

## MEASUREMENT/TECHNICAL REPORT

COMPANY NAME MODEL LF-D201

FCC ID:ACJODSDLFD201

January 14, 2000

This report concerns(check one):Original grant <input checked="" type="checkbox"/> Class II change <input type="checkbox"/>	
Equipment type: <u>Optical Disk Drive(DVD-RAM Drive)</u> (ex: computer, printer, etc.)	
Request issue of grant(check one): <input checked="" type="checkbox"/> Immediately upon completion of view. <input type="checkbox"/> Defer grant per 47 CFR 0.457(d)(1)(ii)until _____ date _____.	
Company	Name agrees to notify the Commission by _____ date _____ of the intended date of announcement of the product so that the grant can be issued on that date.
Measurement procedure used:(check one) ANSI C63.4-1992 <input checked="" type="checkbox"/> Other _____ If other, describe _____	
Applicant for Certification	
Prepared by:	
Your name	Masataka Maeda
Your company name	MATSUSHITA ELECTRIC INDUSTRIAL CO.,LTD. STORAGE DEVICE BUSINESS DEPARTMENT
Your address	1-15,MATSUO-CHO,KADOMA,OSAKA,571-8504 JAPAN
Your phone number	06-6906-2333
Your FAX number	06-6906-2343
Your mail address	1-15,MATSUO-CHO,KADOMA,OSAKA,571-8504 JAPAN

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**STANDARD FORMAT**  
**MESUREMENT / TECHNICAL REPORT**  
**PERSONAL COMPUTER AND PERIPHERAL**

## 1 GENERAL INFORMATION

### 1.1 Product Description

Please make reference to the Sheet 4 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 1.2 Related Submittal/Grant

N/A

### 1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Please make reference to the Sheet 8.9 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 1.4 Test Methodology

Please make reference to the Sheet 10.16 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 1.5 Test Facility

Please make reference to the Sheet 5 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 1.6 Referenced Rules Sections

N/A

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

<p><b>CLASS 1 LASER PRODUCT</b> according to EN 60825 - 1</p> <p><b>APPAREIL À LASER DE CLASSE 1</b> par la loi EN 60825 - 1</p> <p><b>LASER KLASSE 1</b> nach EN 60825 - 1</p>	<p>Do not disassemble. Do not service.</p> <p>Ne Pas Démontez. Réservé Au Personnel Autorisé.</p> <p>Nicht auseinandernehmen. Keine Reparatur oder Wartung erlaubt.</p> <p>分解しないでください。 保守はできません。</p>																				
<p><b>DANGER</b>      VISIBLE OR INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.</p> <p><b>ATTENTION</b>    RAYONNEMENT LASER VISIBLE OU INVISIBLE EN CAS D'OUVERTURE. EXPOSITION DANGEREUSE AU FAISCEAU.</p> <p><b>VORSICHT</b>      SICHTBARE ODER UNSICHTBARE LASERSTRAHLUNG. WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.</p> <p><b>VARNING</b>        SYNLLIG ELLER OSYNLLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. STRÅLEN ÄR FARLIG.</p> <p><b>注意</b>            ここを開くと可視又は不可視レーザー光が出ます。 ビームを直接見たり、触れたりしないでください。</p>																					
<p>THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.</p>																					
<p>THIS CLASS B DIGITAL APPARATUS COMPLIES CANADIAN ICES-003.</p>																					
<p>CET APPAREIL NUMÉRIQUE DE LA CLASSE B EST CONFORME À LA NORME NMB-003 DU CANADA.</p>																					
<p>THIS PRODUCT COMPLIES WITH DHHS RULES 21 CFR CHAPTER I, SUBCHAPTER J. 130K0J</p>																					
<p><b>Panasonic</b></p> <p>MODEL NO. LF-D201</p> <p>MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. KADOMA, OSAKA, JAPAN MADE IN JAPAN</p> <p>SERIAL NO.</p> <p>MANUFACTURED</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">REV</th> </tr> <tr> <td style="width: 50px; height: 20px;"></td> <td style="width: 50px; height: 20px;"></td> </tr> <tr> <td style="width: 50px; height: 20px;"></td> <td style="width: 50px; height: 20px;"></td> </tr> <tr> <td style="width: 50px; height: 20px;"></td> <td style="width: 50px; height: 20px;"></td> </tr> </table> <p>FCC ID: ACJODSDLFD201</p> <p>    </p> <p>E140407 LR 80931</p> <p>    </p> <p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">AUDIO</td> <td style="width: 10%; text-align: center;">ID</td> <td style="width: 10%; text-align: center;">TERM ON</td> <td style="width: 10%; text-align: center;">SCSI</td> <td style="width: 10%; text-align: center;">DC INPUT</td> <td style="width: 20%;"></td> </tr> <tr> <td>R G G L</td> <td style="text-align: center;">1 2 4</td> <td style="text-align: center;">● ● ● ●</td> <td style="text-align: center;">1 2</td> <td style="text-align: center;">5V G B 12V</td> <td style="text-align: center;">+ 5V --- 1.2 A + 12V --- 0.5 A</td> </tr> </table> </p>	REV								AUDIO	ID	TERM ON	SCSI	DC INPUT		R G G L	1 2 4	● ● ● ●	1 2	5V G B 12V	+ 5V --- 1.2 A + 12V --- 0.5 A
REV																					
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R G G L	1 2 4	● ● ● ●	1 2	5V G B 12V	+ 5V --- 1.2 A + 12V --- 0.5 A																

Figure 2.2 Location of Label on EUT



### 3 SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This disk drive is an optical disk drive which can play audio CD disk, can read CD-ROM disk at 24x(Max.) speed of the CD specification and can read and write the phase change rewritable optical disk called "DVD-RAM disk" using same mechanism.

This drive is used as the internal storage device in the personal computer.

Therefore, the verification tests of this device were carried out by using CD-ROM disk, the DVD-RAM disk after installing this device into the personal computer.

For the verification test using CD-ROM disk, this disk drive was connected to the built-in sound board of the personal computer, tested with playing audio sound and data transfer from CD-ROM disk through SCSI interface at 24x(Max.) speed.

For the verification test using DVD-RAM disk, this disk drive was tested with data transfer operation from hard disk drive in the personal computer to DVD-RAM disk drive and from DVD-RAM disk drive to the hard disk drive through SCSI interface.

#### 3.2 Video Mode Justification

N/A

#### 3.3 EUT Exercise Software

Please make reference to the Sheet 6 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

#### 3.4 Special Accessories

N/A

#### 3.5 Equipment Modifications

N/A

#### 3.6 Configuration of Tested System

Please make reference to the Sheet 7 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

##### Figure 3.1 Configuration of Tested System

Please make reference to the Sheet 7 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

## 4 BLOCK DIAGRAM OF EQUIPMENT

### 4.1 Block Diagram Description

This optical disk drive can handle bare disks like CD and CD-ROM disk, DVD-RAM (2.6GB and 4.7GB) disk, which is 12cm phase change rewritable disk with disk cartridge, using same disk tray.

In the case of CD and CD-ROM disk, the rotation speed is set to the standard rotation speed of CD specification or 24x(Max.) speed of the specification depending on the medium and the host computer control.

The information signal from the CD or CD-ROM disk is retrieved by the laser diode.

The laser spot is focused on the disk using objective lens and controlled by the digital servo LSI so as to follow the information track on the disk.

The read out signals from the CD or CD-ROM disks are decoded and converted to the digital data using Read Channel Decoder LSI, and after the error correction procedure, the data is transferred to the host computer.

In the case of DVD-RAM(2.6GB) disk, the Zoned Constant Liner Velocity (ZCLV) format is used with 24 divided zones on the disk and the rotation speed is set to 1014~2254rpm. The data is recorded at each zone on the DVD-RAM disk with the same recording density using different clock from the synthesizer circuit in the drive and the total recording capacity of the DVD-RAM disk becomes 2.6GB using this recording procedure.

The laser spot focused on the DVD-RAM disk is also controlled by the digital servo LSI for focusing and tracking control.

For the data recording, the information data transferred from the host computer is encoded to the (8,16), added the parity data for the error correction procedure and converted to the digital signal for recording to the DVD-RAM disk.

The converted digital signal is transferred to the Laser Power Controller LSI through the Digital Servo Controller LSI.

The laser power for the data recording is modulated between the erase power and the peak power following the information data and the direct overwrite is achieved by using this laser modulation scheme.

For the data reading, the read out signal retrieved from the DVD-RAM disk is maintained and converted to the digital signal using the Read Channel LSI, decoded from the (8,16) to the digital data using the Optical Disk Controller LSI and transferred to the host computer.

In the case of DVD-RAM(4.7GB) disk, the Zoned Constant Liner Velocity (ZCLV) format is used with 35 divided zones on the disk and the rotation speed is set to 1375~3246rpm. The data is recorded at each zone on the DVD-RAM disk with the same recording density using different clock from the synthesizer circuit in the drive and the total recording capacity of the DVD-RAM disk becomes 4.7GB using this recording procedure.

The laser spot focused on the DVD-RAM disk is also controlled by the digital servo LSI for focusing and tracking control.

For the data recording, the information data transferred from the host computer is encoded to the (8,16), added the parity data for the error correction procedure and converted to the digital signal for recording to the DVD-RAM disk.

The converted digital signal is transferred to the Laser Power Controller LSI through the Digital Servo Controller LSI.

The laser power for the data recording is modulated between the erase power and the peak power following the information data and the direct overwrite is achieved by using this laser modulation scheme.

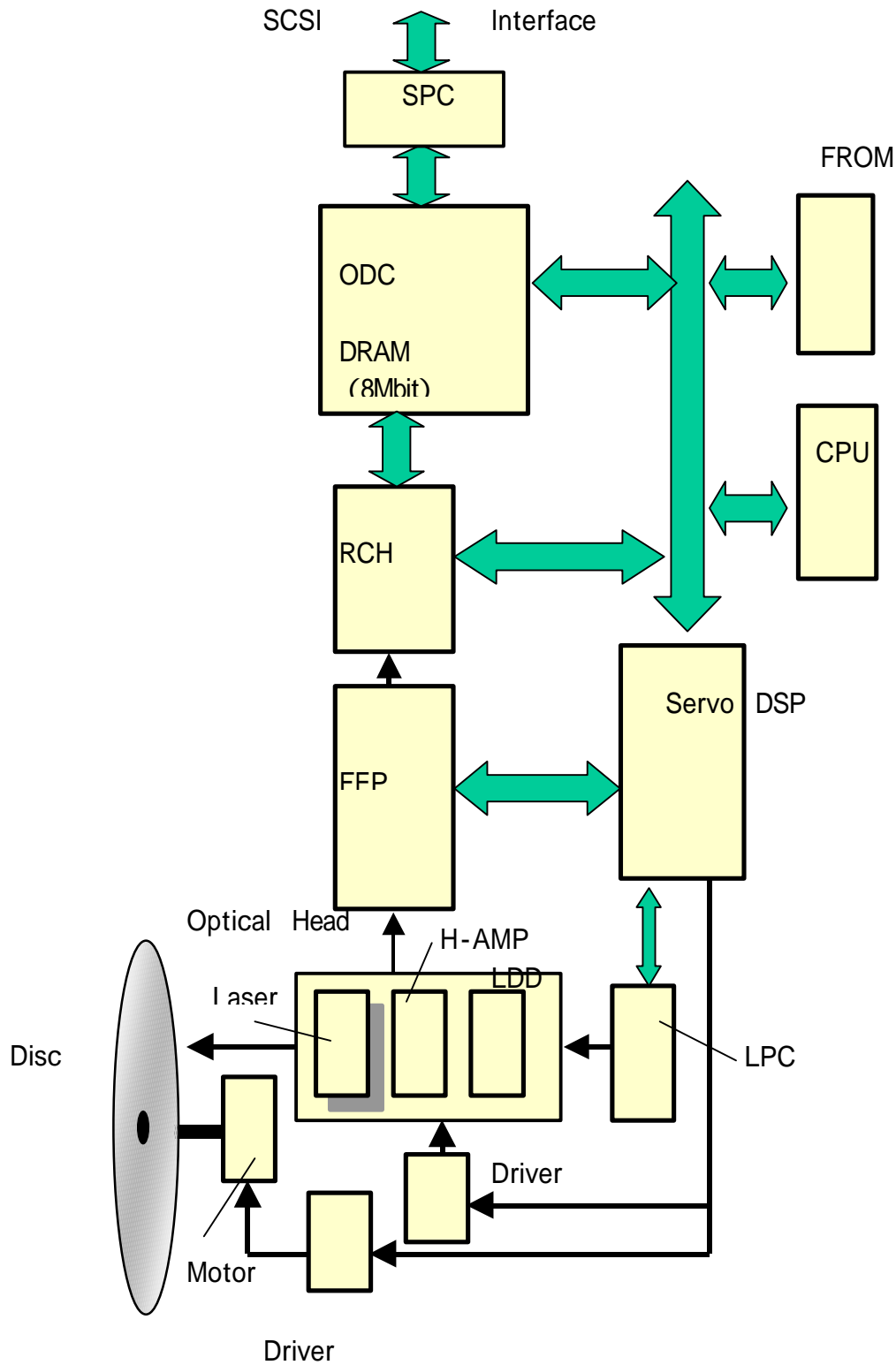
For the data reading, the read out signal retrieved from the DVD-RAM disk is maintained

and converted to the digital signal using the Read Channel LSI, decoded from the (8,16) to the digital data using the Optical Disk Controller LSI and transferred to the host computer.

4.2 Theory of Operation

Please make reference to the chapter 4.1

Figure 4.1 Block Diagram of Model



## 5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

Please make reference to the Sheet 13,14,15,21,22 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

## 6 CONDUCTED EMISSION DATA

### 6.1 Test Procedure

Please make reference to the Sheet 10 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 6.2 Measured Data

Please make reference to the Sheet 11 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 6.3 Referenced Rules Sections

Please make reference to the Sheet 5 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 6.4 Test Instrumentation Used, Conducted Measurement

Please make reference to the Sheet 23 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

## 7 RADIATED EMISSION DATA

### 7.1 Test Procedure

Please make reference to the Sheet 16 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 7.2 Test Data

Please make reference to the Sheet 17,19 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 7.3 Referenced Rules Sections

Please make reference to the Sheet 5 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 7.4 Test Instrumentation Used, Radiated Measurement

Please make reference to the Sheet 23 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

### 7.5 Field Strength Calculation

Please make reference to the Sheet 17,19 of Engineering Test Report A-068-99-A written by Kansai Electronic Industry Development Center.

## 8 PHOTOS OF TESTED EUT

Followings are the photographs of LF-D111, because this model is representative model of this drive series.

Model LF-D111\*\* are same as Model LF-D111 except for design and/or color of decorative parts such as Front panel, shutter, eject button, volume knob, LED cover and/or Brand Name.

( \*:"A~Z" or "0~9" or "-" )

Figure1 Front View

Figure2 Top View

Figure3 Right Side View

Figure4 Left Side View

Figure5 Rear View

Figure6 Bottom View

Figure7 Processor PC Board, Up Side

Figure8 Processor PC Board, Down Side

Figure9 Top Cover Removed(1)

Figure10 Top Cover Removed(2)

Figure11 Top Cover Removed(3)

Figure1 Front View



Figure2 Top View



Figure3 Right Side View

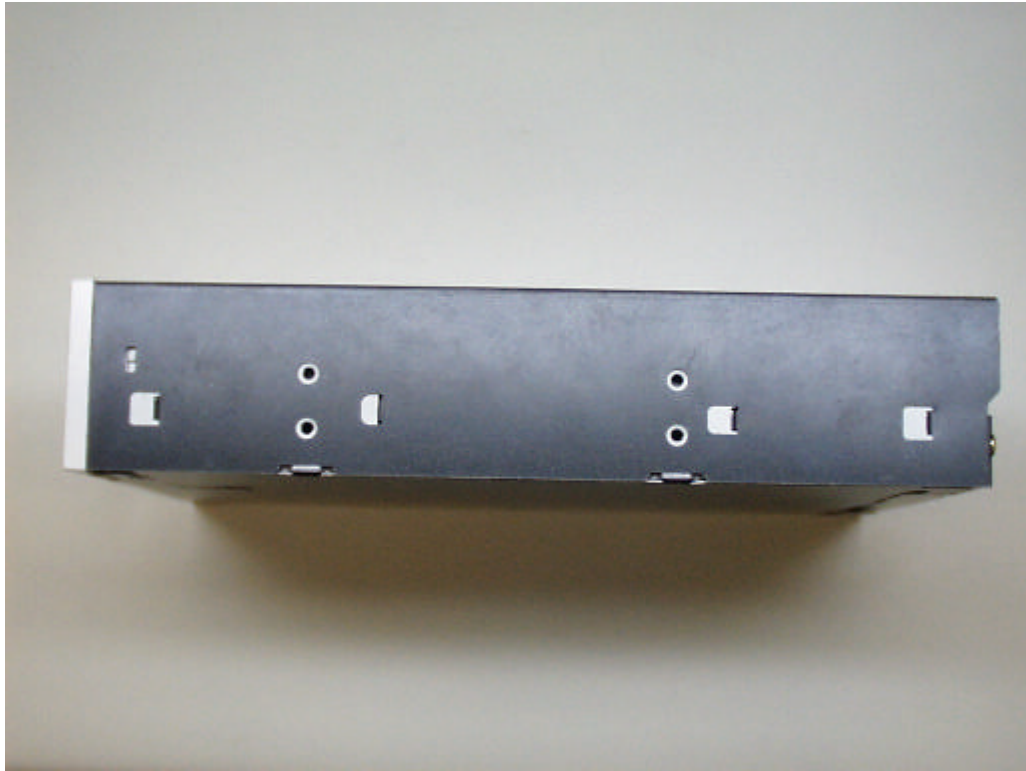


Figure4 Left Side View



Figure5 Rear View

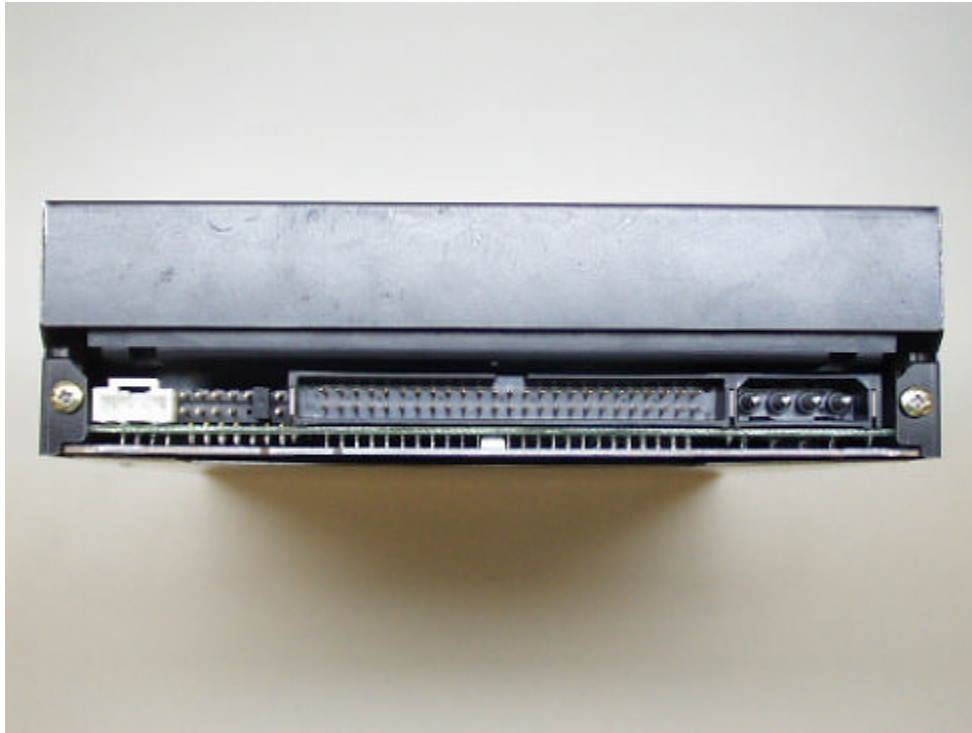


Figure6 Bottom View

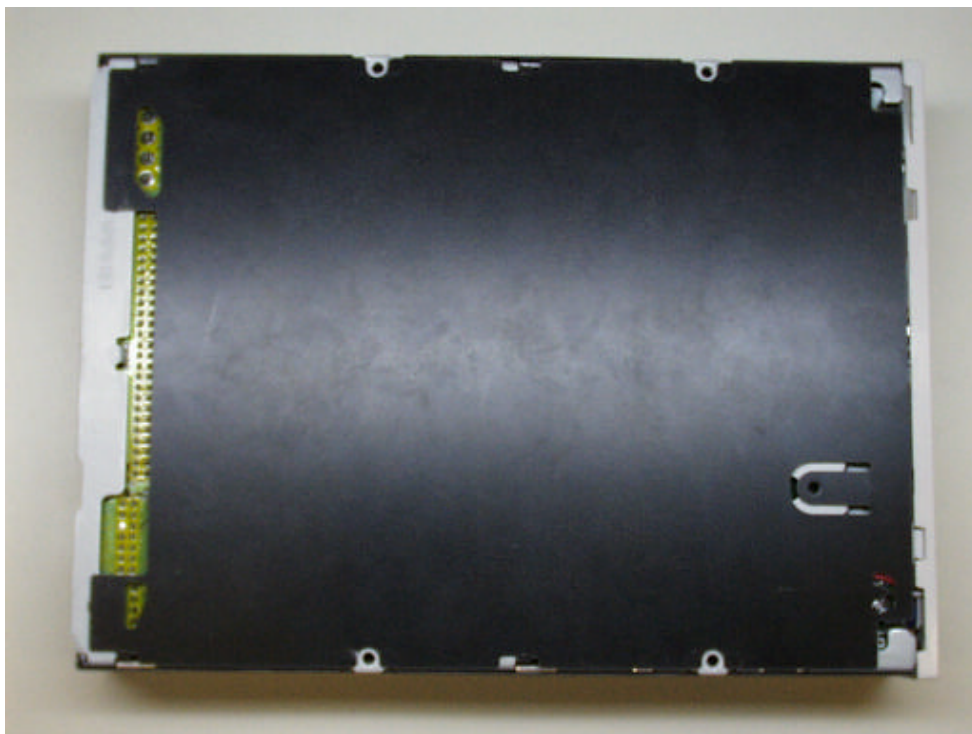


Figure7 Processor PC Board, Up Side

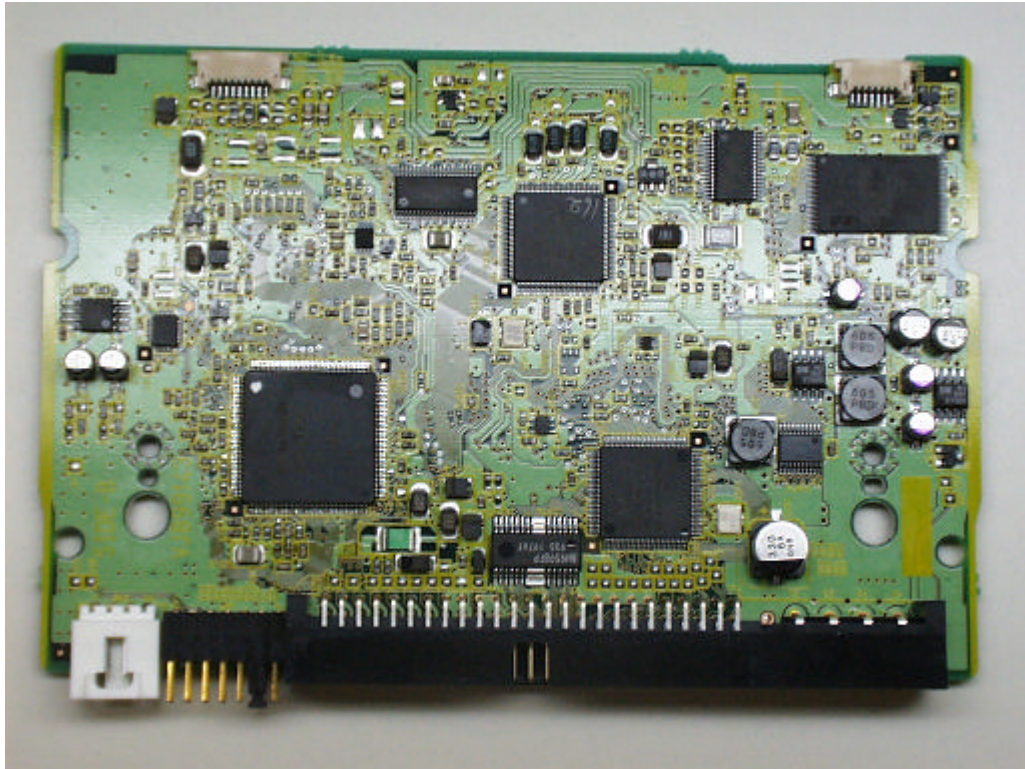


Figure8 Processor PC Board, Down Side

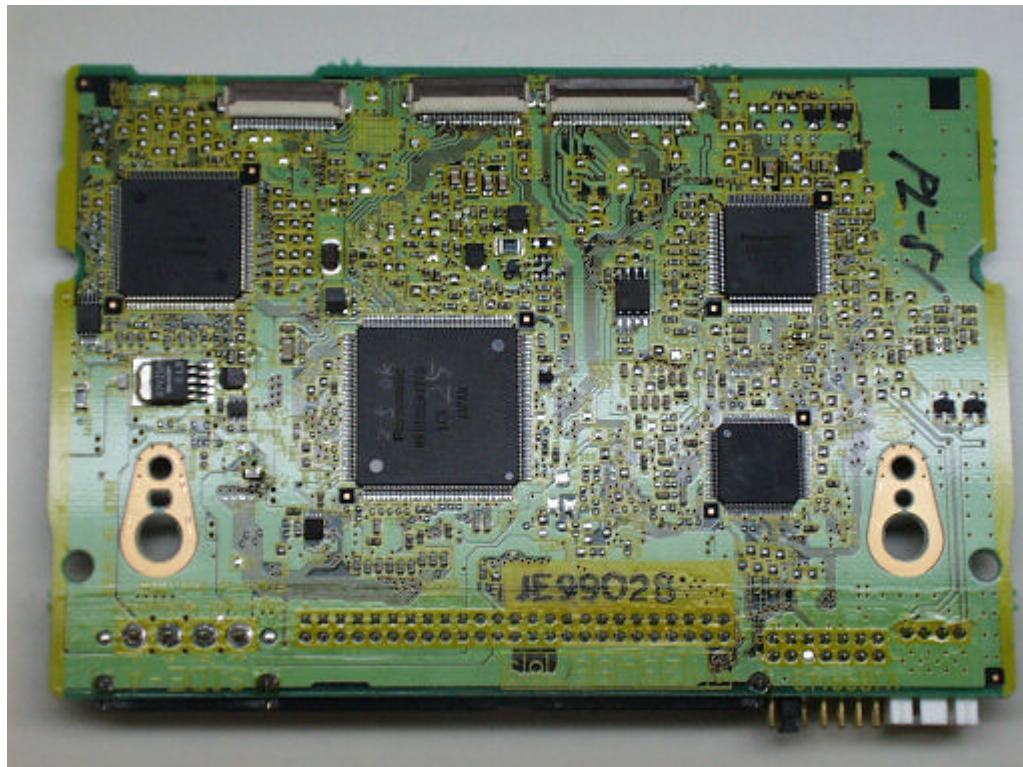


Figure9 Top Cover Removed(1)

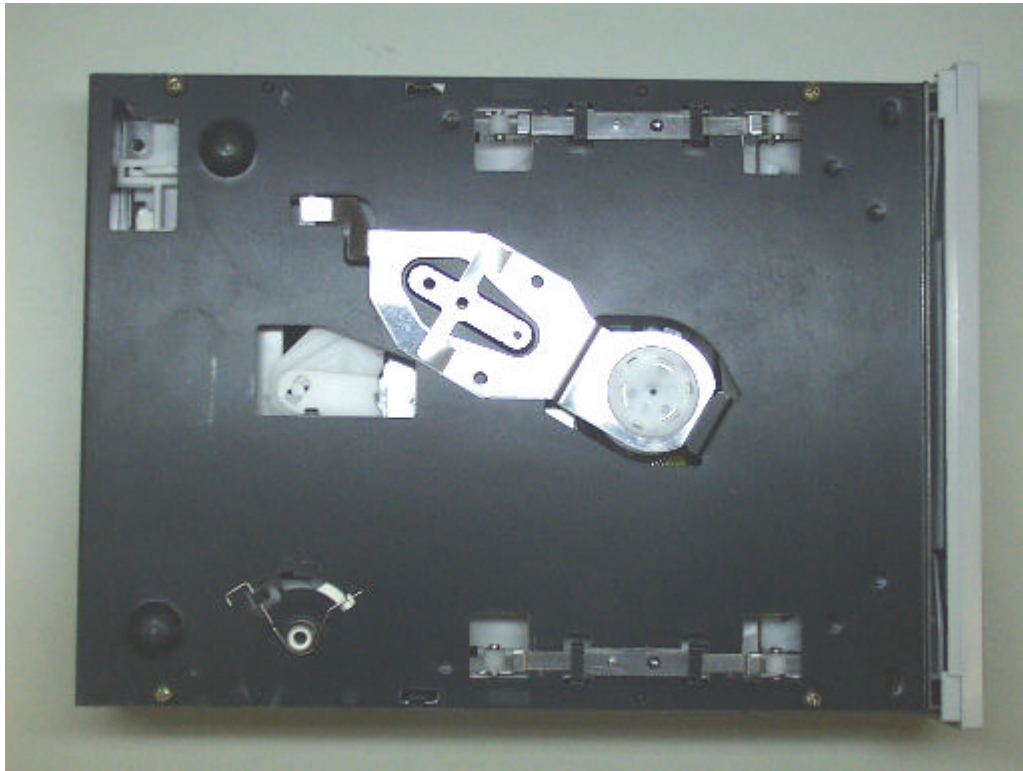


Figure10 Top Cover Removed(2)

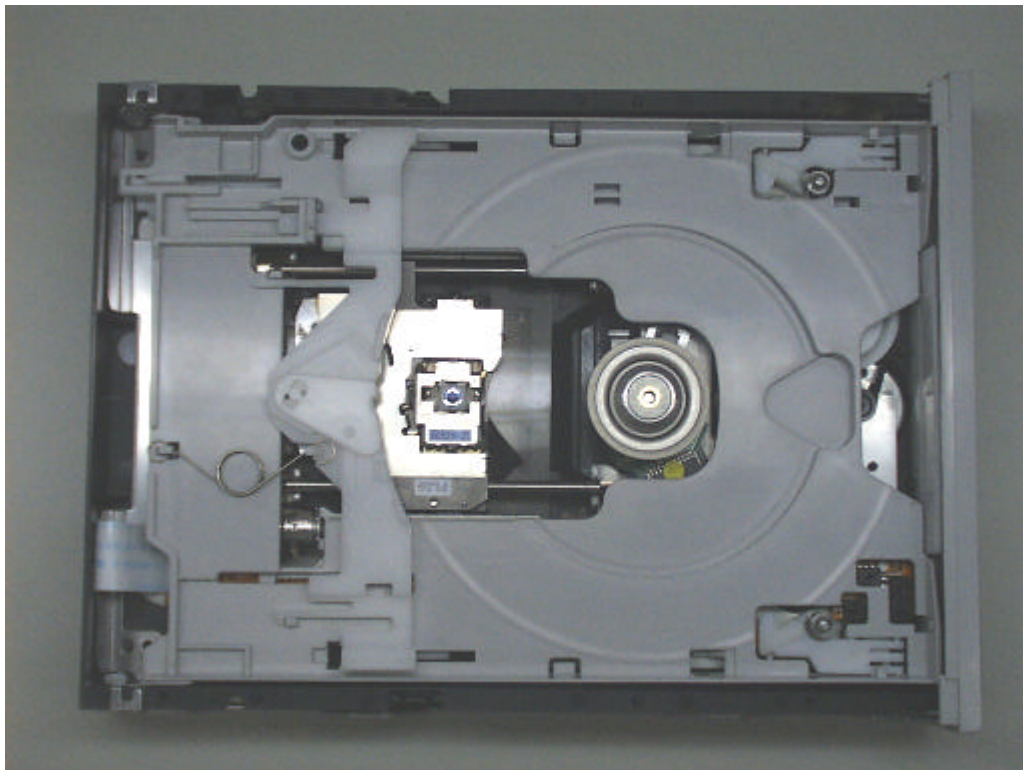
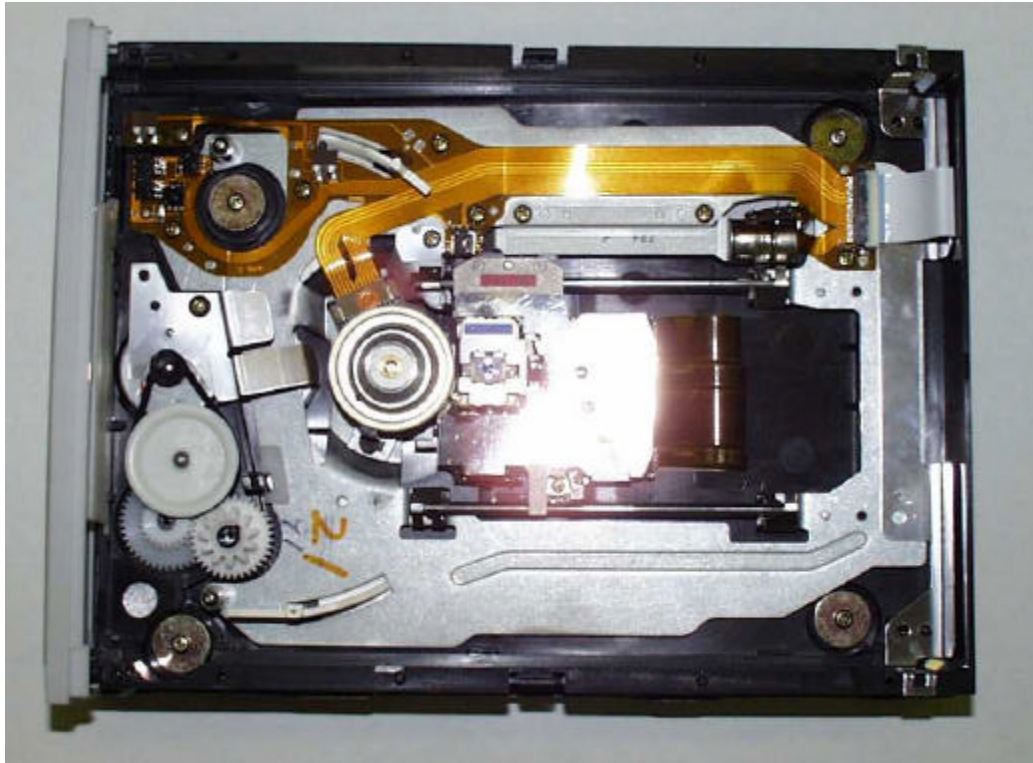


Figure11 Top Cover Removed(3)



## IMPORTANT SAFETY NOTICE

### ●RADIO FREQUENCY INTERFERENCE STATEMENT

#### Class B Digital Device/Information Technology Equipment

**Note:**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. (For U.S.A.)

This equipment has been tested and found to comply with the limits for a Class B Information Technology Equipment, pursuant to EN55022 (European Standard of Radio Frequency Emission for Information Technology Equipment).

EN55022 is harmonized with CISPR22 (published by International Special Committee on Radio Interference). (For Europe)

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Warning:**

To assure continued FCC and EN55022 emission limit compliance, use only the provided internal cables when connecting this device to the computer.

Also, any unauthorized changes or modifications to this equipment would void the user's authority to operate this device.

Attachment B

ENGINEERING TEST REPORT