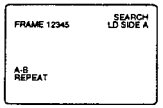
- You can do Repeat A⟷B only on the current side of an LD. You cannot do it on both sides of the LD.
- You cannot use Repeat A⟷B while using PBC functions on a Ver. 2.0 VIDEO CD.

Replaying a selected portion on the disc (Repeat A⟷B)

1 **Press REPEAT A⟷B at the beginning of the scene or phrase you want to repeat.**
This tells the player where to start.
"REPEAT" and "A-" appear, and "B" flashes.

2 **Let the player run to the end of the scene or phrase.**

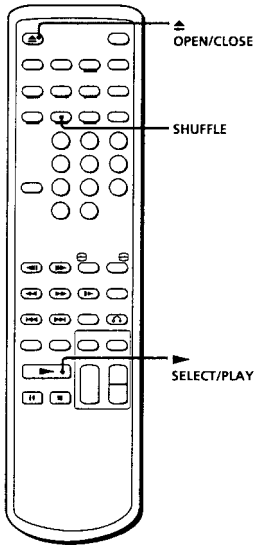
3 **Press REPEAT A⟷B again.**
This tells the player where to end.
"REPEAT" and "A-B" appear. The player repeatedly plays the scenes or phrases between the two points you specified.



To repeat a different portion
Repeat steps **1** to **3** to enter new start and end points.

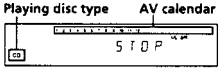
To cancel Repeat A⟷B
Press CLEAR.

Playing songs in random order (Shuffle Play)

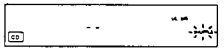


You can play the songs on a disc in random order, each song once (Shuffle Play). If you select the songs you want to play in advance, the player plays only selected songs in random order (Delete Shuffle). These functions are available only on CDs and VIDEO CDs.

1 **Place a disc on the disc tray, then press ≜ OPEN/CLOSE to close the tray.**
The AV calendar appears on the front panel display.



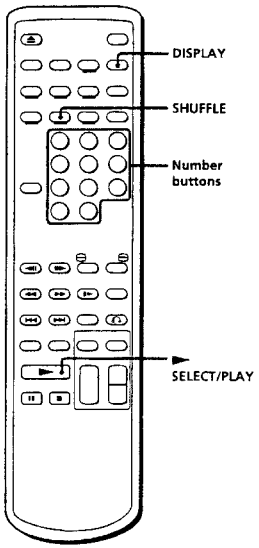
2 **Press SHUFFLE.**
"SHUFFLE" flashes on the front panel display.



3 **Press ► SELECT/PLAY.**
Songs start playing. All songs on the disc are played once in random order.

Tip
- You can skip the current song to the next song, which will be randomly selected, by pressing the ▶▶I NEXT (ACS/AMS) button. The I◀◀ PREV (ACS/AMS) button does not function during Shuffle or Delete Shuffle Play.

Note
- You cannot do Shuffle or Delete Shuffle Play while using PBC functions on a Ver. 2.0 VIDEO CD. To do Shuffle or Delete Shuffle, play on a Ver. 2.0 VIDEO CD, press ■ STOP to stop playing, then press the PBC ON/OFF button to turn off the PBC ON/OFF button indicator on the player.



Tips
- You can delete songs numbered up to 99. To delete a song over 10, press >10, then press two number buttons in sequence, first tens digit, then the ones digit (see page **16**).
- You can repeat Shuffle and Delete Shuffle Play. Press REPEAT on the remote commander. Each time repeat finishes, the order of the songs is reshuffled.

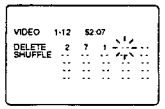
Playing your favorite songs in random order (Delete Shuffle)

To select your favorite songs in random order, delete the songs you do not want to play from the disc.

1 **Press SHUFFLE to enter SHUFFLE mode.**
"SHUFFLE" flashes on the front panel display.

2 **Press DISPLAY twice to use the on-screen display.**

3 **Press the number buttons to delete songs you do not want to play.**
The deleted song numbers are displayed on the screen.



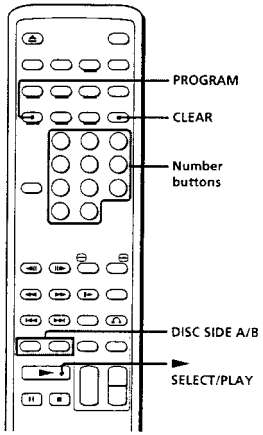
If you enter a wrong number, press CLEAR. With each press, the last song you entered is restored (the number on the screen disappears).

4 **Press ► SELECT/PLAY.**
The remaining songs on the disc are played once in random order.

Canceling Shuffle Play or Delete Shuffle Play

Press CLEAR.
"SHUFFLE" on the front panel display goes off. The player exits Shuffle mode.
All the deleted songs are restored.

Playing songs in any order you like (Program Play)



Tips

- You can select songs numbered up to 99. To select a song over 10, press >10, then press two number buttons, first the tens digit, then the ones digit (see page 16).
- You can skip to the previous or next song in the program by pressing the I◄◄ / ►►I PREV/NEXT (ACS/AMS) button.
- Even when the playback of the whole program is completed, the program is not cleared. The program is cleared when:
  - you press CLEAR (except while "PGM" on the front panel display is flashing) to exit Program mode.
  - you open the disc tray or turn off the player
- To repeat playing the program automatically, press REPEAT on the remote commander.

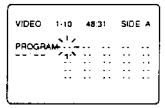
Notes

- You cannot use Program while using PBC functions on a Ver. 2.0 VIDEO CD. To use Program on a Ver. 2.0 VIDEO CD, press ■ STOP to stop playing and then press the PBC ON/OFF button to turn off the PBC ON/OFF button indicator on the player.
- If you select songs numbered over 50, or if the total playing time exceeds 100 minutes, the time display changes to "--:--."

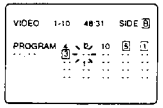
You can select up to 25 songs to be played in any order you like, regardless of disc side, even while a song is being played. The songs are played continuously in the order you specify.

Selecting songs to make a program

1 **Press PROGRAM.**
"PROGRAM" appears. "PGM" flashes on the front panel display.



2 **Press the number buttons to select songs in the order you want them to play.**
When you play a double-sided LD, select the disc side by pressing DISC SIDE A (or B), then press the number buttons to select songs in the order you want them to play. The songs selected from side B appear in squares.

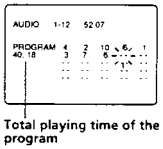


If you enter a wrong number, press CLEAR. With each press, the last song you entered is deleted.

3 **Repeat step 2 until you finish selecting songs.**

4 **Press ► SELECT/PLAY.**
The selected songs are programmed and the on-screen display disappears. "PGM" lights up on the front panel display. The selected songs are played in order you selected them.

To make a program while checking the total playing time (only for CDs and VIDEO CDs)
You can check the total playing time of the program while selecting songs. The time is displayed both on the screen and front panel displays. Each time you select a song, its playing time is added.



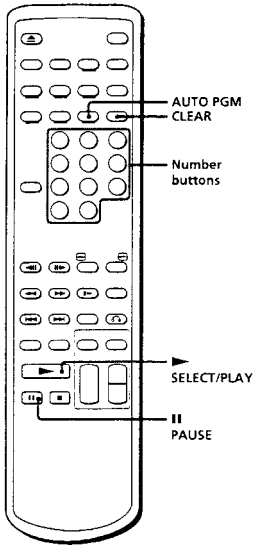
If you enter II PAUSE in the program
You can enter II PAUSEs among songs you select, to make the player automatically pause during the program. If you enter a II PAUSE, the total playing time is re-counted from --:-- (zero).

To check the contents of the program
Press DISPLAY twice.
The numbers of the selected songs appear. If playing a song, its number flashes.

Canceling Program Play

Press CLEAR.
"CLEAR" appears briefly and "PGM" on the front panel display goes off. The player exits Program mode and all the programmed songs are cleared.

Playing a disc within a specified period of time (Auto Program Play)



Tip

- You can skip to the previous or next song in the program by pressing the I◄◄ / ►►I PREV/NEXT (ACS/AMS) button.

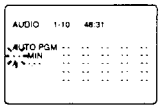
Note

- You cannot use Program while using PBC functions on a Ver. 2.0 VIDEO CD. To use Program on a Ver. 2.0 VIDEO CD, press ■ STOP to stop playing and then press the PBC ON/OFF button to turn off the PBC ON/OFF button indicator on the player.

With Auto Program Play, the player divides the tracks on the disc into what it calls "Program A" and "Program B", playing both A and B for the amount of time entered. Since the player pauses between the two programs, this feature is useful for making tapes.
Decide how long you want the disc to play and then enter half that amount of time.
This function is available only on CDs and VIDEO CDs.

Programming the songs automatically

1 **Press AUTO PGM.**
"AUTO PGM" appears. "AUTO PGM" flashes on the front panel display.

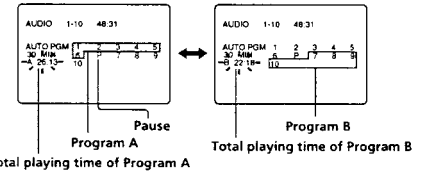


2 **Enter the desired playing time with the number buttons.**

To enter 11 minutes or more
Press ≥10 and then press two number buttons in sequence, first the tens digit, then the ones digit.
For example, to enter 30 minutes, press ≥10, 3 and then 0.

Even if you enter the wrong time, you can enter the correct time by pressing the number buttons.

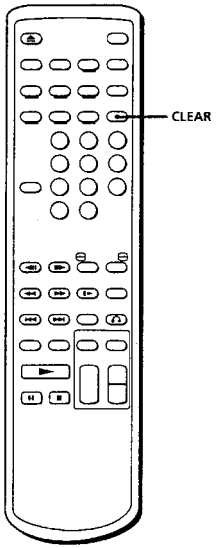
The player selects the songs for both Program A and B, and the total playing time of two programs appear alternately.



3 **Press ► SELECT/PLAY.**
The contents of Program A start playing and the player pauses at the end of Program A. To play Program B, press ► SELECT/PLAY again.

To check the contents of the program
Press DISPLAY twice.
The selected song numbers in program A and program B appear.

Playing a disc within a specified period of time (Continued)



Assignment of the time to Program A and B

If you enter a playing time shorter than half the disc playing time, some songs on the disc may not fit into the specified time and may not be programmed. On the other hand, if you enter a playing time longer than the disc playing time, all songs will be stored only in Program A. This is because Program A always has priority over B.
The table below shows how the player assigns the time in such cases.

Example for a 40-minute disc:

You enter	Program A plays	Program B plays	Total playing time
15 min	15 min (or less)	15 min (or less)	30 min (or less)
30 min	30 min (or less)	10 min (about)	40 min
45 min	40 min (all songs)	0 min	40 min

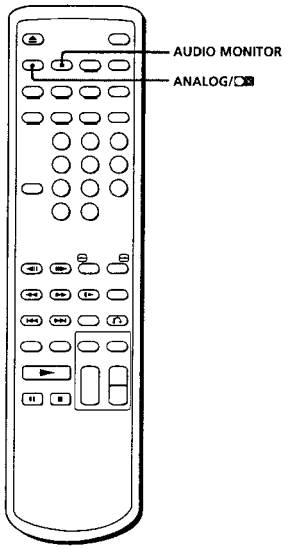
Canceling Auto Program Play

Press CLEAR.
"CLEAR" appears briefly and "AUTO PGM" on the front panel display goes off. The player exits Program mode and the program contents are cleared.

Tip

- Even when the playback of the whole program is completed, the program is not cleared. The program is cleared when:
  - you press CLEAR (except while "AUTO PGM" on the front panel display is flashing) to exit Program mode.
  - you open the disc tray or turn off the player.

Using the sound control functions



Notes

- If you select the analog sound during playback of the disc which conforms to the Dolby Digital system, only the sound of the left channel is output from both speakers. With this type of disc, you cannot use AUDIO MONITOR to alternate the left and right channels of analog sound.
- The output level may differ between digital and analog sound.

Playing a stereo disc or Second Audio Program (SAP) disc

When playing SAP discs such as bilingual discs, you can alternate the sound output using AUDIO MONITOR.

To alternate the sound output

Press AUDIO MONITOR while playing the disc.
Each time you press AUDIO MONITOR, the on-screen indication changes as follows:

1/L → 2/R → 1/L 2/R

Indication	From stereo disc	From SAP disc
1/L	Left channel	First sound track (Left channel)
2/R	Right channel	Second sound track (Right channel)
1/L 2/R	Stereo (Both channels)	First sound track (Left channel) Second sound track (Right channel)

When you select 1/L (or 2/R), the sound of the left (or right) channel is output from both speakers.

Listening to analog sound on an LD

If your LD contains digital sound tracks, the player automatically outputs digital sound. To listen to sound recorded on analog sound tracks, use ANALOG/□■.

Press ANALOG/□■ while playing the disc.
"♪ ANALOG" appears briefly on the screen and the analog sound is output.

To return to digital sound

Press ANALOG/□■ repeatedly until "♪ DIGITAL" appears on the screen.

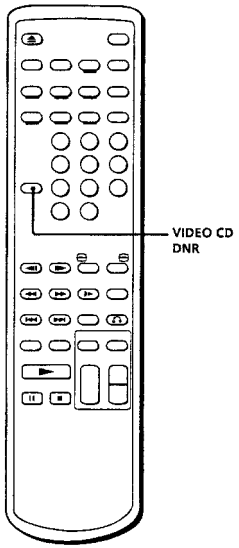
Playing discs with the □■ (CX) logo

LDs bearing the □■ logo are recorded with the CX noise reduction system, which gives lower noise level and higher dynamic range on analog sound. The player detects most □■ discs and activates the CX noise reduction system automatically when outputting analog sound. If your □■ LD does not contain a code to activate the CX noise reduction system, you can activate the CX noise reduction system manually while playing only analog sound.

To activate the CX noise reduction system manually

Press ANALOG/□■ repeatedly until "CX ON" appears. The CX noise reduction system is activated.

Reducing Distortion of the Picture (DNR: Digital Noise Reduction)



This is available only for VIDEO CDs. You can make picture clearly by reducing distortion of the picture.

Each time you press VIDEO CD DNR, the on-screen indication changes as follows:

DNR → DNR ACTIVE → off

The DNR function reduces the blur noise which may appear around the still object, and block noise which may appear on the high-speed motion picture.
The DNR ACTIVE function has the ACTIVE function in addition to the DNR function above. The ACTIVE function gives you a clear-cut picture by emphasizing the outline of the pictures without increasing noise on the picture.

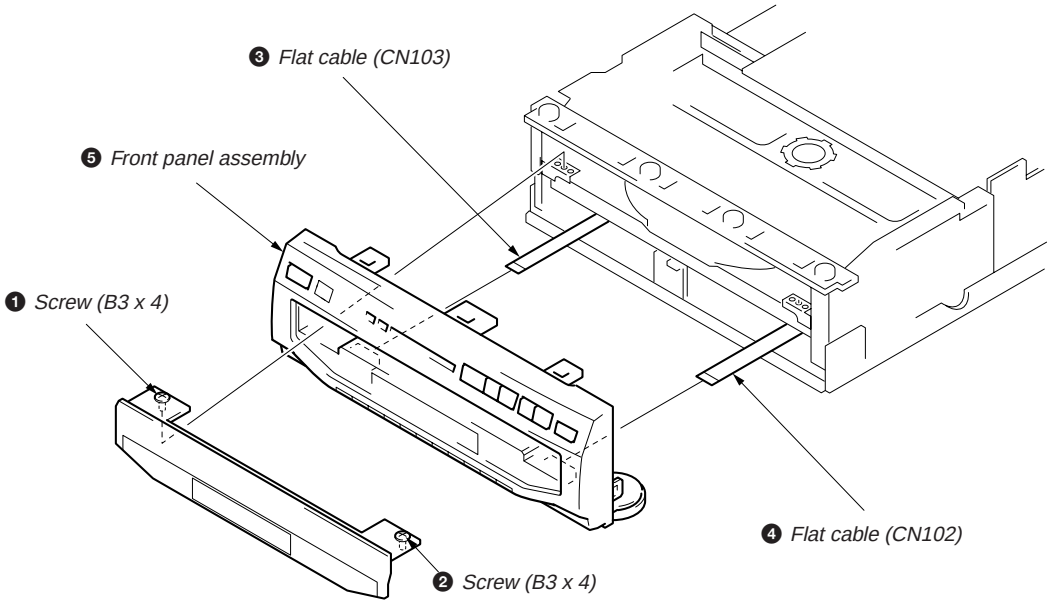
To turn off the DNR function
Press VIDEO CD DNR so that the DNR indicator-button on the player goes off.

Notes
- The effect of the DNR function may not be noticeable with the disc which contains low level noise.
- When you turn on the power of the player, the DNR function is automatically turned on.

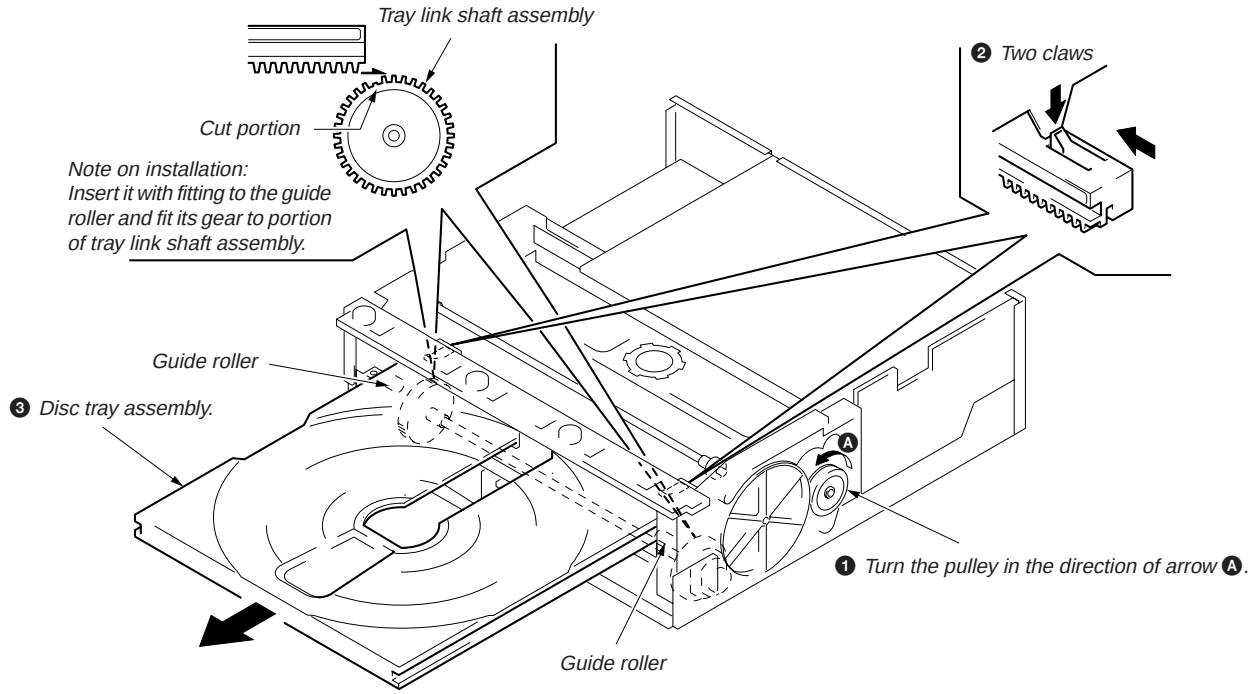
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

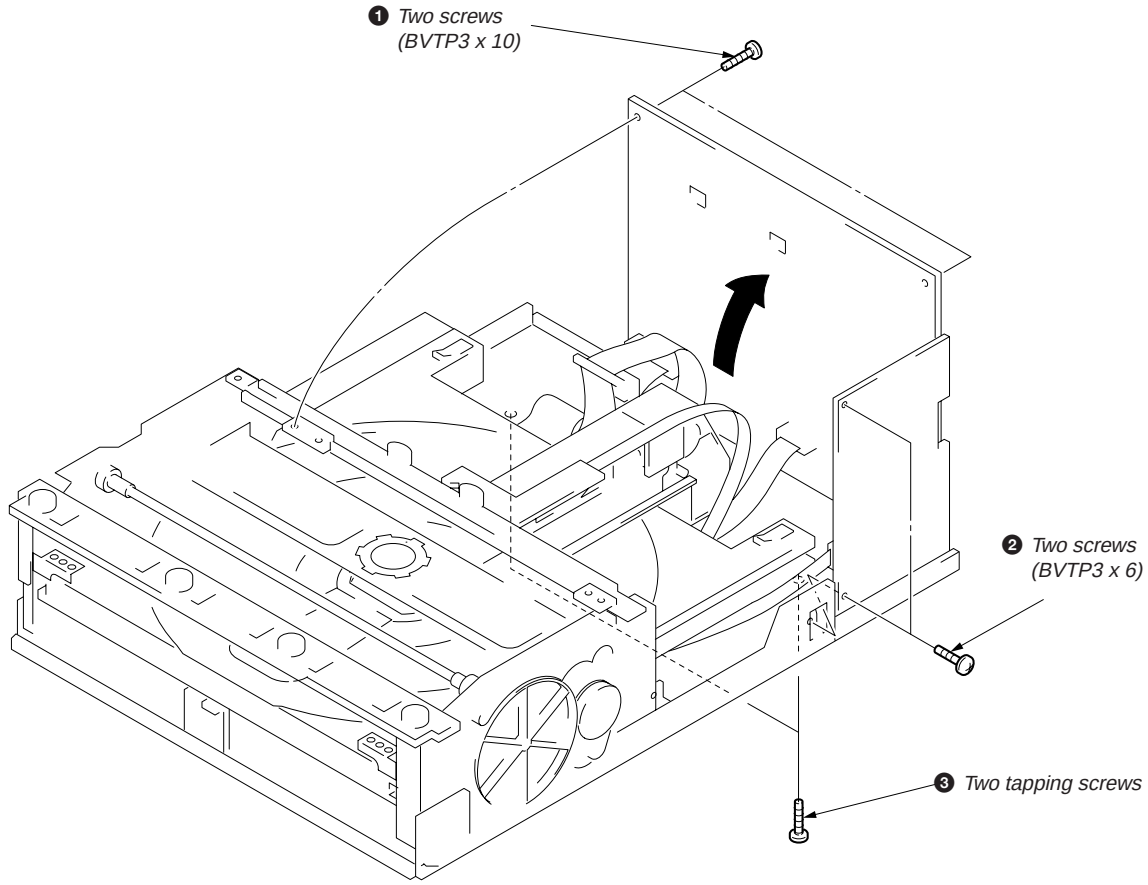
2-1. FRONT PANEL ASSEMBLY



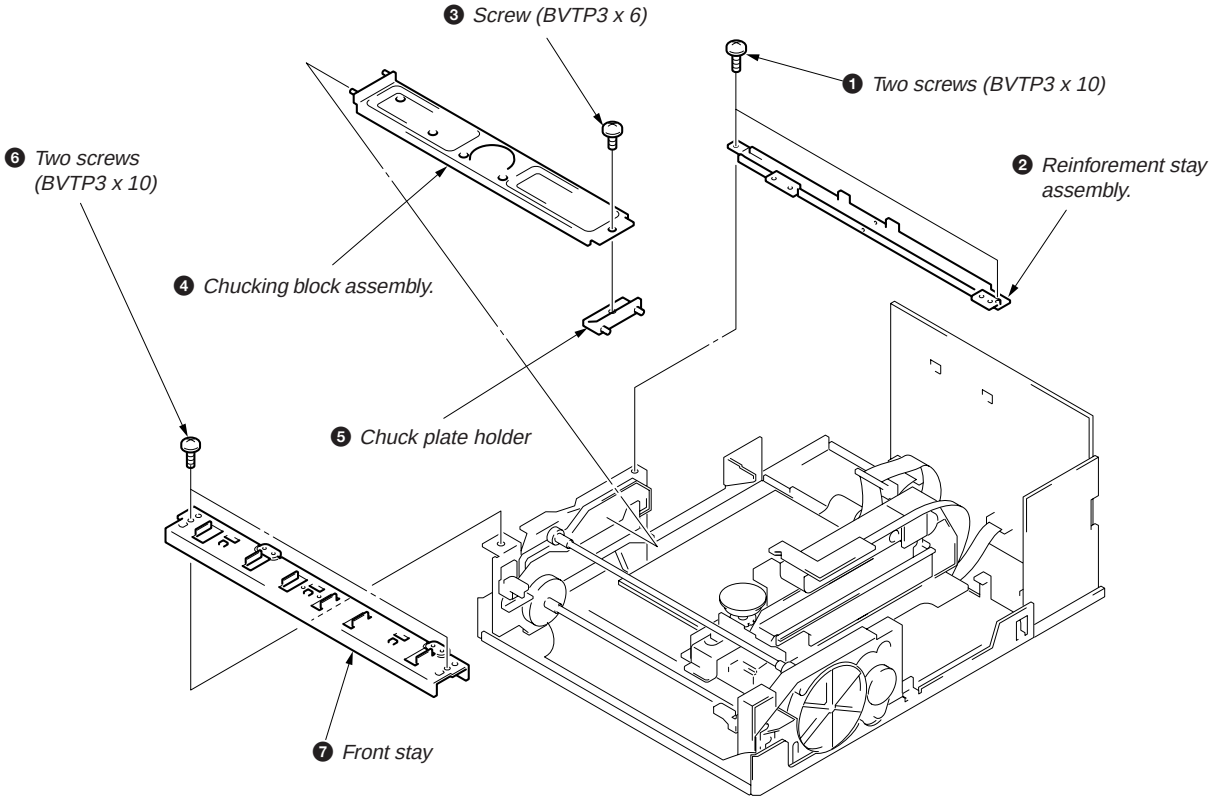
2-2. DISC TRAY ASSEMBLY



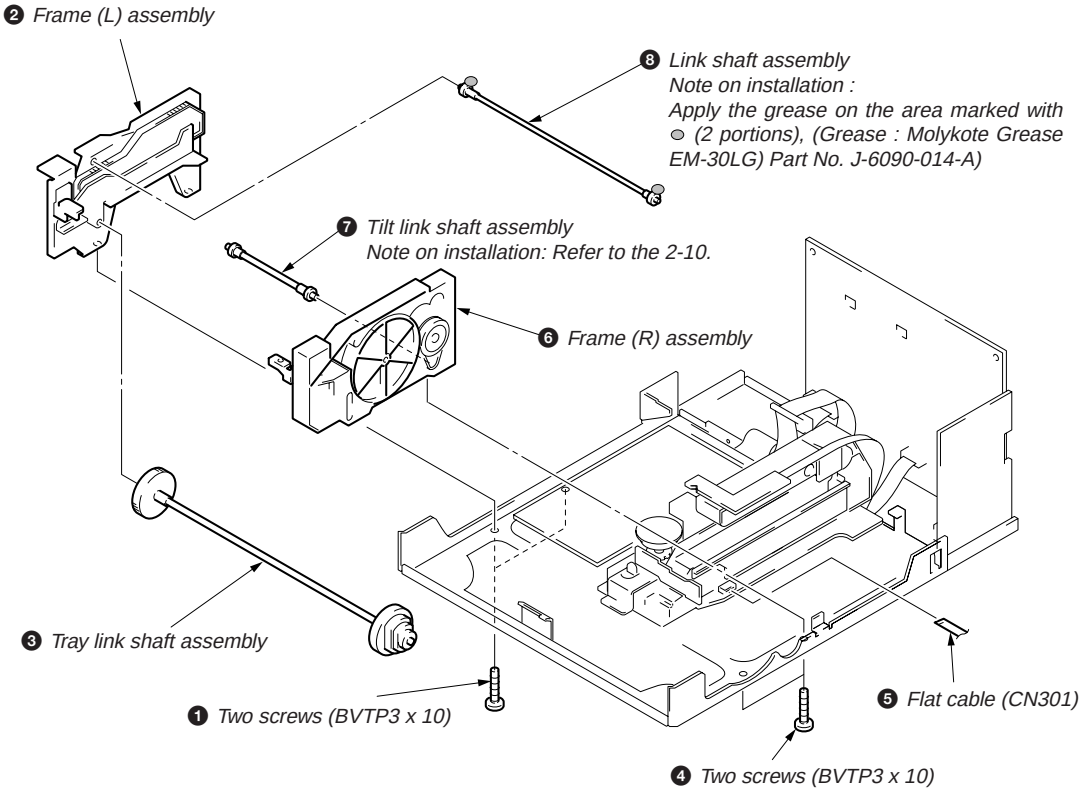
2-3. OPENING OF MB-97/VX-97 BOARD (SERVICE POSITION)



2-4. CHUCKING BLOCK ASSEMBLY

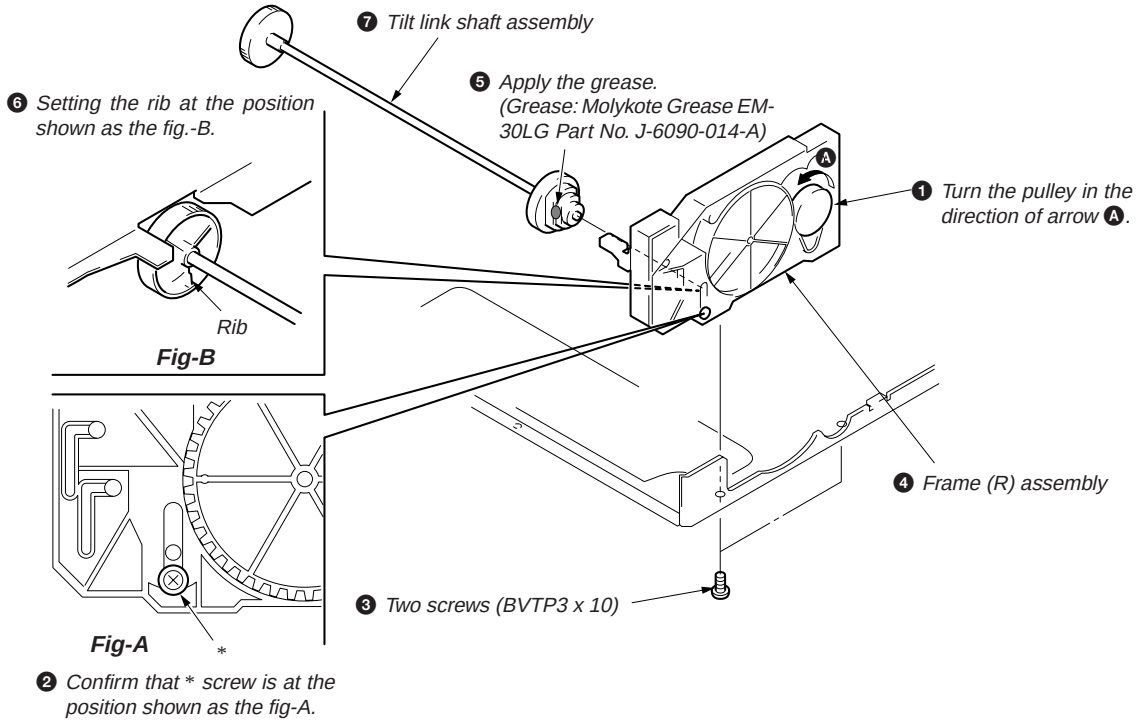


2-5. FRAME (L, R) ASSEMBLY

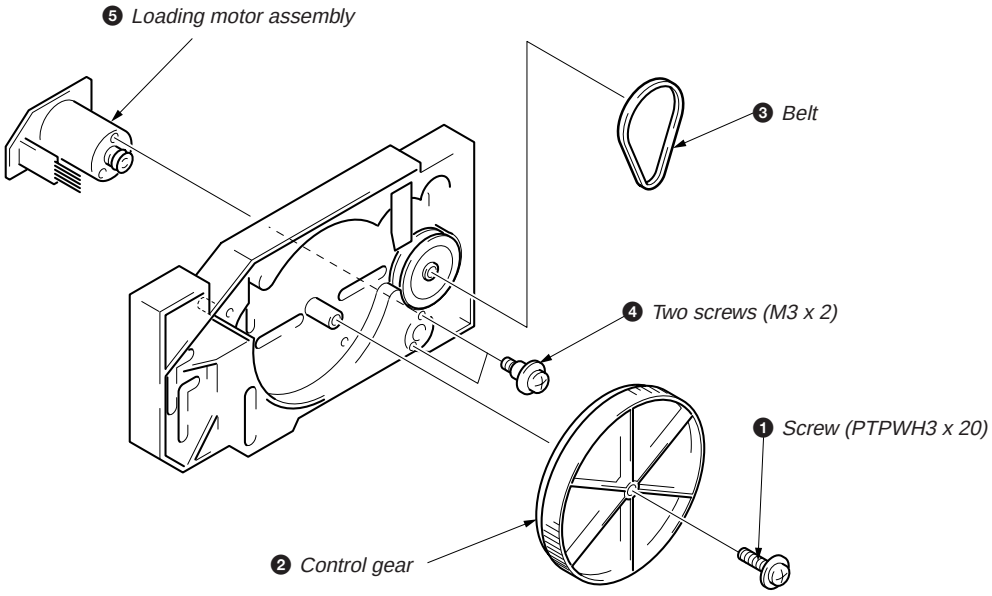


2-6. MOUNTING THE FRAME (R) ASSEMBLY

Note: Follow the assembly procedure in the numerical order given.

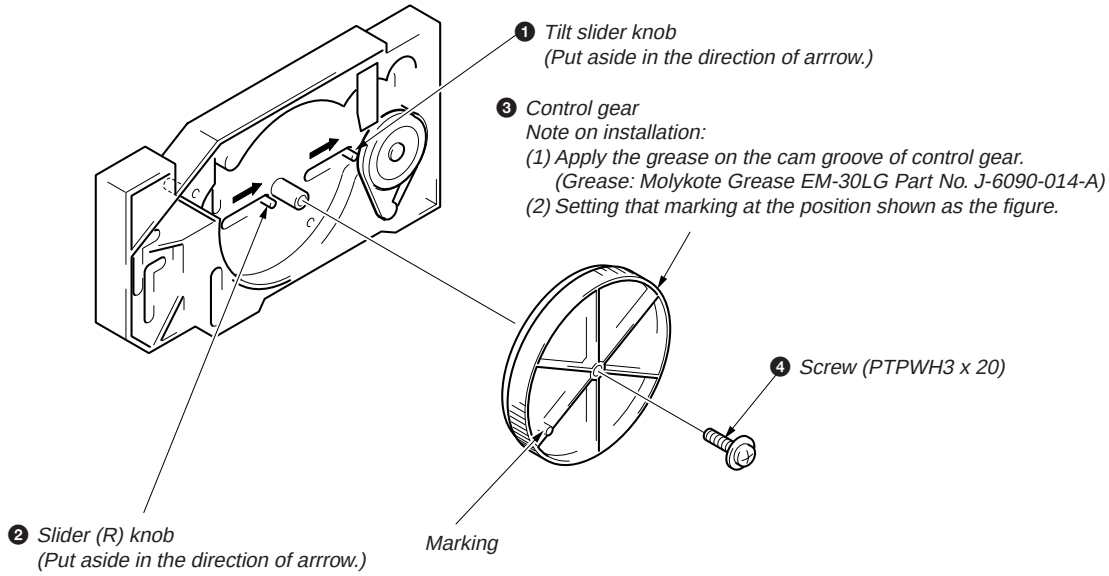


2-7. CONTROL GEAR AND LOADING MOTOR ASSEMBLY

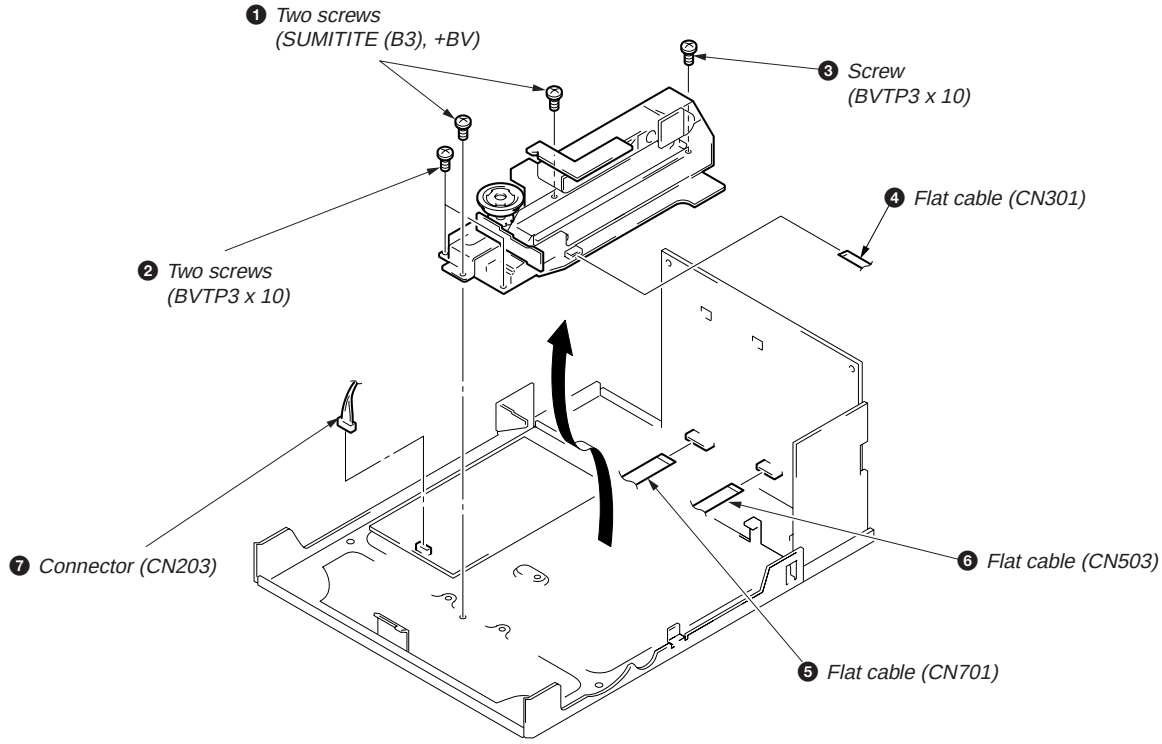


2-8. MOUNTING THE CONTROL GEAR

Note: Follow the assembly procedure in the numerical order given.



2-9. FEED BASE BLOCK ASSEMBLY



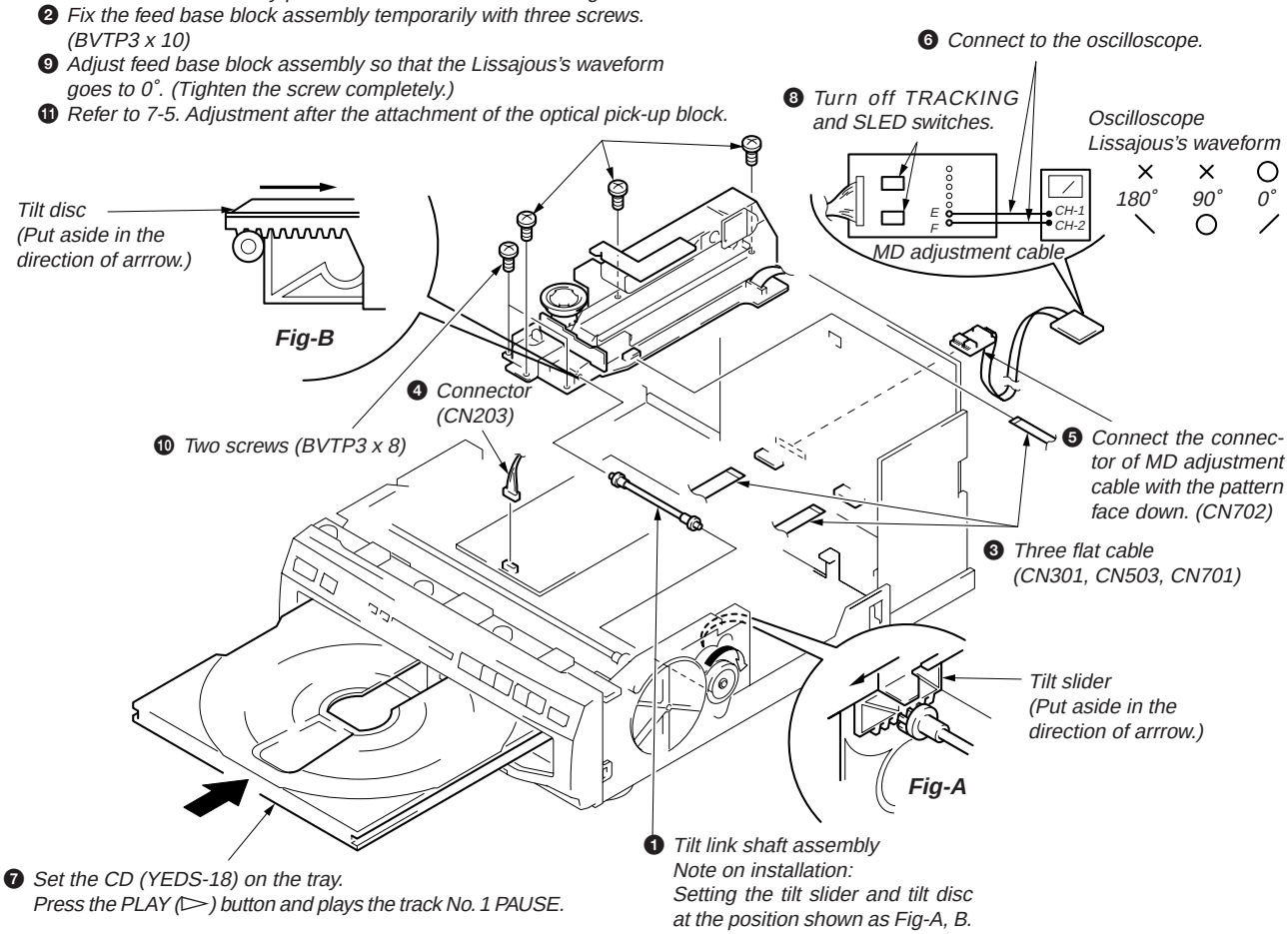
2-10. MOUNTING THE FEED BASE BLOCK ASSEMBLY

Note: *Follow the assembly procedure in the numerical order given.*

❷ *Fix the feed base block assembly temporarily with three screws. (BVTP3 x 10)*

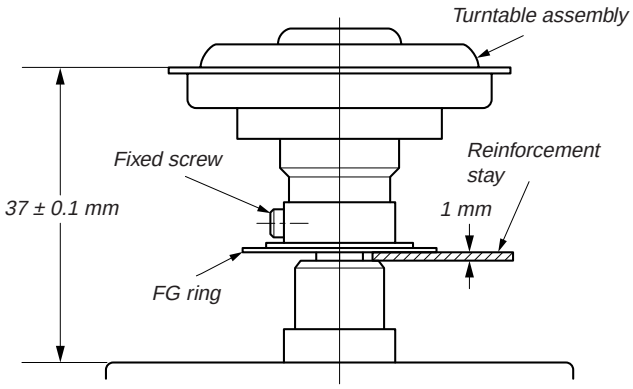
❾ *Adjust feed base block assembly so that the Lissajous's waveform goes to 0˚. (Tighten the screw completely.)*

⓫ *Refer to 7-5. Adjustment after the attachment of the optical pick-up block.*



2-11. HEIGHT ADJUSTMENT OF THE TURNTABLE ASSEMBLY

❶ *Remove the case.*
❷ *Open the MB-97/VX-97 board.*
❸ *Rotate the pulley on the right side of the set, and open the tray.*
❹ *Remove the chucking block ass'y and reinforcement stay ass'y.*
❺ *Change the turntable assembly.*
Adjust the height and also the position putting in the reinforcement stay as below.
The thickness of the reinforcement is 1 mm.
❻ *Fix the reinforcement to fixed position.*

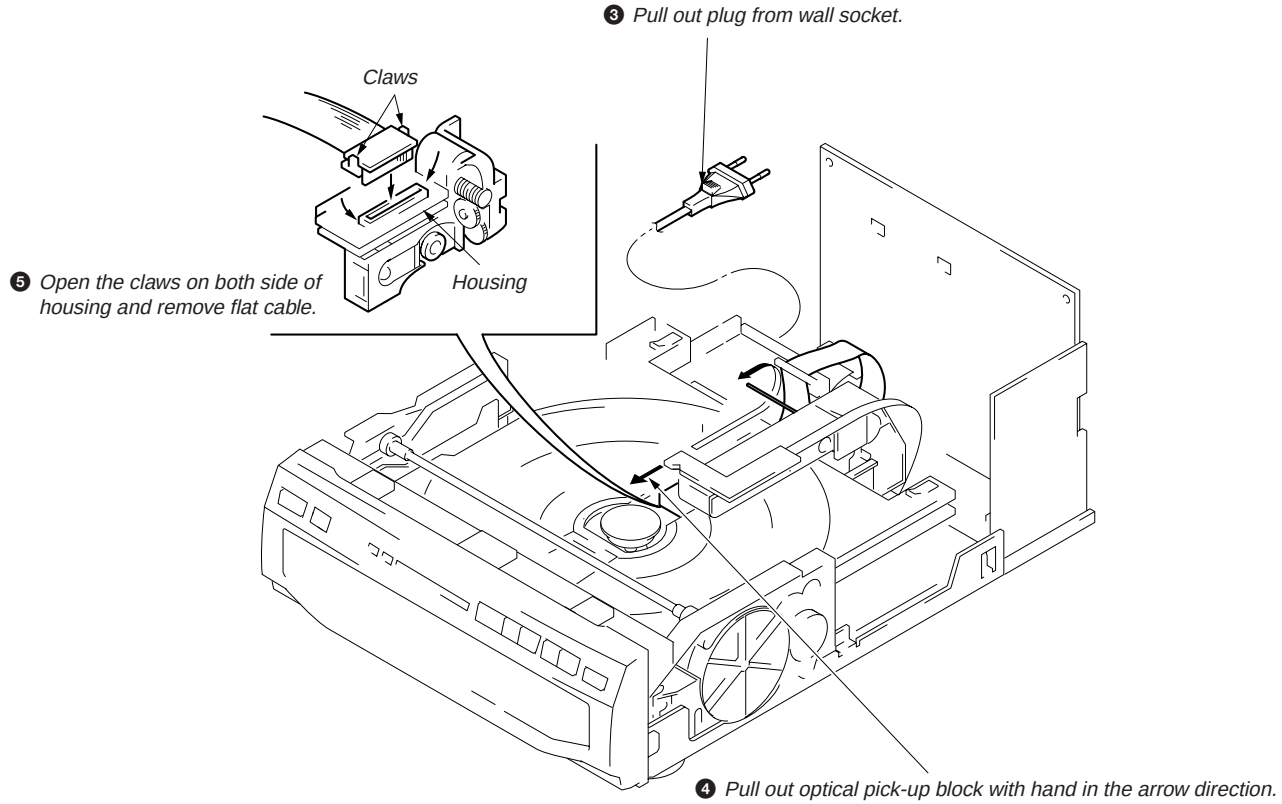


Put in the reinforcement stay between the spindle motor holder and the FG ring, tighten the fixed screw hard after the height adjustment.

2-12. OPTICAL PICK-UP BLOCK (KHS-150A)

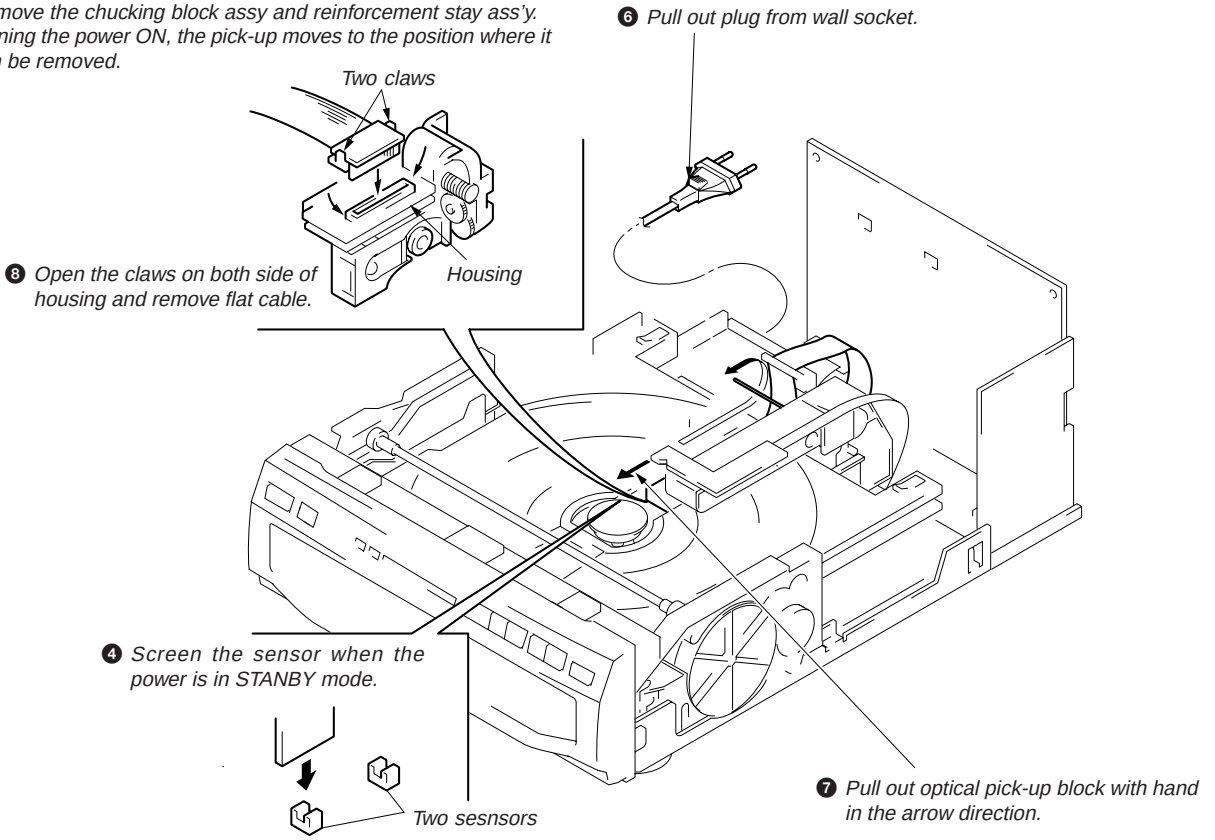
DISASSEMBLY I (OPTICAL PICK-UP BLOCK MOTOR OPERATES)

❶ *Set the test mode.*
(1) Press the POWER button while pressing STOP (■) button and [10] button on the unit.
(2) "No disc" will be appeared on the display board.
(3) Press the [10/0] button and then the [8] key of the remote control while pressing STOP (■) button on the unit.
(4) The display will be disappeared on the display board, then enter the test mode.
***Note:** As for the test mode, refer to the test mode on page 9-10.*
❷ *Move the optical pick-up block to the upper front side (full of side B) pressing the [SIDE-B] button continuously.*



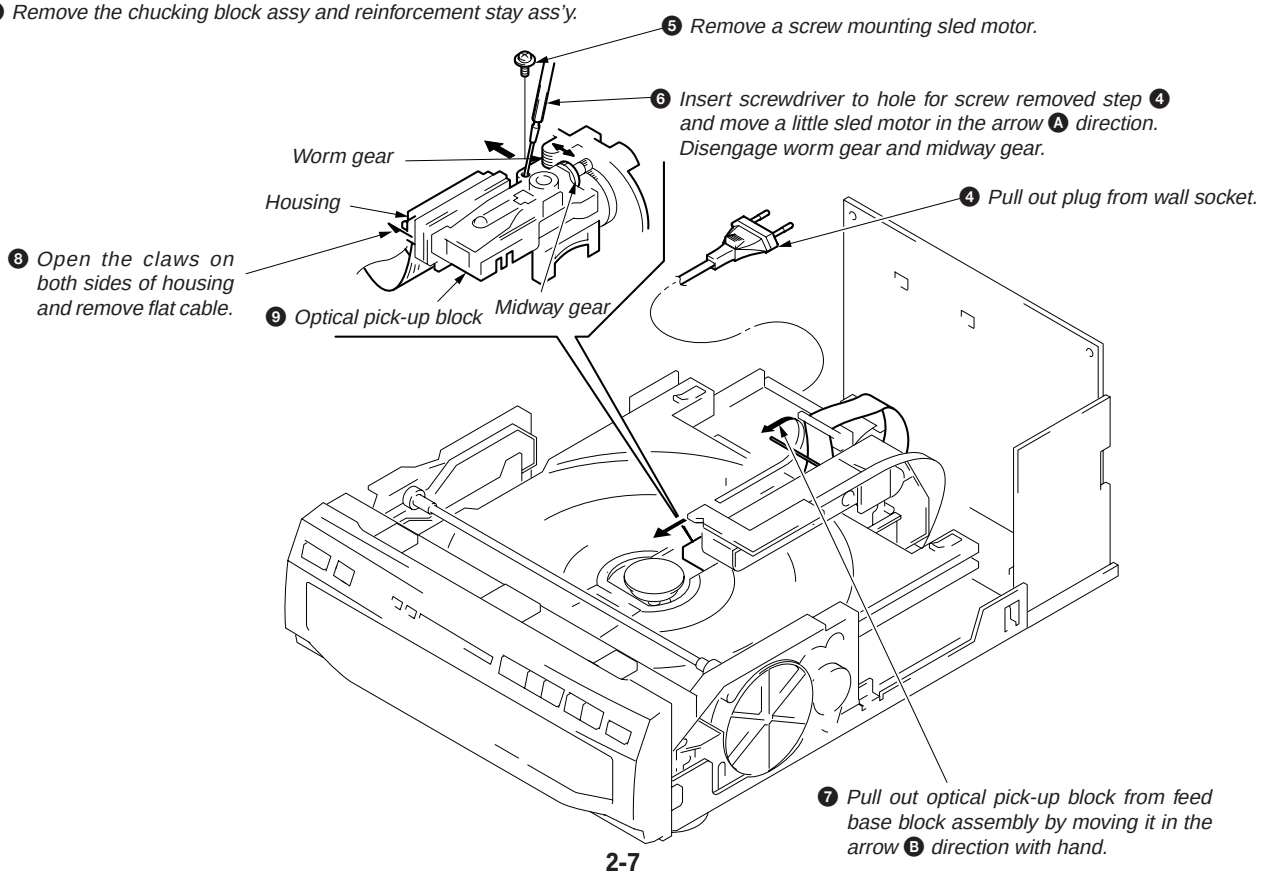
DISASSEMBLY II
(OPTICAL PICK-UP BLOCK MOTOR OPERATES)

❶ *Remove the case.*
❷ *Open the MB-97/VX-97 board.*
❸ *Remove the chucking block assy and reinforcement stay ass'y.*
❺ *Turning the power ON, the pick-up moves to the position where it can be removed.*



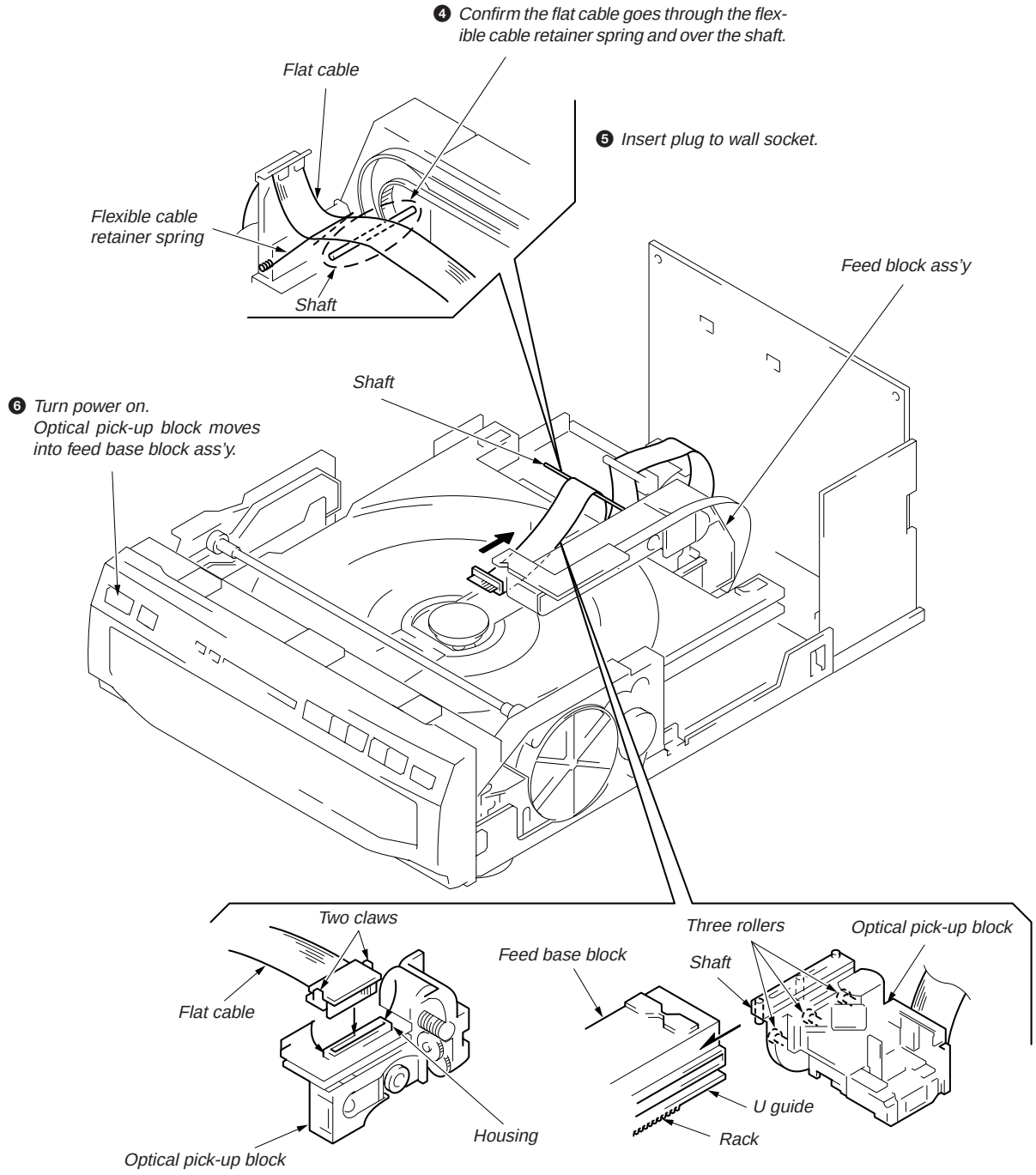
DISASSEMBLY III
(OPTICAL PICK-UP BLOCK MOTOR DOESN'T OPERATE)
(The pick-up block cannot be re-used by using this method)

❶ *Remove the case.*
❷ *Open the MB-97/VX-97 board.*
❸ *Remove the chucking block assy and reinforcement stay ass'y.*



2-13. MOUNTING THE OPTICAL PICK-UP BLOCK ASSEMBLY

Note: Follow the assembly procedure in the numerical order given.

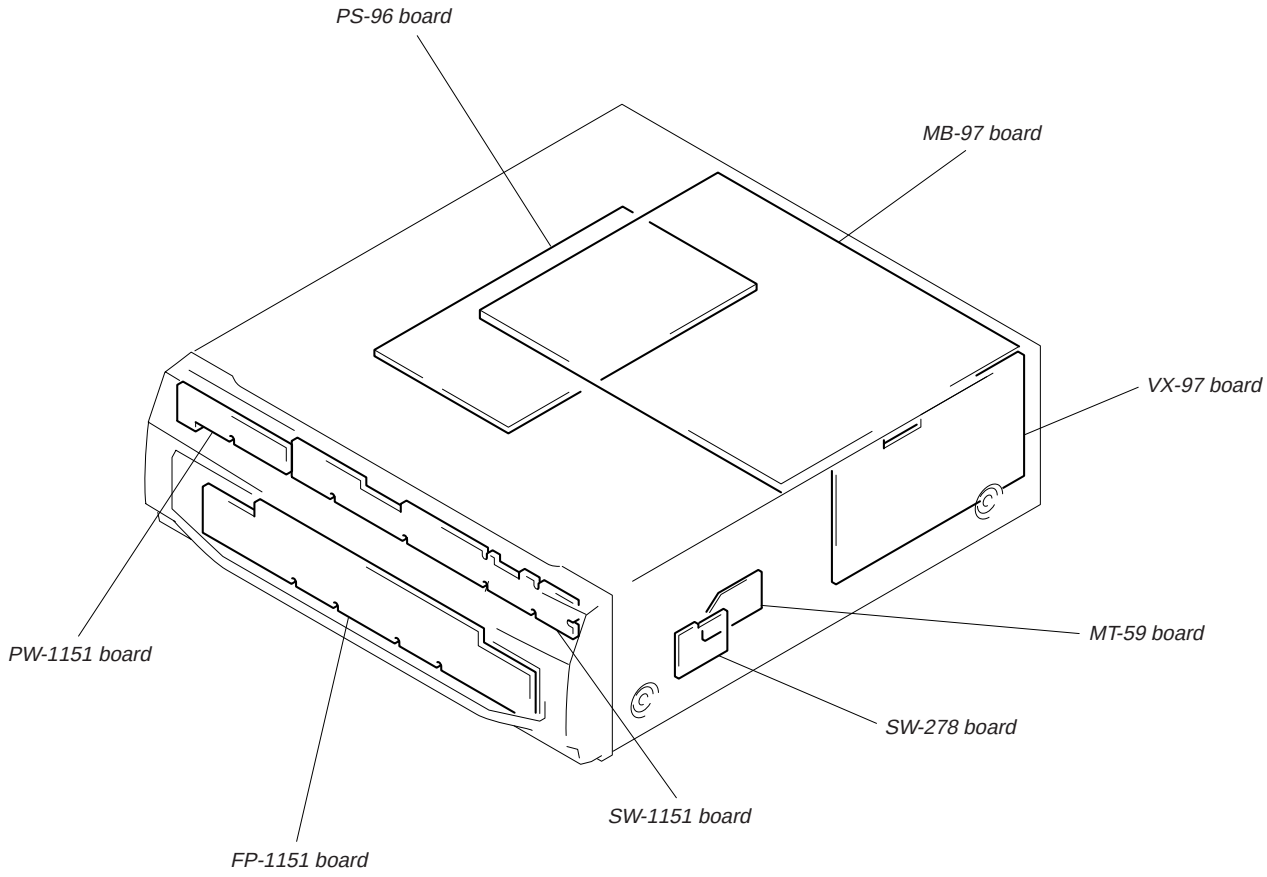


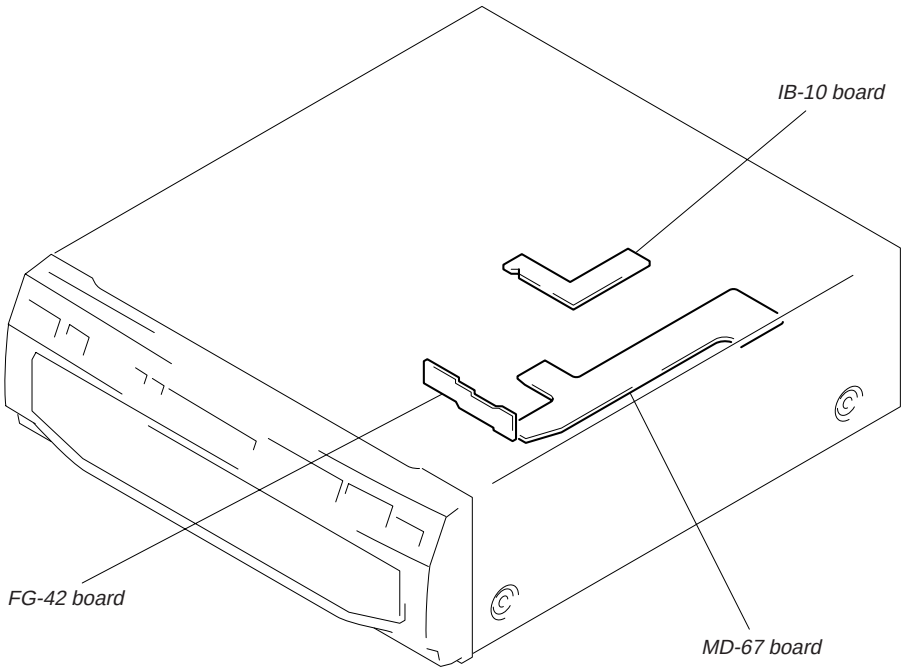
❶ *Insert flat cable to housing on optical pick-up block. Confirm the claws on both sides of housing are locked.*

❷ *Insert the shaft and three rollers of the optical pick-up block into their corresponding grooves of the U guide.*

❸ *Set so that the gear of the optical pick-up block engages with the rack of the U guide.*

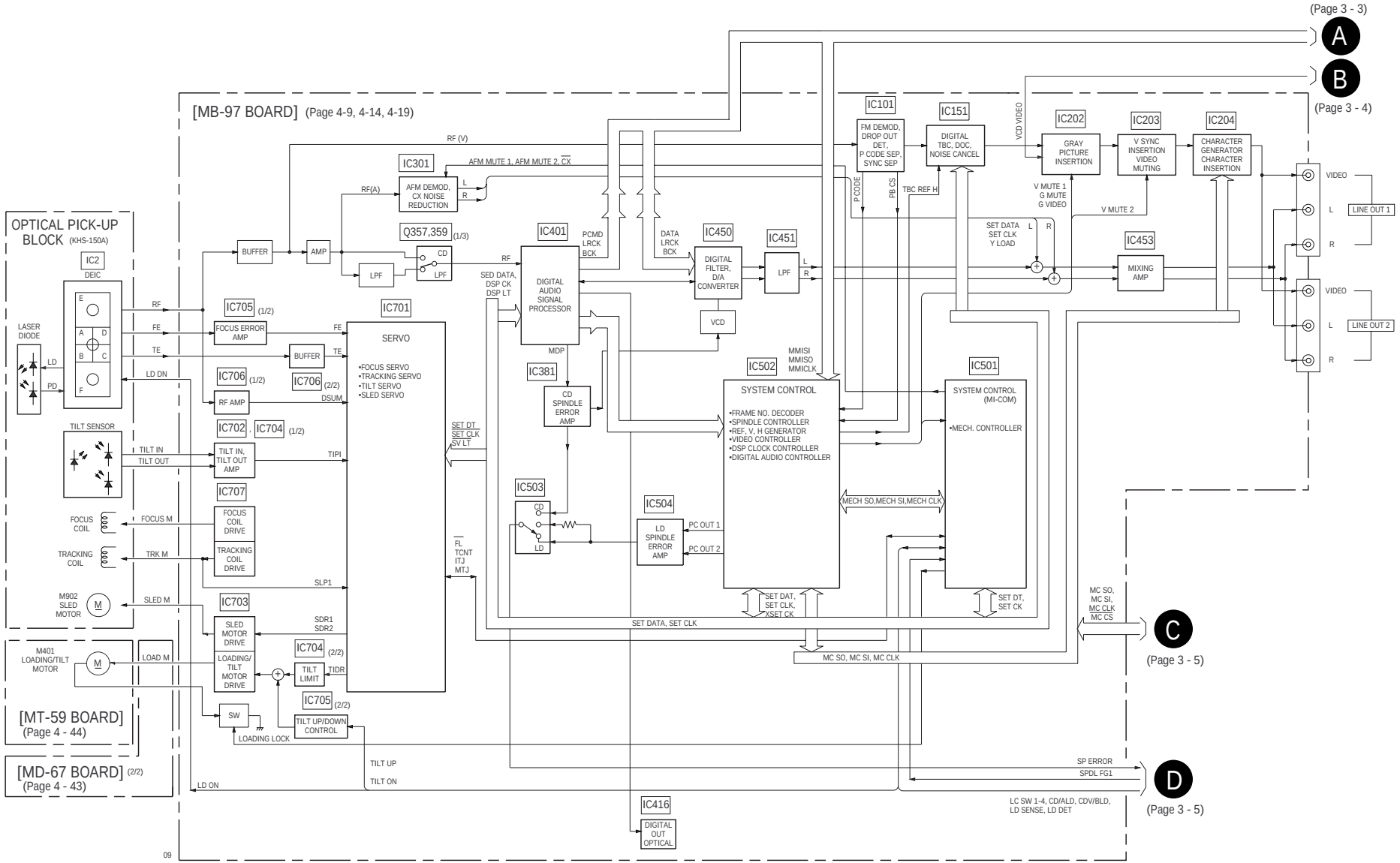
2-14. CIRCUIT BOARDS LOCATION



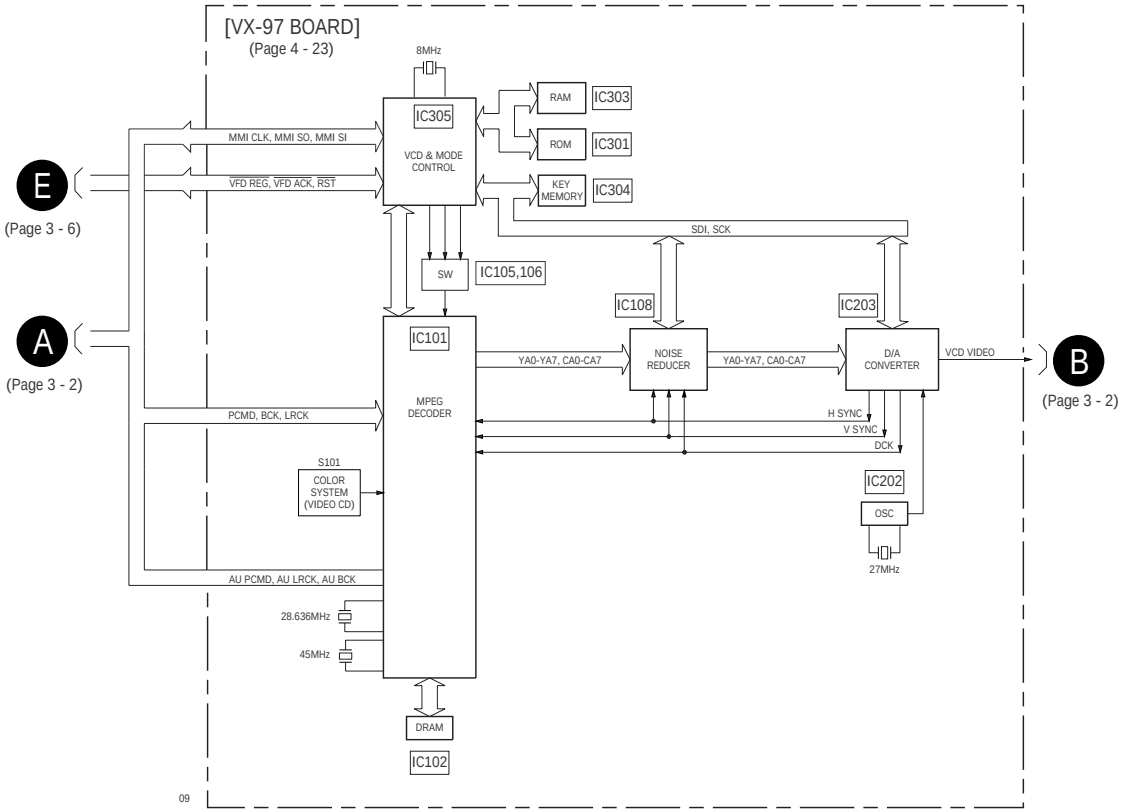


SECTION 3
BLOCK DIAGRAMS

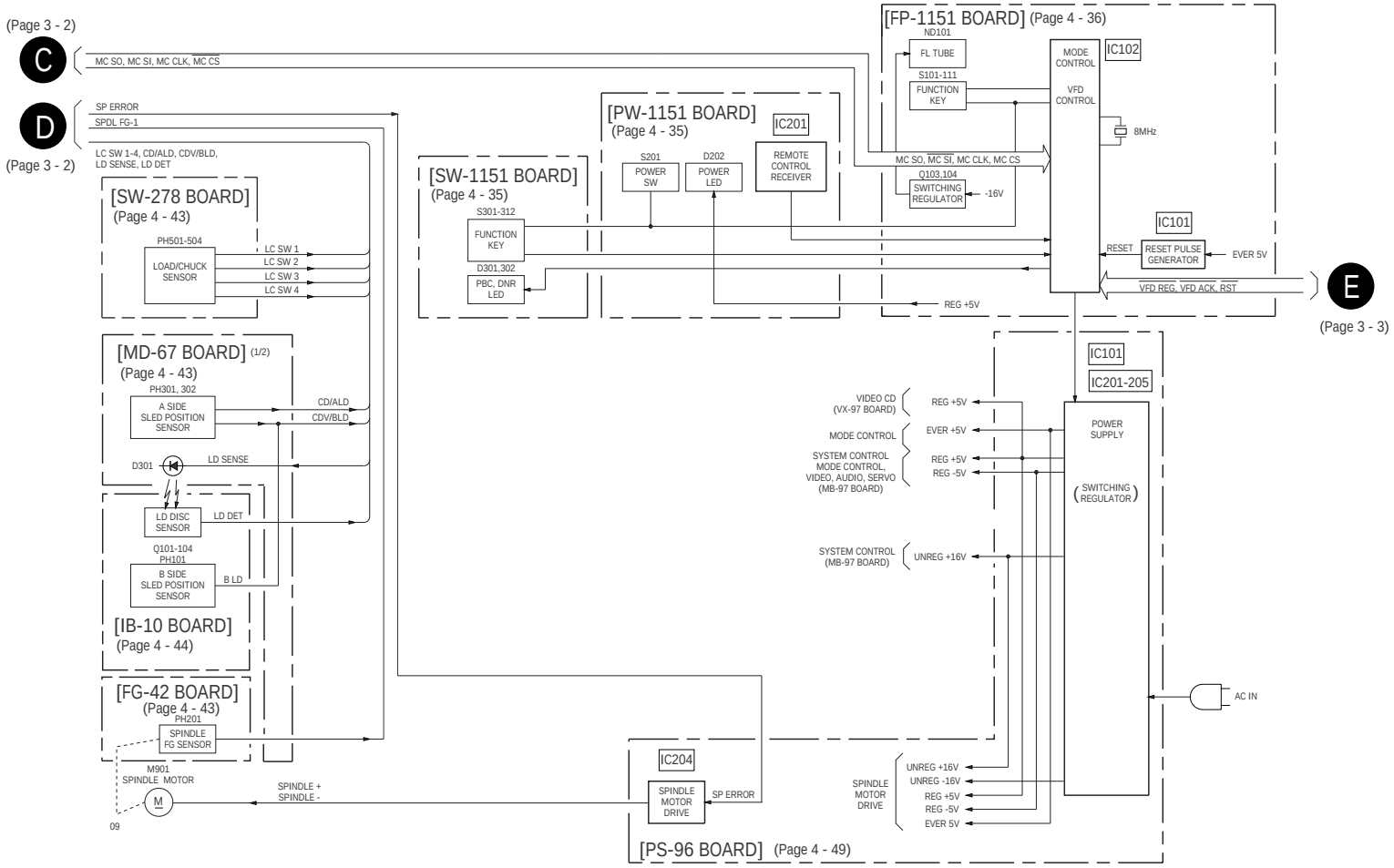
3-1. OVERALL (1/3) BLOCK DIAGRAM



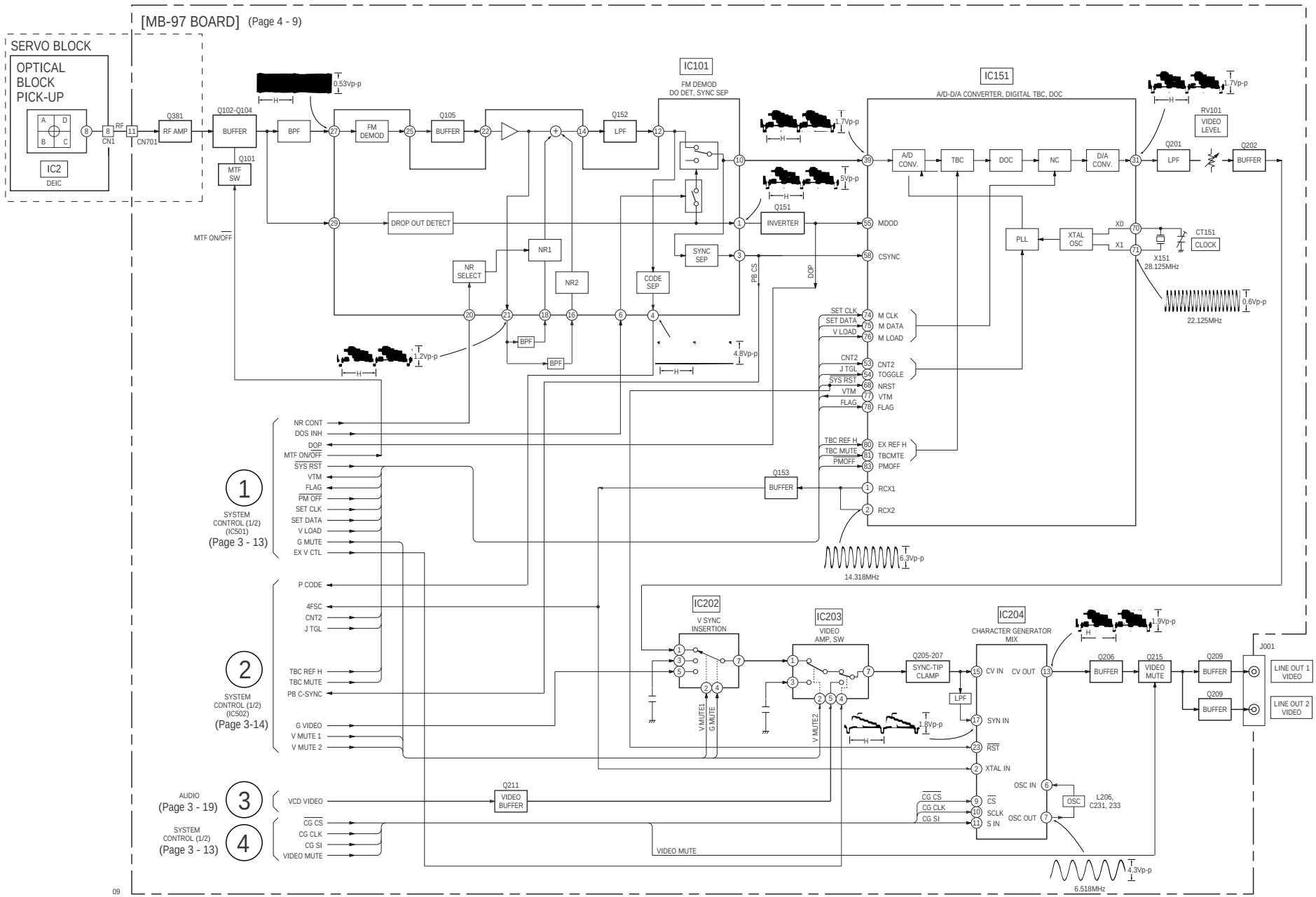
3-2. OVERALL (2/3) BLOCK DIAGRAM



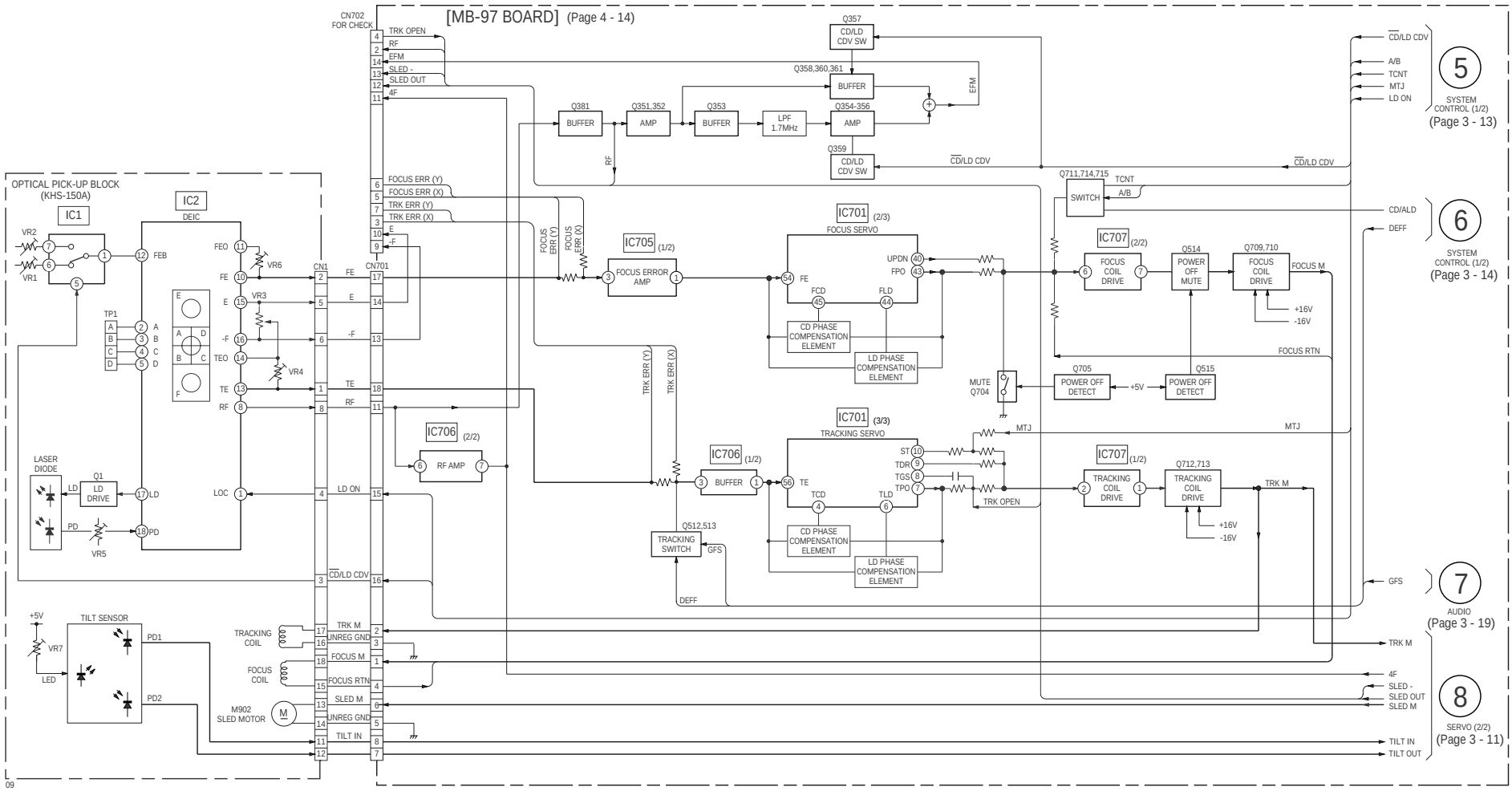
3-3. OVERALL (3/3) BLOCK DIAGRAM



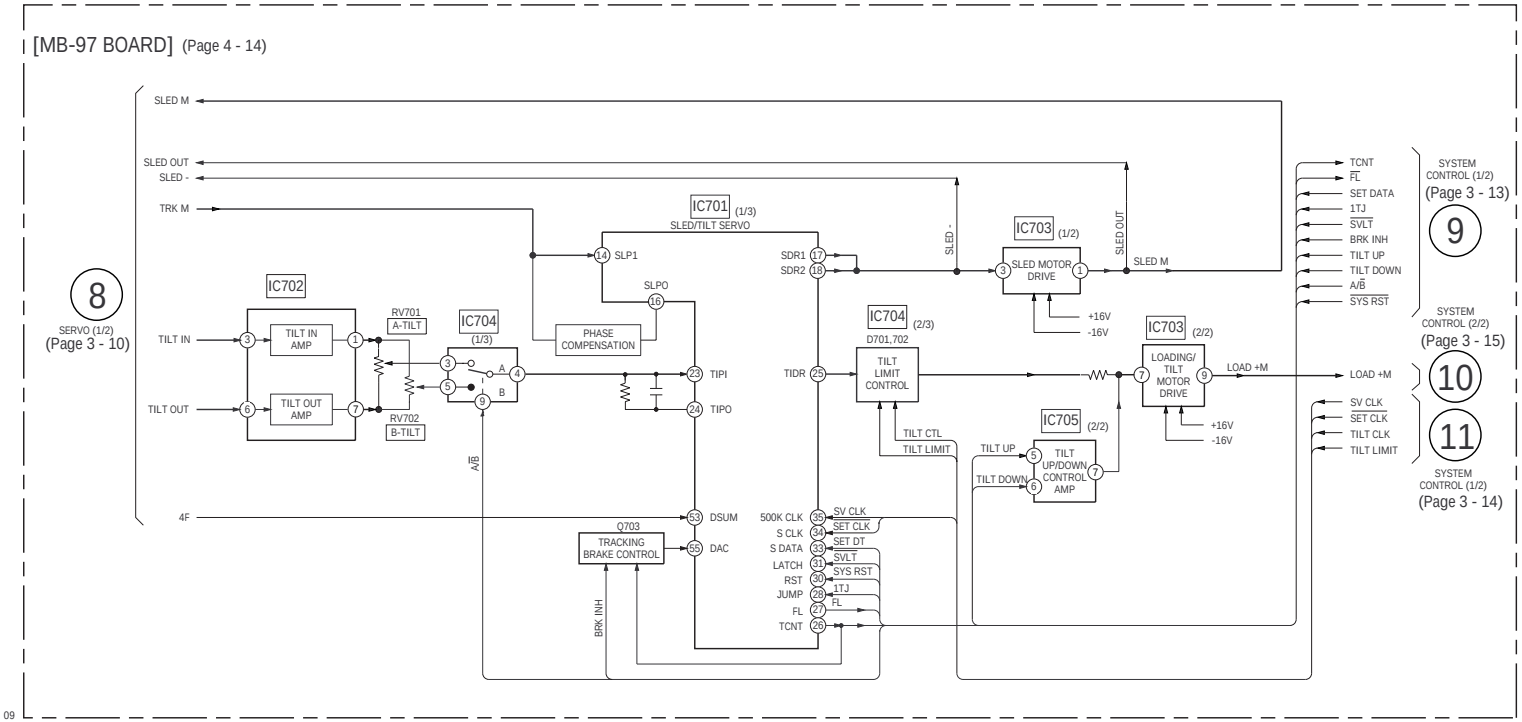
3-4. VIDEO BLOCK DIAGRAM



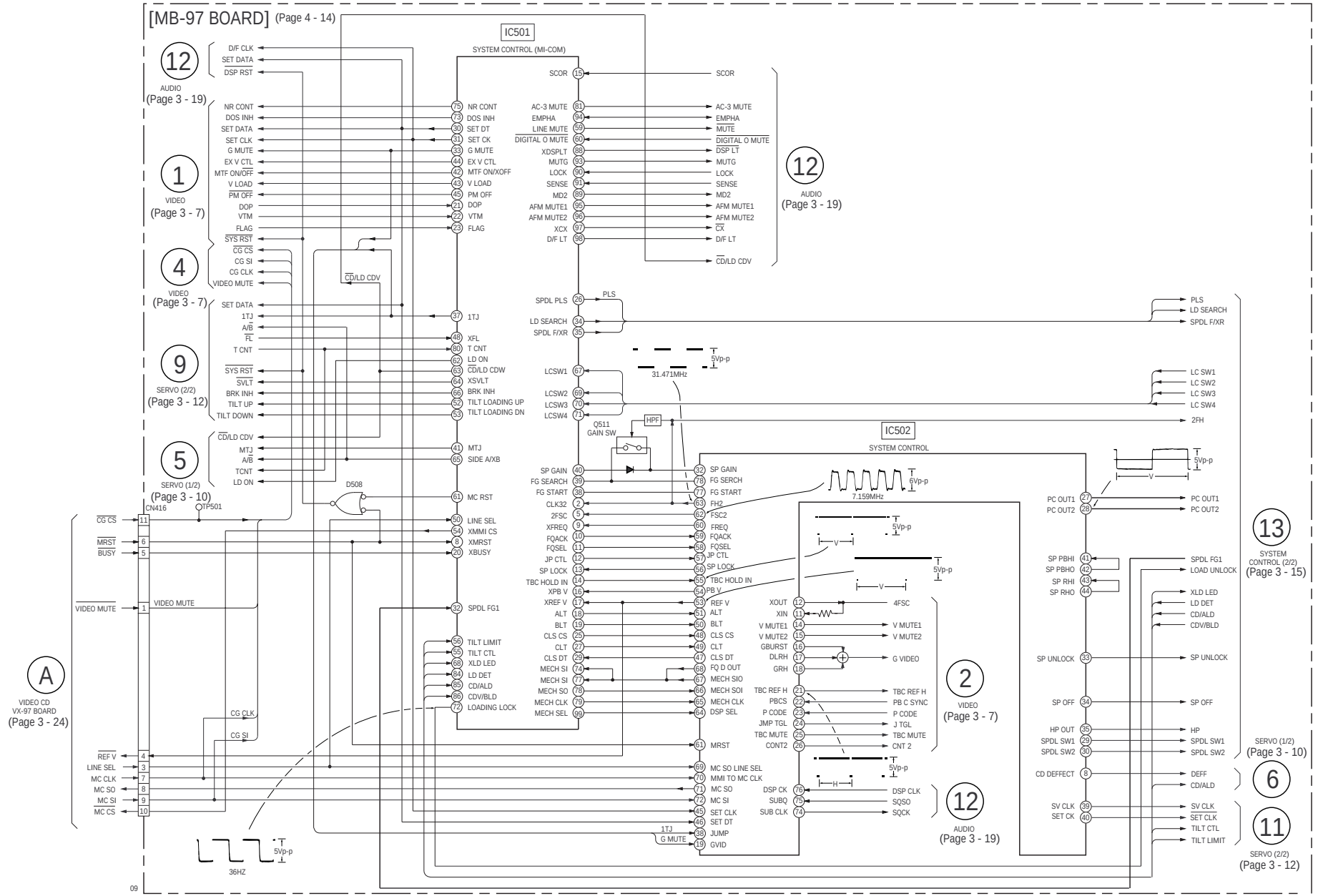
3-5. SERVO (1/2) BLOCK DIAGRAM



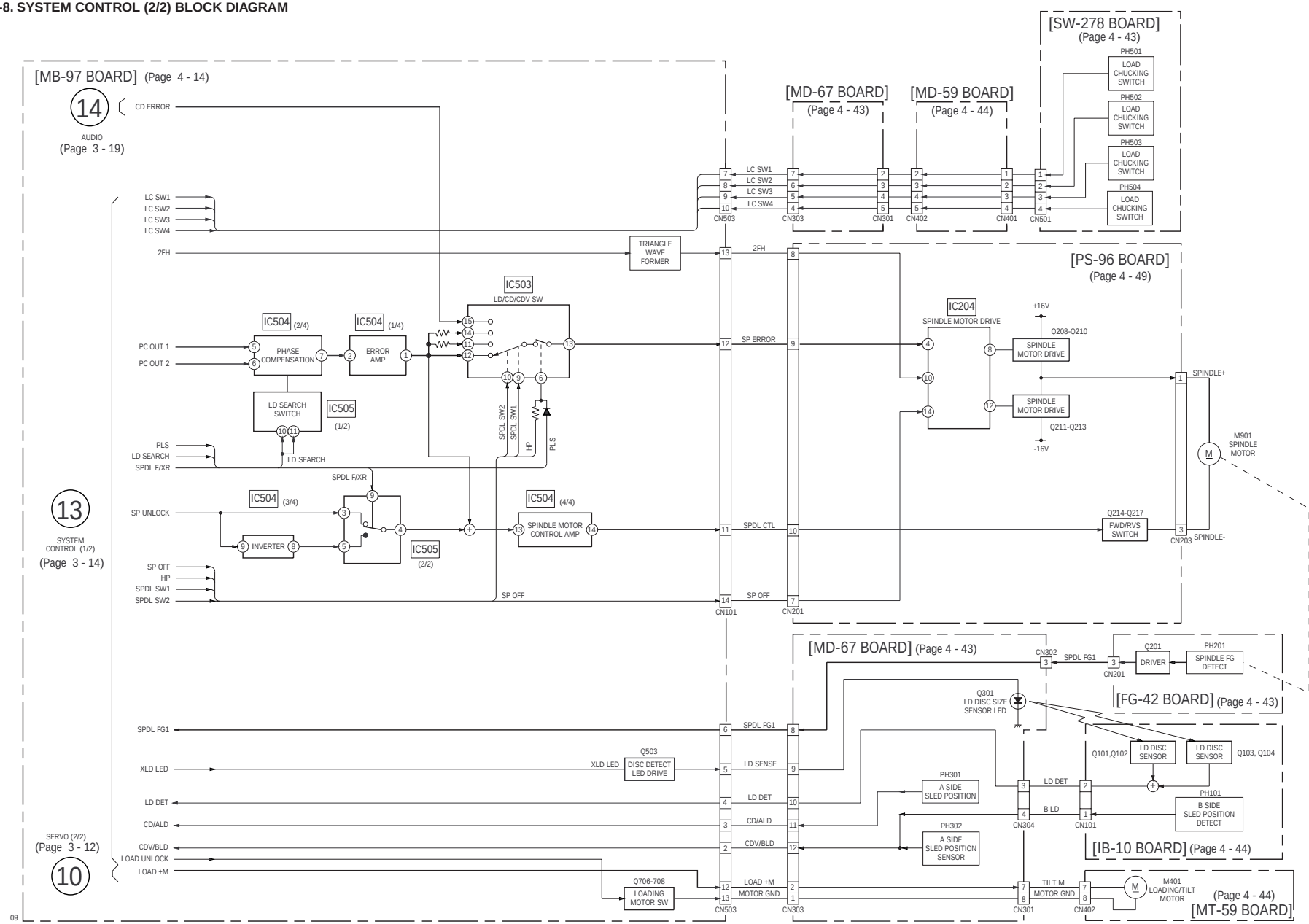
3-6. SERVO (2/2) BLOCK DIAGRAM



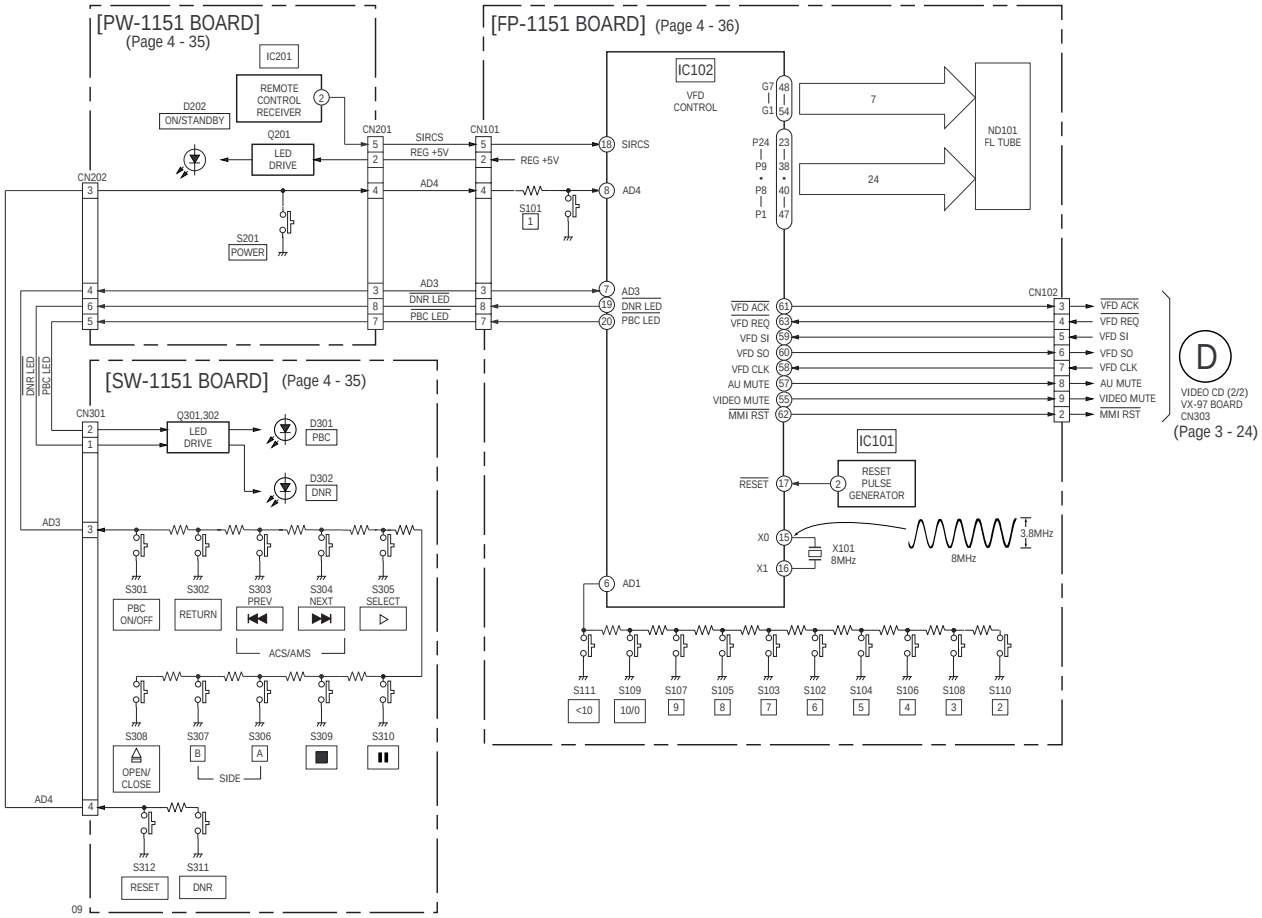
3-7. SYSTEM CONTROL (1/2) BLOCK DIAGRAM



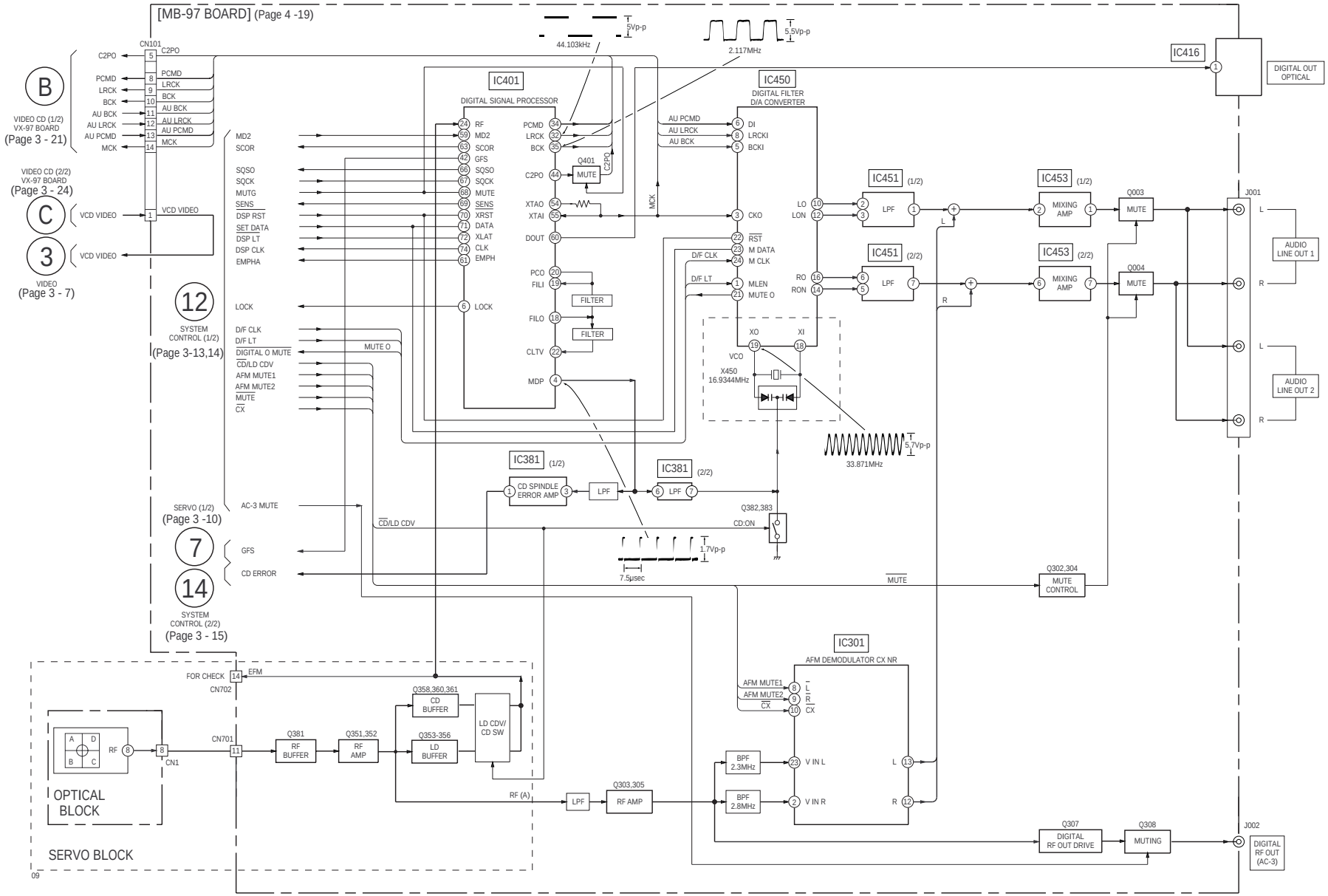
3-8. SYSTEM CONTROL (2/2) BLOCK DIAGRAM



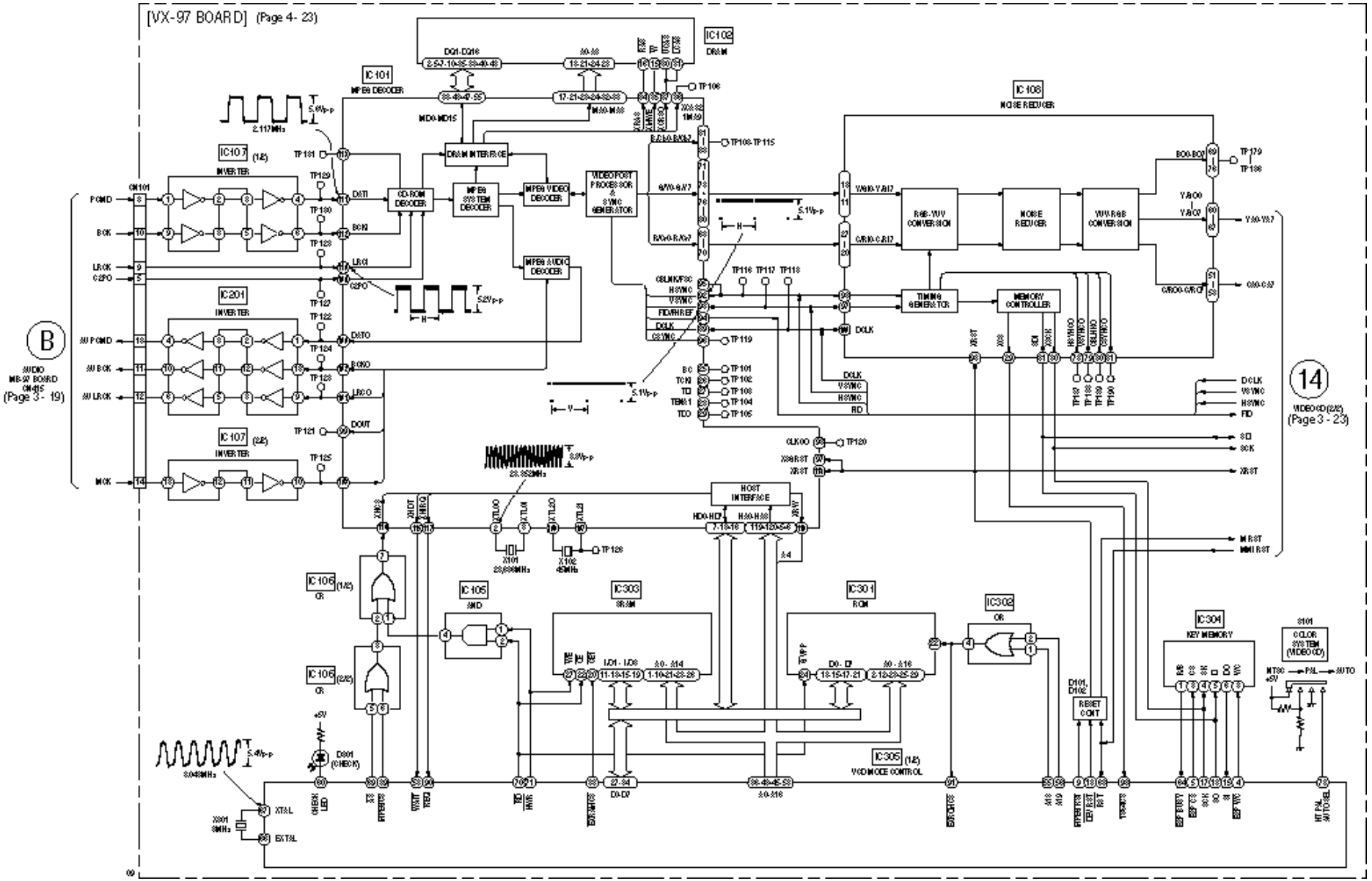
3-9. MODE CONTROL BLOCK DIAGRAM



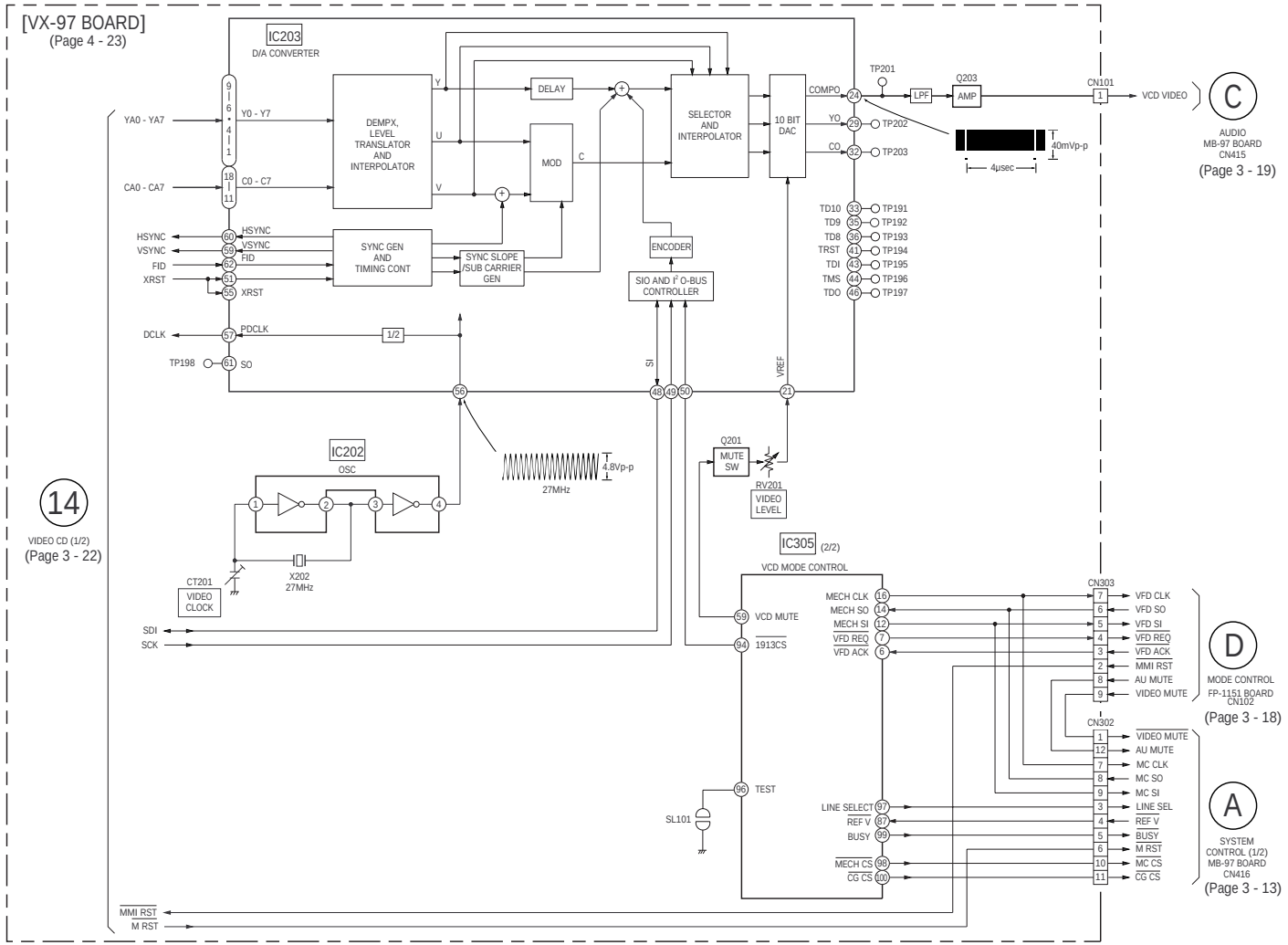
3-10. AUDIO BLOCK DIAGRAM



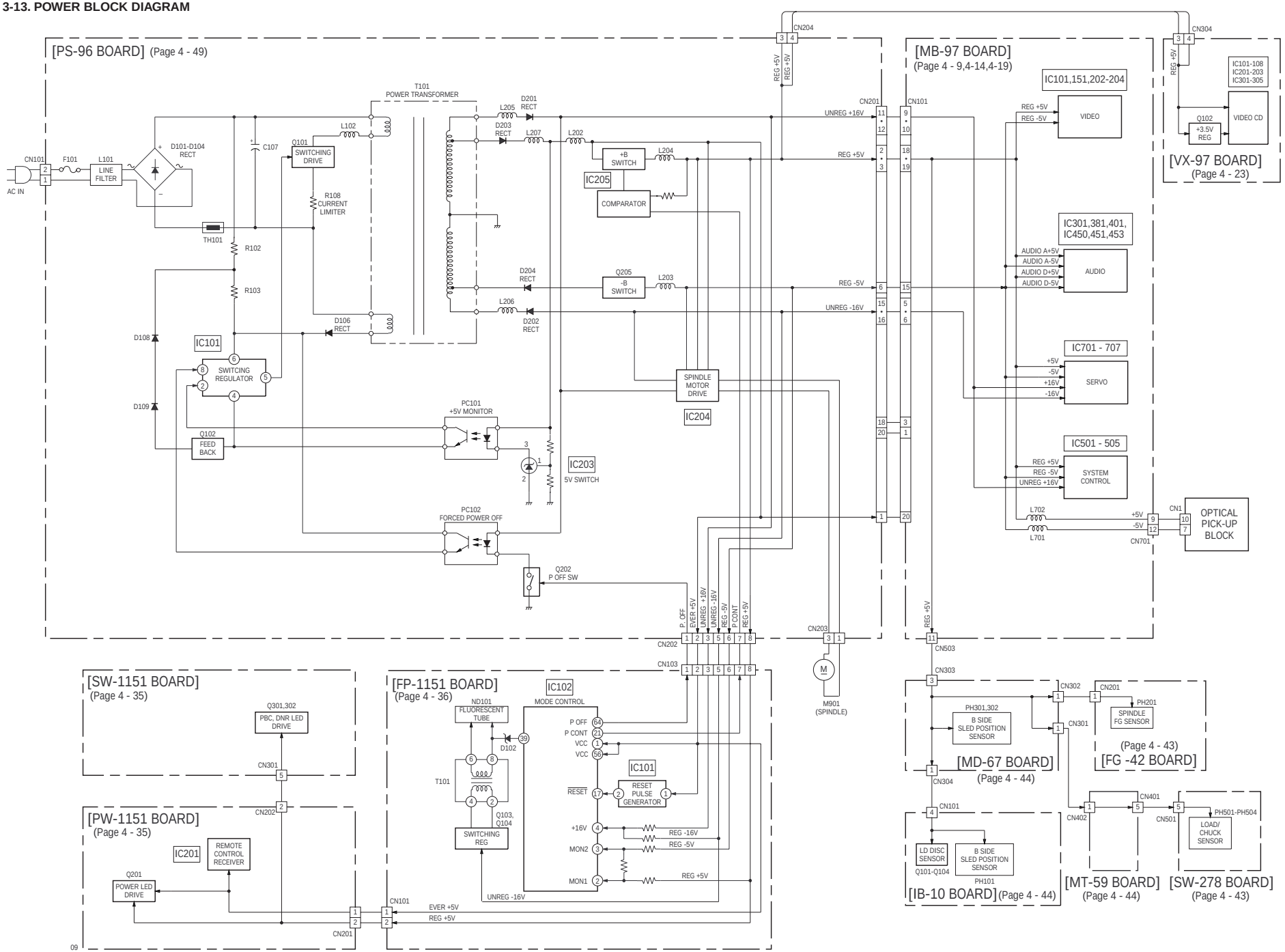
3-11. VIDEO CD (1/2) BLOCK DIAGRAM



3-12. VIDEO CD (2/2) BLOCK DIAGRAM

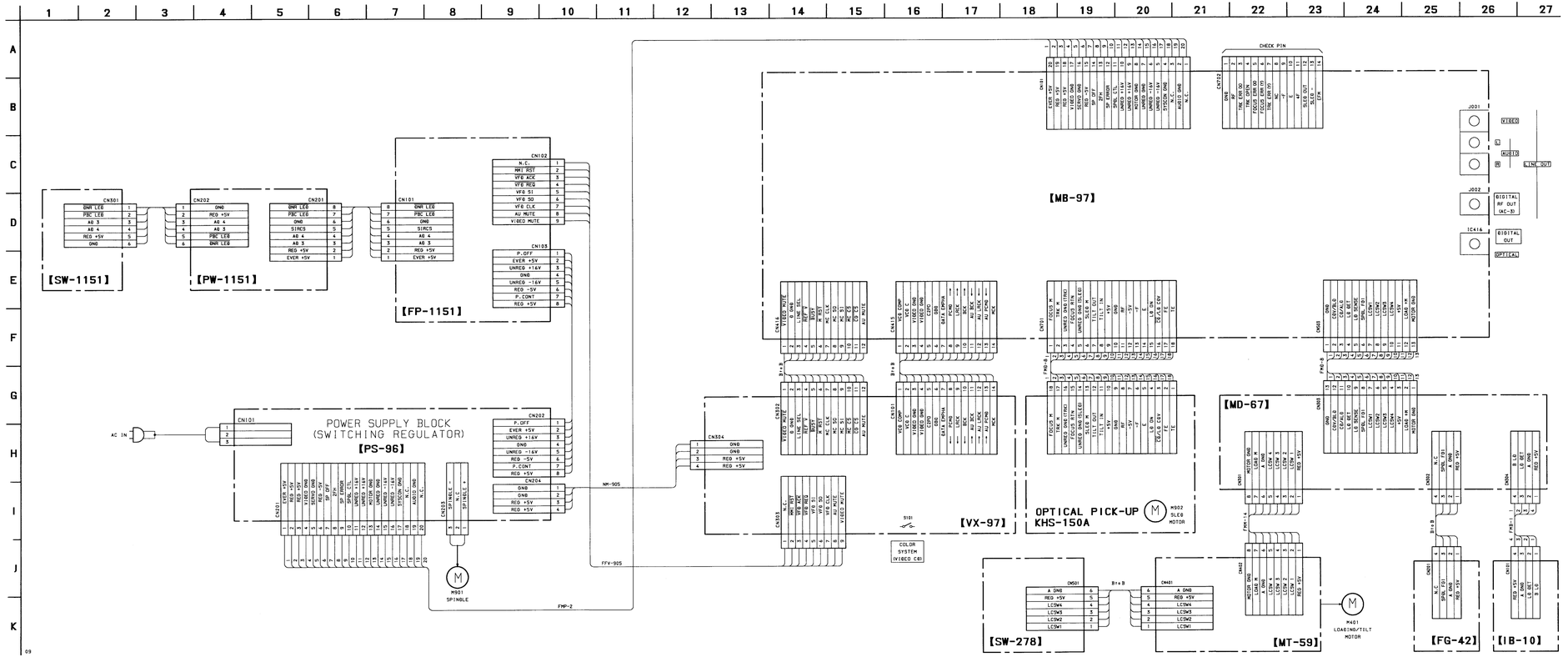


3-13. POWER BLOCK DIAGRAM



SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM



4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

- **For printed wiring boards.**
- ○— : indicated a lead wire mounted on the component side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ▨ : Pattern from the side which enable seeing.
- Circled numbers refer to waveforms.

*Caution:

Pattern face side: (Conductor Side) Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

- **For schematic diagrams.**
- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, because it is damaged by heat.
- All resistors are in ohms, and 1/4W unless otherwise noted. Chip resistor are 1/10W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF:μμF. 50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊣⊢ : fusible resistor.
- ▭ : nonflammable resistor.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- Circled numbers refer to waveforms.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
- Voltages are dc between ground and measurement point.
- Readings are taken under pause mode. (NTSC REF DISC HLV-8 SIDE 1 FRAMENo. 4100)
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

MB-97 (VIDEO, SERVO, SYSTEM CONTROL, AUDIO) PRINTED WIRING BOARD

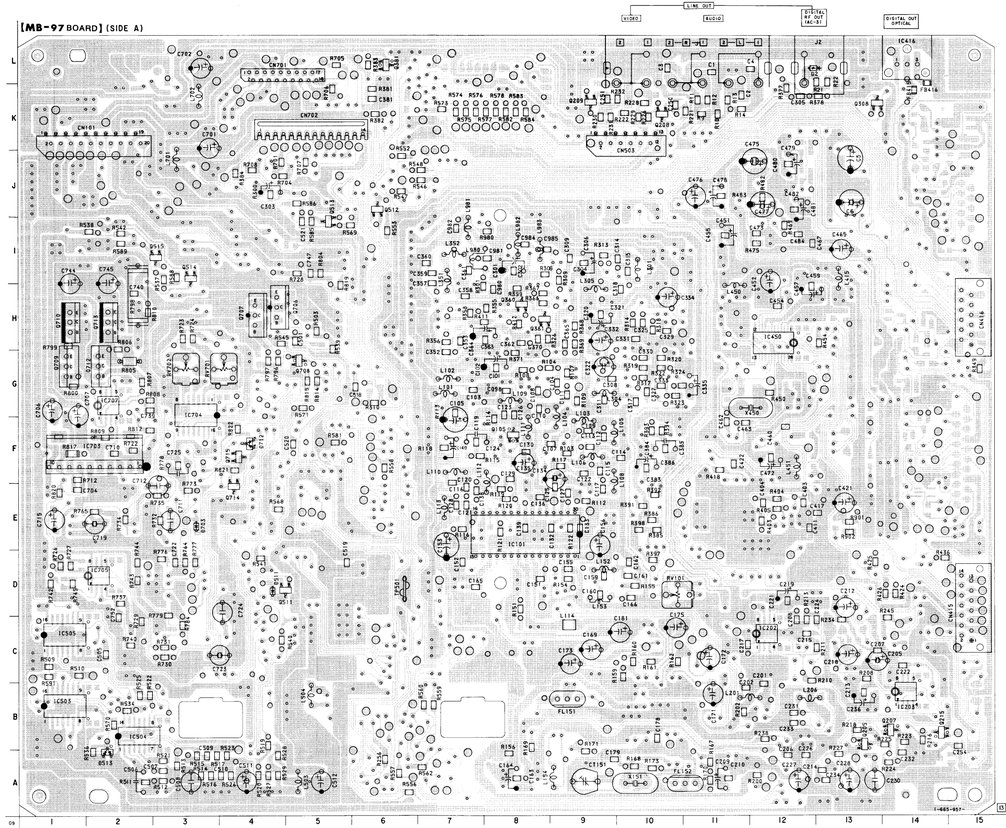
– Ref No. MB-97 BOARD: 1,000 series –

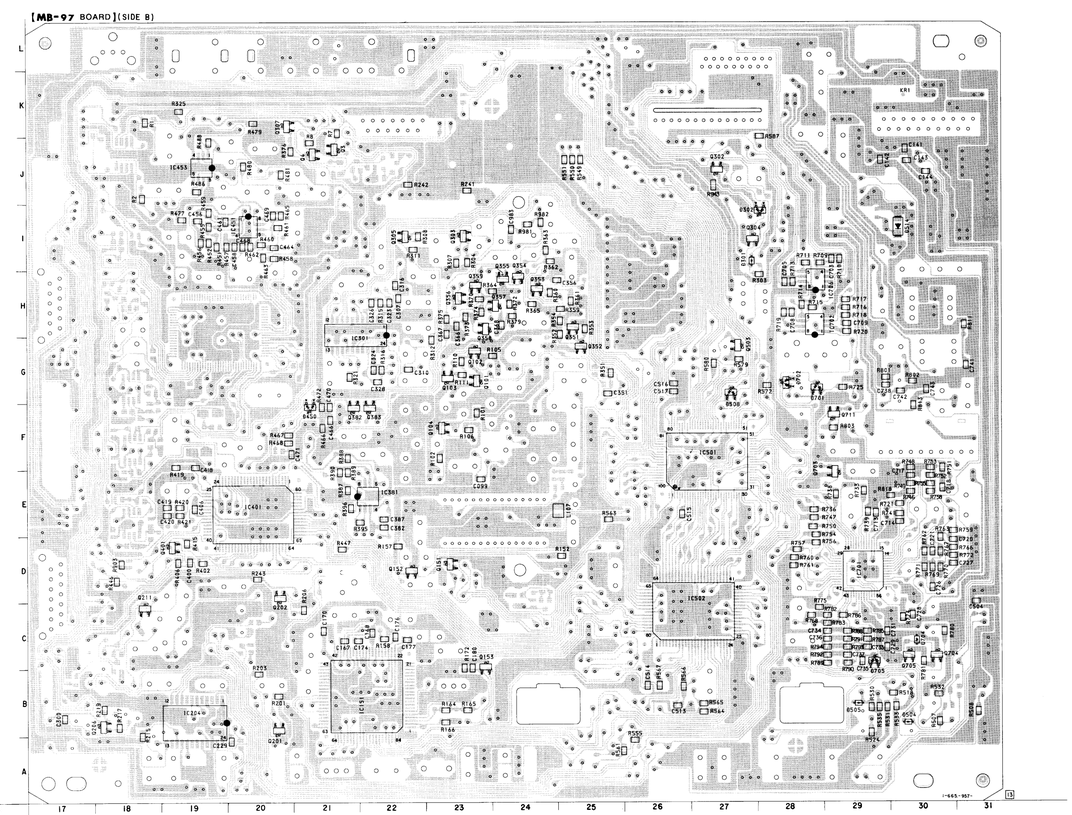
• Refer to page 4–14 to 4–19 for Schematic diagrams.

MB-97 BOARD

CN101	K-2	Q3	J-21
CN412	D-15	Q4	J-21
CN416	H-15	Q101	G-23
CN503	J-10	Q102	G-23
CN701	K-4	Q103	G-23
CN702	K-5	Q104	F-23
		Q105	F-8
CT151	A-9	Q151	D-23
		Q152	D-22
D301	I-27	Q153	C-23
D302	I-27	Q201	A-20
D450	F-21	Q202	C-20
D504	B-30	Q205	B-13
D505	B-29	Q206	B-17
D508	F-27	Q207	B-14
D511	D-4	Q208	K-10
D512	I-29	Q209	K-9
D513	A-2	Q211	D-18
D514	I-30	Q215	B-14
D701	G-28	Q302	I-27
D702	G28	Q303	I-27
D703	E-3	Q304	I-27
D704	C-30	Q305	I-22
D705	B-29	Q307	K-20
D712	F-4	Q308	J-13
		Q351	G-25
IC101	E-8	Q352	G-25
IC151	B-21	Q353	H-24
IC202	C-12	Q354	I-24
IC203	B-14	Q355	I-24
IC204	B-19	Q356	H-23
IC301	G-21	Q357	H-24
IC381	E-22	Q358	G-23
IC401	E-20	Q359	H-23
IC416	K-14	Q360	H-8
IC450	H-12	Q361	H-8
IC451	I-20	Q381	K-6
IC453	J-19	Q382	F-21
IC501	F-27	Q383	F-22
IC502	D-26	Q401	D-19
IC503	B-1	Q503	G-27
IC504	B-2	Q511	D-5
IC505	C-1	Q512	J-6
IC701	D-29	Q513	I-5
IC702	H-29	Q514	I-3
IC703	F-2	Q515	I-4
IC704	F-3	Q703	E-28
IC705	D-2	Q704	C-30
IC706	H-29	Q705	C-30
IC707	G-2	Q706	H-5
		Q707	H-4
		Q708	H-4
		Q709	G-1
		Q710	H-1
		Q711	F-29
		Q712	D-2
		Q713	H-2
		Q714	E-4
		Q715	F-4
		RV101	D-10
		RV701	G-3
		RV702	G-3

• For Printed Wiring Boards.
• Chip transistor

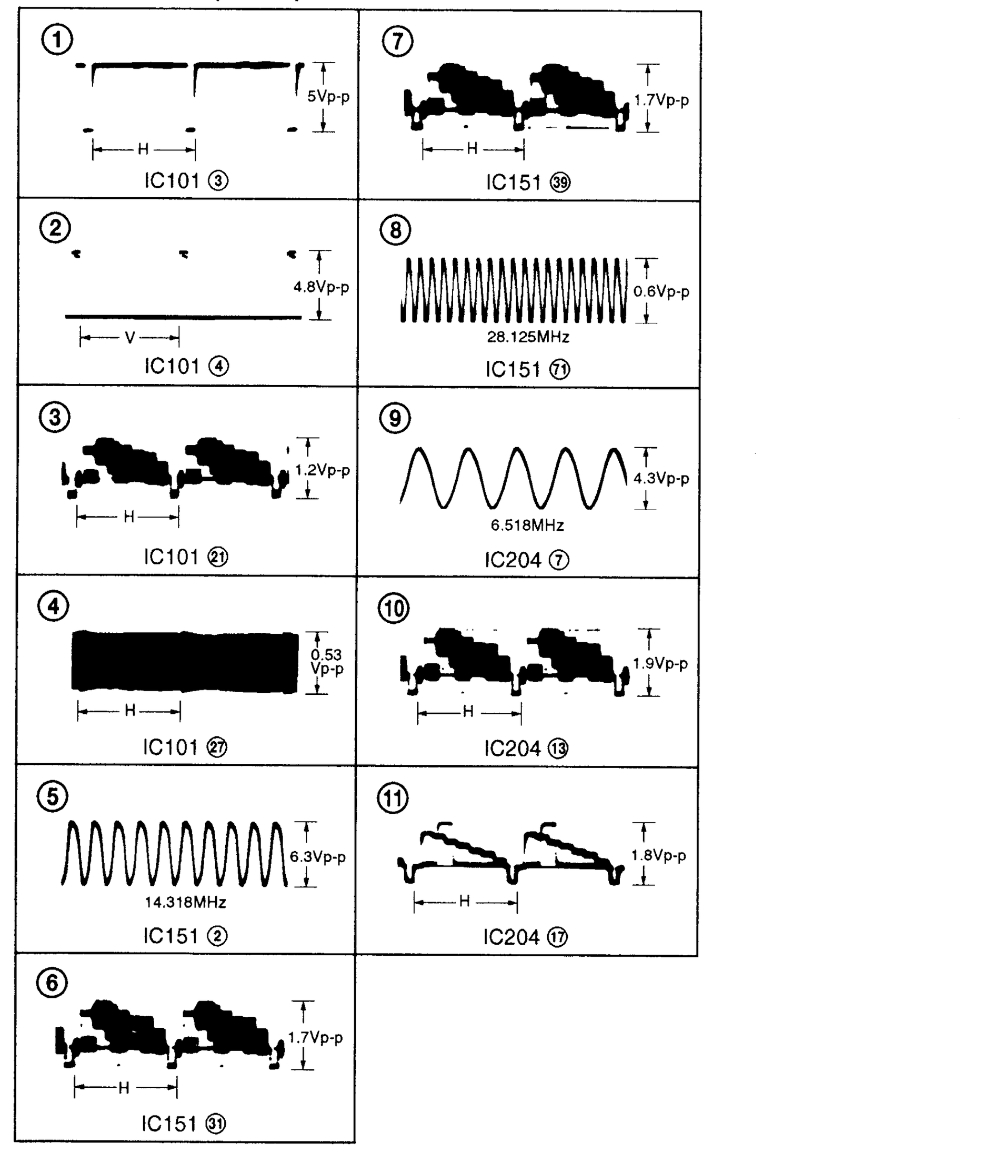




MB-97 (VIDEO) SCHEMATIC DIAGRAM

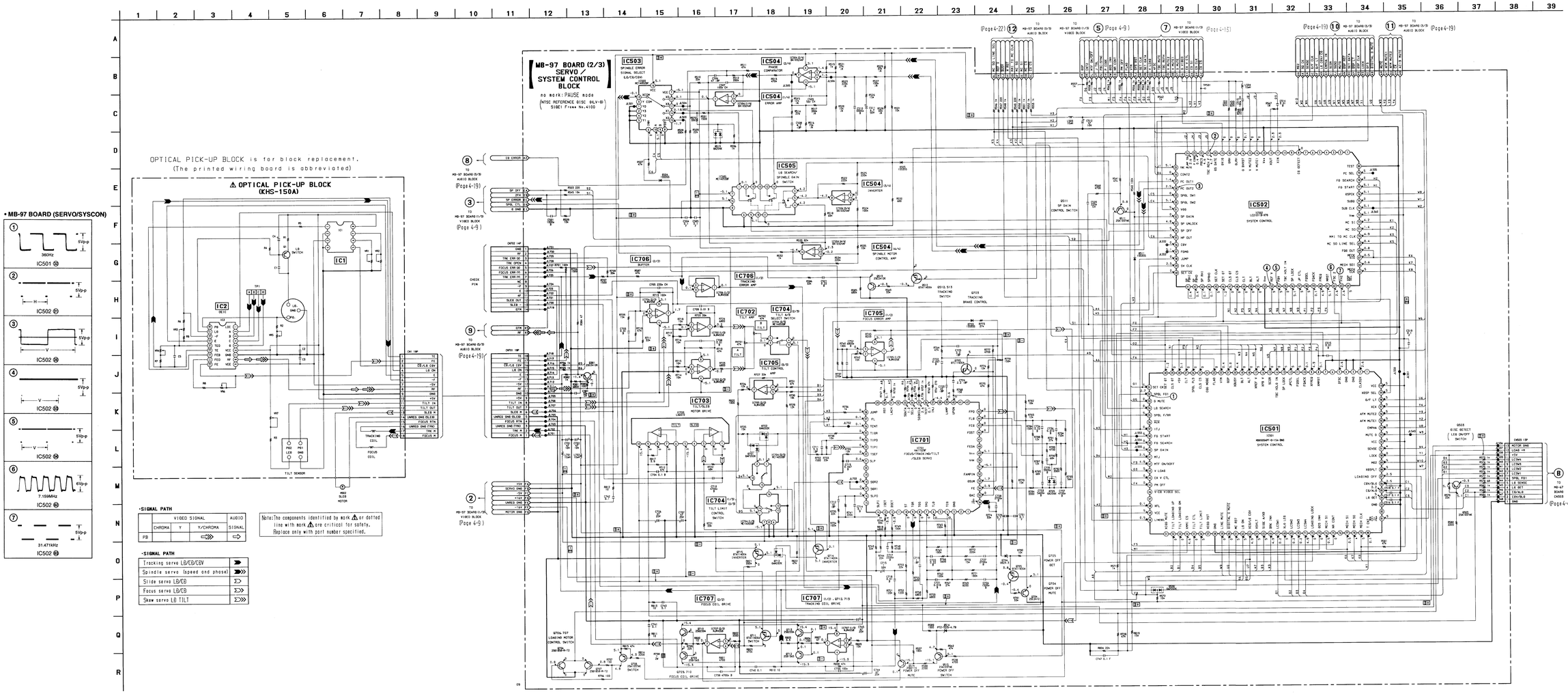
– Ref No. MB-97 BOARD: 1,000 series –

• MB-97 BOARD (VIDEO)



MB-97 (SERVO, SYSTCON) SCHEMATIC DIAGRAM
– Ref No. MB-97 BOARD: 1,000 series –

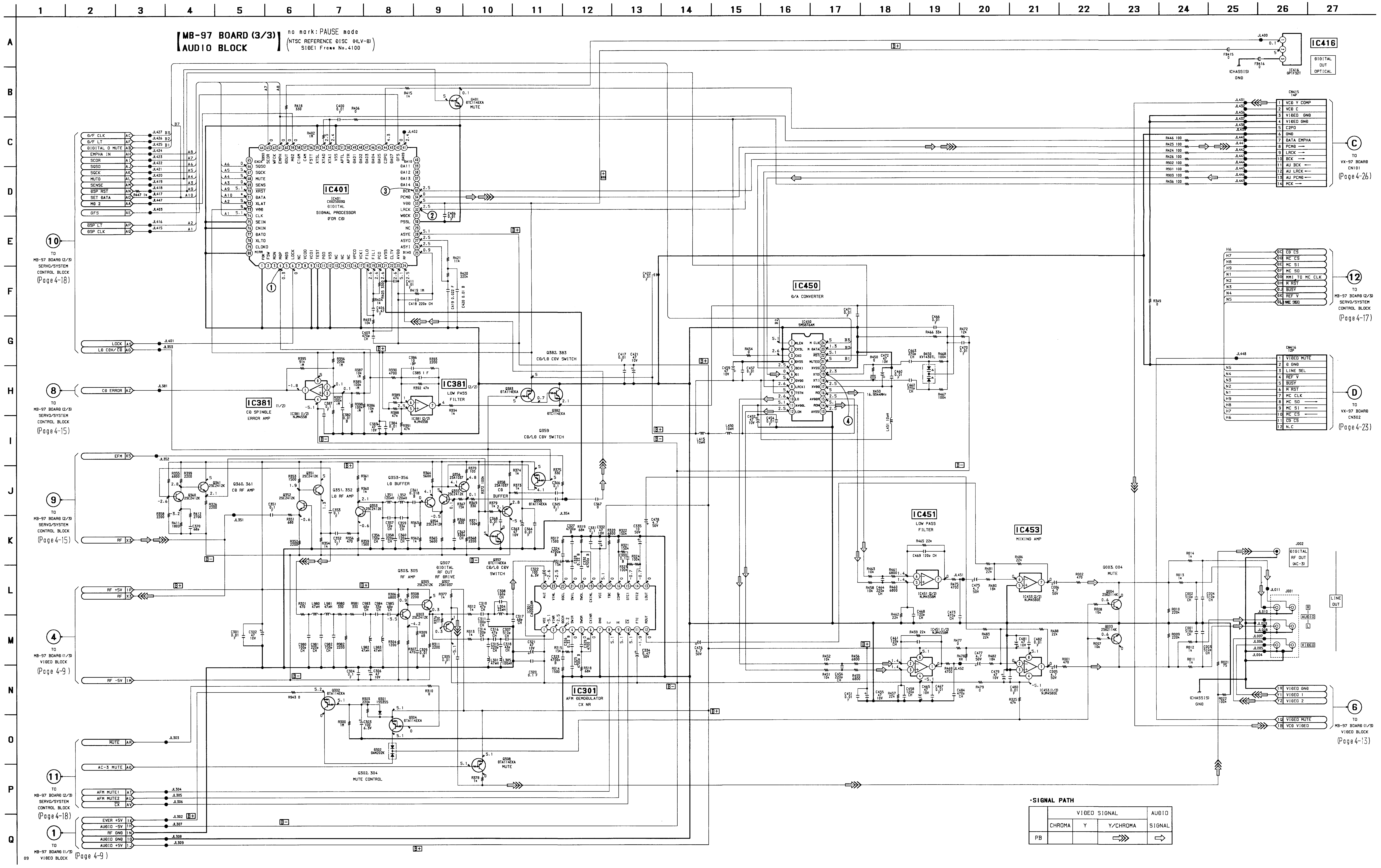
• Refer to page 4-5 for printed wiring board.



MB-97 (AUDIO) SCHEMATIC DIAGRAM

– Ref No. MB-97 BOARD: 1,000 series –

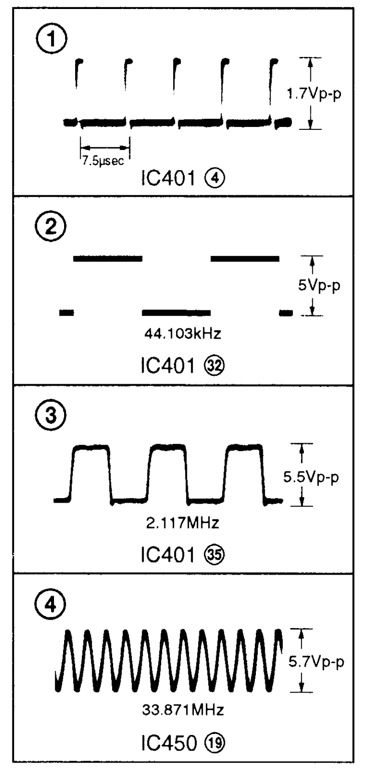
• Refer to page 4–5 for printed wiring board.



·SIGNAL PATH

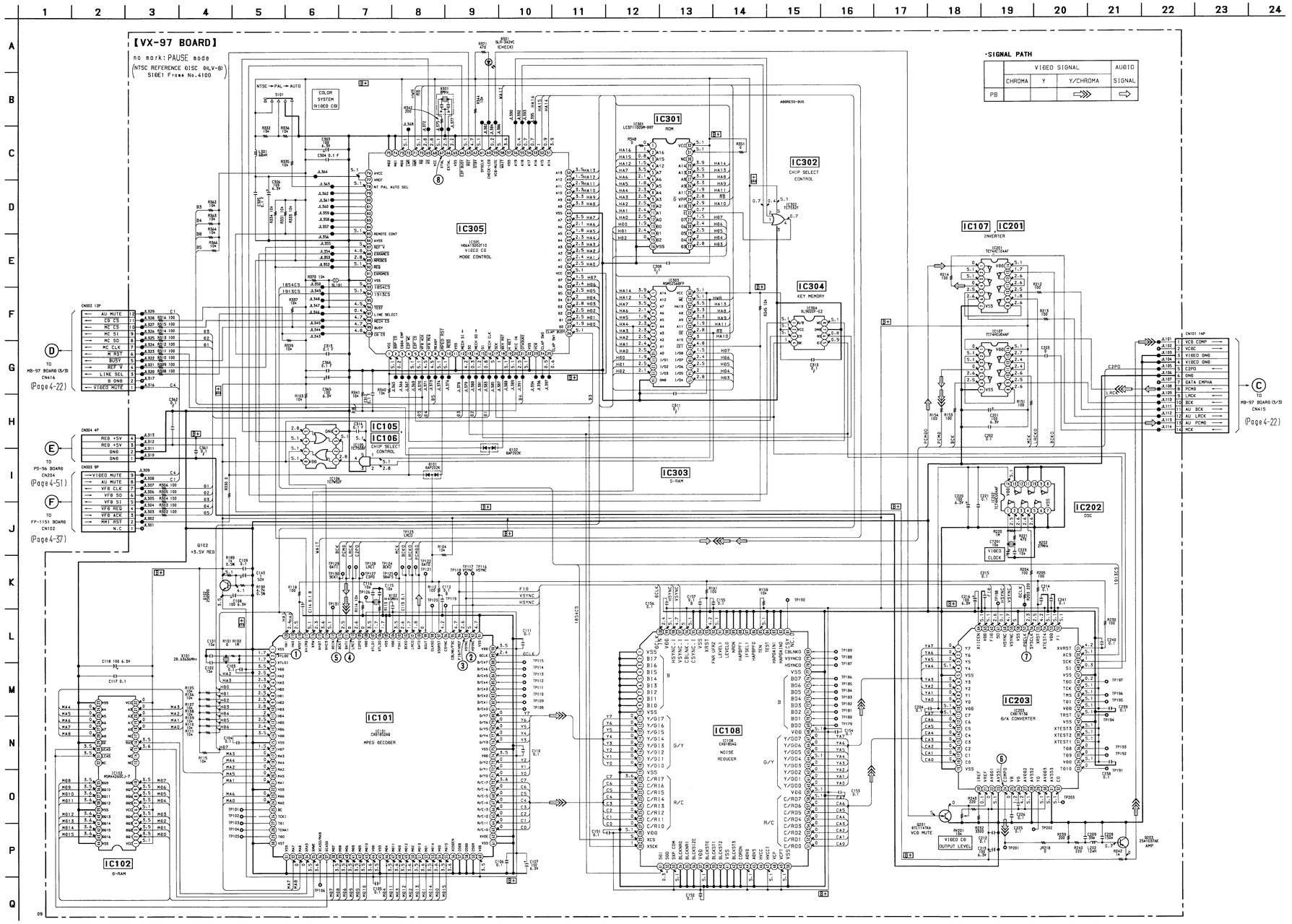
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
PB			⇨⋙	⇨

• MB-97 BOARD (AUDIO)

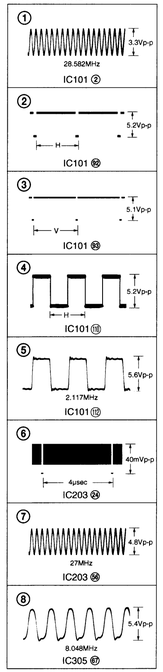


VX-97 (VIDEO CD) SCHEMATIC DIAGRAM

– Ref No. VX-97 BOARD: 3,000 series –



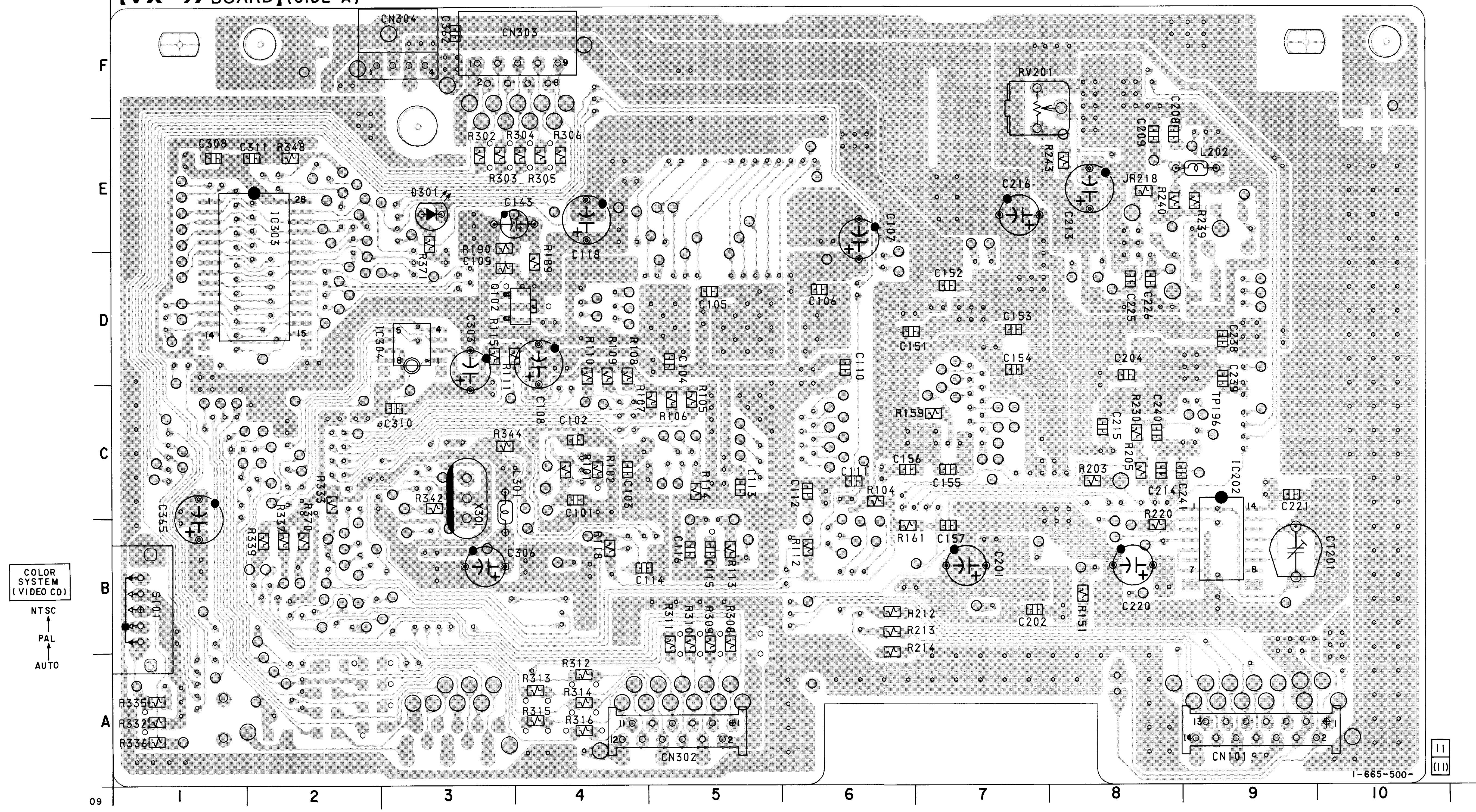
• VX-97 BOARD



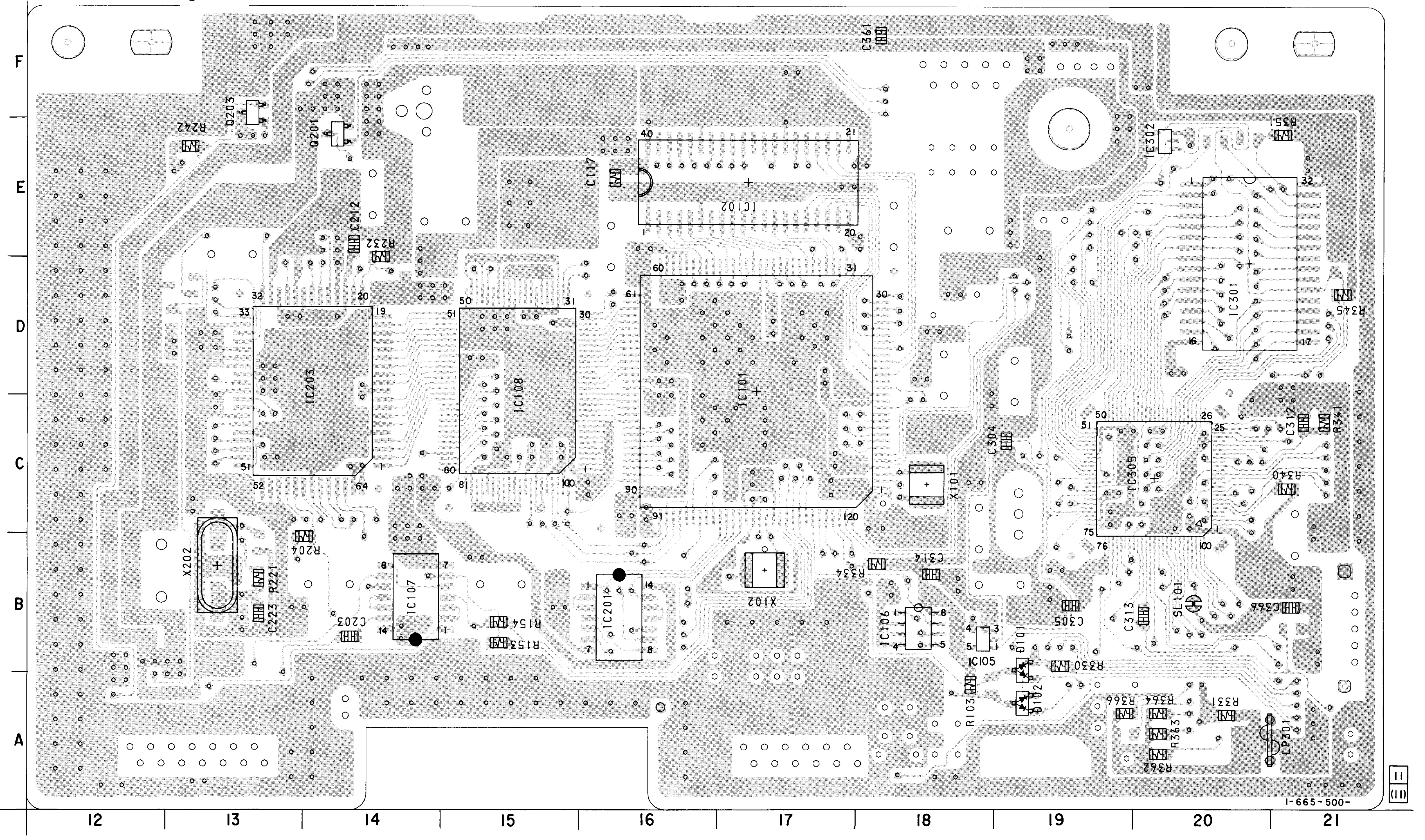
VX-97 (VIDEO CD) PRINTED WIRING BOARD

– Ref No. VX-97 BOARD: 3,000 series –

[VX-97 BOARD] (SIDE A)



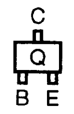
[VX-97 BOARD] (SIDE B)



VX-97 BOARD

CN101	A-9
CN302	A-5
CN303	F-4
CN304	F-3
CT201	B-9
D101	B-19
D102	A-19
D301	E-3
IC101	C-17
IC102	E-17
IC105	B-18
IC106	B-18
IC107	B-14
IC108	C-15
IC201	B-16
IC202	C-9
IC203	C-14
IC301	D-20
IC302	E-20
IC303	E-2
IC304	D-3
IC305	C-19
Q102	D-3
Q201	E-14
Q203	E-13
RV201	F-7

- **For Printed Wiring Boards.**
- Chip transistor



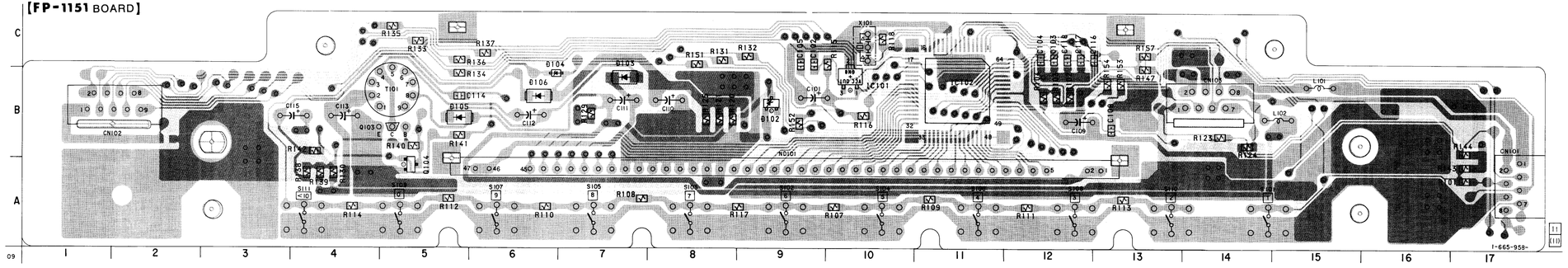
FP-1151 (MODE CONTROL), PW-1151 (FUNCTION 1), SW-1151 (FUNCTION 2) PRINTED WIRING BOARDS

– Ref No. FP-1151, PW-1151 and SW-1151 BOARDS: 4,000 series –

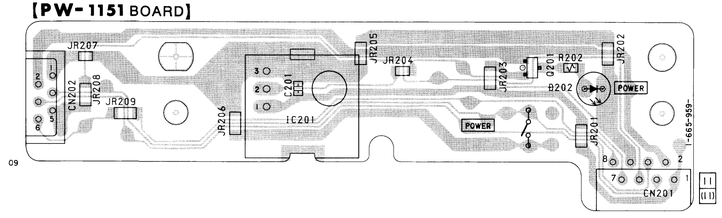
FP-1151 BOARD

CN101	B-17
CN102	B-1
CN103	B-14
D102	B-9
D103	C-7
D104	C-6
D105	B-5
D106	B-6
IC101	B-10
IC102	B-11
Q103	B-4
Q104	A-5

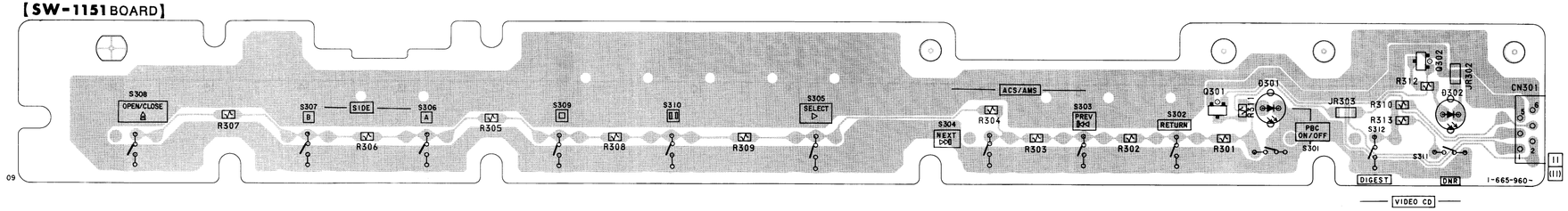
[FP-1151 BOARD]



[PW-1151 BOARD]



[SW-1151 BOARD]



• For Printed Wiring Boards.
• Chip transistor

FP-1151 (MODE CONTROL), PW-1151 (FUNCTION 1), SW-1151 (FUNCTION 2) SCHEMATIC DIAGRAMS

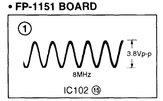
– Ref No. FP-1151, PW-1151 and SW-1151 BOARDS: 4,000 series –

【SW-1151 BOARD】

【PW-1151 BOARD】

【FP-1151 BOARD】

• FP-1151 BOARD



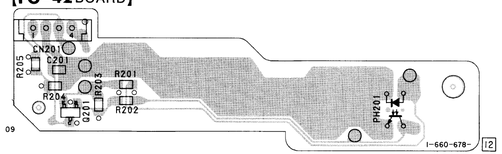
no mark:PAUSE mode
(NTSC REFERENCE DISC 96LV-8)
SIDE1 Frame Nos.4100

Note:The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

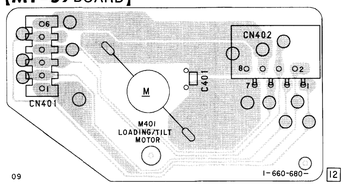
FG-42 (SPINDLE FG DETECT), IB-10 (SLED POSITION DETECT), MD-67 (SLED POSITION DETECT), MT-59 (LOADING/TILT MOTOR), SW-278 (LOAD CHUCKING SWITCH) PRINTED WIRING BOARDS

– Ref No. FG-42, IB-10, MD-67, MT-59 and SW-278 BOARDS: 5,000 series –

[FG-42 BOARD]

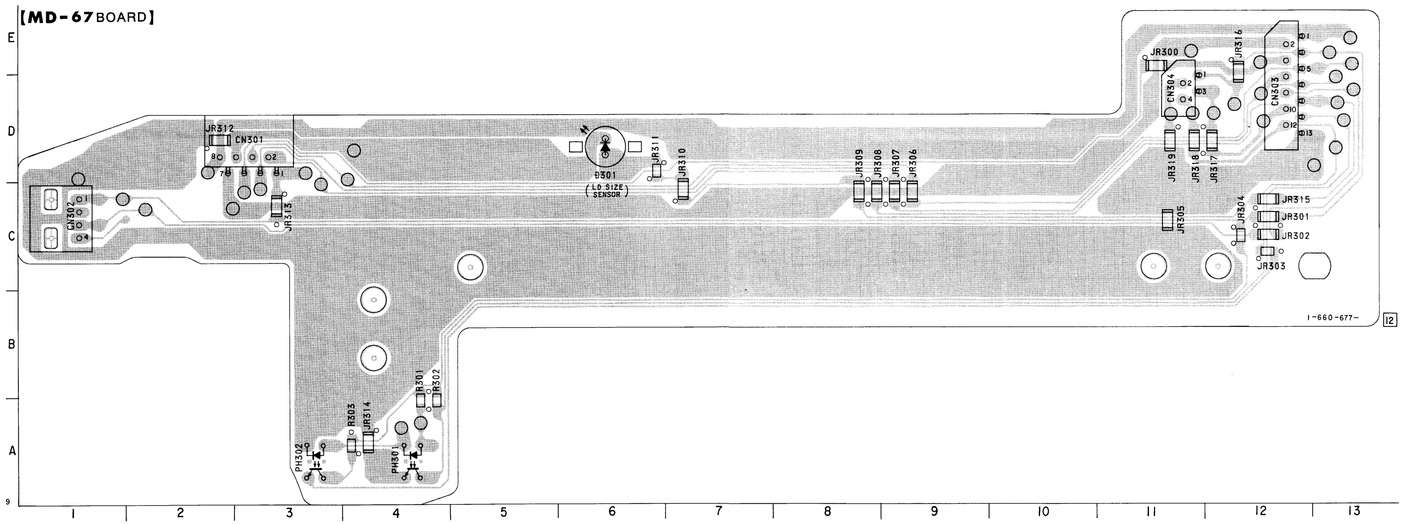


[MT-59 BOARD]



• For Printed Wiring Boards.
• Chip transistor

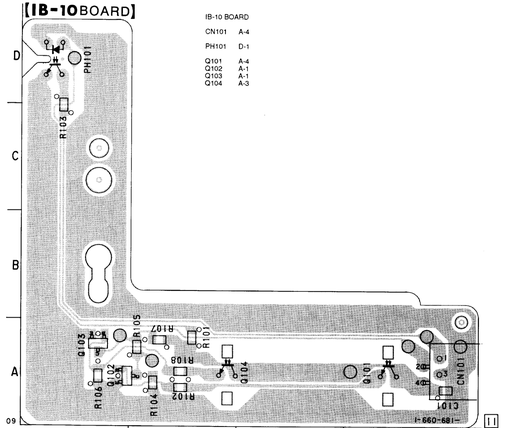
[MD-67 BOARD]



MD-67 BOARD

CN301	D-3
CN302	C-1
CN303	D-12
CN304	D-11
D301	D-6
PH301	A-4
PH302	A-3

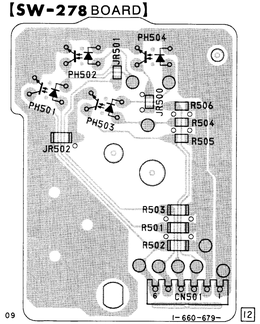
[IB-10 BOARD]



IB-10 BOARD

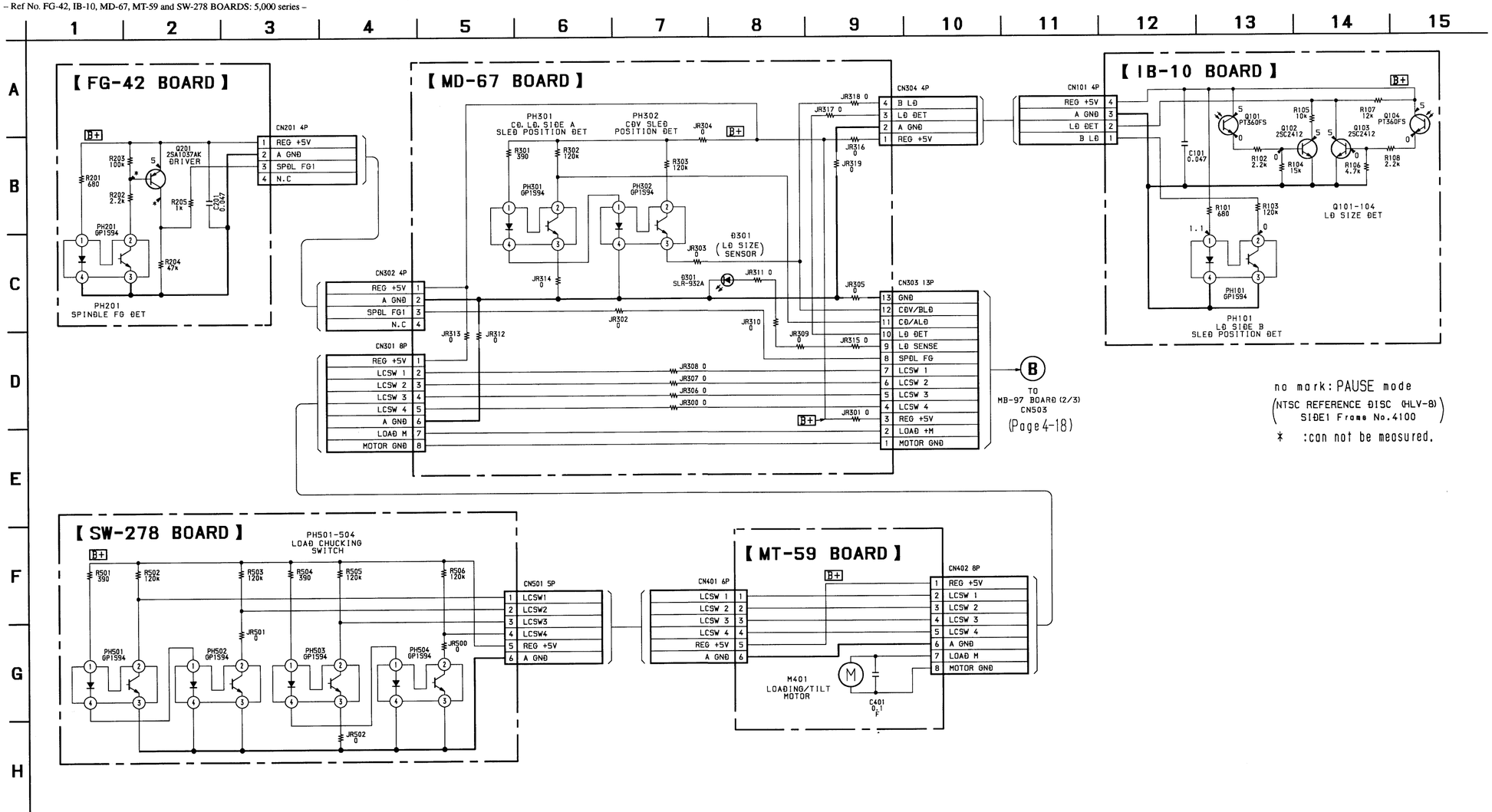
CN101	A-4
PH101	D-1
Q101	A-4
Q102	A-1
Q103	A-1
Q104	A-3

[SW-278 BOARD]



FG-42 (SPINDLE FG DETECT), IB-10 (SLED POSITION DETECT), MD-67 (SLED POSITION DETECT), MT-59 (LOADING/TILT MOTOR), SW-278 (LOAD CHUCKING SWITCH) SCHEMATIC DIAGRAMS

– Ref No. FG-42, IB-10, MD-67, MT-59 and SW-278 BOARDS: 5,000 series –



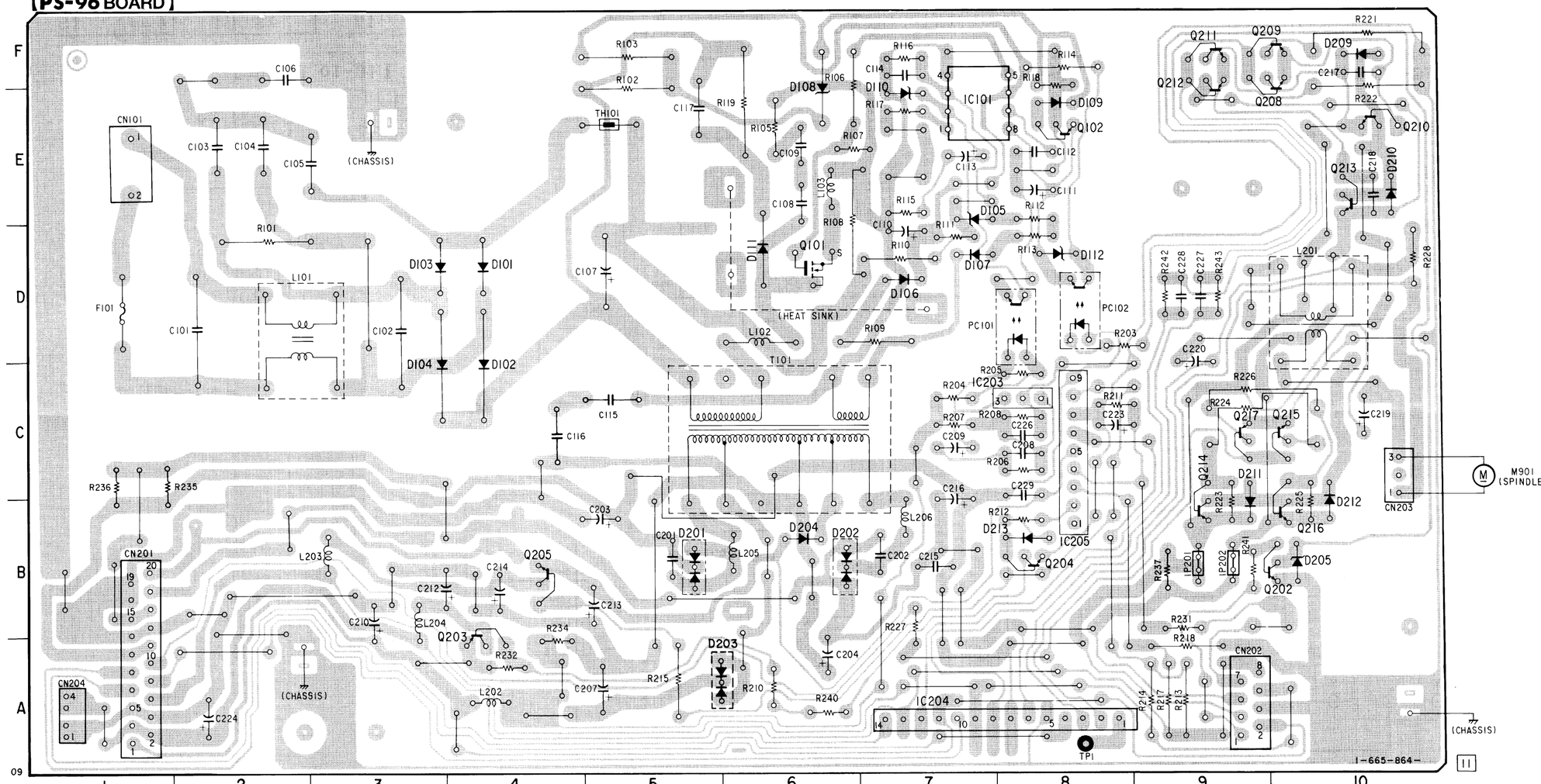
POWER BLOCK (POWER SUPPLY, MOTOR DRIVE) PRINTED WIRING BOARD

– Ref No. POWER BLOCK (PS-96 BOARD) : 7,000 series –

【PS-96 BOARD】

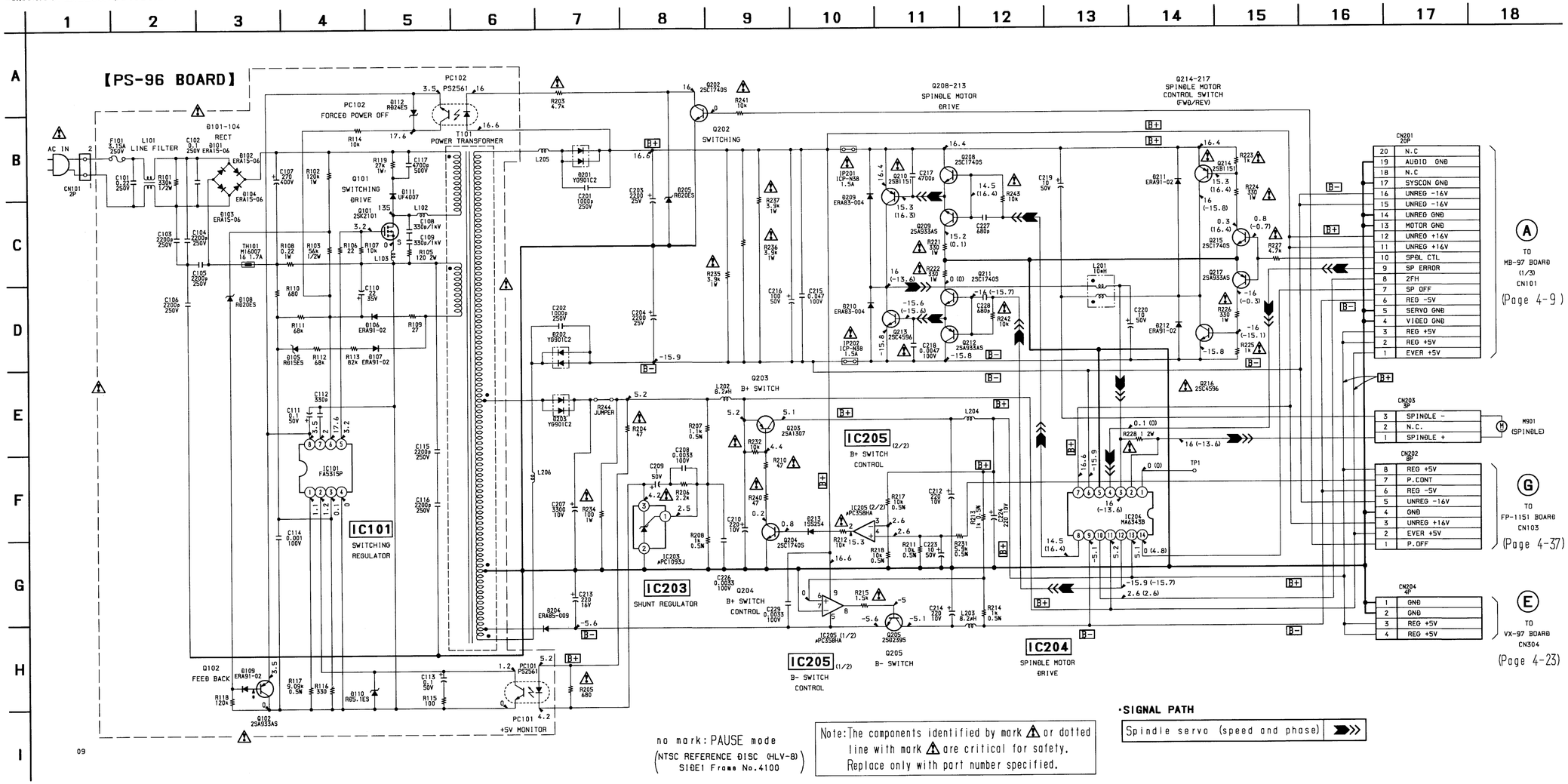
POWER BLOCK

CN101	E-1
CN201	B-1
CN202	A-9
CN203	C-10
CN204	A-1
D101	D-4
D102	C-4
D103	D-3
D104	C-3
D105	E-7
D106	D-7
D107	D-7
D108	E-6
D109	E-8
D110	E-7
D111	D-6
D112	D-8
D201	B-5
D202	B-6
D203	A-5
D204	B-6
D205	B-10
D209	F-10
D210	E-10
D211	C-9
D212	B-10
D213	B-7
IC101	E-7
IC203	C-7
IC204	A-7
IC205	B-8
PC101	D-7
PC102	D-8
Q101	D-6
Q102	E-8
Q202	B-10
Q203	A-4
Q204	B-8
Q205	B-4
Q208	E-10
Q209	F-9
Q210	E-10
Q211	F-9
Q212	E-9
Q213	E-10
Q214	C-9
Q215	C-10
Q216	B-10
Q217	C-9



POWER BLOCK (POWER SUPPLY, MOTOR DRIVE) SCHEMATIC DIAGRAM

– Ref No. POWER BLOCK (PS-96 BOARD) : 7,000 series –



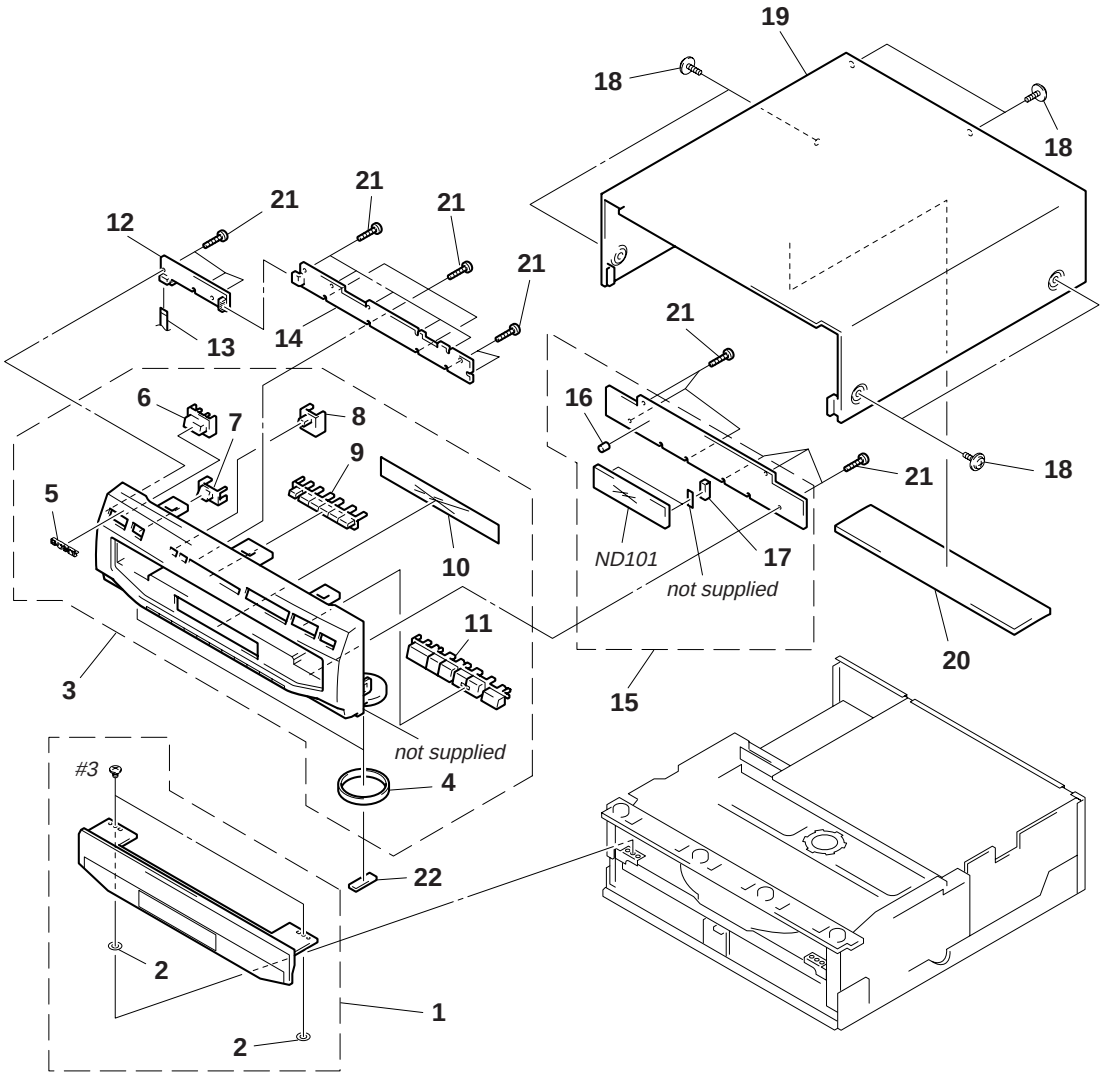
SECTION 5
REPAIR PARTS LIST

5-1. EXPLODED VIEWS

NOTE:
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviation
  CH : Chinese model

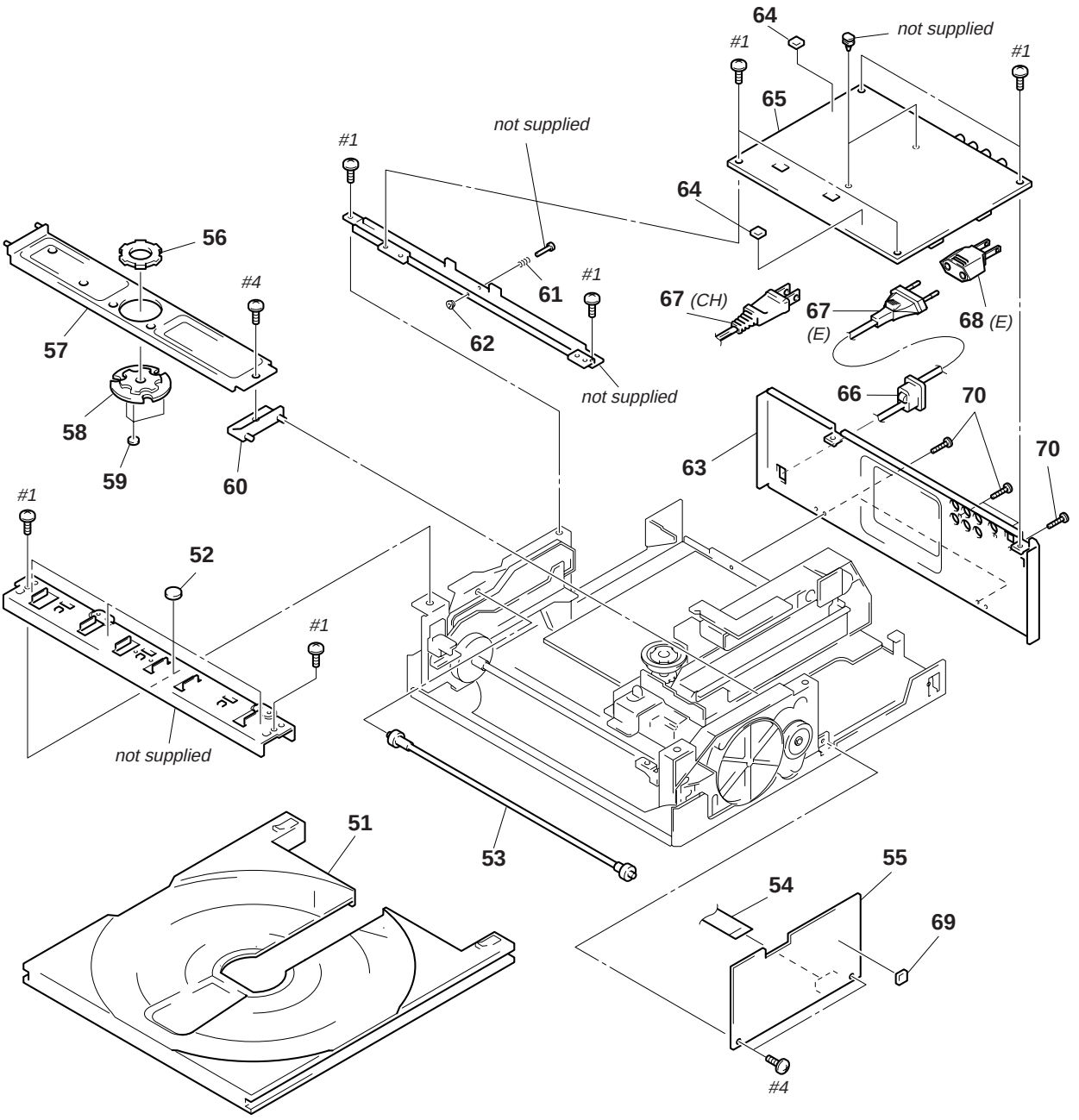
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1-1. UPPER CASE AND FRONT PANEL SECTION



Ref. No.	Part No.	Description	Remark
1	X-3947-384-1	DOOR (51E) ASSY	
2	3-701-438-11	WASHER, 2.5	
3	X-3947-381-1	PANEL (51E) ASSY, FRONT	
4	4-921-918-11	PLATE, ORNAMENTAL	
5	4-963-404-21	EMBLEM (5-A), SONY	
6	X-3947-382-1	BUTTON ASSY, POWER	
7	3-976-348-01	WINDOW, RAY CATCHER BLOCK	
8	3-976-349-01	BUTTON, DNR	
9	X-3947-383-1	BUTTON ASSY, PBC	
10	3-976-362-01	FILTER, ELECTROSTATIC	
11	3-976-351-01	BUTTON, PLAY	
* 12	1-665-959-11	PW-1151 BOARD	
13	1-777-007-11	CABLE, FLAT (8 CORE) (95mm)	
* 14	A-6423-466-A	SW-1151 BOARD, COMPLETE	
* 15	A-6423-464-A	FP-1151 BOARD, COMPLETE	
* 16	3-971-190-11	HOLDER, LED	
* 17	3-971-189-01	HOLDER, FL	
18	3-710-901-11	SCREW, TAPPING	
* 19	3-968-245-01	CASE, UPPER	
* 20	3-970-858-01	DAMPER	
21	4-951-620-01	SCREW (2.6X8), +BVTP	
22	3-971-192-01	CUSHION, FOOT	
ND101	1-517-471-11	INDICATOR TUBE, FLUORESCENT	

5-1-2. MAIN CHASSIS SECTION (1)

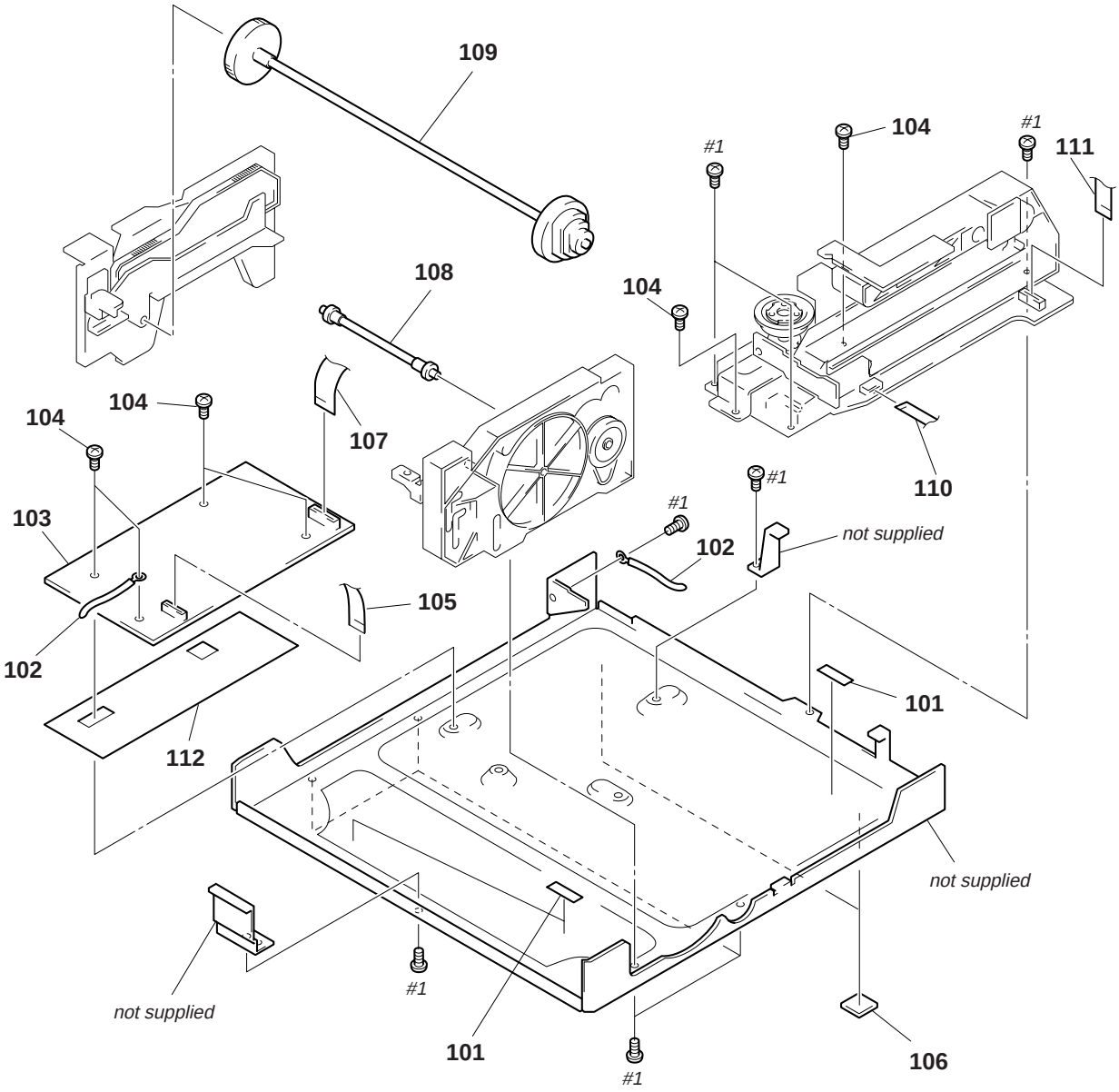


The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
51	A-6415-988-A	TRAY (96) ASSY	
52	9-911-841-XX	CUSHION (BM)	
53	X-3946-037-1	SHAFT ASSY, LINK	
54	1-777-013-11	CABLE, FLAT (9 CORE)	
* 55	A-6423-468-A	VX-97 BOARD, COMPLETE	
56	3-968-317-01	PLATE, TOP	
* 57	X-3946-039-3	PLATE ASSY, CHUCK	
58	A-6415-990-A	CHUCK BLOCK ASSY	
59	3-954-527-11	SHEET, STOPPER	
60	3-968-304-03	HOLDER, CHUCK PLATE	
61	3-969-528-01	SPRING, COMPRESSION	

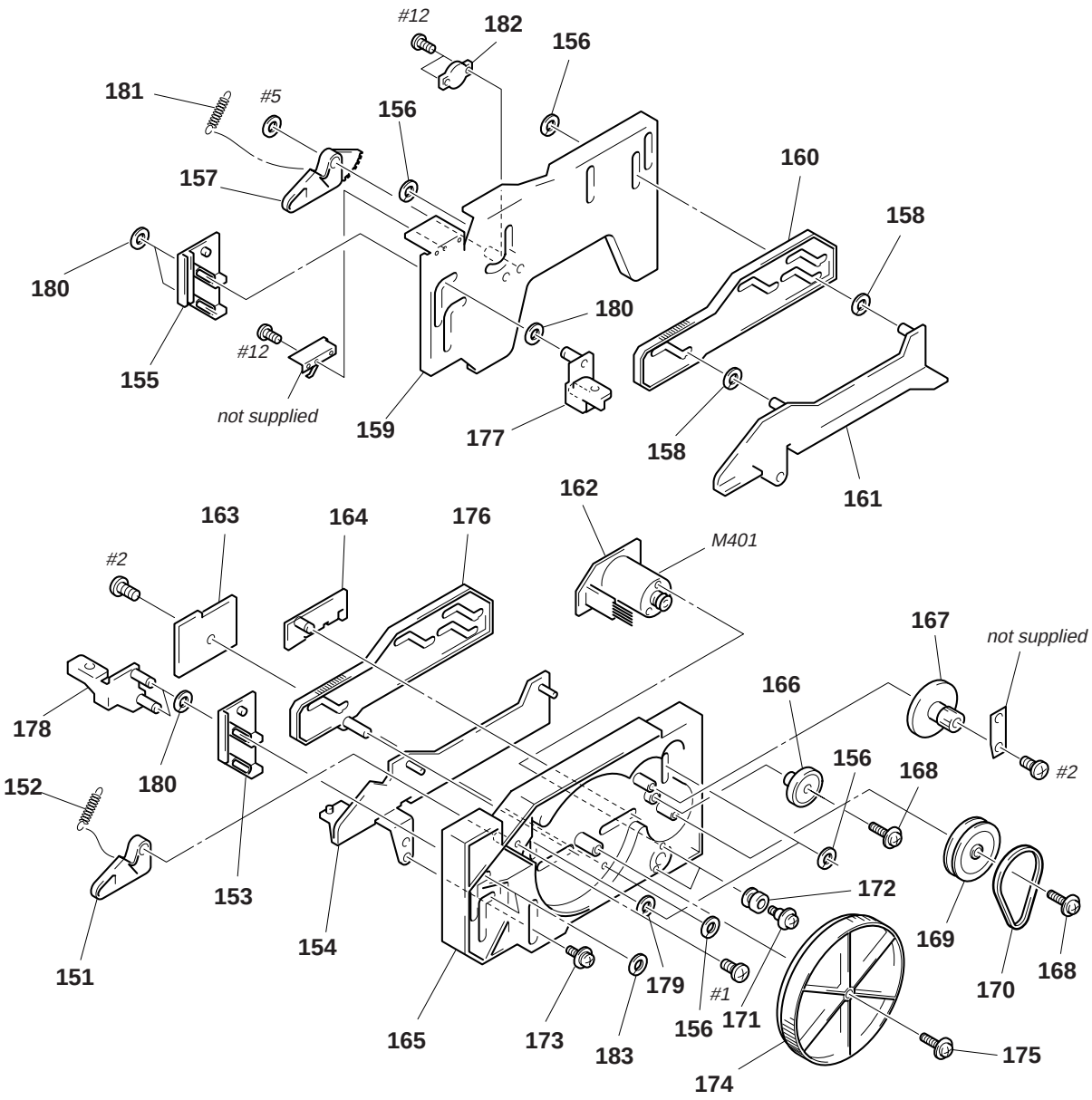
Ref. No.	Part No.	Description	Remark
62	3-703-075-00	CAP 2, SHAFT	
* 63	3-968-246-31	PANEL, REAR (E)	
* 63	3-968-246-41	PANEL, REAR (CH)	
64	9-911-840-XX	RUBBER (B)	
* 65	A-6423-467-A	MB-97 BOARD, COMPLETE	
* 66	3-703-571-11	BUSHING (S) (4516), CORD	
⚠67	1-769-639-11	CORD, POWER (E)	
⚠67	1-782-510-11	CORD, POWER (CH)	
68	1-569-008-11	ADAPTOR, CONVERSION 2P (E)	
69	9-911-842-XX	RUBBER (B)	
70	4-909-982-31	SCREW, TAPPING	

5-1-3. MAIN CHASSIS SECTION (2)



Ref. No.	Part No.	Description	Remark
101	3-896-686-01	CUSHION	
102	3-703-397-01	STOPPER, WIRING	
* 103	A-6423-493-A	PS-96 BOARD, COMPLETE	
104	3-970-608-11	SUMITITE (B3), +BV	
105	1-777-010-11	CABLE, FLAT (8 CORE) (300mm)	
106	3-968-251-01	CUSHION (R), FOOT	
107	1-777-005-11	CABLE, FLAT (20 CORE)	
108	X-3946-038-1	SHAFT ASSY, TILT LINK	
109	X-3946-036-1	SHAFT ASSY, TRAY LINK	
110	1-777-007-11	CABLE, FLAT (8 CORE) (95mm)	
111	1-777-006-11	CABLE, FLEXIBLE FLAT (13 CORE)	
112	3-972-699-01	SHEET, PS	

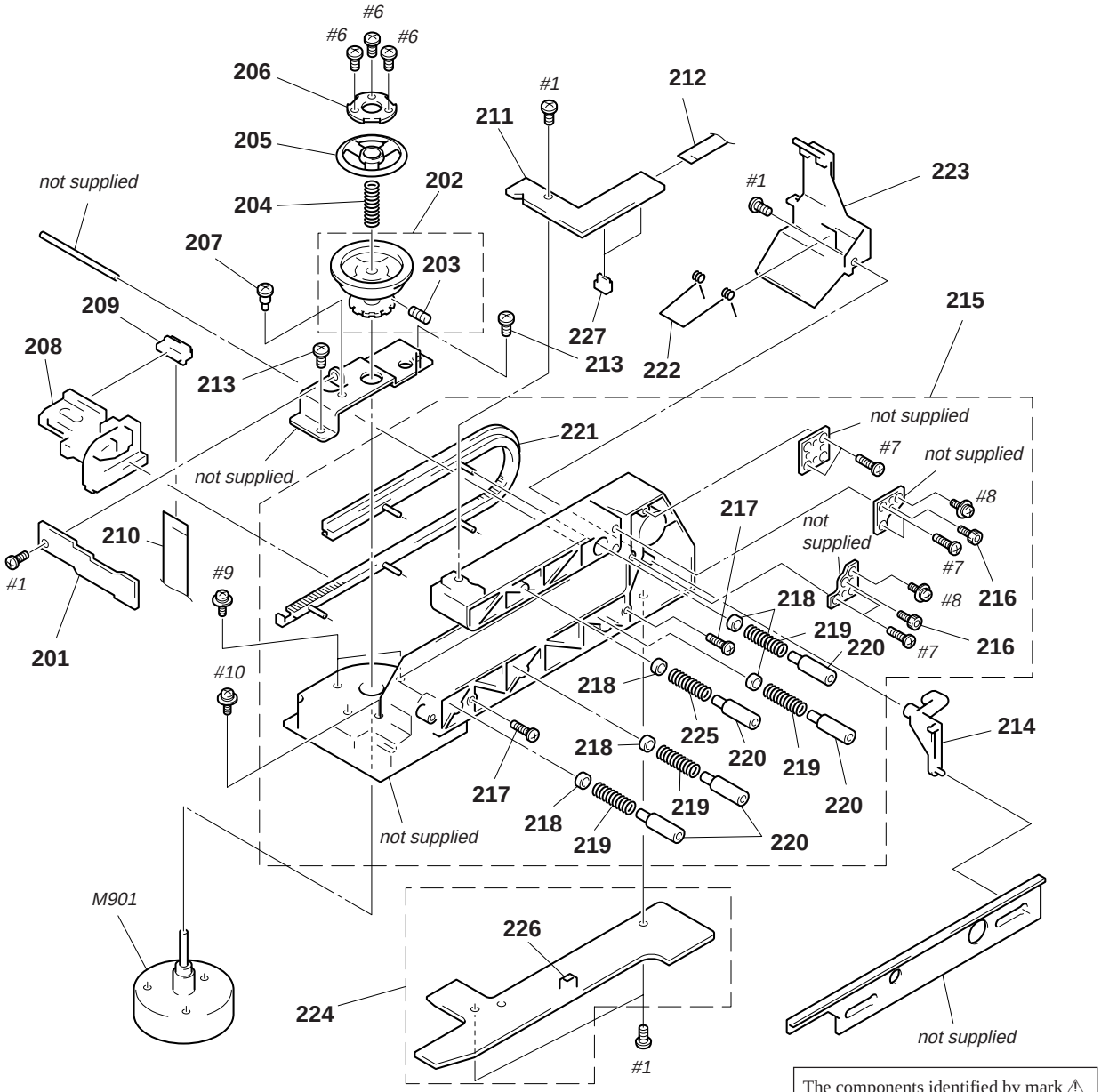
5-1-4. FRAME (L, R) SECTION



Ref. No.	Part No.	Description	Remark
151	3-968-302-01	ARM (R), DOOR	
152	3-968-283-01	SPRING, TENSION	
153	3-968-301-01	SLIDER (R), DOOR	
* 154	X-3946-042-1	GUIDE (R) ASSY, TRAY	
155	3-968-280-01	SLIDER (L), DOOR	
156	3-325-697-01	WASHER	
157	3-968-281-04	ARM (L), DOOR	
158	3-701-441-21	WASHER	
* 159	X-3946-043-4	FRAME (L) ASSY	
160	3-976-951-01	SLIDER (LS)	
* 161	X-3946-044-1	GUIDE (L) ASSY, TRAY	
* 162	1-660-680-11	MT-59 BOARD	
* 163	1-660-679-11	SW-278 BOARD	
164	3-968-305-01	SLIDER, TILT	
165	3-968-298-01	FRAME (R)	
166	3-968-308-01	GEAR (B), MIDWAY	
167	3-968-307-01	GEAR (A), MIDWAY	

Ref. No.	Part No.	Description	Remark
168	3-669-480-11	+ PTPWH 2	
169	3-968-311-01	PULLEY	
170	3-968-309-01	BELT	
171	3-941-733-01	SCREW (M3X2)	
172	3-570-118-00	CUSHION, MOTOR	
173	3-969-353-01	SCREW, GUIDE CLAMP	
174	3-968-310-01	GEAR, CONTROL	
175	3-970-142-01	SCREW (3X20) (TYPE 2), +PTPWH	
176	3-976-950-01	SLIDER (RS)	
* 177	X-3946-306-1	DISK (L) ASSY, DOOR	
178	X-3946-305-1	DISK (R) ASSY, DOOR	
179	3-533-073-01	WASHER	
180	3-972-273-01	WASHER, DOOR	
181	3-979-120-01	SPRING, TENSION	
182	3-712-786-41	DAMPER, OIL	
183	3-701-441-11	WASHER	
M401	X-3946-431-1	MOTOR ASSY, LOADING (LOADING/TILT)	

5-1-5. MECHANISM DECK SECTION



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 201	1-660-678-11	FG-42 BOARD	
202	X-3942-779-1	TURNTABLE ASSY	
203	3-701-507-00	SET SCREW, DOUBLE POINT,(M3X5)	
204	3-953-289-01	SPRING (3), COMPRESSION	
205	3-965-602-01	GUIDE, CENTER	
206	3-953-293-01	PLATE (C), YOKE	
207	3-968-279-01	SCREW, TRAY GUIDE	
⚠208	8-848-286-11	OPTICAL PICK-UP BLOCK KHS-150A(S)	
209	3-953-268-01	HOLDER (18P), FLEXIBLE	
210	1-777-011-11	CABLE, FLEXIBLE FLAT (18 CORE)	
* 211	1-660-681-11	IB-10 BOARD	
212	1-777-008-11	CABLE, FLAT (4 CORE)	
213	3-970-608-11	SUMITITE (B3), +BV	
* 214	3-968-290-01	ARM, TILT DRIVING	
215	A-6403-023-A	BASE (96) ASSY, FEED	

Ref. No.	Part No.	Description	Remark
216	3-899-249-01	BOLT, HEXAGON SOCKET	
217	3-968-297-01	SCREW, TILT	
218	3-953-830-01	WASHER, U	
219	3-953-267-01	SPRING, COMPRESSION	
220	3-953-255-03	HOLDER, U	
221	3-968-295-01	GUIDE (96), U	
222	3-968-287-01	SPRING, FLEXIBLE RETAINER	
223	3-968-288-01	STAND, FLEXIBLE	
* 224	A-6423-384-A	MD-67 BOARD, COMPLETE	
225	3-969-350-01	SPRING, COMPRESSION	
* 226	3-968-252-01	HOLDER, LED	
* 227	3-968-253-01	HOLDER, PD	
M901	1-698-109-11	MOTOR, DD (SPINDLE)	

5-2. ELECTRICAL PARTS LIST

Note:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: µ , for example:
  uA...: µ A..., uPA...: µ PA..., uPB...: µ PB..., uPC...: µ PC..., uPD...: µ PD...
- CAPACITORS
  uF : µ F
- COILS
  uH : µ H
- Abbreviation
  CH : Chinese model

Ref. No.	Part No.	Description			Remark
*	1-660-678-11	FG-42 BOARD (Ref. No. 5,000 Series) **********			
		< CAPACITOR >			
C201	1-163-035-00	CERAMIC CHIP	0.047uF		50V
		< CONNECTOR >			
CN201	1-774-714-11	CONNECTOR, BOARD TO BOARD 4P			
		< PHOTO INTERUPTER >			
PH201	8-749-012-33	PHOTO INTERRUPTER GP1S94			
		< TRANSISTOR >			
Q201	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R			
		< RESISTOR >			
R201	1-216-045-00	METAL CHIP	680	5%	1/10W
R202	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R203	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R204	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R205	1-216-049-91	METAL GLAZE	1K	5%	1/10W
**********					
*	A-6423-464-A	FP-1151 BOARD, COMPLETE ********** (Ref. No. 4,000 Series)			
*	3-971-189-01	HOLDER, FL			
		< CAPACITOR >			
C101	1-104-664-11	ELECT	47uF	20%	10V
C102	1-164-344-11	CERAMIC CHIP	0.068MF	10%	25V
C103	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C104	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C105	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C108	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C109	1-104-664-11	ELECT	47uF	20%	10V
C110	1-128-551-11	ELECT	22uF	20%	35V
C111	1-104-666-11	ELECT	220uF	20%	10V
C112	1-104-666-11	ELECT	220uF	20%	10V
C113	1-126-096-11	ELECT	10uF	20%	35V
C114	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C115	1-126-163-11	ELECT	4.7uF	20%	50V
C116	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C117	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C118	1-163-031-11	CERAMIC CHIP	0.01uF		50V
		< CONNECTOR >			
CN101	1-770-516-31	CONNECTOR, FFC/FPC 8P			
CN102	1-691-645-11	SOCKET, CONNECTOR 9P			
CN103	1-770-889-11	SOCKET, CONNECTOR 8P			
		< DIODE >			
D102	8-719-105-73	DIODE RD4.7M-B2			
D103	8-719-048-98	DIODE RB160L-40TE25			
D104	8-719-056-98	DIODE UDZ-TE-17-30B			
D105	8-719-048-98	DIODE RB160L-40TE25			
D106	8-719-048-98	DIODE RB160L-40TE25			
		< IC >			
IC101	8-759-434-20	IC PST572DML			
IC102	8-759-464-27	IC HD6433712C40H			
		< COIL >			
L101	1-410-072-21	INDUCTOR 820uH			
L102	1-408-970-21	INDUCTOR 10uH			
		< FLUORECENT INDICATOR >			
ND101	1-517-471-11	INDICATOR TUBE, FLUORESCENT			
		< TRANSISTOR >			
Q103	8-729-140-97	TRANSISTOR 2SB734-34			
Q104	8-729-216-22	TRANSISTOR 2SA1162-G			
		< RESISTOR >			
R101	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R102	1-216-085-00	METAL CHIP	33K	5%	1/10W
R103	1-216-073-00	METAL CHIP	10K	5%	1/10W
R104	1-216-073-00	METAL CHIP	10K	5%	1/10W
R107	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R108	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R109	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R110	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R111	1-216-077-00	METAL CHIP	15K	5%	1/10W
R112	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R113	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R114	1-216-049-91	METAL GLAZE	1K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R115	1-216-113-00	METAL CHIP	470K	5%	1/10W
R116	1-216-073-00	METAL CHIP	10K	5%	1/10W
R117	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R118	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R120	1-216-075-00	METAL CHIP	12K	5%	1/10W
R121	1-216-075-00	METAL CHIP	12K	5%	1/10W
R123	1-216-025-91	METAL GLAZE	100	5%	1/10W
R124	1-216-025-91	METAL GLAZE	100	5%	1/10W
R125	1-216-075-00	METAL CHIP	12K	5%	1/10W
R129	1-216-073-00	METAL CHIP	10K	5%	1/10W
R130	1-216-063-91	METAL GLAZE	3.9K	5%	1/10W
R131	1-216-033-00	METAL CHIP	220	5%	1/10W
R132	1-216-033-00	METAL CHIP	220	5%	1/10W
R133	1-216-033-00	METAL CHIP	220	5%	1/10W
R134	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R135	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R136	1-216-033-00	METAL CHIP	220	5%	1/10W
R137	1-216-033-00	METAL CHIP	220	5%	1/10W
R138	1-216-081-00	METAL CHIP	22K	5%	1/10W
R139	1-216-063-91	METAL GLAZE	3.9K	5%	1/10W
R140	1-216-009-00	METAL CHIP	22	5%	1/10W
R141	1-216-073-00	METAL CHIP	10K	5%	1/10W
R142	1-216-073-00	METAL CHIP	10K	5%	1/10W
R143	1-216-073-00	METAL CHIP	10K	5%	1/10W
R144	1-216-073-00	METAL CHIP	10K	5%	1/10W
R147	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R151	1-216-033-00	METAL CHIP	220	5%	1/10W
R152	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R153	1-216-063-91	METAL GLAZE	3.9K	5%	1/10W
R154	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R157	1-216-093-00	METAL CHIP	68K	5%	1/10W
		< SWITCH >			
S101	1-572-199-11	SWITCH, KEYBOARD (1)			
S102	1-572-199-11	SWITCH, KEYBOARD (6)			
S103	1-572-199-11	SWITCH, KEYBOARD (7)			
S104	1-572-199-11	SWITCH, KEYBOARD (5)			
S105	1-572-199-11	SWITCH, KEYBOARD (8)			
S106	1-572-199-11	SWITCH, KEYBOARD (4)			
S107	1-572-199-11	SWITCH, KEYBOARD (9)			
S108	1-572-199-11	SWITCH, KEYBOARD (3)			
S109	1-572-199-11	SWITCH, KEYBOARD (10/0)			
S110	1-572-199-11	SWITCH, KEYBOARD (2)			
S111	1-572-199-11	SWITCH, KEYBOARD (<10)			
		< TRANSFORMER >			
⚠T101	1-431-420-11	TRANSFORMER, DC CONVERTER			
		< VIBRATOR >			
X101	1-579-952-21	VIBRATOR, CERAMIC (8MHz)			

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Ref. No.	Part No.	Description			Remark
*	1-660-681-11	IB-10 BOARD (Ref. No. 5,000 Series)			
		**********			
*	3-968-253-01	HOLDER, PD			
		< CAPACITOR >			
C101	1-163-035-00	CERAMIC CHIP	0.047uF		50V
		< CONNECTOR >			
CN101	1-568-847-11	PIN, CONNECTOR (PC BOARD) 4P			
		< PHOTO INTERUPTER >			
PH101	8-749-012-33	PHOTO INTERRUPTER GP1S94			
		< TRANSISTOR >			
Q101	8-729-904-10	PHOTO TRANSISTOR PT-360FS			
Q102	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
Q103	8-729-120-28	TRANSISTOR 2SC1623-L5L6			
Q104	8-729-904-10	PHOTO TRANSISTOR PT-360FS			
		< RESISTOR >			
R101	1-216-045-00	METAL CHIP	680	5%	1/10W
R102	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R103	1-216-099-00	METAL CHIP	120K	5%	1/10W
R104	1-216-077-00	METAL CHIP	15K	5%	1/10W
R105	1-216-073-00	METAL CHIP	10K	5%	1/10W
R106	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R107	1-216-075-00	METAL CHIP	12K	5%	1/10W
R108	1-216-057-00	METAL CHIP	2.2K	5%	1/10W

****

*	A-6423-467-A	MB-97 BOARD, COMPLETE			
		**********			
					(Ref. No. 1,000 Series)
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3			
		< CAPACITOR >			
C001	1-163-134-00	CERAMIC CHIP	510PF	5%	50V
C002	1-163-134-00	CERAMIC CHIP	510PF	5%	50V
C003	1-163-134-00	CERAMIC CHIP	510PF	5%	50V
C004	1-163-134-00	CERAMIC CHIP	510PF	5%	50V
C005	1-126-963-11	ELECT	4.7uF	20%	50V
C006	1-126-963-11	ELECT	4.7uF	20%	50V
C098	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C099	1-163-224-11	CERAMIC CHIP	7PF	0.25PF	50V
C101	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C102	1-124-589-11	ELECT	47uF	20%	16V
C103	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C104	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C105	1-124-589-11	ELECT	47uF	20%	16V
C107	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C108	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C109	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C110	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C111	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C112	1-163-259-91	CERAMIC CHIP	220PF	5%	50V

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

MB-97

Ref. No.	Part No.	Description			Remark
C113	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C114	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C115	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C116	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C117	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C119	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C120	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C121	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C122	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C123	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C124	1-124-290-00	ELECT	47uF	20%	10V
C125	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C126	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C127	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C128	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C129	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C130	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C132	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C133	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C134	1-124-589-11	ELECT	47uF	20%	16V
C135	1-124-589-11	ELECT	47uF	20%	16V
C136	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C138	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C139	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C140	1-124-261-00	ELECT	10uF	20%	50V
C141	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C142	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C143	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C144	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C151	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C152	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C153	1-124-589-11	ELECT	47uF	20%	16V
C155	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C156	1-124-589-11	ELECT	47uF	20%	16V
C159	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C160	1-163-224-11	CERAMIC CHIP	7PF	0.25PF	50V
C161	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C162	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C163	1-126-177-11	ELECT	100uF	20%	10V
C164	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C165	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C166	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C167	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C168	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C169	1-126-160-11	ELECT	1uF	20%	50V
C170	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C171	1-104-664-11	ELECT	47uF	20%	10V
C172	1-104-664-11	ELECT	47uF	20%	10V
C173	1-124-589-11	ELECT	47uF	20%	16V
C174	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C175	1-104-664-11	ELECT	47uF	20%	10V
C176	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C177	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C178	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C179	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C180	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V

Ref. No.	Part No.	Description			Remark
C181	1-124-584-00	ELECT	100uF	20%	10V
C201	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C202	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C205	1-104-664-11	ELECT	47uF	20%	10V
C206	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C207	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C208	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C209	1-126-177-11	ELECT	100uF	20%	10V
C210	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C212	1-124-907-11	ELECT	10uF	20%	50V
C213	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C214	1-164-346-11	CERAMIC CHIP	1uF		16V
C215	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C217	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C218	1-124-907-11	ELECT	10uF	20%	50V
C219	1-104-664-11	ELECT	47uF	20%	10V
C221	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C222	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C224	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C226	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C227	1-126-177-11	ELECT	100uF	20%	10V
C228	1-124-261-00	ELECT	10uF	20%	50V
C229	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C230	1-124-290-00	ELECT	47uF	20%	10V
C231	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C232	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C233	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C234	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C236	1-104-664-11	ELECT	47uF	20%	10V
C250	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C251	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C254	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C300	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C301	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C302	1-124-589-11	ELECT	47uF	20%	16V
C303	1-126-177-11	ELECT	100uF	20%	10V
C304	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C305	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C306	1-124-589-11	ELECT	47uF	20%	16V
C307	1-163-134-00	CERAMIC CHIP	510PF	5%	50V
C308	1-163-122-00	CERAMIC CHIP	160PF	5%	50V
C309	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C310	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C311	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C314	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C315	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C316	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C317	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C318	1-163-108-00	CERAMIC CHIP	43PF	5%	50V
C320	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C321	1-124-589-11	ELECT	47uF	20%	16V
C322	1-126-177-11	ELECT	100uF	20%	10V
C323	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C324	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C325	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C326	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C327	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V

Ref. No.	Part No.	Description			Remark
C328	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C329	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C330	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C331	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C332	1-124-589-11	ELECT	47uF	20%	16V
C333	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C334	1-124-902-00	ELECT	0.47uF	20%	50V
C335	1-124-907-11	ELECT	10uF	20%	50V
C351	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C352	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C353	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C356	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C357	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C358	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C359	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C360	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C361	1-163-024-00	CERAMIC CHIP	0.018uF	10%	50V
C362	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C363	1-124-589-11	ELECT	47uF	20%	16V
C364	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C365	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C366	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C367	1-216-295-91	CONDUCTOR, CHIP (2012)			
C368	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C370	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C381	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C382	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C383	1-104-664-11	ELECT	47uF	20%	10V
C384	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C385	1-164-346-11	CERAMIC CHIP	1uF		16V
C386	1-107-714-11	ELECT	10uF	20%	16V
C387	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C400	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C403	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C404	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C406	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C411	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C417	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C418	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C419	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C420	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C421	1-104-664-11	ELECT	47uF	20%	10V
C422	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C451	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C452	1-104-664-11	ELECT	47uF	20%	10V
C454	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C455	1-104-664-11	ELECT	47uF	20%	10V
C456	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C457	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C458	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C459	1-104-664-11	ELECT	47uF	20%	10V
C460	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C461	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C462	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C463	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C464	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C465	1-104-664-11	ELECT	47uF	20%	10V
C466	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C467	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C468	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C469	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C470	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C471	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C472	1-104-664-11	ELECT	47uF	20%	10V
C473	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C475	1-126-963-11	ELECT	4.7uF	20%	50V
C476	1-126-963-11	ELECT	4.7uF	20%	50V
C477	1-126-963-11	ELECT	4.7uF	20%	50V
C478	1-126-963-11	ELECT	4.7uF	20%	50V
C479	1-104-664-11	ELECT	47uF	20%	10V
C480	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C481	1-104-664-11	ELECT	47uF	20%	10V
C482	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C484	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C501	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C504	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C505	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C506	1-124-290-00	ELECT	47uF	20%	10V
C507	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C508	1-126-151-11	ELECT, NONPOLAR	4.7uF	20%	16V
C509	1-163-245-11	CERAMIC CHIP	56PF	5%	50V
C510	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C511	1-126-163-11	ELECT	4.7uF	20%	50V
C512	1-124-589-11	ELECT	47uF	20%	16V
C513	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
C514	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C515	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C516	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C517	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C518	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C519	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C520	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C521	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C701	1-104-664-11	ELECT	47uF	20%	10V
C702	1-104-664-11	ELECT	47uF	20%	10V
C703	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C704	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C705	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C706	1-104-664-11	ELECT	47uF	20%	25V
C707	1-104-664-11	ELECT	47uF	20%	25V
C708	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C709	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C710	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C711	1-107-712-11	ELECT	3.3uF	20%	50V
C712	1-107-714-11	ELECT	10uF	20%	16V
C713	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C714	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C715	1-124-903-11	ELECT	1uF	20%	50V
C717	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C718	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C719	1-109-889-11	ELECT	1uF	20%	50V
C720	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C721	1-163-024-00	CERAMIC CHIP	0.018uF	10%	50V

MB-97

Ref. No.	Part No.	Description			Remark
C722	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C723	1-107-715-11	ELECT	22uF	20%	16V
C724	1-109-953-11	ELECT	2.2uF	20%	50V
C725	1-109-953-11	ELECT	2.2uF	20%	50V
C726	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C727	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V
C728	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V
C729	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C731	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C733	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C734	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C735	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C736	1-163-022-00	CERAMIC CHIP	0.012uF	10%	50V
C737	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C738	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C739	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C740	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C741	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C742	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C743	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C744	1-104-664-11	ELECT	47uF	20%	25V
C745	1-104-664-11	ELECT	47uF	20%	25V
C747	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C752	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C980	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C981	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
C982	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C983	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C984	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C985	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
		< CONNECTOR >			
* CN101	1-695-343-41	PIN, CONNECTOR (PC BOARD) 20P			
CN415	1-770-408-11	CONNECTOR, BOARD TO BOARD 14P			
CN416	1-770-407-11	CONNECTOR, BOARD TO BOARD 12P			
CN503	1-695-336-11	PIN, CONNECTOR (PC BOARD) 13P			
* CN701	1-764-594-21	CONNECTOR, FPC 18P			
CN702	1-766-231-11	HOUSING,CONNECTOR(PC BOARD)14P			
		< TRIMMER >			
CT151	1-141-227-00	CAP, TRIMMER 20PF			
		< DIODE >			
D301	8-719-988-62	DIODE 1SS355			
D302	8-719-914-43	DIODE DAN202K			
D450	8-719-032-80	DIODE KV1430-TL			
D504	8-719-988-62	DIODE 1SS355			
D505	8-719-988-62	DIODE 1SS355			
D508	8-719-914-44	DIODE DAP202K			
D511	8-719-988-62	DIODE 1SS355			
D513	8-719-914-42	DIODE DA204K			
D514	8-719-064-79	DIODE PTZTE25-4.7B			
D701	8-719-914-44	DIODE DAP202K			
D702	8-719-914-43	DIODE DAN202K			
D703	8-719-988-62	DIODE 1SS355			
D704	8-719-056-78	DIODE UDZ-TE-17-4.3B			
D705	8-719-914-42	DIODE DA204K			
D712	8-719-914-43	DIODE DAN202K			

Ref. No.	Part No.	Description	Remark
		< FERRITE BEAD >	
FB415	1-216-295-91	CONDUCTOR, CHIP (2012)	
FB416	1-216-295-91	CONDUCTOR, CHIP (2012)	
		< FILTER >	
FL151	1-577-543-11	FILTER, CERAMIC	
FL152	1-577-543-11	FILTER, CERAMIC	
		< IC >	
IC101	8-759-382-15	IC LA7133	
IC151	8-759-290-65	IC MN8811	
IC202	8-759-295-66	IC BA7653AF-E2	
IC203	8-759-710-62	IC NJM2246M	
IC204	8-759-382-12	IC LC74781M9135-TLM	
IC301	8-759-253-26	IC CA0002AM-TP	
IC381	8-759-100-96	IC uPC4558G2	
IC401	8-752-351-78	IC CXD2500BQ	
IC416	8-749-921-12	IC GP1F32T (DIGITAL OUT OPTICAL)	
IC450	8-759-382-13	IC SM5876AM-E2	
IC451	8-759-100-96	IC uPC4558G2	
IC453	8-759-385-17	IC NJM4580E(TE2)	
IC501	8-759-444-96	IC MB89094PF-G-154-BND	
IC502	8-759-385-58	IC LC21011B-X78	
IC503	8-759-009-06	IC MC14052BF	
IC504	8-759-058-50	IC XRA10324AF	
IC505	8-759-300-71	IC HD14053BFP	
IC701	8-759-280-89	IC HA11529F	
IC702	8-759-100-96	IC uPC4558G2	
IC703	8-759-822-38	IC LA6510	
IC704	8-759-300-71	IC HD14053BFP	
IC705	8-759-100-96	IC uPC4558G2	
IC706	8-759-100-96	IC uPC4558G2	
IC707	8-759-100-96	IC uPC4558G2	
		< JACK >	
J001	1-774-946-11	JACK, PIN 6P (LINE OUT, AUDIO, VIDEO)	
J002	1-774-785-11	JACK, PIN 1P (DIGITAL RF OUT (AC-3))	
		< COIL >	
L101	1-410-526-11	INDUCTOR 10uH	
L102	1-410-526-11	INDUCTOR 10uH	
L103	1-412-503-11	INDUCTOR 22uH	
L104	1-410-527-11	INDUCTOR 100uH	
L105	1-412-503-11	INDUCTOR 22uH	
L106	1-410-526-11	INDUCTOR 10uH	
L107	1-414-404-11	INDUCTOR 100uH	
L108	1-410-526-11	INDUCTOR 10uH	
L109	1-412-506-11	INDUCTOR 39uH	
L110	1-412-503-11	INDUCTOR 22uH	
L111	1-412-506-11	INDUCTOR 39uH	
L112	1-408-096-00	INDUCTOR 470uH	
L113	1-412-507-11	INDUCTOR 47uH	
L114	1-414-404-11	INDUCTOR 100uH	
L152	1-412-504-11	INDUCTOR 27uH	
L153	1-412-504-11	INDUCTOR 27uH	
L154	1-410-526-11	INDUCTOR 10uH	

Ref. No.	Part No.	Description		Remark
L201	1-412-500-11	INDUCTOR	12uH	
L206	1-412-505-11	INDUCTOR	33uH	
L301	1-412-507-11	INDUCTOR	47uH	
L304	1-412-503-11	INDUCTOR	22uH	
L305	1-410-527-11	INDUCTOR	100uH	
L351	1-412-511-11	INDUCTOR	120uH	
L352	1-412-511-11	INDUCTOR	120uH	
L415	1-410-526-11	INDUCTOR	10uH	
L450	1-410-526-11	INDUCTOR	10uH	
L451	1-410-526-11	INDUCTOR	10uH	
L503	1-410-526-11	INDUCTOR	10uH	
L504	1-410-526-11	INDUCTOR	10uH	
L701	1-410-526-11	INDUCTOR	10uH	
L702	1-410-526-11	INDUCTOR	10uH	
L980	1-412-507-11	INDUCTOR	47uH	
L981	1-412-507-11	INDUCTOR	47uH	
L982	1-412-507-11	INDUCTOR	47uH	
L983	1-412-507-11	INDUCTOR	47uH	
		< TRANSISTOR >		
Q003	8-729-023-22	TRANSISTOR	2SD2114K	
Q004	8-729-023-22	TRANSISTOR	2SD2114K	
Q101	8-729-900-53	TRANSISTOR	DTC114EK	
Q102	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q103	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q104	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q105	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q151	8-729-900-53	TRANSISTOR	DTC114EK	
Q152	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q153	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q201	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q202	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q205	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q206	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q207	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q208	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q209	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q211	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q215	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q302	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q303	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q304	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q305	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q307	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q308	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q351	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q352	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q353	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q354	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q355	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q356	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q357	8-729-900-53	TRANSISTOR	DTC114EK	
Q358	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q359	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q360	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q361	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q381	8-729-120-28	TRANSISTOR	2SC1623-L5L6	

Ref. No.	Part No.	Description		Remark
Q382	8-729-900-53	TRANSISTOR	DTC114EK	
Q383	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q401	8-729-900-53	TRANSISTOR	DTC114EK	
Q503	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q511	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q512	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q513	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q514	8-729-023-22	TRANSISTOR	2SD2114K	
Q515	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q703	8-729-900-53	TRANSISTOR	DTC114EK	
Q704	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q705	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q706	8-729-931-15	TRANSISTOR	2SD1858-R-TV2	
Q707	8-729-931-15	TRANSISTOR	2SD1858-R-TV2	
Q708	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	
Q709	8-729-024-95	TRANSISTOR	2SB1565EF	
Q710	8-729-019-01	TRANSISTOR	2SD2394-EF	
Q711	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q712	8-729-024-95	TRANSISTOR	2SB1565EF	
Q713	8-729-019-01	TRANSISTOR	2SD2394-EF	
Q714	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q715	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
		< RESISTOR >		
R001	1-216-041-00	METAL CHIP	470 5% 1/10W	
R002	1-216-041-00	METAL CHIP	470 5% 1/10W	
R007	1-216-073-00	METAL CHIP	10K 5% 1/10W	
R008	1-216-073-00	METAL CHIP	10K 5% 1/10W	
R009	1-216-105-91	METAL GLAZE	220K 5% 1/10W	
R010	1-216-105-91	METAL GLAZE	220K 5% 1/10W	
R011	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R012	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R013	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R014	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R021	1-216-022-00	METAL CHIP	75 5% 1/10W	
R022	1-216-097-91	METAL GLAZE	100K 5% 1/10W	
R101	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R102	1-216-053-00	METAL CHIP	1.5K 5% 1/10W	
R103	1-216-045-00	METAL CHIP	680 5% 1/10W	
R104	1-216-025-91	METAL GLAZE	100 5% 1/10W	
R105	1-216-037-00	METAL CHIP	330 5% 1/10W	
R106	1-216-057-00	METAL CHIP	2.2K 5% 1/10W	
R107	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R108	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	
R109	1-216-017-91	METAL GLAZE	47 5% 1/10W	
R110	1-216-077-00	METAL CHIP	15K 5% 1/10W	
R111	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R112	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R113	1-216-017-91	METAL GLAZE	47 5% 1/10W	
R114	1-216-051-00	METAL CHIP	1.2K 5% 1/10W	
R115	1-216-055-00	METAL CHIP	1.8K 5% 1/10W	
R116	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R117	1-216-045-00	METAL CHIP	680 5% 1/10W	
R118	1-216-049-91	METAL GLAZE	1K 5% 1/10W	
R119	1-216-067-00	METAL CHIP	5.6K 5% 1/10W	
R120	1-216-067-00	METAL CHIP	5.6K 5% 1/10W	
R121	1-216-069-00	METAL CHIP	6.8K 5% 1/10W	
R122	1-216-073-00	METAL CHIP	10K 5% 1/10W	

MB-97

Ref. No.	Part No.	Description			Remark
R151	1-216-033-00	METAL CHIP	220	5%	1/10W
R152	1-216-047-91	METAL GLAZE	820	5%	1/10W
R154	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R155	1-216-017-91	METAL GLAZE	47	5%	1/10W
R156	1-216-295-91	CONDUCTOR, CHIP (2012)			
R157	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R158	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R159	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R160	1-216-043-91	METAL GLAZE	560	5%	1/10W
R161	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R162	1-216-027-00	METAL CHIP	120	5%	1/10W
R164	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R165	1-216-037-00	METAL CHIP	330	5%	1/10W
R166	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R167	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R168	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R169	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R170	1-216-037-00	METAL CHIP	330	5%	1/10W
R171	1-216-073-00	METAL CHIP	10K	5%	1/10W
R172	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R173	1-216-033-00	METAL CHIP	220	5%	1/10W
R200	1-216-295-91	CONDUCTOR, CHIP (2012)			
R201	1-216-033-00	METAL CHIP	220	5%	1/10W
R202	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R203	1-216-033-00	METAL CHIP	220	5%	1/10W
R206	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R208	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R210	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R211	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R213	1-216-029-00	METAL CHIP	150	5%	1/10W
R215	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R216	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R217	1-216-025-91	METAL GLAZE	100	5%	1/10W
R218	1-216-073-00	METAL CHIP	10K	5%	1/10W
R219	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R221	1-216-025-91	METAL GLAZE	100	5%	1/10W
R222	1-216-025-91	METAL GLAZE	100	5%	1/10W
R223	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R224	1-216-045-00	METAL CHIP	680	5%	1/10W
R225	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R226	1-216-041-00	METAL CHIP	470	5%	1/10W
R227	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R228	1-216-021-00	METAL CHIP	68	5%	1/10W
R229	1-216-041-00	METAL CHIP	470	5%	1/10W
R230	1-216-041-00	METAL CHIP	470	5%	1/10W
R231	1-216-041-00	METAL CHIP	470	5%	1/10W
R232	1-216-021-00	METAL CHIP	68	5%	1/10W
R234	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R238	1-216-295-91	CONDUCTOR, CHIP (2012)			
R241	1-216-295-91	CONDUCTOR, CHIP (2012)			
R242	1-216-295-91	CONDUCTOR, CHIP (2012)			
R243	1-216-295-91	CONDUCTOR, CHIP (2012)			
R245	1-216-025-91	METAL GLAZE	100	5%	1/10W
R256	1-216-295-91	CONDUCTOR, CHIP (2012)			
R300	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R301	1-216-041-00	METAL CHIP	470	5%	1/10W
R303	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R304	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R306	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R307	1-216-041-00	METAL CHIP	470	5%	1/10W
R308	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R309	1-216-021-00	METAL CHIP	68	5%	1/10W
R310	1-216-295-91	CONDUCTOR, CHIP (2012)			
R311	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R312	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R313	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R314	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R315	1-216-077-00	METAL CHIP	15K	5%	1/10W
R316	1-216-077-00	METAL CHIP	15K	5%	1/10W
R317	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R318	1-216-093-00	METAL CHIP	68K	5%	1/10W
R319	1-216-093-00	METAL CHIP	68K	5%	1/10W
R320	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R321	1-216-101-00	METAL CHIP	150K	5%	1/10W
R322	1-216-101-00	METAL CHIP	150K	5%	1/10W
R323	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R324	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R325	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R326	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R349	1-216-295-91	CONDUCTOR, CHIP (2012)			
R351	1-216-045-00	METAL CHIP	680	5%	1/10W
R352	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R353	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R354	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R355	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R356	1-216-041-00	METAL CHIP	470	5%	1/10W
R358	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R359	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R360	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R361	1-216-295-91	CONDUCTOR, CHIP (2012)			
R362	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R363	1-216-295-91	CONDUCTOR, CHIP (2012)			
R364	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R365	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R366	1-216-047-91	METAL GLAZE	820	5%	1/10W
R367	1-216-077-00	METAL CHIP	15K	5%	1/10W
R368	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R369	1-216-037-00	METAL CHIP	330	5%	1/10W
R370	1-216-025-91	METAL GLAZE	100	5%	1/10W
R371	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R372	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R373	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R374	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R375	1-216-037-00	METAL CHIP	330	5%	1/10W
R376	1-216-025-91	METAL GLAZE	100	5%	1/10W
R377	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R378	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R379	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R381	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R382	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R383	1-216-025-91	METAL GLAZE	100	5%	1/10W
R384	1-216-017-91	METAL GLAZE	47	5%	1/10W
R385	1-208-830-11	METAL GLAZE	100K	0.50%	1/10W

Ref. No.	Part No.	Description			Remark
R386	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W
R387	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W
R388	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R389	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R390	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R391	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R392	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R393	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R394	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R395	1-208-829-11	METAL GLAZE	91K	0.50%	1/10W
R396	1-208-838-11	METAL GLAZE	220K	0.50%	1/10W
R397	1-208-837-11	METAL GLAZE	200K	0.50%	1/10W
R398	1-208-830-11	METAL GLAZE	100K	0.50%	1/10W
R399	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R402	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R403	1-216-073-00	METAL CHIP	10K	5%	1/10W
R404	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R405	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R406	1-216-295-91	CONDUCTOR, CHIP (2012)			
R411	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R412	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R415	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R418	1-216-037-00	METAL CHIP	330	5%	1/10W
R419	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R420	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R421	1-216-074-00	METAL CHIP	11K	5%	1/10W
R424	1-216-025-91	METAL GLAZE	100	5%	1/10W
R425	1-216-025-91	METAL GLAZE	100	5%	1/10W
R426	1-216-025-91	METAL GLAZE	100	5%	1/10W
R436	1-216-025-91	METAL GLAZE	100	5%	1/10W
R446	1-216-025-91	METAL GLAZE	100	5%	1/10W
R447	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R450	1-216-295-91	CONDUCTOR, CHIP (2012)			
R451	1-216-073-00	METAL CHIP	10K	5%	1/10W
R452	1-216-073-00	METAL CHIP	10K	5%	1/10W
R454	1-216-295-91	CONDUCTOR, CHIP (2012)			
R455	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R456	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R457	1-216-081-00	METAL CHIP	22K	5%	1/10W
R458	1-216-073-00	METAL CHIP	10K	5%	1/10W
R459	1-216-081-00	METAL CHIP	22K	5%	1/10W
R460	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R461	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R462	1-216-081-00	METAL CHIP	22K	5%	1/10W
R463	1-216-073-00	METAL CHIP	10K	5%	1/10W
R465	1-216-081-00	METAL CHIP	22K	5%	1/10W
R466	1-216-085-00	METAL CHIP	33K	5%	1/10W
R467	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R468	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R469	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R472	1-216-075-00	METAL CHIP	12K	5%	1/10W
R475	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R477	1-216-295-91	CONDUCTOR, CHIP (2012)			
R479	1-216-295-91	CONDUCTOR, CHIP (2012)			
R480	1-216-079-00	METAL CHIP	18K	5%	1/10W
R481	1-216-081-00	METAL CHIP	22K	5%	1/10W
R482	1-216-079-00	METAL CHIP	18K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R483	1-216-081-00	METAL CHIP	22K	5%	1/10W
R486	1-216-081-00	METAL CHIP	22K	5%	1/10W
R488	1-216-081-00	METAL CHIP	22K	5%	1/10W
R503	1-216-033-00	METAL CHIP	220	5%	1/10W
R507	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R508	1-216-111-91	METAL GLAZE	390K	5%	1/10W
R509	1-216-081-00	METAL CHIP	22K	5%	1/10W
R510	1-216-085-00	METAL CHIP	33K	5%	1/10W
R511	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R512	1-216-111-91	METAL GLAZE	390K	5%	1/10W
R513	1-216-113-00	METAL CHIP	470K	5%	1/10W
R514	1-216-035-00	METAL CHIP	270	5%	1/10W
R515	1-208-808-11	METAL GLAZE	12K	0.50%	1/10W
R516	1-208-810-11	METAL GLAZE	15K	0.50%	1/10W
R517	1-208-844-11	METAL GLAZE	390K	0.50%	1/10W
R518	1-216-093-00	METAL CHIP	68K	5%	1/10W
R519	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R520	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W
R521	1-208-816-11	METAL GLAZE	27K	0.50%	1/10W
R522	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R523	1-208-838-11	METAL GLAZE	220K	0.50%	1/10W
R524	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R525	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R526	1-216-077-00	METAL CHIP	15K	5%	1/10W
R527	1-208-830-11	METAL GLAZE	100K	0.50%	1/10W
R528	1-208-818-11	METAL GLAZE	33K	0.50%	1/10W
R529	1-208-818-11	METAL GLAZE	33K	0.50%	1/10W
R530	1-216-045-00	METAL CHIP	680	5%	1/10W
R531	1-216-073-00	METAL CHIP	10K	5%	1/10W
R532	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R533	1-216-095-00	METAL CHIP	82K	5%	1/10W
R534	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R535	1-216-073-00	METAL CHIP	10K	5%	1/10W
R536	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R537	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R538	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R539	1-216-073-00	METAL CHIP	10K	5%	1/10W
R540	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R541	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R542	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R545	1-216-073-00	METAL CHIP	10K	5%	1/10W
R546	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R547	1-216-033-00	METAL CHIP	220	5%	1/10W
R548	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R549	1-216-033-00	METAL CHIP	220	5%	1/10W
R550	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R551	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R552	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R553	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R555	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R556	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R557	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R558	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R559	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R560	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R561	1-216-049-91	METAL GLAZE	1K	5%	1/10W

MB-97

Ref. No.	Part No.	Description			Remark
R562	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R563	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R564	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R565	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R566	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R567	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R568	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R569	1-216-085-00	METAL CHIP	33K	5%	1/10W
R570	1-216-037-00	METAL CHIP	330	5%	1/10W
R571	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R572	1-216-073-00	METAL CHIP	10K	5%	1/10W
R573	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R574	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R575	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R576	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R577	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R578	1-216-021-00	METAL CHIP	68	5%	1/10W
R579	1-216-081-00	METAL CHIP	22K	5%	1/10W
R580	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R581	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R582	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R583	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R584	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R585	1-216-117-00	METAL CHIP	680K	5%	1/10W
R586	1-216-085-00	METAL CHIP	33K	5%	1/10W
R587	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R588	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R589	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R591	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R701	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R704	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R705	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R706	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R707	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R708	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R709	1-216-077-00	METAL CHIP	15K	5%	1/10W
R710	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R711	1-216-085-00	METAL CHIP	33K	5%	1/10W
R712	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R713	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R714	1-216-073-00	METAL CHIP	10K	5%	1/10W
R715	1-216-073-00	METAL CHIP	10K	5%	1/10W
R716	1-216-073-00	METAL CHIP	10K	5%	1/10W
R717	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R718	1-216-073-00	METAL CHIP	10K	5%	1/10W
R719	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R720	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R721	1-216-085-00	METAL CHIP	33K	5%	1/10W
R722	1-216-093-00	METAL CHIP	68K	5%	1/10W
R723	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R724	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R725	1-216-077-00	METAL CHIP	15K	5%	1/10W
R726	1-216-075-00	METAL CHIP	12K	5%	1/10W
R727	1-216-085-00	METAL CHIP	33K	5%	1/10W
R728	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R729	1-216-075-00	METAL CHIP	12K	5%	1/10W
R730	1-216-079-00	METAL CHIP	18K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R731	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R732	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R733	1-216-085-00	METAL CHIP	33K	5%	1/10W
R734	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R735	1-216-081-00	METAL CHIP	22K	5%	1/10W
R736	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R737	1-216-107-00	METAL CHIP	270K	5%	1/10W
R738	1-216-073-00	METAL CHIP	10K	5%	1/10W
R739	1-216-073-00	METAL CHIP	10K	5%	1/10W
R740	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R741	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R742	1-216-073-00	METAL CHIP	10K	5%	1/10W
R743	1-216-081-00	METAL CHIP	22K	5%	1/10W
R744	1-216-081-00	METAL CHIP	22K	5%	1/10W
R745	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R746	1-216-085-00	METAL CHIP	33K	5%	1/10W
R747	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R748	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R749	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R750	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R751	1-216-099-00	METAL CHIP	120K	5%	1/10W
R752	1-216-099-00	METAL CHIP	120K	5%	1/10W
R753	1-216-081-00	METAL CHIP	22K	5%	1/10W
R754	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R755	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R756	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R757	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R758	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R759	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R760	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R761	1-216-035-00	METAL CHIP	270	5%	1/10W
R762	1-216-099-00	METAL CHIP	120K	5%	1/10W
R763	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R764	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R765	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R766	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R767	1-216-083-00	METAL CHIP	27K	5%	1/10W
R768	1-216-029-00	METAL CHIP	150	5%	1/10W
R769	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R770	1-216-077-00	METAL CHIP	15K	5%	1/10W
R771	1-216-103-00	METAL CHIP	180K	5%	1/10W
R772	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R773	1-216-083-00	METAL CHIP	27K	5%	1/10W
R774	1-216-085-00	METAL CHIP	33K	5%	1/10W
R775	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R776	1-216-073-00	METAL CHIP	10K	5%	1/10W
R777	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R778	1-216-101-00	METAL CHIP	150K	5%	1/10W
R779	1-216-077-00	METAL CHIP	15K	5%	1/10W
R780	1-216-073-00	METAL CHIP	10K	5%	1/10W
R781	1-216-085-00	METAL CHIP	33K	5%	1/10W
R782	1-216-079-00	METAL CHIP	18K	5%	1/10W
R783	1-216-075-00	METAL CHIP	12K	5%	1/10W
R784	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R785	1-216-093-00	METAL CHIP	68K	5%	1/10W
R786	1-216-101-00	METAL CHIP	150K	5%	1/10W
R787	1-216-075-00	METAL CHIP	12K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R788	1-216-075-00	METAL CHIP	12K	5%	1/10W
R789	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R790	1-216-093-00	METAL CHIP	68K	5%	1/10W
R791	1-216-083-00	METAL CHIP	27K	5%	1/10W
R792	1-216-063-91	METAL GLAZE	3.9K	5%	1/10W
R793	1-216-091-00	METAL CHIP	56K	5%	1/10W
R794	1-216-101-00	METAL CHIP	150K	5%	1/10W
R796	1-216-025-91	METAL GLAZE	100	5%	1/10W
R797	1-216-025-91	METAL GLAZE	100	5%	1/10W
⚠R798	1-216-369-00	METAL OXIDE	1	5%	2W F
R799	1-216-081-00	METAL CHIP	22K	5%	1/10W
R800	1-216-003-11	METAL GLAZE	12	5%	1/10W
R801	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R802	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R803	1-216-113-00	METAL CHIP	470K	5%	1/10W
R804	1-216-081-00	METAL CHIP	22K	5%	1/10W
⚠R805	1-249-387-11	CARBON	3.3	5%	1/4W F
R806	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R807	1-216-017-91	METAL GLAZE	47	5%	1/10W
R808	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R809	1-216-073-00	METAL CHIP	10K	5%	1/10W
R810	1-216-001-00	METAL CHIP	10	5%	1/10W
R811	1-216-001-00	METAL CHIP	10	5%	1/10W
R812	1-216-001-00	METAL CHIP	10	5%	1/10W
R813	1-216-001-00	METAL CHIP	10	5%	1/10W
R814	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R815	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R817	1-216-140-00	METAL GLAZE	3.9	5%	1/8W
R818	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R819	1-216-077-00	METAL CHIP	15K	5%	1/10W
R820	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R821	1-216-111-91	METAL GLAZE	390K	5%	1/10W
R822	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R901	1-216-025-91	METAL GLAZE	100	5%	1/10W
R902	1-216-025-91	METAL GLAZE	100	5%	1/10W
R903	1-216-025-91	METAL GLAZE	100	5%	1/10W
R943	1-216-295-91	CONDUCTOR, CHIP (2012)			
R980	1-216-037-00	METAL CHIP	330	5%	1/10W
R981	1-216-037-00	METAL CHIP	330	5%	1/10W
R982	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
		< VARIABLE RESISTOR >			
RV101	1-223-236-11	RES, ADJ, CARBON 1K			
RV701	1-223-241-11	RES, ADJ, CARBON 47K			
RV702	1-223-241-11	RES, ADJ, CARBON 47K			
		< VIBRATOR >			
X151	1-760-693-21	VIBRATOR, CRYSTAL (28.125MHz)			
X450	1-567-515-11	VIBRATOR, VARIABLE CRYSTAL (16.9344MHz)			

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*	A-6423-384-A	MD-67 BOARD, COMPLETE	
		**********	
			(Ref. No. 5,000 Series)
*	3-968-252-01	HOLDER, LED	

Ref. No.	Part No.	Description			Remark
		< CONNECTOR >			
CN301	1-770-516-31	PIN, CONNECTOR (PC BOARD) 8P			
CN302	1-774-715-11	CONNECTOR, BOARD TO BOARD 4P			
CN303	1-695-336-11	PIN, CONNECTOR (PC BOARD) 13P			
CN304	1-691-036-21	PIN, CONNECTOR (PC BOARD) 4P			
		< DIODE >			
D301	8-719-912-39	DIODE SLR932A (LD SIZE SENSOR)			
		< JUMPER RESISTOR >			
JR300	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR301	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR302	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR303	1-216-295-91	CONDUCTOR, CHIP (2012)			
JR304	1-216-295-91	CONDUCTOR, CHIP (2012)			
JR305	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR306	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR307	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR308	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR309	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR310	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR311	1-216-295-91	CONDUCTOR, CHIP (2012)			
JR312	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR313	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR314	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR315	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR316	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR317	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR318	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR319	1-216-296-91	CONDUCTOR, CHIP (3216)			
		< PHOTO INTERUPTER >			
PH301	8-749-012-33	PHOTO INTERRUPTER GP1S94			
PH302	8-749-012-33	PHOTO INTERRUPTER GP1S94			
		< RESISTOR >			
R301	1-216-039-00	METAL CHIP	390	5%	1/10W
R302	1-216-099-00	METAL CHIP	120K	5%	1/10W
R303	1-216-099-00	METAL CHIP	120K	5%	1/10W

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*	1-660-680-11	MT-59 BOARD (Ref. No. 5,000 Series)	
		**********	
		< CAPACITOR >	
C401	1-163-038-91	CERAMIC CHIP 0.1uF	25V
		< CONNECTOR >	
* CN401	1-565-959-11	PIN, CONNECTOR (PC BOARD) 6P	
CN402	1-770-516-31	PIN, CONNECTOR (PC BOARD) 8P	

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The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

PS-96

Ref. No.	Part No.	Description			Remark
*	A-6423-493-A	PS-96 BOARD, COMPLETE			
		**********			
					(Ref. No. 7,000 Series)
	1-533-225-11	HOLDER, FUSE			
	7-685-645-79	SCREW +BVTP 3X6 TYPE2 N-S			
		< CAPACITOR >			
⚠C101	1-117-794-11	FILM	0.22uF	10%	250V
⚠C102	1-137-525-11	FILM	0.1uF	10%	250V
⚠C103	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C104	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C105	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C106	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C107	1-125-731-11	ELECT	270uF	20%	400V
⚠C108	1-162-115-00	CERAMIC	330PF	10%	2KV
⚠C109	1-162-115-00	CERAMIC	330PF	10%	2KV
⚠C110	1-107-907-11	ELECT	22uF	20%	50V
⚠C111	1-111-247-11	ELECT	0.1uF	20%	50V
⚠C112	1-162-722-11	CERAMIC	330PF	1%	50V
⚠C113	1-111-247-11	ELECT	0.1uF	20%	50V
⚠C114	1-137-387-11	FILM	0.001uF	5%	100V
⚠C115	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C116	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C117	1-161-830-00	CERAMIC	4700PF	10%	500V
C201	1-104-570-11	CERAMIC	1000PF	10%	250V
C202	1-104-570-11	CERAMIC	1000PF	10%	250V
C203	1-126-943-11	ELECT	2200uF	20%	25V
C204	1-126-943-11	ELECT	2200uF	20%	25V
C207	1-107-879-11	ELECT	3300uF	20%	10V
C208	1-137-390-11	FILM	0.0033uF	5%	100V
C209	1-107-902-11	ELECT	1uF	20%	50V
C210	1-107-889-11	ELECT	220uF	20%	10V
C212	1-107-889-11	ELECT	220uF	20%	10V
C213	1-104-653-11	ELECT	220uF	20%	16V
C214	1-107-889-11	ELECT	220uF	20%	10V
C215	1-137-397-11	FILM	0.047uF	5%	100V
C216	1-107-910-11	ELECT	100uF	20%	50V
C217	1-162-790-11	CERAMIC	0.0047uF	10%	50V
C218	1-137-391-11	FILM	0.0047uF	5%	100V
C219	1-126-964-11	ELECT	10uF	20%	50V
C220	1-126-964-11	ELECT	10uF	20%	50V
C223	1-126-964-11	ELECT	10uF	20%	50V
C224	1-107-889-11	ELECT	220uF	20%	10V
C226	1-137-390-11	FILM	0.0033uF	5%	100V
C227	1-162-730-11	CERAMIC	680PF	1%	50V
C228	1-162-730-11	CERAMIC	680PF	1%	50V
C229	1-137-390-11	FILM	0.0033uF	5%	100V
		< CONNECTOR >			
CN101	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P			
* CN201	1-569-936-11	SOCKET, CONNECTOR 20P			
* CN202	1-565-671-11	SOCKET, CONNECTOR 8P			
CN203	1-564-506-11	PLUG, CONNECTOR 3P			
CN204	1-506-469-11	PIN, CONNECTOR 4P			

Ref. No.	Part No.	Description	Remark
		< DIODE >	
⚠D101	8-719-064-27	DIODE ERA15-06TP3	
⚠D102	8-719-064-27	DIODE ERA15-06TP3	
⚠D103	8-719-064-27	DIODE ERA15-06TP3	
⚠D104	8-719-064-27	DIODE ERA15-06TP3	
⚠D105	8-719-110-39	DIODE RD15ES-B1	
⚠D106	8-719-064-28	DIODE ERA91-02TP3	
⚠D107	8-719-064-28	DIODE ERA91-02TP3	
⚠D108	8-719-110-52	DIODE RD20ES-B1	
⚠D109	8-719-064-28	DIODE ERA91-02TP3	
⚠D110	8-719-109-84	DIODE RD5.1ES-B1	
⚠D111	8-719-064-29	DIODE UF4007G3	
⚠D112	8-719-110-61	DIODE RD24ES-B1	
D201	8-719-064-31	DIODE YG901C2R	
D202	8-719-064-31	DIODE YG901C2R	
D203	8-719-064-31	DIODE YG901C2R	
D204	8-719-987-87	DIODE ERA85-009	
D205	8-719-110-52	DIODE RD20ES-B1	
D209	8-719-054-79	DIODE ERA83-004TP3	
D210	8-719-054-79	DIODE ERA83-004TP3	
D211	8-719-064-28	DIODE ERA91-02TP3	
D212	8-719-064-28	DIODE ERA91-02TP3	
D213	8-719-911-19	DIODE 1SS119	
		< FUSE >	
⚠F101	1-576-230-11	FUSE (H.B.C.)(3.15A 250V)	
		< IC >	
⚠IC101	8-759-466-37	IC FA5315P	
IC203	8-759-140-85	IC uPC1093J	
IC204	8-749-013-69	IC ZHMA6343B	
IC205	8-759-144-17	IC uPC358HA	
		< IC LINK >	
⚠IP201	1-532-675-21	LINK, IC (ICP-N38 1.5A)	
⚠IP202	1-532-675-21	LINK, IC (ICP-N38 1.5A)	
		< COIL >	
⚠L101	1-427-841-11	LFT (LF-4D-E103)	
⚠L102	1-414-372-11	INDUCTOR 0uH	
⚠L103	1-414-828-21	INDUCTOR, BEAD	
L201	1-416-269-11	COIL, CHOKE 10MH	
L202	1-412-524-11	INDUCTOR 8.2uH	
L203	1-412-524-11	INDUCTOR 8.2uH	
L204	1-414-828-21	INDUCTOR, BEAD	
L205	1-414-828-21	INDUCTOR, BEAD	
L206	1-414-828-21	INDUCTOR, BEAD	
		< PHOTO COUPLER >	
⚠PC101	8-749-013-68	PHOTO COUPLER PS2561-1-D	
⚠PC102	8-749-013-68	PHOTO COUPLER PS2561-1-D	
		< TRANSISTOR >	
⚠Q101	8-729-041-46	TRANSISTOR 2SK2101-01MR	
⚠Q102	8-729-026-41	TRANSISTOR 2SA933AS-QRT	
Q202	8-729-119-78	TRANSISTOR 2SC2785-HFE	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description				Remark
Q203	8-729-041-47	TRANSISTOR	2SA1307Y			
Q204	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q205	8-729-041-48	TRANSISTOR	2SD2395F			
Q208	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q209	8-729-026-41	TRANSISTOR	2SA933AS-QRT			
⚠Q210	8-729-117-11	TRANSISTOR	2SB1151			
Q211	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q212	8-729-026-41	TRANSISTOR	2SA933AS-QRT			
⚠Q213	8-729-019-32	TRANSISTOR	2SC4596F			
⚠Q214	8-729-117-11	TRANSISTOR	2SB1151			
Q215	8-729-119-78	TRANSISTOR	2SC2785-HFE			
⚠Q216	8-729-019-32	TRANSISTOR	2SC4596F			
Q217	8-729-026-41	TRANSISTOR	2SA933AS-QRT			
		< RESISTOR >				
⚠R101	1-260-129-11	CARBON	330K	5%	1/2W	
⚠R102	1-220-863-11	METAL	120K	5%	1W	
⚠R103	1-249-493-11	CARBON	56K	5%	1/2W	F
⚠R105	1-216-451-11	METAL OXIDE	120	5%	2W	F
⚠R106	1-249-397-11	CARBON	22	5%	1/4W	F
⚠R107	1-249-429-11	CARBON	10K	5%	1/4W	
⚠R108	1-216-341-11	METAL OXIDE	0.22	5%	1W	F
⚠R109	1-247-693-11	CARBON	27	5%	1/4W	F
⚠R110	1-249-415-11	CARBON	680	5%	1/4W	F
⚠R111	1-249-439-11	CARBON	68K	5%	1/4W	
⚠R112	1-249-439-11	CARBON	68K	5%	1/4W	
⚠R113	1-249-440-11	CARBON	82K	5%	1/4W	
⚠R114	1-249-429-11	CARBON	10K	5%	1/4W	
⚠R115	1-249-405-11	CARBON	100	5%	1/4W	F
⚠R116	1-249-411-11	CARBON	330	5%	1/4W	
⚠R117	1-220-910-91	METAL	9.09K	0.50%	1/4W	
⚠R118	1-247-881-00	CARBON	120K	5%	1/4W	
⚠R119	1-216-441-00	METAL OXIDE	27K	5%	1W	F
⚠R203	1-249-425-11	CARBON	4.7K	5%	1/4W	F
⚠R204	1-249-401-11	CARBON	47	5%	1/4W	F
⚠R205	1-249-415-11	CARBON	680	5%	1/4W	F
⚠R206	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R207	1-220-908-91	METAL	1.1K	0.50%	1/4W	
R208	1-220-907-91	METAL	1K	0.50%	1/4W	
⚠R210	1-249-401-11	CARBON	47	5%	1/4W	F
R211	1-220-911-91	METAL	10K	0.50%	1/4W	
⚠R212	1-249-429-11	CARBON	10K	5%	1/4W	
R213	1-220-907-91	METAL	1K	0.50%	1/4W	
R214	1-220-907-91	METAL	1K	0.50%	1/4W	
⚠R215	1-249-927-11	CARBON	1.5K	5%	1/4W	F
R217	1-220-911-91	METAL	10K	0.50%	1/4W	
R218	1-220-911-91	METAL	10K	0.50%	1/4W	
⚠R221	1-215-866-11	METAL OXIDE	330	5%	1W	F
⚠R222	1-215-866-11	METAL OXIDE	330	5%	1W	F
⚠R223	1-249-417-11	CARBON	1K	5%	1/4W	F
⚠R224	1-215-866-11	METAL OXIDE	330	5%	1W	F
⚠R225	1-249-417-11	CARBON	1K	5%	1/4W	F
⚠R226	1-215-866-11	METAL OXIDE	330	5%	1W	F
⚠R227	1-249-425-11	CARBON	4.7K	5%	1/4W	F
⚠R228	1-216-369-00	METAL OXIDE	1	5%	2W	F
R231	1-220-909-91	METAL	5.9K	0.50%	1/4W	

Ref. No.	Part No.	Description				Remark
⚠R232	1-249-429-11	CARBON	10K	5%	1/4W	
⚠R234	1-215-863-11	METAL OXIDE	100	5%	1W	F
⚠R235	1-216-436-00	METAL OXIDE	3.9K	5%	1W	F
⚠R236	1-216-436-00	METAL OXIDE	3.9K	5%	1W	F
⚠R237	1-216-436-00	METAL OXIDE	3.9K	5%	1W	F
⚠R240	1-249-401-11	CARBON	47	5%	1/4W	F
⚠R241	1-249-429-11	CARBON	10K	5%	1/4W	
⚠R242	1-249-429-11	CARBON	10K	5%	1/4W	
⚠R243	1-249-429-11	CARBON	10K	5%	1/4W	
		< TRANSFORMER >				
⚠T101	1-431-370-11	TRANSFORMER, CONVERTER				
		< THERMISTOR >				
⚠TH101	1-801-796-21	THERMISTOR (M16007 16 1.7A)				
**********						
*	1-665-959-11	PW-1151 BOARD (Ref. No. 4,000 Series)				
		**********				
		< CAPACITOR >				
C201	1-163-031-11	CERAMIC CHIP	0.01uF		50V	
		< CONNECTOR >				
CN201	1-770-516-31	CONNECTOR, FFC/FPC 8P				
CN202	1-750-195-11	CONNECTOR, BOARD TO BOARD 6P				
		< DIODE >				
D202	8-719-059-98	DIODE SLR-342VC3F (POWER)				
		< IC >				
IC201	8-742-018-00	IC SBX1810-59				
		< JUMPER RESISTOR >				
JR201	1-216-296-91	CONDUCTOR, CHIP (3216)				
JR202	1-216-296-91	CONDUCTOR, CHIP (3216)				
JR203	1-216-296-91	CONDUCTOR, CHIP (3216)				
JR204	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR205	1-216-296-91	CONDUCTOR, CHIP (3216)				
JR206	1-216-296-91	CONDUCTOR, CHIP (3216)				
JR207	1-216-295-91	CONDUCTOR, CHIP (2012)				
JR208	1-216-296-91	CONDUCTOR, CHIP (3216)				
JR209	1-216-296-91	CONDUCTOR, CHIP (3216)				
		< TRANSISTOR >				
Q201	8-729-027-31	TRANSISTOR DTA124EKA-T146				
		< RESISTOR >				
R202	1-216-037-00	METAL CHIP	330	5%	1/10W	
		< SWITCH >				
S201	1-572-199-11	SWITCH, KEYBOARD (POWER)				
**********						

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SW-1151 **SW-278** **VX-97**

Ref. No.	Part No.	Description			Remark
*	A-6423-466-A	SW-1151 BOARD, COMPLETE			
		**********			
			(Ref. No. 4,000 Series)		
*	3-971-190-11	HOLDER, LED			
		< CONNECTOR >			
CN301	1-750-186-11	CONNECTOR, BOARD TO BOARD 6P			
		< DIODE >			
D301	8-719-056-06	DIODE SLR-342DC3F (PBC)			
D302	8-719-056-06	DIODE SLR-342DC3F (DNR)			
		< JUMPER RESISTOR >			
JR302	1-216-296-91	CONDUCTOR, CHIP (3216)			
JR303	1-216-296-91	CONDUCTOR, CHIP (3216)			
		< TRANSISTOR >			
Q301	8-729-027-31	TRANSISTOR DTA124EKA-T146			
Q302	8-729-027-31	TRANSISTOR DTA124EKA-T146			
		< RESISTOR >			
R301	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R302	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R303	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R304	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R305	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R306	1-216-077-00	METAL CHIP	15K	5%	1/10W
R307	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R308	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R309	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R310	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R311	1-216-037-00	METAL CHIP	330	5%	1/10W
R312	1-216-037-00	METAL CHIP	330	5%	1/10W
R313	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
		< SWITCH >			
S301	1-572-199-11	SWITCH, KEYBOARD (PBC ON/OFF)			
S302	1-572-199-11	SWITCH, KEYBOARD (RETURN)			
S303	1-572-199-11	SWITCH, KEYBOARD (ACS/AMS, NEXT, ▶▶I)			
S304	1-572-199-11	SWITCH, KEYBOARD (ACS/AMS, PREV I◀◀)			
S305	1-572-199-11	SWITCH, KEYBOARD (SELECT ▷)			
S306	1-572-199-11	SWITCH, KEYBOARD (SIDE A)			
S307	1-572-199-11	SWITCH, KEYBOARD (SIDE B)			
S308	1-572-199-11	SWITCH, KEYBOARD (OPEN/CLOSE ⏏)			
S309	1-572-199-11	SWITCH, KEYBOARD (■)			
S310	1-572-199-11	SWITCH, KEYBOARD (▮▮)			
S311	1-572-199-11	SWITCH, KEYBOARD (DNR)			
S312	1-572-199-11	SWITCH, KEYBOARD (DIGEST)			
**********					
*	1-660-679-11	SW-278 BOARD (Ref. No. 5,000 Series)			
		**********			
		< CONNECTOR >			
* CN501	1-566-968-11	HOUSING, CONNECTOR(PC BOARD)6P			

Ref. No.	Part No.	Description			Remark
		< JUMPER RESISTOR >			
JR500	1-216-295-91	CONDUCTOR, CHIP (2012)			
JR501	1-216-295-91	CONDUCTOR, CHIP (2012)			
JR502	1-216-296-91	CONDUCTOR, CHIP (3216)			
		< PHOTO INTERUPTER >			
PH501	8-749-012-33	PHOTO INTERRUPTER GP1S94			
PH502	8-749-012-33	PHOTO INTERRUPTER GP1S94			
PH503	8-749-012-33	PHOTO INTERRUPTER GP1S94			
PH504	8-749-012-33	PHOTO INTERRUPTER GP1S94			
		< RESISTOR >			
R501	1-216-188-00	METAL GLAZE	390	5%	1/8W
R502	1-216-248-00	METAL GLAZE	120K	5%	1/8W
R503	1-216-248-00	METAL GLAZE	120K	5%	1/8W
R504	1-216-039-00	METAL CHIP	390	5%	1/10W
R505	1-216-099-00	METAL CHIP	120K	5%	1/10W
R506	1-216-099-00	METAL CHIP	120K	5%	1/10W
**********					
*	A-6423-468-A	VX-97 BOARD, COMPLETE			
		**********			
			(Ref. No. 3,000 Series)		
		< CAPACITOR >			
C101	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C102	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C103	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C104	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C105	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C106	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C107	1-126-968-11	ELECT	100uF	20%	6.3V
C108	1-126-968-11	ELECT	100uF	20%	6.3V
C109	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C110	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C111	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C112	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C113	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C114	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C115	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C116	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C117	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C118	1-126-968-11	ELECT	100uF	20%	6.3V
C143	1-124-903-11	ELECT	1uF	20%	50V
C151	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C152	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C153	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C154	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C155	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C156	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C157	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C201	1-126-968-11	ELECT	100uF	20%	6.3V
C202	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C203	1-216-295-91	CONDUCTOR, CHIP (2012)			
C204	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C208	1-163-121-00	CERAMIC CHIP	150PF	5%	50V

Ref. No.	Part No.	Description			Remark
C209	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C212	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C213	1-126-968-11	ELECT	100uF	20%	6.3V
C214	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C215	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C216	1-126-968-11	ELECT	100uF	20%	6.3V
C220	1-126-968-11	ELECT	100uF	20%	6.3V
C221	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C223	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C225	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C226	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C238	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C239	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C240	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C241	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C303	1-126-968-11	ELECT	100uF	20%	6.3V
C304	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C305	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C306	1-126-968-11	ELECT	100uF	20%	6.3V
C308	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C310	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C311	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C312	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C313	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C314	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C361	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C362	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C365	1-126-968-11	ELECT	100uF	20%	6.3V
C366	1-163-038-91	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
CN101	1-770-383-11	CONNECTOR, BOARD TO BOARD 14P			
CN302	1-770-382-11	CONNECTOR, BOARD TO BOARD 12P			
CN303	1-568-852-11	PIN, CONNECTOR (PC BOARD) 9P			
CN304	1-564-014-11	PIN, CONNECTOR 4P			
		< TRIMMER >			
CT201	1-141-304-21	CAP, TRIMMER 10PF			
		< DIODE >			
D101	8-719-914-44	DIODE DAP202K			
D102	8-719-914-44	DIODE DAP202K			
D301	8-719-059-98	DIODE SLR-342VC3F (FOR CHECK)			
		< IC >			
IC101	8-752-389-31	IC CXD1852AQ			
IC102	8-759-342-01	IC MB814260-70PJER			
IC105	8-759-234-20	IC TC7S08F			
IC106	8-759-242-68	IC TC7W32F			
IC107	8-759-233-64	IC TC74HCU04AF			
IC108	8-752-384-09	IC CXD1854Q			
IC201	8-759-233-66	IC TC74HCT04AF			
IC202	8-759-233-64	IC TC74HCU04AF			
IC203	8-752-380-71	IC CXD1913Q			
IC301	8-759-464-28	IC LC371100SM-TTX1151			
IC302	8-759-035-93	IC SC7S32F			
IC303	8-759-463-99	IC M5M5256DFP-70XL			

Ref. No.	Part No.	Description			Remark
IC304	8-759-276-29	IC XL9020F-S-E2			
IC305	8-759-283-49	IC HD6413002F10			
		< JUMPER RESISTOR >			
JR218	1-216-295-91	CONDUCTOR, CHIP (2012)			
		< COIL >			
L202	1-412-500-11	INDUCTOR	12uH		
L301	1-412-509-11	INDUCTOR	68uH		
		< TRANSISTOR >			
Q102	8-729-140-75	TRANSISTOR 2SD999-CLCK			
Q201	8-729-027-60	TRANSISTOR DTC144TKA-T146			
Q203	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R			
		< RESISTOR >			
R101	1-216-295-91	CONDUCTOR, CHIP (2012)			
R102	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R103	1-216-073-00	METAL CHIP	10K	5%	1/10W
R104	1-216-073-00	METAL CHIP	10K	5%	1/10W
R105	1-216-073-00	METAL CHIP	10K	5%	1/10W
R106	1-216-073-00	METAL CHIP	10K	5%	1/10W
R107	1-216-073-00	METAL CHIP	10K	5%	1/10W
R108	1-216-073-00	METAL CHIP	10K	5%	1/10W
R109	1-216-073-00	METAL CHIP	10K	5%	1/10W
R110	1-216-073-00	METAL CHIP	10K	5%	1/10W
R111	1-216-073-00	METAL CHIP	10K	5%	1/10W
R112	1-216-025-91	METAL GLAZE	100	5%	1/10W
R113	1-216-295-91	CONDUCTOR, CHIP (2012)			
R114	1-216-073-00	METAL CHIP	10K	5%	1/10W
R115	1-216-073-00	METAL CHIP	10K	5%	1/10W
R118	1-216-025-91	METAL GLAZE	100	5%	1/10W
R151	1-216-025-91	METAL GLAZE	100	5%	1/10W
R153	1-216-025-91	METAL GLAZE	100	5%	1/10W
R154	1-216-025-91	METAL GLAZE	100	5%	1/10W
R159	1-216-073-00	METAL CHIP	10K	5%	1/10W
R161	1-216-025-91	METAL GLAZE	100	5%	1/10W
R189	1-216-651-11	METAL CHIP	1K	0.5%	1/10W
R190	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W
R203	1-216-033-00	METAL CHIP	220	5%	1/10W
R204	1-216-025-91	METAL GLAZE	100	5%	1/10W
R205	1-216-025-91	METAL GLAZE	100	5%	1/10W
R212	1-216-025-91	METAL GLAZE	100	5%	1/10W
R213	1-216-025-91	METAL GLAZE	100	5%	1/10W
R214	1-216-025-91	METAL GLAZE	100	5%	1/10W
R220	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R221	1-216-041-00	METAL CHIP	470	5%	1/10W
R230	1-216-025-91	METAL GLAZE	100	5%	1/10W
R232	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R239	1-216-032-00	METAL CHIP	200	5%	1/10W
R240	1-216-033-00	METAL CHIP	220	5%	1/10W
R242	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R243	1-216-033-91	METAL CHIP	220	5%	1/10W
R302	1-216-025-91	METAL GLAZE	100	5%	1/10W
R303	1-216-025-91	METAL GLAZE	100	5%	1/10W
R304	1-216-025-91	METAL GLAZE	100	5%	1/10W

Ref. No.	Part No.	Description			Remark
R305	1-216-025-91	METAL GLAZE	100	5%	1/10W
R306	1-216-025-91	METAL GLAZE	100	5%	1/10W
R308	1-216-025-91	METAL GLAZE	100	5%	1/10W
R309	1-216-025-91	METAL GLAZE	100	5%	1/10W
R310	1-216-025-91	METAL GLAZE	100	5%	1/10W
R311	1-216-025-91	METAL GLAZE	100	5%	1/10W
R312	1-216-025-91	METAL GLAZE	100	5%	1/10W
R313	1-216-025-91	METAL GLAZE	100	5%	1/10W
R314	1-216-025-91	METAL GLAZE	100	5%	1/10W
R315	1-216-025-91	METAL GLAZE	100	5%	1/10W
R316	1-216-025-91	METAL GLAZE	100	5%	1/10W
R330	1-216-295-91	CONDUCTOR, CHIP (2012)			
R331	1-216-073-00	METAL CHIP	10K	5%	1/10W
R332	1-216-073-00	METAL CHIP	10K	5%	1/10W
R333	1-216-073-00	METAL CHIP	10K	5%	1/10W
R334	1-216-073-00	METAL CHIP	10K	5%	1/10W
R335	1-216-073-00	METAL CHIP	10K	5%	1/10W
R336	1-216-073-00	METAL CHIP	10K	5%	1/10W
R337	1-216-073-00	METAL CHIP	10K	5%	1/10W
R339	1-216-073-00	METAL CHIP	10K	5%	1/10W
R340	1-216-073-00	METAL CHIP	10K	5%	1/10W
R341	1-216-073-00	METAL CHIP	10K	5%	1/10W
R342	1-216-032-00	METAL CHIP	200	5%	1/10W
R344	1-216-073-00	METAL CHIP	10K	5%	1/10W
R345	1-216-073-00	METAL CHIP	10K	5%	1/10W
R348	1-216-295-91	CONDUCTOR, CHIP (2012)			
R351	1-216-295-91	CONDUCTOR, CHIP (2012)			
R362	1-216-073-00	METAL CHIP	10K	5%	1/10W
R363	1-216-073-00	METAL CHIP	10K	5%	1/10W
R364	1-216-073-00	METAL CHIP	10K	5%	1/10W
R366	1-216-073-00	METAL CHIP	10K	5%	1/10W
R370	1-216-073-00	METAL CHIP	10K	5%	1/10W
R371	1-216-041-00	METAL CHIP	470	5%	1/10W
		< VARIABLE RESISTOR >			
RV201	1-223-239-11	RES, ADJ, CARBON 10K			
		< SWITCH >			
S101	1-571-308-11	SWITCH, SLIDE (COLOR SYSTEM (VIDEO CD))			
		< VIBRATOR >			
X101	1-767-361-11	VIBRATOR, CERAMIC (28.63636MHz)			
X102	1-767-055-11	VIBRATOR, CERAMIC (45MHz)			
X202	1-767-212-11	VIBRATOR, CRYSTAL (27MHz)			
X301	1-579-952-21	VIBRATOR, CERAMIC (8MHz)			

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Ref. No.	Part No.	Description	Remark
		MISCELLANEOUS	
		**********	
13	1-777-007-11	CABLE, FLAT (8 CORE) (95mm)	
54	1-777-013-11	CABLE, FLAT (9 CORE)	
⚠67	1-769-639-11	CORD, POWER (E)	
⚠67	1-782-510-11	CORD, POWER (CH)	
68	1-569-008-11	ADAPTOR, CONVERSION 2P (E)	
105	1-777-010-11	CABLE, FLAT (8 CORE) (300mm)	
107	1-777-005-11	CABLE, FLAT (20 CORE)	
110	1-777-007-11	CABLE, FLAT (8 CORE) (95mm)	
111	1-777-006-11	CABLE, FLEXIBLE FLAT (13 CORE)	
⚠208	8-848-286-11	OPTICAL PICK-UP BLOCK KHS-150A(S)	
210	1-777-011-11	CABLE, FLEXIBLE FLAT (18 CORE)	
212	1-777-008-11	CABLE, FLAT (4 CORE)	
M401	X-3946-431-1	MOTOR ASSY, LOADING (LOADING/TILT)	
M901	1-698-109-11	MOTOR, DD (SPINDLE)	
ND101	1-517-471-11	INDICATOR TUBE, FLUORESCENT	

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ACCESSORIES & PACKING MATERIALS
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	1-475-221-11	REMOTE COMMANDER (RMT-M46A)
	1-569-008-11	ADAPTOR, CONVERSION 2P (E)
	1-575-334-11	CORD, CONNECTION (AUDIO/VIDEO 1.5m)
	3-708-885-01	COVER, BATTERY (for RMT-M45A)
	3-859-745-11	MANUAL, INSTRUCTION (ENGLISH,CHINESE)

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HARDWARE LIST
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#1	7-685-647-79	SCREW, TAPPING
#2	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#3	7-682-545-09	SCREW +B 3X4
#4	7-685-645-79	SCREW +BVTP 3X6 TYPE2 IT-3
#5	7-624-108-04	STOP RING 4.0, TYPE -E
#6	7-685-104-21	SCREW +P 2X6 TYPE2 SLIT
#7	7-685-648-79	SCREW +BVTP 3X12 TYPE2
#8	7-621-759-35	+PSW, 2.6X5
#9	7-682-946-09	SCREW +PSW 3X5
#10	7-682-947-09	SCREW +PSW 3X6
#11	7-685-133-19	SCREW +P 2.6X6 TYPE2
#12	7-685-102-19	SCREW +P 2X4 NON-SLIT TYPE 2

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SECTION 6
IC PIN DESCRIPTION

6-1. MODE CONTROL IC PIN DESCRIPTION (FP-1152 BOARD IC102 HD6433712-C40H)

Pin No.	Pin Name	I/O	Function
1	AVCC	–	Power supply EVER +5V
2	MON1	I	+5V REG monitor
3	MON2	I	–5V REG monitor
4	MON3	I	±16V monitor
5	———	–	Not used
6	AD1	I	Unit key input
7	AD3	I	Unit key input
8	AD4	I	Unit key input
9	———	–	Not used
10	AVSS	–	Ground
11	TEST	I	Test terminal (Connected to ground)
12	———	O	Not used
13	———	I	Not used
14	VCC	–	Ground
15	X0	I	Crystal oscillator terminal (8 MHz)
16	X1	O	Crystal oscillator terminal (8 MHz)
17	$\overline{\text{RESET}}$	I	VFD controller reset (“L”: Reset)
18	SIRCS	I	SIRCS data input
19	$\overline{\text{DNR LED}}$	O	DNR LED drive signal output
20	$\overline{\text{PBC LED}}$	O	PBC LED drive signal output
21	P. CONT	O	Unit power on/off control (“H”: Power on)
22	———	I	Not used
23	P24	O	FL segment output
24	P23	O	FL segment output
25	P22	O	FL segment output
26	P21	O	FL segment output
27	P20	O	FL segment output
28	P19	O	FL segment output
29	P18	O	FL segment output
30	P17	O	FL segment output
31	P16	O	FL segment output
32	P15	O	FL segment output
33	P14	O	FL segment output
34	P13	O	FL segment output
35	P12	O	FL segment output
36	P11	O	FL segment output
37	P10	O	FL segment output
38	P9	O	FL segment output
39	–30V	I	High-voltage proof pull-down power supply –30V
40	P8	O	FL segment output

Pin No.	Pin Name	I/O	Function
41	P7	O	FL segment output
42	P6	O	FL segment output
43	P5	O	FL segment output
44	P4	O	FL segment output
45	P3	O	FL segment output
46	P2	O	FL segment output
47	P1	O	FL segment output
48	G1	O	FL grid output
49	G2	O	FL grid output
50	G3	O	FL grid output
51	G4	O	FL grid output
52	G5	O	FL grid output
53	G6	O	FL grid output
54	G7	O	FL grid output
55	VIDEO MUTE	O	“L” when video mute
56	VCC	–	Power supply EVER +5V
57	AU MUTE	O	“H” when audio mute
58	VFD CLK	O	Communication clock to the mode VCD controller
59	VFD SI	I	Data reception from the mode VCD controller
60	VFD SO	O	Data transfer to the mode VCD controller
61	$\overline{\text{VFD ACK}}$	O	Transfer enable signal to the mode VCD controller from the VFD controller (“L”: Communication enable)
62	$\overline{\text{MMI RST}}$	O	Mode VCD controller reset (“L”: Reset)
63	$\overline{\text{VFD REQ}}$	I	Chip select for VFD controller from the mode VCD controller
64	P. OFF	O	Power reset output (“H”: Reset)

6-2. VCD MODE CONTROL IC PIN DESCRIPTION (VX-97 BOARD IC305 HD6413002F10)

Pin No.	Pin Name	I/O	Function
1	VCC	–	Power supply, REG +5V
2	$\overline{\text{DSP CS}}$	O	Chip select for KARAOKE DSP (“L”: Being communicated) (Not used)
3	CDDA EMP	I	CDDA de-emphasis control input (“H”: ON). Only when video CD is used, this pin is used due to CL480 bug. (Not used)
4	$\overline{\text{E2P WC}}$	O	EEPROM line control output
5	$\overline{\text{E2P CS}}$	O	EEPROM chip select output
6	$\overline{\text{VFD ACK}}$	I	Transfer enable signal to the mode controller from the VFD controller (“L”: Communication enable)
7	$\overline{\text{VFD REQ}}$	O	Transfer request signal to the VFD controller from the mode controller (“L”: Communication request)
8	READY	I	Not used (Fixed at “H”)
9	$\overline{\text{MPEG RST}}$	O	1852 MPEG reset (“L”: Reset)
10	$\overline{\text{RESO}}$	O	Not used
11	VSS	–	Ground
12	MECH SI	O	Data output to the mechanism controller/CG
13	SO	O	Transfer data to the VFD controller/EEPROM
14	MECH SO	I	Data input from the mechanism controller
15	SI	I	Reception data from the VFD controller/EEPROM
16	MECH CLK	O	Communication clock output to the mechanism controller/CG
17	SCK	O	Communication clock to the VFD controller/EEPROM
18	$\overline{\text{DEV RST}}$	O	Device reset (“L”: Reset)
19	$\overline{\text{H DET}}$	I	“L”: Video input present (Not used)
20	MIC IN	I	“L”: MIC IN (Not used)
21	OTASUKE	I	“H”: Microphone sound absent, “L”: Microphone sound present (Fixed at “H”)
22	VSS	–	Ground
23	$\overline{\text{VCD}}$	O	Not used
24	CLAP SW0	O	“H”: Hand clapping 0 START (Not used)
25	CLAP SW1	O	“H”: Hand clapping 1 START (Not used)
26	$\overline{\text{CLAP BUSY}}$	I	“L”: Hand clapping (Not used)
27	D0	I/O	Data bus I/O
28	D1	I/O	Data bus I/O
29	D2	I/O	Data bus I/O
30	D3	I/O	Data bus I/O
31	D4	I/O	Data bus I/O
32	D5	I/O	Data bus I/O
33	D6	I/O	Data bus I/O
34	D7	I/O	Data bus I/O
35	VCC	–	Power supply, REG +5V
36	A0	O	Address bus output
37	A1	O	Address bus output
38	A2	O	Address bus output
39	A3	O	Address bus output
40	A4	O	Address bus output

Pin No.	Pin Name	I/O	Function
41	A5	O	Address bus output
42	A6	O	Address bus output
43	A7	O	Address bus output
44	VSS	–	Ground
45	A8	O	Address bus output
46	A9	O	Address bus output
47	A10	O	Address bus output
48	A11	O	Address bus output
49	A12	O	Address bus output
50	A13	O	Address bus output
51	A14	O	Address bus output
52	A15	O	Address bus output
53	A16	O	Address bus output
54	A17	O	Not used
55	A18	O	Chip select signal output
56	A19	O	Chip select signal output
57	VSS	–	Ground
58	$\overline{\text{WAIT}}$	I	Wait pin. Requests the insertion of wait state when accessing the external address space.
59	VCD MUTE	O	VIDEO DAC output mute control (“H”: Mute. Sync is not muted.)
60	CHECK LED	O	LED drive signal output for system check
61	SYSCLK	O	System clock output (Not used)
62	$\overline{\text{STBY}}$	I	Standby pin. When “L”, the hardware standby mode is set.
63	$\overline{\text{RST}}$	I	Mode controller reset (“L”: Reset)
64	$\overline{\text{E2P BUSY}}$	I	EEPROM write. “H”: READY, L: BUSY.
65	VSS	–	Ground
66	EXTAL	I	Connected to the crystal oscillator. Clock 8 MHz.
67	XTAL	O	Connected to the crystal oscillator. Clock 8 MHz.
68	VCC	–	Power supply REG +5V
69	$\overline{\text{AS}}$	O	Address strobe. When “L”, an address on the address bus is valid.
70	$\overline{\text{RD}}$	O	Read pin. When “L”, the external address space is in a read condition.
71	$\overline{\text{HWR}}$	O	High write pin. When “L”, the external address space is in a write condition, and the data bus is valid (bus width: 8-bit).
72	$\overline{\text{LWR}}$	O	Not used
73	MD0	I	Mode pin (Fixed at “H”) — Sets the microcontroller operation mode to mode 1 (Address space: 1M bytes, 8-bit data bus).
74	MD1	I	Mode pin (Fixed at “L”)
75	MD2	I	Mode pin (Fixed at “L”)
76	AVCC	–	AD conversion power supply, REG +5V
77	VREF	I	AD conversion reference voltage input, REG +5V
78	NT PAL AUTO SEL	I	NTSC/PAL auto select (Video-CD output mode)
79	———	I	AD input (Not used)
80	———	I	AD input (Not used)

Pin No.	Pin Name	I/O	Function
81	———	I	AD input (Not used)
82	———	I	AD input (Not used)
83	———	I	AD input (Not used)
84	———	I	AD input, destination specification (Not used)
85	REMOTE CONT	I	AD input, microphone remote input (Not used)
86	AVSS	–	AD conversion Ground
87	$\overline{\text{REF V}}$	I	Reference V sync signal input (Non-maskable interrupt. Requests a non-maskable interrupt.)
88	$\overline{\text{EXRAMCS}}$	O	External RAM chip select
89	$\overline{\text{MPEGCS}}$	O	CXD1852Q chip select
90	$\overline{\text{REQ}}$	O	Transfer request signal from CXD1852Q to mode controllor
91	$\overline{\text{EXROMCS}}$	O	External ROM chip select (Not used)
92	VSS	–	Ground
93	$\overline{\text{1854CS}}$	O	CXD1854Q chip select
94	$\overline{\text{1913CS}}$	O	CXD1913Q chip select
95	———	–	Not used (Reserved for input capture.)
96	$\overline{\text{TEST}}$	–	Test mode pin
97	LINE SELECT	O	“H”: Communication with the mechanism controller, “L”: Communication with CG
98	$\overline{\text{MECH CS}}$	I	Chip select for the mode controller from the mechanism controller
99	BUSY	O	Transfer enable signal to the mechanism controller from the mode controller (“L”: Communication enable)
100	$\overline{\text{CG CS}}$	O	CG chip select (“L”: Being communicated)

6-3. SYSTEM CONTROL IC PIN DESCRIPTION (MB-97 BOARD IC501 MB89094PF-G-154-BND)

Pin No.	Pin Name	I/O	Function
1	———	O	Clock 32 kHz (Not used)
2	CLK32K	I	Clock 32 kHz
3	GND	–	Ground
4	GND	–	Ground
5	2FSC	I	Clock 2 fsc (7.159 MHz)
6	———	O	Clock 2 fsc (Not used)
7	———	–	Ground
8	XMRST	I	Mechanism controller reset (“L”: Reset)
9	XFREQ	I	Phillips code (Frame No.) read enable
10	FQACK	O	Phillips code/SubQ (Subcode) data output control (“H”: Data output)
11	FQSEL	O	Phillips code/SubQ data selection (“L”: SubQ)
12	JPCTL	O	One track jump (1TJ)/Multi track jump (MTJ) selection signal (“H”: 1TJ)
13	SP LOCK	I	Spindle servo lock signal (“H”: Spindle servo locked)
14	TBC HOLD IN	O	Chroma TBC control signal
15	SCOR	I	“H” when subcode sync is detected.
16	XPB V	I	Playback V sync signal input
17	XREF V	I	Reference V sync signal input
18	ALT	O	Latches internal register A of extension output port IC (MB-97 board IC502)
19	BLT	O	Latches internal register B of extension output port IC (MB-97 board IC502)
20	XBUSY	I	Communication enable signal from the mode controller (“L”: Communication enable)
21	DOP	I	VIDEO dropout detection input
22	VTM	I	Servo processor V timing signal
23	FLAG	I	Reference line operation flag
24	CDG MODE	I	“H” when CDG. (Decode IC disc discrimination) (Not used)
25	CLS CS	O	Chip select of CLS DT (pin 29) signal
26	SPDL PLS	O	Spindle pulse drive signal (“H”: Spindle free running)
27	CLT	O	CLD register latch
28	+5V	I	Input of the start mode selection after reset release (+5V PULL UP)
29	CLS DT	I	CLV scanning V sync phase difference data input from IC502 (Data input when CLS CS is “H”.)
30	SET DT	O	Serial data output to DSP/Extension output port IC
31	SET CK	O	Serial data transfer clock to DSP, IC502
32	SPDL FG1	I	Spindle FG input 1 (12 waves per one rotation)
33	G MUTE	O	Gray image mute control output when CLV scanning (“L”: Playback image, “H”: Gray image)
34	LD SEARCH	O	Spindle servo control output (“H”: During LD search)
35	SPDL F/XR	O	Spindle rotation direction signal (“H”: FWD)
36	$\overline{\text{AUX}}$	O	“H”: External input, “L”: Others (Not used)
37	1TJ	O	Track jump trigger pulse output
38	FG START	O	H sync measuring start
39	FG SEARCH	O	During LD search, H
40	SP GAIN	O	H sync measuring prohibition

Pin No.	Pin Name	I/O	Function
41	MTJ	I	MTJ tracking pulse output. Normally, input. Output when TJ is executed (“L”: FWD).
42	MTF ON/$\overline{\text{OFF}}$	O	MTF compensation ON/OFF signal (“H”: MTF ON)
43	V LOAD	O	VIDEO IC (MN8811) latch signal
44	EX V CTL	O	“H” when external input (VCD) is muted.
45	PM OFF	O	Read clock phase modulation. “H”: OFF.
46	$\overline{\text{V-CD VIDEO SEL}}$	O	“L” when VCD mode (Not used)
47	———	O	Not used
48	XFL	I	Focus lock signal (“L”: Focus lock)
49	VCC	–	Power supply REG +5V
50	LINE SEL	I	“H”: MMI is connected to FSIO.
51	XCDG MUTE	O	Graphic data mute (“L”: PB, “H”: Others) (Not used)
52	TILT LOADING UP	O	Forcibly moves to TILT UP.
53	TILT LOADING DN	O	Forcibly moves to TILT DOWN.
54	XMMI CS	O	Serial communication chip select signal to the mode controller
55	TILT CTL	O	Tilt center position switch input
56	TILT LIMIT	O	Tilt UP/DOWN limit switch input
57	XCDG RST	O	Not used
58	GND	–	Ground
59	LINE MUTE	O	Audio output mute signal (“L”: Mute)
60	$\overline{\text{DIGITAL 0 MUTE}}$	I	Digital 0 mute information
61	MC RST	O	Servo DSP/DF reset signal (“L”: Reset)
62	LD ON	O	Laser diode ON/OFF signal (“H”: ON (emission))
63	XCD/LD CDV	O	“L”: CD or CDV audio part is played back, “H”: Others
64	XSVLT	O	SERVO IC (HA11529) latch signal
65	SIDE A/XB	O	Tilt servo image selection (“H”: A, “L”: B)
66	BRK INH	O	SERVO brake mode control (“H”: Prohibited)
67	LCSW1	I	Loading/chucking position sensor input 1
68	XLD LED	O	DISC discrimination LED emission signal (“L”: Emission)
69	LCSW2	I	Loading/chucking position sensor input 2
70	LCSW3	I	Loading/chucking position sensor input 3
71	LCSW4	I	Loading/chucking position sensor input 4
72	LOADING LOCK	O	Loading motor break cancel
73	DOS INH	I	Input is fixed
74	MECH SI	I	32-byte serial transfer data input (For SCOR check)
75	NR CONT	I	Noise canceler
76	SCAN DOP CTL	O	“H” when CLV mode (Not used)
77	MECH SI	I	32-byte serial transfer data input (Input from the mode controller, IC502)
78	MECH SO	O	32-byte serial transfer data output (Output to the mode controller)
79	MECH CLK	O	32-byte serial transfer clock
80	T CNT	I	Track jump number count signal input

Pin No.	Pin Name	I/O	Function
81	AC-3 MUTE	O	Digital RF out (AC-3) mute signal
82	———	–	Not used
83	GND	–	Ground
84	LD DET	I	A/D input (Disc present/absent, 8/12 inch detection)
85	CD/ALD	I	A/D input SLED position information (CDV)
86	CDV/BLD	I	A/D input SLED position information (CD, ALD, BLD)
87	LOADING OFF	I	A/D input loading off signal
88	XDSPLT	O	DSP IC latch signal
89	MD2	O	Optical output mute (“L”: Mute)
90	LOCK	I	Frame sync (EFM) lock signal (“H”: Lock)
91	SENSE	I	Various SENSE signals input from DSP
92	VCC	–	Power supply REG +5V
93	MUTE G	O	DSP mute signal (“H”: Mute)
94	EMPHA	O	De-emphasis control (“H”: ON)
95	A MUTE 1	O	Audio L output mode selection (“H”: Analog audio R mute)
96	A MUTE 2	O	Audio R output mode selection (“H”: Analog audio L mute)
97	XCX	O	CX ON/OFF control output (“L”: CX ON)
98	D/F LT	O	Digital filter latch
99	XDSP SEL	O	Selection of communication with DSP (“L”: Connection, “H”: Disconnection)
100	VCC	–	Power supply REG +5V

6-4. SYSTEM CONTROL IC PIN DESCRIPTION (MB-97 BOARD IC502 LC21011B-X78)

Pin No.	Pin Name	I/O	Function
1	———	–	Not used
2	———	–	Not used
3	———	–	Not used
4	———	–	Not used
5	———	–	Not used
6	———	–	Not used
7	———	–	Not used
8	CD DEFECT	O	CD defect signal output
9	———	–	Not used
10	———	–	Not used
11	XIN	I	4 fsc 14.3 MHz input (Clock)
12	XOUT	O	4 fsc 14.3 MHz output (Clock)
13	VSS	–	Ground
14	V MUTE1	O	When CLV scanning: V sync delete signal
15	V MUTE2	O	When CLV scanning: REF V sync add signal
16	G BVRST	O	Gray image output
17	DLRH	O	Gray image output
18	GRH	O	Gray image output
19	GVID	I	When CLV scanning: Gray image input signal
20	DS GATE	O	Phillips code gate signal output (Not used)
21	TBC REF H	O	CAV disc track traverse signal
22	PBCS	I	Composite sync signal input
23	P CODE	I	Phillips code data input
24	JMP TGL	O	CAV disc track traverse signal
25	TBC MUTE	O	TBC mute signal
26	CONT2	O	TBC operation selection: “H” Line mode, “L” Burst mode
27	PC OUT1	O	Forcibly accelerates/decelerates the spindle servo
28	PC OUT2	O	Spindle servo H servo error output
29	SPDL SW1	O	Spindle gain selection control signal 1 output
30	SPDL SW2	O	Spindle gain selection control signal 2 output
31	VDD	–	+5V
32	SP GAIN	I	When “H” (Tracking off): PC OUT2 becomes hi-impedance
33	SP UNLOCK	O	When the spindle is not locked: Signal output set by the mechanical controller
34	SP OFF	O	Output for spindle motor stop
35	HP OUT	O	Spindle error signal hold pulse output (Outputs when track jump)
36	CDV	O	Spindle mode setting. CDV-V part “H” (Not used)
37	FGMD	O	Spindle mode setting. FG mode “H” (Not used)
38	JUMP	I	Track jump control signal (HP out gate)
39	SV CLK	O	Servo IC clock output 1/8 fsc
40	$\overline{\text{SET CK}}$	O	Serial data transfer clock output to the servo IC

Pin No.	Pin Name	I/O	Function
41	SP PBHI	I	Spindle PBH input
42	SP PBHO	O	Spindle PBH output
43	SP RHI	I	Spindle REF H input
44	SP RHO	O	Spindle REF H output
45	SET CLK	I	Internal resisters A and B clock input
46	SET DT	I	Internal resisters A and B data input
47	CLS DT	O	CLV scanning V sync counter data output
48	CLS CS	I	CLV scanning V sync counter data read clock control input
49	CLT	I	Internal resister C latch
50	BLT	I	Internal resister B latch
51	ALT	I	Internal resister A latch
52	VSS	–	Ground
53	REF V	O	REF V sync output
54	PBV	O	PB V sync output
55	TBC HOLT IN	I	TBC mute control
56	SP LOCK	O	Spindle lock detection signal
57	JP CTL	I	Track jump selection signal. “H” 1TJ, “L” MTJ
58	FQSEL	I	Frame No./Sub-Q data selection signal
59	FQACK	I	Frame No./Sub-Q data output control. “H”: Data output
60	FREQ	O	Frame No. read OK
61	MRST	I	Reset signal input
62	FSC2	O	Clock to the mechanism controller
63	FH2	O	Clock to the mechanism controller
64	DSP SEL	I	Selection of communication with DSP
65	MECH CLK	I	Serial transfer clock
66	MECH SOI	I	Serial treansfer data input
67	MFCK SOI	O	Serial treansfer data output
68	FQD OUT	O	Frame No./Sub-Q data output
69	MC SO LINE SEL	I	When “H”: Communication between the mode controller and the mechanism
70	MMI TO MC CLK	I	Communication clock from the mode controller
71	MC SO	O	Transfer data to the mode controller
72	MC SI	I	Reception data to the mode controller
73	VDD	–	+5V
74	SUB CLK	O	Sub-Q read out clock output
75	SUBQ	I	Sub-Q input
76	DSPCK	O	Serial data transfer clock output to DSP
77	FG START	I	FG count start signal input: When CLV disc starts to search
78	FG SEARCH	I	“H”: When CLV disc search
79	PC SEL	–	Not used
80	TEST	–	Test pin. Normally “L”

SECTION 7
ADJUSTMENTS

During the adjustment, see the arrangement diagram for adjustment parts on page from 7-8.

7-1. LIST OF SERVICING JIGS

- Oscilloscope
- Color monitor TV
- Digital voltmeter
- Frequency counter
- LD alignment disc HLV-8 (8-797-008-00) NTSC Ref. Disc 8
- Video CD test disc HLV-401 (4-978-510-01)

7-2. CAUTIONS ON ADJUSTMENT

- Disc load/unload operation must not be performed when servicing with the unit laying down sideways. (Never press the OPEN and CLOSE buttons (⏏)).
- When laying the unit down sideways, perform adjustment with the left side down and turn the power ON.
- When adjusting the servo system, be sure to set up the unit horizontally.

7-3. POWER BLOCK CHECK

7-3-1. Power Supply Check (Power Block (PS-96))

Mode	Stop
Measuring equipment	Digital voltmeter
UNREG +16V check	
Measurement point	Pin ⑪ of CN201 (Pin ⑬, GND)
Specified value	15.7 ± 1.5V
UNREG -16V check	
Measurement point	Pin ⑮ of CN201 (Pin ⑬, GND)
Specified value	-16.0 ± 1.5V
REG +5 check	
Measurement point	Pin ③ of CN201 (Pin ⑬, GND)
Specified value	5 ± 0.3V
REG -5V check	
Measurement point	Pin ⑥ of CN201 (Pin ⑬, GND)
Specified value	-5 ± 0.3V
EVER +5V check	
Measurement point	Pin ① of CN201 (Pin ⑬, GND)
Specified value	5 ± 0.3V

- Confirm that the power supply voltages satisfy the respective specified values.

7-4. SYSTEM CONTROL SYSTEM ADJUSTMENT

7-4-1. Microprocessor Clock Adjustment (MB-97 board)

Mode	Stop
Measurement point	Emitter of Q153 (Pin ② of IC204)
Measuring equipment	Frequency counter
Adjusting element	CT151
Specified value	14,318,180 Hz ± 40 Hz

Adjustment method:
1) Adjust CT151 to 14,318,180 Hz ± 40 Hz.

7-5. ADJUSTMENT AFTER THE ATTACHMENT OF THE OPTICAL PICK-UP BLOCK

7-5-1. Jigs and Tools

- Hexagonal wrench (Tangential screwdriver: 7-700-766-04)
- Oscilloscope
- MD adjustment cable (J-6082-059-B)
- Alignment disc Ref. 8 (HVL8: 8-797-008-00)/LD YEDS-18 (3-702-101-01) or an equivalent/CD
- Eccentric screwdriver 4ø (J-6095-029-A)

* Insert the terminal of MD adjusting cable to CN702 on the MB-97 board.

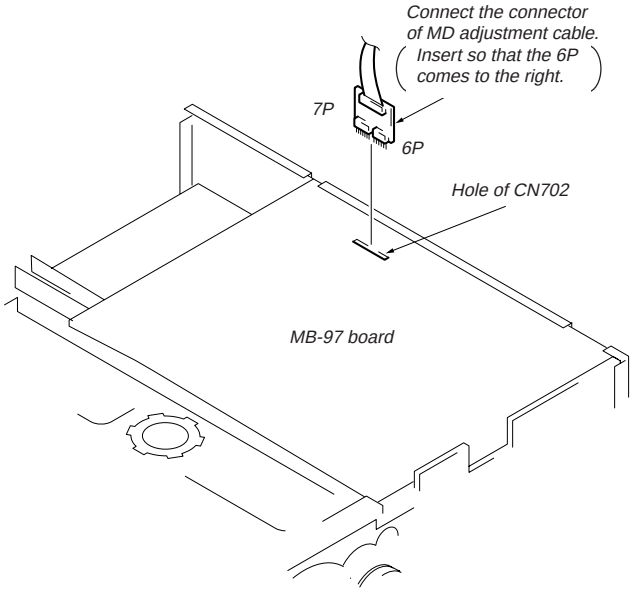


Fig. 7-1.

7-5-2. CD Adjustment

① Playback the CD alignment disc (YEDS-18) and press the Pause button (❚❚) about three seconds later.
② Connect the oscilloscope to LD RF of the MD adjustment cable to seen if the waveform shown below again.

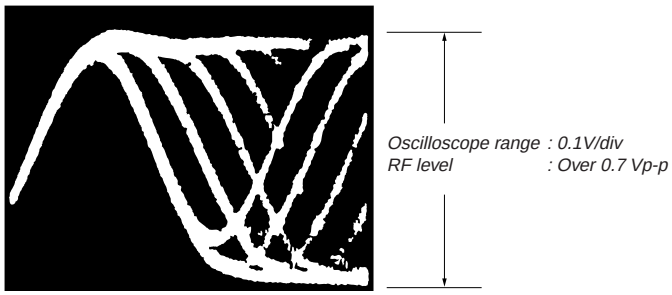


Fig. 7-2.

③ Press the STOP button (■) to stop the CD (YEDS-18).
④ Press the OPEN/CLOSE button (≙) to draw out the disc tray.
⑤ Loosen three screws on the feed base block assembly.

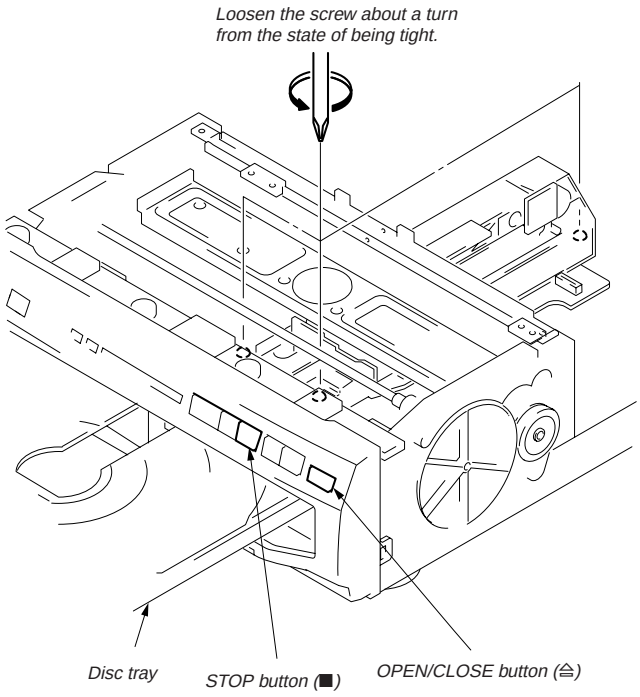


Fig. 7-3.

⑥ Loosen three screws on the spindle motor.

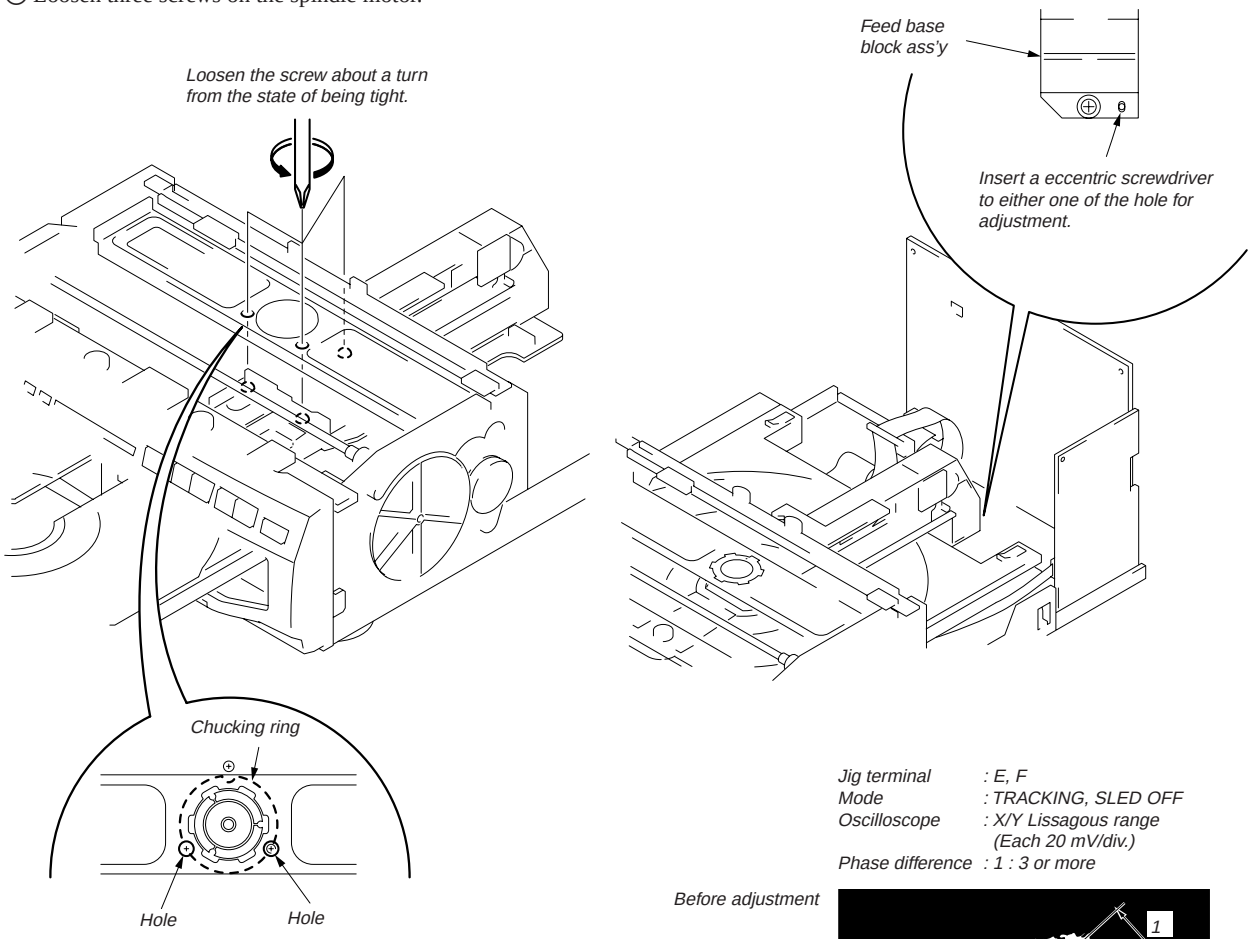


Fig. 7-4.

⑦ Again, plate the CD (YEDS-18) in the playback status.
⑧ Connect the oscilloscope to the terminals E and F of MD adjustment cable, and turn off the SLED and TRACKING switches.
⑨ Insert a eccentric screwdriver into the feed base block assembly for RD adjustment.
⑩ After adjustment, turn on the SLED and TRACKING switches.
⑪ Remove the CD (YEDS-18), and tighten three screws on the spindle motor, then three screws on the feed base block assembly.

Jig terminal : E, F
Mode : TRACKING, SLED OFF
Oscilloscope : X/Y Lissagous range (Each 20 mV/div.)
Phase difference : 1 : 3 or more

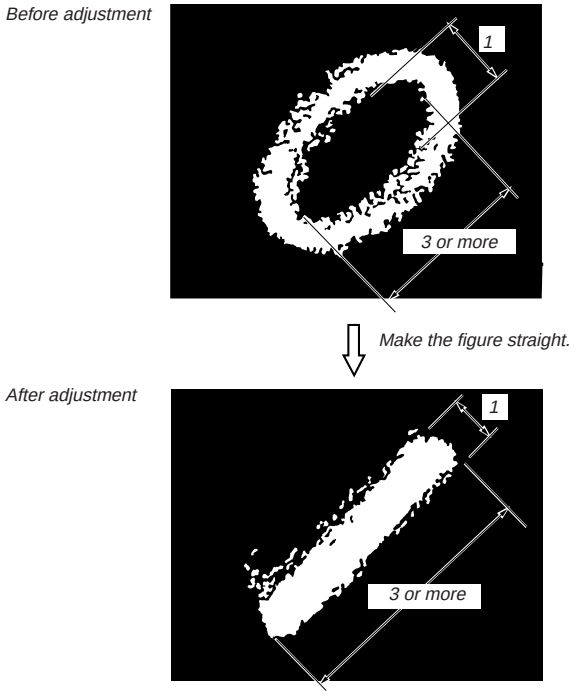


Fig. 7-5.

7-6. SERVO SYSTEM ADJUSTMENTS

7-6-1. LD Side A Adjustment

① Put the LD alignment disc HLV-8 in with the CAV side to the side A, play it and pause at the chapter 3 (#2201).

② Connect an oscilloscope to LD RF terminal on the MD adjustment cable and adjust RV701 so that the RF waveform goes maximum in the state the TRACKING and SLED are ON.

Fig. 7-6.

③ Play #770 and pause.

④ Check that the vertical bar appears on TV monitor and right and left crosstalks (moire) are the same level and minimum.

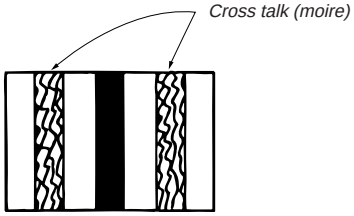
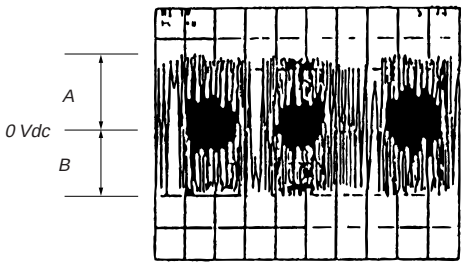


Fig. 7-7.

⑤ Tracking gain and focus gain adjustment are not necessary.
– Already adjusted at the optical pick-up block side –

⑥ Check the tracking bal
Measure the resistance at the Y terminal of TRACKING ERR on jig with oscilloscope.



Check that it meets

$$-6 \leqq \frac{A - B}{2\,(A + B)} \times 100\,(\%) \leqq 9$$

Fig. 7-8.

TRACKING BAL check

Note: The last code-C of parts No. for MD adjustment cable will be assigned with TRK ERR Y1 and Y2 (◌ part). In this case, use the Y1 terminal.

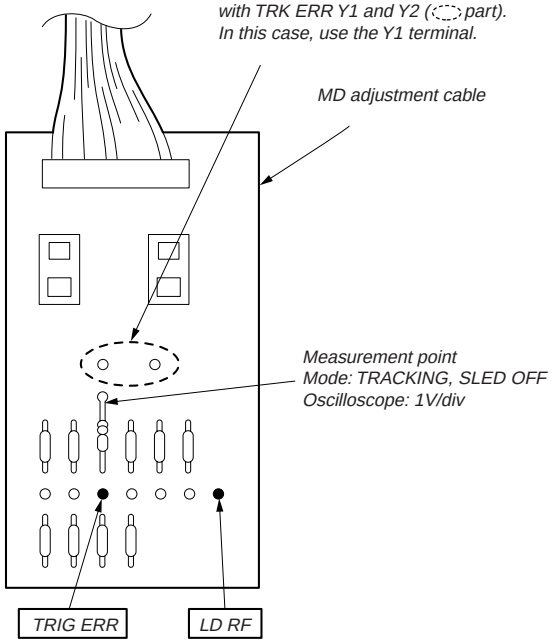
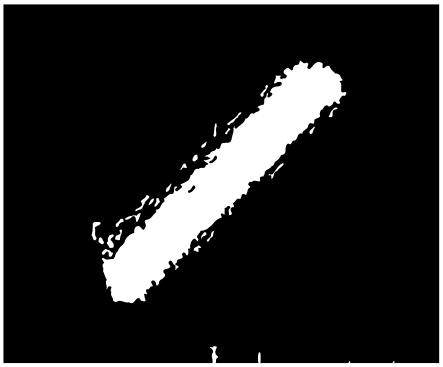


Fig. 7-9.

7-6-2. LD Side B Adjustment

① Loosen the side B RD screw and TAN screw (hexagonal screw 2.6) on the feed base.
② Put the LD alignment disc (HLV-8) in with the CAV side to the side B, playback it and pause at the chapter 3 (#2201).
③ Turn off the SLED and TRACKING, and adjust inserting an eccentric screwdriver to B RD adjustment hole so that the Lissagous waveform meets standard.



Jig terminal : E, F
Mode : TRACKING, SLED OFF
Oscilloscope : X/Y Lissagous range (Each 20 mV/div.)
Phase difference : 1 : 3 or more

Fig. 7-10.

④ Connect an oscilloscope to LD RF terminal on the MD adjustment cable and adjust RV702 so that the RF waveform goes maximum in the state the TRACKING and SLED are on.

Fig. 7-11.

⑤ Insert an eccentric screwdriver to B TAN adjustment hole and adjust the RF waveform goes maximum similarly to the step 4.
⑥ Play #770 and pause.
At this time in the same manner as the side A, check that the vertical bar appears on TV monitor and right and left crosstalks (moire) are the same level and maximum.
⑦ Take out the disc to tighten B TAN and RD screw.

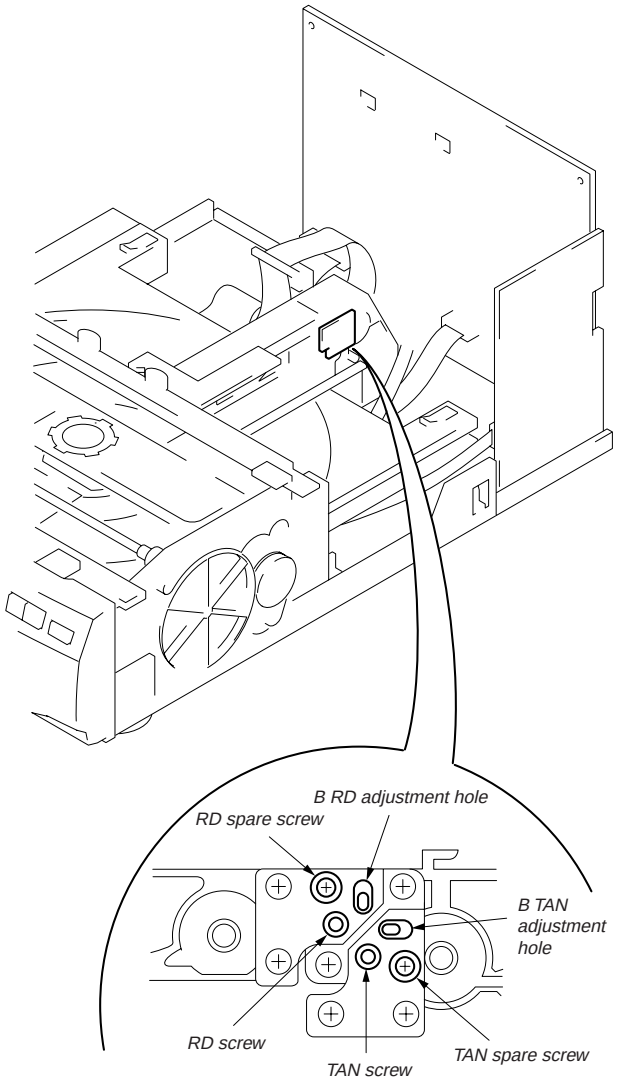


Fig. 7-12.

7-7. VIDEO SYSTEM ADJUSTMENTS

7-7-1. LD Output Level Adjustment (MB-97 board)

Mode	Still
Signal	LD alignment disc HLV-8 Frame No. 4100 (Color bar)
Measurement point	J001 (VIDEO OUT 1 terminal) (Be sure to terminate at 75Ω)
Measuring equipment	Oscilloscope
Adjusting element	RV101
Specified value	1.00 ± 0.1 Vp-p

Adjusting method:
1) Press the still (STILL/STEP ◀II) button on remote commander.
2) Search the frame No. 4100 and apply a color bar signal.
3) Adjust RV101 to 1.00 ± 0.1 Vp-p.

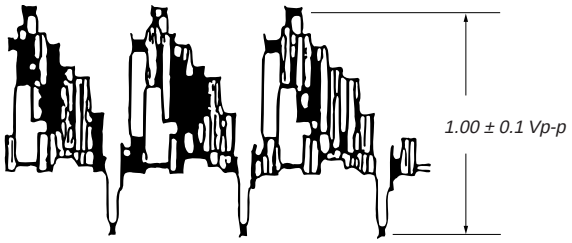


Fig. 7-13.

7-7-2. Video Clock Adjustment (VX-97 board)

Mode	Stop
Measurement point	Pin ㊼ of IC203
Measuring equipment	Frequency counter
Adjusting element	CT201
Specified value	13,500,000 Hz ± 40 Hz

7-7-3. Video CD Output Level Adjustment (VX-97 board)

Mode	Still
Signal	Video CD test disc (HLV-401) Track No. 41 (White 100%)
Measurement point	J001 (VIDEO OUT 1 terminal) (Be sure to terminate at 75Ω)
Measuring equipment	Oscilloscope
Adjusting element	RV201
Specified value	1.00 ± 0.1 Vp-p

Adjusting method:
1) Press the still (STILL/STEP ◀II) button
2) Search the track No. 41 and apply a white 100% picture signal.
3) Adjust RV201 to be 1.00 ± 0.1 Vp-p.

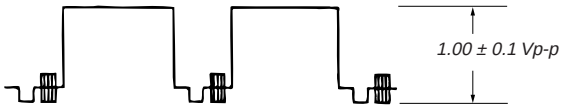
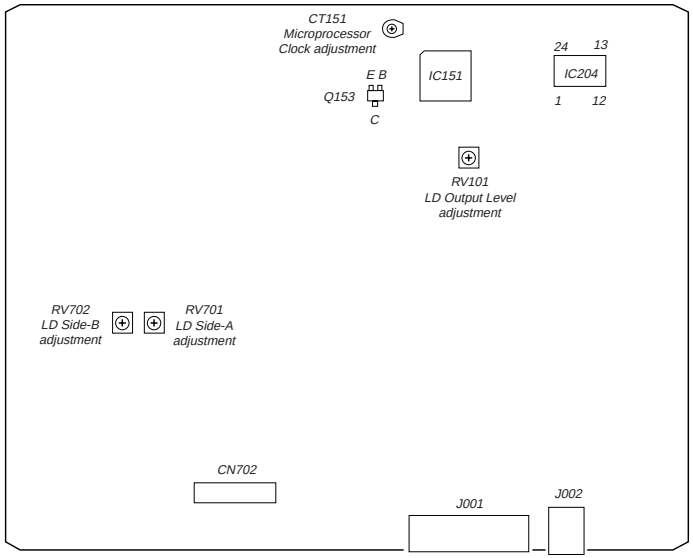


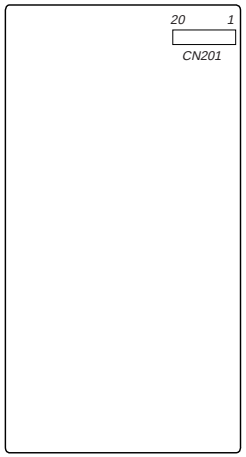
Fig. 7-14.

7-8. ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

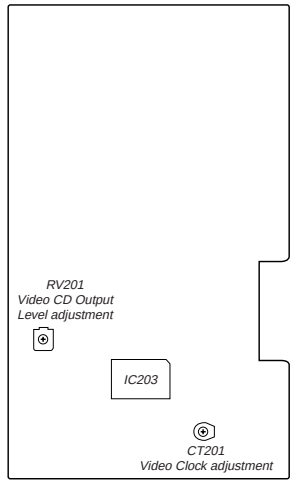
MB-97 BOARD (SIDE B)



POWER BLOCK (PS-96) (COMPONENT SIDE)



VX-97 BOARD (SIDE B)



SECTION 8
EVALUATION OF OPTICAL PICK-UP BLOCK (KHS-150A)

• To evaluate whether the optical pick-up block (KHS-150A) is good or not good, perform as follows.

8-1. PREPARATION

Connect the jig (J-6082-059-B) to the CN702 on the MB-97 board. (For details of connection, see Fig. 7-1 on page 7-2, and for the jig, see Fig. 7-9 on page 7-4.)

8-2. RF LEVEL CHECK

1. Connect an oscilloscope to the LD RF terminal of jig.
2. Load the CD test disc (YEDS-18).
3. Press the ▷ button to activate the play mode.
4. At this time, check if the RF waveform level is over 0.7V.
5. When the RF waveform level is over 0.7V, go to "8-3. Tracking Level/Tracking Balance Check".
6. If the RF waveform level is below 0.7V, clean the lens using the lens cleaning kit.
7. After drying the lens completely, again check the RF waveform level. And if the RF level is still low, the laser diode in the optical pick-up block has deteriorated, or internal lens is dirty. Replace the optical pick-up block.

8-3. TRACKING LEVEL/TRACKING BALANCE CHECK

1. Connect an oscilloscope to the TRK ERR Y terminal of jig.
2. Unload the CD test disc (YEDS-18), and load the LD reference disc (HLV-8) instead.
3. Press the ▷ button to activate the play mode, and play the chapter 3.
4. After playing, please the set in the still status.
   At this time, observe the tracking error waveform on the oscilloscope to check that both level and balance satisfy the specification given below.
   Specification
   Level: 3V or more
   Balance: –6% to +9%

Note: For a calculation method of balance, see Fig. 7-8 on page 7-4.

8-4. CROSSTALK CHECK

1. Play the CAV of the LD reference disc (HLV-8) to check the crosstalk at 770 frames.
   (For details, see 7-3-1. LD Side A Adjustment on page 7-4.)
2. Adjust the RV701 and RV702 on the MB-97 board so that the crosstalk becomes best condition (no moire observed).
3. At this time, if the RV701 and RV702 rotated more than the angle shown in Fig. 8-1 (normally, the rotation angle is within ±45º from the center), the suspension (spring) of pick-up will be deformed. Playing the LD under this condition could cause the images to be disturbed in the vicinity of outside. Replace the optical pick-up.

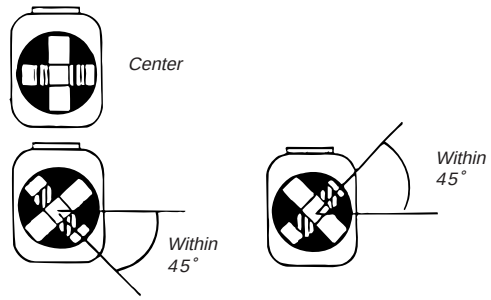


Fig. 8-1.

Notes:

• In executing the above operation, if no signal is output from each terminal of jig, the laser diode will be deteriorated.
When red beam is not generated from the lens during the focus search, replace the optical pick-up block.

• The above checking uses basically the reference disc, and if no particular abnormality is found, a failure which occurs in the user's disc only may be present.
Especially, in the case of LD, if a wavy tracking error as shown in Fig. 8-2 appears, the pick-up is resonating. Replace it with a new one.

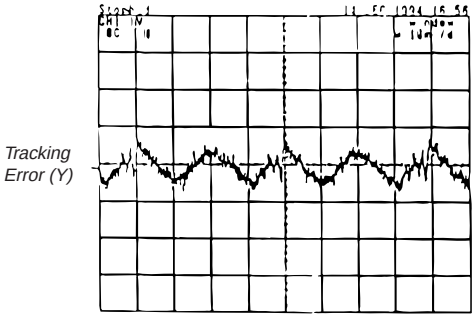


Fig. 8-2. Play Mode

SECTION 9
INSTRUCTION MANUAL FOR SPECIAL FUNCTIONS

Introduction

The MDP-V10 is provided with special functions, in addition to its normal functions, for convenience and repair work.
In this manual, these functions are classified into three sections-"Debug Mode", "Service Mode", and "Expansion Key Mode" and explained.
The specifications given in this manual are subject to change without prior notice for upgrading, etc.

CONTENTS

1. OUTLINE

1-1. Debug Mode

The “Debug Mode” is a state in which the function (debug function) which displays microprocessor RAM information on the screen can be used.
This mode differs from the normal mode as follows.

1) The Fluorescent tube goes off when the commands of this mode are effective.
2) When the key of the remote control is pressed in the state of 1), debug information such as emergency history, etc., can be displayed. During this time, only some keys will be effective.

1-2. Service Mode

The “Service Mode” is a state in which the function (service function) which facilitates repairs and inspections can be used.
This mode differs from the normal mode as follows.

1) Special operations such as focus search, sled forwarding, etc. can be performed.
2) The power will not go off automatically even when emergencies which turn off the power occur.
3) When this mode is set, the debug mode will also be set automatically.

1-3. Expansion Key Function

The “Expansion Key Function” is the function which operates when several keys of the unit or remote control are pressed simultaneously for tests, etc. according to a set of procedures.
This function can be used in the service mode, debug mode, and in normal operations.
This function consists of the “Unit Key Simultaneous Pressing Function” used by pressing several keys of the unit simultaneously and the “Unit Key+Remote Control Key Simultaneous Pressing Function” used by pressing the unit key together with a key of the remote control twice.

2. DEBUG MODE

2-1. Setting the Debug Mode

To set the debug mode from the normal mode (normal state), press the [10/0] key and then the [STOP] key of the remote control while pressing the [STOP] key of the unit with the power on.
The following screen should be displayed.
This screen shows the microprocessor version. For details, refer to “2-4-1. Microprocessor Version”.
So as to valid the debugging commands at the debugging mode, press the [10/0] key and then the [8] key of the remote control while pressing the [STOP] key of the unit. And the Fluorescent tube will be off while debug commands are effective.
So as to invalid the debugging commands at the debugging mode, press the [10/0] key and then [9] key of the remote control while pressing the [STOP] key of the unit. The Fluorescent tube will be on while debugging commands are not effective.

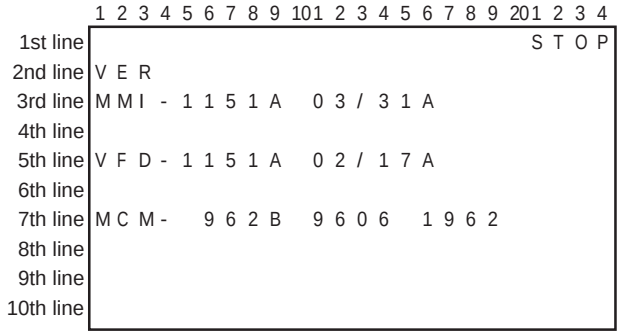


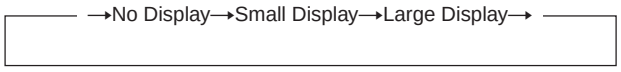
Fig. 9-1. Debug Mode Initial Screen

2-2. Exiting the Debug Mode

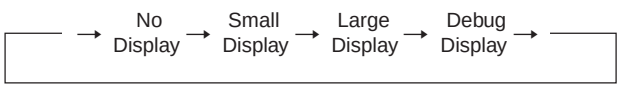
To return to the normal mode from the debug mode, press the [CLEAR] key of the remote control at the screen shown in Fig. 9-2. (Microprocessor Version Screen), which should be effective the debugging commands.

2-3. Switching the Screen Display

When the debug mode is set, the screen will display the “Debug Screen”.
Press the [DISPLAY] key will switch it to the display format as in the normal mode.
In the debug mode, the display format can be selected from “No-Display” (normally nothing is displayed), “Small Display” (only the first line displayed)”, “Large Display” (the whole screen is displayed constantly), and “Debug-Display”.
When the [DISPLAY] key is pressed in the normal mode, the display will be switched as follows.



In the debug mode, it will be switched as follows



2-4. Reading the Debug Display

"Debug Display" shows information of the mode controller on the screen in dump list format.
The title is displayed at the left side of the screen at the second line, while the data is displayed from the third to the ninth lines.
The display format of the data is basically 4 hexadecimal characters (2 bytes) equals one set, and one line is composed of up to four sets (8 bytes).
When a certain key is pressed while the Fluorescent tube is off during "Debug Display", the information to be displayed can be selected.
The information currently defined is as follows.

Table 9-1. Debug Display Key/Information Table

Key	Displayed Information
[FRAME/TIME]	Microprocessor version
[1]	Function mode history
[2]	Emergency history
[3]	Normal service mode information
[4]	Trap flag
[5]	Key/remote control data
[7]	Information on communication with mechanism controller
[REPEAT]	Operation information

2-4-1. [FRAME/TIME] Microprocessor Version

Displays the microprocessor version.
The third line displays the mode controller version, the fifth line displays the VFD controller version, and the seventh line displays the mechanism controller version.
According to the example in Fig. 9-2, the mode controller version is "MMI-1151A 03/31A", the VFD controller version is "VFD-1151A 02/17A", and the mechanism controller version is "MCM-962B 9606 1962".

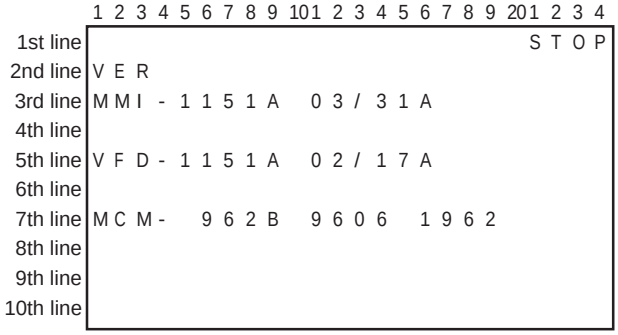


Fig. 9-2. Microprocessor Version

2-4-2. [1] Function Mode History

Displays the history of the function mode.
The function mode is the basic operation commands, such as STOP and PLAY, which are transmitted from the mode controller to the mechanism controller.
The function mode data is one byte each (hexadecimal 2 digits). 8 latest histories of the function mode can be stored at the one line, and up to 24 histories in three lines.
The data is stored byte by byte from left to right. The data [FF] is stored next to the last data stored. When the data reaches the right edge of the first line, it is stored from the left edge of the second line continuously. When it reaches the right edge of the third line, it returns to the left edge of the third line again.
The current (stored last) function mode is the data at the left side of the data [FF]. When this data [FF] is at the left edge of the first (second, third) line, the function mode will be the data at the right edge of the third (first, second) line.
The data [FE] indicates that an emergency has occurred there. To find out the type of emergency, refer to "2-4-3. Emergency History".

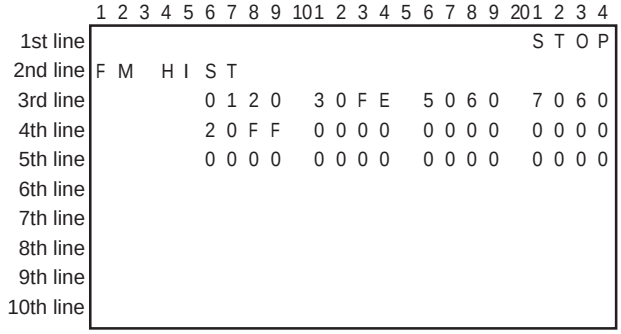


Fig. 9-3. Function Mode History

In the case of Fig. 9-3;

01 (Power ON start-up)
→ 20 (Stop)
→ 30 (Side A start-up)
→ FE (Emergency occurred)
→ 50 (Chapter search)
→ 60 (Playback)
→ 70 (Normal direction low speed scan)
→ 60 (playback)
→ 20 (Stop) (Current function mode)

The function mode changed in the above order.

The following page shows the function mode list.

Table 9-2. Function Mode List

No.	State	Description	
00	Power OFF		
01	Power ON start-up	During initialization when power is turned on	
10	Open	Opens the door and ejects the tray	
20	Stop	Draws in the tray and stops the spindle	
30	Side A playback standby	From stop, etc. to immediately before side A search	
40	Side B playback standby	From stop, etc. to immediately before side B search	
50	Chapter search	Chapter search including disc top search	
51	Frame/time search	CAV frame search/other time search	
60	Playback	PLAY	
61	Instantaneous stop	PAUSE	
70	Normal direction low speed scan	> >	
71	Normal direction high speed scan	> > >	
72	Reverse direction low speed scan	< <	
73	Reverse direction high speed scan	< < <	
80	Normal direction still	STILL	Only CAV is effective from 80 (Normal direction still) to 9C (Reverse direction x 10 speed playback)
81	Normal direction step	Forwards one frame	
82	Normal direction 1/90 speed playback		
83	Normal direction 1/30 speed playback		
84	Normal direction 1/16 speed playback		
85	Normal direction 1/8 speed playback		
86	Normal direction 1/4 speed playback		
87	Normal direction 1/2 speed playback		
88	Normal direction x 1 speed playback		
89	Normal direction x 2 speed playback		
8A	Normal direction x 3 speed playback		
8B	Normal direction x 5 speed playback		
8C	Normal direction x 10 speed playback		
90	Reverse direction still	STILL	
91	Reverse direction step	Returns one frame	
92	Reverse direction 1/90 speed playback		
93	Reverse direction 1/30 speed playback		
94	Reverse direction 1/16 speed playback		
95	Reverse direction 1/8 speed playback		
96	Reverse direction 1/4 speed playback		
97	Reverse direction 1/2 speed playback		
98	Reverse direction x 1 speed playback		
99	Reverse direction x 2 speed playback		
9A	Reverse direction x 3 speed playback		
9B	Reverse direction x 5 speed playback		
9C	Reverse direction x 10 speed playback		
FE	Emergency occurred	Some kind of emergency occurred	
FF	Next to last data	Last history data	

2-4-3. [2] Emergency History

Displays the history of emergency codes occurred.
The emergency code is 1 byte data transmitted to the mode controller when problems occur in the mechanism controller.
Like [64 (Minimum chapter detection)], some codes only indicate the state code level. Codes above [80] are generated in the mode controller itself and are not transmitted from the mechanism controller.
If emergency has not occurred once since the power cord was inserted in the outlet, all the data will be [00].
The display format is the same as the function mode history. 16 sets are stored in 2 lines. The emergency code immediately before the data [FF] corresponds to the data [FE], which is closest to the data [FF] in the function mode history.

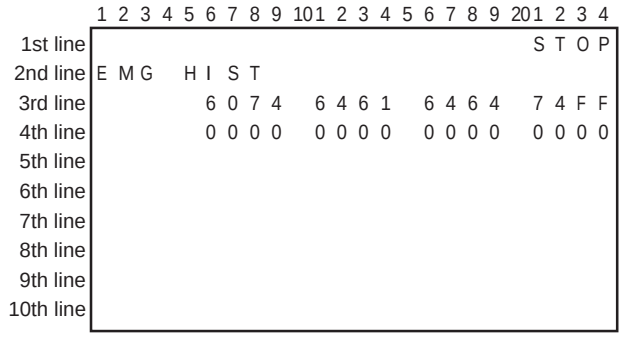


Fig. 9-4. Emergency History

According to the above example, as next to [FF] is the left edge 60, it can be seen that the emergency occurred in the following order.

60 (Read-in detection)
→ 74 (Focus drop)
→ 64 (Minimum chapter detection)
→ 61 (Read-out detection)
→ 64 (Minimum chapter detection)
→ 64 (Minimum chapter detection)
→ 74 (Focus drop) (Emergency immediately before).

The following page shows the emergency code list.

Table 9-3. Emergency Code List

No.	State	Operation After Occurring
01	Forced power OFF request	POWER OFF
02	Forced tray ejection request	EJECT
03	STOP request	STOP
04	STOP request during forced door open	STOP
05	PLAY request	PLAY
06	Power OFF shift finalization request	POWER OFF display fixed
07	Power OFF request after communication stop	POWER OFF
08	Front door does not move	POWER OFF
09	Door open when in tray open	POWER OFF
10	Tray push detection	PLAY
11	Tray does not move	POWER OFF
20	Sleder does not move	POWER OFF
30	TILT does not move	POWER OFF
31	TILT does not move and counter measure is executed	None
40	Spindle FG detection erasure	POWER OFF
41	Not transmitted from FG to H servo	STOP
42	When upper limit speed is exceeded	STOP
43	When lower limit speed is exceeded	STOP
44	Spindle STOP operation does not end	POWER OFF
45	Spindle control time-out	POWER OFF
50	Focus is not imposed	STOP
51	Focus is not imposed (Disc present)	STOP
52	Determined as not LD	None
53	8 inch LD focus not imposed	STOP
54	CD/CDC TOC not read	STOP
60	Read-in detection	PLAY, etc.
61	Read-out detection	STOP/PAUSE, etc.
62	CDV A part read-out detection	STOP/PAUSE, etc.
63	Picture stop detection	STILL
64	Minimum chapter detection	None
65	CD/CDV subcode not read	STOP
66	LD phillips code not read	STOP
67	Locked groove countermeasure is executed	None
70	Over-search detected	PLAY
71	Under search detected	PLAY
72	Search time-over	PLAY
74	Search focus drop	STOP
76	Retry executed after focus drop	None
	(The following emergencies occurred inside the mode controller.)	
80	Emergency time-out	POWER OFF
81	Search time-out	PLAY
82	Mechanism controller communication time-out	POWER OFF
86	12V power supply error	Unplug the AC power cord

2-4-4. [3] Mechanism Controller Service Information

Displays the service information transmitted from the mechanism controller.

Currently, the information in Table 9-4 is defined.
The data number in the table correspond to the number of the third to fifth lines in Fig. 9-5.

Table 9-4. Mechanism Controller Service Information

Data No.	Data
(02)	Mechanism mode (Mechanism controller internal mode) For details, refer to the next page.

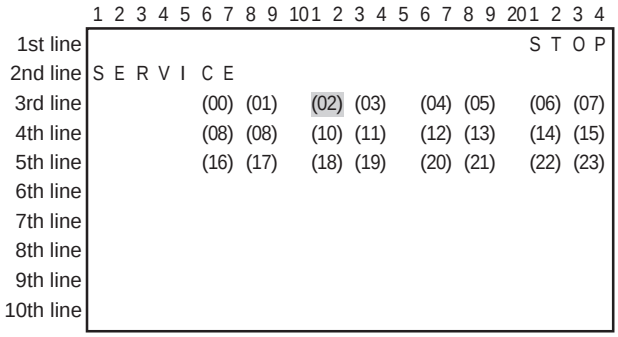


Fig. 9-5. Mechanism Controller Service Information

Mechanism Mode

The mechanism mode is the basic operation mode in the mechanism controller. The codes are more or less the same as the function mode, but divided more in detail than the function mode.

The following is the mechanism mode list.

Table 9-5. Mechanism Mode List

No.	Function
00	POWER OFF
01	Mechanism controller initialization (No mechanism operations)
03	Processing from POWER ON to OFF
04	Processing from POWER OFF to ON
05	Mechanism and peripheral IC initialization
10	Tray, EJECT state
11	Ejecting tray
12	Loading tray
20	STOP state in chucked up state
21	Setting chuck up from side A chucking
22	Setting side A chuck up from chuck up
23	Side A chuck state
30	To side A focus lock
31	0 search and start up from focus lock
32	Moving from Side A/B to STOP
33	Reversing from side A to B
40	To side B focus lock
50	Chapter search
51	Frame/time search
60	Playback
61	Instantaneous stop
70	Normal direction low speed scan
71	Normal direction high speed scan
72	Reverse direction low speed scan
73	Reverse direction high speed scan
74	Scan completion process
80 to FF	(Same as function mode)

2-4-5. [4] Trap Flag

Displays the contents of the trap flag.
The trap flag is data containing the reason why the power turned off abnormally other than when the POWER key was pressed.
Trap flag is output from the VFD controller and mode controller. That flag from the VFD controller is the fourth digit from the left and that from the mode controller is the fourth digit from the right.
The first byte of each from the right side (hexadecimal 2 digits) have meanings for each bit, and bit 1 corresponds to the reason why the power turned off abnormally the last time.
The first byte from the left side is the same flag, and is the logic OR of the reasons why the power turned off abnormally in the past.

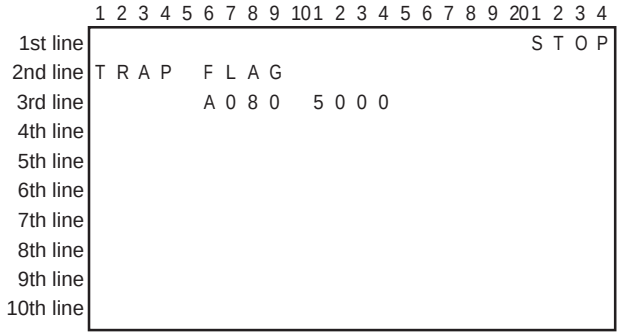


Fig. 9-6. Trap Flag

According to the above figure, it can be seen that in the past, 80 (power off due to abnormal voltage level) and 20 (power off due to mode controller communication error) occurred in the VFD controller, and 10 (power off due to mechanism controller communication error) and 40 (power off due to VFD controller communication error) occurred in the mode controller.
The reason why the power turned off abnormally the last time is because 80 (power off due to abnormal voltage level) occurred in the VFD controller.
The bits of the flag have the following meanings.

Table 9-6. Trap Flag Bit/Reason Table

Bit No. (Pattern)	Reason
7 (80)	Power OFF due to abnormal voltage level
6 (40)	Power OFF due to VFD controller communication error
5 (20)	Power OFF due to mode controller communication error
4 (10)	Power OFF due to mechanism controller communication error
3 (08)	Power OFF due to emergency
2 (04)	Forced power OFF due to key operations
1 (02)	Reset due to mode controller self-diagnosis
0 (01)	Forced reset due to key operations

Note:

- The resetting of bits 0 and 1 means that the mode controller is initialized in the same state as when the power was turned on, except when the trap flag is stored.
  In this case, the function mode and emergency histories will be erased.
- Hexadecimal A is 2+8. In the same way, B=1+2+8, C=4+8. D=1+4+8, E=2+4+8, F=-1+2+4+8.

2-4-6. [5] Key/remote Control Data

Displays the data input using the keys of the unit and remote control as SIRCS codes.
Only the remote control for MDP is effective.
The first byte on the left side of the third line (hexadecimal 2 digits) in Fig. 9-7 is the SIRCS code in the key inputs, and the first byte from the right side is the SIRCS code in the remote control input.
FF is set when nothing is pressed. When two keys are pressed together, the code of the one pressed faster will be shown.
In current models, only the keys of the unit can be used and some keys have no SIRCS code.
These are defined as internal codes for data above 80.

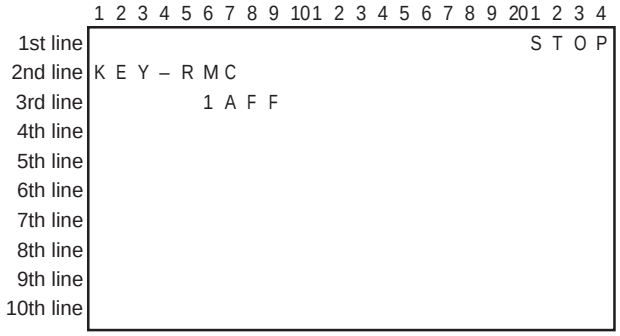


Fig. 9-7. Key/Remote Control Data

According to the above figure, it can be seen that the [1A (PLAY key)] of the unit is pressed, and the remote control is FF (nothing is pressed).
Take note for some remote controls, the code is generated instantaneously when the key is pressed.

The following next page shows a list of the SIRCS code used by MDP-V10.

Table 9-7. List of MDP SIRCS Codes

No	Function
00	1
01	2
02	3
03	4
04	5
05	6
06	7
07	8
08	9
09	10/0
0C	Frame/time
0F	Clear
15	Power ON/OFF
16	Tray open/close (⏏)
17	Audio monitor
18	Stop (■)
19	Pause (❚❚)
1A	Playback (►)
1E	Reverse direction low speed scan (◄◄)
1F	Normal direction low speed scan (►►)
28	Time display (AV time)
29	Repeat
2B	Normal still/Frame forwarding (❚❚►)
2C	Reverse still/Frame forwarding (◄❚❚)
30	Program
34	Normal direction ACS (►►❙)
35	Reverse direction ACS (❙◄◄)
38	Repeat AB
39	Number +10 (>10)
3A	Screen display (Display)
40	Analog/CX
41	Shuffle
45	Auto program
46	Auto pause
47	1/one side/both side
5D	Side A
5E	Side B
74	DIGEST
7A	DNR
AB	PBC return
AC	PBC selection
AE	Normal direction Video index search
AF	Reverse direction Video index search
B0	Slow
FF	Not pressed

2-4-7. [7] Information on Communication with Mechanism Controller

Displays the communication data of normal text with the mechanism controller.
The third to the fifth line is the text transmitted from the mode controller to the mechanism controller.
The seventh to the ninth line is the text received from the mechanism controller by the mode controller.
The [!] symbol at the head of the eighth and ninth line indicates that the text has been communicated normally.
If the text was cut off halfway, the [?] is displayed. [■] is displayed when the communication was cut off after the communication for service, etc.

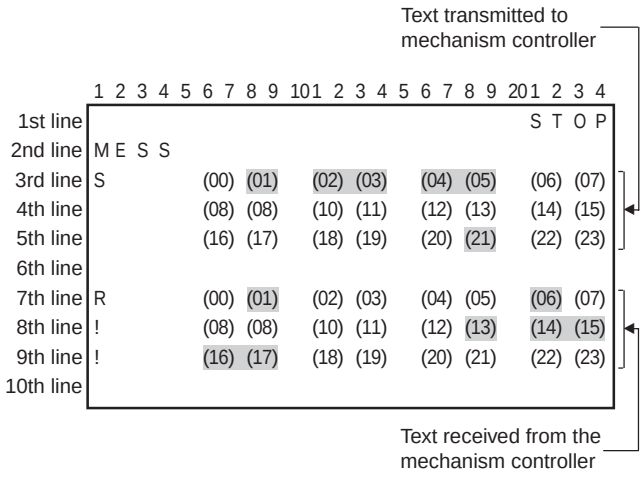


Fig. 9-8. Information Communicated with Mechanism Controller

The following is a part of the communicated text.

Table 9-8. Text Transmitted from Mode Controller to Mechanism Controller (Fig. 9-8. Top)

No.	Explanation
(01)	Current (Next) function mode
(02)	Last goal function mode
(03 to 05)	Search destination address (Time/frame)

Table 9-9. Text Received by Mode Controller from Mechanism Controller (Fig. 9-8. (Bottom))

No.	Explanation
(01)	Current (Next) function mode
(06)	Completion flag of function mode shift (lowermost bit)
(13)	Current chapter/track number
(14)	Current index number
(15 to 17)	Current address (Time/frame)

2-4-8. [REPEAT] Operation Information

Displays the operation information

Displays the optical system operation time at the third line. The fourth to ninth lines show the number of SIRCS received in hexadecimal digits.

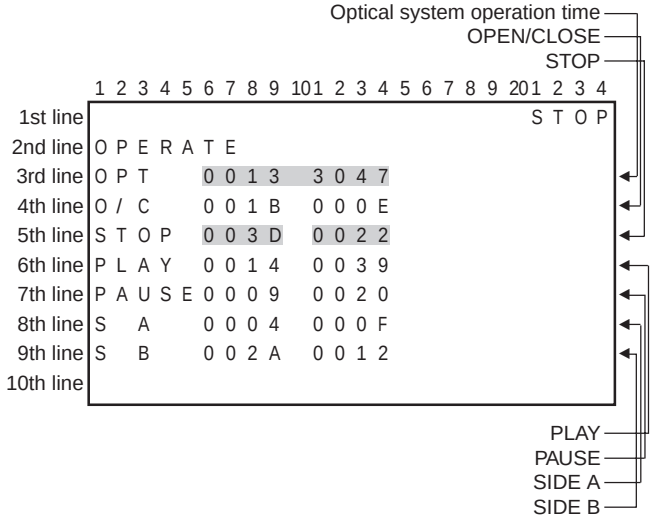


Fig. 9-9. Operation Information

According to the above example, the optical system operation time is 12 hours, 30 minutes, and 47 seconds.

The received SIRCS is counted separately for [key] and [remote control]. For example, STOP, the number of times received for [key] is 3Dh=61 times and that of [remote control] is 22h=34 times.

• Hexadecimal/Decimal Conversion Table

Hexadecimal	Decimal
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	10
B	11
C	12
D	13
E	14
F	15

Conversion Example

3Dh: 3 x 16 + 13 = 61 ..... Decimal
3 D ..... Hexadecimal

ACh: 10 x 16 + 12 = 72 ..... Decimal
A C ..... Hexadecimal

3. SERVICE MODE

3-1. Setting the Service Mode

To set the service mode, perform the following process.

With the power off, press the following three keys of the unit simultaneously and start up the power.

[STOP]+[10] + [POWER]

If the microprocessor version is displayed on the screen, it indicates that the service mode is set.

If it is not displayed, it indicates that the mode is not set.

When the service mode is set, the debug mode will also be set at the same time from the beginning.

3-2. Exiting the Service Mode

To exit, press POWER and turn off the power.

If it cannot be turned off (when the mechanism has not been completed, etc.), press the [STOP] key and [POWER] key of the unit simultaneously and turn off the power forcibly.

3-3. Using Special Operations

For safety, the special operations in the service mode can only be performed in the [NO DISC] and [STOP] state. Check that the above message is not blinking but displayed on the screen. So as to valid the debugging commands at the debugging mode, press the [10/0] key and then the [8] key of the remote control while pressing the [STOP] key of the unit. And the Fluorescent tube will be off while debug commands are effective, and after the Fluorescent tube goes off, keys of the unit such as [PLAY] and [PAUSE] are pressed, the special functions in Table 9-10 can be performed.

Operations by other keys are continuously performed once the keys are pressed until the [STOP] key is pressed.

Several special operations cannot be performed at the same time even by pressing more than two keys together.

As some keys will not function while the Fluorescent tube is off, to stop special operations from being performed. So as to invalid the debugging commands at the debugging mode, press the [10/0] key and then [9] key of the remote control while pressing the [STOP] key of the unit. The Fluorescent tube will be on while debugging commands are not effective.

Table 9-10. List of Special Operations

Keys	Special Operations
[SIDE A]	Sled reverse direction (downwards) forwarding
[SIDE B]	Sled normal direction (upwards) forwarding
[PLAY]	Focus search start
[PAUSE]	Tilt servo ON start
[STILL/STEP II►]	Tray aging start
[STILL/STEP ◄II]	Sled aging start
[REPEAT A←→B]	Tilt aging start
[STOP]	Special operations are stopped

The following describe the special operations.

3-3-1. [SIDE A] Key……Sled Reverse Direction Forwarding

When the [SIDE A] key is pressed continuously, after the tilt initialization operations (the tilt is moved to the center position) are performed, the sled moves in the reverse direction (Side B inner circumference⟶ Side B outer circumference⟶ Side A outer circumference⟶Side A inner circumference).
It stops when the key is released.

3-3-2. [SIDE B] Key……Sled Normal Direction Forwarding

Opposite to 3-3-1. Sled Reverse Direction Forwarding, the sled moves in the normal direction (Side A inner circumference⟶Side A outer circumference⟶Side B outer circumference⟶Side B inner circumference).
Useful for replacing the optical parts.
The sled stops when the key is released.

3-3-3. [PLAY] Key……Focus Search

When the [PLAY] key is pressed continuously, focus search operations are repeated.
The pickup lens should move up and down.
Execute focus search after confirming that the sled is at the correct position (center of side A).
It stops when the [STOP] key is released.

3-3-4. [PAUSE] Key……Tilt Servo ON

When the [PAUSE] key is pressed, the tilt servo turns on.
When the [PAUSE] key is pressed after moving the sled to the center of side A by [SIDE A]/[SIDE B] key and placing the CD, etc. on the tray so that it touches the skew sensor, the tilt should move.
If the sled is moved using the [SIDE A]/[SIDE B] key, the tilt will return to the center.
It will stop when the [STOP] key is pressed.

3-3-5. [STILL/STEP II►] Key……Tray Aging Start

When the [Still/STEP II►] key is pressed, tray aging will start.
As the tray will move in and out automatically, be careful of the surrounding area.
It will stop when the [STOP] key is pressed.

3-3-6. [STILL/STEP ◄II] Key……Sled Aging Start

When the [Still/STEP ◄II] key is pressed, sled aging will start.
The sled will move to and for between sides A and B inner circumferences automatically.
It will stop when the [STOP] key is pressed.

3-3-7. [REPEAT A←→B] Key……Tilt Aging Start

When the [REPEAT A←→B] key is pressed, tilt aging will start.
The tilt will move up and down automatically.
It will stop when the [STOP] key is pressed.

4. EXPANSION KEY FUNCTION

4-1. Using the Unit Simultaneous Key Pressing Function

The simultaneous key pressing function of the unit is effective when several keys of the unit are pressed simultaneously.

Used for functions to be executed promptly such as Forced Power OFF.
Currently defined simultaneous key pressing functions of the unit are as follows.

Table 9-11. Simultaneous Key Pressing Function of Unit

Function	Unit Key
① Forced power off Turns off the power forcible. To turn off the power immediately when the mechanism overruns, etc. or when the power cannot be turned off by pressing the [POWER] key. As the power will be turned off without regard of the conditions of the mechanism, do not use it frequently.	[PBC ON/OFF]+[POWER]
② Forced reset In addition to the forced power off function, initializes the mode controller. When the mode controller is operating abnormally such as strange items are displayed on the screen, use this function to reset the mode controller. When this function is executed, take note that emergency histories, and all information will be deleted other than the trap flag information of the debug mode.	[STOP]+[POWER]
③ MDP-V10 Fluorescent tube/all LEDs lighting up When the power turns on automatically, all the segments of the Fluorescent tube and LEDs will light up. Normal operations will be performed until the power is turned off. In such cases, the Fluorescent tube and LED displays will remain lit.	[STOP]+[>10]+[POWER] (Only when the power is off.)

4-2. Using the Unit + Remote Control Simultaneous Key Pressing Function

The simultaneous key pressing function of the unit+remote control is effective while the unit key is pressed and a key of the remote control is pressed twice.

For users to execute it accidentally, it is necessary to press two remote commandeer keys within about 1 second.
The special key operations currently set are as follows.

Table 9-12. Simultaneous Key Pressing Function of Unit Key Remote Control

Function	Procedure	Unit key + Remote control key
① Debug mode ON/OFF selection The debug mode is set if it has not been set, and is exited when it is set.	1 2	[STOP]+[10/0] [STOP]+[STOP]
④ Mechanism controller time-out invalidation Invalidates the function which cuts off the power supply when communication with the mechanism controller cannot be performed. Used when the mechanism controller may not be operating and the mode controller is to be moved.	1 2	[STOP]+[10/0] [STOP]+[>10]
⑤ Mechanism controller time-out validation Validates the function which cuts off the power supply when communication with the mechanism controller cannot be performed. Used for exiting the ④ function.	1 2	[STOP]+[10/0] [STOP]+[10/0]
⑧ EEPROM clear All clears the data of the EEPROM debug mode. Valid only when the power is on.	1 2	[STOP]+[10/0] [STOP]+[REPEAT]

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