ORDER NO. AD9505132C2

Service Manual

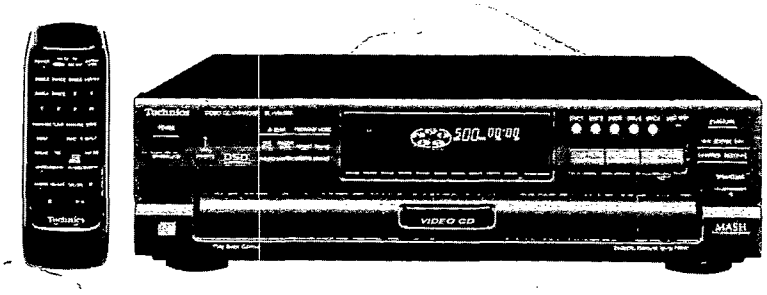
COMPACT disc DIGITAL VIDEO

COMPACT disc DIGITAL AUDIO

DIGITAL MASH※ multi-stage noise shaping

Video CD Changer

SL-VM500



Colour

(K) ... Black Type

Area

Suffix for Model No.	Area	Colour
(E)	Europe.	(K)
(EB)	Great Britain.	
(EG)	Germany and Italy.	

※ MASH is a trademark of NTT.

RAE0113Z MECHANISM SERIES

■ SPECIFICATIONS

■ AUDIO

No. of channels	2 (left and right, stereo)
Frequency response	2–20,000 Hz, ±1 dB
Output voltage	2 V (at 0 dB)
Dynamic range	92 dB
S/N	100 dB
Total harmonic distortion	0.007 % (1 kHz, 0 dB)
Wow and flutter	Below measurable limit
DA converter	MASH (1 bit)
Output impedance	Approx. 1.5 kΩ
Load impedance	More than 10 kΩ

■ VIDEO

Output voltage	1.0 Vp-p, 75 Ω

■ PICKUP

Wavelength	780 nm

■ GENERAL

Power consumption	26 W
Power supply	AC 50/60 Hz 230–240 V
Dimensions (W × H × D)	430 × 125 × 370 mm
Weight	5.0 kg

Note:

Specifications are subject to change without notice.
Weight and dimensions are approximate.

■ CONTENTS

Technics®

⚠ 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.

■ PRECAUTION OF LASER DIODE

CAUTION: This product utilizes a laser diode with the unit turned "on", invlsible 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

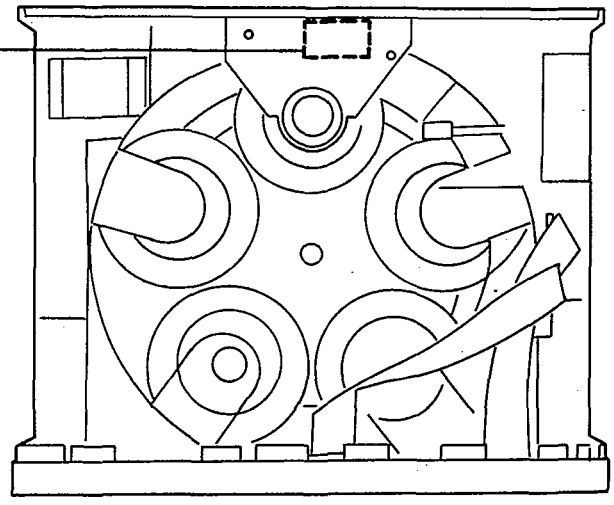
Die Strahlung an der Lasereinheit ist ungefährlich, wenn folgende Punkte beachtet werden:

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

ADVARSEL: I dette a apparat anvendes laser.

• Use of caution label

DANGER	INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
ADVARSEL	USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!	AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING	OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.
ADVARSEL	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN. RQLS0104



CAUTION!
THIS PRODUCT UTILIZES A LASER.
USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

■ DISCS YOU CAN USE

You can playback the following discs on this video CD changer.

Video CD	
Video CDs must bear the below mark COMPACT disc DIGITAL VIDEO	
Types of discs	**Indication used in these instructions**
Version 1.1 Operated in the same way as audio CDs, these discs allow playback of video pictures as well as sound, but they are not equipped with PBC.	VIDEO CD 1.1
Version 2.0 Equipped with PBC, these discs allow playback of menus on the TV screen as well as high resolution still pictures.	VIDEO CD 2.0

PBC (Playback control)

PBC is a signal recorded on version 2.0 CDs that enables you to control playback. It makes video enjoyment more interesting by allowing you to interact with the system viamenus, search functions or other typically computer-like operations.

Audio CD	
Audio CDs must bear the below mark COMPACT disc DIGITAL AUDIO	Indication used in these instructions AUDIO CD

■ ON-SCREEN DISPLAY

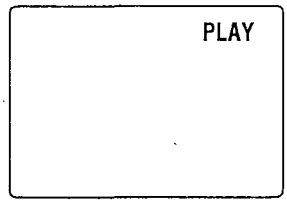
This function displays disc position and selections you make, on the TV screen. It is ON when you turn ON the changer.

VIDEO CD 2.0 / VIDEO CD 1.1 / AUDIO CD

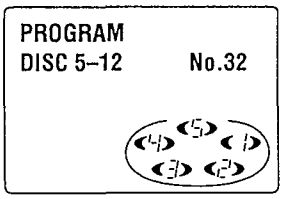
Selections you make

Displays show the changes you make via the changer and remote control as you make them, as well as the disc and track number you are about to access, and program information.

Ex.
Changes in operating state you make,either at the changer or by remote control



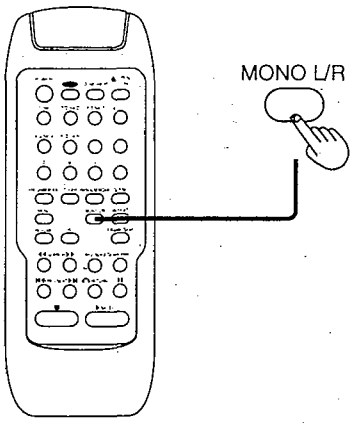
When programming

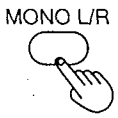


■ SOUND SWITCH FUNCTION

(Only available from the remote control.)
This function lets you have more fun with sound multiplex CDs, both audio and video.

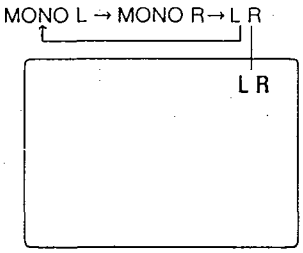
VIDEO CD 2.0 / VIDEO CD 1.1 / AUDIO CD





Press MONO L/R until either "MONO L" or "MONO R" appears on the TV screen.

As you press the button, the display changes in the order shown below.



TV screen

MONO L:
The left side channel is produced from both speakers (sound from the right side channel will be canceled out).

MONO R:
The right side channel is produced from both speakers (sound from the left side channel will be canceled out).

L R:
Left and right side channels are produced from their respective speakers.

This is the setting when power is turned on.

■ 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 5-ampere fuse is fitted in this plug.
Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5-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.

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

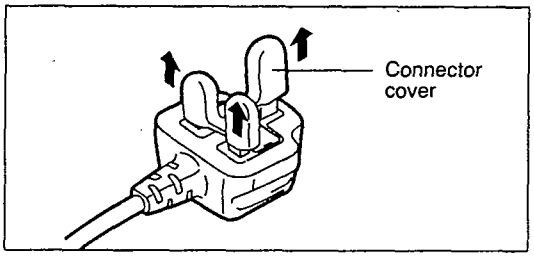
The wires in this mains lead are coloured in accordance with the following code:
Blue: Neutral, Brown: Live.
As these colours may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Black or Blue.
The wire which is coloured Brown must be connected to the terminal which is marked with the letter L or coloured Brown or Red.

WARNING: DO NOT CONNECT EITHER WIRE TO THE EARTH TERMINAL WHICH IS MARKED WITH THE LETTER E, BY THE EARTH SYMBOL ⏚ OR COLOURED GREEN OR GREEN/YELLOW.

THIS PLUG IS NOT WATERPROOF—KEEP DRY.

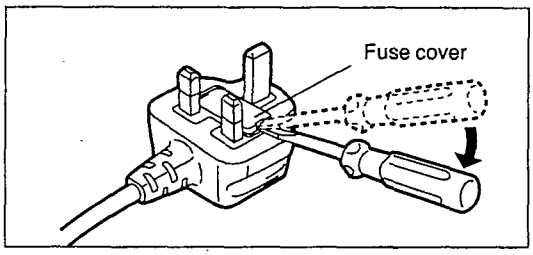
Before use

Remove the connector cover as follows.

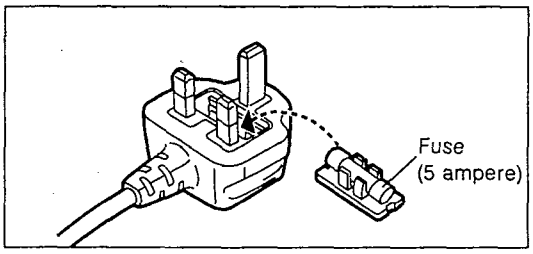


How to replace the fuse

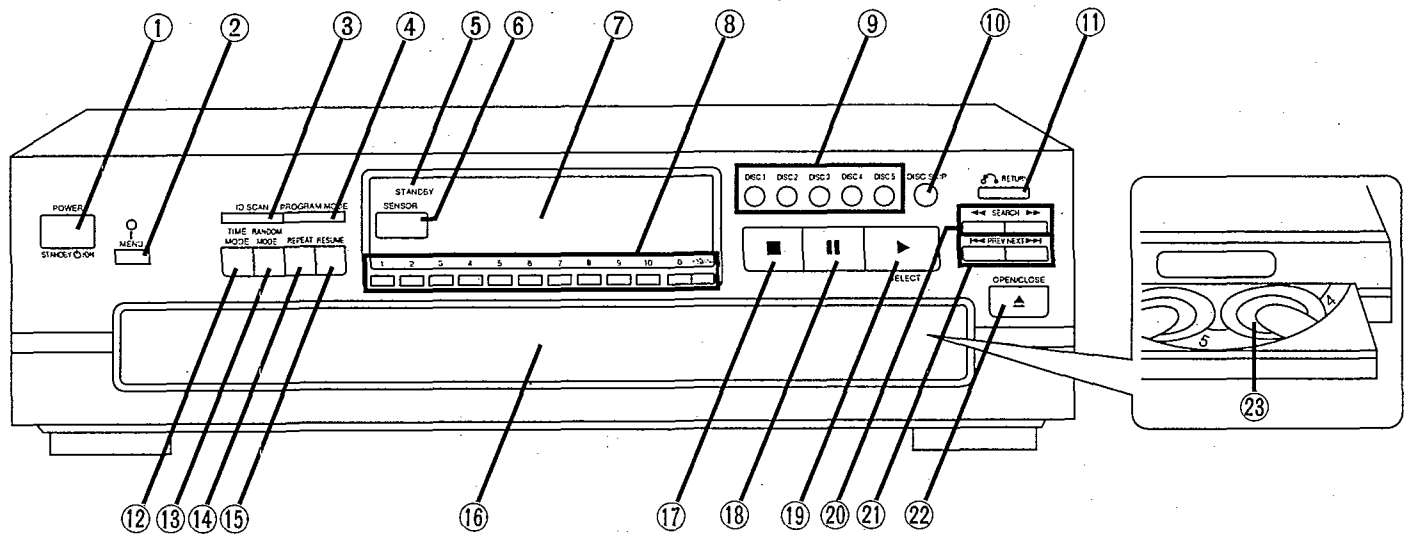
1. Remove the fuse cover with a screwdriver.



2. Replace the fuse and attach the fuse cover.



■ FRONT PANEL CONTROLS



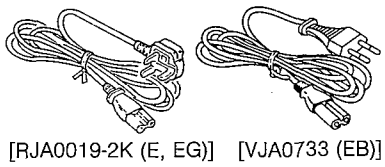
No.	Name
①	**Power "STANDBY ⏻/ON" switch (POWER, STANDBY ⏻/ON)** Press to switch the unit from on to standby mode or vice versa. In standby mode, the unit is still consuming a small amount of power.
②	**Menu button (MENU)**
③	**ID scan button (ID SCAN)**
④	**Program mode button (PROGRAM MODE)**
⑤	**"STANDBY" indicator (STANDBY)** When the unit is connected to the AC mains supply, this indicator lights up in standby mode and goes out when the unit is turned on.
⑥	**Remote control signal sensor (SENSOR)**
⑦	**Display**
⑧	**Numeric buttons (1−10, 0, >10/-/--)**
⑨	**Disc buttons (DISC 1−5)**
⑩	**Disc skip button (DISC SKIP)**
⑪	**Return button (↩ RETURN)**

No.	Name
⑫	**Time mode button (TIME MODE)**
⑬	**Random mode button (RANDOM MODE)**
⑭	**Repeat button (REPEAT)**
⑮	**Resume button (RESUME)**
⑯	**Loading drawer**
⑰	**Stop button (■)**
⑱	**Pause button (❚❚)**
⑲	**Play button (▶ SELECT)**
⑳	**Search buttons (◀◀ SEARCH ▶▶)**
㉑	**Skip buttons (⏮ PREV NEXT ⏭)**
㉒	**Loading drawer open/close button (▲ OPEN/CLOSE)**
㉓	**Disc trays (1−5)**

CAUTION
Do not touch the loading drawer and carousel while they are in motion, and do not attempt to rotate the carousel by hand; doing so could result in incorrect operation of the unit and/or damage to the discs.

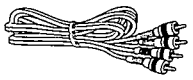
■ ACCESSORIES

AC power supply cord ..... 1 pc.



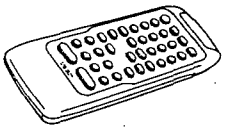
[RJA0019-2K (E, EG)] [VJA0733 (EB)]

Stereo connection Cable (SJP2249-3).... 1 pc.

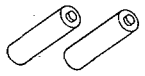


Video connection cable (RJL1P007B20) .. 1 pc.

Remote control transmitter (RAK-SL171WH) .. 1 pc.



Batteries for remote control transmitter ..... 2 pcs.



(UM-4, "AAA", R03)

Note: These are available on sale route.

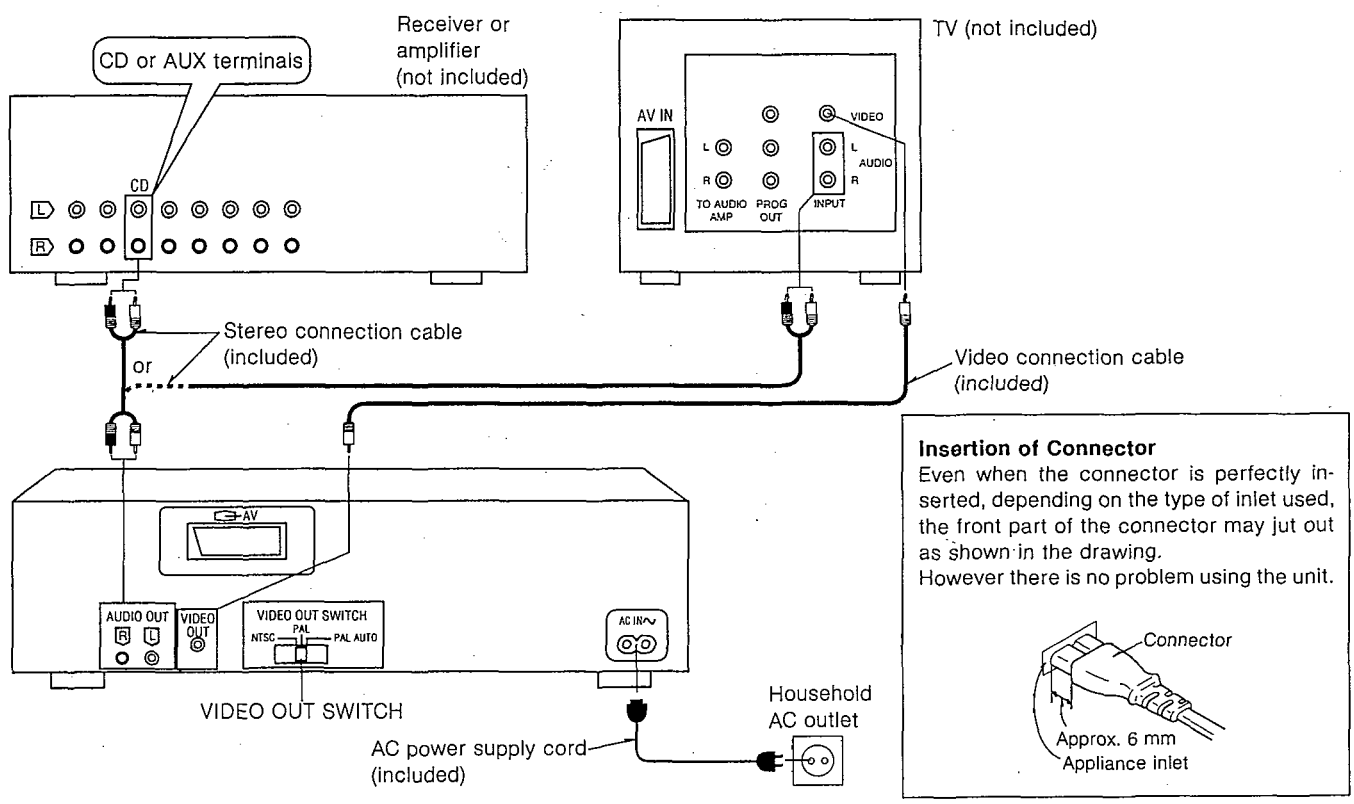
■ CONNECTIONS

Before connecting the changer to your audio system, make sure that the power of the changer and all other system components is turned off.

- Although the figure below shows the AC power supply cord being connected to a household AC outlet, if the amplifier (or receiver) is equipped with an AC outlet, connect the cord to that outlet.
- The configuration of the AC outlet differs according to area.

(For (EB) area only)

BE SURE TO READ THE CAUTION FOR AC POWER SUPPLY CORD ON PAGE 4 BEFORE THE FOLLOWING CONNECTIONS.



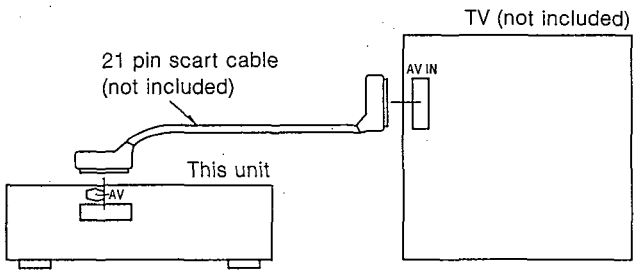
Insertion of Connector

Even when the connector is perfectly inserted, depending on the type of inlet used, the front part of the connector may jut out as shown in the drawing.
However there is no problem using the unit.

Notes

- To listen from TV speakers, connect AUDIO OUT on the video CD changer directly to AUDIO IN on the TV.
- If connecting the video CD changer to a receiver with video CD input terminals, connect AUDIO OUT and VIDEO OUT of the video CD changer to AUDIO IN and VIDEO IN of the receiver. For details, see the instructions provided with your receiver.

To connect a TV with 21-pin scart terminal



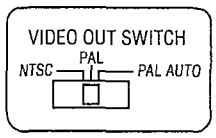
For your reference

You can output sound from the TV by simply connecting the video CD changer to the TV with the scart cable.

When using a receiver or amplifier to output sound

Connect the video CD changer to the TV with the scart cable, and use the included stereo connection cable to connect the AUDIO OUT terminal on the changer to the CD/AUX IN terminal on the receiver or amp. This lets you output sound using the receiver or amplifier, or from the TV as well.

VIDEO OUT SWITCH settings



Set the VIDEO OUT SWITCH according to the television set.

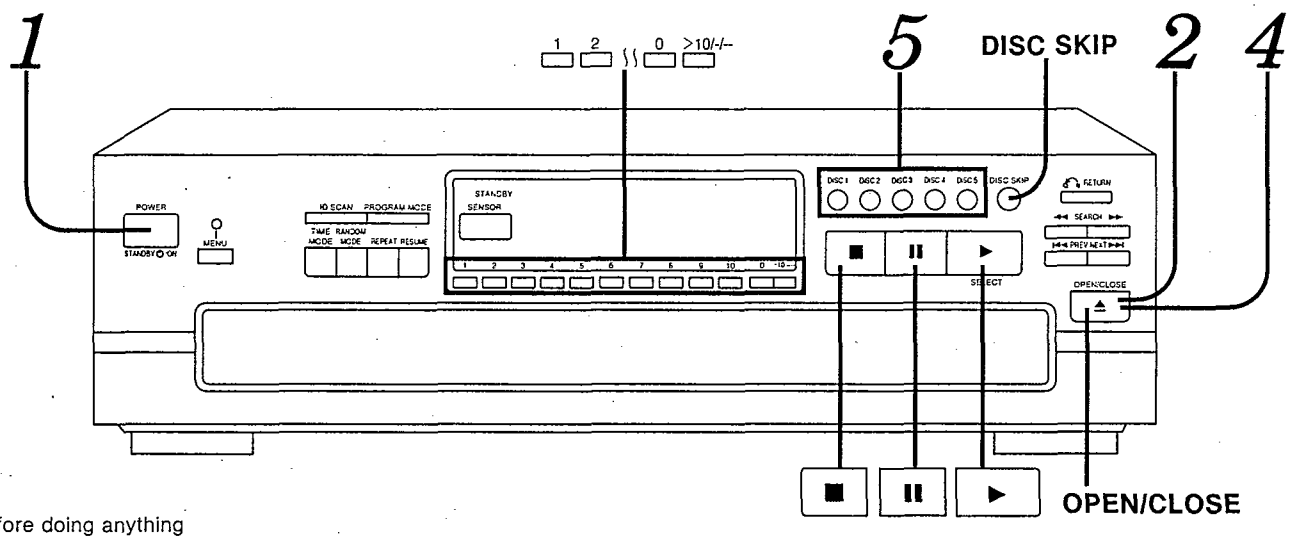
NTSC: When connecting to a NTSC system TV
PAL: When connecting to a PAL system TV
PAL AUTO: When connecting to a PAL AUTO system TV.
(This is the system which lets you enjoy NTSC software with PAL system TVs.)

Note This switch is factory-set to "PAL".

■ SEQUENTIAL PLAY (FOR AUDIO CDS AND VIDEO CDS WITHOUT PBC)

VIDEO CD 1.1 AUDIO CD

All of the discs will be played, beginning from track 1 on the selected disc.



Before doing anything
- For video CDs (ver. 1.1)
  Turn ON the TV and set the TV/VIDEO selector on the TV to project the video CD picture.
- Turn ON the receiver and/or amplifier and select the proper source.

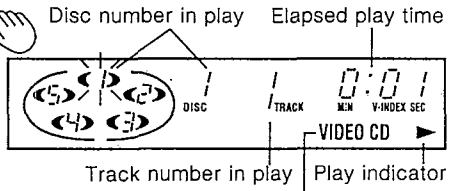
1 POWER **Press POWER.**
The unit will switch on.

2 OPEN/CLOSE **Press OPEN/CLOSE to open the loading drawer.**

3 **Load the disc(s) on the disc tray(s).**

4 OPEN/CLOSE **Press OPEN/CLOSE again to close the loading drawer.**

5 **Press the desired disc button (1 – 5).**
DISC 1 DISC 2 DISC 3 DISC 4 DISC 5
Play will begin from the selected disc.

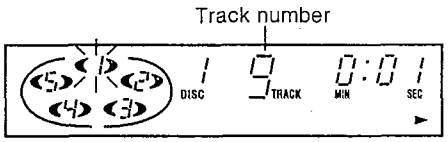


The changer plays all the tracks on all the discs in order and stops automatically when the last track on the last disc finishes playing. The first disc will then be at the playing position.

Note
Menu playback is automatically selected for version 2.0 video CDs if any are loaded in the trays.

To directly access a desired track

1 2 0 >10/-/-- **Press the numeric button(s) to select the track.**



To select a track between 1 and 10:
Press the corresponding number on the numeric button.
To select a two-digit track number over 10:
First press >10/-/--, and then press the numbers for the two digits.
For example; number 20:
Press >10/-/--, then 2, and then 0.

To exchange discs during play

① **Press OPEN/CLOSE to open the loading drawer.**

② **Press DISC SKIP to rotate the disc trays and exchange the discs.**

③ **Press OPEN/CLOSE to close the loading drawer.**

To temporarily stop play

Press ❚❚.
Press ▶ to resume play.

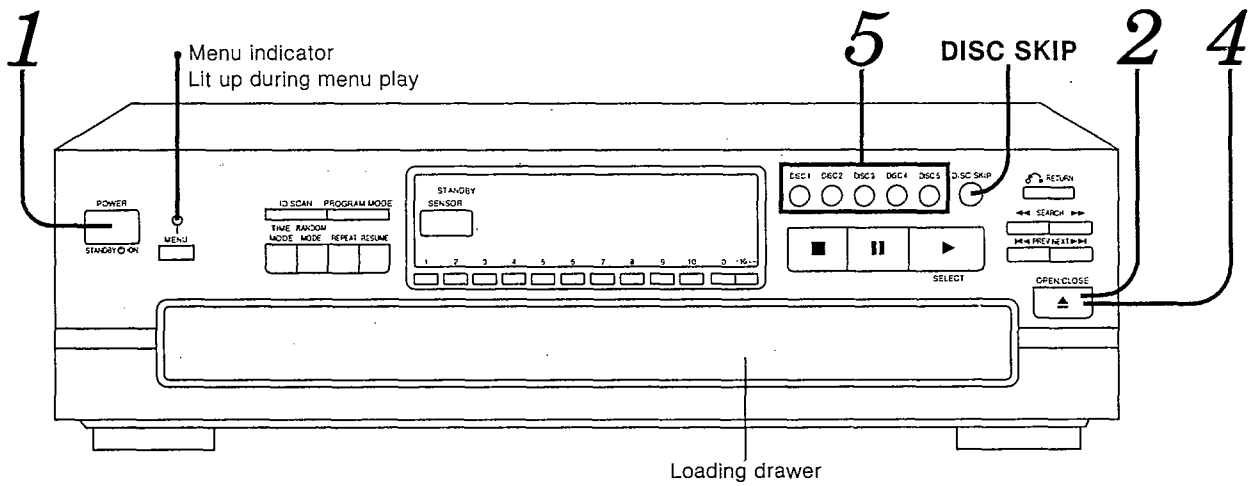
To stop play

Press ■.

■ MENU PLAY (ONLY FOR VIDEO CDS WITH PBC)

VIDEO CD 2.0

You can use menus displayed on the TV screen to control playback when running interactive software.



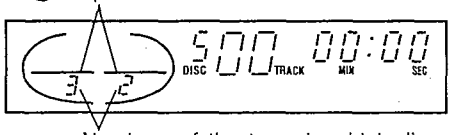
Before doing anything
- When the video CD changer is connected to the TV
  Turn ON the TV and set the TV/VIDEO selector on the TV to project the video CD picture.
- Turn ON the receiver and/or amplifier and select the proper source.

1 POWER

Press POWER.
The unit will switch on.

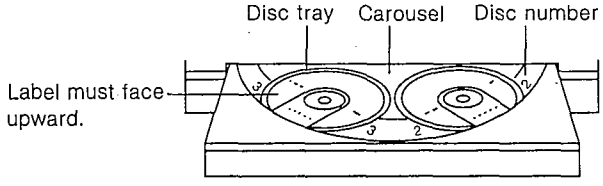
2 OPEN/CLOSE

Press OPEN/CLOSE to open the loading drawer.
Indicates that the loading drawer is open.



Numbers of the trays in which discs are loaded.

3 **Load the disc(s) on the disc tray(s).**
The discs can be loaded two at a time by pressing DISC SKIP to rotate the carousel.



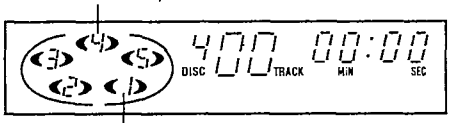
Note
Do not load 8 cm and 12 cm discs on the same disc tray.

4 OPEN/CLOSE

Press OPEN/CLOSE again to close the loading drawer.

Note
Do not attempt to close the drawer by hand.

Current play position (The numeral illuminates with a red color.)

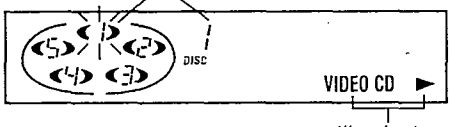


Illuminates when a disc is in the disc tray. If there is no disc in the disc tray, the indication disappears when the disc tray comes to the play position.

5 DISC 1 DISC 2 DISC 3 DISC 4 DISC 5

Press the desired disc button (1–5).
Menu playback starts.

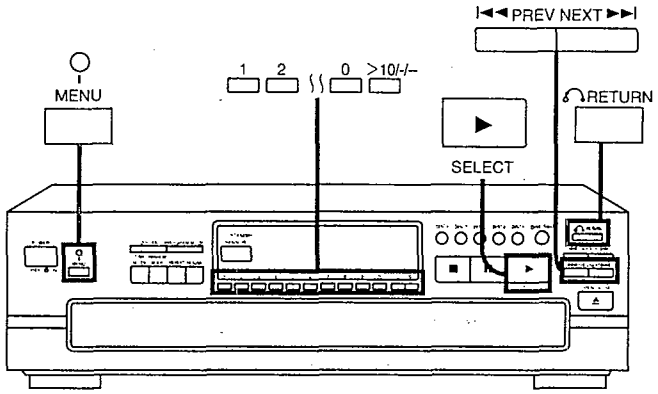
Disc number in play

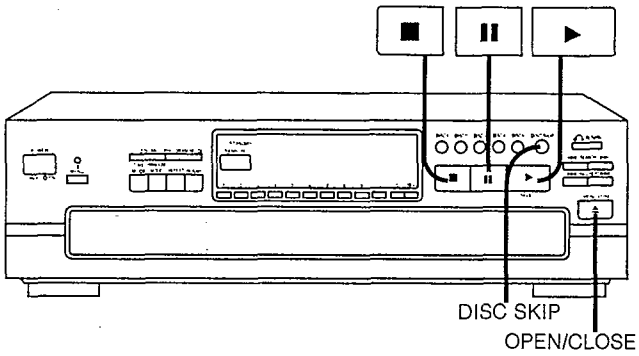


Illuminates

The illumination of a disc button indicates that there is a disc in the corresponding tray. During play, the illuminated color will change to green.

While the menu appears on the TV screen, press the buttons as indicated on next page (example only), to interact with the system.





How to work with menus

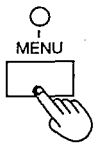
Menus will vary according to disc. Press the buttons in response to what appears on the TV screen and in accordance with the disc's instructions.

Buttons and function

(Example)

What you want to do	Button
To select a menu item	1 2 0 >10/-/-- **To select an item 1–10** Press the appropriate (1–10) button **To select an item over 10** (Example: Item 20) >10/-/-- → 2 → 0
To playback the selected item	▶ SELECT
To move to the next item	NEXT ▶▶I
To go back to the previous item	I◀◀ PREV
To return to the previous menu	RETURN

To quit menu playback



[While the changer is stopped]

Press MENU.

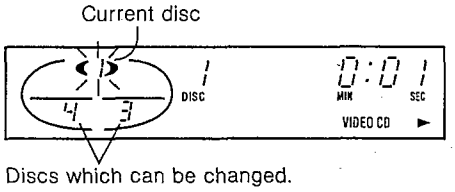
The indicator will go out and "MENU OFF" appears on the TV screen.

When menu playback is OFF, playback functions in the same way as when playing back tracks on a 1.1 version video CD. As a result, some menu items may not playback.

To exchange discs during play

While playing a disc, it is possible to change the other discs without interrupting play.

① **Press OPEN/CLOSE to open the loading drawer.**



② **Press DISC SKIP to rotate the disc trays and exchange the discs.**

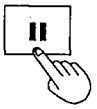
The carousel will move one disc tray. Pressing again moves the carousel in the opposite direction two disc trays.

③ **Press OPEN/CLOSE to close the loading drawer.**

Note

If you play a disc with the loading drawer open, discs other than the current disc can not be played.

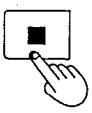
To temporarily stop play



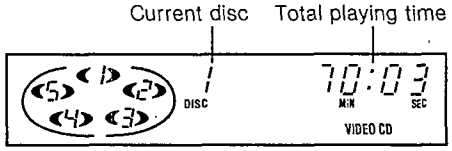
Press ❚❚.

Press ▶ to resume play.

To stop play



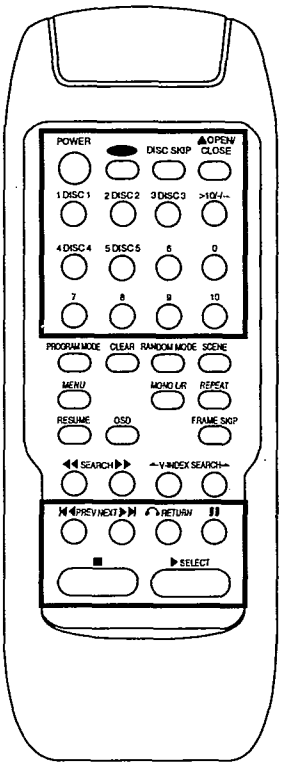
Press ■.



The total playing time displayed includes the silent sections between tracks. For this reason, it may be a few seconds longer than the playing time indicated on the disc.

■ REMOTE CONTROL OPERATION

Basic operation



To turn OFF/ON the main unit	POWER
To open/close the loading drawer	▲OPEN/ CLOSE
To rotate the carousel	DISC SKIP
To select the desired disc number	DISC → 1 DISC 1, 2 DISC 2, 3 DISC 3, 4 DISC 4, 5 DISC 5
To select the desired track number	1 DISC 1, 2 DISC 2, 3 DISC 3, >10/-/--, 4 DISC 4, 5 DISC 5, 6, 0, 7, 8, 9, 10 **To select a track between 1 and 10:** Press the corresponding number on the keypad. **To select a two-digit track number over 10:** First press >10/-/--, and then press the numbers for the two digits.
To start play	▶ SELECT
To stop play temporarily	❚❚ Press ▶ button to resume play.
To stop play	■

Buttons used for menu playback VIDEO CD 2.0

To select a menu item	1 DISC 1, 2 DISC 2, 3 DISC 3, >10/-/--, 4 DISC 4, 5 DISC 5, 6, 0, 7, 8, 9, 10 **To select an item between 1 and 10:** Press the corresponding number on the keypad. **To select a two-digit item number over 10:** First press >10/-/--, and then press the numbers for the two digits.
To move to the next item	NEXT ▶▶|
To go back to the previous item	|◀◀ PREV
To playback the selected item	▶ SELECT
To return to the previous menu	RETURN

Note

Operation will vary according to software. Read carefully the instructions provided with your software so as to run the software correctly.

■ SELF-DIAGNOSTIC DISPLAY FUNCTION

Self-diagnostic display

This unit is equipped with a self-diagnostic display function which, if a problem occurs, will display an error code corresponding to the problem.
Use this function when performing maintenance on the unit.

Display procedure

Entering the Self-Diagnostic Mode

1. With no CD loaded in the tray, turn on the unit.
2. The tray rotates for several seconds and then stops.
3. Press the STOP (■) button for more than two seconds. Then press the STOP (■) and NEXT (▶▶I) buttons together for more than two seconds, and " C " will appear on the FL display.

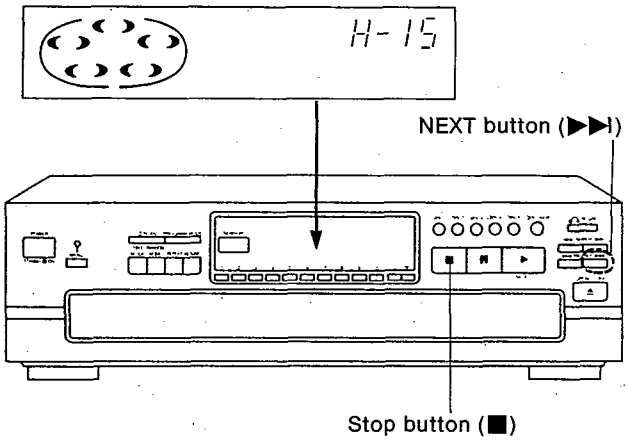
To Display Self-Diagnostic Results

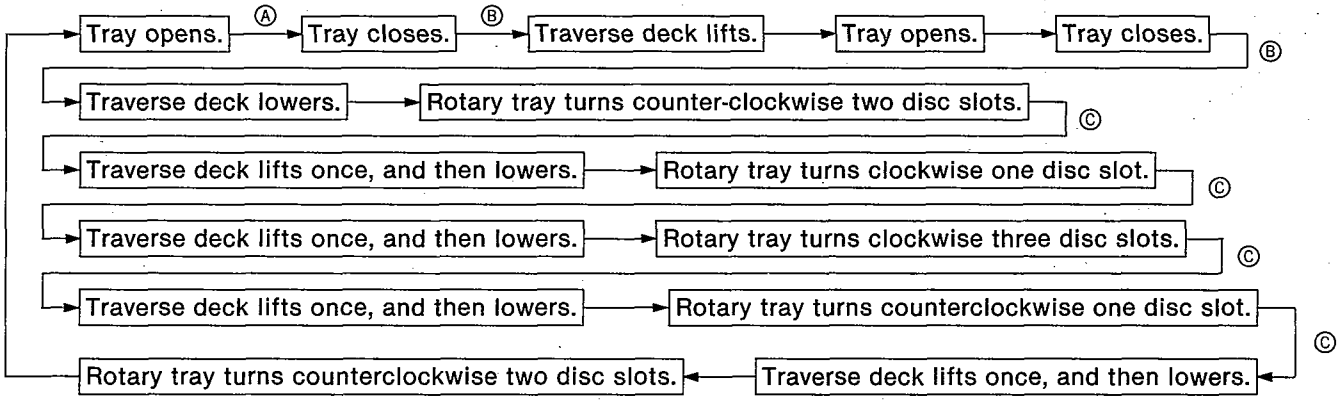
〈H15, H16 and F18〉

1. After " C " appears on the FL display, the changer mechanism operates automatically to repeat the following mechanical checks in a cycle lasting approximately 40 seconds.

Display location

Self-diagnostic display location





2. Any faults encountered during the checks in step 1 above are indicated on the FL display as "H15" for point Ⓐ, "H16" for point Ⓑ and "F18" for point Ⓒ, respectively. Each of these self-diagnostic codes appears for about one second.
3. When no fault is found, " C " remains on the FL display during unit operation.

〈F26〉

• This fault is indicated automatically on the FL display when the unit is turned on.
In this event, all buttons remain inoperative.

To Return to Normal Display

〈H15, H16 and F18〉

• Turn the unit off and then turn it on again.

〈F26〉

• "F26" remains on the FL display, causing the unit not to return to the regular state. To turn the unit off, the power supply must be disconnected since all the controls remain inoperative.

To Display Self-Diagnostic Results Again

〈H15, H16 and F18〉

• Follow steps 1, 2 and 3 for "Entering the self-diagnostic mode" above.

〈F26〉

• If the power cord has been disconnected due to the controls being inoperative, reconnect it, and "F26" will appear on the FL display.

Interpretation of error codes

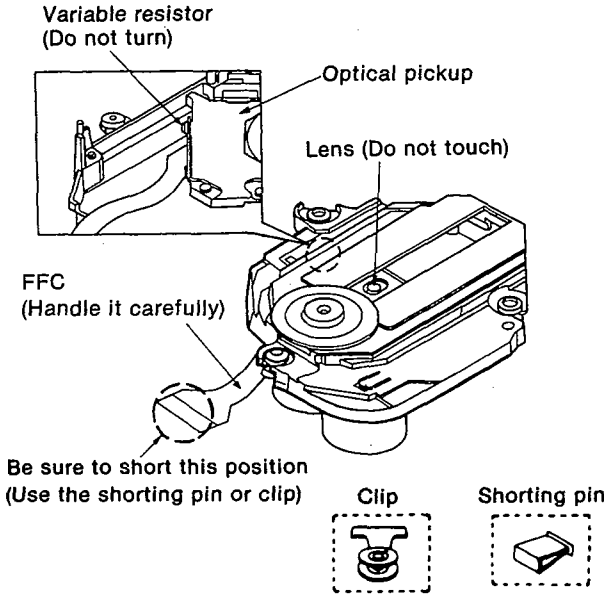
Error code	Problem condition	Correction procedure
H15	CD tray does not open or close when CD tray open/close (▲) button is pressed. When the CD tray open/close (▲) button is pressed, the CD tray closes momentarily but then opens again, or opens momentarily and then closes again.	Faulty loading motor and motor drive IC (IC501), or faulty contact or short-circuit on open/close detect switch, S551. (Check and replace)
H16		
F18	The disc tray continues to rotate without stopping at the initial value due to a fault in detecting its speed.	Check the optical sensor (D501) and replace if necessary.
F26	"F26" remains on the FL display, rendering the controls inoperative.	The system control (IC401) or servo processor (IC702) is faulty. (Check and replace as necessary.) The FFC or a wire has become disconnected. (Check and replace as necessary.)

■ 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).

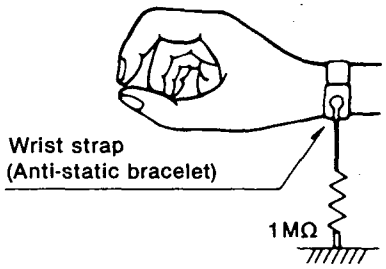
• Handling of traverse deck (optical pickup)

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).
   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).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.



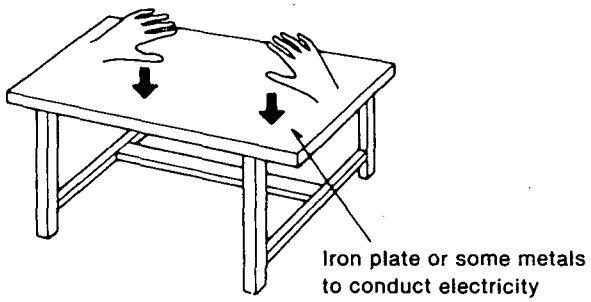
• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table gounding
   Put a conductive material (sheet) or steel sheet on the area where the 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

"ATTENTION SERVICER"
Some chassis components may have sharp edgs. Be careful when disassembling and servicing.
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.

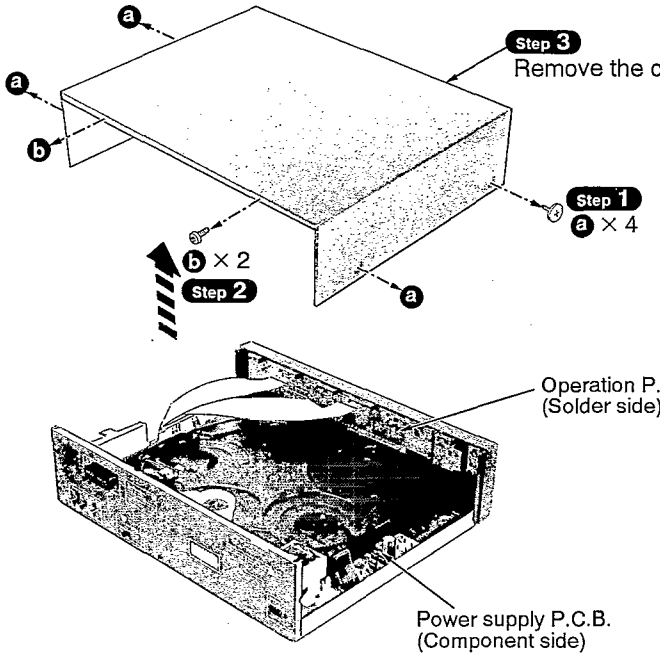
NOTE

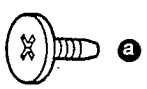
1. **This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.**
2. **For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.**
3. **Select items from the following index when checks or replacement are required.**
4. **Illustrated screws are equivalent to actual size.**
5. **Refer the parts No. on the page of "Main Component Replacement Procedures", if necessary.**

• Contents

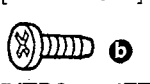
1. Checking for the Operation P.C.B. and power supply P.C.B.

• Check the operation P.C.B. and power supply P.C.B. as shown below.



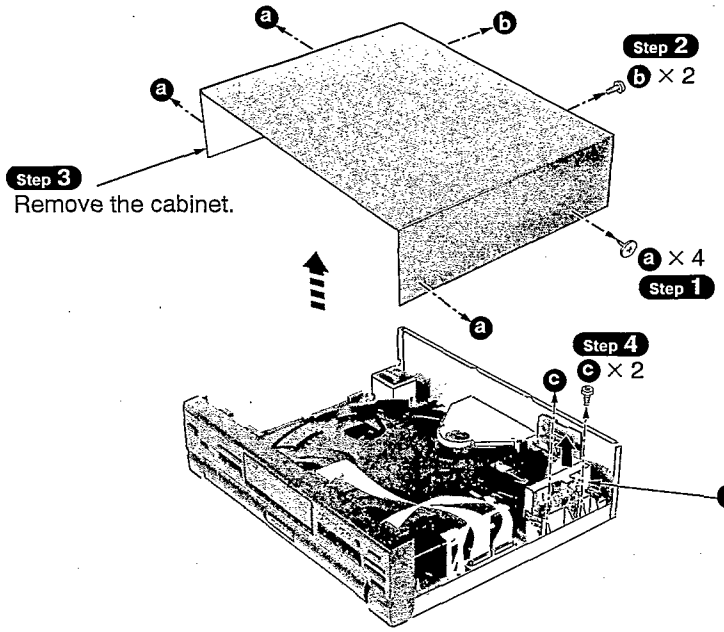


[SNE2129–3] (Black)

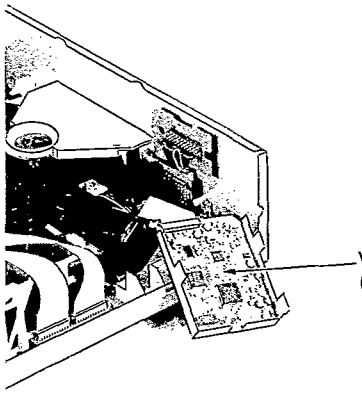


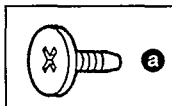
[XTBS3+8JFZ1] (Black)

2. Checking for the video P.C.B.



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





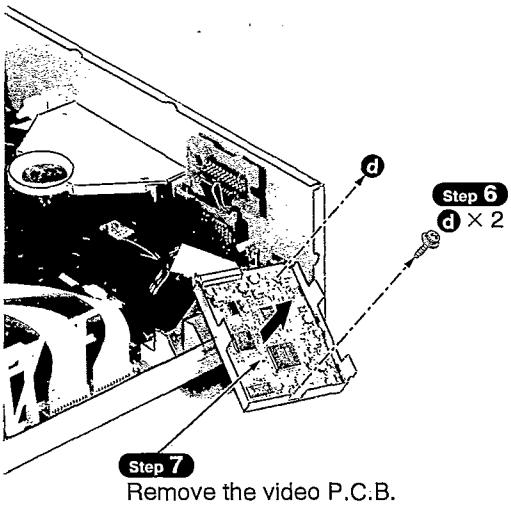
[SEN2129–3] (Black)

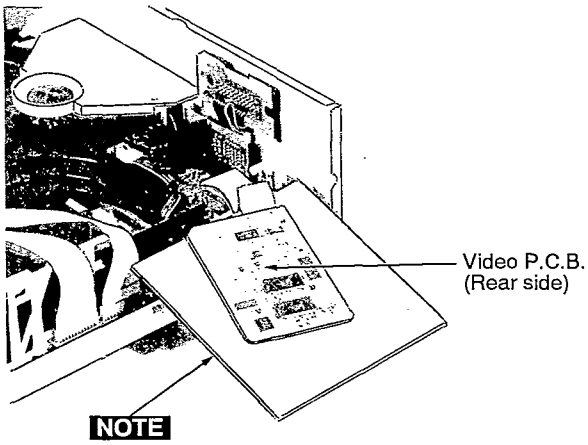
[XTBS3+8JFZ1] (Black)

[XTB3+10JFZ] (Black)

[XYC26+JF6]

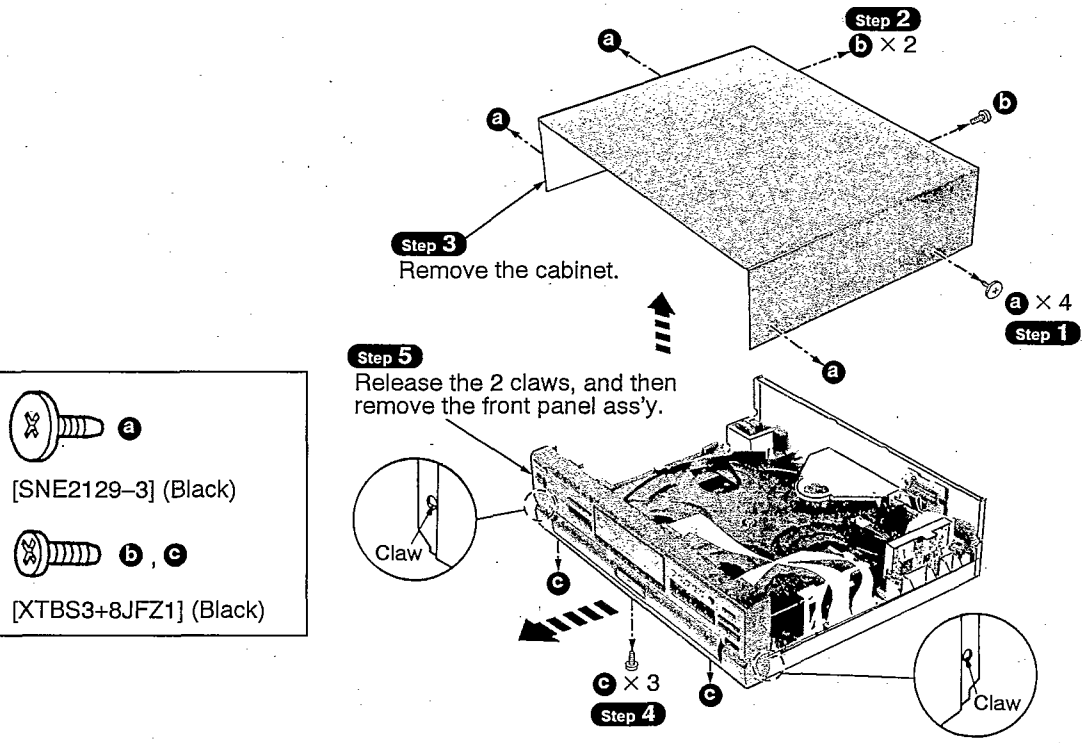
- **Check the video P.C.B. (Rear side) as shown below.**





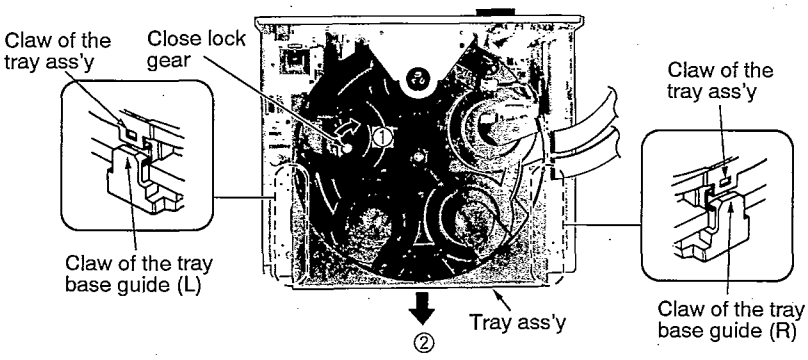
NOTE
Insulate video P.C.B. with insulation material to avoid short–circuit.

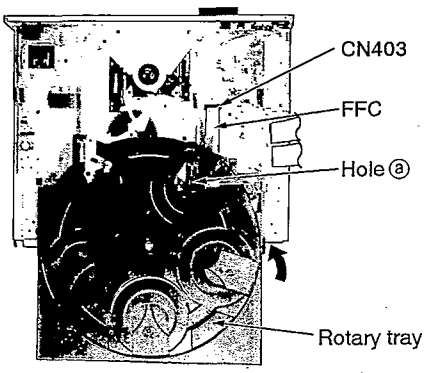
3. Checking for the main P.C.B.



ⓐ
[SNE2129–3] (Black)

ⓑ, ⓒ
[XTBS3+8JFZ1] (Black)





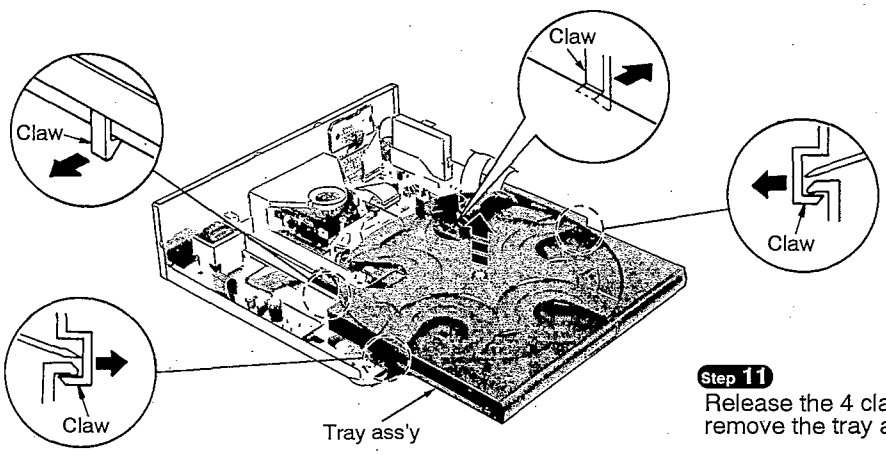
Step 6 Keep the close lock gear pressed in the direction of arrow ①, and move the tray ass'y in the direction of arrow ②.

Step 7 Fit the claw of the tray ass'y in the claw of the tray base guide (L).

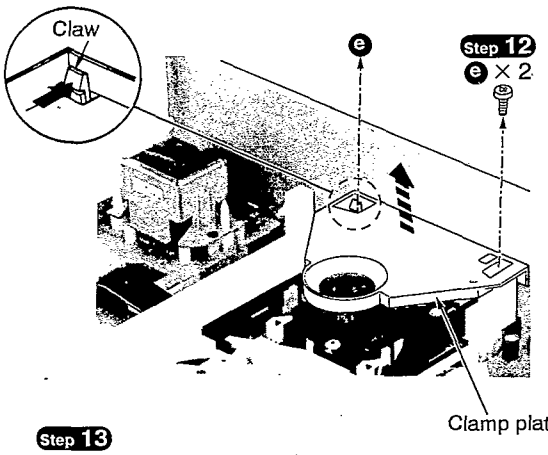
Step 8 Fit the claw of the tray ass'y in the claw of the tray base guide (R).

Step 9 Pull out the FFC from connector (CN403).

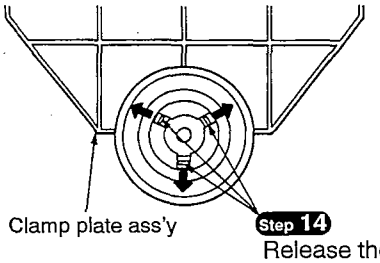
Step 10 Rotate the rotary tray to the position that can be confirmed the hole ⓐ in the direction of arrow.



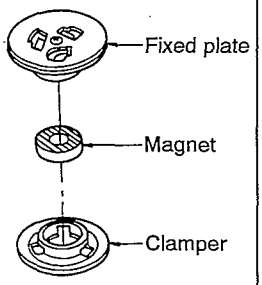
Step 11 Release the 4 claws, and then remove the tray ass'y.

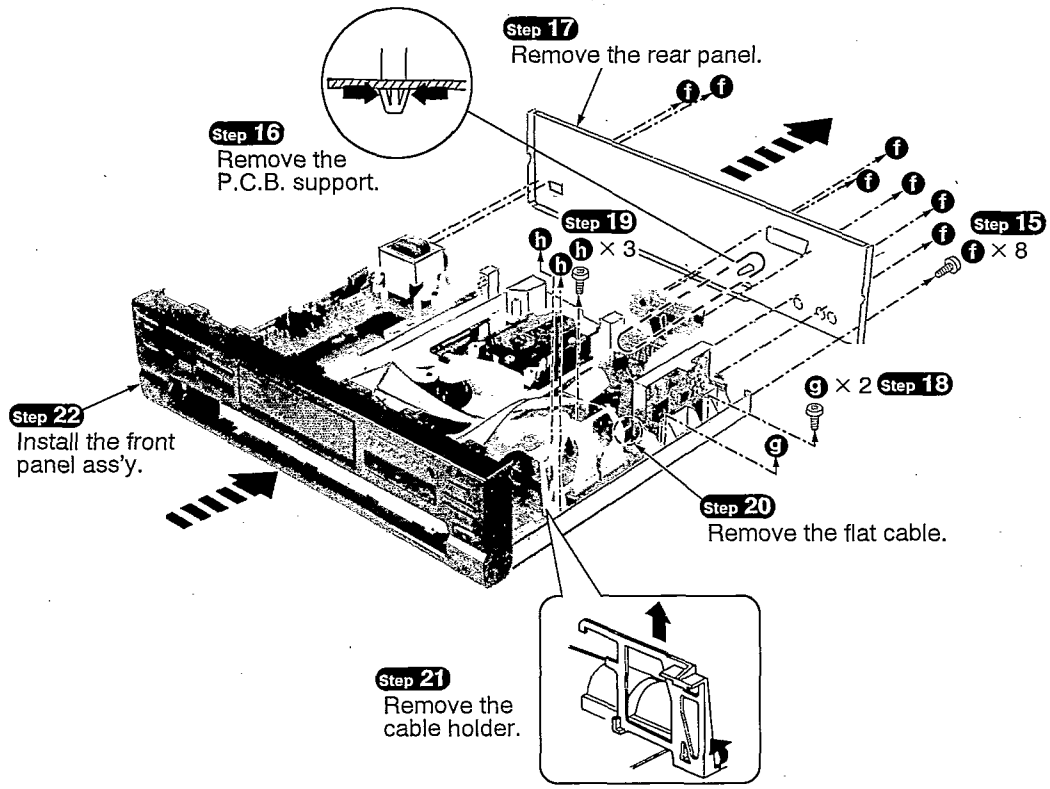


Step 13
Release the claw, and then remove the clamp plate ass'y.



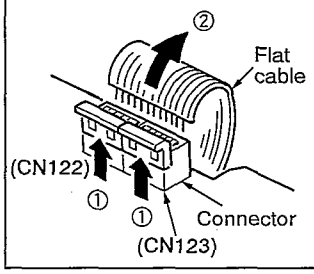
Release the 3 claws.





■ Removal of the flat cable

1. Lift the connector
2. Pull out the flat cable.

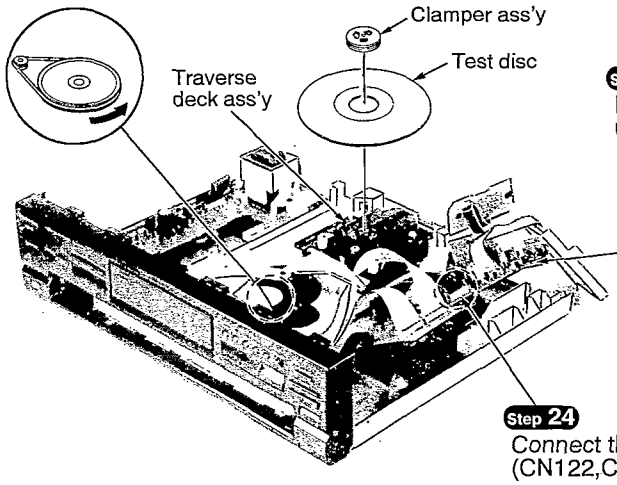


[XTB3+10JFZ] (Black)

[XTBS3+8JFZ1] (Black)

[XTBS3+8JFZ]

Step 25
Rotate the pulley gear in the direction of arrow until traverse deck ass'y comes up.

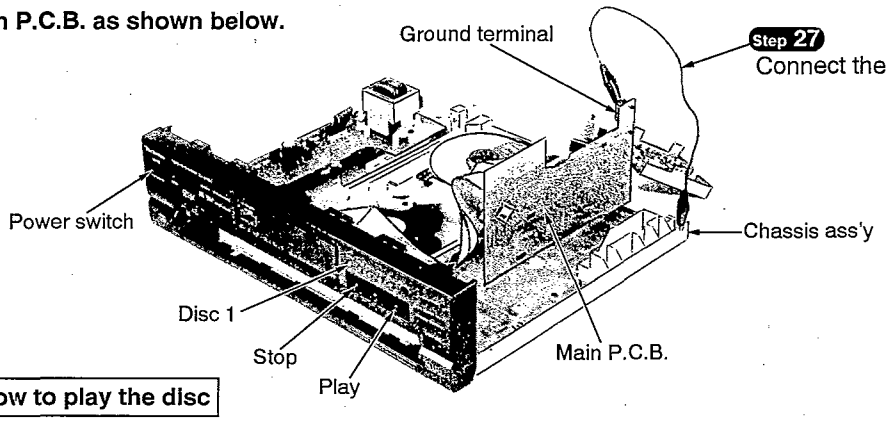


Step 26
Place the test disc and secure it by using the clamper ass'y.

Step 23
Set up the main P.C.B.

Step 24
Connect the flat cable to connector (CN122,CN123).

• **Check the main P.C.B. as shown below.**



How to play the disc

Unplug the set previously.

↓

While pressing 3 keys of STOP(■), PLAY(▶), and DISC 1 simultaneously, insert the power plug of the set into the plug socket.

NOTE:
Be sure to begin pressing the 3 keys before plugging the set. Otherwise, the Service Mode cannot be set.

↓

FL lights up? — **No** → Press the POWER key (POWER ON). → FL lights up.

↓ **Yes**

Withdraw hand from the 3 keys.

↓

Mount the disc on the turntable and press the PLAY key.

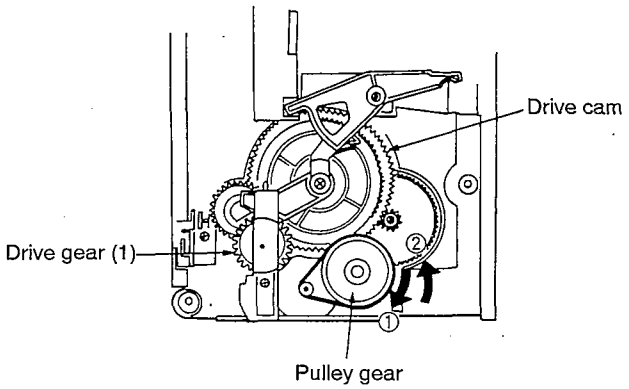
NOTE:
Make sure that the traverse mechanism is then in UP(PLAY)position.

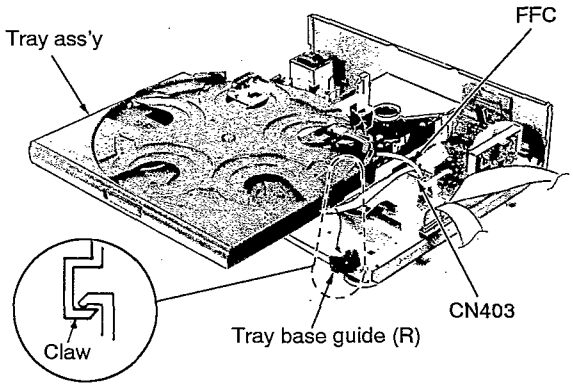
Service Mode setting

When checking the main/servo P.C.B. of this set, remove the rotary tray previously.
After the rotary tray is removed, the microcomputer is kept from issuing PLAY command even when the PLAY key is pressed.
Stated above is the procedure of setting the Service Mode for keeping the microcomputer in the PLAY mode even after removal of the rotary tray.

Installation of the tray ass'y

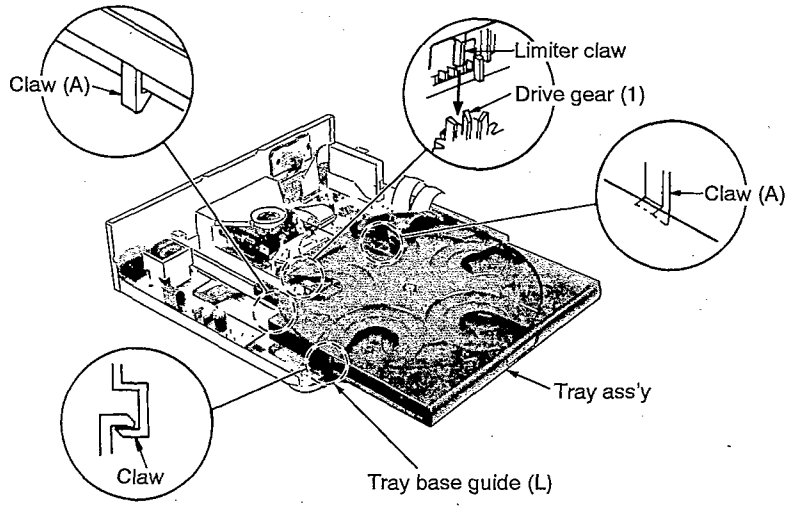
• **Arrange the loading parts as shown below before installation of tray ass'y.**





Step 1 Rotate the pulley gear to the direction of arrow ①.
Step 2 Then, rotate the pulley gear in the direction of arrow ②.
Step 3 When the drive gear (1) stops rotating, turn of thet pulley gear is rotating.

Step 4 Attach the FFC to the connector (CN403).
Step 5 Fit the claws on the right side of the tray ass'y underneath the claws on the tray base guide (R).



Step 6 Fit the claws on the right side of the tray ass'y underneath the claws on the tray base guide (L).

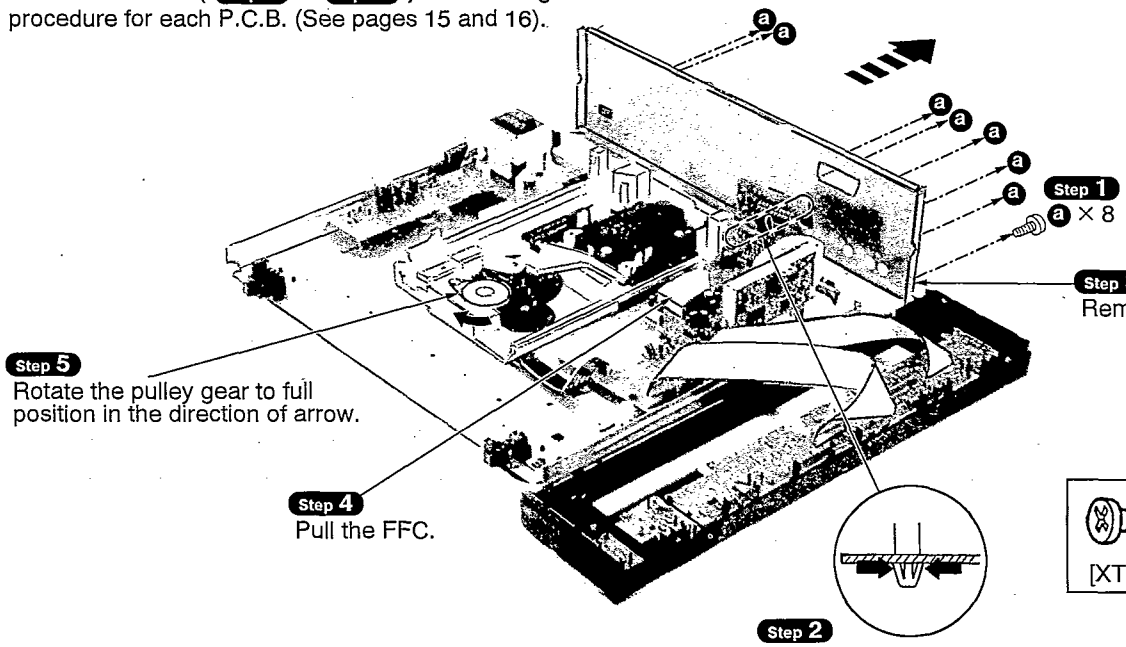
Step 7 Fit the limiter claw on the tray ass'y between the teeth of the drive gear (1).

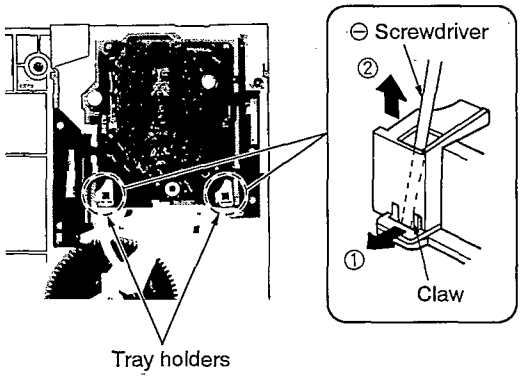
Step 8 Catch the 2 claws (A) with the loading mechanism ass'y.

Step 9 After installing the tray ass'y check that it moves smoothly.

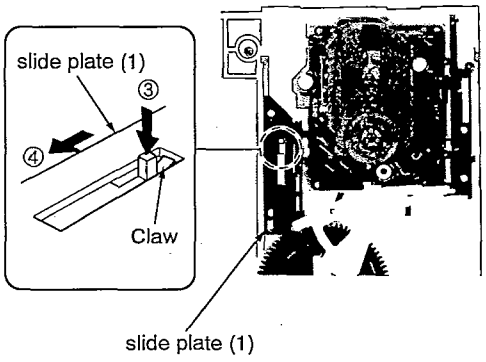
4. Checking for the servo P.C.B.

• Follow the item 3 (**Step 1** ~ **Step 14**) on checking procedure for each P.C.B. (See pages 15 and 16).



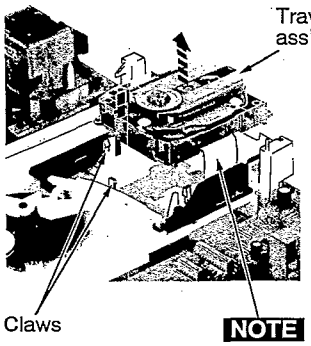


Step 6
While pushing the claw of tray holders in the direction ① using the ⊖ screwdriver, remove the tray holder in the direction of arrow ②.



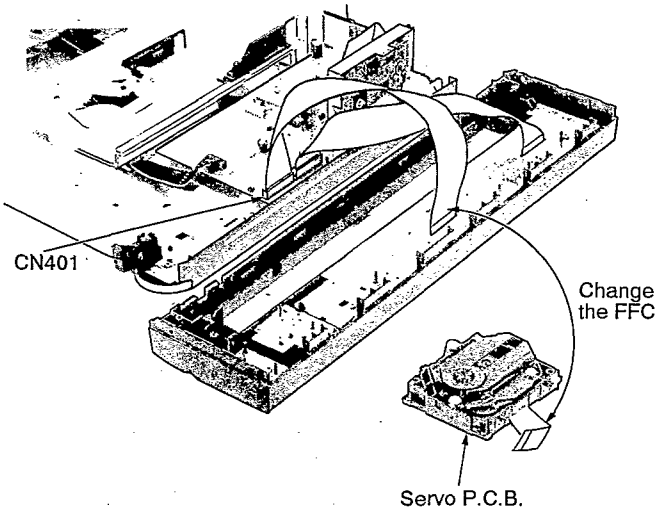
Step 7
Push the claw in the direction of arrow ③, and then move the slide plate (1) in the direction of arrow ④.

Step 8
Lift up the traverse deck ass'y with taking care the claws.

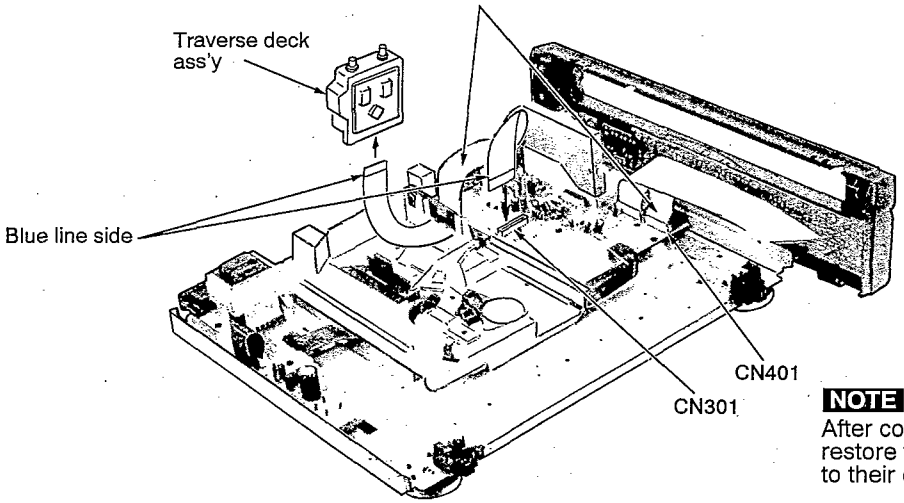


NOTE
Be carefel not to scratch or bend the FFC.

Step 9
Replace the FFC of servo P.C.B. to the FFC (CN401) of the main P.C.B.



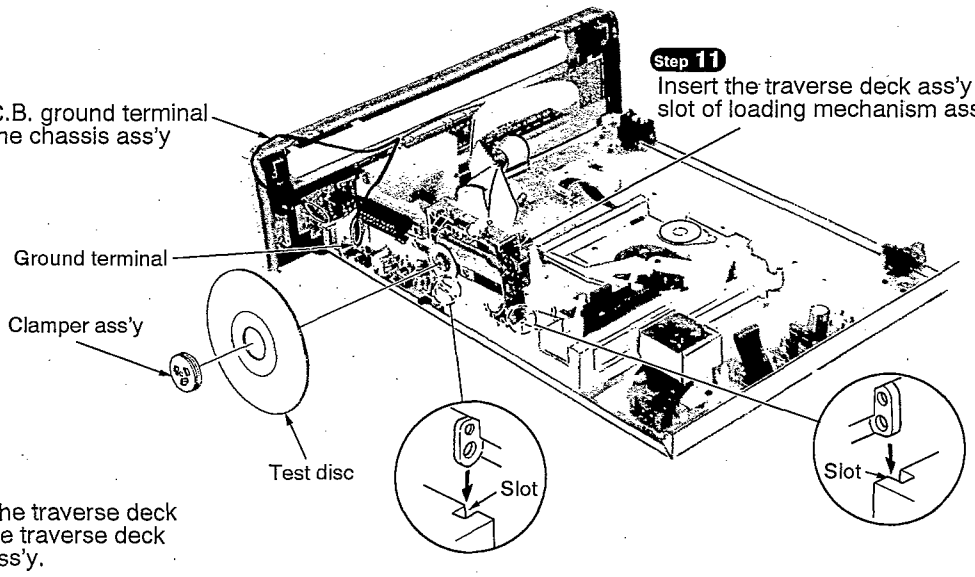
Step 10
Connect the FFC as shown in below.



NOTE
After completing the check, restore the replaced FFC to their original positions.

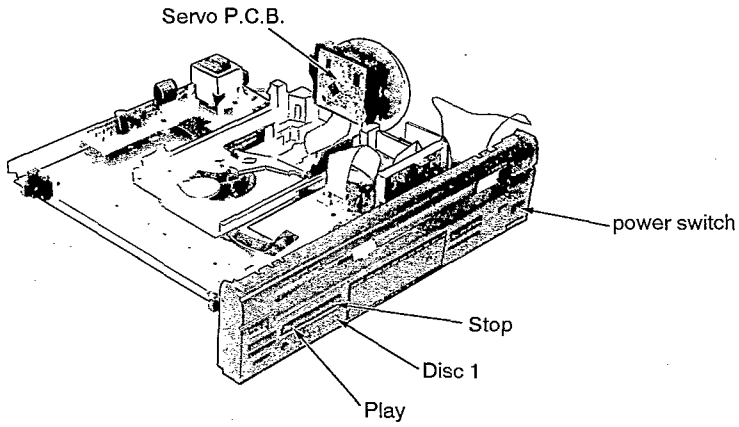
Step 11
Insert the traverse deck ass'y in the slot of loading mechanism ass'y

Step 13
Connect the main P.C.B. ground terminal (line out terminal) to the chassis ass'y with a lead wire.



Step 12
Set the test disc on the traverse deck ass'y, and then fix the traverse deck ass'y with clamper ass'y.

• **Check the servo P.C.B. as shown below.**



How to play the disc

Unplug the set previously.

↓

While pressing 3 keys of STOP(■), PLAY(▶), and DISC 1 simultaneously, insert the power plug of the set into the plug socket.

NOTE:
Be sure to begin pressing the 3 keys *before plugging the set.* Otherwise, the Service Mode cannot be set.

↓

FL lights up? — **No** → Press the POWER key (POWER ON).

Press the POWER key (POWER ON). → FL lights up.

Yes ↓

Withdraw hand from the 3 keys.

↓

Mount the disc on the turntable and press the PLAY key.

NOTE:
Make sure that the traverse mechanism is then in UP(PLAY)position.

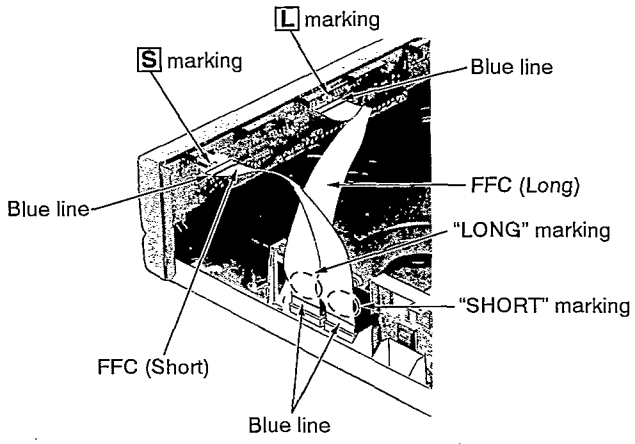
Service Mode setting

When checking the main/servo P.C.B. of this set, remove the rotary tray previously.
After the rotary tray is removed, the microcomputer is kept from issuing PLAY command even when the PLAY key is pressed.
Stated above is the procedure of setting the Service Mode for keeping the microcomputer in the PLAY mode even after removal of the rotary tray.

Installation of the FFC

• When connecting the FFC, connect as shown right.

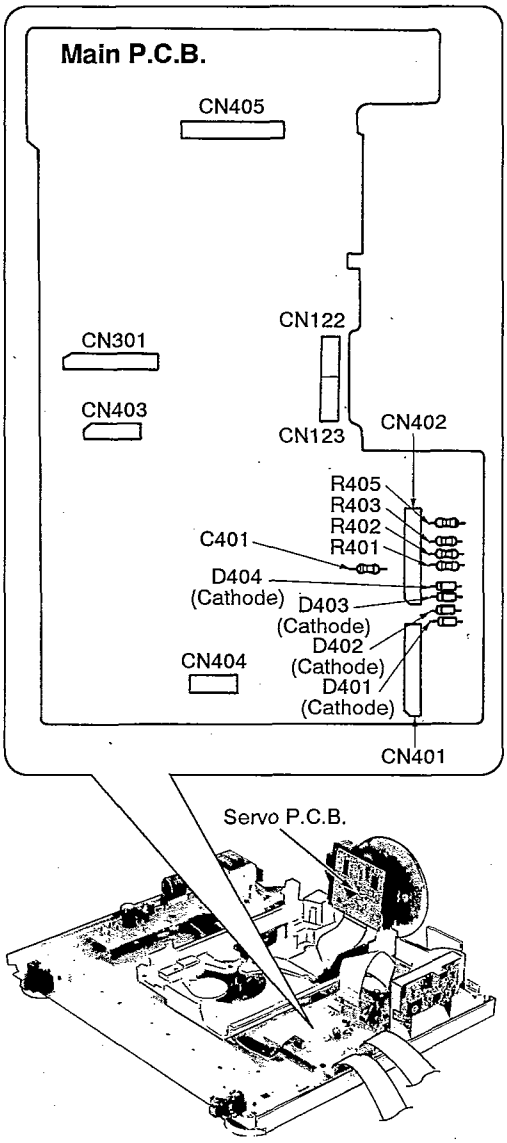
• Connect as follows:
Short FFC ; between Connector [S] and SHORT
Long FFC ; between Connector [L] and LONG
• Connect the FFC (Long/Short) with blue line upward to the operation P.C.B. connectors.
• Connect the FFC (Long/Short) with blue line outward to the main P.C.B. connectors.



NOTE
The pin numbers of each connector are marked on the P.C.B. surface.

■ OPERATING THE UNIT WITHOUT THE FRONT PANEL ASS'Y

(OPERATION P.C.B. AND KEYS)



A Turning off the back-up power to the microprocessor(IC 401)

1. Unplug the AC cord.
2. Short the ends of the C401 jumpers at 10 Ω (5W) resistance for at least 1 second.

B Turning the power on again

1. Plug the AC cord back in.
2. Short the between the following jumpers simultaneously:
   - The D401 cathode and R401 from IC401 (equivalent to pressing the STOP button).
   - The D401 cathode and R403 from IC401 (equivalent to pressing the PLAY button).
   - The D402 cathode and R401 from IC401 (equivalent to pressing the DISC 1 button).
3. Keeping the above shorts in place, short between the D404 cathode and R405 from IC401 for 1 second to turn on the power to the main unit.
4. Remove the shorts placed in step 2.

C Using the machine

- To play, short between the D401 cathode and R403 from IC401 (equivalent to pressing the PLAY button).
- To pause, short between the D401 cathode and R402 from IC401 (equivalent to pressing the PAUSE button).
- To stop, short between the D401 cathode and R401 from IC401 (equivalent to pressing the STOP button).
- To move forward, short between the D402 cathode and R402 from IC401 (equivalent to pressing the F.SKIP button).
- To move backward, short between the D402 cathode and R403 from IC401 (equivalent to pressing the R.SKIP button).
- To search in the forward direction, short between the D403 cathode and R402 from IC401 (equivalent to pressing the F.SEARCH button).
- To search in the backward direction, short between the D403 cathode and R403 from IC401 (equivalent to pressing the R.SEARCH button).

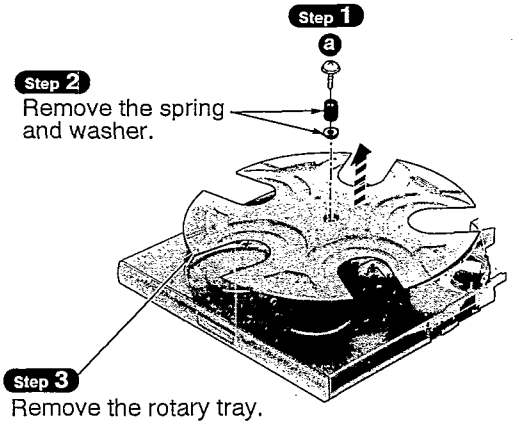
D Finishing off

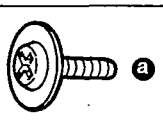
1. Unplug the AC cord.
2. Short the ends of the C401 jumpers at 10 Ω (5W) resistance.

■ Main Component Replacement Procedures

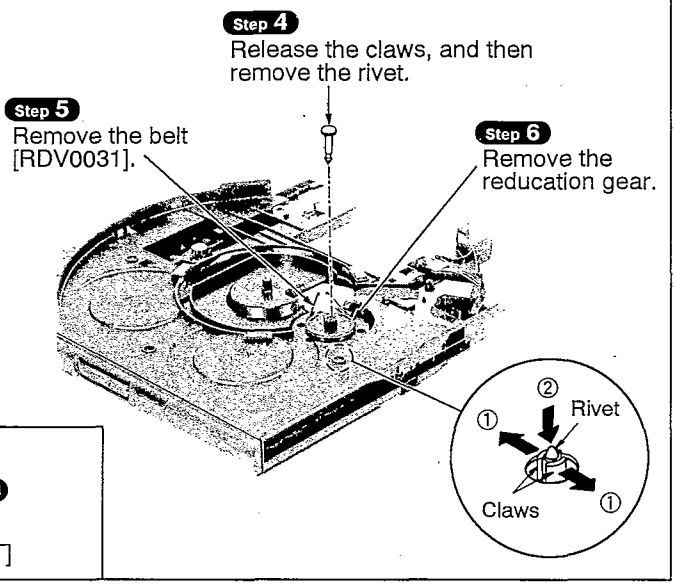
1. Replacement for the belt and tray motor ass'y

• Follow the item 3 (Step 1 ~ Step 11) on checking procedure for each P.C.B. (See page 15).

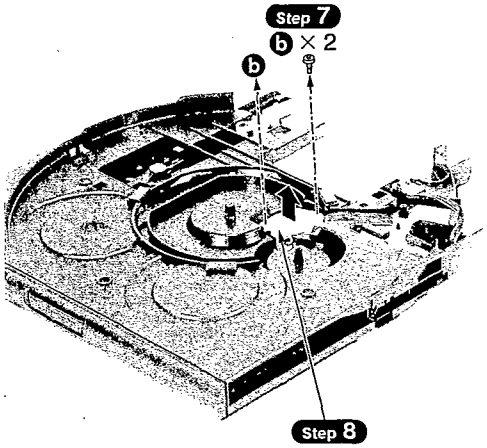




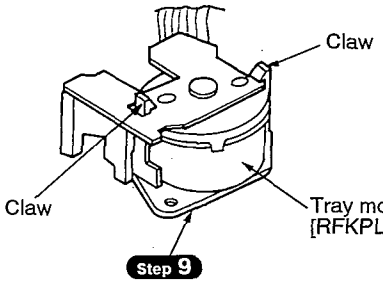
[XTWS3+10T]



[XTB3+10G]



Remove the tray motor ass'y.

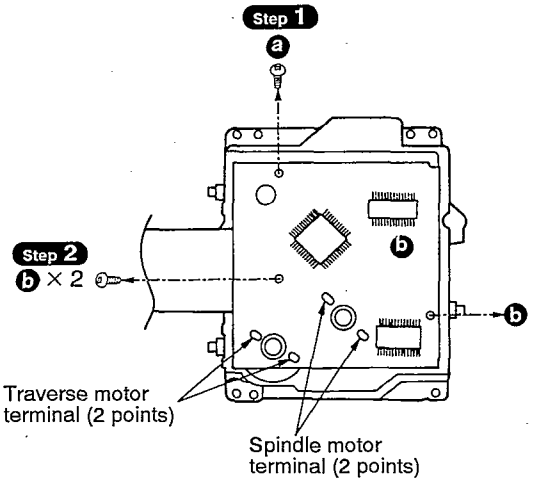


Release the 2 claws, and then remove the motor holder.

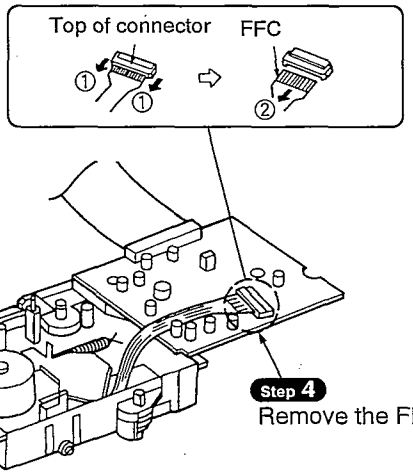
2. Replacement for the traverse deck ass'y

[XTN2+6G] [XTV2+6G]

- Follow the item 3 (Step 1 ~ Step 14) on checking procedure for each P.C.B. (See pages 15 and 16).
- Follow the item 4 (Step 1 ~ Step 7) on checking procedure for each P.C.B. (See page 18).

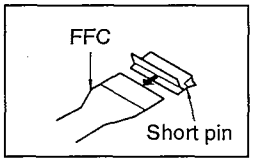


Step 3
Unsolder the spindle motor terminals and traverse motor terminals.

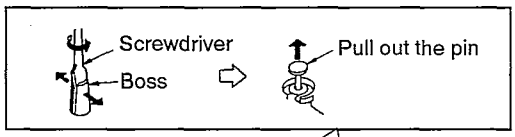


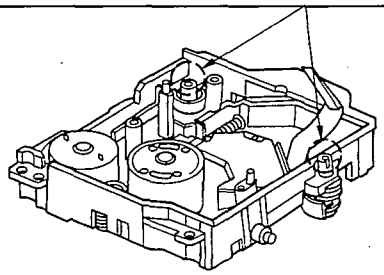
Remove the FFC.

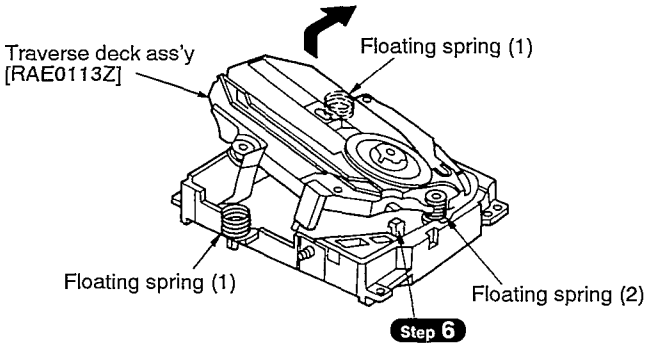
CAUTION
Insert a short pin into the traverse unit FFC.
(Refer to "Handling Precautions for Traverse Deck" on page 12.)



Step 5
Remove the pin.





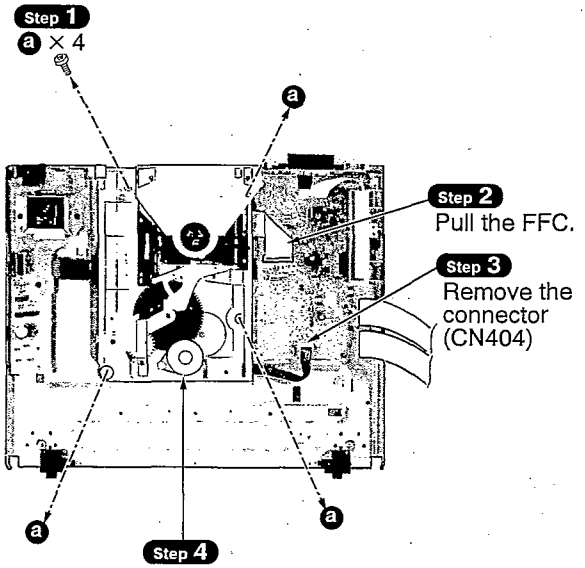


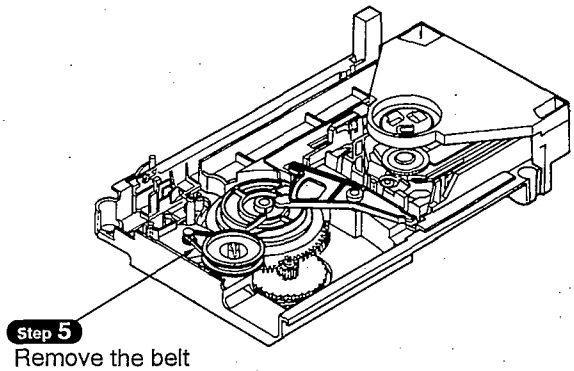
Release the claw.

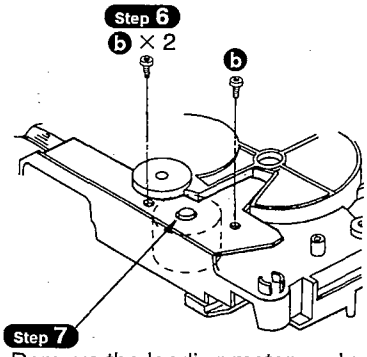
NOTE
Be careful not to lose the 3 springs because those will also be removed on removal of the traverse deck ass'y.

3. Replacement of the belt and loading motor ass'y

• Follow the item 3 (Step 1 ~ Step 11) on checking procedure for each P.C.B. (See page 15).







[XTB3+8JFZ] (Black)

[XTB3+10JFZ] (Black)

■SERVICE MODE

This unit comes with servomonitor function that indicates the operation conditions of the focus servo, tracking and CLV systems on the FL display. It is also equipped with a function indicating the automatic adjustment result of the servo circuit on the FL display as an error code.

• Use these two functions to assist with fault diagnosis.

(1) 〈When the unit is assembled〉

Turn the unit on, load it with a commercially available CD and turn it off.

↓

Turn the unit on while pressing the STOP (■), PAUSE (▮▮) and PLAY (▶) buttons simultaneously.

(2) 〈When the unit is disassembled〉

Set the unit in the state within the paragraph begining "Checking the main P.C.B." on pages 17, 18 of the service manual.

↓

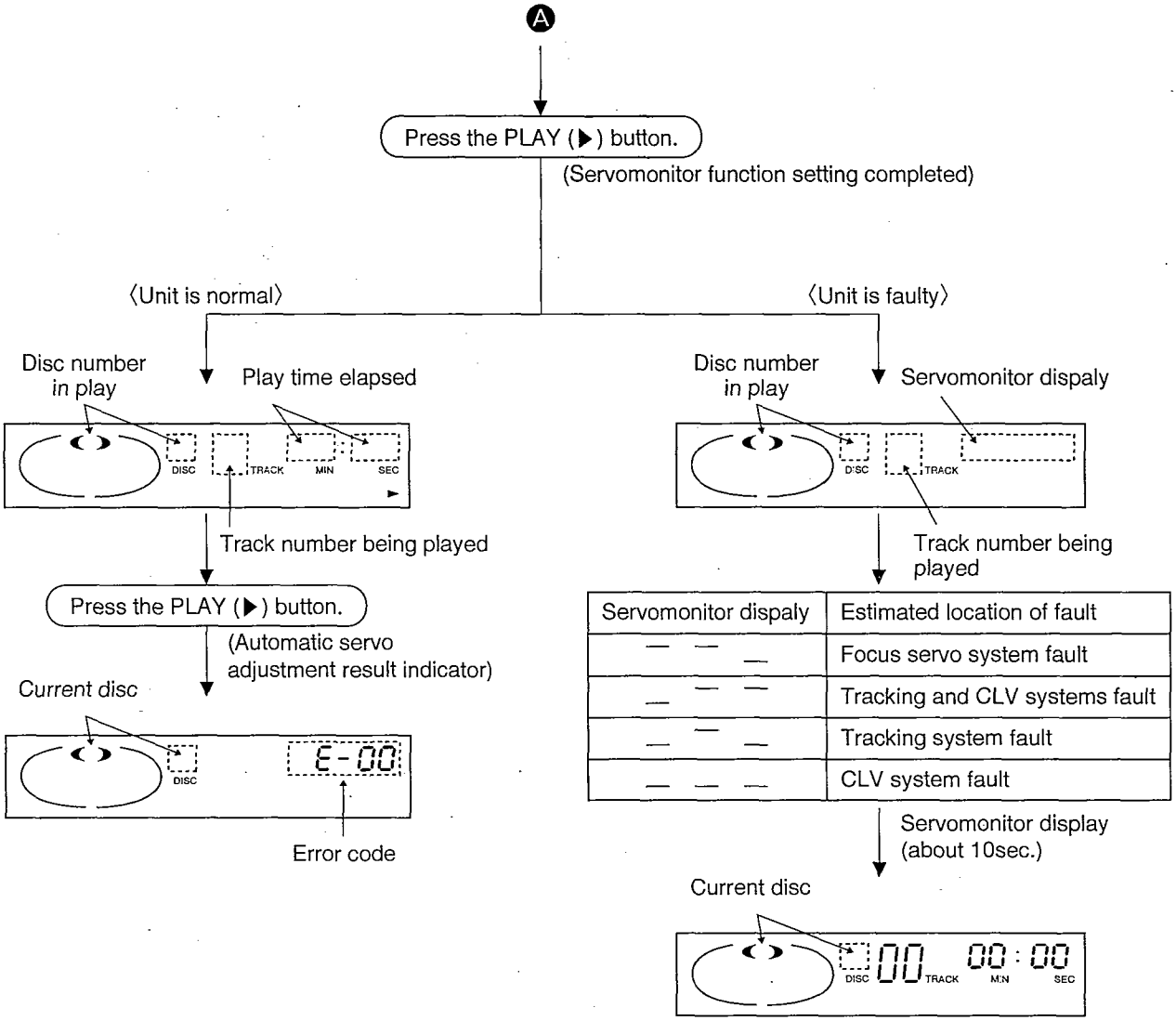
Turn the unit on while pressing the STOP (■), PLAY (▶) and Disc 1 buttons simultaneously.

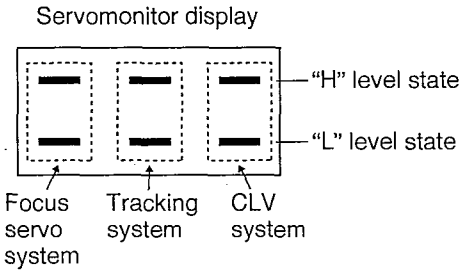
↓

Place the commercially available CD on the Traverse deck ass'y, and then attach a clamper ass'y.

↓

Ⓐ



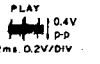
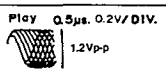
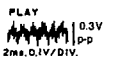
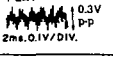


The servomonitor display allows the signal conditions of pin ⑪ (Flock in the focus servo system), pin ⑫ (Tlock in the tracking system) and pin ⑯ (CLVS in the CLV system), respectively of IC702 to be monitored on the FL display.

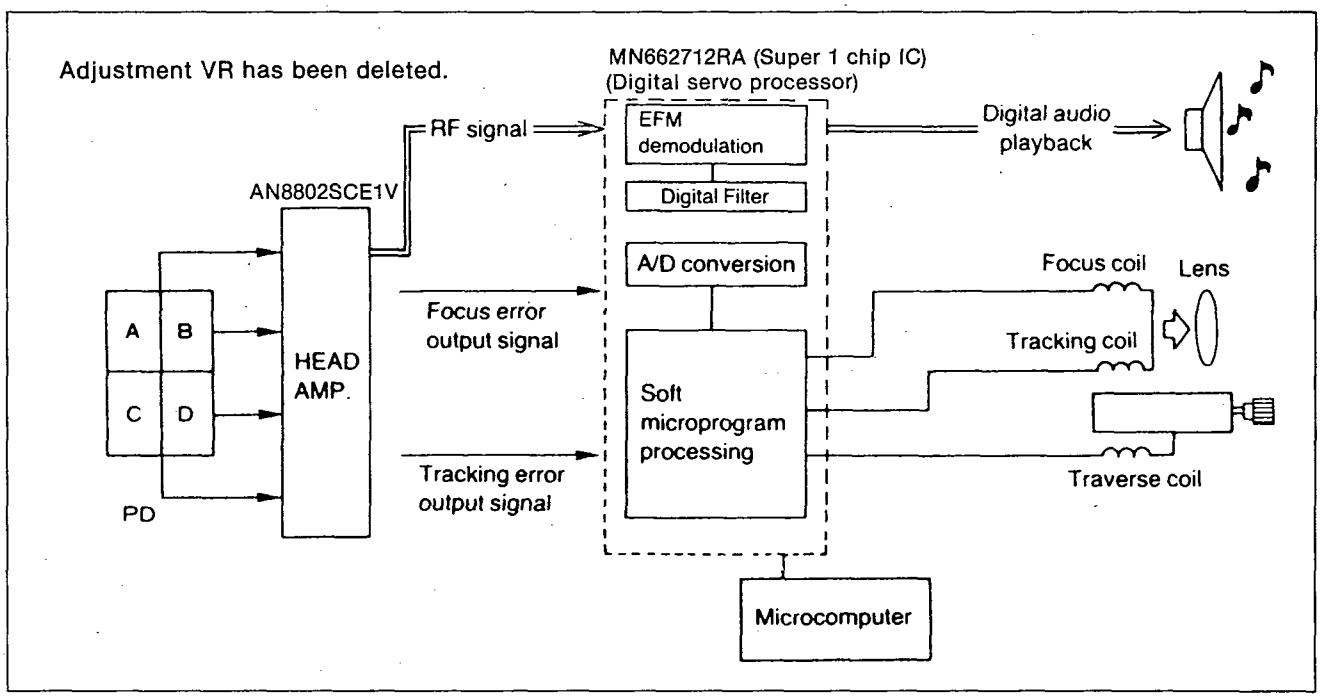
	"H" level state	"L" level state
Pin ⑪ (FLOCK)	Focus servo operation indicator or focus servo system fault	Focus servo system normal
Pin ⑫ (TLOCK)	Search (stop) operation indicator or tracking system fault	Tracking system normal
Pin ⑯ (CLVS)	CLV system normal	CLV servo operation indicator or spindle speed fault

• Error code based troubleshooting

※ The unit is satisfactory if the error code is **E-0** of **E-2.**
※ Before testing, check that the test disc is free of scratches and dirt and optical pickup is clean.

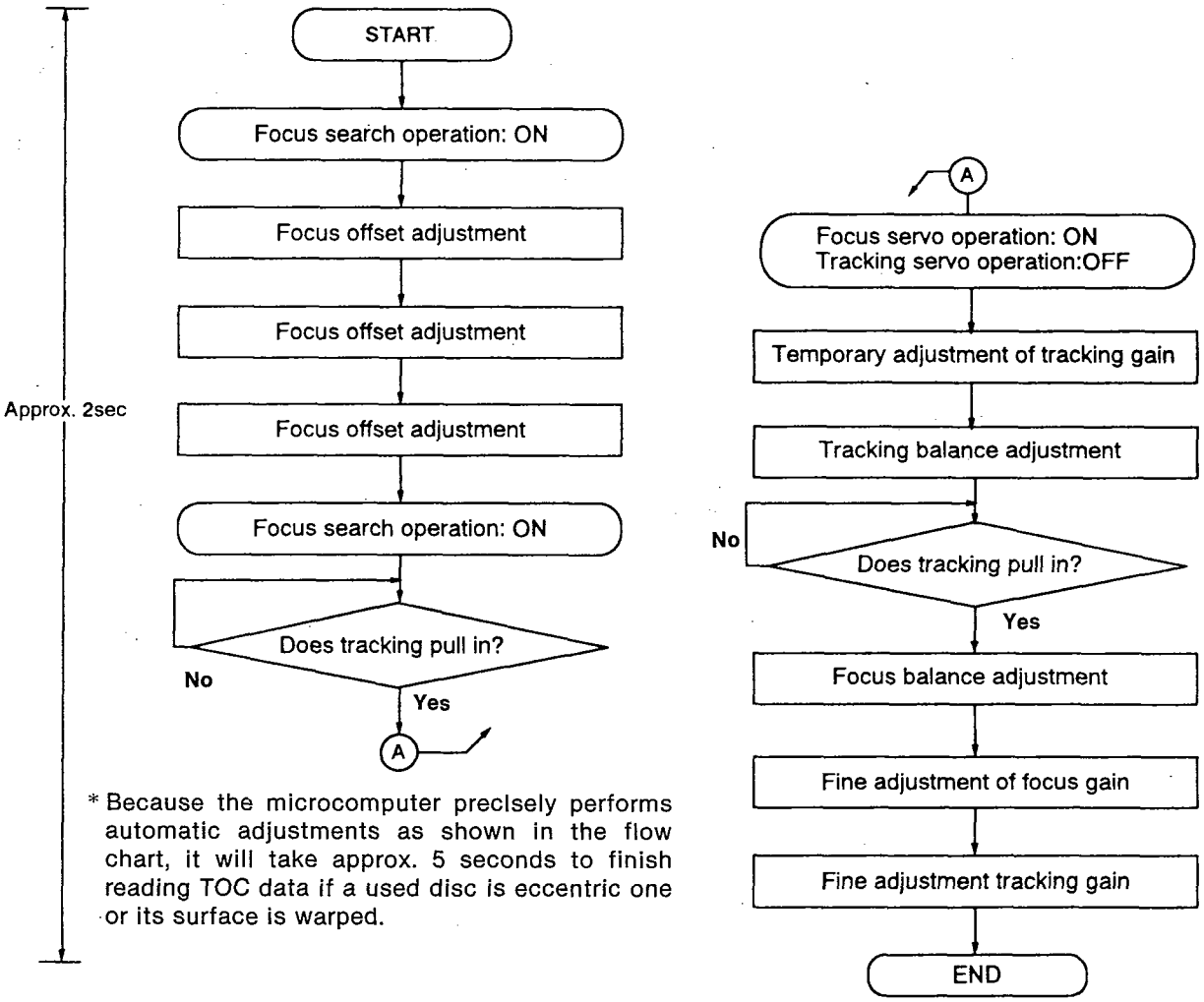
FL error code display	Symptom	Probable cause	Signal to check		Normal voltage and waveform values	
			Signal name	Location	PLAY	STOP
E-1	Focus and tracking offset adjustments not completed in specified time period.	① Clocks X1 and X2, power supply V_{DD}, and reset/RST, all on IC702 ② MDATA, MCLK, MLD, and SENSE signals to/from mechanism controller	MDATA	IC702 ⑧ pin		4.8V
			MCLK	IC702 ⑦ pin		4.8V
			MLD	IC702 ⑨ pin		
			SENSE	IC702 ⑩ pin	0V	0V
			/RST	IC702 ⑱ pin	4.9V	4.9V
			X1	IC702 ⑱ pin		
			X2	IC702 ⑲ pin		
E-3 E-5 E-7 E-9 E-B E-D E-F	Disc play unstable	① Scratches or contaminants on disc surface ② Focus and tracking servo circuits (check waveforms, voltages, and part values.) ③ Spindle driver circuit ④ Optical pickup	FE	IC702 ㉜ pin		2.4V
			TE	IC702 ㉝ pin		2.4V
			FOD	IC702 ㉘ pin	2.4V	2.4V
			TRD	IC702 ㉗ pin	2.4V	2.4V
			KICK	IC702 ㉖ pin	2.4V	2.4V
			/FLOCK	IC702 ⑪ pin	0V	4.9V
			/RF DET	IC702 ㊳ pin	0V	4.8V
			RF	TJ701		1.5V
			STAT	IC702 ⑰ pin	3.5V	0V
E-4 E-6 E-C E-E	Best "Eye" (PD Balance) adjustment not completed in specified time period.	① Scratches or contaminants on disc surface ② Focus and Tracking servo circuit (check waveforms, voltages, and part values.) ③ Optical pickup	FBAL	IC702 ㉚ pin	2.5 ± 1.25V	2.5 ± 1.25V
			RF	TJ701		1.5V
			FE	IC702 ㉜ pin		0V
			/TLOCK	IC702 ⑫ pin	0V	0V
			OFT	IC702 ㉟ pin	0V	0V
E-8 E-A	Focus or Tracking gain adjustment not completed in specified time period.	① Scratches or contaminants on disc surface ② Focus and Tracking servo circuit (check waveforms, voltages, and part values.) ③ Optical pickup	FE	IC702 ㉜ pin		2.4V
			TE	IC702 ㉝ pin		2.4V
			/TLOCK	IC702 ⑫ pin	0V	0V
			OFT	IC702 ㉟ pin	0V	0V

■ DIGITAL SERVO SYSTEM



The following flow chart shows the sequence of automatic adjustments.

● Flow chart automatic adjustment sequence



* Because the microcomputer precisely performs automatic adjustments as shown in the flow chart, it will take approx. 5 seconds to finish reading TOC data if a used disc is eccentric one or its surface is warped.

■ MEASUREMENTS AND ADJUSTMENTS

Warning: This product uses a laser diode. Refer to caution statements on page 2.

Measuring Instruments and Special Tools

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

* Musical program disc (ordinary)
* Dual-beam oscilloscope with bandwidth of 30MHz or better (with EXT. trigger and 1:1 probe).
* Allen wrench (M2.0) (SZZP1101C)
* Lock paint (RZZ0L01)

PREPARATION

1. Remove the cabinet and front panel ass'y.
2. Set the power switch to ON and press the open/close key to close the loading drawer.
3. Press the play key and when the traverse deck reaches it's height position, set the power switch to OFF.
4. Remove the tray ass'y.
5. Remove the clamp plate, fixed plate, magnet and clamper.
6. Place the test disc and secure it by using clamper ass'y. (Refer to Fig. 1)

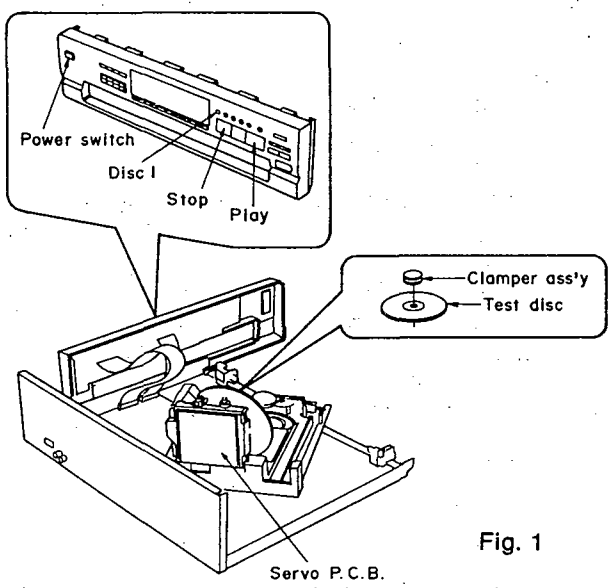


Fig. 1

How to play the disc

Unplug the set previously.

↓

While pressing 3 keys of STOP(■), PLAY(▶), and DISC 1 simultaneously, insert the power plug of the set into the plug socket.

NOTE:
Be sure to begin pressing the 3 keys before plugging the set. Otherwise, the Service Mode cannot be set.

↓

FL lights up? — No → Press the POWER key (POWER ON).

Yes ↓

Press the POWER key (POWER ON). → FL lights up.

Withdraw hand from the 3 keys.

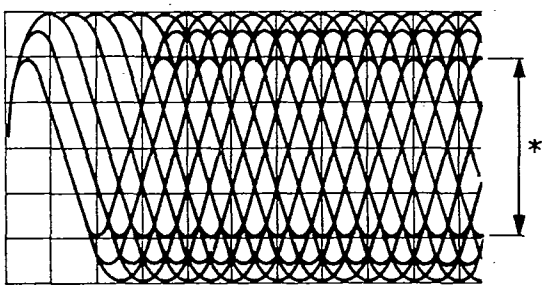
↓

Mount the disc on the turntable and press the PLAY key.

NOTE:
Make sure that the traverse mechanism is then in UP (PLAY) position.

(1) MECHANICAL ADJUSTMENT

1. Connect the oscilloscope's CH. 1 probe across **TJ701** (RF) and **TJ702** (VREF) on the servo P.C.B. (Refer to Fig. 3)
   Oscilloscope setting: VOLT 200mV
   SWEEP..... 0.5μs.
   Input coupling..... AC
2. Switch the player power **ON**, and play track **19** on the test disc (SZZP1056C).
   (Playing any other track will prevent the HEX screws from being accessed.)
3. Leave the player in play mode and place it as shown Fig. 1.
4. Alternately adjust the two 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. 2)
5. After completing the adjustment, lock the HEX screws with lock paint (RZZ0L01).



*Most streched eye pattern.

Fig. 2

(2) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

* 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.

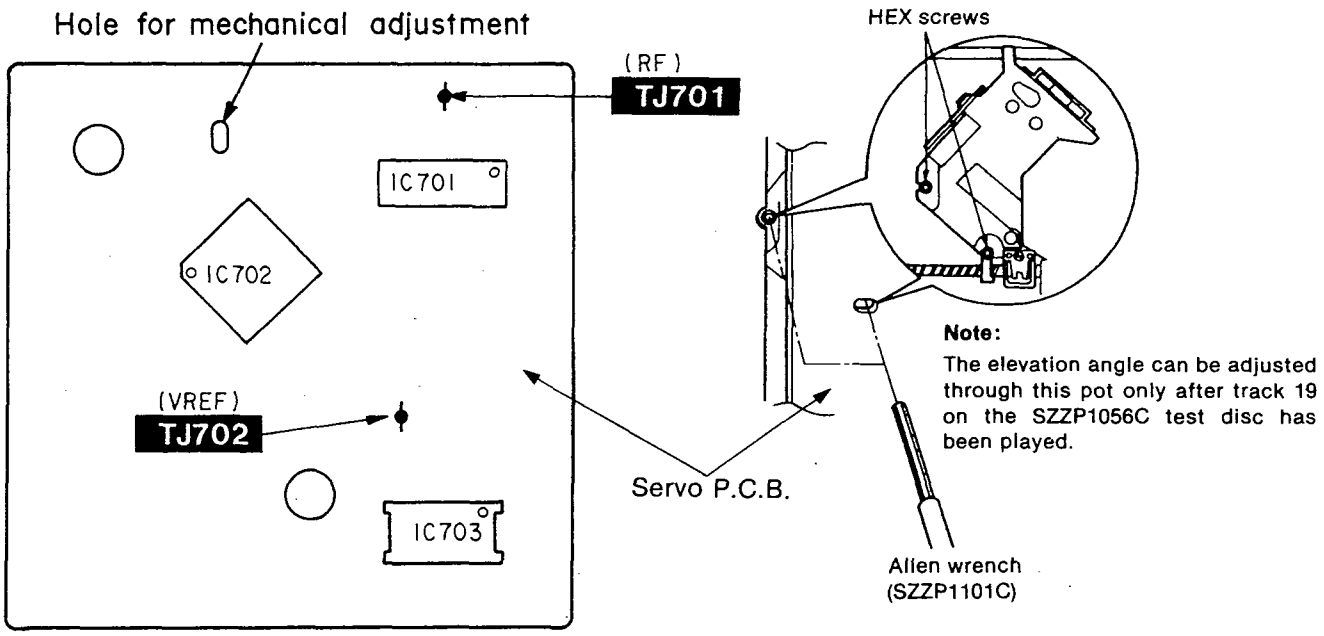
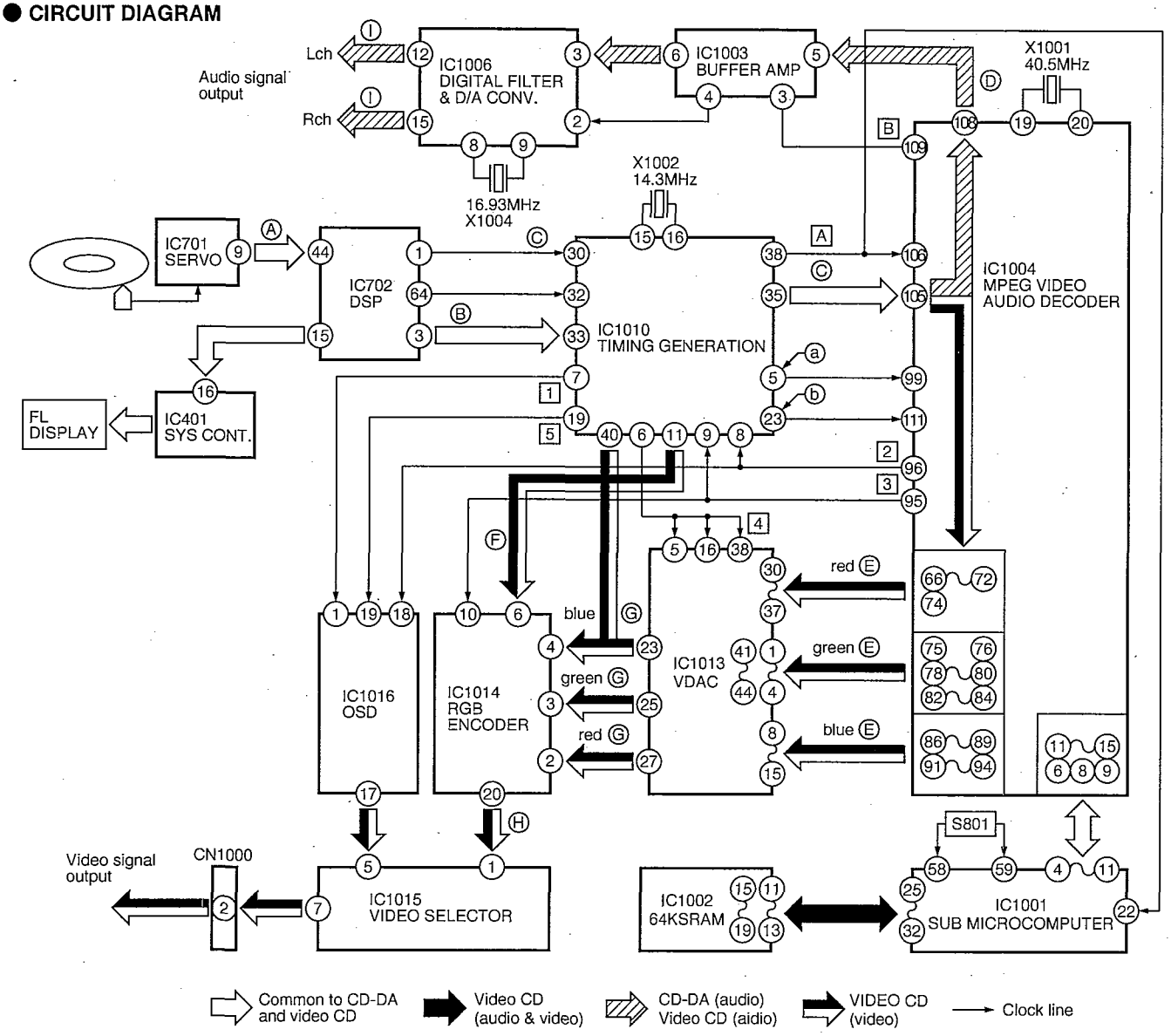


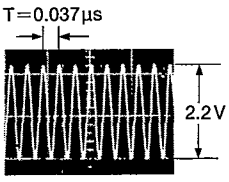
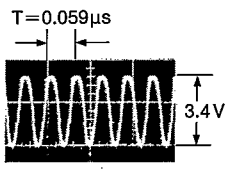
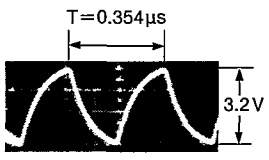
Fig. 3

■TROUBLESHOOTING GUIDE

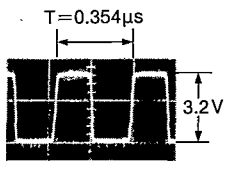
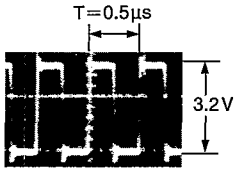
● CIRCUIT DIAGRAM



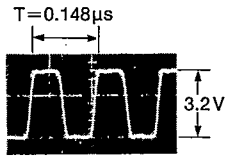
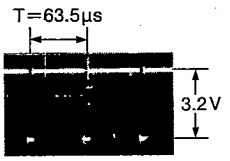
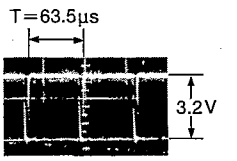
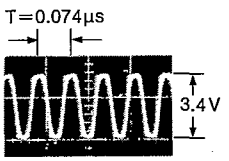
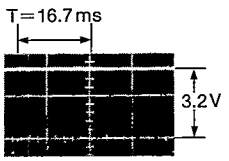
MASTER CLOCK SYSTEM WAVEFORM

ⓐ Video read clock	ⓑ Audio read clock	ⓒ Write reference clock
		
T=0.037µs, 2.2V	T=0.059µs, 3.4V	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

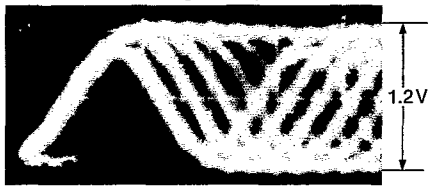
VIDEO DATA CLOCK SYSTEM WAVEFORM

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=63.5µs, 3.2V	T=63.5µs, 3.2V	T=0.074µs, 3.4V	T=16.7ms, 3.2V
F=6.75MHz	F=15.7kHz	F=15.7kHz	F=13.5MHz	F=60Hz

DATA SIGNAL LINE WAVEFORMS

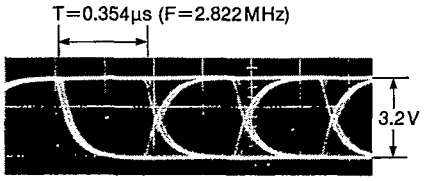
Note: Use the PVCD_K06 video CD test disc (menu playback feature is available on version 2.0). For color bar display, play back the 1st track when the menu playback feature is used, or the 3rd track when the feature is not used.

Ⓐ IC701 ⑨ RF signal



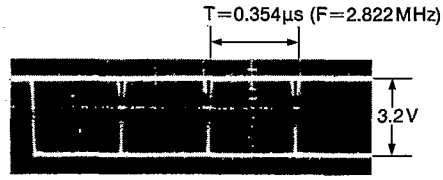
PLAY X: 0.5µs
Y: 0.05V×10

Ⓑ IC1010 ㉝ CD serial data input



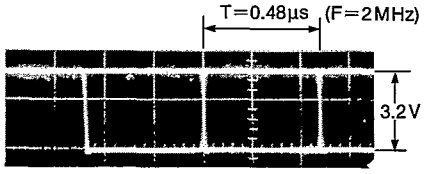
PLAY X: 0.2µs
Y: 0.2V×10

Ⓒ IC1010 ㉟ CD serial data output



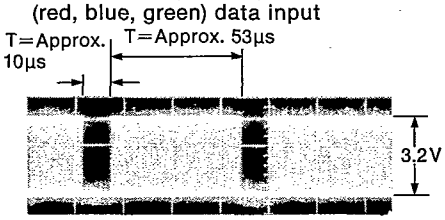
PLAY X: 0.2µs
Y: 0.2V×10

Ⓓ IC1004 ⑩⑧ Audio serial data output



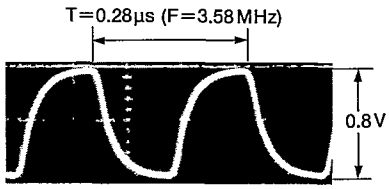
PLAY X: 0.2µs
Y: 0.2V×10

Ⓔ IC1013 ㉚~㊲, ①~④, ㊶~㊹, ⑧~⑮ (red, blue, green) data input



PLAY X: 20µs
Y: 0.2V×10

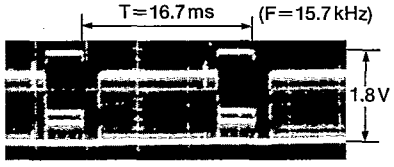
Ⓕ IC1014 ⑥ Subcarrier signal input



PLAY X: 0.1µs
Y: 0.05V×10

Ⓖ IC1013 ㉓ ㉕ ㉗ Analog color (blue, green, red) output

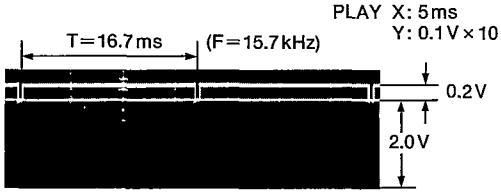
• V signal (color bar screen)



PLAY X: 5ms
Y: 0.1V×10

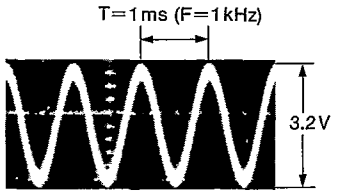
Ⓖ IC1013 ㉓ Analog color (blue) output

• 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.

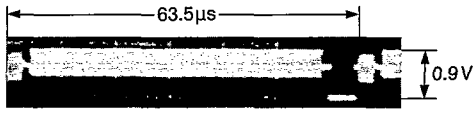
① IC1006 ⑫, ⑮ Audio signal output



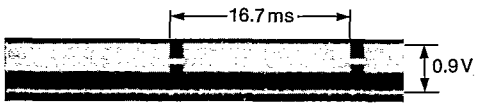
• Test disc played at 1kHz, 0dB (1st track. SZZP1054C)
PLAY X: 1ms
Y: 0.1V×10

Ⓗ IC1014 ⑳ Video signal output (Blue-Back screen)

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

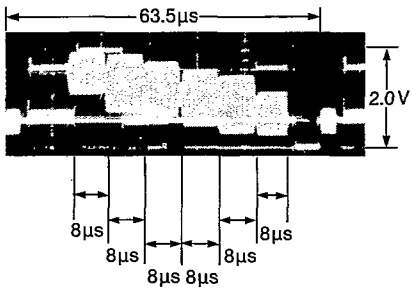


• V signal (PLAY, X: 5ms, Y: 0.1V×10)

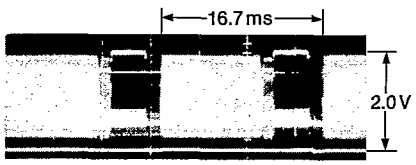


(color bar screen)

• 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. IC701, IC702, IC703, or traverse system
Turntable fails to rotate.	Fails to rotate.	Traverse system, focus servo system (IC701, IC703), supply line, clock line, system microprocessor
Turntable rotates.	Rotates.	Traverse system, tracking servo system/CLV servo system/traverse servo system (IC701, IC702, IC703)
Audio normal	Audio normal, Video NG.	IC1013, IC1014, IC1015
No sound	No sound, Video normal	IC1003, IC1006, IC801
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.

Power ON. Close mode

Press the SELECT (▶) button to start playback.

Press the STOP (■) button to stop playback.

TOC display normal? (Are track No. and time displays normal?)

NO → Traverse deck, IC701, IC702 (Refer to "TROUBLE SHOOTING GUIDE" on pages 30, 31.)

YES

Press the SELECT (▶) button to start playback.

Does sound dropout occur?

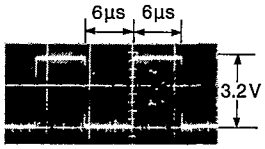
NO → Normal (go to procedure 2-1.)

YES

Check pin ㉜ of IC1010 or pin ㉗ of CN1000.

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

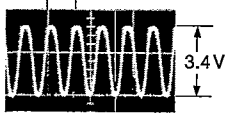
(Check) The following waveform is observed either intermittently or constantly during playback.



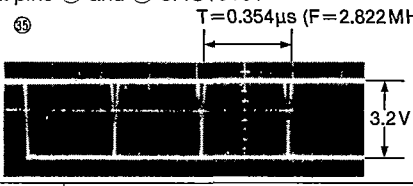
→ Fault is in the traverse deck or servo board.

Are the following waveforms present at pins ㉓ and ㉟ of IC1010?

㉓ T=0.059µs (F=16.9344MHz)



㉟ T=0.354µs (F=2.822MHz)

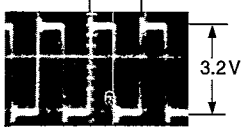


NO → IC1010

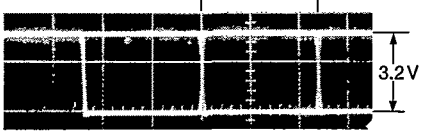
YES

Are the following waveforms present at pins ⑩⑧ and ⑩⑨ of IC1004?

⑩⑨ 0.5µs (F=2MHz)



⑩⑧ T=0.48µs (F=2MHz)

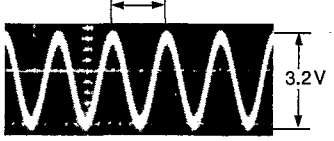


NO → IC1004

YES

Are the following waveforms present at pins ⑫ and ⑮ of IC1006 when the 1kHz, 0dB portion of the 1st track on test disc SZZP1054C is played back?

⑫, ⑮ 1ms (F=1kHz)



NO → IC1006

YES → IC801, Q801, Q802

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

Troubleshooting flowchart

Likely location of fault

Load a video CD disc.

Power ON. close mode

Press the SELECT(▶) button.

Connected to TV / Not connected to TV

Dose the menu appear on screen? NO

YES

Press the STOP (■) button to stop layback.

TOC display normaly? (Are track NO. and time displays normal?) NO → Traverse deck, IC701, IC702

YES

Press the SELECT (▶) button.

Press the NUMERIC (1 2 ... 0 >0/-/--) button to start playback.

Image noise or unstable picture. NO → Normal

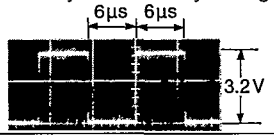
YES

Is the sound unstable? YES / NO

Check the waveforms at pin ㉜ of IC1010 or pin ㉗ of CN1000.

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

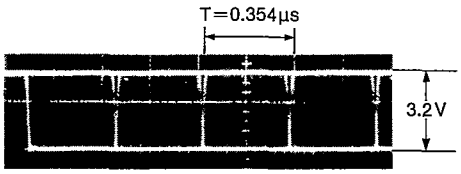
(Check) The following waveform is observed either intermittently or constantly during playback.



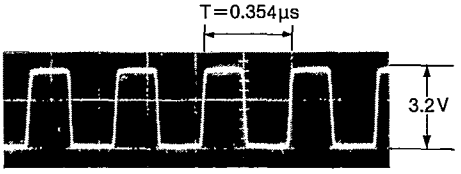
→ Fault is in the traverse deck or servo board.

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 (▶) button.

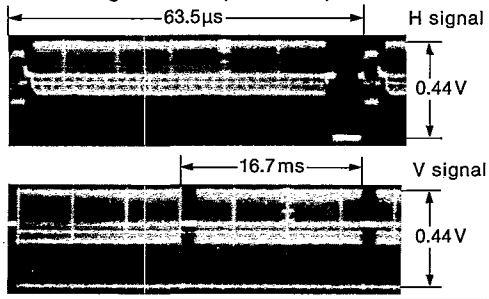
Press the STOP (■) button to stop playback.

Does blue-back screen appear?

YES → Normal

NO

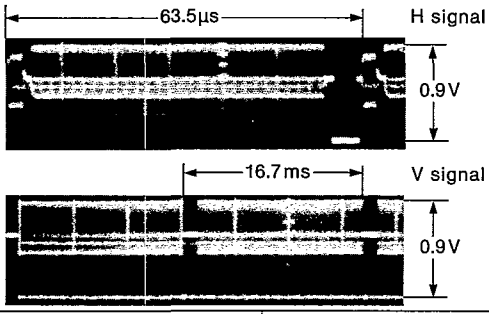
Is the following waveform present at pin ② of CN1000?



YES → Fault is in the main board (video output block).

NO

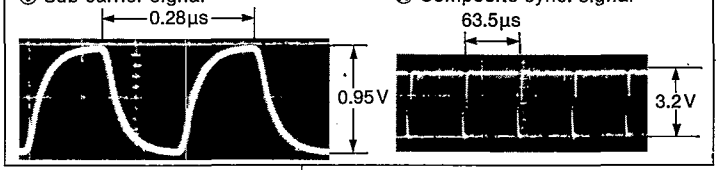
Is the following waveform present at pin ⑳ of IC1014?



YES → IC1015

NO

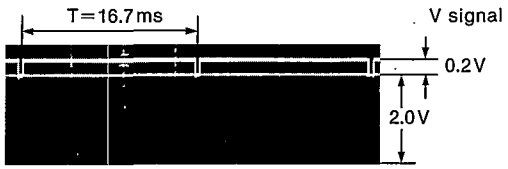
Are the following waveforms present at pins ⑥ and ⑩ of IC1014?



NO → IC1010, IC1004

YES

Is the following waveform present at pin ㉓ of IC1013?



NO → IC1013, IC1004

IC1014

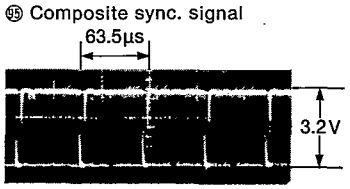
Troubleshooting Procedure 2-3	Video portion of video CD	No picture

Troubleshooting flowchart	Likely location of fault

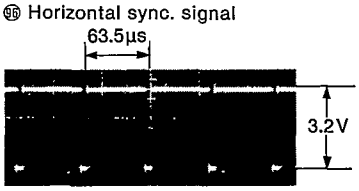
● Video signal line

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

⑮ Composite sync. signal



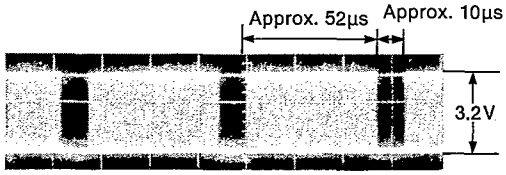
⑯ Horizontal sync. signal



NO → IC1004

YES

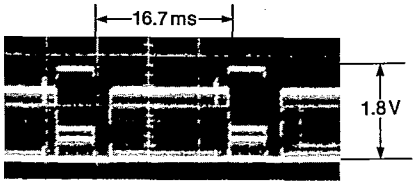
Are the following waveforms present at pins ㉚~㊲, ①~④, ㊶~㊹ and ⑧~⑮ of IC1013?



NO → IC1004

YES

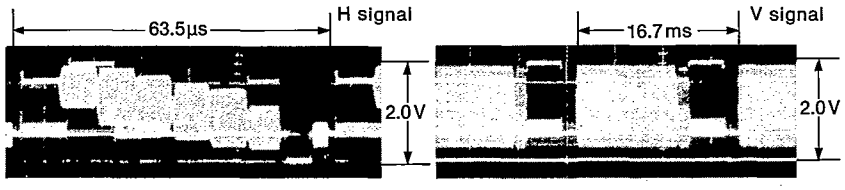
Are the following waveforms present at pins ㉓, ㉕, ㉗ of IC1013?



NO → IC1013

YES

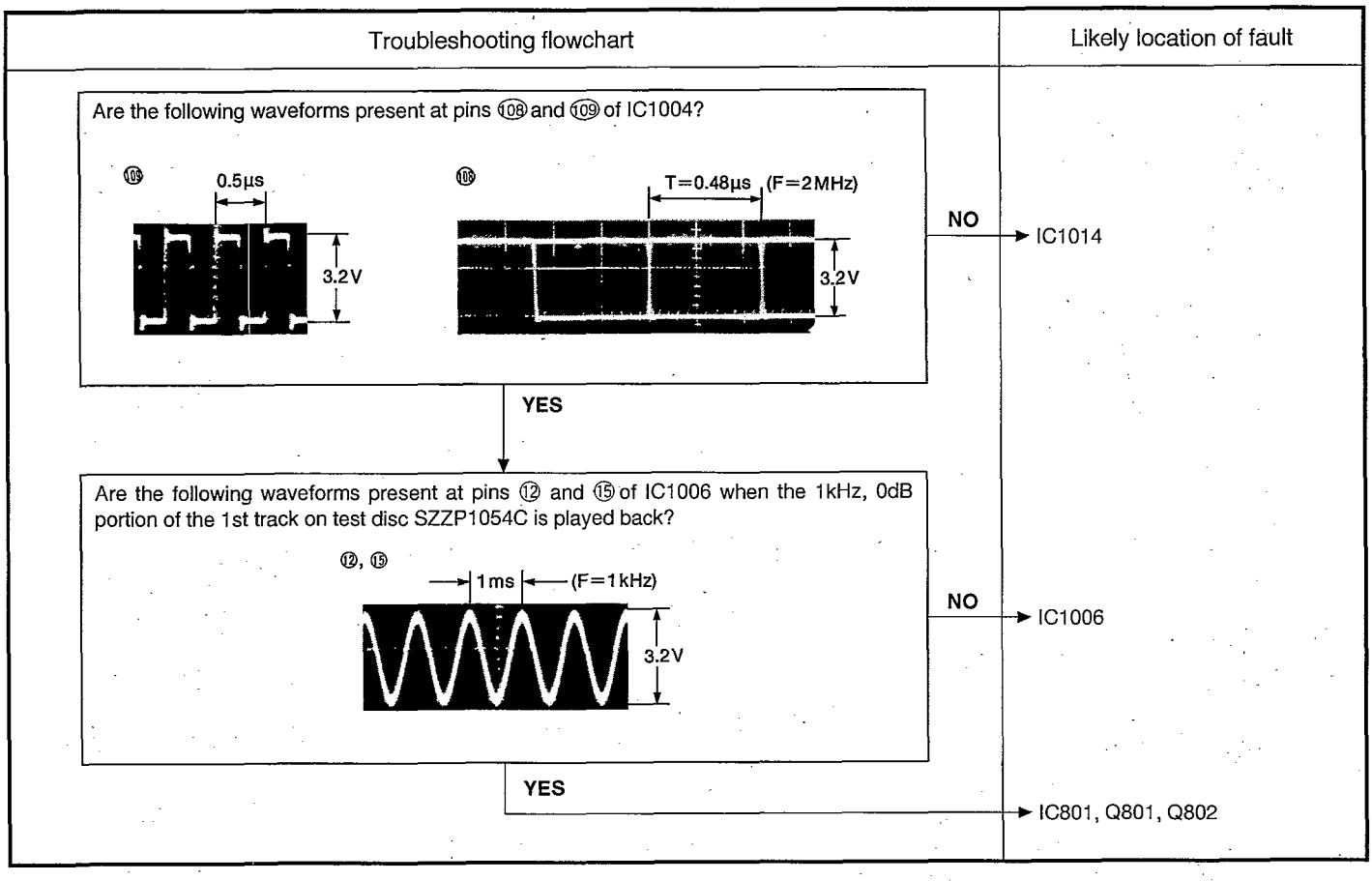
Is the following waveform present at pin ⑳ of IC1014 when color bar is on the screen?



NO → IC1014

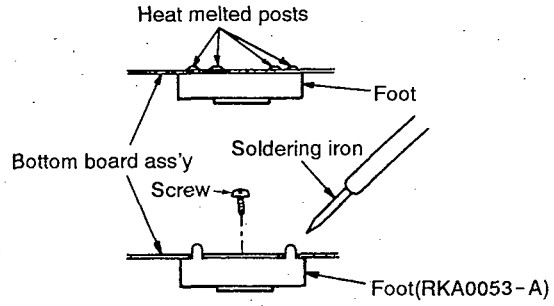
YES → IC1015 or beyond

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

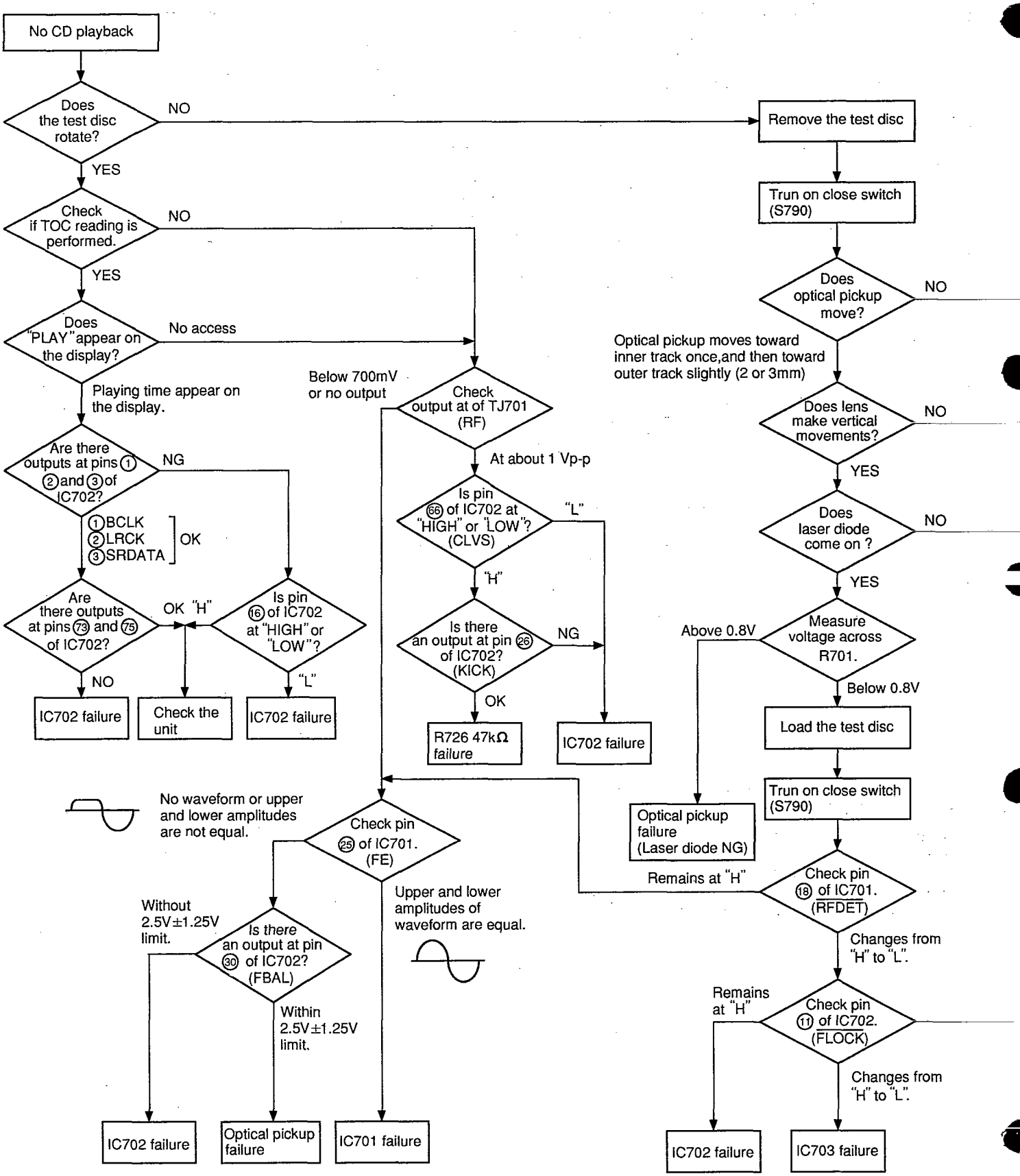


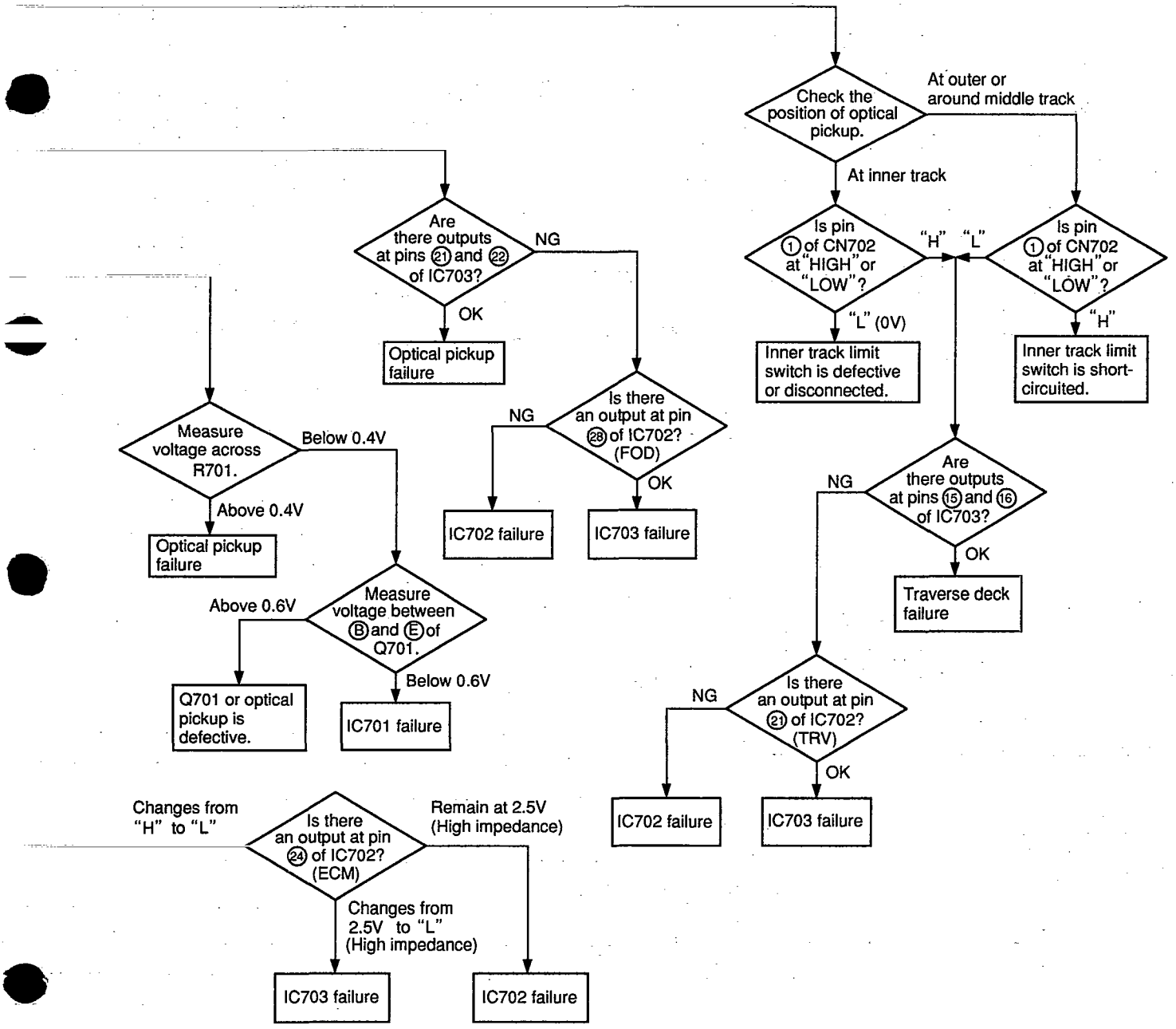
■ REPLACEMENT OF THE FOOT

1. Remove the 4 heat melted posts on the Bottom board ass'y with a pair of nippers or similar tool.
2. To replace the foot (RKA0053-A) on the Bottom board ass'y melt the 4 posts with a soldering iron or install it with a screw (XTB3+6J).

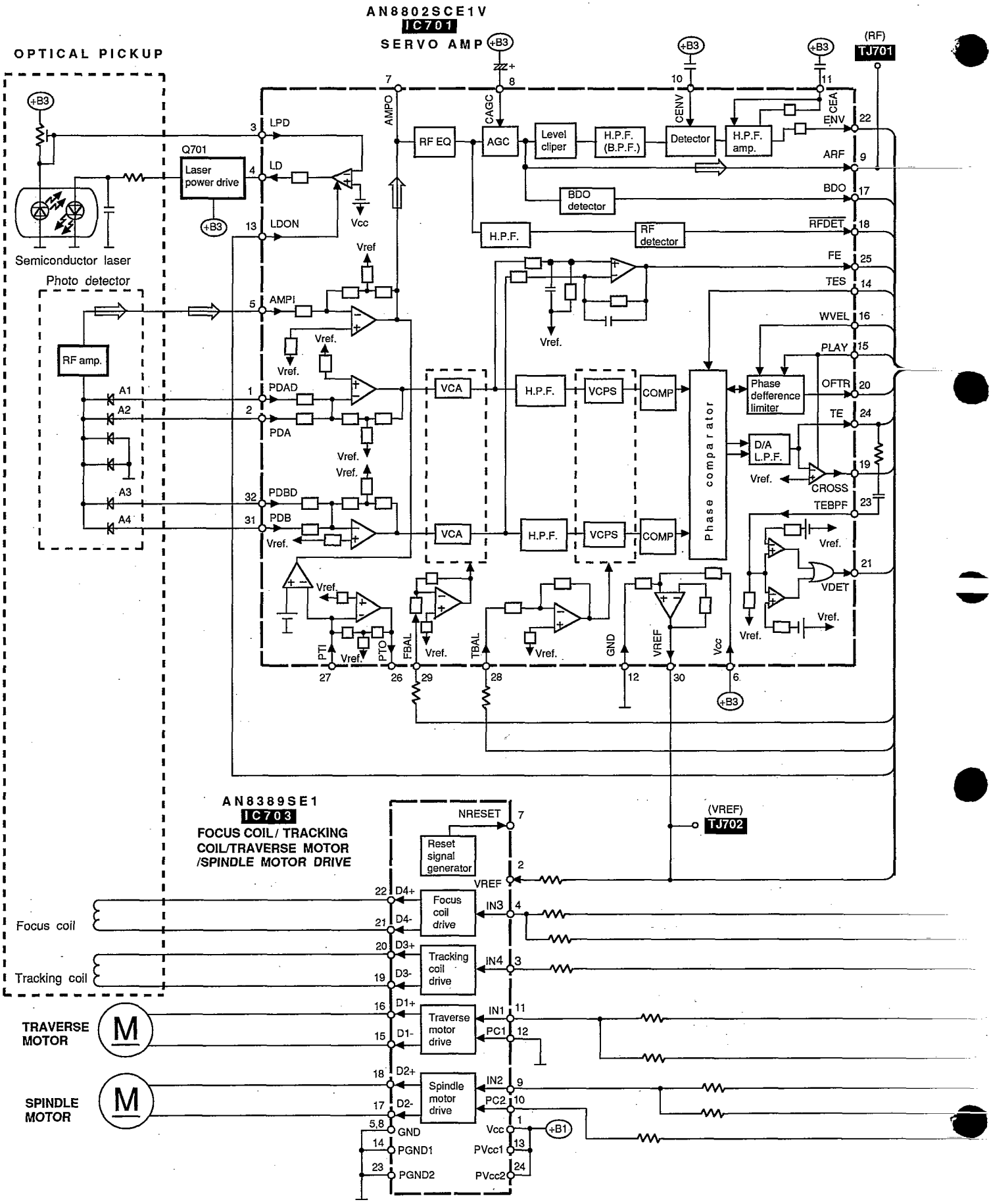


■TROUBLESHOOTING GUIDE




Check the position of optical pickup.
At outer or around middle track
At inner track
Is pin ① of CN702 at "HIGH" or "LOW"?
"H"
"L"
Is pin ① of CN702 at "HIGH" or "LOW"?
"L" (0V)
Inner track limit switch is defective or disconnected.
"H"
Inner track limit switch is short-circuited.
Are there outputs at pins ㉑ and ㉒ of IC703?
NG
OK
Optical pickup failure
Is there an output at pin ㉘ of IC702? (FOD)
NG
OK
IC702 failure
IC703 failure
Measure voltage across R701.
Below 0.4V
Above 0.4V
Optical pickup failure
Measure voltage between Ⓑ and Ⓔ of Q701.
Above 0.6V
Below 0.6V
Q701 or optical pickup is defective.
IC701 failure
Are there outputs at pins ⑮ and ⑯ of IC703?
NG
OK
Traverse deck failure
Is there an output at pin ㉑ of IC702? (TRV)
NG
OK
IC702 failure
IC703 failure
Changes from "H" to "L"
Is there an output at pin ㉔ of IC702? (ECM)
Remain at 2.5V (High impedance)
Changes from 2.5V to "L" (High impedance)
IC703 failure
IC702 failure

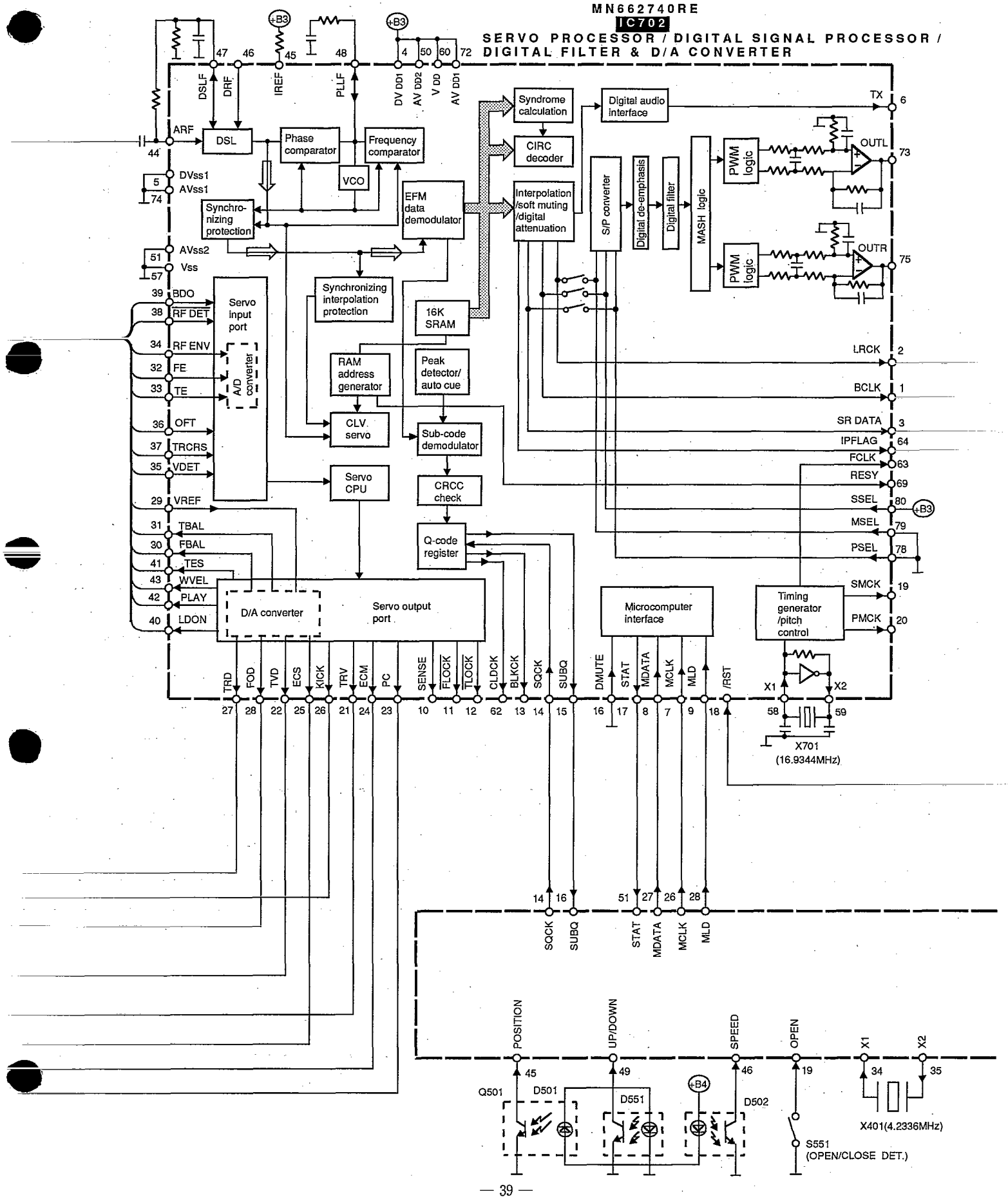
■ BLOCK DIAGRAM

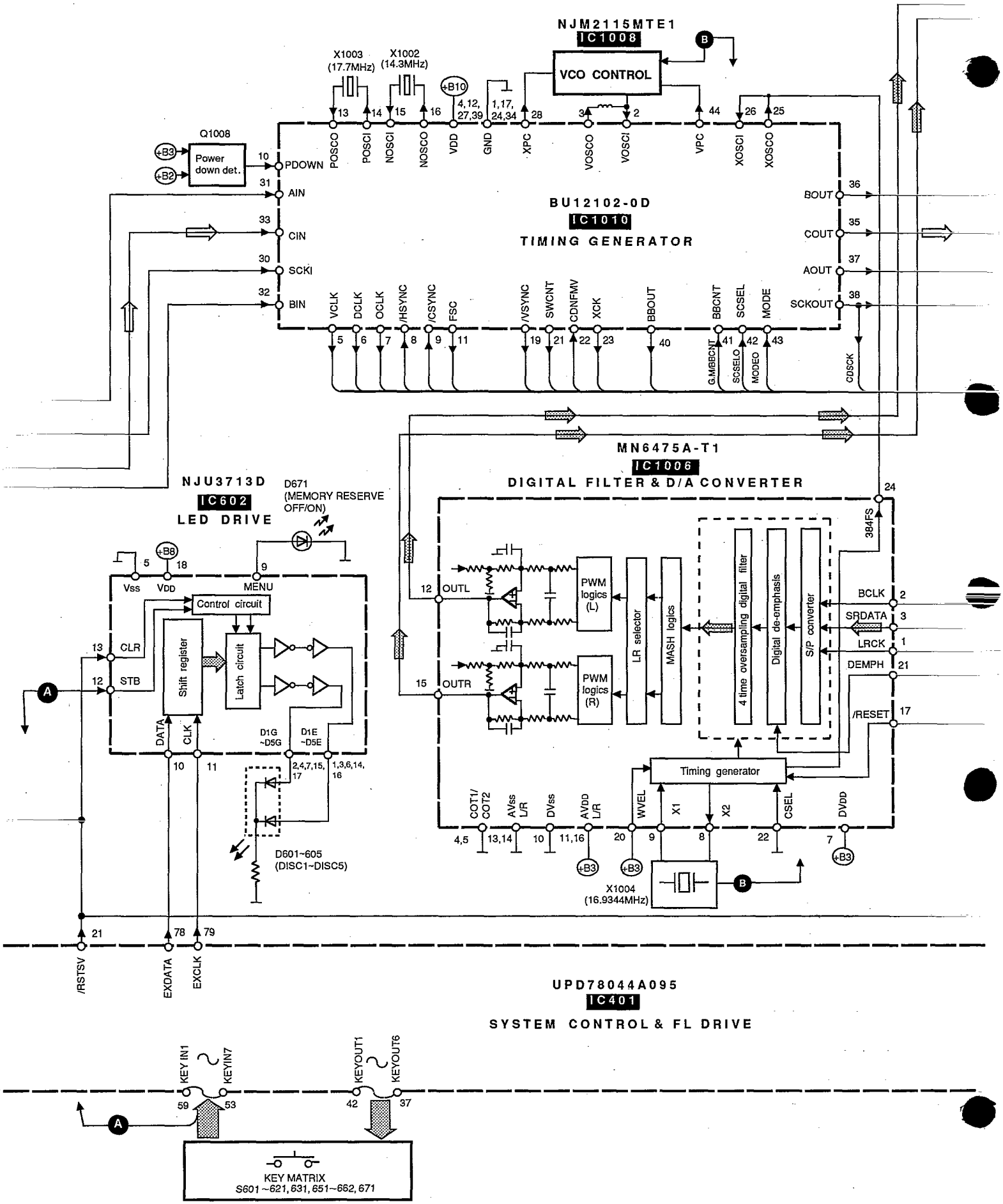


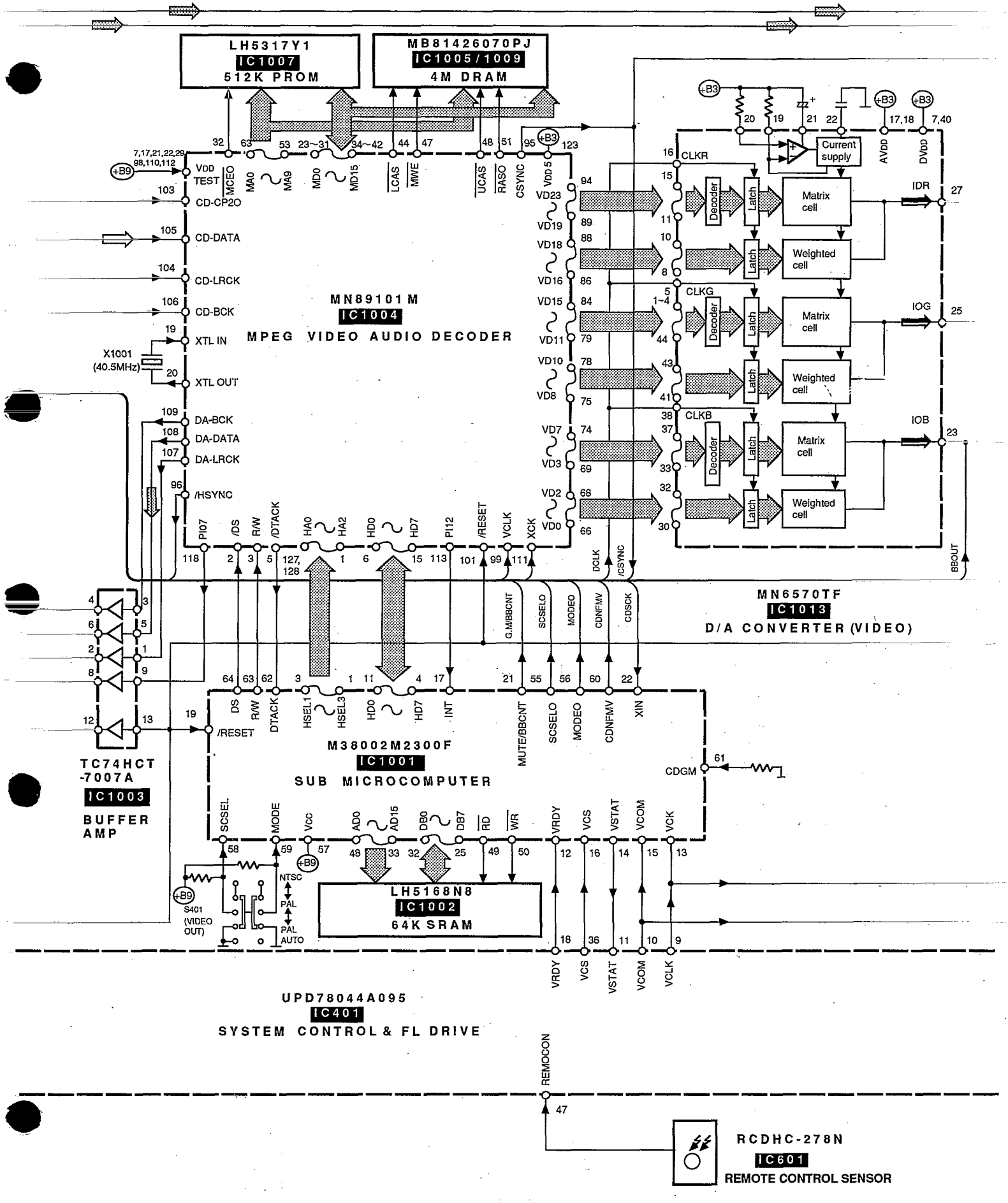
MN662740RE

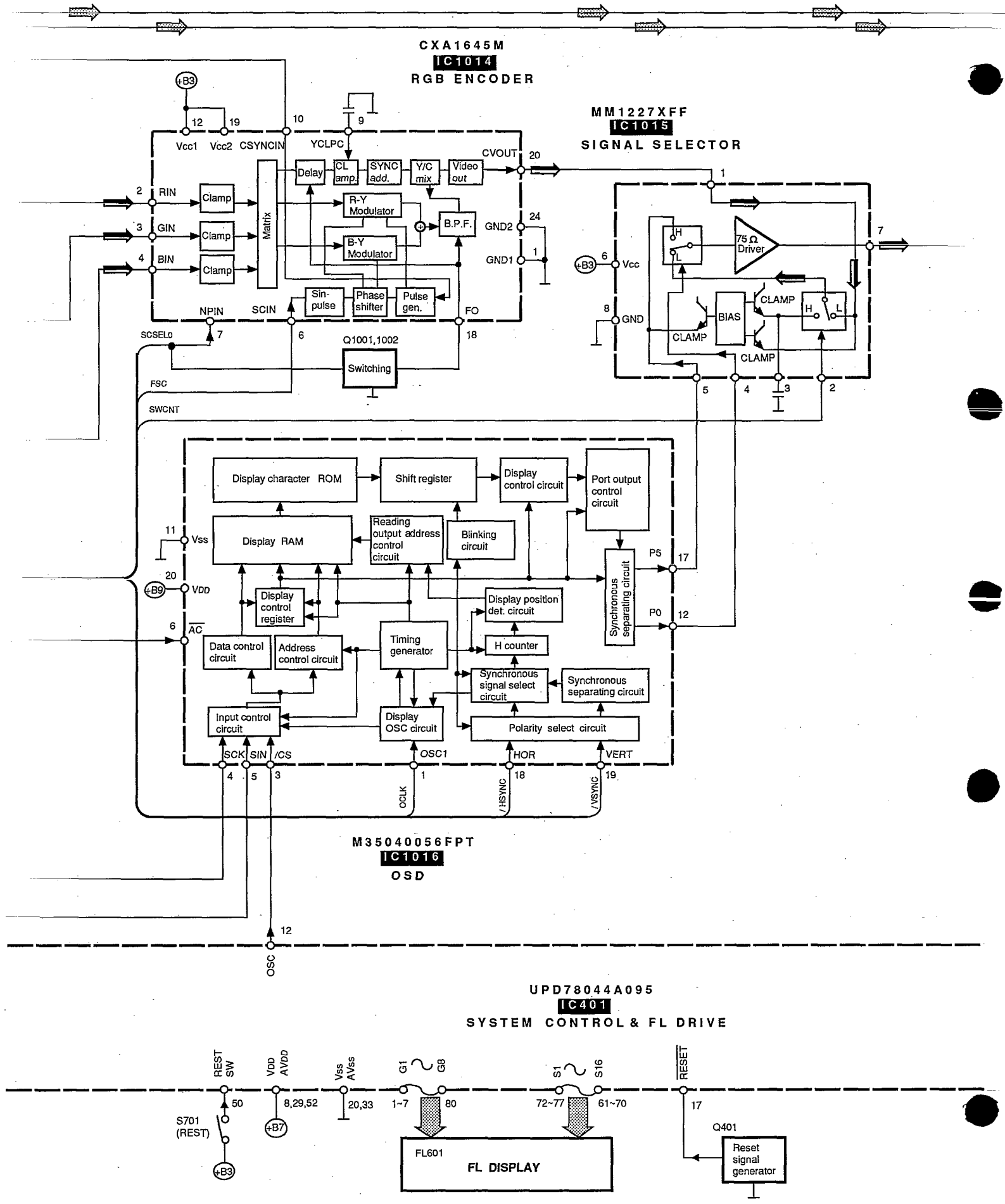
IC702

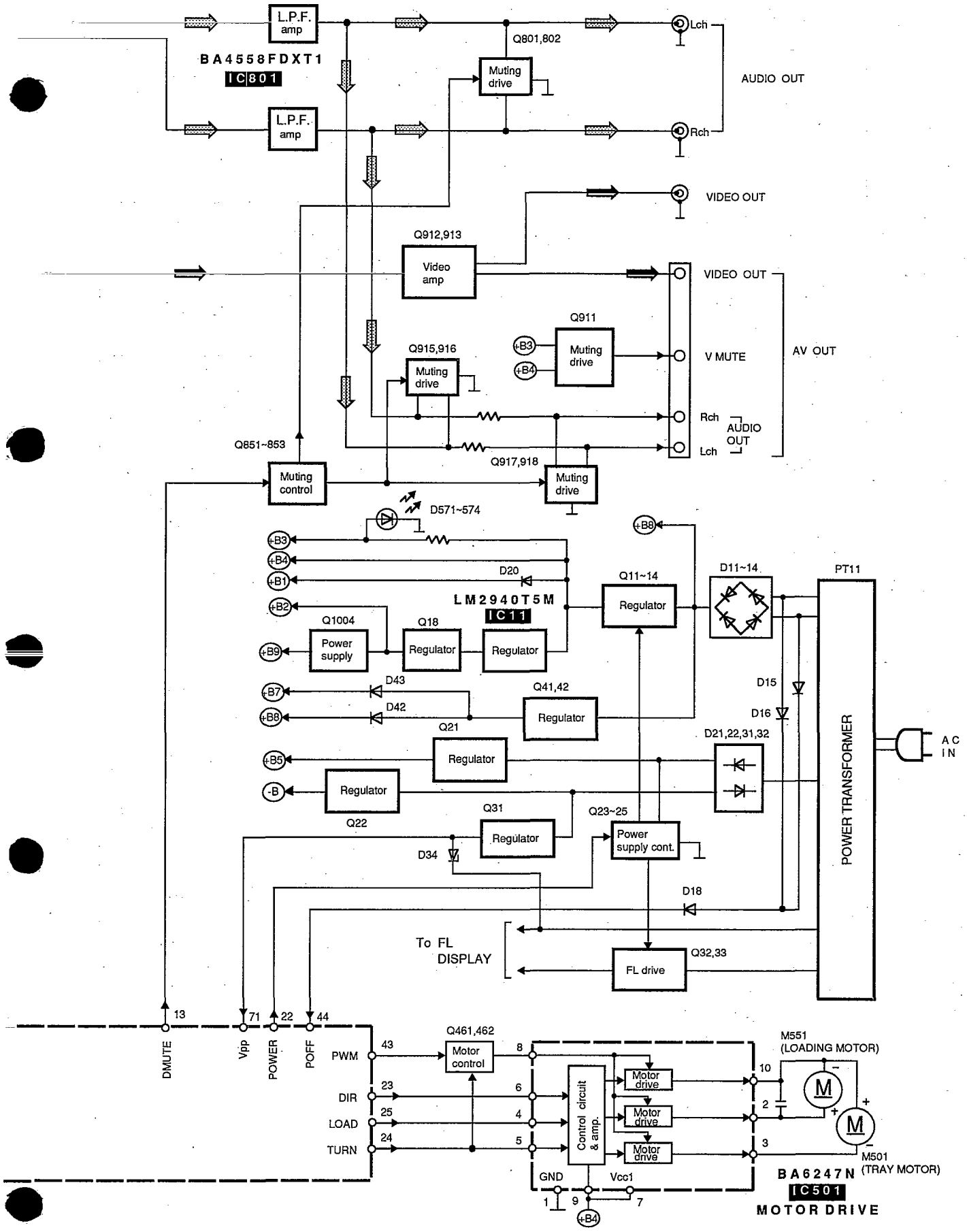
SERVO PROCESSOR / DIGITAL SIGNAL PROCESSOR / DIGITAL FILTER & D/A CONVERTER




NJM2115MTE1
IC1008
VCO CONTROL
X1003 (17.7MHz)
X1002 (14.3MHz)
+B10
4,12, 27,39
1,17, 24,34
POSCO
POSCI
NOSCI
NOSCO
VDD
GND
XPC
VOSCO
VOSCI
VPC
XOSCI
XOSCO
Q1008
+B3
+B2
Power down det.
PDOWN
AIN
CIN
SCKI
BIN
BU12102-0D
IC1010
TIMING GENERATOR
BOUT
COUT
AOUT
SCKOUT
VCLK
DCLK
OCLK
/HSYNC
/CSYNC
FSC
/VSYNC
SWCNT
CDNFMV
XCK
BBOUT
BBCNT
SCSEL
MODE
G.M/BBCNT
SCSELO
MODEO
CDSCK
MN6475A-T1
IC1006
DIGITAL FILTER & D/A CONVERTER
384FS
BCLK
SRDATA
LRCK
DEMPH
/RESET
OUTL
OUTR
PWM logics (L)
PWM logics (R)
LR selector
MASH logics
4 time oversampling digital filter
Digital de-emphasis
S/P converter
Timing generator
COT1/ COT2
AVss L/R
DVss
AVDD L/R
WVEL
X1
X2
CSEL
DVDD
X1004 (16.9344MHz)
NJU3713D
IC602
LED DRIVE
D671 (MEMORY RESERVE OFF/ON)
+B8
Vss
VDD
MENU
Control circuit
CLR
STB
Shift register
Latch circuit
DATA
CLK
D1G ~D5G
D1E ~D5E
D601~605 (DISC1~DISC5)
/RSTSV
EXDATA
EXCLK
UPD78044A095
IC401
SYSTEM CONTROL & FL DRIVE
KEY IN1
KEYIN7
KEYOUT1
KEYOUT6
KEY MATRIX
S601~621, 631, 651~662, 671


LH5317Y1
IC1007
512K PROM
MB81426070PJ
IC1005/1009
4M DRAM
MN89101M
IC1004
MPEG VIDEO AUDIO DECODER
X1001
(40.5MHz)
MN6570TF
IC1013
D/A CONVERTER (VIDEO)
Current supply
Matrix cell
Weighted cell
Decoder
Latch
IDR
IOG
IOB
CLKR
CLKG
CLKB
M38002M2300F
IC1001
SUB MICROCOMPUTER
TC74HCT
-7007A
IC1003
BUFFER
AMP
LH5168N8
IC1002
64K SRAM
S401
(VIDEO
OUT)
NTSC
PAL
PAL
AUTO
UPD78044A095
IC401
SYSTEM CONTROL & FL DRIVE
REMOCON
RCDHC-278N
IC601
REMOTE CONTROL SENSOR


CXA1645M
IC1014
RGB ENCODER
MM1227XFF
IC1015
SIGNAL SELECTOR
+B3
Vcc1
Vcc2
CSYNCIN
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
SCSEL0
Q1001,1002
Switching
FSC
SWCNT
75Ω Driver
Vcc
GND
BIAS
CLAMP
Display character ROM
Shift register
Display control circuit
Port output control circuit
Display RAM
Reading output address control circuit
Blinking circuit
Synchronous separating circuit
Vss
VDD
Display control register
Display position det. circuit
AC
Data control circuit
Address control circuit
Timing generator
H counter
Synchronous signal select circuit
Input control circuit
Display OSC circuit
Polarity select circuit
SCK
SIN
/CS
OSC1
HOR
VERT
OCLK
/HSYNC
/VSYNC
M35040056FPT
IC1016
OSD
OSC
UPD78044A095
IC401
SYSTEM CONTROL & FL DRIVE
REST SW
VDD AVDD
Vss AVss
G1 ~ G8
S1 ~ S16
RESET
S701 (REST)
FL601
FL DISPLAY
Q401
Reset signal generator



• Signal line

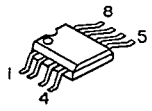
: Video CD (audio) signal

: Video CD (video) signal

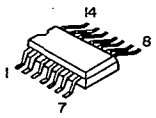
: CD-DA/Video CD signal

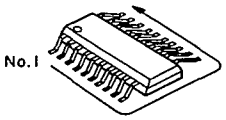
■TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

BA4558FDXT1
MM1227XFF



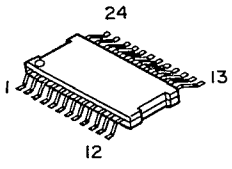
TC74HCT7007A



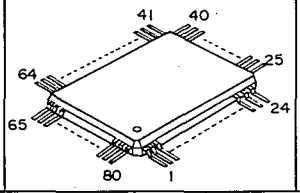


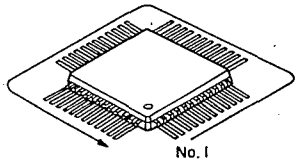
NJM2115MTE1	8 Pin	LH5168N8	28 Pin
TC4050BF	16 Pin	LH5317Y1	28 Pin
M35040056FPT	20 Pin	AN8802SCE1V	32 Pin
CXA1645M	24 Pin		
MN6475A-T1	24 Pin		

AN8389SE1



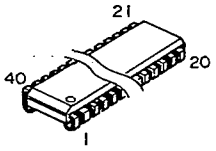
UPD78044A095



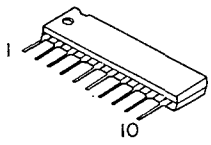


BU12102-0D	32 Pin
MN6570TF	44 Pin
M38002M2300F	64 Pin
MN662740RE	80 Pin
MN89101M	128 Pin

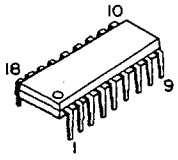
MB81426070PJ



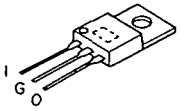
BA6247N



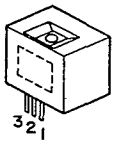
NJU3713D

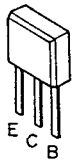


LM2940T5M



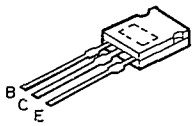
RCDHC-278N



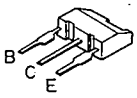


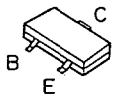
2SA1309AIQST
2SC3311AIQST
2SD1450RSTTA
UN4112TA
UN4114TA
UN4212TA
UN4214TA
UN4215TA

2SD2037EFTA



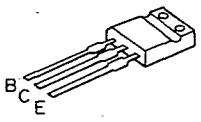
2SB1238QSTV6
2SD1862QRTV6



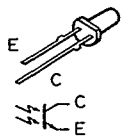


2SB709STX
2SD1328STTX
2SD1819QRSTX
UN5115TX

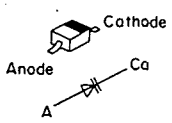
2SD2137PQTA



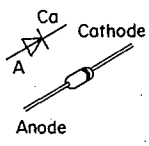
PT381



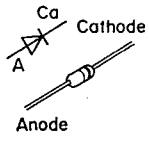
MA304TX



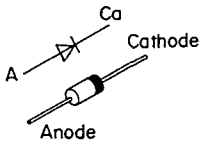
MA165TA

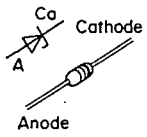


1SS291TA

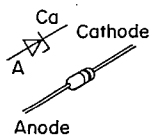


RL1N4003N02



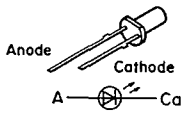


MA4039HTA
MA4051MTA
MA4056MTA
MA4062MTA
MA4068HTA
MA4082MTA
MA4091MTA

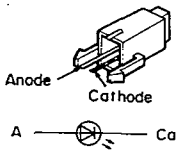


MA4100LTA
MA4110LTA
MA4270MTA

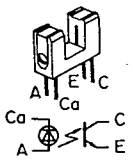
GL380



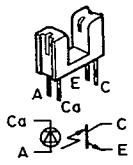
LN013304P
LN018304P



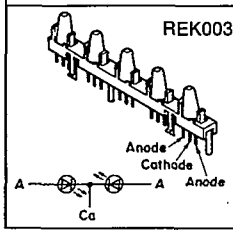
RSQGP1S53V



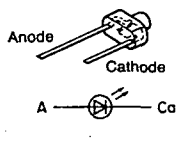
SG-206S



REK0033



SLR-325MC



■ SCHEMATIC DIAGRAM (Parts list on pages 78~80, 85~87.)

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

Note:

- **S401** : Video out switch.
- **S551** : Open/close detector switch.
- **S601** : Time mode (TIME MODE) switch.
- **S602** : Random mode (RANDOM MODE) switch.
- **S603** : Repeat (REPEAT) switch.
- **S604** : Resume (RESUME) switch.
- **S605** : ID scan (ID SCAN) switch.
- **S606** : Program mode (PROGRAM MODE) switch.
- **S607** : Stop (■) switch.
- **S608** : Pause (▮▮) switch.
- **S609** : Play (▶ SELECT) switch.
- **S610~S614** : Disc (DISC 1~5) switches. [S610: 1, S611: 2, S612: 3, S613: 4, S614: 5]
- **S615** : Disc skip (DISC SKIP) switch.
- **S616** : Return (↶RETURN) switch.
- **S617, 618** : Search (SEARCH) switches. [S617: ◀◀, S618: ▶▶]
- **S619, 620** : Skip (PREV NEXT) switches. [S619: I◀◀, S620: ▶▶I]
- **S621** : Loading drawer open/close (▲OPEN/CLOSE) switch.
- **S631** : Power "STANDBY ⏻ /ON" (POWER, STANDBY ⏻ ON) switch.
- **S651~S662** : Numeric (1~10, 0, > 10) switches. [S651: (1), S652: (2), S653: (3), S654: (4), S655: (5), S656: (6), S657: (7), S658: (8), S659: (9), S660: (10), S661: (> 10), S662: (0)]
- **S671** : Menu (MENU) switch.
- **S701** : Rest detector.

Caution!

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

- Cover the parts boxes made of plastics with aluminum 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.

- The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.

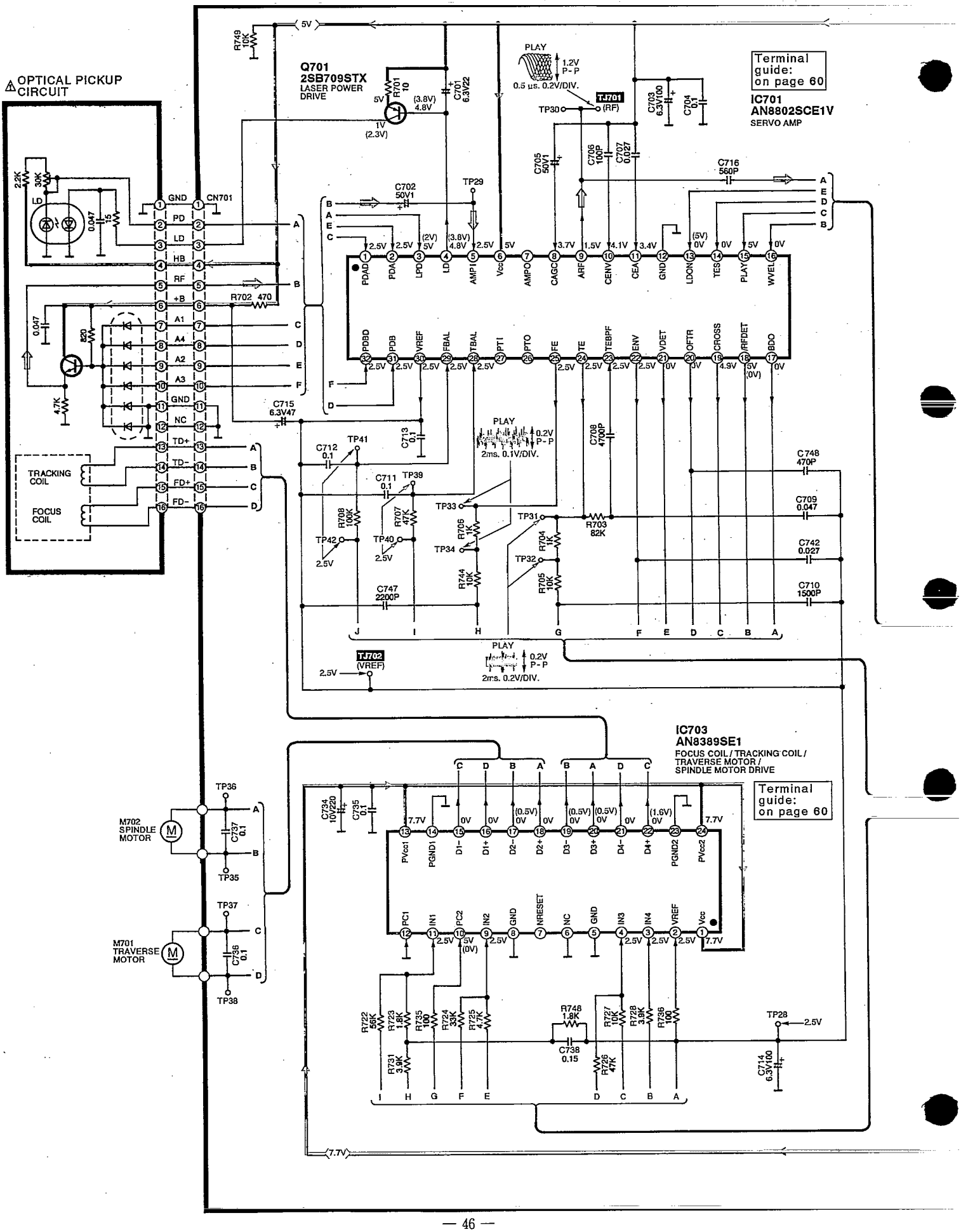
*The parenthesized are the values of voltage generated during playing (Video CD Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.

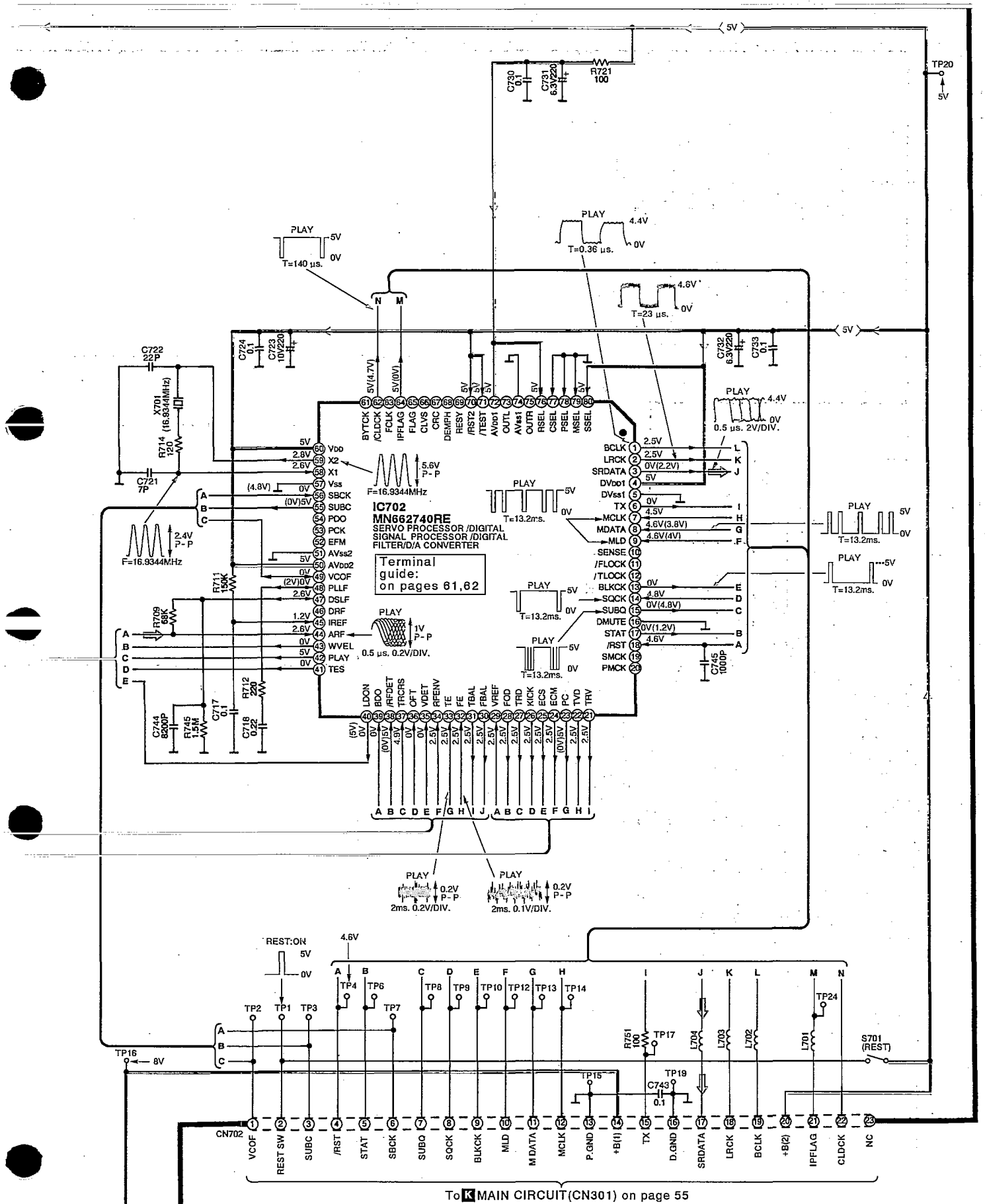
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used as occation calls. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
- The supply part number is described alone in the replacement parts.

Part No.	Production Part No.	Supply Part No.
IC11	LM2940T5M	LM2940T5
IC1008	NJM2115MTE1	NJM2115MT1

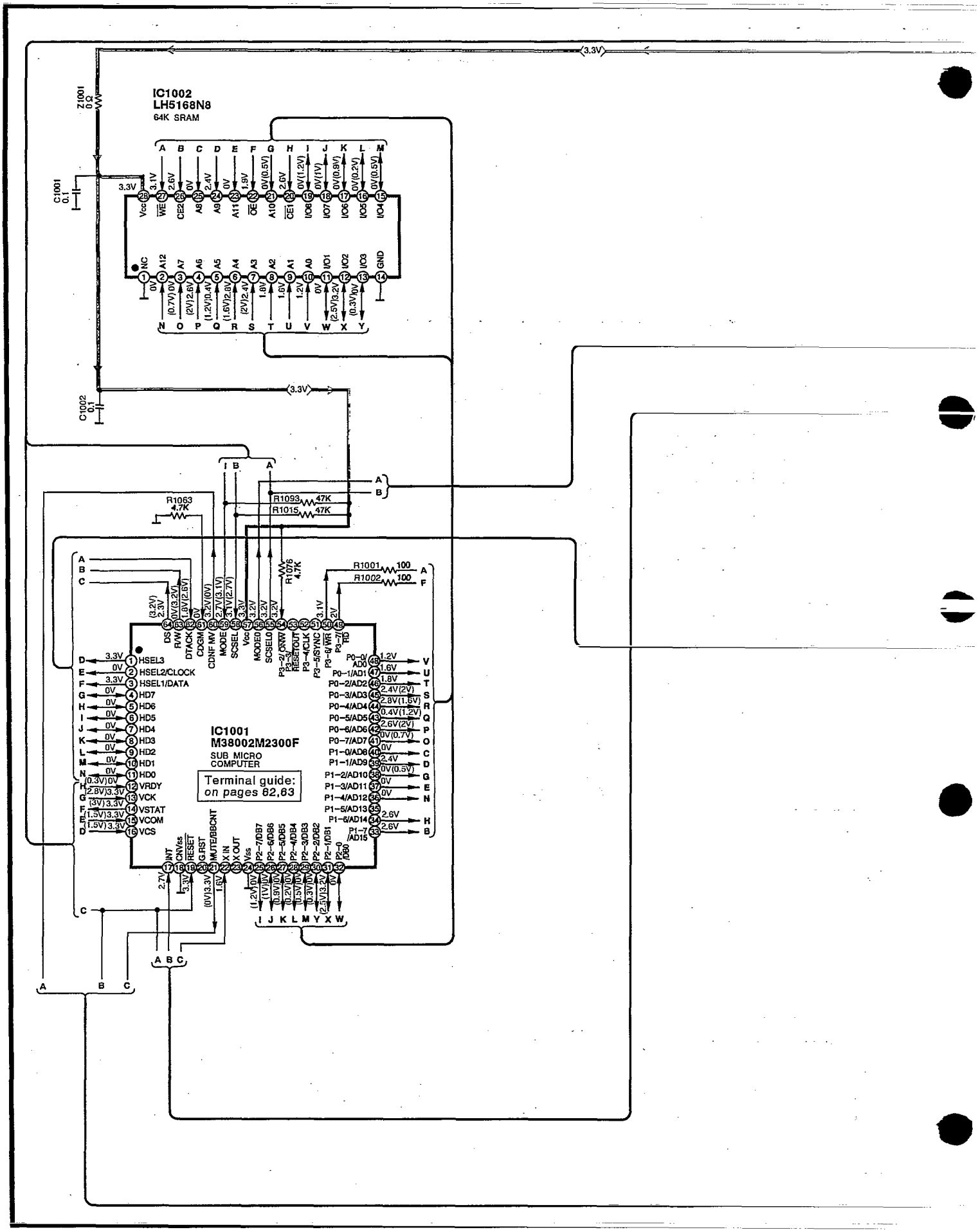
- Signal line
  ═══ / ═ ═ ═ : Positive voltage lines and negative voltage lines.
  ⇨ : Video CD (audio) signal
  ⇨ : Video CD (video) signal
  ⇨ : CD-DA/Video CD signal

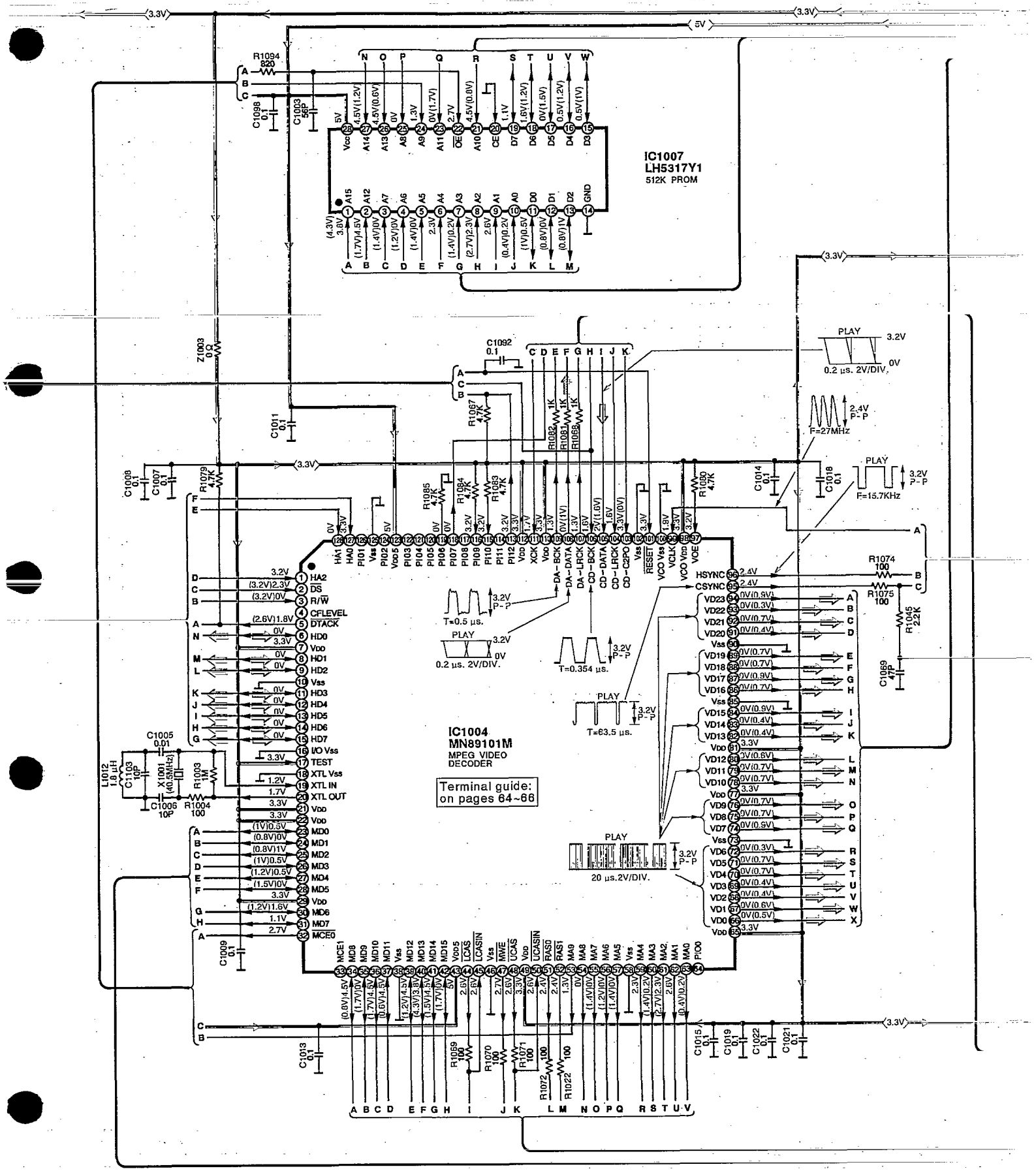
A SERVO CIRCUIT (P.C.Board:on page 72)



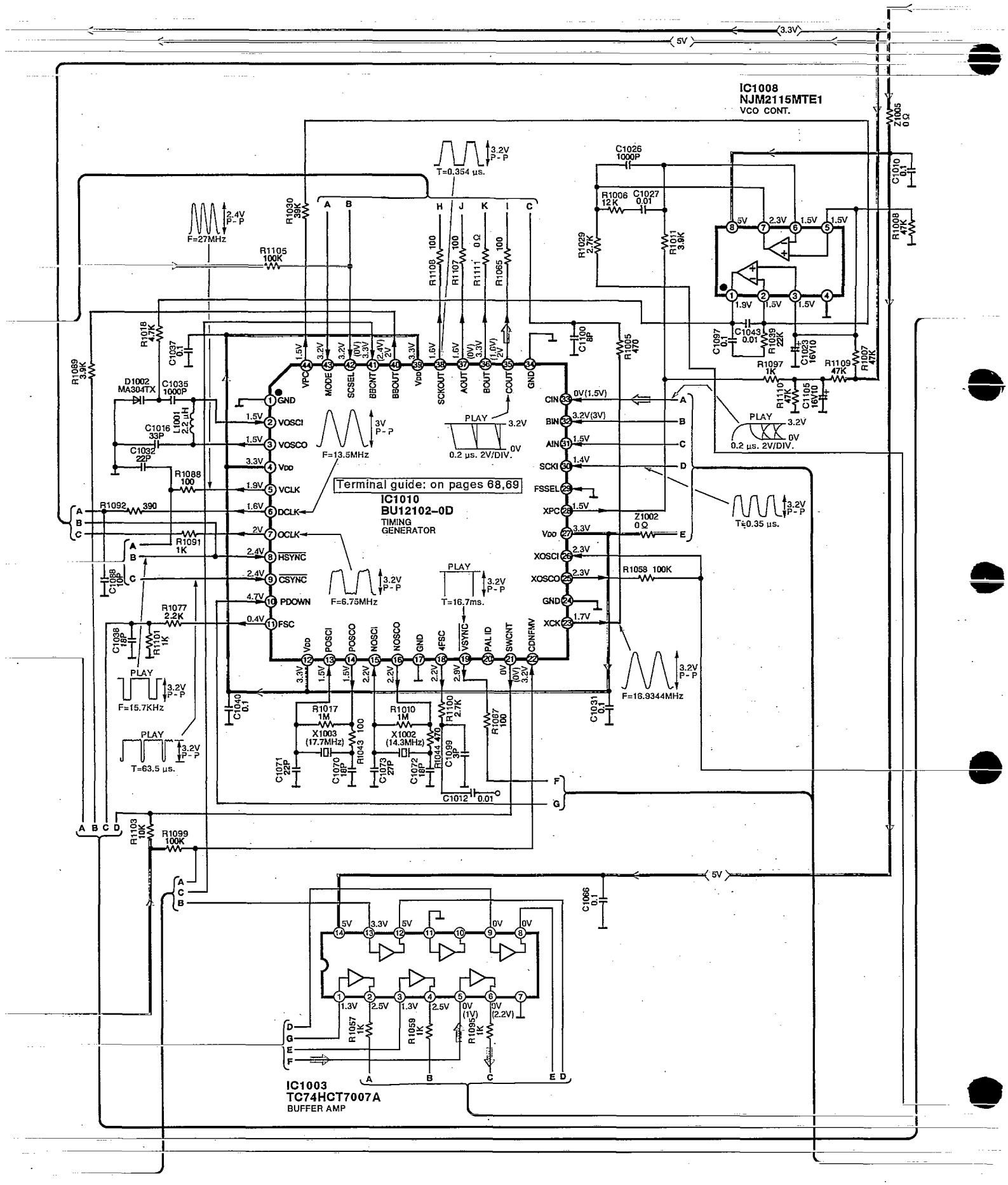

IC702
MN662740RE
SERVO PROCESSOR /DIGITAL SIGNAL PROCESSOR /DIGITAL FILTER/D/A CONVERTER
Terminal guide: on pages 61,62
X701 (16.9344MHz)
F=16.9344MHz
F=16.9344MHz
PLAY
T=140 µs.
T=0.36 µs.
T=23 µs.
T=13.2ms.
0.5 µs. 0.2V/DIV.
0.5 µs. 2V/DIV.
2ms. 0.2V/DIV.
2ms. 0.1V/DIV.
REST:ON
To K MAIN CIRCUIT(CN301) on page 55

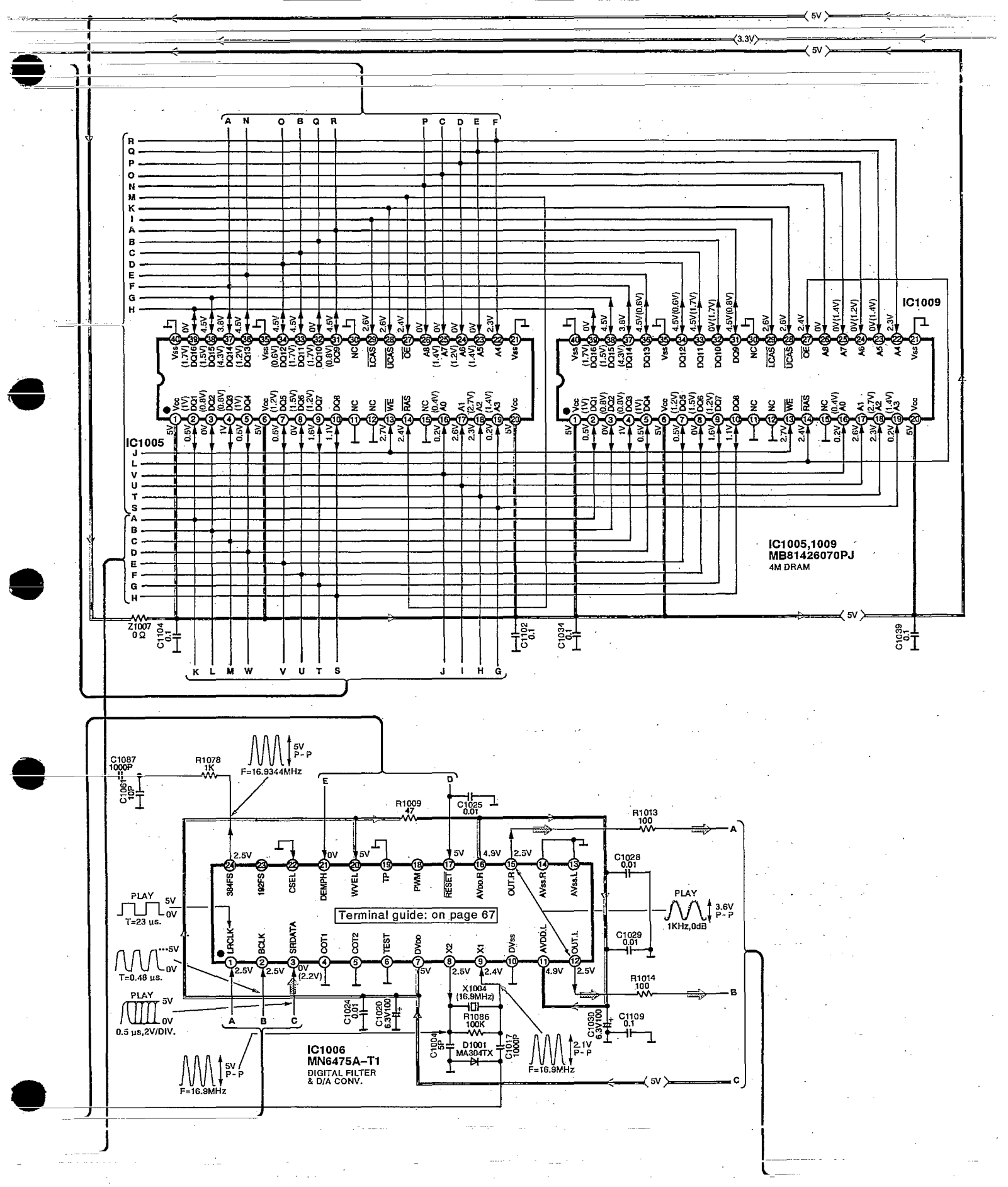
B VIDEO CIRCUIT (P.C.Board:on pages 73,74)



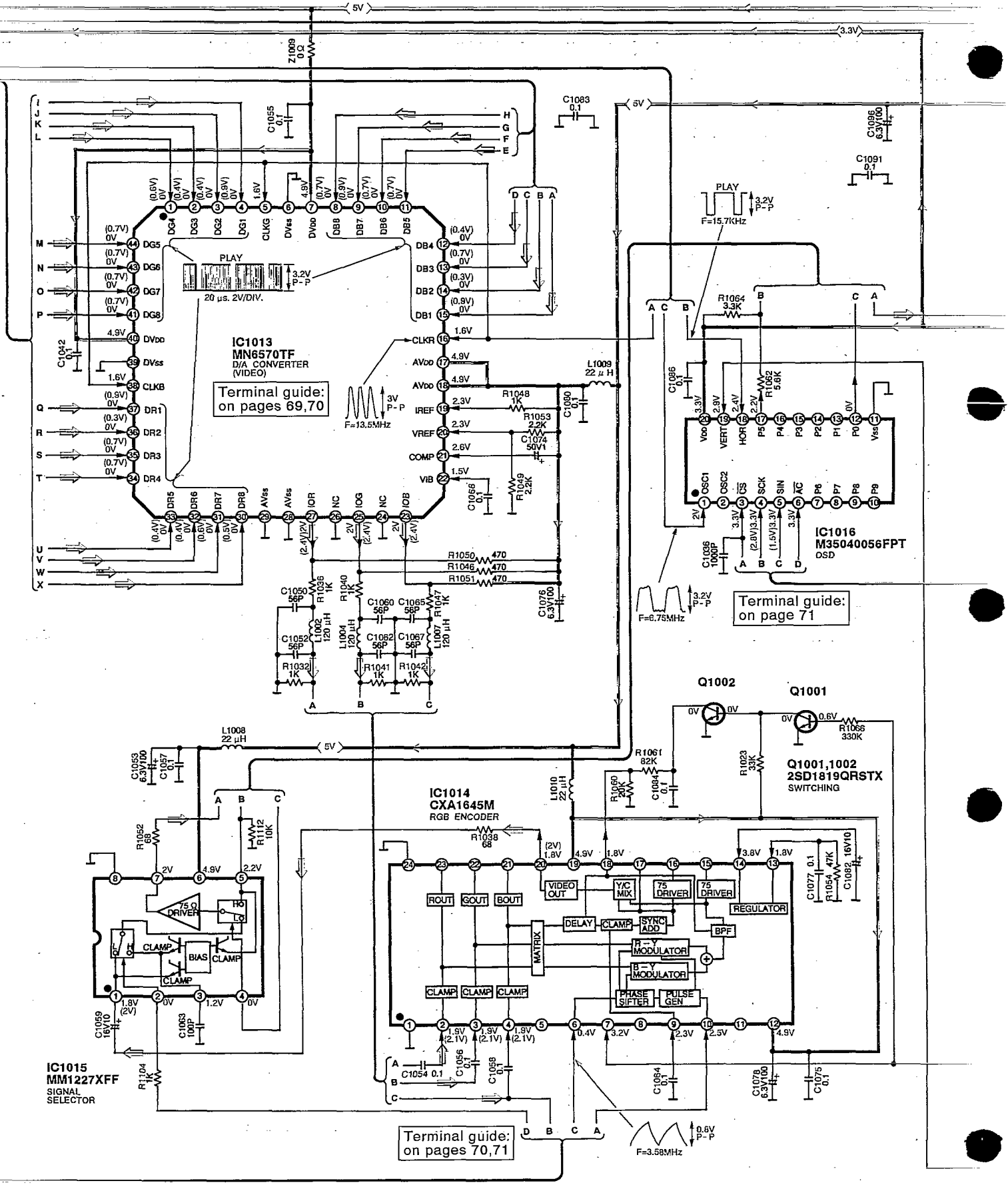

IC1007
LH5317Y1
512K PROM
IC1004
MN89101M
MPEG VIDEO
DECODER
Terminal guide:
on pages 64~66
PLAY
3.2V
0V
0.2 µs. 2V/DIV.
F=27MHz
2.4V P-P
F=15.7KHz
3.2V P-P
T=0.5 µs.
T=0.354 µs.
T=63.5 µs.
20 µs.2V/DIV.
3.3V
5V
HSYNC
CSYNC
R1094 820
C1098 0.1
C1003 56P
Z1003 0Ω
C1092 0.1
C1011 0.1
R1067 4.7K
R1082 1K
R1081 1K
R1068 1K
C1008 0.1
C1007 0.1
R1079 4.7K
R1085 4.7K
R1084 4.7K
R1083 4.7K
R1080 4.7K
C1014 0.1
C1018 0.1
R1074 100
R1075 100
R1045 22K
C1069 47P
C1005 0.01
L1012 1.8 µH
C1103 10P
X1001 (40.5MHz)
R1003 1M
C1006 10P
R1004 100
C1009 0.1
C1013 0.1
R1069 100
R1070 100
R1071 100
R1072 100
R1022 100
C1015 0.1
C1019 0.1
C1022 0.1
C1021 0.1

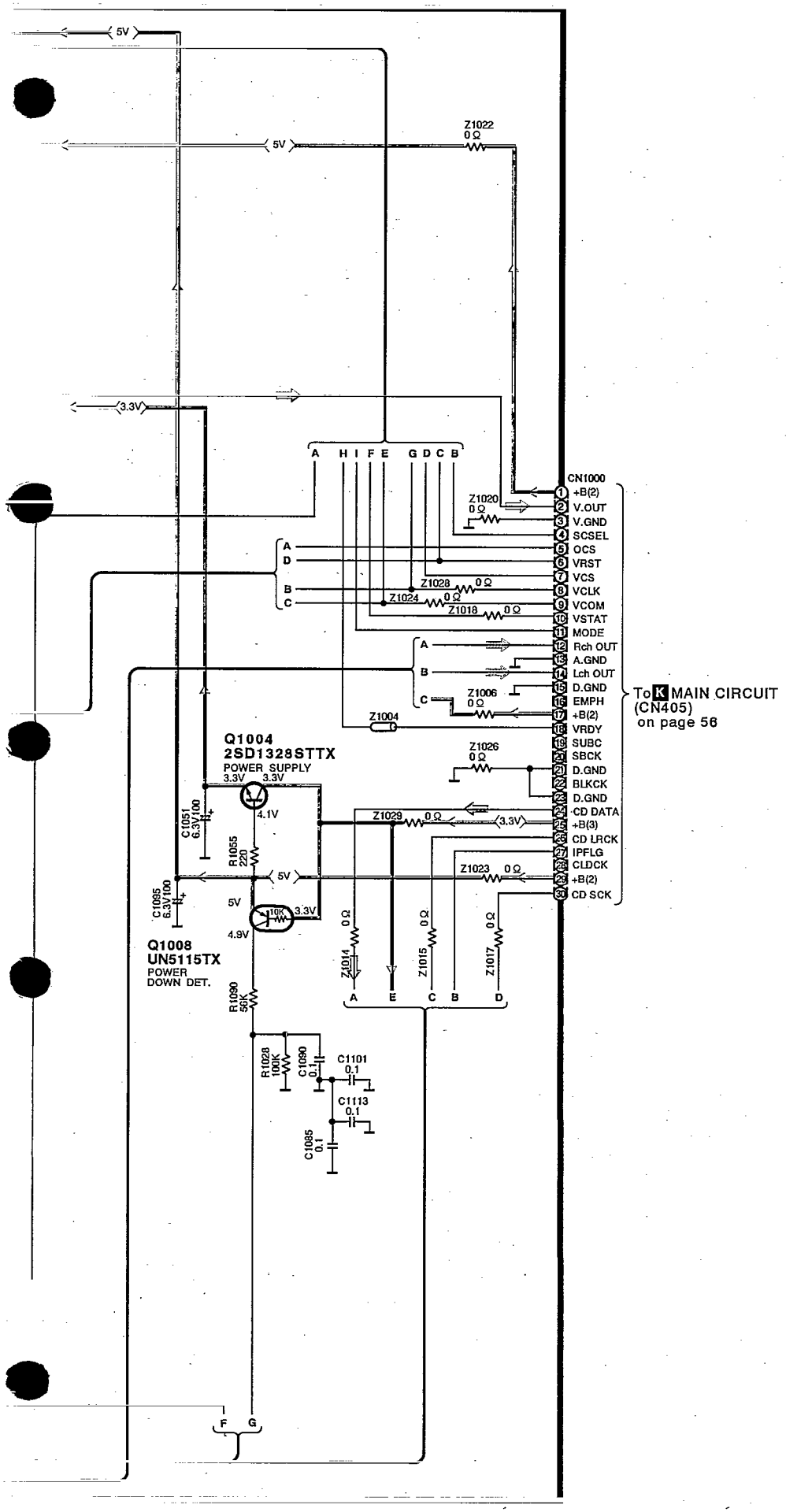
B VIDEO CIRCUIT (P.C.Board:on pages 73,74)



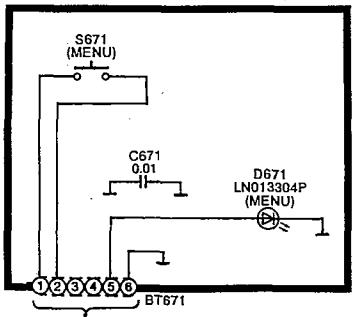

IC1005
IC1009
IC1005,1009
MB81426070PJ
4M DRAM
IC1006
MN6475A-T1
DIGITAL FILTER
& D/A CONV.
Terminal guide: on page 67
F=16.9344MHz
F=16.9MHz
X1004
(16.9MHz)
D1001
MA304TX
PLAY
T=23 µs.
T=0.48 µs.
0.5 µs,2V/DIV.
1KHz,0dB
3.6V
P-P
2.1V
P-P
5V
P-P
3.3V
5V

B VIDEO CIRCUIT (P.C.Board:on pages: 73,74)

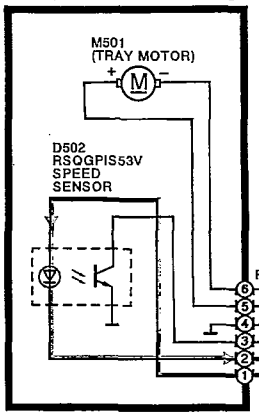



5V
5V
Z1022
0Ω
3.3V
A H I F E G D C B
CN1000
1 +B(2)
2 V.OUT
3 V.GND
4 SCSEL
5 OCS
6 VRST
7 VCS
8 VCLK
9 VCOM
10 VSTAT
11 MODE
12 Rch OUT
13 A.GND
14 Lch OUT
15 D.GND
16 EMPH
17 +B(2)
18 VRDY
19 SUBC
20 SBCK
21 D.GND
22 BLKCK
23 D.GND
24 CD DATA
25 +B(3)
26 CD LRCK
27 IPFLG
28 CLDCK
29 +B(2)
30 CD SCK
Z1020
Z1028
Z1024
Z1018
Z1006
Z1004
Z1026
Z1029
Z1023
To K MAIN CIRCUIT
(CN405)
on page 56
Q1004
2SD1328STTX
POWER SUPPLY
3.3V
4.1V
C1051
6.3V100
R1055
220
C1095
6.3V100
Q1008
UN5115TX
POWER
DOWN DET.
4.9V
10K
R1090
56K
Z1014
Z1015
Z1017
R1028
100K
C1090
0.1
C1101
0.1
C1113
0.1
C1085
0.1
F G

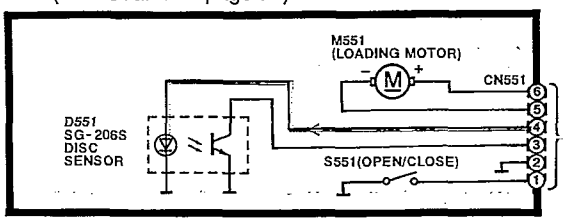
C SWITCH CIRCUIT
(P.C. Board: on page 75)



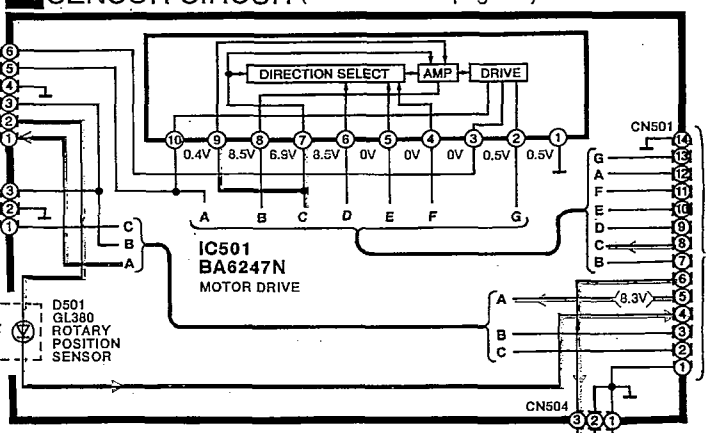
D TRAY MOTOR CIRCUIT
(P.C. Board: on page 75)



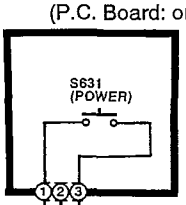
F LOADING MOTOR CIRCUIT
(P.C. Board: on page 75)



G SENSOR CIRCUIT (P.C. Board: on page 76)

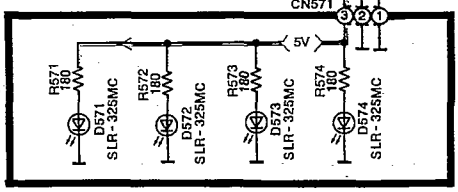


E POWER SWITCH CIRCUIT
(P.C. Board: on page 75)

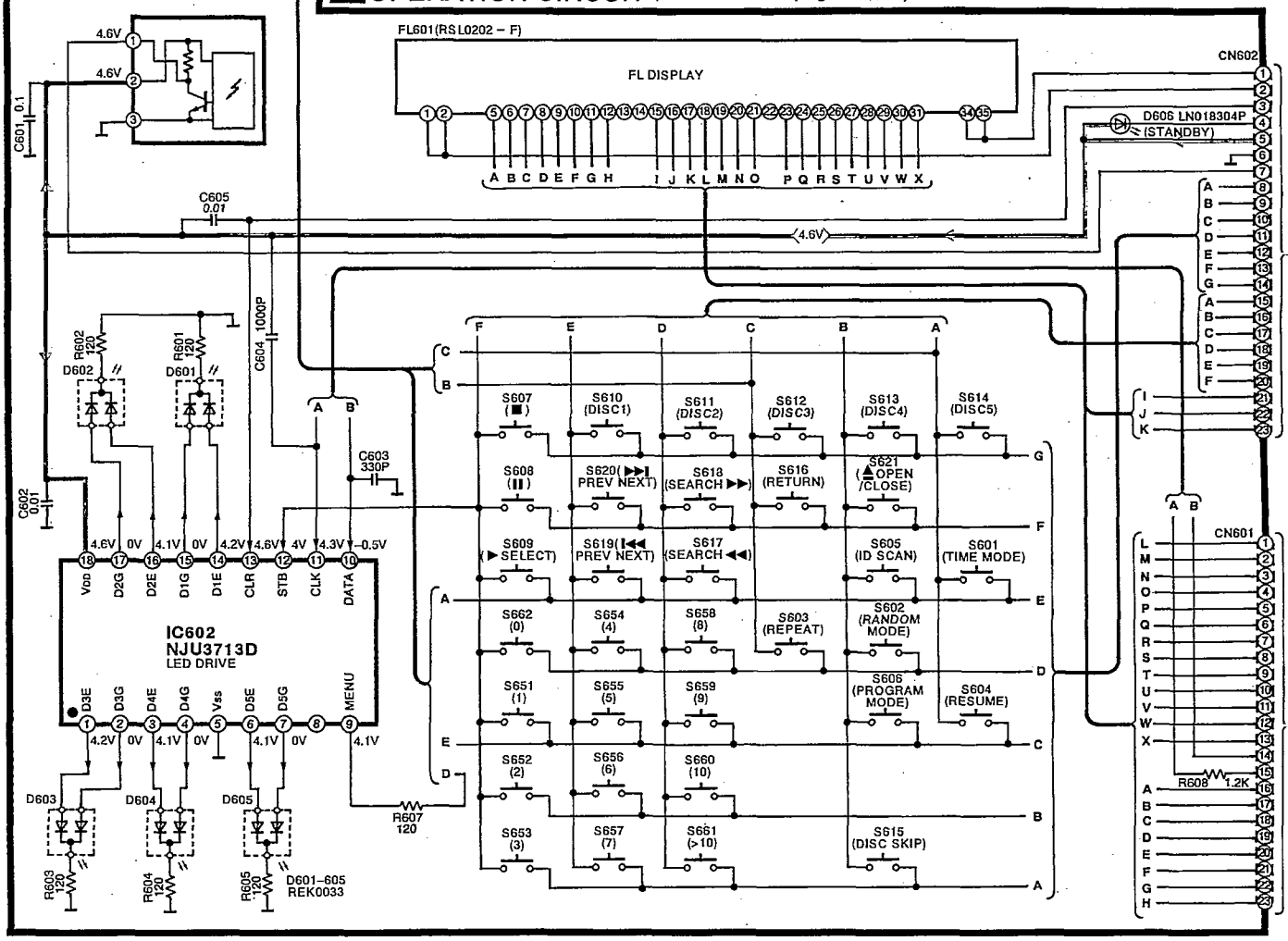


H PHOTO TRANSISTOR CIRCUIT
(P.C. Board: on page 76)

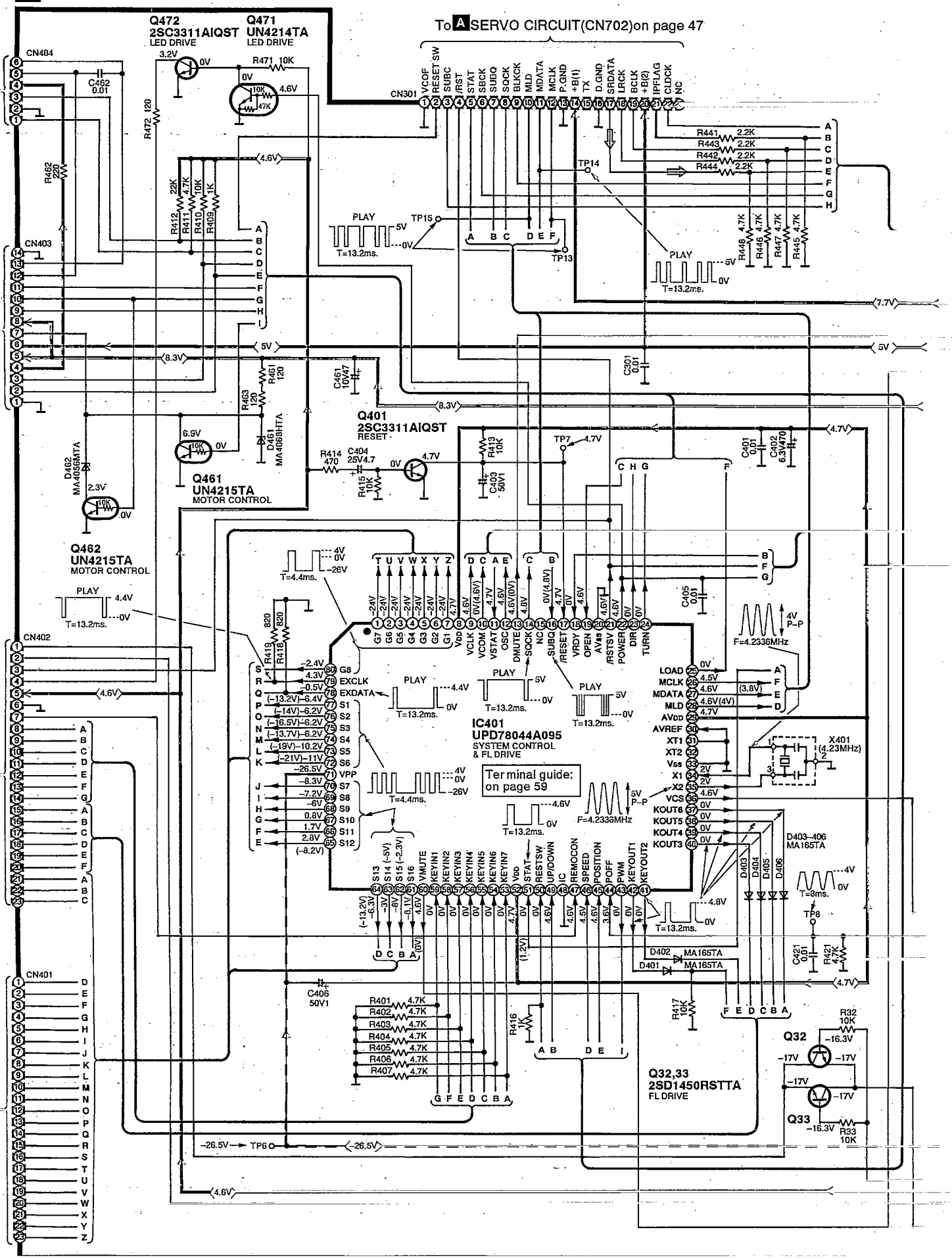
I LED CIRCUIT
(P.C. Board: on page 75)



J OPERATION CIRCUIT (P.C. Board: on pages 75,76)

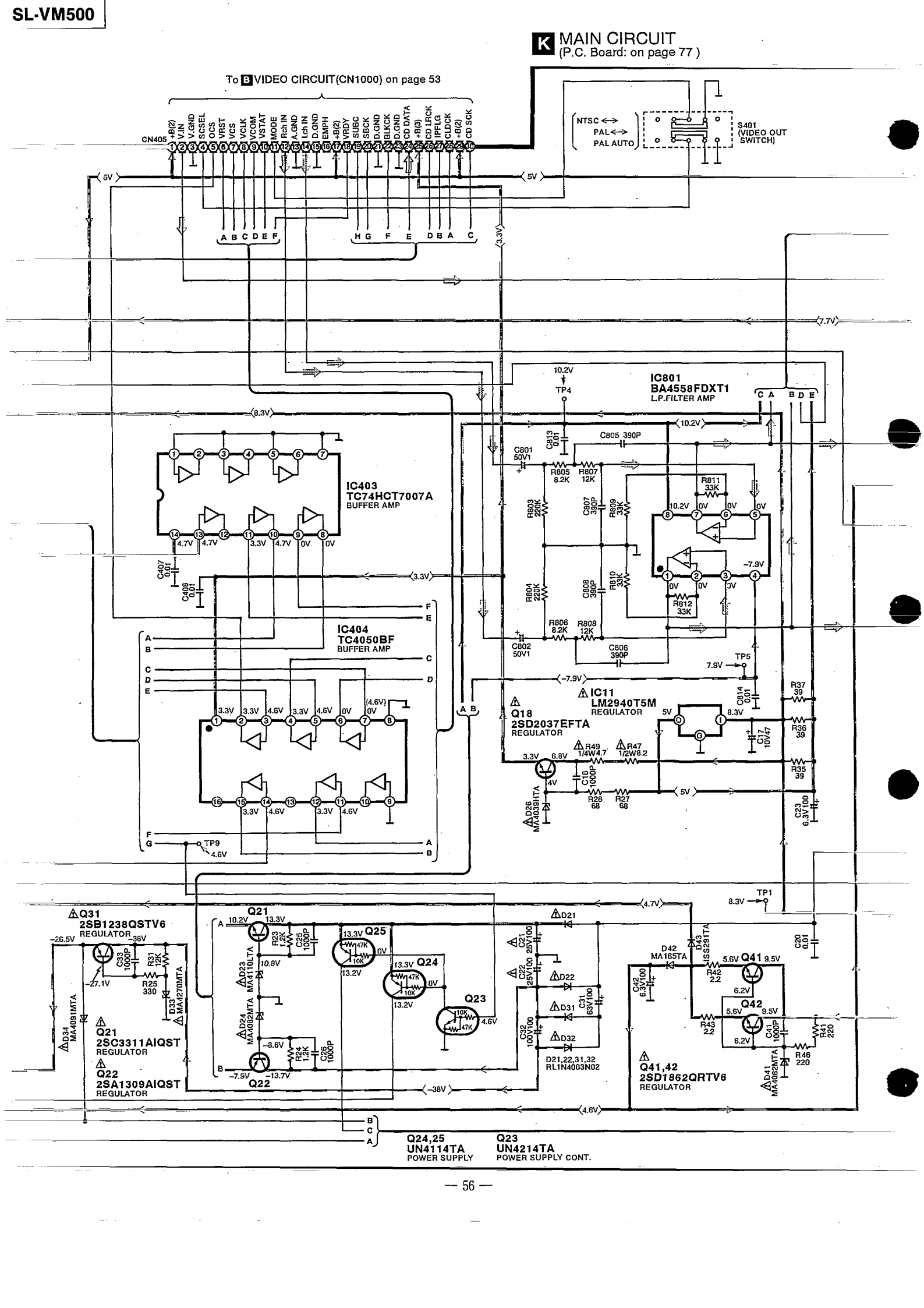


K MAIN CIRCUIT (P.C. Board: on page 77)

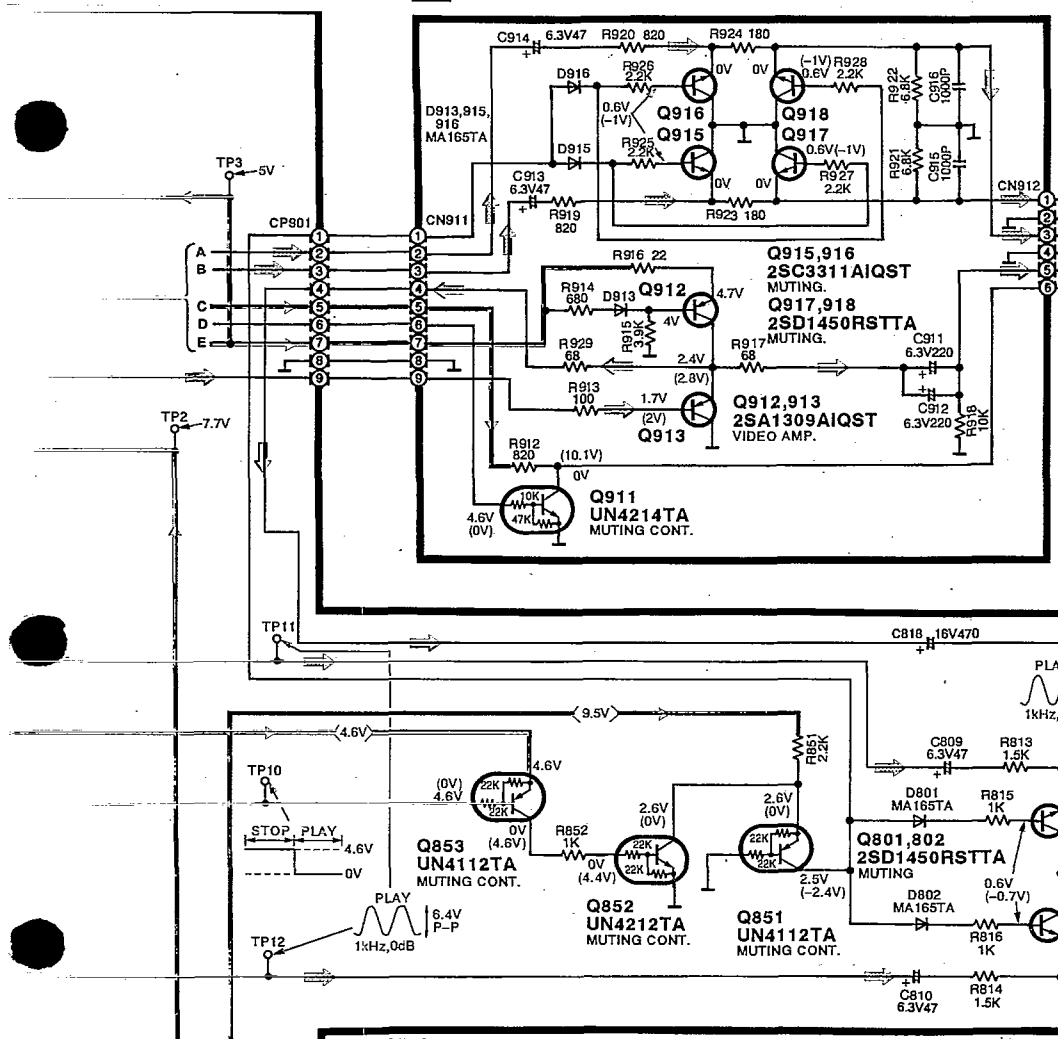


K MAIN CIRCUIT
(P.C. Board: on page 77)

To B VIDEO CIRCUIT(CN1000) on page 53

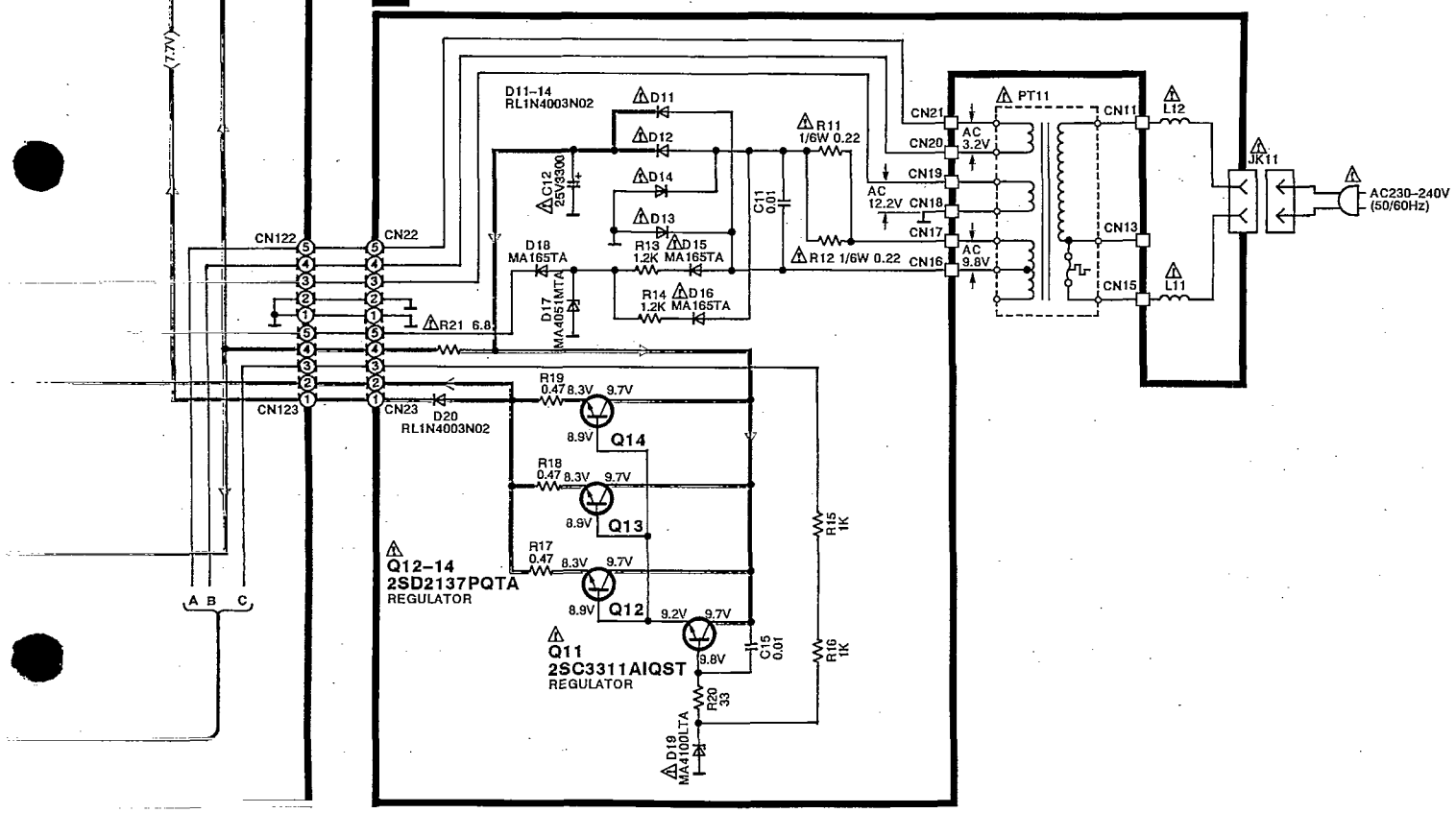


L VIDEO AMP CIRCUIT (P.C. Board: on page 76)

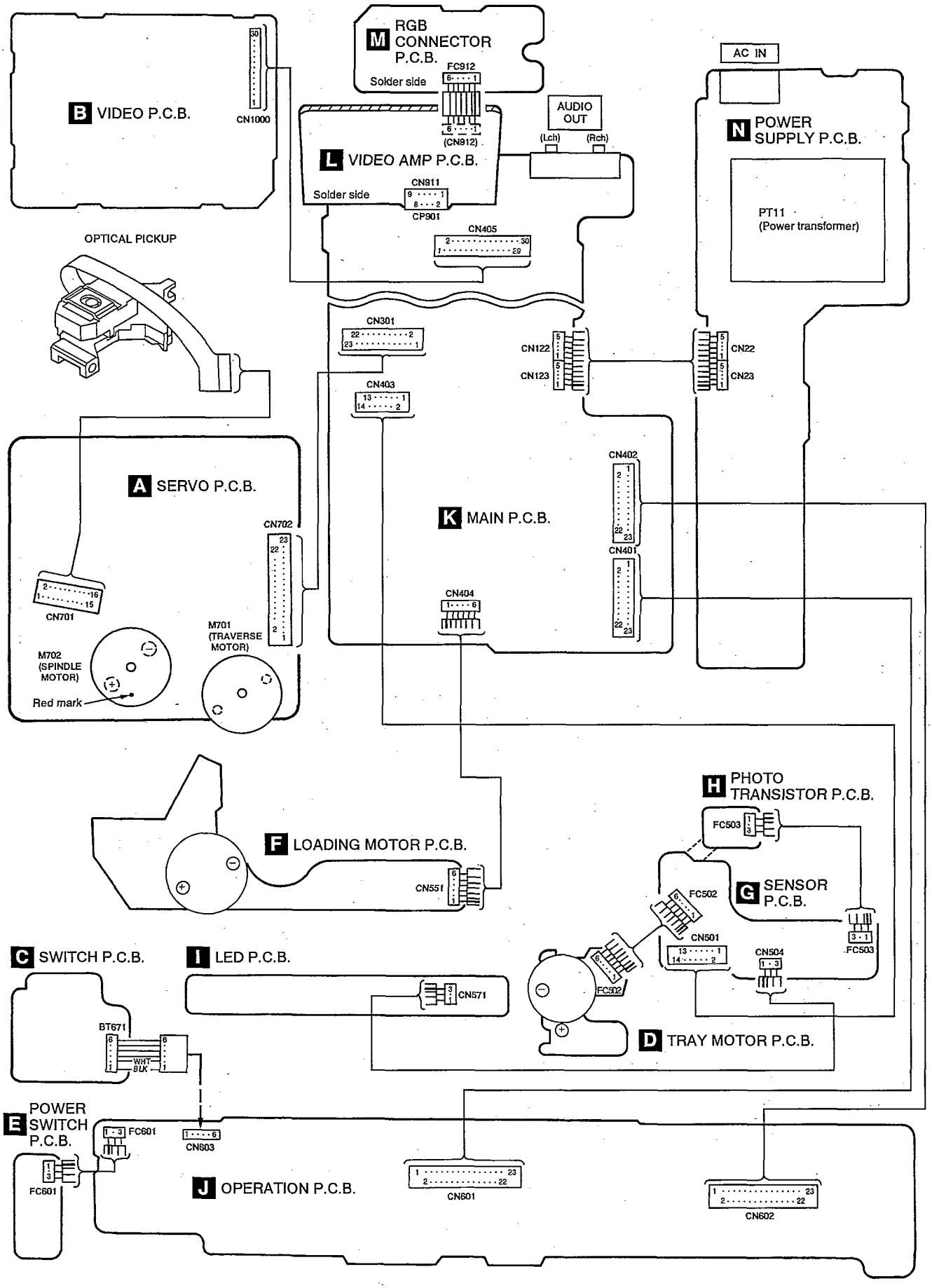


M RGB CONNECTOR CIRCUIT (P.C. Board: on page 76)

N POWER SUPPLY CIRCUIT (P.C. Board: on page 72)



WIRING CONNECTION DIAGRAM



■TERMINAL GUIDE

• IC401 (UPD78044A095): System control & FL drive

Pin No.	Mark	I/O Division	Function
1 ⟆ 7	G7 ⟆ G1	O	Grid signal of FL display
8	VDD	I	Power supply terminal
9	VCLK	O	Video Clock output
10	VCOM	O	Command data output
11	VSTAT	I	Status signal input
12	OSC	O	Chip Select signal output
13	DMUTE	O	Muting control signal
14	SQCK	O	Sub-code Q register clock
15	NC	—	Not connected
16	SUBQ	I	Sub-code Q data
17	/RESET	I	Reset signal input
18	VRDY	O	Ready signal output
19	OPEN	I	Open detect terminal
20	AVSS	—	GND terminal
21	/RSTSV	O	Reset signal output
22	POWER	O	Power ON/OFF output terminal
23	DIR	O	Motor control signal
24	TRUN	O	
25	LOAD	O	Motor control signal
26	MCLK	O	Command clock signal
27	MDATA	O	Command data signal
28	MLD	O	Command load signal ("L" LOAD)
29	AVDD	I	Power supply terminal
30	AVREF	I	Power supply terminal
31	XT1	—	Not used, connected to GND

Pin No.	Mark	I/O Division	Function
32	XT2	—	Not used, open
33	VSS	—	GND terminal
34	X1	I	Crystal Osc terminal (F: 4.2336MHz)
35	X2	O	
36	VSC	O	Chip Select signal output
37 ⟆ 42	KEYOUT 6 ⟆ KEYOUT 1	O	Key scan signal
43	PWM	O	Motor control signal
44	POFF	I	Power det. terminal
45	POSITION	I	Rotary tray position det. terminal
46	SPEED	I	Loading motor speed sensor signal
47	REMOCON	I	Remote control signal input
48	IC	—	Not used, connected to GND
49	UP/DOWN	I	Traverse deck up/down det. terminal
50	RESTSW	I	Rest position det. terminal
51	STAT	I	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
52	VDD	I	Power supply terminal
53 ⟆ 59	KEYIN 7 ⟆ KEYIN 1	I	Key return signal
60	VMUTE	O	Video muting control terminal
61 ⟆ 70	S16 ⟆ S7	O	Segment signal of FL display
71	VPP	I	Power supply terminal
72 ⟆ 77	S6 ⟆ S1	O	Segment signal of FL display
78	EXDATA	O	Serial data signal
79	EXCLK	O	Serial clock signal
80	G8	O	Grid signal of FL display

• IC701 (AN8802SCE1V): Servo amp

Pin No.	Mark	I/O Division	Function
1	PDAD	I	Photo detector Bch input without delay
2	PDA	I	Photo detector Ach input without delay
3	LPD	I	Laser PD signal
4	LD	O	Laser power auto control output
5	AMPI	I	RF amp terminal
6	V_{CC}	I	Power supply terminal
7	AMPO	O	RF amp signal (Not used, open)
8	CAGC	I	AGC detection capacitor input
9	ARF	O	RF signal
10	CENV	I	RF detect capacitor connection terminal
11	CEA	I	HPF-AMP capacitor connection terminal
12	GND	—	GND terminal
13	LDON	I	LD APC ON/OFF ("H": ON, "L": OFF)
14	TES	I	Tracking error shunt input ("H": shunt)
15	PLAY	I	Play signal ("H": ON, "L": OFF)
16	WVEL	I	Double velocity ("H": double, "L": single)

Pin No.	Mark	I/O Division	Function
17	BDO	O	Dropout detection control
18	/RFDET	O	RF det. signal ("L": det.)
19	CROSS	O	Tracking error zero cross output
20	OFTR	O	Off track detection ("H": det.)
21	VDET	O	Oscillation det. signal ("H": det.)
22	ENV	O	Envelope output terminal
23	TEBPF	I	Oscillation detect input terminal
24	TE	O	Tracking error signal
25	FE	O	Focusing error signal
26	PTO	O	Potention amp output (Not used, open)
27	PTI	I	Potention amp input (Not used, open)
28	TBAL	I	Tracking balance adj. input
29	FBAL	I	Focus balance adj. input
30	VREF	O	Reference voltage output
31	PDB	I	Photo detector Ach input with delay
32	PDBD	I	Photo detector Bch input with delay

• IC703 (AN8389SE1): Focus coil/tracking coil/traverse motor/spindle motor drive

Pin No.	Mark	I/O Division	Function
1	V_{CC}	I	Power supply terminal
2	VREF	I	Reference voltage input
3	IN4	I	Motor driver (4) input
4	IN3	I	Motor driver (3) input
5	GND	—	GND terminal
6	NC	—	Not used, connected to GND
7	NRESET	O	Reset terminal (Not used, open)
8	GND	—	GND terminal
9	IN2	I	Motor driver (2) input
10	PC2	I	PC2 (power cut) input
11	IN1	I	Motor driver (1) input
12	PC1	I	PC1 (power cut) input (Not used, connected to GND)

Pin No.	Mark	I/O Division	Function
13	$PV_{CC}1$	I	Driver power supply (1)
14	PGND1	—	Driver GND terminal (1)
15	D1−	O	Motor driver (1) output terminal (−)
16	D1+	O	Motor driver (1) output terminal (+)
17	D2−	O	Motor driver (2) output terminal (−)
18	D2+	O	Motor driver (2) output terminal (+)
19	D3−	O	Motor driver (3) output terminal (−)
20	D3+	O	Motor driver (3) output terminal (+)
21	D4−	O	Motor driver (4) output terminal (−)
22	D4+	O	Motor driver (4) output terminal (+)
23	PGND2	—	Driver GND terminal (2)
24	$PV_{CC}2$	I	Driver power supply (2)

• IC702 (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	O	Digital audio interface signal
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	/RST	I	Reset signal ("L": reset)
19	SMCK	O	System clock (f=4.2336MHz)
20	PMCK	O	Frequency division clock signal ($f=\frac{1}{1.92}\times ck=88.2kHz$)
21	TRV	O	Traverse servo control
22	TVD	O	Traverse drive signal
23	PC	O	Turntable motor drive signal ("L": ON)
24	ECM	O	Turntable motor drive signal (Forced mode)
25	ECS	O	Turntable 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	OFT	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	O	Double velocity status signal ("H": double)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias terminal (Not used, open)
47	DSLF	I/O	DSL loop filter terminal
48	PLLF	I/O	PLL loop filter terminal
49	VCOF	I/O	VCO loop filter terminal (Not used, connected to GND)
50	$AV_{DD}2$	I	Power supply (analog circuit) terminal (2)
51	$AV_{SS}2$	—	GND (analog circuit) terminal
52	EFM	O	384fs (16.9344MHz) output (Not used, open)
53	PCK	—	PLL extract clock (f=4.3218MHz) (Not used, open)
54	PDO	—	Tracking servo OFF signal (Not used, open)
55	SUBC	O	Sub-code serial output data
56	SBCK	I	Sub-code serial input clock
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	BYTCK	O	Traverse motor stop control terminal (Not used, open)

Pin No.	Mark	I/O Division	Function
62	/CLDCK	O	Sub-code frame clock signal (f CLDCK=7.35kHz: Normal)
63	FCLK	O	Crystal frame clock (Not used, open)
64	IPFLAG	O	Interpolation flag terminal
65	FLAG	—	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	DEMPH	—	DE-emphasis ON signal ("H": ON) (Not used, open)
69	RESY	O	Flag terminal (Not used, open)
70	/RST2	I	Not used, connected to power supply

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

• IC1001 (M38002M2300F): Sub-Micro computer

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 (IC401) 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 (IC401) with status data
15	VCOM	I	Command data input	Receives command data from the system controller (IC401)
16	VCS	I	Chip select signal input	Transferred from the system controller (IC401)
17	INT	I	Soft Interrupt signal output	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 (IC401)
20	G. RST	O	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	VSS	—	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	O	——	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	MODEO / SCSELO: PAL 60 = H / L; PAL = L / L; NTSC = — / H *When SCSELO is High, NTSC is selected no matter whether MODEO is High or Low
56	MODE0	O		
57	VCC	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	——	Not used connected to resistor
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 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	R/$\overline{W}$	I	Read/Write signal input	Read/write signal Low=read, High=write
4	CFLEVEL	—	——	Not used, open
5	$\overline{DTACK}$	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	VDD	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	VDD	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) and ROM (IC1007). Data used to control MPEG (IC1004) is transferred from ROM, while video data with CD-ROM format comes from DRAM
29	VDD	I	Power supply terminal	3.3V
30	MD6	I/O	DRAM/ROM data I/O lines	Used exchange data with DRAM (IC1009) and ROM (IC1007)
31	MD7			
32	$\overline{MCE0}$	I/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) 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) and ROM (IC1007)
43	$V_{DD}5$	I	Power supply terminal	4.7V

Pin No.	Mark	I/O Division	Function description	Remarks
44	$\overline{\text{LCAS}}$	O	DRAM LCAS/ROM address output	Lower address/data command output for DRAM (IC1009)
45	$\overline{\text{LCAS IN}}$	I	DRAM LCAS input	Lower address/data command intput for DRAM (IC1009)
46	V_{SS}	—	GND terminal	0V
47	$\overline{\text{MWE}}$	O	DRAM Write Enable signal output	Low writes to IC1009. High reads from IC1009
48	$\overline{\text{UCAS}}$	O	DRAM UCAS/ROM address output	Higher address/data command output for DRAM (IC1009)
49	V_{DD}	I	Power supply terminal	3.3V
50	$\overline{\text{UCAS IN}}$	I	DRAM UCAS input	Higher address/data command intput for DRAM (IC1009)
51	$\overline{\text{RAS0}}$	O	DRAM RAS0 output	Higher address output for DRAM (IC1009)
52	$\overline{\text{RAS1}}$	O	DRAM RAS1 output	Not used, open
53 ∫ 57	MA9 ∫ MA5	O	DRAM/ROM address output	Address output for DRAM (IC1009)
58	V_{SS}	—	GND terminal	0V
59 ∫ 63	MA4 ∫ MA0	O	DRAM/ROM address output	Address output for DRAM (IC1009)
64	PIO 0	—	——	Not used, open
65	VDD	I	Power supply terminal	3.3V
66 ∫ 72	VD0 ∫ VD6	O	Video data output (red)	Video data output (red) to VDAC (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 VDAC (IC1013)
77	VDD	I	Power supply terminal	3.3V
78 ∫ 80	VD10 ∫ VD12	O	Video data output (Green)	Video data output (green) to VDAC (IC1013)
81	VDD	I	Power supply terminal	3.3V
82 ∫ 84	VD13 ∫ VD15	O	Video data output (Green)	Video data output (green) to VDAC (IC1013)
85	V_{SS}	—	GND terminal	0V
86 ∫ 89	VD16 ∫ VD19	O	Video data output (blue)	Video data output (blue) to VDAC (IC1013)
90	V_{SS}	—	GND terminal	0V
91 ∫ 94	VD20 ∫ VD23	O	Video data output (blue)	Video data output (blue) to VDAC (IC1013)
95	CSYNC	O	Composite Sync. signal output	Output to the timing generator (IC1010) and RGB encoder (IC1014) (F=15.7kHz)

Pin No.	Mark	I/O Division	Function description	Remarks
96	HSYNC	O	Horizontal Sync. signal output	Output to the timing generator (IC1010) and OSD (IC1016) (F=15.7kHz)
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	$\overline{\text{RESET}}$	I	Reset signal input	Active low reset signal from the system controller (IC401)
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)
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=2.822MHz (T=0.354µs)
109	DA-BCK	O	Audio bit clock output	 F=2MHz (T=0.5µs)
110	VDD	—	Power supply terminal	3.3V
111	XCK	I	Audio read clock input	 F=16.9344MHz (T=0.059µs)
112	VDD	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	VDD5	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

• IC1006 (MN6475A-T1): Digital filter and D/A converter

Pin No.	Mark	I/O Division	Function description	Remarks
1	LRCLK	I	Left/right channel discrimination selection	Left channel: H Right channel: L
2	BCLK	I	Bit clock input for serial data	Clock signal from MPEG video decoder (IC1004)
3	SRDATA	I	Serial data input	Data signal from MPEG video decoder (IC1004)
4	COT1	O	Signal selection (Not used connected to GND)	COT1 / COT2 / Selection signal L / L / Normal, stereo output L / H / Left channel output H / L / Right channel output H / H / Reversed left and right channel outputs
5	COT2	O		
6	TEST	—	Test terminal	Normally L (connected to ground)
7	DV_{DD}	I	Digital system power supply	5V
8	X2	O	External clock input/output	 F=16MHz
9	X1	I		
10	DV_{SS}	—	Digital system ground	0V
11	$AV_{DD}L$	I	Left channel analog system power supply	5V
12	OUTL	O	Left channel analog signal output	Audio signal
13	$AV_{SS}L$	—	Left channel analog system ground	0V
14	$AV_{SS}R$	—	Right channel analog system ground	0V
15	OUTR	O	Right channel analog signal output	Audio signal
16	$AV_{DD}R$	I	Right channel analog system power supply	5V
17	$\overline{RESET}$	I	Reset input	Reset on: L
18	PWM	O	Output for testing LSI	Not used and open
19	TP	—	Output for testing LSI	Connected to ground
20	WVEL	I	Internal operation mode switching	Connected to power supply
21	DEMPH	I	Digital de-emphasis on/off	De-emphasis on: H
22	CSEL	I	Clock output frequency selection (for COUT terminal)	Frequency-divides external clock signal 1/4 frequency-division: L 1/2 frequency-division: H
23	192FS	O	Frequency-division clock output (192Fs)	Not used and open
24	384FS	O	External clock output	Clock signal for timing generator (IC1010) (384Fs=16.9344MHz)

• IC1010 (BU12102-OD): 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	VDD	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)
9	$\overline{\text{CSYNC}}$	I	Composite Sync. signal input	F=15.7kHz (T=63.5µs)
10	PDOWN	I	Power Down signal input	Active low selects power down mode
11	FSC	O	Subcarrier signal output	Subcarrier signal output to the OSC (IC1016) (F=3.58MHz)
12	VDD	I	Power supply terminal	3.3V
13	POSCI	I	Crystal OSC circuit input	Not used, connected to resistor
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)
19	$\overline{\text{VSYNC}}$	O	Vertical Sync. signal output	Vertical Sync. signal output to the OSC (IC1016)
20	PALID	O	——	Not used, open
21	SWCNT	O	Switch Control signal output	Signal output to the switch IC (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	VDD	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	I	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)

Pin No.	Mark	I/O Division	Function description	Remarks
32	BIN	I	Data Error Flag signal input	Accepts a flag signal when serial data error is uncorrectable
33	CIN	I	Serial data input	Serial data from the servo processor (IC702)
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	VDD	I	Power supply terminal	3.3V
40	BBOUT	O	Blue back output	Applied to analog blue data input of RGB encoder
41	BBCNT	I	Blue back control signal input	Control signal from the sub-CPU. 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 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 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)

Pin No.	Mark	I/O Division	Function description	Remarks
24	NC	—	Not connected	Connected to ground
25	IOG	O	Analog RGB (green) output	RGB signal for RGB encoder (IC1014)
26	NC	—	Not connected	Connected to ground
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 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 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 VDAC (IC1013)
3	GIN	I	Analog RGB (green) input	RGB signal from VDAC (IC1013)
4	BIN	I	Analog RGB (blue) input	RGB signal from VDAC (IC1013)
5	NC	—	Not connected	——
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	O	Output for BF pulse monitor	Not used and open
9	YCLPC	I	Y signal clamp time constant	0.1μF capacitor connected between terminal and ground
10	CSYNC IN	I	Composite sync signal When L (≦0.8V): Sync period	Sync signal from timing generator (IC1010)
11	NC	—	Not connected	Not used and 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	O	Chroma signal output	Not used and open
16	YOUT	O	Y signal output	Not used and open
17	YTRAP	I	Cross color power supply regulated by subcarrier frequency component of Y signal	Not used and open

Pin No.	Mark	I/O Division	Function description	Remarks
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	O	Analog RGB signal output	Not used and open
22	GOUT	O	Analog RGB signal output	Not used and open
23	ROUT	O	Analog RGB signal output	Not used and open
24	GND 2	—	Ground	0V

• IC1016 (M35040056FPT): OSD

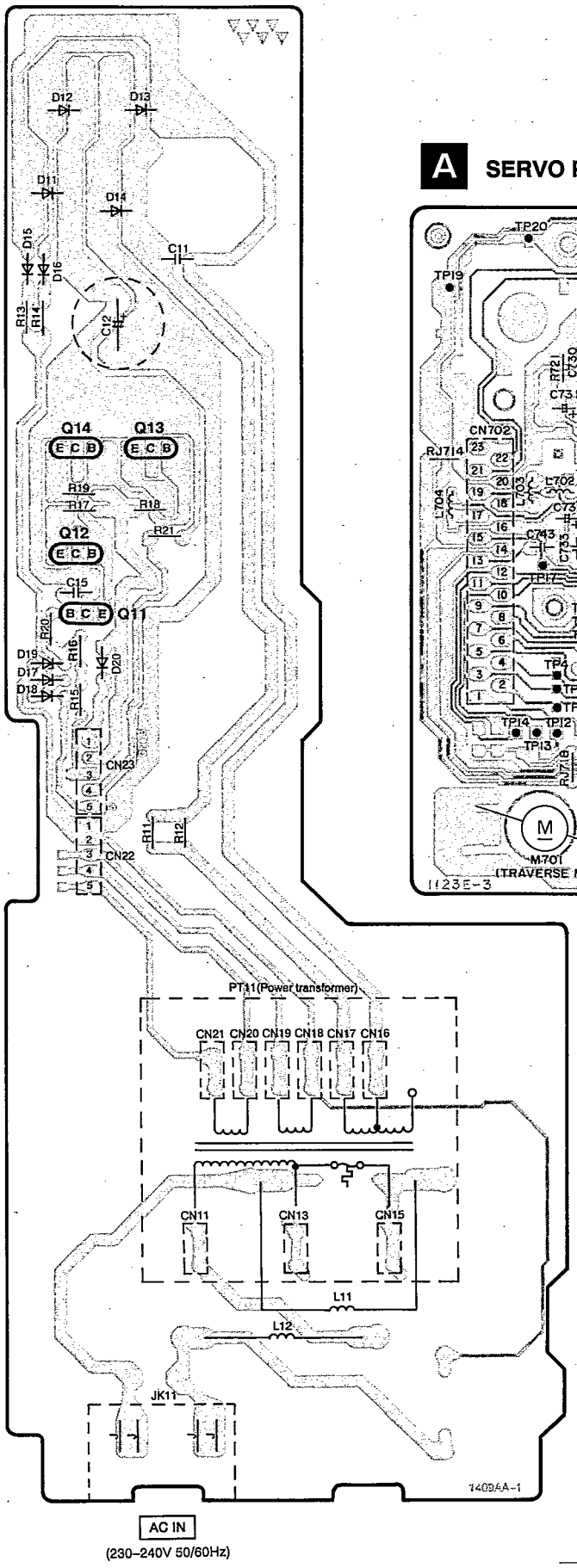
Pin No.	Mark	I/O Division	Function description	Remarks
1	OSC1	I	External network I/O for display OSC	The display OSC's oscillation frequency determines the horizontal display position and character width on the TV screen. OSC2 is not used and left open
2	OSC2	O		
3	$\overline{CS}$	I	Chip select input	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
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	O	——	Not used open
11	V_{SS}	—	GND terminal	0V
12	P0	O	Port 0 output	Outputs TV screen display character control signal to pin 4 of the video selector (IC1015)
13 ∫ 16	P1 ∫ P4	O	——	Not used open
17	P5	O	Port 5 output	Outputs TV screen display character data to pin 5 of the video selector (IC1015)
18	HOR	I	Horizontal Sync. input	Hysteresis input to accept H. Sync. signal from the MPEG video decoder (IC1004)
19	VERT	I	Vertical Sync. input	Hysteresis input to accept V. Sync. signal from the MPEG video decoder (IC1004)
20	V_{DD}	—	Power supply terminal	3.3V

■ PRINTED CIRCUIT BOARDS

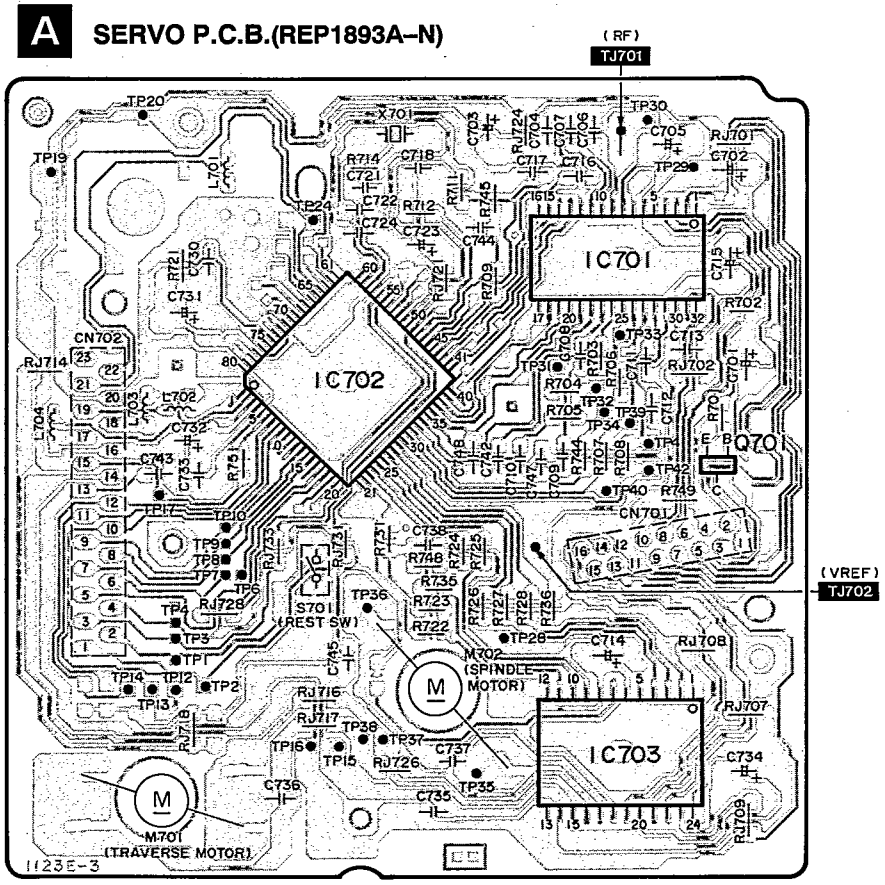
Note:

- This printed circuit boards diagram may be modified at any time with the development of new technology.

N POWER SUPPLY P.C.B. (REP2098B–M)



A SERVO P.C.B.(REP1893A–N)

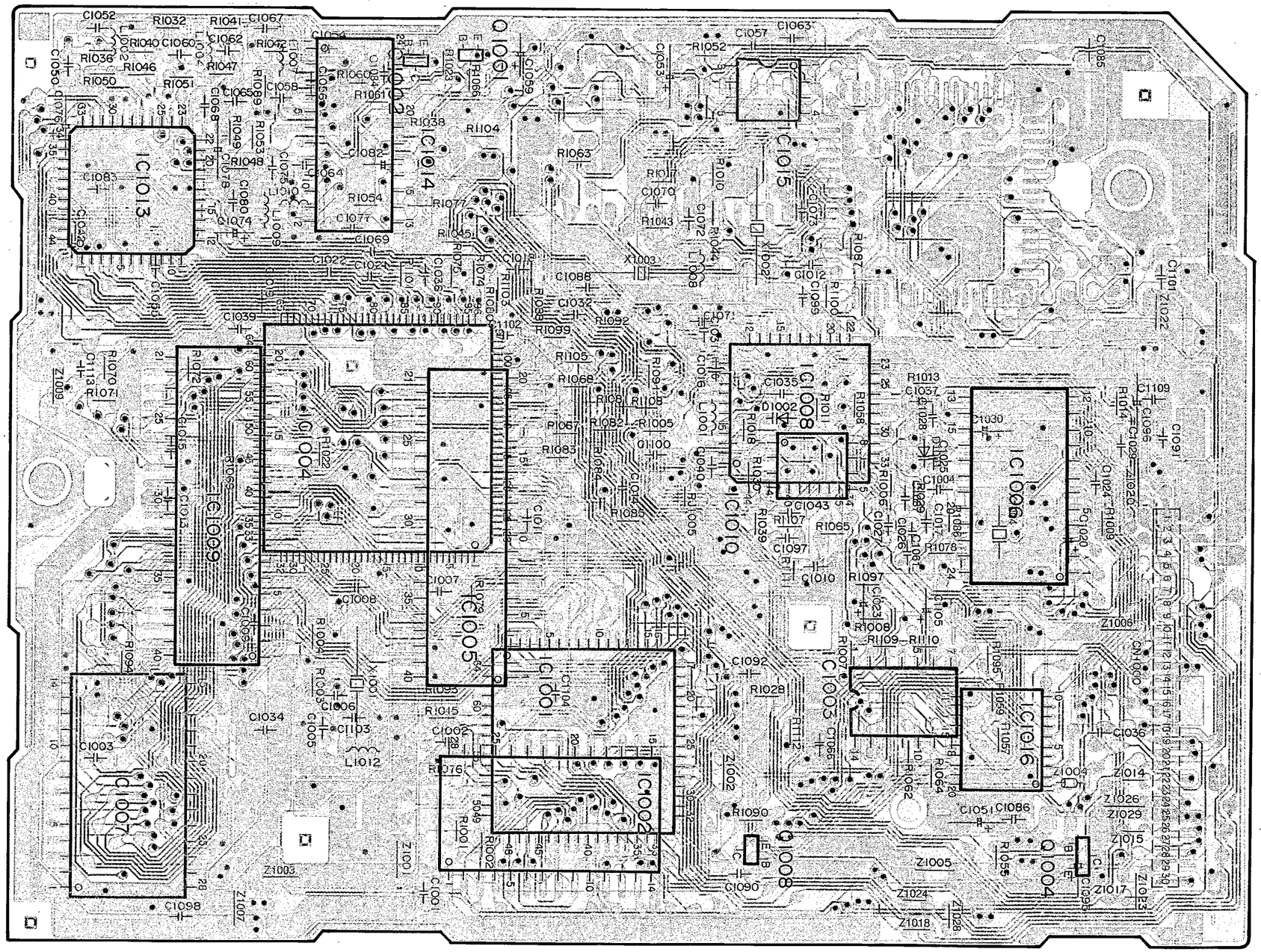


6 7 8 9 10 11 12 13 14 15

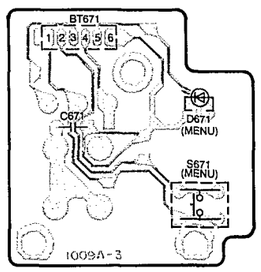
Notes:

- 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 "◎" mark denote the connection points of double-faced foil patterns (through holes) on both sides of the printed circuit board.

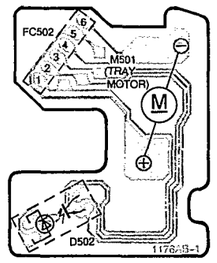
B VIDEO P.C.B. (REP2118D-T)



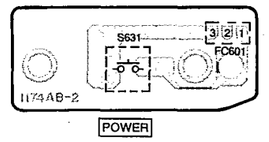
C SWITCH P.C.B. (REP1863B–S)



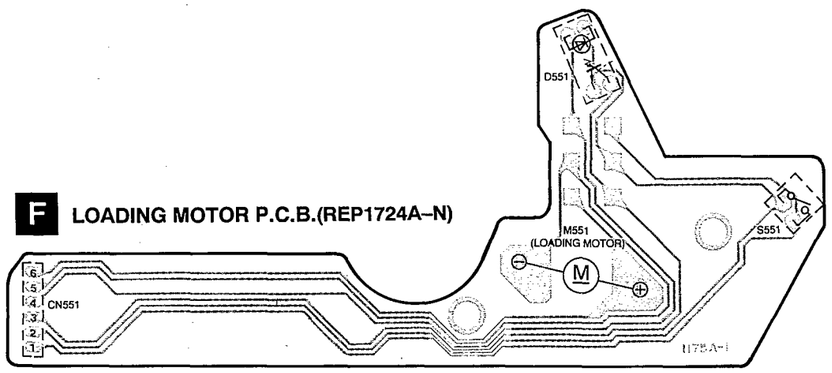
D TRAY MOTOR P.C.B. (REP1725B–N)



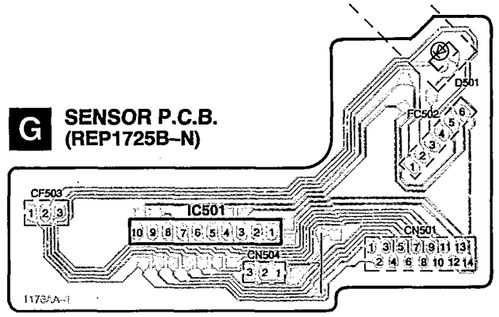
E POWER SWITCH P.C.B. (REP1723K–S)



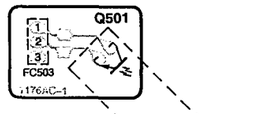
F LOADING MOTOR P.C.B.(REP1724A–N)



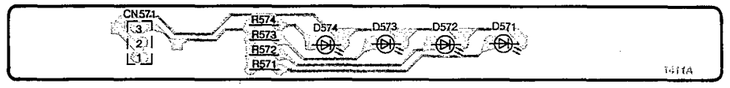
G SENSOR P.C.B. (REP1725B–N)



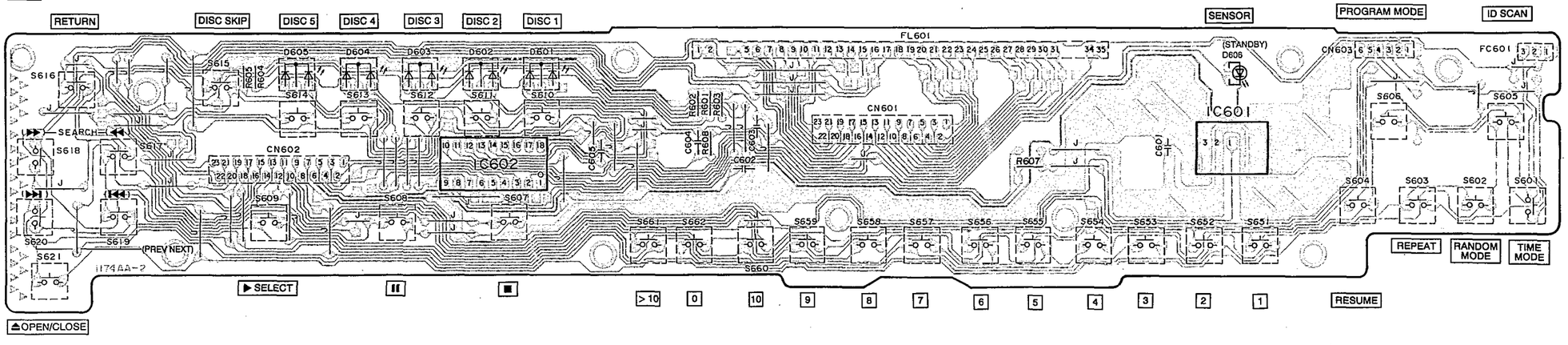
H PHOTO TRANSISTOR P.C.B.(REP1725B–N)



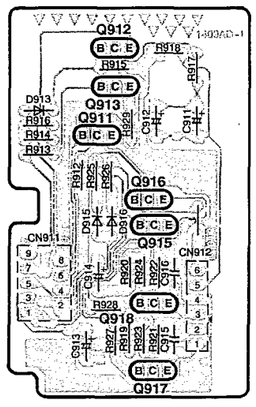
I LED P.C.B. (REP2100A–N)



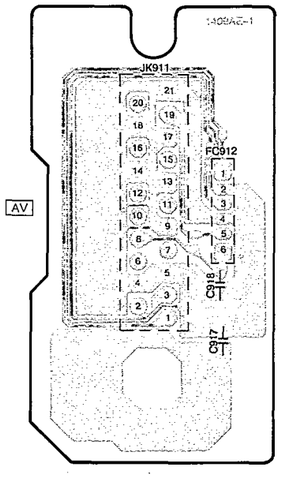
J OPERATION P.C.B.(REP1723K–S)



L VIDEO AMP P.C.B. (REP2098B–M)

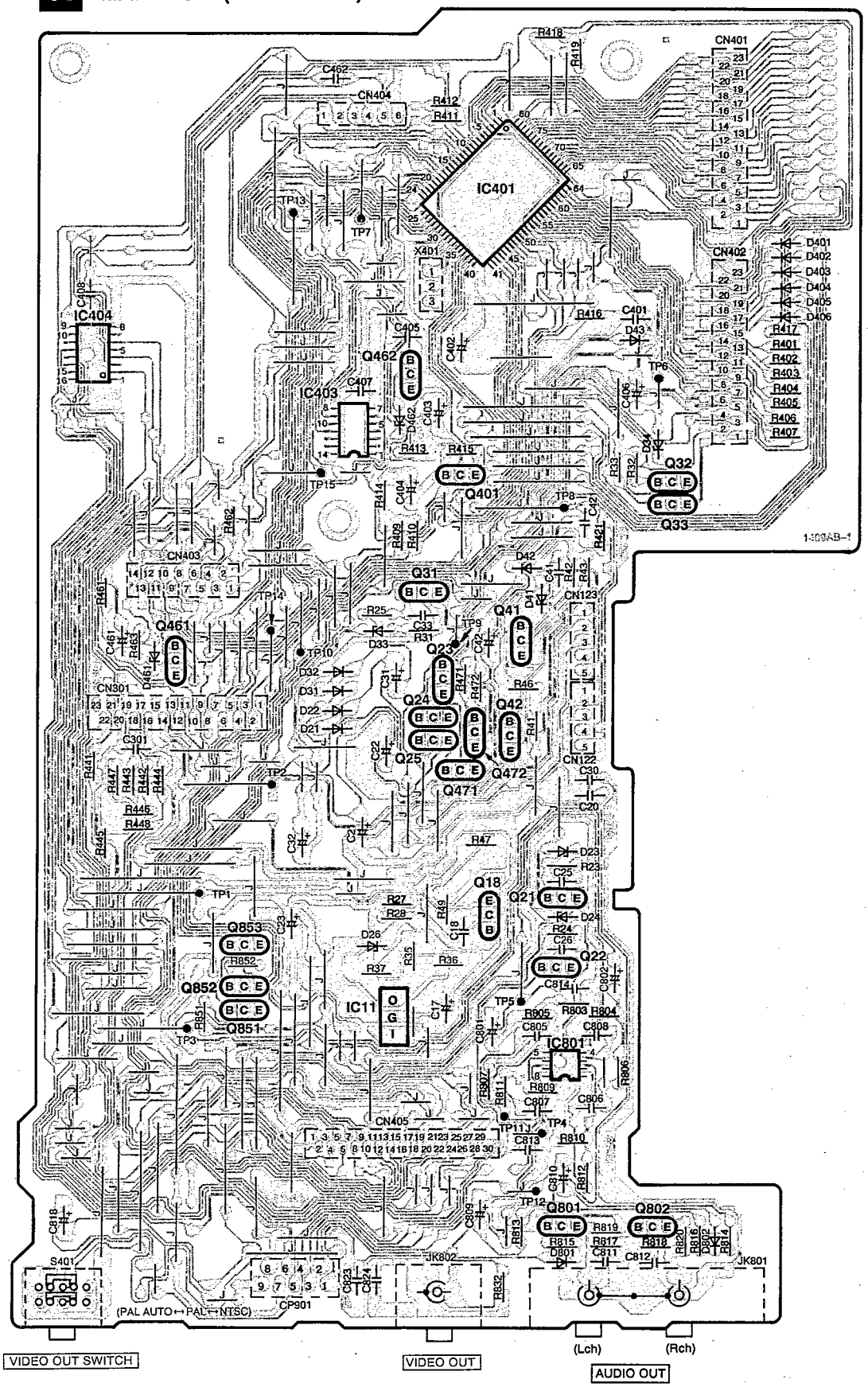


M RGB CONNECTOR P.C.B. (REP2098B–M)



11 12 13 14 15

K MAIN P.C.B.(REP2098B-M)



■ 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.
*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	LM2940T5	REGULATOR	⚠
IC401	UPD78044A095	SYSTEM CONTROL&FL DRIVE	
IC403	TC74HCT7007A	BUFFER AMP	
IC404	TC4050BF	BUFFER AMP	
IC501	BA6247N	MOTOR DRIVE	
IC601	RCDHC-278N	REMOTE CONTROL SENSOR	
IC602	NJU3713D	LED DRIVE	
IC801	BA4558FDXT1	L. P. F.	
IC1001	M38002M2300F	SUB MICROCOMPUTER	
IC1002	LH5168N8	64K SRAM	
IC1003	TC74HCT7007A	BUFFER AMP	
IC1004	MN89101M	MPEG VIDEO DECODER	
IC1005	MB81426070PJ	4M DRAM	
IC1006	MN6475A-T1	DIGITAL FILTER&D/A CONV.	
IC1007	LH5317Y1	512K PROM	
IC1008	NJM2115MT1	VCO CONT.	
IC1009	MB81426070PJ	4M DRAM	
IC1010	BU12102-0D	TIMING GENERATOR	
IC1013	MN6570TF	D/A CONVERTER(VIDEO)	
IC1014	CXA1645M	RGB ENCODER	
IC1015	MM1227XFF	SIGNAL SELECTOR	
IC1016	M35040056FPT	OSD	
		TRANSISTOR(S)	
Q11	2SC3311AIQST	TRANSISTOR	⚠
Q12-14	2SD2137PQTA	TRANSISTOR	⚠
Q18	2SD2037EFTA	TRANSISTOR	⚠
Q21	2SC3311AIQST	TRANSISTOR	⚠
Q22	2SA1309AIQST	TRANSISTOR	⚠
Q23	UN4214TA	TRANSISTOR	
Q24, 25	UN4114TA	TRANSISTOR	
Q31	2SB1238QSTV6	TRANSISTOR	⚠
Q32, 33	2SD1450RTA	TRANSISTOR	
Q41, 42	2SD1862QRTV6	TRANSISTOR	⚠
Q401	2SC3311AIQST	TRANSISTOR	
Q461, 462	UN4215	TRANSISTOR	
Q471	UN4214TA	TRANSISTOR	
Q472	2SC3311AIQST	TRANSISTOR	
Q501	PT381TB	TRANSISTOR	
Q801, 802	2SD1450RTA	TRANSISTOR	
Q851	UN4112	TRANSISTOR	
Q852	UN4212TA	TRANSISTOR	
Q853	UN4112	TRANSISTOR	
Q911	UN4214TA	TRANSISTOR	
Q912, 913	2SA1309AIQST	TRANSISTOR	
Q915, 916	2SC3311AIQST	TRANSISTOR	
Q917, 918	2SD1450RTA	TRANSISTOR	
Q1001, 1002	2SD1819QRSTX	TRANSISTOR	
Q1004	2SD1328-S	TRANSISTOR	
Q1008	UN5115TX	TRANSISTOR	
		DIODE(S)	
D11-14	RL1N4003N02	DIODE	⚠
D15, 16	MA165	DIODE	⚠
D17	MA4051MTA	DIODE	
D18	MA165	DIODE	
D19	MA4100LTA	DIODE	⚠
D20	RL1N4003N02	DIODE	
D21, 22	RL1N4003N02	DIODE	⚠
D23	MA4110L	DIODE	⚠
D24	MA4082MTA	DIODE	⚠
D26	MA4039HTA	DIODE	⚠
D31, 32	RL1N4003N02	DIODE	⚠
D33	MA4270	DIODE	⚠
D34	MA4091-M	DIODE	⚠
D41	MA4062MTA	DIODE	⚠
D42	MA165	DIODE	
D43	1SS291TA	DIODE	
D401-406	MA165	DIODE	
D461	MA4068HTA	DIODE	
D462	MA4056MTA	DIODE	
D501	GL380TB	L. E. D.	
D502	RSQGP1S53V	DIODE	
D551	SG-206S	DIODE	
D571-574	SLR-325MC	L. E. D.	
D601-605	REK0033	L. E. D. BLOCK	
D606	LN018304P	L. E. D.	
D671	LN013304P	L. E. D.	
D801, 802	MA165	DIODE	
D913	MA165	DIODE	
D915, 916	MA165	DIODE	
D1001, 1002	MA304TX	DIODE	
		COIL(S)	
L11, 12	RLQX400MT-D	COIL	⚠
L1001	RLQM2R2KT2-W	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L1002	RLQM121JT2-W	COIL	
L1004	RLQM121JT2-W	COIL	
L1007	RLQM121JT2-W	COIL	
L1008-1010	RLQU220KT-W	COIL	
L1012	RLQM1R8KT2-W	COIL	
		TRANSFORMER(S)	
PT11	RTP1K4B025-V	POWER TRANSFORMER	⚠
		COMPONENT COMBINATION(S)	
Z1004	RLBN102V-Y	COMPONENT COMBINATION	
		OSCILLATOR(S)	
X401	RSXY4M23M01T	OSCILLATOR(4.2336MHz)	
X1001	RSXZ40M5S01T	OSCILLATOR(40.5MHz)	
X1002	RSXC14M3S03M	OSCILLATOR(14.3MHz)	
X1003	RSXC17M7S02M	OSCILLATOR(17.7MHz)	
X1004	RSXZ16M9H01T	OSCILLATOR(16.9MHz)	
		DISPLAY TUBE(S)	
FL601	RSL0202-F	DISPLAY TUBE	
		SWITCH(ES)	
S401	RSS3B33ZA-H	VIDEO OUT	
S551	RSH1A005	OPEN/CLOSE DETECTOR	
S601	EVQ21405R	TIME MODE	
S602	EVQ21405R	RANDOM MODE	
S603	EVQ21405R	REPEAT	
S604	EVQ21405R	RESUME	
S605	EVQ21405R	ID SCAN	
S606	EVQ21405R	PROGRAM MODE	
S607	EVQ21405R	STOP	
S608	EVQ21405R	PAUSE	
S609	EVQ21405R	PLAY SELECT	
S610	EVQ21405R	DISC 1	
S611	EVQ21405R	DISC 2	
S612	EVQ21405R	DISC 3	
S613	EVQ21405R	DISC 4	
S614	EVQ21405R	DISC 5	
S615	EVQ21405R	DISC SKIP	
S616	EVQ21405R	RETURN	
S617	EVQ21405R	BACKWARD SEARCH	
S618	EVQ21405R	FORWARD SEARCH	
S619	EVQ21405R	PREV SKIP	
S620	EVQ21405R	NEXT SKIP	
S621	EVQ21405R	OPEN/CLOSE	
S631	EVQ21405R	POWER	

Ref. No.	Part No.	Part Name & Description	Remarks
S651	EVQ21405R	NUMERIC 1	
S652	EVQ21405R	NUMERIC 2	
S653	EVQ21405R	NUMERIC 3	
S654	EVQ21405R	NUMERIC 4	
S655	EVQ21405R	NUMERIC 5	
S656	EVQ21405R	NUMERIC 6	
S657	EVQ21405R	NUMERIC 7	
S658	EVQ21405R	NUMERIC 8	
S659	EVQ21405R	NUMERIC 9	
S660	EVQ21405R	NUMERIC 10	
S661	EVQ21405R	NUMERIC >10	
S662	EVQ21405R	NUMERIC 0	
S671	EVQQB005R	MENU OFF/ON	
		CONNECTOR(S) AND SOCKET(S)	
CN11	RJS1A1101T1	CONNECTOR(1P)	
CN13	RJS1A1101T1	CONNECTOR(1P)	
CN15-21	RJS1A1101T1	CONNECTOR(1P)	
CN22, 23	RJS1A6605	CONNECTOR(5P)	
CN122, 123	RJS1A6605	CONNECTOR(5P)	
CN301	RJS1A6823	CONNECTOR(23P)	
CN401, 402	RJS1A6823	CONNECTOR(23P)	
CN403	RJS1A6814	CONNECTOR(14P)	
CN404	RJS1A6606	CONNECTOR(6P)	
CN405	RJS30Q11ZA	CONNECTOR(30P)	
CN501	RJS1A6714	CONNECTOR(14P)	
CN504	SJT30344-H	CONNECTOR(3P)	
CN551	RJS2A1506	CONNECTOR(6P)	
CN571	SJT30344-H	CONNECTOR(3P)	
CN601, 602	RJS1A6223-1	CONNECTOR(23P)	
CN603	RJP6G20ZA	CONNECTOR(6P)	
CN911	RJU063W09T	SOCKET(9P)	
CN912	SJT30644-H	CONNECTOR(6P)	
CN1000	RJS2A0630T	CONNECTOR(30P)	
BT671	REX0493	CONNECTOR(6P)	
CP901	RJT063W09T	CONNECTOR(9P)	
		JACK(S) AND TERMINAL(S)	
JK11	SJS9236	AC INLET	⚠
JK801	RJH3201N	AUDIO OUT	
JK802	SJFD7-6	VIDEO OUT	
JK911	RJS2A3121	21 PIN SCART TERMINAL	
		FLAT CABLE(S)	
FC502	REZ0612	FLAT CABLE(6P)	
FC503	REZ0613	FLAT CABLE(3P)	
FC601	REZ0610	FLAT CABLE(3P)	
FC912	REZ0805	FLAT CABLE(6P)	

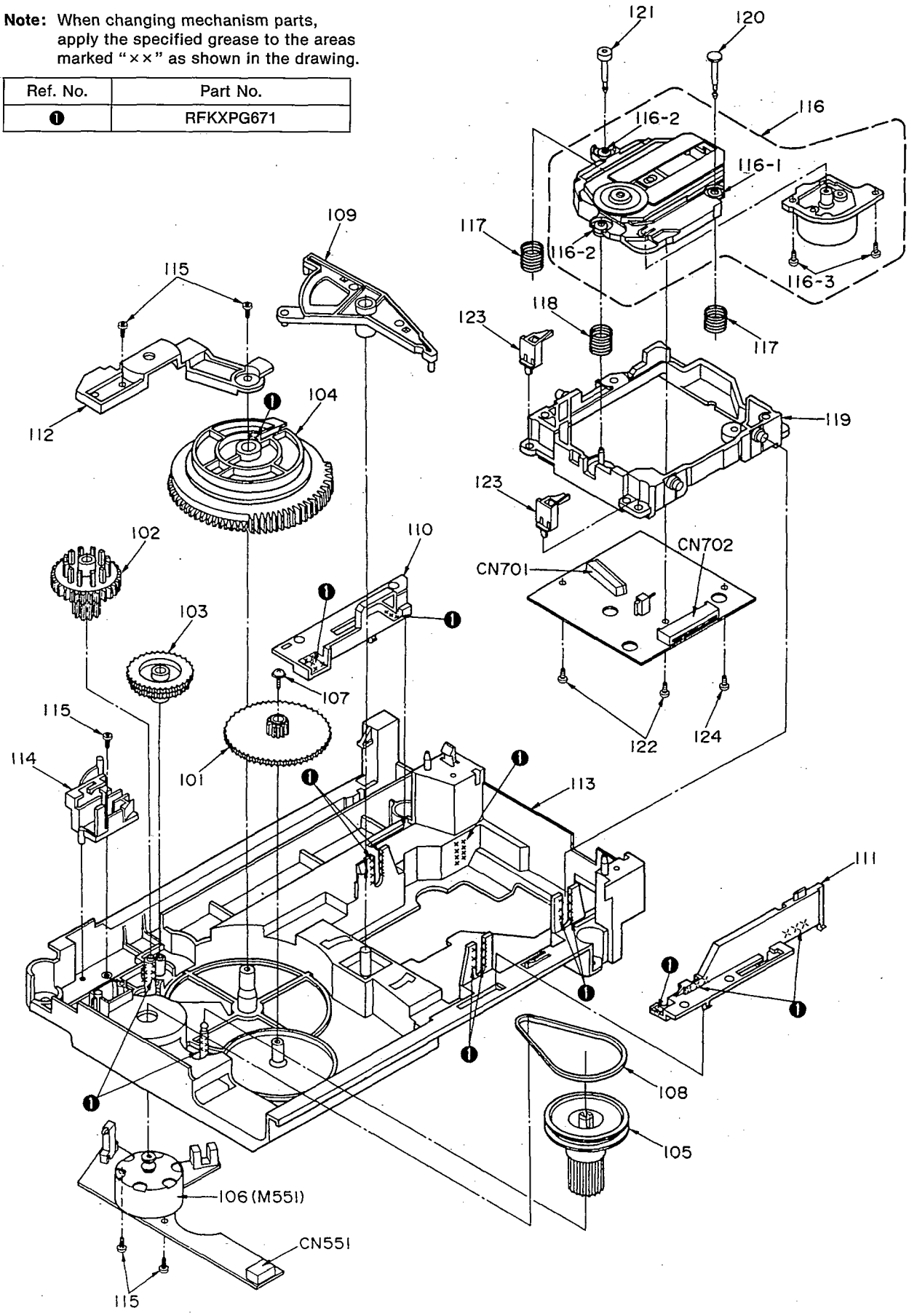
Ref. No.	Part No.	Part Name & Description	Remarks
		GND PLATE(S)	
FG911	RMC0269	GND PLATE	
		<SERVO P. C. B.>	
		INTEGRATED CIRCUIT(S)	
IC701	AN8802SCE1V	SERVO AMP	
IC702	MN662740RE	SERVO PROCESSOR	
IC703	AN8389SE1	MOTOR DRIVE	
		TRANSISTOR(S)	
Q701	2SB709S	TRANSISTOR	
		COIL(S)	
L701-704	RLBN102V-Y	COIL	
		OSCILLATOR(S)	
X701	RSXB16M9J01T	OSCILLATOR(16.9344MHz)	
		SWITCH(ES)	
S701	RSM0006-P	REST DETECTOR	
		CONNECTOR(S) AND SOCKET(S)	
CN701	RJU035T016-1	SOCKET(16P)	
CN702	RJS1A6723-1Q	CONNECTOR(23P)	

Ref. No.	Part No.	Part Name & Description	Remarks
		LOADING MECHANISM	
101	RDG0270	REDUCTION GEAR	
102	RDG0271	DRIVE GEAR(1)	
103	RDG0272	DRIVE GEAR(2)	
104	RDK0025	DRIVE CAM	
105	RDP0050	PULLEY GEAR	
106	RFKPLPD667PB	LOADING MOTOR(M551) ASS'Y	
107	RHD26019	SCREW	
108	RMG0268-K	BELT	
109	RML0334	DRIVE GEAR	
110	RMM0117	SLIDE PLATE(1)	
111	RMM0118	SLIDE PLATE(2)	
112	RMR0746-W	REINFORCING PLATE	
113	RFKNLPD667PB	MECHANISM BASE ASS'Y	
114	RXQ0346-1	SLIDER ASS'Y	
115	XTB3+10JFZ	SCREW	
116	RAE0113Z	TRAVERSE DECK ASS'Y	
116-1	SHGD112	FLOATING RUBBER(1)	
116-2	SHGD113-1	FLOATING RUBBER(2)	
116-3	SNSD38	SCREW	
117	RME0109	FLOATING SPRING(1)	
118	RME0142	FLOATING SPRING(2)	
119	RMR0698-K	TRAVERSE CHASSIS	
120	RMS0123-1	TRAVERSE FIXED PIN(1)	
121	RMS0350	TRAVERSE FIXED PIN(2)	
122	XTV2+6G	SCREW	
123	RMX0094	TRAY HOLDER	
124	XTN2+6G	SCREW	

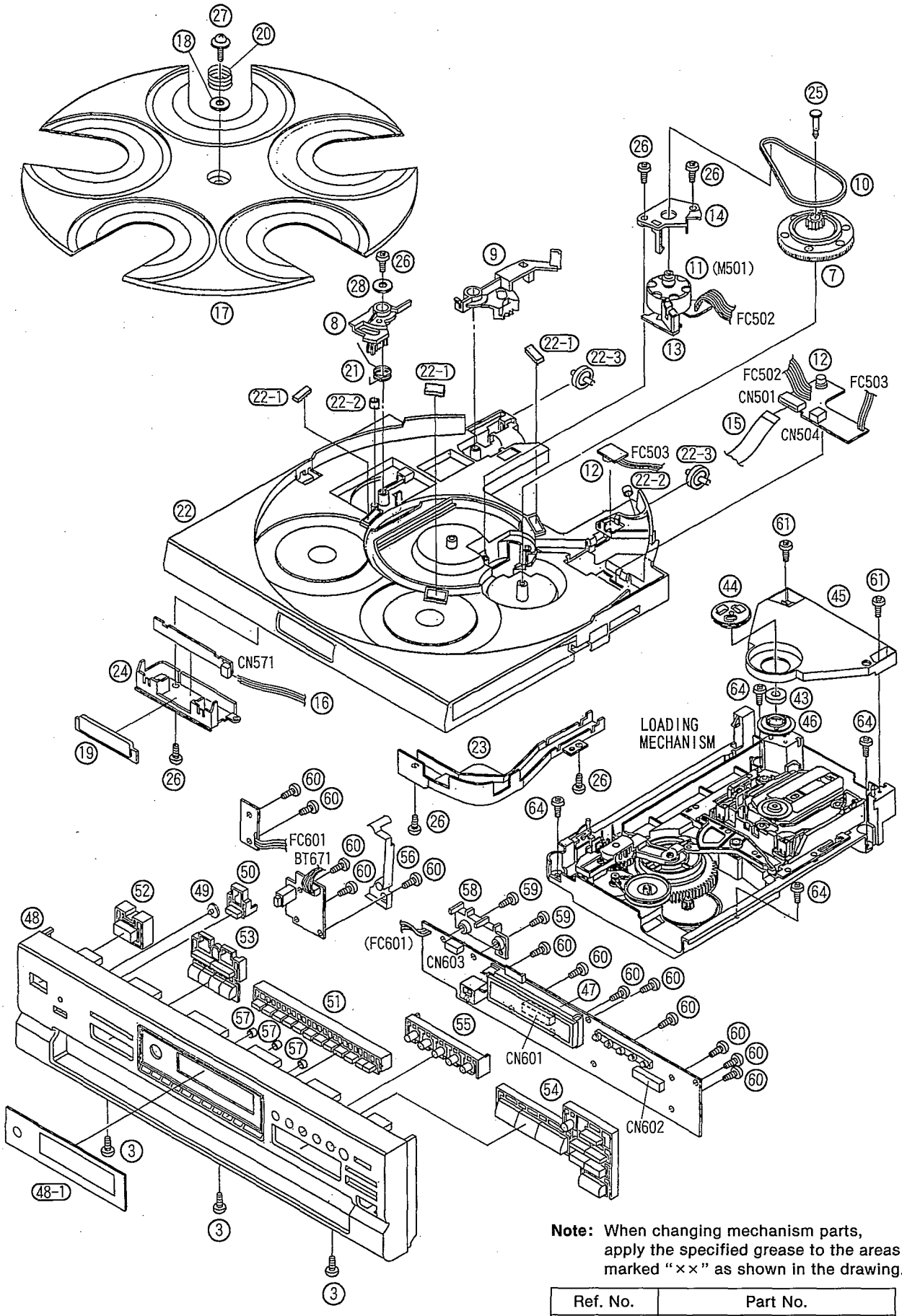
■ LOADING MECHANISM PARTS

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

Ref. No.	Part No.
❶	RFKXPG671

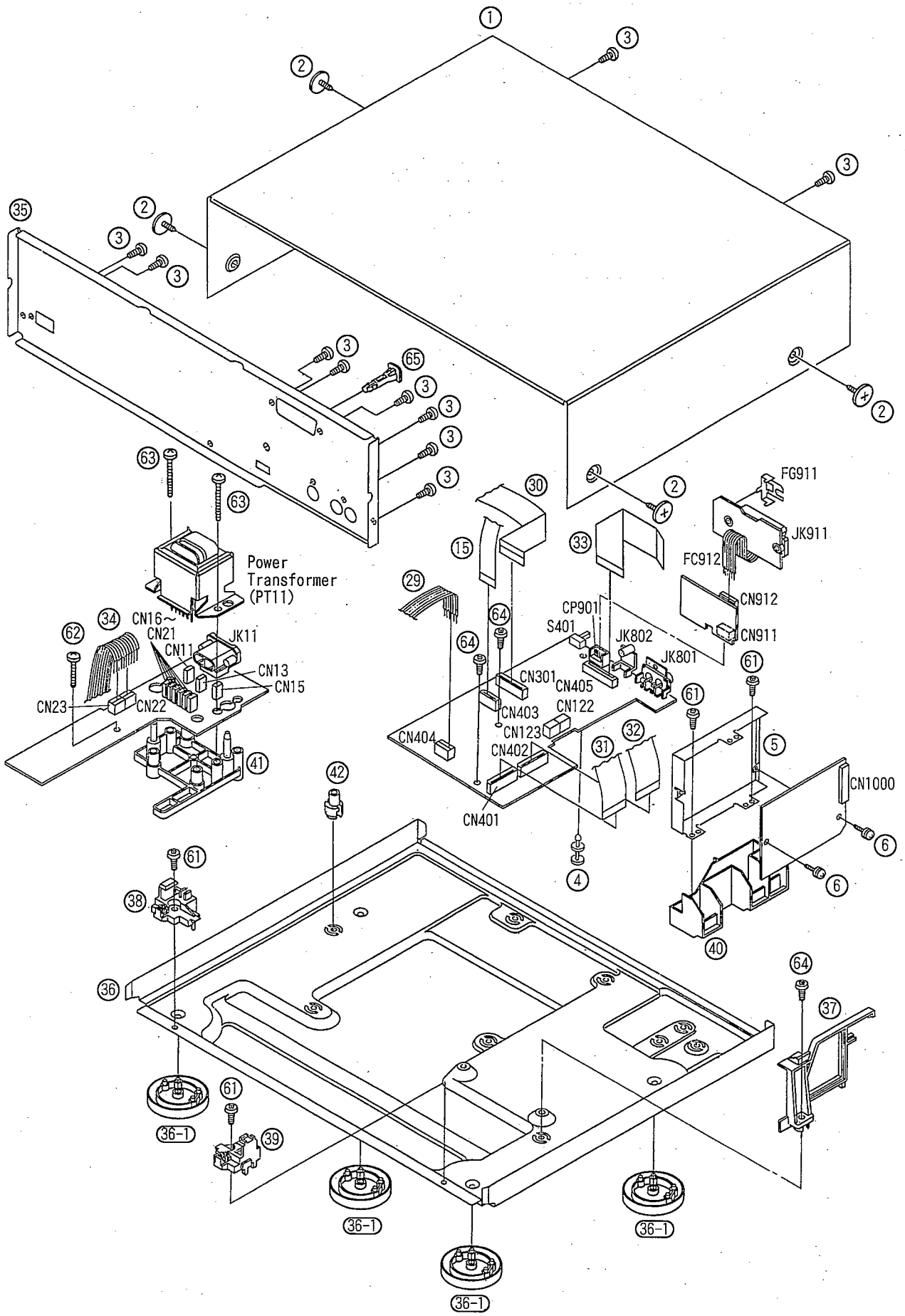


■ CABINET PARTS LOCATION



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

Ref. No.	Part No.
❶	RFKXPG671


Power
Transformer
(PT11)
CN16~
CN21
CN11
JK11
CN13
CN15
CN23
CN22
CN301
CN405
CN403
CN122
CN123
CN402
CN404
CN401
S401
CP901
JK802
JK801
FG911
JK911
FC912
CN912
CN911
CN1000
36-1
36-1
36-1

■ 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.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RKM0193-K	CABINET	
2	SNE2129-3	SCREW	
3	XTBS3+8JFZ1	SCREW	
4	SHR9806	SPACER	
5	RSC0416A	SHIELD PLATE	
6	XYC26+JF6	SCREW	
7	RDG0267	REDUCTION GEAR	
8	RDG0268	CLOSE LOCK GEAR	
9	RDG0269-3	OPEN LOCK GEAR	
10	RDV0031	BELT	
11	RFKPLPD667PA	TRAY MOTOR(M501) ASS'Y	
12	RMN0254	LED HOLDER(Q501, D501)	
13	RMN0255	SENSOR HOLDER	
14	RMN0263	MOTOR HOLDER	
15	REZ0648	FFC(14P)	
16	REZ0803	FLAY CABLE(3P)	
17	RGT0019-1	ROTARY TRAY	
18	RHW81001-1	WASHER	
19	RKW0399-Q	ORNAMENT WINDOW	
20	RMB0365	SPRING	
21	RME0152-2	LOCK GEAR SPRING	
22	RFKNLVM500PK	TRAY ASS'Y	
22-1	RMF0182	TRAY FELT	
22-2	RMG0200	SILENT RVBBER	
22-3	RMR0546-W	TRAY ROLLER	
23	RMR0860-K	CABLE CASE	
24	RMR0861-K	TRAY LED HOLDER	
25	RMS0123-1	RIVET	
26	XTB3+10G	SCREW	
27	XTWS3+10T	SCREW	
28	XWE3D13	WASHER	
29	REZ0623	FLAT CABLE(6P)	
30	REZ0635	FFC(23P)	
31	REZ0636	FFC(23P)	
32	REZ0637	FFC(23P)	
33	REZ0780	FFC(30P)	
34	REZ0804	FLAT CABLE(10P)	
35	RGR0184E-A	REAR PANEL	(E, EG)
35	RGR0184E-B	REAR PANEL	(EB)
36	RFKJLPD667PK	CHASSIS ASS'Y	
36-1	RKA0053-A	FOOT	
37	RMR0749-W	CABLE HOLDER	
38	RMR0742-K	TRAY BASE GUIDE(L)	
39	RMR0743-K	TRAY BASE GUIDE(R)	
40	RMR0863-W	MODULE GUIDE	
41	RMR0862-W	TRANSFORMER BASE	
42	RMR0873-W	P.C.B. SUPPORT	
43	RHM245ZA	MAGNET	
44	RMR0334	FIXED PLATE	
45	RFKNLPD687EK	CLAMP PLATE ASS'Y	
46	RMR0761-W	CLAMPER	
47	RMN0185-1	FL HOLDER	
48	RFKGLVM500EK	FRONT PANEL ASS'Y	
48-1	RGK0611L-K	FRONT ORNAMENT PLATE	
49	RGL0098	PANEL LIGHT	
50	RGU0878-K	PITCH CONTROL BUTTON	
51	RGU1019-K	10KEY BUTTON	
52	RGU1015-K	POWER BUTTON	
53	RGU1017-K	SUB BUTTON	
54	RGU1043-K	MAIN BUTTON	
55	RGU1044-Q	DISC BUTTON	
56	RMC0245	GND PLATE	
57	RMG0200	STOPPER TUBE	
58	RMR0913-K	REINFORCING PLATE	
59	XTBS26+10J	SCREW	
60	XTBS26+8J	SCREW	
61	XTB3+10JFZ	SCREW	
62	XTB3+20J	SCREW	
63	XTB3+35JFZ	SCREW	
64	XTB3+8JFZ	SCREW	
65	RMN0341	SPACER	

■ 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
R11, 12	ERQ16NKWR22E	1/6W 0.22 ⚠
R13, 14	ERDS2TJ122	1/4W 1.2K
R15, 16	ERDS2TJ102	1/4W 1K
R17-19	ERDS2TJR47T	1/4W 0.47
R20	ERDS2TJ330	1/4W 33
R21	ERD2FCVJ6R8T	1/4W 6.8 ⚠
R23, 24	ERDS2TJ122	1/4W 1.2K
R25	ERDS2TJ331	1/4W 330
R27, 28	ERDS2TJ680T	1/4W 68
R31	ERDS2TJ123	1/4W 12K
R32, 33	ERDS2TJ103	1/4W 10K
R35-37	ERG1SJ390E	1W 39
R41	ERDS2TJ221	1/4W 220
R42, 43	ERDS2TJ2R2T	1/4W 2.2
R46	ERDS2TJ221	1/4W 220
R47	ERDS1FVJ8R2T	1/2W 8.2 ⚠
R49	ERD2FCVJ4R7T	1/4W 4.7 ⚠
R401-407	ERDS2TJ472	1/4W 4.7K
R409	ERDS2TJ102	1/4W 1K
R410	ERDS2TJ103	1/4W 10K
R411	ERDS2TJ472	1/4W 4.7K
R412	ERDS2TJ223	1/4W 22K
R413	ERDS2TJ103	1/4W 10K
R414	ERDS2TJ471	1/4W 470
R415	ERDS2TJ103	1/4W 10K
R416	ERDS2TJ102	1/4W 1K
R417	ERDS2TJ103	1/4W 10K
R418, 419	ERDS2TJ821	1/4W 820
R421	ERDS2TJ472	1/4W 4.7K
R441-444	ERDS2TJ222	1/4W 2.2K
R445-448	ERDS2TJ472	1/4W 4.7K
R461	ERDS2EJ121	1/4W 120
R462	ERDS2TJ221	1/4W 220
R463	ERDS2EJ121	1/4W 120
R471	ERDS2TJ103	1/4W 10K
R472	ERDS2EJ121	1/4W 120
R571-574	ERDS2TJ181T	1/4W 180
R601-605	ERDS2EJ121	1/4W 120
R607	ERDS2EJ121	1/4W 120
R608	ERDS2TJ122	1/4W 1.2K
R803, 804	ERDS2TJ224T	1/4W 220K
R805, 806	ERDS2TJ822	1/4W 8.2K
R807, 808	ERDS2TJ123	1/4W 12K
R809-812	ERDS2TJ333	1/4W 33K
R813, 814	ERDS2TJ152	1/4W 1.5K
R815, 816	ERDS2TJ102	1/4W 1K
R817, 818	ERDS2TJ473	1/4W 47K
R819, 820	ERDS2TJ100	1/4W 10
R832	ERDS2TJ103	1/4W 10K
R851	ERDS2TJ222	1/4W 2.2K
R852	ERDS2TJ102	1/4W 1K
R912	ERDS2TJ821	1/4W 820
R913	ERDS2TJ101	1/4W 100
R914	ERDS2TJ681	1/4W 680
R915	ERDS2TJ392T	1/4W 3.9K
R916	ERDS2TJ220T	1/4W 22
R917	ERDS2TJ680T	1/4W 68
R918	ERDS2TJ103	1/4W 10K
R919, 920	ERDS2TJ821	1/4W 820
R921, 922	ERDS2TJ682T	1/4W 6.8K
R923, 924	ERDS2TJ181T	1/4W 180
R925-928	ERDS2TJ222	1/4W 2.2K
R929	ERDS2TJ680T	1/4W 68
R1001, 1002	ERJ6GEYJ101V	1/10W 100
R1003	ERJ6GEYJ105	1/10W 1M
R1004	ERJ6GEYJ101V	1/10W 100
R1005	ERJ6GEYJ471V	1/10W 470
R1006	ERJ6GEYJ123V	1/10W 12K
R1007, 1008	ERJ6GEYJ473V	1/10W 47K
R1009	ERJ6GEYJ470V	1/10W 47
R1010	ERJ6GEYJ105	1/10W 1M
R1011	ERJ6GEYJ392V	1/10W 3.9K
R1013, 1014	ERJ6GEYJ101V	1/10W 100
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	ERJ6GEYJ272V	1/10W 2.7K
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
R1053	ERJ6GEYJ222V	1/10W 2.2K
R1054	ERJ6GEYJ473V	1/10W 47K
R1055	ERJ6GEYJ221V	1/10W 220
R1057	ERJ6GEYJ102V	1/10W 1K
R1058	ERJ6GEYJ104V	1/10W 100K
R1059	ERJ6GEYJ102V	1/10W 1K
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	ERJ6GEYJ101V	1/10W 100
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
R1078	ERJ6GEYJ102V	1/10W 1K
R1079, 1080	ERJ6GEYJ472V	1/10W 4.7K
R1081, 1082	ERJ6GEYJ102V	1/10W 1K
R1083-1085	ERJ6GEYJ472V	1/10W 4.7K
R1086	ERJ6GEYJ104V	1/10W 100K
R1087	ERJ6GEYJ101V	1/10W 100
R1088	ERJ3GEYJ101V	1/16W 100
R1089	ERJ6GEYJ392V	1/10W 3.9K
R1090	ERJ6GEYJ563V	1/10W 56K
R1091	ERJ6GEYJ102V	1/10W 1K
R1092	ERJ6GEYJ391V	1/10W 390
R1093	ERJ6GEYJ473V	1/10W 47K
R1094	ERJ6GEYJ821V	1/10W 820
R1095	ERJ6GEYJ102V	1/10W 1K
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	ERJ6GEYJ101V	1/10W 100
R1109, 1110	ERJ6GEYJ473V	1/10W 47K
R1112	ERJ3GEYJ103V	1/16W 10K
		CHIP JUMPERS
Z1001, 1002	ERJ8GEY0R00V	CHIP JUMPER
Z1003	ERJ6GEY0R00V	CHIP JUMPER
Z1005, 1006	ERJ8GEY0R00V	CHIP JUMPER
Z1007	ERJ6GEY0R00V	CHIP JUMPER

Ref. No.	Part No.	Values & Remarks
Z1009	ERJ6GEY0R00V	CHIP JUMPER
Z1014, 1015	ERJ6GEY0R00V	CHIP JUMPER
Z1017, 1018	ERJ6GEY0R00V	CHIP JUMPER
Z1020	ERJ8GEY0R00V	CHIP JUMPER
Z1022, 1023	ERJ8GEY0R00V	CHIP JUMPER
Z1024	ERJ6GEY0R00V	CHIP JUMPER
Z1026	ERJ8GEY0R00V	CHIP JUMPER
Z1028	ERJ6GEY0R00V	CHIP JUMPER
Z1029	ERJ8GEY0R00V	CHIP JUMPER
RJ1005	ERJ3GEY0R00V	CHIP JUMPER
R1111	ERJ3GEY0R00V	CHIP JUMPER
		CAPACITORS
C11	ECBT1E103ZF	25V 0.01U
C12	ECA1EM332B	25V 3300U ⚠
C15	ECBT1C103NS5	16V 0.01U
C17	RCE1AKA470BV	10V 47U
C18	ECBT1H102KB5	50V 1000P
C20	ECBT1E103ZF	25V 0.01U
C21, 22	ECA1EM101B	25V 100U ⚠
C23	RCE0JKA101BV	6.3V 100U
C25, 26	ECBT1H102KB5	50V 1000P
C30	ECBT1E103ZF	25V 0.01U
C31	ECEA1JU101B	63V 100U
C32	ECA2AM101B	100V 100U
C33	ECBT1H102KB5	50V 1000P
C41	ECBT1H102KB5	50V 1000P
C42	RCE0JKA101BV	6.3V 100U
C301	ECBT1E103ZF	25V 0.01U
C401	ECBT1E103ZF	25V 0.01U
C402	RCE0JM471BV	6.3V 470U
C403	ECEA1HKA010B	50V 1U
C404	ECEA1EKA4R7B	25V 4.7U
C405	ECBT1C103NS5	16V 0.01U
C406	ECEA1HKA010B	50V 1U
C407, 408	ECBT1C103NS5	16V 0.01U
C421	ECBT1C103NS5	16V 0.01U
C461	ECEA1AU470	10V 47U
C462	ECBT1C103NS5	16V 0.01U
C601	ECFR1E104ZF5	25V 0.1U
C602	ECBT1C103NS5	16V 0.01U
C603	ECBT1H331KB5	50V 330P
C604	ECBT1H102KB5	50V 1000P
C605	ECBT1C103NS5	16V 0.01U
C671	ECFR1C103KR	16V 0.01U
C801, 802	ECEA1HKA010B	50V 1U
C805-808	ECCR1H391J5	50V 390P
C809, 810	RCE0JKA470BG	6.3V 47U
C811, 812	ECBT1H102KB5	50V 1000P
C813, 814	ECBT1E103ZF	25V 0.01U
C818	ECEA1CU471B	16V 470U

Ref. No.	Part No.	Values & Remarks
C823	ECBT1H121KB5	50V 120P
C824	ECBT1H104ZF5	50V 0.1U
C911, 912	RCE0JKA221BV	6.3V 220U
C913, 914	RCE0JKA470BG	6.3V 47U
C915, 916	ECBT1H102KB5	50V 1000P
C917	ECBT1E103ZF	25V 0.01U
C918	ECBT1H102KB5	50V 1000P
C1001, 1002	ECUV1E104ZFN	25V 0.1U
C1003	ECUV1H560KCN	50V 56P
C1004	ECUV1H050DCN	50V 5P
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
C1017	ECUV1H102KBN	50V 1000P
C1018, 1019	ECUV1E104ZFN	25V 0.1U
C1020	ECEV0JA101P	6.3V 100U
C1021, 1022	ECUV1E104ZFN	25V 0.1U
C1023	ECEV1CA100R	16V 10U
C1024, 1025	ECUV1H103KBN	50V 0.01U
C1026	ECUV1H102KBN	50V 1000P
C1027-1029	ECUV1H103KBN	50V 0.01U
C1030	ECEV0JA101P	6.3V 100U
C1031	ECUV1E104ZFN	25V 0.1U
C1032	ECUV1H220JCV	50V 22P
C1034	ECUV1E104ZFN	25V 0.1U
C1035, 1036	ECUV1H102KBN	50V 1000P
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
C1061	ECUV1H100DCN	50V 10P
C1062	ECUV1H560KCN	50V 56P
C1063	ECUV1H101KCN	50V 100P
C1064	ECUV1E104ZFN	25V 0.1U
C1065	ECUV1H560KCN	50V 56P
C1066	ECUV1E104ZFN	25V 0.1U
C1067	ECUV1H560KCN	50V 56P
C1068	ECUV1E104ZFN	25V 0.1U
C1069	ECUV1H470KCN	50V 47P
C1070	ECUV1H180JCN	50V 18P
C1071	ECUV1H220JCN	50V 22P

Ref. No.	Part No.	Values & Remarks
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
C1083-1086	ECUV1E104ZFN	25V 0.1U
C1087	ECUV1H102KBN	50V 1000P
C1088	ECUV1H100DCN	50V 10P
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
C1101	ECUV1E104ZFN	25V 0.1U
C1102	ECUV1C104ZFV	16V 0.1U
C1103	ECUV1H100DCN	50V 10P
C1104	ECUV1E104ZFN	25V 0.1U
C1105	ECEV1CA100R	16V 10U
C1109	ECUV1E104ZFN	25V 0.1U
C1113	ECUV1E104ZFN	25V 0.1U
		<SERVO P.C.B.>
		RESISTORS
R701	ERJ6GEYJ100	1/10W 10
R702	ERJ6GEYJ471V	1/10W 470
R703	ERJ6GEYJ823	1/10W 82K
R704	ERJ6GEYJ102A	1/10W 1K
R705	ERJ6GEYJ103V	1/10W 10K
R706	ERJ6GEYJ102A	1/10W 1K
R707	ERJ6GEYJ473V	1/10W 47K
R708	ERJ6GEYJ104V	1/10W 100K
R709	ERJ6GEYJ683V	1/10W 68K
R711	ERJ6GEYJ154V	1/10W 150K
R712	ERJ6GEYJ221V	1/10W 220
R714	ERJ6GEYJ121V	1/10W 120
R721	ERJ6GEYJ101V	1/10W 100
R722	ERJ6GEYJ563V	1/10W 56K
R723	ERJ6GEYJ182V	1/10W 1.8K
R724	ERJ6GEYJ333V	1/10W 33K
R725	ERJ6GEYJ472V	1/10W 4.7K
R726	ERJ6GEYJ473V	1/10W 47K
R727	ERJ6GEYJ103V	1/10W 10K
R728	ERJ6GEYJ392V	1/10W 3.9K
R731	ERJ6GEYJ392V	1/10W 3.9K
R735, 736	ERJ6GEYJ101V	1/10W 100
R744	ERJ6GEYJ103V	1/10W 10K

Ref. No.	Part No.	Values & Remarks
R745	ERJ6GEYJ155V	1/10W 1.5M
R748	ERJ6GEYJ182V	1/10W 1.8K
R749	ERJ8GEYJ103V	1/8W 10K
R751	ERJ6GEYJ101V	1/10W 100
		CHIP JUMPERS
RJ701, 702	ERJ8GEY0R00A	CHIP JUMPER
RJ707-709	ERJ8GEY0R00A	CHIP JUMPER
RJ714	ERJ8GEY0R00A	CHIP JUMPER
RJ716-718	ERJ8GEY0R00A	CHIP JUMPER
RJ721	ERJ6GEY0R00A	CHIP JUMPER
RJ724	ERJ6GEY0R00A	CHIP JUMPER
RJ726	ERJ6GEY0R00A	CHIP JUMPER
RJ728	ERJ8GEY0R00A	CHIP JUMPER
RJ731	ERJ6GEY0R00A	CHIP JUMPER
RJ733	ERJ6GEY0R00A	CHIP JUMPER
		CAPACITORS
C701	ECEA0JKA220	6.3V 22U
C702	ECEA1HKA010I	50V 1U
C703	ECEA0JKA101I	6.3V 100U
C704	ECUZNE104MBN	25V 0.1U
C705	ECEA1HKA010I	50V 1U
C706	ECUE1H101JCN	50V 100P
C707	ECUV1E273KBN	25V 0.027U
C708	ECUE1H472KBN	50V 4700P
C709	ECUE1C473KBN	16V 0.047U
C710	ECUE1H152KBN	50V 1500P
C711, 712	ECUWNE104ZFN	25V 0.1U
C713	ECUV1C104MBM	16V 0.1U
C714	ECEA0JKA101I	6.3V 100U
C715	ECEA0JKA470I	6.3V 47U
C716	ECUE1H561KBN	50V 560P
C717	ECUWNE104ZFN	25V 0.1U
C718	ECUV1C224KBM	16V 0.22U
C721	ECUV1H070DCN	50V 7P
C722	ECUV1H220JCN	50V 22P
C723	ECEA1AKA221I	10V 220U
C724	ECUV1C104MBM	16V 0.1U
C730	ECUWNE104ZFN	25V 0.1U
C731, 732	ECEA0JK221I	6.3V 220U
C733	ECUZNE104MBN	25V 0.1U
C734	ECEA1AKA221I	10V 220U
C735-737	ECUWNE104ZFN	25V 0.1U
C738	ECUV1C154KBN	16V 0.15U
C742	ECUV1E273KBN	25V 0.027U
C743	ECUWNE104ZFN	25V 0.1U
C744	ECUE1E822KBN	25V 8200P
C745	ECUE1H102KBN	50V 1000P
C747	ECUE1H222KBN	50V 2200P
C748	ECUV1H471KBM	50V 470P

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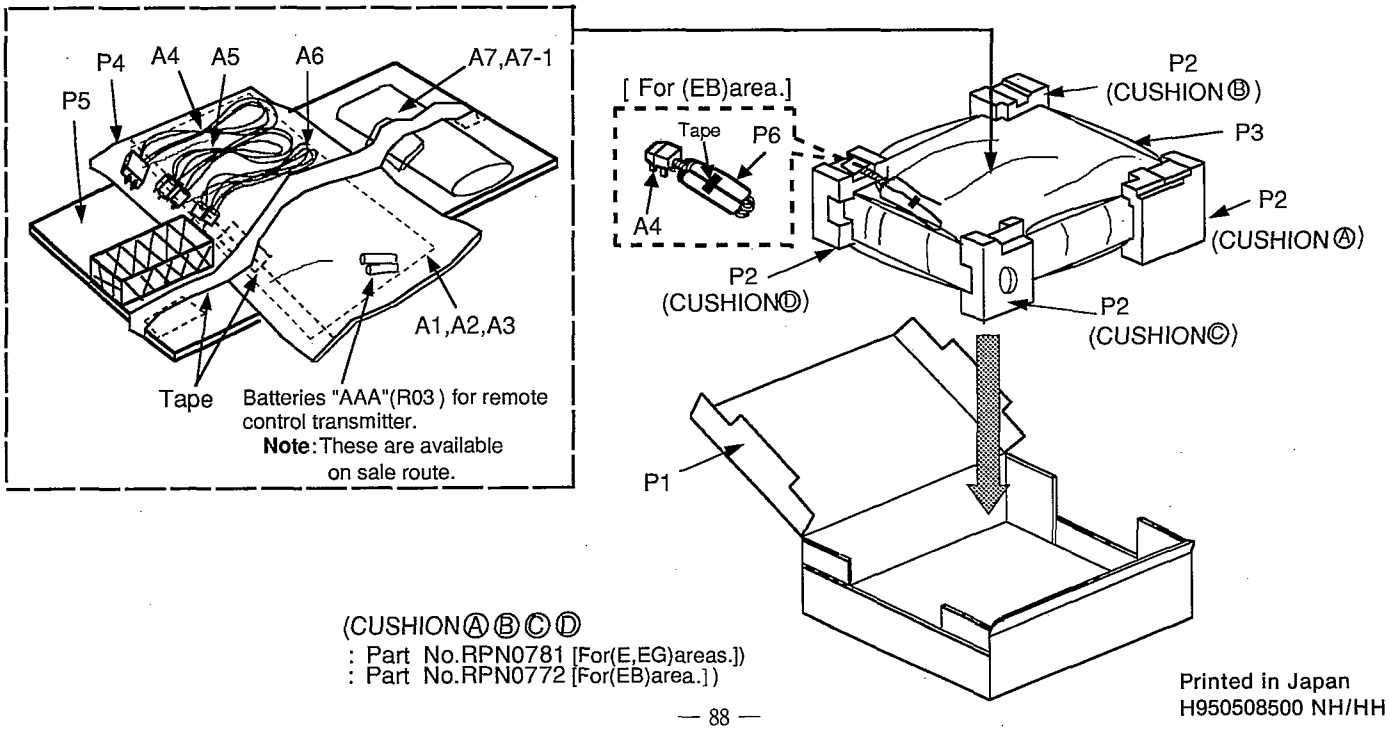
■ REPLACEMENT PARTS LIST

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.
*The "(SF)" mark denotes the standard part.
*[V] indicates in Remarks columns parts that are supplied by Video Recoder Division.

Ref. No.	Part No.	Part Name & Description	Remarks
		PACKING MATERIAL	
P1	RPG2511	PACKING CASE	(E, EG)
P1	RPG2512	PACKING CASE	(EB)
P2	RPN0781	CUSHION	(E, EG)
P2	RPN0772	CUSHION	(EB)
P3	SPP730	PROTECTION BAG (UNIT)	
P4	RPF0139	PROTECTION BAG (F. B.)	
P5	RPQ0535	PAD	
P6	RPH0032	MIRROR SHEET	(EB)
		ACCESSORIES	
A1	RFKSLVM500E	INSTRUCTION MANUAL ASS'Y	(E)
A1	RFKSLVM500EG	INSTRUCTION MANUAL ASS'Y	(EG)
A1	RQT2964-B	INSTRUCTION MANUAL	(EB)
A2	RQA0013	WARRANTY CARD	
A3	RQCB0169	SERVICENTER LIST	
A4	RJA0019-2K	AC POWER SUPPLY CORD	(E, EG) ⚠ (SF)
A4	VJA0733	AC POWER SUPPLY CORD	(EB) ⚠ (SF) [V]
A5	SJP2249-3	STEREO CONNECTION CABLE	

Ref. No.	Part No.	Part Name & Description	Remarks
A6	RJL1P007B20	VIDEO CONNECTION CABLE	
A7	RAK-SL171WH	REMOTE CONTROL TRANSMITTER	
A7-1	RKK0057-K	BATTERY COVER	FOR R/C TRANSMITTER
		<GREASE OR JIG/TOOL>	
		TEST DISC	
SA1	SZZP1054C	PLAYABILITY TEST DISC	
SA2	SZZP1056C	UNEVEN TEST DISC	
		ALLEN WRENCH	
SA3	SZZP1101C	ALLEN WRENCH (M2.0)	
		LOCK PAINT	
SA4	RZZ0L01	LOCK PAINT	
		GREASE	
SA5	RFKXPG671	MOLYCOAT GREASE PG671	

■ PACKAGING



(CUSHION Ⓐ Ⓑ Ⓒ Ⓓ
: Part No.RPN0781 [For(E,EG)areas.])
: Part No.RPN0772 [For(EB)area.])

Printed in Japan
H950508500 NH/HH