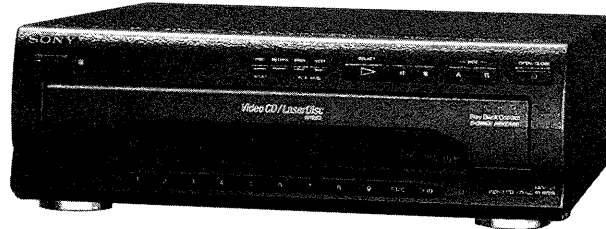


MDP-V1

RMT-M43A/M43B

SERVICE MANUAL

E Model



Model Name Using Similar Mechanism	NEW
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)
(PAL color system is E model 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

General

Power requirements

110-240 V AC, 50/60 Hz (E model)
110 V AC, 60 Hz (Taiwan model)

Power consumption

40 W

Operating temperature

5°C to 35°C

Ambient humidity

5% to 90 %

Dimensions

Approx. 355 × 121 × 395 mm
(w/h/d)
including projecting parts and controls

Mass

Approx. 8 kg

— Continued on next page —

VIDEO CD/CD/LD PLAYER
SONY®

Supplied accessories

Remote Commander

RMT-M43A (1) (E model)

RMT-M43B (1) (Taiwan model)

R6 (size AA) batteries (2)

Audio/Video Cable





(phono plug 3 ↔ phono plug 3) (1)

AC plug adaptor (1)

Design and specifications are subject to change without notice.

Optical discs

The MDP-V1 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	 LASER DISC	LD Single (NTSC)	8 in. (20 cm)	Single	CAV	14 min	
					CLV	20 min	
	 Laser Vision	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	 COMPACT disc DIGITAL AUDIO	CD Single	3 in. (8 cm)	Single	20 min (audio only)		
		CD	5 in. (12 cm)	Single	74 min (audio only)		
	 COMPACT disc DIGITAL VIDEO	VIDEO CD (NTSC and PAL)	3 in. (8 cm)	5 in. (12 cm)	Single	20 min	
					Single	74 min	

* The MDP-V1 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.

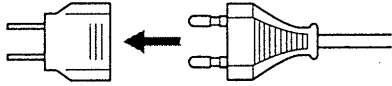
Discs conforming to the Dolby Surround AC-3 system

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 (E model only)

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

If the AC plug of your unit does not fit into the wall outlet, attach the supplied AC plug adaptor.



The MDP-V1, 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
- Mark a point on a VIDEO CD where you want to resume playback—Book Mark
- The COLOR SYSTEM selector allows you to play PAL VIDEO CDs regardless of the TV system (PAL, NTSC or Multi Monitor system)
- Search for any point on any type of disc—Frame/Time/Scene Search
- Continue an LD/VIDEO CD from the exact 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.

NOTE: PAL color system is E model only.

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 \triangle OR DOTTED LINE WITH MARK \triangle 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.

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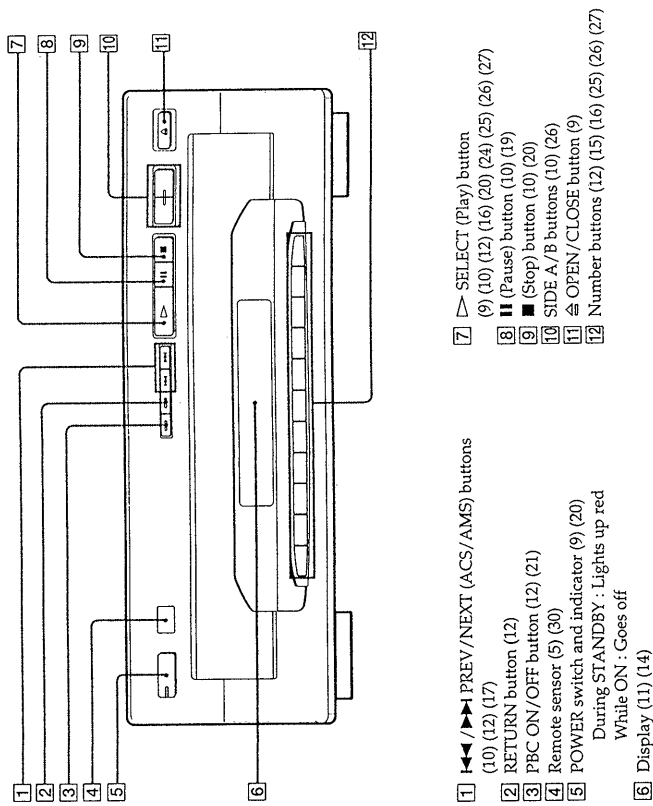
SECTION 1 GENERAL

This section is extracted from instruction manual.

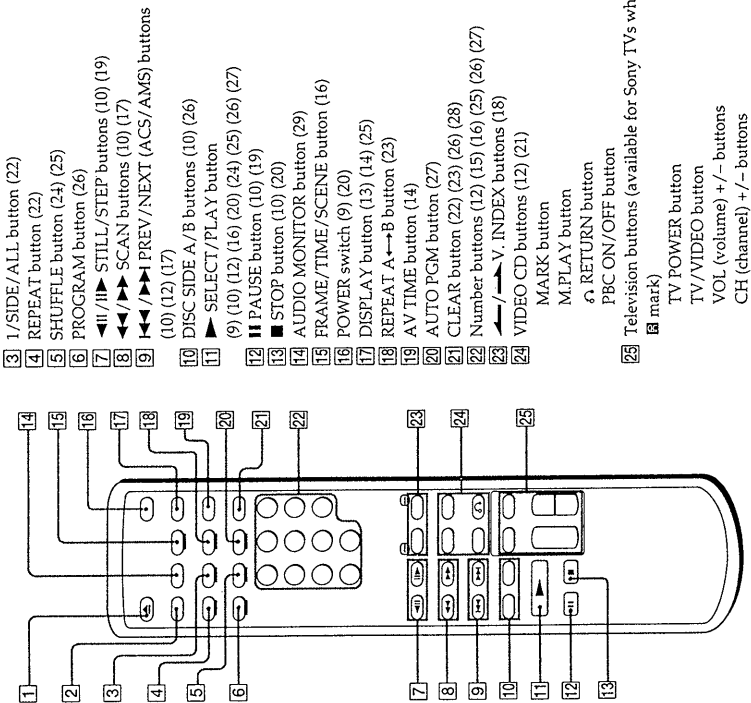
See the pages indicated in () for details.

Index to parts and controls

Front



Remote commander



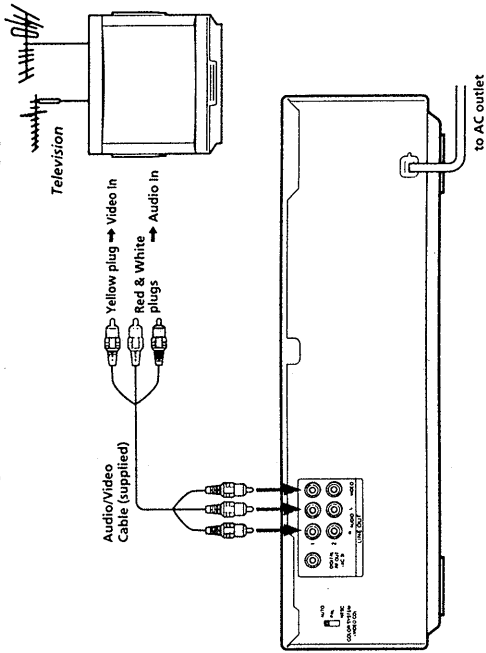
Ⓜ A function activated by pressing a button with an orange mark can be canceled by pressing the CLEAR button.

Step 3

Connecting the player

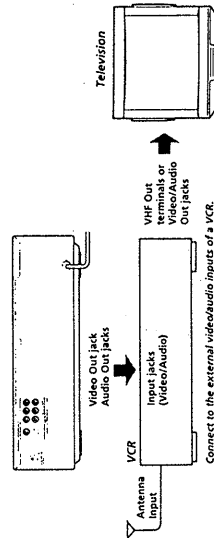
Television hook-up

To play LDs or VIDEO CDs, hook up a television to the player. Take out the supplied audio/video connecting cable (yellow, red, and white plugs). Use this to connect the player to the television. Once you have hooked up the television, set the input selector on the TV to "Video." Before connecting or disconnecting any cables, turn off all equipment.



Television/VCR hook-up

Connect the player to the VCR's inputs when:
 - the video inputs of the TV are already used for the VCR or a similar machine.
 - the TV has only an antenna input.



Notes

- Make sure all equipment is turned off before connecting or disconnecting any cables.
- Connection methods may differ; when in doubt about a connection, consult the TV or VCR manufacturer's manual.
- If the sound or picture is disturbed by noise, try moving the equipment farther apart.
- Firmly insert plugs into the jacks. A loose connection may cause noise.
- To prevent interference with TV broadcast reception, turn off all equipment connected but not currently in use.
- If the TV only has a monaural phono jack for audio input, use a VMC-910/915 Connecting Cable (not supplied).

COLOR SYSTEM selector setting (only for VIDEO CDs) (E model only)
 This player conforms to the NTSC and PAL color systems. Set the COLOR SYSTEM selector on the rear of the player to the appropriate position, according to your TV.

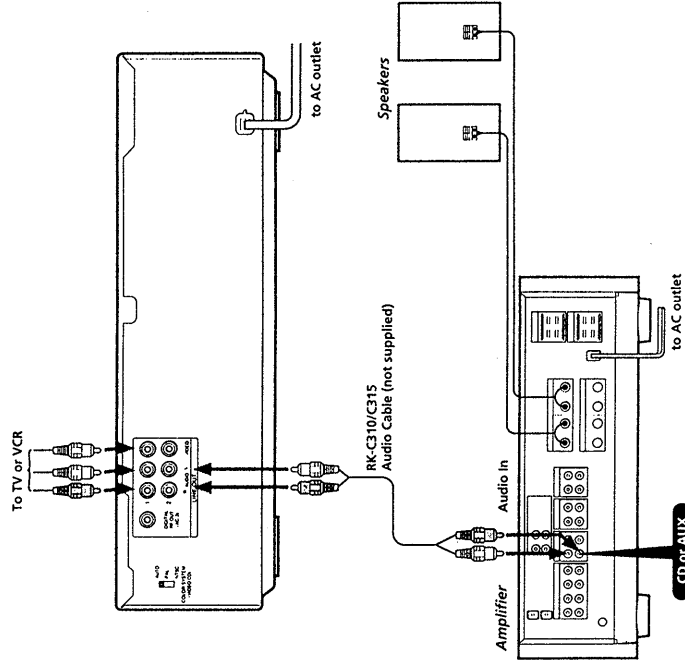
TV system	Set to
Multi monitor system	AUTO
PAL system	PAL
NTSC system	NTSC

Note

This selector can be set only when the power is turned off.

Audio equipment hook-up

To achieve full stereo sound from the player, hook up a stereo system following the diagram below. Use an RK-C310 (or RK-C315) Audio Connecting Cable (not supplied) to connect the player to your amplifier or receiver. Before connecting or disconnecting any cables, turn off all equipment.




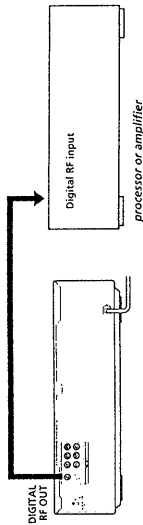
Notes

- Make sure all equipment is turned off before making any connections.
- Firmly insert plugs into the jacks. A loose connection may cause noise.
- When listening to a radio broadcast, turn off the player to get better reception.

Step 3 Connecting the player (continued)

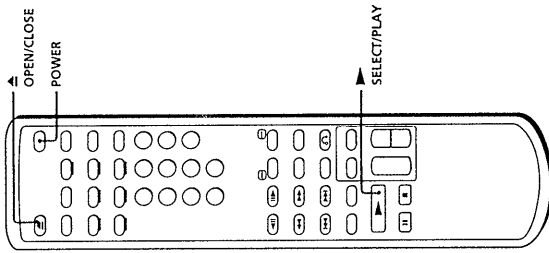
If you have a processor or amplifier that conforms to the Dolby Surround AC-3 system

To enjoy discs that conform to the Dolby Surround AC-3 system (discs with the  logo), connect the DIGITAL RF OUT to the processor or amplifier's digital RF input. You can obtain a theater-like atmosphere more effectively than with Dolby Pro Logic Surround. For details, refer to the instructions supplied with the processor or decoder amplifier.





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.
- 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...

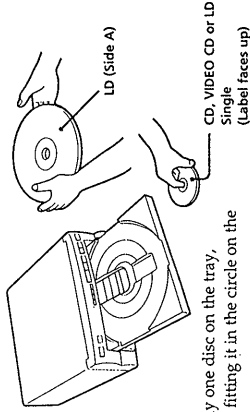
Connect the player to your TV and set the input selector on the TV to "Video" (see "Connecting the player" on page 6).

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. When you press  SELECT/PLAY or push in the disc tray in step 4, a menu appears on the screen and the player waits for you to play the disc using the PBC functions. To play a VIDEO CD using PBC functions, see "Playing a VIDEO CD using PBC functions" on page 12 for details.

Playing a disc (continued)

To	Press
Stop play	■ STOP
Pause play	⏸ PAUSE
Resume play after pause	▶ PAUSE or ▶ SELECT/PLAY
Scan forward or backward	◀◀/▶▶ SCAN
Skip chapters or tracks	⏮/⏭ PREV/NEXT (ACS/AMS)
Play step by step	◀ / ▶ 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 12 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 ■ 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 ■ 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 ■ 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 20).

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

Note

- When you press ■ 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 19).

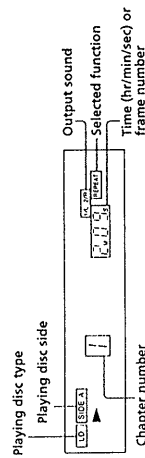
Tips

- 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.

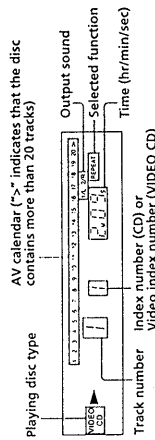
Reading the front panel display

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

When playing an LD

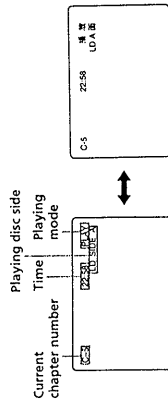


When playing a VIDEO CD or CD

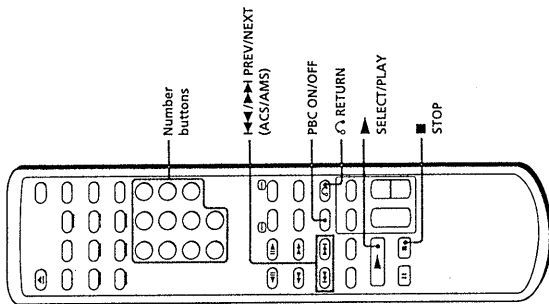


Viewing the on-screen display

Press DISPLAY twice. The on-screen display appears (see "Understanding on-screen indications" on page 13). You can select the language of the on-screen display, English or Chinese, by pressing the ■ STOP button on the player less than 10 seconds after you turn on the player. To return to the original display, press the ■ STOP button again less than 10 seconds after you first pressed it. Each time you press the ■ STOP button (within 10 seconds) the displays alternate.



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 15).
 - 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
 - turn on "PBC" on the front panel display
 - 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.

- Place a Ver. 2.0 VIDEO CD (with PBC functions) on the disc tray, then press **▶ SELECT/PLAY** to close the disc tray.**
- Check to see that "PBC" on the front panel display 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.
- Enter a number to select the item in the menu.**
- 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)

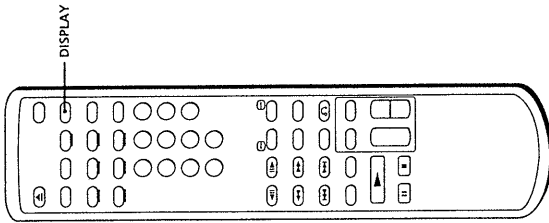
If **"NOT VALID NOW"** appears on the screen
You have pressed an unoperable button. Use the operable buttons, following the menu.

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 "PBC" on the front panel display. Now you can play the VIDEO CD continuously but menus for interactive playback are not displayed.

To turn on PBC playback again
"PBC" 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.

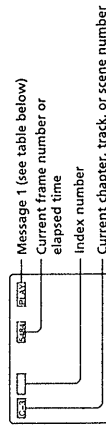
Additional Operations Understanding on-screen indications



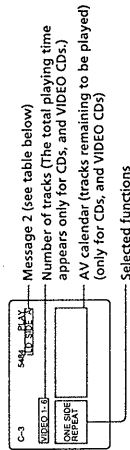
You can view the operating status of the player or disc information on the TV screen.

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

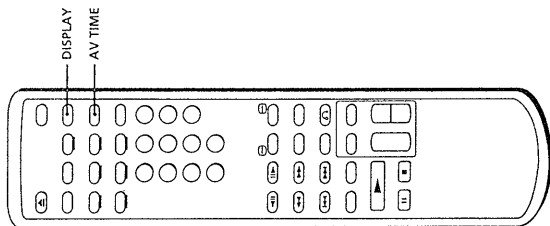
Display	Current status of the player
OPEN	Disc tray open
CLOSE	Disc tray closed
PLAY	Playing a disc
STOP	Operation stopped
PAUSE	Operation momentarily stopped
◀/▶	Speed scanning
SEARCH	Searching

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
f DIGITAL	Digital sound
f ANALOG	Analog sound

- 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 "72", meaning 22 minutes, appears.
 - Messages concerning sound control functions such as "1/L, 2/R" or "f DIGITAL, f ANALOG" appear only briefly when you press the AUDIO MONITOR or ANALOG/DIGITAL button.

Understanding on-screen indications (continued)



Notes

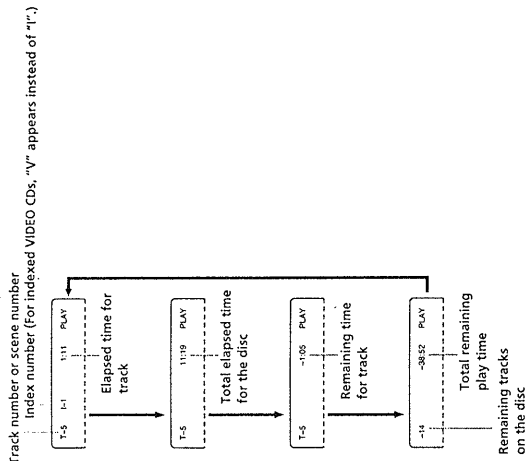
- When playing a Ver. 2.0 VIDEO CD using PBC functions:
 - the scene number (such as "S 5") is displayed instead of the track number
 - you can only view the elapsed time for the current scene
- The display does not show remaining time for tracks that are 51 or more tracks away from the beginning of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

Checking the elapsed or remaining time of the disc

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

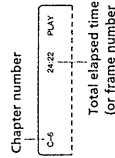
CDs/VIDEO CDs

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



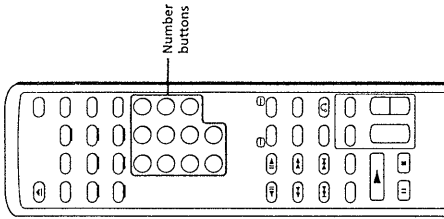
LDs

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



The AV TIME button does not function for LDs.

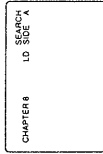
Selecting a chapter or track directly (Chapter/Track Search)



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.

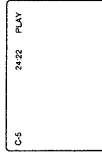
To enter a number greater than 10

Press 0 , then press two number buttons in sequence, first the tens digit, then the ones digit. If you press 0 by mistake, press 0 again, then enter the correct one digit number.

To	Press
Enter 10	0
Enter 14	0 , then 1 , then 4
Enter 20	0 , then 2 , then 0
Enter 25	0 , 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.



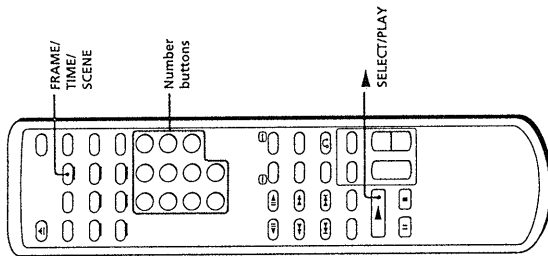
Tips

- 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 when you play a Ver. 2.0 VIDEO CD using PBC functions. Entering a number selects an item in the menu.

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.

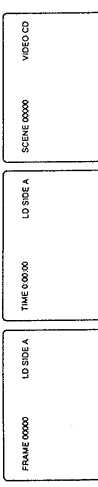
When playing a CLV (extended-play) LD, the player keeps track of the elapsed playing time, allowing you to locate a particular point on the CLV LD by specifying the total elapsed time.

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 "PBC" on the front panel display 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 14).

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 ⑤.

To locate the 12 minutes, 5 second point on the CLV LD, press ①, ②, ③ 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

You can locate a particular point on a disc by scanning scenes or skipping chapters/tracks.

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 ◀◀/▶▶ | PREV/NEXT (ACS/AMS)

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

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

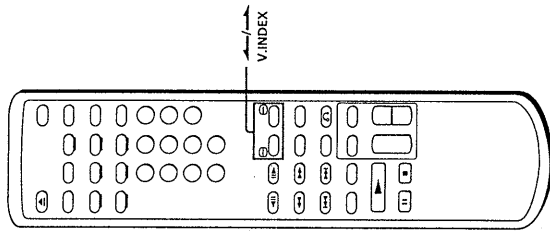
Notes

- 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.

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.

Searching for a particular point on a disc (continued)

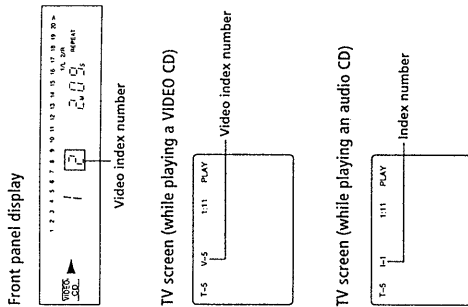


What is an index?
It is the division of a track or disc into numbered sections. It allows you to easily locate a desired point on the disc. To determine whether or not a disc has an index, look at the disc's packaging.

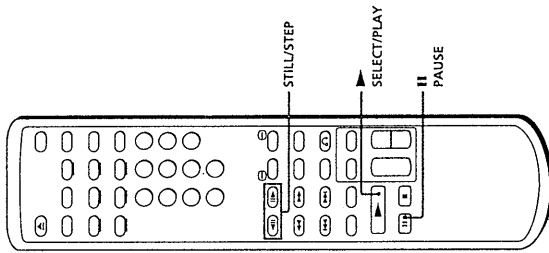
Locating a point using the index (Index Search)

There are two kinds of indexes: one is for audio CDs and the other is for VIDEO CDs. You can locate any point on the disc using the index. Note that this function is available only for indexed discs.

- While playing a track, press \leftarrow V.INDEX or \rightarrow V.INDEX repeatedly.
- To locate the current or preceding index numbers, press \leftarrow V.INDEX.
- To locate the next or subsequent index numbers, press \rightarrow V.INDEX.



Viewing frame-by-frame action



Tip

- When you play a CLV LD, Freeze Frame and Step Play are not available. When you press \parallel PAUSE, the screen goes blue. If you press \leftarrow II/ \rightarrow 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 \parallel PAUSE while playing a CAV LD or VIDEO CD. The sound mutes and the picture freezes.

To resume normal playback
Press \blacktriangleright SELECT/PLAY.

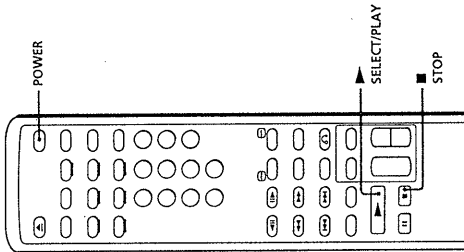
Playing frame-by-frame (Step Play)

You can use this function only for CAV LDs.

- 1 Press \leftarrow II/ \rightarrow STILL/STEP while playing a CAV LD.**
The sound mutes and the picture freezes.
- 2 Press \leftarrow II/ \rightarrow STILL/STEP repeatedly to advance or reverse the action frame-by-frame.**
Hold down \leftarrow II/ \rightarrow STILL/STEP to view continuous frame-by-frame action.

To resume normal playback
Press \blacktriangleright SELECT/PLAY.

Resuming LD/VIDEO CD playback (Auto Resume)



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 TV 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 **■ PAUSE** instead of **▶ SELECT/PLAY**.

If the player is turned off, press **POWER** or **▶ SELECT/PLAY** to turn on the player, then press **■ 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.

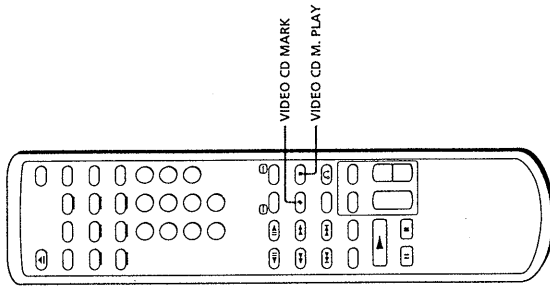
Tips

- 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 **◀◀/▶▶/PREV/NEXT (ACS/AMS)**
 - you do a Chapter 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

- The point at which you stopped is not memorized if you stop playback during a Chapter Search or Frame/Time Search.
- 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.

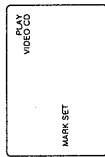
Resuming VIDEO CD playback from a point you like (Book Mark)



This is available for VIDEO CDs. You can mark any point you like on the disc with a "Book Mark" so that you can resume playback from that point. The player memorizes the point even after you remove the disc or turn off the player. You can make one Book Mark for one disc. Each time you make a new Book Mark, the old Book Mark is erased.

Making a Book Mark

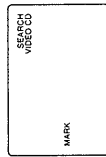
Play the VIDEO CD on which you want to make a Book Mark, then press **VIDEO CD MARK** on the remote commander at a point you like.



Resuming playback using the Book Mark

Press **VIDEO CD M. PLAY**.

The player searches for the point you marked, then starts playing.



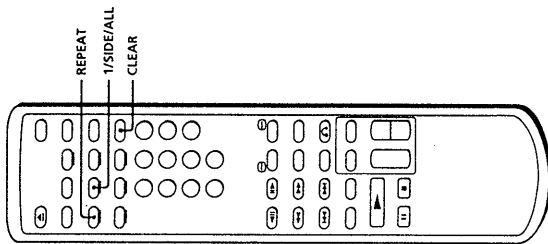
Tips

- Each time you press the **VIDEO CD MARK** button while playing a disc, the Book Mark moves (the old Book Mark is erased and a new Book Mark is made).
- You can use Book Marks on Ver. 1.0, Ver. 1.1 and Ver. 2.0 VIDEO CDs.
- The Book Mark remains even after you unplug the AC power cord of the player.

Note

- "PBC" on the front panel display must be lit to use a Book Mark on a Ver. 2.0 VIDEO CD. If it is not lit, press **■ STOP** to stop playing the disc, then press the **PBC ON/OFF** button to turn it on.

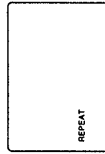
Playing a section repeatedly (Repeat Play)



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.

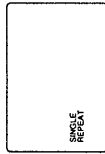
Repeating the whole disc (All Disc Repeat)

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.



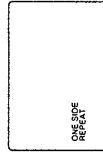
Repeating the selected chapter/track (Single Repeat)

Press 1/SIDE/ALL once, then press REPEAT. "SINGLE" and "REPEAT" appear 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)

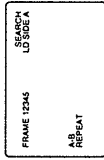
Press 1/SIDE/ALL twice, then press REPEAT. "ONE SIDE" and "REPEAT" appear on the screen briefly. "REPEAT 1 SIDE" lights up on the front panel display. The player plays the selected disc side repeatedly.



- 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 "PBC" on the front panel display.

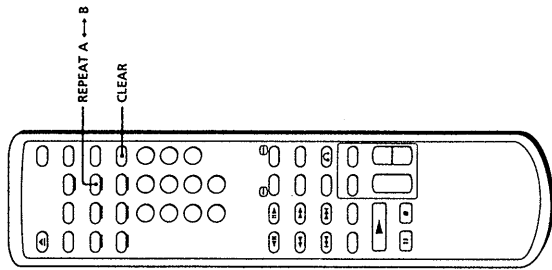
Replaying a selected portion on the disc (Repeat A→B)

- 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.
- Let the player run to the end of the scene or phrase.
- 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.



- 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.

To check the repeat status
Press DISPLAY twice.

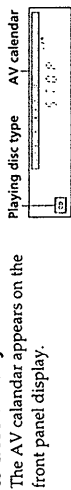
Canceling Repeat Play

Press CLEAR.

Playing songs in random order (Shuffle Play)

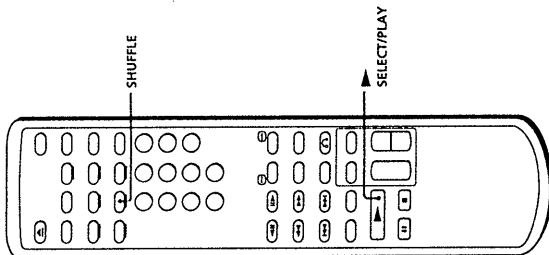
You can play the songs on a disc in random order, each song once (Shuffle Play). If you select the songs you want to play in advance, the player plays only selected songs in random order (Delete Shuffle). These functions are available only on CDs and VIDEO CDs.

- 1 Place a disc on the disc tray, then press **OPEN/CLOSE** to close the tray.



- 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 **▶ NEXT** (ACS/AMS) button. The **◀ 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 "PBC" on the front panel display.

Playing only 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.

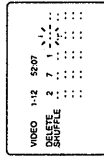
- 1 Press **SHUFFLE** to enter **SHUFFLE mode**.

"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.

Tips

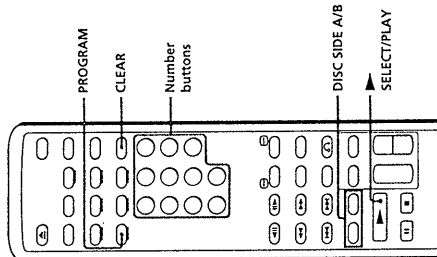
- You can delete songs numbered up to 99. To delete a song over 10, press >10, then press two number buttons in sequence, first tens digit, then the ones digit (see page 15).
- You can repeat Shuffle and Delete Shuffle Play. Press **REPEAT** on the remote commander. Each time repeat finishes, the order of the songs is reshuffled.

Canceling Shuffle Play or Delete Shuffle Play

Press **CLEAR**.

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

Playing songs in any order you like (Program Play)



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.

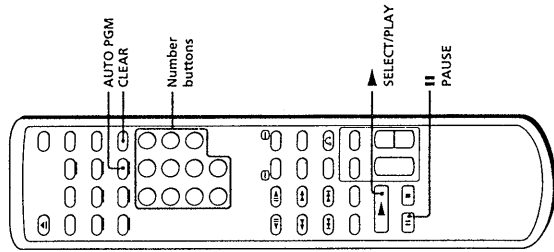
If you enter PAUSE in the program
You can enter PAUSE among songs you select, to make the player automatically pause during the program. If you enter PAUSE, the total playing time is re-counted from zero.

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)



- Tips**
- You can skip to the previous or next song in the program by pressing the PREV/NEXT (ACS/AMS) button.
 - Even when the playback of the whole program is not completed, 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.
- 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 "PBC" on the front panel display.

With Auto Program Play, the player divides the tracks/chapters 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.

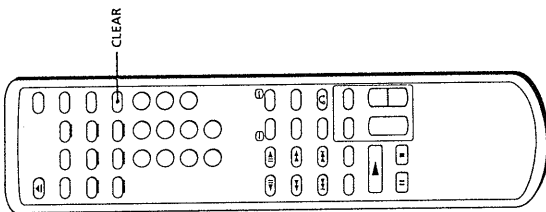
Programming the songs automatically

- 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 0 and then press two number buttons in sequence, first the tens digit, then the ones digit.
For example, to enter 30 minutes, press 3, 0, 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)



- 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 "PCM" on the front panel display is flashing) to exit Program mode.
 - you open the disc tray or turn off the player.

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:

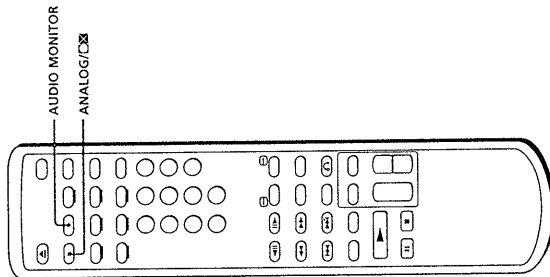
You enter	Program A plays	Program B plays	Total playing time
15 min	15 min (or less)	15 min (or less)	30 min (or less)
30 min	30 min (or less)	10 min (about)	40 min
45 min	40 min (all songs)	0 min	40 min

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.

Using the sound control functions



Notes

- If you select the analog sound during playback of the disc which conforms to the Dolby Surround AC-3 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:



Indication	From stereo disc	From SAP disc
1/L	Left channel	Sound track 1 (Left channel)
2/R	Right channel	Sound track 2 (Right channel)
1/L 2/R	Stereo (Both channels)	Sound track 1 (Left channel) Sound track 2 (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 soundtracks, the player automatically outputs digital sound. To listen to sound recorded on analog soundtracks, use ANALOG/CX.

Press ANALOG/CX while playing the disc.

"ANALOG" appears briefly on the screen and the analog sound is output.

To return to digital sound

Press ANALOG/CX repeatedly until "DIGITAL" appears on the screen.

Playing discs with the CX (CX) logo

LDs bearing the CX 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 CX discs and activates the CX noise reduction system automatically when outputting analog sound. If your CX 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.

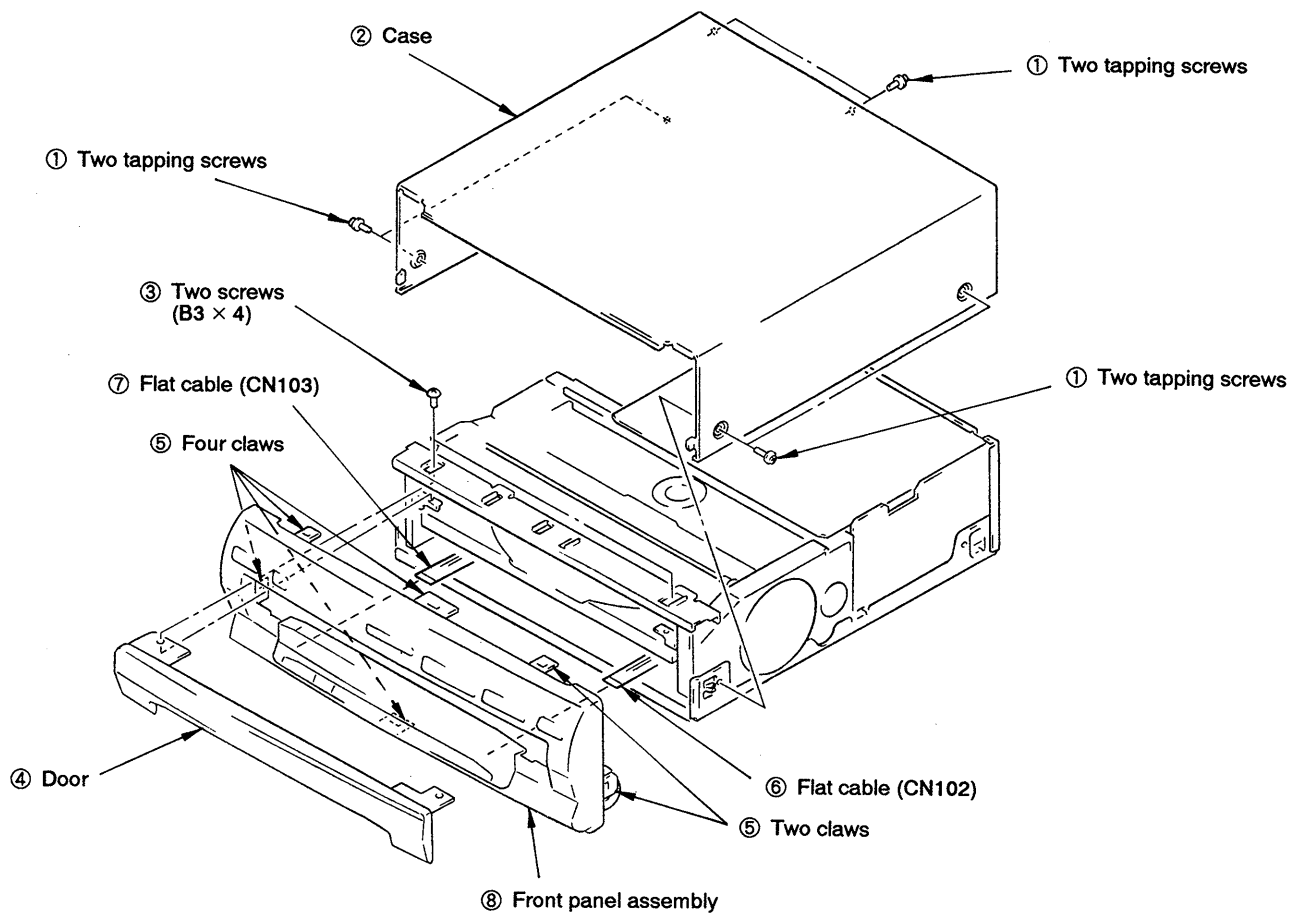
To activate the CX noise reduction system manually

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

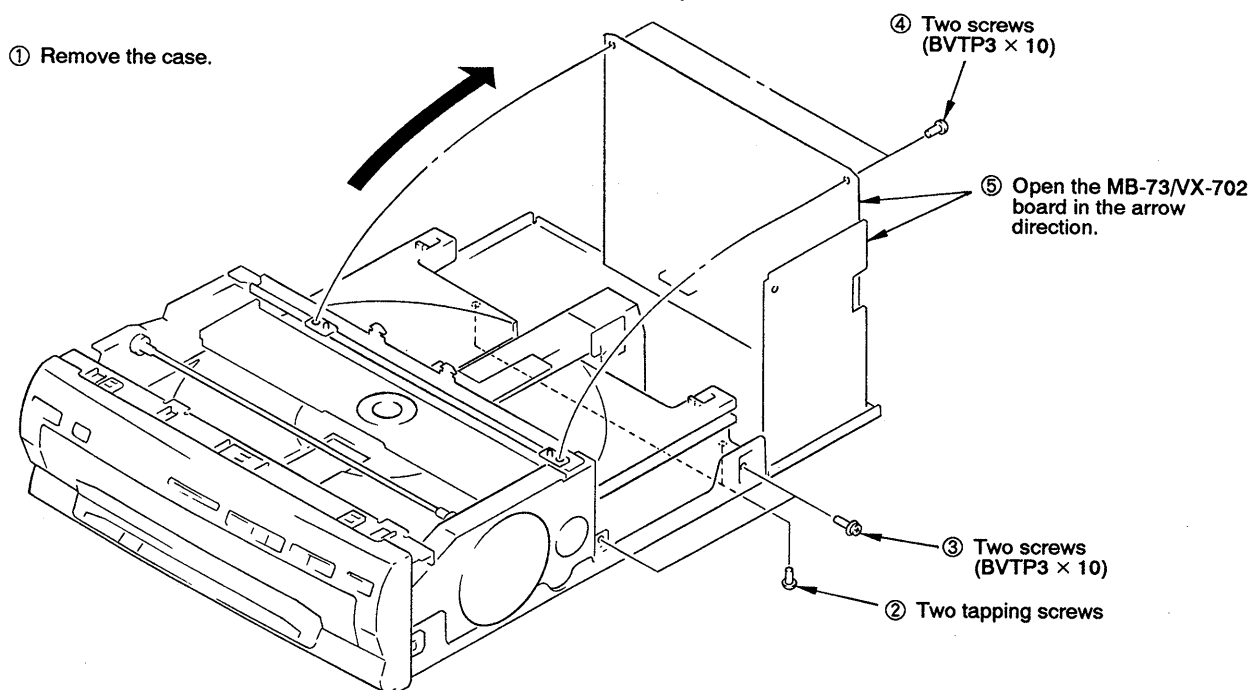
SECTION 2 DISASSEMBLY

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

2-1. CASE, FRONT PANEL ASSEMBLY



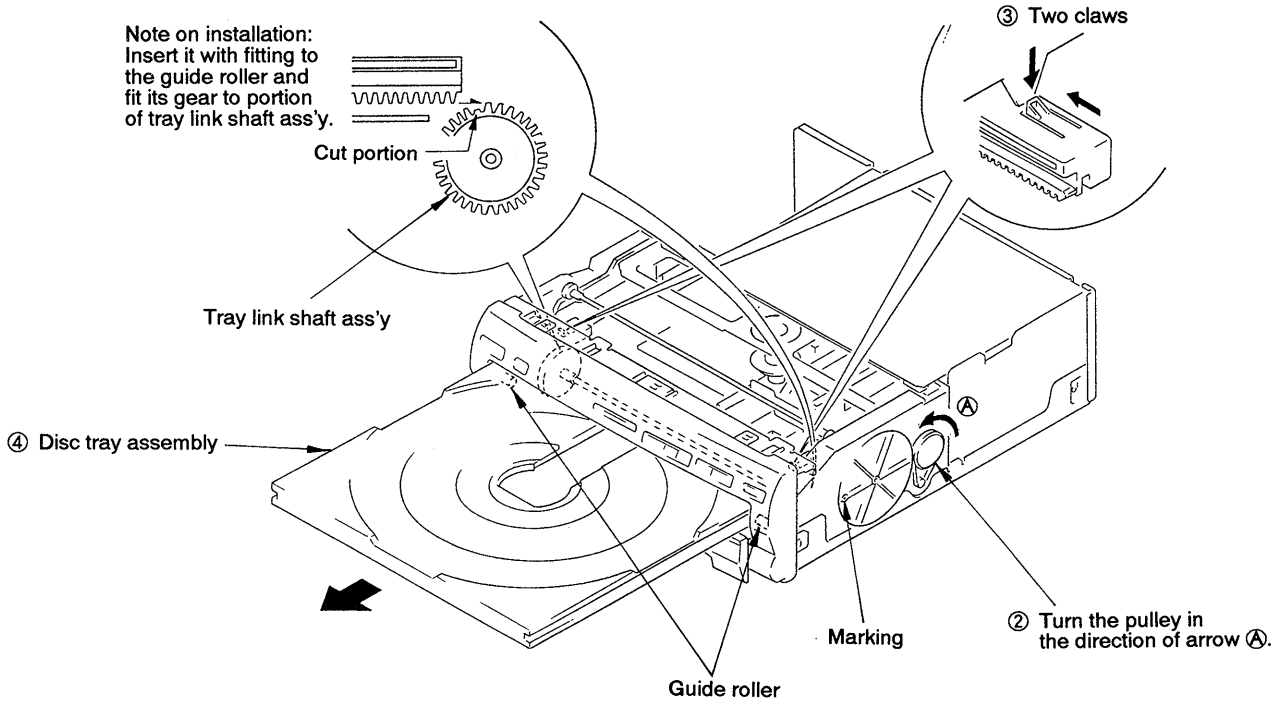
2-2. OPENING OF MB-73/VX-702 BOARD (SERVICE POSITION)



2-3. DISC TRAY ASSEMBLY

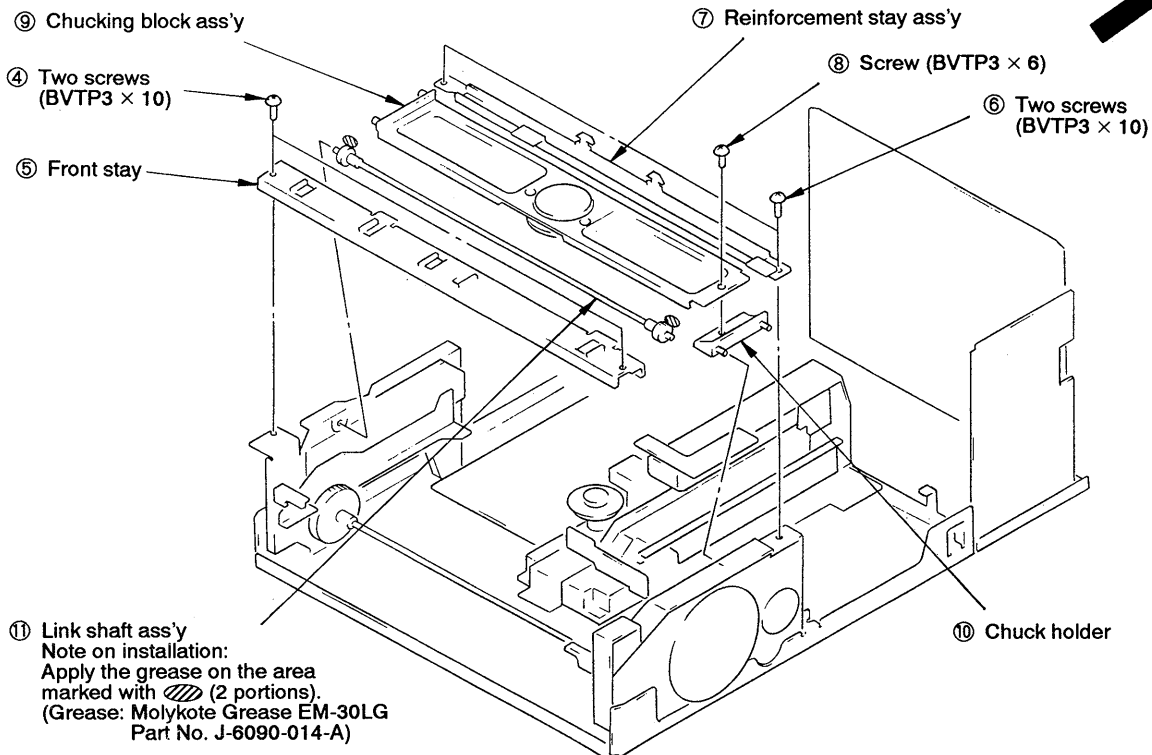
- ① Remove the case.

Note on installation:
Insert it with fitting to
the guide roller and
fit its gear to portion
of tray link shaft ass'y.

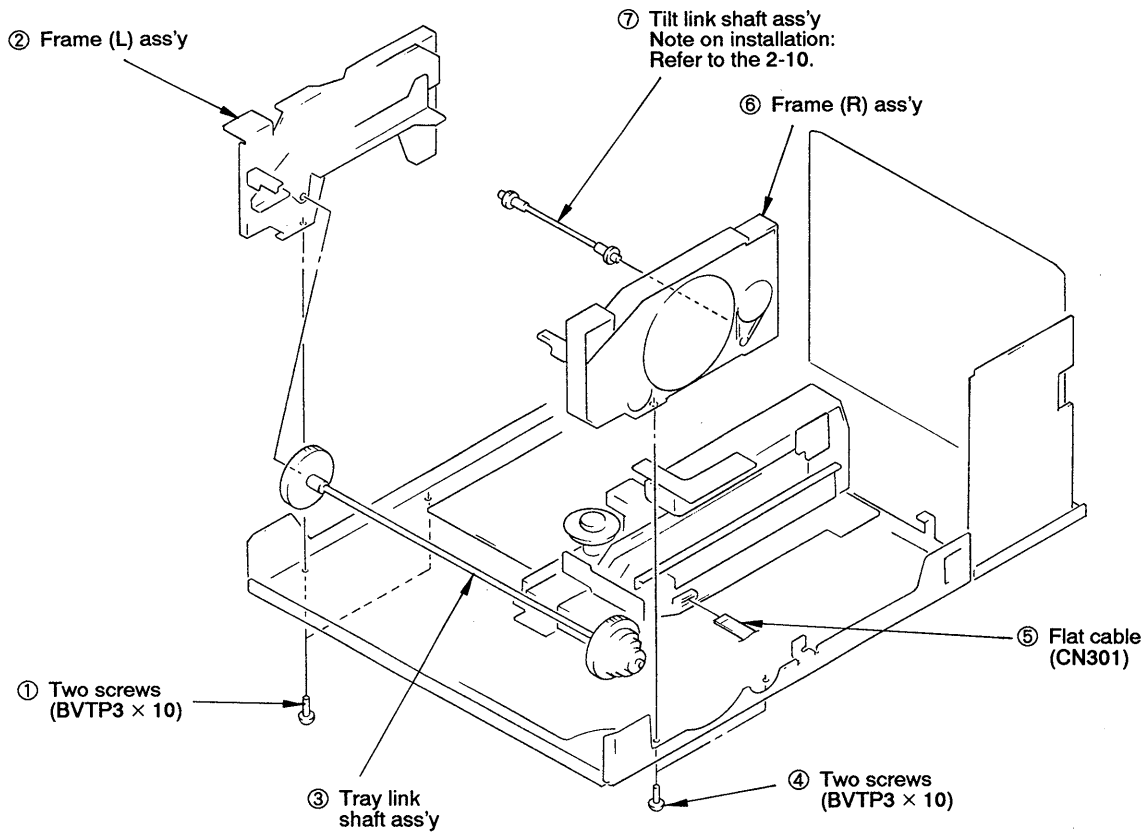


2-4. CHUCKING BLOCK ASSEMBLY

- ① Remove the case and front panel ass'y.
- ② Opening of MB-73/VX-702 board.
- ③ Remove the disc tray ass'y.

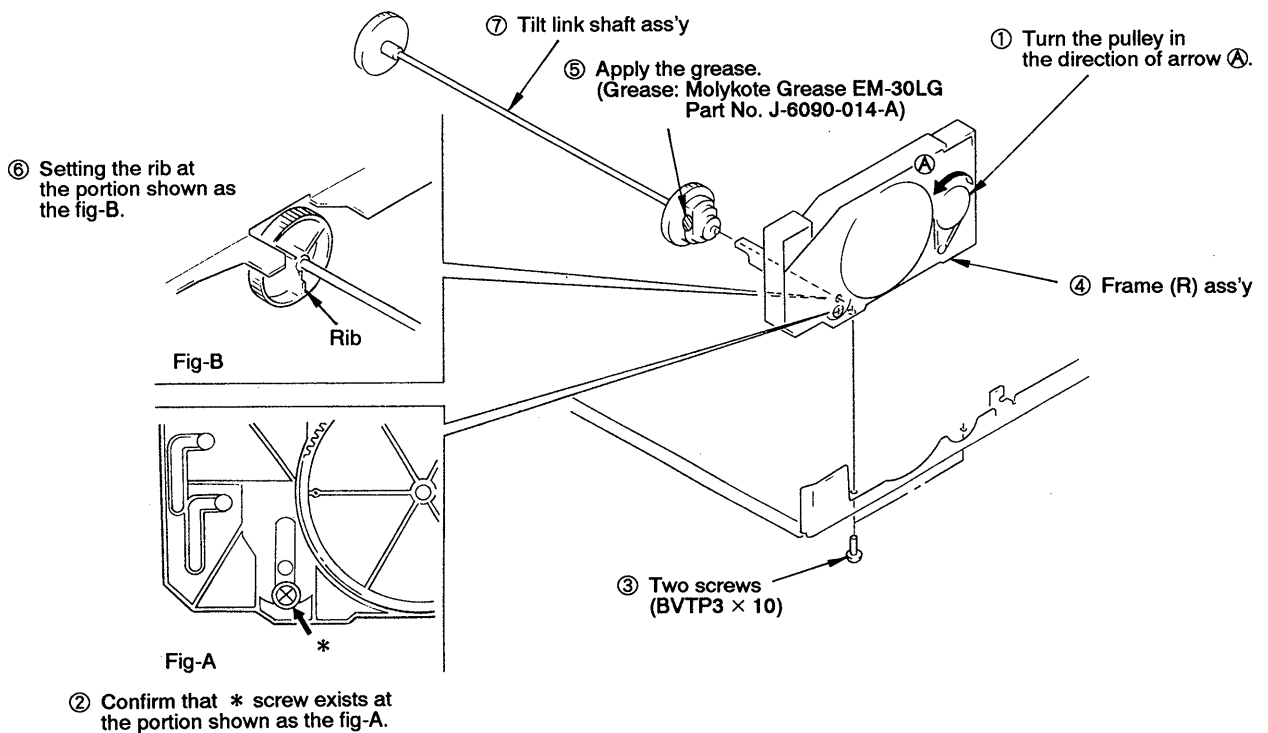


2-5. FRAME (L, R) ASSEMBLY

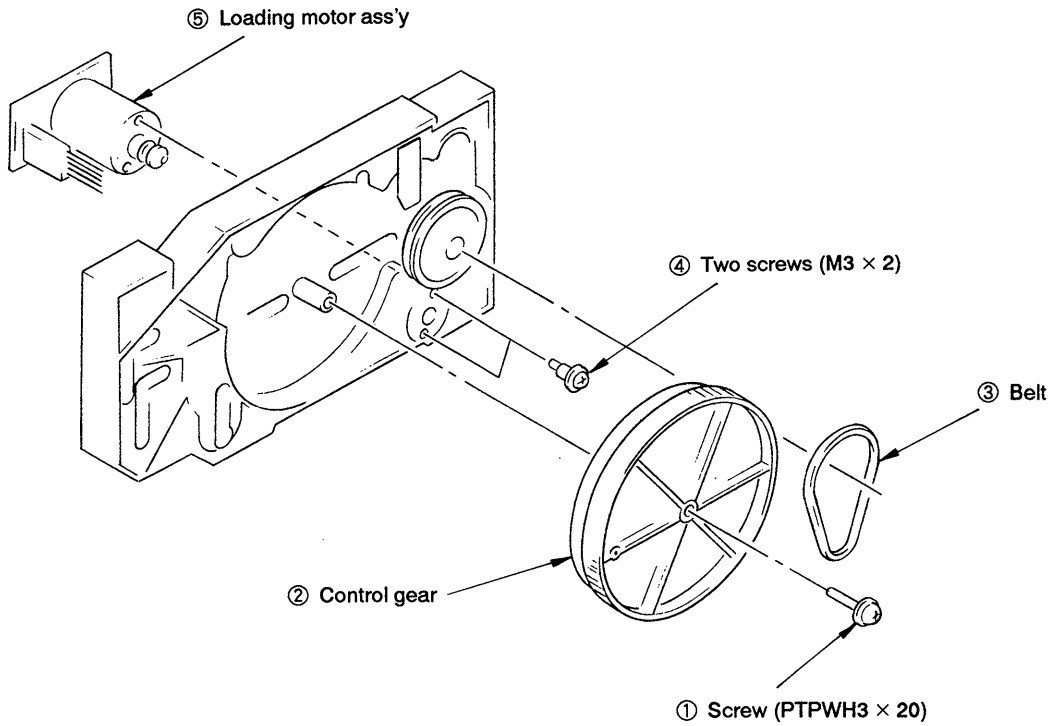


2-6. MOUNTING THE FRAME (R) ASSEMBLY

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

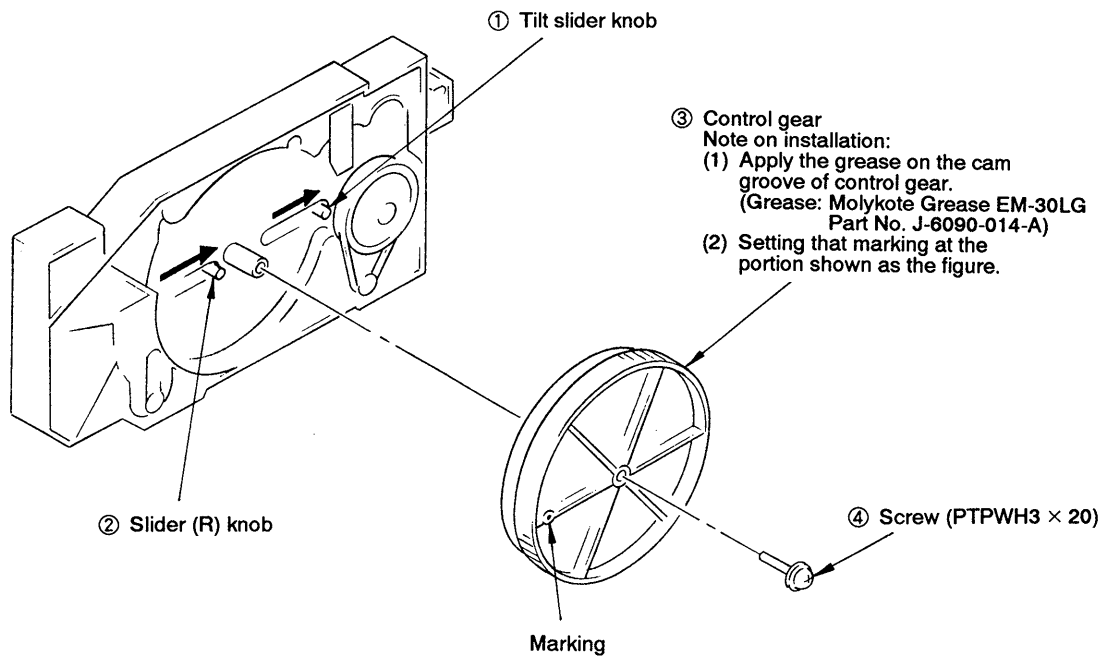


2-7. CONTROL GEAR AND LOADING MOTOR ASSEMBLY



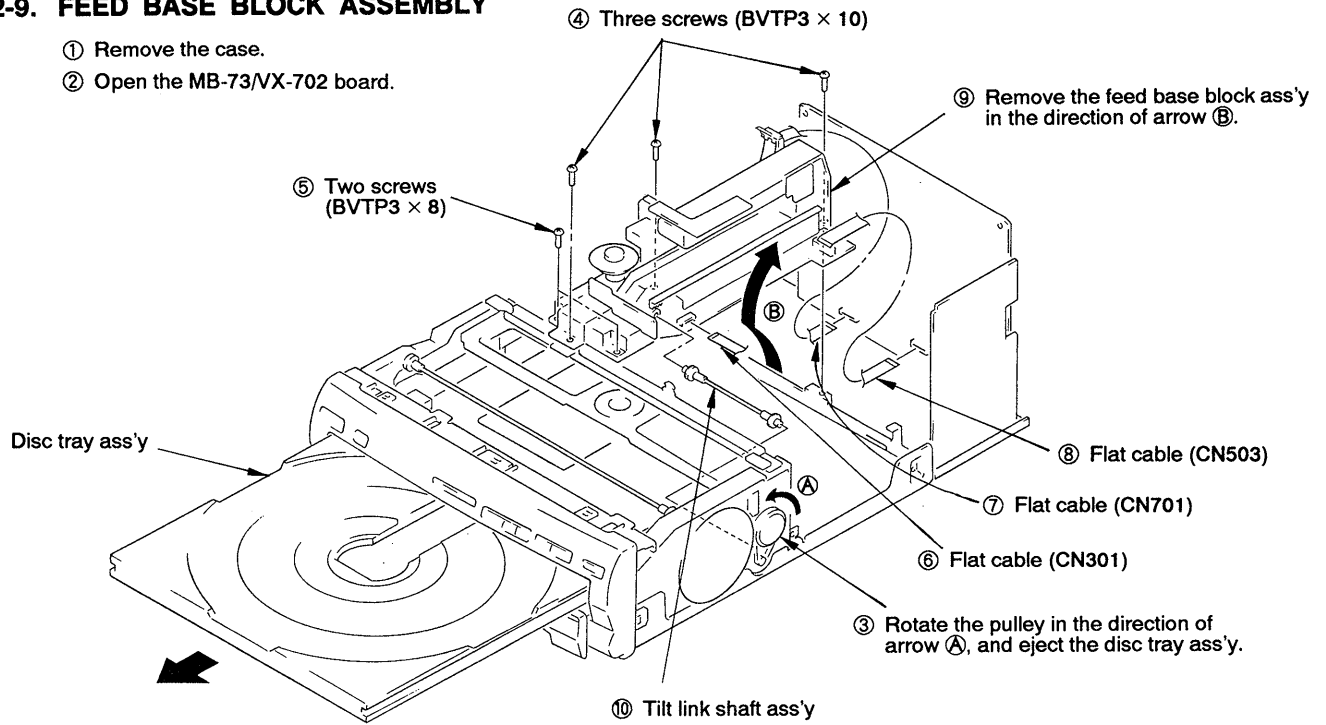
2-8. MOUNTING THE CONTROL GEAR

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



2-9. FEED BASE BLOCK ASSEMBLY

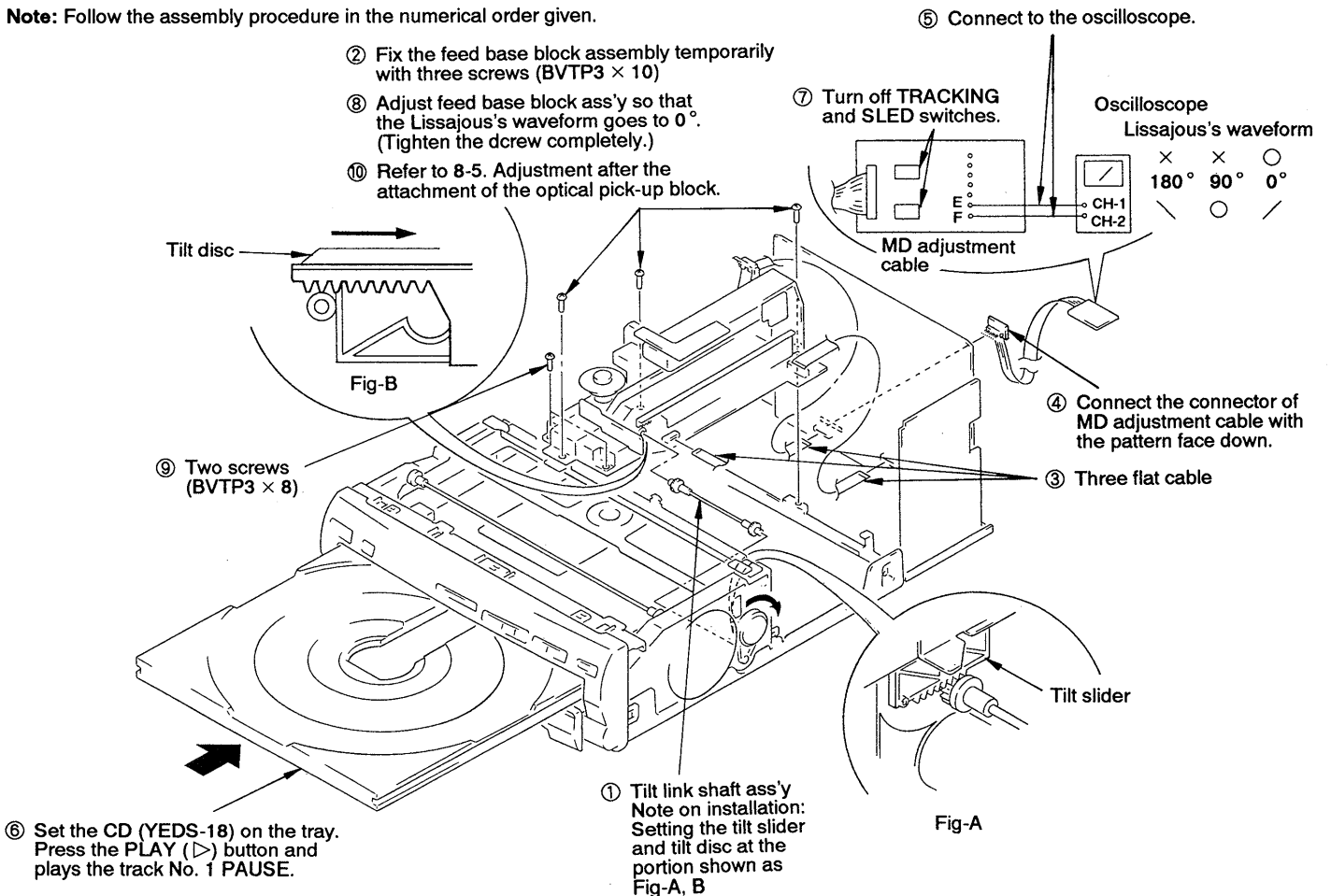
- ① Remove the case.
- ② Open the MB-73/VX-702 board.



2-10. MOUNTING THE FEED BASE BLOCK ASSEMBLY

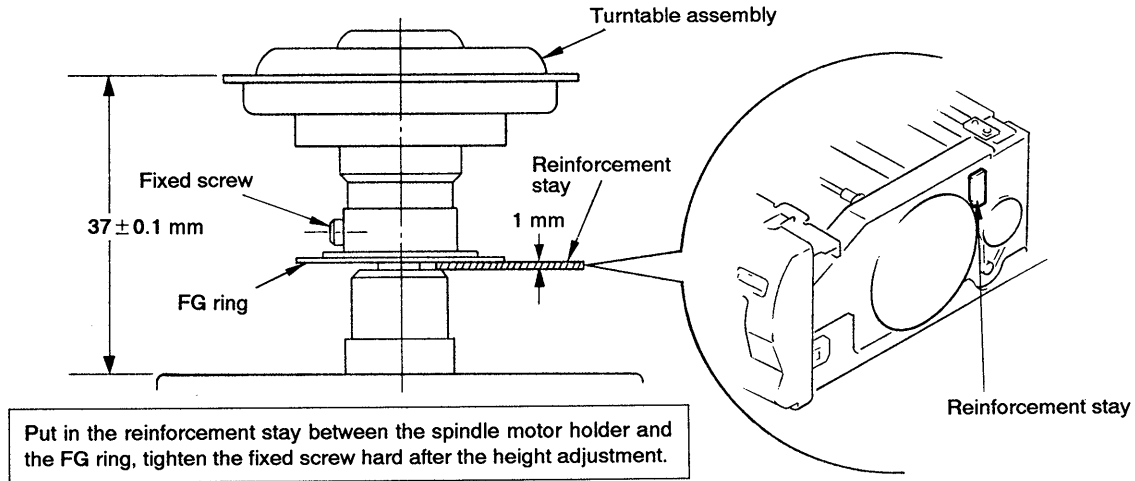
Note: Follow the assembly procedure in the numerical order given.

- ② Fix the feed base block assembly temporarily with three screws (BVTP3 x 10)
- ⑧ Adjust feed base block ass'y so that the Lissajous's waveform goes to 0°. (Tighten the screw completely.)
- ⑩ Refer to 8-5. Adjustment after the attachment of the optical pick-up block.



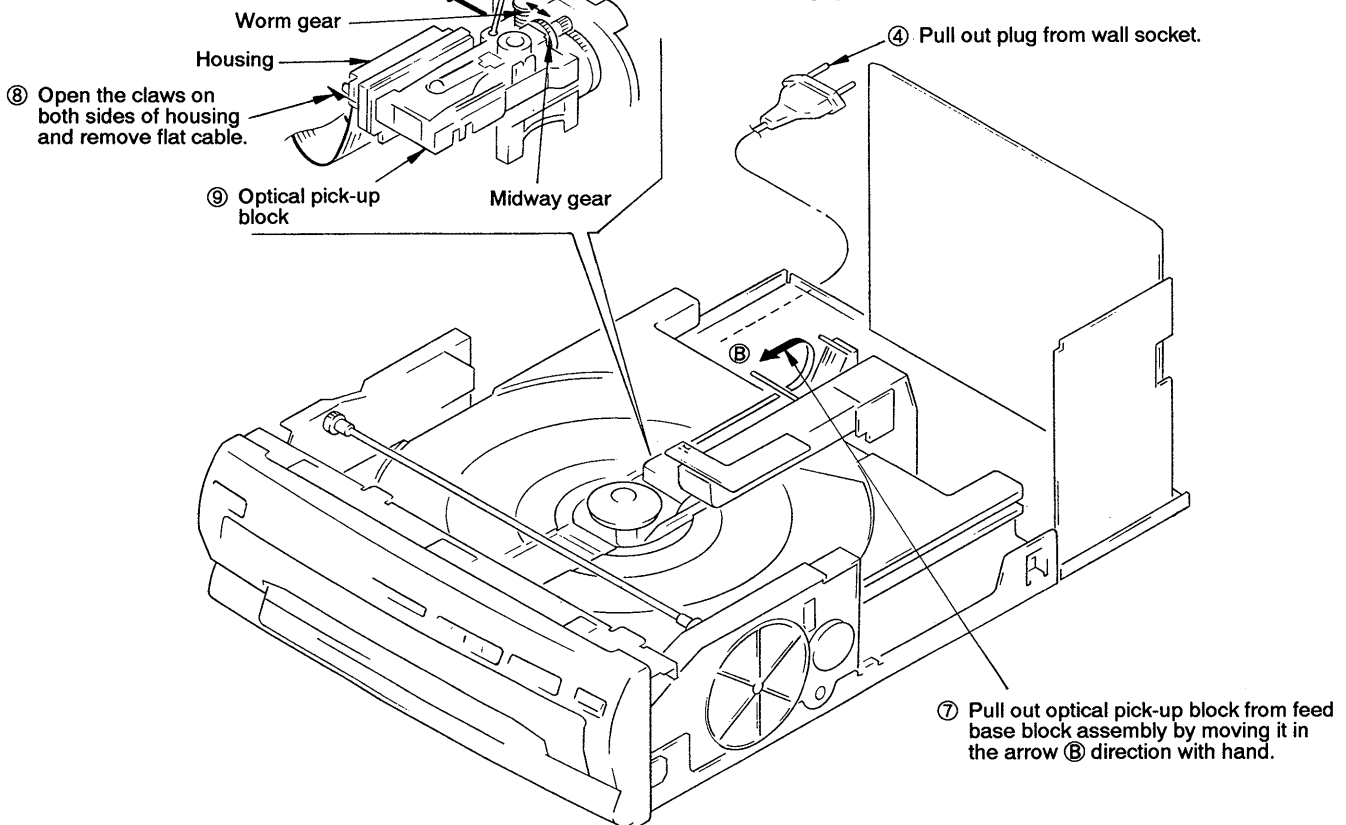
2-11. HEIGHT ADJUSTMENT OF THE TURNTABLE ASSEMBLY

- ① Remove the case.
- ② Open the MB-73/VX-702 board.
- ③ Rotate the pulley on the right side of the set, and open the tray.
- ④ Remove the chucking block ass'y and reinforcement stay ass'y.
- ⑤ 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.
- ⑥ Fix the reinforcement to fixed position.



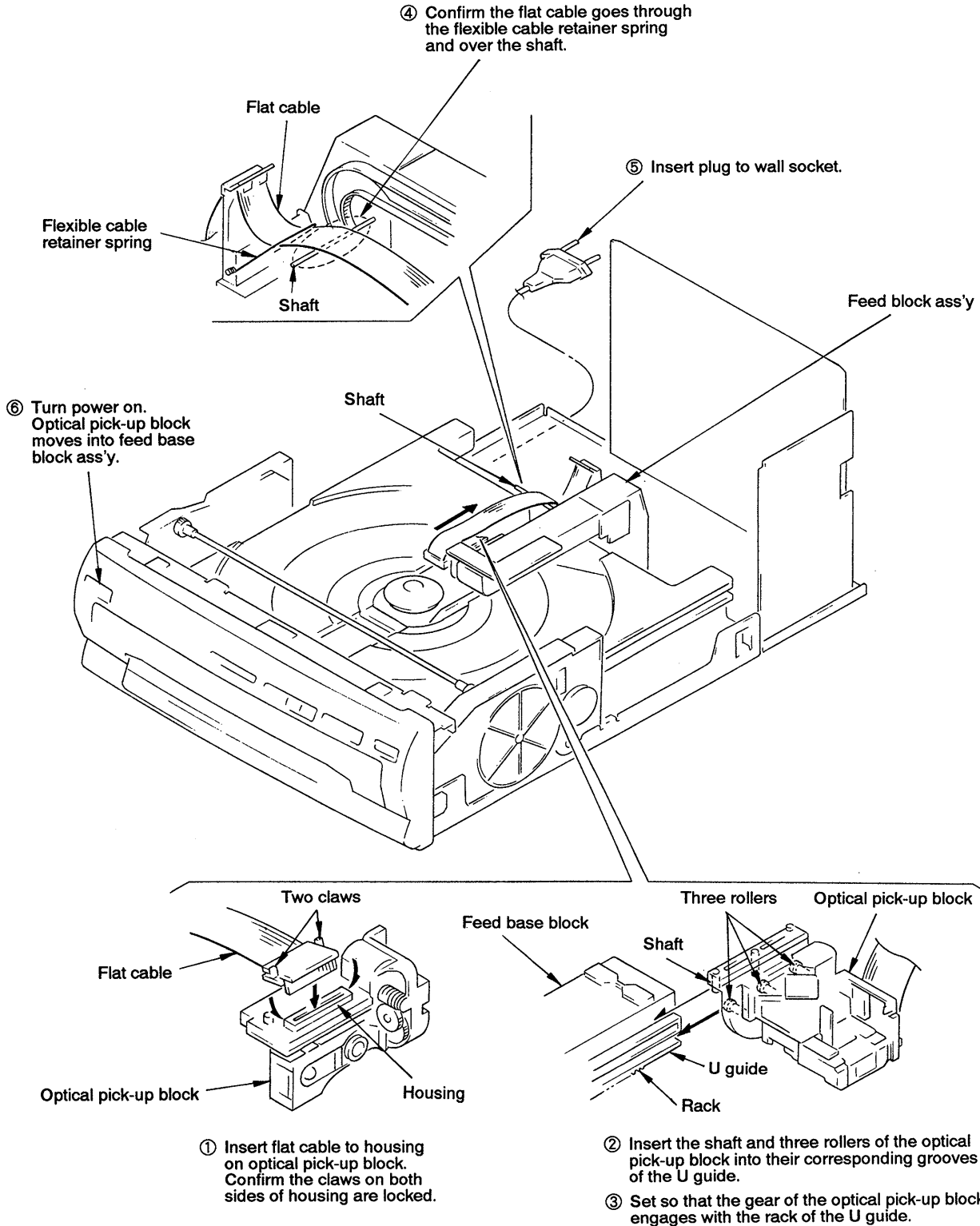
2-12. OPTICAL PICK-UP BLOCK (KHS-150A)

- ① Remove the case.
- ② Open the MB-73/VX-702 board.
- ③ Remove the chucking block ass'y and reinforcement stay ass'y.
- ④ Pull out plug from wall socket.
- ⑤ Remove a screw mounting sled motor.
- ⑥ Insert screwdriver to hole for screw removed step ④ and move a little sled motor in the arrow **A** direction. Desengage worm gear and midway gear.

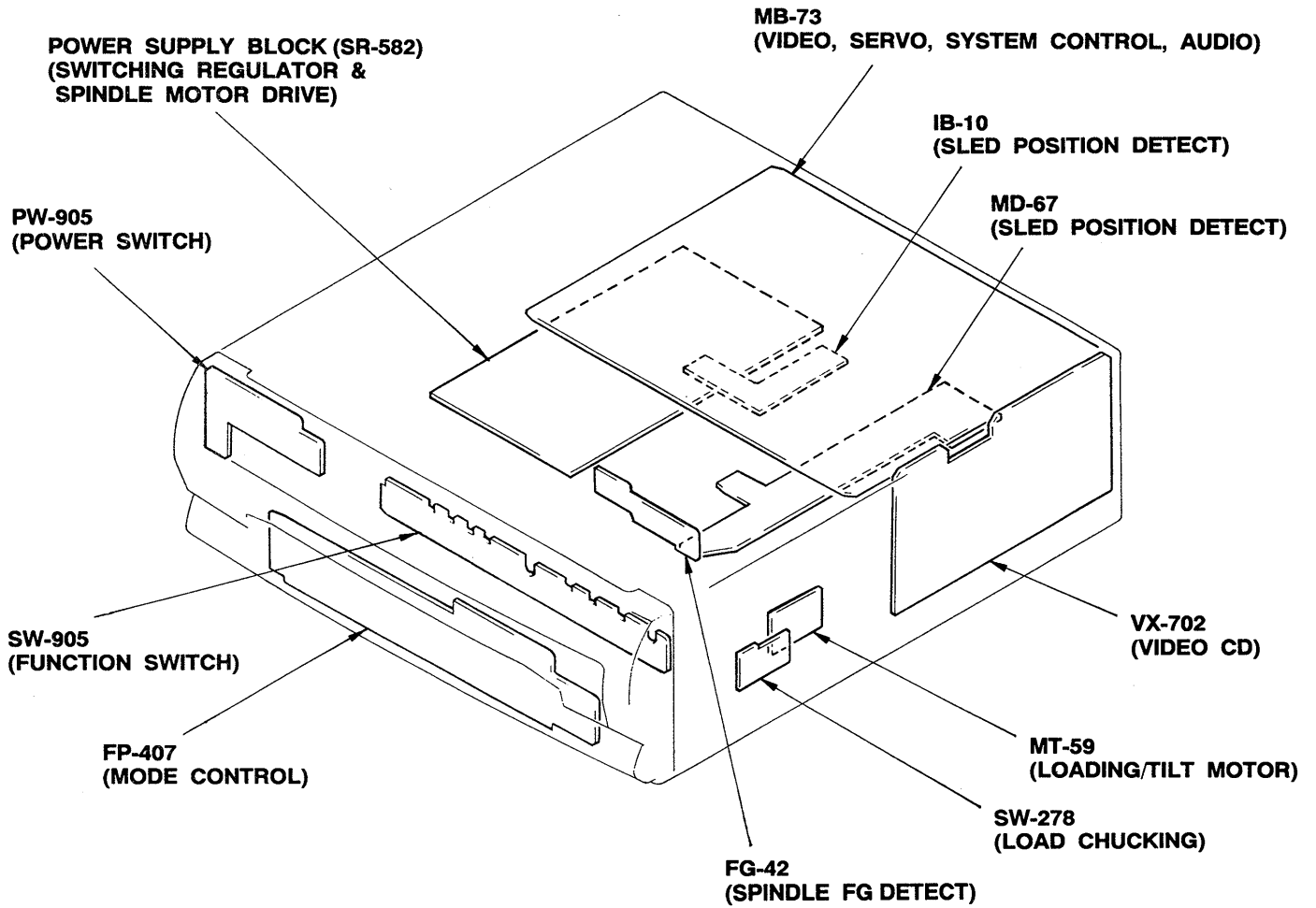


2-13. MOUNTING THE OPTICAL PICK-UP BLOCK ASSEMBLY

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

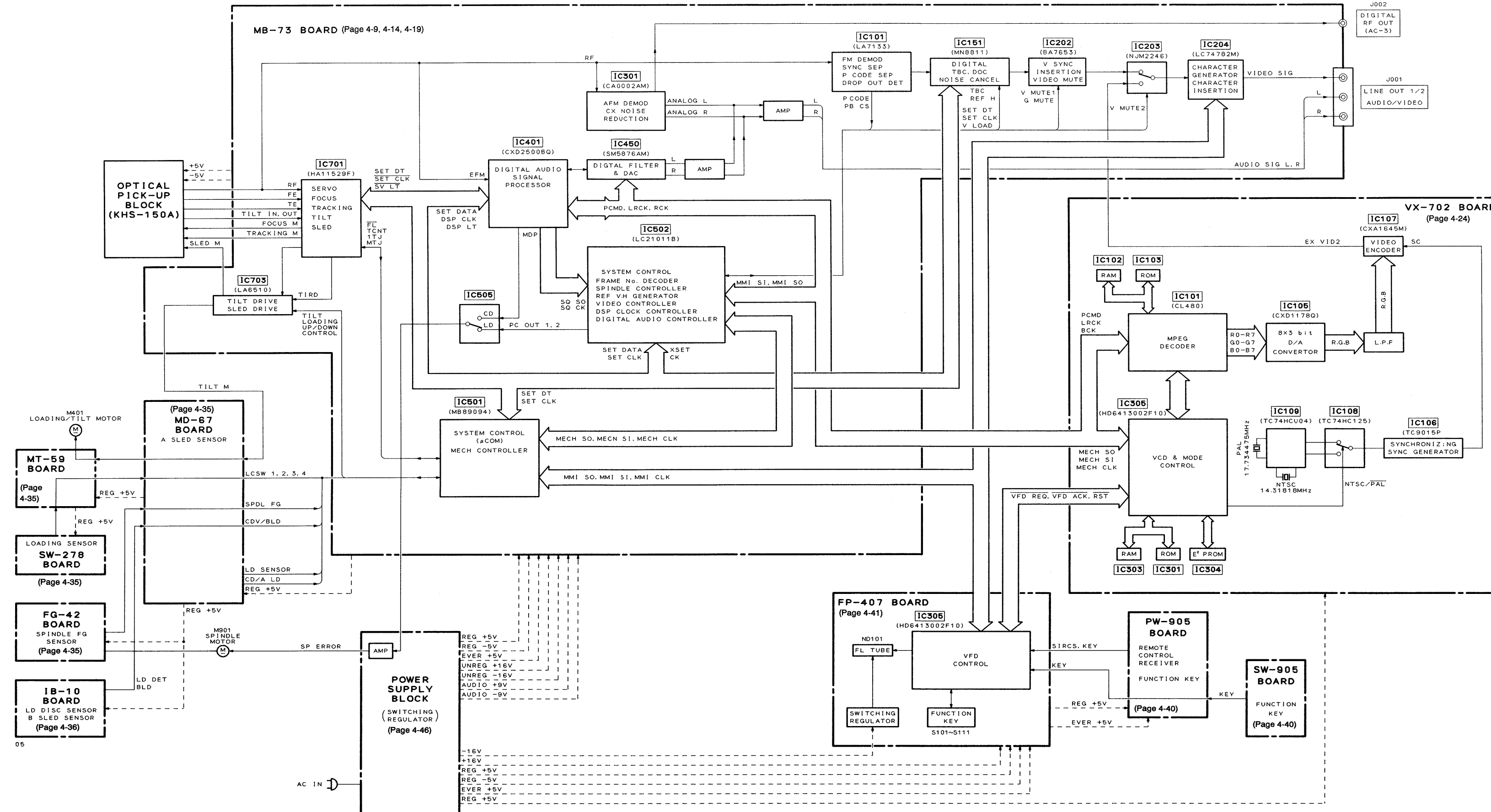


2-14. CIRCUIT BOARDS LOCATION



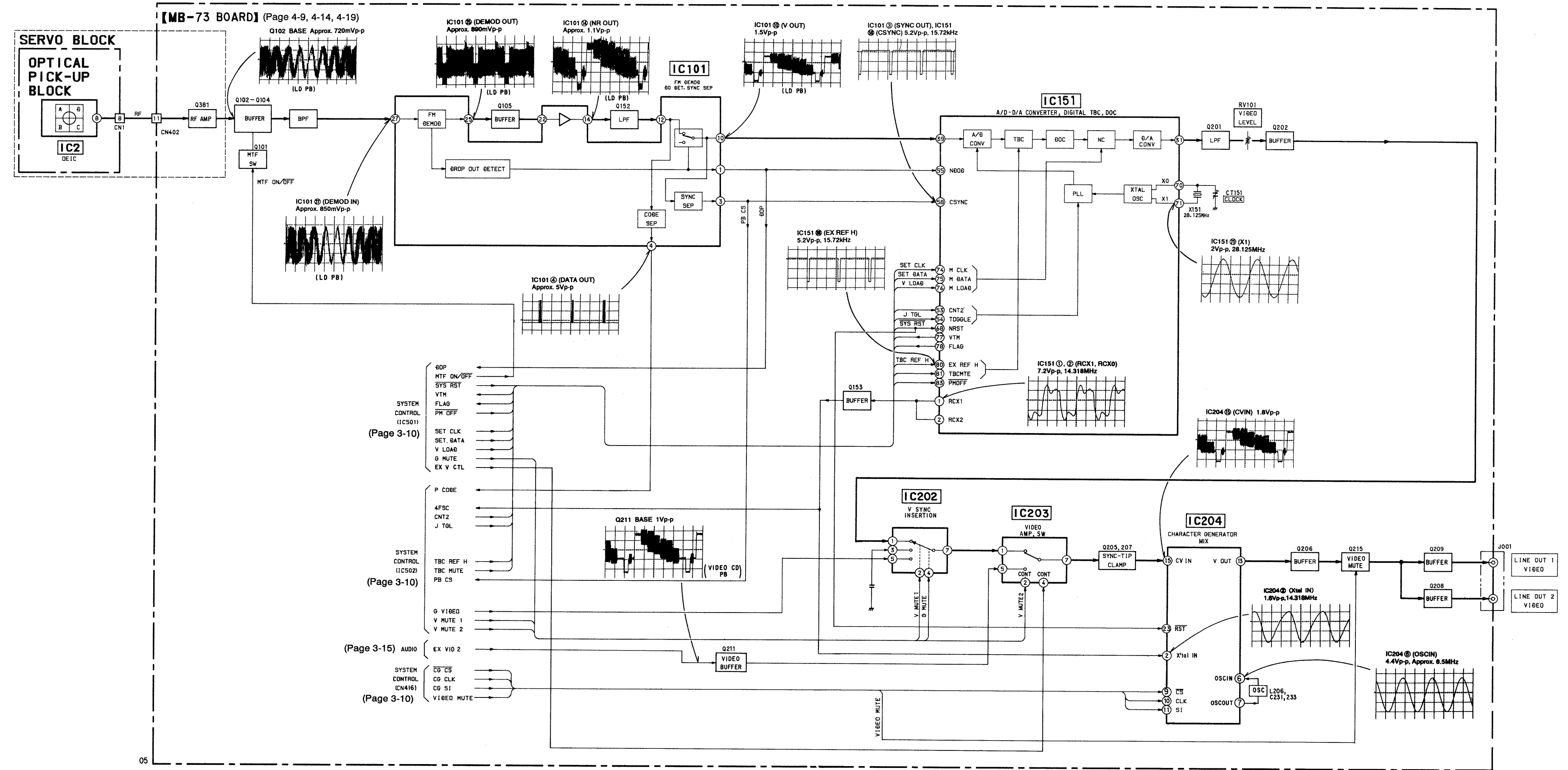
SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM

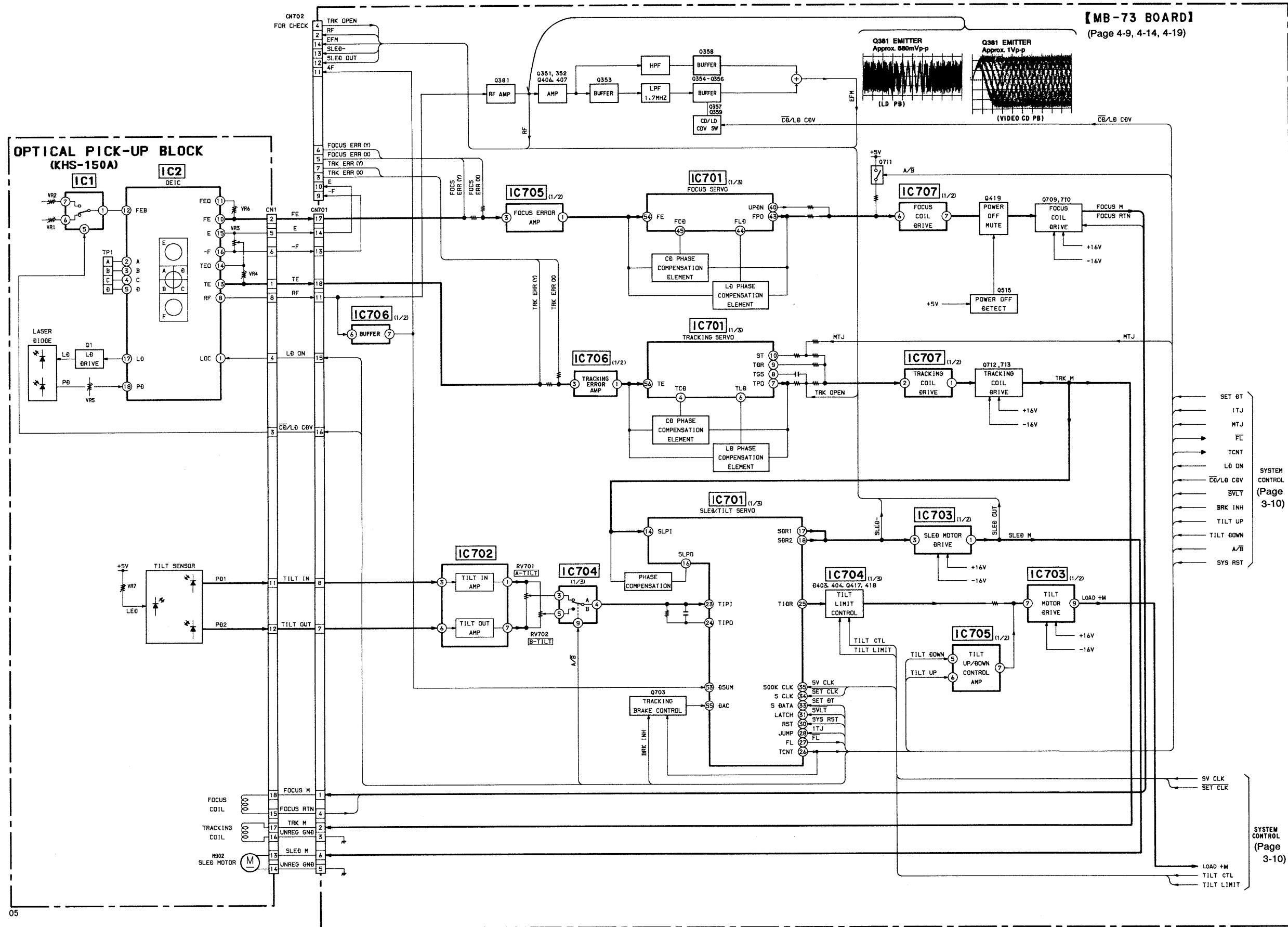


05

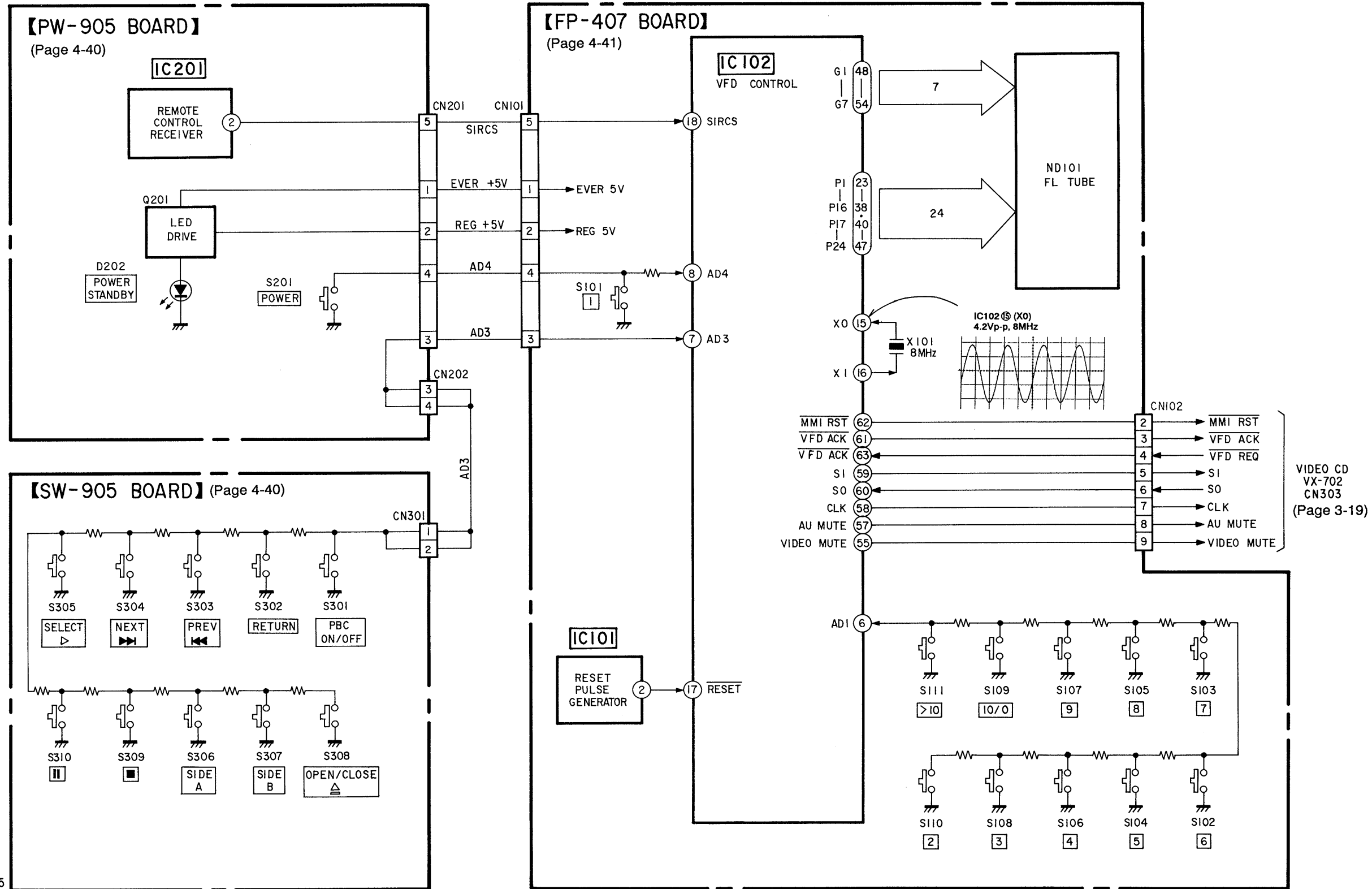
3-2. VIDEO BLOCK DIAGRAM



3-3. SERVO BLOCK DIAGRAM

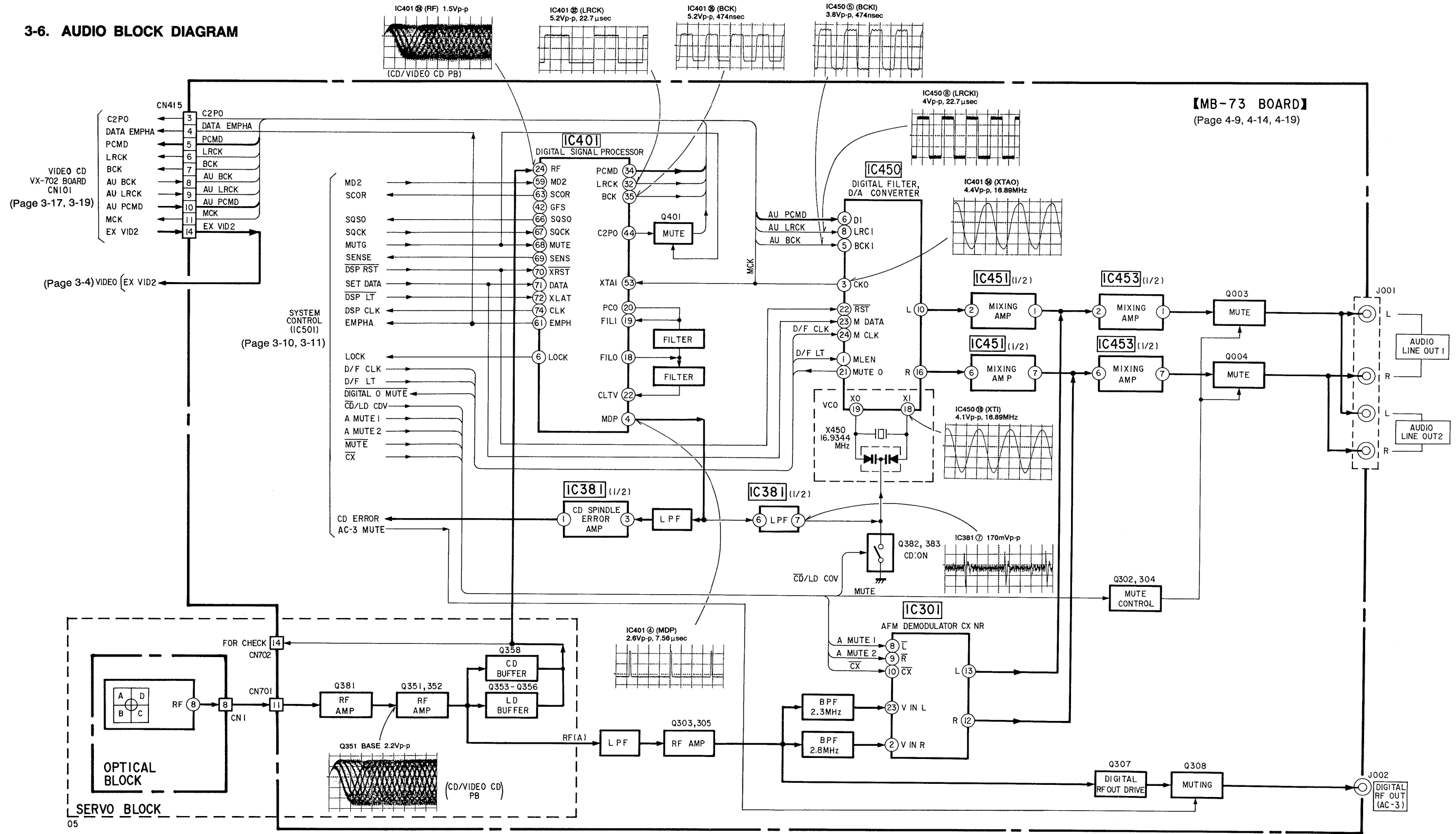


3-5. MODE CONTROL BLOCK DIAGRAM



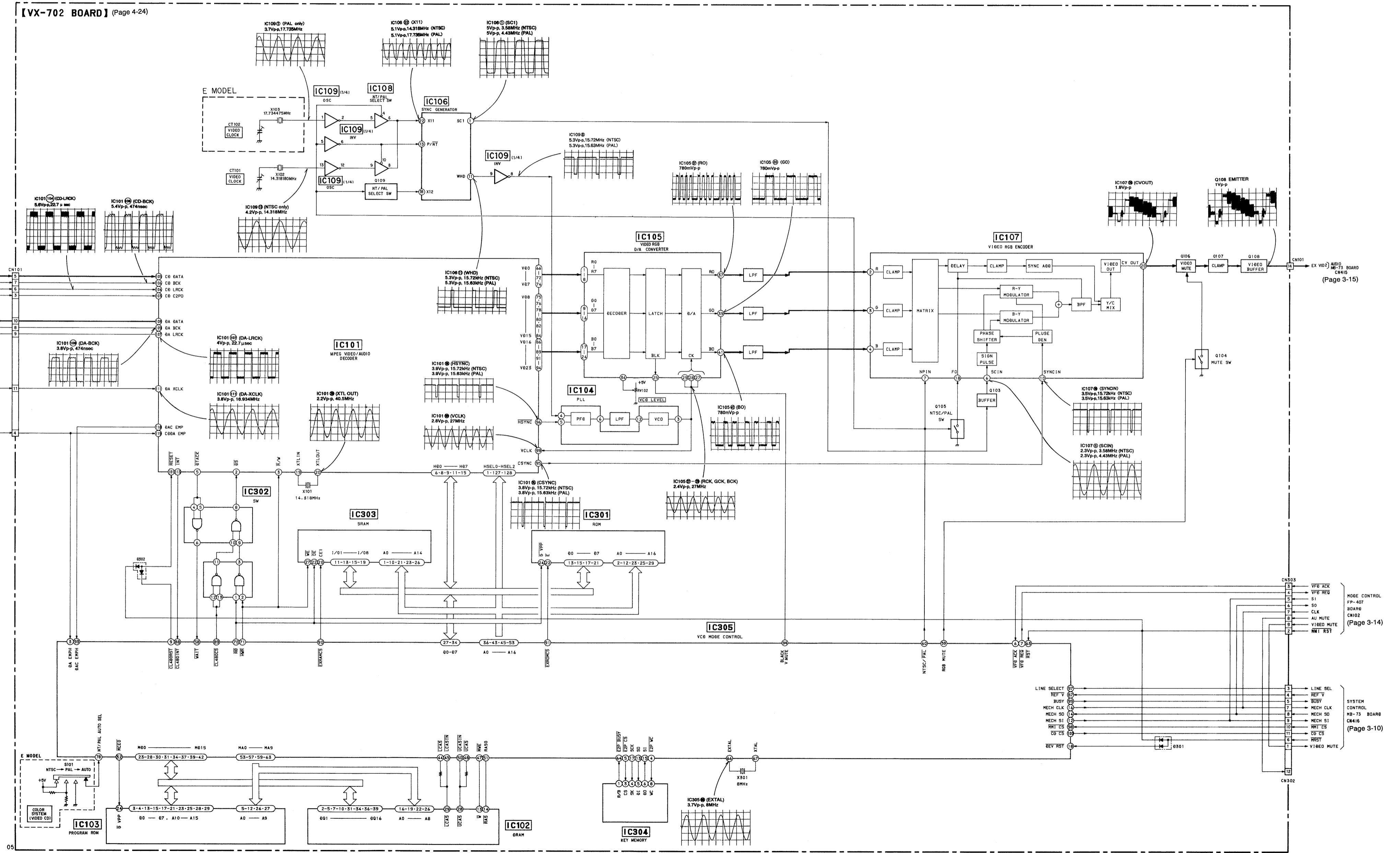
05

3-6. AUDIO BLOCK DIAGRAM



05

3-7. VIDEO CD BLOCK DIAGRAM



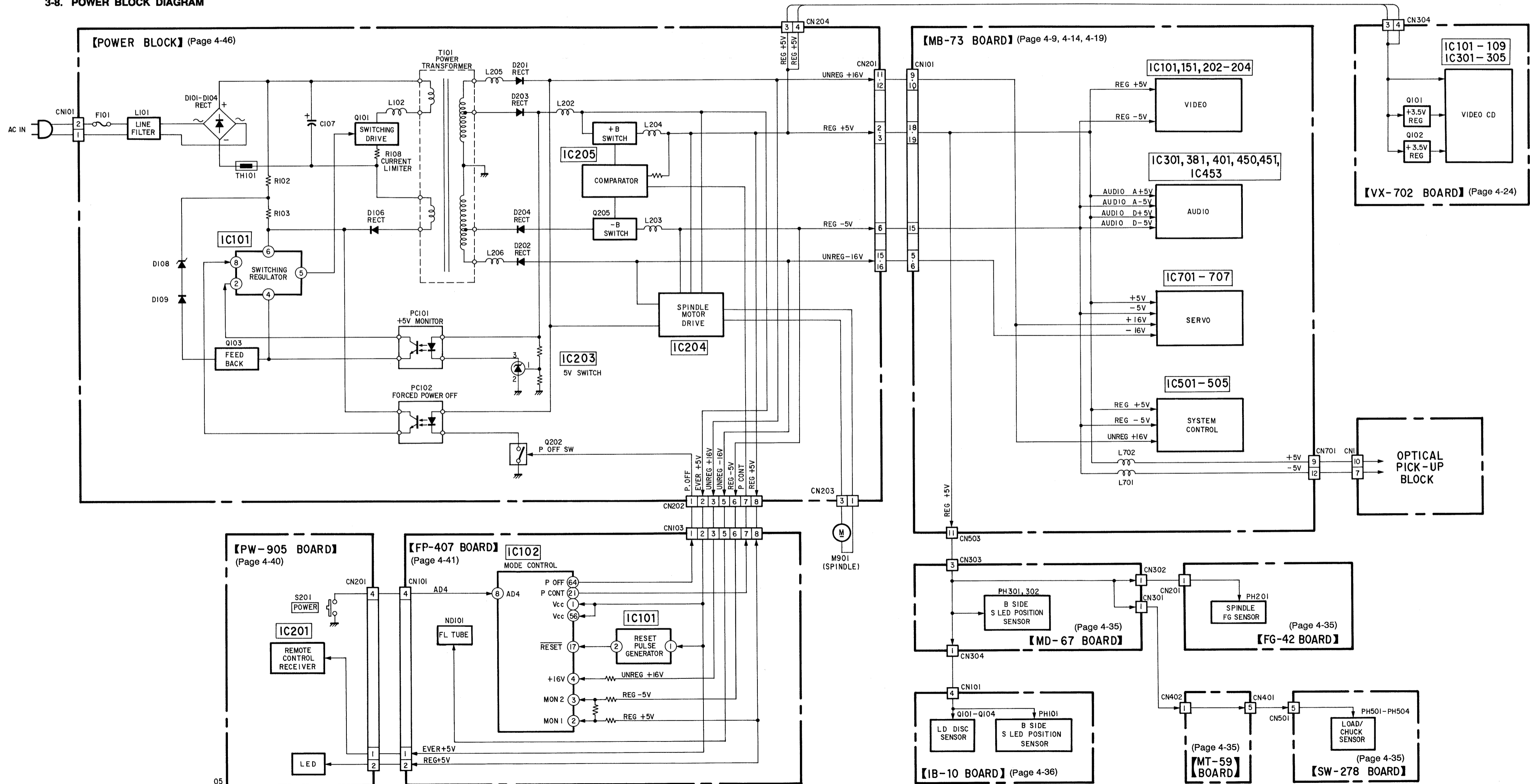
AUDIO BOARD CM415 (Page 3-15)

EX VIDEO BOARD CM415 (Page 3-15)

MODE CONTROL FP-407 S0448 CM802 (Page 3-14)

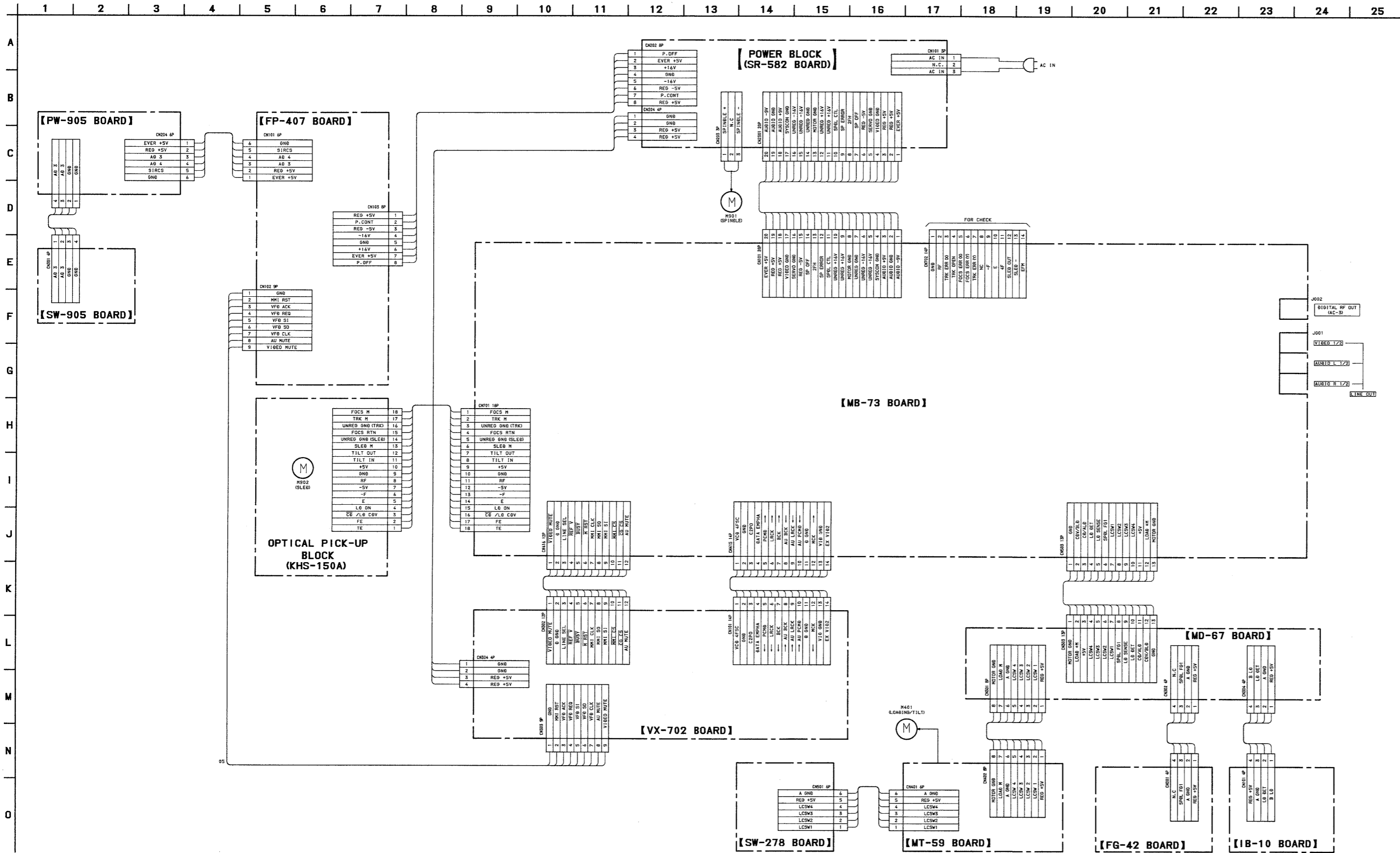
SYSTEM CONTROL MB-73 BOARD CM416 (Page 3-10)

3-8. 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:







-  : indicates a lead wire mounted on the component side.
-  : Through hole.
-  : parts mounted on the conductor side.
-  : Pattern from the side which enables seeing.



Caution:

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

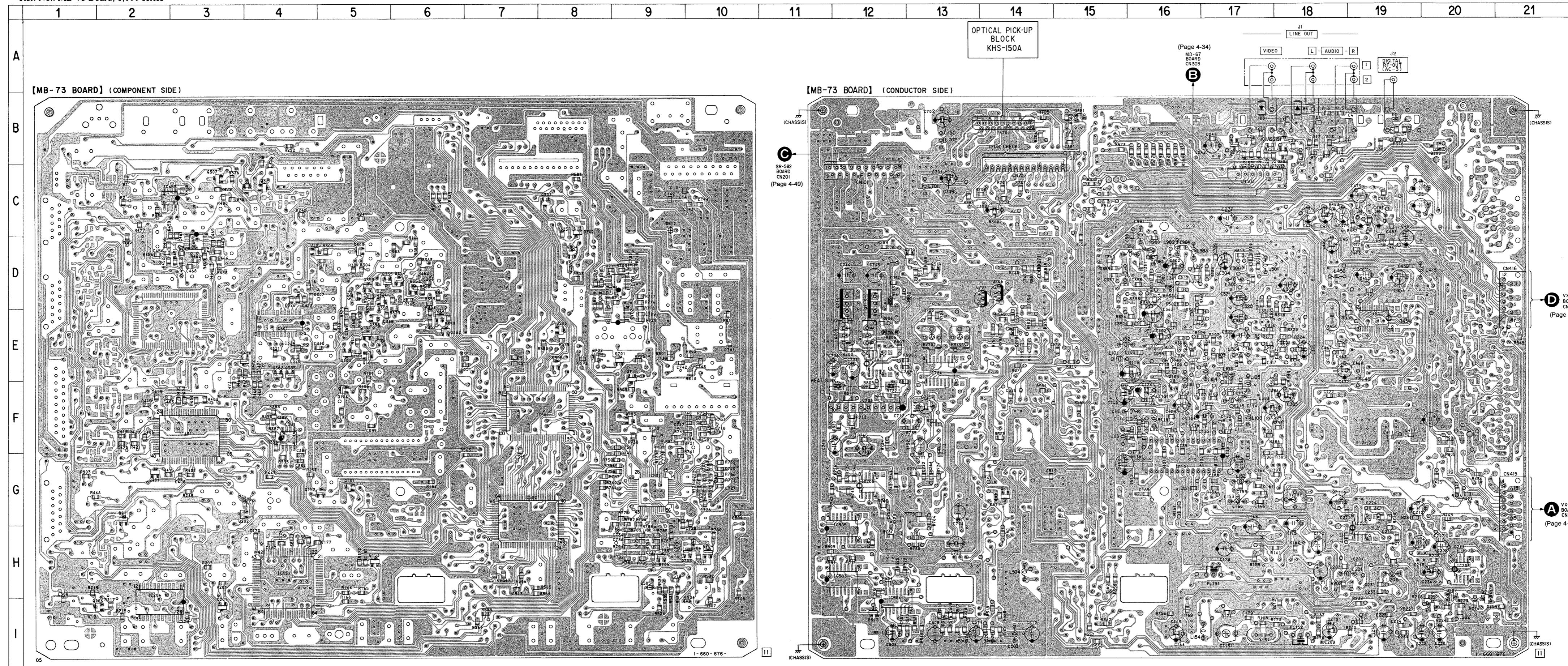
Parts face side: Parts on the parts face side seen from the parts face are indicated.
(Component Side)

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 the heat.
- All resistors are in ohms, 1/4W unless otherwise noted.
Chip resistors are 1/10W unless otherwise noted.
k Ω : 1000 Ω , M Ω : 1000k Ω .
- All capacitors are in μ F unless otherwise noted. pF: μ μ F
50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
-  : nonflammable resistor.
-  : fusible resistor.
-  : panel designation.
-  : adjustment for repair.
-  : B + Line.
-  : B - Line.
- Circled numbers refer to waveforms.
- Voltages are dc between ground and measurement points.
- Readings are taken under LD or VIDEO CD pause mode.
LD: NTSC REFERENCE DISC HLV-8 SIDE-1 Frame No. 4100.
VIDEO CD: TEST DISC HLV-401 (TGIS-3)
(Part No.: 4-978-510-01)
Track No. 34 (Full Field Color Bar (75%)).
- Readings are taken with a digital multimeter (DC10M Ω).
- 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.

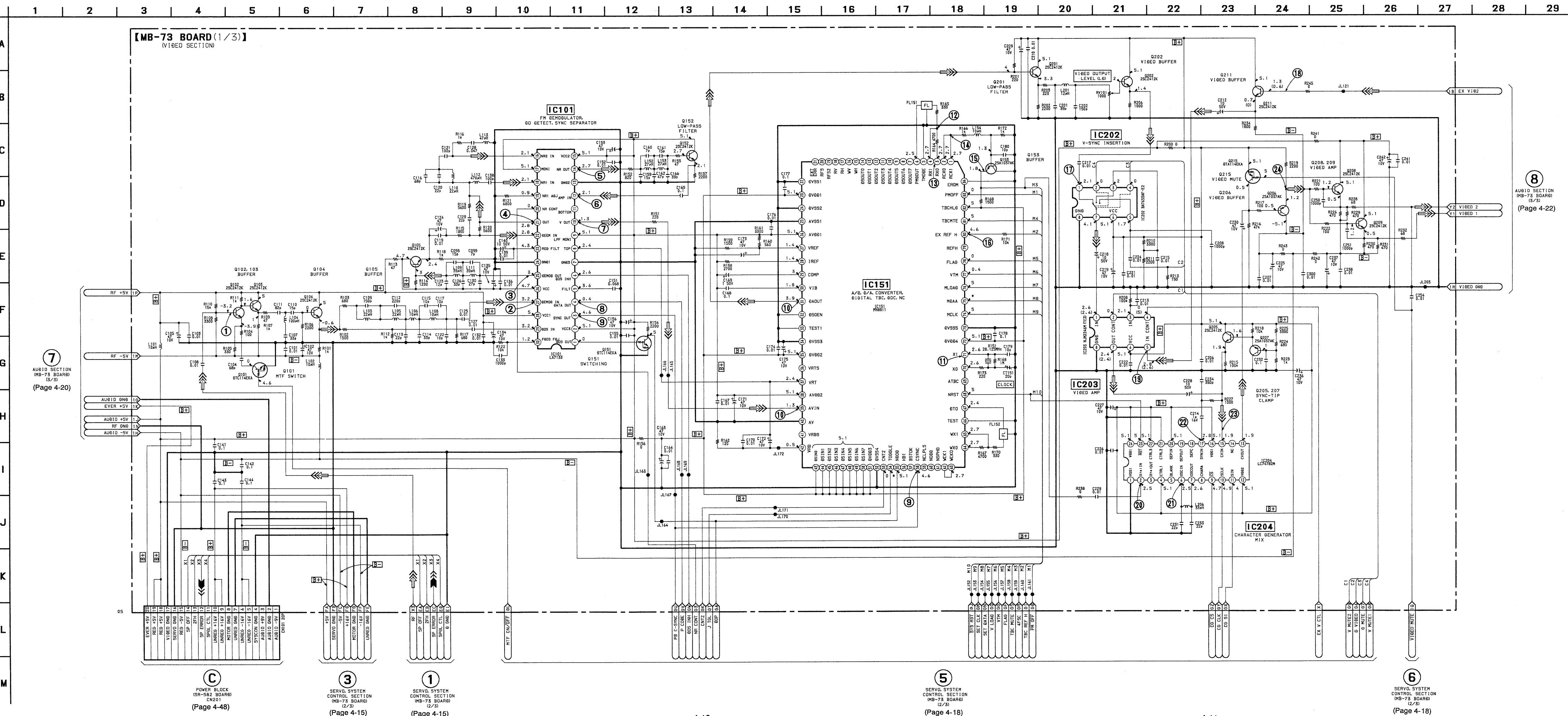
When indicating parts by reference number, please include the board name.



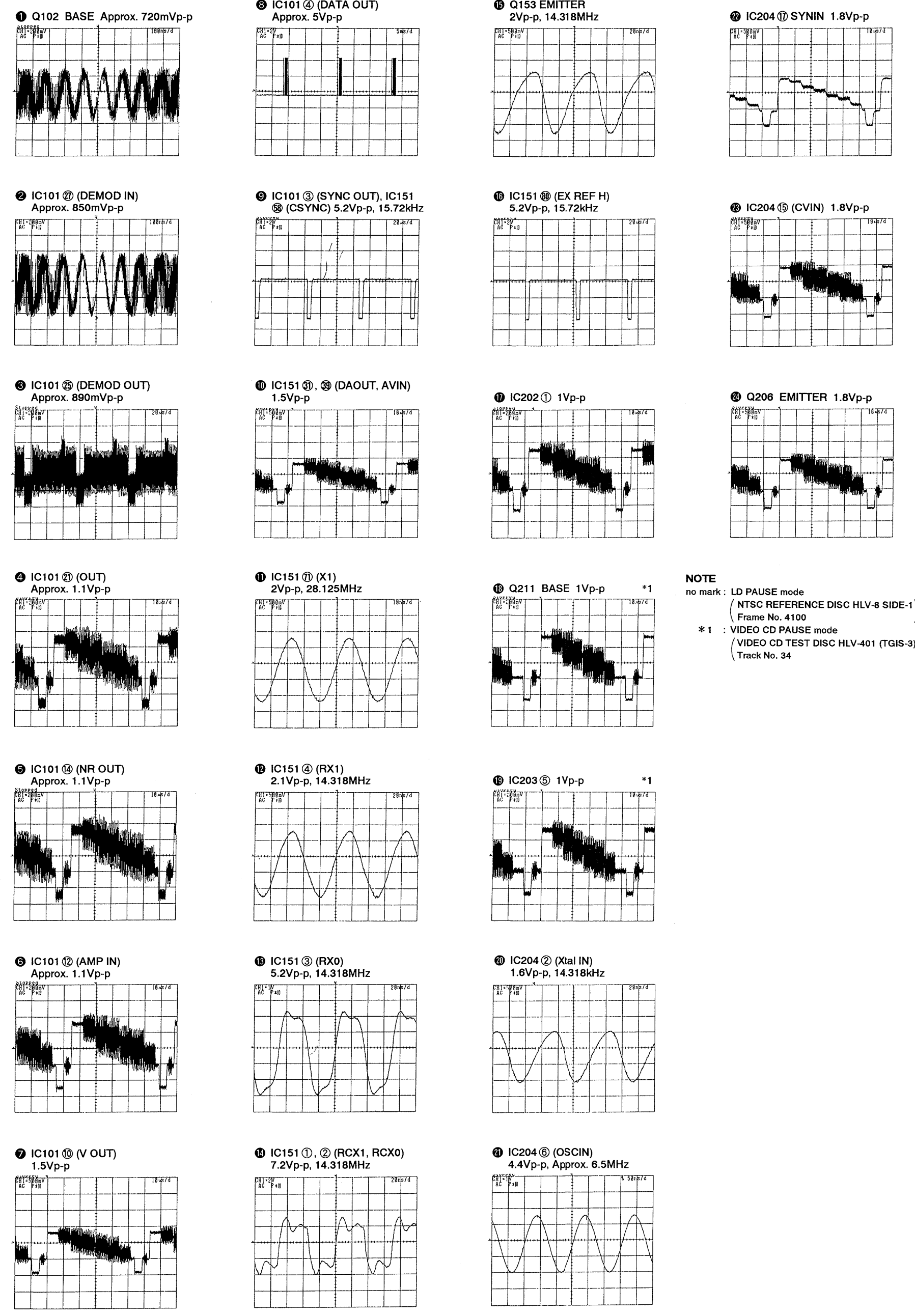
VIDEO, SERVO, SYSTEM CONTROL, AUDIO SECTION (MB-73 BOARD)

CN101	C-12	Q503	E-8
CN415	G-21	Q511	G-14
CN416	D-21	Q514	D-13
CN503	C-17	Q515	D-13
CN701	B-14	Q703	F-9
CN702	C-14	Q704	H-10
		Q705	H-10
CT151	I-17	Q706	D-14
		Q707	D-14
D003	B-17	Q708	E-14
D004	B-18	Q709	E-12
D301	D-8	Q710	D-12
D302	C-8	Q711	E-9
D450	E-4	Q712	E-12
D504	I-10	Q713	D-12
D505	H-9		
D508	E-8	RV101	G-18
D511	G-14	RV701	E-13
D512	C-9	RV702	E-13
D513	I-12		
D701	E-9		
D702	E-8		
D703	G-13		
D704	H-10		
D705	H-9		
D711	D-14		
IC101	G-16		
IC151	H-4		
IC202	H-9		
IC203	H-20		
IC204	I-2		
IC301	E-4		
IC381	F-4		
IC401	F-3		
IC450	E-19		
IC451	D-3		
IC453	C-2		
IC501	F-8		
IC502	G-7		
IC503	H-12		
IC504	I-12		
IC505	H-12		
IC701	G-9		
IC702	E-9		
IC703	F-12		
IC704	E-13		
IC705	G-12		
IC706	D-9		
IC707	E-12		
Q003	C-4		
Q004	C-4		
Q101	E-5		
Q102	E-5		
Q103	E-5		
Q104	F-5		
Q105	F-16		
Q151	G-5		
Q152	G-5		
Q153	H-5		
Q201	I-3		
Q202	G-3		
Q205	I-20		
Q206	I-2		
Q207	I-20		
Q208	B-18		
Q209	B-17		
Q211	G-2		
Q215	I-20		
Q302	C-8		
Q303	D-5		
Q304	D-8		
Q305	D-4		
Q307	C-3		
Q308	B-20		
Q351	E-6		
Q352	E-6		
Q353	D-6		
Q354	D-6		
Q355	D-5		
Q356	D-5		
Q357	D-5		
Q358	E-5		
Q359	D-5		
Q381	B-15		
Q382	E-4		
Q383	E-4		
Q401	G-2		

MB-73 (VIDEO) SCHEMATIC DIAGRAM
- Ref. No.: MB-73 Board; 1,000 series -



• Waveforms
MB-73 BOARD (1/3)



NOTE
no mark : LD PAUSE mode
(NTSC REFERENCE DISC HLV-8 SIDE-1)
Frame No. 4100
() : VIDEO CD PAUSE mode
(VIDEO CD TEST DISC HLV-401 (TGIS-3))
Track No. 34
* 1 : Can not be measured.

⑦ AUDIO SECTION MB-73 BOARD (1/3) (Page 4-20)

③ POWER BLOCK (CR-582 BOARD) (Page 4-48)

① SERVO SYSTEM CONTROL SECTION MB-73 BOARD (1/3) (Page 4-15)

⑤ SERVO SYSTEM CONTROL SECTION MB-73 BOARD (1/3) (Page 4-15)

⑤ SERVO SYSTEM CONTROL SECTION MB-73 BOARD (1/3) (Page 4-18)

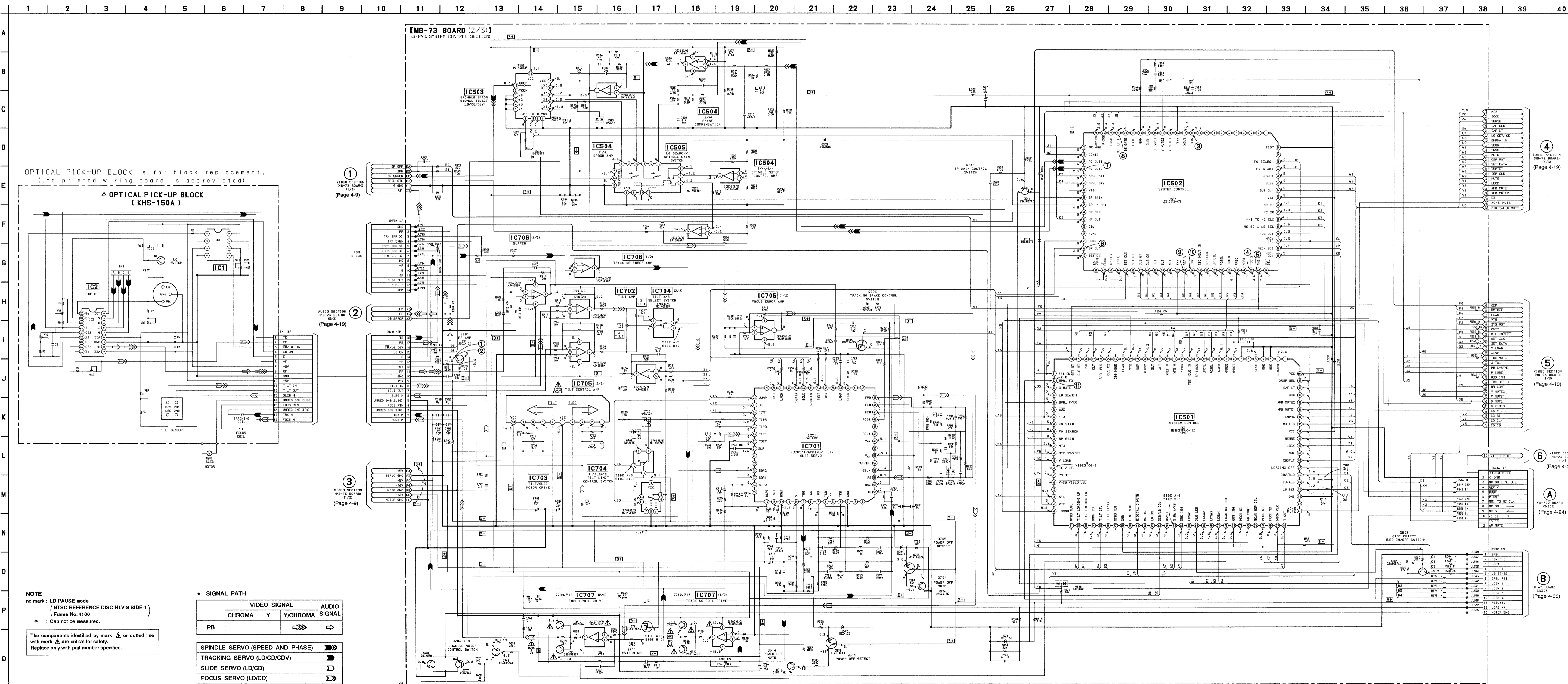
⑥ SERVO SYSTEM CONTROL SECTION MB-73 BOARD (1/3) (Page 4-18)

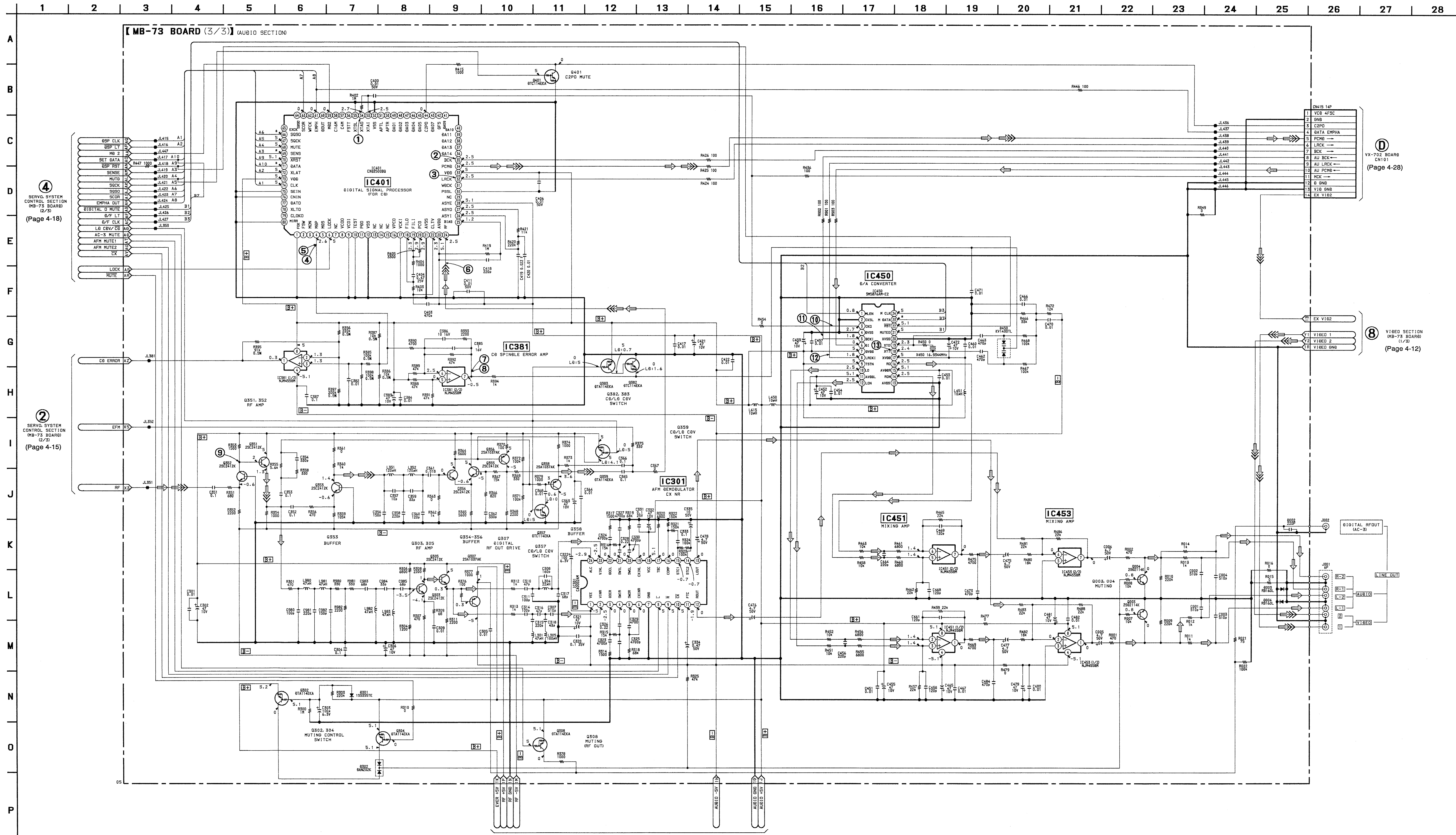
⑥ SERVO SYSTEM CONTROL SECTION MB-73 BOARD (1/3) (Page 4-18)

⑥ SERVO SYSTEM CONTROL SECTION MB-73 BOARD (1/3) (Page 4-18)

⑥ SERVO SYSTEM CONTROL SECTION MB-73 BOARD (1/3) (Page 4-18)

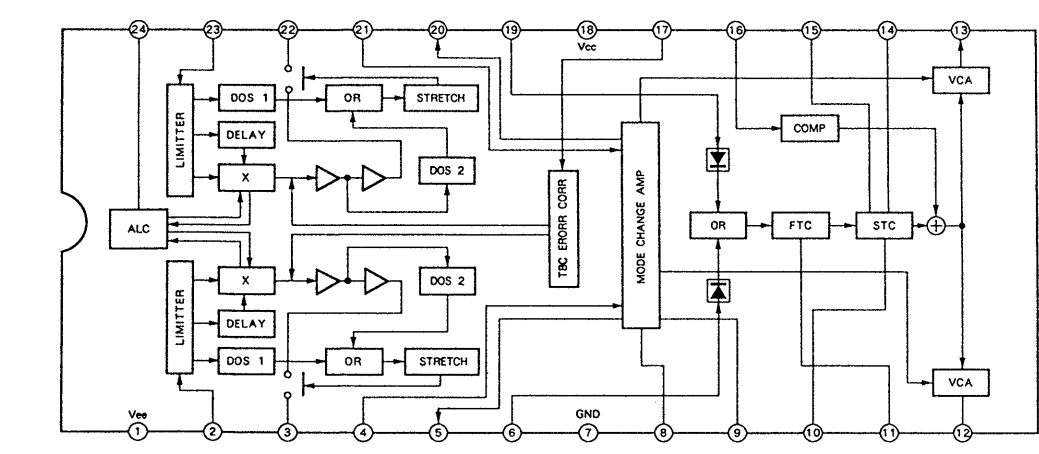
MB-73 (SERVO, SYSTEM CONTROL) SCHEMATIC DIAGRAM • See page 4-5 for printed wiring board of MB-73 BOARD. • See page 4-37 for waveforms. - Ref. No.: MB-73 Board; 1,000 series -



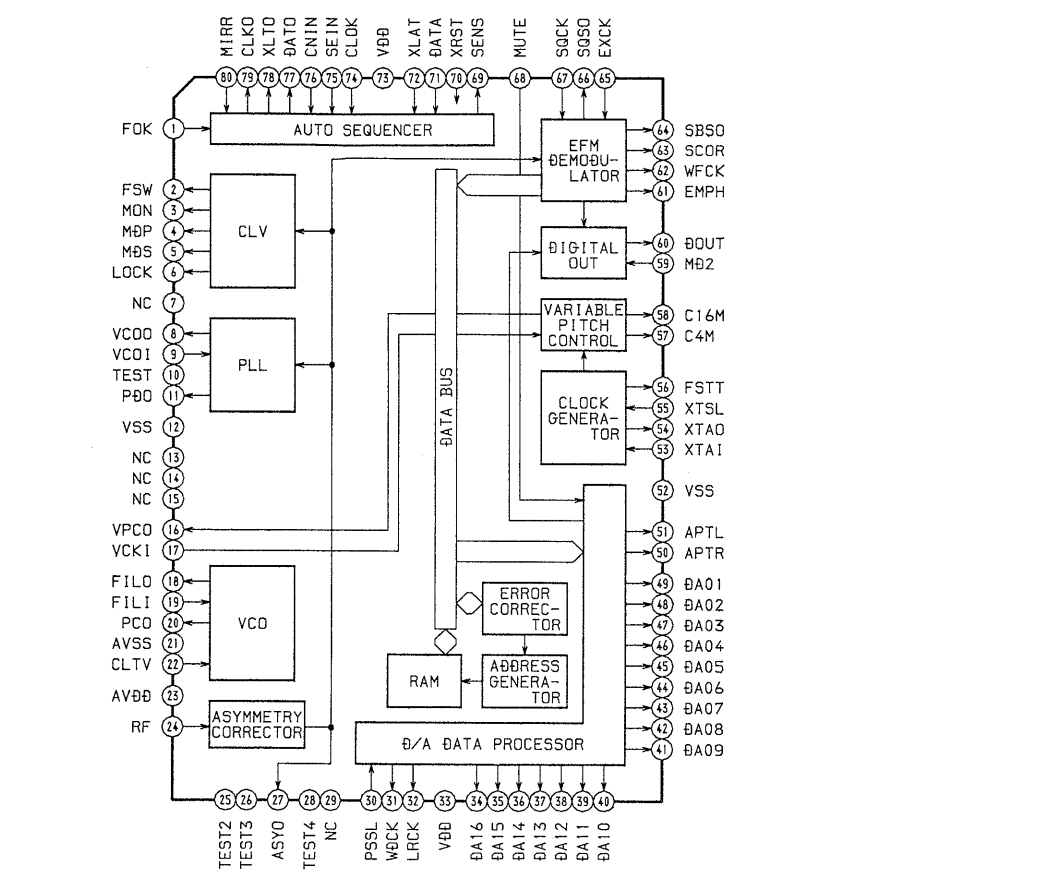


• IC Block Diagrams

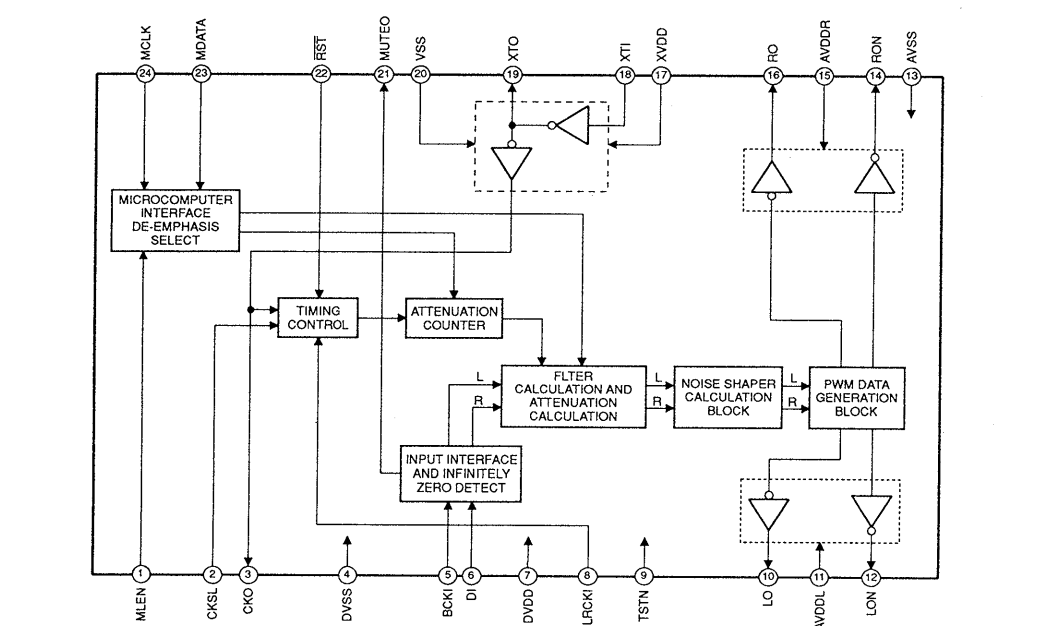
IC301 CA0002AM



IC401 CXD2500BQ



IC450 SM5876AM-E2



NOTE
 no mark : VIDEO CD PAUSE mode
 (VIDEO CD TEST DISC HLV-401 (TGIS-3))
 (Track No. 34)
 * : Can not be measured.

• SIGNAL PATH

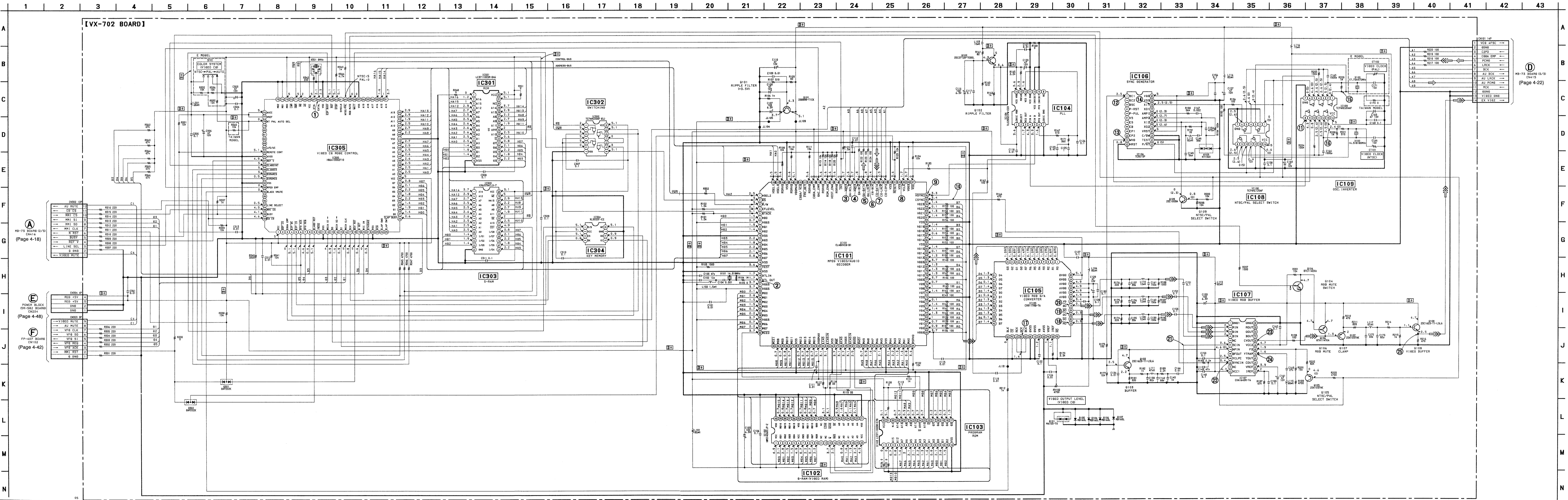
	VIDEO SIGNAL	AUDIO SIGNAL
CHROMA	Y	Y/CHROMA
PB		

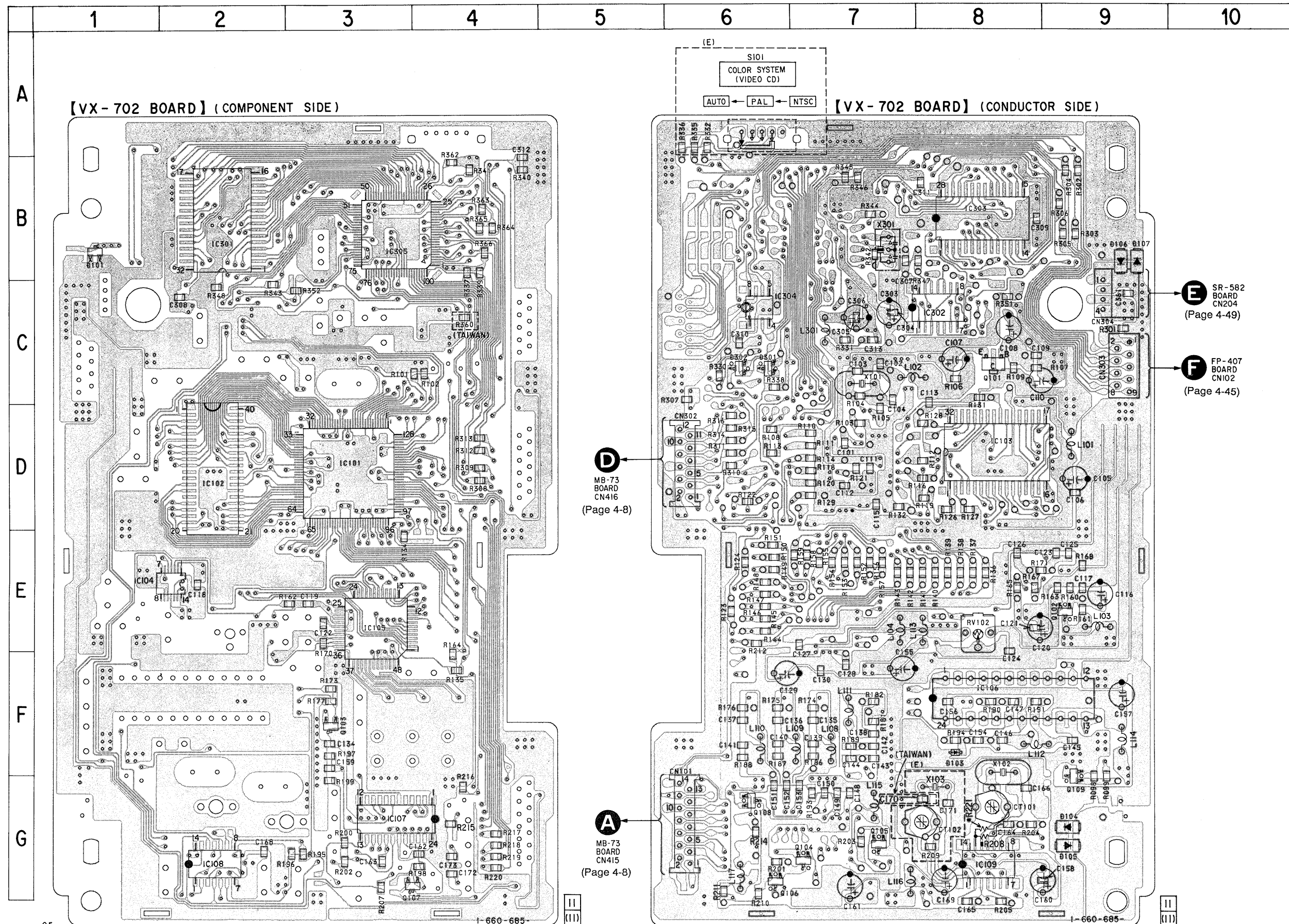
VX-702 (VIDEO CD) SCHEMATIC DIAGRAM • See page 4-31 for waveforms and 4-32 for IC block diagrams.
- Ref. No.: VX-702 Board; 2,000 series -

NOTE
no mark : VIDEO CD PAUSE mode
(VIDEO CD TEST DISC HLV-401 (TGIS-3))
(Track No. 34)
() : PAL mode
* : Can not be measured.

• SIGNAL PATH

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





VIDEO CD SECTION
(VX-702 BOARD)

CN101	G-6
CN302	D-6
CN303	C-9
CN304	C-9
CT101	G-8
CT102	G-8
D101	B-1
D103	F-8
D104	G-9
D105	G-9
D106	B-9
D107	B-9
D301	C-6
D302	C-6
IC101	D-3
IC102	D-2
IC103	D-8
IC104	E-2
IC105	E-3
IC106	F-8
IC107	G-3
IC108	G-2
IC109	G-8
IC301	B-2
IC302	C-8
IC303	B-8
IC304	C-6
IC305	B-3
Q101	C-8
Q102	E-9
Q103	F-3
Q104	Q-7
Q105	Q-7
Q106	G-6
Q107	G-3
Q108	G-6
Q109	G-9
RV102	E-8

D
MB-73 BOARD
CN416
(Page 4-8)

E
SR-582 BOARD
CN204
(Page 4-49)

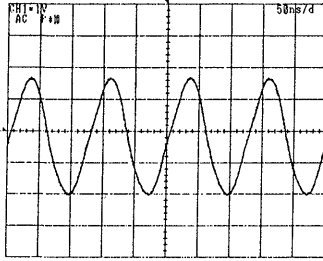
F
FP-407 BOARD
CN102
(Page 4-45)

A
MB-73 BOARD
CN415
(Page 4-8)

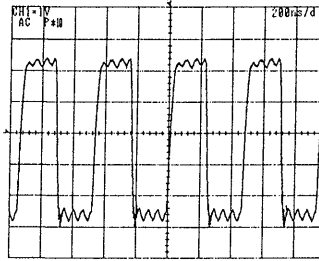
• Waveforms

VX-702 BOARD

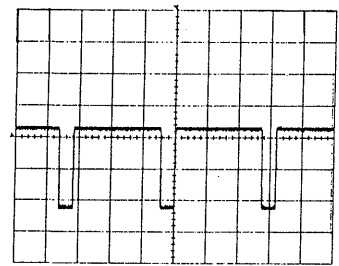
1 IC305 (EXTAL)
3.7Vp-p, 8MHz



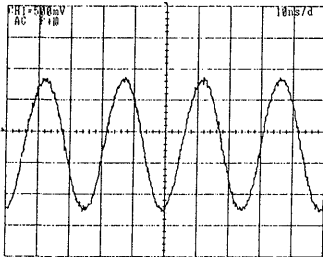
6 IC101 (CD-BCK)
5.4Vp-p, 474nsec



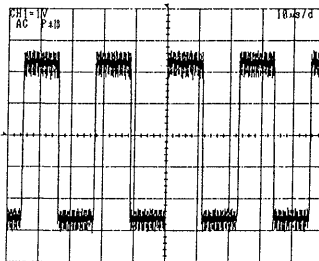
7 IC109 (NTSC)
5.3Vp-p, 15.72kHz (NTSC)
5.3Vp-p, 15.63kHz (PAL)



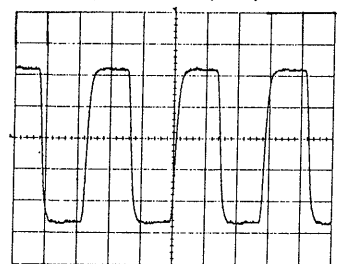
2 IC101 (XTL OUT)
2.2Vp-p, 40.5MHz



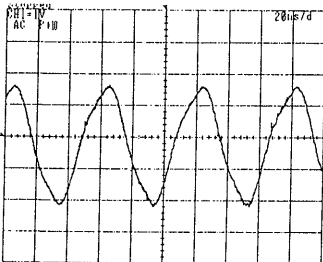
7 IC101 (CD-LRCK)
5.6Vp-p, 22.7µsec



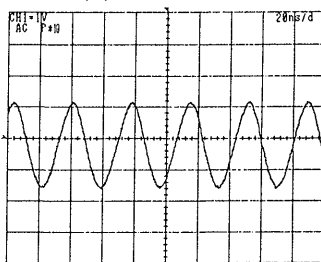
12 IC106 (SC1)
5Vp-p, 3.58MHz (NTSC)
5Vp-p, 4.43MHz (PAL)



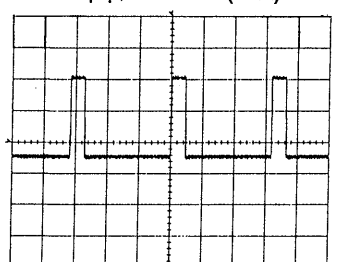
3 IC101 (DA-XCLK)
3.8Vp-p, 16.934MHz



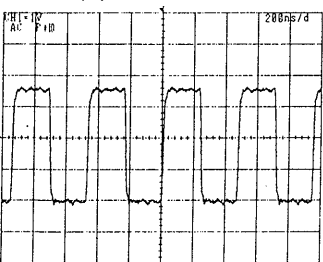
8 IC101 (VCLK)
2.8Vp-p, 27MHz



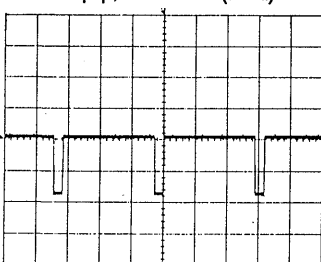
13 IC106 (WHD)
5.3Vp-p, 15.72kHz (NTSC)
5.3Vp-p, 15.63kHz (PAL)



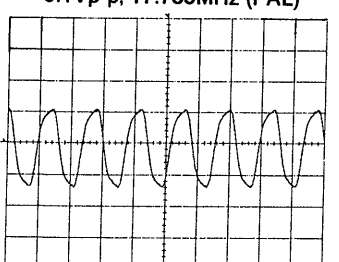
4 IC101 (DA-BCK)
3.8Vp-p, 474nsec



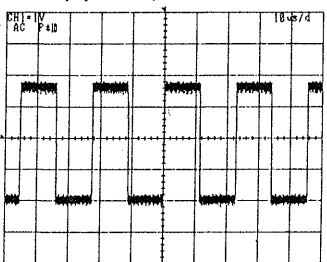
9 IC101 (HSYNC)
3.9Vp-p, 15.72kHz (NTSC)
3.9Vp-p, 15.63kHz (PAL)



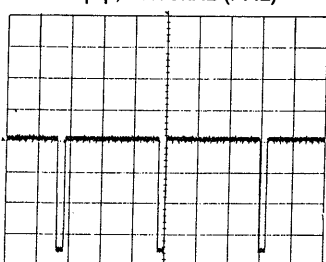
14 IC106 (X11)
5.1Vp-p, 14.318MHz (NTSC)
5.1Vp-p, 17.735MHz (PAL)



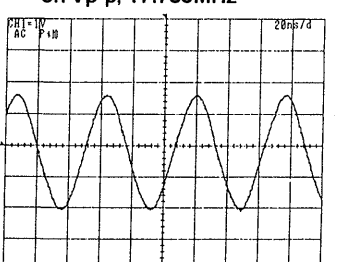
5 IC101 (DA-LRCK)
4Vp-p, 22.7µsec



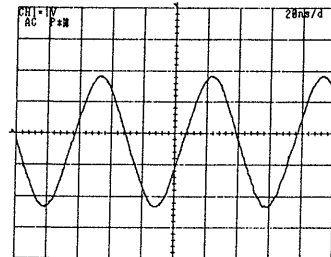
10 IC101 (CSYNC)
3.8Vp-p, 15.72kHz (NTSC)
3.8Vp-p, 15.63kHz (PAL)



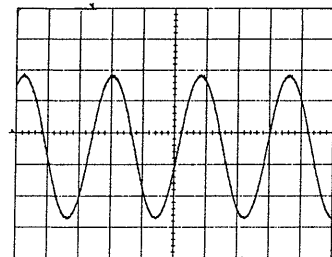
15 IC109 (PAL only)
3.7Vp-p, 17.735MHz



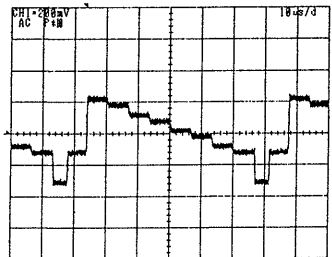
⑩ IC109 ⑬ (NTSC only)
4.2Vp-p, 14.318MHz



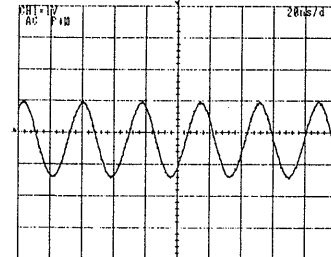
⑪ IC107 ⑥ (SCIN)
2.3Vp-p, 3.58MHz (NTSC)
2.3Vp-p, 4.43MHz (PAL)



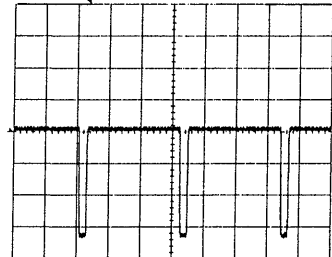
⑫ IC107 ⑩ (YTRAP)
580mVp-p



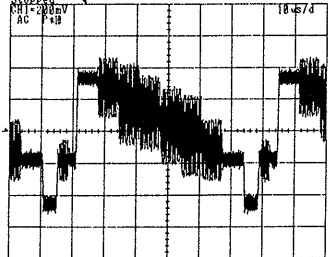
⑬ IC105 ⑦-⑨ (RCK, GCK, BCK)
2.4Vp-p, 27MHz



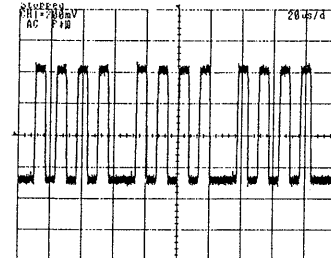
⑭ IC107 ⑪ (SYNCIN)
3.5Vp-p, 15.72kHz (NTSC)
3.5Vp-p, 15.63kHz (PAL)



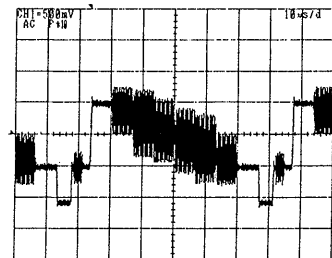
⑮ Q108 EMITTER
1Vp-p



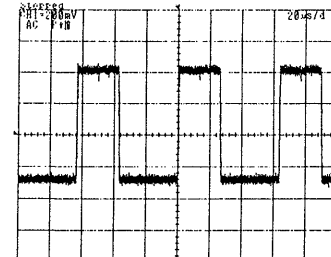
⑯ IC105 ⑫ (RO)
780mVp-p



⑰ IC107 ⑫ (CVOUT)
1.9Vp-p

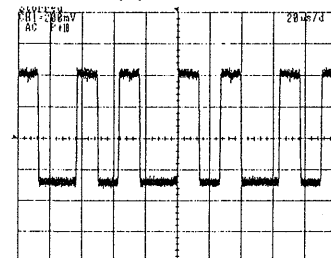


⑱ IC105 ⑬ (GO)
780mVp-p

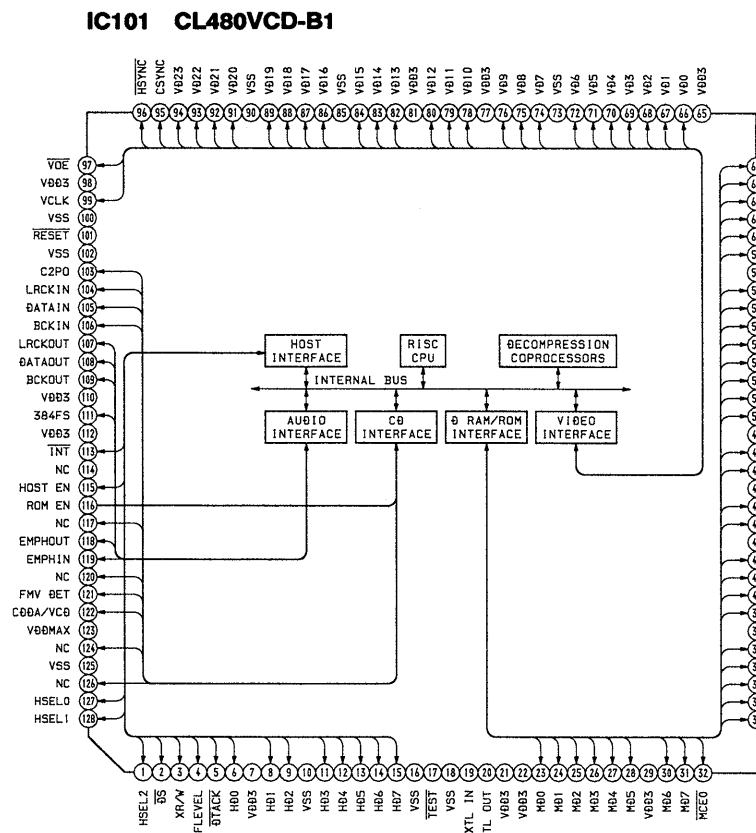


NOTE
no mark : VIDEO CD PAUSE mode
(VIDEO CD TEST DISC HLV-401 (TGIS-3)
Track No. 34)

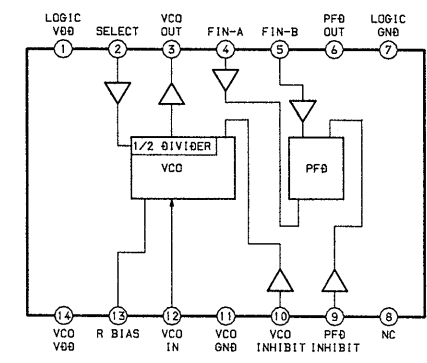
⑳ IC105 ⑭ (BO)
780mVp-p



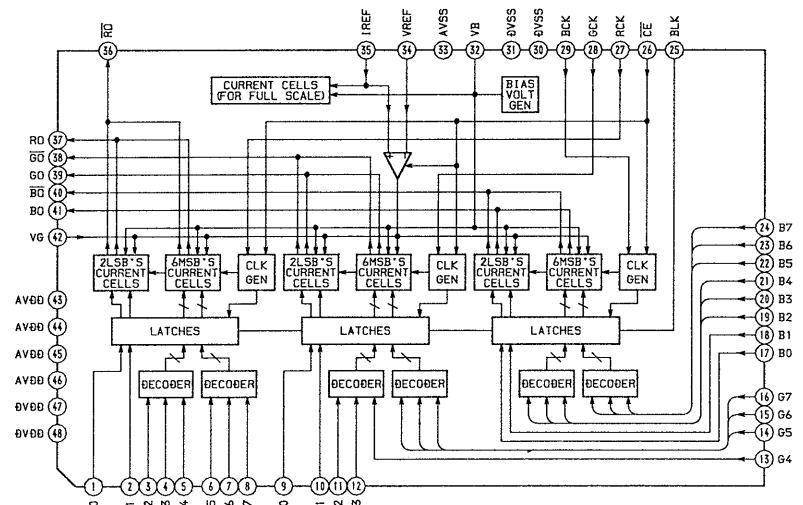
● IC Block Diagrams
VX-702 BOARD



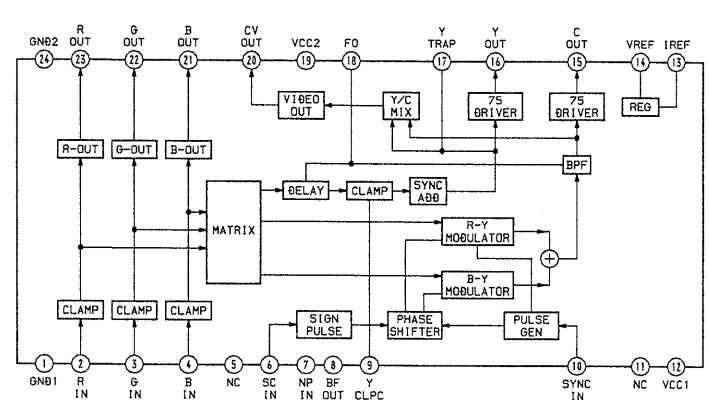
IC104 TLC2932IPW



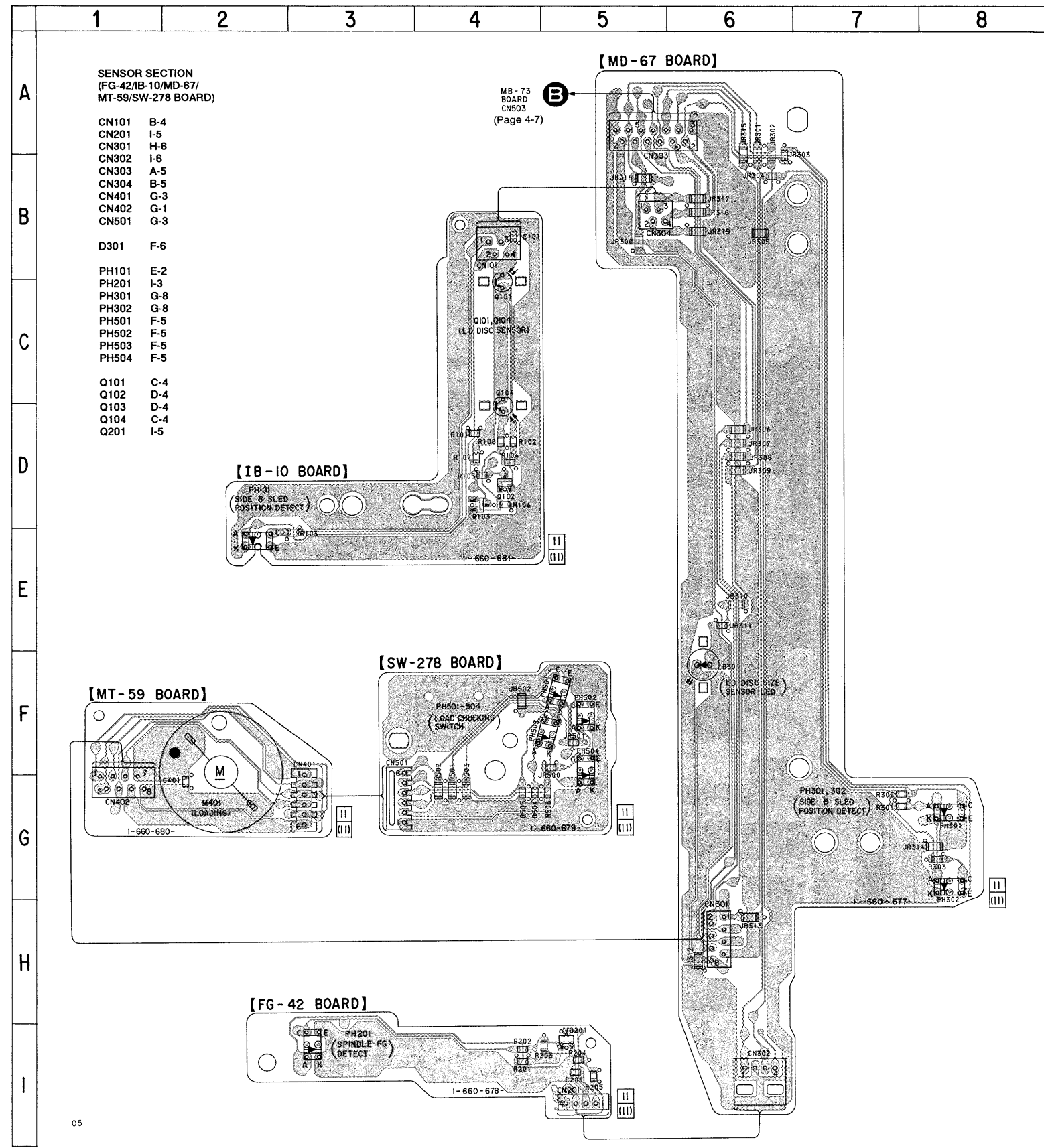
IC105 CXD1178Q



IC107 CXA1645M

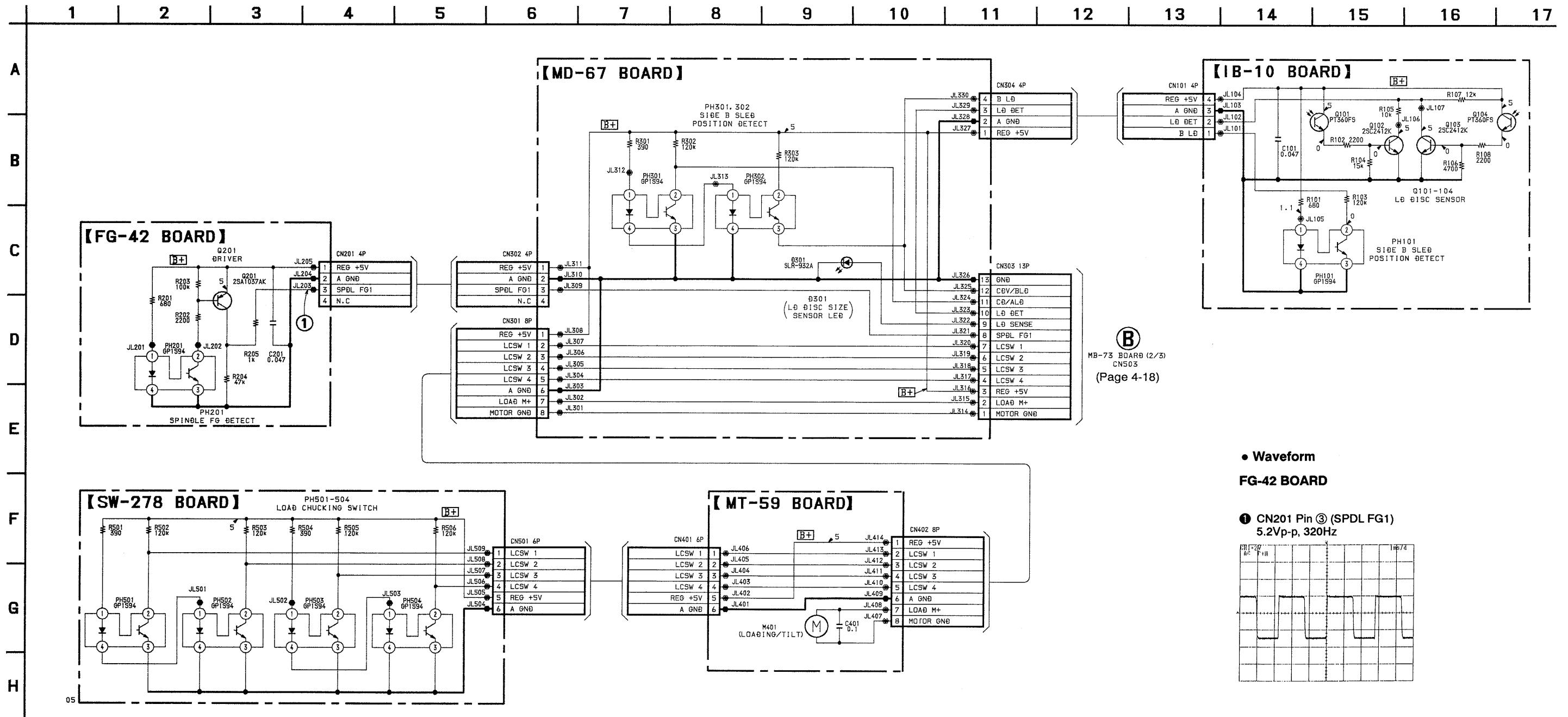


FG-42 (SPINDLE FG DETECT), IB-10 (SLED POSITION DETECT), MD-67 (SLED POSITION DETECT),
MT-59 (LOADING/TILT MOTOR), SW-278 (LOAD CHUCKING) PRINTED WIRING BOARDS
- Ref. No.: FG-42, IB-10, MD-67, MT-59 and SW-278 Boards; 5,000 series -



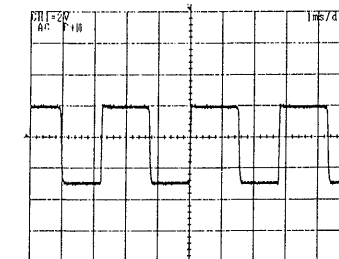
FG-42 (SPINDLE FG DETECT), IB-10 (SLED POSITION DETECT), MD-67 (SLED POSITION DETECT), MT-59 (LOADING/TILT MOTOR), SW-278 (LOAD CHUCKING) SCHEMATIC DIAGRAMS

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



• Waveform
FG-42 BOARD

① CN201 Pin ③ (SPDL FG1)
5.2Vp-p, 320Hz

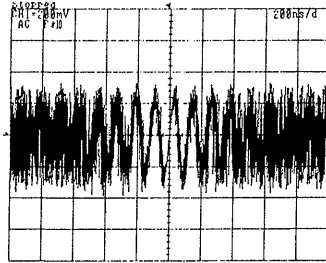


NOTE
no mark : LD PAUSE mode
(NTSC REFERENCE DISC HLV-8 SIDE-1)
(Frame No. 4100)

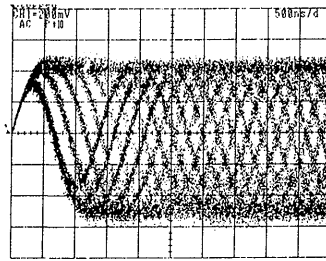
• Waveforms

MB-73 BOARD (2/3)

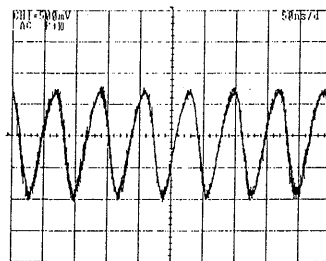
① Q381 EMITTER
Approx. 680mVp-p



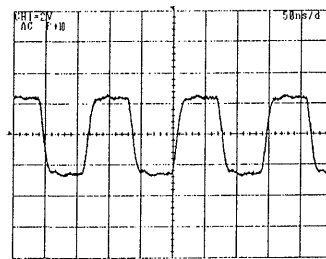
② Q381 EMITTER
Approx. 1Vp-p *1



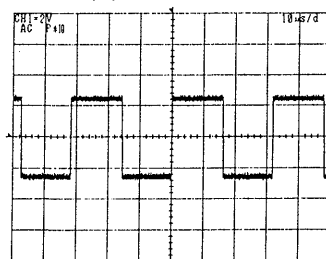
③ IC502 ① (XIN)
1.8Vp-p, 14.318MHz



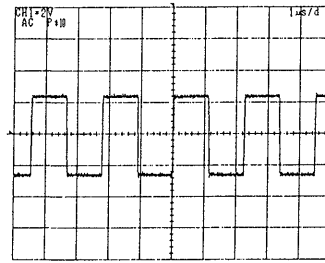
④ IC502 ② (FSC 2)
5.4Vp-p, 7.159MHz



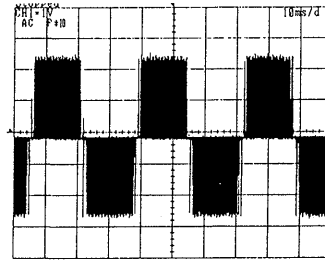
⑤ IC502 ③ (FH2)
5.4Vp-p, 32kHz



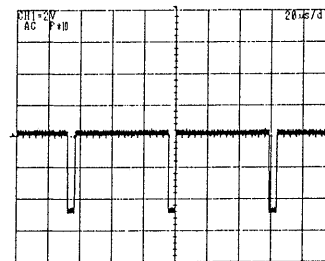
⑥ IC502 ④ (SV CLK)
5.4Vp-p, Approx. 446.4kHz



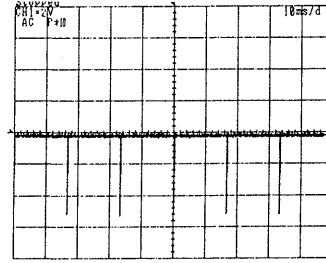
⑦ IC502 ⑤ (PC OUT2)
5.2Vp-p



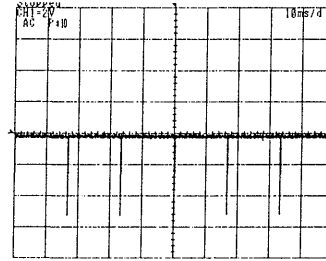
⑧ IC502 ⑥ (TBC REF H)
5.4Vp-p, 15.72kHz



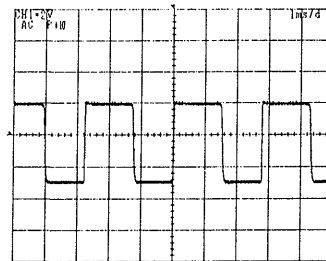
⑨ IC502 ⑦ (REF V)
5.3Vp-p



⑩ IC502 ⑧ (PBV)
5.3Vp-p



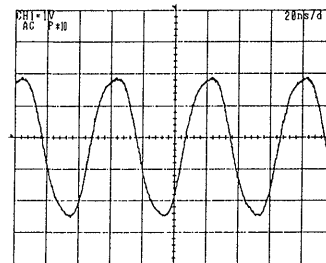
⑪ IC501 ② (SPDL FG1)
5.2Vp-p, 360Hz



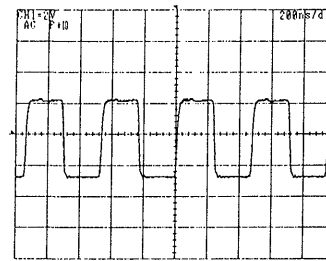
• Waveforms

MB-73 BOARD (3/3)

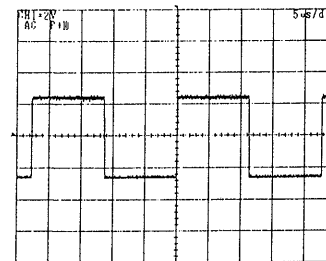
⑫ IC401 ④ (XTAO)
4.4Vp-p, 16.89MHz



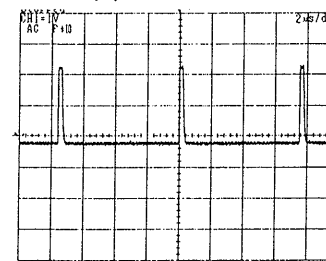
⑬ IC401 ⑤ (BCK)
5.2Vp-p, 474nsec



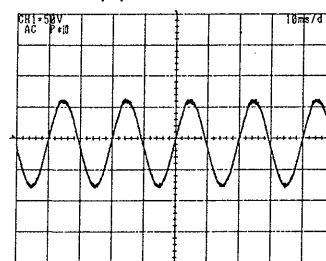
⑭ IC401 ⑥ (LRCK)
5.2Vp-p, 22.7 μsec



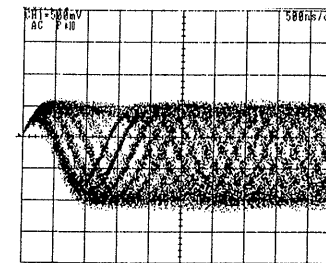
⑮ IC401 ⑦ (MDP)
2.6Vp-p, 7.56 μsec



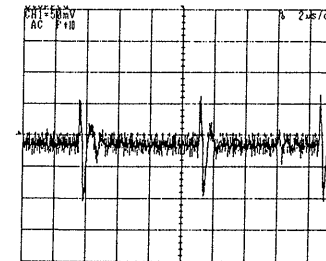
⑯ IC401 ⑧ (MDP)
144Vp-p, 20msec *1



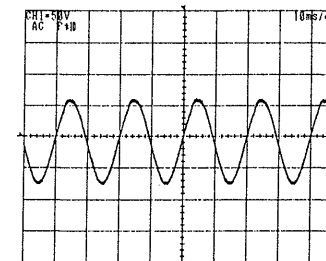
⑰ IC401 ⑨ (RF) 1.5Vp-p



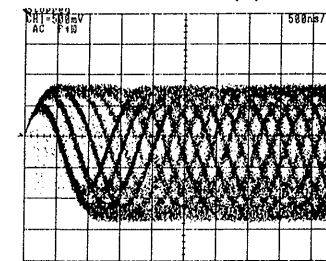
⑱ IC381 ⑦ 170mVp-p



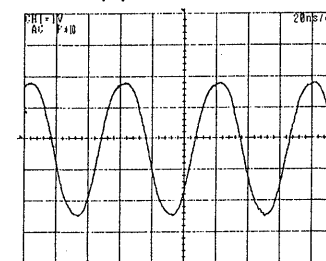
⑲ IC381 ⑧ 138Vp-p, 20msec *1



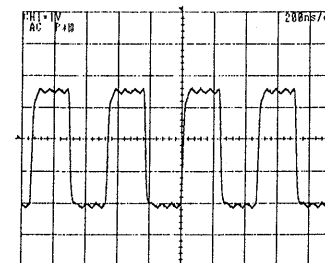
⑳ Q351 BASE 2.2Vp-p



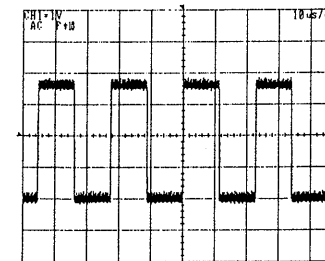
㉑ IC450 ③ (CKO)
4.3Vp-p, 16.89MHz



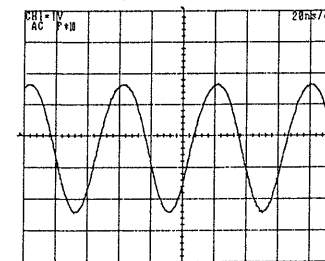
㉒ IC450 ④ (BCKI)
3.8Vp-p, 474nsec



㉓ IC450 ⑤ (LRCKI)
4Vp-p, 22.7 μsec



㉔ IC450 ⑥ (XTI)
4.1Vp-p, 16.89MHz



NOTE

no mark : LD PAUSE mode
(NTSC REFERENCE DISC HLV-8 SIDE-1)
(Frame No. 4100)
* 1 : VIDEO CD PAUSE mode
(VIDEO CD TEST DISC HLV-401 (TGIS-3))
(Track No. 34)

NOTE

no mark : VIDEO CD PAUSE mode
(VIDEO CD TEST DISC HLV-401 (TGIS-3))
(Track No. 34)
* 1 : LD PAUSE mode
(NTSC REFERENCE DISC HLV-8 SIDE-1)
(Frame No. 4100)

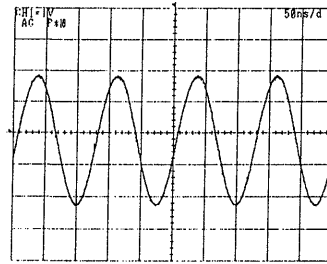
FP-407 (MODE CONTROL), PW-905 (POWER SWITCH), SW-905 (FUNCTION SWITCH) SCHEMATIC DIAGRAMS

- Ref. No.: FP-407; Board; 3,000 series, PW-905 and SW-905 Boards; 4,000 series -

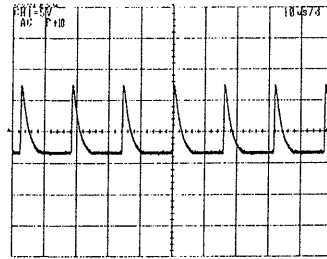
• Waveforms

FP-407 BOARD

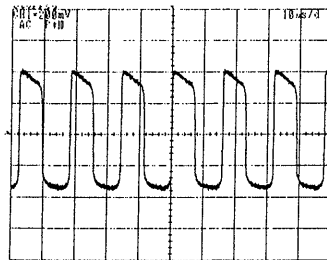
① IC102 (X0)
4.2Vp-p, 8MHz



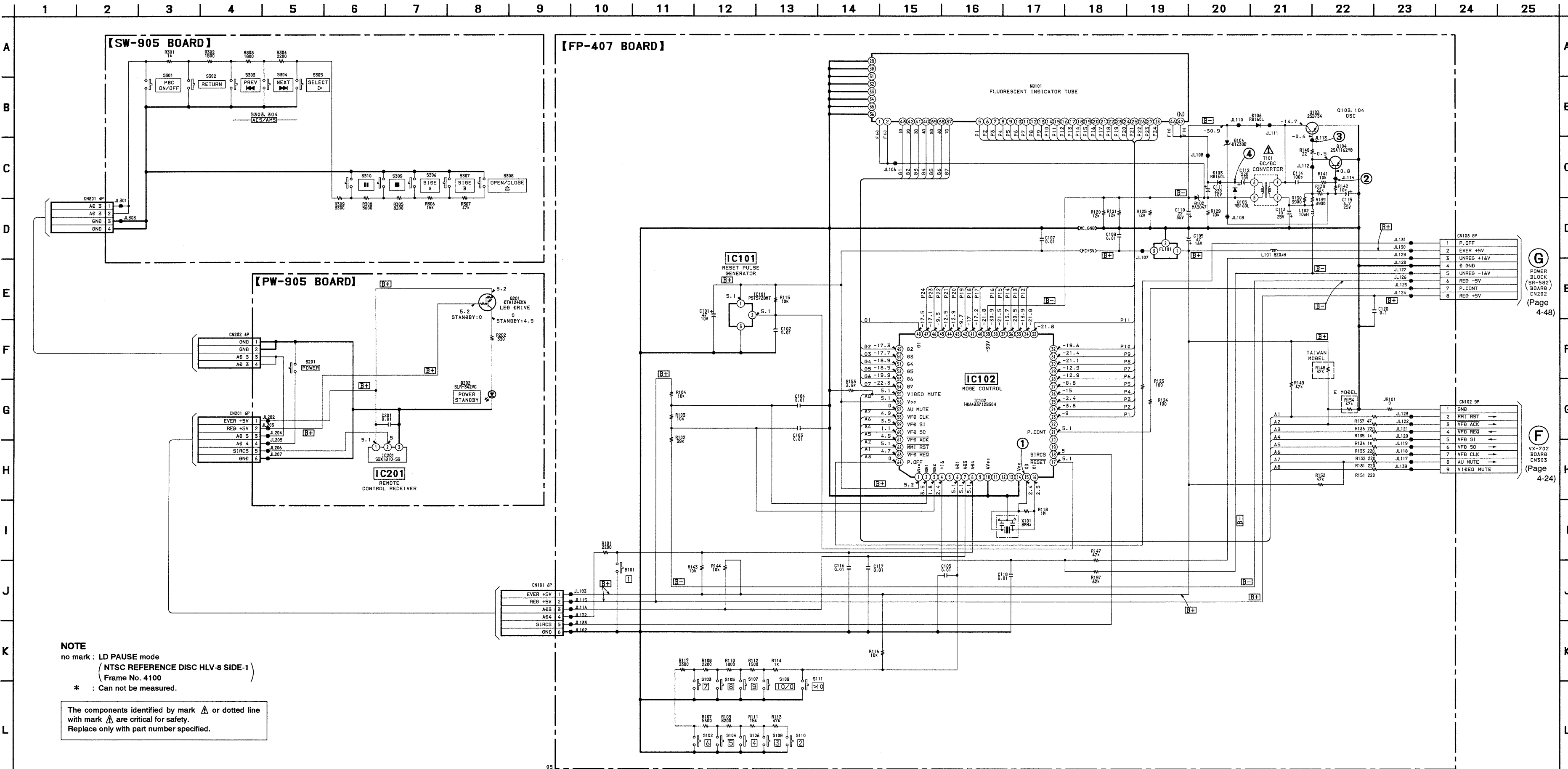
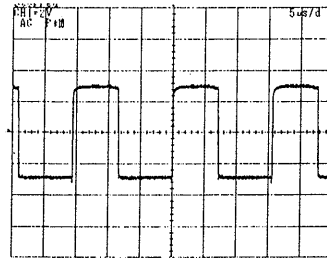
② Q104 BASE
11.4Vp-p, 16.2μsec



③ Q103 BASE
800mVp-p, 16.2μsec



④ D103 ANODE
6.2Vp-p, 16.2μsec



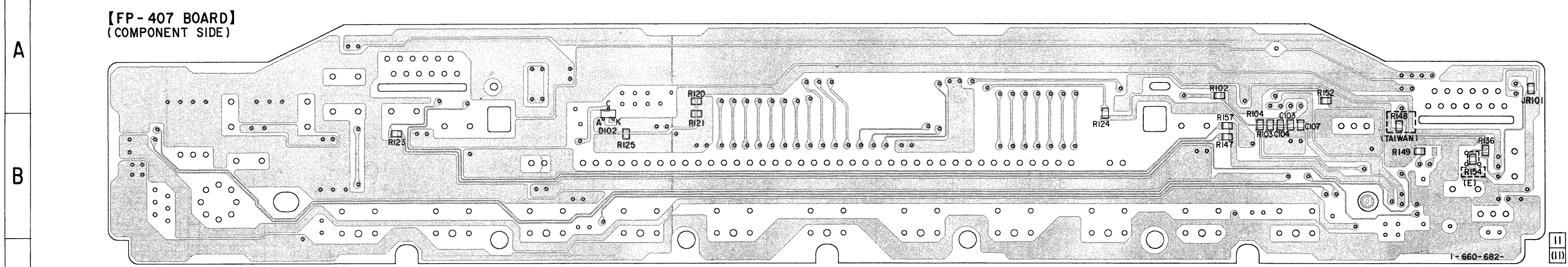
NOTE
no mark : LD PAUSE mode
(NTSC REFERENCE DISC HLV-8 SIDE-1)
Frame No. 4100
* : Can not be measured.

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

① POWER BLOCK (SR-582) BOARD / CN202 (Page 4-48)

② VV-702 BOARD / CN303 (Page 4-24)

1 2 3 4 5 6 7 8 9 10 11 12 13

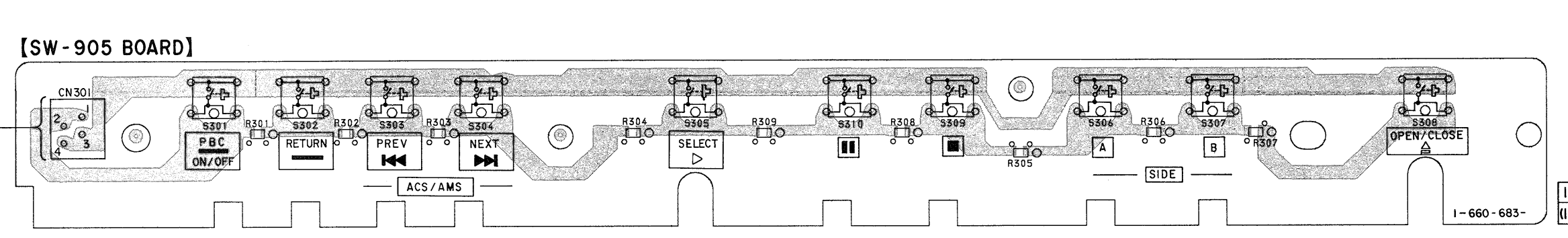
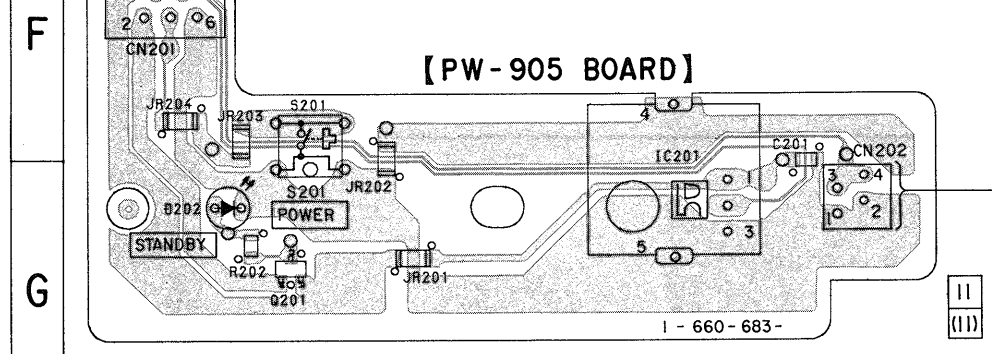
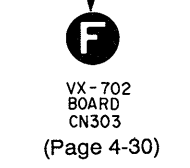
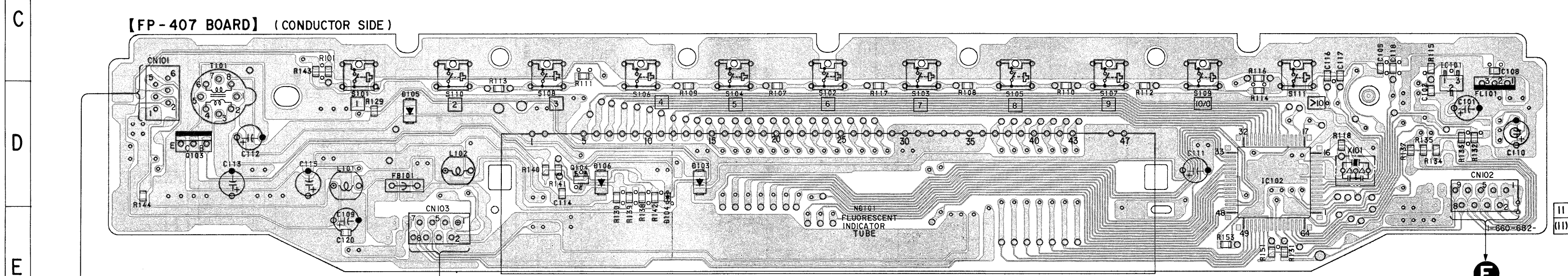


- FRONT SECTION
(FP-407/PW-905/SW-905 BOARD)
- CN101 C-2
 - CN102 D-12
 - CN103 E-4
 - CN201 F-1
 - CN202 G-4
 - CN301 G-5

 - D102 B-5
 - D103 D-6
 - D104 E-6
 - D105 D-4
 - D106 D-5
 - D202 G-1

 - IC101 C-12
 - IC102 D-10
 - IC201 G-3

 - Q103 D-2
 - Q104 D-5
 - Q201 G-1



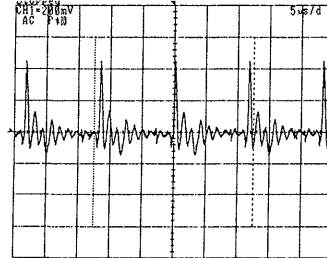
POWER SUPPLY BLOCK (SWITCHING REGULATOR & SPINDLE MOTOR DRIVER) SCHEMATIC DIAGRAM

- Ref. No.: POWER BLOCK; 6,000 series -

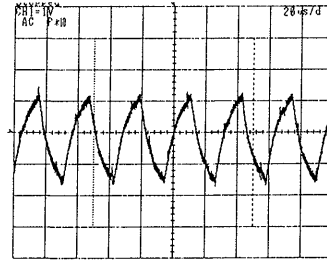
• Waveforms

POWER SUPPLY BLOCK (SR-582 BOARD)

① IC204 (LD PAUSE)
Approx. 600mVp-p, 11.7 μsec



② IC204 (LD PAUSE)
3Vp-p, 32kHz

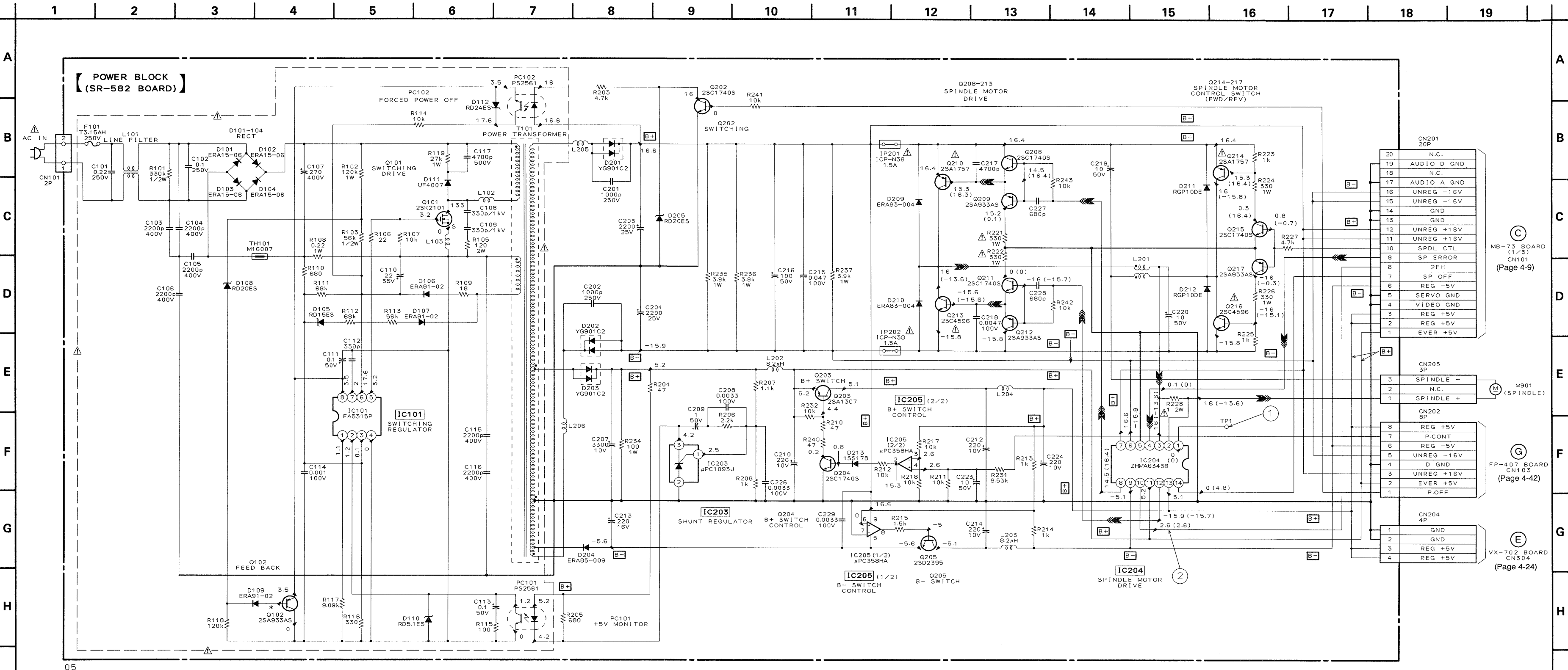


NOTE
no mark : EE mode
() : LD PAUSE mode
() : NTSC REFERENCE DISC HLV-8 SIDE-1 (Frame No. 4100)
* : Can not be measured.
PRIMARY GND: Pin ④ of IC101.
SECONDARY GND: Pin ④ of CN201.

• SIGNAL PATH

SPINDLE SERVO (SPEED AND PHASE) →

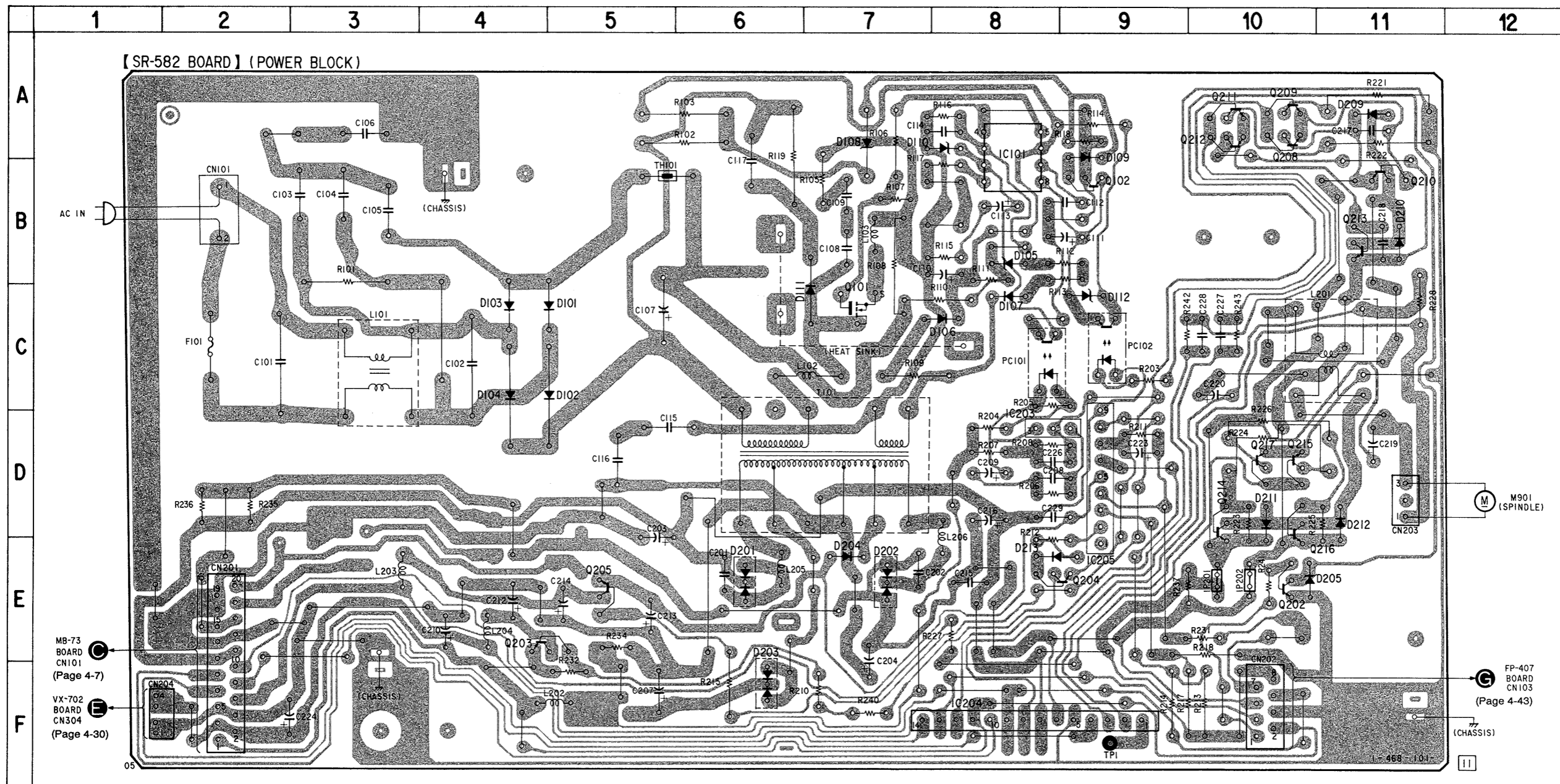
The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.



05

POWER SUPPLY BLOCK (SWITCHING REGULATOR & SPINDLE MOTOR DRIVER) PRINTED WIRING BOARD

- Ref. No.: POWER BLOCK; 6,000 series -



**POWER SECTION
(POWER SUPPLY BLOCK)**

- CN101 B-2
- CN201 E-2
- CN202 F-10
- CN203 D-11
- CN204 F-2

- D101 C-5
- D102 C-5
- D103 C-4
- D104 C-4
- D105 B-8
- D106 C-8
- D107 C-8
- D108 A-7
- D109 A-9
- D110 A-8
- D111 C-7
- D112 C-9
- D201 E-6
- D202 E-7
- D203 F-6
- D204 E-7
- D205 E-11
- D209 A-11
- D210 B-11
- D211 D-10
- D212 D-11
- D213 E-8

- IC101 A-8
- IC203 D-8
- IC204 F-8
- IC205 D-9

- PC101 C-8
- PC102 C-9

- Q101 C-7
- Q102 B-9
- Q202 E-10
- Q203 E-4
- Q204 E-9
- Q205 E-5
- Q208 A-10
- Q209 A-10
- Q210 B-11
- Q211 A-10
- Q212 A-10
- Q213 B-11
- Q214 D-10
- Q215 D-10
- Q216 D-10
- Q217 D-10

MB-73 BOARD
CN101
(Page 4-7)

VX-702 BOARD
CN304
(Page 4-30)

FP-407 BOARD
CN103
(Page 4-43)

SECTION 5 REPAIR PARTS LIST

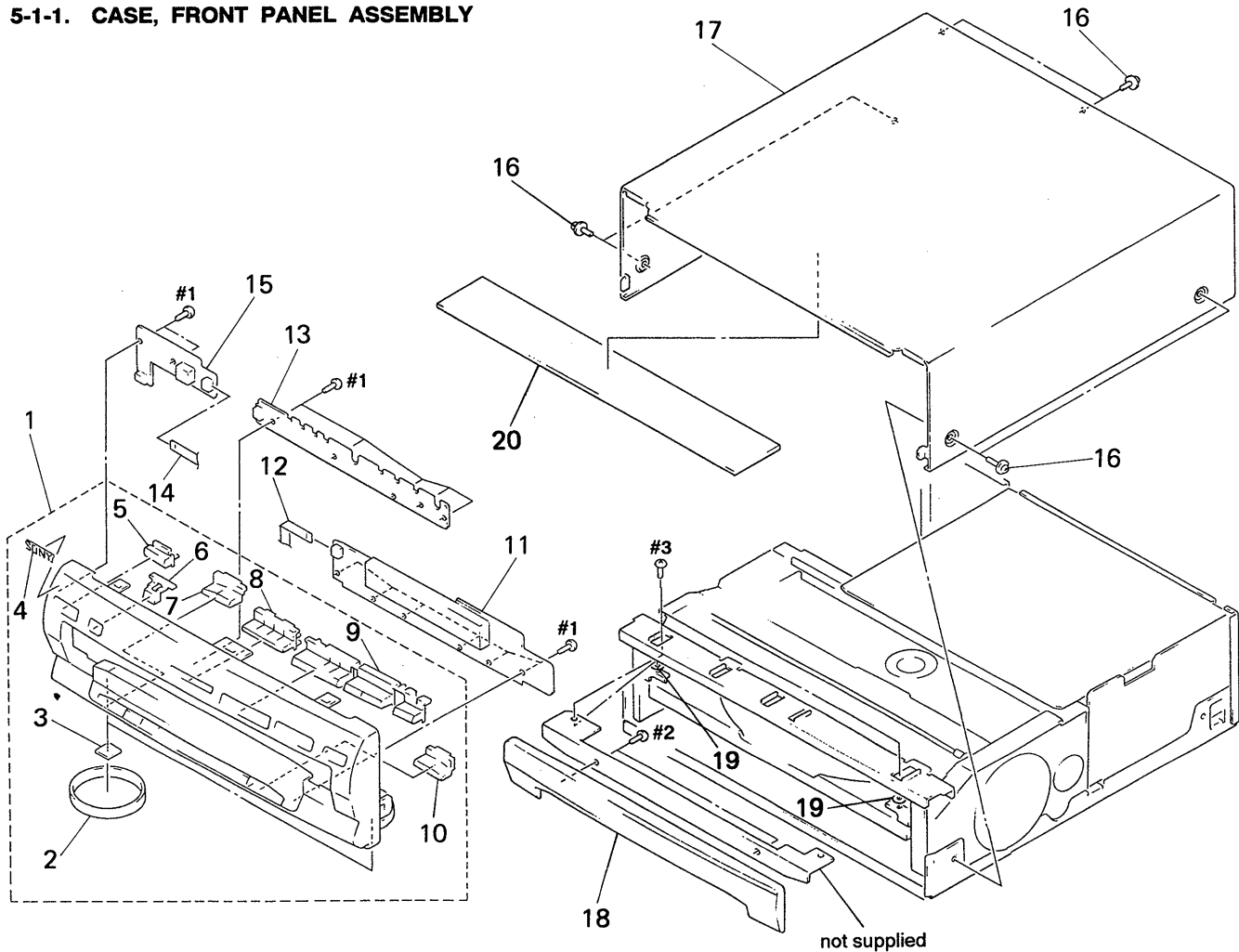
5-1. EXPLODED VIEWS

NOTE:

- -XX and -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 the electrical parts list.
- Abbreviation
TW: Taiwan model

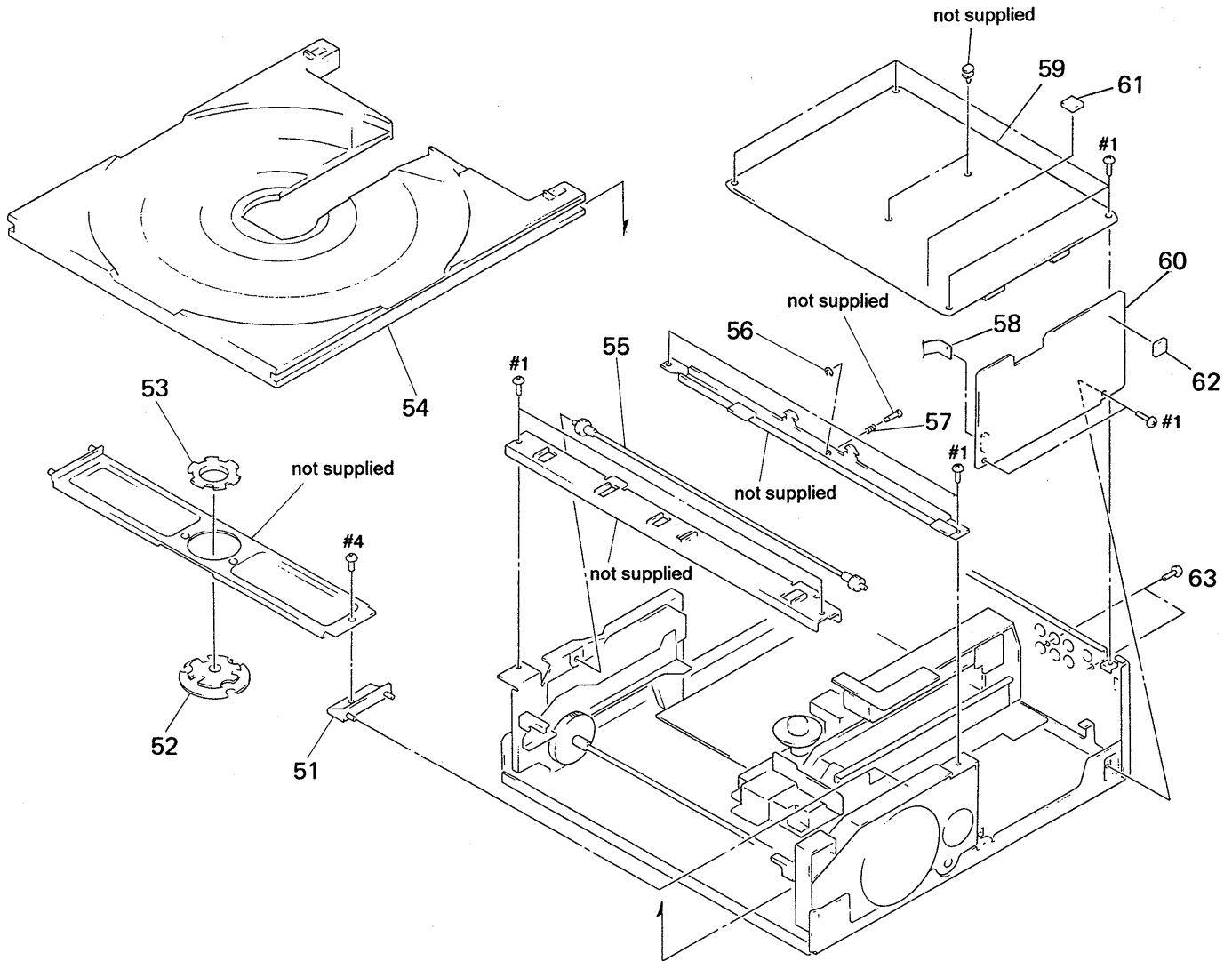
The components identified by mark or dotted line with mark are critical for safety. Replace only with part number specified.

5-1-1. CASE, FRONT PANEL ASSEMBLY



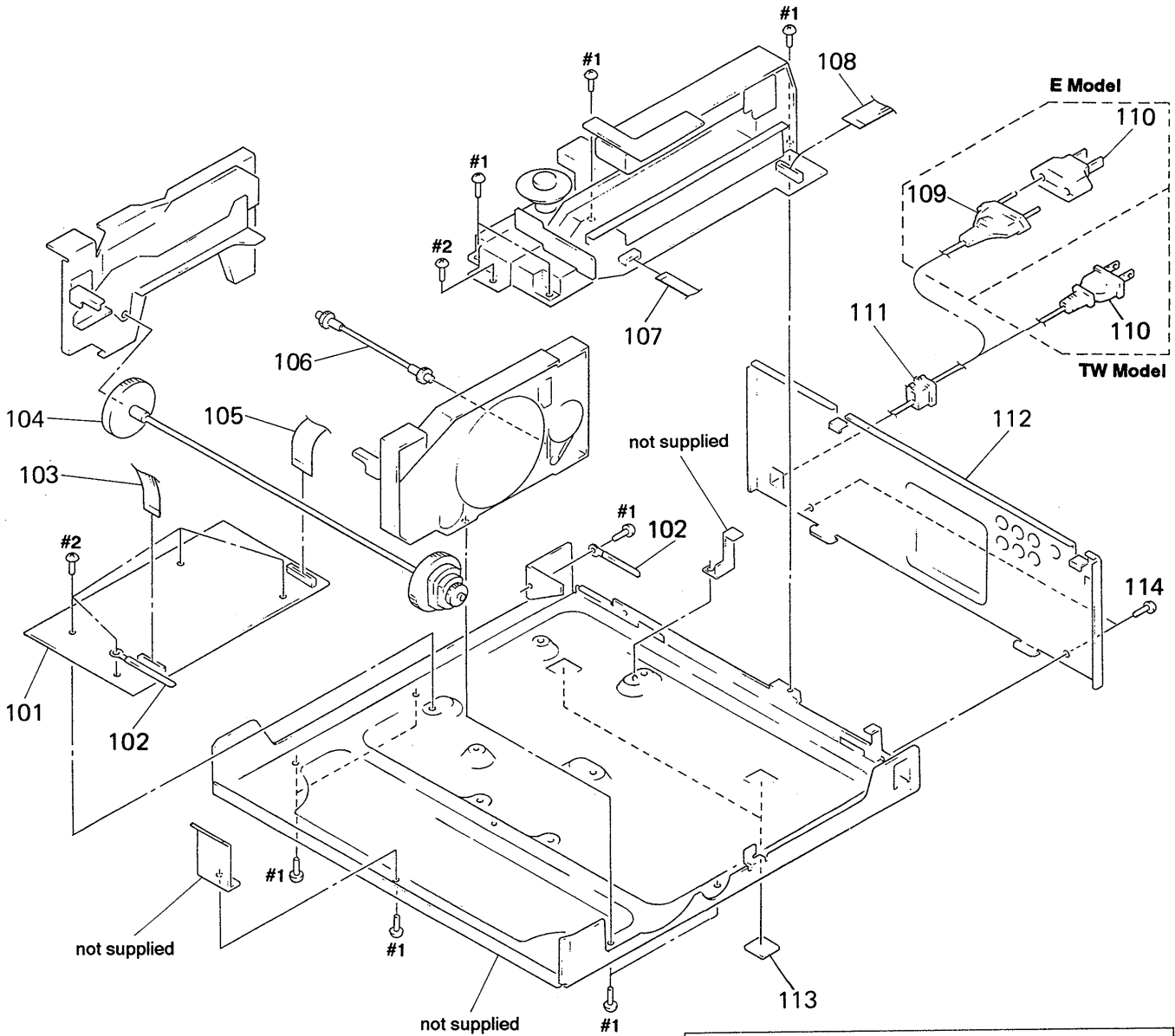
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	X-3946-041-1	PANEL ASSY, FRONT (E)		* 11	A-6423-388-A	FP-407 BOARD, COMPLETE (E)	
* 1	X-3946-209-1	PANEL ASSY, FRONT (TW)		* 11	A-6423-411-A	FP-407 BOARD, COMPLETE (TW)	
* 2	4-921-918-21	PLATE, ORNAMENTAL		12	1-777-009-11	CABLE, FLAT (6 CORE)	
3	3-968-251-01	CUSHION (R), FOOT		* 13	1-660-684-11	SW-905 BOARD	
* 4	4-963-404-21	EMBLEM (5-A), SONY		14	1-777-012-11	CABLE, FLEXIBLE FLAT (4 CORE)	
* 5	3-970-492-01	BUTTON (CHIP), POWER (TW)		* 15	1-660-683-11	PW-905 BOARD	
5	X-3945-887-1	BUTTON ASSY, POWER (E)		16	3-710-901-11	SCREW, TAPPING	
6	3-968-262-01	WINDOW, RAY CATCHER		* 17	3-968-245-01	CASE, UPPER	
7	3-968-265-01	KEY (L), 10		18	3-968-255-01	DOOR	
8	3-969-344-01	KEY, 4 GANG		19	3-701-438-11	WASHER, 2.5	
9	3-968-257-01	BUTTON, PLAY		* 20	3-970-858-01	DAMPER	
10	3-968-264-01	KEY (R), 10					

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



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	3-968-304-01	HOLDER, CHUCK PLATE		58	1-777-013-11	CABLE, FLAT (9 CORE)	
52	A-6415-990-A	CHUCK BLOCK ASSY		* 59	A-6423-387-A	MB-73 BOARD, COMPLETE	
53	3-968-317-01	PLATE, TOP		* 60	A-6423-395-A	VX-702 BOARD, COMPLETE (E)	
54	A-6415-988-A	TRAY (96) ASSY		* 60	A-6423-405-A	VX-702 BOARD, COMPLETE (TW)	
55	X-3946-037-1	SHAFT ASSY, LINK		61	9-911-840-99	RUBBER (B)	
56	3-703-075-00	CAP 2, SHAFT		62	4-909-982-31	SCREW, TAPPING	
57	3-969-528-01	SPRING, COMPRESSION		63	9-911-842-99	RUBBER (B)	

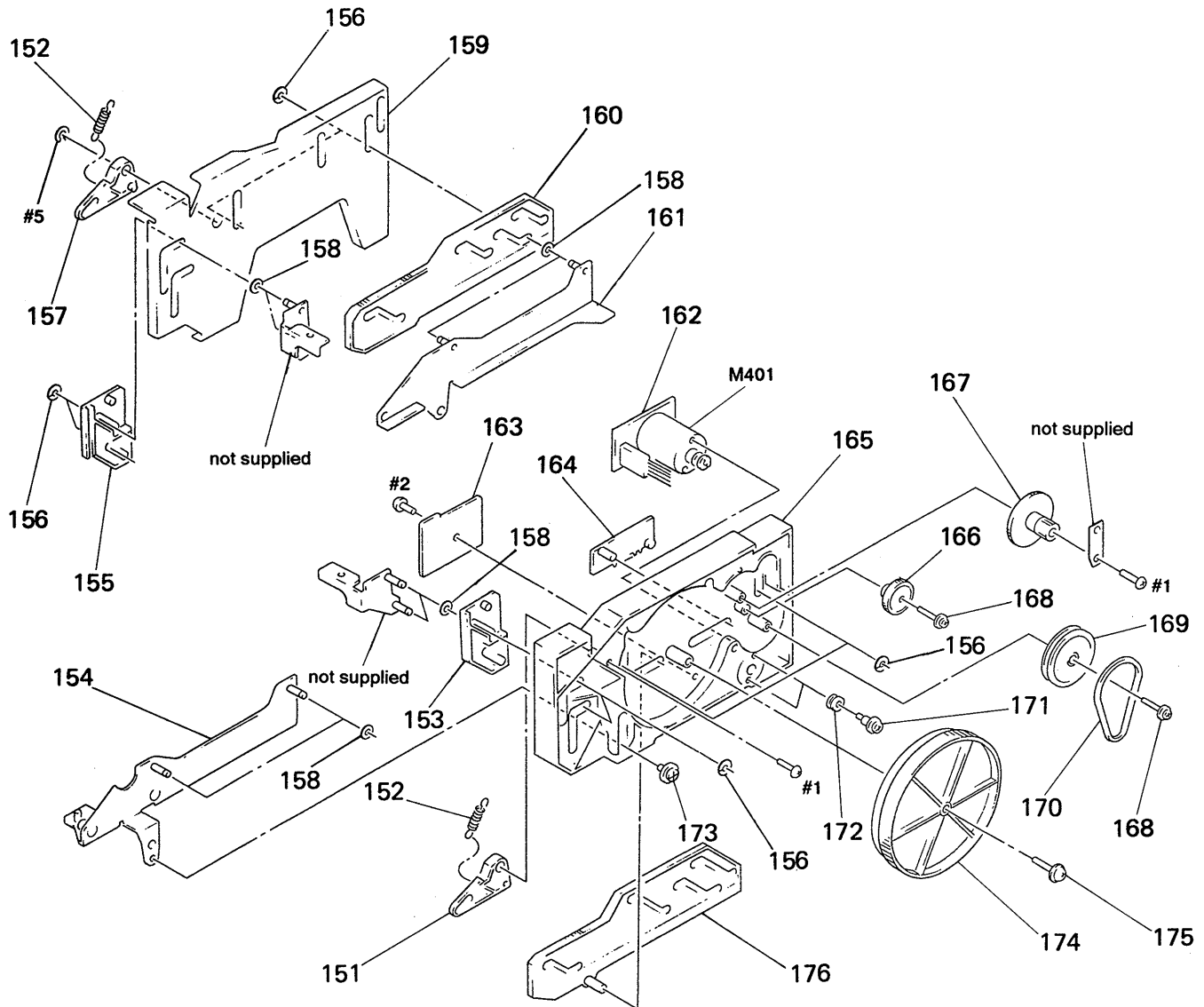
5-1-3. MAIN CHASSIS ASSEMBLY (2)



Ref. No.	Part No.	Description	Remark
Δ101	1-468-101-11	POWER SUPPLY BLOCK (SR-582 BOARD)	
102	3-703-397-01	STOPPER, WIRING	
103	1-777-010-11	CABLE, FLAT (8 CORE)	
104	X-3946-036-1	SHAFT ASSY, TRAY LINK	
105	1-777-005-11	CABLE, FLAT (20 CORE)	
106	X-3946-038-1	SHAFT ASSY, TILT LINK	
107	1-777-007-11	CABLE, FLAT (8 CORE)	
108	1-777-006-11	CABLE, FLEXIBLE FLAT (13 CORE)	

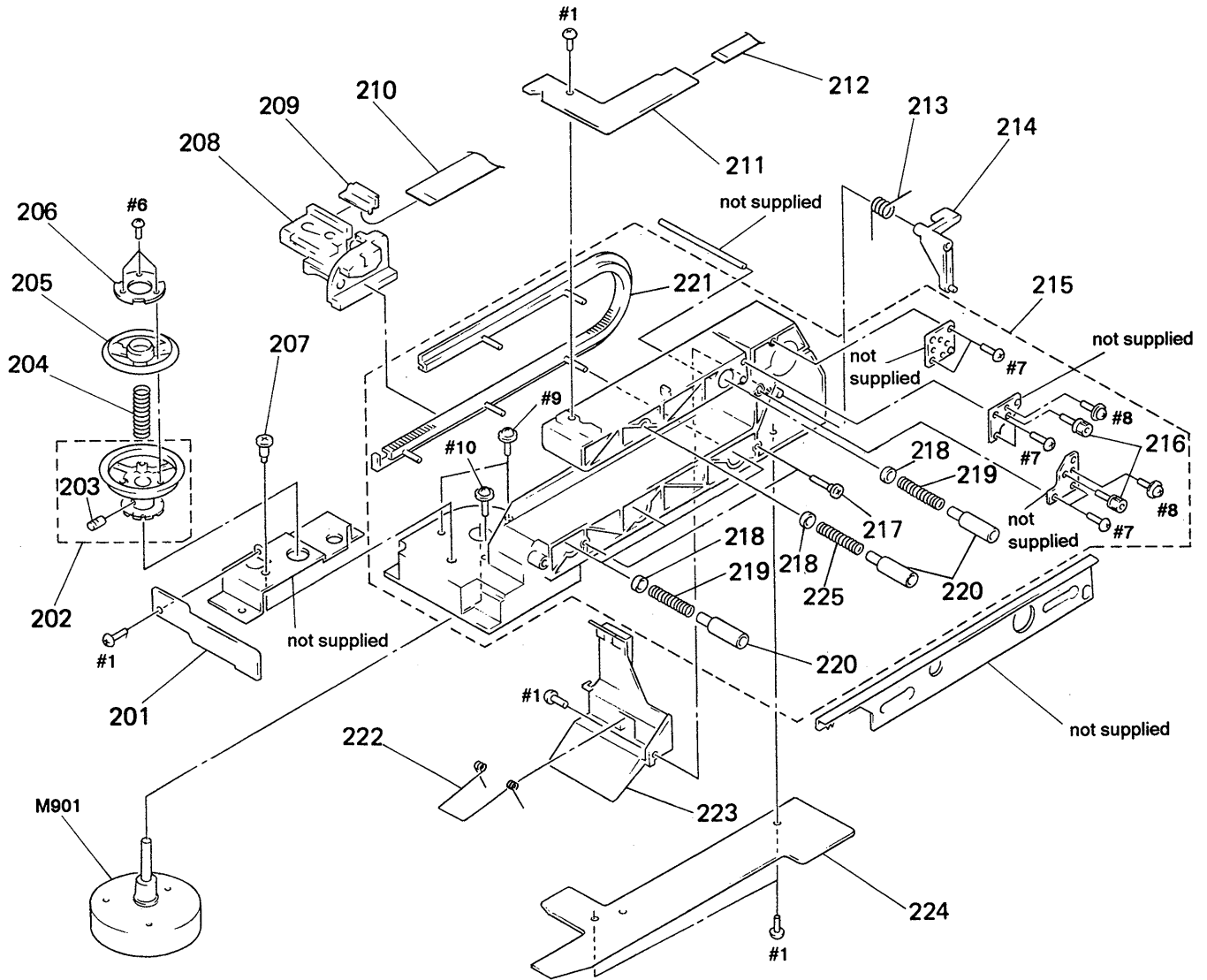
Ref. No.	Part No.	Description	Remark
Δ109	1-769-639-21	CORD, POWER (E)	
Δ109	1-777-274-11	CORD, POWER (TW)	
Δ110	1-569-008-11	ADAPTER, CONVERSION 2P (E)	
* 111	3-703-571-11	BUSHING (S) (4516), CORD	
* 112	3-968-246-03	PANEL, REAR (E)	
* 112	3-968-246-11	PANEL, REAR (TW)	
113	3-968-251-01	CUSHION (R), FOOT	
114	4-909-982-31	SCREW, TAPPING	

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



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
151	3-968-302-01	ARM (R), DOOR		165	3-968-298-01	FRAME (R)	
152	3-968-283-01	SPRING, TENSION		166	3-968-308-01	GEAR (B), MIDWAY	
153	3-968-301-01	SLIDER (R), DOOR		167	3-968-307-01	GEAR (A), MIDWAY	
* 154	X-3946-042-1	GUIDE (R) ASSY, TRAY		168	3-669-480-11	+ PTPWH 2	
155	3-968-280-01	SLIDER (L), DOOR		169	3-968-311-01	PULLEY	
156	3-325-697-01	WASHER		170	3-968-309-01	BELT	
157	3-968-281-01	ARM (L), DOOR		171	3-941-733-01	SCREW (M3X2)	
158	3-701-444-21	4 ϕ WASHER		172	3-570-118-00	CUSHION, MOTOR	
* 159	X-3946-043-1	FRAME (L) ASSY		173	3-969-353-01	SCREW, GUIDE CLAMP	
160	3-968-276-01	SLIDER (L)		174	3-968-310-01	GEAR, CONTROL	
* 161	X-3946-044-1	GUIDE (L) ASSY, TRAY		175	3-970-142-01	SCREW (3X20) (TYPE 2), +PTPWH	
* 162	1-660-680-11	MT-59 BOARD		176	3-968-300-01	SLIDER (R)	
* 163	1-660-679-11	SW-278 BOARD		M401	X-3946-431-1	MOTOR ASSY, LOADING (LOADING/TILT)	
164	3-968-305-01	SLIDER, TILT					

5-1-5. MECHANISM DECK ASSEMBLY



Note: 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 KHS-150A	
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	3-968-291-01	SPRING, TILT	

Ref. No.	Part No.	Description	Remark
* 214	3-968-290-01	ARM, TILT DRIVING	
215	A-6403-023-A	BASE (96) ASSY, FEED	
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	
M901	1-698-109-11	MOTOR, DD (SPINDLE)	

5-2. ELECTRICAL PARTS LIST

NOTE:

- 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 and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
All resistors are in ohms.
METAL: Metal-film resistor.
METAL OXIDE: Metal oxide-film resistor.
F: nonflammable
- Abbreviation TW: Taiwan model

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- 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

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

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

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 INTERRUPTER >	
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	1-216-097-00	METAL CHIP 100K 5%	1/10W
R204	1-216-089-00	METAL CHIP 47K 5%	1/10W
R205	1-216-049-00	METAL CHIP 1K 5%	1/10W

*	A-6423-388-A	FP-407 BOARD, COMPLETE (E)	
*	A-6423-411-A	FP-407 BOARD, COMPLETE (TW) *****	(Ref. No. 3,000 Series)
*	3-969-352-01	HOLDER, INDICATION TUBE	
		< CAPACITOR >	
C101	1-124-589-11	ELECT 47uF	20% 16V
C102	1-164-232-11	CERAMIC CHIP 0.01uF	50V
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
C107	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C108	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C109	1-124-589-11	ELECT 47uF	20% 16V
C110	1-124-248-00	ELECT 22uF	20% 35V

Ref. No.	Part No.	Description	Remark
C111	1-126-923-11	ELECT 220uF	20% 10V
C112	1-126-923-11	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
C120	1-165-319-11	CERAMIC CHIP 0.1uF	50V
		< CONNECTOR >	
CN101	1-770-540-31	PIN, CONNECTOR (PC BOARD) 6P	
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 DTZ-TT11-30B	
D105	8-719-048-98	DIODE RB160L-40TE25	
D106	8-719-048-98	DIODE RB160L-40TE25	
		< FILTER >	
FL101	1-421-927-21	FILTER, NOISE	
		< IC >	
IC101	8-759-074-40	IC PST572DMT-T1	
IC102	8-759-388-40	IC HD6433712B50H	
		< CHIP CONDUCTOR >	
JR101	1-216-295-00	CONDUCTOR, CHIP (2012)	
		< COIL >	
L101	1-410-072-21	MICRO INDUCTOR 820uH	
L102	1-408-970-21	INDUCTOR 10uH	
		< FLUORESCENT INDICATOR >	
ND101	1-517-471-11	INDICATOR TUBE, FLUORESCENT	

Ref. No.	Part No.	Description	Remark
< TRANSISTOR >			
Q103	8-729-140-97	TRANSISTOR 2SB734-34	
Q104	8-729-216-22	TRANSISTOR 2SA1162-G	
< RESISTOR >			
R101	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
R102	1-216-689-11	METAL CHIP 39K 0.5%	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	1-216-089-00	METAL CHIP 47K 5%	1/10W
R114	1-216-049-00	METAL CHIP 1K 5%	1/10W
R115	1-216-073-00	METAL CHIP 10K 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	1-216-121-00	METAL CHIP 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	1-216-025-00	METAL CHIP 100 5%	1/10W
R124	1-216-025-00	METAL CHIP 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	1-216-063-00	METAL CHIP 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	1-216-049-00	METAL CHIP 1K 5%	1/10W
R135	1-216-049-00	METAL CHIP 1K 5%	1/10W
R136	1-216-033-00	METAL CHIP 220 5%	1/10W
R137	1-216-017-00	METAL CHIP 47 5%	1/10W
R138	1-216-081-00	METAL CHIP 22K 5%	1/10W
R139	1-216-063-00	METAL CHIP 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	1-216-089-00	METAL CHIP 47K 5%	1/10W
R148	1-216-089-00	METAL CHIP 47K 5%	1/10W (TW)
R149	1-216-089-00	METAL CHIP 47K 5%	1/10W
R151	1-216-033-00	METAL CHIP 220 5%	1/10W
R152	1-216-089-00	METAL CHIP 47K 5%	1/10W
R153	1-216-063-00	METAL CHIP 3.9K 5%	1/10W

Ref. No.	Part No.	Description	Remark
R154	1-216-089-00	METAL CHIP 47K 5%	1/10W (E)
R157	1-216-092-00	METAL CHIP 62K 5%	1/10W
< SWITCH >			
S101	1-570-472-11	SWITCH, KEY BOARD (1)	
S102	1-570-472-11	SWITCH, KEY BOARD (6)	
S103	1-570-472-11	SWITCH, KEY BOARD (7)	
S104	1-570-472-11	SWITCH, KEY BOARD (5)	
S105	1-570-472-11	SWITCH, KEY BOARD (8)	
S106	1-570-472-11	SWITCH, KEY BOARD (4)	
S107	1-570-472-11	SWITCH, KEY BOARD (9)	
S108	1-570-472-11	SWITCH, KEY BOARD (3)	
S109	1-570-472-11	SWITCH, KEY BOARD (10/0)	
S110	1-570-472-11	SWITCH, KEY BOARD (2)	
S111	1-570-472-11	SWITCH, KEY BOARD (>10)	
< TRANSFORMER >			
△T101	1-448-740-21	TRANSFORMER, DC-DC CONVERTER	
< VIBRATOR >			
X101	1-579-952-21	VIBRATOR, CERAMIC (8MHz)	

*	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 INTERRUPTER >			
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

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

IB-10**MB-73**

Ref. No.	Part No.	Description	Remark		
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-6423-387-A MB-73 BOARD, COMPLETE				

	(Ref. No. 1,000 Series)				
	< CAPACITOR/CHIP CONDUCTOR >				
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	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
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	1-124-589-11	ELECT	47uF	20%	16V
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

Ref. No.	Part No.	Description	Remark		
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	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C142	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C143	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C144	1-163-038-00	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	1-124-589-11	ELECT	47uF	20%	16V
C164	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C165	1-163-038-00	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	1-163-038-00	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	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C178	1-163-038-00	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
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	1-124-589-11	ELECT	47uF	20%	16V
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

Ref. No.	Part No.	Description		Remark
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	1-124-589-11	ELECT	47uF	20% 16V
C228	1-124-261-00	ELECT	10uF	20% 50V
C229	1-163-031-11	CERAMIC CHIP	0.01uF	50V
C230	1-124-589-11	ELECT	47uF	20% 16V
C231	1-163-235-11	CERAMIC CHIP	22PF	5% 50V
C232	1-163-038-00	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
C237	1-124-589-11	ELECT	47uF	20% 16V
C238	1-163-031-11	CERAMIC CHIP	0.01uF	50V
C241	1-163-031-11	CERAMIC CHIP	0.01uF	50V
C242	1-124-589-11	ELECT	47uF	20% 16V
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	1-163-038-00	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	1-163-125-00	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	1-163-038-00	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	1-163-038-00	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	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C352	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C353	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C354	1-163-263-11	CERAMIC CHIP	330PF	5% 50V
C356	1-163-121-00	CERAMIC CHIP	150PF	5% 50V
C357	1-163-227-11	CERAMIC CHIP	10PF	0.5PF 50V
C358	1-163-125-00	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	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C366	1-163-038-00	CERAMIC CHIP	0.1uF	25V
C367	1-216-295-00	CONDUCTOR, CHIP	(2012)	
C368	1-163-031-11	CERAMIC CHIP	0.01uF	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	1-163-038-00	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	1-163-125-00	CERAMIC CHIP	220PF	5% 50V
C419	1-163-033-00	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
C453	1-163-031-11	CERAMIC CHIP	0.01uF	50V
C454	1-163-031-11	CERAMIC CHIP	0.01uF	50V
C455	1-104-664-11	ELECT	47uF	20% 10V
C456	1-163-125-00	CERAMIC CHIP	220PF	5% 50V

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Ref. No.	Part No.	Description	Remark
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	1-163-133-00	CERAMIC CHIP	470PF 5% 50V
C463	1-163-133-00	CERAMIC CHIP	470PF 5% 50V
C464	1-163-125-00	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	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C505	1-163-038-00	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	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C517	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C518	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C519	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C520	1-163-125-00	CERAMIC CHIP	220PF 5% 50V
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

Ref. No.	Part No.	Description	Remark
C705	1-163-125-00	CERAMIC CHIP	220PF 5% 50V
C706	1-124-477-11	ELECT	47uF 20% 25V
C707	1-124-477-11	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
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	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C731	1-163-038-00	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	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C741	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C742	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C743	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C744	1-124-477-11	ELECT	47uF 20% 25V
C745	1-124-477-11	ELECT	47uF 20% 25V
C746	1-164-004-11	CERAMIC CHIP	0.1uF 10% 25V
C747	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C749	1-163-038-00	CERAMIC CHIP	0.1uF 25V
C750	1-163-038-00	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	1-163-125-00	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

Ref. No.	Part No.	Description	Remark
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	1-141-318-11	CAP, VAR, TRIMMER	
< CAPACITOR/DIODE >			
D002	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
D003	8-719-048-98	DIODE RB160L-40TE25	
D004	8-719-048-98	DIODE RB160L-40TE25	
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	
D512	8-719-976-96	DIODE DTZ. 7C	
D513	8-719-914-42	DIODE DA204K	
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 DTZ-TT11-4.3	
D705	8-719-914-42	DIODE DA204K	
D711	8-719-158-15	DIODE RD5.6S-B	
< 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	8-759-382-17	IC LC74782M9136-TLM	
IC301	8-759-253-26	IC CA0002AM-TP	
IC381	8-759-100-96	IC UPC4558G2	
IC401	8-752-351-78	IC CXD2500BQ	
IC450	8-759-382-13	IC SM5876AM-E2	
IC451	8-759-100-96	IC UPC4558G2	

Ref. No.	Part No.	Description	Remark
IC453	8-759-100-96	IC UPC4558G2	
IC501	8-759-388-41	IC MB89094PF-G-152-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 (AUDIO/VIDEO LINE OUT)	
J002	1-774-785-11	JACK, PIN 1P (DIGITAL RF OUT)	
< COIL >			
L101	1-410-509-61	INDUCTOR	10uH
L102	1-410-509-61	INDUCTOR	10uH
L103	1-410-513-11	INDUCTOR	22uH
L104	1-410-521-11	INDUCTOR	100uH
L105	1-410-513-11	INDUCTOR	22uH
L106	1-410-509-61	INDUCTOR	10uH
L108	1-410-509-61	INDUCTOR	10uH
L109	1-410-516-11	INDUCTOR	39uH
L110	1-410-513-11	INDUCTOR	22uH
L111	1-410-516-11	INDUCTOR	39uH
L112	1-408-096-00	INDUCTOR	470uH
L113	1-410-517-11	INDUCTOR	47uH
L152	1-410-514-11	INDUCTOR	27uH
L153	1-410-514-11	INDUCTOR	27uH
L154	1-410-509-61	INDUCTOR	10uH
L201	1-410-510-11	INDUCTOR	12uH
L206	1-410-515-11	INDUCTOR	33uH
L301	1-410-517-11	INDUCTOR	47uH
L304	1-410-513-11	INDUCTOR	22uH
L305	1-410-521-11	INDUCTOR	100uH
L351	1-410-522-11	INDUCTOR	120uH
L352	1-410-522-11	INDUCTOR	120uH
L415	1-410-509-61	INDUCTOR	10uH
L450	1-410-509-61	INDUCTOR	10uH
L451	1-410-509-61	INDUCTOR	10uH
L503	1-410-509-61	INDUCTOR	10uH
L504	1-410-509-61	INDUCTOR	10uH
L701	1-410-509-61	INDUCTOR	10uH
L702	1-410-509-61	INDUCTOR	10uH
L980	1-410-517-11	INDUCTOR	47uH

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

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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
L981	1-410-517-11	INDUCTOR	47uH	Q705	8-729-027-23	TRANSISTOR	DTA114EKA-T146
L982	1-410-517-11	INDUCTOR	47uH	Q706	8-729-140-96	TRANSISTOR	2SD774-34
L983	1-410-517-11	INDUCTOR	47uH	Q707	8-729-140-96	TRANSISTOR	2SD774-34
< TRANSISTOR >				Q708	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R
Q003	8-729-023-22	TRANSISTOR	2SD2114K	△Q709	8-729-024-95	TRANSISTOR	2SB1565EF
Q004	8-729-023-22	TRANSISTOR	2SD2114K	△Q710	8-729-019-01	TRANSISTOR	2SD2394-EF
Q101	8-729-900-53	TRANSISTOR	DTC114EK	Q711	8-729-027-23	TRANSISTOR	DTA114EKA-T146
Q102	8-729-120-28	TRANSISTOR	2SC1623-L5L6	△Q712	8-729-024-95	TRANSISTOR	2SB1565EF
Q103	8-729-120-28	TRANSISTOR	2SC1623-L5L6	△Q713	8-729-019-01	TRANSISTOR	2SD2394-EF
Q104	8-729-120-28	TRANSISTOR	2SC1623-L5L6	< RESISTOR/CHIP CONDUCTOR >			
Q105	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R001	1-216-041-00	METAL CHIP	470 5% 1/10W
Q151	8-729-900-53	TRANSISTOR	DTC114EK	R002	1-216-041-00	METAL CHIP	470 5% 1/10W
Q152	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R007	1-216-073-00	METAL CHIP	10K 5% 1/10W
Q153	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R008	1-216-073-00	METAL CHIP	10K 5% 1/10W
Q201	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R009	1-216-105-00	METAL CHIP	220K 5% 1/10W
Q202	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R010	1-216-105-00	METAL CHIP	220K 5% 1/10W
Q205	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R011	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q206	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R012	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q207	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R013	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q208	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R014	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q209	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R015	1-216-295-00	CONDUCTOR, CHIP	(2012)
Q211	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R016	1-216-295-00	CONDUCTOR, CHIP	(2012)
Q215	8-729-027-23	TRANSISTOR	DTA114EKA-T146	R021	1-216-022-00	METAL CHIP	75 5% 1/10W
Q302	8-729-027-23	TRANSISTOR	DTA114EKA-T146	R022	1-216-097-00	METAL CHIP	100K 5% 1/10W
Q303	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R101	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q304	8-729-027-23	TRANSISTOR	DTA114EKA-T146	R102	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
Q305	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R103	1-216-045-00	METAL CHIP	680 5% 1/10W
Q307	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R104	1-216-025-00	METAL CHIP	100 5% 1/10W
Q308	8-729-027-23	TRANSISTOR	DTA114EKA-T146	R105	1-216-037-00	METAL CHIP	330 5% 1/10W
Q351	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R106	1-216-057-00	METAL CHIP	2.2K 5% 1/10W
Q352	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R107	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q353	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R108	1-216-061-00	METAL CHIP	3.3K 5% 1/10W
Q354	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R109	1-216-017-00	METAL CHIP	47 5% 1/10W
Q355	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R110	1-216-077-00	METAL CHIP	15K 5% 1/10W
Q356	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R111	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q357	8-729-900-53	TRANSISTOR	DTC114EK	R112	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q358	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R113	1-216-017-00	METAL CHIP	47 5% 1/10W
Q359	8-729-027-23	TRANSISTOR	DTA114EKA-T146	R114	1-216-051-00	METAL CHIP	1.2K 5% 1/10W
Q381	8-729-120-28	TRANSISTOR	2SC1623-L5L6	R115	1-216-055-00	METAL CHIP	1.8K 5% 1/10W
Q382	8-729-900-53	TRANSISTOR	DTC114EK	R116	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q383	8-729-027-23	TRANSISTOR	DTA114EKA-T146	R117	1-216-045-00	METAL CHIP	680 5% 1/10W
Q401	8-729-900-53	TRANSISTOR	DTC114EK	R118	1-216-049-00	METAL CHIP	1K 5% 1/10W
Q503	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R119	1-216-067-00	METAL CHIP	5.6K 5% 1/10W
Q511	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R	R120	1-216-067-00	METAL CHIP	5.6K 5% 1/10W
Q514	8-729-023-22	TRANSISTOR	2SD2114K	R121	1-216-069-00	METAL CHIP	6.8K 5% 1/10W
Q515	8-729-027-23	TRANSISTOR	DTA114EKA-T146	R122	1-216-073-00	METAL CHIP	10K 5% 1/10W
Q703	8-729-900-53	TRANSISTOR	DTC114EK	R151	1-216-033-00	METAL CHIP	220 5% 1/10W
Q704	8-729-120-28	TRANSISTOR	2SC1623-L5L6				

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Ref. No.	Part No.	Description	Remark
R152	1-216-047-00	METAL CHIP	820 5% 1/10W
R154	1-216-057-00	METAL CHIP	2. 2K 5% 1/10W
R155	1-216-017-00	METAL CHIP	47 5% 1/10W
R156	1-216-295-00	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	1-216-043-00	METAL CHIP	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	1-216-049-00	METAL CHIP	1K 5% 1/10W
R167	1-216-065-00	METAL CHIP	4. 7K 5% 1/10W
R168	1-216-121-00	METAL CHIP	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	1-216-049-00	METAL CHIP	1K 5% 1/10W
R173	1-216-033-00	METAL CHIP	220 5% 1/10W
R200	1-216-295-00	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	1-216-049-00	METAL CHIP	1K 5% 1/10W
R208	1-216-097-00	METAL CHIP	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	1-216-097-00	METAL CHIP	100K 5% 1/10W
R216	1-216-089-00	METAL CHIP	47K 5% 1/10W
R217	1-216-025-00	METAL CHIP	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	1-216-025-00	METAL CHIP	100 5% 1/10W
R222	1-216-025-00	METAL CHIP	100 5% 1/10W
R223	1-216-049-00	METAL CHIP	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	1-216-049-00	METAL CHIP	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	1-216-295-00	CONDUCTOR, CHIP (2012)	

Ref. No.	Part No.	Description	Remark
R241	1-216-295-00	CONDUCTOR, CHIP (2012)	
R242	1-216-295-00	CONDUCTOR, CHIP (2012)	
R243	1-216-295-00	CONDUCTOR, CHIP (2012)	
R245	1-216-295-00	CONDUCTOR, CHIP (2012)	
R300	1-216-121-00	METAL CHIP	1M 5% 1/10W
R301	1-216-041-00	METAL CHIP	470 5% 1/10W
R303	1-216-105-00	METAL CHIP	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	1-216-295-00	CONDUCTOR, CHIP (2012)	
R311	1-216-057-00	METAL CHIP	2. 2K 5% 1/10W
R312	1-216-049-00	METAL CHIP	1K 5% 1/10W
R313	1-216-049-00	METAL CHIP	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	1-216-699-11	METAL CHIP	100K 0. 5% 1/10W
R324	1-216-699-11	METAL CHIP	100K 0. 5% 1/10W
R325	1-216-089-00	METAL CHIP	47K 5% 1/10W
R349	1-216-295-00	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	1-216-049-00	METAL CHIP	1K 5% 1/10W
R355	1-216-067-00	METAL CHIP	5. 6K 5% 1/10W
R356	1-216-041-00	METAL CHIP	470 5% 1/10W
R358	1-216-037-00	METAL CHIP	330 5% 1/10W
R359	1-216-053-00	METAL CHIP	1. 5K 5% 1/10W
R360	1-216-049-91	METAL CHIP	1K 5% 1/10W
R361	1-216-295-91	CONDUCTOR, CHIP (2012)	
R362	1-216-049-91	METAL CHIP	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	1-216-047-00	METAL CHIP	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	1-216-025-00	METAL CHIP	100 5% 1/10W
R371	1-216-097-00	METAL CHIP	100K 5% 1/10W

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Ref. No.	Part No.	Description	Remark		
R372	1-216-097-00	METAL CHIP	100K	5%	1/10W
R373	1-216-049-00	METAL CHIP	1K	5%	1/10W
R374	1-216-049-00	METAL CHIP	1K	5%	1/10W
R375	1-216-037-00	METAL CHIP	330	5%	1/10W
R376	1-216-025-00	METAL CHIP	100	5%	1/10W
R377	1-216-049-00	METAL CHIP	1K	5%	1/10W
R378	1-216-049-00	METAL CHIP	1K	5%	1/10W
R379	1-216-049-00	METAL CHIP	1K	5%	1/10W
R381	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R382	1-216-049-00	METAL CHIP	1K	5%	1/10W
R383	1-216-025-00	METAL CHIP	100	5%	1/10W
R384	1-216-017-00	METAL CHIP	47	5%	1/10W
R385	1-208-830-11	METAL CHIP	100K	0.5%	1/10W
R386	1-208-806-11	METAL CHIP	10K	0.5%	1/10W
R387	1-208-806-11	METAL CHIP	10K	0.5%	1/10W
R388	1-216-089-00	METAL CHIP	47K	5%	1/10W
R389	1-216-089-00	METAL CHIP	47K	5%	1/10W
R390	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R391	1-216-089-00	METAL CHIP	47K	5%	1/10W
R392	1-216-089-00	METAL CHIP	47K	5%	1/10W
R393	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R394	1-216-049-00	METAL CHIP	1K	5%	1/10W
R395	1-208-829-11	METAL CHIP	91K	0.5%	1/10W
R396	1-208-838-11	METAL CHIP	220K	0.5%	1/10W
R397	1-208-837-11	METAL CHIP	200K	0.5%	1/10W
R398	1-208-830-11	METAL CHIP	100K	0.5%	1/10W
R402	1-216-121-00	METAL CHIP	1M	5%	1/10W
R403	1-216-073-00	METAL CHIP	10K	5%	1/10W
R404	1-216-049-00	METAL CHIP	1K	5%	1/10W
R405	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R415	1-216-049-00	METAL CHIP	1K	5%	1/10W
R419	1-216-121-00	METAL CHIP	1M	5%	1/10W
R420	1-216-105-00	METAL CHIP	220K	5%	1/10W
R421	1-216-074-00	METAL CHIP	11K	5%	1/10W
R424	1-216-025-00	METAL CHIP	100	5%	1/10W
R425	1-216-025-00	METAL CHIP	100	5%	1/10W
R426	1-216-025-00	METAL CHIP	100	5%	1/10W
R436	1-216-025-00	METAL CHIP	100	5%	1/10W
R446	1-216-025-00	METAL CHIP	100	5%	1/10W
R447	1-216-049-00	METAL CHIP	1K	5%	1/10W
R450	1-216-295-00	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	1-216-295-00	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

Ref. No.	Part No.	Description	Remark		
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	1-216-097-00	METAL CHIP	100K	5%	1/10W
R468	1-216-097-00	METAL CHIP	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	1-216-295-00	CONDUCTOR, CHIP			(2012)
R479	1-216-295-00	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
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
R502	1-216-089-00	METAL CHIP	47K	5%	1/10W
R503	1-216-033-00	METAL CHIP	220	5%	1/10W
R507	1-216-089-00	METAL CHIP	47K	5%	1/10W
R508	1-216-109-00	METAL CHIP	330K	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	1-216-089-00	METAL CHIP	47K	5%	1/10W
R512	1-216-111-00	METAL CHIP	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 CHIP	12K	0.5%	1/10W
R516	1-208-810-11	METAL CHIP	15K	0.5%	1/10W
R517	1-208-844-11	METAL CHIP	390K	0.5%	1/10W
R518	1-216-093-00	METAL CHIP	68K	5%	1/10W
R519	1-216-049-00	METAL CHIP	1K	5%	1/10W
R520	1-208-806-11	METAL CHIP	10K	0.5%	1/10W
R521	1-208-816-11	METAL CHIP	27K	0.5%	1/10W
R522	1-216-105-00	METAL CHIP	220K	5%	1/10W
R523	1-208-838-11	METAL CHIP	220K	0.5%	1/10W
R524	1-216-097-00	METAL CHIP	100K	5%	1/10W
R525	1-216-105-00	METAL CHIP	220K	5%	1/10W
R526	1-216-077-00	METAL CHIP	15K	5%	1/10W
R527	1-208-830-11	METAL CHIP	100K	0.5%	1/10W
R528	1-208-818-11	METAL CHIP	33K	0.5%	1/10W
R529	1-208-818-11	METAL CHIP	33K	0.5%	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	1-216-049-00	METAL CHIP	1K	5%	1/10W

Ref. No.	Part No.	Description	Remark		
R533	1-216-095-00	METAL CHIP	82K	5%	1/10W
R534	1-216-105-00	METAL CHIP	220K	5%	1/10W
R535	1-216-073-00	METAL CHIP	10K	5%	1/10W
R537	1-216-097-00	METAL CHIP	100K	5%	1/10W
R539	1-216-073-00	METAL CHIP	10K	5%	1/10W
R540	1-216-097-00	METAL CHIP	100K	5%	1/10W
R541	1-216-089-00	METAL CHIP	47K	5%	1/10W
R545	1-216-073-00	METAL CHIP	10K	5%	1/10W
R546	1-216-049-00	METAL CHIP	1K	5%	1/10W
R547	1-216-033-00	METAL CHIP	220	5%	1/10W
R548	1-216-049-00	METAL CHIP	1K	5%	1/10W
R549	1-216-033-00	METAL CHIP	220	5%	1/10W
R550	1-216-049-00	METAL CHIP	1K	5%	1/10W
R551	1-216-049-00	METAL CHIP	1K	5%	1/10W
R552	1-216-049-00	METAL CHIP	1K	5%	1/10W
R553	1-216-049-00	METAL CHIP	1K	5%	1/10W
R555	1-216-049-00	METAL CHIP	1K	5%	1/10W
R556	1-216-049-00	METAL CHIP	1K	5%	1/10W
R557	1-216-049-00	METAL CHIP	1K	5%	1/10W
R558	1-216-049-00	METAL CHIP	1K	5%	1/10W
R559	1-216-049-00	METAL CHIP	1K	5%	1/10W
R560	1-216-049-00	METAL CHIP	1K	5%	1/10W
R561	1-216-049-00	METAL CHIP	1K	5%	1/10W
R562	1-216-049-00	METAL CHIP	1K	5%	1/10W
R563	1-216-049-00	METAL CHIP	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	1-216-121-00	METAL CHIP	1M	5%	1/10W
R568	1-216-065-00	METAL CHIP	4. 7K	5%	1/10W
R570	1-216-037-00	METAL CHIP	330	5%	1/10W
R571	1-216-049-00	METAL CHIP	1K	5%	1/10W
R572	1-216-073-00	METAL CHIP	10K	5%	1/10W
R573	1-216-049-00	METAL CHIP	1K	5%	1/10W
R574	1-216-049-00	METAL CHIP	1K	5%	1/10W
R575	1-216-049-00	METAL CHIP	1K	5%	1/10W
R576	1-216-049-00	METAL CHIP	1K	5%	1/10W
R577	1-216-049-00	METAL CHIP	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	1-216-089-00	METAL CHIP	47K	5%	1/10W
R582	1-216-049-00	METAL CHIP	1K	5%	1/10W
R583	1-216-049-00	METAL CHIP	1K	5%	1/10W
R584	1-216-049-00	METAL CHIP	1K	5%	1/10W
R587	1-216-295-00	CONDUCTOR, CHIP	(2012)		
R588	1-216-057-00	METAL CHIP	2. 2K	5%	1/10W
R589	1-216-073-00	METAL CHIP	10K	5%	1/10W
R591	1-216-053-00	METAL CHIP	1. 5K	5%	1/10W

Ref. No.	Part No.	Description	Remark		
R701	1-216-097-00	METAL CHIP	100K	5%	1/10W
R704	1-216-053-00	METAL CHIP	1. 5K	5%	1/10W
R705	1-216-049-00	METAL CHIP	1K	5%	1/10W
R706	1-216-049-00	METAL CHIP	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	1-216-089-00	METAL CHIP	47K	5%	1/10W
R711	1-216-085-00	METAL CHIP	33K	5%	1/10W
R712	1-216-089-00	METAL CHIP	47K	5%	1/10W
R713	1-216-097-00	METAL CHIP	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	1-216-049-00	METAL CHIP	1K	5%	1/10W
R718	1-216-073-00	METAL CHIP	10K	5%	1/10W
R719	1-216-089-00	METAL CHIP	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	1-216-089-00	METAL CHIP	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
R731	1-216-089-00	METAL CHIP	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	1-216-097-00	METAL CHIP	100K	5%	1/10W
R735	1-216-081-00	METAL CHIP	22K	5%	1/10W
R736	1-216-049-00	METAL CHIP	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	1-216-097-00	METAL CHIP	100K	5%	1/10W
R741	1-216-105-00	METAL CHIP	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	1-216-049-00	METAL CHIP	1K	5%	1/10W
R748	1-216-065-00	METAL CHIP	4. 7K	5%	1/10W
R749	1-216-097-00	METAL CHIP	100K	5%	1/10W
R750	1-216-049-00	METAL CHIP	1K	5%	1/10W

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Ref. No.	Part No.	Description	Remark
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	1-216-049-00	METAL CHIP	1K 5% 1/10W
R755	1-216-069-00	METAL CHIP	6.8K 5% 1/10W
R756	1-216-049-00	METAL CHIP	1K 5% 1/10W
R757	1-216-049-00	METAL CHIP	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	1-216-089-00	METAL CHIP	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	1-216-097-00	METAL CHIP	100K 5% 1/10W
R764	1-216-089-00	METAL CHIP	47K 5% 1/10W
R765	1-216-097-00	METAL CHIP	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	1-216-105-00	METAL CHIP	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	1-216-089-00	METAL CHIP	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
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	1-216-063-00	METAL CHIP	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	1-216-025-00	METAL CHIP	100 5% 1/10W
R797	1-216-025-00	METAL CHIP	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

Ref. No.	Part No.	Description	Remark
R800	1-216-003-11	METAL CHIP	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	1-216-017-00	METAL CHIP	47 5% 1/10W
R808	1-216-089-00	METAL CHIP	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	1-216-089-00	METAL CHIP	47K 5% 1/10W
R817	1-216-140-00	METAL CHIP	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
R901	1-216-025-00	METAL CHIP	100 5% 1/10W
R902	1-216-025-00	METAL CHIP	100 5% 1/10W
R903	1-216-025-00	METAL CHIP	100 5% 1/10W
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, CRYSTAL (16.9344MHz)	

*	A-6423-384-A	MD-67 BOARD, COMPLETE	

(Ref. No. 5,000 Series)			
*	3-968-252-01	HOLDER, LED	
< 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	

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

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POWER SUPPLY BLOCK

Ref. No.	Part No.	Description	Remark
		< DIODE >	
D301	8-719-912-39	LED SLR932A (LD DISC SIZE SENSOR)	
		< CHIP CONDUCTOR >	
JR300	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR301	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR302	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR303	1-216-295-00	CONDUCTOR, CHIP (2012)	
JR304	1-216-295-00	CONDUCTOR, CHIP (2012)	
JR305	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR306	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR307	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR308	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR309	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR310	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR311	1-216-295-00	CONDUCTOR, CHIP (2012)	
JR312	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR313	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR314	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR315	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR316	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR317	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR318	1-216-296-00	CONDUCTOR, CHIP (3216)	
JR319	1-216-296-00	CONDUCTOR, CHIP (3216)	
		< PHOTO INTERRUPTER >	
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	

*	1-660-680-11	MT-59 BOARD (Ref. No. 5,000 Series)	

		< CAPACITOR >	
C401	1-163-038-00	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	
		< MOTOR >	
M401	X-3946-431-1	MOTOR ASSY, LOADING (LOADING/TILT)	

Ref. No.	Part No.	Description	Remark
△	1-468-101-11	POWER SUPPLY BLOCK (SR-582 BOARD)	

		(Ref. No. 6,000 Series)	
	1-533-225-41	HOLDER, FUSE	
	9-939-266-01	LUG TERMINAL	
		< CAPACITOR >	
△C101	9-939-240-01	FILM 0.22uF	250V
△C102	9-939-241-01	FILM 0.1uF	250V
△C103	9-939-242-01	CERAMIC 2200PF	400V
△C104	9-939-242-01	CERAMIC 2200PF	400V
△C105	9-939-242-01	CERAMIC 2200PF	400V
△C106	9-939-242-01	CERAMIC 2200PF	400V
△C107	9-939-243-01	ELECT 270uF	400V
△C108	9-939-244-01	CERAMIC 330PF	1KV
△C109	9-939-244-01	CERAMIC 330PF	1KV
△C110	1-124-786-51	ELECT 22uF	35V
△C111	1-111-247-51	ELECT 0.1uF	50V
△C112	9-939-245-01	CERAMIC 330PF	50V
△C113	1-111-247-51	ELECT 0.1uF	50V
△C114	1-137-387-51	FILM 0.001uF	100V
△C115	9-939-242-01	CERAMIC 2200PF	400V
△C116	9-939-242-01	CERAMIC 2200PF	400V
△C117	9-939-246-01	CERAMIC 4700PF	500V
C201	9-939-247-01	CERAMIC 1000PF	250V
C202	9-939-247-01	CERAMIC 1000PF	250V
C203	1-126-943-51	ELECT 220uF	25V
C204	1-126-943-51	ELECT 220uF	25V
C207	1-107-879-51	ELECT 3300uF	10V
C208	1-137-390-51	FILM 0.0033uF	100V
C209	1-107-902-51	ELECT 1uF	50V
C210	1-107-875-51	ELECT 220uF	10V
C212	1-107-875-51	ELECT 220uF	10V
C213	1-104-653-51	ELECT 220uF	16V
C214	1-107-875-51	ELECT 220uF	10V
C215	1-137-397-51	FILM 0.047uF	100V
C216	1-107-910-51	ELECT 100uF	50V
C217	9-939-248-01	CERAMIC 4700PF	50V
C218	1-137-391-51	FILM 0.0047uF	100V
C219	1-126-964-51	ELECT 10uF	50V
C220	1-126-964-51	ELECT 10uF	50V
C223	1-126-964-51	ELECT 10uF	50V
C224	1-107-875-51	ELECT 220uF	10V
C226	1-137-390-51	FILM 0.0033uF	100V
C227	9-939-249-01	CERAMIC 680PF	50V
C228	9-939-249-01	CERAMIC 680PF	50V
C229	1-137-390-51	FILM 0.0033uF	100V

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

POWER SUPPLY BLOCK

Ref. No.	Part No.	Description	Remark
< CONNECTOR >			
CN101	1-580-230-11	CONNECTOR 2P	
CN201	1-569-936-11	CONNECTOR 20P	
CN202	1-565-671-11	CONNECTOR 8P	
CN203	1-564-506-11	CONNECTOR 3P	
CN204	1-568-781-11	CONNECTOR 4P	
< DIODE >			
△D101	8-719-304-63	DIODE RM11C	
△D102	8-719-304-63	DIODE RM11C	
△D103	8-719-304-63	DIODE RM11C	
△D104	8-719-304-63	DIODE RM11C	
△D105	8-719-110-41	DIODE RD15ES-B2	
△D106	8-719-951-30	DIODE ERA91-02	
△D107	8-719-951-30	DIODE ERA91-02	
△D108	8-719-110-51	DIODE RD20ES-B	
△D109	8-719-951-30	DIODE ERA91-02	
△D110	8-719-109-85	DIODE RD5.1ES-B2	
△D111	8-719-053-19	DIODE UF4007G23	
△D112	8-719-110-60	DIODE RD24ES-B	
D201	8-719-031-13	DIODE YG901C2	
D202	8-719-031-13	DIODE YG901C2	
D203	8-719-031-13	DIODE YG901C2	
D204	8-719-987-87	DIODE ERA85-009	
D205	8-719-110-51	DIODE RD20ESB	
D209	8-719-023-56	DIODE ERA83-004	
D210	8-719-023-56	DIODE ERA83-004	
D211	8-719-961-02	DIODE RGP10DE	
D212	8-719-961-02	DIODE RGP10DE	
D213	8-719-107-94	DIODE 1SS202-1	
< FUSE >			
△F101	1-576-230-11	FUSE (T3. 15A/250V)	
< IC >			
△IC101	9-939-260-01	IC FA5315P	
IC203	8-759-140-85	IC μPC1093J	
IC204	9-939-261-01	IC ZHMA6343B	
IC205	8-759-144-17	IC μPC358HA	
< IC LINK >			
△IP201	1-532-675-21	IC LINK (ICP-N38 1.5A)	
△IP202	1-532-675-21	IC LINK (ICP-N38 1.5A)	
< COIL >			
△L101	1-427-841-11	LINE FILTER	
△L102	1-414-372-11	BEAD COIL	
△L103	9-939-264-01	BEAD COIL	

Ref. No.	Part No.	Description	Remark
L201	9-939-265-01	CHOKE COIL 10mH	
L202	1-412-524-21	COIL 8. 2uH	
L203	1-412-524-21	COIL 8. 2uH	
L204	9-939-264-01	BEAD COIL	
L205	9-939-264-01	BEAD COIL	
L206	9-939-264-01	BEAD COIL	
< PHOTO COUPLER >			
△PC101	8-749-924-79	PHOTO COUPLER PS2561L1-1	
△PC102	8-749-924-79	PHOTO COUPLER PS2561L1-1	
< TRANSISTOR >			
△Q101	9-939-258-01	TRANSISTOR 2SK2101-01M	
△Q102	8-729-026-38	TRANSISTOR 2SA933AS-QR	
Q202	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q203	8-729-112-61	TRANSISTOR 2SA1441-L	
Q204	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q205	8-729-033-96	TRANSISTOR 2SD2395E	
Q208	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q209	8-729-026-38	TRANSISTOR 2SA933AS-QR	
△Q210	9-939-259-01	TRANSISTOR 2SA1757F	
Q211	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q212	8-729-026-38	TRANSISTOR 2SA933AS-QR	
△Q213	8-729-019-32	TRANSISTOR 2SC4596F	
△Q214	9-939-259-01	TRANSISTOR 2SA1757F	
Q215	8-729-119-78	TRANSISTOR 2SC2785-HFE	
△Q216	8-729-019-32	TRANSISTOR 2SC4596F	
Q217	8-729-026-38	TRANSISTOR 2SA933AS-QR	
< RESISTOR >			
△R101	9-939-250-01	CARBON 330K	1/2W
△R102	9-939-251-01	THICK FILM 120K	1W
△R103	1-249-493-11	CARBON 56K	5% 1/2W
△R105	1-216-451-11	METAL OXIDE 120	5% 2W
△R106	1-247-692-11	CARBON 22	5% 1/4W
△R107	1-249-429-11	CARBON 10K	5% 1/4W
△R108	1-212-352-61	METAL OXIDE 0.22	1W
△R109	1-247-691-11	CARBON 18	5% 1/4W
△R110	1-249-415-11	CARBON 680	5% 1/4W
△R111	1-249-439-11	CARBON 68K	5% 1/4W
△R112	1-249-439-11	CARBON 68K	5% 1/4W
△R113	1-249-438-11	CARBON 56K	5% 1/4W
△R114	1-249-429-11	CARBON 10K	5% 1/4W
△R115	1-249-405-11	CARBON 100	5% 1/4W
△R116	1-249-411-11	CARBON 330	5% 1/4W
△R117	9-939-252-01	METAL OXIDE FILM 9.09K	1/6W
△R118	9-939-253-01	CARBON 120K	1/4W
△R119	9-939-254-01	METAL OXIDE 27K	1W

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

POWER SUPPLY BLOCK

PW-905

SW-278

Ref. No.	Part No.	Description	Remark
R203	1-249-425-11	CARBON	4.7K 5% 1/4W
R204	1-249-401-11	CARBON	47 5% 1/4W
R205	1-249-415-11	CARBON	680 5% 1/4W
R206	1-249-421-11	CARBON	2.2K 5% 1/4W
R207	1-215-422-00	METAL OXIDE FILM	1.1K 5% 1/6W
R208	1-215-421-00	METAL OXIDE FILM	1K 5% 1/6W
R210	1-249-401-11	CARBON	47 5% 1/4W
R211	1-215-445-00	METAL OXIDE FILM	10K 5% 1/6W
R212	1-249-429-11	CARBON	10K 5% 1/4W
R213	1-215-421-00	METAL OXIDE FILM	1K 5% 1/6W
R214	1-215-421-00	METAL OXIDE FILM	1K 5% 1/6W
R215	1-247-715-11	CARBON	1.5K 5% 1/4W
R217	1-215-445-00	METAL OXIDE FILM	10K 5% 1/6W
R218	1-215-445-00	METAL OXIDE FILM	10K 5% 1/6W
△R221	1-213-137-61	METAL OXIDE	330 1W
△R222	1-213-137-61	METAL OXIDE	330 1W
R223	1-249-417-11	CARBON	1K 5% 1/4W
R224	1-213-137-61	METAL OXIDE	330 1W
R225	1-249-417-11	CARBON	1K 5% 1/4W
R226	1-213-137-61	METAL OXIDE	330 1W
R227	1-249-425-11	CARBON	4.7K 5% 1/4W
△R228	1-216-369-00	METAL OXIDE	1 5% 2W
R231	9-939-255-01	METAL OXIDE FILM	9.53K 1/6W
R232	1-249-429-11	CARBON	10K 5% 1/4W
R234	9-939-256-01	METAL OXIDE	100 1W
R235	9-939-257-01	METAL OXIDE	3.9K 1W
R236	9-939-257-01	METAL OXIDE	3.9K 1W
R237	9-939-257-01	METAL OXIDE	3.9K 1W
R240	1-249-401-11	CARBON	47 5% 1/4W
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	9-939-263-01	TRANSFORMER, CONVERTER	
< THERMISTOR >			
△TH101	9-939-262-01	THERMISTOR M1600T3C 16	

*	1-660-683-11	PW-905 BOARD (Ref. No. 4, 000 Series)	

< CAPACITOR >			
C201	1-164-232-11	CERAMIC CHIP	0.01uF 50V
< CONNECTOR >			
CN201	1-770-540-31	PIN, CONNECTOR (PC BOARD)	6P

Ref. No.	Part No.	Description	Remark
CN202	1-568-847-11	PIN, CONNECTOR (PC BOARD)	4P
< DIODE >			
D202	8-719-045-62	LED SLR-342VC-A-47	(POWER STANDBY)
< IC >			
IC201	8-741-810-59	IC SBX1810-59	
< CHIP CONDUCTOR >			
JR201	1-216-296-00	CONDUCTOR, CHIP	(3216)
JR202	1-216-296-00	CONDUCTOR, CHIP	(3216)
JR203	1-216-296-00	CONDUCTOR, CHIP	(3216)
JR204	1-216-296-00	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	1-570-472-11	SWITCH, KEY BOARD (POWER)	

*	1-660-679-11	SW-278 BOARD (Ref. No. 5, 000 Series)	

< CONNECTOR >			
* CN501	1-566-968-11	HOUSING, CONNECTOR(PC BOARD)	6P
< CHIP CONDUCTOR >			
JR500	1-216-295-00	CONDUCTOR, CHIP	(2012)
JR501	1-216-295-00	CONDUCTOR, CHIP	(2012)
JR502	1-216-296-00	CONDUCTOR, CHIP	(3216)
< PHOTO INTERRUPTER >			
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 CHIP	390 5% 1/8W
R502	1-216-248-00	METAL CHIP	120K 5% 1/8W
R503	1-216-248-00	METAL CHIP	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

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SW-278**SW-905****VX-702**

Ref. No.	Part No.	Description	Remark		
R506	1-216-099-00	METAL CHIP 120K 5%	1/10W		

*	1-660-684-11	SW-905 BOARD (Ref. No. 4,000 Series)			

< CONNECTOR >					
CN301	1-568-847-11	PIN, CONNECTOR (PC BOARD) 4P			
< RESISTOR >					
R301	1-216-049-00	METAL CHIP 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	1-216-089-00	METAL CHIP 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		
< SWITCH >					
S301	1-570-472-11	SWITCH, KEY BOARD (PBC ON/OFF)			
S302	1-570-472-11	SWITCH, KEY BOARD (RETURN)			
S303	1-570-472-11	SWITCH, KEY BOARD (PREV ◀)			
S304	1-570-472-11	SWITCH, KEY BOARD (NEXT ▶)			
S305	1-570-472-11	SWITCH, KEY BOARD (SELECT ▷)			
S306	1-570-472-11	SWITCH, KEY BOARD (SIDE A)			
S307	1-570-472-11	SWITCH, KEY BOARD (SIDE B)			
S308	1-570-472-11	SWITCH, KEY BOARD (OPEN/CLOSE ☰)			
S309	1-570-472-11	SWITCH, KEY BOARD (■)			
S310	1-570-472-11	SWITCH, KEY BOARD (▣)			

*	A-6423-395-A	VX-702 BOARD, COMPLETE (E)			
*	A-6423-405-A	VX-702 BOARD, COMPLETE (TW)			

(Ref. No. 2,000 Series)					
< CAPACITOR/CHIP CONDUCTOR >					
C101	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C102	1-163-229-11	CERAMIC CHIP 12PF	5%	50V	
C103	1-163-243-11	CERAMIC CHIP 47PF	5%	50V	
C104	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V	
C105	1-126-968-11	ELECT 100uF	20%	6.3V	
C106	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C107	1-126-968-11	ELECT 100uF	20%	6.3V	
C108	1-104-664-11	ELECT 47uF	20%	10V	
C109	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C110	1-104-664-11	ELECT 47uF	20%	10V	
C111	1-163-031-11	CERAMIC CHIP 0.01uF		50V	

Ref. No.	Part No.	Description	Remark		
C112	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C113	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C115	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C116	1-126-968-11	ELECT 100uF	20%	6.3V	
C117	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C118	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C119	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C120	1-104-664-11	ELECT 47uF	20%	10V	
C121	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C122	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C123	1-107-823-11	CERAMIC CHIP 0.47uF	10%	16V	
C124	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C125	1-109-982-11	CERAMIC CHIP 1uF	10%	10V	
C126	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C127	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C128	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C129	1-104-664-11	ELECT 47uF	20%	10V	
C130	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C134	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C135	1-163-241-11	CERAMIC CHIP 39PF	5%	50V	
C136	1-163-241-11	CERAMIC CHIP 39PF	5%	50V	
C137	1-163-241-11	CERAMIC CHIP 39PF	5%	50V	
C138	1-163-249-11	CERAMIC CHIP 82PF	5%	50V	
C139	1-163-121-00	CERAMIC CHIP 150PF	5%	50V	
C140	1-163-121-00	CERAMIC CHIP 150PF	5%	50V	
C141	1-163-121-00	CERAMIC CHIP 150PF	5%	50V	
C142	1-163-113-00	CERAMIC CHIP 68PF	5%	50V	
C143	1-163-222-11	CERAMIC CHIP 5PF	0.25PF	50V	
C144	1-163-031-11	CERAMIC CHIP 0.01uF		50V	
C145	1-163-245-11	CERAMIC CHIP 56PF	5%	50V	
C146	1-163-241-11	CERAMIC CHIP 39PF	5%	50V	
C147	1-163-037-11	CERAMIC CHIP 0.022uF	10%	25V	
C148	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C149	1-163-243-11	CERAMIC CHIP 47PF	5%	50V	
C150	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C151	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C152	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C153	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C154	1-163-133-00	CERAMIC CHIP 470PF	5%	50V	
C155	1-126-968-11	ELECT 100uF	20%	6.3V	
C156	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C157	1-104-664-11	ELECT 47uF	20%	10V	
C158	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C159	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C160	1-124-589-11	ELECT 47uF	20%	16V	
C161	1-124-589-11	ELECT 47uF	20%	16V	
C162	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C163	1-163-237-11	CERAMIC CHIP 27PF	5%	50V	
C164	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V	

Ref. No.	Part No.	Description	Remark		
C165	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C166	1-163-229-11	CERAMIC CHIP	12PF	0.5PF	50V
C168	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C169	1-124-589-11	ELECT	47uF	20%	16V
C170	1-216-295-00	CONDUCTOR, CHIP	(2012)		(TW)
C171	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V (E)
C172	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C173	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C303	1-104-664-11	ELECT	47uF	20%	10V
C304	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C305	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C306	1-104-664-11	ELECT	47uF	20%	10V
C307	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C308	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C309	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C310	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C311	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C312	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C313	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C361	1-163-031-11	CERAMIC CHIP	0.01uF		50V
< CONNECTOR >					
CN101	1-770-383-11	CONNECTOR, BOARD TO BOARD	14P		
CN302	1-770-382-11	CONNECTOR, BOARD TO BOARD	12P		
CN303	1-568-828-11	PIN, CONNECTOR (PC BOARD)	9P		
CN303	1-774-475-31	CONNECTOR, FFC/FPC	9P		
CN304	1-568-781-11	PIN, CONNECTOR	4P		
< TRIMMER >					
CT101	1-141-355-21	CAP, VAR, TRIMMER	(E)		
CT101	1-141-318-11	CAP, VAR, TRIMMER	(TW)		
CT102	1-141-318-11	CAP, VAR, TRIMMER	(E)		
< DIODE >					
D101	8-719-800-76	DIODE	1SS226		
D103	8-719-027-74	DIODE	1SV231-TPH3		
D104	8-719-048-98	DIODE	RB160L-40TE25		
D105	8-719-048-98	DIODE	RB160L-40TE25		
D106	8-719-048-98	DIODE	RB160L-40TE25		
D107	8-719-048-98	DIODE	RB160L-40TE25		
D301	8-719-914-44	DIODE	DAP202K		
D302	8-719-914-44	DIODE	DAP202K		
< IC >					
IC101	8-759-363-78	IC	CL480VCD-B1		
IC102	8-759-371-04	IC	HM514260CJ7-Z		
IC103	8-759-375-63	IC	LC371100SM-C78		
IC104	8-759-295-09	IC	TLC2932IPW		
IC105	8-752-338-46	IC	CXD1178Q		

Ref. No.	Part No.	Description	Remark		
IC106	8-759-207-28	IC	TC9015P		
IC107	8-752-068-43	IC	CXA1645M		
IC108	8-759-232-44	IC	TC74HC125AF		
IC109	8-759-233-64	IC	TC74HC04AF		
IC301	8-759-423-99	IC	LC371100SM-D46		
IC302	8-759-032-01	IC	MC74HC00AF		
IC303	8-759-349-93	IC	KM62256CLG-7		
IC304	8-759-276-29	IC	XL9020F-S-E2		
IC305	8-759-283-49	IC	HD6413002F10		
< COIL >					
L101	1-410-520-11	INDUCTOR		82uH	
L102	1-410-499-41	INDUCTOR		1.5uH	
L103	1-410-509-61	INDUCTOR		10uH	
L104	1-410-520-11	INDUCTOR		82uH	
L108	1-410-510-11	INDUCTOR		12uH	
L109	1-410-510-11	INDUCTOR		12uH	
L110	1-410-510-11	INDUCTOR		12uH	
L111	1-410-517-11	INDUCTOR		47uH	
L112	1-410-520-11	INDUCTOR		82uH	
L113	1-410-520-11	INDUCTOR		82uH	
L114	1-410-520-11	INDUCTOR		82uH	
L115	1-410-519-11	INDUCTOR		68uH	
L116	1-410-509-61	INDUCTOR		10uH	
L117	1-410-517-11	INDUCTOR		47uH	
L301	1-410-519-11	INDUCTOR		68uH	
< TRANSISTOR >					
Q101	8-729-140-75	TRANSISTOR	2SD999-CLCK		
Q102	8-729-230-49	TRANSISTOR	2SC2712-YG		
Q103	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
Q104	8-729-900-53	TRANSISTOR	DTC114EK		
Q105	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R		
Q106	8-729-027-24	TRANSISTOR	DTA114TKA-T146		
Q107	8-729-026-49	TRANSISTOR	2SA1037AK-T146-R		
Q108	8-729-120-28	TRANSISTOR	2SC1623-L5L6		
Q109	8-729-101-25	TRANSISTOR	2SC1009A		
< RESISTOR/CHIP CONDUCTOR >					
R098	1-216-073-00	METAL CHIP	10K	5%	1/10W
R099	1-216-073-00	METAL CHIP	10K	5%	1/10W
R101	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R102	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R103	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R104	1-216-121-00	METAL CHIP	1M	5%	1/10W
R105	1-216-295-00	CONDUCTOR, CHIP	(2012)		
R106	1-216-049-00	METAL CHIP	1K	5%	1/10W
R107	1-216-042-00	METAL CHIP	510	5%	1/10W
R108	1-216-073-00	METAL CHIP	10K	5%	1/10W

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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R109	1-216-023-00	METAL CHIP	82 5% 1/10W	R163	1-216-049-00	METAL CHIP	1K 5% 1/10W
R110	1-216-073-00	METAL CHIP	10K 5% 1/10W	R164	1-216-041-00	METAL CHIP	470 5% 1/10W
R111	1-216-073-00	METAL CHIP	10K 5% 1/10W	R165	1-216-057-00	METAL CHIP	2. 2K 5% 1/10W
R112	1-216-013-00	METAL CHIP	33 5% 1/10W	R167	1-216-042-00	METAL CHIP	510 5% 1/10W
R113	1-216-073-00	METAL CHIP	10K 5% 1/10W	R168	1-216-295-00	CONDUCTOR, CHIP	(2012)
R114	1-216-073-00	METAL CHIP	10K 5% 1/10W	R170	1-216-061-00	METAL CHIP	3. 3K 5% 1/10W
R116	1-216-013-00	METAL CHIP	33 5% 1/10W	R171	1-216-038-00	METAL CHIP	360 5% 1/10W
R118	1-216-073-00	METAL CHIP	10K 5% 1/10W	R173	1-216-025-00	METAL CHIP	100 5% 1/10W
R119	1-216-013-00	METAL CHIP	33 5% 1/10W	R174	1-216-033-00	METAL CHIP	220 5% 1/10W
R120	1-216-073-00	METAL CHIP	10K 5% 1/10W	R175	1-216-033-00	METAL CHIP	220 5% 1/10W
R121	1-216-053-00	METAL CHIP	1. 5K 5% 1/10W	R176	1-216-033-00	METAL CHIP	220 5% 1/10W
R122	1-216-025-00	METAL CHIP	100 5% 1/10W	R177	1-216-073-00	METAL CHIP	10K 5% 1/10W
R123	1-216-025-00	METAL CHIP	100 5% 1/10W	R181	1-216-037-00	METAL CHIP	330 5% 1/10W
R124	1-216-025-00	METAL CHIP	100 5% 1/10W	R182	1-216-049-00	METAL CHIP	1K 5% 1/10W
R126	1-216-295-00	CONDUCTOR, CHIP	(2012)	R186	1-216-049-00	METAL CHIP	1K 5% 1/10W
R127	1-216-295-00	CONDUCTOR, CHIP	(2012)	R187	1-216-049-00	METAL CHIP	1K 5% 1/10W
R128	1-216-295-00	CONDUCTOR, CHIP	(2012)	R188	1-216-049-00	METAL CHIP	1K 5% 1/10W
R129	1-216-073-00	METAL CHIP	10K 5% 1/10W	R189	1-216-057-00	METAL CHIP	2. 2K 5% 1/10W
R131	1-216-049-00	METAL CHIP	1K 5% 1/10W	R190	1-216-091-00	METAL CHIP	56K 5% 1/10W
R132	1-216-073-00	METAL CHIP	10K 5% 1/10W	R191	1-216-121-00	METAL CHIP	1M 5% 1/10W
R134	1-216-073-00	METAL CHIP	10K 5% 1/10W	R193	1-216-057-00	METAL CHIP	2. 2K 5% 1/10W
R135	1-216-295-00	CONDUCTOR, CHIP	(2012)	R194	1-216-097-00	METAL CHIP	100K 5% 1/10W
R136	1-216-025-00	METAL CHIP	100 5% 1/10W	R195	1-216-025-00	METAL CHIP	100 5% 1/10W
R137	1-216-025-00	METAL CHIP	100 5% 1/10W	R196	1-216-025-00	METAL CHIP	100 5% 1/10W
R138	1-216-025-00	METAL CHIP	100 5% 1/10W	R197	1-216-089-00	METAL CHIP	47K 5% 1/10W
R139	1-216-025-00	METAL CHIP	100 5% 1/10W	R198	1-216-025-00	METAL CHIP	100 5% 1/10W
R140	1-216-025-00	METAL CHIP	100 5% 1/10W	R199	1-216-065-00	METAL CHIP	4. 7K 5% 1/10W
R141	1-216-025-00	METAL CHIP	100 5% 1/10W	R200	1-216-077-00	METAL CHIP	15K 5% 1/10W
R142	1-216-025-00	METAL CHIP	100 5% 1/10W	R201	1-216-073-00	METAL CHIP	10K 5% 1/10W
R143	1-216-025-00	METAL CHIP	100 5% 1/10W	R202	1-216-095-00	METAL CHIP	82K 5% 1/10W
R144	1-216-025-00	METAL CHIP	100 5% 1/10W	R203	1-216-065-00	METAL CHIP	4. 7K 5% 1/10W
R145	1-216-025-00	METAL CHIP	100 5% 1/10W	R204	1-216-097-00	METAL CHIP	100K 5% 1/10W
R146	1-216-025-00	METAL CHIP	100 5% 1/10W	R205	1-216-097-00	METAL CHIP	100K 5% 1/10W
R147	1-216-025-00	METAL CHIP	100 5% 1/10W	R207	1-216-049-00	METAL CHIP	1K 5% 1/10W
R148	1-216-025-00	METAL CHIP	100 5% 1/10W	R208	1-247-903-00	CARBON	1M 5% 1/4W
R149	1-216-025-00	METAL CHIP	100 5% 1/10W	R209	1-216-121-00	METAL CHIP	1M 5% 1/10W (E)
R150	1-216-025-00	METAL CHIP	100 5% 1/10W	R210	1-216-041-00	METAL CHIP	470 5% 1/10W
R151	1-216-025-00	METAL CHIP	100 5% 1/10W	R211	1-216-047-00	METAL CHIP	820 5% 1/10W
R152	1-216-025-00	METAL CHIP	100 5% 1/10W	R212	1-216-049-00	METAL CHIP	1K 5% 1/10W
R153	1-216-025-00	METAL CHIP	100 5% 1/10W	R214	1-216-295-00	CONDUCTOR, CHIP	(2012)
R154	1-216-025-00	METAL CHIP	100 5% 1/10W	R215	1-216-049-00	METAL CHIP	1K 5% 1/10W
R155	1-216-025-00	METAL CHIP	100 5% 1/10W	R216	1-216-041-00	METAL CHIP	470 5% 1/10W
R156	1-216-025-00	METAL CHIP	100 5% 1/10W	R217	1-216-025-00	METAL CHIP	100 5% 1/10W
R157	1-216-025-00	METAL CHIP	100 5% 1/10W	R218	1-216-025-00	METAL CHIP	100 5% 1/10W
R158	1-216-025-00	METAL CHIP	100 5% 1/10W	R219	1-216-025-00	METAL CHIP	100 5% 1/10W
R159	1-216-025-00	METAL CHIP	100 5% 1/10W	R220	1-216-025-00	METAL CHIP	100 5% 1/10W
R160	1-216-042-00	METAL CHIP	510 5% 1/10W	R221	1-249-442-11	CARBON	510 5% 1/4W
R161	1-216-023-00	METAL CHIP	82 5% 1/10W	R301	1-216-033-00	METAL CHIP	220 5% 1/10W
R162	1-216-025-00	METAL CHIP	100 5% 1/10W				

Ref. No.	Part No.	Description	Remark
R302	1-216-033-00	METAL CHIP	220 5% 1/10W
R303	1-216-033-00	METAL CHIP	220 5% 1/10W
R304	1-216-033-00	METAL CHIP	220 5% 1/10W
R305	1-216-033-00	METAL CHIP	220 5% 1/10W
R306	1-216-033-00	METAL CHIP	220 5% 1/10W
R307	1-216-033-00	METAL CHIP	220 5% 1/10W
R308	1-216-033-00	METAL CHIP	220 5% 1/10W
R309	1-216-033-00	METAL CHIP	220 5% 1/10W
R310	1-216-033-00	METAL CHIP	220 5% 1/10W
R311	1-216-033-00	METAL CHIP	220 5% 1/10W
R312	1-216-033-00	METAL CHIP	220 5% 1/10W
R313	1-216-033-00	METAL CHIP	220 5% 1/10W
R314	1-216-033-00	METAL CHIP	220 5% 1/10W
R315	1-216-033-00	METAL CHIP	220 5% 1/10W
R316	1-216-033-00	METAL CHIP	220 5% 1/10W
R330	1-216-295-00	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 (E)
R335	1-216-073-00	METAL CHIP	10K 5% 1/10W (E)
R336	1-216-073-00	METAL CHIP	10K 5% 1/10W (E)
R337	1-216-049-00	METAL CHIP	1K 5% 1/10W
R338	1-216-073-00	METAL CHIP	10K 5% 1/10W
R339	1-216-073-00	METAL CHIP	10K 5% 1/10W
R340	1-216-061-00	METAL CHIP	3.3K 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
R343	1-216-049-00	METAL CHIP	1K 5% 1/10W
R344	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
R345	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
R346	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
R347	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
R348	1-216-295-00	CONDUCTOR, CHIP	(2012)
R351	1-216-295-00	CONDUCTOR, CHIP	(2012)
R352	1-216-295-00	CONDUCTOR, CHIP	(2012)
R360	1-216-073-00	METAL CHIP	10K 5% 1/10W (TW)
R362	1-216-089-00	METAL CHIP	47K 5% 1/10W
R363	1-216-089-00	METAL CHIP	47K 5% 1/10W
R364	1-216-089-00	METAL CHIP	47K 5% 1/10W
R365	1-216-089-00	METAL CHIP	47K 5% 1/10W
R366	1-216-089-00	METAL CHIP	47K 5% 1/10W
< VARIABLE RESISTOR >			
RV102	1-223-238-21	RES, ADJ, CARBON	4.7K
< SWITCH >			
S101	1-571-308-11	SWITCH, SLIDE (COLOR SYSTEM)	(E)

Ref. No.	Part No.	Description	Remark
< VIBRATOR >			
X101	1-760-683-11	VIBRATOR, CRYSTAL (14.318MHz)	
X102	1-577-381-11	VIBRATOR, CRYSTAL (14.31818MHz)	
X103	1-577-289-11	VIBRATOR, CRYSTAL (17.734475MHz)	(E)
X301	1-579-125-11	VIBRATOR, CERAMIC (8MHz)	

MISCELLANEOUS			

12	1-777-009-11	CABLE, FLAT (6 CORE)	
14	1-777-012-11	CABLE, FLEXIBLE FLAT (4 CORE)	
58	1-777-013-11	CABLE, FLAT (9 CORE)	
△101	1-468-101-11	POWER SUPPLY BLOCK (SR-582 BOARD)	
103	1-777-010-11	CABLE, FLAT (8 CORE)	
105	1-777-005-11	CABLE, FLAT (20 CORE)	
107	1-777-007-11	CABLE, FLAT (8 CORE)	
108	1-777-006-11	CABLE, FLEXIBLE FLAT (13 CORE)	
△109	1-769-639-21	CORD, POWER (E)	
△109	1-777-274-11	CORD, POWER (TW)	
△110	1-569-008-11	ADAPTER, CONVERSION 2P (E)	
△208	8-848-286-11	OPTICAL PICK-UP BLOCK (KHS-150A)	
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)	

ACCESSORIES & PACKING MATERIALS			

1-473-526-11	REMOTE COMMANDER (RMT-M43A)	(E)	
* 1-473-705-11	REMOTE COMMANDER (RMT-M43B)	(TW)	
△ 1-569-008-11	ADAPTER, CONVERSION 2P (E)		
1-575-334-11	CORD, CONNECTION (AV)		
	(A/V CONNECTING CABLE (STEREO) 1.5M)		
3-708-885-01	COVER, BATTERY (RMT-M43A/M43B)		
3-810-880-11	MANUAL, INSTRUCTION (ENGLISH, CHINESE)		
* 3-968-173-01	CUSHION (E)		
* 3-970-171-01	INDIVIDUAL CARTON (E)		
* 3-971-001-01	CUSHION (TW)		
* 3-971-002-01	INDIVIDUAL CARTON (TW)		

HARDWARE LIST			

#1	7-685-647-79	SCREW +BTP 3X10 TYPE2 N-S	
#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	

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

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Remark</u>
#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	7-682-647-09	SCREW +PSW 3X6	

SECTION 6 IC PIN DESCRIPTION

6-1. MODE CONTROL IC PIN DESCRIPTION (FP-407 BOARD IC102 HD6433712B50H)

Pin No.	Pin Name	I/O	Function
1	AVCC	-	Power supply EVER +5 V
2	MON1	1	- 5 V REG monitor
3	MON2	1	+5 V REC monitor
4	+16	1	± 16 V monitor
5	-	-	N.C.
6	AD1	1	Unit key input
7	AD3	1	Unit key input
8	AD4	1	Unit key input
9	-	-	N.C.
10	AVSS*	-	GND
11	TEST	1	Test terminal (Not used: Open)
12	X2	0	Sub clock oscillator terminal (Not used: Open)
13	X1	1	Sub clock oscillator terminal (Not used: Open)
14	VCC	-	GND
15	X0	1	Crystal oscillator terminal (8 MHz)
16	X1	0	Crystal oscillator terminal (8 MHz)
17	RESET	1	VFD controller reset ("L": Reset)
18	SIRCS	1	SIRCS data input
19	-	-	N.C.
20	-	-	N.C.
21	P.CONT	0	Unit power on/off control ("H": Power on)
22	-	1	N.C.
23	P1	0	FL segment output
24	P2	0	FL segment output
25	P3	0	FL segment output
26	P4	0	FL segment output
27	P5	0	FL segment output
28	P6	0	FL segment output
29	P7	0	FL segment output
30	P8	0	FL segment output
31	P9	0	FL segment output
32	P10	0	FL segment output
33	P11	0	FL segment output
34	P12	0	FL segment output
35	P13	0	FL segment output
36	P14	0	FL segment output
37	P15	0	FL segment output
38	P16	0	FL segment output
39	-30V	1	High-voltage proof pull-down power supply - 30 V
40	P17	0	FL Segment output

Pin No.	Pin Name	I/O	Function
41	P18	0	FL Segment output
42	P19	0	FL Segment output
43	P20	0	FL Segment output
44	P21	0	FL Segment output
45	P22	0	FL Segment output
46	P23	0	FL Segment output
47	P24	0	FL Segment output
48	G1	0	FL grid output
49	G2	0	FL grid output
50	G3	0	FL grid output
51	G4	0	FL grid output
52	G5	0	FL grid output
53	G6	0	FL grid output
54	G7	0	FL grid output
55	VIDEO MUTE	0	"L" when video mute
56	VCC	-	Power supply EVER +5 V
57	AU MUTE	0	"H" when audio mute
58	VFD CLK	0	Communication clock to the mode VCD controller
59	VFD SI	1	Data reception from the mode VCD controller
60	VFD SO	0	Data transfer to the mode VCD controller
61	VFD ACK	0	Transfer enable signal to the mode VCD controller from the VFD controller ("L": Communication enable)
62	MMIRST	0	Mode VCD controller reset ("L": Reset)
63	VFD REQ	1	Chip select for VFD controller from the mode VCD controller
64	P.OFF	0	Power reset output ("H": Reset)

**6-2. VCD MODE CONTROL IC PIN DESCRIPTION
(VX-702 BOARD IC305 HD6413002F10)**

Pin No.	Pin Name	I/O	Function
1	VCC	-	Power supply REG +5 V
2	DSP CS	0	Chip select for KARAOKE DSP ("L": Being communicated) (Not used: Open)
3	CDDA EMP	1	CD DA de-emphasis control input ("H": ON) Only when video CD is used
4	E2P WC	0	EEPROM line control output
5	E2P CS	0	EEPROM chip select output
6	VFD ACK	1	Transfer enable signal to the mode controller from the VFD controller ("L": Communication enable)
7	VFD REQ	0	Transfer request signal to the VFD controller from the mode controller ("L": Communication request)
8	-	1	Not used (Fixed at "H")
9	CL480 RST	0	CL480 reset ("L": Reset)
10	RESO	0	Not used (Open)
11	VSS	-	GND
12	MECH S1	0	Data output to the mechanism controller/CG
13	SO	0	Transfer data to the VFD controller/EEPROM
14	MECH SO	1	Data input from the mechanism controller
15	S1	1	Reception data from the VFD controller/EEPROM
16	MECH CLK	0	Communication clock output to the mechanism controller/CG
17	SK	0	Communication clock to the VFD controller/EEPROM
18	DEV RST	0	Device reset ("L": Reset)
19	HDET	1	"L": Video input present
20	MIC IN	1	"L": MIC IN
21	OTASUKE	1	"H": Microphone sound absent, "L": Microphone sound present
22	VSS	-	GND
23	VCD	0	"L": Video CD playback (Not used: Open)
24	CLAP SW0	0	"H": Hand clapping 0 START (Not used: Open)
25	CLAP SW1	0	"H": Hand clapping 1 START (Not used: Open)
26	CLAP BUSY	1	"L": Hand clapping
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 +5 V
36	A0	0	Address bus output
37	A1	0	Address bus output
38	A2	0	Address bus output
39	A3	0	Address bus output
40	A4	0	Address bus output

Pin No.	Pin Name	I/O	Function
41	A5	0	Address bus output
42	A6	0	Address bus output
43	A7	0	Address bus output
44	Vss	-	GND
45	A8	0	Address bus output
46	A9	0	Address bus output
47	A10	0	Address bus output
48	A11	0	Address bus output
49	A12	0	Address bus output
50	A13	0	Address bus output
51	A14	0	Address bus output
52	A15	0	Address bus output
53	A16	0	Address bus output
54	A17	0	Address bus output
55	A18	0	Address bus output
56	A19	0	Not used (Open).
57	VSS	-	GND
58	WAIT	1	Wait pin. Request the insertion of wait state when accessing the external address space
59	RGB MUTE	0	RGB encoder output mute control ("H": Mute, Sync is not muted)
60	NTSC/PAL	0	RGB encoder mode selection ("H": NTSC output, "L": PAL output)
61	SYSCLOCK	0	System clock output (Not used: Open)
62	STBY	1	Standby pin. When "L", the hardware standby mode is set (Not used: Fixed at "H")
63	RST	1	Mode controller reset ("L": Reset)
64	E2P BUSY	1	EEPROM write "H": READY "L": BUSY.
65	VSS	-	GND
66	EXTAL	1	Connected to the crystal oscillator. Clock 8 MHz
67	XTAL	1	Connected to the crystal oscillator. Clock 8 MHz
68	VCC	-	Power supply REG +5 V
69	AS	0	Address strobe. When "L", an address on the address bus is valid (Not used: Open)
70	RD	0	Read pin. When "L", the external address space is in a read condition
71	HWR	0	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	LWR	0	Not used (Open)
73	MD0	1	Mode pin (Fixed at "H")
74	MD1	1	Mode pin (Fixed at "L")
75	MD2	1	Mode pin (Fixed at "L")
76	AVCC	-	AD conversion power supply REG +5 V
77	VREF	-	AD conversion reference voltage input REG +5 V
78	NT PAL-AUTO SEL	1	NTSC/PAL auto select (video-CD output mode)
79	-	1	AD input (Not used: open)
80	-	1	AD input (Not used: open)

Pin No.	Pin Name	I/O	Function
81	–	1	AD input (Not used: open)
82	–	1	AD input (Not used: open)
83	–	1	AD input (Not used: open)
84	J/EUC	1	AD input, destination specification
85	REMOTE CONT	1	AD input, microphone remote input
86	AVSS	–	AD conversion GND
87	REFV	1	Reference V sync signal input (Non-maskable interrupt. Requests a non-maskable interrupt)
88	CL480INT	1	CL480 interrupt request signal input
89	CL480CS	0	CL480 chip select
90	EXRAMCS	0	External RAM chip select
91	EXROMCS	0	External ROM chip select
92	VSS	–	GND
93	MPEG EMP	1	De-emphasis control input of MPEG audio ("H": ON)
94	BLACK YMUTE	0	Complete mute control of RGB encoder ("H": Mute. Sync is also muted)
95	–	–	N.C. (Reserved for input capture)
96	–	–	N.C. (Reserved for input capture)
97	LINE SELECT	0	"H": Communication with the mechanism controller, "L": Communication with CG
98	MMTCS	1	Chip select for the mode controller from the mechanism controller
99	BUSY	0	Transfer enable signal to the mechanism controller from the mode controller ("L": Communication enable)
100	CG CS	0	CG chip select ("L": Being communicated)

6-3. SYSTEM CONTROL IC PIN DESCRIPTION (MB-73 BOARD IC501 MB89094-PF-G-152-BND)

Pin No.	Pin Name	I/O	Function
1	-	0	Clock 32 kHz (Open)
2	CLK32K	1	Clock 32 kHz
3	GND	-	(Connected to GND)
4	GND	-	(Connected to GND)
5	2F5C	1	Clock 2 fsc (32 kHz)
6	-	0	Clock 2 fsc (Open)
7	-	-	GND
8	XMRST	1	Mechanism controller reset ("L": Reset)
9	XFREQ	1	Phillips code (Frame No.) read enable
10	FQACK	0	Disc data read
11	FQSEL	0	Phillips code/Sub-Q data selection ("L": Sub-Q)
12	JPCTL	0	One track jump (ITJ)/Multi track jump (MTJ) selection signal ("H": ITJ)
13	SP LOCK	1	Spindle servo lock ("H": Spindle servo locked)
14	TBC HOLD IN	0	Chroma TBC control
15	SCOR	1	"H": when subcode sync is detected (External interrupt 2)
16	XPBV	1	Playback V sync signal input (External interrupt 2)
17	XREF V	1	Reference V sync signal input (External interrupt 1)
18	ALT	0	Latches internal register A of extension output port IC (MB-73 board IC502)
19	BLT	0	Latches internal register B of extension output port IC (MB-73 board IC502)
20	XBUSY	1	Communication enable signal from the mode controller ("L": Communication enable)
21	DOP	1	VIDEO dropout detection input
22	VIM	1	Servo processor V timing signal
23	FLAG	1	Reference line operation flag
24	CDG MODE	1	"H" when CDG (Decode IC disc discrimination)
25	CLS CS	0	Chip select of CLS DT (pin 29) signal
26	SPDL PLS	0	Spindle pulse drive signal ("H": Spindle free running)
27	CLT	0	C register latch
28	+5V	-	Input of the start mode selection after reset release (+5 V PULL UP)
29	CLS DT	1	CLV scanning V sync phase difference data input from IC502 (Data input when CLS CS is "H")
30	SET DT	0	Serial data output to DSP/Extension output port IC
31	SET CK	0	Serial data transfer clock to DSP, IC502
32	SPDL FG1	1	Spindle FG input 1 (12 waves per one rotation)
33	G MUTE	0	Gray image mute control output when CLV scanning ("L": Playback image, "H": Gray image)
34	LD SEARCH	0	Spindle servo control output ("H": During LD search)
35	SPDL F/AXR	0	Spindle rotation direction signal ("H": FWD)
36	AUX	1	"H": External input, "L": Others (Not used: Open)
37	ITJ	0	Track jump trigger pulse output
38	FG START	0	H sync measuring start
39	FG SEARCH	0	During LD search, H
40	SP GAIN	0	H sync measuring prohibition

Pin No.	Pin Name	I/O	Function
41	MTJ	1	MTJ tracking pulse output. Normally, input. Output when TJ is executed ("L": FWD).
42	MTF ON/OFF	0	MTF compensation on/off signal ("L": FWD)
43	V LOAD	0	Video IC (MN8811) latch signal
44	EX V CTL	0	"H" when external input (VCD) is muted
45	PM OFF	0	Read clock phase modulation "H": off
46	V-CD VIDEO SEL	0	"L" when VCD mode (Not used: Open)
47	-	0	Theater mode ("H": on) (Not used: Open)
48	XFL	1	Focus lock signal ("L": Focus lock)
49	VCC	-	Power supply REG +5 V
50	LINE SEL	1	"H": MMI is connected to FSIO.
51	XCDG MUTE	1	Graphic data mute ("L": PB, "H": Other) (Not used: Open)
52	TILT LOADING UP	0	Tray loading drive
53	TILT LOADING DN	0	Tray eject drive
54	XMMICS	0	Serial communication chip select signal to MMI
55	TILT CTL	0	Tilt position
56	TILT LIMIT	0	Tilt position
57	XCDGRST	1	CDG IC reset (Not used: Open)
58	GND	-	GND
59	LINE MUTE	0	Audio output mute signal ("L": Mute)
60	DIGITAL 0 MUTE	1	Digital 0 mute information
61	MC RST	0	Servo DSP/DF reset signal ("L": Reset)
62	LD ON	0	Laser diode on/off signal ("H": On (emission))
63	XCDLD CDV	0	"L": CD or VDV audio part is played back, "H": Others
64	XSVLT	0	SERVO IC (HA11529) latch signal
65	SIDE AXB	0	Tilt servo image selection ("H": A, "L": B)
66	BRK INH	0	SERVO brake mode control
67	LCSW1	1	Loading/chucking position sensor input 1
68	XLD LED	0	DISC discrimination LED emission signal ("L": Emission)
69	LCSW2	1	Loading/chucking position sensor input2
70	LCSW3	1	Loading/chucking position sensor input3
71	LCSW4	1	Loading/chucking position sensor input4
72	LOADING LOCK	0	Loading motor break cancel
73	DOS INH	1	Input is fixed
74	MECH SI	1	32-byte serial transfer data input (For SCOR check)
75	NR CONT	1	Noise canceler
76	SCAN DOP CTL	0	"H" when CLV mode
77	MECH SI	1	32-byte serial transfer data input (Input from the mode controller, IC502)
78	MECH SO	0	32-byte serial transfer data output (Output to the mode controller)
79	MECH CLK	0	32-byte serial transfer clock
80	T CNT	1	Traverse count signal input

Pin No.	Pin Name	I/O	Function
81	AC-3 MUTE	O	Digital RF out (AC-3) mute signal
82	—	—	N.C.
83	GND	—	GND
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 signal input from DSP
92	VCC	—	Power supply REG +5 V
93	MUTE G	O	DSP mute signal ("H": Mute)
94	EMPHA	I	De-emphasis control ("H": ON)
95	AFM MUTE 1	O	Audio L output mode selection ("H": analog audio R mute)
96	AFM MUTE 2	O	Audio R output mode selection ("H": analog audio L mute)
97	XCX	O	CX on/off control output ("H": Off)
98	D/F LT	O	Digital filter latch
99	XDPS SEL	O	Selection of communication with DSP ("L": Connection, "H": Disconnection)
100	VCC	—	Power supply REG +5 V

6-4. SYSTEM CONTROL IC PIN DESCRIPTION (MB-73 BOARD IC502 LC21011B-X78)

Pin No.	Pin Name	I/O	Function
1	PCD1	-	N.C.
2	PCD2	-	N.C.
3	PCD3	-	N.C.
4	PCD4	-	N.C.
5	PCD5	-	N.C.
6	PCD6	-	N.C.
7	PCD7	-	N.C.
8	CD DEFECT	0	CD defect signal output
9	SP CHECK	-	N.C.
10	FSC	-	N.C.
11	XIN	1	4 fsc 14.3 MHz input (Clock)
12	XOUT	0	4 fsc 14.3 MHz output (Clock)
13	VSS	1	GND
14	V MUTE1	0	When CLV scanning: V sync delete signal
15	V MUTE2	0	When CLV scanning: REF V sync add signal
16	G BURST	0	Gray image output
17	DLRH	0	Gray image output
18	GRH	0	Gray image output
19	GVID	1	When CLV scanning: Gray image output signal
20	DS GATE	0	Phillips code gate signal output (Not used)
21	TBC REF H	0	CAV disc track traverse signal
22	PBCS	1	Composite sync signal input
23	P CODE	1	Phillips code data input
24	JMP TGL	0	CAV disc track traverse signal
25	TBC MUTE	0	TBC mute signal
26	CONT2	0	TBC operation selection: "H": Line mode, "L": Burst mode
27	PC OUT1	0	Forcibly accelerates/decelerates the spindle servo
28	PC OUT2	0	Spindle servo H servo error output
29	SPDL SW1	0	Spindle gain selection control signal 1 output
30	SPDL SW2	0	Spindle gain selection control signal 2 output
31	VDD	-	+5 V
32	SP GAIN	1	When "H" (Tracking off): PC OUT2 becomes hi-impedance
33	SP UNLOCK	0	When the spindle is not locked: Signal output set by the mechanical controller
34	SP OFF	0	Output for spindle motor stop
35	HP OUT	0	Spindle error signal hold pulse output (Outputs when track jump)
36	CDV	0	Spindle mode setting. CDV-V part "H"
37	FGMD	0	Spindle mode setting. FG mode "H"
38	JUMP	1	Track jump control signal (HP out gate)
39	SV CLK	0	Servo IC clock output 1/8 fsc
40	SET CK	0	Serial data transfer clock output to the servo IC

Pin No.	Pin Name	I/O	Function
41	SP PBHI	1	Spindle PBH input
42	SP PBHO	0	Spindle PBH output
43	SP RHI	1	Spindle REF H input
44	SP RHO	0	Spindle REF H output
45	SET CLK	1	Internal resistors A and B clock input
46	SET DT	1	Internal resistors A and B data input
47	CLS DT	0	CLV scanning V sync counter data read clock control input
48	CLS CS	1	CLV scanning V sync counter data read clock control input
49	CLT	1	Internal resistor C latch
50	BLT	1	Internal resistor B latch
51	ALT	1	Internal resistor A latch
52	VSS	-	GND
53	REF V	0	REF V sync output
54	PBV	0	PB V sync output
55	TBC HOLD	1	TBC mute control
56	SP LOCK	0	Spindle lock detection signal
57	JP CTL	1	Track jump selection signal. "H": ITJ, "L": MTJ
58	FQSEL	1	Frame No./Sub-Q data selection signal
59	FQACK	1	Frame No./Sub-Q data output control. "H": Data output
60	FREQ	0	Frame No. read OK
61	MRST	1	Reset signal input
62	FSC2	0	Clock to the mechanism controller
63	FH2	0	Clock to the mechanism controller
64	DSP SEL	1	Selection of communication with DSP
65	MECH CLK	1	Serial transfer clock
66	MECH SOI	1	Serial transfer data input
67	MFCCK SOI	0	Serial transfer data output
68	FOD OUT	0	Frame No./Sub-Q data output
69	MC SO LINE SEL	1	When "H": Communication between the mode controller and the mechanism
70	MMI TO MC CLK	1	Communication clock from the mode controller
71	MC SO	0	Transfer data to the mode controller
72	MC SI	1	Reception data to the mode controller
73	VDD	-	+5 V
74	SUBQ CLK	0	Sub-Q read out clock output
75	SUBQ	1	Sub-Q input
76	DSPCK	0	Serial data transfer clock output to DSP
77	FG START	1	FG count start signal input. When CLV disc starts to search
78	FG SEARCH	1	"H": When CLV disc search
79	PCSEL	-	N.C.
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)

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

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

7-4. SYSTEM CONTROL SYSTEM ADJUSTMENT

7-4-1. Microprocessor Clock Adjustment (MB-73 Board)

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

Adjustment method:

- 1) Adjust CT151 to 14,318,180 ± 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 (HVL-8: 8-797-008-00)/LD YEDS-18 (3-702-101-01) or an equivalent/CD
- Eccentric screwdriver 4 φ (J-6095-029-A)

* Insert the terminal of MD adjusting cable to CN702 on the MB-73 board.

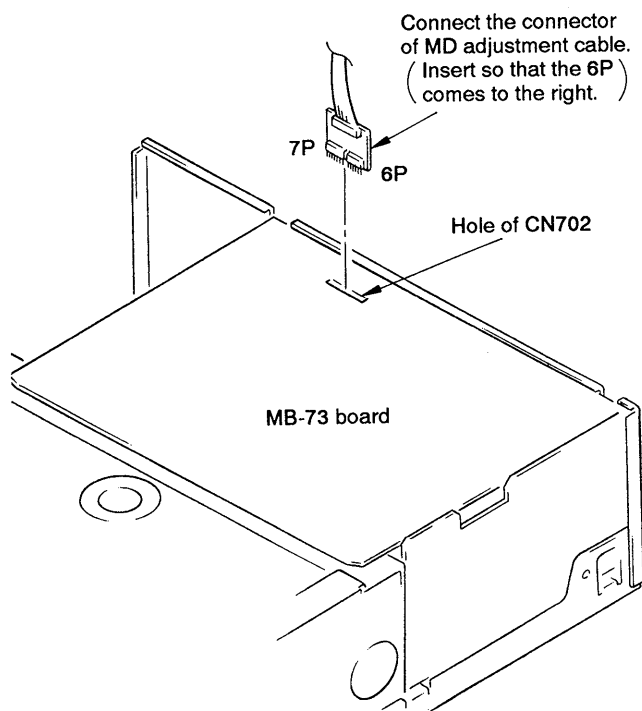


Fig. 7-1.

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 see if the waveform shown below again.

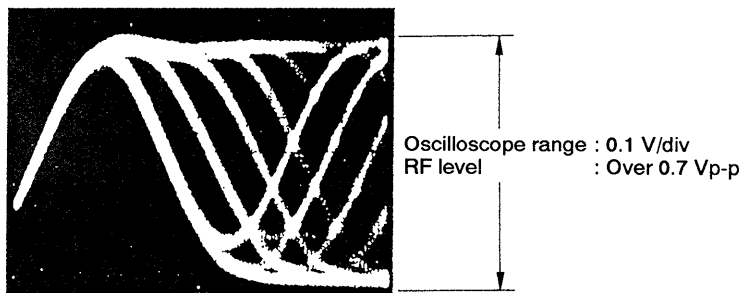


Fig. 7-2.

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

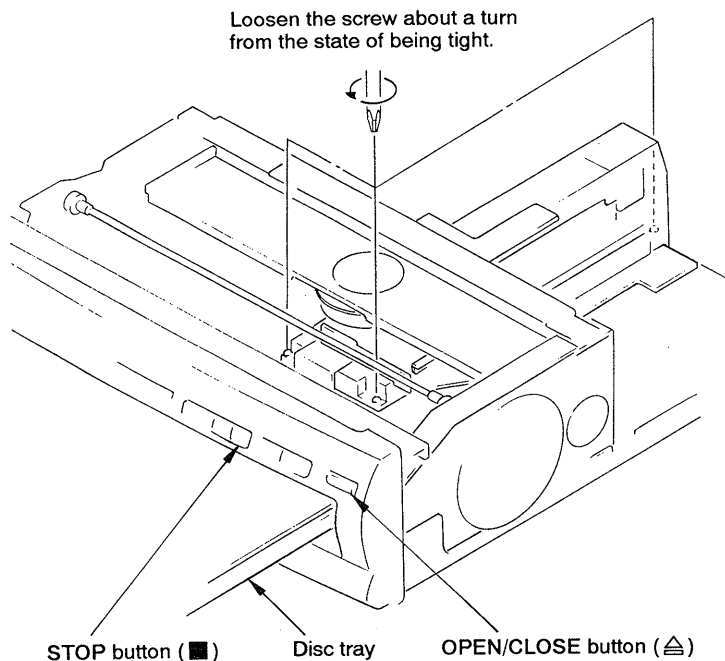


Fig. 7-3.

- ⑥ Loosen three screws on the spindle motor.

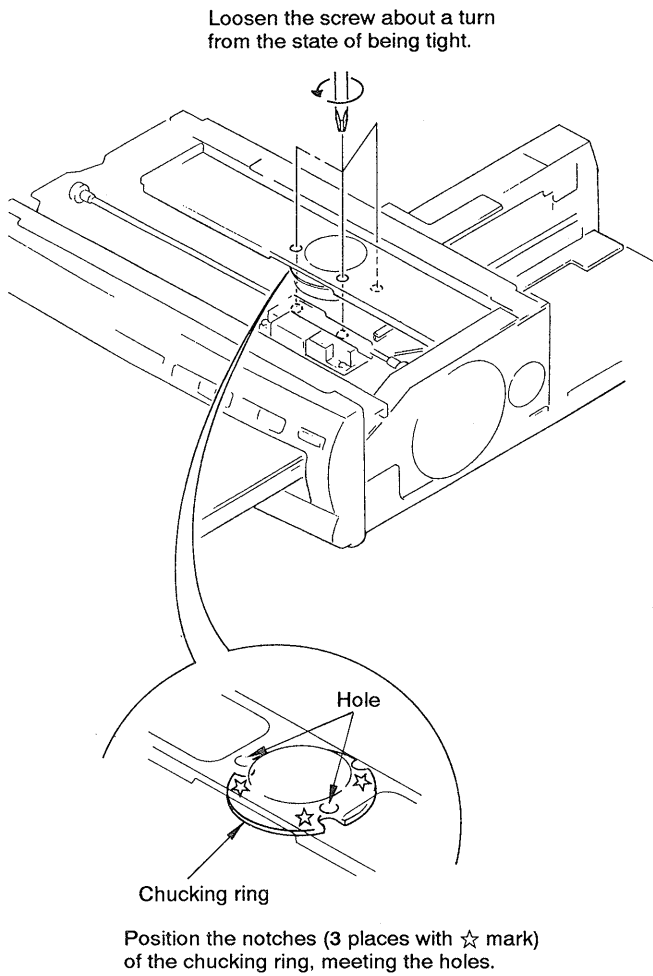
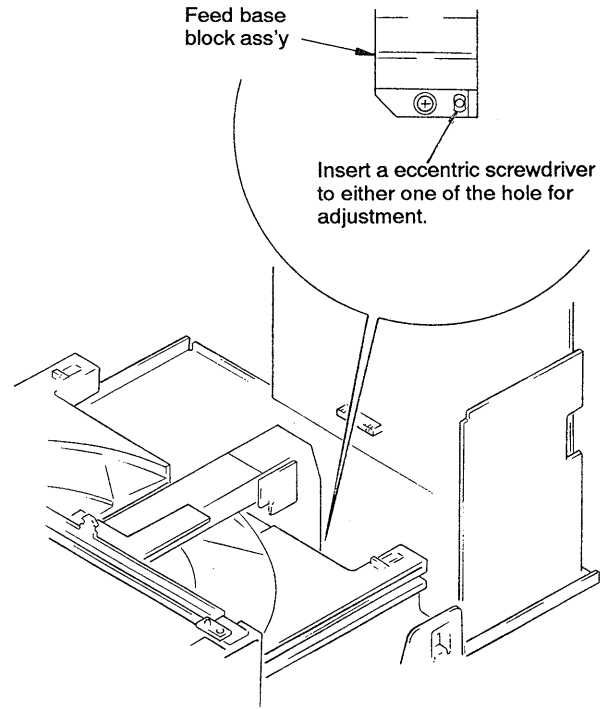


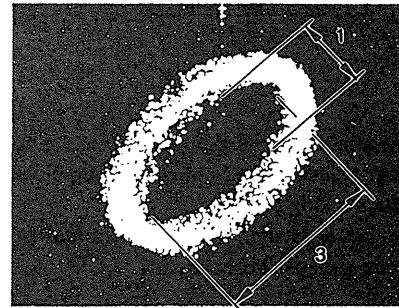
Fig. 7-4.

- 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 : Within 1 : 3

Before adjustment



↓ Make the figure straight.

After adjustment

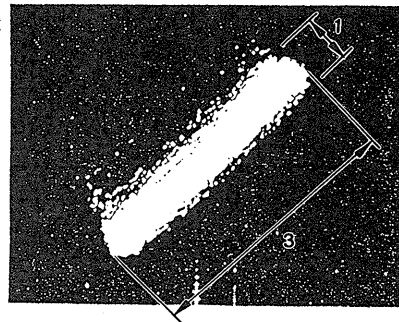


Fig. 7-5.

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.

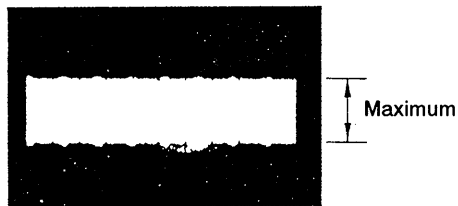


Fig. 7-6.

- 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.

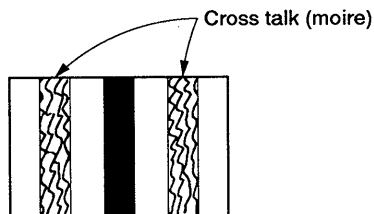
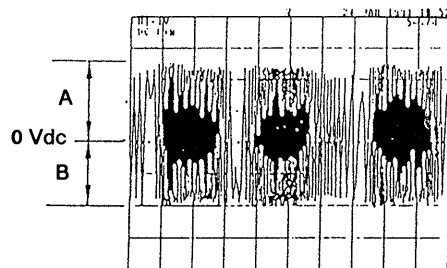


Fig. 7-7.

- 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

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

Fig. 7-8.

TRACKING BAL check

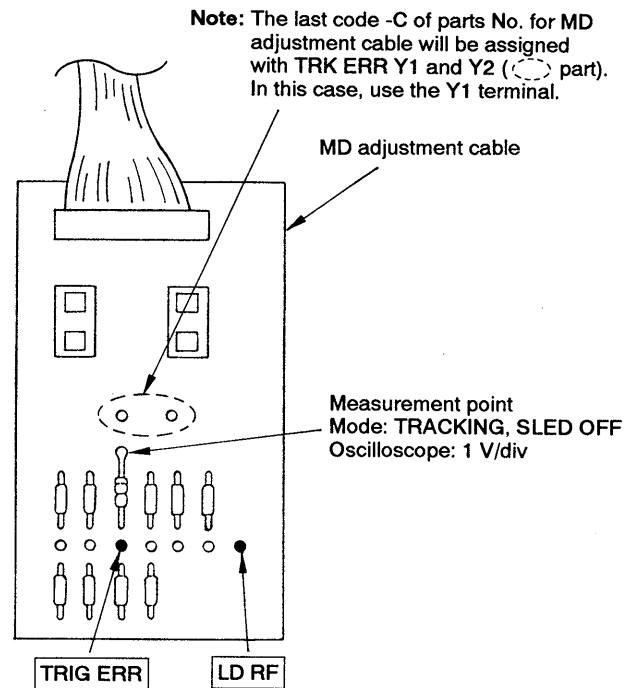
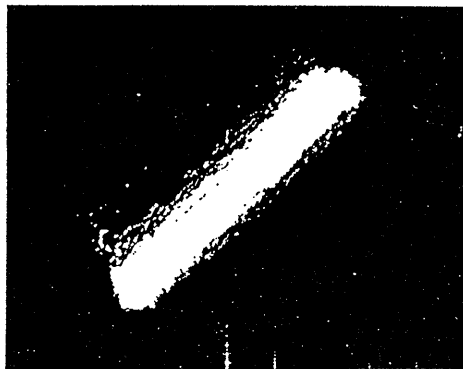


Fig. 7-9.

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 board 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 Lissajous waveform meets standard.



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

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.

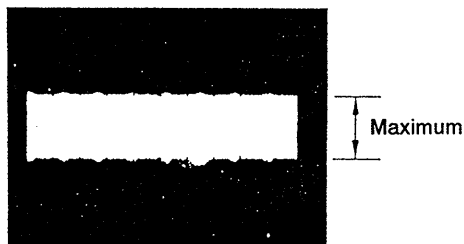


Fig. 7-11.

- 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.

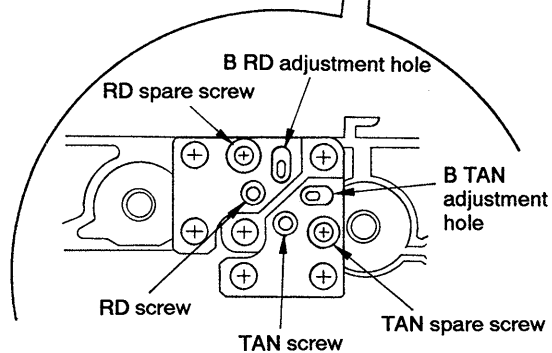
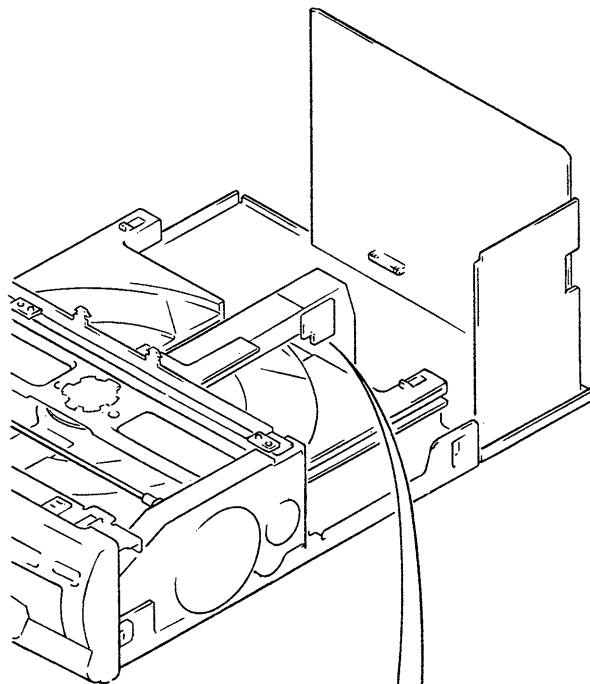


Fig. 7-12.

7-7. VIDEO SYSTEM ADJUSTMENT

7-7-1. LD Output Level Adjustment (MB-73 Board)

Mode	Still
Signal	LD reference disc HLV-8 Frame No. 4100 (Color bar)
Measurement point	J001 (VIDEO LINE OUT 1 terminal) (Be sure to terminate at 75 Ω)
Measuring equipment	Oscilloscope
Adjusting element	RV101
Specified value	1.00 ± 0.02 Vp-p

Adjusting method:

- 1) Press the still (STILL: ◀|||) button on remote commander.
- 2) Search the frame 4100 and apply a color bar signal.
- 3) Adjust RV101 to be 1.00 ± 0.02 Vp-p.

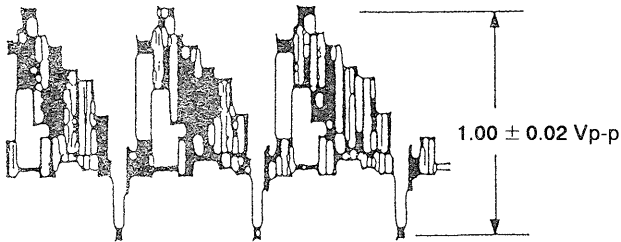


Fig. 7-13.

7-7-2. Video Clock Adjustment (VX-702 Board)

Mode	Stop (State of the equipped video CD disc)
Measurement point	Pin ① of IC106
Measuring equipment	Frequency counter
Adjusting element	CT101 (NTSC) CT102 (PAL)
Specified value	NTSC : $3,579,545 \pm 10$ Hz PAL : $4,433,618 \pm 10$ Hz

Adjusting method:

- 1) Put a video CD test disc (HLV-401) or a video CD disc on the market.
- 2) Set the COLOR SYSTEM switch (S101) to NTSC. (E model)
- 3) Adjust CT101 to be $3,579,545 \pm 10$ Hz.
- 4) Set the COLOR SYSTEM switch (S101) to PAL. (E model)
- 5) Adjust CT102 to be $4,433,618 \pm 10$ Hz. (E model)

Note: This selector can be set only when the power is turned off.

7-7-3. Video CD Output Level Adjustment (VX-702 Board)

Mode	Still
Signal	Video CD test disc HLV-401 Track No. 41 (White 100%)
Measurement point	J001 (VIDEO LINE OUT 1 terminal) (Be sure to terminate at 75 Ω)
Measuring equipment	Oscilloscope
Adjusting element	RV102
Specified value	1.00 ± 0.02 Vp-p

Adjusting method:

- 1) Press the still (STILL: ◀|||) button on remote commander.
- 2) Search the track 41 and apply a white 100% picture signal.
- 3) Adjust RV102 to be 1.00 ± 0.02 Vp-p.

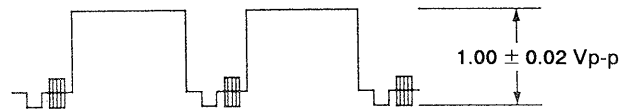
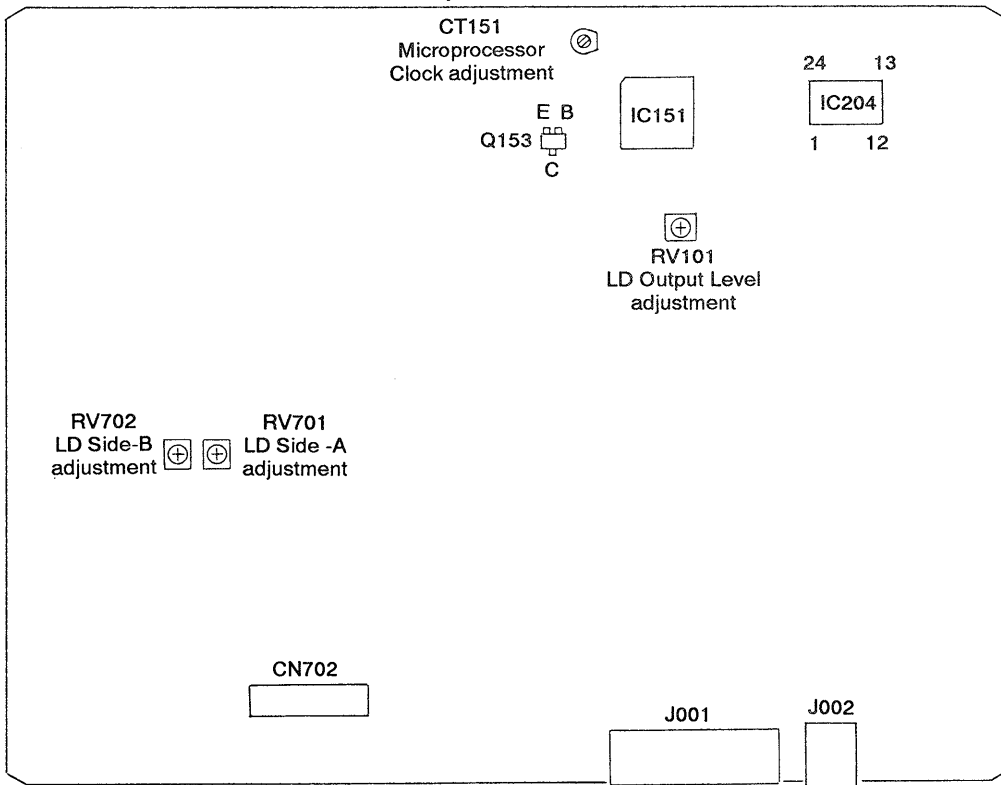


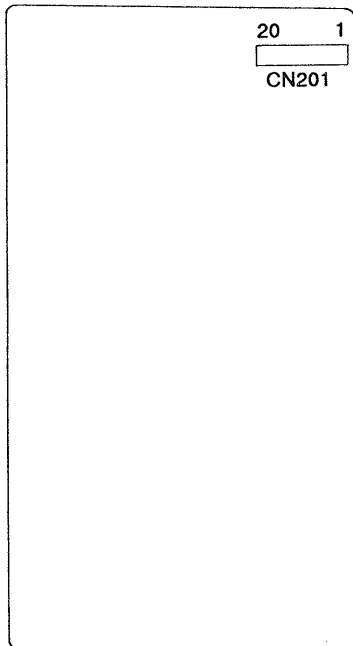
Fig. 7-14.

7-8. ARRANGEMENT DIAGRAM FOR ADJUSTMENT PARTS

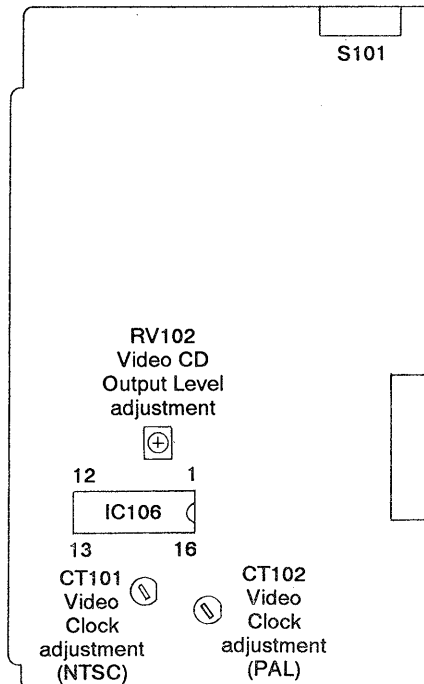
MB-73 BOARD (COMPONENT SIDE)



POWER BLOCK (COMPONENT SIDE)



VX-702 BOARD (COMPONENT SIDE)



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-73 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

- Connect an oscilloscope to the LD RF terminal of jig.
- Load the CD test disc (YEDS-18).
- Press the  button to activate the play mode.
- At this time, check if the RF waveform level is over 0.7 V.
- When the RF waveform level is over 0.7 V, go to "8-3. Tracking Level/Tracking Balance Check".
- If the RF waveform level is below 0.7 V, clean the lens using the lens cleaning kit.
- 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

- Connect an oscilloscope to the TRK ERR Y terminal of jig.
- Unload the CD test disc (YEDS-18), and load the LD reference disc (HLV-8) instead.
- Press the  button to activate the play mode, and play the chapter 3.
- After playing, please 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: 3 V 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

- 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.)
- Adjust the RV701 and RV702 on the MB-73 board so that the crosstalk becomes best condition (no moire observed).
- At this time, if the RV701 and RV702 rotated more than the angle shown in Fig. 8-1 (normally, the rotation angle is within $\pm 45^\circ$ 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.

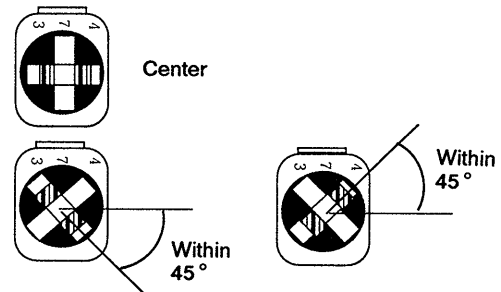


Fig. 8-1.

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.

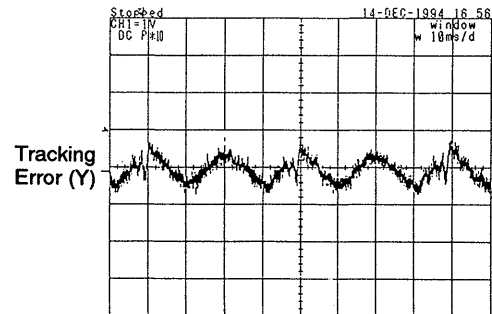


Fig. 8-2. Play Mode

SECTION 9

INSTRUCTION MANUAL FOR SPECIAL FUNCTIONS

Introduction

The MDP-V1 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.

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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 FL 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 [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 [0] key and then the [8] key of the remote control while pressing the [STOP] key of the unit. And the FL tube will be off while debug commands are effective.

So as to invalid the debugging commands at the debugging mode, press the [0] key and then [9] key of the remote control while pressing the [STOP] key of the unit. The FL tube will be on while debugging commands are not effective.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4		
1st line																									S T O P	
2nd line	V	E	R																							
3rd line	M	M	I	-	9	0	5	A		0	1	/	1	2	A											
4th line																										
5th line	V	F	D	-	9	0	5	A		1	2	/	2	1	A											
6th line																										
7th line	M	C	M	-	9	0	5	A		9	5	1	2		2	5	A	0								
8th line																										
9th line	M	I	C	-	1	6	J	U	L	9	5	/														
10th line																										

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. 9-1. (Microprocessor Version Screen).

Pressing this key as described in step 2-1 will also return the normal mode.

2-3. Switching the screen Display

When the debug mode is set, the screen will display the "Debug Screen".

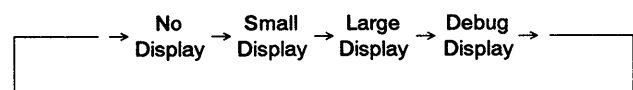
Press the [DISPLAY] key will switch it to the display format as in the normal mode.

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 FL 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.

At the same time, displays the c-cube microprocessor cord 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.

The microprocessor cord version is displayed at the ninth line.

According to the example in Fig. 9-2, the mode controller version is “MMI-905A 01/12A”, the VFD controller version is “VFD-905A 12/21A”, the mechanism controller version is “MCM-905A 9512 25A0”, and the microprocessor cord version is “16JUL95”.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4			
1st line																										S T O P	
2nd line	V	E	R																								
3rd line	M	M	I	-	9	0	5	A		0	1	/	1	2	A												
4th line																											
5th line	V	F	D	-	9	0	5	A		1	2	/	2	1	A												
6th line																											
7th line	M	C	M	-	9	0	5	A		9	5	1	2		2	5	A	0									
8th line																											
9th line	M	I	C	-	1	6	J	U	L	9	5	/															
10th line																											

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 first 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”.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4			
1st line																										S T O P	
2nd line	F	M																									
3rd line					0	1	2	0		3	0	F	E		5	0	6	0		7	0	6	0				
4th line					2	0	F	F		0	0	0	0		0	0	0	0		0	0	0	0				
5th line					0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0				
6th line																											
7th line																											
8th line																											
9th line																											
10th line																											

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 ×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 ×1 speed playback		
89	Normal direction ×2 speed playback		
8A	Normal direction ×3 speed playback		
8B	Normal direction ×5 speed playback		
8C	Normal direction ×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 ×1 speed playback		
99	Reverse direction ×2 speed playback		
9A	Reverse direction ×3 speed playback		
9B	Reverse direction ×5 speed playback		
9C	Reverse direction ×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.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4			
1st line																								S	T	O	P
2nd line	E	M	G								H	I	S	T													
3rd line					6	0	7	4			6	4	6	1		6	4	6	4		7	4	F	F			
4th line					0	0	0	0			0	0	0	0		0	0	0	0		0	0	0	0			
5th line																											
6th line																											
7th line																											
8th line																											
9th line																											
10th line																											

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 Apart 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
80	(The following emergencies occurred inside the mode controller.) 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.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	
1st line																									S T O P
2nd line	S	E	R	V	I	C	E																		
3rd line		(00)	(01)	(02)	(03)	(04)	(05)	(06)	(07)																
4th line		(08)	(09)	(10)	(11)	(12)	(13)	(14)	(15)																
5th line		(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)																
6th line																									
7th line																									
8th line																									
9th line																									
10th line																									

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 serach 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 serach
51	Frame/time serach
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.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4				
1st line	S T O P																											
2nd line	T	R	A	P											F	L	A	G										
3rd line											A	0	8	0											5	0	0	0
4th line																												
5th line																												
6th line																												
7th line																												
8th line																												
9th line																												
10th line																												

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.

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4		
1st line	S T O P																									
2nd line	K	E	Y	-	R	M	C																			
3rd line											1	A	F	F												
4th line																										
5th line																										
6th line																										
7th line																										
8th line																										
9th line																										
10th line																										

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 SIRCS code used by MDP-V1.

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	0
0C	Frame/time
0F	Clear
15	Power ON/OFF
16	Tray open
17	Audio monitor
18	Stop
19	Instantaneous stop
1A	Playback
1E	Reverse direction low speed scan
1F	Normal direction low speed scan
28	Time display
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
3A	Screen display
40	Analog/CX
41	Shuffle
45	Auto program
47	1/one side/both side
5D	Side A
5E	Side B
(The following are expansion codes)	
A9	Marker setting
AA	Marker call
AB	PBC return
AC	PBC selection
AE	Normal direction V index
AF	Reverse direction V index
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.

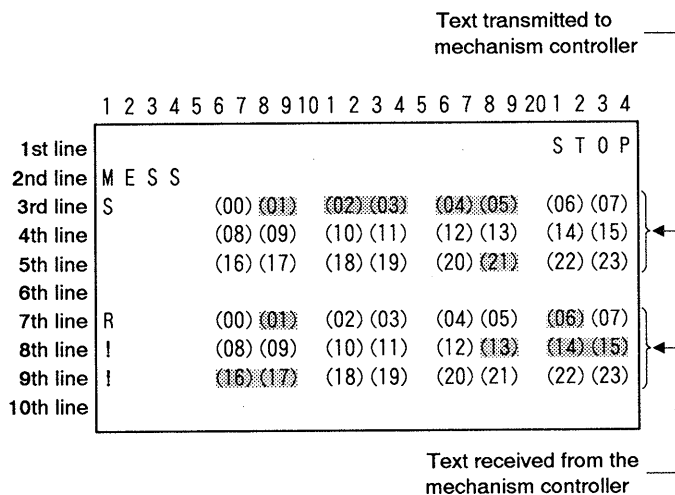


Fig. 9-8. Information communicated with Mechanism Controller

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/frme)

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.

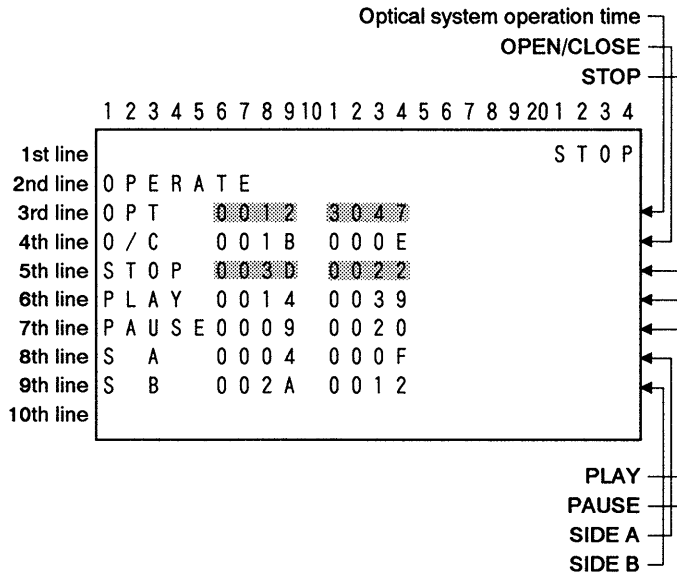


Fig. 9-9. Operation Information

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=34times.

• 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: $3 \times 16 + 13 = 61$ Decimal
 3 D Hexadecimal
 ACh: $10 \times 16 + 12 = 72$ 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]+[10/0]+[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 [PBC] 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 [0] key and then the [8] key of the remote control while pressing the [STOP] key of the unit. And the FL tube will be off while debug commands are effective, and after the FL tube goes off, keys of the unit such as [PLAY] and [PAUSE] are pressed, the special functions in Table 9-10 can be performed.

The sled forwarding operations using [SIDE A] and [SIDE B] keys are performed only when the keys are being pressed.

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 FL tube is off, to stop special operations from being performed. So as to invalid the debugging commands at the debugging mode, press the [0] key and then [9] key of the remote control while pressing the [STOP] key of the unit. The FL 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
[Normal direction frame forwarding]	Tray aging start
[Reverse direction frame forwarding]	Sled aging start
[Repeat AB]	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 Reverse 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 ] Key Tray Aging Start

When the [Still/STEP ] 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 ] Key Sled Aging Start

When the [Still/STEP ] 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 function 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
<p>① <u>Forced power off</u> 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.</p>	PBC+[POWER]
<p>② <u>Forced reset</u> 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.</p>	[STOP]+[POWER]
<p>③ <u>MDP-V1 FLtube lighting up</u> When the power turns on automatically, all the segments of the FL tube will light up. Normal operations will be performed until the power is turned off. In such cases, the FL tube displays will remain lit.</p>	[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 commander 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
<p>① <u>Debug mode ON/OFF selection</u> The debug mode is set if it has not been set, and is exited when it is set.</p>	1 2	[STOP]+[0] [STOP]+[STOP]
<p>④ <u>Mechanism controller time-out invalidation</u> 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.</p>	1 2	[STOP]+[0] [STOP]+[>10]
<p>⑤ <u>Mechanism controller time-out validation</u> Validates the function which cuts off the power supply when communication with the mechanism controller cannot be performed. Used for exiting the ④ function.</p>	1 2	[STOP]+[0] [STOP]+[0]
<p>⑧ <u>EEPROM clear</u> All clears the data of the EEPROM debug mode. Valid only when the power is on.</p>	1 2	[STOP]+[0] [STOP]+[REPEAT]

第7章 调整方法

在调整时，请参阅7-8页调整元件的排列图。

7-1. 维修工具表

- 示波器
- 彩色监视电视
- 数字式电压表
- 频率计算器
- LD校正光碟HLV-8 (8-797-008-00) NTSC基准光碟8
- 视频CD测试光碟HLV-401 (4-978-510-01)

7-2. 调整时的预防措施

- 当维修机台时的位置为直立时，不可执行进碟/卸碟的操作，(切勿按下OPEN及CLOSE按钮(≡))。
- 当机台直立置放时，执行调整时左边应朝下，同时把电源接通。
- 调整伺服系统时，须确定机台为横向置放。

7-3. 电源组件的检查

7-3-1. 检查电源供应 (电源组件)

状态	停止
测试仪器	数字式电压表
检查 UNREG +16V	
测试点	CN201的脚 ⑪ (脚 ⑬, GND)
规定值	15.7 ± 1.5V
检查 UNREG -16V	
测试点	CN201的脚 ⑮ (脚 ⑬, GND)
规定值	-16.0 ± 1.5V
检查 REG +5V	
测试点	CN201的脚 ③ (脚 ⑬, GND)
规定值	5 ± 0.3V
检查 REG -5V	
测试点	CN201的脚 ⑥ (脚 ⑬, GND)
规定值	-5 ± 0.3V
检查 EVER +5V	
测试点	CN201的脚 ① (脚 ⑬, GND)
规定值	5 ± 0.3V

- 确定电源电压符合各个规定值。

7-4. 系统控制的系统调整

7-4-1. 微处理器时钟的调整 (MB-73 电路板)

状态	停止
测试点	Q153的射极 (IC204的脚 ②)
测试仪器	频率计算器
调整元件	CT151
规定值	14,318,180 ± 40Hz

调整方法:

- 1) 调整CT151至14,318,180 Hz ± 40Hz。

7-5. 连接光拾音组件后的调整

7-5-1. 来具与工具

- 六角形板子 (切向螺丝起子: 7-700-766-04)
- 示波器
- MD调整电缆 (J-6082-059-B)
- 8号基准校正光碟 (HLV-8: 8-797-008-00)/LD YEDS-18 (3-702-101-01) 或相等的/CD
- 偏心螺丝起子 4φ (J-6095-029-A)
- * 把MD调整电缆插入MB-73电路板上的CN702插孔。

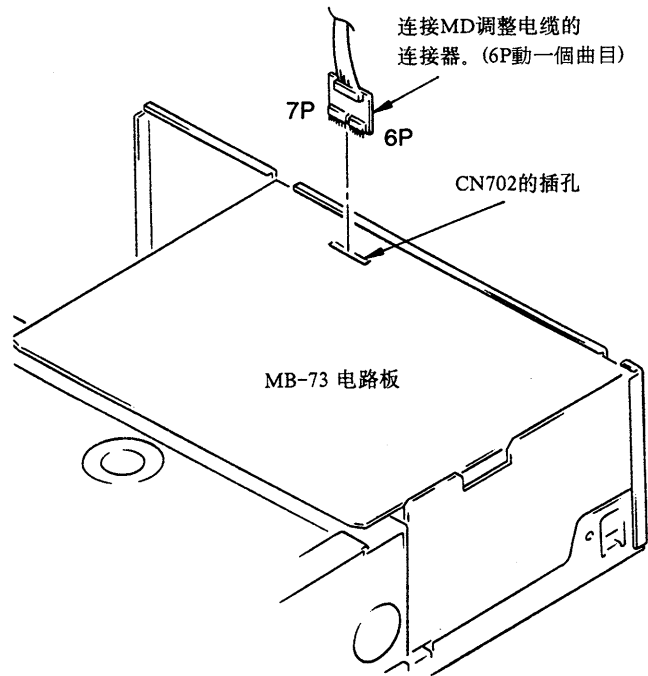


图 7-1.

- ③ 按STOP (■) 键使CD (YED-18) 停止播放。
- ④ 按OPEN/CLOSE (⊕) 键退出CD唱片托盘。
- ⑤ 松开馈电边组配件上的3根螺丝。

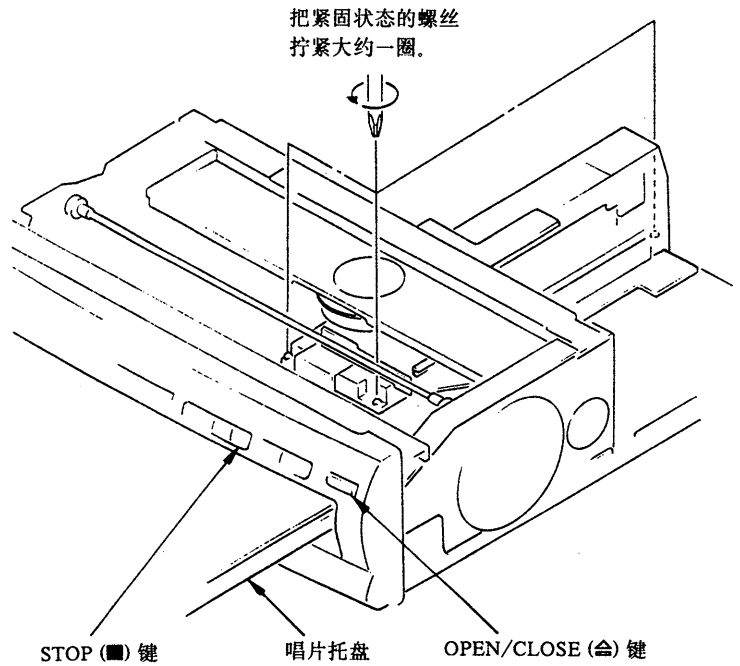


图 7-3.

7-5-2. CD的调整

- ① 重放CD校正光碟 (YEDS-18), 约3秒钟后按下 Pause (■) 按钮。
- ② 连接示波器至MD调整电缆的LD RF, 检查以下的波形是否再显现。

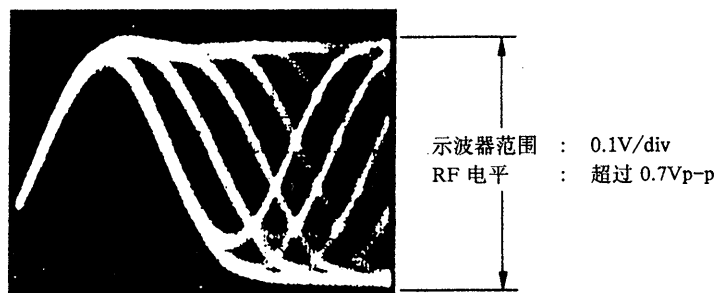


图 7-2.

⑥ 松开柱形马达上的3根螺丝。

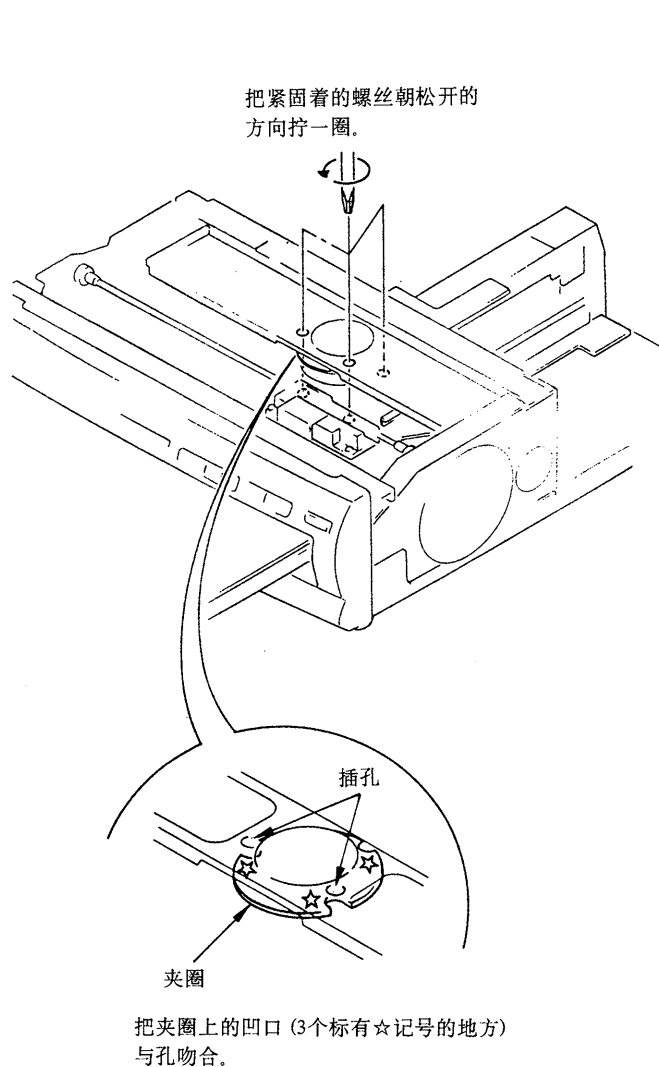
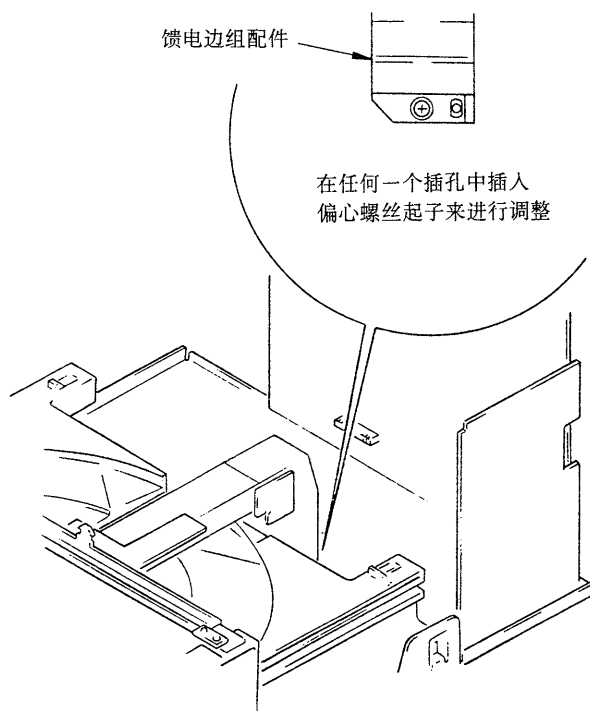


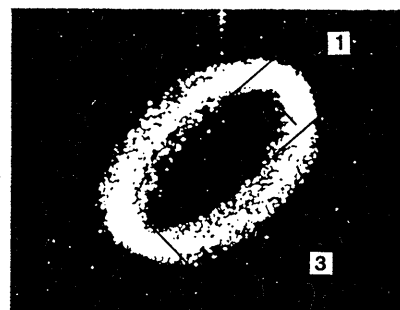
图 7-4.

- ⑦ 再播放CD (YEDS-18)。
- ⑧ 连接示波器至MD调整电缆的E和F端子，并关闭SLED和TRACKING开关。
- ⑨ 把偏心螺丝起子插入馈电边组配件进行RD调整。
- ⑩ 调整之后，打开SLED和TRACKING开关。
- ⑪ 取出CD (YEDS-18)，拧上柱形马达上的3根螺丝，再拧上馈电边组配件上的3根螺丝。



来具端 : E, F
 状态 : TRACKING, SLED OFF
 示波器 : X/Y 利萨如范围
 (个别为 20mV/div.)
 相位差 : 1:3 之内

调整前



↓ 使图案成为竖直

调整后

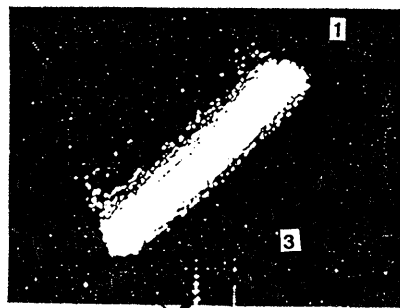


图 7-5.

7-6. 伺服系统的调整

7-6-1. LD的A面调整

- ① 把LD校正光碟HLV-8的CAV面放进机台的A面，然后播放。放在第3章 (#2201) 时暂停播放。
- ② 连接示波器至MD调整电缆的LD RF端子，调整RV701使波形处于TRAKING及SLED ON (接通) 状态时为最大。

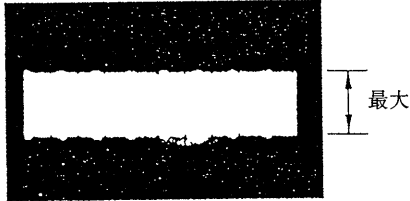


图 7-6.

- ③ 播放#770开暂停。
- ④ 检查显示在电视监视器上的垂直条及左右的串音 (波动光栅) 处于同电平开保持在最小。

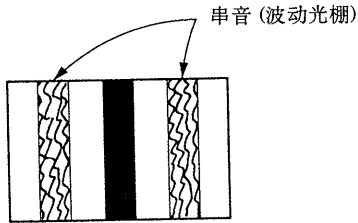
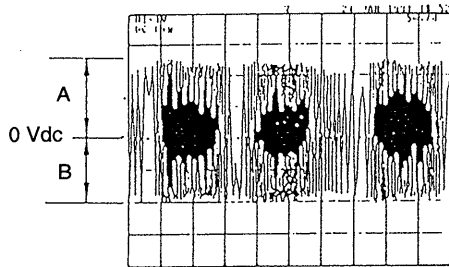


图 7-7.

- ⑤ 不需要调整跟踪增益及聚焦增益。
- 已在光拾音组件上调整 -
- ⑤ 检查跟踪平衡
用示波器的来具测量TRAKING ERR的Y端子的电阻。



检查是否符合

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

图 7-8.

TRACKING BAL 的检查

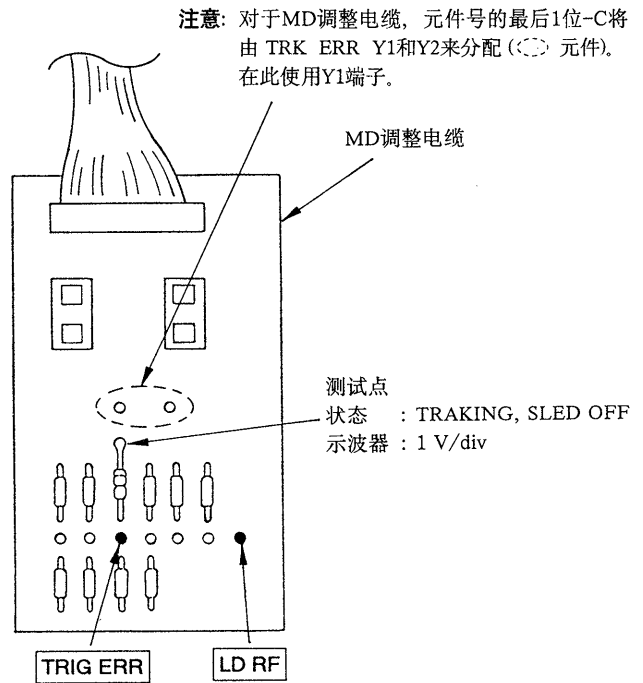
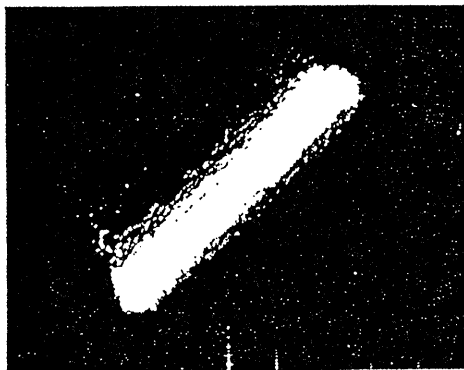


图 7-9.

7-6-2. LD的B面调整

- ① 松开馈电边的B面RD螺钉及TAN螺钉（六角形螺钉2.6）。
- ② 把LD校正光碟（HLV-8）的CAV面放进B面，然后播放并在第3章（#2201）时暂停播放。
- ③ 把SLED及TRACKING断开，插入偏心螺钉起子至B RD调整孔进行调整，使利萨如波形达到标准。



来具端 : E, F
 状态 : TRACKING, SLED OFF
 示波器 : X/Y 利萨如范围
 (个别为 20mV/div.)
 相位差 : 1:3 之内

图 7-10.

- ④ 连接示波器至MD调整电缆的LD RF端子，然后调整RV702，使波形处于TRACKING及SLED ON状态时成为最大。



图 7-11.

- ⑤ 把偏心螺钉起子插入B TAN调整孔并调整RF波形至最大，如步骤4所列。
- ⑥ 播放#770并暂停。
 这情况和 A 面相同，检查显现在电视监视器上的垂直条及左右串音（波动光栅）处于同电平并保持在最大。
- ⑦ 取出光碟并拧紧B TAN及RD螺钉。

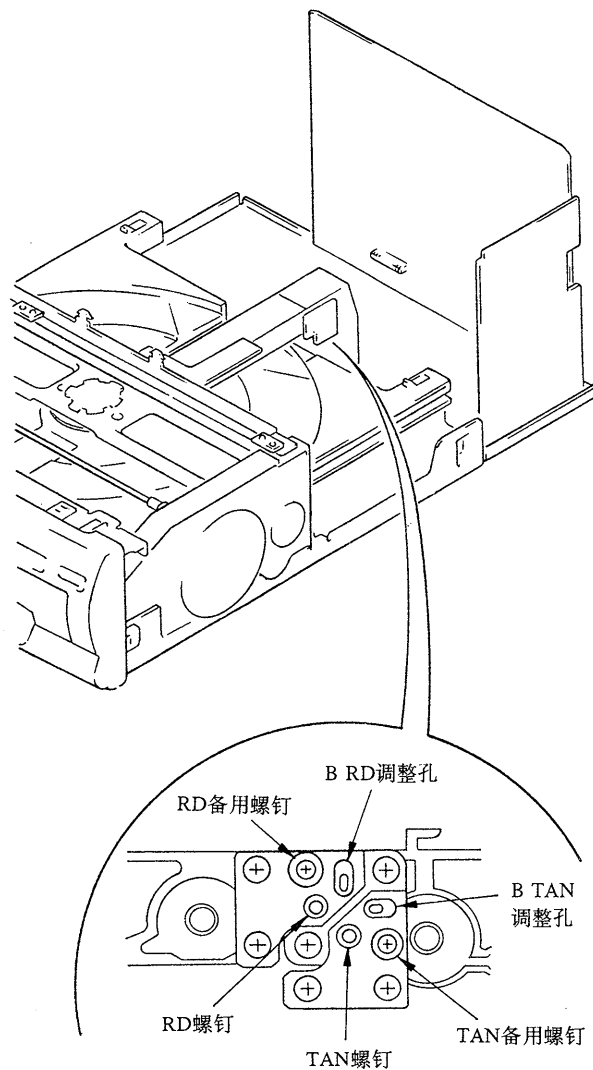


图 7-12.

7-7. 视频系统的调整

7-7-1. LD输出电平的调整 (MB-73电路板)

状态	静止
信号	LD标准光碟 HLV-8 帧4100 (彩条)
测试点	J001 (VIDEO LINE OUT 1 端子) (须确保终接在75 Ω)
测试仪器	示波器
调整元件	RV101
规定值	1.00 ± 0.02 Vp-p

调整方法:

- 1) 按下遥控器上的静止 (STILL: ◀||) 键。
- 2) 搜寻帧4100并加上彩条信号。
- 3) 调整RV101至 1.0 ± 0.02 Vp-p。

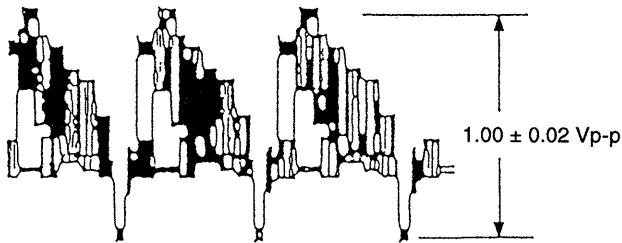


图 7-13.

7-7-3. 视频CD输出电平的调整 (VX-702电路板)

状态	静止
信号	视频CD测试光碟 (HLV-401) 轨道 No.41 (100% 白色)
测试点	J001 (VIDEO LINE OUT 1 端子) (须确保终接在75 Ω)
测试仪器	示波器
调整元件	RV102
规定值	1.00 ± 0.02 Vp-p

调整方法:

- 1) 按下遥控器上的静止 (STILL: ◀||) 键。
- 2) 搜寻轨道41并加上100%白色的图案信号。
- 3) 调整RV102至 1.00 ± 0.02 Vp-p。

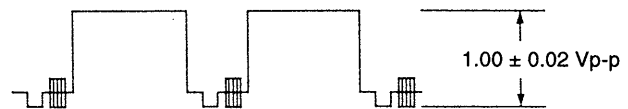


图 7-14.

7-7-2. 视频时钟的调整 (VX-702电路板)

状态	停止 (处于装配好视频CD光碟的状态)
测试点	IC106 的脚 ①
测试仪器	频率计算器
调整元件	CT101 (NTSC) CT102 (PAL)
规定值	NTSC : $3,579,545 \text{ Hz} \pm 10 \text{ Hz}$ PAL : $4,433,618 \text{ Hz} \pm 10 \text{ Hz}$

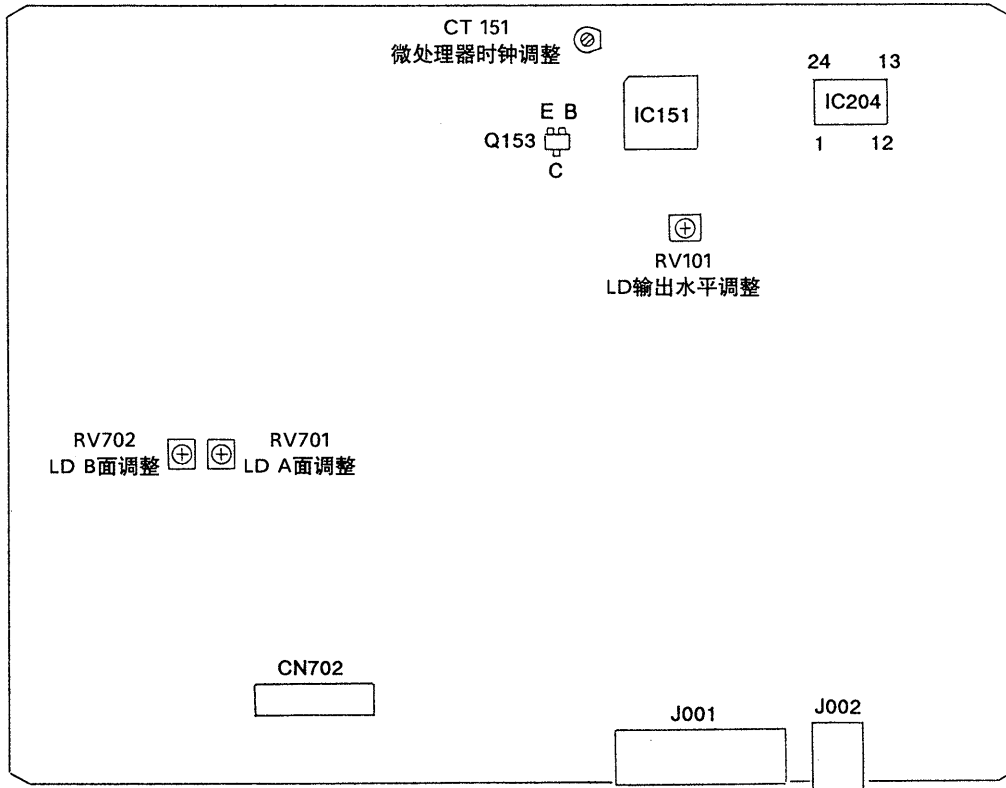
调整方法:

- 1) 放入视频CD测试光碟 (HLV-401) 或市场上购买的视频CD光碟。
- 2) 设置彩色系统 (COLOR SYSTEM) 开关 (S101) 至NTSC. (E型号)
- 3) 调整CT101为 $3,579,545 \pm 10 \text{ Hz}$ 。
- 4) 设置彩色系统 (COLOR SYSTEM) 开关 (S101) 至PAL. (E型号)
- 5) 调整CT102 $4,433,618 \pm 10 \text{ Hz}$ 。(E型号)

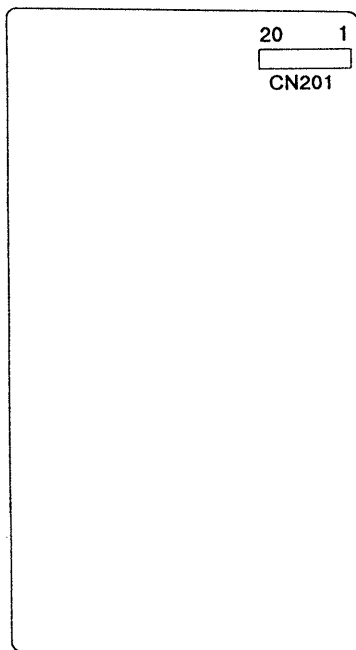
注意: 此选择开关只能在电源关闭时使用。

7-8. 调整元件的排列图

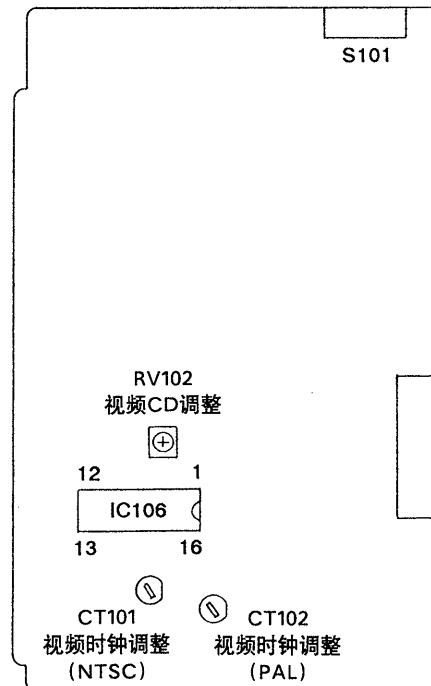
MB-73 电路图 (元件面)



电源板 (元件面)



VX-702 电路板 (元件面)



第8章


光拾音组件 (KHS-150A) 的性能评估

- 为了确认光拾音组件 (KHS-150A) 是否良好, 请按下述内容进行检测。


8-1. 准备

把夹具 (J-6082-059-B) 接到 MB-73 电路板上的 CN702 上。(详细的连接方法请参照 7-2 页上的图 7-1, 有关夹具请参照 7-4 页上的图 7-9。)

8-2. RF 水平检测

1. 连接示波器至夹具的 LD RF 端子。
2. 放入 CD 测试光碟 (YEDS-18)。
3. 按下  键起启动播放方式。
4. 此时请检查 RF 波形水平是否超过 0.7V。
5. 当 RF 波形水平超过 0.7V 时, 请进入 “8-3. 的跟踪水平和跟踪平衡的检测”。
6. 当 RF 波形水平低于 0.7V 时, 用镜片清洁用具清洁镜片。
7. 在镜片完全干燥之后, 再检查 RF 波形水平。如果 RF 的水平依然低于 0.7V 时, 说明光拾音组件中的激光二极管已经老化, 或者是内部镜片变脏。此种情况下, 请更换光拾音组件。

8-3. 跟踪水平/跟踪平衡检测

1. 连接示波器至夹具的 TRK ERR Y 端子。
2. 取出 CD 测试光碟 (YEDS-18), 放入 LD 校正光碟 (HLV-8)。
3. 按下  键起启动播放方式, 并播放第 3 段。
4. 播放之后, 设置光碟于静止状态。此时, 监视示波器上的跟踪出错波形以检测水平和平衡是否满足下列特性指数。

特性指数
水平: 3V 以上
平衡: -6% 至 +9%

注意: 平衡的计算方法, 请参照 7-4 页上的图 7-8。

8-4. 串音检测

1. 播放 LD 校正光碟 (HLV-8) 的 CAV 面以检测在 770 幅的串音。
(详细说明请参照 7-4 页上的 7-3-1. 节 LD 的 A 面调整。)
2. 调整 MB-73 电路板是的 RV701 和 RV702 以使串音处于最佳状态 (不出现波动光栅)。
3. 此时, 如果 RV701 和 RV702 的调整角度大于图 8-1. 所示的角度时, (通常调整角度在以中心为基准的 $\pm 45^\circ$ 之内), 拾音组件的置 (弹簧) 已经变形。在此种情况下播放 LD 时, 附近可能会出现外沿部分有抖动情况的图象。请更换光拾音组件。

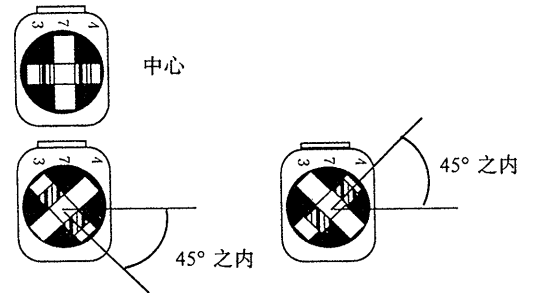


图 8-1.

注意:

- 在实行上述操作时, 如果夹具的每一个端子都没有输出信号的话, 激光二极管将被老化。如果在对焦时镜头中没有产生红色射线时, 请更换光拾音组件。
- 上述检测基本上使用校正光碟, 如果无特殊错误被发现, 只可能是使用者的光碟上有错。尤其是 LD 的情况, 如果图 8-2 所示的波动的跟踪出错出现时, 拾音组件产生了共振。请更换新的

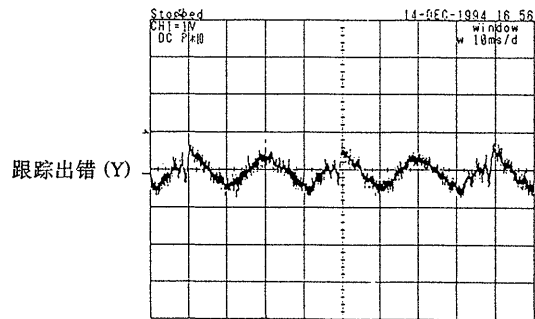


图 8-2. 播放方式




第9章 特别功能的说明书

引言

为了方便保养及修理工作，MDP-V1除了拥有一些特别功能外，还外加了一些特别功能，本说明书里，这些功能可分为三部分："调试状态"，"维修状态"及"扩展按键状态"并加以解释。

本说明书的规格若有变更之处，恕不另行通知。

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1. 概述

1-1. 调试状态

调试状态提供在显示屏上显示微处理器的只读记忆 (RAM) 的数据的功能 (调试功能)。

此状态与普通状态的不同点如下:

- 1) 当此状态的指令有效时, FL管关闭。
- 2) 在状态 1) 时, 按遥控器上的键, 调试资料如过去的紧急事故等都可以显示出来。在这时候, 只有一些键是有效的。

1-2. 维修状态

维修状态提供维修与检查的功能 (维修功能)。

此状态与普通状态的不同点如下:

- 1) 可以执行特别的操作功能如聚焦搜索, 滑板速进等。
- 2) 当发生会引起断开电源的紧急事故时, 电源将不会自动断开。
- 3) 当调整至此状态时, 会同时自动调整至调试状态。

1-3. 扩展按键功能

"扩展按键功能" 是根据一套程序, 同时按机台或者遥控器的几个键来操作测试等等。

此功能能够用在维修状态, 调试状态和普通操作。

此功能包括使用同时按下机台的几个键的 "同时按机台键功能" 和使用同时机台与遥控器上的一个键两次的 "同时按机台键+遥控器键的功能"。

2. 调试状态

2-1. 调试状态的设定

为了从普通方式 (通常状态) 设置到调试方式, 请在电源开状态下, 按下本机上的 [STOP] 键时, 按遥控器上的 [0] 键, 再按下遥控器上的 [STOP] 键。

下列屏幕将会被显示。

这屏幕显示微处理器的版本。详细说明请参阅 "2-4-1. 微处理器版本"。

为了要使调试命令在调试方式下生效时, 在按下本机上的 [STOP] 键的同时, 按下遥控器上的 [0] 键, 再按下遥控器上的 [8] 键。当调试命令有效时, FL管道将被关闭。

同样, 要使调试命令在调试方式下无效时, 在按下本机上的 [STOP] 键的同时, 按下遥控器上的 [0] 键, 再按下遥控器上的 [9] 键。当调试命令无效时, FL管道将被开放。

```
1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4
第1行                               S T O P
第2行 V E R
第3行 M M I - 9 0 5 A   0 1 / 1 2 A
第4行
第5行 V F D - 9 0 5 A   1 2 / 2 1 A
第6行
第7行 M C M -   9 0 5 A   9 5 1 2   2 5 A 0
第8行
第9行 M I C -   1 6 J U L 9 5 /
第10行
```

图 9-1. 调试状态最初屏幕

2-2. 离开调试状态

要从调试状态回到普通状态, 请在如图9-1 (微处理器版本屏幕) 显示时, 按下遥控器的 [CLEAR] 键。

如步骤2-1所述, 按下此键也会回复到普通状态。

在普通状态时, 此键将只执行原来的功能。

2-3. 转换屏幕的显示

当调整至调试状态时, 屏幕将出现 "调试屏幕"。按下 [DISPLAY] 键将转换至普通状态的显示格式。

在调试状态时, 你可以选择 "无显示屏" (通常不显示任何东西), "小显示屏" (只显示第1行), "大显示屏" (显示整个屏幕) 和 "调试显示屏"。

在普通状态时, 按 [DISPLAY] 键, 显示屏将会转换如下:

→ 无显示屏 → 小显示屏 → 大显示屏 →

在调试状态时, 它将会转换如下:

→ 无显示屏 → 小显示屏 → 大显示屏 → 调试显示屏 →

2-4. 阅读调试显示屏

"调试显示屏"从倾卸表格式 (dump list format) 展示状态控制器的资料。

显示屏左边第2行显示的是标题，而第3至第9行则显示数据。数据的展示格式基本上是四个十六进制数 (两个二进制组) (2bytes) 等于一组，而一行最多包括四组 (八个二进制组) (8bytes)。

当FL管在 "调试显示屏" 为关闭时，按下某些键将可以选择要展示的资料。

已被定义的资料如下：

表9-1. 调试显示屏键/资料表

键	展示资料
[FRAME/TIME]	微处理器版本
[1]	功能状态的过去事故
[2]	过去的紧急事故
[3]	普通维修状态的资料
[4]	陷阱标记
[5]	键/遥控数据
[7]	与机械装置控制器通讯的资料
[REPEAT]	操作资料

2-4-1. [FRAME/TIME]微处理器版本

展示微处理器的版本。

同时展示C-立方微处理器的组合版本。

第3行显示状态控制器的版本，第5行显示VFD控制器的版本，而第7行显示机械控制器的版本。

微处理器的组合版本显示在第9行。

根据图8-2的例子，状态控制器的版本是 "MMI-905A 01/12A"，VFD控制器的版本是 "VFD-905A 12/21A"，机械控制器的版本是 "MCM-905A 951225A"，而微处理器的组合版本是 "16JUL95"。

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	
第1行																									S T O P
第2行	V	E	R																						
第3行	M	M	I	-	9	0	5	A		0	1	/	1	2	A										
第4行																									
第5行	V	F	D	-	9	0	5	A		1	2	/	2	1	A										
第6行																									
第7行	M	C	M	-	9	0	5	A		9	5	1	2		2	5	A	0							
第8行																									
第9行	M	I	C	-	1	6	J	U	L	9	5	/													
第10行																									

图 9-2. 微处理器版本

2-4-2. [1] 功能状态的过去事故

显示功能状态的过去事故。

功能状态是基本的操作指令，如STOP和PLAY，它们都是由状态控制器传送到机械控制器。

每个功能状态数据是一个二进制组 (两个十六进制数) (1byte)。一行可以储存八个最近的过去事故，三行可储存最多24个过去事故。数据是以二进制组来储存，从左到右。数据 (FF) 储存在最后数据的下一位。当数据到达第1行的最右边，它就储存在第2行最左边。当数据到达第3行的最右边，它就会再回到第1行的最左边。

现在 (最后储存) 的功能状态是数据 [FF] 左边的数据。当这数据 [FF] 在第1 (第2, 第3) 行的最左边时，这功能状态将会是第3 (第1, 第2) 行最右边的数据。

数据 [FE] 代表曾发生过的紧急事故。请参阅 "2-4-3. 过去的紧急事故" 来找出紧急事故的种类。

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	
第1行																									S T O P
第2行	F	M																							
第3行					0	1	2	0		3	0	F	E		5	0	6	0		7	0	6	0		
第4行					2	0	F	F		0	0	0	0		0	0	0	0		0	0	0	0		
第5行					0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
第6行																									
第7行																									
第8行																									
第9行																									
第10行																									

图 9-3. 功能状态的过去事故

以图9-3为例：

- 01 (电源ON启动)
- 20 (停止)
- 30 (A面准备重播)
- FE (发生紧急事故)
- 50 (章节搜寻)
- 60 (重播)
- 70 (普通方向低速扫描)
- 60 (重播)
- 20 (停止) (现在的功能状态)

功能状态以上列的次序更换。

下一页显示功能状态表。

2-4-3. [2] 过去的紧急事故

显示过去发生的紧急事故编码。

紧急事故编码是当机械控制器发生故障时，所传输至状态控制器的一个二进位组数据。

如[64(最低章节测定)]，一些编码只表示状态编码的电平，所有[80]以上的编码是由状态控制器本身所发出，并非由机械控制器所传送。

如果接通电源之后就不曾发生紧急事故，所有数据将会是 [00]。

显示的格式与功能状态的过去记录相同。十六组分别储存在两条线。在数据[FF]之前的紧急事故编码与数据[FE]对应，并且在功能状态的过去记录里与数据[FF]最为接近。

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4				
第1行																									S	T	O	P
第2行	E	M	G	H	I	S	T																					
第3行				6	0	7	4	6	4	6	1	6	4	6	4	7	4	F	F									
第4行				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
第5行																												
第6行																												
第7行																												
第8行																												
第9行																												
第10行																												

图 9-4. 紧急事故的过去记录

根据以上的例子，在[FF]之前是左边的60，并且紧急事故是以下列次序发生。

- 60 (读入测出)
- 74 (搜索聚焦下降)
- 64 (最低章节测定)
- 61 (读出测出)
- 64 (最低章节测定)
- 64 (最低章节测定)
- 74 (搜索聚焦下降) (最近的紧急事故)

下页显示紧急事故编码表。

表9-3. 紧急事故编码表

号码	状态	结果
01	强制切断电源	电源切断
02	强制托盘弹出	弹出
03	要求停止	停止
04	在强制开门后要求停止	停止
05	要求放像	放像
06	电源切断, 要求改变结束	电源切断显示固定
07	在通信停止后, 要求切断电源	电源切断
08	正门不移动	电源切断
09	门开当托盘打开	电源切断
10	托盘推进探测	放像
11	托盘不移动	电源切断
20	滑板不滑动	电源切断
30	TILT不移动	电源切断
31	TILT不移动, 计数器测量进行	无
40	FG轴探测删除	电源切断
41	由FG到H伺服无传送	停止
42	进行上限速度	停止
43	进行下限速度	停止
44	轴不终结停止运转	电源切断
45	轴控制暂停	电源切断
50	没有进行聚焦	停止
51	没有进行聚焦(碟存在)	停止
52	测定无LD	无
53	8寸LD聚焦没有进行	停止
54	CD/CDC TOC不读	停止
60	读入测出	放像等
61	读出测出	停止/暂停等
62	CVD A部分读出测出	停止/暂停等
63	图象停止测出	静止
64	最低章节测定	无
65	CD/CDV子码不读	停止
66	LC菲力编码不读	停止
67	反锁定常轨进行	无
70	超搜索测出	放像
71	搜索不足测出	放像
72	搜索时间结束	放像
74	搜索聚焦下降	停止
76	在搜索聚焦下降后再试进行	无
80	(下列事故发生在状态控制器内) 事故暂停	电源切断
81	搜索暂停	放像
82	机械控制器通信暂停	电源切断
86	12V电源供应误差	拨开AC电源电线

2-4-4. [3] 机械结构控制器服务资料

显示由机械结构控制器传达的服务资料。

目前，表9-4的资料已定义。

表的数据号码与图9-5的第3至5行的数字符合。

表 9-4. 机械结构控制器服务资料

数据号码	数据
(02)	机械结构状态 (机械结构控制器内部状态) 详情参考下页。

	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4
第1行	S E R V I C E										S T O P													
第2行																								
第3行	(0 0)	(0 1)	(0 2)	(0 3)	(0 4)	(0 5)	(0 6)	(0 7)																
第4行	(0 8)	(0 9)	(1 0)	(1 1)	(1 2)	(1 3)	(1 4)	(1 5)																
第5行	(1 6)	(1 7)	(1 8)	(1 9)	(2 0)	(2 1)	(2 2)	(2 3)																
第6行																								
第7行																								
第8行																								
第9行																								
第10行																								

图 9-5. 机械结构控制器服务资料

机械结构状态

机械结构状态在机械结构控制器内是基本的作业状态，编码大致上与功能状态一样，但比功能状态分得更详细。

下列是机械结构状态表。

表 9-5. 机械结构状态表

号码	功能
00	切断电源
01	机械结构控制器起始 (无机械操作)
03	由接通电源到切断的过程
04	由电源切断到接通的过程
05	机械装置和周边IC起始
10	托盘，弹出阶段
11	弹出托盘
12	装入托盘
20	停止阶段在卡紧阶段
21	由A面设定卡紧
22	由卡盘设定A面卡紧
23	A面卡紧阶段
30	A面焦点锁定
31	0搜索和由焦点锁定起动
33	由A面到B面的倒换
40	B面焦点锁定
50	章节搜索
51	画面/时间搜索
60	放像
61	瞬时停止
70	正常方向低速扫描
71	正常方向高速扫描
72	反向低速扫描
73	反向高速扫描
74	扫描完毕过程
80至FF	(与功能状态一样)

2-4-5. [4] 陷波标志

显示陷波标志 的内容。

陷波标志 是数据包涵电源在不按电源键的情况下不正常的切断的原因。

陷波标志 是VFD控制器和状态控制器的输出。

VFD控制器的标志是左边4位数字，状态控制器则是右边4位数字。第1位元是由右边（十六进制2位数）算起，每一比特都有其含义。比特一相对的是最后一次电源不正常的切断原因。

左边的第1位元是同样的标志，是逻辑OR的过去电源不正常切断的原因。

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
第1行																	S T O P											
第2行	T	R	A	P													F	L	A	G								
第3行																	A	0	8	0					5	0	0	0
第4行																												
第5行																												
第6行																												
第7行																												
第8行																												
第9行																												
第10行																												

图 9-6. 陷波标志

根据上面的图表，可察觉到80（不正常电压水平导致电源切断）和20（状态控制器通信误差导致电源切断）发生在VFD控制器。

10（机械控制器通信误差导致电源切断）和40（VFD控制器通信误差导致电源切断）发生在状态控制器。

上次电源不正常切断的原因是80（不正常电压水平导致电源切断），发生在VFD控制器。

标志的比特有下列的意义。

表 9-6. 陷波标志比特/因由表

比特号码(样式)	原因
7 (8)	不正常电压水平导致电源切断
6 (40)	VFD控制器通信误差导致电源切断
5 (20)	状态控制器通信误差导致电源切断
4 (10)	机械控制器通信误差导致电源切断
3 (08)	电源切断因事故发生
2 (04)	键操作强制电源切断
1 (02)	因状态控制器的自我诊断复位
0 (01)	键操作强制复位

注:

- 比特0 和1 的复位表示在电源接通的同时状态控制器起始，除了当陷波标志 被储存。
- 16位元A是2+8，B=1+2+8，C=4+8，D=1+4+8，E=2+4+8，F=1+2+4+8。

2-4-6. [5] 键/遥控数据

由机台的键和遥控器输入数据以SIRCS编码显示出来。

只有使用MDP的遥控器方为有效。

如图9-7所示，第3行（16位元，2位数）左边第1位元是机只键输入的SIRCS编码，右边第1位元是遥控器键输入的SIRCS编码。没有按键时是定位在 FF，同时按下两个键时，最先显示的是最早按下的。

现有的型号中，只能使用机台的键并且某些键并无SIRCS编码。数据在80以上的都定义为内码。

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
第1行																	S T O P							
第2行	K E Y - R M C																							
第3行	1 A F F																							
第4行																								
第5行																								
第6行																								
第7行																								
第8行																								
第9行																								
第10行																								

图 9-7. 键/遥控数据

根据上面的图表，可看出从机只按下 [1A (放像)] 而遥控器则无 FF（没有按键）。

注意，某些遥控器在按入键后瞬间就会产生编码。

下页列出MDP - V1所用的SIRCS编码。

表 9-7. MDP SIRCS 编码

号码	功能
00	1
01	2
02	3
03	4
04	5
05	6
06	7
07	8
08	9
09	0
0C	画面/时间
0F	清除
15	电源接上/切断
16	托盘打开
17	音频监视器
18	停止
19	瞬时停止
1A	放像
1E	反向低速扫描
1F	常态低速扫描
28	时间显示
29	重复
2B	常态固定/画面速进
2C	反向固定/画面速进
30	程序
34	正常方向ACS
35	反向ACS
39	号码 + 10
3A	光屏显示器
40	模拟/CX
41	混合
45	自动编程
47	1/单面/双面
5D	A面
5E	B面
(下列是扩展的编码)	
A9	指示器设定
AA	指示器呼叫
AB	PBC返回
AC	PBC选择
AE	正常方向V索引
AF	反向V索引
FF	无按键

2-4-7. [7] 与机械装置控制器通信的资料

显示与机械装置控制器的正文通信数据。
 第3行到5是由状态控制器传达到机械装置控制器的正文。
 第7行到9是状态控制器从机械装置控制器接收到的正文。
 在第8行和9最前头的符号[!]表示正文正常通信。
 显示[?]当正文半途被切断, [■]表示在通信服务后, 通信被切断等。

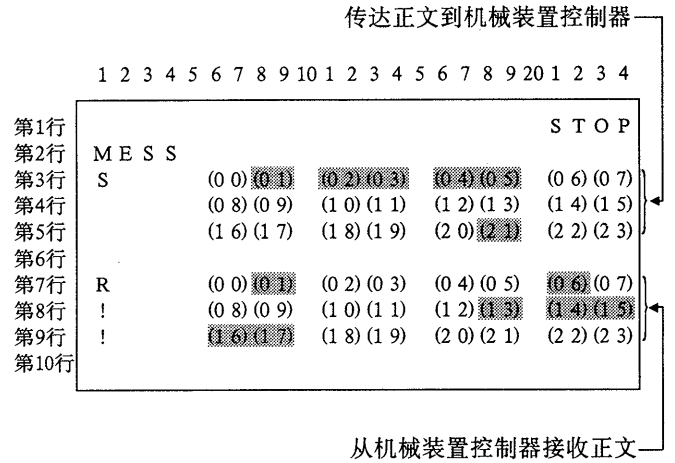


图 9-8. 与机械结构控制器的通信资料

下列是部分的通讯正文:

表 9-8. 正文由状态控制器传送到机械装置控制器 (图 9-8. (上))

号码	说明
(01)	当前(下次)的功能状态
(02)	最终目标功能状态
(03至05)	搜索目标位置(时间/画面)

表 9-9. 机械装置控制器接收由状态控制器传送的正文 (图 9-8. (下))

号码	说明
(01)	当前(下次)的功能状态
(06)	功能状态切换的完成标志 (最底下的比特)
(13)	当前章节/轨迹号码
(14)	当前索引号码
(15至17)	当前位置(时间/画面)

2-4-8. [重复]作业资料

显示作业资料

第3行显示光学系统的作业时间，第4行至第9行列出以十六进制接收的SIRCS的数目。

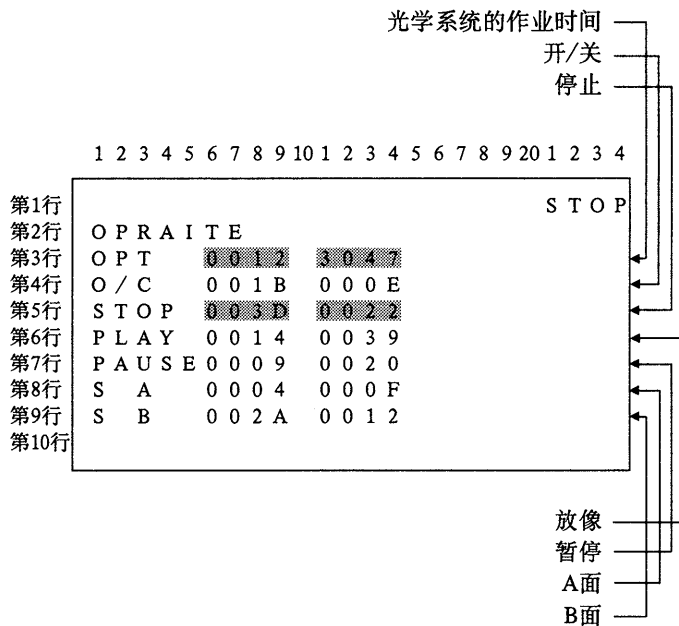


图 9-9. 作业资料

根据上述例子，光学系统的作业时间是12小时30分钟和47秒。由机台键和遥控器接收的SIRCS是分来计算。例如停止，由机台键入3Dh = 61次，由遥控器键入则有22h = 34次。

● 十六进制/十进制换算表

十六进制	十进制
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

换算例子

3Dh: $3 \times 16 + 13 = 61$ 十进制
 3 D 十六进制
 ACh: $10 \times 16 + 12 = 72$ 十进制
 A C 十六进制

3. 服务状态

3-1. 设定服务状态

进行下列过程以设定服务状态:

切断电源，同时按机台的下列3个键并开动电源:

[STOP] + [10/0] + [POWER]

若微处理机方案在屏幕上显示即表示服务状态已设定。

若不，即表示无服务状态设定。

当服务状态设定后，除误状态也同时设定。

3-2. 离开服务状态

按下POWER切断电源即可离开服务状态。

若不能离开服务状态(当机械装置等还未完成)，同时按下[PBC]键和[POWER]键强制切断电源。

3-3. 使用特别作业

为了安全起见，服务方式下的特别操作只能在[NO DISC]和[STOP]状态下进行。检查确保上述信息在光屏上显示而并非闪烁。为了使调试命令在调试方式下有效时，请在按下本机上的[STOP]键的同时，按下遥控器上的[0]键，再按下遥控器上的[8]键。当调试命令有效时，FL管道将被关闭。

FL管道被关闭后，按下本机上的[PLAY]和[PAUSE]等键时，表9-10上的特别功能就能被执行了。

只有当机台[SIDE A]和[SIDE B]时才能进行滑板速进作业。

其他键作业会连续进行直到按下[STOP]键，在进行特别作业时，B面的LED会亮起。

就算同时按下两个以上的键，某些特别作业还是不能同时进行的。

由于某些功能在FL管道关闭时不能操作，因此要在执行中停止特殊操作。

可在按下本机上的[STOP]键的同时，按下遥控器上的[0]键，再按下遥控器上的[9]键，以使调试命令在调试方式下无效。当调试命令无效时，FL管道将被开放。

表 9-10. 特别作业表

键	特别作业
[SIDE A]	滑板反向（下降）速进
[SIDE B]	滑板正常方向（上升）速进
[PLAY]	开始焦点搜索
[PAUSE]	倾斜操纵伺服ON开始
[正常方向画面速进]	托盘时效开始
[反向画面速进]	滑板时效开始
[重复AB]	倾斜时效开始
[停止]	特别作业停止

特别作业的描述如下所列:

3-3-1. [SIDE A]键.....滑板反向速进

当连续按下[SIDE A]键时，在倾斜起始作业（倾斜移动中心位置）进行时，滑板反向移动（B面内圆周 → B面外圆周 → A面外圆周 → A面内圆周）。
停止按键后作业停止。

3-3-2. [SIDE B]键.....滑板正常方向速进

与3-3-1的滑板反向速进相反，滑板向正常方向移动（A面内圆周 → A面外圆周 → B面外圆周 → B面内圆周）。
在更换光学零件时非常有用。
释放按键后作业停止。

3-3-3. [PLAY]键.....焦点搜索

当连续按下[PLAY]键时，重复焦点搜索作业。
拾音镜头应该上下移动。
在确保滑板处在正确位置后（A面的中心）进行焦点搜索。
按下[STOP]后作业停止。

3-3-4. [PAUSE]键.....倾斜操纵伺服ON

当按下[PAUSE]键时，倾斜操纵伺服起动。
在使用[A面]/[B面]键把滑板移至A面的中心并把CD等放置在托盘时，在和倾斜感应器接触后，倾斜应该移动。
若使用[A面]/[B面]键移动滑板，倾斜会回返中心。
按下[STOP]后作业停止。

3-3-5. [STILL/STEP II▶]键.....托盘时效开始

按下[STILL/STEP II▶]键，托盘时效开始。
由于托盘会自动进出移动，小心其周围。
按下[STOP]后作业停止。

3-3-6. [STILL/STEP ◀II]键.....滑板时效开始

按下[STILL/STEP ◀II]键，滑板时效开始。
滑板在A面和B面的内圆周内自动往返。
按下[STOP]后作业停止。

3-3-7. [重复A ↔ B]键.....倾斜时效开始

[重复A↔B]键，倾斜时效开始。
倾斜会自动上下移动。
按下[STOP]后作业停止。

4. 扩展按键功能

4-1. 应用同时按机台键的功能

只有当机台的数个按键同时被按下时，机台的“同时按键功能”方为有效。

这是用来即时执行的功能如强制断开电源。本机的“同时按键功能”的定义如下：

表 9-11. 同时按机台键的功能

功能	机台键
<p>① <u>强行断开电源</u> 强行断开电源。 当机台失控或按[POWER]键却不能断开电源时，将马上断开电源。 由于在任何机械情况下都会断开电源，请勿常用。</p>	PBC + [POWER]
<p>② <u>强行复原</u> 除强行断开电源外，也能起始状态控制器。 当状态控制器操作不正常，如显示屏出现奇怪的项目时，使用这功能来复原状态控制器。 当执行这功能时，除了调试状态的陷波标记外，其他过去的紧急事故和所有资料都被清除掉。</p>	[STOP] + [POWER]
<p>③ <u>MDP-V1 FL管道 点亮</u> 当电源自动接通时，所有FL管和LED都会发光。 将执行普通操作，直到电源关闭，在这种情况下，FL管和LED保持发光。</p>	[STOP] + [>10] + [POWER] (只限电源关闭时。)

4-2. 应用同时按机台 + 遥控器键的功能

只有在按下机台键并按下遥控键两次时，机台 + 遥控的“同时按键功能”方为有效。

用户若意外的执行这功能，则需在1秒钟内按下遥控的两按键。这特别按键操作的定义如下：

表 9-12. 同时按机台与遥控器键的功能

功能	程序	机台键 + 遥控键
<p>① <u>调试状态ON/OFF选择</u> 若非调试状态就设定调试状态，若已设定在调试状态就会离开这状态。</p>	1 2	[STOP] + [0] [STOP] + [STOP]
<p>④ <u>机械控制器超时无效 (time-out invalidation)</u> 当与机械控制器的通讯不能执行时，取消切断电源的功能。 当机械控制器不能操作而状态控制器必须继续执行时使用。</p>	1 2	[STOP] + [0] [STOP] + [>10]
<p>⑤ <u>机械控制器超时有效 (time-out validation)</u> 当与机械控制器的通讯不能执行时，使用切断电源的功能。 离开功能 ④ 时使用。</p>	1 2	[STOP] + [0] [STOP] + [0]
<p>⑧ <u>EEPROM清除指令</u> 在接通电源时，清除EEPROM调试状态的数据。</p>	1 2	[STOP] + [0] [STOP] + [REPEAT]

