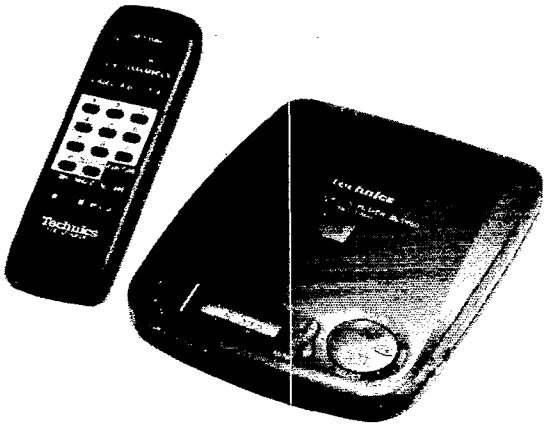
ORDER NO. AD9505133C2

Service Manual

Portable Video CD Player

SL-VP50

COMPACT disc DIGITAL VIDEO COMPACT disc DIGITAL AUDIO DIGITAL MASH multi-stage noise shaping ※



Colour

(K)... Black Type

Area

Suffix for Model No.	Area	Colour
(EB)	Great Britain.	(K)
(EG)	Europe.	

※ MASH is a trademark of NTT.

TRAVERSE DECK: RAE0133Z MECHANISM SERIES

■ SPECIFICATIONS

■ Audio

No. of channels: 2 channels (left and right, stereo)
Output voltage: 0.65V (50kΩ) φ3.5 stereo mini jack
Frequency response: 20~20,000Hz (+0.5dB, −1.5dB)
S/N: more than 94dB
Wow and flutter: Below measurable limit
Digital filter: 8 times over sampling
DA converter: 1 bit, MASH 4 DAC
Headphone output level: max. 9mW+9mW/16Ω (variable) stereo mini jack φ3.5

■ Video

Output format: NTSC/PAL
Output voltage: 1.0Vp-p (75Ω)

■ Pickup

Type: One beam
Light source: Semiconductor laser
Wavelength: 780nm
Lens: Glass pressed lens

■ Playing time;

(When used in hold mode, at 25°C temperature and on flat and stable surface.)

Rechargeable batteries (SH-CDB8D)	About 2 hours
Panasonic alkaline dry cell batteries (LR6)	About 5 hours

The play time may be less depending on the operating conditions.

Recharging time; About 4 hours

■ General

Operational temperature range: 0°C−40°C (32°F−104°F)
Power requirement: AC; with an included panasonic AC adaptor
RFEA903B-W.....(EB)
RFEA903E-W.....(EG)
Batteries; 9V (two "AA" size (LR6) batteries, not included)
(Panasonic R6P/LR6 or equivalent, not included)
Rechargeable Batterries; DC 7.2V with an optional Panasonic Rechargeable Batteries (SH-CDB8D) (set of 2×3)
DC IN: 9.0V
Power consumption: Using AC adaptor; 7.3W
Using Batteries; 2.4W
Dimensions (W×H×D): 135×43×160mm
Weight: 580g (20.5 oz) (with batteries)
460g (16.2 oz) (without batteries)

Note: Design and specifications are subject to change without notice.
Weight and dimensions are approximate.
These specifications were measured using the AC adaptor.

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

■ CONTENTS

	Page
PRECAUTION OF LASER DIODE	2
LOCATION OF CONTROLS	3
REMOTE CONTROL PREPARATIONS	3
ACCESSORIES	3
POWER SOURCE	4, 5
CAUTION FOR AC MAINS LEAD	4, 5
BEFORE OPERATING THE UNIT	5
PLAYING VIDEO CDs (with the playback control feature)	6
FEATURES	6
PLAYING AUDIO CDs AND VIDEO CDs (not equipped with the playback control feature)	7
DESCRIPTION OF TERMS	7
VARIOUS PLAY USING THE REMOTE CONTROL UNIT	8~11
CAUTIONS	8, 9
USING THE UNIT WITH OPTIONAL ACCESSORIES	10
AUDIO CHANNEL SELECTION	11
IF THE TV SCREEN IS IN THE FOLLOWING CONDITION	11
MAINTENANCE	11
CONCERNING THE TV DISPLAY	12
HANDLING PRECAUTIONS FOR TRAVERSE DECK	13
OPERATION CHECKS AND MAIN COMPONENT REPLACEMENT PROCEDURES	14~18
MEASUREMENTS AND ADJUSTMENTS	18, 19
AUTOMATIC ADJUSTMENT RESULTS DISPLAY FUNCTION (SELF-CHECK FUNCTION)	20, 21
TROUBLESHOOTING GUIDE	22~27
CHECKING THE OPERATION PROBLEMS ON THE TRAVERSE DECK (OPTICAL PICKUP)	28
BLOCK DIAGRAM	29~34
PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM	35~38
TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES	39
SCHEMATIC DIAGRAM	39~50
TERMINAL GUIDE	51~63
REPLACEMENT PARTS LIST	64, 65, 68, 70
RESISTORS AND CAPACITORS	66~68
CABINET PARTS LOCATION	69
PACKAGING	70

■ PRECAUTION OF LASER DIODE

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pickup lens.
Wave length: 780nm
Maximum output radiation power from pickup: 100μW/VDE

Laser radiation from the pickup lens is safety level, but be sure the followings:

1. Do not disassemble the optical pickup unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pickup unit. It was already adjusted.
3. Do not look at the focus lens using optical instruments.
4. Recommend not to look at pickup lens for a long time.

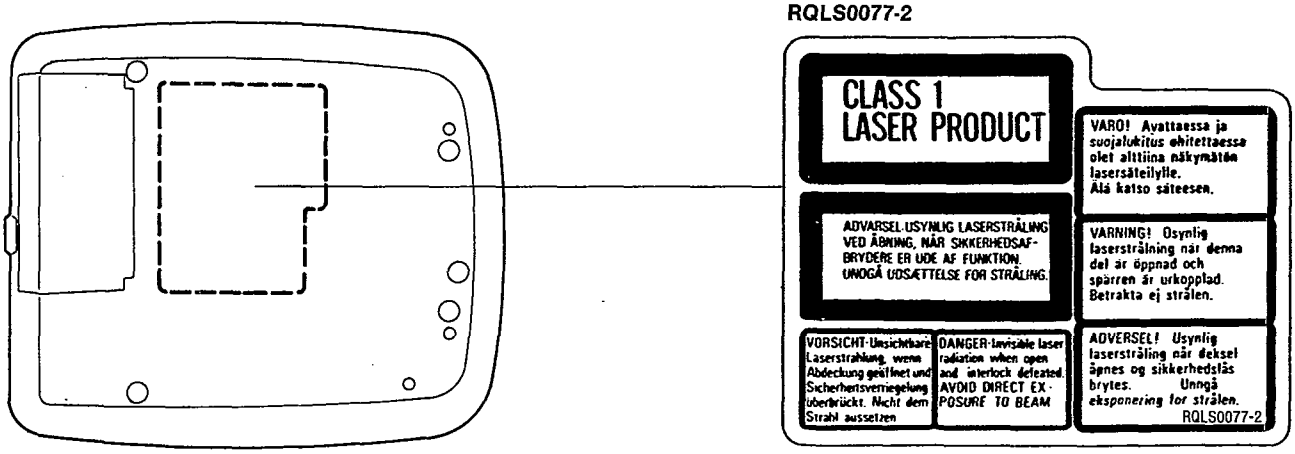
ACHTUNG: Dieses Produkt enthält eine Laserdiode. Im eingeschalteten Zustand wird unsichtbare Laserstrahlung von der Lasereinheit abgestrahlt.

Wellenlänge: 780nm
Maximale Strahlungsleistung der Lasereinheit: 100μW/VDE

Die Strahlung an der Lasereinheit ist ungefährlich, wenn folgende Punkte beachtet werden:

1. Die Lasereinheit nicht zerlegen, da die Strahlung an der freigelegten Laserdiode gefährlich ist.
2. Den werkseitig justierten Einstellregler der Lasereinheit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlines blicken.
4. Nicht über längere Zeit in die Fokussierlines blicken.

ADVARSEL: I dette a apparat anvendes laser.



■ LOCATION OF CONTROLS

Main unit A

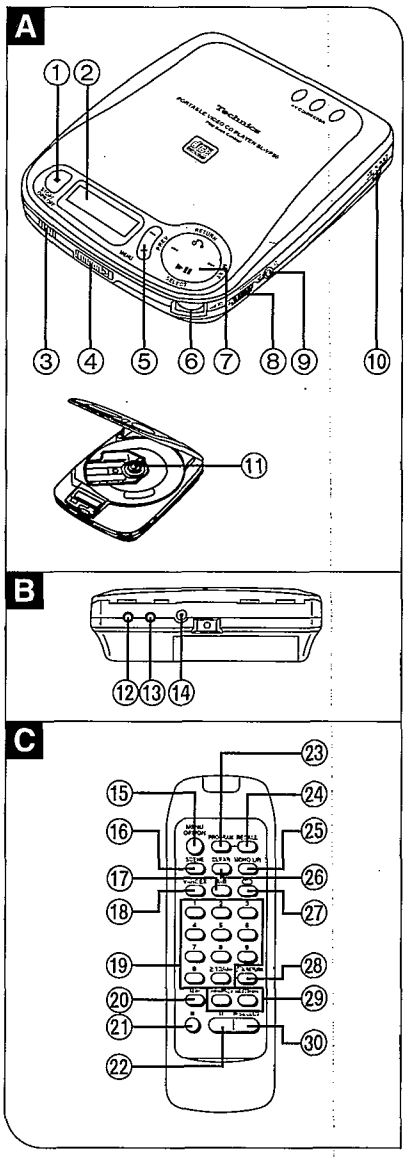
① **Stop/operation off button**
② **Display**
③ **Remote control signal sensor**
④ **Open switch**
⑤ **Menu, +, − button**
⑥ **Headphones volume control**
⑦ **Multi operation button**
(NEXT, PREV, SELECT, RETURN)
⑧ **Hold switch**
⑨ **Headphones jack (∩) 16Ω φ3.5**
⑩ **Video format selector**
(NTSC, PAL, PAL AUTO)
⑪ **Push button**

■ Rear panel of the unit B

⑫ **Video output terminal (VIDEO OUT)**
⑬ **Audio output terminal (AUDIO OUT)**
⑭ **DC in jack (DC IN 9 V ⟐⊖⟐)**

Remote control unit C

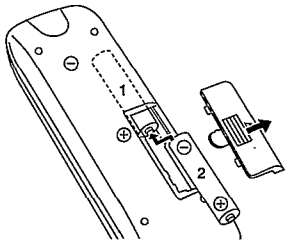
⑮ **Menu on/off button**
⑯ **Scene button**
⑰ **A-B repeat button**
⑱ **VCD index button**
⑲ **Numeric button**
⑳ **II► (Frame skip) button**
㉑ **■ Stop button**
㉒ **II Pause button**
㉓ **Program button**
㉔ **Recall button**
㉕ **Audio channel select button**
㉖ **Clear button**
㉗ **↻ Repeat button**
㉘ **↺ Return button**
㉙ **|◄◄ Previous, next ►►| button**
㉚ **► Select button**



■ REMOTE CONTROL PREPARATIONS

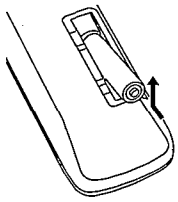
■ Battery installation

Insert two "R03" size (UM-4, included) as shown below. Insert batteries in the correct polarities (⊕, ⊖).

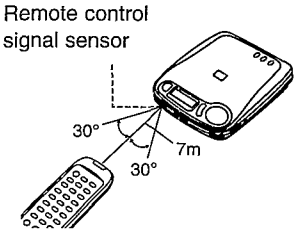


■ Battery removal

Press and push up batteries in the direction of the arrow to remove them.



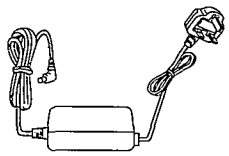
■ Remote control transmitter's operation range and precautions



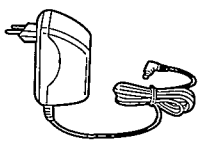
- Do not place obstacles between the remote control signal sensor and remote control transmitter.
- Take care to keep the remote control signal sensor and end of the remote control unit free from dust.
- Do not leave it where it will be exposed to direct sunlight.

■ ACCESSORIES

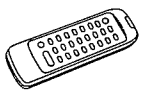
AC adaptor
[For (EB) area.]
(RFEA903B-W) ..... 1 pc.



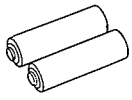
[For (EG) area.]
(RFEA903E-W) ..... 1 pc.



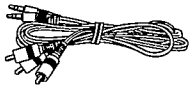
Remote control transmitter
(RAK-SL408WH) ..... 1 pc.



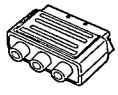
Batteries (for remote control)
(R03, "AAA") ..... 2 pcs.



Connection cable
(RJL3X001X15) ..... 1 pc.



21 pin adaptor
(VFA0151-1) ..... 1 pc.



Note: These are available on sale route.

■ POWER SOURCE

AC Adaptor A

Connect the AC adaptor.

Use only the AC adaptor provided with this unit.

Note

- The configuration of the AC adpator differs depending on the area.
- The unit is in the standby condition when the AC adaptor is connected. The primary circuit is always "live" as long as the AC adaptor is connected to an electrical outlet.

For (EB) only:

The indicator on the AC adaptor lights when the AC adaptor is connected.

> **CAUTION**
> Do not use the AC adaptor provided with this unit for other products.

Dry cell batteries (not included)

B

Install six "R6/LR6" (UM-3) alkaline batteries as shown in the figure.

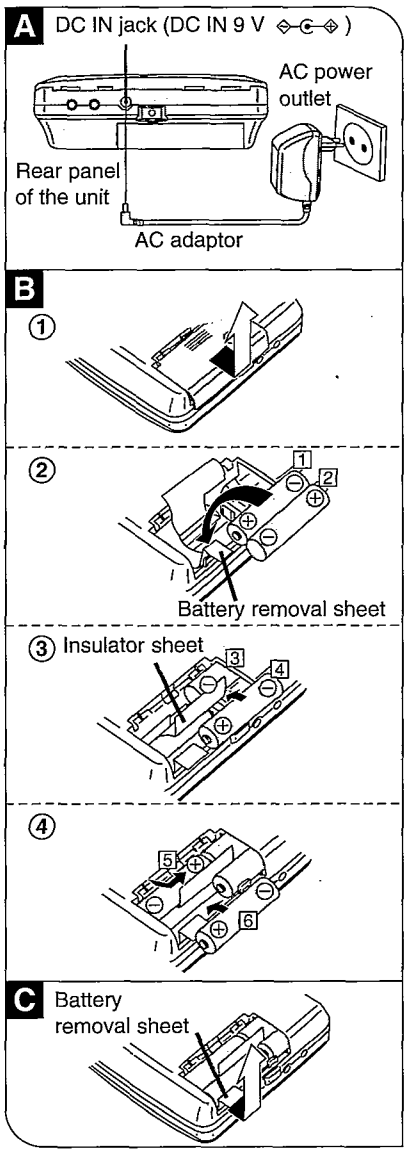
Make sure that the AC adaptor is disconnected from the AC power outlet and the unit.

① Slide the battery cover to open.
② Put the battery removal sheet under the batteries, and then install batteries [1] and [2].
③ Put the insulator sheet on top of the batteries and install battery [3].
Install battery [4] to make the insulator sheet come between batteries [3] and [4].
④ Now install batteries [5] and [6].

■ Battery removal C

Pull the battery removal sheet and remove the batteries with your finger.

Refer to the cautions on page 8, 9.

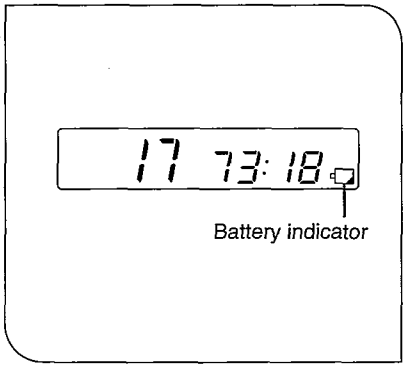


Battery indicator

This starts flashing when the batteries have run down. After a short while the power automatically shuts off.
(The amount of time the unit will continue to play after the indicator has started flashing differs slightly, depending on the type of batteries used.)

Type of battery	Action
Rechargeable batteries	Recharge the batteries again.
Dry cell batteries	Replace with new batteries.

(The battery indicator may not flash if rechargeable batteries, other than those designated by Panasonic, are used.)



Rechargeable batteries (not included)

Make sure that the batteries have been charged before use.

■ Recharging batteries

1 Install six rechargeable batteries.

Only the SH-CDB8D batteries can be recharged.
Refer to the "Dry cell batteries" concerning the installation and removal of the batteries.

2 Connect the AC adaptor.

Note

The configuration of the AC adaptor differs depending on the area.
It takes about 4 hours to fully recharge them.
The recharging indicator C flashes when you start recharging and the light off when recharging has completed.

3 After completing recharging of the batteries, disconnect the AC adaptor from the DC in jack and the AC power outlet.

- Recharging is possible only when the unit is switched to the standby mode.
- The batteries can be used for about 10 months (300 times) if they are recharged every day. After that, their operating time will be shortened, and you will have to replace them.
Obtain new rechargeable batteries (SH-CDB8D) designed exclusively for the unit.
- While recharging, the AC adaptor and rechargeable batteries may get warm. This is normal.

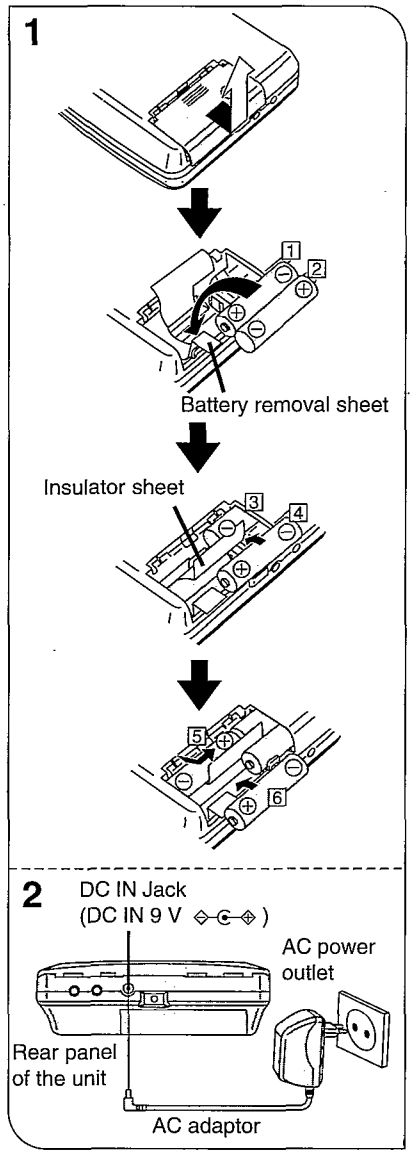
■ CAUTION FOR AC MAINS LEAD

For (EB) area.

("EB" area code model only)

For your safety, please read the following text carefully.
This appliance is supplied with a moulded three pin mains plug for your safety and convenience.
A 3-ampere fuse is fitted in this plug.
Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 3-ampere and that it is approved by ASTA or BSI to BS1362.
Check for the ASTA mark ⟐ or the BSI mark ▽ on the body of the fuse.
If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.
If you lose the fuse cover the plug must not be used until a replacement cover is obtained.
A replacement fuse cover can be purchased from your local dealer.

(POWER SOURCE)



■ BEFORE OPERATING THE UNIT

1 When you install a video CD
Connect the unit to the TV.

Use the connection cable (included) and the 21 pin adaptor (included only for Continental Europe and United Kingdom).
Set the NTSC, PAL, PAL AUTO selector according to the television set.
NTSC: When connecting the NTSC system TV
PAL: When connecting the PAL system TV
PAL AUTO: When connecting the TV which has PAL 60 system. (This is the system which enable to enjoy NTSC software.)
For details, refer to the operating instructions of the TV.

If your television set has 21 pin plug terminal:

1. Connect the connection cable to the 21 pin adaptor.
2. Connect the 21 pin adaptor to the TV set.

2 Release the hold mode.

■ Accidental Operation Prevention Function A

This function prevents the unit from operating even if its function buttons are pressed accidentally. (However, the disc lid can be opened or closed.) Use the function to prevent the following situations:

Example 1: While the unit is not in use, the power is inadvertently tuned on and the batteries run down.

Example 2: Play is interrupted while the unit is in use.

To use the accidental operation prevention function

Set HOLD to the HOLD position. It is possible to operate the unit from the remote control in the "hold" mode (except for turning on or off the unit).

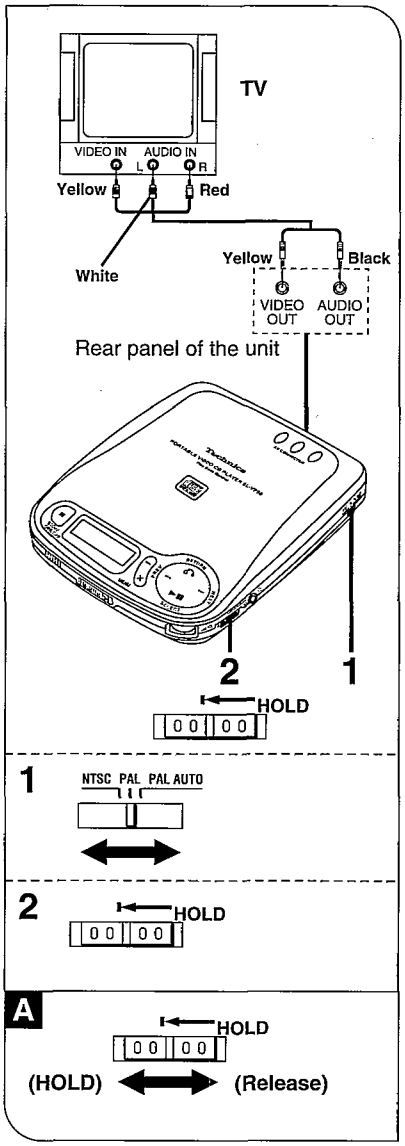
Before operation, release the unit from the hold state.

"hold" indicator

If the unit is in the hold mode, the "hold" indicator appears when any of the unit's function buttons is pressed.

When the unit is turned off

The "hold" indicator appears only when ▶II button is pressed.



(CAUTION FOR AC MAINS LEAD)

CAUTION!
IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR HOME THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY.
THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO ANY 13-AMPERE SOCKET.

If a new plug is to be fitted please observe the wiring code as shown below.
If in any doubt please consult a qualified electrician.

IMPORTANT

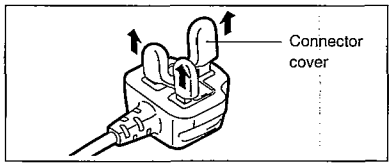
The wires in this mains lead are coloured in accordance with the following code:

Blue: Neutral
Brown: Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.
Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol ⏚.

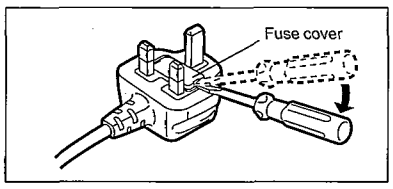
Before use

Remove the connector cover as follows.

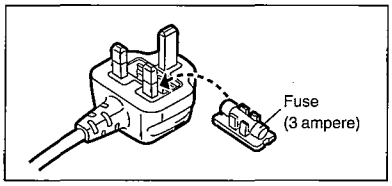


How to replace the fuse

1. Remove the fuse cover with a screwdriver.



2. Replace the fuse and attach the fuse cover.



■ PLAYING VIDEO CDs (with the playback control feature)

Menu Playback

(See description of terms on page 7)

The playback method described below is only for video CDs equipped with the playback control feature. Menu playback is automatically played when a video CD is playback control supported. If the video CD is not playback control supported, refer to the regular playback mode described on page 13.

1 Switch on the TV and select the VIDEO input mode.

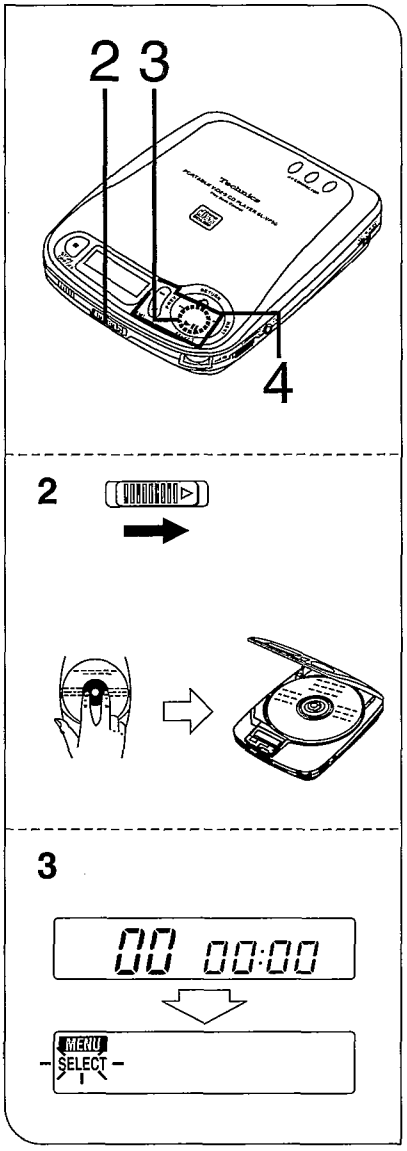
2 Slide OPEN to open the lid, and insert the video CD.
Press the area near the center hole of the disc until it clicks into position. Close the lid.

3 Press ▶II.
The menu screen appears on the TV. (with some discs, it may not appear immediately.) The menu screen that appears differs depending on the disc.

4 ① Press MENU (+ or −) to select the menu.
② Press SELECT ▶II to start playback.
MENU +: When selecting the bigger number
MENU −: When selecting the smaller number
The display shows the menu number, and then playback will start.
The unit also identifies and plays the high-resolution still image automatically.

5 Adjust the TV volume level.
VOLUME control on this unit is exclusively for the headphones.

The menu configuration differs depending on the disc. Select the menu by following the instructions accompanying the disc or the screen display.
For your reference:
Concerning the display that appears on the TV screen, refer to page 12.
Menu numbers can also be selected using the numeric buttons on the remote control unit.



Menu operation	
To return to the previous menu	RETURN
To advance to the continuation of the menu	▶▶I NEXT
To return to the previous screen	PREV I◀◀
Playback operation	
To temporarily stop disc play Press during play. To resume play, press the button once again.	▶II
To stop play Press during play.	■
To turn off the unit Press in the stop condition.	■
To skip forward or backward (skip) (Regular playback mode only) Press during play	PREV I◀◀: Skip backward ▶▶I NEXT Skip forward
To search forward or backward Press and hold during play.	PREV I◀◀: Search backward ▶▶I NEXT Search forward

Note

- The pictures moving on the menu screen will not pause even when ▶II is pressed during playback.
- You cannot search forward or backward with a "slide show" disc.

■ To switch to the menu play/regular play mode

(Available only from the remote control)
Press MENU OFF/ON.
Refer to page 7 for regular playback.
When the power is switched to on, the menu playback will be automatically selected.

■ FEATURES

This unit is the portable video CD player which is the playback control method.
The following CDs shown below can be played on this unit.

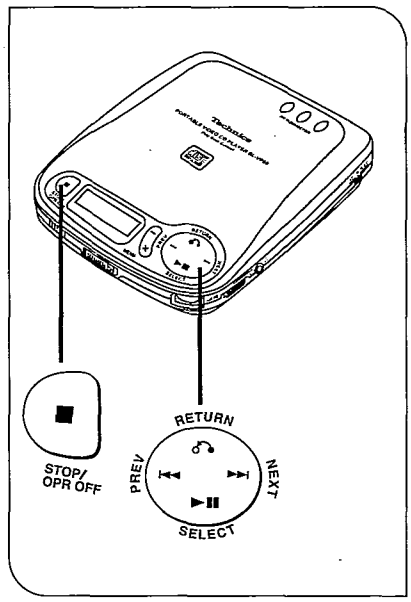
Video CD:
(Motion picture + audio)
Only compact discs having this mark can be used.

Version 2.0
The disc with the playback control feature. In addition to the motion picture playback, menu playback and high-resolution still image playback are possible.

Version 1.1
The disc not equipped with the playback control feature
Only the motion picture playback is possible.

Audio CD:
Only comapct discs having this mark can be used.

Only the audio playback is possible.



■ PLAYING AUDIO CDs AND VIDEO CDs (not equipped with the playback control feature)

Regular Playback

(See description of terms on page 7)
The playback method described below will playback the disc in sequence from the beginning. Regular playback can also playback video CDs equipped with the playback control feature. However, it is impossible to playback some moving or still pictures. In this case, use the menu playback.

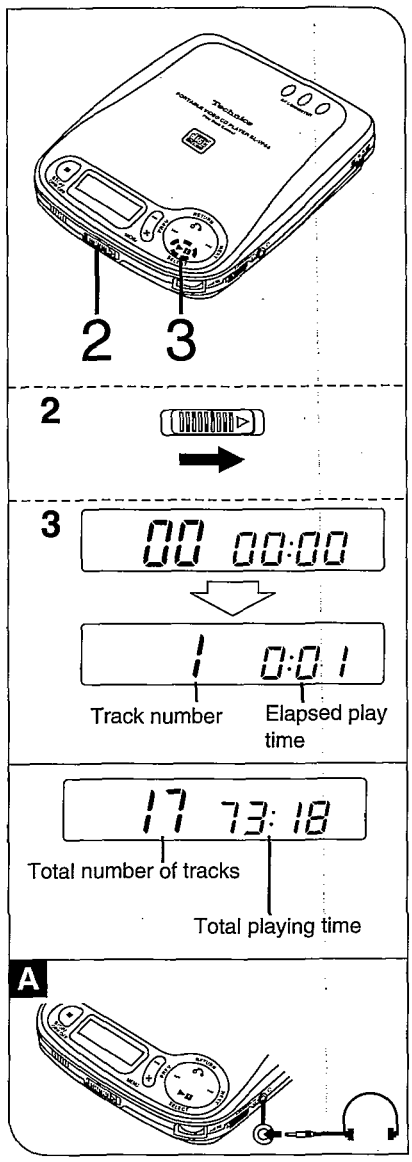
1 **For playing a video CD only: Switch on the TV and select the VIDEO input mode.**

2 **Slide OPEN to open the lid, and insert the CD.**
Close the lid.

3 **Press ▶II.**
Play starts from the first track.
Play stops when all the tracks have been played.

4 **For playing a video CD only: Adjust the TV volume level to set sound level.**
VOLUME control on this unit is exclusively for the headphones.

To listen through the headphones
(not included) A
- Before connecting the headphones, reduce the volume level.
- Plug Type: Stereo mini type



Removing the disc A
After the disc has stopped rotating, press PUSH and release the disc.

Note
Do not open the lid during play.

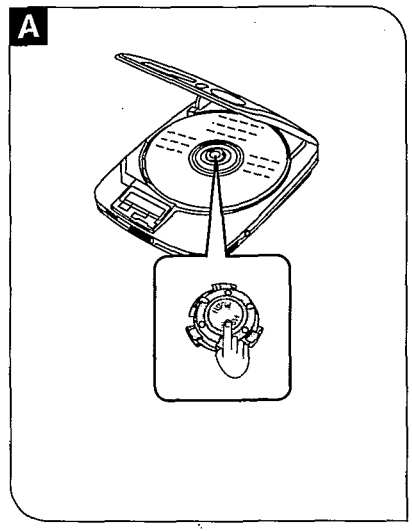
Automatic Shut-Off:
This functions, in order to prevent rechargeable and other batteries from becoming discharged. If you leave the unit in the stop mode for about 10 minutes, it will automatically shut off.

■ "no dISC" display
This appears for about 30 seconds when a disc has not been inserted or when a disc has not been inserted properly and then ▶II is pressed.
This display also appears when a disc or the lens are stained.

■ "OPEN" display
This appears for about 10 minutes after the lid is opened. (It does not appear when the unit is turned off.)

■ The backlight of the display
When using the AC adaptor, the backlight of the display turns on.

Note
When you listen to an audio CD, disconnect the yellow video pin plug from the VIDEO OUT terminal to prevent from battery consumption.



■ DESCRIPTION OF TERMS

(Read this section together with the instructions accompanying the disc.)

Playback control:
This refers to the control signals which have already ben recorded on a disc. These signals enable moving picture and still picture playback by selecting menus. There are two types of video CDs, those which support playback control and those which do not. The type is indicated in the disc's instructions and on the CD case.

Menu (playback control) playback:
This method plays back the moving pictures or high-definition still pictures on a video CD by selecting a menu.

Regular playback:
This method plays back a disc in sequence from the beginning without using menus.

Track (number):
Video and audio programs are divided up into units called tracks. The numbers allocated to the tracks are called track numbers.

Video index (number):
A track is subdivided into smaller units called indexes. The numbers allocated to the video indexes are called index numbers.

Scene:
Scenes refer to an individual menu, moving picture, still picture, etc. which are recorded only on video CDs equipped with the playback control feature. The numbers allocated to the scenes are called scene numbers.

■ VARIOUS PLAY USING THE REMOTE CONTROL UNIT

(Only for video CDs)

To find the particular scene you want to watch A

■ To find the scene using a video index number

(See description of terms on page 7)

A particular scene in a track you want to watch can be located by selecting a video index number. This can be done only with the video index recorded.

1 Press V-INDEX in the play mode.

2 Press |◀◀ PREV or NEXT ▶▶| to select the video index number corresponding to the scene.

Play now starts at the video index selected.

To cancel this function:
Press V-INDEX again.

■ To find the scene using the numeric buttons B

1 Press V-INDEX.

2 Press the numeric button to select the index number corresponding to the scene.

3 Press ▶ SELECT.

Play now starts at the video index selected.

To select a two-digit video index number:

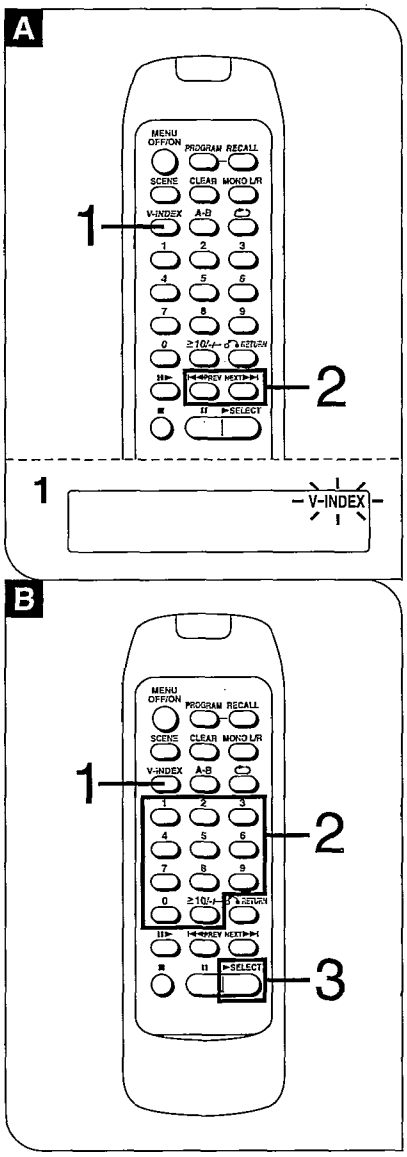
Press the numeric button corresponding to the desired index number.

Example:
15: 1→5
24: 2→4

When you make an error, press CLEAR to cancel.

Note

- The video index search function is available with a track in play only.
- It may not possible to make a video index search with the motion picture.



(Only for video CDs)

■ To find the scene using a scene number A

(See description of terms on page 7)

A particular scene in a track you want to watch can be located by selecting the scene number. Refer to the instructions accompanying the disc for details on the scene numbers.

Scene playback is possible only with video CDs equipped with the playback control feature (Menu playback mode).

1 Press SCENE.

2 Press the numeric button to select the scene number corresponding to the scene you desired to watch.

3 Press ▶ SELECT.

To cancel this function:
Press SCENE again.

To select a two-digit scene number:

Press the numeric button corresponding to the desired scene number.

Example:
15: 1→5
208: 2→0→8

Frame skip B

Press ❚❚▶ during play.

Each time it is pressed, the video frame will go forward.

Continually pressing the button, the unit performs a still playback.

To cancel the frame skip mode.
Press ❚❚.

■ CAUTIONS

Rechargeable batteries

- Only the SH-CDB8D batteries can be recharged.
- If the power delivered by the batteries lasts for a very short time after recharging, it means that the batteries' service life is over. Do not use them any more. Please replace the batteries.
- Recharging already charged batteries will shorten their service life.
- When recharging batteries for the first time or when they have not been used for a long period of time, the play time may be shorter than usual. In a case like this, repeatedly recharge and discharge the batteries. This will restore them to their regular state.
- Do not allow any metal objects to touch the terminals of rechargeable batteries since this may cause short-circuiting which is dangerous.

Dry cell batteries/rechargeable batteries

To prevent damage to the batteries and electrolyte leakage, heed the following points.

- Align the ⊕ and ⊖ polarities properly when inserting the batteries into the unit.
- Do not mix different types or makes of batteries or old and new batteries.
- Remove the batteries if you do not plan to use the unit for extended period of time.
- Do not throw batteries into a fire, and do not short-circuit, disassemble or subject them to excessive heat.
- Do not attempt to recharge dry cell batteries.
- Do not peel off the plastic covering on the rechargeable batteries. Short-circuiting may occur which is dangerous.
- When inserting the batteries into the unit, be sure to set the insulator sheet properly. (see pages 4, 5).

Carrying dry cell batteries/ rechargeable batteries around

When putting dry cell or rechargeable batteries in a pocket or bag, ensure that no other metal objects such as a necklace are placed in the pocket of bag with them. Contact with metal may cause short-circuiting which, in turn, may cause a fire.

Be absolutely sure to carry the rechargeable batteries in the battery carrying case.

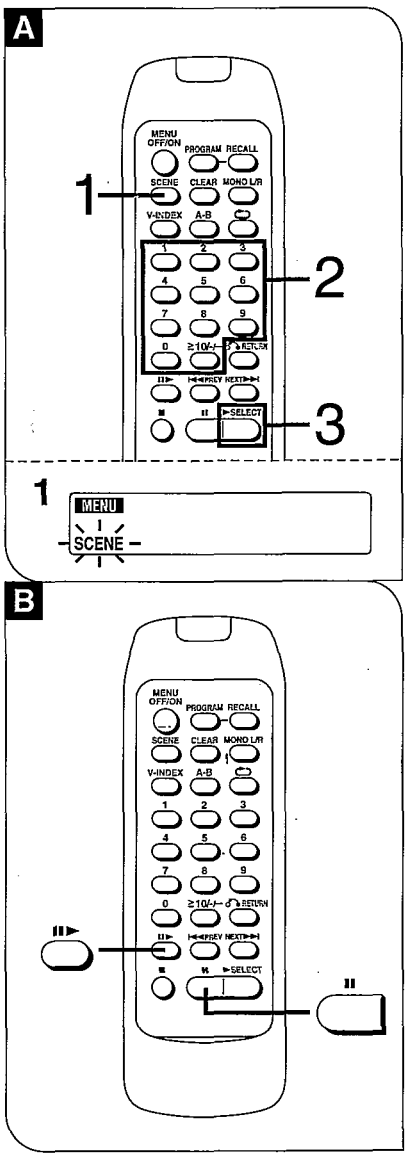
When driving a car

In the interest of traffic safety, do not either operate the unit or watch the video CD while driving.

Precautions for Listening with the Headphones

- Do not play your headset at a high volume. Hearing experts advise against continuous extended play.
- If you experience a ringing in your ears, reduce volume or discontinue use.

(Various play using the remote control unit)



(For video CDs and audio CDs)

Playing Tracks repeatedly (Repeat Function)

(Preparation: Press MENU OFF/ON on the remote control and set the unit to be regular playback mode)

■ To repeat only one track A

Press ↻ once in the play or stop mode.

Each time you press the button, the display will change as follows:

1 ↻ →ALL ↻ →light off (OFF)

■ To repeat all tracks on the disc B

Press ↻ twice in the play or stop mode.

For your reference:

In the program play mode, only all the programmed tracks will be repeated.

To cancel repeat function:

Press ↻ and the "↻" indicator goes out.

■ To repeat a particular section C (A–B repeat)

1 Press A–B during play at the point where repeat play is to be started (point A).

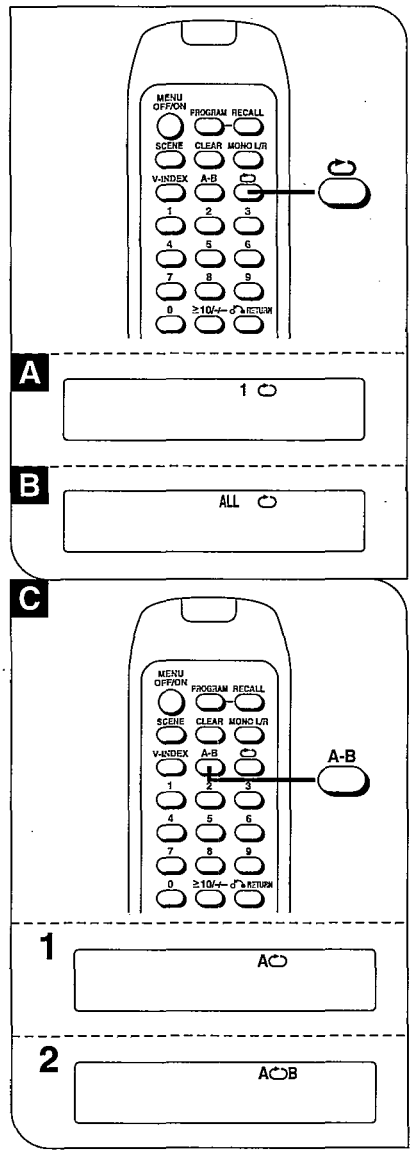
2 Press A–B at the point where repeat play is to be ended (point B).

To cancel the A–B repeat

Press A–B again.

Note

- A–B repeat is not possible during program play.
- A–B repeat between a track and another track is not possible.
- When using a video CD, A–B repeat of within 2 seconds is not possible.



(Coutions)

- Do not use while operating a motorized vehicle. It may create a traffic hazard and is illegal in many areas.
- You should use extreme caution or temporarily discontinue use in potentially hazardous situations.
- Even if your headset is an open-air type designed to let you hear outside sounds, don't turn up the volume so high that you can't hear what's around you.

When purchasing rechargeable batteries

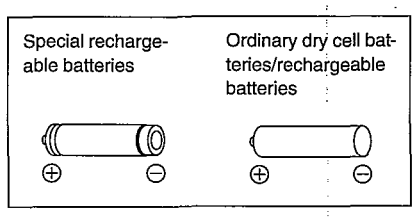
As a safety precaution, the portable video CD players made by our company have a construction designed to make it impossible to recharge ordinary batteries.

To use rechargeable batteries, be absolutely sure to purchase the rechargeable Ni-Cd batteries designed especially for this unit.

Special rechargeable NI-Cd batteries:

SH-CDB8D (set of 2×3)

For details, consult with your dealer.



Notice about the rechargeable battery

The battery is designated recyclable.

Please follow your local recycling regulations.

(Various play using the remote control unit)

(For video CDs and audio CDs)

Playing Tracks in a Particular Sequence (Program Play)

With program play, you can program up to 24 tracks on the disc in any order you choose.

Before operation:

1. Press MENU OFF/ON to set the unit to the regular playback mode.
2. Set the unit to the stop mode.

1 Press PROGRAM.

2 Press the numeric buttons corresponding to the track number in sequence.

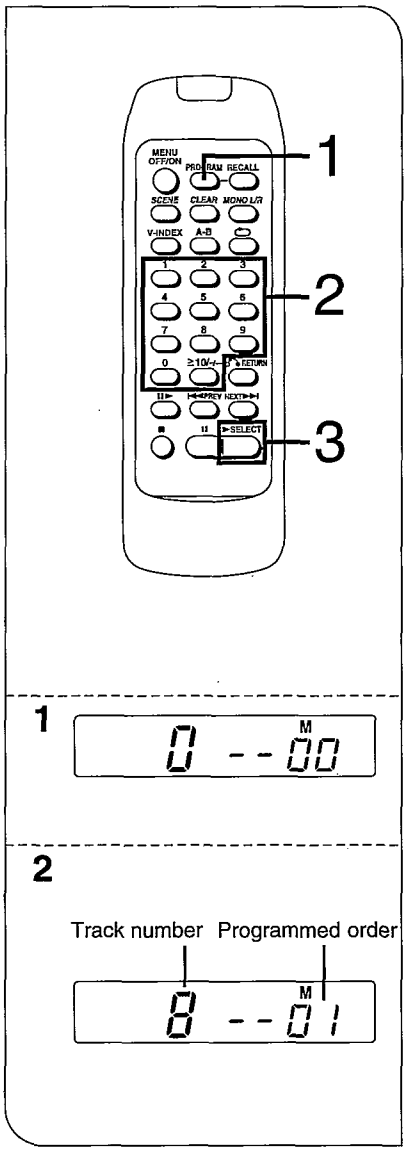
To select a two-digit track number:
First press ≥10/-/-- and then press the numeric button corresponding to the desired track number.

Example:
15: ≥10/-/-- →1→5
20: ≥10/-/-- →2→0

3 Press ▶SELECT.
When all the programmed tracks have been played, the unit will automatically stop.

To cancel program play:
Press PROGRAM again.

Concerning the "F" indication:
It shows no further tracks can be programmed.



■ To confirm the programmed contents
Press RECALL.
The display shows the programmed track numbers in the sequence you have entered.

■ To cancel the programmed track
Press CLEAR (during play, press twice).
The track you programmed last will be cancelled.

■ To cancel all the programmed tracks
Press ■.

For your reference:
During the program play, the selections play in the same order as you programmed them.
Press |◀◀ PREV or NEXT ▶▶| to skip other programmed tracks.

Starting play from a desired track (Direct access play)

Before operation:
Press MENU OFF/ON to set the unit to the regular playback mode.
Direct access play can be operated either in stop mode or play mode.

Press the numeric buttons corresponding to the track number.
All the tracks are played in the original track order starting with the one selected and ending with the final track, and then play stops automatically.

To select a two-digit track number:
First press ≥10/-/--, and then press the numeric button corresponding to the desired track number.

Example:
15: ≥10/-/-- →1→5
20: ≥10/-/-- →2→0

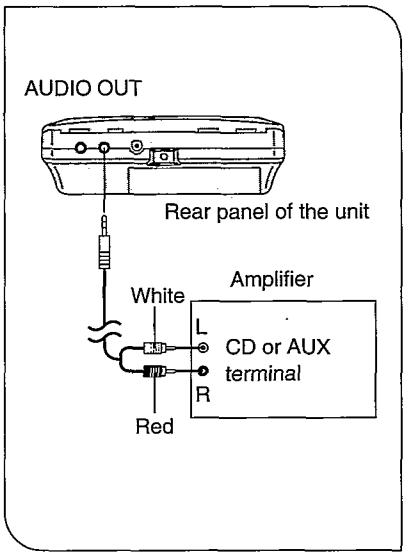
■ USING THE UNIT WITH OPTIONAL ACCESSORIES

Using the unit with an audio system

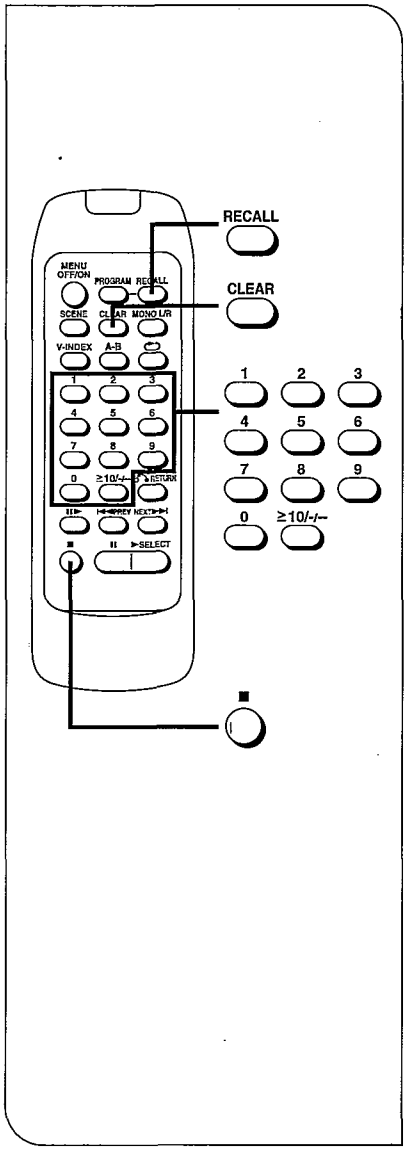
- Adjust the volume level on the amplifier.
- Do not connect the cable to the PHONO jacks on the amplifier.
- When you do not connect the provided yellow pin plug connection cable to the VIDEO OUT terminal, you can only listen to the audio portion of the video CD.
- Obtain the optional connecting cable if the amplifier comes with mini-phone jacks.
- When you connect to the speaker system which has a built-in amplifier, make the connection to the headphones jack (∩).
- When you connect the microphone to an audio system, you can enjoy "KARAOKE" (singing with an accompaniment) by selecting the audio channel using the remote control unit. (See page 11.)

Note

You cannot use this unit with a car audio system.



(Various play using the remote control unit)



AUDIO CHANNEL SELECTION

When you use a multi audio CDs, you can hear only the vocal track or accompaniment by selecting the audio channel.

Press MONO L/R.

Pressing this button once displays the present audio condition. If you press the button continuously, the audio mode will change as follows.

•LR: Accompaniment+vocal A

You can hear an accompaniment (main audio) from the left channel, and vocal track (sub audio) from the right channel.

•L : Accompaniment only B

You can hear an accompaniment (main audio) only.

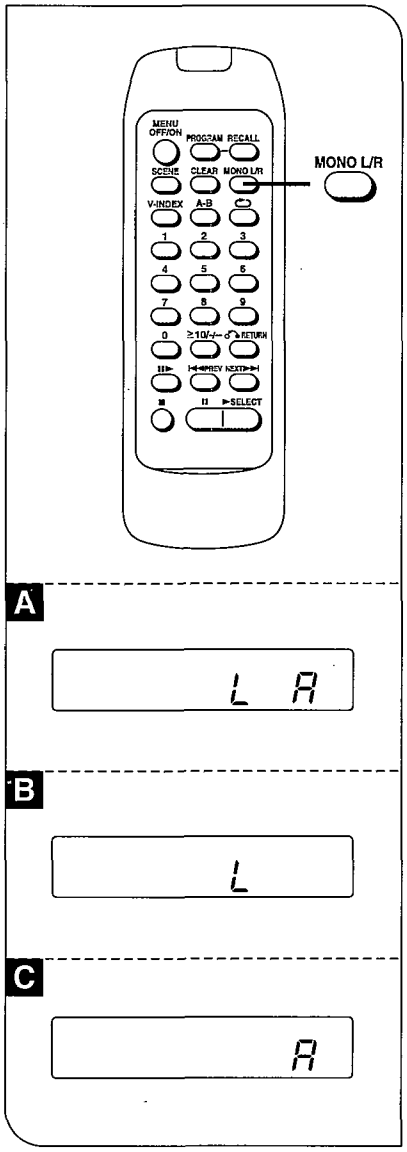
•R : Vocal track only C

You can hear a vocal track (sub audio) only.

(With some discs, accompaniment may be heard)

Note

If you open or close the lid, the audio channel selection retains in the memory. However, the LR mode resumes once the power is turned off and on again.



IF THE TV SCREEN IS IN THE FOLLOWING CONDITION

If the TV screen is in the following condition

- **Picture is smaller than screen.**
- **Picture appears too wide.**
- **Picture movements are not smooth.**

It is possible that software recorded using the NTSC system is being viewed on a PAL type TV.
Set the video format selector on the unit's rear panel to "PAL AUTO".

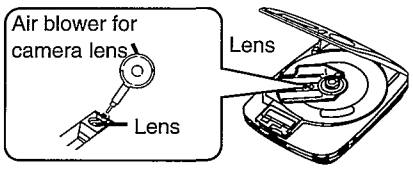
Note

- Depending on the TV set used, the picture may shrink vertically and black bars may appear both at the top and bottom of the screen.
  This is not an indication of a malfunction.
- If the picture remains unchanged even when the switch has been set to the "PAL AUTO" position, set it to the normal viewing position.
- When the picture on the TV is displayed in monochrome or so with AUTO mode, switch the video format selector to PAL mode on this unit.

MAINTENANCE

Maintaining the lens

Open the lid and clean the lens as shown in the figure.
Use a cotton swab to gently wipe off any finger-prints.
Recommended product:
Lens cleaner kit



Maintaining the unit

Wipe the unit with a soft cloth. Remove stubborn dirt using a cloth which has been dipped in water or soapy water and wrung out, and then wipe dry.

- If you intend to use a chemical cleaning cloth, read its directions first.
- Do not use alcohol or paint thinners.

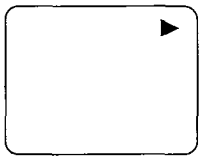
■ CONCERNING THE TV DISPLAY

(On screen display)

You can confirm the unit's operating condition on the TV screen. The display will disappear after a few seconds. ☐: Reference page

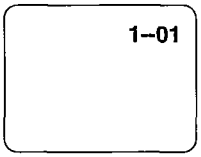
•When starting play

6, 7



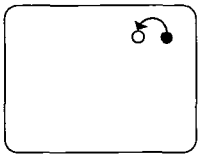
•When selecting a track for program play

10



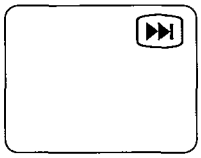
•When returning to the previous menu (RETURN)

6



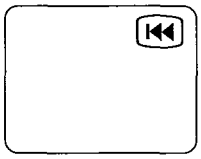
•When advancing to the continuation of the menu (NEXT)

6



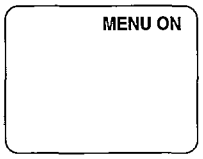
•When returning to the previous screen

6



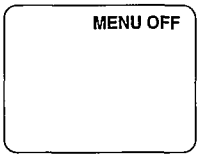
•When making a menu play

6



•When making a regular play

6

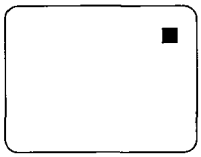


•When stopping the play temporarily

6

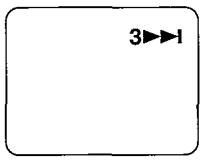
•When stopping the play

6



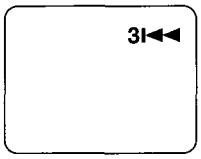
•When skipping forward to the track "3" (track skip)

6



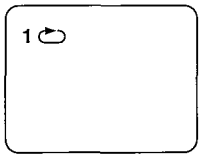
•When skipping backward to the track "3" (track skip)

6



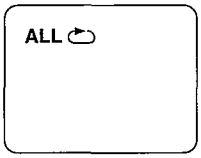
•When repeating only one track (one track repeat)

9



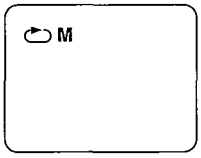
•When repeat all tracks (all repeat)

9



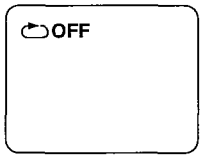
•When repeating the programmed tracks

9



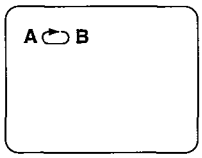
•When canceling the repeat function

9



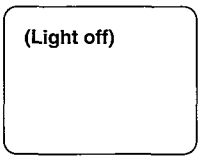
•When repeating a particular section (A–B repeat)

9



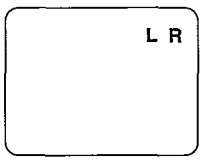
•When canceling the A–B repeat function

9



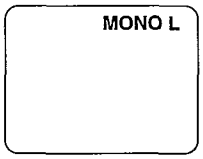
•When changing the audio channel to select "accompaniment+vocal track" channel

11



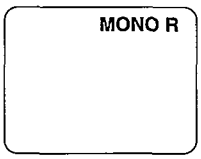
•When changing the audio channel to select "accompaniment" channel only

11



•When changing the audio channel to select "vocal" channel only

11



When you making a frame skip, video index search, or scean playback, the operating conditions is also displayed on the TV screen.

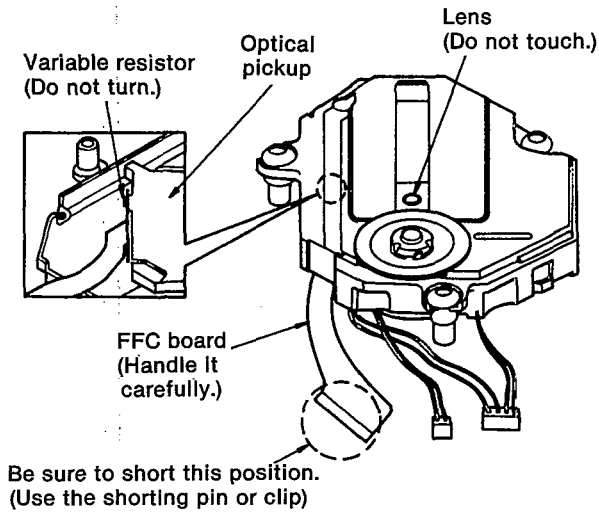
Besides, the display is varied depending on discs.

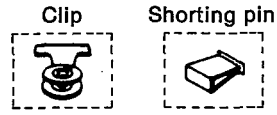
■ HANDLING PRECAUTIONS FOR TRAVERSE DECK

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

• Handling of traverse deck (optical pickup)

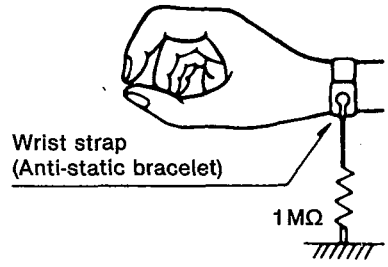
1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To prevent the breakdown of the laser diode, an antistatic shorting pin is inserted into the flexible board (FFC board).
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board (FFC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.





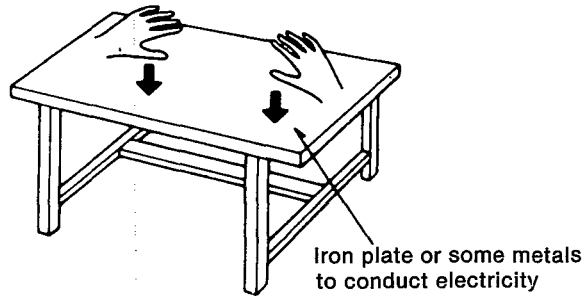
• Grounding for electrostatic breakdown prevention

1. Human body grounding.
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.



Caution:

The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).



■ OPERATION CHECKS AND MAIN COMPONENT REPLACEMENT PROCEDURES

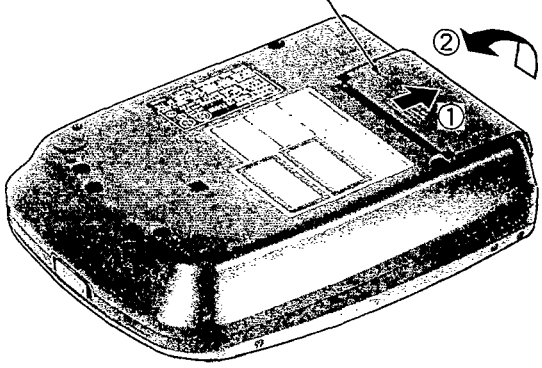
Warning: This product uses a laser diode. Refer to caution statements on page 2.
ACHTUNG: • Die lasereinheit nicht zerlegen.
• Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

NOTE

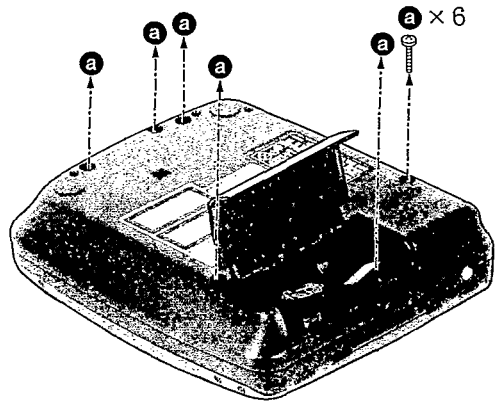
1. **This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.**
2. **For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.**
3. **Illustrated screws are equivalent to actual size.**
4. **〔 〕 indicates parts No.**

Checking for the video P.C.B.(Front side)

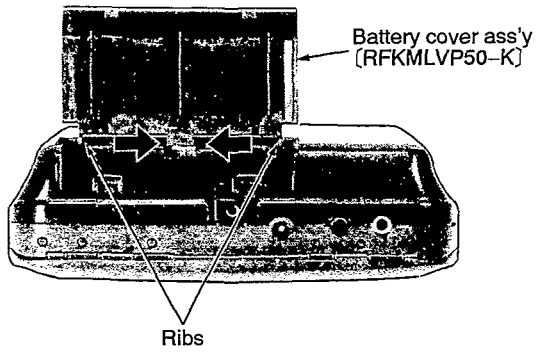
Step 1
Open the battery cover ass'y.



Step 2
Remove the 6 screws.



■ Removal of the battery cover ass'y

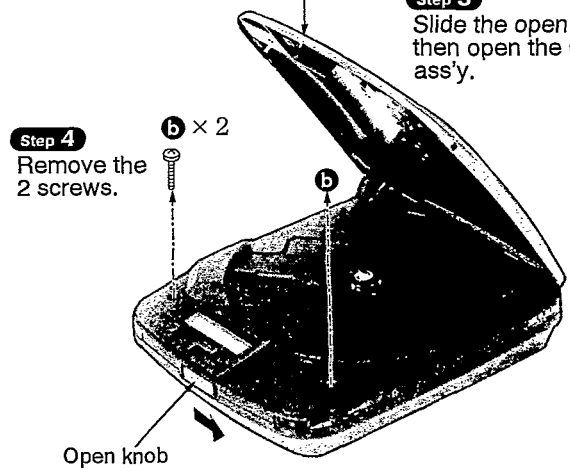


• Release the ribs in the direction of arrow.

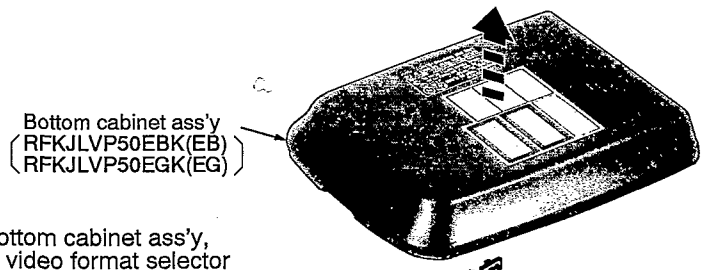
CD cover ass'y

Step 3
Slide the open knob and then open the CD cover ass'y.

Step 4
Remove the 2 screws.

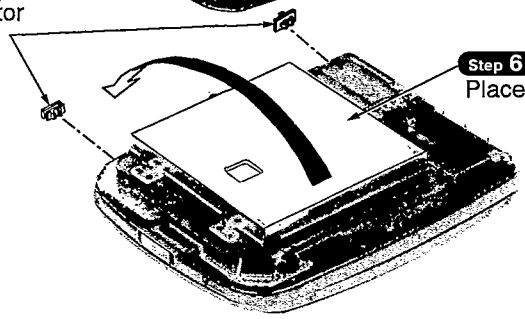


ⓐ, ⓑ
〔XTN17+6GFZ〕



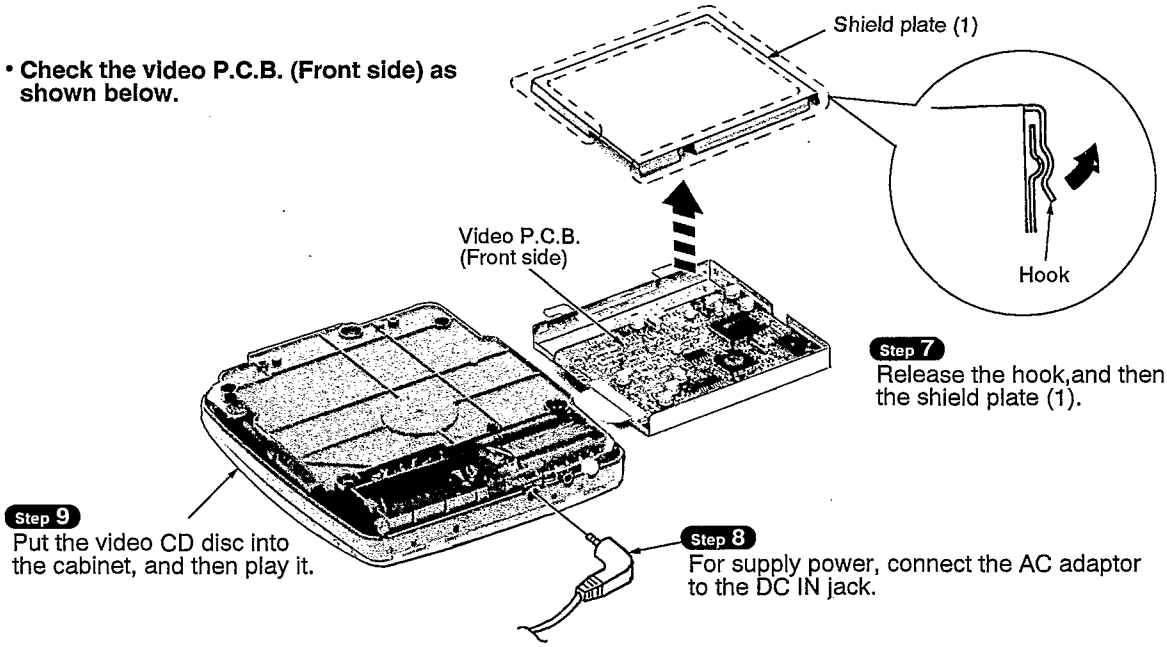
Step 5
Remove the bottom cabinet ass'y.

NOTE
When removing bottom cabinet ass'y, the hold knob and video format selector knob will be also removed.
So, take care not lose the hold knob and video format selector knob.



Step 6
Place the shield case aside the main cabinet.

- **Check the video P.C.B. (Front side) as shown below.**



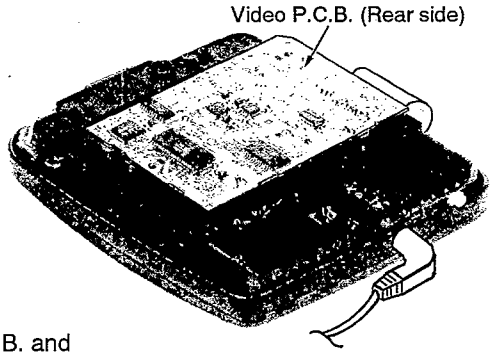
Step 7
Release the hook,and then remove the shield plate (1).

Step 8
For supply power, connect the AC adaptor to the DC IN jack.

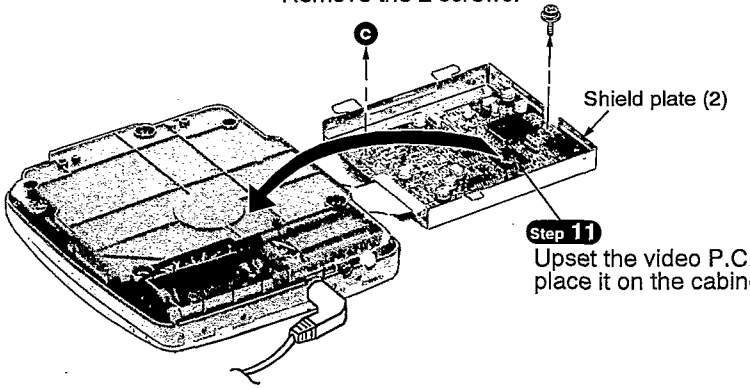
Step 9
Put the video CD disc into the cabinet, and then play it.

Checking for the video P.C.B.(Rear side)

- **Check the video P.C.B. (Rear side) as shown below.**



Step 10
Remove the 2 screws. ⓒ × 2



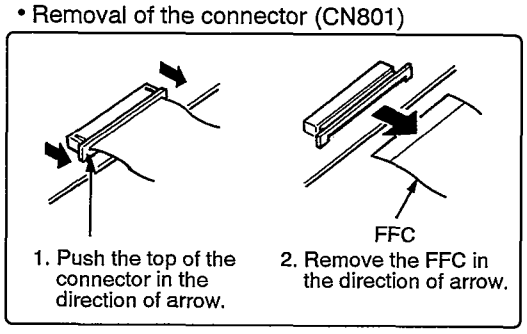
Step 11
Upset the video P.C.B. and place it on the cabinet.

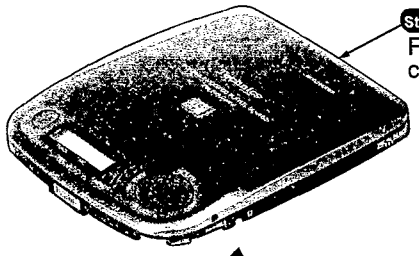
ⓒ [XYC26+JF6]

Checking for the main P.C.B.(Component side)

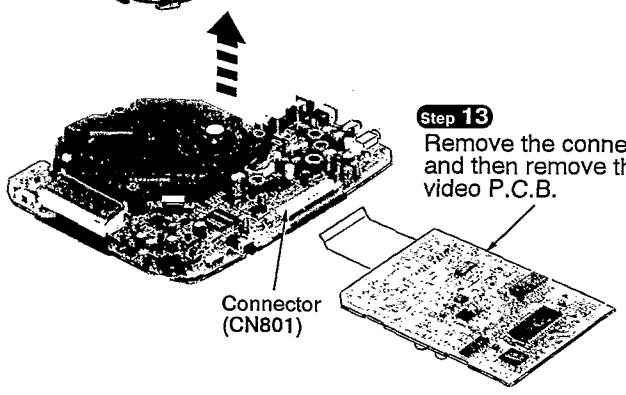
NOTE
After checking the video P.C.B., pull the AC adaptor and take the video CD disc out the cabinet.

• Removal of the connector (CN801)



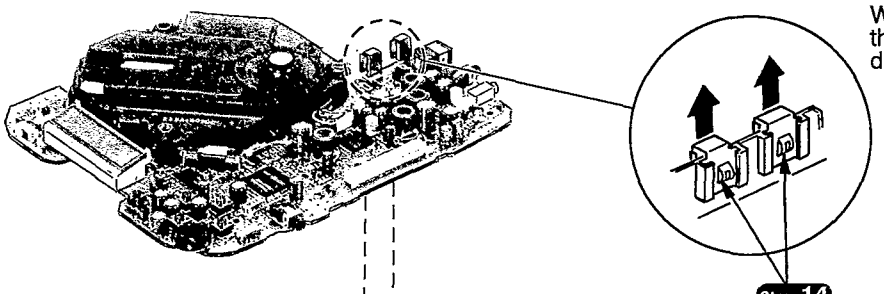


Step 12
Remove the intermediate cabinet ass'y.



Step 13
Remove the connector, and then remove the video P.C.B.

NOTE
When removing the video P.C.B., the AC adaptor must be disconnercted.

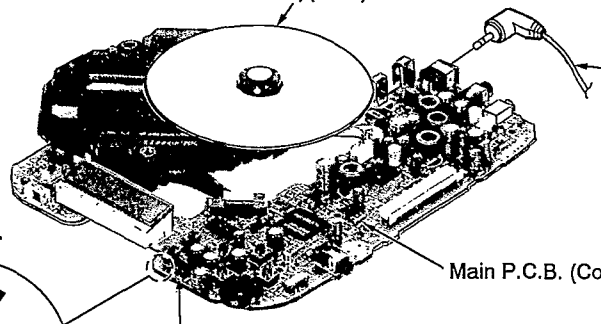


Step 14
Pull the battery terminals.

Step 15
Remove the mechanism chassis.

• **Check the main P.C.B. (Component side) as shown below.**

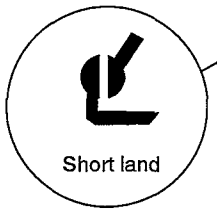
Step 17
Set the CD–DA(Conventional CD only with audio tracks)(8cm).



Step 18
For supply power, connect the AC adaptor to the DC IN jack.

Step 16
Short–circuit the land by soldering.

Main P.C.B. (Component side)

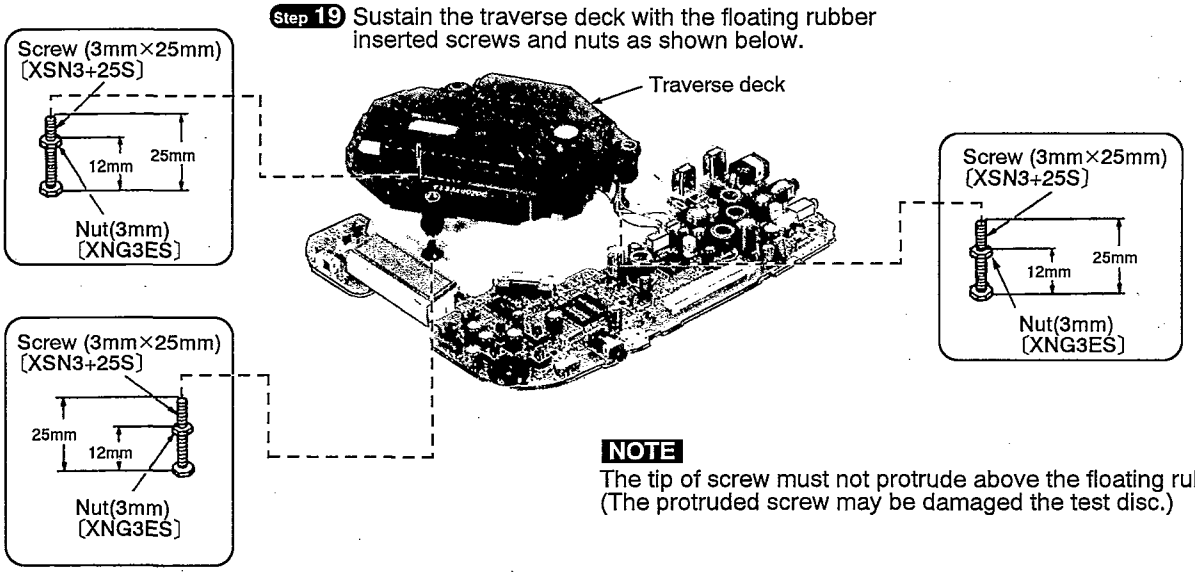


Laser ON/OFF switch (S201)

NOTE
After checking, unsolder the short land to open circuit.

• Prepare the following procedures when checking the unit with test disc or CD–DA (Conventional CD only with audio tracks) (16cm)

Step 19 Sustain the traverse deck with the floating rubber inserted screws and nuts as shown below.



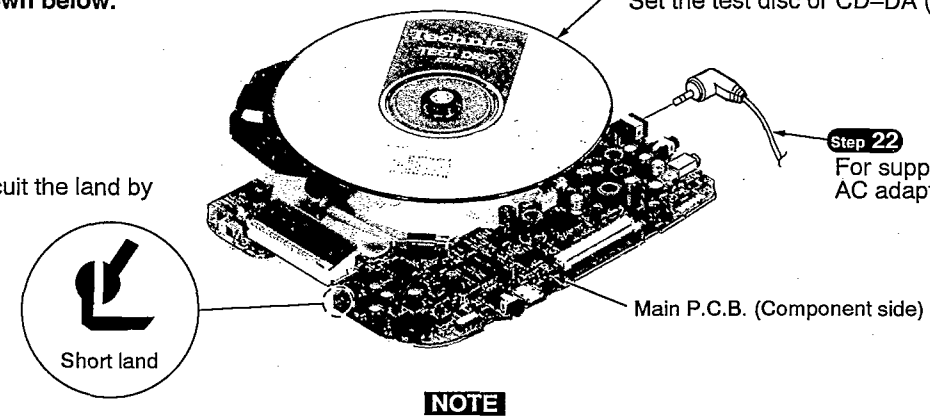
NOTE
The tip of screw must not protrude above the floating rubber. (The protruded screw may be damaged the test disc.)

• Check the main P.C.B. (Component side) as shown below.

Step 21 Set the test disc or CD–DA (16cm).

Step 20 Short–circuit the land by soldering.

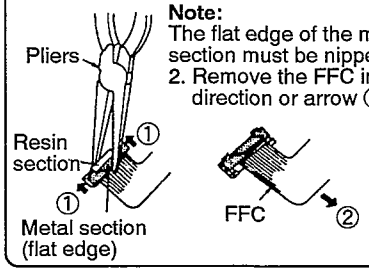
Step 22 For supply power, connect the AC adaptor to the DC IN jack.



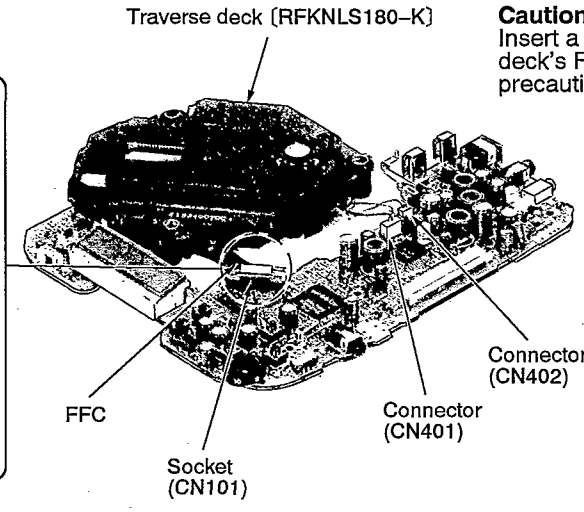
NOTE
After checking, unsolder the short land to open circuit.

■ Removal of the traverse deck

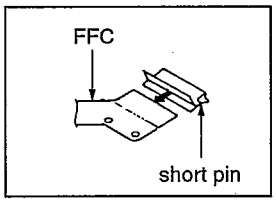
Removal of the FFC.
1. Nip the metal and resin sections of the socket with a pair of pliers and then move the metal section in the direction of arrows ①.



Note:
The flat edge of the metal section must be nipped.
2. Remove the FFC in the direction or arrow ②.



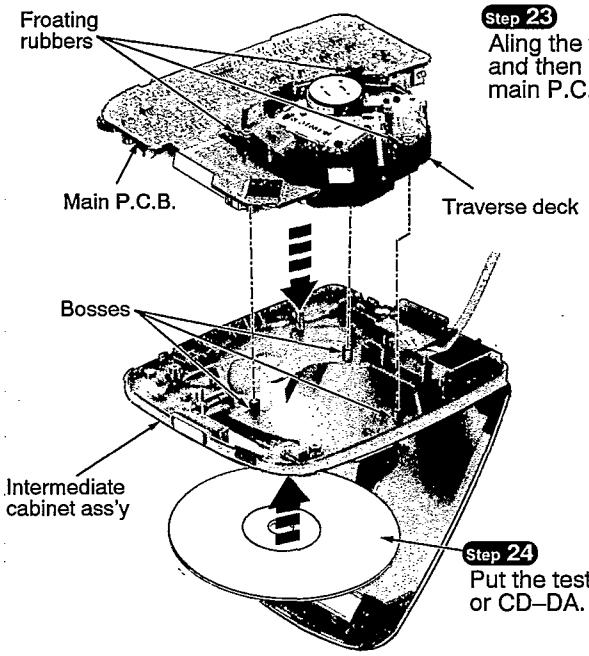
Caution:
Insert a short pin into the traverse deck's FFC.(Refer to "handling precautions for traverse deck" on page 13)



• Remove the 2 connectors and socket.

Checking for the main P.C.B.(Solder side) and mechanical adjustment

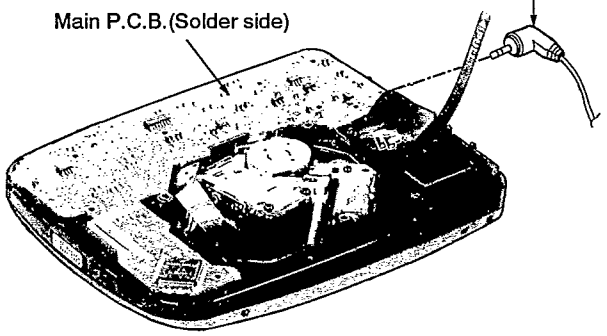
NOTE
After checking the main P.C.B. (Component side), remove the AC adaptor and test disc or CD–DA (Conventional CD only with audio tracks).



Step 23
Aling the floating rubbers with the boss, and then install the traverse deck and main P.C.B. to the intermediate cabinet.

Step 24
Put the test disc or CD–DA.

Step 25
For supply power, connect the AC adaptor to the DC IN jack.



• When performing the mechanical adjustment, place the unit as shown above.
Refer to the mechanical adjustment in "MEASUREMENTS AND ADJUSTMENT" on page 18 and 19.

■ MEASUREMENTS AND ADJUSTMENTS

Warning: This product uses a laser diode. Refer to caution statements on page 2.
ACHTUNG: • Die lasereinheit nicht zerlegen.
• Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

• Measuring instruments and special tools

• Test discs
1. Playability test disc (SZZP1054C)
2. Uneven test disc (SZZP1056C)

- Lock paint (RZZ0L01)
- Musical program disc (ordinary)
- Lead wire (for test points)
- Allen wrench (M2.0) (SZZP1101C)
- DC voltmeter

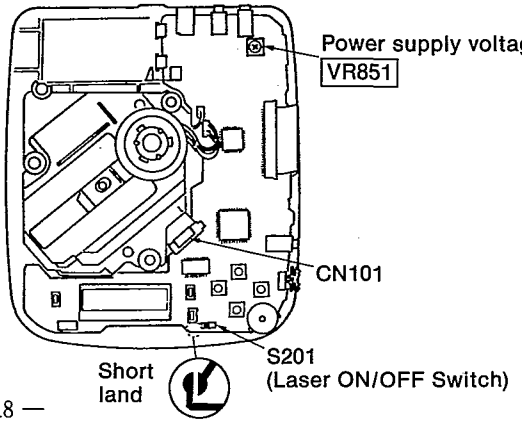
• Test short land

Short-circuit the lands of the laser ON/OFF switch (S201) by soldering them. It turns "ON" position. (Refer to below figure or printed circuit board and wiring connection diagram for short land location on pages 35~36.)

Note: Remove the solders from the lands after adjustment.

• Adjustment point

Notes: 1. Please refer to the printed circuit board and wiring connection diagram for test point locations.
2. Take care to connect CN101.

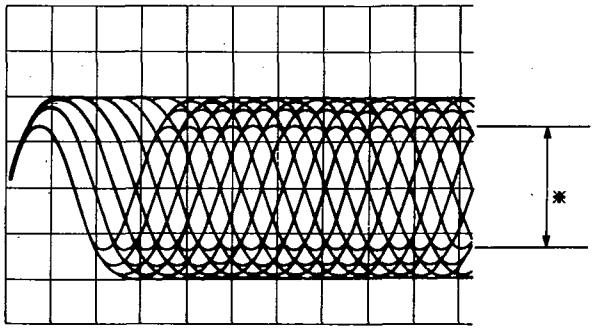


• **Adjustment procedure**

(1) MECHANICAL ADJUSTMENT

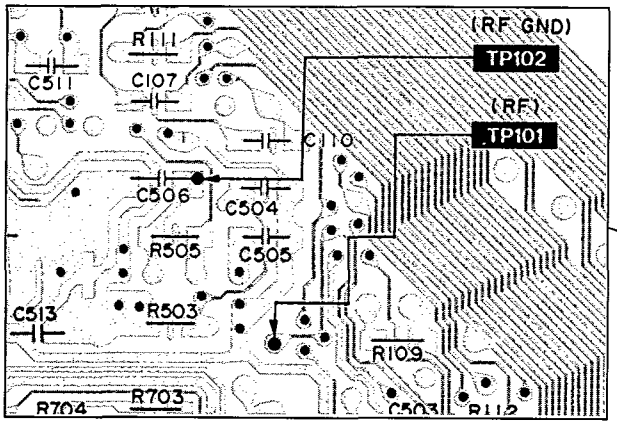
- When the traberse deck is replaced, making adjustments is not necessary. (The traverse deck ass'y is already adjusted.)
- Make adjustments to improve playability if the traverse deck has not been replaced.

1. Connect the oscilloscope's CH. 1 probe across **TP101** (RF) (+) and **TP102** (RF GND) (−) on the P.C.B.
   Oscilloscope setting: VOLT 100mV
   SWEEP ..... 0.5μs.
   Input coupling ..... AC
2. Switch the player power **ON**, and play track **9** on the test disc (SZZP1056C).
   (Playing any other track will prevent, the HEX screws from being accessed.)
3. Alternately adjust the HEX screws with the 2.0mm allen wrench (SZZP1101C) until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched. (Refer to Fig. 1 and Fig. 2)
4. After completing the adjustment, lock the HEX screws with lock paint (RZZ0L01).



※ Most stretched eye pattern.

Fig. 1



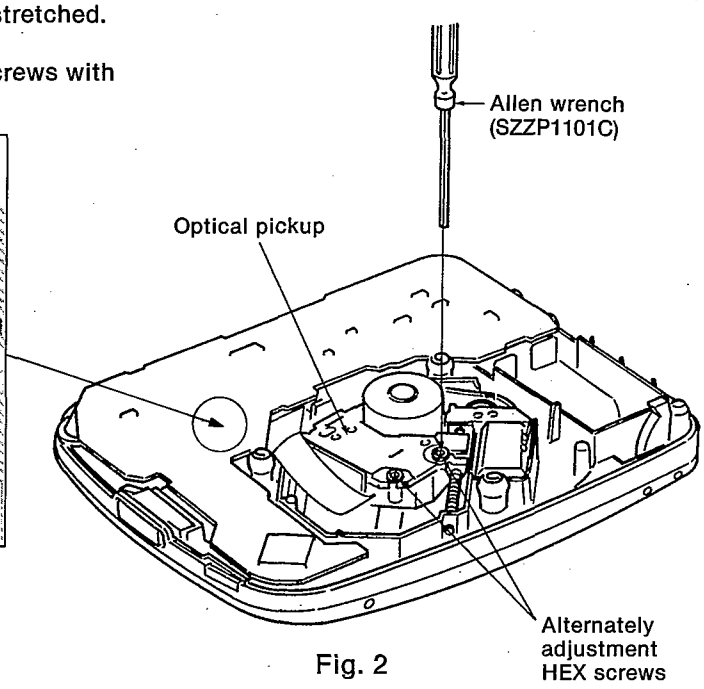


Fig. 2

(2) POWER SUPPLY VOLTAGE ADJUSTMENT

1. Connect the DC voltmeter to **TP103** (VCC) (+) and **TP104** (GND) on the P.C.B.
2. Connect the AC adaptor cord to the DC (IN) port. (Use a new dry cell battery or a rechargeable battery that is full charged.)
3. Connect the connection cable to the video out jack.
4. Insert the CD-DA (Conventional CD only with audio tracks), and switch the player power ON.
5. Switch the player power **OFF**.
6. Adjust VR851 on the P.C.B. at **4.76~4.80V**.

(3) CHECK OF PLAY OPERATION

＊Checking Skip Search

1. Play an ordinary musical program disc.
2. Press the skip button to check for normal skip search operation (in both the forward and backward directions).

＊Checking Manual Search

1. Play an ordinary musical program disc.
2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and backward directions).

＊Checking Playability

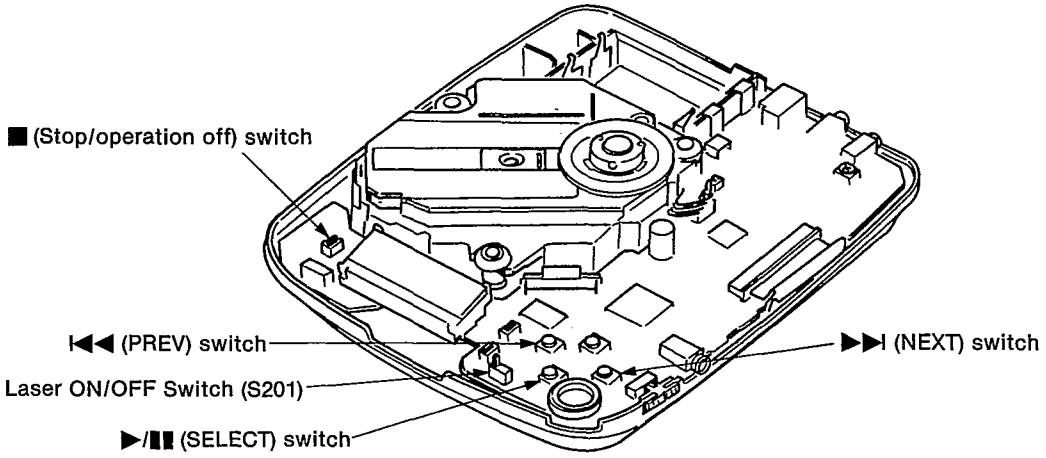
1. Play the 0.7mm black dot and the 0.7mm wedge on the playability test disc (SZZP1054C) and verify that no sound skip or noise occurs.
2. Play the middle tracks of the uneven test disc (SZZP1056C) and verify that no sound skip or noise occurs.

■ AUTOMATIC ADJUSTMENT RESULTS DISPLAY FUNCTION (SELF-CHECK FUNCTION)

On this unit (SL-VP50), each automatic adjustment result are displayed on the LCD. This function is convenient to check or identify which automatic adjustment circuit is incorrect. The followings are the contents of the automatic adjustment result displays (self-check function).

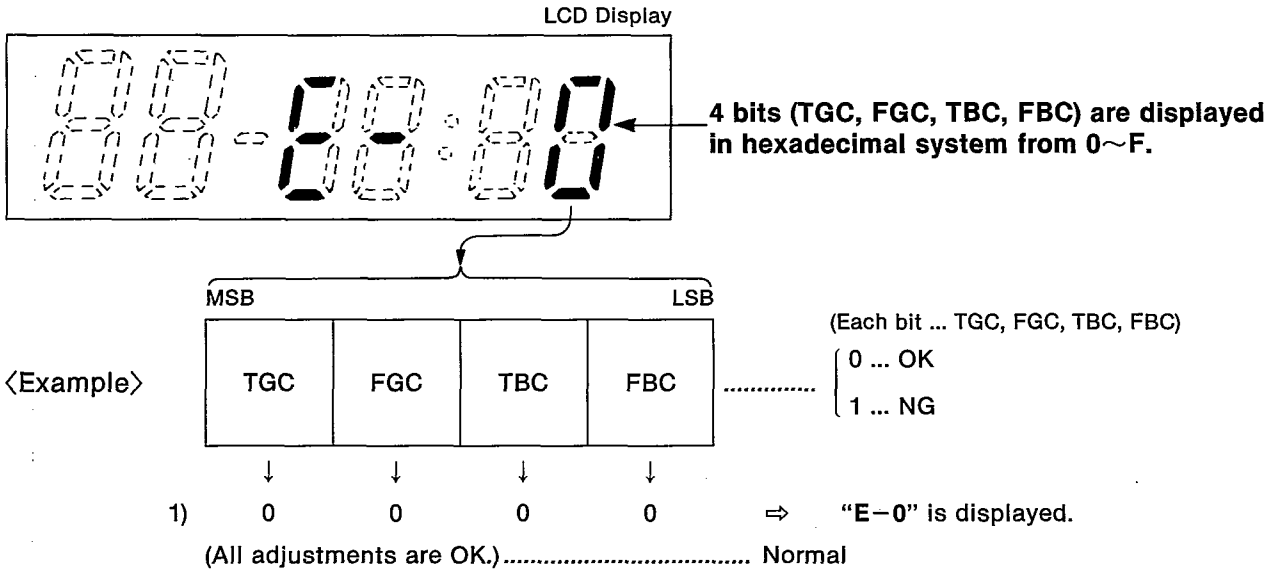
• How to display automatic adjustment results

1. Disassemble the unit into the following state, in which the CD lid and intermediate cabinet are removed. (Complete Step 1 through Step 4 in "Operation checks and main component replacement procedures" on page 12.)



2. Load the test disc (SZZP1054C).
3. Press the Laser ON/OFF Switch (S201).
4. Press the I◀◀ (PREV) and ▶▶I (NEXT) switchs simultaneously and hold them, and additionally press the ▶/▮▮ (SELECT) switch.
5. Press the ■ (STOP/OPERATION OFF) switch once.
6. An automatic adjustment result is displayed on the LCD.

• Display of automatic adjustment results (self-check function)



2) 0 0 0 1 ⇨ "E−1" is displayed.
(OK) (OK) (OK) (NG)
(Focus balance adjustment is NG (incorrect.))

3) 0 1 0 0 ⇨ "E−4" is displayed.
(OK) (NG) (OK) (OK)
(Focus gain adjustment is NG.)

4) 1 1 1 1 ⇨ "E−F" is displayed.
(All adjustments are NG.)

〈Example〉 **Follow the below steps when "E−1" is displayed.**

(Cause: Focus balance (FBC) is set beyond the limit.)
• Check if
(1) R101 (4 resistors) is not defective by measuring the value,
(2) the waveform or voltage of the focus servo circuit is correct, and
(3) the optical pickup returns to the normal state by exchanging the traverse deck.

Follow the below steps when "E−4" is displayed.

(Cause: Focus gain (FGC) is set beyond the limit.)
• Check if
(1) the waveform or voltage of the focus servo circuit is correct,
(2) the focus coil of the optical pickup is correct (around 8 ohms), and
(3) the optical pickup returns to the normal state by exchanging the traverse deck.

Follow the below steps when "E−F" is displayed.

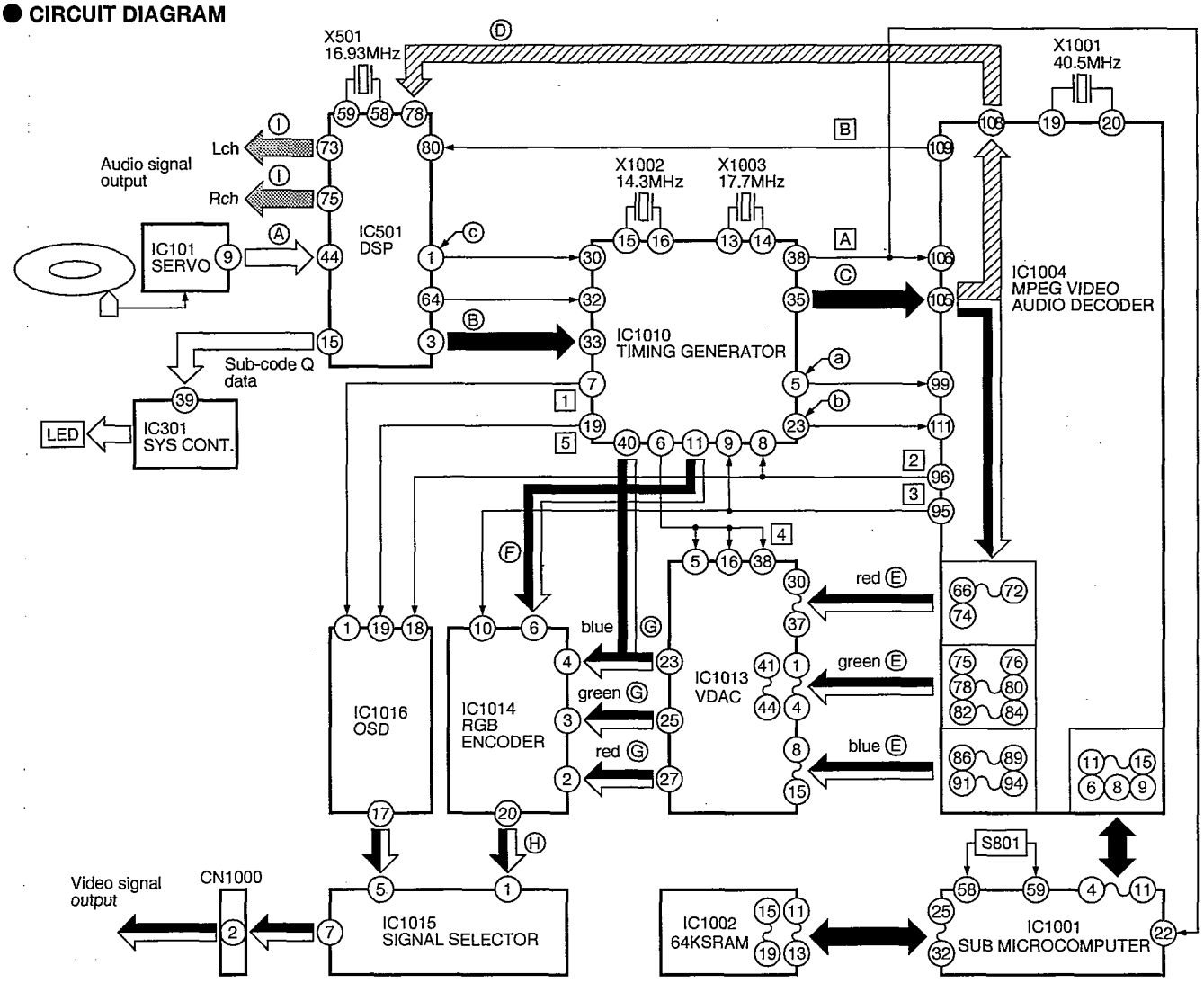
(Cause: All adjustments (TGC, FGC, TBC, FBC) are set beyond the limit.)
• Check if
(1) the optical pickup returns to the normal state by exchanging the traverse deck, and
(2) the waveform or voltage of the servo IC's (IC101, 501) are correct.

Note:
It is not always necessary to exchange the traverse deck when an error message is displayed. Be sure to check if the circuit is defective or not before exchanging the traverse deck.

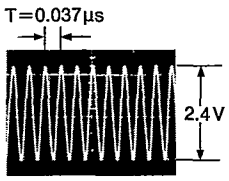
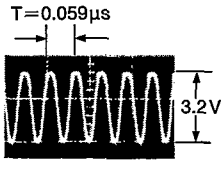
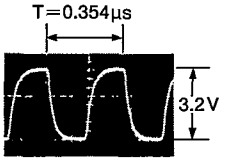
Note:
If any other disc than the test disc (SZZP1054C) is used, an error message may be displayed. This is not a malfunction.

■TROUBLESHOOTING GUIDE

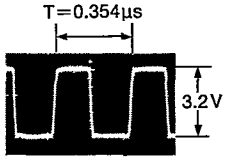
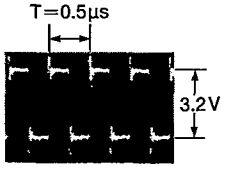
● CIRCUIT DIAGRAM



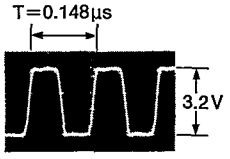
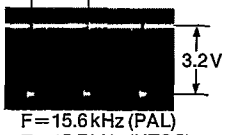
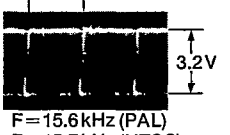
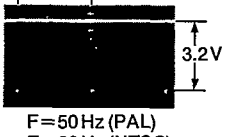
MASTER CLOCK SYSTEM WAVEFORM

ⓐ Video read clock	ⓑ Audio read clock	ⓒ Write reference clock
		
T=0.037µs, 2.4V	T=0.059µs, 3.2V	T=0.354µs, 3.2V
F=27MHz	F=16.9344MHz	F=2.822MHz

AUDIO DATA CLOCK SYSTEM WAVEFORM

Ⓐ CD bit clock	Ⓑ Audio bit clock
	
T=0.354µs, 3.2V	T=0.5µs, 3.2V
F=2.822MHz	F=2MHz

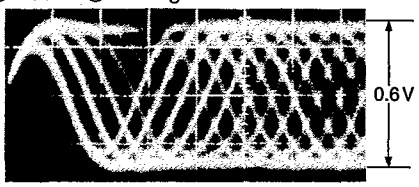
VIDEO DATA CLOCK SYSTEM WAVEFORM

[1] Character display clock	[2] Horizontal sync. clock	[3] Composite sync. clock	[4] Pixel clock	[5] Vertical sync. clock
				
T=0.148µs, 3.2V	T=64µs (PAL) T=63.5µs (NTSC), 3.2V	T=64µs (PAL) T=63.5µs (NTSC), 3.2V	T=0.074µs, 3.0V	T=20ms (PAL) T=16.7ms (NTSC), 3.2V
F=6.75MHz	F=15.6kHz (PAL) F=15.7kHz (NTSC)	F=15.6kHz (PAL) F=15.7kHz (NTSC)	F=13.5MHz	F=50Hz (PAL) F=60Hz (NTSC)

DATA SIGNAL LINE WAVEFORMS

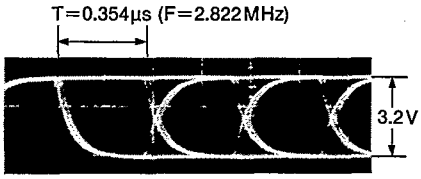
Note: Use the PVCD_K06 video CD test disc (menu playback feature is available on version 2.0). For color bar display, play back the 1st track when the menu playback feature is used, or the 3rd track when the feature is not used.

Ⓐ IC501 ㊹ RF signal



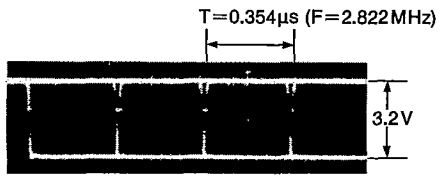
PLAY X: 0.5µs
Y: 0.02V×10

Ⓑ IC1010 ㊸ CD serial data input



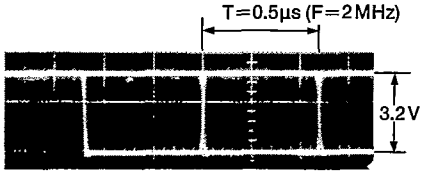
PLAY X: 0.2µs
Y: 0.2V×10

Ⓒ IC1010 ㉟ CD serial data output



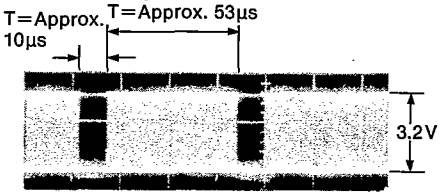
PLAY X: 0.2µs
Y: 0.2V×10

Ⓓ IC1004 ⑩ Audio serial data output



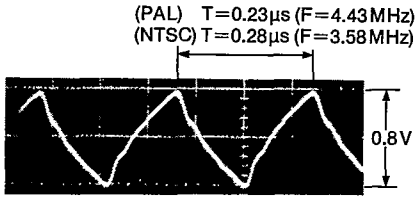
PLAY X: 0.2µs
Y: 0.2V×10

Ⓔ IC1013 ㉚~㉗, ①~④, ㊶~㊹, ⑧~⑮ (red, blue, green) data input



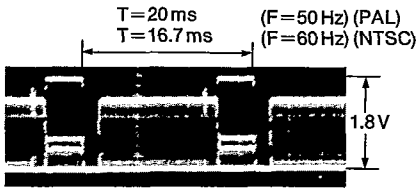
PLAY X: 20µs
Y: 0.2V×10

Ⓕ IC1014 ⑥ Subcarrier signal input



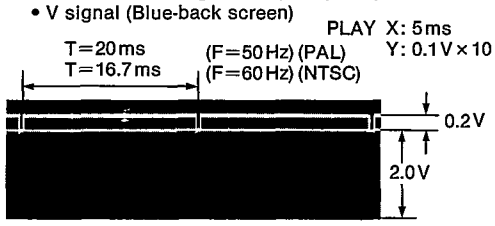
PLAY X: 0.1µs
Y: 0.05V×10

Ⓖ IC1013 ㉓ ㉕ ㉗ Analog color (blue, green, red) output
• V signal (color bar screen)



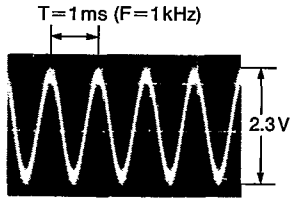
PLAY X: 5ms
Y: 0.1V×10

Ⓖ IC1013 ㉓ Analog color (blue) output
• V signal (Blue-back screen)



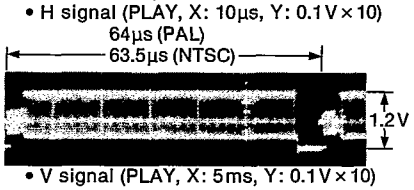
• The blue-back signal is output at pin ㉓. It is superimposed with a 2V (DC) signal, as shown above. The signals at ㉕ and ㉗ are always 2V.

① IC501 ㉓, ㉕ Audio signal output

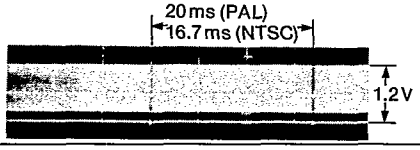


• Test disc played at 1kHz, 0dB (1st track. SZZP1056C)
PLAY X: 1ms
Y: 0.1V×10

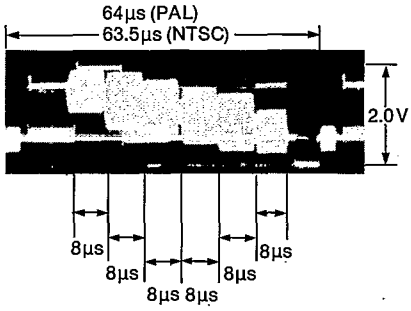
Ⓗ IC1014 ⑳ Video signal output (Blue-Back screen)
• H signal (PLAY, X: 10µs, Y: 0.1V×10)



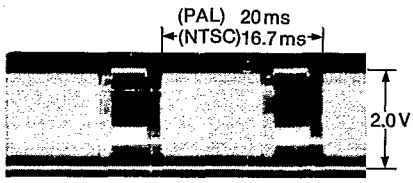
• V signal (PLAY, X: 5ms, Y: 0.1V×10)



(color bar screen)
• H signal (PLAY, X: 10µs, Y: 0.1V×10)



• V signal (PLAY, X: 5ms, Y: 0.1V×10)

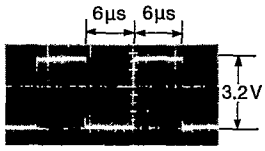
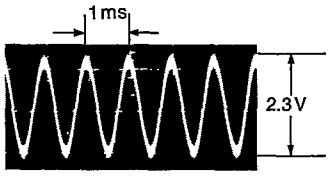


■ DIAGNOSTIC PROCEDURES BY SYMPTOM

Symptom		
CD-DA	**Video-CD**	**Likely location of fault**
TOC NG	TOC NG (both audio and video are NG.) Blue back display	For TOC NG, fault in the CD-DA cirucit. IC101, IC501, IC11, or traverse system
Turntable fails to rotate.	Fails to rotate.	Traverse system, focus servo system (IC101, IC11), supply line, clock line, system control (IC301)
Turntable rotates.	Rotates.	Traverse system, tracking servo system/CLV servo system/traverse servo system (IC101, IC501, IC11)
Audio normal	Audio normal, Video NG.	IC1013, IC1014, IC1015
Audio normal	No sound, Video NG.	IC1010, IC1004, IC1013, IC1014, IC1015
TOC OK, counter OK, but no sound.	TOC OK, counter OK, but no sound and video NG.	CD disc other than DV 'Karaoke' soft, video CD and CD-DA

Troubleshooting Procedure 1	CD-DA	No sound

CD-DA: Compact disc digital autio (conventional CD only with audio tracks)

Troubleshooting flowchart	Likely location of fault
Load a CD-DA disc.	
Press the SELECT (▶II) button to start playback.	
Press the STOP/OPR OFF (■) button to stop playback.	
TOC display normal? (Are track No. and time displays normal?) NO	Traverse deck, IC101, IC501 (Refer to Checking the operation problems on the traverse deck (optical pickup) on page 26.)
YES	
Press the SELECT (▶II) button to start playback.	
Does sound dropout occur? NO → Normal (go to procedure 2-1.)	
YES	
Check pin ⑭ of IC501 or pin ㉗ of CN1000.	
(Check) Constant low (0V) Level ——— 0V	
(Check) The following waveform is observed either intermittently or constantly during playback. 	Fault is in the traverse deck or main board (servo block).
Are the following waveforms present at pins ⑬ and ⑮ of IC501 when the 1kHz, 0dB portion of the 1st track on test disc SZZP1056C is played back?  NO	IC501
YES	IC501 or higher (VR701, IC701, headphones jack, etc.)

Troubleshooting Procedure 2-1	Video CD	No picture or No sound

Troubleshooting flowchart

Likely location of fault

Load a video CD disc.

Press the SELECT(▶II) button to start playback.

Connected to TV / Not connected to TV

Dose the menu appear on screen? NO

YES

Press the STOP/OPR OFF(■) button to stop playback.

TOC display normaly? (Are track NO. and time displays normal?) NO → Traverse deck, IC101, IC501

YES

Press the Menu (+, −) to select the menu. Press the SELECT (▶II) to start playback.

Image noise or unstable picture. NO → Normal

YES

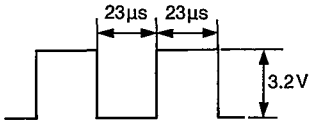
NO

YES Is the sound unstable?

Check the waveforms at pin ⑭ of IC501 or pin ㉗ of CN1000.

(Check) Constant low (0V) Level ——— 0V

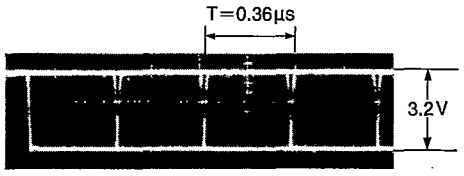
(Check) The following waveform is observed either intermittently or constantly during playback.



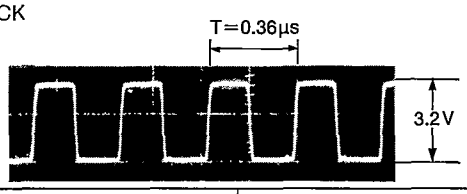
→ Fault is in the traverse deck or main board (servo block).

Are the following waveforms present at pins ㉟, ㊳ of IC1010.

㉟ CDDATA



㊳ CDSCK



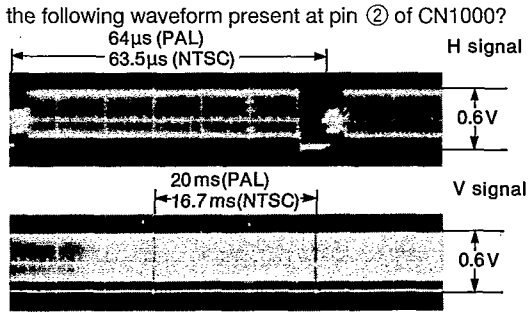
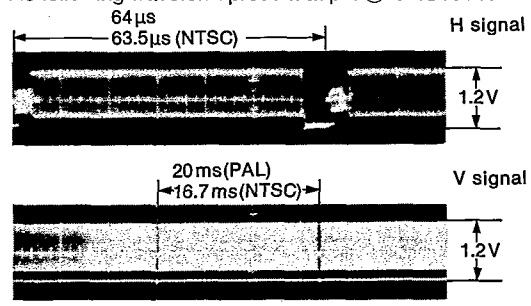
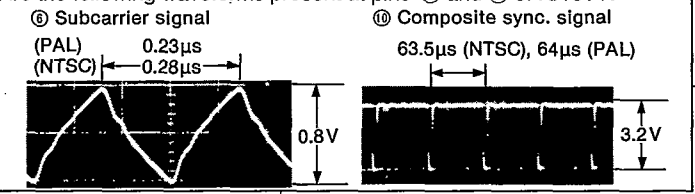
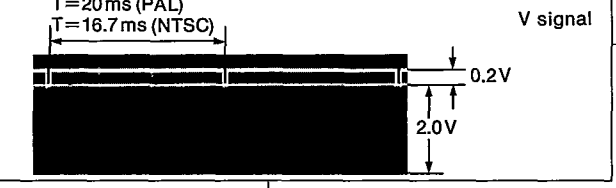
NO → IC1010

YES

Video line → Procedure 2-3

Audio line → Procedure 2-4

Troubleshooting Procedure 2-2	Video CD blue back	No blue back

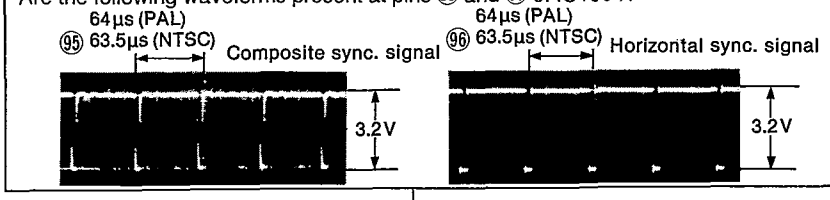
Troubleshooting flowchart	Likely location of fault
Load a video CD disc.	
Press the SELECT (▶II) button to start playback.	
Press the STOP/OPR OFF (■) button to stop playback.	
Does blue-back screen appear? YES → Normal	
NO	
Is the following waveform present at pin ② of CN1000?  YES	Fault is in the main board (video output block).
NO	
Is the following waveform present at pin ⑳ of IC1014?  YES	IC1015
NO	
Are the following waveforms present at pins ⑥ and ⑩ of IC1014?  NO	IC1010 IC1004
YES	
Is the following waveform present at pin ㉓ of IC1013?  NO	IC1013 IC1004
YES	IC1014

Troubleshooting Procedure 2-3	Video portion of video CD	No picture

Troubleshooting flowchart	Likely location of fault

● Video signal line

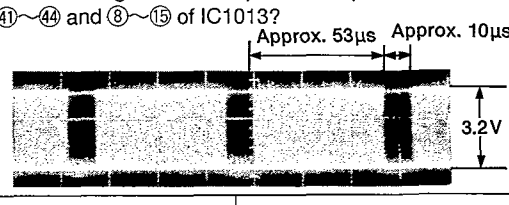
Are the following waveforms present at pins ⑮ and ⑯ of IC1004?



NO → IC1004

YES

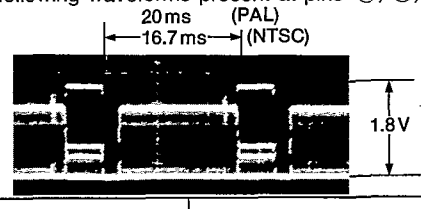
Are the following waveforms present at pins ㉚~㊲, ①~④, ㊶~㊹ and ⑧~⑮ of IC1013?



NO → IC1004

YES

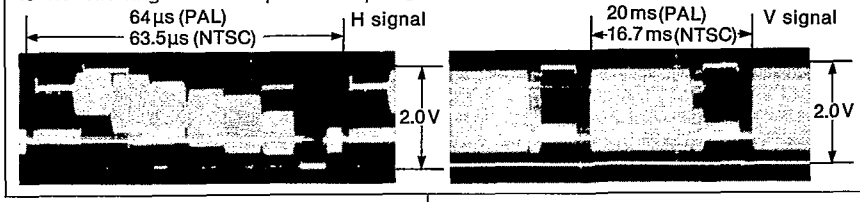
Are the following waveforms present at pins ㉓, ㉕, ㉗ of IC1013?



NO → IC1013

YES

Is the following waveform present at pin ⑳ of IC1014 when color bar is on the screen?



NO → IC1014

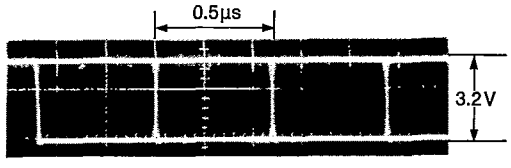
YES → IC1015 or beyond

Troubleshooting Procedure 2-4	Audio portion of video CD	No sound

Troubleshooting flowchart	Likely location of fault

● Audio signal line

Is the following waveform present at pin ⑩⑧ of IC1014.

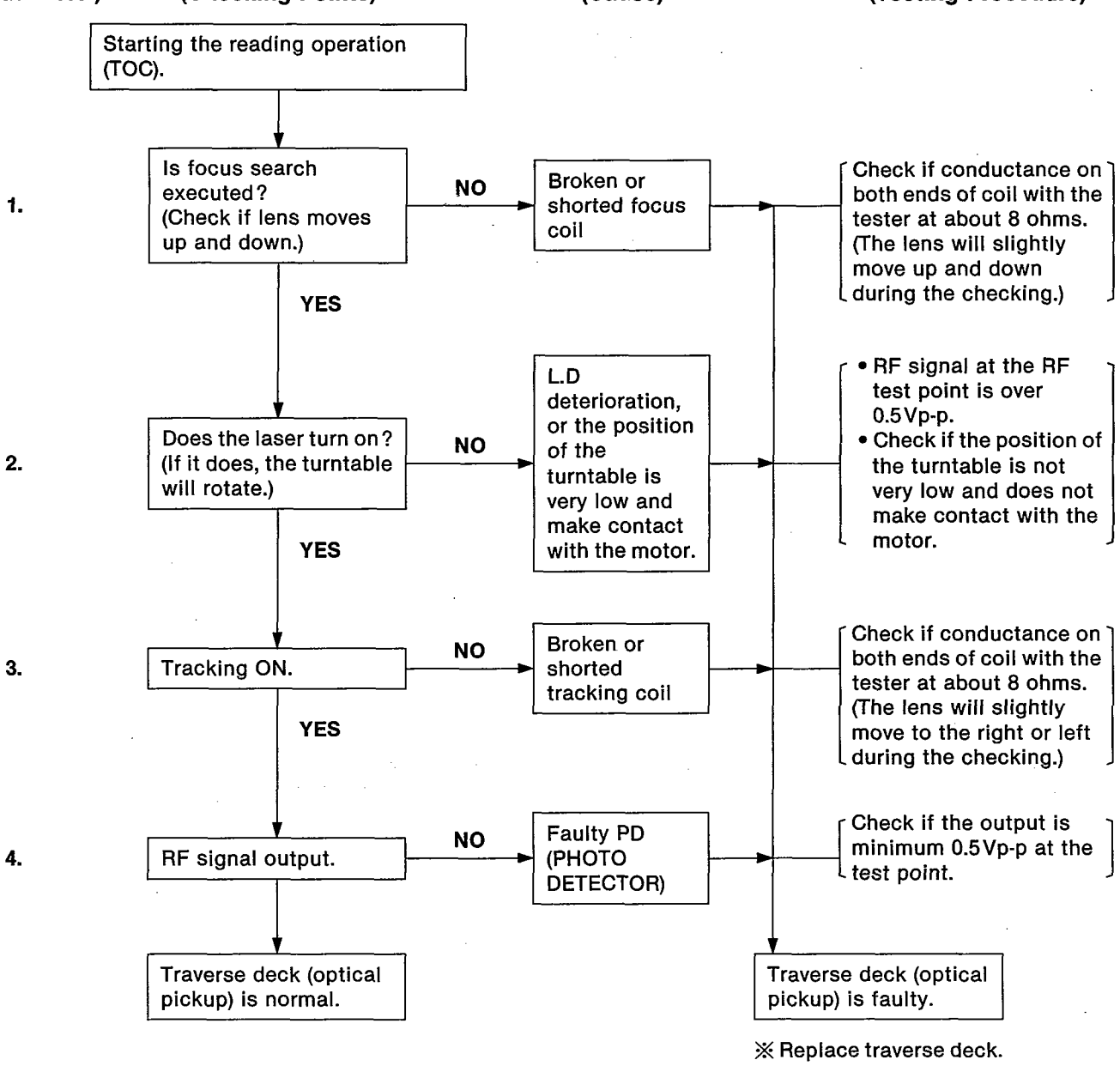


NO → IC1004

YES → IC501

■ CHECKING THE OPERATION PROBLEMS ON THE TRAVERSE DECK (OPTICAL PICKUP)

Make sure to follow the procedures below to check the operation problems of the traverse deck (optical pickup) before replacing it. Replace the traverse deck only after the problem is identified.
Use the CD-DA (Conventional CD only with audio tracks).



※ Replace traverse deck.

- Check electrical circuit.
- Check for flaws on disc or if it is warped or not centered.

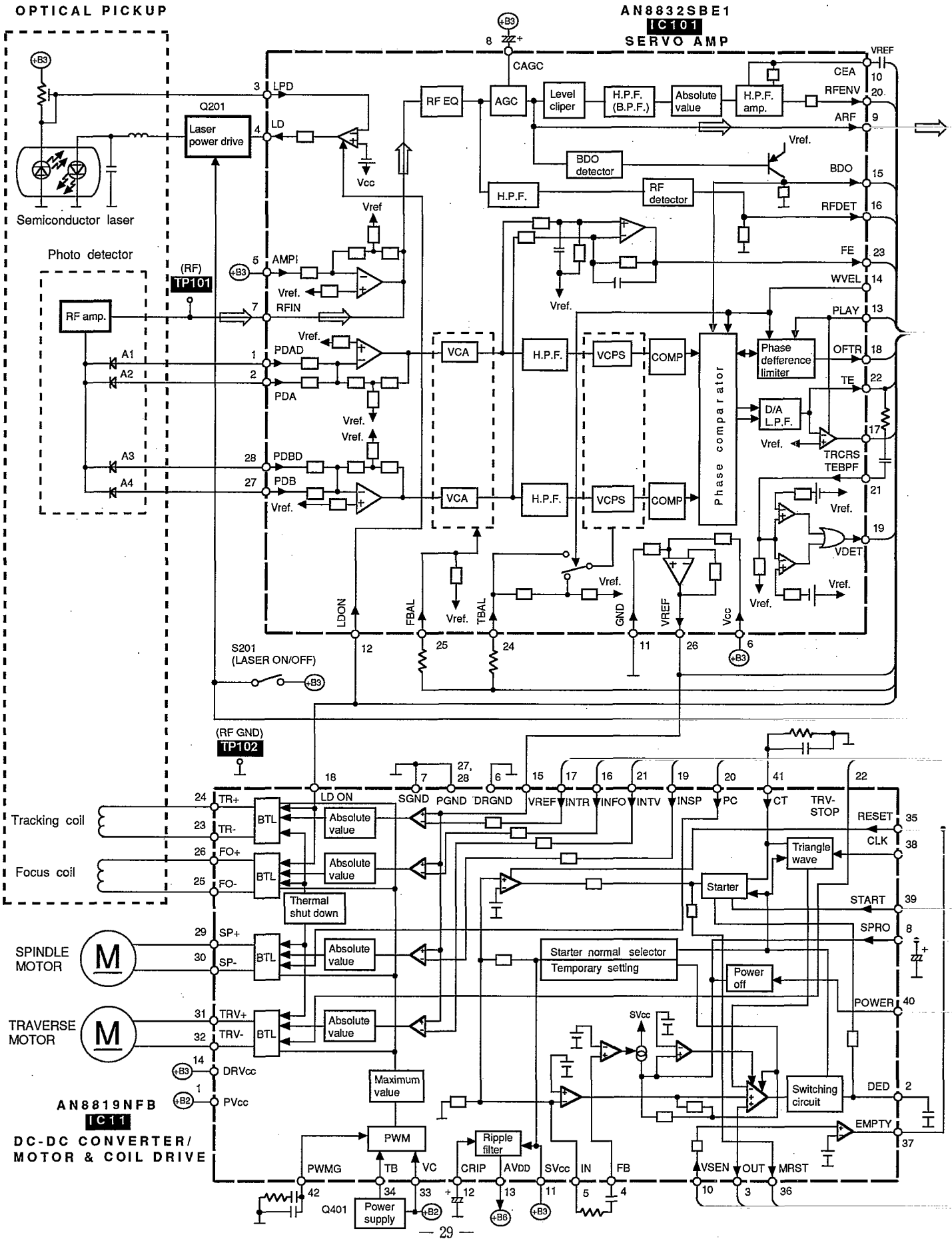
• Check the operations described below on the traverse deck after replacing it.

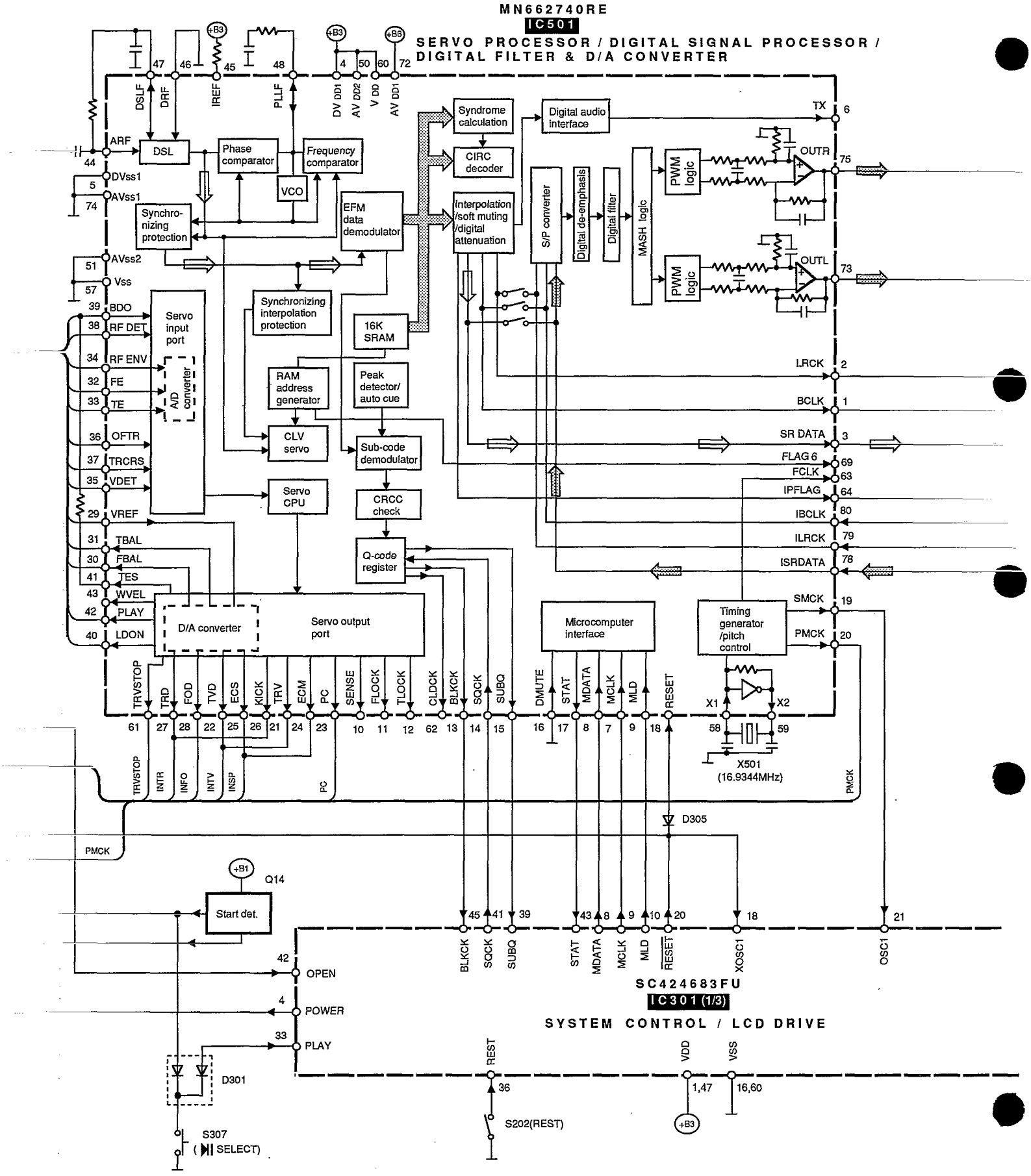
* Checking Skip Search
1. Play an ordinary musical program disc.
2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).

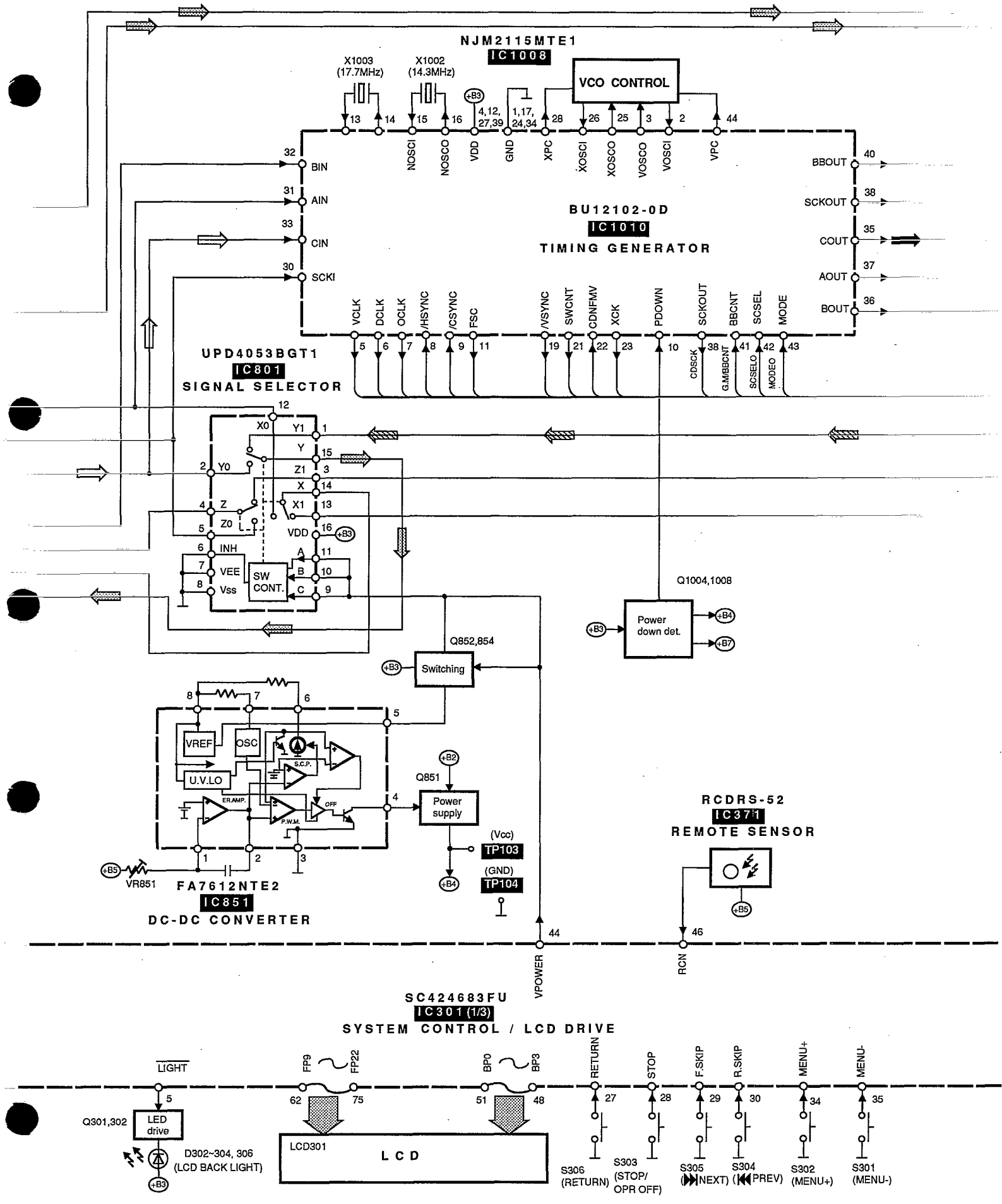
* Checking Manual Search
1. Play an ordinary musical program disc.
2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).

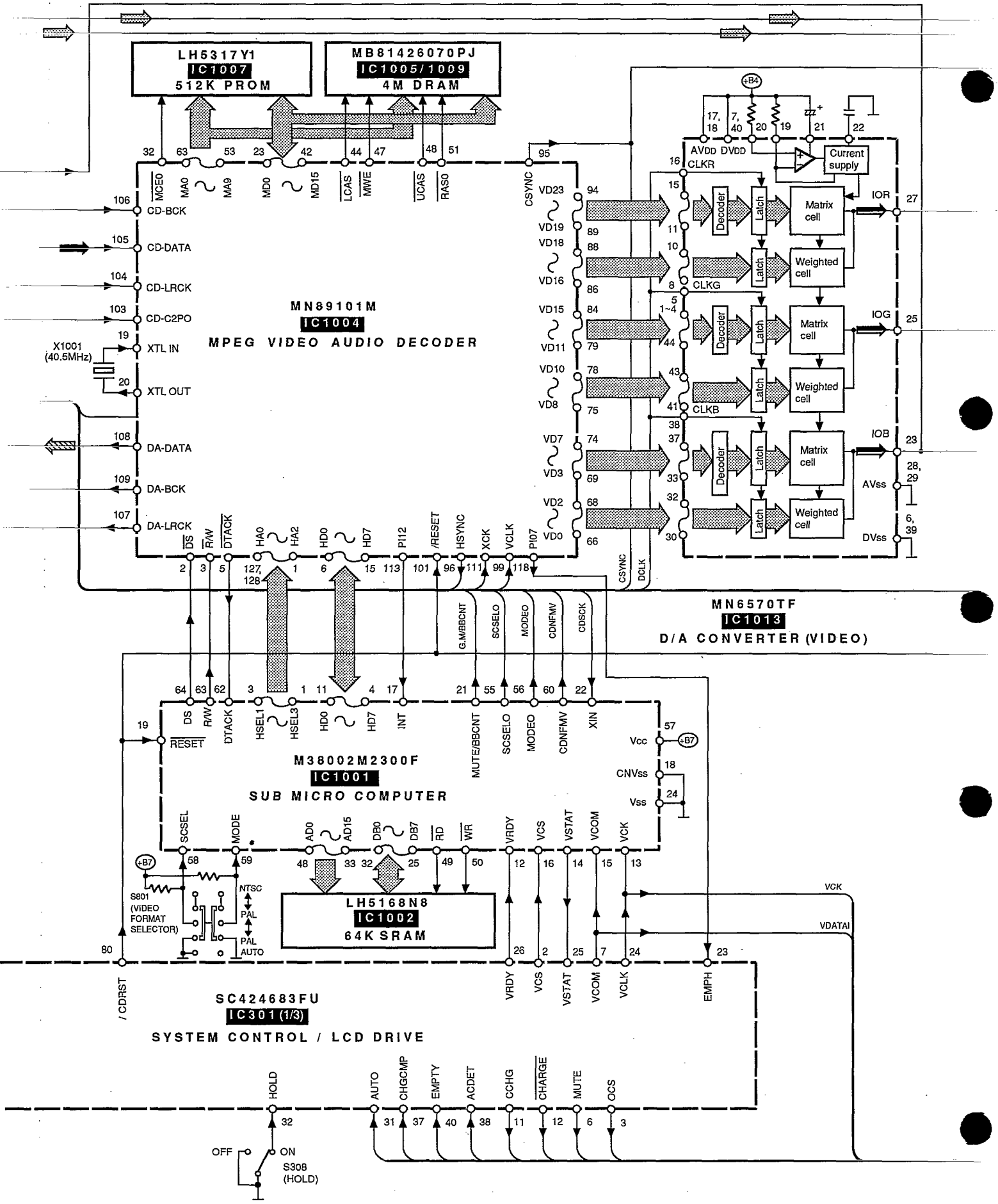
* Checking Playability
1. Play the 0.7mm black dot and the 0.7mm wedge on the playability test disc (SZZP1054C) and verify that no sound skip or noise occurs.
2. Play the middle tracks of the uneven test disc (SZZP1056C) and verify that no sound skip or noise occurs.

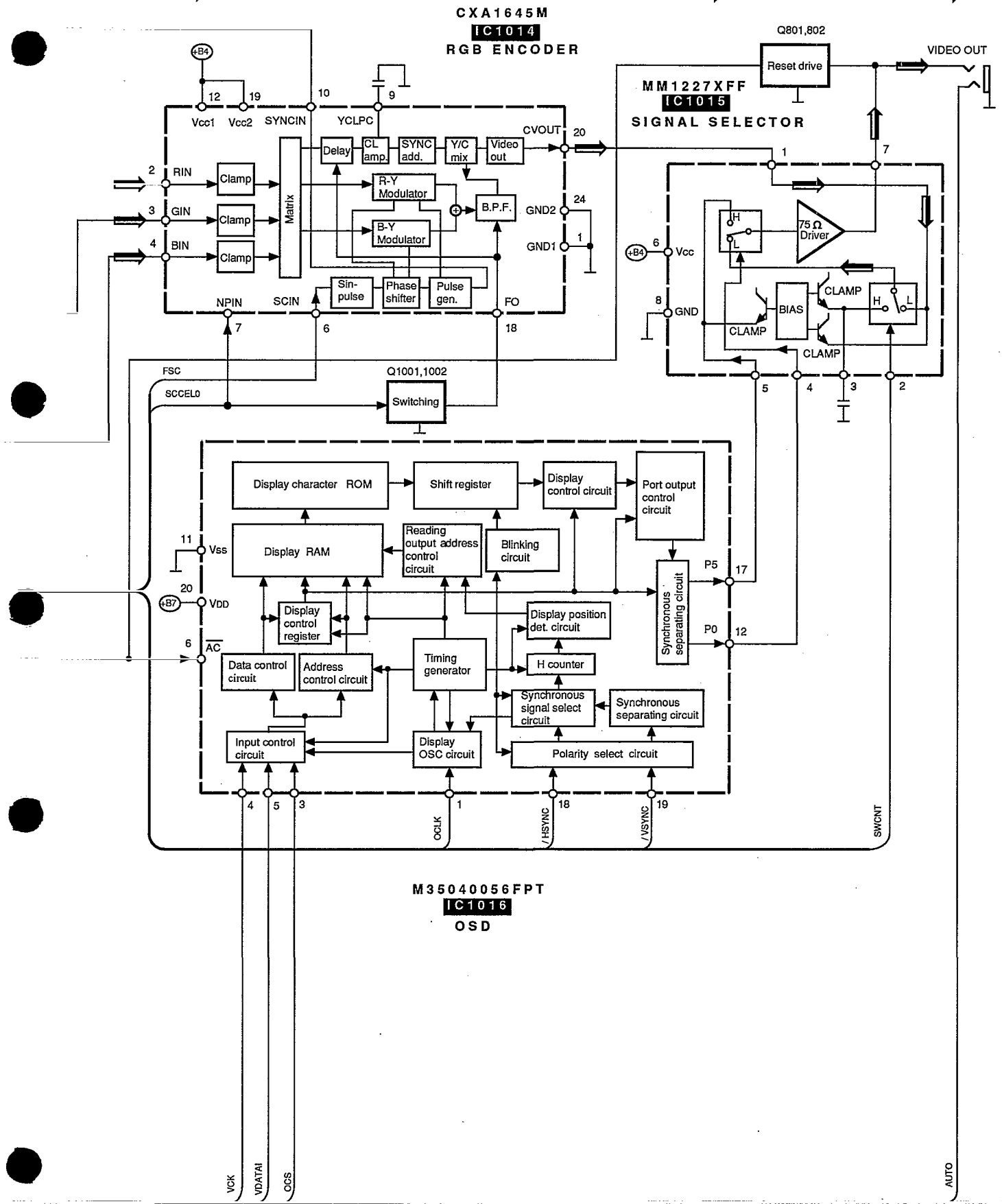
■ BLOCK DIAGRAM

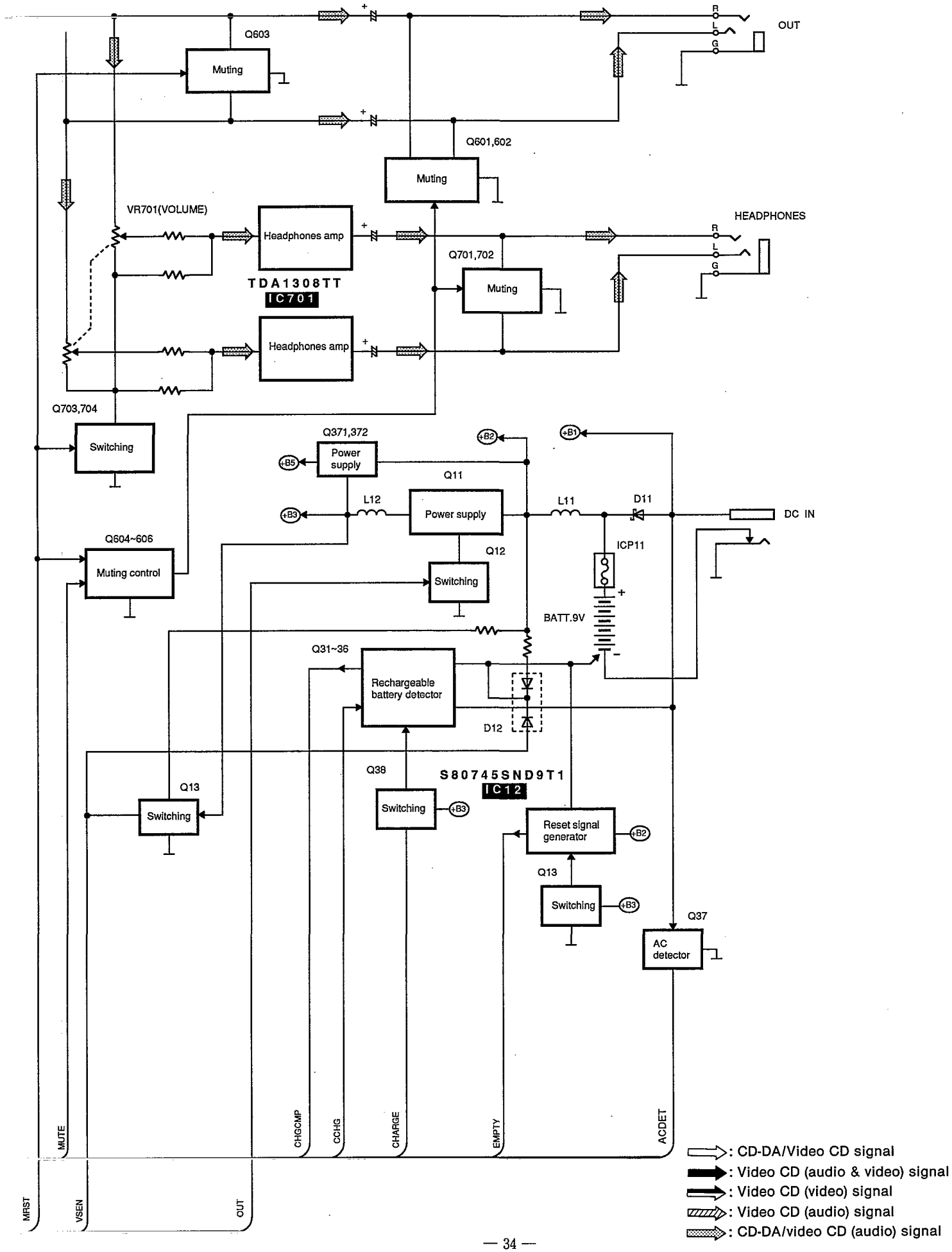



MN662740RE
IC501
SERVO PROCESSOR / DIGITAL SIGNAL PROCESSOR / DIGITAL FILTER & D/A CONVERTER
DSLF
DRF
IREF
PLLF
DV DD1
AV DD2
V DD
AV DD1
ARF
DSL
Phase comparator
Frequency comparator
VCO
Synchro-nizing protection
EFM data demodulator
Syndrome calculation
CIRC decoder
Interpolation /soft muting /digital attenuation
Digital audio interface
S/P converter
Digital de-emphasis
Digital filter
MASH logic
PWM logic
TX
OUTR
OUTL
DVss1
AVss1
AVss2
Vss
BDO
RF DET
RF ENV
FE
TE
OFTR
TRCRS
VDET
VREF
TBAL
FBAL
TES
WVEL
PLAY
LDON
Servo input port
A/D converter
Synchronizing interpolation protection
16K SRAM
RAM address generator
Peak detector/ auto cue
CLV servo
Sub-code demodulator
Servo CPU
CRCC check
Q-code register
D/A converter
Servo output port
Microcomputer interface
Timing generator /pitch control
LRCK
BCLK
SR DATA
FLAG 6
FCLK
IPFLAG
IBCLK
ILRCK
ISRDATA
SMCK
PMCK
TRVSTOP
TRD
FOD
TVD
ECS
KICK
TRV
ECM
PC
SENSE
FLOCK
TLOCK
CLDCK
BLKCK
SQCK
SUBQ
DMUTE
STAT
MDATA
MCLK
MLD
RESET
X1
X2
X501
(16.9344MHz)
INTR
INFO
INTV
INSP
D305
Q14
Start det.
OPEN
POWER
PLAY
D301
S307
(SELECT)
REST
S202(REST)
VDD
VSS
XOSC1
OSC1
SC424683FU
IC301 (1/3)
SYSTEM CONTROL / LCD DRIVE


NJM2115MTE1
IC1008
X1003 (17.7MHz)
X1002 (14.3MHz)
VCO CONTROL
NOSCI
NOSCO
VDD
GND
XPC
XOSCI
XOSCO
VOSCO
VOSCI
VPC
BIN
AIN
CIN
SCKI
BBOUT
SCKOUT
COUT
AOUT
BOUT
BU12102-0D
IC1010
TIMING GENERATOR
VCLK
DCLK
OCLK
/HSYNC
/CSYNC
FSC
/VSYNC
SWCNT
CDNFMV
XCK
PDOWN
SCKOUT
BBCNT
SCSEL
MODE
CDSCK
G.MBBCNT
SCSELO
MODEO
UPD4053BGT1
IC801
SIGNAL SELECTOR
X0
Y1
Y
Y0
Z1
X
Z
X1
Z0
VDD
INH
VEE
Vss
SW CONT.
A
B
C
Q1004,1008
Power down det.
Q852,854
Switching
VREF
OSC
S.C.P.
U.V.LO
ER.AMP.
P.W.M.
OFF
Q851
Power supply
(Vcc)
TP103
(GND)
TP104
VR851
FA7612NTE2
IC851
DC-DC CONVERTER
RCDRS-52
IC371
REMOTE SENSOR
VPOWER
RCN
SC424683FU
IC301 (1/3)
SYSTEM CONTROL / LCD DRIVE
LIGHT
Q301,302
LED drive
D302~304, 306 (LCD BACK LIGHT)
FP9
FP22
BP0
BP3
LCD301
L C D
RETURN
STOP
F.SKIP
R.SKIP
MENU+
MENU-
S306 (RETURN)
S303 (STOP/ OPR OFF)
S305 (NEXT)
S304 (PREV)
S302 (MENU+)
S301 (MENU-)

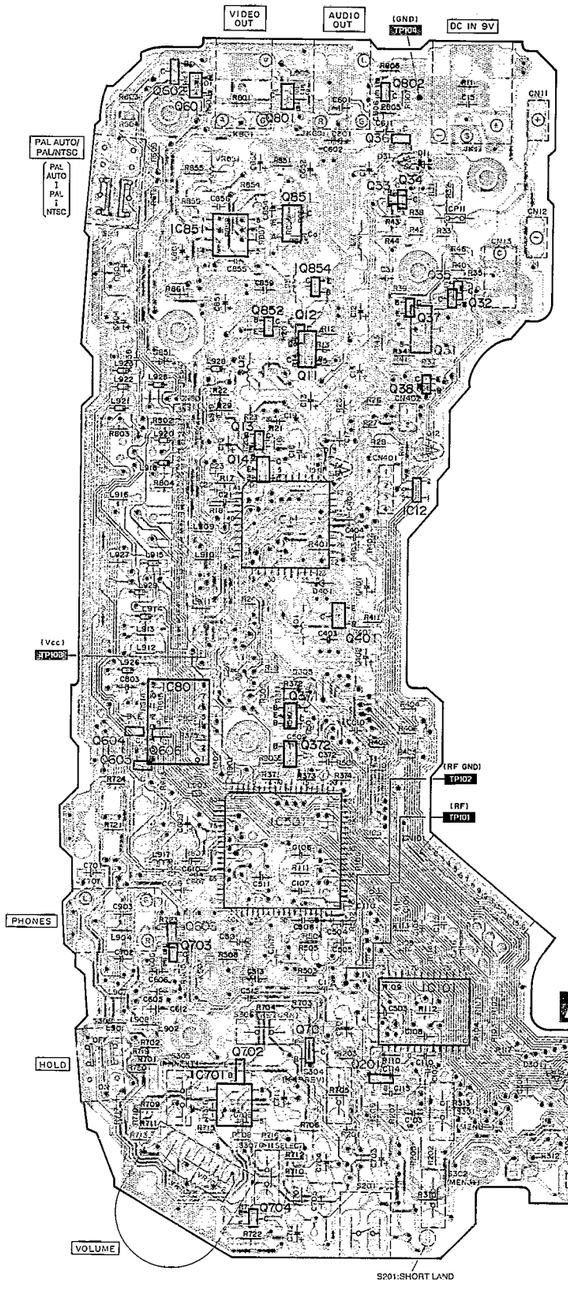

LH5317Y1
IC1007
512K PROM
MB81426070PJ
IC1005/1009
4M DRAM
MN89101M
IC1004
MPEG VIDEO AUDIO DECODER
X1001
(40.5MHz)
CD-BCK
CD-DATA
CD-LRCK
CD-C2PO
XTL IN
XTL OUT
DA-DATA
DA-BCK
DA-LRCK
MCEO
MA0
MA9
MD0
MD15
LCAS
MWE
UCAS
RAS0
CSYNC
VD23
VD19
VD18
VD16
VD15
VD11
VD10
VD8
VD7
VD3
VD2
VD0
DS
R/W
DTACK
HA0
HA2
HD0
HD7
PI12
/RESET
HSYNC
XCK
VCLK
PI07
DCLK
+B4
AVDD
DVDD
CLKR
CLKG
CLKB
Current supply
Decoder
Latch
Matrix cell
Weighted cell
IOR
IOG
IOB
AVss
DVss
MN6570TF
IC1013
D/A CONVERTER (VIDEO)
G.M/BBCNT
SCSELO
MODEO
CDNFMV
CDSCK
M38002M2300F
IC1001
SUB MICRO COMPUTER
RESET
HSEL1
HSEL3
INT
MUTE/BBCNT
XIN
Vcc
CNVss
Vss
SCSEL
MODE
AD0
AD15
DB0
DB7
RD
WR
VRDY
VCS
VSTAT
VCOM
VCK
S801
(VIDEO FORMAT SELECTOR)
NTSC
PAL
PAL AUTO
LH5168N8
IC1002
64K SRAM
VDATAI
/CDRST
SC424683FU
IC301 (1/3)
SYSTEM CONTROL / LCD DRIVE
EMPH
HOLD
AUTO
CHGCMP
EMPTY
ACDET
CCHG
CHARGE
MUTE
OCS
OFF
ON
S308
(HOLD)


CXA1645M
IC1014
RGB ENCODER
Vcc1
Vcc2
SYNCIN
YCLPC
CVOUT
Delay
CL amp.
SYNC add.
Y/C mix
Video out
RIN
GIN
BIN
Clamp
Matrix
R-Y Modulator
B-Y Modulator
B.P.F.
GND2
GND1
Sin-pulse
Phase shifter
Pulse gen.
NPIN
SCIN
FO
Q801,802
Reset drive
VIDEO OUT
MM1227XFF
IC1015
SIGNAL SELECTOR
75Ω Driver
Vcc
GND
BIAS
CLAMP
FSC
SCCEL0
Q1001,1002
Switching
Display character ROM
Shift register
Display control circuit
Port output control circuit
Display RAM
Reading output address control circuit
Blinking circuit
Vss
VDD
AC
Display control register
Display position det. circuit
Synchronous separating circuit
P5
P0
Data control circuit
Address control circuit
Timing generator
H counter
Synchronous signal select circuit
Synchronous separating circuit
Input control circuit
Display OSC circuit
Polarity select circuit
OCLK
/HSYNC
/VSYNC
SWCNT
M35040056FPT
IC1016
OSD
VCK
VDATAI
OCS
AUTO



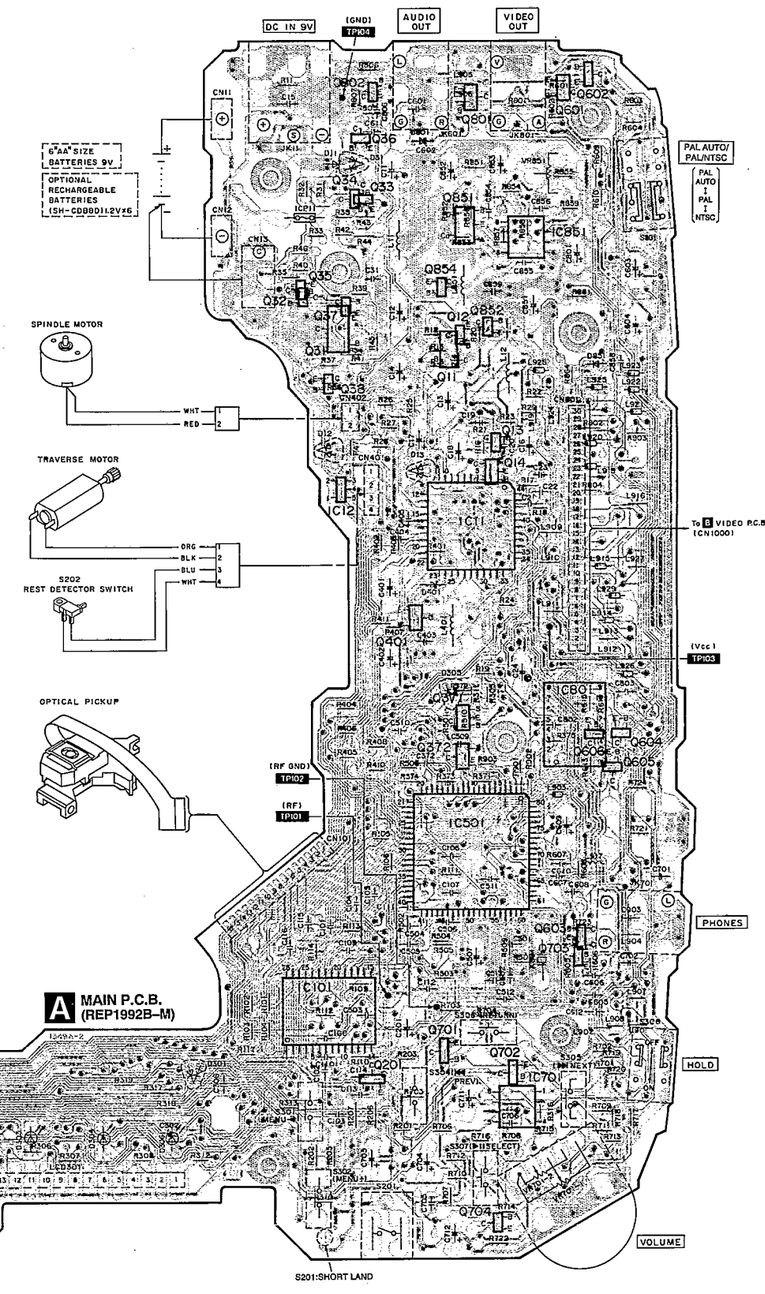
: CD-DA/Video CD signal
: Video CD (audio & video) signal
: Video CD (video) signal
: Video CD (audio) signal
: CD-DA/video CD (audio) signal

■ PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



Notes:

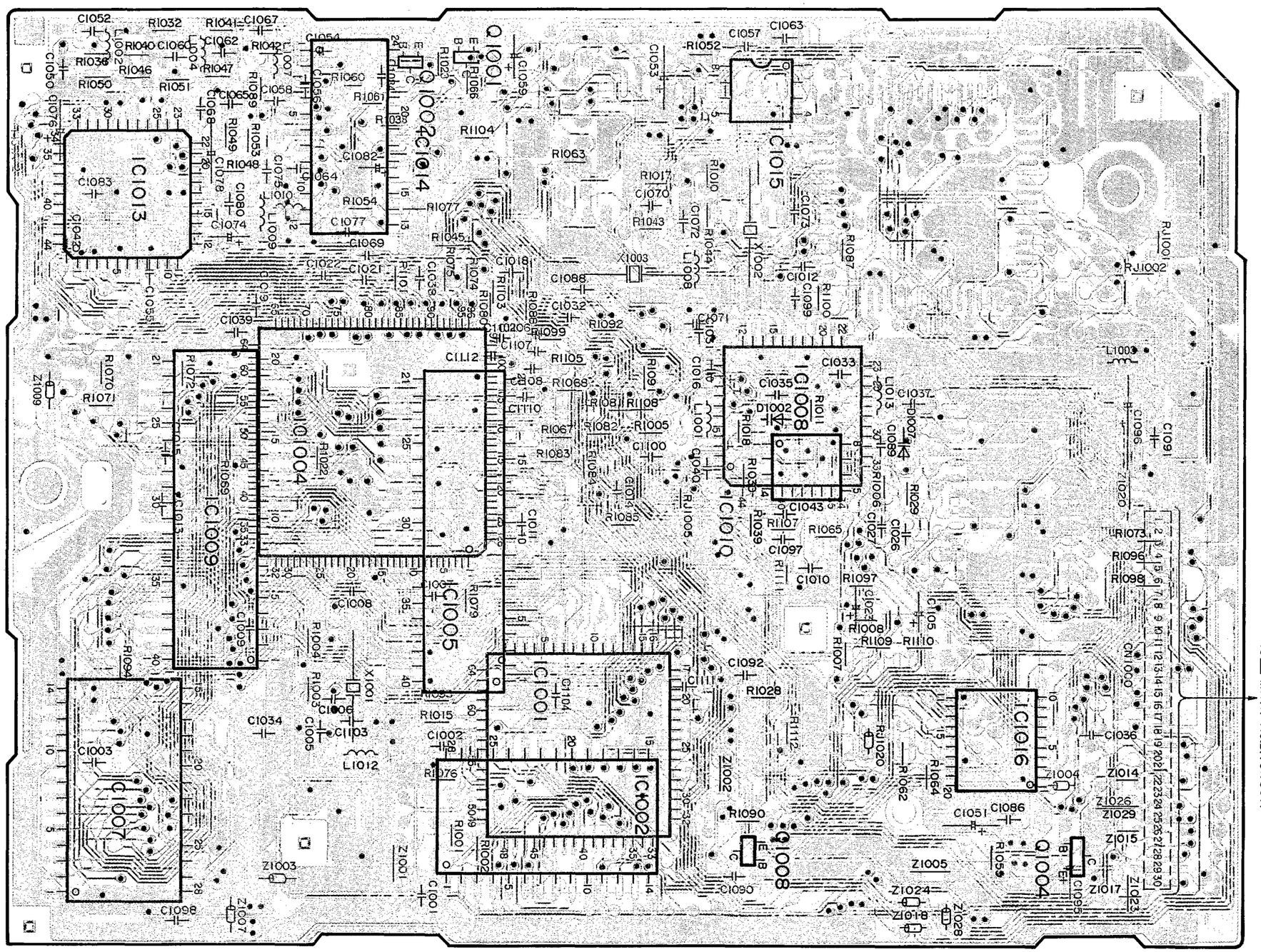
- In this printed circuit board diagram, the parts and foil patterns on the board facing toward you are printed in black.
  The opposite side is printed in blue.
- The "●" and "●" marks denote the connection points of double-faced foil patterns (through holes) on both sides of the printed circuit board.
- This printed circuit board diagram may be modified at any time with the development of new technology.



B VIDEO P.C.B. (REP2118A-T)

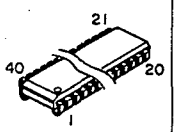
Notes:

- In this printed circuit board diagram, the parts and foil patterns on the board facing toward you are printed in blue.
  The opposite side is printed in black.
- The "●" mark denote the connection points of double-faced foil patterns (through holes) on both sides of the printed circuit board.
- This printed circuit board diagram may be modified at any time with the development of new technology.



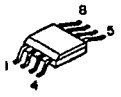
■TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

MB81426070PJ

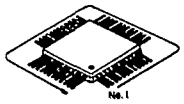


MM1227XFF

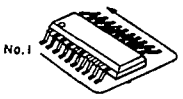
FA7612NTE2
TDA1308TT



BU12102-0D	32 Pin	MN6570TF	44 Pin
AN8819NFB	44 Pin	M38002M2300F	64 Pin
		SC424683FU	80 Pin
		MN662740RE	80 Pin
		MN89101M	128 Pin



NJM2115MTE1	8 Pin	M35040056FPT	20 Pin
UPD4053BGT1	16 Pin	CXA1645M	24 Pin
		AN8832SBE1	28 Pin
		LH5168N8	28 Pin
		LH5317Y1	28 Pin



S80745SND9T1

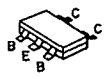
RCDRS-52

2SD1758TLPQR

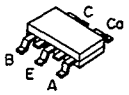
2SB709QRSTX
2SB970RSTX
2SB1218QRSTX
2SD1328STTX
2SD1328RSTTX
2SD1819QRSTX

UN5112TX
UN5114TX
UN5115TX
UN5210TX
UN5213TX
UN5215TX

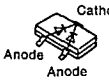
FMG4T148
FMG6T148
FMW1T98



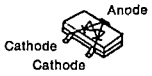
FP106TL



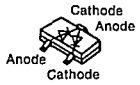
MA141WKTX
MA741WKTX



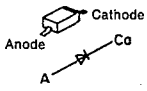
MA141WATX



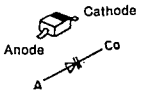
MA143TX



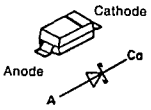
MA110TX



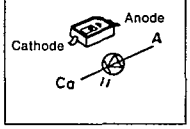
MA304TX



D1FS4



SML-010MTT87



■SCHEMATIC DIAGRAM

(Parts list on pages 64~68.)

(This schematic diagram may be modified at any time with development of new technology.)

Notes:

- **S201** : Laser ON/OFF switch in "OFF" position. (It turns "ON" with disc holder closed.)
- **S202** : Rest detector in "OFF" position. (It turns "ON" when optical pickup comes to innermost periphery.)
- **S301** : Menu (−)
- **S302** : Menu (+)
- **S303** : Stop/operation off (■)
- **S304** : PREV/NEXT/RETURN/SELECT (I◀◀/▶▶I/ ⟲ /▶ II) switch.
- **307** [S304: PREV, S305: NEXT, S306: RETURN, S307: SELECT]
- **S308** : Hold lock (HOLD-LOCK) switch in "OFF" position.
- **S801** : Video format selector switch in "NTSC" position.
- The voltage value and waveforms are the reference voltage of this measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of GND terminal (DC IN Jack). Accordingly, there may arise some errors in the voltage values and waveforms depending upon the internal impedance of the tester or measuring unit.
  * The parenthesized is the voltage for Video CD test disc (1 kHz, L+R, 0 dB) in play mode, and the other, for no disc in stop mode.
  * AC adaptor is used for power supply.
- : Positive voltage lines.
- : CD-DA/Video CD signal
- : Video CD (audio & video) signal
- : Video CD (video) signal
- : Video CD (audio) signal
- : CD-DA/Video CD (audio) signal
- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
- The supply parts number is described alone in the replacement parts.

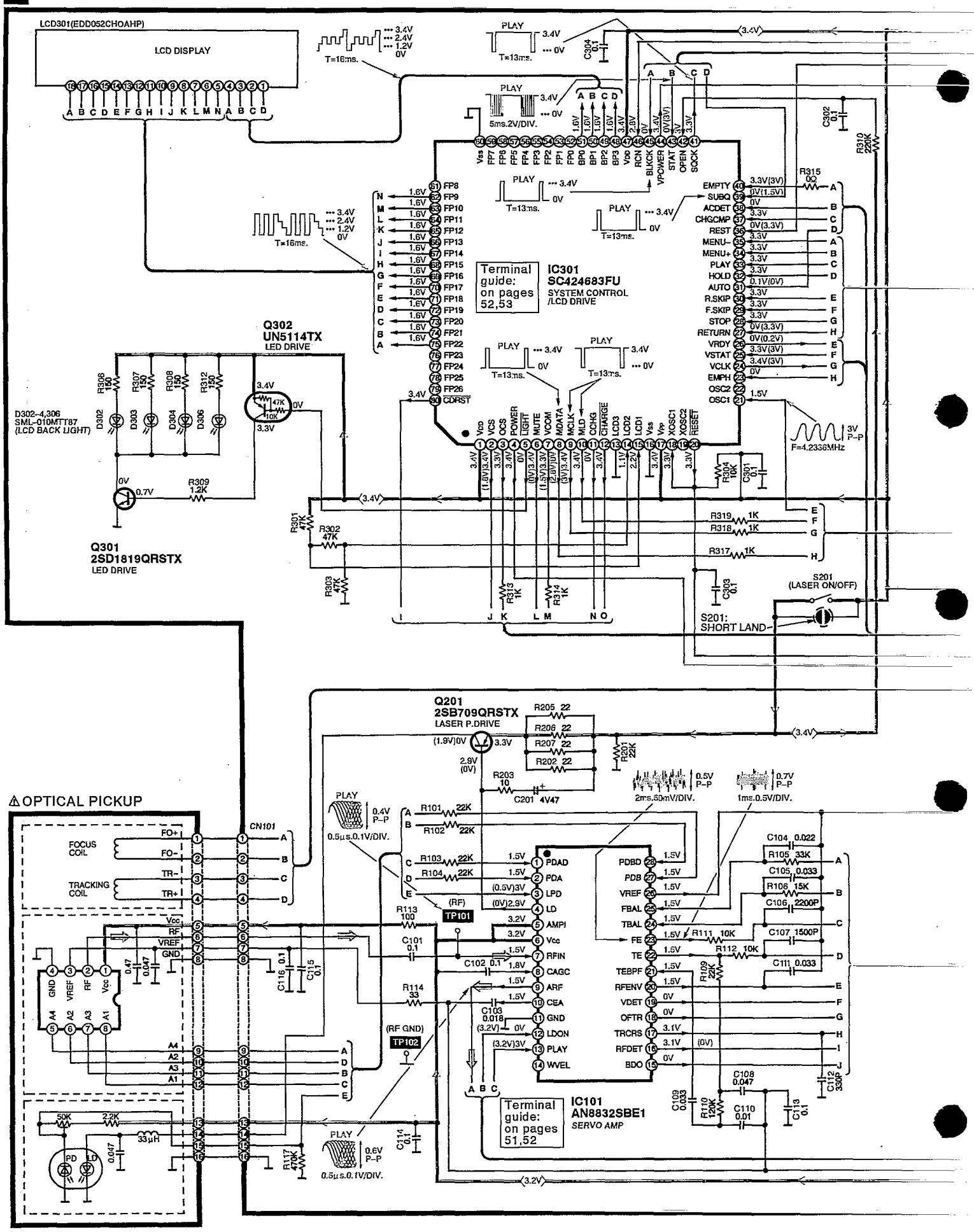
Part No.	Original Part No.	Supply Part No.
IC1008	NJM2115MTE1	NJM2115MT1
Q601, 602, 701 702, 801	2SD1328RSTTX	2SD1328QRSTX
Q1004	2SD1328STTX	2SD1328-S

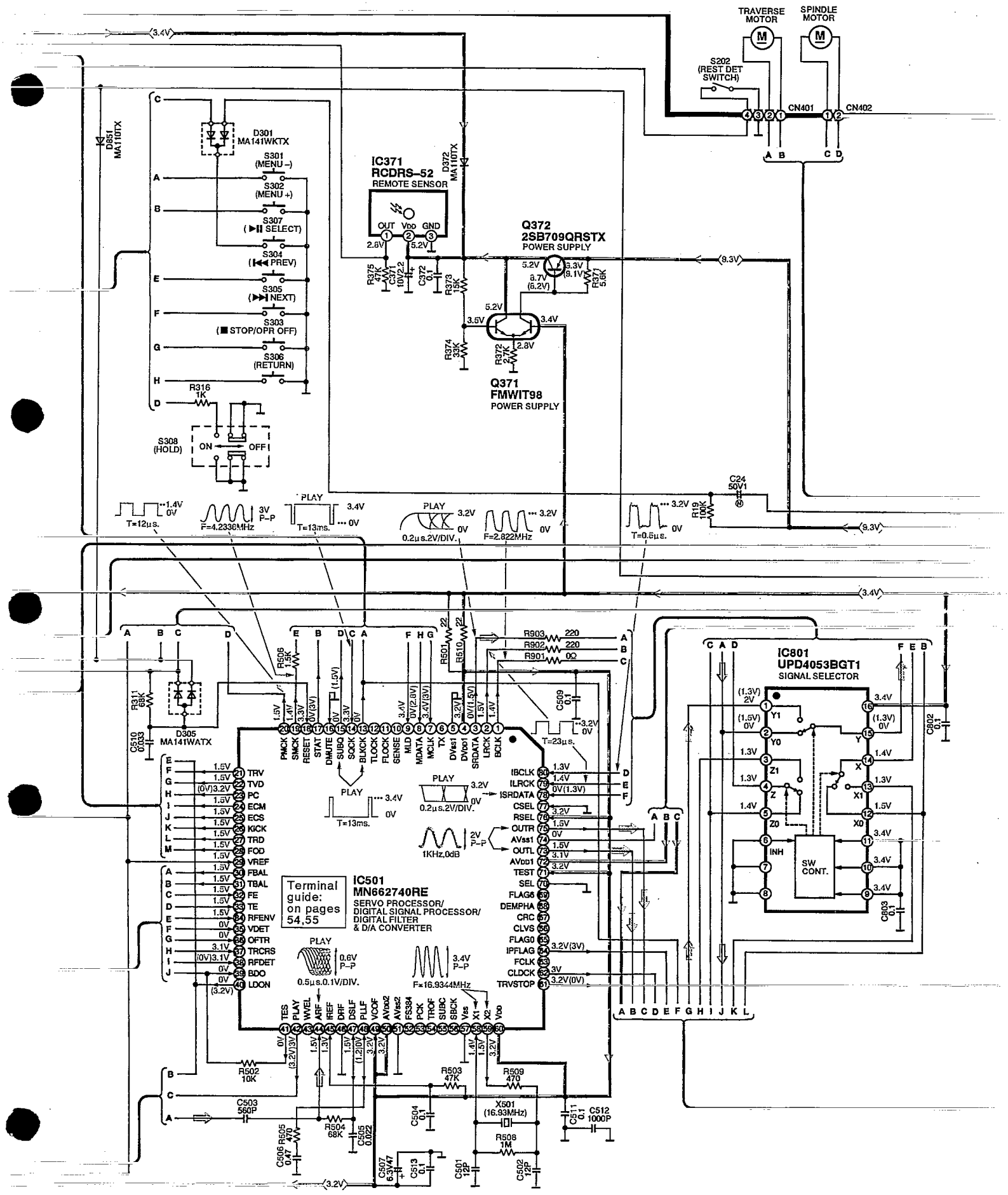
Caution!

IC and LSI are sensitive to static ellectricity.
Secondary trouble can be prevented by taking care during repair.

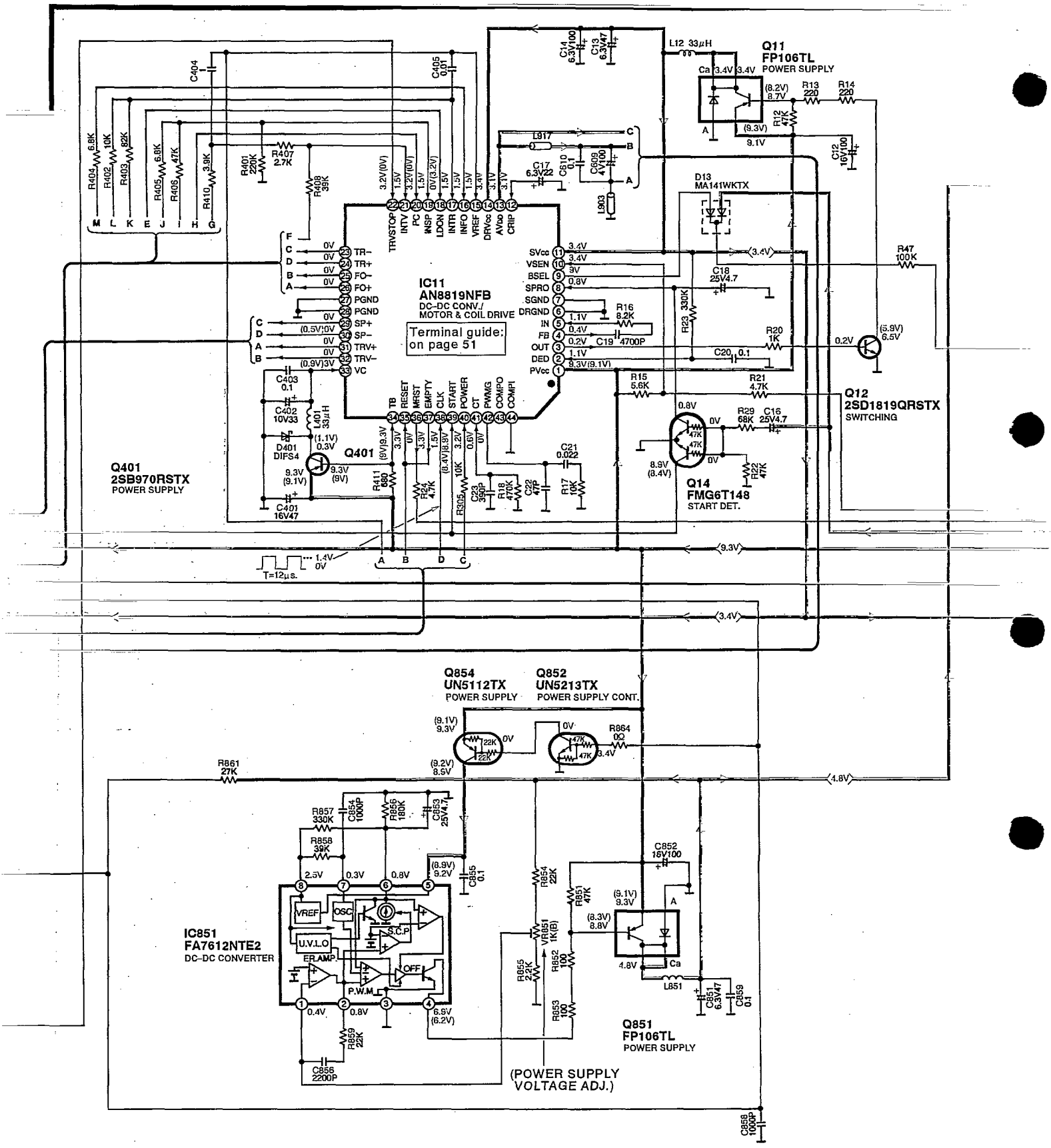
- Cover the parts boxes made of plastics with aluminium foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.

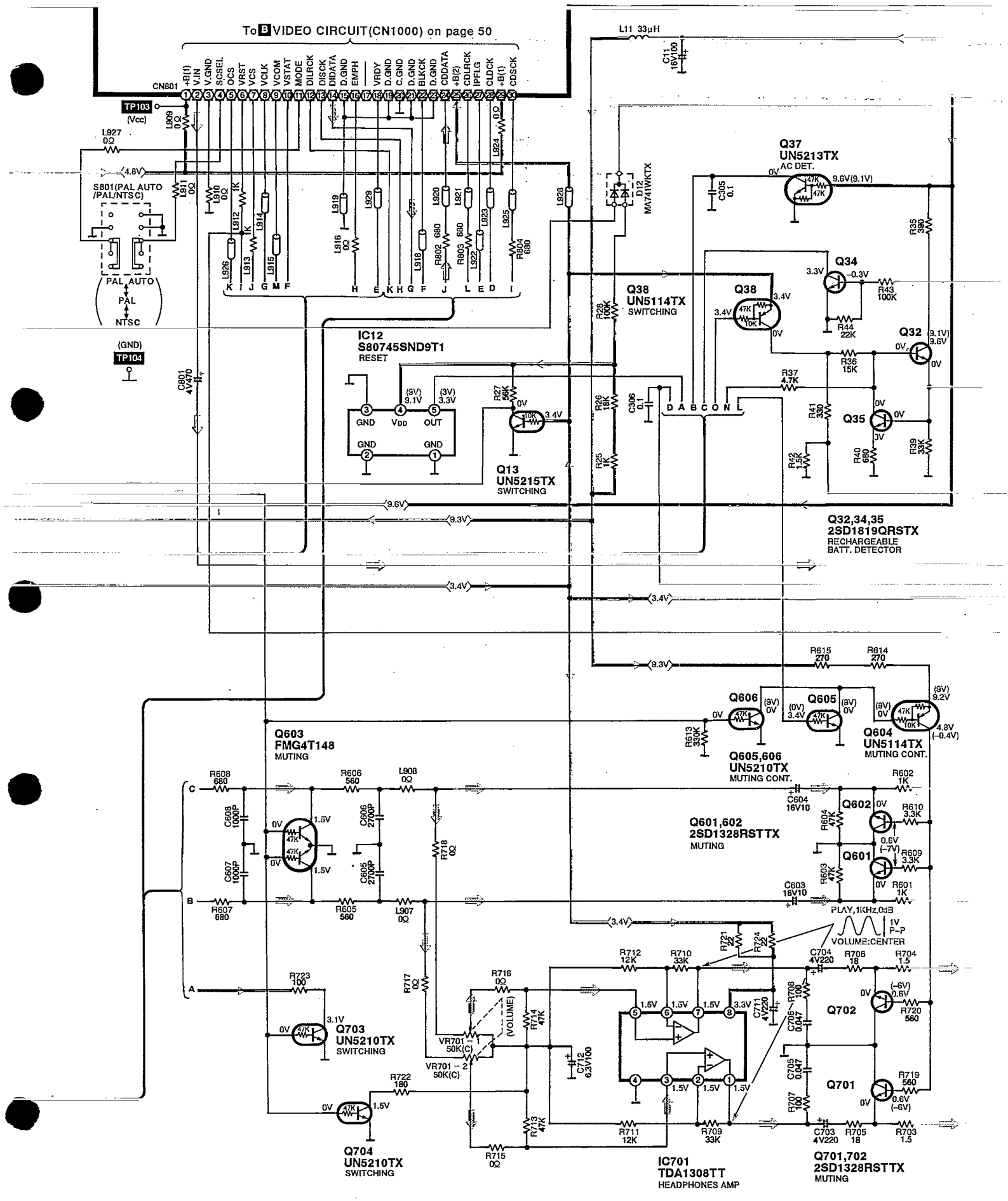
A MAIN CIRCUIT (P.C.Board:on pages 35,36)



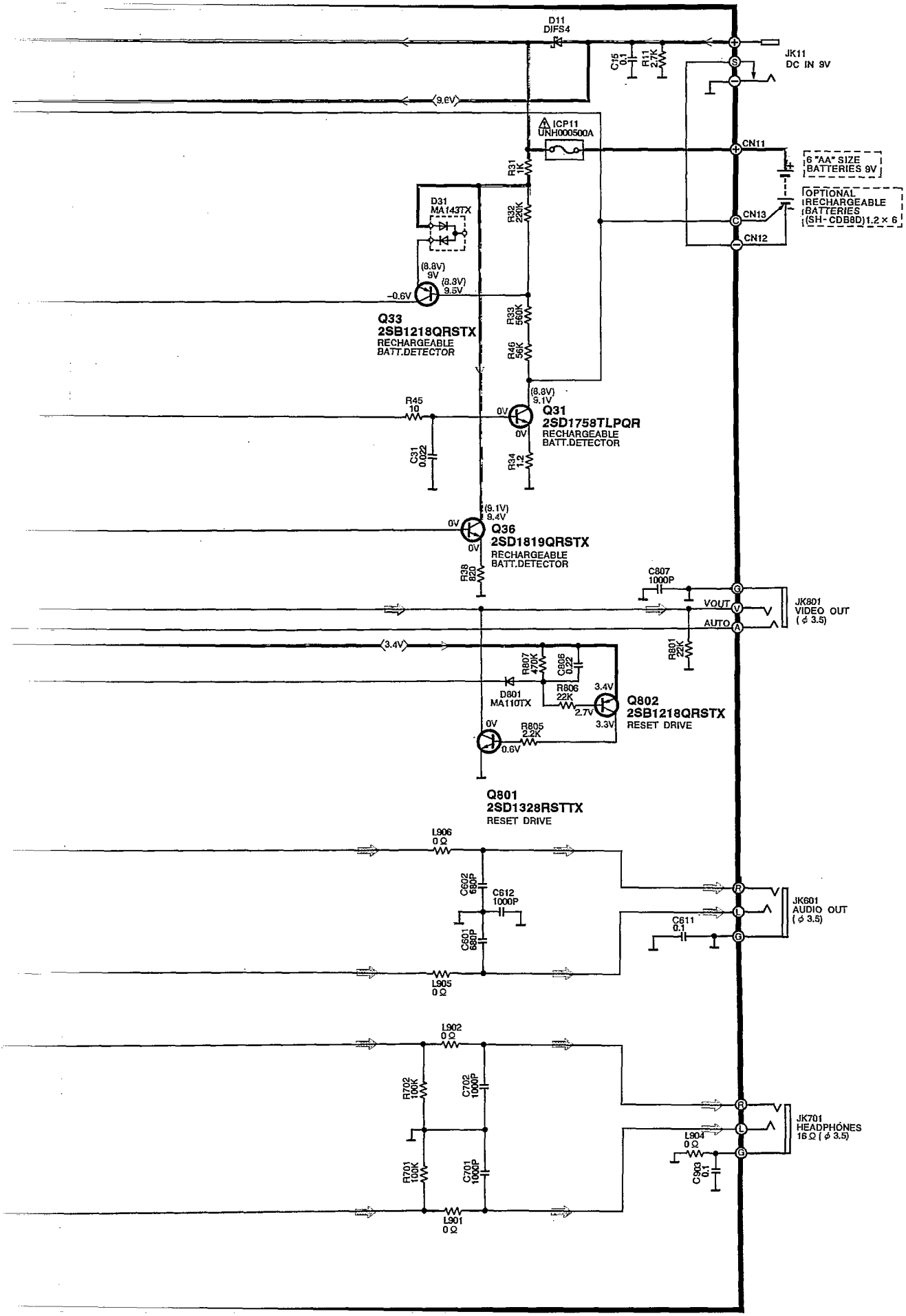

TRAVERSE MOTOR
SPINDLE MOTOR
S202 (REST DET SWITCH)
CN401
CN402
D851 MA110TX
D301 MA141WKTX
S301 (MENU –)
S302 (MENU +)
S307 (▶II SELECT)
S304 (I◀◀ PREV)
S305 (▶▶I NEXT)
S303 (■ STOP/OPR OFF)
S306 (RETURN)
R316 1K
S308 (HOLD)
ON
OFF
IC371
RCDRS–52
REMOTE SENSOR
OUT Vdd GND
D372 MA110TX
Q372
2SB709QRSTX
POWER SUPPLY
Q371
FMWIT98
POWER SUPPLY
C24 50V1
R19 10K
D305 MA141WATX
R311 68K
C510 0.033
R506 1.5K
R501 22
R510 22
R903 220
R902 220
R901 0Ω
C509 0.1
IC801
UPD4053BGT1
SIGNAL SELECTOR
C802 0.1
C803 0.1
SW CONT.
INH
IC501
MN662740RE
SERVO PROCESSOR/
DIGITAL SIGNAL PROCESSOR/
DIGITAL FILTER
& D/A CONVERTER
Terminal guide: on pages 54,55
TRV
TVD
PC
ECM
ECS
KICK
TRD
FOD
VREF
FBAL
TBAL
FE
TE
RFENV
VDET
OFTR
TRCRS
RFDET
BDO
LDON
IBCLK
ILRCK
ISRDATA
CSEL
RSEL
OUTR
AVss1
OUTL
AVdd1
TEST
SEL
FLAG5
DEMPHA
CRC
CLVS
FLAG0
IPFLAG
FCLK
CLDCK
TRVSTOP
R502 10K
R503 47K
R509 470
C503 560P
R504 68K
C505 0.022
C504 0.1
X501 (16.93MHz)
C511 0.1
C512 1000P
R508 1M
C501 12P
C502 12P
C506 0.47
R505 470
C507 6.3V47
C513 0.1
3.4V
9.3V
3.2V
PLAY
T=12µs.
F=4.2336MHz
T=13ms.
0.2µs.2V/DIV.
F=2.822MHz
T=0.5µs.
T=23µs.
1KHz,0dB
0.5µs.0.1V/DIV.
F=16.9344MHz

A MAIN CIRCUIT (P.C.Board:on pages 35,36)

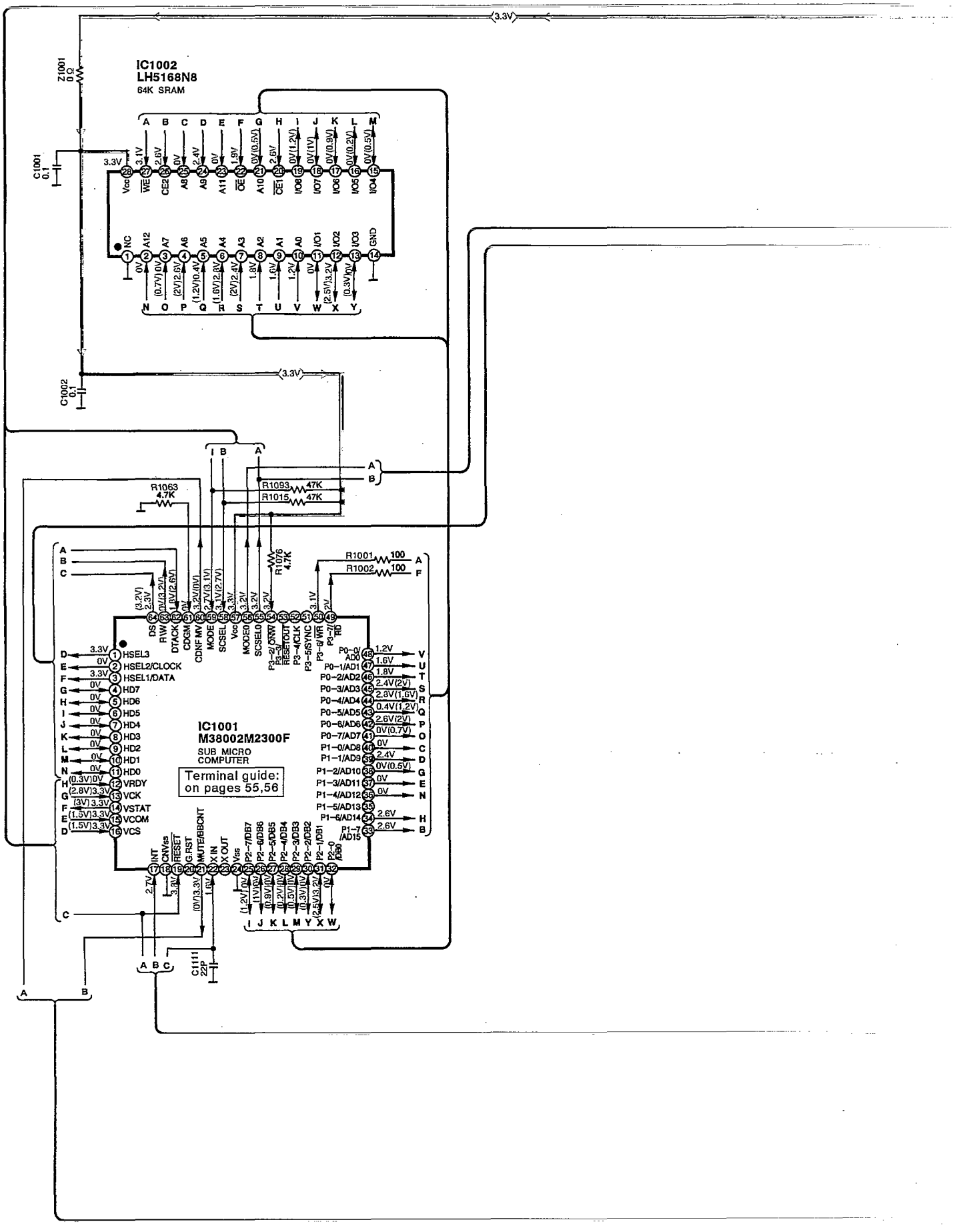



To B VIDEO CIRCUIT(CN1000) on page 50
CN801
+B(1) V.IN V.GND SCSEL OCS VRST VCS VCLK VCOM VSTAT MODE DILRCK DISCK DIDATA D.GND EMPH VRDY D.GND C.GND D.GND BLKCK D.GND CDDATA +B(2) CDLRCK IPFLG CLOCK +B(1) CDSCK
TP103 (Vcc)
4.8V
S801(PAL AUTO /PAL/NTSC)
PAL AUTO
PAL
NTSC
(GND)
TP104
L11 33µH
C11 16V100
Q37 UN5213TX AC DET.
D12 MA741WKTX
C305 0.1
9.6V(9.1V)
R35 390
Q34
R43 100K
R44 22K
Q38 UN5114TX SWITCHING
R28 100K
Q32
R36 15K
R37 4.7K
IC12 S80745SND9T1 RESET
GND VDD OUT
C801 4V470
R27 56K
C306 0.1
D A B C O N L
R26 18K
R25 1K
Q13 UN5215TX SWITCHING
R41 330
Q35
R42 15K
R40 680
R39 33K
Q32,34,35 2SD1819QRSTX RECHARGEABLE BATT. DETECTOR
9.6V
9.3V
3.4V
R615 270
R614 270
Q606
Q605
Q604 UN5114TX MUTING CONT.
R613 330K
Q605,606 UN5210TX MUTING CONT.
Q603 FMG4T148 MUTING
R608 680
R606 560
L908 0Ω
C608 1000P
C607 1000P
C606 2700P
C605 2700P
R718 0Ω
R607 680
R605 560
L907 0Ω
R602 1K
C604 16V10
Q602
R604 47K
R610 3.3K
Q601,602 2SD1328RSTTX MUTING
Q601
R609 3.3K
R603 47K
C603 16V10
R601 1K
PLAY,1KHz,0dB
1V P-P
VOLUME:CENTER
R723 100
Q703 UN5210TX SWITCHING
R716 0Ω
R717 0Ω
VR701 – 1 50K(C)
VR701 – 2 50K(C)
(VOLUME)
R714 47K
C712 6.3V100
R722 180
Q704 UN5210TX SWITCHING
R715 0Ω
R713 47K
R712 12K
R710 33K
R721 22
R724 22
C704 4V220
R706 18
R704 1.5
C706~R708 0.047 100
Q702
R720 560
C705 0.047
Q701
R719 560
R707 100
R711 12K
R709 33K
C703 4V220
R705 18
R703 1.5
IC701 TDA1308TT HEADPHONES AMP
Q701,702 2SD1328RSTTX MUTING

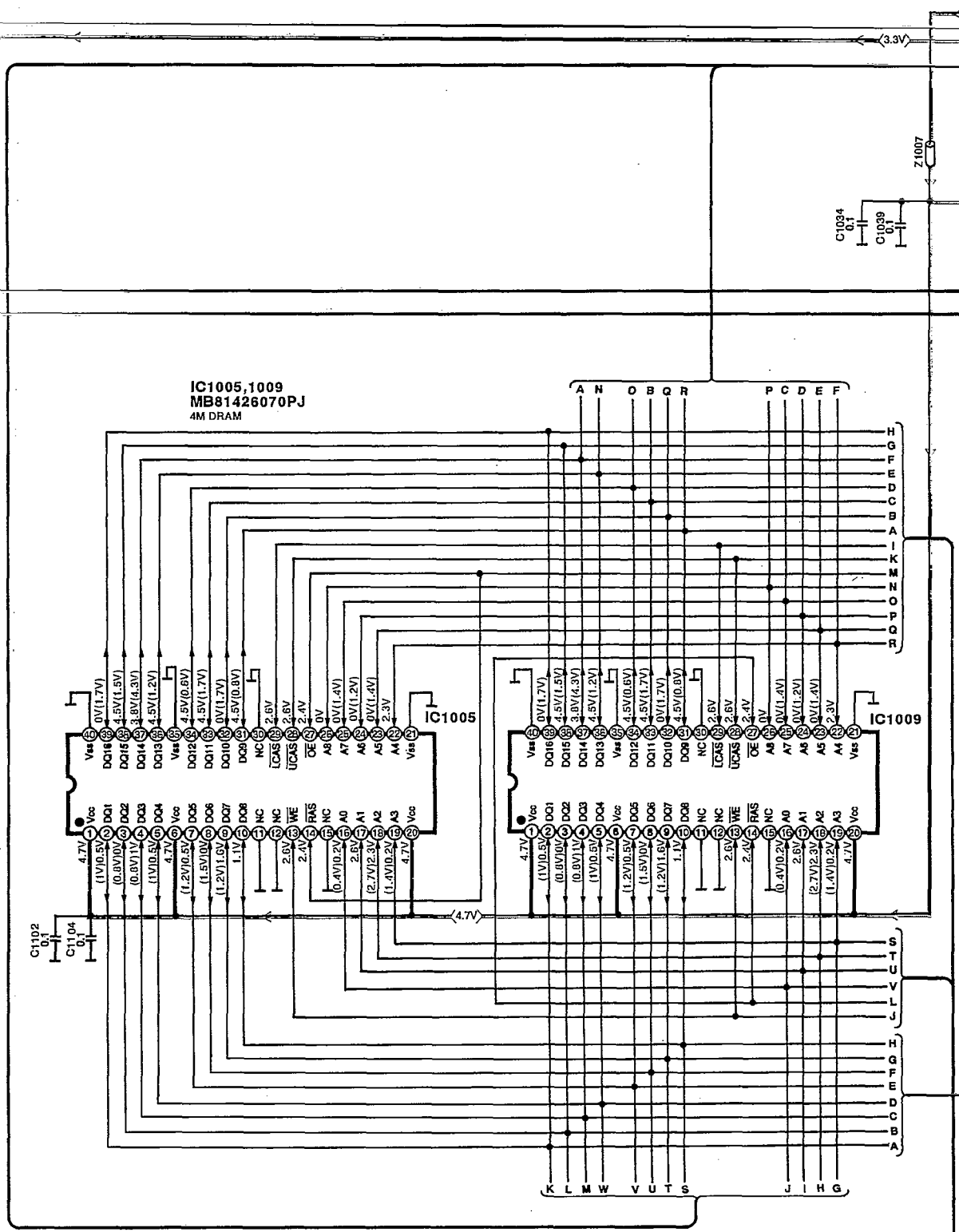
A MAIN CIRCUIT (P.C.Board:on pages 35,36)

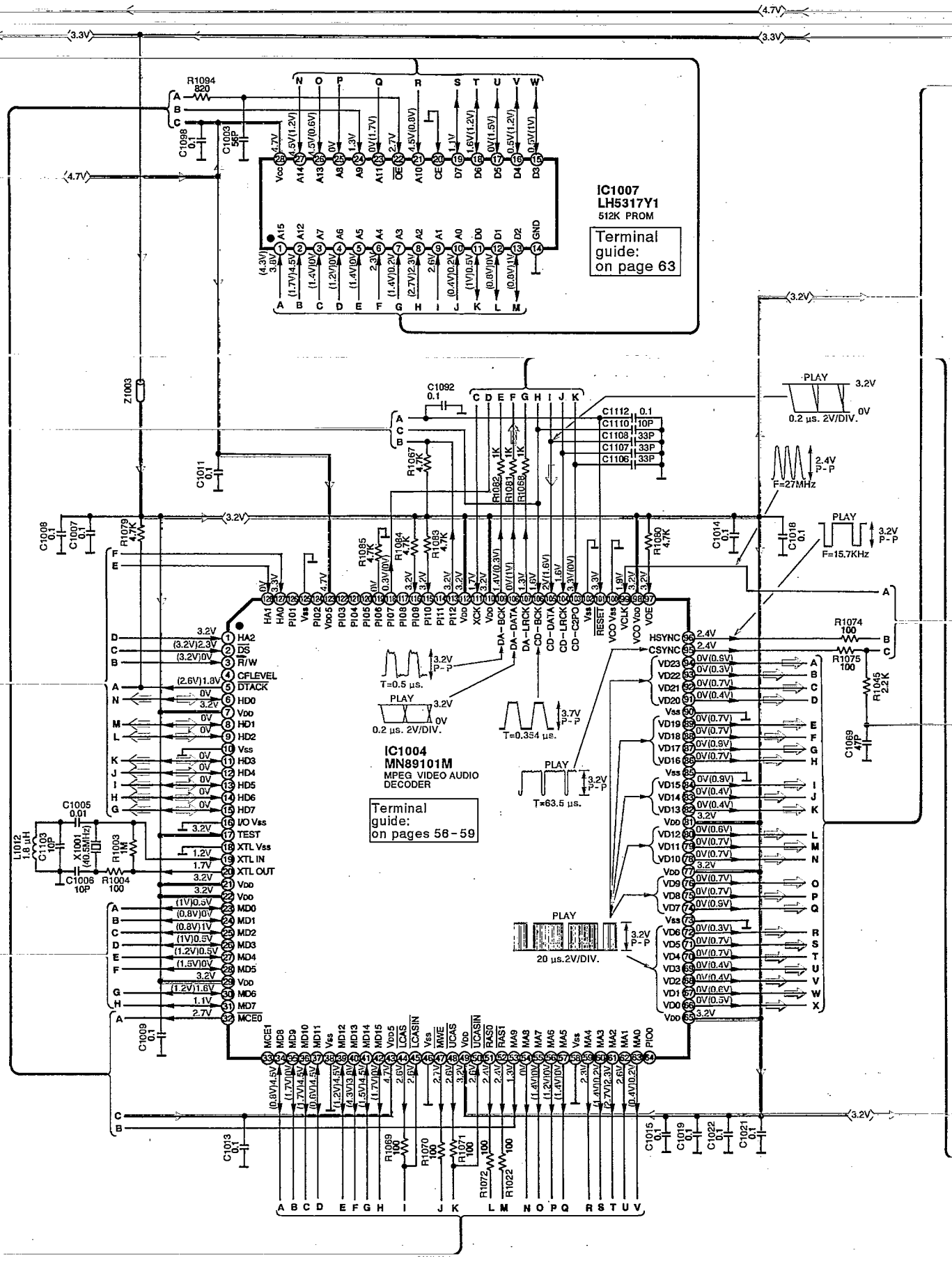


B VIDEO CIRCUIT (P.C.Board:on pages 37,38)

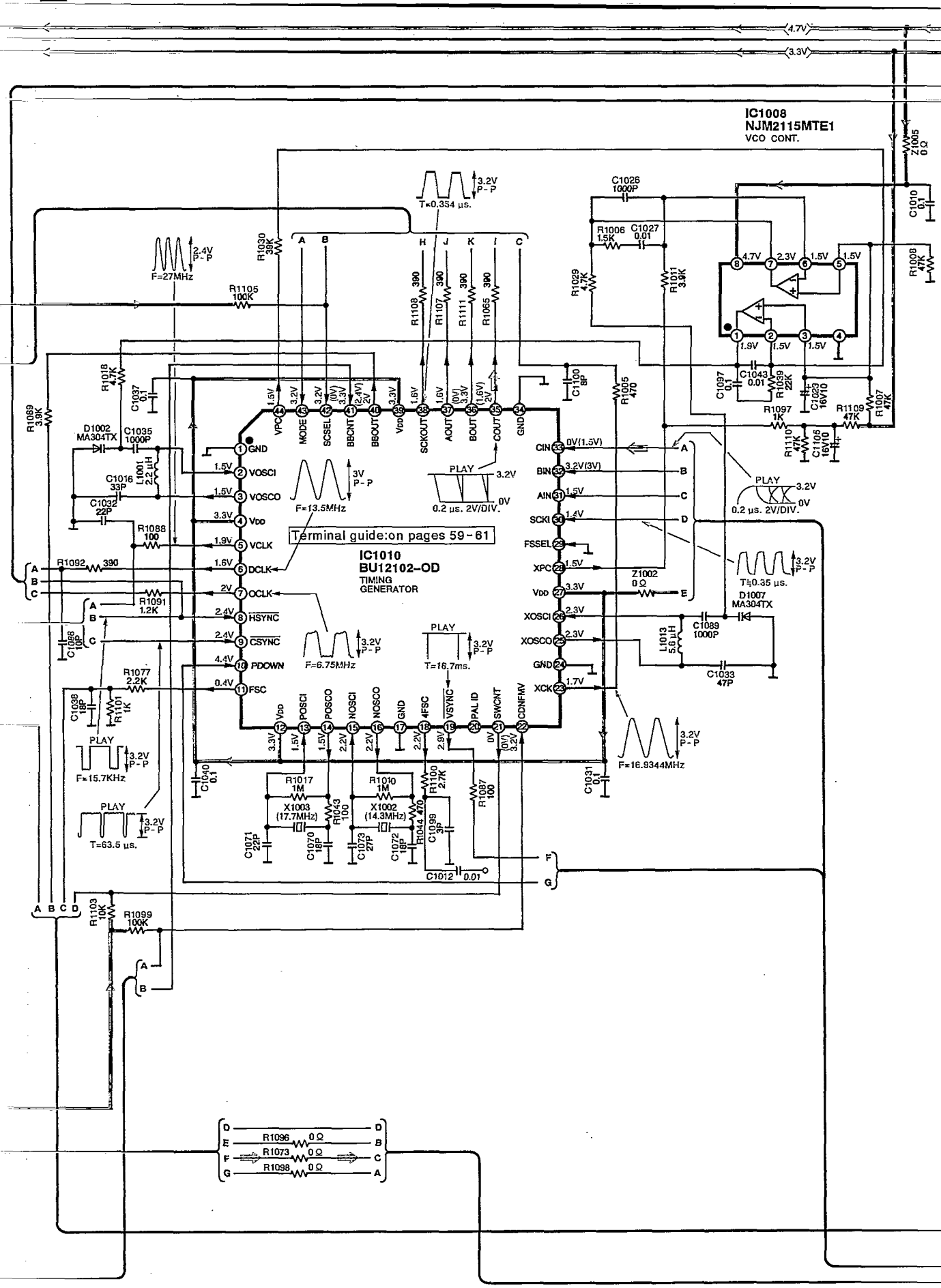


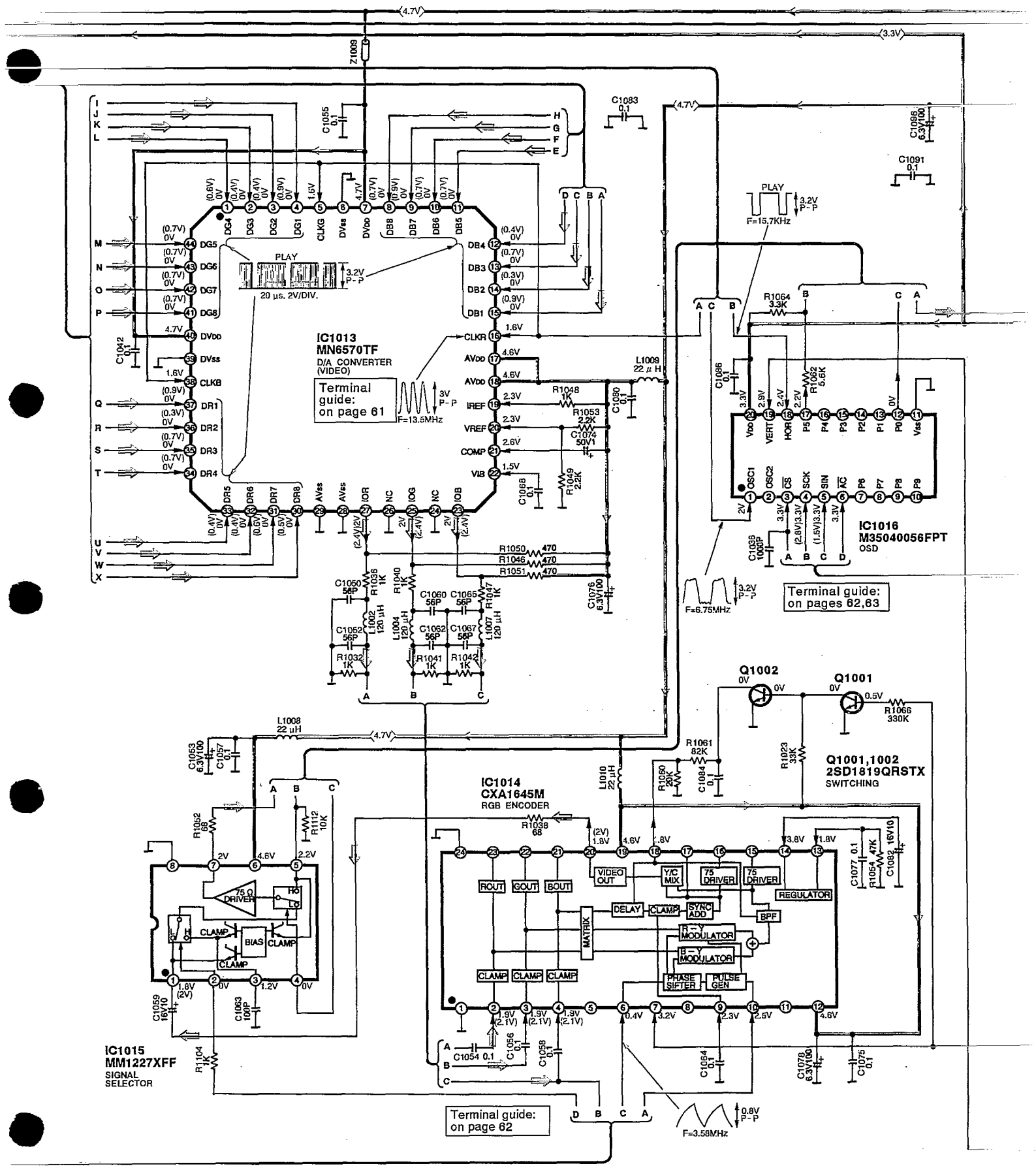
B VIDEO CIRCUIT (P.C.Board:on pages 37,38)



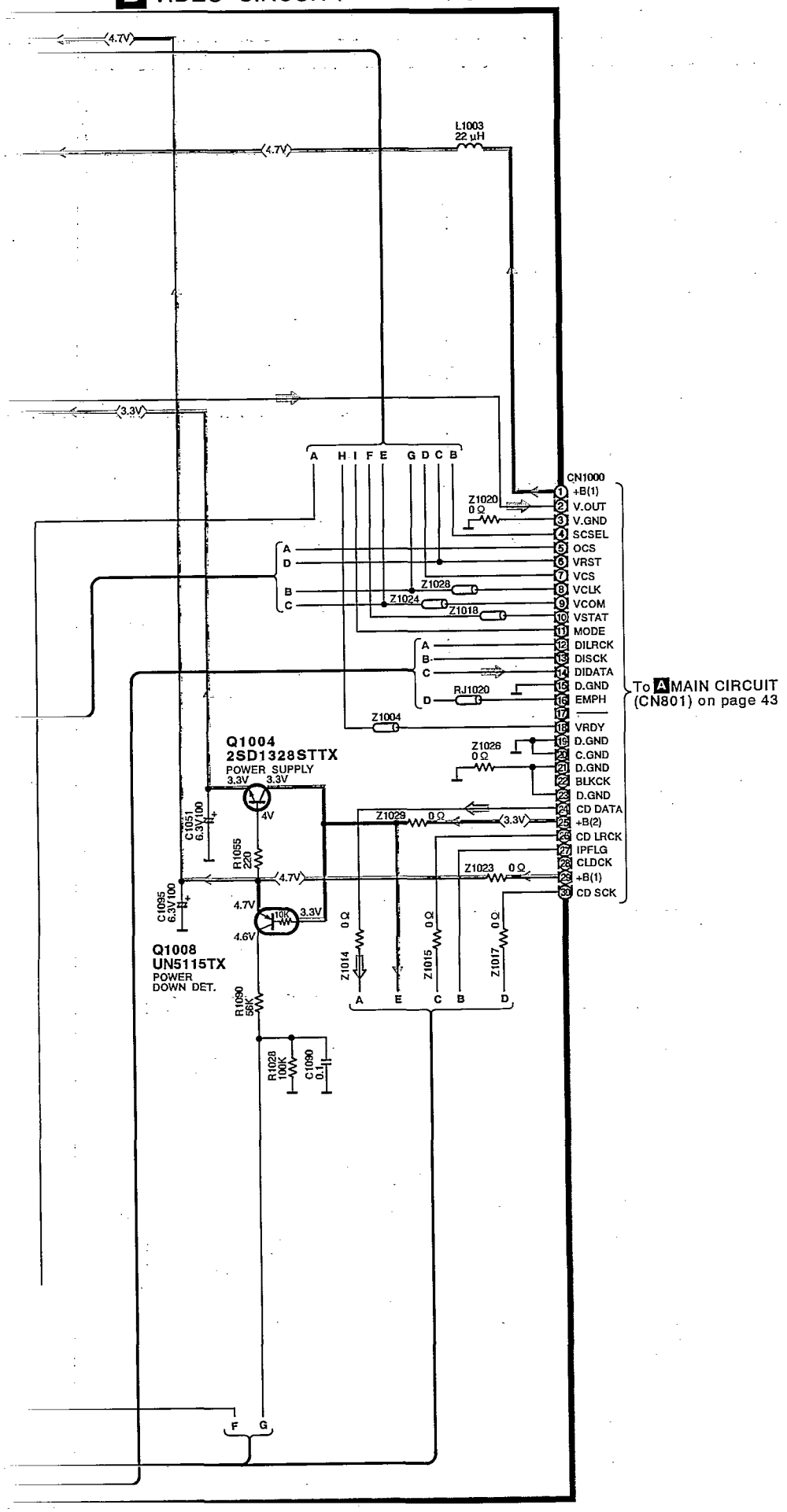

IC1007
LH5317Y1
512K PROM
Terminal guide: on page 63
IC1004
MN89101M
MPEG VIDEO AUDIO DECODER
Terminal guide: on pages 56 - 59
PLAY
0.2 µs. 2V/DIV.
F=27MHz
F=15.7KHz
T=0.5 µs.
T=0.384 µs.
T=63.5 µs.
20 µs.2V/DIV.
HSYNC
CSYNC
RESET
XTL IN
XTL OUT
TEST

B VIDEO CIRCUIT (P.C.Board:on pages 37,38)




IC1013
MN6570TF
D/A CONVERTER
(VIDEO)
Terminal guide: on page 61
IC1016
M35040056FPT
OSD
Terminal guide: on pages 62,63
IC1014
CXA1645M
RGB ENCODER
Terminal guide: on page 62
IC1015
MM1227XFF
SIGNAL SELECTOR
Q1001,1002
2SD1819QRSTX
SWITCHING
Q1002
Q1001
PLAY
20 µs. 2V/DIV.
F=15.7KHz
F=13.5MHz
F=6.75MHz
F=3.58MHz
4.7V
3.3V

B VIDEO CIRCUIT (P.C.Board:on pages 37,38)



■TERMINAL GUIDE

• IC11 (AN8819NFB): DC-DC converter control/motor & coil drive

Pin No.	Mark	I/O Division	Function
1	PV_{CC}	I	Power supply terminal
2	DED	I	Dead time input
3	OUT	O	Switching output
4	FB	O	Error amp output
5	IN	I	Error amp input
6	DRGND	—	Ground terminal
7	SGND	—	Ground terminal
8	SPRO	I	Short protect circuit
9	BSEL	I	Battery select terminal
10	VSEN	I	Empty detect terminal
11	SV_{CC}	I	Power supply terminal
12	CRIP	I	Ripple filter terminal
13	AV_{DD}	O	Power supply terminal
14	DRV_{CC}	I	Power supply terminal
15	VREF	I	Reference voltage input
16	INFO	I	Focus coil control signal input
17	INTR	I	Tracking coil control signal input
18	LDON	I	Laser ON/OFF control signal input
19	INSP	I	Spindle motor control signal input
20	PC	I	Phase control terminal
21	INTV	I	Traverse motor control signal input
22	TRVSTOP	I	Traverse motor stopping signal input

Pin No.	Mark	I/O Division	Function
23	TR−	O	Tracking coil drive signal output
24	TR+		
25	FO−	O	Focus coil drive signal output
26	FO+		
27	P. GND	—	Ground terminal
28	P. GND	—	Ground terminal
29	SP+	O	Spindle motor drive signal output
30	SP−		
31	TRV+	O	Traverse motor drive signal output
32	TRV−		
33	VC	I	PWM control terminal
34	TB	I	PWM control terminal
35	RESET	I	Reset signal input
36	MRST	O	Muting signal output
37	EMPTY	O	Empty signal output
38	CLK	I	Clock signal input (f=88.2kHz)
39	START	I	Start detection input
40	POWER	I	Power ON/OFF detection terminal
41	CT	I	Triangular wave oscillator capacitor input
42	PWMG	I	PWM control terminal
43	COMPO	—	Not used, open
44	COMPI	—	Laser power drive terminal (Not used, connected to GND)

• IC101 (AN8832SBE1): Servo amp

Pin No.	Mark	I/O Division	Function
1	PDAD	I	Photo detector current input
2	PDA	I	Photo detector current input
3	LPD	I	Non-inverting laser power input
4	LD	O	Laser power auto control output
5	AMPI	I	RF signal input Not used, connected to V_{CC}
6	V_{CC}	I	Power supply terminal
7	RFIN	I	RF signal input
8	CAGC	I	AGC detecting capacitor terminal
9	ARF	O	RF signal output
10	CEA	O	HPF-amp. terminal

Pin No.	Mark	I/O Division	Function
11	GND	—	Ground terminal
12	LDON	I	Laser ON/OFF control input
13	PLAY	I	Play control terminal
14	WVEL	—	Not used, open
15	BDO	O	Dropout detection output
16	RFDET	O	NRFDET signal output
17	TRCRS	O	CROSS signal output
18	OFTR	O	OFTR signal output
19	VDET	O	VDET signal output
20	RFENV	O	Envelope signal output

Pin No.	Mark	I/O Division	Function
21	TEBPF	I	Shock detection signal input
22	TE	O	Tracking error signal output
23	FE	O	Focus error signal output
24	TBAL	I	Tracking balance signal input

Pin No.	Mark	I/O Division	Function
25	FBAL	I	Focus balance signal input
26	VREF	O	Reference voltage output
27	PDB	I	Photo detector current input
28	PDBD	I	Photo detector current input

IC301 (SC424683FU): System Control & LCD Drive

Pin No.	Mark	I/O Division	Function description	Remarks
1	V_{DD}	I	Power supply terminal	3.3V
2	VCS	O	Chip Select signal output	When set to Low, communication with VCDM and VSTAT of the sub-microcomputer (IC1001) is enabled
3	OSC	O	Chip Select signal output	When set to Low, serial data transfer to SIN of OSD (IC1016) is enabled
4	POWER	O	Power On/Off signal output	Output to the DC-DC converter (IC11)
5	$\overline{\text{LIGHT}}$	O	LCD Backlight Control signal output	LED (D302~304, D306) control
6	MUTE	O	Muting signal output	Active high mute signal
7	VCOM	O	Command data output	Supplies the sub-microcomputer (IC1001) and OSD (IC1016) with command data
8	MDATA	O	CPU command data output	Supplies the DSP (IC501) with command data
9	MCLK	O	CPU Command Clock signal output	Supplies the DSP (IC501) with command clock signal
10	MLD	O	CPU Command Load signal output	Supplies the DSP (IC501) with command load signal
11	CCHG	O	Charging control output	High=Charging
12	$\overline{\text{CHARGE}}$			Low=Quick charging, High=Trickle charging
13	LCD3	—	——	Not used, connected to GND
14	LCD2	I	Power supply terminal	1.1V
15	LCD1			2.2V
16	V_{SS}	—	GND terminal	0V
17	V_{PP}	I	Power supply terminal	3.3V
18	XOSC1	I	Reset signal input	Normally at 3.3V
19	XOSC2	—	——	Not used, open
20	$\overline{\text{RESET}}$	O	Reset signal output	Supplies the DC-DC converter (IC11) and DSP (IC501) with reset signal
21	OSC1	I	Main System Clock input	f=4.2336MHz
22	OSC2	—	——	Not used, open
23	EMPH	I	DAC emphasis signal input	Receives the signal from MPGE video audio encoder (IC1004)
24	VCLK	O	Video Clock output	When set to Low, VCOM (command data) and VSTAT (status data) can be transferred
25	VSTAT	I	Status signal input	Status input from the sub-microcomputer (IC1001)
26	VRDY	O	Ready signal output	When set to Low, communication with VCOM and VSTAT of sub-microcomputer (IC1001) is enabled
27	RETURN	I	Return input	Receives an active signal when the "RETURN" button is pressed

Pin No.	Mark	I/O Division	Function description	Remarks
28	STOP	I	STOP/OFF input	Received an active signal when the "■ STOP/POWER OFF" button is pressed
29	F. SKIP	I	Forward input	Received an active signal when the "▶▶I NEXT" button is pressed
30	R. SKIP	I	Rewind input	Received an active signal when the "PREV I◀◀" button is pressed
31	AUTO	I	VIDEO OUT cable detection input	Identifies whether or not a video cable is plugged into the VIDEO OUT jack
32	HOLD	I	HOLD input	Receives an active signal when the "HOLD" button is pressed
33	PLAY	I	Play input	Received an active signal when the "▶II SELECT" button is pressed
34	MENU+	I	MENU+ input	Received an active signal when the "MENU+" button is pressed
35	MENU−	I	MENU− input	Received an active signal when the "MENU−" button is pressed
36	REST	I	Rest (innermost position) detection input	It turns "L" when optical pickup comes to innermost periphery
37	CHGCMP	I	Charging control input	Identifies the presence of battery or status of charging process
38	ACDET	I	Supply type detection input	Determines whether the supply power is AC or DC Low=AC, High=DC
39	SUBQ	I	Subcode (Q data) input	Accepts time and track information from the DSP (IC501). Common to CD-DA and video CD
40	EMPTY	I	Empty signal input	Active low signal, used to idetify low battery condition
41	SQCK	O	Subcode Q register clock output	Clock used to receive sub-code Q from the DSP (IC501)
42	OPEN	I	Disc Holder Open Detection signal input	Low=open, High=closed
43	STAT	I	Status signal input	Receives CRC, CUE, CLVS, TTSTOP, FCLV and SQOK from the DSP (IC501)
44	VPOWER	O	Module Power On/Off signal output	Supplies the DC-DC converter (IC11) with active high signal
45	BLKCK	I	Subcode clock (Q data) input	F=75Hz
46	RCN	I	Remote control input	Receives a signal from the remote control receiver
47	V_{DD}	I	Power supply terminal	3.3V
48 ∫ 51	BP3 ∫ BP0	O	LCD segment signal outputs	Used to display time and track information on the LCD panel
52 ∫ 59	FP0 ∫ FP7	—	——	Not used, open
60	V_{SS}	—	GND terminal	0V
61	FP8	—	——	Not used, open
62 ∫ 75	FP9 ∫ FP22	O	LCD segment signal outputs	Used to display time and track information on the LCD panel
76 ∫ 79	FP23 ∫ FP26	—	——	Not used, open
80	$\overline{\text{CDRST}}$	O	Reset signal output	Supplies the sub-microcomputer (IC1001) and OSD (IC1016) with a reset signal

• IC501 (MN662740RE): Servo processor/digital signal processor/digital filter/D/A converter

Pin No.	Mark	I/O Division	Function
1	BCLK	O	Serial bit clock output
2	LRCK	O	L/R discriminating signal output
3	SRDATA	O	Serial data signal output
4	$DV_{DD}1$	I	Power supply (digital circuit) terminal
5	$DV_{SS}1$	—	GND (digital circuit) terminal
6	TX	—	Digital audio interface signal (Not used, open)
7	MCLK	I	Command clock signal
8	MDATA	I	Command data signal
9	MLD	I	Command load signal ("L": LOAD)
10	SENSE	—	Sense signal (OFT, FESL, NACEND, NAJEND, POSAD, SFG) (Not used, open)
11	FLOCK	—	Optical servo condition (focus) ("L": lead-in) (Not used, open)
12	TLOCK	—	Optical servo condition (tracking) ("L": lead-in) (Not used, open)
13	BLKCK	O	Sub-code block clock (f=75Hz)
14	SQCK	I	Sub-code Q register clock
15	SUBQ	O	Sub-code Q data
16	DMUTE	I	Muting input ("H": MUTE) (Not used, connected to GND)
17	STAT	O	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
18	RESET	I	Reset signal ("L": reset)
19	SMCK	O	System clock (f=4.2336MHz)
20	PMCK	O	Frequency division clock signal ($f=\frac{1}{192}\times ck=88.2kHz$)
21	TRV	O	Traverse servo control
22	TVD	O	Traverse drive signal
23	PC	O	Spindle motor drive signal ("L": ON)
24	ECM	O	Spindle motor drive signal (Forced mode)
25	ECS	O	Spindle motor drive signal (Servo error signal)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive signal output
28	FOD	O	Focus drive signal output
29	VREF	I	D/A drive output (TVD, ECS, TRD, FOD, FBAL, TBAL) normal voltage input terminal

Pin No.	Mark	I/O Division	Function
30	FBAL	O	Focus balance adj. output
31	TBAL	O	Tracking balance adj. output
32	FE	I	Focus error signal (analog input)
33	TE	I	Tracking error signal (analog input)
34	RFENV	I	RF envelope signal
35	VDET	I	Oscillation det. signal ("H": det.)
36	OFTR	I	Off track signal ("H": Off track.)
37	TRCRS	I	Track cross signal input
38	RFDET	I	RF detection signal ("L": detection)
39	BDO	I	Dropout detection signal ("H": droput)
40	LDON	O	Laser power control ("H": ON)
41	TES	O	Tracking error shunt output ("H": dropout)
42	PLAY	O	Play signal ("H": play)
43	WVEL	—	Double velocity status signal ("H": double) (Not used, open)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias terminal (Not used, connected to GND)
47	DSLF	I/O	DSL loop filter terminal
48	PLLF	I/O	PLL loop filter terminal
49	VCOF	I	VCO loop filter terminal (Not used, connected to $AV_{DD}2$)
50	$AV_{DD}2$	I	Power supply (analog circuit) terminal (2)
51	$AV_{SS}2$	—	GND (analog circuit) terminal
52	FS384	O	384fs (16.9344MHz) output (Not used, open)
53	PCK	—	PLL extract clock (f=4.3218MHz) (Not used, open)
54	TROF	—	Tracking servo OFF signal (Not used, open)
55	SUBC	—	Sub-code serial output data (Not used, open)
56	SBCK	—	Sub-code serial input clock (Not used, open)
57	V_{SS}	—	GND terminal
58	X1	I	Crystal oscillator terminal (f=16.9344MHz)
59	X2	O	
60	V_{DD}	I	Power supply terminal
61	TRVSTOP	O	Traverse motor stop control terminal

Pin No.	Mark	I/O Division	Function
62	CLDCK	O	Sub-code frame clock signal (f CLDCK=7.35kHz: Normal) (Not used, open)
63	FCLK	—	Crystal frame clock (Not used, open)
64	IPFLAG	O	Interpolation flag terminal
65	FLAG0	—	Flag terminal (Not used, open)
66	CLVS	—	Turntable servo phase synchro signal ("H": CLV, "L": Rough servo) (Not used, open)
67	CRC	—	Sub-code CRC check terminal ("H": OK, "L": NG) (Not used, open)
68	DEMPHA	—	DE-emphasis ON signal ("H": ON) (Not used, open)
69	FLAG6	—	Flag terminal (Not used, open)

Pin No.	Mark	I/O Division	Function
70	SEL	—	Not used, connected to GND
71	TEST	I	Test terminal (Normal: "H")
72	$AV_{DD}1$	I	Power supply (analog circuit) terminal (1)
73	OUTL	O	Lch audio signal
74	$AV_{SS}1$	—	GND (analog circuit) terminal
75	OUTR	O	Rch audio signal
76	RSEL	I	Polarity direction control terminal of RF signal (Not used connected to power supply)
77	CSEL	—	Frequency control terminal of crystal oscillator (Not used, connected to GND)
78	ISRDATA	I	Audio serial data input
79	ILRCK	I	Audio L/R clock input
80	IBCLK	I	Audio bit clock input

• IC1001 (M38002M2300F): Sub-Microcomputer

Pin No.	Mark	I/O Division	Function description	Remarks
1	HSEL3	O	Data/address mode selection output	Accepts a mode switching signal for HD0~HD7 (address/data I/O lines)
2	HSEL2/CLOCK	O	Data/address mode selection output	Accepts a mode switching signal for HD0~HD7 (address/data I/O lines)
3	HSEL1/DATA	O	Data/address mode selection output	Accepts a mode switching signal for HD0~HD7 (address/data I/O lines)
4 ∫ 11	HD7 ∫ HD0	I/O	Address/data I/O lines	Used to exchange address or data with the MPEG video/audio decoder. Address is transferred in one direction from IC1001 to IC1004. Data is transferred in both directions between IC1001 and IC1004
12	VRDY	I	Ready signal input	When set to low, communication with VCOM and VSTAT of system controller (IC301) is enabled
13	VCK	I	Video clock input	Used to clock VCOM (command data) and VSTAT (status data) transfers. When set to low, communication with VCOM and VSTAT is enabled
14	VSTAT	O	Status data output	Supplies the system controller (IC301) with status data
15	VCOM	I	Command data input	Receives command data from the system controller (IC301)
16	VCS	I	Chip select signal input	Transferred from the system controller (IC301), this signal in used to select either sub-microcomputer (IC1001) or OSD (IC1016)
17	INT	I	Soft interrupt signal input	Receives soft Interrupt signal from the MPEG video audio decoder (IC1004)
18	CNV_{SS}	—	GND terminal	0V
19	$\overline{RESET}$	I	Reset signal	Active low reset input from the systam controller (IC301)
20	G. RST	—	CD-G reset signal	Not used, open
21	MUTE/BBCNT	O	Blue back control signal output	When a high signal is supplied to the timing generator (IC1010), the screen turns entirely blue

Pin No.	Mark	I/O Division	Function description	Remarks
22	XIN	I	CD bit clock input	Clock input from the timing generator (IC1010)
23	XOUT	O	——	Not used, open
24	V_{SS}	—	GND terminal	0V
25 ∫ 32	P2-7/DB7 ∫ P2-0/DB0	I/O	8-bit parallel data I/O lines	Data I/O from/to the 64K SRAM (IC1002)
33 34	P1-7/AD15 P1-6/AD14	O	Address output	Supply the 64K SRAM (IC1002) with address information
35	P1-5/AD13	—	——	Not used, open
36 ∫ 48	P1-4/AD12 ∫ P0-0/AD0	O	Address output	Supply the 64K SRAM (IC1002) with address information
49	P3-7/$\overline{RD}$	O	Read control output	When set to Low, data is read out of the 64K SRAM (IC1002)
50	P3-6/$\overline{WR}$	O	Write control output	When set to Low, data is read out of the 64K SRAM (IC1002)
51	P3-5/SYNC	—	——	Not used, open
52	P3-4/CLK	—	——	Not used, open
53	P3-3/$\overline{RESETOUT}$	—	——	Not used, open
54	P3-2/$\overline{ONW}$	I	ON_WAIT input	Used to insert a wait cycle into CPU cycle
55	SCSEL0	O	NTSC/PAL selection signal output	MODE0 / SCSEL0: PAL 60: H / L; PAL: L / L; NTSC: — / H. *When SCSEL0 is High, NTSC is selected no matter whether MODE0 is High or Low
56	MODE0	O		
57	V_{CC}	I	Power supply terminal	3.3V
58	SCSEL	I	NTSC/PAL selection signal input	MODE / SCSEL: PAL 60: H / L; PAL: L / L; NTSC: — / H. *When SCSEL is High, NTSC is selected no matter whether MODE is High or Low
59	MODE	I		
60	CDNFMV	O	CD-DA audio line/video CD line selection signal output	High: Selects CD-DA Low: Selects video CD
61	CDGM	I	——	——
62	DTACK	I	Data acknowledge signal input	Data acknowledgement from MPEG (IC1004) received in response to data output to MPEG
63	R/W	O	Read/write control output	Controls address or data read/write operations performed with MPEG (IC1004)
64	DS	O	Data strobe signal output	When set to Low, address or data is exchanged with MPEG (IC1004) through HD0~HD7

• IC1004 (MN89101M): MPEG Video audio decoder

Pin No.	Mark	I/O Division	Function description	Remarks
1	HA2	I	Data/address mode switching input	Used to switch the mode for HD0~HD7 (address/data I/O) lines
2	$\overline{DS}$	I	Data strobe signal input	When set to Low, address or data is read/written from/to the sub-microcomputer (IC1001) to/from HD0~HD7
3	$\overline{R}$/W	I	Read/Write signal input	Read/write signal Low=read, High=write
4	CFLEVEL	—	——	Not used, open

Pin No.	Mark	I/O Division	Function description	Remarks
5	$\overline{\text{DTACK}}$	O	Data acknowledge signal output	This signal is output to IC1001 when data is received from IC1001 to HD0~HD7
6	HD0	I/O	Address/data I/O	Used to exchange address or data between IC1001 and IC1004
7	V_{DD}	I	Power supply terminal	3.3V
8	HD1	I/O	Address/data I/O	Used exchange address or data between IC1001 and IC1004. Address is transferred only in one direction from IC1001 to IC1004. Data is transferred in both directions between IC1001 and IC1004 (IC1004's status is transferred to IC1001, commands are transferred from IC1001 to IC1004)
9	HD2	I/O	Address/data I/O	
10	V_{SS}	—	GND terminal	0V
11 ∫ 15	HD3 ∫ HD7	I/O	Address/data I/O	Used exchange address or data between IC1001 and IC1004. Address is transferred only in one direction from IC1001 to IC1004. Data is transferred in both directions between IC1001 and IC1004.
16	I/O V_{SS}	—	GND terminal	0V
17	TEST	I	——	Not used, connected to power supply
18	XTL V_{SS}	—	GND for crystal resonator	0V
19	XTL IN	I	Crystal resonator terminals	 F=40.5MHz (T=0.0247μs)
20	XTL OUT	O		
21, 22	V_{DD}	I	Supply input for crystal resonator	3.3V
23 ∫ 28	MD0 ∫ MD5	I/O	DRAM/ROM data I/O lines	Used to exchange data with DRAM (IC1009, IC1005) and ROM (IC1007). Data used to control MPEG (IC1004) is transferred from ROM, while video data with CD-ROM format comes from DRAM
29	V_{DD}	I	Power supply terminal	3.3V
30	MD6	I/O	DRAM/ROM data I/O lines	Used exchange data with DRAM (IC1009, IC1005) and ROM (IC1007)
31	MD7			
32	$\overline{\text{MCE0}}$	O	ROM chip enable signal output	Low selects ROM (IC1007)
33	MCE1	—	——	Not used, open
34 ∫ 37	MD8 ∫ MD11	I/O	DRAM data/ROM address I/O lines	Used to exchange data with DRAM (IC1009, IC1005) and ROM (IC1007)
38	V_{SS}	—	GND terminal	0V
39 ∫ 42	MD12 ∫ MD15	I/O	DRAM data/ROM address I/O lines	Used to exchange data with DRAM (IC1009, IC1005) and ROM (IC1007)
43	$V_{DD}5$	I	Power supply terminal	4.7V
44	$\overline{\text{LCAS}}$	O	DRAM LCAS/ROM address output	Lower address/data command output for DRAM (IC1009, IC1005)
45	$\overline{\text{LCAS IN}}$	I	DRAM LCAS input	Lower address/data command input for DRAM (IC1009, IC1005)
46	V_{SS}	—	GND terminal	0V
47	$\overline{\text{MWE}}$	O	DRAM write enable signal output	Low writes to IC1009, IC1005 High reads from IC1009, IC1005
48	$\overline{\text{UCAS}}$	O	DRAM UCAS/ROM address output	Higher address/data command output for DRAM (IC1009, IC1005)
49	V_{DD}	I	Power supply terminal	3.3V
50	$\overline{\text{UCAS IN}}$	I	DRAM UCAS input	Higher address/data command input for DRAM (IC1009, IC1005)

Pin No.	Mark	I/O Division	Function description	Remarks
51	$\overline{RAS0}$	O	DRAM RAS0 output	Higher address output for DRAM (IC1009)
52	$\overline{RAS1}$	O	DRAM RAS1 output	Higher address output for DRAM (IC1005)
53 ∫ 57	MA9 ∫ MA5	O	DRAM/ROM address output	Address output for DRAM (IC1009, IC1005)
58	V_{SS}	—	GND terminal	0V
59 ∫ 63	MA4 ∫ MA0	O	DRAM/ROM address output	Address output for DRAM (IC1009, IC1005)
64	PIO 0	—	——	Not used, open
65	V_{DD}	I	Power supply terminal	3.3V
66 ∫ 72	VD0 ∫ VD6	O	Video data output (red)	Video data output (red) to D/A converter (video) (IC1013)
73	V_{SS}	—	GND terminal	0V
74 ∫ 76	VD7 ∫ VD9	O	Video data outputs Pin 74: Red Pins 75~76: Green	Video data outputs (red and green) to D/A converter (video) (IC1013)
77	V_{DD}	I	Power supply terminal	3.3V
78 ∫ 80	VD10 ∫ VD12	O	Video data output (Green)	Video data output (green) to D/A converter (video) (IC1013)
81	V_{DD}	I	Power supply terminal	3.3V
82 ∫ 84	VD13 ∫ VD15	O	Video data output (Green)	Video data output (green) to D/A converter (video) (IC1013)
85	V_{SS}	—	GND terminal	0V
86 ∫ 89	VD16 ∫ VD19	O	Video data output (blue)	Video data output (blue) to D/A converter (video) (IC1013)
90	V_{SS}	—	GND terminal	0V
91 ∫ 94	VD20 ∫ VD23	O	Video data output (blue)	Video data output (blue) to D/A converter (video) (IC1013)
95	CSYNC	O	Composite Sync. signal output	Output to the timing generator (IC1010) and RGB encoder (IC1014) (F=15.7kHz: NTSC, F=15.6kHz: PAL)
96	HSYNC	O	Horizontal Sync. signal output	Output to the timing generator (IC1010) and OSD (IC1016) (F=15.7kHz: NTSC, F=15.6kHz: PAL)
97	VOE	I	Video enable signal input	Not used connected to power supply
98	VCO V_{DD}	I	Power supply terminal	3.3V
99	VCLK	I	Video read clock input	 F=27MHz (T=0.037μs)
100	VCO V_{SS}	—	GND terminal	0V
101	$\overline{RESET}$	I	Reset signal input	Active low reset signal from the system controller (IC301)
102	V_{SS}	—	GND terminal	0V
103	CD-C2PO	I	Data Error Flag signal input	Accepts a flag signal when serial data error is uncorrectable
104	CD-LRCK	I	CD LR clock input	 F=87kHz (T=11.5μs)

Pin No.	Mark	I/O Division	Function description	Remarks
105	CD-DATA	I	CD serial data input	F=2.822MHz (T=0.354µs)
106	CD-BCK	I	CD bit clock input	 F=2.822MHz (T=0.354µs)
107	DA-LRCK	O	Audio LR clock output	 F=87kHz (T=11.5µs)
108	DA-DATA	O	Audio serial data output	F=2MHz (T=0.5µs)
109	DA-BCK	O	Audio bit clock output	 F=2MHz (T=0.5µs)
110	V_{DD}	I	Power supply terminal	3.3V
111	XCK	I	Audio read clock input	 F=16.9344MHz (T=0.059µs)
112	V_{DD}	I	Power supply terminal	3.3V
113	PI12	O	Soft interrupt signal output	Issued when IC1004 wants to transfer its own information to the sub-microcomputer (IC1001)
114	PI11	—	——	Not used, open
115	PI10	I	Host Enable signal input	Raised to high level
116	PI09	I	Boot ROM Enable signal input	Raised to high level
117	PI08	—	——	Not used, open
118	PI07	O	DAC emphasis output	High frequency emphasis signal output
119 ∫ 122	PI06 ∫ PI03	—	——	Not used, open
123	$V_{DD}5$	I	Power supply terminal	4.7V
124	PI02	—	——	Not used, open
125	Vss	—	GND terminal	0V
126	PI01	—	——	Not used, open
127	HA0	I	Data/address mode switching input	Used to switch the mode for HD0~HD7 (address/data I/O) lines
128	HA1	I	Data/address mode switching input	Used to switch the mode for HD0~HD7 (address/data I/O) lines

• IC1010 (BU12102-0D): Timing generator

Pin No.	Mark	I/O Division	Function description	Remarks
1	GND	—	GND terminal	0V
2	VOSCI	I	Video clock OSC input	 F=27MHz (T=0.037µs)
3	VOSCO	O	Video clock OSC output	
4	V_{DD}	I	Power supply terminal	3.3V
5	VCLK	O	Video clock output	 F=27MHz (T=0.037µs)
6	DCLK	O	Pixel clock output	 F=13.5MHz (T=0.074µs)
7	OCLK	O	TV screen character display clock output	 F=6.75MHz (T=0.148µs)
8	$\overline{\text{HSYNC}}$	I	Horizontal Sync. signal input	F=15.7kHz (T=63.5µs) NTSC F=15.6kHz (T=64µs) PAL

Pin No.	Mark	I/O Division	Function description	Remarks
9	$\overline{\text{CSYNC}}$	I	Composite Sync. signal input	F=15.7kHz (T=63.5µs) (NTSC) F=15.6kHz (T=64µs) (PAL)
10	PDOWN	I	Power Down signal input	Active low selects power down mode
11	FSC	O	Subcarrier signal output	Subcarrier signal output to the OSD (IC1016) (F=3.58MHz: NTSC, F=4.43MHz: PAL)
12	V_{DD}	I	Power supply terminal	3.3V
13	POSCI	I	Crystal OSC circuit input	 F=17.734475MHz (PAL) (T=0.056µs)
14	POSCO	O	Crystal OSC circuit output	
15	NOSCI	I	Crystal OSC circuit input	 F=14.31818MHz (NTSC) (T=0.07µs)
16	NOSCO	O	Crystal OSC circuit output	
17	GND	—	GND terminal	0V
18	4FSC	O	Frequency output 4 times the subcarrier frequency	F=14.31818MHz (T=0.07µs) (NTSC) F=17.734475MHz (T=0.06µs) (PAL)
19	$\overline{\text{VSYNC}}$	O	Vertical Sync. signal output	Vertical Sync. signal output to the OSD (IC1016)
20	PALID	—	——	Not used, open
21	SWCNT	O	Switch control signal output	Signal output to the signal selector (IC1015)
22	CDNFMV	I	CD-DA audio line/video CD line switching signal input	Switching signal from the sub-microcomputer (IC1001)
23	XCK	O	Reference signal output	 F=16.9344MHz (T=0.059µs)
24	GND	—	GND terminal	0V
25	XOSCO	O	Reference signal generator output	 F=16.9344MHz (T=0.059µs)
26	XOSCI	I	Reference signal genarator input	
27	V_{DD}	I	Power supply terminal	3.3V
28	XPC	O	Reference signal phase comparator output	SCK (Serial data bit clock) frequency is compared with one sixth the XCK (reference signal) frequency to lock the SCK frequency
29	FSSEL	—	GND terminal	0V
30	SCKI	I	Serial data bit clock input	F=2.822MHz (T=0.354µs)
31	AIN	I	L/R Discrimination signal input	 F=87kHz (T=11.5µs)
32	BIN	I	Data Error Flag signal input	Accepts a flag signal when serial data error is uncorrectable
33	CIN	I	CD serial data input	CD serial data from the DSP (IC501)
34	GND	—	GND terminal	0V
35	COUT	O	CD serial data output	Serial data output to MPEG video audio decoder (IC1004)
36	BOUT	O	Data Error Flag signal output	Accepts a flag signal when serial data error is uncorrectable
37	AOUT	O	CD LR clock output	 F=87kHz (T=11.5µs)
38	SCKOUT	O	CD bit clock	 F=2.822MHz (T=0.354µs)
39	V_{DD}	I	Power supply terminal	3.3V
40	BBOUT	O	Blue back output	Applied to analog blue data input of RGB encoder (IC1014)

Pin No.	Mark	I/O Division	Function description	Remarks
41	BBCNT	I	Blue back control signal input	Control signal from the sub-microcomputer (IC1001). The screen turns entirely blue when this signal is high
42	SCSEL	I	NTSC/PAL Selection signal input	<table><tr><th></th><th>MODE</th><th>SCSEL</th></tr><tr><td>PAL 60</td><td>H</td><td>L</td></tr><tr><td>PAL</td><td>L</td><td>L</td></tr><tr><td>NTSC</td><td>—</td><td>H</td></tr></table> ∗NTSC is selected when SCSEL is high, no matter whether MODE is High or Low
43	MODE	I		
44	VPC	O	Video clock phase comparator output	/HSYNC (horizontal sync.) frequency is compared with 4FSC (4 times the subcarrier frequency) to lock the former to the latter

• IC1013 (MN6570TF): D/A converter (video)

Pin No.	Mark	I/O Division	Function description	Remarks
1 ∫ 4	DG4 ∫ DG1	I	Pixel (green) output (bits 1~4)	Pixel signals from MPEG video audio decoder (IC1004)
5	CLKG	I	Pixel (green) clock input	Clock signal (F=13.5MHz) from timing generator (IC1010)
6	DV_{SS}	—	Ground	0V
7	DV_{DD}	I	Digital system power supply	4.7V
8 ∫ 15	DB8 ∫ DB1	I	Pixel (blue/chrominance) output (bits 2~7)	Pixel signals from MPEG video audio decoder (IC1004)
16	CLKR	I	Pixel (red) clock input	Clock signal (F=13.5MHz) from timing generator (IC1010)
17 • 18	AV_{DD}	I	Analog power supply	4.7V
19	IREF	I	Internal reference current	Connected to power supply via a 1kΩ resistance
20	VREF	I	Internal reference voltage	Connected in parallel to power supply and ground via a 2.2kΩ resistance
21	COMP	I	Time constant setting	1μF capacitor between terminal and power supply
22	VIB	I	Time constant setting	0.1μF capacitor connected between terminal and ground
23	IOB	O	Analog RGB (blue) output	RGB signal for RGB encoder (IC1014)
24	NC	—	Ground	0V
25	IOG	O	Analog RGB (green) output	RGB signal for RGB encoder (IC1014)
26	NC	—	Ground	0V
27	IOR	O	Analog RGB (red) output	RGB signal for RGB encoder (IC1014)
28 • 29	AV_{SS}	—	Ground	0V
30 ∫ 37	DR8 ∫ DR1	I	Pixel (red/luminance) input (bits 1~8)	Pixel signals from MPEG video audio decoder (IC1004)
38	CLKB	I	Pixel (blue) clock input	Clock signal (F=13.5MHz) from timing generator (IC1010)
39	DV_{SS}	—	Ground	0V
40	DV_{DD}	I	Power supply	4.7V
41 ∫ 44	DG8 ∫ DG5	I	Pixel (green) input (bits 0~3)	Pixel signals from MPEG video audio decoder (IC1004)

• IC1014 (CXA1645M): RGB encoder

Pin No.	Mark	I/O Division	Function description	Remarks
1	GND1	—	Ground	0V
2	RIN	I	Analog RGB (red) input	RGB signal from D/A converter (video) (IC1013)
3	GIN	I	Analog RGB (green) input	RGB signal from D/A converter (video) (IC1013)
4	BIN	I	Analog RGB (blue) input	RGB signal from D/A converter (video) (IC1013)
5	NC	—	Ground	0V
6	SCIN	I	Subcarrier input	Subcarrier signal (F=3.58MHz) from timing generator (IC1010)
7	NPIN	I	NTSC/PAL mode switching	NTSC: "H" PAL: "L"
8	BFOUT	—	Output for BF pulse monitor	Not used, open
9	YCLPC	I	Y signal clamp time constant	0.1μF capacitor connected between terminal and ground
10	SYNC IN	I	Composite sync signal When L (≦0.8V): Sync period	Sync signal from timing generator (IC1010)
11	NC	—	Not connected	Not used, open
12	$V_{CC}1$	I	Power supply	5V
13	IREF	I	Internal reference current	47kΩ resistance connected between terminal and ground
14	VREF	I	Internal reference voltage	10μF capacitor connected between terminal and ground
15	COUT	—	Chroma signal output	Not used, open
16	YOUT	—	Y signal output	Not used, open
17	YTRAP	—	Cross color power supply regulated by subcarrier frequency component of Y signal	Not used, open
18	FO	O	Frequency adjust (fo) for internal filter	Resistance connected between terminal and ground in accordance with mode NTSC: 20kΩ (±1%) PAL: 16kΩ (±1%)
19	$V_{CC}2$	I	Power supply	4.6V
20	CVOUT	O	Composite video signal output	Video signal from a video CD
21	BOUT	—	Analog RGB signal output	Not used, open
22	GOUT	—	Analog RGB signal output	Not used, open
23	ROUT	—	Analog RGB signal output	Not used, open
24	GND 2	—	Ground	0V

• IC1016 (M35040056FPT): OSD

Pin No.	Mark	I/O Division	Function description	Remarks
1	OSC1	I	External network I/O for display OSC	The display OSC's oscillation frequency determines the horizontal display position and character width on the TV screen. OSC2 is not used and open
2	OSC2	—		
3	$\overline{CS}$	I	Chip select input	Set to Low during serial data transfer. Hysteresis input with internal pull-up resistor
4	SCK	I	Serial clock input	The SIN input reads serial data at the rising edge of SCK when the /CS input is low. Hysteresis input with internal pull-up resistor

Pin No.	Mark	I/O Division	Function description	Remarks
5	SIN	I	Serial data input	Accepts data and address for the display control register and display data memory. Hysteresis input with internal pull-up resistor
6	$\overline{AC}$	I	Auto clear input	Clears the IC's internal logics when set to Low. Hysteresis input with internal pull-up resistor
7 ∫ 10	P6 ∫ P9	—	——	Not used, open
11	V_{SS}	—	GND terminal	0V
12	P0	O	Port 0 output	Outputs TV screen display character data to pin 4 of the signal selector (IC1015)
13 ∫ 16	P1 ∫ P4	—	——	Not used, open
17	P5	O	Port 5 output	Outputs TV screen display character control signal to pin 5 of the sigani selector (IC1015)
18	HOR	I	Horizontal Sync. input	Hysteresis input to accept H. Sync. signal from the MPEG video audio decoder (IC1004)
19	VERT	I	Vertical Sync. input	Hysteresis input to accept V. Sync. signal from the MPEG video audio decoder (IC1004)
20	V_{DD}	—	Power supply terminal	3.3V

• IC1007 (LH5317Y1): 512K PROM

Pin No.	Mark	I/O Division	Function description	Remarks
1 • 2	A15 • A12	I	Address input terminal	Address data from MPEG video audio decoder (IC1004)
3 ∫ 10	A7 ∫ A0	I	Address input terminal	Address data from MPEG video audio decoder (IC1004)
11 ∫ 13	D0 ∫ D2	I/O	Data output terminal	Control data output to MPEG video audio decoder (IC1004)
14	GND	—	GROUND	0V
15 ∫ 19	D3 ∫ D7	I/O	Data output terminal	Control data output to MPEG video audio decoder (IC1004)
20	$\overline{CE}$	I	Chip enable input	$\overline{CE}$ / OE/$\overline{OE}$ / Data output: H / Do not cave / High impedance; L / L/H / High impedance; L / H/L / Output. Connected to ground
21	A10	I	Address input terminal	Address data from MPEG video audio decoder (IC1004)
22	OE/$\overline{OE}$	I	Output enable input	Refer to the Remarks of pin No. 20
23	A11	I	Address input terminal	Address data from MPEG video audio decoder (IC1004)
24 • 25	A9 • A8	I	Address input terminal	Address data from MPEG video audio decoder (IC1004)
26 • 27	A13 • A14	I	Address input terminal	Address data from MPEG video audio decoder (IC1004)
28	V_{CC}	I	Power supply	4.7V

■ REPLACEMENT PARTS LIST

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*Warning: This product uses a laser diode. Refer to caution statements on page 2.
*ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen einc vom hersteller spezifizierte einheit ausgetauscht werden.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC11	AN8819NFB	DC-DC CONV. & MOTOR DRIVE	
IC12	S80745SND9T1	RESET	
IC101	AN8832SBE1	SERVO AMP	
IC301	SC424683FU	SYSTEM CONT. & LCD DRIVE	
IC371	RCDRS-52	REMOTE CONTROL SENSOR	
IC501	MN662740RE	SERVO PROCESSOR	
IC701	TDA1308TT	HEADPHONES AMP	
IC801	UPD4053BGT1	SIGNAL SELECTOR	
IC851	FA7612NTE2	DC-DC CONV.	
IC1001	M38002M2300F	SUB MICROCOMPUTER	
IC1002	LH5168N8	64K SRAM	
IC1004	MN89101M	MPEG VIDEO AUDIO DECODER	
IC1005	MB81426070PJ	4M DRAM	
IC1007	LH5317Y1	512K PROM	
IC1008	NJM2115MT1	VCO CONTROL	
IC1009	MB81426070PJ	4M DRAM	
IC1010	BU12102-0D	TIMING GENERATOR	
IC1013	MN6570TF	D/A CONVERTER	
IC1014	CXA1645M	RGB ENCODER	
IC1015	MM1227XFF	SIGNAL SELECTOR	
IC1016	M35040056FPT	OSD	
		TRANSISTOR(S)	
Q11	FP106TL	TRANSISTOR	
Q12	2SD1819QRSTX	TRANSISTOR	
Q13	UN5215TX	TRANSISTOR	
Q14	FMG6T148	TRANSISTOR	
Q31	2SD1758TLPQR	TRANSISTOR	
Q32	2SD1819QRSTX	TRANSISTOR	
Q33	2SB1218QRSTX	TRANSISTOR	
Q34-36	2SD1819QRSTX	TRANSISTOR	
Q37	UN5213TX	TRANSISTOR	
Q38	UN5114TX	TRANSISTOR	
Q201	2SB709QRSTX	TRANSISTOR	
Q301	2SD1819QRSTX	TRANSISTOR	
Q302	UN5114TX	TRANSISTOR	
Q371	FMW1T98	TRANSISTOR	
Q372	2SB709QRSTX	TRANSISTOR	
Q401	2SB970RSTX	TRANSISTOR	
Q601, 602	2SD1328QRSTX	TRANSISTOR	
Q603	FMG4T148	TRANSISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
Q604	UN5114TX	TRANSISTOR	
Q605, 606	UN5210TX	TRANSISTOR	
Q701, 702	2SD1328QRSTX	TRANSISTOR	
Q703, 704	UN5210TX	TRANSISTOR	
Q801	2SD1328QRSTX	TRANSISTOR	
Q802	2SB1218QRSTX	TRANSISTOR	
Q851	FP106TL	TRANSISTOR	
Q852	UN5213TX	TRANSISTOR	
Q854	UN5112TX	TRANSISTOR	
Q1001, 1002	2SD1819QRSTX	TRANSISTOR	
Q1004	2SD1328-S	TRANSISTOR	
Q1008	UN5115TX	TRANSISTOR	
		DIODE(S)	
D11	D1FS4	DIODE	
D12	MA741WKTX	DIODE	
D13	MA141WKTX	DIODE	
D31	MA143TX	DIODE	
D301	MA141WKTX	DIODE	
D302-304	SML-010MTT87	L. E. D.	
D305	MA141WATX	DIODE	
D306	SML-010MTT87	L. E. D.	
D372	MA110TX	DIODE	
D401	D1FS4	DIODE	
D801	MA110TX	DIODE	
D851	MA110TX	DIODE	
D1002	MA304TX	DIODE	
D1007	MA304TX	DIODE	
		IC PROTECTOR(S)	
ICP11	UNHD00500A	IC PROTECTOR	⚠
		VARIABLE RESISTOR(S)	
VR701	EVUT2EA25C54	VOLUME	
VR851	EVNDXAA00B13	POWER SUPPLY VOLTAGE ADJ.	
		COIL(S) AND BEADS	
Z1003	RLB0003	BEADS	
Z1004	RLBN102V-Y	BEADS	
Z1007	RLB0003	BEADS	
Z1009	RLB0003	BEADS	

Ref. No.	Part No.	Part Name & Description	Remarks
Z1018	RLBN102V-Y	BEADS	
Z1024	RLBN102V-Y	BEADS	
Z1028	RLBN102V-Y	BEADS	
L11, 12	RLQB330KT-M	COIL	
L401	RLQB330KT-M	COIL	
L851	RLQB330KT-M	COIL	
L903	RLB0003	BEADS	
L914, 915	RLB0003	BEADS	
L917-923	RLB0003	BEADS	
L925, 926	RLB0003	BEADS	
L928, 929	RLB0003	BEADS	
L1001	RLQM2R2KT2-W	COIL	
L1002	RLQM121JT2-W	COIL	
L1003	RLQU220KT-W	COIL	
L1004	RLQM121JT2-W	COIL	
L1007	RLQM121JT2-W	COIL	
L1008-1010	RLQU220KT-W	COIL	
L1012	RLQM1R8KT2-W	COIL	
L1013	RLQM5R6KT2-W	COIL	
RJ1020	RLBN102V-Y	BEADS	
		OSCILLATOR(S)	
X501	RSXC1693S01T	OSCILLATOR(16.93MHz)	
X1001	RSXZ40M5S01T	OSCILLATOR(40.5MHz)	
X1002	RSXC14M3S03M	OSCILLATOR(14.3MHz)	
X1003	RSXC17M7S02M	OSCILLATOR(17.7MHz)	
		LCD(S)	
LCD301	EDD052CH0AHP	LCD	
		SWITCH(ES)	
S201	RSH1A91ZA-A	LASER ON/OFF	
S202	SSHD5	REST DETECTOR	
S301	EVQPJH05K	MENU, -	
S302	EVQPJH05K	MENU, +	
S303	RSG0024-A	STOP/OPERATION OFF	
S304	EVQ21405R	MULTI OPERATION(PREV)	
S305	EVQ21405R	MULTI OPERATION(NEXT)	
S306	EVQ21405R	MULTI OPERATION(RETURN)	
S307	EVQ21405R	MULTI OPERATION(SELECT)	
S308	ESD11H220	HOLD	
S801	ESD11H230	VIDEO FORMAT SELECTOR	
		CONNECTOR(S) AND SOCKET(S)	
CN11	RJC93015-1	BATTERY TERMINAL(+)	
CN12	RJC93015-1	BATTERY TERMINAL(-)	
CN13	RJH5102-1	RECHARGEABLE BATT. TERMINAL	
CN101	RJS1A6116	SOCKET(16P)	

Ref. No.	Part No.	Part Name & Description	Remarks
CN401	RJT068W04V	CONNECTOR(4P)	
CN402	RJT068W02V	CONNECTOR(2P)	
CN801	RJS2A0630T	CONNECTOR(30P)	
CN1000	RJS2A0630T	CONNECTOR(30P)	
		JACK(S)	
JK11	RJJ43K06-C	DC IN JACK(9V)	
JK601	RJJD3S5ZB-C	AUDIO OUT JACK	
JK701	RJJD3S5ZB-C	HEADPHONES JACK	
JK801	RJJ33TY04-C	VIDEO OUT JACK	

■ RESISTORS AND CAPACITORS

Notes : * Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM), 1M=1,000k (OHM)

Ref. No.	Part No.	Values & Remarks
		RESISTORS
L912, 913	ERJ6GEYJ102V	1/10W 1K
R11	ERJ6GEYJ272V	1/10W 2.7K
R12	ERJ6GEYJ473V	1/10W 47K
R13, 14	ERJ6GEYJ221V	1/10W 220
R15	ERJ6GEYD562V	1/10W 5.6K
R16	ERJ6GEYJ822V	1/10W 8.2K
R17	ERJ6GEYJ103V	1/10W 10K
R18	ERJ6GEYJ474V	1/10W 470K
R19	ERJ6GEYJ104V	1/10W 100K
R20	ERJ6GEYJ102V	1/10W 1K
R21	ERJ6GEYD472V	1/10W 4.7K
R22	ERJ6GEYJ473V	1/10W 47K
R23	ERJ6GEYJ334V	1/10W 330K
R24	ERJ6GEYJ472V	1/10W 4.7K
R25	ERJ6GEYJ102V	1/10W 1K
R26	ERJ6GEYD183V	1/10W 18K
R27	ERJ6GEYD563V	1/10W 56K
R28	ERJ6GEYD104V	1/10W 100K
R29	ERJ6GEYJ683V	1/10W 68K
R31	ERJ6GEYJ102V	1/10W 1K
R32	ERJ6GEYD224V	1/10W 220K
R33	ERJ6GEYD564V	1/10W 560K
R34	ERJ12YJ1R2H	1/2W 1.2
R35	ERJ6GEYJ391V	1/10W 390
R36	ERJ6GEYJ153V	1/10W 15K
R37	ERJ6GEYJ472V	1/10W 4.7K
R38	ERJ6GEYJ821V	1/10W 820
R39	ERJ6GEYJ333V	1/10W 33K
R40	ERJ6GEYJ681V	1/10W 680
R41	ERJ6GEYJ331V	1/10W 330
R42	ERJ6GEYJ152V	1/10W 1.5K
R43	ERJ6GEYJ104V	1/10W 100K
R44	ERJ6GEYJ223V	1/10W 22K
R45	ERJ6GEYJ100	1/10W 10
R46	ERJ6GEYJ563V	1/10W 56K
R47	ERJ6GEYJ104V	1/10W 100K
R101-104	ERJ6GEYJ223V	1/10W 22K
R105	ERJ6GEYJ333V	1/10W 33K
R106	ERJ6GEYJ153V	1/10W 15K
R109	ERJ6GEYJ223V	1/10W 22K
R110	ERJ6GEYJ124V	1/10W 120K
R111, 112	ERJ6GEYJ103V	1/10W 10K
R113	ERJ6GEYJ101V	1/10W 100
R114	ERJ6GEYJ330V	1/10W 33
R117	ERJ6GEYJ474V	1/10W 470K
R201	ERJ6GEYJ223V	1/10W 22K
R202	ERJ8GEYJ220V	1/8W 22
R203	ERJ6GEYJ100	1/10W 10
R205-207	ERJ8GEYJ220V	1/8W 22
R301-303	ERJ6GEYJ473V	1/10W 47K
R304, 305	ERJ6GEYJ103V	1/10W 10K
R306-308	ERJ6GEYJ151V	1/10W 150
R309	ERJ6GEYJ122V	1/10W 1.2K
R310	ERJ6GEYJ224V	1/10W 220K
R311	ERJ6GEYJ683V	1/10W 68K
R312	ERJ6GEYJ151V	1/10W 150
R313, 314	ERJ6GEYJ102V	1/10W 1K
R316-319	ERJ6GEYJ102V	1/10W 1K
R371	ERJ6GEYJ562V	1/10W 5.6K
R372	ERJ6GEYJ272V	1/10W 2.7K
R373	ERJ6GEYJ153V	1/10W 15K
R374	ERJ6GEYJ333V	1/10W 33K
R375	ERJ6GEYJ473V	1/10W 47K
R401	ERJ6GEYJ224V	1/10W 220K
R402	ERJ6GEYJ103V	1/10W 10K
R403	ERJ6GEYJ823	1/10W 82K
R404, 405	ERJ6GEYJ682V	1/10W 6.8K
R406	ERJ6GEYJ473V	1/10W 47K
R407	ERJ6GEYJ272V	1/10W 2.7K
R408	ERJ6GEYJ393V	1/10W 39K
R410	ERJ6GEYJ392V	1/10W 3.9K
R411	ERJ6GEYJ681V	1/10W 680
R501	ERJ6GEYJ220	1/10W 22
R502	ERJ6GEYJ103V	1/10W 10K
R503	ERJ6GEYJ473V	1/10W 47K
R504	ERJ6GEYJ683V	1/10W 68K
R505	ERJ6GEYJ471V	1/10W 470
R506	ERJ6GEYJ152V	1/10W 1.5K
R508	ERJ6GEYJ105	1/10W 1M
R509	ERJ6GEYJ471V	1/10W 470
R510	ERJ6GEYJ220	1/10W 22
R601, 602	ERJ6GEYJ102V	1/10W 1K
R603, 604	ERJ6GEYJ473V	1/10W 47K
R605, 606	ERJ6GEYJ561V	1/10W 560
R607, 608	ERJ6GEYJ681V	1/10W 680
R609, 610	ERJ6GEYJ332V	1/10W 3.3K
R613	ERJ6GEYJ334V	1/10W 330K
R614, 615	ERJ6GEYJ271V	1/10W 270
R701, 702	ERJ6GEYJ104V	1/10W 100K
R703, 704	ERJ6GEYJ1R5V	1/10W 1.5
R705, 706	ERJ6GEYJ180V	1/10W 18
R707, 708	ERJ6GEYJ101V	1/10W 100
R709, 710	ERJ6GEYJ333V	1/10W 33K
R711, 712	ERJ6GEYJ123V	1/10W 12K
R713, 714	ERJ6GEYJ473V	1/10W 47K
R719, 720	ERJ6GEYJ561V	1/10W 560
R721	ERJ6GEYJ220	1/10W 22
R722	ERJ6GEYJ181V	1/10W 180
R723	ERJ6GEYJ101V	1/10W 100
R724	ERJ6GEYJ220	1/10W 22
R801	ERJ6GEYJ223V	1/10W 22K
R802-804	ERJ6GEYJ681V	1/10W 680
R805	ERJ6GEYJ222V	1/10W 2.2K
R806	ERJ6GEYJ223V	1/10W 22K
R807	ERJ6GEYJ474V	1/10W 470K
R851	ERJ6GEYJ473V	1/10W 47K
R852, 853	ERJ6GEYJ101V	1/10W 100
R854	ERJ6GEYJ223V	1/10W 22K
R855	ERJ6GEYJ222V	1/10W 2.2K
R856	ERJ6GEYJ184V	1/10W 180K
R857	ERJ6GEYJ334V	1/10W 330K
R858	ERJ6GEYJ393V	1/10W 39K
R859	ERJ6GEYJ223V	1/10W 22K
R861	ERJ6GEYJ273V	1/10W 27K
R902, 903	ERJ3GEYJ221V	1/16W 220
R1001, 1002	ERJ6GEYJ101V	1/10W 100
R1003	ERJ6GEYJ105	1/10W 1M
R1004	ERJ6GEYJ101V	1/10W 100
R1005	ERJ6GEYJ471V	1/10W 470
R1006	ERJ6GEYJ152V	1/10W 1.5K
R1007, 1008	ERJ6GEYJ473V	1/10W 47K
R1010	ERJ6GEYJ105	1/10W 1M
R1011	ERJ6GEYJ392V	1/10W 3.9K
R1015	ERJ6GEYJ473V	1/10W 47K
R1017	ERJ6GEYJ105	1/10W 1M
R1018	ERJ6GEYJ472V	1/10W 4.7K
R1022	ERJ6GEYJ101V	1/10W 100
R1023	ERJ6GEYJ333V	1/10W 33K
R1028	ERJ6GEYJ104V	1/10W 100K
R1029	ERJ6GEYJ472V	1/10W 4.7K
R1030	ERJ6GEYJ393V	1/10W 39K
R1032	ERJ6GEYJ102V	1/10W 1K
R1036	ERJ6GEYJ102V	1/10W 1K
R1038	ERJ6GEYJ680V	1/10W 68
R1039	ERJ6GEYJ223V	1/10W 22K
R1040-1042	ERJ6GEYJ102V	1/10W 1K
R1043	ERJ6GEYJ101V	1/10W 100
R1044	ERJ6GEYJ471V	1/10W 470
R1045	ERJ6GEYJ222V	1/10W 2.2K
R1046	ERJ6GEYJ471V	1/10W 470
R1047, 1048	ERJ6GEYJ102V	1/10W 1K
R1049	ERJ6GEYJ222V	1/10W 2.2K
R1050, 1051	ERJ6GEYJ471V	1/10W 470
R1052	ERJ6GEYJ680V	1/10W 68

Ref. No.	Part No.	Values & Remarks
R1053	ERJ6GEYJ222V	1/10W 2.2K
R1054	ERJ6GEYJ473V	1/10W 47K
R1055	ERJ6GEYJ221V	1/10W 220
R1060	ERJ3GEYD203V	1/16W 20K
R1061	ERJ3GEYD823V	1/16W 82K
R1062	ERJ6GEYJ562V	1/10W 5.6K
R1063	ERJ6GEYJ472V	1/10W 4.7K
R1064	ERJ6GEYJ332V	1/10W 3.3K
R1065	ERJ6GEYJ391V	1/10W 390
R1066	ERJ6GEYJ334V	1/10W 330K
R1067	ERJ6GEYJ472V	1/10W 4.7K
R1068	ERJ6GEYJ102V	1/10W 1K
R1069-1072	ERJ6GEYJ101V	1/10W 100
R1074, 1075	ERJ6GEYJ101V	1/10W 100
R1076	ERJ6GEYJ472V	1/10W 4.7K
R1077	ERJ6GEYJ222V	1/10W 2.2K
R1079, 1080	ERJ6GEYJ472V	1/10W 4.7K
R1081, 1082	ERJ6GEYJ102V	1/10W 1K
R1083-1085	ERJ6GEYJ472V	1/10W 4.7K
R1087	ERJ6GEYJ101V	1/10W 100
R1088	ERJ3GEYJ101V	1/16W 100
R1089	ERJ6GEYJ392V	1/10W 3.9K
R1090	ERJ6GEYJ563V	1/10W 56K
R1091	ERJ6GEYJ122V	1/10W 1.2K
R1092	ERJ6GEYJ391V	1/10W 390
R1093	ERJ6GEYJ473V	1/10W 47K
R1094	ERJ6GEYJ821V	1/10W 820
R1097	ERJ6GEYJ102V	1/10W 1K
R1099	ERJ6GEYJ104V	1/10W 100K
R1100	ERJ6GEYJ272V	1/10W 2.7K
R1101	ERJ6GEYJ102V	1/10W 1K
R1103	ERJ6GEYJ103V	1/10W 10K
R1104	ERJ6GEYJ102V	1/10W 1K
R1105	ERJ6GEYJ104V	1/10W 100K
R1107, 1108	ERJ6GEYJ391V	1/10W 390
R1109, 1110	ERJ6GEYJ473V	1/10W 47K
R1111	ERJ3GEYJ391V	1/16W 390
R1112	ERJ3GEYJ103V	1/16W 10K
		CHIP JUMPERS
Z1001, 1002	ERJ8GEY0R00V	CHIP JUMPER
Z1005	ERJ8GEY0R00V	CHIP JUMPER
Z1014, 1015	ERJ6GEY0R00V	CHIP JUMPER
Z1017	ERJ6GEY0R00V	CHIP JUMPER
Z1020	ERJ8GEY0R00V	CHIP JUMPER
Z1023	ERJ8GEY0R00V	CHIP JUMPER
Z1026	ERJ8GEY0R00V	CHIP JUMPER
Z1029	ERJ8GEY0R00V	CHIP JUMPER
L901, 902	ERJ6GEY0R00V	CHIP JUMPER
L904-911	ERJ6GEY0R00V	CHIP JUMPER
L916	ERJ6GEY0R00V	CHIP JUMPER

Ref. No.	Part No.	Values & Remarks
L924	ERJ6GEY0R00V	CHIP JUMPER
L927	ERJ6GEY0R00V	CHIP JUMPER
RJ1001	ERJ6GEY0R00V	CHIP JUMPER
RJ1002	ERJ6GEY0R00V	CHIP JUMPER
RJ1005	ERJ3GEY0R00V	CHIP JUMPER
R315	ERJ6GEY0R00V	CHIP JUMPER
R715-718	ERJ6GEY0R00V	CHIP JUMPER
R864	ERJ6GEY0R00V	CHIP JUMPER
R901	ERJ3GEY0R00V	CHIP JUMPER
R1073	ERJ6GEY0R00V	CHIP JUMPER
R1096	ERJ6GEY0R00V	CHIP JUMPER
R1098	ERJ6GEY0R00V	CHIP JUMPER
		CAPACITORS
C11, 12	RCE1CKA101IV	16V 100U
C13	RCE0JSA470IX	6.3V 47U
C14	RCE0JKA101IV	6.3V 100U
C15	ECUV1C104ZFN	16V 0.1U
C16	ECEA1EKA4R7I	25V 4.7U
C17	RCE0JKA220IG	6.3V 22U
C18	ECEA1EKA4R7I	25V 4.7U
C19	ECUV1H472KBN	50V 4700P
C20	ECUV1C104KBN	16V 0.1U
C21	ECUV1E223KBN	25V 0.022U
C22	ECUV1H470KCN	50V 47P
C23	ECUV1H391KBN	50V 390P
C24	ECEA1HKN010I	50V 1U
C31	ECUV1E223KBN	25V 0.022U
C101, 102	ECUV1C104KBN	16V 0.1U
C103	ECUV1E183KBN	25V 0.018U
C104	ECUV1E223KBN	25V 0.022U
C105	ECUV1C333KBN	16V 0.033U
C106	ECUV1H222KBN	50V 2200P
C107	ECUV1H152KBN	50V 1500P
C108	ECUV1C473KBN	16V 0.047U
C109	ECUV1C333KBN	16V 0.033U
C110	ECUV1E103KBN	25V 0.01U
C111	ECUV1C333KBN	16V 0.033U
C112	ECUV1H331KBN	50V 330P
C113-116	ECUV1C104ZFN	16V 0.1U
C201	RCE0GKS470IV	4V 47U
C301-306	ECUV1C104ZFN	16V 0.1U
C371	ECST1AY225RR	10V 2.2U
C372	ECUV1C104ZFN	16V 0.1U
C401	RCE1CKA470IV	16V 47U
C402	RCE1ASA330IX	10V 33U
C403	ECUV1C104ZFN	16V 0.1U
C404	ECUVNC105ZFN	16V 1U
C405	ECUV1E103KBN	25V 0.01U
C501, 502	ECUV1H120JCN	50V 12P
C503	ECUV1H561KBN	50V 560P

Ref. No.	Part No.	Values & Remarks
C504	ECUV1C104KBN	16V 0.1U
C505	ECUV1E223KBN	25V 0.022U
C506	ECUV1C474KBM	16V 0.47U
C507	RCE0JSL470IX	6.3V 47U
C509	ECUV1C104ZFN	16V 0.1U
C510	ECUV1C333KBN	16V 0.033U
C511	ECUV1C104ZFN	16V 0.1U
C512	ECUV1H102KBN	50V 1000P
C513	ECUV1C104ZFN	16V 0.1U
C601, 602	ECUV1H681KBN	50V 680P
C603, 604	ECEA1CPD100I	16V 10U
C605, 606	ECUV1H272KBN	50V 2700P
C607, 608	ECUV1H102KBN	50V 1000P
C609	RCE0GKS101IV	4V 100U
C610, 611	ECUV1C104ZFN	16V 0.1U
C612	ECUV1H102KBN	50V 1000P
C701, 702	ECUV1H102KBN	50V 1000P
C703, 704	ECEA0GPD221I	4V 220U
C705, 706	ECUV1C473KBN	16V 0.047U
C711	ECEA0GPD221I	4V 220U
C712	ECEA0JPD101I	6.3V 100U
C801	ECEA0GKA471I	4V 470U
C802, 803	ECUV1C104ZFN	16V 0.1U
C806	ECUV1C224KBN	16V 0.22U
C807	ECUV1H102KBN	50V 1000P
C851	RCE0JSA470IX	6.3V 47U
C852	RCE1CKA101IV	16V 100U
C853	ECEA1EKA4R7I	25V 4.7U
C854	ECUV1H102KBN	50V 1000P
C855	ECUV1C104ZFN	16V 0.1U
C856	ECUV1H222KBN	50V 2200P
C858	ECUV1H102KBN	50V 1000P
C859	ECUV1C104ZFN	16V 0.1U
C903	ECUV1C104ZFN	16V 0.1U
C1001, 1002	ECUV1E104ZFN	25V 0.1U
C1003	ECUV1H560KCN	50V 56P
C1005	ECUV1H103KBN	50V 0.01U
C1006	ECUV1H100DCN	50V 10P
C1007-1011	ECUV1E104ZFN	25V 0.1U
C1012	ECUV1H103KBN	50V 0.01U
C1013-1015	ECUV1E104ZFN	25V 0.1U
C1016	ECUV1H330JCN	50V 33P
C1018, 1019	ECUV1E104ZFN	25V 0.1U
C1021, 1022	ECUV1E104ZFN	25V 0.1U
C1023	ECEV1CA100R	16V 10U
C1026	ECUV1H102KBN	50V 1000P
C1027	ECUV1H103KBN	50V 0.01U
C1031	ECUV1E104ZFN	25V 0.1U
C1032	ECUV1H220JCV	50V 22P
C1033	ECUV1H470KCN	50V 47P
C1034	ECUV1E104ZFN	25V 0.1U
C1035, 1036	ECUV1H102KBN	50V 1000P

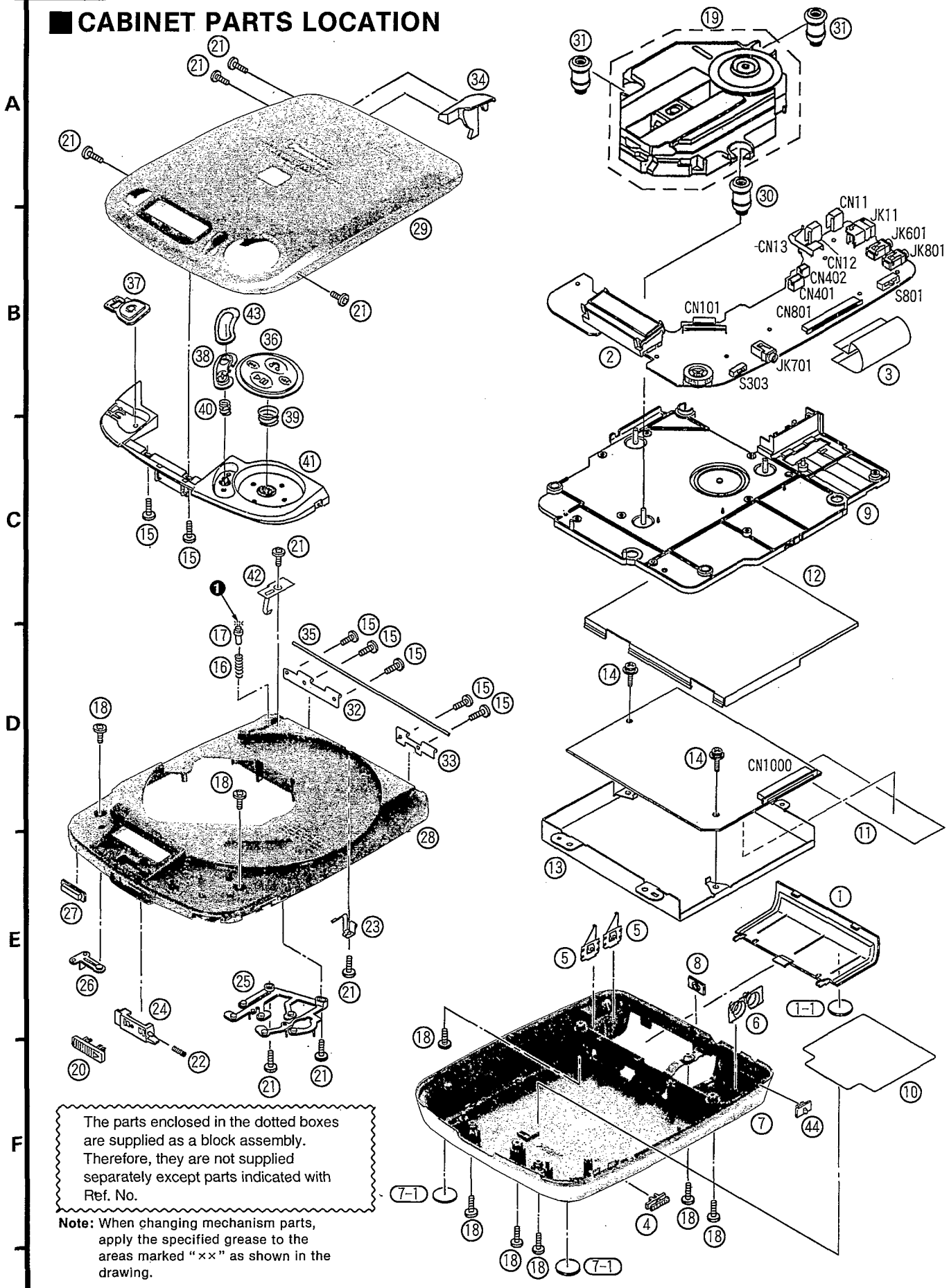
Ref. No.	Part No.	Values & Remarks
C1037	ECUV1E104ZFN	25V 0.1U
C1038	ECUV1H180JCN	50V 18P
C1039, 1040	ECUV1E104ZFN	25V 0.1U
C1042	ECUV1E104ZFN	25V 0.1U
C1043	ECUV1H103KBN	50V 0.01U
C1050	ECUV1H560KCN	50V 56P
C1051	ECEV0JA101P	6.3V 100U
C1052	ECUV1H560KCN	50V 56P
C1053	ECEV0JA101P	6.3V 100U
C1054-1058	ECUV1E104ZFN	25V 0.1U
C1059	ECEV1CA100R	16V 10U
C1060	ECUV1H560KCN	50V 56P
C1062	ECUV1H560KCN	50V 56P
C1063	ECUV1H101KCN	50V 100P
C1064	ECUV1E104ZFN	25V 0.1U
C1065	ECUV1H560KCN	50V 56P
C1067	ECUV1H560KCN	50V 56P
C1068	ECUV1E104ZFN	25V 0.1U
C1069	ECUV1H470KCN	50V 47P
C1070	ECUV1H180JCN	50V 18P
C1071	ECUV1H220JCN	50V 22P
C1072	ECUV1H180JCN	50V 18P
C1073	ECUV1H270KCN	50V 27P
C1074	ECEV1HA010R	50V 1U
C1075	ECUV1E104ZFN	25V 0.1U
C1076	ECEV0JA101P	6.3V 100U
C1077	ECUV1E104ZFN	25V 0.1U
C1078	ECEV0JA101P	6.3V 100U
C1080	ECUV1E104ZFN	25V 0.1U
C1082	ECEV1CA100R	16V 10U
C1083, 1084	ECUV1E104ZFN	25V 0.1U
C1086	ECUV1E104ZFN	25V 0.1U
C1088	ECUV1H100DCN	50V 10P
C1089	ECUV1H102KBN	50V 1000P
C1090-1092	ECUV1E104ZFN	25V 0.1U
C1095, 1096	ECEV0JA101P	6.3V 100U
C1097	ECUV1C104KBN	16V 0.1U
C1098	ECUV1E104ZFN	25V 0.1U
C1099	ECUV1H030DN	50V 3P
C1100	ECUV1H080DCN	50V 8P
C1102	ECUV1C104ZFV	16V 0.1U
C1103	ECUV1H100DCN	50V 10P
C1104	ECUV1E104ZFN	25V 0.1U
C1105	ECEV1CA100R	16V 10U
C1106-1108	ECUV1H330KCV	50V 33P
C1110	ECUV1H100DCV	50V 10P
C1111	ECUV1H220JCN	50V 22P
C1112	ECUV1C104ZFV	16V 0.1U

■ REPLACEMENT PARTS LIST

Notes: *The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.) Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RFKMLVP50-K	BATTERY COVER ASS'Y	
1-1	RKA0063-K	FOOT	
2	RJF0022	LCD HOLDER	
3	REZ0750-1	FFC(30P)	
4	RGV0145-K	HOLD KNOB	
5	RJC93021	COMMON BATTERY TERMINAL	
6	RJC93022	COMMON BATTERY TERMINAL	
7	RFKJLVP50EBK	BOTTOM CABINET ASS'Y	(EB)
7	RFKJLVP50EGK	BOTTOM CABINET ASS'Y	(EG)
7-1	RKA0063-K	FOOT	
8	RMA0677	REAR ORNAMENT PLATE	
9	RMR0841-K	MECHA. CHASSIS	
10	RMZ0342	INSULATING SHEET	
11	RMZ0343	INSULATING SHEET	
12	RFKNLVP50KA	SHIELD PLATE(1)	
13	RFKNLVP50KB	SHIELD PLATE(2)	
14	XYC26+JF6	SCREW	
15	RHE5097ZA	SCREW	
16	RMB0390	SPRING	
17	RMS0462	PUSH SHAFT	
18	XTN17+6GFZ	SCREW	
19	RFKNLS180-K	TRAVERSE DECK	
20	RGU1215-H	OPEN KNOB	
21	RHE5079YA	SCREW	
22	RMB0389	OPEN KNOB RETURN SPRING	
23	RMC0259	EARTH PLATE	
24	RML0365	LOCK LEVER	
25	RMR0836-K1	SWITCH MOVING PIECE(1)	
26	RMR0837-K	SWITCH MOVING PIECE(2)	
27	RMR0842-Q	REMOTE CONTROL FILTER	
28	RFKKLVP50EGK	INTERMEDIATE CABINET ASS'Y	
29	RFKLLVP50EGK	CD COVER ASS'Y	
30	RXQ0321	FLOATING RUBBER(1)	
31	RXQ0322	FLOATING RUBBER(2)	
32	RMA0846	SHAFT PLATE(A)	
33	RMA0847	SHAFT PLATE(B)	
34	RMR0839-K	FULL-OPEN BASE	
35	RMS0495	SHAFT	
36	RGU1216-K	OPERATION BUTTON(1)	
37	RGU1217-K	OPERATION BUTTON(2)	
38	RGU1218-K2	OPERATION BUTTON(3)	
39	RMB0391	SPRING	
40	RMB0392-2	SPRING	
41	RMR0840-K1	BUTTON COVER	
42	RMC0279	BRAKE SPRING	
43	RMZ0350	BUTTON SHEET	
44	RGU1214-K	VIDEO FORMAT SELECTOR KNOB	

■CABINET PARTS LOCATION



The parts enclosed in the dotted boxes are supplied as a block assembly. Therefore, they are not supplied separately except parts indicated with Ref. No.

Note: When changing mechanism parts, apply the specified grease to the areas marked "××" as shown in the drawing.

Ref. No.	Part No.
❶	RFKXPG671

988

■ REPLACEMENT PARTS LIST

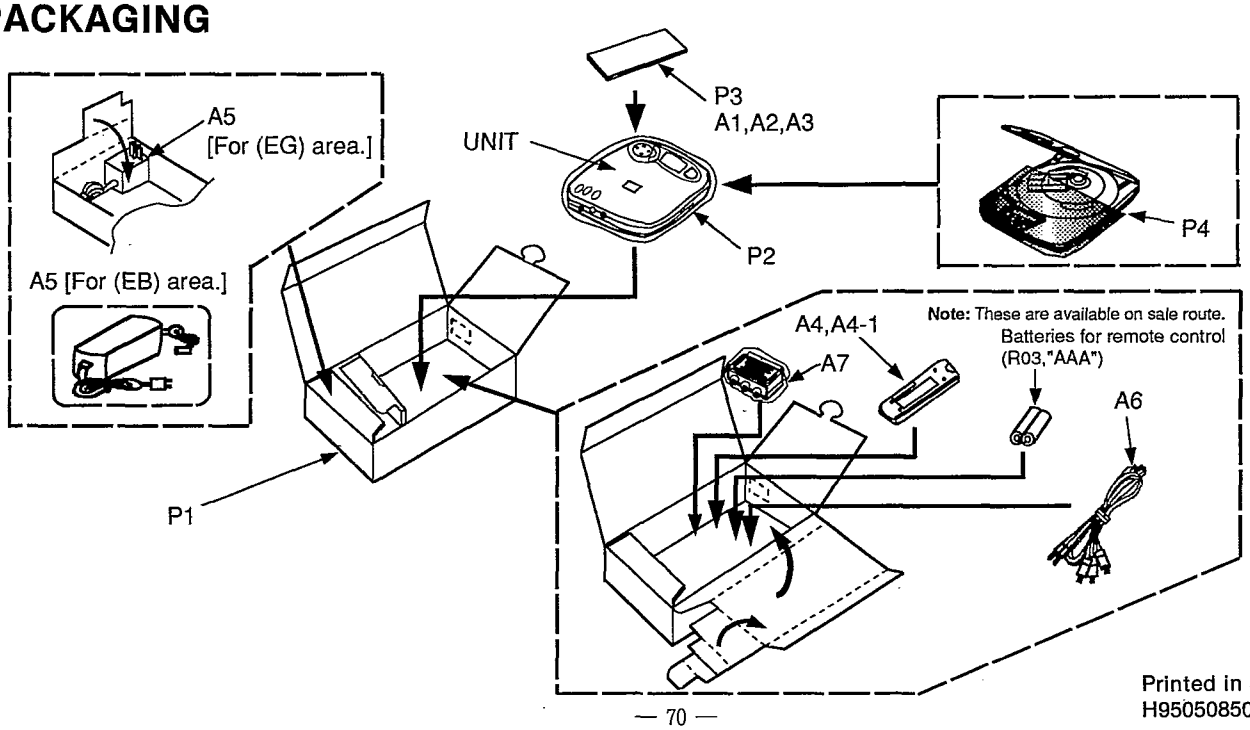
Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*Remote Control Ass'y: Supply period for three years from termination of production.

Ref. No.	Part No.	Part Name & Description	Remarks
		PACKING MATERIAL	
P1	RPK0570	PACKING CASE	
P2	RPF0171	PROTECTION BAG (UNIT)	
P3	RPF0046	PROTECTION BAG (F. B.)	
P4	RPH0168	MIRROR SHEET	
		ACCESSORIES	
A1	RQT2876-B	INSTRUCTION MANUAL	(EB)
A1	RFKSLVP50EGK	INSTRUCTION MANUAL ASS'Y	(EG)
A2	RQA0013	WARRANTY CARD	
A3	RQCB0169	SERVICENTER LIST	
A4	RAK-SL408WH	REMOTE CONTROL TRANSMITTER	
A4-1	RKK0080-H	BATTERY COVER	FOR R/C TRANSMITTER
A5	RFEA903B-W	AC ADAPTOR	(EB)⚠
A5	RFEA903E-W	AC ADAPTOR	(EG)⚠
A6	RJL3X001X15	CONNECTION CABLE	
A7	VFA0151-1	21 PIN ADAPTOR	
		<GREASE OR JIG/TOOL>	

Ref. No.	Part No.	Part Name & Description	Remarks
		TEST DISC	
SA1	SZZP1054C	PLAYABILITY TEST DISC	
SA2	SZZP1056C	UNEVEN TEST DISC	
		ALLEN WRENCH	
SA3	SZZP1101C	ALLEN WRENCH (M2.0)	
		LOCK PAINT	
SA4	RZZOL01	LOCK PAINT	
		GREASE	
SA5	RFKXPG671	MOLYCOAT GREASE PG671	
		<PRINTED CIRCUIT BOARDS	
		ASS'Y>	
PCB1	REP1992B-M	MAIN P. C. B.	(RTL)
PCB2	REP2118B-T	VIDEO P. C. B.	(RTL)

• The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

■ PACKAGING



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