



DVD-ROM DRIVE

TS-H352C(SH-D162C)

Service Manual

DVD-ROM

Product Features



● READ

| | |
|------------------|--------------------|
| CD-ROM(MODE1) | : MAX 7,800KB/sec |
| DVD_single | : MAX 21,600KB/sec |
| DVD_dual | : MAX 10,800/sec |
| DVD - R | : MAX 8,100KB/sec |
| DVD+RW | : MAX 8,100KB/sec |
| DVD-RW | : MAX 8,100KB/sec |
| DVD-RAM | : MAX 2,700KB/sec |
| PIO MODE 4 | : MAX 16.6MB/sec |
| DMA MODE 2 | : MAX 16.6MB/sec |
| Ultra DMA MODE 2 | : MAX 33.3MB/sec |
| Ultra DMA MODE 5 | : MAX 100MB/sec |

The exterior design and some parts of the product may be changed without prior notification.

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1. Safety Precautions

1-1. Safety Precautions for Repairs

- 1) Since the equipment uses laser diode, ensure that eyes and parts of the body do not come near the laser diode while performing repair service.
- 2) Do not disassemble pickup to repair. If the laser diode is faulty, then replace the complete pickup assembly.
- 3) Perform repair services away from electrical equipments such as TV to avoid interference from these equipments.
- 4) Ensure to unplug the power cord from the unit before replacing any parts.
- 5) Ensure to insert the disc properly into the unit before use.
- 6) Since this equipment cannot be used as a standalone unit, it must be installed in a PC (586 or higher) with appropriate device driver from the floppy disk to verify proper operation.
- 7) This equipment has many parts with properties related to safety. These parts are specifically noted in the parts list and schematic drawings. Ensure to replace these parts with new parts that have the same specifications.
 - Since the laser diode in the optical pickup bundle can be easily damaged by the static electricity in human body or clothing, use the following grounding guidelines when handling the bundle.
 - Wear a wrist strap with one end properly grounded. The wrist strap discharges the static electricity in human body.
 - Work on a conductive material such as copper plate that is properly grounded.
 - Since the static electricity stored in clothing is not easily discharged, ensure that clothing does not make a contact with the pickup bundle.

1-2. Safety Precautions for Installations

A certain semiconductor components are highly susceptible to damages caused by electrostatic discharge (ESD).

Semiconductors components such integrated circuits, field effect transistors, and other semiconductor devices are examples of devices that are highly sensitive to ESD.

Use the following guidelines to reduce the damages caused by the ESD.

- 1) Before handling any semiconductor components or parts that contains semiconductors, immediately discharge all static electricity in the body by making a contact with a grounded metallic object. A commercially available wrist strap may also be used.

The static electricity must be discharged to avoid potential impact on the voltage during testing.
- 2) After removing ESD-sensitive components or parts, place the items on a conductive surface such as on a piece of aluminium to prevent accumulation of charges and exposure to ESD.
- 3) Use properly grounded soldering iron to solder or to de-solder ESD-sensitive components.
- 4) Only use anti-static soldering iron to de-solder ESD-sensitive components.

Use of soldering irons not classified as “anti -static” has enough electrostatic charges to cause damages to the components.

- 5) Do not use chemical sprays such as Freon. These chemicals have enough electrostatic charges to cause damages to the ESD-sensitive components.
- 6) Do not remove replacement parts from the anti-static packaging until they are ready for installation. [Most of the replacement parts are packaged in conductive foam, aluminium, or other conductive materials with all the leads shorted together.]
- 7) Before removing the anti-static packing materials for the new parts, make a contact with the chassis or protective material for the circuits to discharge the static charges.


Caution: Ensure that the power does not get transferred to the chassis or to the circuitry, and that all general safety guidelines are followed.

- 8) Minimize body movement when handling unprotected ESD-sensitive parts and components. (The movement of body causes build up of electrostatic charges from friction between layers of clothing, and between the shoes and the carpet which may cause damage to the components.)

1-3. Static Electricity, PL, and Voltage Safety Precautions

- 1) Read all safety and operational manuals before operating the product.
- 2) Keep the safety and operational manuals for future reference.
- 3) Follow all precautions and operational instructions shown inside or on the outside of the product.
- 4) Follow all operational and maintenance precautions.
- 5) Unplug the power cord from the socket before cleaning operation. Do not use liquid or aerosol type of cleaners to clean the exterior cabinet. Use a dry cloth only to clean the dust off the cabinet.
- 6) Do not use any attachments not recommended by the manufacturer. This may be unsafe and may damage the product.
- 7) Do not use the product near water such as bathtubs, washbasins, washing machines, swimming pools, or lakes.
- 8) Never place the product on the bed, sofa, radiator, or near any heat source.
- 9) Power: Only use the type described on the label. Contact the dealer if the power type cannot be identified. To operate the product using batteries or other sources of power, consult the operating manual.
- 10) Lightning: Unplug the power during lightning and during a long period when the product is not being used.
- 11) Electrical Overload: Do not plug excessive number of power cords into the outlet or extension outlet to prevent fire hazard and electrical shock.
- 12) Never put any object or liquid in the product. It may cause fire or electrical shock due to a potential contact with the power supply and/or short-circuit.
- 13) Replacement Parts: The service technician must use a replacement part with the same exact specification. Use of replacement part with incorrect specification may result in fire, electrical shock, and other safety hazards.
- 14) Safety Inspection: Always perform a safety inspection after a service and/or repairs.

Important Safety Precaution:

The product contains special components important for safety. These components are identified with  in the schematic drawings. These components must be replaced with components with the exact same specification to prevent electrical shock, fire, and other hazards. Do not modify any part of the original product design without manufacturer's permission.

Description of Warning / Caution



Warning: A death or a serious injury may result if the instructions are not followed properly.

Caution: Property damage may result if the instructions are not followed properly.

2. General Specifications and Features

2-1. General Specifications

- Drive Type: Internal
- Power Consumption: DC +5V, 1.2A
DC +12V, 1.5A
- Dimensions: 148.2mm(W) x 184mm(L) x 42mm(H)
- Weight: 750g

2-2. Features

- Interface: ATAPI BUS (E-IDE)

- Data Transfer Rate:

● CD/DVD

Read (CD-ROM) 7,200KB/sec (Maximum: 48X)

Read (DVD-ROM) 21,600KB/sec (Maximum: 16X)

- ACCESS TIME

- (CD-ROM) 1/3 Stroke: < 130ms

Full Stroke: <210ms

- (DVD-ROM) 1/3 Stroke: < 140ms

Full Stroke: <230ms

- Buffer Size: 512KB

- Error Rate: Mode 1: 10^{-12}

Mode 2: $< 10^{-9}$

- Frequency Response: 20Hz~20KHz (Line out)

20Hz~20KHz (Line out)

- Signal to Noise Ratio: 80dB (1KHz, Line out)

65dB (1KHz, Line out)

- Distortion: < 0.15% (1KHz)

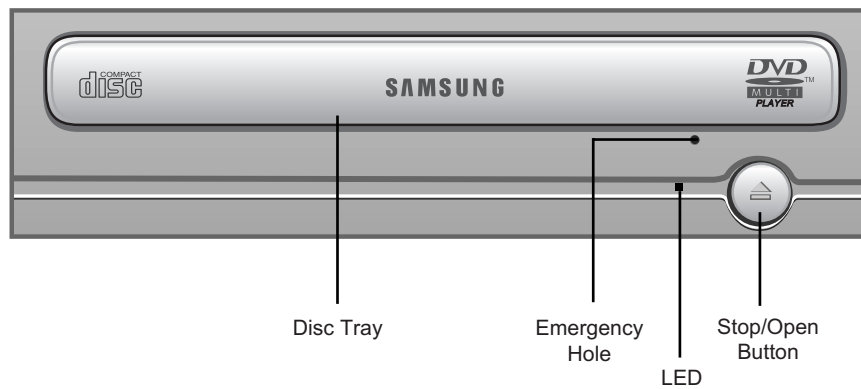
- Channel Separation: Line out: 65dB (1KHz)

- Laser Type: Semiconductor Laser

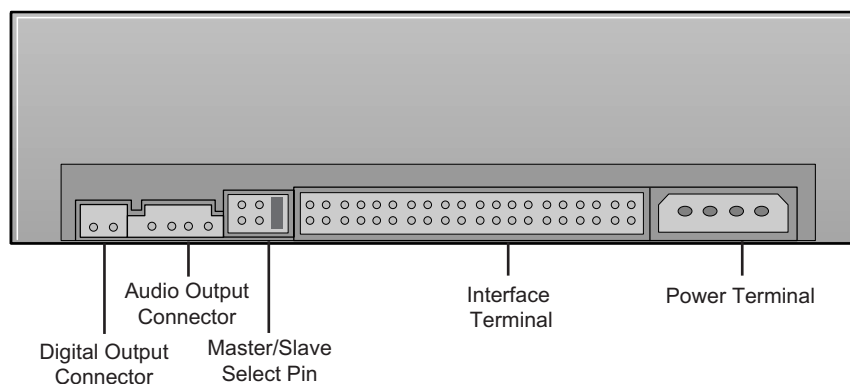
- Audio Output: Line out : 0.7Vrms \pm 20% 47Kohm



Front



Rear



3. Functional Description and Installation

3-1. Hardware Functional Description

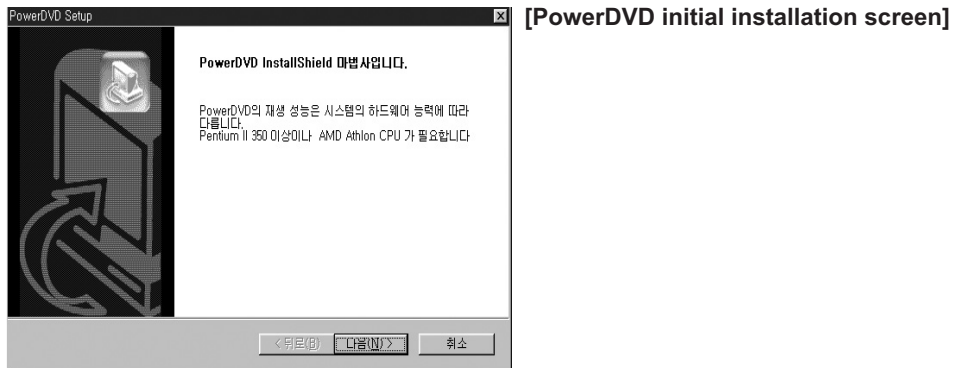
Read CD-ROM: CAV 48X Max.
 CD-R: CAV 48X Max.
 CD-RW: CAV 32X Max.
 PIO mode 4: 16.6MB/sec
 Multiword DMA mode 2: 16.6MB/sec
 UDMA mode 2: 33.3MB/sec

3-2. PowerDVD

Installing PowerDVD

(a) Install PowerDVD.

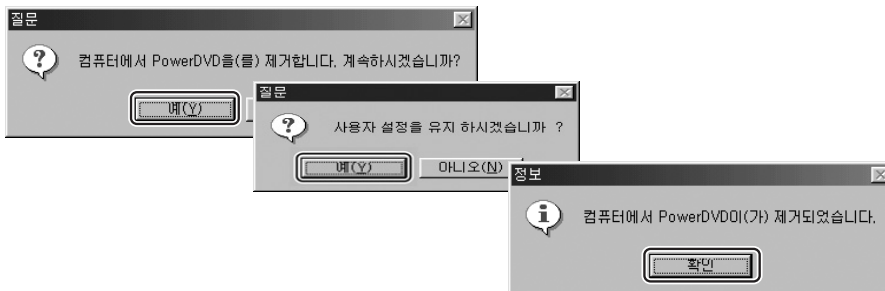
After the initial installation screen as shown below, click [NEXT] and follow the instructions to complete the installation.



Uninstalling PowerDVD

(b) There are two methods of uninstalling PowerDVD.

1. Click [Start] -> [Program] -> [CyberLink PowerDVD] -> [Uninstall PowerDVD]. Follow the dialog boxes shown below in sequence.
1. Click [Start] -> [Setting] -> [Control Panel] -> [Add/Remove Programs], the following screens appear.



PowerDVD System Requirements

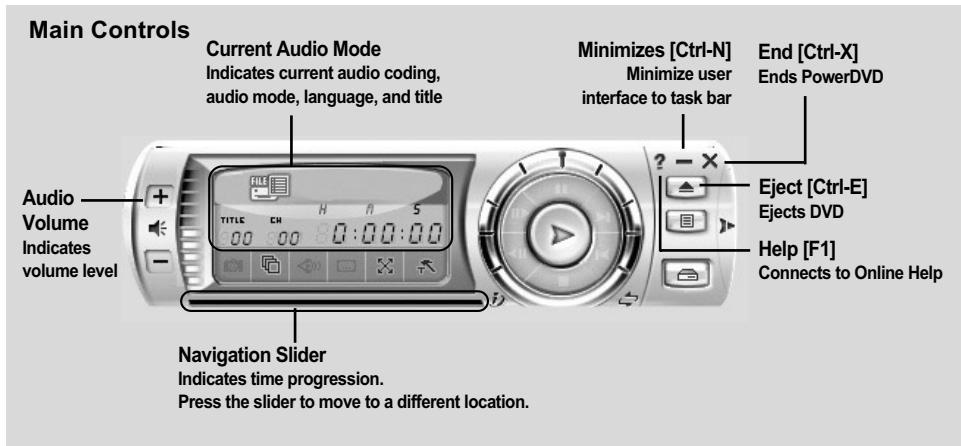
- Operating System: Microsoft Windows 98SE/ME/2000/XP
- Processor: Intel Pentium II 350MHz or higher, Athlon Processor
- Memory: > 64MB
128MB is recommended to utilize the audio effects.
- Display Resolution: 800 x 600 pixels minimum, 1024 x 768 recommended
- Audio: PCI Sound Card, USB Audio Box, Mainboard with audio support
- Hard Disk Space: > 40MB
- Video Display: Display card supporting DirectDraw overlay

PowerDVD Introduction Screen



3-2-1. PowerDVD Functional Overview

Main Controls



Frame Capture [C]
Captures video contents in bitmap image



Next Title [U]
Changes the title during playback



Previous Section [R]
Selects the previous section during DVD title menu selection

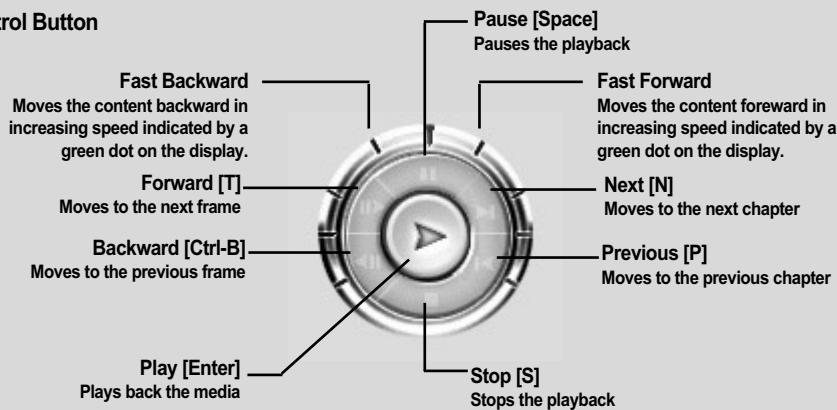


Full Screen [Z]
Changes to full screen mode or window mode



Next Audio Stream [H]
Changes the audio stream

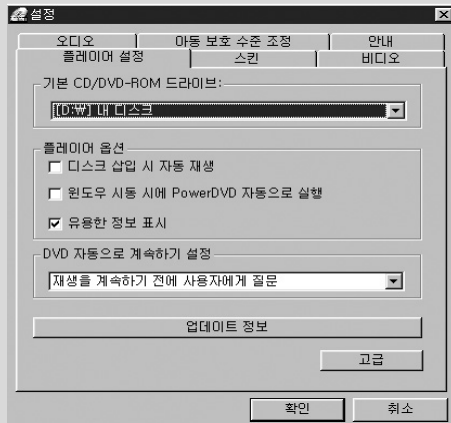
Control Button



Options

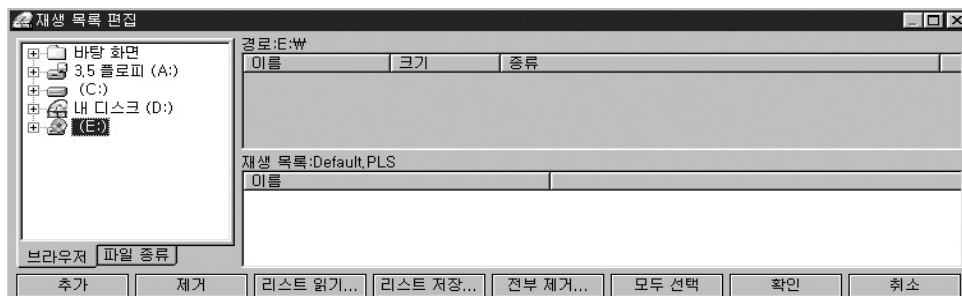


This window has options for player, skin, audio, child protection control, and information.



Standard Video Playback

[Icon] Select source -> Open media file: play standard video files [mpg,avi...]



4. Disassembly and Assembly

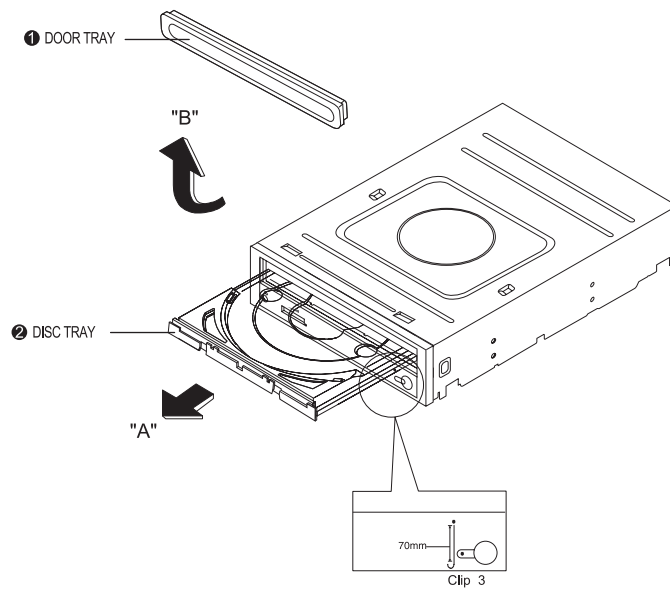
4-1. Disassembly

4-1-1. Exterior Components and PCB Disassembly

• Door-Tray

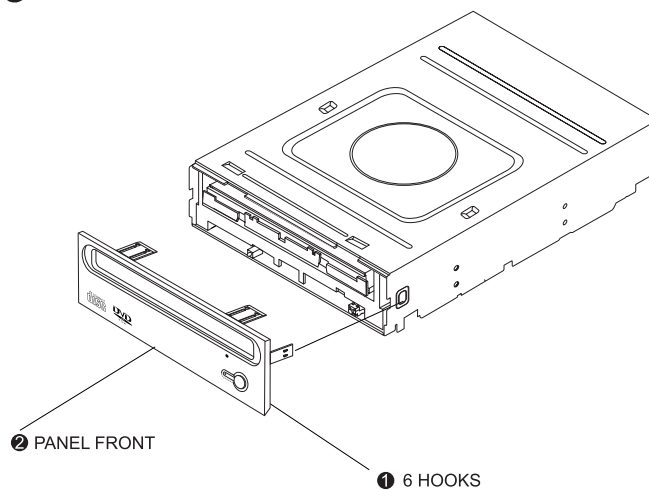
- (a) Apply power, and open tray ② in "A" direction.
- (b) Lift door ① in "B" direction.
- (c) After closing the tray ②, turn the power OFF.

Note: If the tray ② does not open, then force the tray open manually by pushing the pin Clip 3 into the emergency hole on the unit.



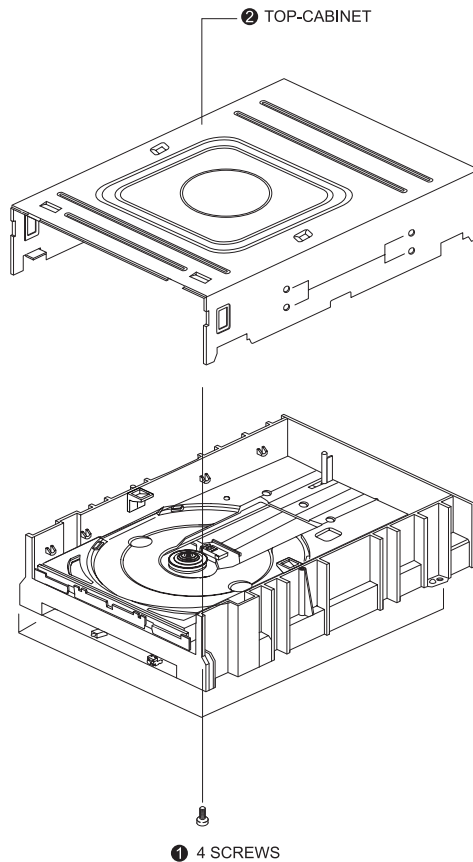
• Panel Front

- (a) Press hooks ① in 6 places.
- (b) Pull front panel ② toward the front.



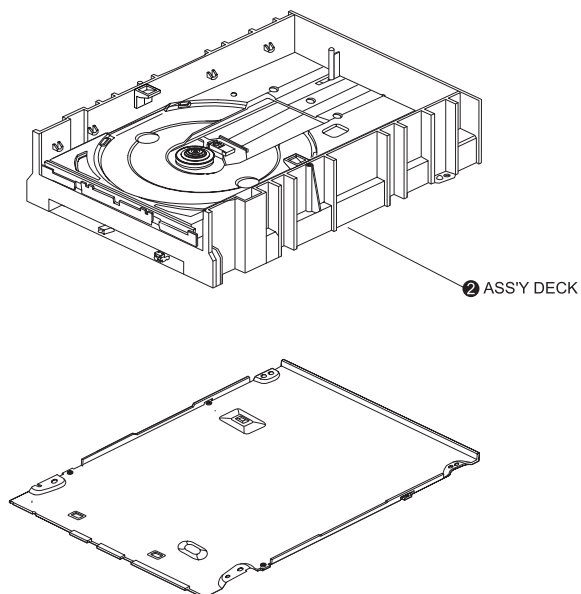
• **Top-Cabinet**

- (a) Remove screws ❶ in 4 places.
- (b) Lift top cabinet ❷.



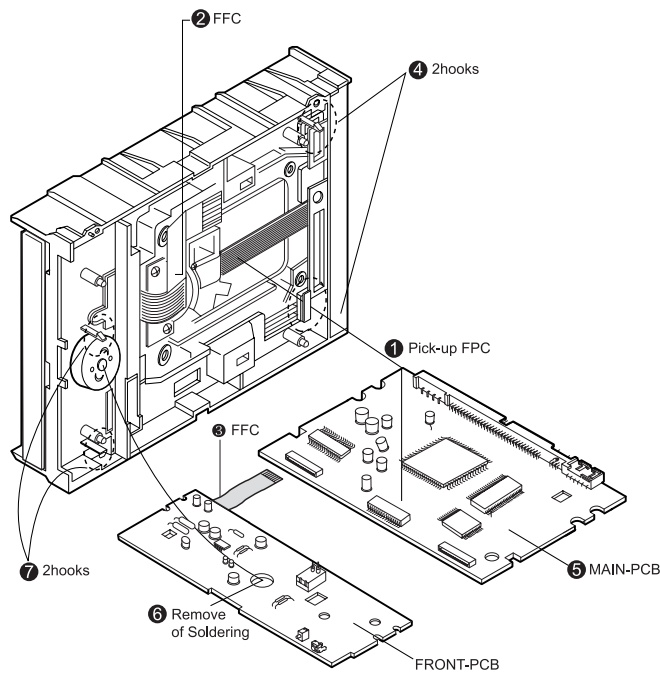
• **Assy-Deck**

- (a) Lift assembly deck ❷.



• **MAIN-PCB**

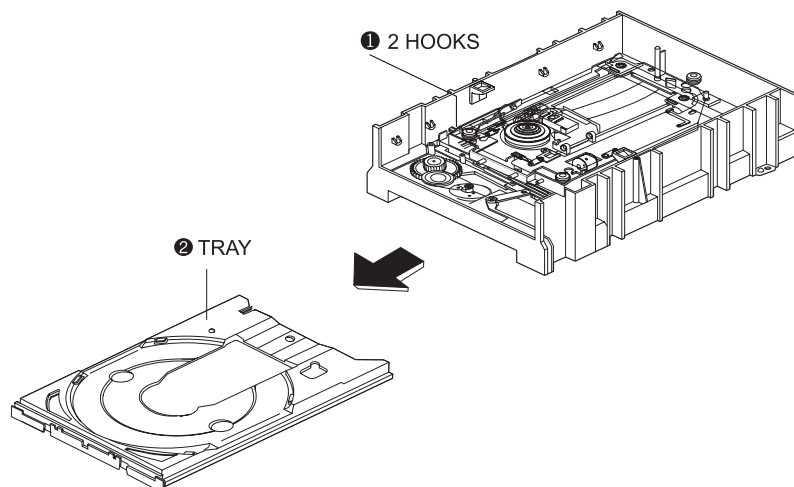
- (a) Detach Pick-up FPC ① from the PCB.
- (b) Detach FFC ② between the main PCB and the front of the PCB.
- (c) Detach FFC ③ between the main PCB and the front of the PCB.
- (d) Press hooks ④ on the deck used for securing the PCB.
- (e) Disassemble the main PCB ⑤.
- (f) Remove the solder on the PCB used for connecting the motor.
- (g) Detach the front PCB from the deck by pressing the hooks.



4-1-2. Deck Disassembly

• **Tray**

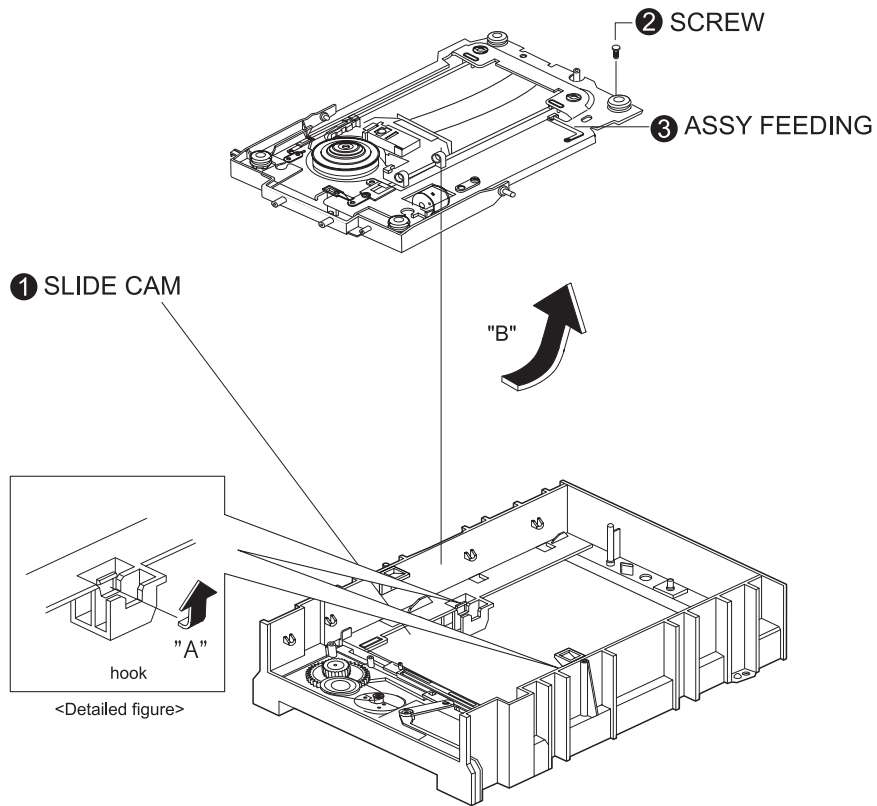
- (a) Press hooks ① in 2 places.
- (b) Pull tray ② towards the direction of the arrow.



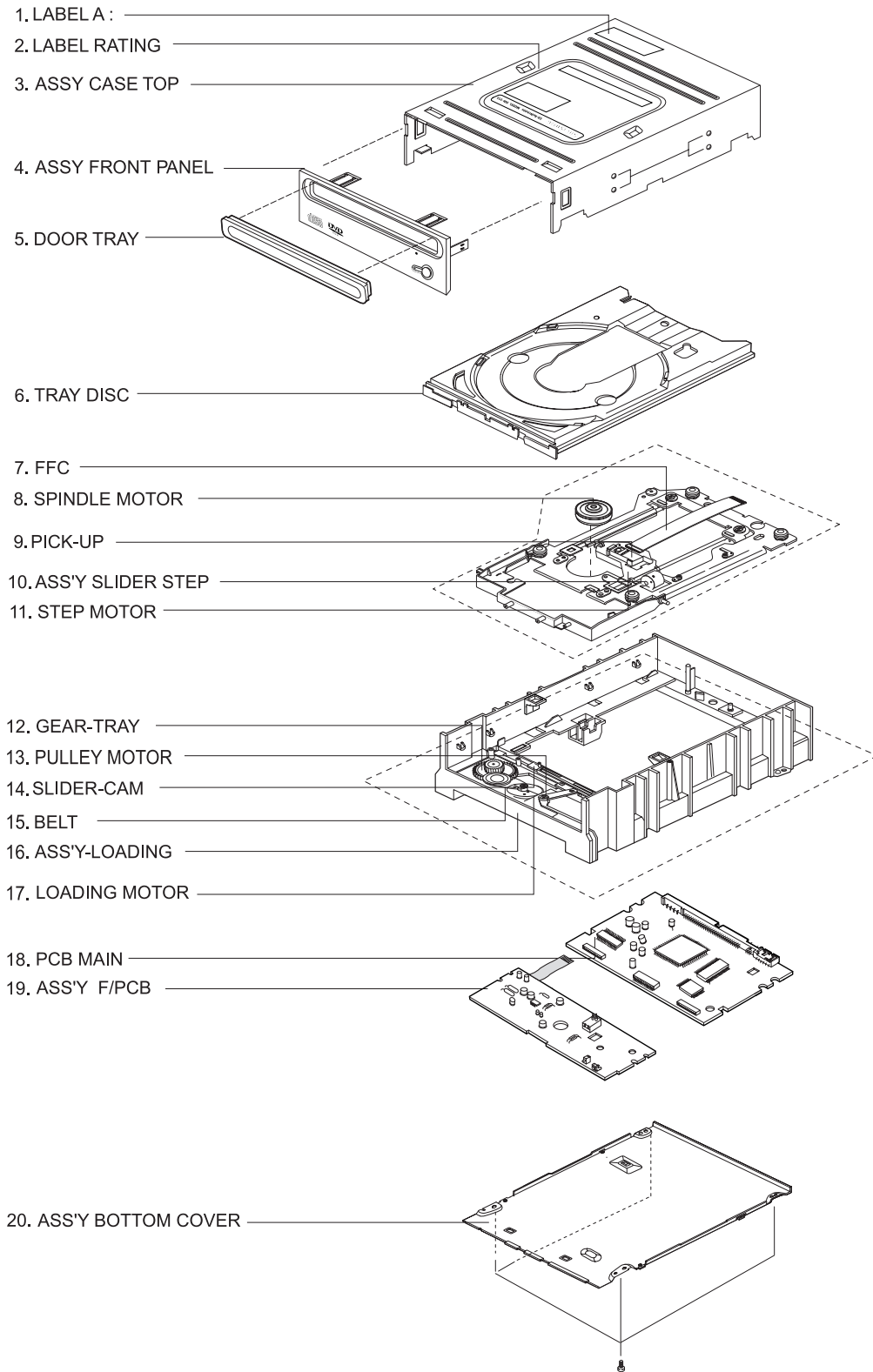
4-1-3. Deck Disassembly

• Assembly Deck

- (a) Move slide cam ① towards the left.
- (b) Remove screw ②.
- (c) While pressing hooks in 2 places towards the direction of "A", disassemble ASSY FEEDING ③ in the direction of "B."



4-1-4. Assembly Diagram



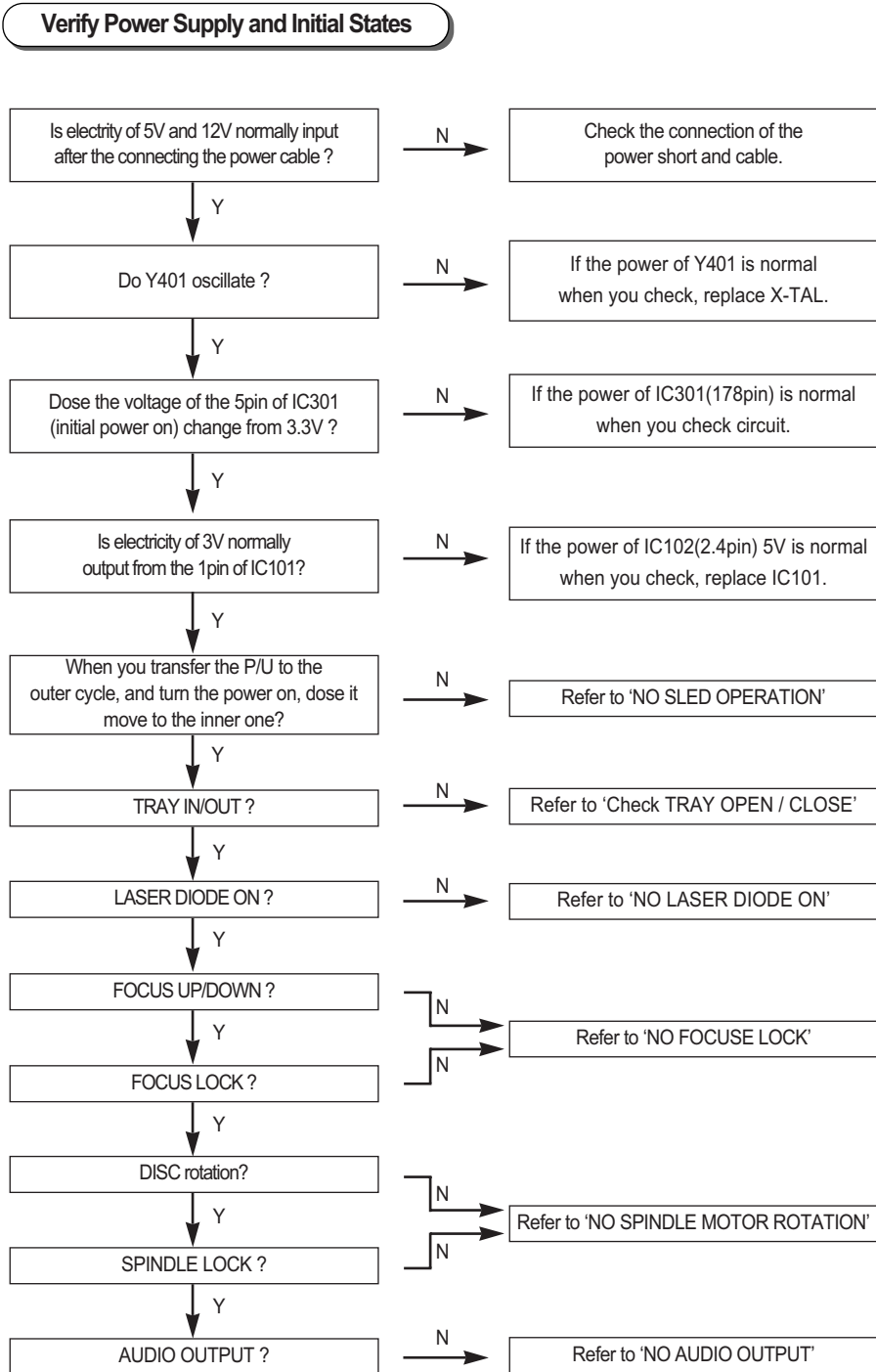
- Parts List

| No | Code No | Description | Specipication | Remark |
|----|-------------|--------------------|--|--------|
| 1 | BG68-00130A | LABEL A | | |
| 2 | BG68-00954A | LABEL RATING | LABEL RATING ; TS-H352C, DELL, ART PAPER, -, 8 | |
| 3 | BG97-04128A | ASSY CASE TOP | ASSY-COVER TOP ; -, SW-252T, D6V | |
| 4 | BG97-03869B | ASSY FRONT PANNEL | ASSY-PANEL FRONT ; ABS, SD-616E/DNR, C6200 G | |
| 5 | BG64-00252J | DOOR TRAY | DOOR-TRAY ; SD-616E/DWR, PC/ABS, -, -, -, -, C62 | |
| 6 | BG63-00149B | TRAY DISC | TRAY-DISC ; SM-352S, ABS(NH-0926), -, -, -, -, M | |
| 7 | BG41-00331A | FFC | FFC-FRONT ; TS-H352C, -, -, 8, -, - | |
| 8 | BG97-04477A | SPINDLE MOTOR | ASSY-SPINDLE MOTOR ; LEAD FREE, TS-H492A | |
| 9 | BG30-00082A | PICK-UP | PICK UP ; SF-HD68V, 3.05/3.07, 0.60/0.47, 1.2 | |
| 10 | BG97-04145A | ASS'Y SLIDER STEP | ASSY-SLIDER STEP ; -, SD-616P, ASSY SLIDER S | |
| 11 | BG31-00066A | STEP MOTOR | MOTOR STEP ; SPS-15RF-057KP, SM-352S, -, -, -, - | |
| 12 | BG66-00061A | GEAR-TRAY | GEAR-TRAY ; SC-152A, -, -, -, -, -, -, - | |
| 13 | BG66-00118A | PULLEY MOTOR | GEAR-PULLY ; SW-252T, POM(F20-03), -, -, -, -, - | |
| 14 | BG66-00062A | SLIDER-CAM | SLIDER-CAM ; SC-152A, -, -, -, -, -, - | |
| 15 | BG66-00044A | BELT | BELT-PULLY ; SC-148T, CR-70, KIPA, 5CM-70, -, -, - | |
| 16 | BG97-05124A | ASS'Y LOADING | ASSY-LOADING ; ASSY, TS-H292C, - | |
| 17 | BG97-04449A | LOADING MOTOR | ASSY-LOADING MOTOR ; -, SD-616P, ASSY | |
| 18 | BG99-90009D | PCB MAIN | ASSY PCB, m;TS-H352C, DELL | |
| 19 | BG92-00516A | ASS'Y F/PCB | ASSY OPT PCB ; TS-H352C, - | |
| 20 | BG63-00147A | ASS'Y BOTTOM COVER | COVER-BOTTOM ; SD-616P, SECC, 0.5T, -, -, -, -, - | |

*** The parts list contains parts for SA only.**

5. Troubleshooting

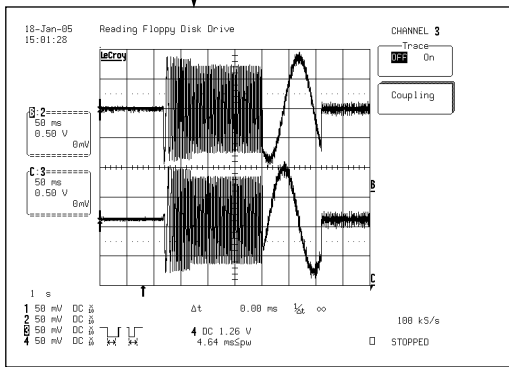
5-1. Troubleshooting Procedure



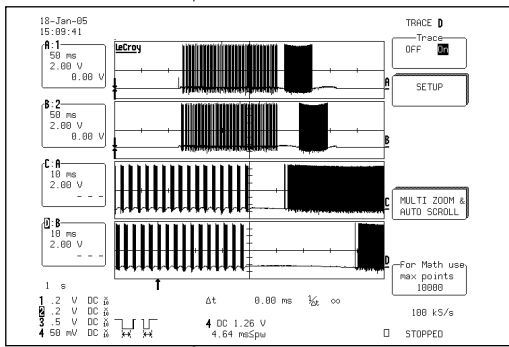
When sled is not working

When you transfer the pick-up to the outer cycle and turn the power on, dose the P/U move to the inner one? Y → SLED operation of normal.

N ↓
 The below waveform is outputted in IC301 17, 18pin, R310, R311(PWMOUT1)? N → If the constant of IC301 and GND, pattern's when you check, replace.

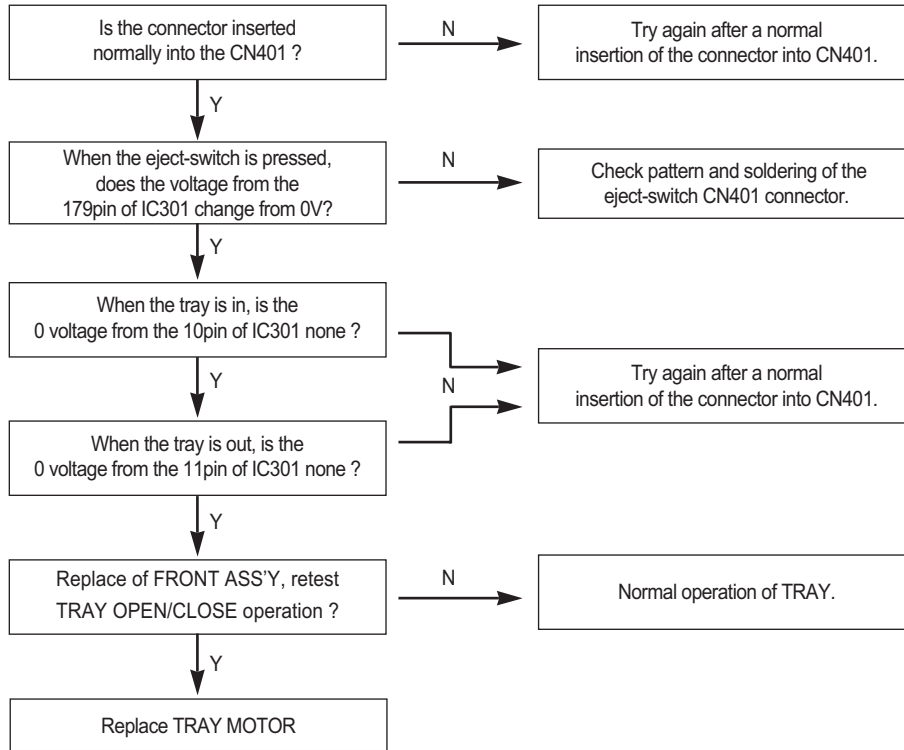


The below waveform is outputted in IC501 33, 35pin ? N → If the constant of IC501 and GND, pattern's when you check, replace.

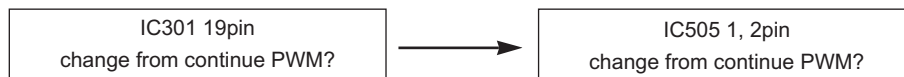


Y ← Checking soldering of CN501 N →
Y ↓ Replace stepping Motor.

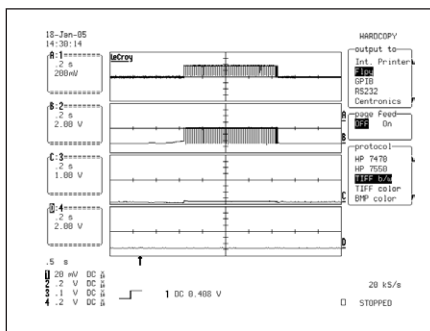
When tray does not open or close



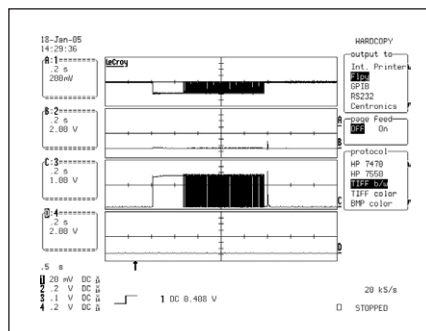
Tray driver IC operation



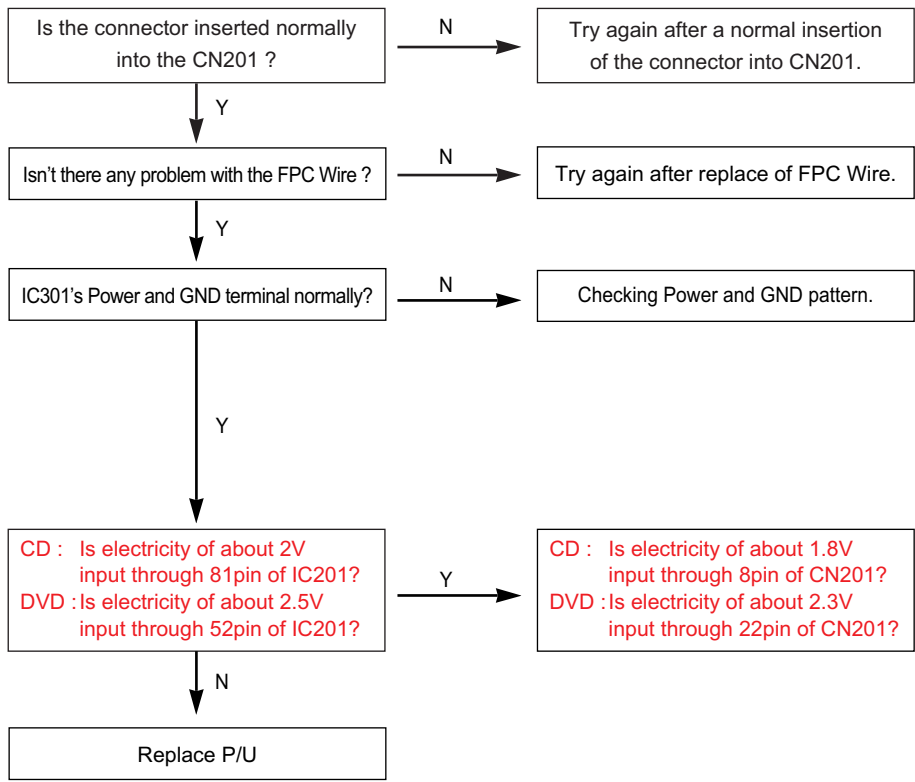
● TRAY IN



● TRAY OUT

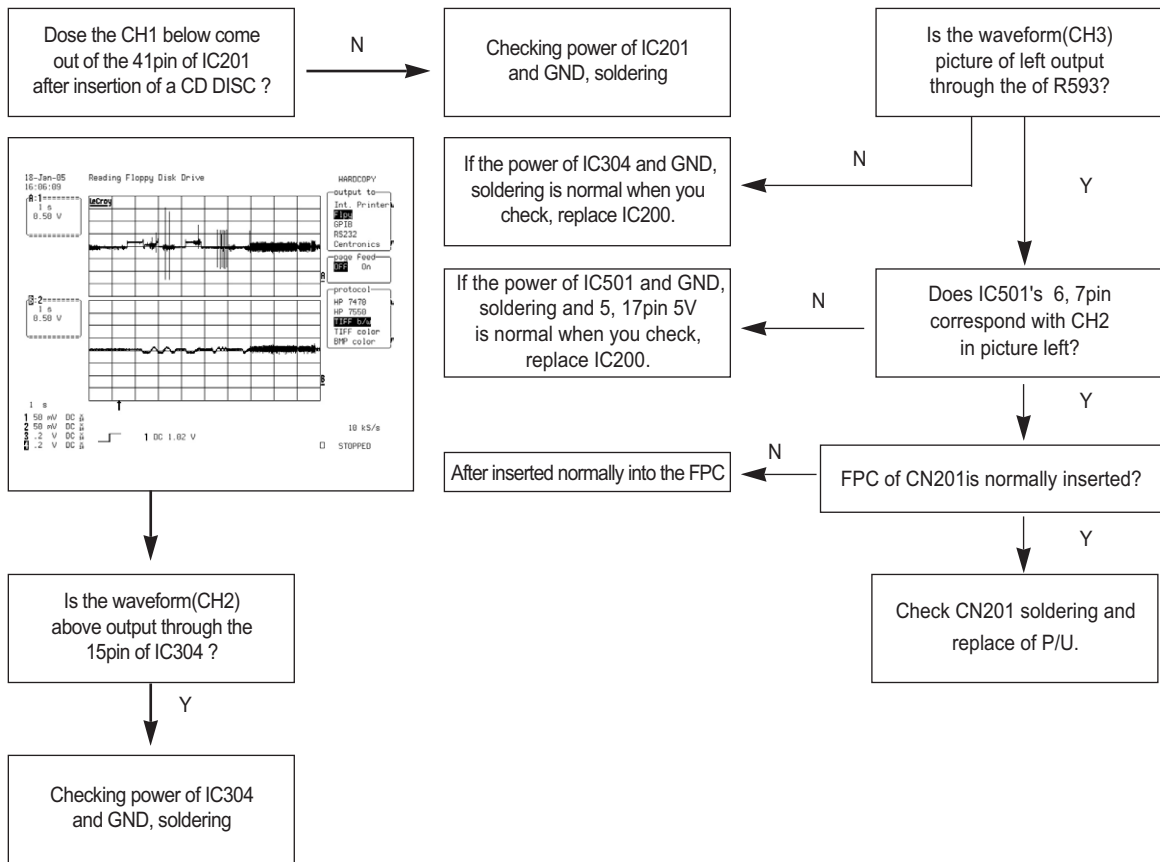


When the laser diode does not turn on

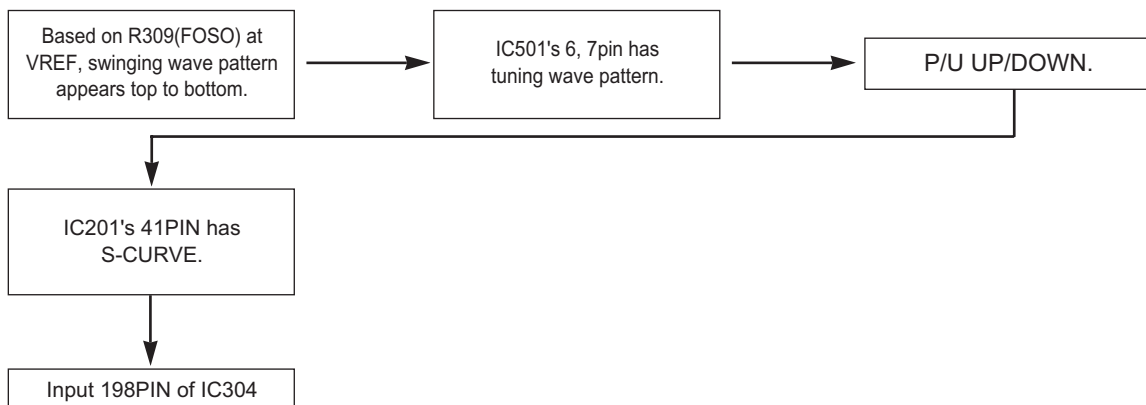


※ Voltages indicated with (*) vary depending on the set, disc, P/U and Read, Write modes.

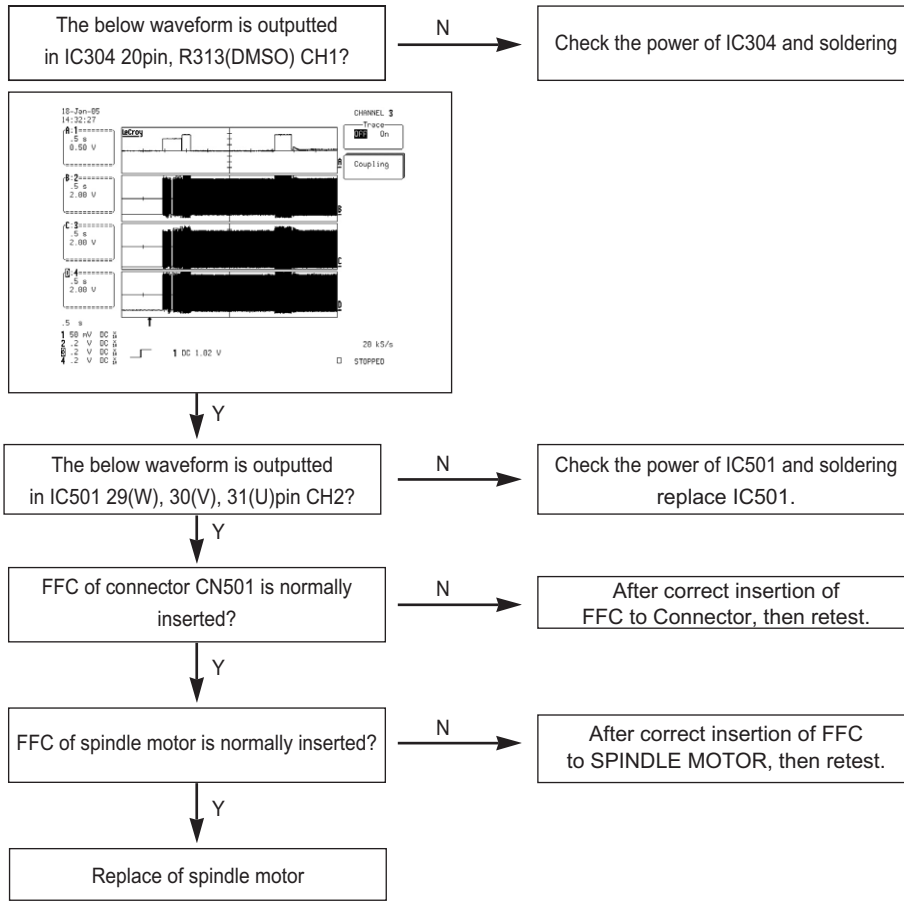
When focus lock is not functioning



Focus lock operation

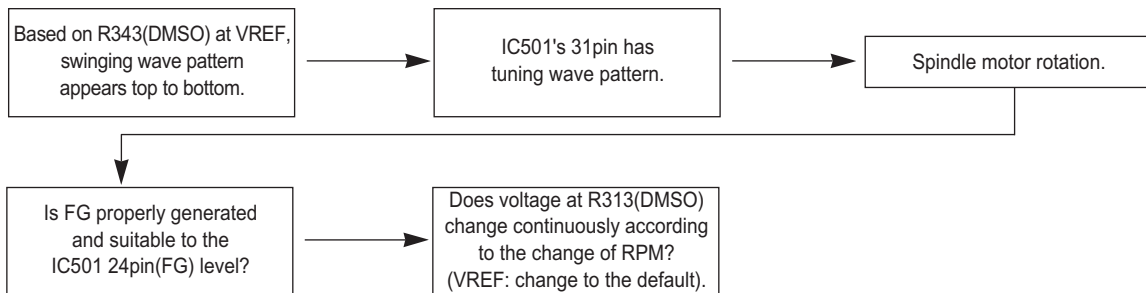


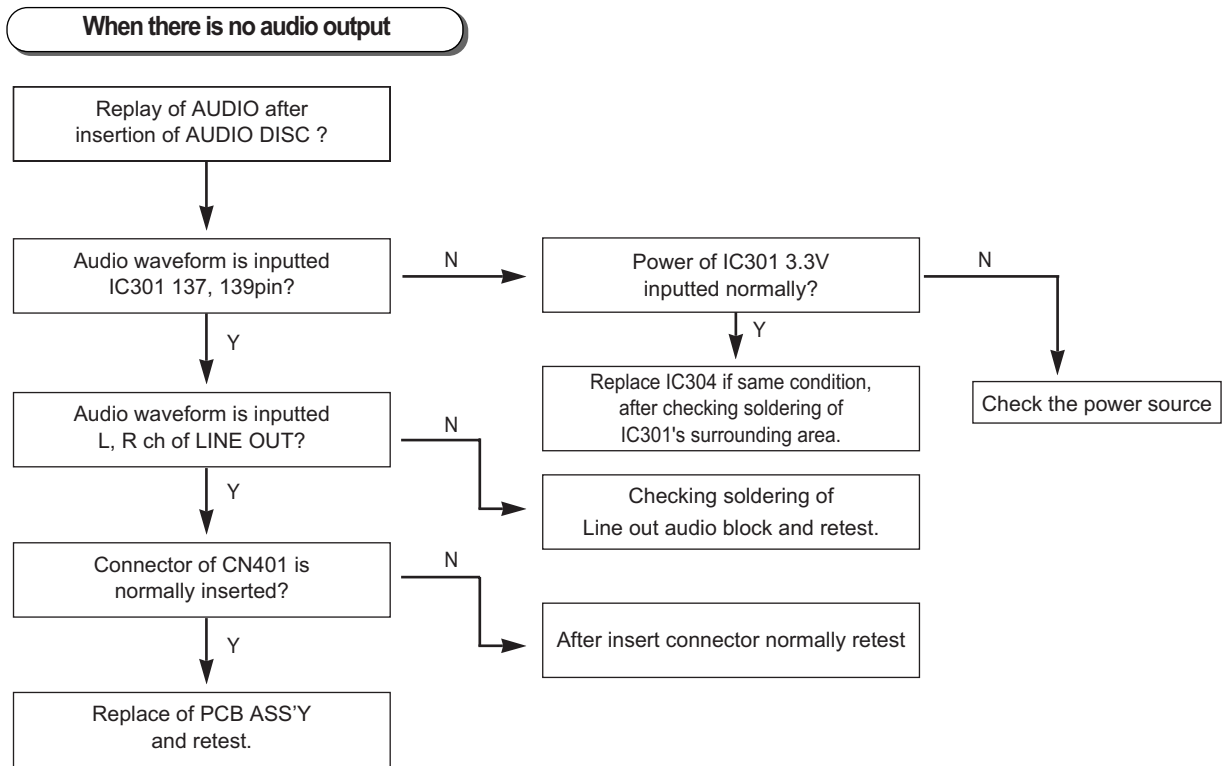
When spindle motor is not rotating



Spindle motor operation

● CD - ROM READ





5-2. Diagnostic Program

5-2-1. Environment

A. Program: RW DIAG (FA TEST for Windows Program)

B. Target Products: All ODD Products (CD-ROM, DVD-ROM, CD-RW, COMBO, DVD-WRITE)

C. Evaluation Criteria and Test Specifications

(a) CD-ROM, DVD-ROM Read Test (STD-200, TDV-520) < CD => 01:10 DVD => 02:05 Inner/Outer >

- Sequential Read, Random Read 200 times on 10% of internal, external tracks

(b) CD-R, CD-RW Write/Read Test (CD-R/RW) <CD-R=>00:50 CD-RW=>01:04 Inner/Outer >

- Write Test: TAO Mode 1, record 10000 LBA from the Next writable Address

- Read Test: Sequential Read and Compare of recorded sectors

(c) DVD-R/RW, DVD+R/RW Write/Read Test (DVD-R/RW, DVD+R/RW) < DVD ±/RW 01:30 Inner/Outer >

- Write Test: Incremental Mode, record 10000 LBA from the Next writable Address

- Read Test: Sequential Read and Compare of recorded sectors

(d) Media Support Verification: Verification of support for the user media among the products for evaluation. (NDF distinction)

- Indicates support for WST by comparing with the disc information (Atip or MID)

D. Application

(a) Target Users: PC/ODD service center technicians

(b) Description

- Existing ODD product evaluation has been based on reproduction of symptoms already received (SWAP) on DOS environment. On the other hand, RWDIAG program runs on Windows environment, and allows evaluation of major performance features of ODD in real time enabling faster response to customer inquiries and objective performance evaluation. Therefore, it reduces potential conflicts with the customers by providing faster and precise information from the tool.

- This program can reduce defaults and errors that may cause malfunctioning of computer.

E. RWDIAG Screen Description



■ Using the Program

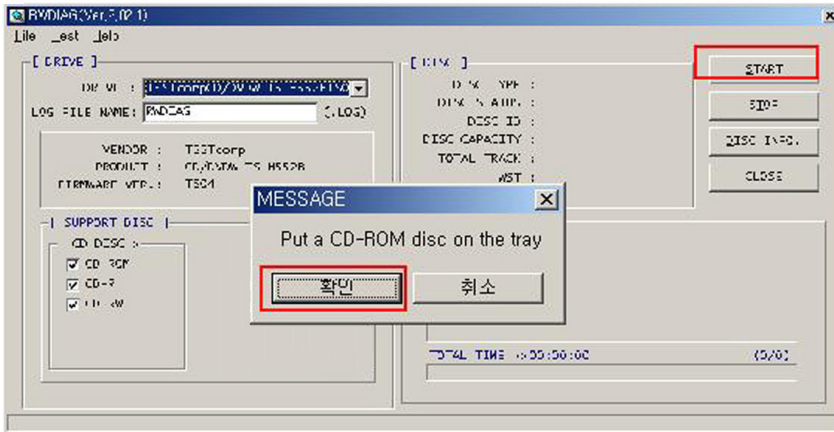
The program automatically selects appropriate target test criteria for each product category to be evaluated, and test criteria that do not apply to the target evaluation products become inactivated so that they cannot be selected.

- Copy RWDIAG program supplied to hard drive .
- Connect the drive to be tested to the PC, and start the program.

<< Starting the Test >>

A. Drive under Test: TS-H352C(SH-D162C)

(a) Click on “START” within RWDIAG program window, and “Put a CD-ROM disc on the tray” message window appears.

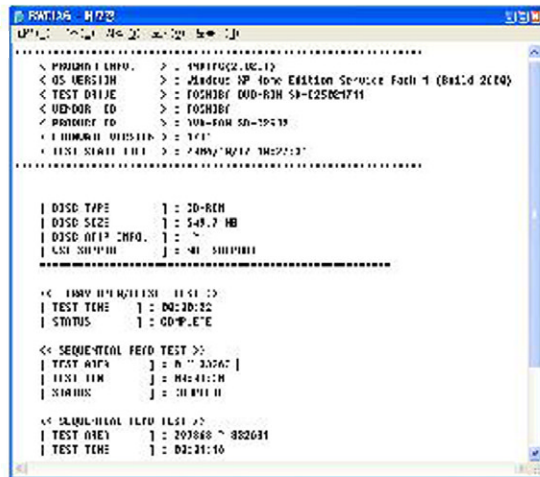


B. Insert “STD-200” disc in the tray, and click “OK” button. The tray closes, and CD Read evaluation testing starts.

- After the test, CD-ROM test result as shown on the right can be displayed by clicking “Open LogFile” in “File” menu.

[CD/DVD-ROM TEST Category]

- Tray Open/Close Test
- Sequential Read Test (inner/outer 10%)
- Random Read Test, 200 times



5-3. Operational Failure Symptoms and Actions

The PC does not recognize the DVD-ROM Drive.

PC becomes slow after installing DVD-ROM Drive.

- Ensure that the power cable, audio cable, and IDE cables are connected properly.
- Use a different IDE cable connection. (Connect to the master for the secondary IDE cable if possible.)
- Check the status of Master/Slave pin setting.

The PC does not recognize the DVD-ROM Drive in DOS.

- Install the driver again, or go to Samsung Electronics website (www.sec.co.kr) or to ODD Service website (www.samsung.ODD.com) to download and install the latest version of the driver.

The PC does not recognize the DVD-ROM Drive in Windows.

- If error occurs in Windows program, then the hardware may not get recognized – reinstall the program.
- If the drive is not recognized only in Windows, then reinstall Windows.

There is no sound from the Audio CD.

- Check whether the audio cable is correctly connected to the sound output terminal on the DVD-ROM drive and the sound card CD-IN terminal.
- Check that the sound card is operational.

The PC does not recognize the CD and is slow.

- Check the condition of the CD, and, if necessary, use it after it has been cleaned.

The disc tray does not open.

- Ensure that the power cord and cables are connected properly.
- If the tray does not open when the power is on, first, try to open by pressing Open/Close button again after re-booting the system. If, however, it still does not open, then turn the power off, and insert a pin or a paper clip into the emergency hole to force the tray open.

When software MPEG player is used to playback the contents of CD, the video is jerky and slow.

- Use a smaller playback window.
- Ensure the display resolution is set correctly. If not, go to the Control Panel to set the resolution to correct setting.

Disc empty message appears even with a disc in the drive.

- Accessing the drive too fast after inserting the CD in the tray may cause the PC not to recognize the CD. Open and close the tray, and then retry.
- Always clean the disc before use.

5-4. Compatibility Issues and Suggested Actions

What is DMA Mode?

DAM (Direct Memory Access) allows autonomous transfer of data between the main memory and peripheral devices without CPU intervention which reduces the CPU load for multi-tasking, and increases the transfer speed.

- It minimizes the number of interrupts for inputs and outputs during program execution increasing system efficiency. It provides direct exchange of I/O data at high speed between the main memory and peripheral devices without going through the CPU.
- UDMA means Ultra DMA, and PIO has the opposite concept to DMA. That is, if PIO transfer mode is selected, the CPU manages the data transfers between the main memory and peripheral devices.
- In DMA mode, data are transferred directly among peripheral devices without the intervention of CPU. However, DMA mode cannot be selected if the mainboard does not support the DMA mode. In addition, DMA mode cannot be selected if an external connection device is used.
- In DMA mode, a number of mainboard using VIA chipsets and some specialized mainboard may have compatibility issues. Check for DMA mode support on your mainboard before using the mode. If the mainboard does not support the DMA mode, then change the mode to PIO mode.

※ **The Combo Drive supports UDMA. Since a number of mainboards with VIA chipsets may cause compatibility issue, use PIO mode instead of DMA mode.**

DMA Selection for the Combo Drive

Windows98 & WinME

Select DMA by clicking 『 Start -> Settings -> Control Panel -> System -> Hardware Wizard -> CD-ROM -> Drive Property -> Select 』

Windows2000 & Windows XP

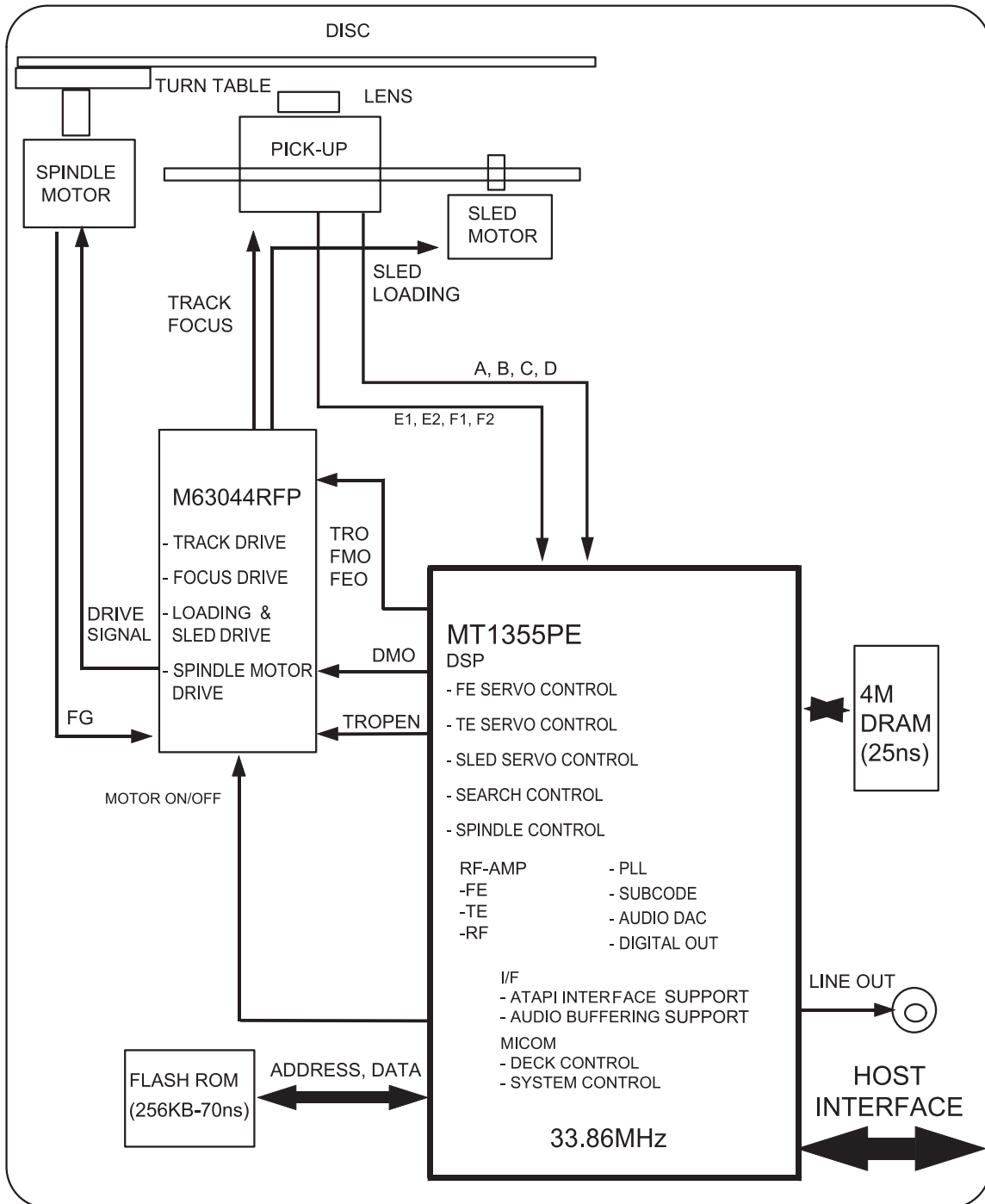
Select DMA by clicking 『 Start -> Settings -> Control Panel -> System -> Hardware -> Hardware Wizard -> IDE ATA / ATAPI Controller -> Secondary IDE Cable Controller Property -> Advanced 』

- **Device 0: Master Device 1: Slave**

The DMA selection procedure may vary depending upon the OS environment.

※ **Verify that the DMA selection has been performed correctly after the selection process.**

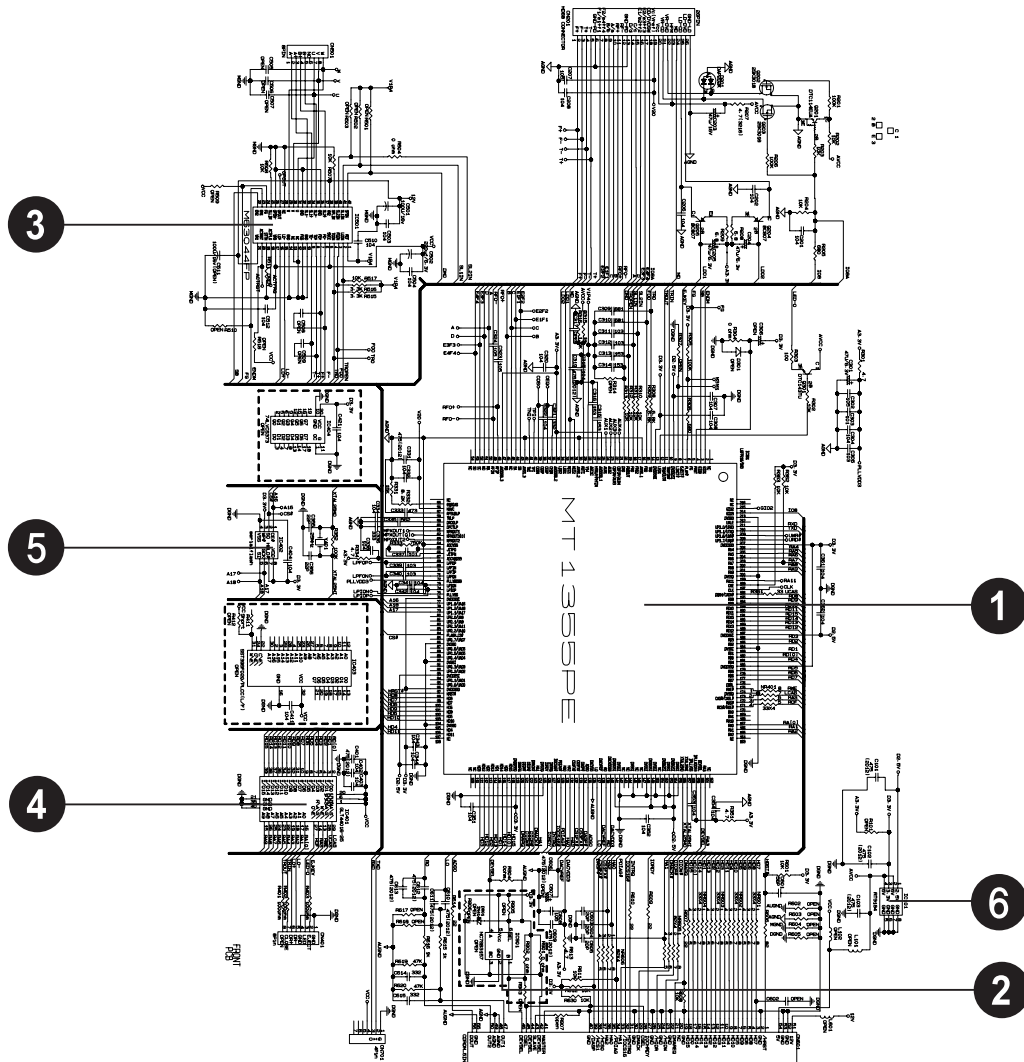
6. Block Diagram



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7. Schematic Drawings



- Circuit Parts List

TS-H352C(SH-D162C)

| Name | Part Number | Specification | Qty | SA-SNA | Notes |
|-------|-------------|--|-----|--------|-------|
| IC301 | 0904-001999 | IC-DSP ; MT1355,16Bit, LQFP, 216P, 24x24mm, 25 | 1 | SA | |
| IC901 | 1003-001715 | IC-ANALOG MULTIPLEX ; SN74LVC1G3157, -, SO, 6 | 1 | SA | |
| IC501 | 1105-001261 | IC-MOTOR DRIVER ; M63044FP, SSOP, 42P, 13x17m | 1 | SA | |
| IC401 | 1107-001406 | IC-DRAM ; V53C16258HK25, 256KX16BIT, SOJ, 40P | 1 | SA | |
| IC402 | 1107-001406 | IC-FLASH MEMORY ; M25P20,256Kx8Bit, SOP, 8P | 1 | SA | |
| IC101 | 1107-001406 | IC-MULTI REG .; RT9184A-FNPS, SOP, 8P, 5.0x6 | 1 | SA | |

* The parts list contains parts for SA only.

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