Toshiba Personal Computer

QOSMIO G20

Maintenance Manual

TOSHIBA CORPORATION

File Number 960-511

[CONFIDENTIAL]

Copyright

Toshiba QOSMIO G20 Maintenance Manual

First edition February 2005

Disclaimer

The information presented in this manual has been reviewed and validated for accuracy. The included set of instructions and descriptions are accurate for the QOSMIO G20 at the time of this manual's production. However, succeeding computers and manuals are subject to change without notice. Therefore, Toshiba assumes no liability for damages incurred directly or indirectly from errors, omissions, or discrepancies between any succeeding product and this manual.

Trademarks

IBM is a registered trademark and IBM PC is a trademark of International Business Machines Corporation. Intel, Intel SpeedStep, Centrino, Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries/regions.
Windows and Microsoft are either registered trademarks of Microsoft Corporation.
Bluetooth is a trademark owned by its proprietor and used by TOSHIBA under license.
Memory Stick id a registered trademark and i.LINK is a trademark of Sony Corporation.
Other trademarks and registered trademarks not listed above may be used in this manual.

Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer QOSMIO G20.

> *NOTE:* *Each model of QOSMIO G20 has a different configuration. For each model's configuration, refer to the parts list dedicated to it.*

The procedures described in this manual are intended to help service technicians isolate faulty Field Replaceable Units (FRUs) and replace them in the field.

SAFETY PRECAUTIONS

Four types of messages are used in this manual to bring important information to your attention. Each of these messages will be italicized and identified as shown below.

> *DANGER:* *"Danger" indicates the existence of a hazard that could result in death or serious bodily injury, if the safety instruction is not observed.*

> *WARNING:* *"Warning" indicates the existence of a hazard that could result in bodily injury, if the safety instruction is not observed.*

> *CAUTION:* *"Caution" indicates the existence of a hazard that could result in property damage, if the safety instruction is not observed.*

> *NOTE:* *"Note" contains general information that relates to your safe maintenance service.*

Improper repair of the computer may result in safety hazards. Toshiba requires service technicians and authorized dealers or service providers to ensure the following safety precautions are adhered to strictly.

❑ Be sure to fasten screws securely with the right screwdriver. Be sure to use the PH Point size "0" and "1" screwdrivers complying with the ISO/DIS 8764-1:1996. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.

❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

Chapter 1   Hardware Overview describes the QOSMIO G20 system unit and each FRU.

Chapter 2   Troubleshooting Procedures explains how to diagnose and resolve FRU problems.

Chapter 3   Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.

Chapter 4   Replacement Procedures describes the removal and replacement of the FRUs.

Appendices   The appendices describe the following:

- ❏ Handling the LCD module
- ❏ Board layout
- ❏ Pin assignment
- ❏ Display codes
- ❏ Key layout
- ❏ Wiring diagrams
- ❏ BIOS Rewrite procedures
- ❏ EC/KBC Rewrite procedures
- ❏ Reliability
- ❏ Maintenance of TOSHIBA RAID

Conventions

This manual uses the following formats to describe, identify, and highlight terms and operating procedures.

Acronyms

On the first appearance and whenever necessary for clarification acronyms are enclosed in parentheses following their definition. For example:

Read Only Memory (ROM)

Keys

Keys are used in the text to describe many operations. The key top symbol as it appears on the keyboard is printed in **boldface** type.

Key operation

Some operations require you to simultaneously use two or more keys. We identify such operations by the key top symbols separated by a plus (+) sign. For example, **Ctrl + Pause (Break)** means you must hold down **Ctrl** and at the same time press **Pause (Break)**. If three keys are used, hold down the first two and at the same time press the third.

User input

Text that you are instructed to type in is shown in the boldface type below:

DISKCOPY A: B:

The display

Text generated by the QOSMIO G20 that appear on its display is presented in the type face below:

```
Format complete
System transferred
```

Table of Contents

Chapter 1 Hardware Overview

Chapter 2 Troubleshooting Procedures

Chapter 3   Tests and Diagnostics

Chapter 4   Replacement Procedures

Appendices

Chapter 1

Hardware Overview

Chapter 1   Contents

Figures

Tables

1.1 Features

The QOSMIO G20 series are high performance all-in-one PCs running a Pentium-M processor.

The features are listed below.

❑ Microprocessor

Microprocessor that is used will be different of the model.

Intel $^®$ Mobile Pentium $^®$-M

Pentium-M   1.60GHz (Processor Number : 730)
1.73GHz (Processor Number : 740)
1.86GHz (Processor Number : 750)
2.00GHz (Processor Number : 760)
2.13GHz (Processor Number : 770)

L1 cache : 64KB (32KB + 32KB)
L2 cache : 2MB

❑ Memory

Two DDR2-SDRAM slots. Memory modules can be installed to provide a maximum of 2GB. Memory modules are available in 256MB, 512MB and 1024MB sizes.

❑ VGA

nVIDIA NV43M is mounted.

❑ HDD

Double (or single) 60GB 80GB or 100GB internal serial-ATA drive. 2.5 inch x 9.5mm height.

❑ Optical devices

A slot-loading style DVD Super Multi drive (supporting double layer) is equipped.

❑ Keyboard

An-easy-to-use 85(US)/86(UK)-key keyboard provides a numeric keypad overlay for fast numeric data entry or for cursor and page control. The keyboard also includes two keys that have special functions in Microsoft® Windows® XP. It supports software that uses a 101- or 102-key enhanced keyboard.

❏ Display

LCD

Built-in 17.0-inch, WXGA+ (1,440 x 900 dots) amorphous silicon TFT color display.

Interface

To external monitor via   - RGB connector
                           - S-video OUT connector
                           - D-port OUT connector

To internal monitor via   - S-video IN connector
                           - Monitor IN port

❏ Sound system

Harman/Kardon-made stereo speaker is equipped. An internal microphone, external monaural microphone connector, stereo headphone connector is also equipped.

❏ Battery

The RTC battery is equipped inside the computer.
The main battery is a detachable lithium ion battery (4,400mAh:Li-Ion, 6cell).

❏ TV-tuner (Mini PCI slot)

This enables to watch TV and record it. (Supporting world wide signal : NTSC, PAL and SECAM).

❏ Wireless LAN (Mini PCI slot)

The wireless LAN is equipped on the mini PCI slot.

❏ LAN/MODEM

Connectors for LAN and Modem are separately mounted.

❏ Bluetooth

Depending on the model, the computer is equipped with a dedicated Bluetooth module. This enables a communication to devices that support Bluetooth Version 1.2/1.1/. Adopting AFH (Adaptive Frequency Hopping), reduce the interference with the wireless communication in 2.4GHz. It can be switched on or off with a switch on the computer.

❏ Remote controller

A remote controller for easy operation from some distance.

❏ USB FDD

USB FDD supports 720KB and 1.44MB.

❏ PC card slot

The PC card slot (PCMCIA) accommodates one 5mm Type II card. (Based on PC Card Standard, supporting CardBus)

❏ ExpressCard slot

The ExpressCard slot accommodates an ExpressCard.

❏ USB (Universal Serial Bus)

Four USB ports are provided. The ports comply with the USB2.0 standard, which enables data transfer speeds 40 times faster than USB1.1 standard. USB1.1 is also supported.

❏ Bridge Media slot

One SD memory card/ SDIO card/Memory stick (PRO)/xDPicture card/MultiMedia card slot. Data can be read and written by inserting each media to the slot.

❏ IEEE1394 port

The computer has one IEEE 1394 port. It enables high-speed data transfer directly from external devices such as digital video cameras.

❏ S/PDIF

This port can send or receive the digital sound data with the equipment like CD, MD Player. (This port is also used for headphone I/F.)
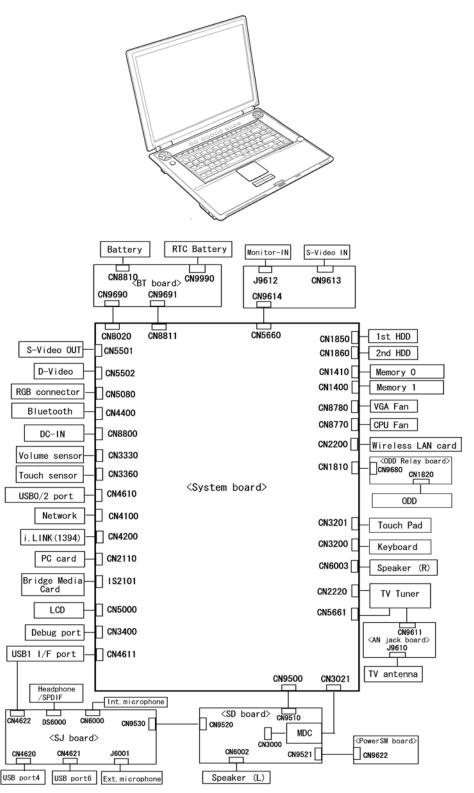
Figure 1-1 shows the front of the computer and the system units configuration.

Figure 1-1 Front of the computer and the system units configuration

1.2 System Block Diagram

Figure 1-2 shows the system block diagram.
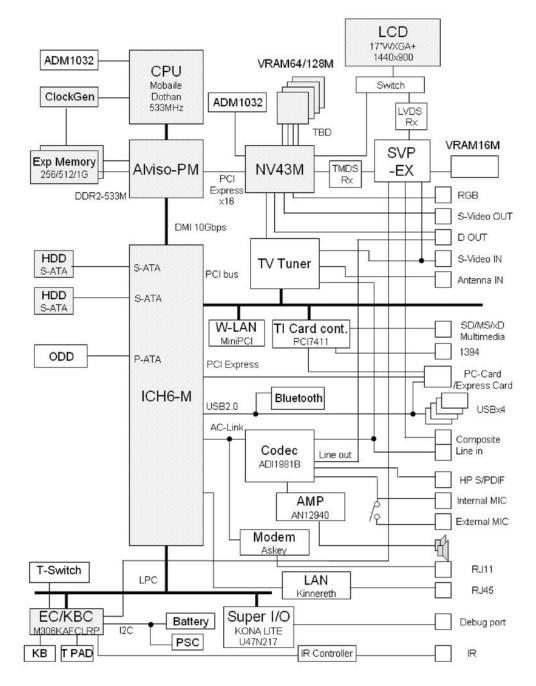
Figure 1-2 System block diagram

The PC contains the following components.

❏ CPU

   Intel $^{®}$ Mobile Pentium $^{®}$-M

      Pentium-M   1.60GHz (Processor Number ; 730)
                        1.73GHz (Processor Number ; 740)
                        1.86GHz (Processor Number ; 750)
                        2.00GHz (Processor Number ; 760)
                        2.13GHz (Processor Number ; 770)

      L1 cache : 64KB (32KB + 32KB)
      L2 cache : 2MB
      FSB : 533MHz   Core voltage : 1.340~0.748V

❏ Memory

   Two memory slots capable of accepting DDR2-SDRAM 256MB, 512MB or 1024MB memory modules for a maximum of 2GB.

      - 200-pin small-size DIMM
      - 2.5V operation
      - PC3200(DDR2-400)/PC4300(DDR2-533) support

❏ BIOS ROM (Flash memory)

      - 8Mbit (512K×16-bit chip)

            64KB used for logo/icon
            224KB used for system BIOS
            64KB used for VGA-BIOS
            60KB used for Intel PXE
            32KB used for ACPI
            16KB used for MBI
            17KB used for booting
            16KB used for Parameter Block
            19KB are reserved

❑ Chipset

This gate array has the following elements and functions.

➢ North Bridge (Intel 915PM <Express Chipset>)

     - Support Dothan Processor System Bus
     - System Memory Interface
     - Memory Controller : DDR333/DDR2-400/DDR2-533, 2GB(max)
     - Graphics I/F : x16 PCI Express Based Graphics I/F
     - DMI (Direct Media Interface)
     - 1,257-ball 40.0mmx37.5mmx2.6mm FC-BGA Package

➢ South Bridge (Intel 82801DBM (ICH6-M))

     - DMI (Direct Media Interface)
     - PCI Express I/F (4 ports)
     - PCI Bus I/F Rev 2.3 (PCI REQ/GNT Pairs)
     - Integrated Serial ATA Host Controller (2 ports, 150MB/S)
     - Integrated IDE Controller (Ultra ATA 100/66/33)
     - AC'97 2.3 codes
     - USB 1.1/2.0 Controller 8 ports (EHCI: Enhanced Host Controller
        Interface)
     - Built-in LAN Controller (Wfm 2.0& IEEE802.3 compliance)
     - Power Management (ACPI 2.0 compliance)
     - SMBus2.0 controller
     - FWH interface (BIOS)
     - LPC interface (EC/KBC, Super I/O)
     - IRQ controller
     - Serial Interrupt Function
     - Suspend/Resume control
     - Built-in RTC
     - GPIO
     - 609-ball 31mmx31mm micro BGA Package

❑ PC card controller (PCI7411, Texas Instrument-made)

     - PCI Interface (PCI Rev. 2.3)
     - PC Card Controller
     - IEEE1394 Controller
     - Flash Media Controller
     - SD Host Controller

❏ Super I/O (SMSC-made LPC47N217)

Two serial ports (NS16C550 compatible)
         - One port is used as Debug port

❏ VGA controller

nVIDIA NV43m

        - Built-in VRAM 64MB/128MB
        - PCI Express Interface
        - LCD Interface LVDS 2ch
        - Supports TV Encoder, S-Video

❏ Mini PCI

Wireless LAN card

2.4GHz DSSS/OFDM, 5.0GHz OFDM wireless LAN card is equipped.
Conformity with IEEE 802.11b/g or IEEE 802a/b/g. Transfer speed is maximum
of 11Mbit/sec. Supports 128bit WEP.

TV tuner

Some signals (NTSC, PAL and SECAM) are supported for worldwide use and
MPEG2 hardware encoding function are also supported.

❏ LAN controller (ICH4-M Kinnerth 82562EP)

Controls LAN and supports 100BASE-TX (Fast Ethernet)/10BASE-T (Ethernet).

❏ Other main system chips

➢ PSC (Toshiba-made TMP87PM48U x 1)
➢ Clock Generator (ICS-made 954204BGFT x 1)
➢ EC/KBC (Renesas-made M306KA x 1)
➢ FWH (ST-Micro-made M50FW080N1 x 1)
➢ AC97-CODEC (ADI-made AD1981 x 1)
➢ Audio AMP (Matsushita-made AN12941A-VF x1)
➢ SVP EX (Trident-made 7052-LF x 1)

❏ MODEM (Askey-made 1456VQL4 x 1)

Supported by MDC.
Uses secondary AC97 line.
Data and FAX transmission is available.
Supports ITU-TV.90.
The transfer speed of data receiving is 56kbps, of data sending is 33.6kbps and of FAX is 14.4kbps. Actual speed depends on the quality of the line used.
Connected to telephone line through RJ11 MODEM jack.

1.3   2.5-inch Hard Disk Drive

A compact, high-capacity Serial-ATA HDD with a height of 9.5mm. Contains a 2.5-inch magnetic disk and magnetic heads.

Figure 1-3 shows a view of the 2.5-inch HDD and Tables 1-1 and 1-2 list the specifications.

Figure 1-3 2.5-inch HDD

Table 1-1 2.5-inch HDD dimensions
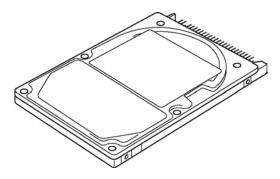
Parameter		Standard value		
		FUJITSU G8BC0001R610	**FUJITSU G8BC0001R810**	**TOSHIBA HDD2D30BZK01**
Outline dimensions	Width (mm)	70.0		-
	Height (mm)	9.5		-
	Depth (mm)	100.0		-
	Weight (g)	99 (max)		-

Table 1-2 2.5-inch HDD Specifications

Parameter		Specification	
		FUJITSU G8BC0001R610	**FUJITSU G8BC0001R610**
Storage size (formatted)		60GB	80GB
Speed (RPM)		5,400	
Positioning time	Minimum	1.5 ms	
	Average	12 ms (read)	
	Maximum	22 ms	
Data transfer speed	To/From Media	53.9 MB/s (max)	
	To/From Host	1.5GB/s (max)	
Data Buffer size		8MB	
Power-on-to-ready (sec)		4	

Parameter		Specification
		TOSHIBA HDD2D30BZK01
Storage size (formatted)		100GB
Speed (RPM)		5,400
Positioning time	Minimum	- ms
	Average	- ms (read)
	Maximum	- ms
Data transfer speed	To/From Media	- MB/s (max)
	To/From Host	-GB/s (max)
Data Buffer size		-MB
Power-on-to-ready (sec)		-

1.4 Optical Drive

1.4.1 DVD Super Multi Drive (supporting Double-Layer)

The DVD Super Multi drive (supporting Double Layer) accommodates 12 cm (4.72-inch) CD/DVD-ROM, CD-R/RW, DVD±R/±RW and DVD-RAM. It is a high-performance drive that reads DVD-ROM at maximum 8-speed and CD-ROM at maximum 24-speed. It writes CD-R at maximum 24-speed, CD-RW at maximum 10-speed, DVD±R at maximum 8-speed, DVD±RW at maximum 4-speed, DVD-RAM at maximum 5-speed and DVD+R (Double Layer) at maximum 2.4-speeed.

The DVD Super Multi drive is shown in Figure 1-6. The dimensions and specifications of the DVD Super Multi drive are described in Table 1-7, Table 1-8.

Figure 1-4 DVD Super Multi drive (Double-Layer)

Table 1-3 DVD Super Multi drive (Double-Layer) outline dimensions

Parameter		Standard value
Outline dimensions (excluding projections)	Maker	MATSUSHITA-KOTOBUKI (G8CC0002CZ10)
	Width (mm)	128
	Height (mm)	12.7
	Depth (mm)	129.0
	Mass (g)	179 (±15)

Table 1-4 DVD Super Multi drive (Double-Layer) specifications
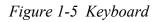
Parameter		Drive Specification
		MATSUSHITA-KOTOBUKI (G8CC0002CZ10)
Data transfer speed	Read(KB/s)	DVD-ROM MAX 8X CAV CD-ROM MAX 24X CAV
	Write (Maximum)	CD-R 24x (Zone CLV) CD-RW 4X (CLV) High Speed CD-RW 10X (CLV) Ultra Speed CD-RW 10X (CLV) DVD-R 8x (Zone CLV) DVD-RW 4x (Zone CLV) DVD+R 8x (Zone CLV) DVD+R Double Layer 2.4x (CLV) DVD+RW 4x (Zone CLV) DVD-RAM 5x (ZCLV) (4.7GB)
	ATAPI interface (MB/s)	PIO mode 16.6 MB/s (PIO MODE4 supported) DMA mode 16.6 MB/s (Multi-word MODE2 supported) Ultra DMA mode 33.3 MB/s(Ultra DMA MODE2 supported)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, CD-ROM XA, Photo CD, CD-Extra(CD+), CD-text
	DVD	DVD-R, DVD-RW (Ver1.1) DVD+R/+RW, DVD Video, DVD-RAM (2.6GB/4.7GB)

1.5   Keyboard

A keyboard which consists of 85(US)/86(UK) keys is mounted on the system unit. The
keyboard is connected to membrane connector on the system board and controlled by the
keyboard controller.

Figure 1-7 is a view of the keyboard.

Figure 1-5 Keyboard

See Appendix E for details of the keyboard layout.

1.6 TFT Color Display

The TFT color display is 17.1 inch and consists of LCD module and FL inverter board.

1.6.1 LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display a maximum of 320,000 colors with 1,440 x 900 resolution.

Figure 1-8 shows a view of the LCD module and Table 1-9 lists the specifications.
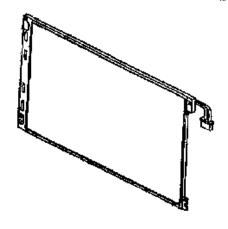
Figure 1-6 LCD module

Table 1-5 LCD module specifications

Item	Specifications
	LG-Philips (G33C0002K110)
Number of Dots	1,440(W) × 900(H)
Dot spacing (mm)	0.255 (H) x 0.255 (V)
Display range (mm)	367.2 (W) x 229.5 (H)
Outline dimensions	382.2 (w) x 246.8 (H) x 10.0(max) (D)

1.6.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL.

Table 1-10 lists the FL inverter board specifications.

Table 1-6 FL inverter board specifications

Item		Specifications
		G71C0004F310
Input	Voltage (V)	5 (DC)
	Power (W)	18
Output	Voltage (V)	900 (rms)
	Power (W/VA)	7W / 10VA (x 2 output ; MAX 13W)
	Current (f=70KHz)(mA)	7 (rms) (x 2 output)

1.7   Power Supply

The power supply supplies 28 different voltages to the system board.

The power supply microcontroller has the following functions.

1. Judges if the DC power supply (AC adapter) is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the battery icon, and DC IN icon.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Turns the power supply on and off.
6. Provides more accurate detection of a low battery.
7. Calculates the remaining battery capacity.
8. Controls the transmission of the status signal of the main battery.

Table 1-11 lists the power supply output specifications.

Table 1-7 Power supply output rating (1/2)

Name	Power supply （Yes/No）				
	Voltage [V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No Battery	Object
PPV	1.308 - 0.748	No	No	No	CPU
PTV	1.05	No	No	No	CPU, MCH, ICH6-M
PGV	1.056	No	No	No	GPU
1R5-P1V	1.5	No	No	No	CPU, MCH, ICH6-M, Express card
1R8-B1V	1.8	**Yes**	No	No	MCH, DDR2-SDRAM, GPU
2R5-P2V	2.5	No	No	No	MCH, ICH6-M, GPU, SVP EX, LVDS
MR0R9-B0V	0.9	**Yes**	No	No	MCH, DDR2-SDRAM
G0R9-P0V	0.9	No	No	No	GPU
0R9-P0V	0.9	No	No	No	DDR2-SDRAM
1R5-S1V	1.5	**Yes**	**Yes**	No	ICH6-M
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, SDRAM(SPD), SDRAM(SPD), ICH6-M, LAN, Super I/O, PC Card Cont., Mini-PCI, WW-Tuner, Express card, FWH, AD1981B, EC/KBC, GPU, SVP EX, TMDS, LCD, HDD (SATA)
E3V	3.3	**Yes**	**Yes** / No	No	Card Cont., PC card power, Mini PCI, Express card, MDC
FM-E3V	3.3	No	No	No	Media Bridge
BT-P3V	3.3	No	No	No	Bluetooth
USB0PS-E5V	5	**Yes**	**Yes** / No	No	USB
USB1PS-E5V	5	**Yes**	**Yes** / No	No	USB
S3V	3.3	**Yes**	**Yes**	No	ICH6-M, EC/KBC, PSC, IR Cont.
P5V	5	No	No	No	CRT, ICH6-M, FL inverter, LEDs, HDD (SATA), ODD, KB, PAD, Bluetooth power
ICH-S5V	5	**Yes**	**Yes**	No	ICH6-M
ICH-S3V	3.3	**Yes**	**Yes**	No	ICH6-M
ICH1R5-S1V	1.5	**Yes**	**Yes**	No	ICH6-M
SND-P5V	5	No	No	No	AN12941
A4R7-P4V	4.7	No	No	No	AD1981B, AN12941
E5V	5	**Yes**	**Yes** / No	No	PC-Card, USB power
M5V	5	**Yes**	**Yes**	No	ICH6-M, MAX6501, LED

Table 1-11 Power supply output rating (2/2)

Name	Power supply （Yes/No）				
	Voltage [V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No Battery	Object
MCV	5	**Yes**	**Yes**	No	PSC
R3V	2.0 -3.5	**Yes**	**Yes**	**Yes**	ICH6-M (RTC)
TC-S5V	5	**Yes**	**Yes**	No	Touch sensor

1.8   Batteries

The PC has the following two batteries.

- ❏ Main battery
- ❏ Real time clock (RTC) battery

Table 1-12 lists the specifications for these two batteries.

Table 1-8 Battery specifications

Battery Name		Battery Element	Output Voltage	Capacity
Main battery	G71C0004H510	Lithium ion	10.8V	4,400mAh
	G71C0004H610			
Real time clock (RTC) battery	P71035009115	Nickel hydrogen	2.4V	16mAh

1.8.1 Main Battery

The main battery is the primary power supply for the computer when the AC adapter is not connected. In Standby, the main battery maintains the current status of the computer.

1.8.2 Battery Charging Control

Battery charging is controlled by a power supply microprocessor. The power supply microprocessor controls power supply and detects a full charge when the AC adaptor and battery are connected to the computer.

❏ Battery Charge

When the AC adapter is connected, normal charging is used while the system is turned on and quick charge is used while the system is turned off. Refer to the following Table 1-13.

Table 1-9 Time required for charges of main battery

Condition	Charging Time
Normal charge	About 3.5 or longer (hours)
Quick charge	About 3.0 (hours)

Charge is stopped in the following cases.

1. The main battery is fully charged

2. The main battery is removed

3. Main battery or AC adapter voltage is abnormal

4. Charging current is abnormal

❏ Data preservation time

When turning off the power in being charged fully, the preservation time is as following Table 1-14.

Table 1-10 Data preservation time

Condition	preservation time
Standby	About 4 days
Shutdown	About 35 days

1.8.3 RTC Battery

The RTC battery provides the power supply to maintain the date, time, and other system information in memory.

Table 1-15 lists the Time required for charges of RTC battery and data preservation time.

Table 1-11 Time required for charges of RTC battery

Condition	Time
Power ON (Lights Power LED)	About 8 hours
Data preservation tome (Full-charged)	About 30 days

1.9   AC Adapter

The AC adapter is used to charge the battery.

Table 1-16 lists the AC adapter specifications.

Table 1-12 AC adapter specifications

Parameter	Specification
	G71C0002R610
Power	120W (Peak 150W)
Input voltage	AC 100 to 240V
Input frequency	50Hz/60Hz
Input voltage	1.7A or less
Output voltage	DC 15V
Output current	8.0A

Chapter 2

Troubleshooting Procedures

Chapter 2　　Contents

Figures

Tables

2.1 Troubleshooting

Chapter 2 describes how to determine which Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. (The "FRU" means the replaceable unit in the field.) The FRUs covered are:

1. Power supply	7. Display	13. Sound
2. System Board	8. Optical Disk Drive	14. TV Tuner
3. USB FDD	9. Modem	15. Bridge Media slot
4. 2.5" HDD	10. LAN	16. PCI ExpressCard slot
5. Keyboard	11. Wireless LAN	
6. Touch pad	12. Bluetooth	

The Test Program operations are described in Chapter 3. Detailed replacement procedures are described in Chapter 4.

NOTE: After replacing the system board or CPU, it is necessary to execute the subtest 01 initial configuration of the 3.3 Setting of the hardware configuration in Chapter 3. Also update with the latest BIOS as described in Appendix G "BIOS Rewrite Procedures"
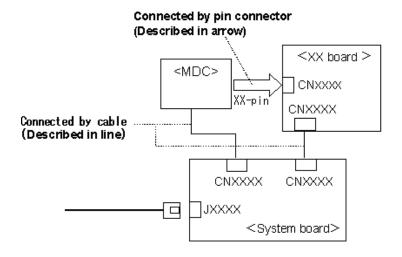
After replacing the LCD, update with the latest EC/KBC as described in Appendix H "EC/KBC Rewrite Procedures" to set the SVP parameter.

The implement for the Diagnostics procedures is referred to Chapter 3. Also, following implements are necessary:

1. Phillips screwdrivers (For replacement procedures)
2. Implements for debugging port check
   - Toshiba MS-DOS system FD
   - RS-232C cross cable
   - Test board with debug port test cable
   - PC for displaying debug port test result

There are following two types of connections in the figure of board and module connection in and after 2.3 Power Supply Troubleshooting.

(1) Cable connection is described in the figure as line.
(2) Pin connection is described in the figure as arrow.
<e.g> Connection of modem

2.2   Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedures to execute. Before going through the flowchart steps, verify the following:

❑ Ask him or her to enter the password if a password is registered.

❑ Verify with the customer that Toshiba Windows is installed on the hard disk. Non-Windows operating systems can cause the computer to malfunction.

❑ Make sure all optional equipment is removed from the computer.
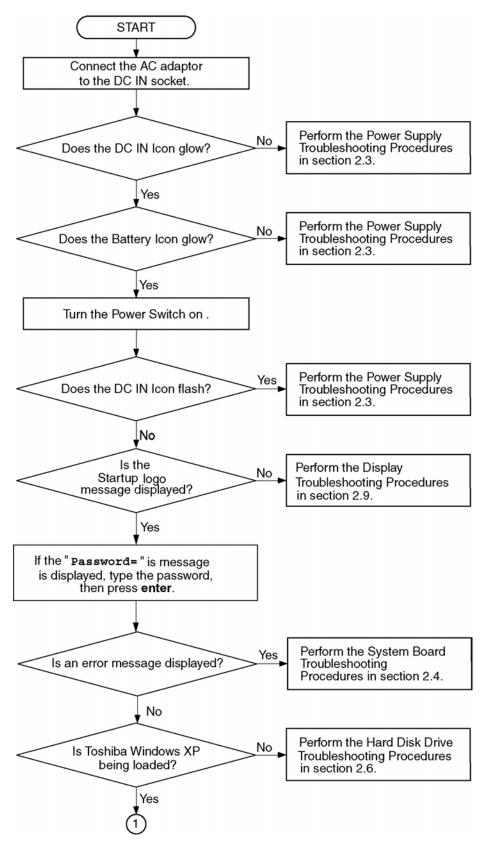
Figure 2-1 Troubleshooting flowchart (1/2)
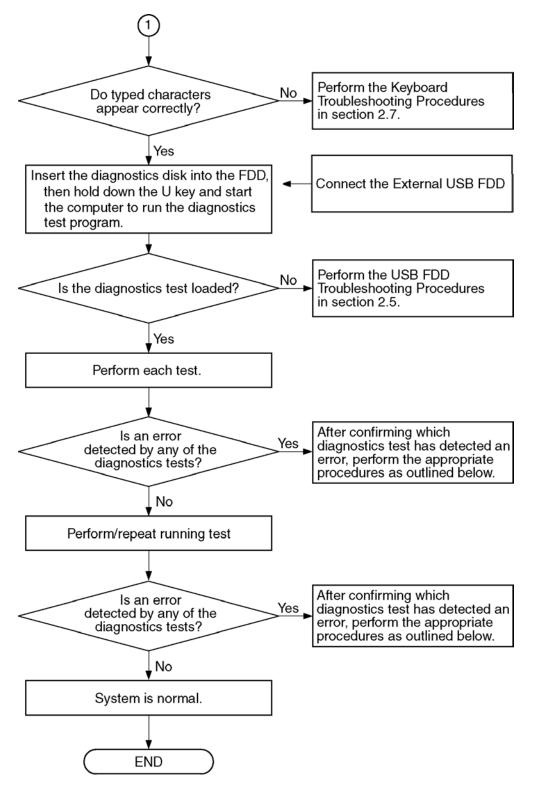
Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The Test program should be executed several times to isolate the problem. Check the Log Utilities function to confirm which diagnostic test detected an error(s), then perform the appropriate troubleshooting procedures as follows:

1. If an error is detected on the system test, memory test, display test, CD-ROM/DVD-ROM test, expansion test, real timer test, sound test or Modem/LAN/Bluetooth /IEEE1394 test, perform the System Board Troubleshooting Procedures in Section 2.4.

2. If an error is detected on the floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.

3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.

4. If an error is found on the keyboard test (DIAGNOSTICS TEST) and pressed key display test (ONLY ONE TEST), perform the Keyboard Troubleshooting Procedures in Section 2.7.

5. If an error is found on the touch pad test (ONLY ONE TEST), perform the touch pad Troubleshooting Procedures in Section 2.8.

6. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.9.

7. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Disk Drive Troubleshooting Procedures in Section 2.10.

8. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.11.

9. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.12.

10. If an error is detected on the wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.13.

11. If an error is detected on the bluetooth test, perform the bluetooth Troubleshooting Procedures in Section 2.14.

12. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.15.

2.3 Power Supply Troubleshooting

The power supply controller controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The procedures described in this section are:

Procedure 1:   Power Status Check

Procedure 2:   Error Code Check

Procedure 3:   Connection Check

Procedure 4:   Charging Check

Procedure 5:   Replacement Check

Procedure 1   Power Status Check

The following icons indicate the power supply status:

❑ Battery icon

❑ DC IN icon

The power supply controller displays the power supply status with the Battery icon and the DC IN icon as listed in the tables below.

Table 2-1 Battery icon

Battery icon	Power supply status
Lights orange	Battery is charged and the external DC is input. It has no relation with ON/OFF of the system power.
Lights blue	Battery is fully charged and the external DC is input. It has no relation with ON/OFF of the system power.
Blinks orange (even intervals)	The battery level is low while the system power is ON.
Blinks orange once (at being switched on)	The system is driven by only a battery and the battery level is low.
Doesn't light	Any condition other than those above.

Table 2-2 DC IN icon

DC IN icon	Power supply status
Lights blue	DC power is being supplied from the AC adapter.
Blinks orange	Power supply malfunction[*1]
Doesn't light	Any condition other than those above.

    *1   When the power supply controller detects a malfunction, the DC IN icon blinks orange. It shows an error code.

When the icon is blinking, perform the following procedure.

1.   Remove the battery pack and the AC adapter.

2.   Re-attach the battery pack and the AC adapter.

If the icon is still blinking after the operation above, check the followings:

    Check 1   If the DC IN icon blinks orange, go to Procedure 2.

    Check 2   If the DC IN icon does not light, go to Procedure 3.

    Check 3   If the battery icon does not light orange or blue, go to Procedure 4.

> *NOTE: Use a supplied AC adapter G71C0002R610.*
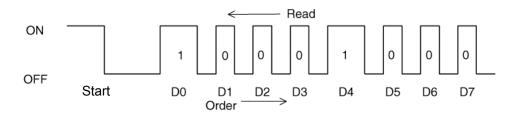
Procedure 2   Error Code Check

If the power supply microprocessor detects a malfunction, the DC IN icon blinks orange. The blink pattern indicates an error as shown below.

❑ Start   Off for 2 seconds

❑ Error code (8 bit)

   "1"   On for one second

   "0"   On for half second

   Interval between data bits   Off for half second

The error code begins with the least significant digit.

Example: Error code 11h (Error codes are given in hexadecimal format.)

Check 1   Convert the DC IN icon blink pattern into the hexadecimal error code and compare
it to the tables below. Then go to Check 2.

Table 2-3 Error code

Error code	Where error occurs
1*h	DC Power (AC Adapter)
2*h	Main battery
3:h	2nd battery
4*h	S3V output
5*h	1R5-C1V output
6*h	A-C3V output
7*h	PPV output
8*h	PTV output
9*h	E5V output
A*h	E3V output
B*h	PPV output
C*h	PGV output
D*h	PTV output
E*h	1R9-B1V output
F*h	-

❑ DC power supply (AC adapter)

Error code	Meaning
10h	AC Adapter output voltage is over 16.5V.
11h	Common Dock output voltage is over 16.5V.
12h	Current from the DC power supply is over 12.0A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Abnormal current has been sensed.

❑ 1st Battery

Error code	Meaning
20h	Over voltage has been sensed. (Error code 20h is not supported.)
21h	Main battery charge current is over 12.0A.
22h	Main battery discharge current is over 0.5A when there is no load.
23h	Main battery charge current is over 3.9A when AC adapter is not connected.
24h	Abnormal current has been sensed.
25h	Main battery charge current is over 0.3A when the charging is off.

❑ 2nd Battery

Error code	Meaning
30h	Over voltage has been sensed. (Error code 30h is not supported.)
31h	Second battery charge current is over 12.0A.
32h	Second battery discharge current is over 0.5A when there is no load.
33h	Second battery charge current is over 3.1A when AC adapter is not connected.
34h	Abnormal current has been sensed.
35h	Second battery charge current is over 0.3A when the charging is off.

❑ S3V output

Error code	Meaning
40h	S3V voltage is 2.81V or less when the computer is powered on/off.
45h	S3V voltage is 2.81V or less when the computer is booting up.(CV support)

❑ 1R5-C1V output

Error code	Meaning
50h	1R5-C1 voltage is over 1.80V when the computer is powered on/off.
51h	1R5-C1 voltage is 1.275V or less when the computer is powered on.
52h	1R5-C1 voltage is 1.275V or less when the computer is booting up.
53h	1R5-C1 voltage is 1.275V or less while the computer is suspended.
54h	1R5-C1 voltage is abnormal while the computer is shutdown. (CV support)
55h	1R5-C1 voltage is 1.275V or less when the computer is booting up. (CV support)

❑ A-C3V output

Error code	Meaning
60h	A-C3V voltage is over 3.96V when the computer is powered on/off.
61h	A-C3V voltage is 2.81V or less when the computer is powered on.
62h	A-C3V voltage is 2.81V or less when the computer is booting up.
63h	A-C3V voltage is 2.81V or less while the computer is suspended.
64h	A-C3V voltage is abnormal while the computer is shutdown. (CV support)
65h	A-C3V voltage is 2.81V or less when the computer is booting up. (CV support)

❑ PPV output

Error code	Meaning
70h	PPV voltage is over 1.80V when the computer is powered on/off.
71h	PPV voltage is 0.56V or less when the computer is powered on.
72h	PPV voltage is 0.56V or less when the computer is booting up.
73h	PPV voltage is 0.56V or more when the computer is powered off.

❑ PTV

Error code	Meaning
80h	PTV voltage is over 1.26V when the computer is powered on/off.
81h	PTV voltage is 0.68V or less when the computer is powered on.
82h	PTV voltage is 0.68V or less when the computer is booting up.
83h	PTV voltage is 0.68V or more when the computer is powered off.
84h	PTV voltage is 0.68V or less while the computer is suspended.

❑ E5V output

Error code	Meaning
90h	E5V voltage is over 6.00V when the computer is powered on/off.
91h	E5V voltage is 4.50V or less when the computer is powered on.
92h	E5V voltage is 4.50V or less when the computer is booting up.
93h	E5V voltage is 4.50V or more when the computer is powered off.
94h	E5V voltage is 4.50V or less while the computer is suspended.

❑ E3V output

Error code	Meaning
A0h	E3V voltage is over 3.96V when the computer is powered on/off.
A1h	E3V voltage is 2.81V or less when the computer is powered on.
A2h	E3V voltage is 2.81V or less when the computer is booting up.
A3h	E3V voltage is 2.81V or more when the computer is powered off.
A4h	E3V voltage is 2.81V or less when the computer is suspended.

❑ PPV output

Error code	Meaning
B0h	PPV voltage is over 1.80V when the computer is powered on/off.
B1h	PPV voltage is 0.56V or less when the computer is powered on.
B2h	PPV voltage is 0.56V or less when the computer is booting up.
B3h	PPV voltage is 0.56V or more when the computer is powered off.

❑ PGV output

Error code	Meaning
C0h	PGV voltage is over 1.62V when the computer is powered on/off.
C1h	PGV voltage is 0.68V or less when the computer is powered on.
C2h	PGV voltage is 0.68V or less when the computer is booting up.
C3h	PGV voltage is 0.68V or more when the computer is powered off.
C4h	PGV voltage is 0.68V or less while the computer is suspended.

❑ PTV output

Error code	Meaning
D0h	PTV voltage is over 1.26V when the computer is powered on/off.
D1h	PTV voltage is 0.68V or less when the computer is powered on.
D2h	PTV voltage is 0.68V or less when the computer is booting up.
D3h	PTV voltage is 0.68V or more when the computer is powered off.
D4h	PTV voltage is 0.68V or less while the computer is suspended.

❑ 1R9-B1V output

Error code	Meaning
E0h	1R9-B1V voltage is over 2.40V when the computer is powered on/off.
E1h	1R9-B1V voltage is 1.53V or less when the computer is powered on.
E2h	1R9-B1V voltage is 1.53V or less when the computer is booting up.
E3h	1R9-B1V voltage is 1.53V or more when the computer is powered off.
E4h	1R9-B1V voltage is 1.53V or less while the computer is suspended.
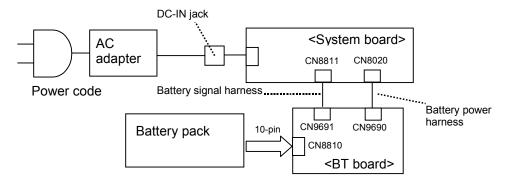
Check 2   In the case of error code 10h or 12h:

      ❑ Make sure the AC adapter and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected firmly, go to the following step:

      ❑ Connect a new AC adapter and AC power cord. If the problem still occurs, go to Procedure 5.

Check 3   In the case of error code 21h:

      ❑ Go to Procedure 3.

Check 4   For any other errors, go to Procedure 5.

Procedure 3   Connection Check

The wiring diagram related to the power supply is shown below:

Any of the connectors may be disconnected. Perform Check 1.

Check 1   Make sure the AC adapter and the AC power cord are firmly plugged into the DC IN jack and wall outlet. If these cables are connected firmly, go to Check 2.

Check 2   Replace the AC adapter and the AC power cord with new ones.

- If the DC IN icon does not light, go to Procedure 5.
- If the battery icon does not light, go to Check 3.

Check 3   Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 4   Charging Check

Check if the power supply controller charges the battery pack properly. Perform the following procedures:

Check 1   Make sure the AC adapter is firmly plugged into the DC IN jack.

Check 2   Make sure the battery pack is properly installed. If it is properly installed, go to Check 3.

Check 3   The battery pack may be completely discharged. Wait a few minutes to charge the battery pack while connecting the battery pack and the AC adapter. If the battery pack is still not charged, go to Check 4.

Check 4   The battery's temperature is too high or low. Leave the battery for a while to adjust it in the right temperature. If the battery pack is still not charged, go to Check 5.

Check 5   Replace the battery pack with a new one. If the battery pack is still not charged, go to Procedure 5.

Procedure 5   Replacement Check

The power is supplied to the system board by the AC adapter. If either the AC adapter or the system board was damaged, perform the following Checks.

To disassemble the computer, follow the steps described in Chapter 4, *Replacement Procedures*.

When AC adapter is connected;

Check 1   AC adapter may be faulty. Replace the AC adapter with a new one. If the problem still occurs, perform Check 2.

Check 2   System board may be faulty. Replace the system board with a new one.

When AC adapter is not connected;
(When driving with battery pack)

Check 1   Battery pack may be faulty. Replace it with a new one. If the problem still occurs, perform Check 2.

Check 2   BT board may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.

Check 3   Battery signal harness or battery power harness may be faulty. Replace it with a new one. If the problem still occurs, perform Check 4.

Check 4   System board may be faulty. Replace it with a new one.

2.4   System Board Troubleshooting

This section describes how to determine if the system board is malfunctioning or not. Start with Procedure 1 and continue with the other procedures as instructed. The procedures described in this section are:

Procedure 1:   Message Check

Procedure 2:   Debugging Port Check

Procedure 3:   Diagnostic Test Program Execution Check

Procedure 4:   Replacement Check

Procedure 1   Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. The IRT tests each IC on the system board and initializes it.

❑ If an error message is shown on the display, perform Check 1.

❑ If there is no error message, go to Procedure 2.

❑ If MS-DOS or Windows OS is properly loaded, go to Procedure 4.

Check 1   If one of the following error messages is displayed on the screen, press the **F1** key as the message instructs. These errors occur when the system configuration preserved in the RTC memory (CMOS type memory) is not the same as the actual configuration or when the data is lost.

If you press the **F1** key as the message instructs, the SETUP screen appears to set the system configuration. If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message is displayed, perform Check 2.

```
(a)        *** Bad HDD type ***
           Check system.  Then press [F1] key ......
(b)        *** Bad RTC battery ***
           Check system.  Then press [F1] key ......
(c)        *** Bad configuration ***
           Check system.  Then press [F1] key ......
(d)        *** Bad memory size ***
           Check system.  Then press [F1] key ......
(e)        *** Bad time function ***
           Check system.  Then press [F1] key ......
(f)        *** Bad check sum (CMOS) ***
           Check system.  Then press [F1] key ......
(g)        *** Bad check sum (ROM) ***
           Check system.  Then press [F1] key ......
```

Check 2   If the following error message is displayed on the screen, press any key as the message instructs.
The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the system board is damaged. Go to Procedure 3.

```
WARNING:  RESUME FAILURE.
PRESS ANY KEY TO CONTINUE.
```

If any other error message displays, perform Check 3.

Check 3   The IRT checks the system board. When the IRT detects an error, the system stops or an error message appears.

If one of the following error messages (1) through (17), (23) or (24) is displayed, go to Procedure 4.

If error message (18) is displayed, go to the Keyboard Troubleshooting Procedures.

If error message (19), (20) or (21) is displayed, go to the HDD Troubleshooting Procedures.

If error message (22) is displayed, go to the USB FDD Troubleshooting Procedures.

```
(1)  PIT ERROR
(2)  MEMORY REFRESH ERROR
(3)  TIMER CH.2 OUT ERROR
(4)  CMOS CHECKSUM ERROR
(5)  CMOS BAD BATTERY ERROR
(6)  FIRST 64KB MEMORY ERROR
(7)  FIRST 64KB MEMORY PARITY ERROR
(8)  VRAM ERROR
(9)  SYSTEM MEMORY ERROR
(10) SYSTEM MEMORY PARITY ERROR
(11) EXTENDED MEMORY ERROR
(12) EXTENDED MEMORY PARITY ERROR
(13) DMA PAGE REGISTER ERROR
(14) DMAC #1 ERROR
(15) DMAC #2 ERROR
(16) PIC #1 ERROR
(17) PIC #2 ERROR
(18) KBC ERROR
(19) HDC ERROR
(20) HDD #0 ERROR
(21) HDD #1 ERROR
(22) NO FDD ERROR
(23) TIMER INTERRUPT ERROR
(24) RTC UPDATE ERROR
```

Procedure 2   Debugging Port Check

Check the D port status by a debug port test. The tool for debug port test is shown below.
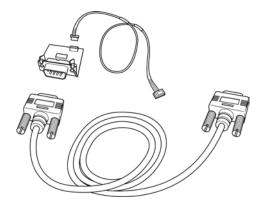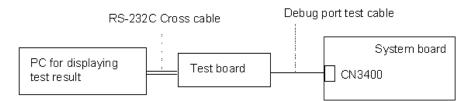
Figure 2-2 A set of tool for debug port test

The test procedures are follows:

1. Connect the debug port test cable to the connector CN3400 of the system board. For disassembling to connect the test cable, refer to Chapter 4.

2. Connect the debug port test cable and RS-232C cross-cable to the test board.

3. Connect the RS-232C cross-cable to the PC that displays the results.

4. Boot the computer in MS-DOS mode.

5. Execute GETDPORT.COM in the text menu in CPU REAL mode. (Insert the FD for starting D port into FDD and input "FD starting drive:>dport".)

   The D port status is displayed in the following form;

6. When the D port status is FFFFh (normal status), go to Procedure 4.

7. When the D port status falls into any status in Table 2-4, execute Check 1.

Table 2-4 Debug port (Boot mode) error status (1/8)

D port status	Inspection items	Details
	Permission of A20 and Clear of software reset bit	
	Prohibition of APIC	
	Initialization of MCHM	
	Initialization of ICHM	
	Initialization of Super I/O	
	Initialization of debug port	
	Dummy read of 3rd Bus data	
F000h	PIT CH0 initialization (for HOLD_ON)	
	BIOS rewrite factor flag initialization	
	CHECK SUM CHECK	Transition to protected mode
		Boot block checksum (skip when returned to S3) (halts when error)
		Checksum other than boot block (skip when returned to S3)
F001h	EC/KBC rewrite check	Key input
	If "rewrite" is requested, go to "BIOS rewrite process".	Check of Tilde key, Tab key if a key is pressed
	Transition of process to System BIOS IRT when returned to S3)	
F002h	BIOS rewrite request check	
	BIOS rewrite request check if Checksum check error occurred on except Boot Block or rewrite is required by user. "BIOS rewrite process".	
F003h	Transits to System BIOS IRT	
BIOS rewrite		
	Initialization of ICHM. D31	
	DRAM configuration	
	Permission of cache (L1 cache only)	
	Memory clear	
	Transition to real mode and copy of BIOS to RAM	

Table 2-4 Debug port (Boot mode) error status (2/8)

D port status	Inspection items	Details
F005h	Saving key scan code	
	Setting TASK_1ms_TSC	
	Controlling fan	
	Initializing sound items (for BEEP)	Enabling system speaker
		Releasing mute
		Making the volume max.
	When request BIOS, EC/KBC rewriting	Blinks green (cycle:2s, on:1s, off:1s)
	When BIOS ROM abnormal	Blinks orange (cycle:2s, on:1s, off:1s)
	Key input	Prohibition of USB
		BEEP
		Waiting for key input
	Reading CHGBIOSA.EXE / CHGFIRMA.EXE	FDC reset
		Setting parameters for 2HD(1.44MB)
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.
		Setting of parameters for 2DD (720KB)
		Retrieval of "CHGBIOSA.EXE" from the root directory.
		Directory start header and calculates the sector
		Read 1 sector of the root directory
		Retrieval of entry of "CHGBIOSA.EXE" /"CHGFIRMA.EXE" from the sector read.
	Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"	(Key input when error occurred.)
	Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"	
IRT		
F100h	Prohibition of cache	
	Initialization of H/W (before DRAM recognition)	Initialization of MCHM
		Initialization of ICH6M.D31.Func0
		Initialization of ICH6M.D31.Func1
		Initialization of USB.Func0,1,2,7
		Initialization of ICH6M.D31.Func3
		Initialization of ICH6M.D31.Func5
		Initialization of FLUTE
	Initialization of PIT channel 1	(Setting the refresh interval "30μs")

Table 2-4 Debug port (Boot mode) error status (3/8)

D port status	Inspection items	Details
F101h	Checking DRAM type and size (at cold boot)	When unsupported memory connected, beeps and halts. (When DRAM size = o, it halts.)
	Testing the stack area of SM-RAM	(When it can not be used, halts.)
F102h	Configuring cache memory	
	Permission of L1/L2 cache memory	
	Checking the access of a CMOS (Only in Cold Boot)	(When error detected, it halts.)
	Examining the battery level of CMOS	
	Checksum check of CMOS	
	Initializing data in CMOS (1)	
	Setting up IRT status	(Setting of boot status and IRT busy flag, The rest bit is 0)
	Storing the size of DRAM	
F103h	Branch of resuming (only in Cold Boot)	When a CMOS error is detected, no resume occurs.
		If "resume status code" is not set, no resume occurs.

		Resume error check
		 S3 recovery error (ICH)
		      Resume error F17AH
		 SM-RAM checksum check
		      Resume error F173H
		 Memory configuration change check
		      Resume error F173H
		 Checksum check of system BIOS RAM area
		      Resume error F179H
		 Checksum check of expansion memory
		      Resume error F176H
		 Checksum check of PnP RAM
		      Resume error F177H
		To resume process (RESUME_MAIN)

	Resume error process	Returns the CPU clock to "Low"
		Prohibition of all SMI
		Clears resume status
		Return to ROM

Table 2-4 Debug port (Boot mode) error status (4/8)

D port status	Inspection items	Details
		Forwards the area of C0000h to EFFFFh to PCI (prohibition of DRAM)
		Sets resume error request
	Copying ROM/RAM of system BIOS	(When error occurred, it halts.)
F104h	SMRAM initialization	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	
F105h	Initialization of devices which need initialization before PCI bus initialization	PIT test (at Cold boot only) and initialization Setting of test pattern to channel 0 of PIT#0 Check whether the set test pattern can be read. Initialization of PIT channel 0 (Setting of timer interruption interval to 55ms) Initialization of PIT channel 2 (Setting of the sound generator frequency to 664Hz) Test of PIT channel 1 (Check whether the refresh signal works normally in 30 micro-s refresh interval) (The system halts when the time is out.) Test of PIT channel 2 (Check if the speaker gate works properly.)
		CPU clock measurement
		Check of parameter block A
		Permission of SMI except auto-off function
		Control on excess of rated input power
		Battery discharge current control (1CmA)
		AC adapter rated over current control
		Dividing procedures for time measuring by IRT
		Setting for clock generator
		CPU Initialization Update of micro code Judge of CPU type Geyserville support check Setting of CPU clock to "high"
		Graphics Aperture Size setting

Table 2-4 Debug port (Boot mode) error status (5/8)

D port status	Inspection items	Details
F106h	Saving memory configuration to buffer	
	Reading of EC version	
	Update of flash ROM type	
	Judging of destination (Japan or except Japan) based on DMI data	
	CMOS default setting check ACPI table initialization (for execution of option ROM)	Defaults set if bad battery, bad checksum (ROM, CMOS) is detected)
	Initialization of devices which need initialization before PCI bus initialization	AC'97 control
		Initialization of temperature control information
		KBC initialization
		VGA display off, Reset control
		Sound initialization
		HC initialization, USB Device recognition and initialization
		Control of built-in LAN permission/prohibition
	PIC initialization	
	PIC test	
	Password Initialization	
F107h	PCI bus initialization	(connection of DS Bus)
	Initialization of LAN information	
	Check of WakeUp factor	
F108h	Task generation for waiting INIT_PCI completion	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	H/W setting based on resource	
F109h	Task generation for waiting PnP resource making completion	
	PnP H/W initialization	PC card slot initialization
	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ

Table 2-4 Debug port (Boot mode) error status (6/8)

D port status	Inspection items	Details
(F109h)		Configuration
		Saving of VGA configuration result
F10Ah	Task generation for waiting PCI_CONFIGURATION completion	
	Initialization of H/W needed after PCI configuration	HDD initialization sequence start
	Enabling power off	
	Output code generation	
F10Bh	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10Ch	INIT_INT_VECTOR	(Initialization of vectors)
F10Dh	INIT_NDP	(Initialization of NDP)
F10Eh	INIT_SYSTEM (Initialization of system)	Storing of CMOS error status to IRT_ERR_STS_BUF
		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update of EDID information for LCD)
F10Fh	INIT_DISPLAY	Waiting for VGA chip initialization completion, VGA BIOS initialization
		Waiting for VGA power ON
		Waiting for Display access completion
F110h	Calling VGA BIOS	
F112h	DISP_LOGO	Displaying logo
F113h	SYS_MEM_CHECK	Check of convention memory in the protected mode (boot)
F114h	EXT_MEM_CHECK	Check of exception in the protected mode (boot)
F115h	Check of exception in the protected mode	DPORT= F116H when error
	INIT_SYS_MEM	Initialization of conventional memory (Reboot)

Table 2-4 Debug port (Boot mode) error status (7/8)

D port status	Inspection items	Details
F117h	CHK_DMA_PAGE	Check of DMA Page Register (Boot)
F118h	CHECK_DMAC	Check of DMAC (Boot)
F119h	INIT_DMAC Initialization of DMAC (Boot)	(In the case of "Reboot") Waiting for HDD initialization completion Check of key input during IRT (waiting for KBC initialization completion) I/O LOCK process ATA priority initialization

F11Ch	BOOT_PASSWORD
	(password check)
		(In the case of "Reboot")
		  Waiting for HDD initialization
		  Check of key input during IRT (waiting for KBC
		  initialization completion)
		  ATA priority initialization
		(In the case of "Boot")
		  Check of key input during IRT (waiting for KBC
		  initialization completion)
		  Input of password
		  (Waiting for completion of initializing HDD)

F11Dh	EX_IO_ROM_CHECK	Check of option I/O ROM
F11Eh	PRE_BOOT_SETUP	Saving of value in 40:00h (for SIO saving/restoring)
		Setting of font address for resume password
		Setting of repeat parameter for USB KB
		Final check of key input during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource before boot
		Rewriting of memory map data of INT15h E820h function
		Waiting for AC-Link initialization completion
		Renewal table for DMI
		Copying ACPI table to uppermost of extension memory
		Waiting for completion of BIOS rewriting of PSC version
		Waiting for completion of setting clock generator When error occurred, halts at DPORT=F11FH
		Cancel of NMI Mask
		TIT check sum

Table 2-4 Debug port (Boot mode) error status (8/8)

D port status	Inspection items	Details
(F11Eh)		Clearance of the IRT flag of Runtime side
		Update of check sum of Runtime side
		Initialization of Bluetooth
		Check of target maintenance card
		Prohibition of unused PC card
		Setting Wakeup status data for ACPI
		HW initialization before Boot, Waiting for initialization completion
		Notifies the DVI connection status to VGA BIOS
		Setting of battery save mode
		Setting of date
		Waiting for Bluetooth initialization completion
		Update of DMI Wakeup factor, Update of SM-BIOS structure table
		PCI device configuration space close
		Cache control
		Process for CPU
		Make the CPU clock to be set by SETUP
		Waiting of motor-off completion of disabled HDD
		Final decision of USB FDD drive information
		Post processing of PRE_BOOT_SETUP
		Clearance of PWRBTN_STS
		Enabling POWER Button
		Measure on chip set defective
F120h	Clearance of IRT status	
	Update of check sum of Runtime side	
FFFFh	End	

Table 2-5   Debug port (Suspend mode) error status (1/3)

D port status	Inspection items	Details
Suspend mode		
F130h	When powering-off request from OS is required, waiting for the completion of dividing process because waiting in SUSPEND of Runtime returns the process to OS.	
	Forced execution of dividing (Permission of SMI for dividing)	
	Waiting for completion of dividing	
F131h	After prohibiting of all SMI, permits I/O trap (EHCI) and external SMI.	
	Starts dividing to transmit periodically extension command (every 25 seconds) not to generate time-out of power-off.	
	Clears resume/power-off status.	
	Storing and initializing of special configuration register	
	Prohibits clock control	
	Recognition of suspending for boot/ resume	
	Branch of resume mode (DPORT= F132h) or boot mode(DPORT=F133h)	
F132h	Powering-off during resuming	Halt of HC
		Starts sequence for storing display system.
F133h	Resume error check in suspend mode.	Checks if in IRT.
		Checks if external option ROM are connected
	Execution of driver for suspend	
	Clearing of data for Remote Lockout	
	Storing of USB register	
	Halt of HC	
	Storing CPU register	
	Permission of system area, memory cache	(to work at high-speed)
	Suspending of HDD	
	Storing KBC,SCC and MOUSE	
	Storing of PCI device	

Table 2-5 Debug port (Suspend mode) error status (2/3)

LED Status	Test item	Contents
(F133h)	Storing of PIT	
	Starts sequence for storing display system.	
	Storing of PIC	
	Storing of DMAC	
	Storing of system status command port	
	Storing of PCMCIA card	
	Storing of RTC	
	Storing of original HW for system	
	Calculation of check sum (conventional memory)	
Suspend process for boot mode		
F137h	Processing of VGA –off (boot)	
	Suspending of HDD (boot)	
	Transition to S5 of Bluetooth (boot)	(For models supporting Bluetooth)
F138h	Suspending of boot / resume for PnP	(Stores PnP resource information into Flash ROM.)
	Suspending of boot / resume for password	(Stores password information into Flash ROM.)
F139h	Waiting for completion of suspending for HDD password	
F13Ah	Prohibition of PCI arbiter	
	Setting of Wakeup event	
	Power-off of PC card	
	Re-setting backup current	
	Forced off of fan	
	Checks if off-process for resume is needed	
	Power LED control during suspending	
	Isolates built-in LAN.	
	Makes the power of sound off.	
F13Bh	Model-unique processing just before suspending	
	Waiting for completion of dividing for suspending	
	Stops dividing of extension command for power off.	

Table 2-5 Debug port (Suspend mode) error status (3/3)

LED Status	Test item	Contents
F13Ch	Measure for USB over current	
	Calculation of check sum of PnP RAM area	Not work in suspending for boot
	Acquires how to turn the power off	
	Resets by EC	(when required)
	Makes not to send Eject Power Off command when turning the power off by the date check of alarm power on	
	Prohibition of all SMI	
	Initializing of special register in suspend	
	Calculates the check sum of SMRAM and stores it in SMRAM	
F13Dh	Calculates the checksum of system BIOS in the IRT side	Checksum does not match during IRT and Runtime
	Setting status of suspend completion	
	Prohibition of L1&L2	
	Power off	Completion of BIOS

Table 2-6   Debug port (Resume mode) error status (1/4)

LED Status	Test item	Contents
Resume		
F100h	Refer to IRT	
F101h	Refer to IRT	
F102h	Refer to IRT	
F103h	Refer to IRT	
	Clears flag for SMI control.	
	Renewal of Resume counter	
F121h	Checks the WakeUp factors.	
	Rewriting of SMRAM BASE	
F122h	Initializing devices necessary for initialization before initializing PCI bus	Initializing of PIT
		Initializing of PIT channel 0 (Sets the interval of timer interruption to 55ms)
		Initializing of PIT channel 2 (Sets the sound generator frequency to 664Hz)
		Measuring CPU clock
		Permission of SMI other than auto-off function
		Control of excess of rated input power
		Control of battery discharging current (1CmA)
		Control of excess of rated current of AC adapter
		Dividing for measuring of IRT time
		Setting to clock generator
		Check of parameter block A
		Initializing of CPU
		Updating micro-code
		Judge of CPU type
		Check of supporting Geyserville
		Sets the CPU clock to High
		Setting of Graphics Aperture Size
	Recovery of PIC register	
	Initialization 2 of devices necessary for initialization before initializing PCI bus	AC'97 control
		Initializing of temperature control information
		Initializing of KBC
		VGA display-off and Reset control

Table 2-6 Debug port (Resume mode) error status (2/4)

LED Status	Test item	Contents
(F122h)		Start recovery of VGA
		Initializing of sound
		Acquires the multi-box status
		Initializing of HC, recognizing of devices
		Control of permission/prohibition for built-in LAN
	Check of the checksum of conventional memory	Resume error DPORT=F174H
F123h	Initializing of PCI devices	
	Check of WakeUp factors after initializing PCI bus	
F124h	Waiting for initializing of devices which have to be initialized before setting HW by PnP resource	
	Recovery of each device (1)	Processing of RESUME for PnP
		Waiting for the completion of VGA power-down control (because the VGA configuration can not be seen)
		Processing of RESUME for PCI
		Recovery of PCMCIA card
		Error when an ATA card is pulled out (Resume error DPORT=17BH)
		Executing of dividing process of device detection of PC card
	Check of HDD pack connection	Resume error when HDD is mounted DPORT=F172h
	Start of IDE device resume sequence	
F125h	Recovery of user alarm setting and cancel of alarm power-on function	(This function works only one time)
	Enable of power-off switch	
	Initializing EC and start of reading battery information	
	Recovery of each device(2)	Setting of setup items
		Initializing of DMAC
	Initializing of VGA BIOS in resume	Waiting for VGA power on
F126h	Call of VGA BIOS	
F128h	Processing of password for RESUME	
F129h	Recovery of each device(3)	Recovery of DMAC register
		PnP Resume processing (2nd)
	Motor-off of disabled HDD	

Table 2-6 Debug port (Resume mode) error status s (3/4)

LED status	Test item	Contents
F12Ah	Waiting for completion of KBC initializing	(not in ACPI mode)
	Waiting for completion of USB initializing	
	Recovery of USB register	
	Recovery of CPU register	
	Resetting NDP interruption	
	Recovery of system, status command and port	
	Wakeup check	Notifies the device change status to the high rank.
		Setting WAKEUP status data for ACPI
	Initializing HW just before booting or waiting for the completion	Notifies the DVI connection status to VGA BIOS
		Setting battery saving mode
		Setting of date
		Waiting for the completion of Bluetooth initializing (models supporting Bluetooth)
		Renewal of Wakeup factor of DMI and SM-BIOS structure table
		Closing PCI device configuration area
		Cache control
		Update of parameter block A
		Process related to CPU
		Setting of CPU clock to SETUP designation
		Waiting for motor-off of disabled HDD
		Final decision of USB FDD information
		Post-process of PRE_BOOT_SETUP
		Clears PWRBTN_STS
		Enables Power Button
		Measures against chip set defective
	Waiting for the completion of recovery of VGA register	
	Recovery of PIT register	
	Recovery of PCI configuration register	
	Recovery of PIC MASK	
	Executing of driver for RESUME	

Table 2-6 Debug port (Resume mode) error status (4/4)

LED status	Test item	Contents
F12Bh	Checks if the power-off switch is pressed or not during resume processing	(Suspends if pressed)
	Executes HOTKEY F1 processing when booting in instant security	
F12Ch	(Not in ACPI mode) Clears key buffer	
F12Dh	(In ACPI mode) Clears IRT status	
F12Eh	(In ACPI mode)	
	Clears flag in Resume process	
	Acquires Wake Up Vector address.	
	Clears key buffer	
	Update of date/time	
	ACPI mode on	
	Recovery of write-protected status before	
FFFFh	(In ACPI mode / not in ACPI mode)	
	Returning to the main process	

NOTE: Status outputted by the test means the last error detected in the debug port test.

Procedure 3   **Diagnostic Test Program Execution Check**

Execute the following tests from the Diagnostic Test Menu. These tests check the system board. Refer to Chapter 3, *Tests and Diagnostic,* for more information on how to perform these tests.

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. Floppy Disk test
6. Printer test   [It is not supported]
7. Async test   [It is not supported]
8. Hard Disk test
9. Real Timer test
10. NDP test
11. Expansion test
12. CD-ROM/DVD-ROM test
13. Only One test
14. Wireless LAN test
15. LAN/Modem/Bluetooth/IEEE1394 test
16. Sound test

If an error is detected during these tests, go to Procedure 4.

Procedure 4   **Replacement Check**

System board may be faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and replace system board with a new one.

2.5　USB FDD Troubleshooting

To check if the USB FDD is malfunctioning or not, follow the troubleshooting procedures below as instructed.

> Procedure 1: FDD Head Cleaning Check
>
> Procedure 2: Diagnostic Test Program Execution Check
>
> Procedure 3: Connector Check and Replacement Check

Procedure 1　FDD Head Cleaning Check

FDD head cleaning is one option available in the Diagnostic Program.

After connecting USB FDD, insert the Diagnostics Disk in the floppy disk drive. Turn on the computer and run the test. And then clean the FDD heads using the cleaning kit. If the FDD still does not function properly after cleaning, go to Procedure 2.

Detailed operation is given in Chapter 3, *Tests and Diagnostics*.

If the test program cannot be executed on the computer, go to Procedure 3.

Procedure 2   Diagnostic Test Program Execution Check

Insert the Diagnostics Disk in the USB FDD, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics,* for more information about the diagnostics test procedures.

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-7. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-7   FDD error code and status

Code	Status
01h	Bad command
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media replaced
08h	DMA overrun error
09h	DMA boundary error
10h	CRC error
20h	FDC error
40h	Seek error
60h	FDD not drive
80h	Time out error (Not ready)
EEh	Write buffer error
FFh	Data compare error

Check 1   If the following message is displayed, disable the write protect tab on the floppy disk by sliding the write protect tab to "write enable". If any other message appears, perform Check 2.
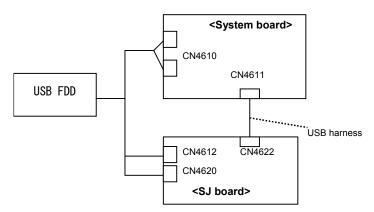
```
Write protected
```

Check 2   Make sure the floppy disk is formatted correctly. If it is, go to Procedure 3.

Procedure 3   Connector Check and Replacement Check

USB FDD is connected to USB port on system board and US board. US board is also connected to system board by cable. The connection of cable and board may be defective. Otherwise, they may be faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks.

USB FDD can be connected to the following 4 ports.
(System board x 2 ports, SJ board x 2 ports)

Check 1   Make sure USB FDD is firmly connected to USB port. If the connection is loose, connect firmly and repeat Procedure 2. If the problem still occurs, go to Check 2.

NOTE: When checking the connection, be sure to check it with care for the followings.

1. Cable can not be disconnected from the connector.

2. Cable is connected straight to the connector.

3. Cable is connected all the way seated in the connector.

4. Cable can not be broken.

Check 2   USB FDD may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.

Check 3   Connect USB FDD to each port embedded on system board and on SJ board. Then, check if it works properly. If it does not work properly when connected to CN4621/CN4620, perform Check 4. If it does not work properly when connected to CN4610 or all ports, perform Check 6.

Check 4   USB harness may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 5.

Check 5   SJ board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 6.

Check 6   System board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.6   2.5" HDD Troubleshooting

To check if 2.5" HDD is malfunctioning or not, follow the troubleshooting procedures below as instructed.

>   Procedure 1: Partition Check
>
>   Procedure 2: Message Check
>
>   Procedure 3: Format Check
>
>   Procedure 4: Diagnostic Test Program Execution Check
>
>   Procedure 5: Connector Check and Replacement Check

CAUTION: *The contents of the hard disk will be erased when the 2.5" HDD troubleshooting procedures are executed. Transfer the contents of the hard disk to floppy disks or other storage drive(s). For the backup, refer to the User's Manual.*

Procedure 1   Partition Check

Insert the Toshiba MS-DOS system disk and start the computer. Perform the following checks:

Check 1   Input **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.

Check 2   Input **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed in the Display Partition Information, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition or a logical DOS drive on drive C. If the problem still occurs, go to Procedure 2.

Check 3   If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Then go to Procedure 2.

Check 4   Remove the system disk from the FDD and reboot the computer. If the problem still occurs, go to Procedure 2. Otherwise, the 2.5" HDD is operating normally.

Procedure 2   Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. When the test detects an error, an error message is displayed on the screen.

Make sure no floppy disk is in the FDD. Turn on the computer and check the message on the screen. When an OS starts from the 2.5" HDD, go to Procedure 3. Otherwise, start with Check 1 below and perform the other checks as instructed.

Check 1   If any of the following messages appear, go to Procedure 3. If the following messages do not appear, perform Check 2.

> ```
> HDC ERROR
> ```
>
> or
>
> ```
> HDD #X ERROR
> ```
> (After 5 seconds this message will disappear.)

Check 2   If either of the following messages appears, go to Check 3. If the following messages do not appear, perform Check 4.

> ```
> Insert system disk in drive
> Press any key when ready .....
> ```
>
> or
>
> ```
> Non-System disk or disk error
> Replace and press any key when ready
> ```

Check 3   Using the SYS command of the MS-DOS, transfer the system to the 2.5" HDD. If the system is not transferred, go to Procedure 3. Refer to the MS-DOS Manual for detailed operation.

> If the following message appears on the display, the system program has been transferred to the HDD.
>
> ```
> System Transferred
> ```
>
> If an error message appears on the display, perform Check 4.

Check 4   2.5" HDD(s) and the connector(s) of system board may be defective (Refer to the steps described in Chapter 4, *Replacement Procedures* for disassembling.). Insert HDD(s) to the connector(s) firmly. If it is (or they are) firmly connected, go to Procedure 3.

Procedure 3　Format Check

The computer's HDD is formatted using the MS-DOS FORMAT program or the physical format program of the test program. To format the HDD, start with Check 1 below and perform the other steps as required.

Refer to the MS-DOS Manual for the operation of MS-DOS. For the format by the test program, refer to the Chapter 3.

Check 1　Format an 2.5" HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

        If 2.5" HDD can not be formatted, perform Check 2.

Check 2　Using the MS-DOS FDISK command, set the 2.5" HDD partition. If the partition is not set, go to Check 3. If it is set, format 2.5" HDD using MS-DOS FORMAT command.

Check 3　Using the Diagnostic Disk, format 2.5" HDD with a format option (physical format). If HDD is formatted, set the 2.5" HDD partition using MS-DOS FDISK command.

        If you cannot format 2.5" HDD using the Tests and Diagnostic program, go to Procedure 4.

Procedure 4   Diagnostic Test Program Execution Check

The HDD test program is stored in the Diagnostics Disk. Perform all of the HDD tests in the Hard Disk Drive Test. Refer to Chapter 3, *Tests and Diagnostics,* for more information about the HDD test program.

If an error is detected during the HDD test, an error code and status will be displayed. The error codes and statuses are described in Table 2-8. If an error code is not displayed but the problem still occurs, go to Procedure 5.

Table 2-8 2.5" Hard disk drive error code and status
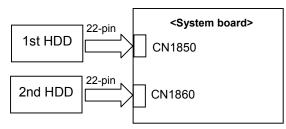
Code	Status
05	HDD - HDC NOT RESET ERROR
07	HDD - DRIVE NOT INITIALIZE
09	HDD - DMA BOUNDARY ERROR
0B	HDD - BAD TRACK ERROR
BB	HDD - UNDEFINED ERROR
08	HDD - OVERRUN ERROR (DRQ ON)
01	HDD - BAD COMMAND ERROR
02	HDD - ADDRESS MARK NOT FOUND
04	HDD - RECORD NOT FOUND ERROR
10	HDD - ECC ERROR
20	HDD - HDC ERROR
40	HDD - SEEK ERROR
80	HDD - TIME OUT ERROR
11	HDD - ECC RECOVER ENABLE
AA	HDD - DRIVE NOT READY
CC	HDD - WRITE FAULT
E0	HDD - STATUS ERROR
0A	HDD - BAD SECTOR
EE	HDD - ACCESS TIME ERROR
DA	HDD - NO HDD
12	HDD - DMA CRC ERROR

Procedure 5   Connector Check and Replacement Check

HDD(s) is/are connected to the connector(s) on the system board. The connection of HDD(s) and board may be defective. Otherwise, they may be faulty. Disassemble the computer following instructions in Chapter 4, *Replacement Procedures* and perform the following checks.

Check 1   Make sure HDD(s) is/are firmly connected to the connector(s) on the system board.

    If any of the connections are loose, reconnect firmly and repeat Procedure 1. If the problem still occurs, go to Check 2.

Check 2   (One of) HDD(s) may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and check the operation. If the problem still occurs, perform Check 3.

Check 3   System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.7   Keyboard Troubleshooting

To check if the computer's keyboard is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Execute the Keyboard Test (DIAGNOSTIC TEST) and Pressed key display test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

If an error occurs, go to Procedure 2. If an error does not occur, keyboard is functioning properly.

Procedure 2   Connector and Replacement Check

The connection of cable and board may be defective. Otherwise, they may be faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure keyboard cable is firmly connected to system board.

        If the connection is loose, reconnect firmly and repeat Procedure 1. If the problem still occurs, go to Check 2.

Check 2   Keyboard may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.

Check 3   System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.8 Touch pad Troubleshooting

To check if the computer's touch pad is malfunctioning or not, follow the troubleshooting procedures below as instructed.

        Procedure 1: Diagnostic Test Program Execution Check

        Procedure 2: Connector and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check
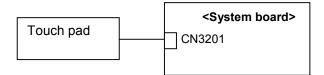
Execute the Touch pad test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

If an error occurs, go to Procedure 2. If an error does not occur, touch pad is functioning properly.

Procedure 2   Connector and Replacement Check

The connection of cable and board may be defective. Otherwise, they may be faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure the cable is firmly connected to system board.

```
                             ┌──────────────────────────┐
                             │      <System board>      │
        ┌──────────────┐     │ ┌┐                       │
        │  Touch pad   │─────┼─┤│ CN3201                │
        │              │     │ └┘                       │
        └──────────────┘     │                          │
                             └──────────────────────────┘
```

         If the connection is loose, reconnect firmly and repeat Procedure 1. If the problem still occurs, go to Check 2.

Check 2   Touch Pad or the cable may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.

Check 3   System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.9 Display Troubleshooting

To check if the computer's display is malfunctioning or not, follow the troubleshooting procedures below as instructed.

        Procedure 1: External Monitor Check

        Procedure 2: Diagnostic Test Program Execution Check

        Procedure 3: Connector and Cable Check

        Procedure 4: Replacement Check

Procedure 1   External Monitor Check

Connect an external monitor to the computer's external monitor port, then boot the computer. The computer automatically detects the external monitor.

If the external monitor works correctly, the internal LCD may be faulty. Go to Procedure 3.

If the external monitor appears to have the same problem as the internal monitor, system board may be faulty. Go to Procedure 2.
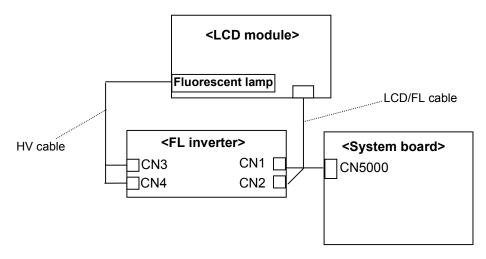
Procedure 2   Diagnostic Test Program Execution Check

The Display Test program is stored in Diagnostics disk. This program checks the display controller on system board. Insert the Diagnostics disk in the USB FDD, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details. If an error is detected, go to Procedure 3.

Procedure 3   Connector and Cable Check

LCD Module is connected to system board by an LCD/FL cable. FL inverter board is also connected to system board by an LCD/FL cable. In addition, fluorescent lamp is connected to FL inverter board by HV cable. Their cables may be disconnected from system board or FL inverter board. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*.

If the connection is loose, reconnect firmly and restart the computer. If the problem still occurs, go to Procedure 4.

Procedure 4   Replacement Check

Fluorescent lamp, FL inverter, LCD module, HV cable and LCD/FL cable are connected to display circuits. Any of these components may be faulty. Refer to Chapter 4, *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks:

        If fluorescent lamp does not light, perform Check 1.

        If characters or graphics on the internal display are not displayed clearly, perform Check 4.

        If some screen functions do not operate properly, perform Check 4.

        If fluorescent lamp remains lit when the display is closed, perform Check 5.

Check 1   Replace fluorescent lamp with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still occurs, perform Check 2.

Check 2   LCD/FL cable may be faulty. Replace FL/LCD cable with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still occurs, perform Check 3.

Check 3   FL inverter may be faulty. Replace FL inverter with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still occurs, perform Check 4.

Check 4   LCD module may be faulty. Replace LCD module with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still occurs, perform Check 5.

Check 5   System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedure*.

2.10 Optical Disk Drive Troubleshooting

To check if optical disk drive is malfunctioning or not, follow the troubleshooting procedures below as instructed.

> Procedure 1:   Diagnostic Test Program Execution Check
>
> Procedure 2:   Connector Check and Replacement Check
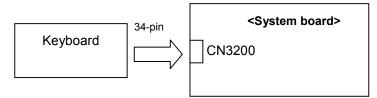
Procedure 1   Diagnostic Test Program Execution Check

Execute the CD-ROM/DVD-ROM Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.
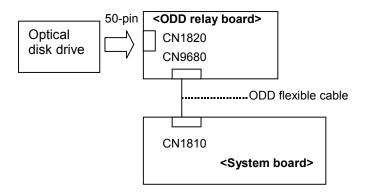
Prepare the tools before the test.

If any error is detected by the test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The connection may be defective among optical disk drive, ODD relay board, ODD flexible cable and system board. Otherwise, they may be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure optical disk drive is firmly connected to the connector on system board.

> If the connection is loose, reconnect it firmly and return to Procedure 2. If the problem still occurs, perform Check 2.

Check 2   Optical disk drive may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 3.

Check 3   ODD relay board may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 4.

Check 4   ODD flexible cable may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 5.

Check 5   System board may be faulty. Replace it with new one following the instructions in Chapter 4.

2.11 Modem Troubleshooting

To check if modem is malfunctioning or not, follow the troubleshooting procedures below as instructed.

       Procedure 1:   Diagnostic Test Program Execution Check

       Procedure 2:   Connector Check and Replacement Check

### Procedure 1   Diagnostic Test Program Execution Check

Execute Modem test in the LAN/Modem/Bluetooth/IEEE1394 test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.
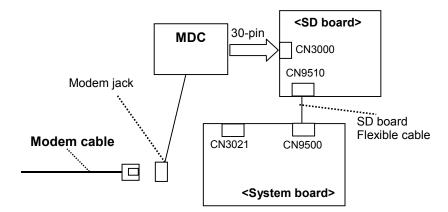
If any error is detected, perform Procedure 2.

Procedure 2   Connector Check and Replacement Check

MDC (Modem Daughter Card) is used as the modem for this computer. MDC is connected to SD board that is connected to system board. If modem malfunctions, The connection of cable, board and module may be defective. Otherwise, they may be faulty.

Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure the following connections are firmly connected.

       If any connector is disconnected, connect it firmly and return to Procedure 1. If the problem still occurs, perform Check 2.

Check 2   Modem cable may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.

Check 3   MDC may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 4.

Check 4   SD board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem still occurs, perform Check 5.

Check 5   SD board flexible cable may be faulty between SD board and system board. Replace it with a new one following the instructions in Chapter 4. If the problem still occurs, perform Check 6.

Check 6   System board may be faulty. Replace it with a new one following the instruction in Chapter 4.

2.12 LAN Troubleshooting

To check if the computer's LAN is malfunctioning or not, follow the troubleshooting procedures below as instructed.

        Procedure 1: Diagnostic Test Program Execution Check

        Procedure 2: Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

Execute LAN test in the LAN/Modem/Bluettoth/IEEE1394 test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

If any error is detected by the test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

LAN is connected to LAN jack that is connected to system board. If LAN malfunctions, the connection of cable, board and module may be defective. Otherwise, they may be faulty.

Check 1   Make sure LAN cable is firmly connected to the LAN jack. If the problem still occurs, perform Check 2.

Check 2   LAN cable may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.

Check 2   LAN harness may be faulty. Replace it with a new one. If the problem still occurs, perform Check 4.

Check 4   System board may be faulty. Replace it with a new one following the instruction in Chapter 4.

2.13 Wireless LAN Troubleshooting

To check if the computer's Wireless LAN is malfunctioning or not, follow the troubleshooting procedures below as instructed.

>Procedure 1: Transmitting-Receiving Check
>
>Procedure 2: Antennas' Connection Check
>
>Procedure 3: Replacement Check

Procedure 1   Transmitting-Receiving Check
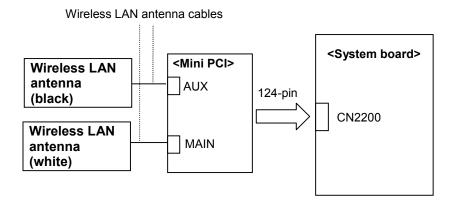
Before starting the test, make sure the wireless communication switch is set in the ON position.

Check 1   Execute Wireless LAN test program to check the transmitting-receiving function of wireless LAN. You will need a second computer that can communicate by wireless LAN. Perform the test following the instructions described in Chapter 3.

            If the computer passes the test, the function is correctly working. If the computer does not pass the test, perform Procedure 2.

Procedure 2   Antennas' Connection Check

The wireless LAN function-wiring diagram is shown below:

Wireless LAN antenna cables

Wireless LAN antenna (black)		<Mini PCI>

AUX

| Wireless LAN antenna (white) | | MAIN |

124-pin

<System board>

CN2200

Any of the connections may be defective. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure the wireless communication switch is "On".

If the switch is "Off", turn it "On". If the problem still occurs, perform Check 2.

Check 2   Make sure wireless LAN card (Mini-PCI) is firmly connected to the CN2200 on system board. If the connector is defective, connect it firmly and perform Procedure 1. If the problem still occurs, perform Check 3.

Check 3   Make sure that wireless LAN antenna cables (black and white) are firmly connected to the connectors on Wireless LAN card. If wireless LAN antenna cables are not connected properly, connect them firmly and perform Procedure 1. If the problem still occurs, go to the procedure 3.

Procedure 3   **Replacement Check**

Wireless LAN card, wireless LAN antenna or system board may be faulty. Refer to Chapter 4, *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks:

Check 1   Wireless LAN antenna may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.

Check 2   Wireless LAN card may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.

Check3   System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.14 Bluetooth Troubleshooting

To check if the Bluetooth is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

Procedure 1 Transmitting-Receiving Check
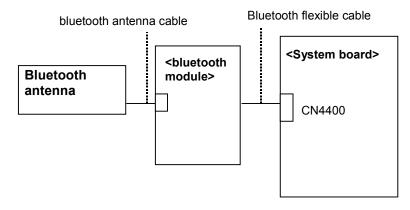
Before starting the test, make sure the wireless communication switch is set in the ON position.

Check 1   Execute Bluetooth test program to check the transmitting-receiving function of Bluetooth. You will need a second computer that can communicate by Bluetooth. Perform the test following the instructions described in Chapter 3.

If the computer passes the test, the function is correctly working. If the computer does not pass the test, perform Procedure 2.

Procedure 2 Antennas' Connection Check

The Bluetooth function-wiring diagram is shown below:

Any of the connections may be defective. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1   Make sure that the wireless communication switch is "On".

              If the switch is "Off", turn it "On". If the problem still occurs, perform Check 2.

Check 2   Make sure that Bluetooth flexible cable is firmly connected to the CN4400 on system board. If the connector is defective, connect it firmly and perform Procedure 1. If the problem still occurs, perform Check 3.

Check 3   Make sure that Bluetooth antenna cable is firmly connected to the connector on Bluetooth module. If Bluetooth antenna cable is not connected properly, connect them firmly and perform Procedure 1. If the problem still occurs, go to the procedure 3.

Procedure 3 Replacement Check

Bluetooth module, Bluetooth antenna or system board may be faulty. Refer to Chapter 4, *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks:

Check 1   Bluetooth antenna may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.

Check 2   Bluetooth flexible cable may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.

Check 3   Bluetooth module may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 4.

Check 4   System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.15 Sound Troubleshooting

To check if the sound function is malfunctioning or not, follow the troubleshooting procedures below as instructed.

        Procedure 1:   Diagnostic Test Program Execution Check

        Procedure 2:   Connector Check

        Procedure 3:   Replacement Check
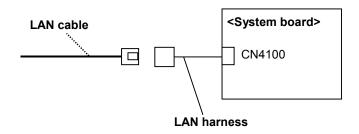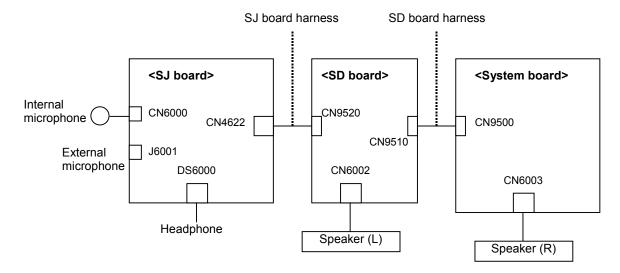
Procedure 1   Diagnostic Test Program Execution Check

Execute the Sound test in Sound Test program disk. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

If any error is detected by the test, go to Procedure 2.

Procedure 2   Connector Check

The connection of sound system is shown in the following figure.

As the connection may be defective, disassemble the PC and check each connection.

If the problem still occurs, go to Procedure 3.

Procedure 3   Replacement Check

❑ If external microphone does not work properly, perform check 1.

❑ If headphone does not work properly, perform check 2.

❑ If internal microphone does not work properly, perform check 3.

❑ If speaker (L) does not work properly, perform check 4.

❑ If speaker (R) does not work properly, perform check 4.

Check 1   External microphone may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 6.

Check 2   Headphone may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 6.

Check 3   Internal microphone may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 6.

Check 4   Speaker (L) may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 7.

Check 5   Speaker (R) may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 9.

Check 6   SJ board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem still occurs, perform Check 7.

Check 7   SD board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem still occurs, perform Check 8.

Check 8   Harnesses among SJ board, SD board and system board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem still occurs, perform Check 9.

Check 9   System board may be faulty. Replace it with a new one following the instructions in Chapter 4.
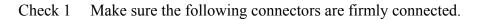
2.16 TV tuner Troubleshooting
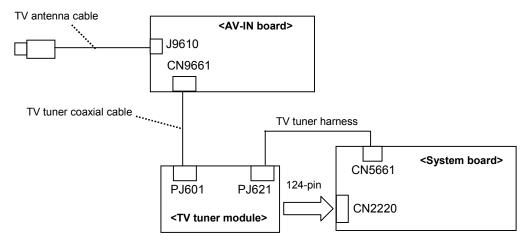
To check if TV tuner is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Connector Check and Replacement Check

Procedure 1   Connector Check and Replacement Check

The connection of cables, boards and module may be defective. Otherwise, they may be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure the following connectors are firmly connected.

If the connection is loose, reconnect it firmly and return to Procedure 2. If the problem still occurs, perform Check 2.

Check 2   TV antenna cable may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 3.

Check 3   TV tuner module may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 4.

Check 4   AV-IN board may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 5.

Check 5   Cables among AV-IN board, system board and TV tuner module may be faulty. Replace them with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 6.

Check 6   System board may be faulty. Replace it with new one following the instructions in Chapter 4.

2.17 Bridge media Slot Troubleshooting

This section describes how to determine if the computer's Bridge media functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Check on Windows OS

Procedure 2: Connector Check and Replacement Check

Procedure 1   Check on Windows XP
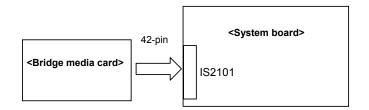
Insert a Bridge media card into the slot. Check if the installed Windows recognizes automatically the Bridge media card and the data in the Bridge media card can be read.

If the card is not recognized or data are not red, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

The Bridge media card is connected to IS2101 on the System Board.

Bridge media supports SD memory card/SDIO card/Memory stick/Memory stick Pro/ xD Picture card/Multimedia card.

Check 1   The Bridge media card and the System Board may be disconnected. Make sure the Bridge media card is firmly inserted to IS2101 on the System Board. If not, insert it firmly. If the SD card is still not functioning properly, perform Check 2.

Check 2   Bridge media card may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*. If the problem continues, perform Check 3.

Check 3   The System Board may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*.

2.18 PCI ExpressCard Slot Troubleshooting

This section describes how to check PCI ExpressCard slot by inspecting a card with PCI Express interface and a card with USB 2.0 interface.

> 1. Gigabit Ether ExpressCard
>
> 2. USB2.0 5in1 ExpressCard

1. Gigabit Ether ExpressCard

(1) Insert the Gigabit Ether ExpressCard into the ExpressCard slot.

(2) On Windows, open System Property → Hardware → Device Manager window.

(3) Make sure that the following device is recognized on the Device Manager window.

```
Marvell Yukon 88E8053E PCI-E Gigabit Ethernet Controller #2
```

("#2" is displayed in the PC with a built-in LAN of Gigabit, because the controller is the same one. "#2" is not displayed in the PC with a built-in LAN of 10/100 Megabit.)

(4) After confirmation, take a "Safety Remove" procedure and pull out the Gigabit Ether ExpressCard

2. USB2.0 5in1 ExpressCard

(1) Insert the USB2.0 5in1 ExpressCard into the ExpressCard slot.

(2) On Windows, open System Property →Hardware → Device Manager window.

(3) Make sure that the following device is recognized on the Device Manager window.

```
USB 2.0 5in1 ExpressCard USB Device
```

(4) After confirmation, take a "Safety Remove" procedure and pull out the USB2.0 5in1 ExpressCard.

Chapter 3

Tests and Diagnostics

Chapter 3   Contents

Tables

3.1   The Diagnostic Test

This chapter explains how to use the Diagnostic Test programs to test the functions of the computer's hardware modules. The Diagnostics Programs are stored on some Diagnostic Disks. There are Service Program Modules (DIAGNOSTIC MENU) and the Test Program Modules (DIAGNOSTIC TEST MENU) on the Diagnostic Disk.

The Hardware Initial information Setting Tool consists of some programs that write the hardware information or displays the current information of the computer. It is also included in one of Diagnostic Disks.

The heatrun test is automatic test program that executes the some tests successively.

NOTE: *Before starting the diagnostics, be sure to follow these steps:*

1. *Check all cables are connected firmly.*

2. *Exit any application and close Windows.*

3. *Check if [ALL Device] is selected in the "Device Config." in SET UP menu. After checking the diagnostics, be sure to select [Setup by OS] in the "Device Config."*

   When replacing the system board, be sure to execute the following procedures.

1. *Before replacing the system board, execute subtest03 "DMI information save" in 3.3 Setting of the hardware configuration in order to save the DMI information from system board to floppy disk.*

2. *After replacing the system board, execute the subtest04 "DMI information recovery" and subtest08 "System configuration display" in 3.3 Setting of the hardware configuration in order to copy the DMI information and system information from the floppy disk.*

3.1.1   Diagnostics menu

The DIAGNOSTIC MENU consists of the following functions.

- ❑ DIAGNOSTIC TEST
- ❑ ONLY ONE TEST
- ❑ HEAD CLEANING
- ❑ LOG UTILITIES
- ❑ RUNNING TEST
- ❑ FDD UTILITIES
- ❑ SYSTEM CONFIGURATION
- ❑ EXIT TO MS-DOS

The DIAGNOSTIC TEST MENU contains the following functional tests:

- ❑ SYSTEM TEST
- ❑ MEMORY TEST
- ❑ KEYBOARD TEST
- ❑ DISPLAY TEST
- ❑ FLOPPY DISK TEST
- ❑ PRINTER TEST
- ❑ ASYNC TEST
- ❑ HARD DISK TEST
- ❑ REAL TIMER TEST
- ❑ NDP TEST
- ❑ EXPANSION TEST
- ❑ CD-ROM/DVD-ROM TEST

Other tests are:

- ❑ Wireless LAN TEST (Wireless LAN TEST disk)
- ❑ LAN/Modem/Bluetooth/IEEE1394 TEST (LAN/Modem/Bluetooth/IEEE1394 TEST disk)
- ❑ Sound TEST (Sound TEST disk)

You will need the following equipment to perform some of the Diagnostic test programs.

- ❑ USB FDD
- ❑ The Diagnostic Disks (T&D for maintenance, LAN/Modem/Bluetooth/IEEE1394 for maintenance, wireless LAN for maintenance and Sound for maintenance)
- ❑ A formatted working disk (Floppy disk test)
- ❑ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- ❑ An external display supporting monitor ID (Expansion test)
- ❑ A CD test media TOSHIBA CD-ROM TEST DISK or ABEX TEST CD-ROM (Sound test)
- ❑ A DVD test media (DVD-ROM TEST DISK TSD-1) (Sound test)
- ❑ A music CD (Sound test)
- ❑ A CD-RW test media (CD-ROM/DVD-ROM test)
- ❑ A USB test module (USB test)
- ❑ A USB cable (USB test)
- ❑ LAN wraparound connector (LAN test)
- ❑ RGB wraparound connector (Expansion test)
- ❑ Module cable and RJ11 connector checker (Modem test)
- ❑ Headphones (Sound test)
- ❑ A microphone (Sound test)
- ❑ A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 test)
- ❑ PC card wraparound connector (Expansion test) [Not necessary for this model]

3.1.2 H/W (Hardware) initial information setting tool

The H/W initial information setting tool consists of the following programs.

- ❑ Initial configuration
- ❑ Region write
- ❑ System configuration display
- ❑ E2PROM test (MAC/GUID/DMI)

You will need the following equipment to perform some of the programs.

- ❑ The Diagnostics Disk (Main T&D)
- ❑ A LAN wraparound connector (E2PROM test)

3.1.3 Heatrun test program

The heatrun test starts automatically after the selection.

You will need the following equipment to perform this program.

- ❑ The Diagnostics Disk (Main T&D)

3.2   Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the Diagnostics disk in the floppy disk drive.

2. Release the lock of the power switch and turn on the computer with pressing the **F12**. Select the FDD in the display for selecting booting unit. Then, press **Enter** and the following menu appears.

```
Microsoft Windows XX Startup Menu
-----------------------------------------------------------

1. Repair Main (T&D)
2. Repair initial config set
3. Repair Heatrun (T&D)

Enter a choice: 1
```

To start the Diagnostics menu (T&D), press **1** and **Enter** .
To start the H/W initial information setting tool, press **2** and **Enter**.
To start the Heatrun test, press **3** and **Enter**.

3.2.1 Diagnostics menu (T&D)

After pressing **1** and **Enter** in the startup menu, the following menu appears.

```
TOSHIBA personal computer XXXXXX DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 20XX

DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
2 - ONLY ONE TEST
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - EXIT TO MS-DOS

                                  ↑↓→←  :  Select items
                                  Enter :  Specify
                                  Esc   :  Exit
```

NOTE: *To exit the DIAGNOSTIC TEST MENU, press the* **Esc** *key. If a test program is in progress, press* **Ctrl** *+* **Break** *to exit the test program. If a test program is in progress, press* **Ctrl** *+* **C** *to stop the test program.*

Set the highlight bar to **1**, and press **Enter**. The following DIAGNOSTIC TEST MENU will appear:

```
TOSHIBA personal computer XXXXXX DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 20XX

DIAGNOSTIC TEST MENU :

 1 - SYSTEM TEST
 2 - MEMORY TEST
 3 - KEYBOARD TEST
 4 - DISPLAY TEST
 5 - FLOPPY DISK TEST
 6 - PRINTER TEST        [It is not supported]
 7 - ASYNC TEST          [It is not supported]
 8 - HARD DISK TEST      [There is a second hard disk]
 9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 - CD-ROM/DVD-ROM TEST
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU

                                      ↑↓→←  :  Select items
                                      Enter :  Specify
                                      Esc   :  Exit
```

NOTE: *Only when a 2nd HDD is installed in the computer, [There is a second hard disk] message appears in the display.*

Functions 1 through 12 are the Diagnostic Tests. Function 88 sets the floppy disk drive and hard disk drive error retry count (0-255).

To exit the submenu of the Diagnostic Test and returns to the Diagnostics Menu, set the highlight bar to function 99 and press **Enter**.

Select the option you want to execute and press **Enter**. When you select `1- SYSTEM TEST`, the following message will appear:

```
SYSTEM TEST NAME    XXXXXX  ┌─────────────────────────────┐
                            │ xxxxxxx DIAGNOSTIC TEST VX.XX│
                            │ [Ctrl]+[Break] ; test end   │
                            │ [Ctrl]+[C]     ; key stop   │
                            └─────────────────────────────┘


SUB-TEST    : XX
PASS COUNT : XXXXX     ERROR COUNT: XXXXX
WRITE DATA : XX        READ DATA  : XX
ADDRESS    : XXXXXX   STATUS      : XXX

SUB-TEST MENU :

01 - ROM checksum
02 - Fan ON/OFF
03 - Geyserville
04 - Quick charge
05 - DMI read
99 - Exit to DIAGNOSTIC TEST MENU


                                 ↑↓→←  :   Select items
                                 Enter :   Specify
                                 Esc   :   Exit
```

> *NOTE: The menu displayed by your computer may be slightly different from the one shown above.*

Select the desired subtest number from the subtest menu and press **Enter**. The following message will appear:

```
TEST LOOP  : YES (or NO)
ERROR STOP : YES (or NO)
```

Use the right and left arrow keys to move the cursor to the desired option.

Selecting **YES** of TEST LOOP increases the pass counter by one, each time the test cycle ends and restarts the test cycle.

Selecting **NO** returns the process to the subtest menu after the test is complete.

Use the up and down arrow keys to move the cursor to "ERROR STOP".

Use the right and left arrow keys to move the cursor to the desired option and press **Enter**.

Selecting **YES** of ERROR STOP stops the test program when an error is found and displays the operation guide on the right side of the display screen as shown below:

```
ERROR STATUS NAME    [[ HALT OPERATION ]]

                                 1: Test end
                                 2: Continue
                                 3: Retry
```

These three selections have the following functions respectively:

1. Terminates the test program and exits to the subtest menu.
2. Continues the test.
3. Restarts the test from the error.

Selecting **NO** keeps the test running even if an error is found. When an error occurred, the error status is displayed and one error is added to the error counter.

Table 3-1 in section 3.5 describes the function of each test on the subtest menu. Table 3-2 in section 3.19 describes the error codes and error status for each error.

3.2.2 H/W initial information setting tool

After selecting this test, the following menu appears in the display.

```
################################################################
######   H/W initial information setting tool   VX.XX     ######
################################################################
*      1 ............................ Initial configuration              *
*      2 ............................ Region write                       *
*      3 ............................ DMI information save               *
*      4 ............................ DMI information recovery           *
*      8 ............................ System configuration display       *
*      9 ............................ E2PROM test (MAC/GUID/DMI)          *
****************************************************************
... Press test number[1-4,8,9] ?
```

For more details on this test, refer to the section 3.4.

3.2.3 Heatrun test program

Heatrun test starts executing the same subtest as 3.24 RUNNING TEST.

For more details on this test, refer to the section 3.4.
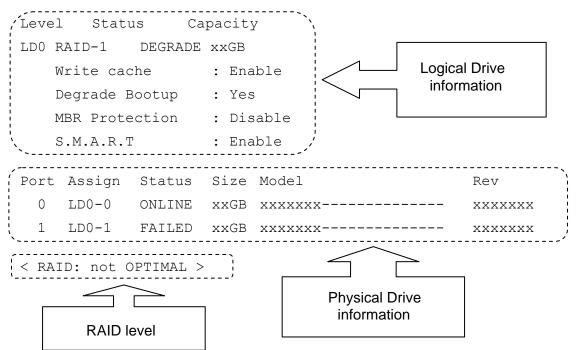
3.3   Check of the RAID configuration

Following screen is displayed for checking the RAID configuration and specifying a failed drive.

```
TOSHIBA RAID / RAID Information Display Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

    Level    Status      Capacity
LD0 RAID-1 DEGRADE xxGB
    Write cache          : Enable
    Degrade Bootup       : Yes
    MBR Protection       : Disable
    S.M.A.R.T            : Enable

Port Assign    Status  Size Model                    Rev
   0   LD0-0   ONLINE  xxGB xxxxxxx------------- xxxxxxx
   1   LD0-1   FAILED  xxGB xxxxxxx------------- xxxxxxx

< RAID: not OPTIMAL >
```

3.3.1   Explanation of the screen display

Contents of the screen display are shown below.

Logical Drive Information:

Displays logical drive number, RAID level, RAID status, contents and setting.

Physical Drive Information:

Displays port number, logical drive number belonged, status and disk information.

RAID level:

Displays RAID level configured.

NON:

Means that RAID is not configured. Confirming the logical drive information can check if a drive exists and check models of the drive.

RAID-0:

There are 1RAID-0 and 2RAID-0 (striping). When "RAID-0 OPTIMAL" is displayed in LD0 and LD1 in the logical drive information, it means 1RAID-0. When "RAID-0 OPTIMAL" is displayed only on the LD0, it means 2RAID-0 (striping). There is no problem in the RAID configuration, when "OPTIMAL" is displayed in the logical drive information.

RAID-1:

Indicates that 2RAID-1 (mirroring) is set. There is no problem in the RAID configuration, when "RAID-1 OPTIMAL" is displayed in the logical drive information.

not OPTIMAL:

Indicates that the RAID configuration is not optimal. See the logical drive information and physical drive information and check the condition of them.

3.3.1.1   Explanation of Logical drive condition

(1) **OPTIMAL:**   Indicates that all disks configuring RAID are normal and condition of the RAID is optimal.

(2) **Degrade:** Indicates that one HDD failed in the RAID-1 that has redundancy.

(3) **Critical:**   Indicates critical condition that one HDD is failed in the RAID-0 that does not have redundancy.

"OPTIMAL" is displayed in the case of (1) and "not OPTIMAL" is displayed in the case of (2) and (3).

3.3.2 Check of the screen display

Contents of the screen displayed are shown below.

3.3.2.1   RAID-1

When the "RAID-1" is displayed in the ⌐⎯⎯⌐ shown below, it is judged that the RAID is configured by two drives.

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c)  2005 TOSHIBA CORPORATION. All Rights Reserved.

      Level    Status     Capacity
LD0  RAID-1    DEGRADE     xxGB
      Write cache       : Enable
      Degrade Bootup    : Yes
      MBR Protection    : Disable
      S.M.A.R.T         : Enable

Port  Assign Status    Size  Model                    Rev
  0   LD0-0 ONLINE      xxGB  FUJITSU--------------     xxxxxxx
  1   LD0-1 FAILED      xxGB  FUJITSU--------------     xxxxxxx

< RAID: not OPTIMAL >
```

3.3.2.2   RAID-0 (1)

When there is one LD and "RAID-0 OPTIMAL" is displayed in the ⌐⎯⎯⌐ shown below, it is judged that the RAID is configured by two drives.

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

      Level    Status     Capacity
LD0  RAID-0 OPTIMAL       xxGB
      Write cache       : Enable
      Degrade Bootup    : Yes
      MBR Protection    : Disable
      S.M.A.R.T         : Enable
Port  Assign Status    Size  Model                    Rev
  0   LD0-0 ONLINE      xxGB  xxxxxxx--------------     xxxxxxx
  1   LD0-1 FAILED      xxGB  xxxxxxx--------------     xxxxxxx
```

```
< RAID: not OPTIMAL >
```

The RAID is not configured by two drives in the following display, because there are two
LDs (LD0 and LD1).

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

        Level    Status   Capacity
LD0 RAID-0 OPTIMAL     xxGB
      Write cache      : Enable
      Degrade Bootup   : Yes
      MBR Protection   : Disable
      S.M.A.R.T        : Enable
LD1 RAID-0 OPTIMAL     xxGB
      Write cache      : Enable
      Degrade Bootup   : Yes
      MBR Protection   : Disable
      S.M.A.R.T        : Enable

Port  Assign Status   Size  Model                  Rev
  0   LD0-0 ONLINE    xxGB  FUJITSU-------------    xxxxxxx
  1   LD0-0 ONLINE    xxGB  FUJITSU-------------    xxxxxxx

< RAID: RAID-0 >
```

3.3.2.3   RAID-0 (2)

When there is one LD and "RAID-0 Critical" is displayed in the⌐ ⌐ ⌐ ⌐ ⌐ ⌐ shown below, it is
judged that the RAID is configured by two drives.

```
      Level     Status    Capacity
LD0 RAID-0 CRITICAL   xxGB
      Stripe Size     : 64KB
      Write cache     : Enable
      MBR Protection  : Disable
      S.M.A.R.T       : Enable

Port Assign Status   Size  Model                  Rev
  0  LD0-0 ONLINE    xxGB  FUJITSU-------------    xxxxxxx
  1  NODRIVE

< RAID: not OPTIMAL >
```

3.3.3 Specification of the failed HDD

Check the RAID configuration condition from the [　　　　] shown below and specify a failed drive.

```
TOSHIBA RAID / RAID Information Display  Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

    Level  Status      Capacity
LD0 RAID-1 DEGRADE     xxGB

    Write cache      : Enable

    Degrade Bootup   : Yes

    MBR Protection   : Disable

    S.M.A.R.T        : Enable


Port Assign Status   Size Model                 Rev
  0  LD0-0 ONLINE     xxGB FUJITSU------------  xxxxxxx
  1  LD0-1 FAILED     xxGB FUJITSU------------  xxxxxxx
```
[< RAID: not OPTIMAL >]

3.3.3.1 RAID : OPTIMAL

When RAID is "OPTIMAL" (Both the two drives are normal), it is judged that RAID configuration is normal. There are the following reasons why the repair is requested.

Abnormal noise of the motor from the HDD:

Refer to the *2.5-HDD trouble shooting* in Chapter 2, *Troubleshooting Procedures.*

Access to the HDD is very slow:

Display the drive log by using Independent Utility of the DIAGNOSTIC PROGRAM. Check if ten or more continual logs of the message indicating retry such as "Write Error occurred, Retry the command." or "Other Read Error occurred are recorded in the drive log of either HDD. If recorded, the drive is failed and should be repaired. Refer to *Independent Utility* in Appendix J.

In the other case above mentioned, it is judged that the MB side fails.

3.3.3.2 RAID : not OPTIMAL

ABSENT or OFFLINE is displayed

When the "ABSENT" or "OFFLINE" is displayed as shown below, the drive is removed by the RAID console and installed again. When the drive is unlocked, "ABSENT" is displayed. When the drive is locked, "OFFLINE" is displayed. Repair is not needed in this case.

```
TOSHIBA RAID / RAID Information Display Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

      Level     Status      Capacity

LD0  RAID-1   DEGRADE     xxGB

     Write cache       : Enable

     Degrade Bootup    : Yes

     MBR Protection    : Disable

     S.M.A.R.T         : Enable

Port Assign  Status   Size  Model              Rev

  0  LD0-0  ONLINE    xxGB  FUJITSU----------  xxxxxxx

  1  LD0-1  ABSENT    xxGB  FUJITSU---------   xxxxxxx

< RAID: not OPTIMAL >
```

NO DRIVE for one drive is displayed

When "NO DORIVE" is displayed and the HDD is connected to the port, follow the procedures below to check the HDD failure.

(1) Install a new HDD.
When "NO DORIVE" is still displayed, It is judged that the MB or cable fails.

(2) When a new HDD is recognized, It is judged that the HDD removed is failed. Specify the reason by using the Independent Utility.

```
TOSHIBA RAID / RAID Information Display    Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

     Level    Status      Capacity
LD0  RAID-1   DEGRADE     xxGB
     Write cache       : Enable
     Degrade Bootup    : Yes
     MBR Protection    : Disable
     S.M.A.R.T         : Enable

Port Assign Status   Size  Model               Rev
  0  LD0-0   ONLINE  xxGB  FUJITSU----------   xxxxxxx
  1          NODRIVE xxGB  FUJITSU----------   xxxxxxx

< RAID: not OPTIMAL >
```

FAIL for one drive is displayed

One drive in the "RAID-1"is failed and degraded. This may look like failure by wrong operation. Specify the reason by using Independent Utility.

```
TOSHIBA RAID / RAID Information Display    Rev xx.xx.xxxx
Copyright(c) 2005 TOSHIBA CORPORATION. All Rights Reserved.

     Level    Status  Capacity
LD0 RAID-1    DEGRADE xxGB

     Write cache      : Enable

     Degrade Bootup   : Yes

     MBR Protection   : Disable

     S.M.A.R.T        : Enable

Port Assign Status Size  Model                      Rev
  0  LD0-0 ONLINE  xxGB  FUJITSU----------------    xxxxxxx
  1  LD0-1 FAILED  xxGB  FUJITSU----------------    xxxxxxx

< RAID: not OPTIMAL >
```

3.4   Setting of the hardware configuration

To execute this program, select `2-Repair initial config test` in the startup menu, press **Enter** and follow the directions on the screen. The H/W initial information setting tool consists of four subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   Initial configuration

This subtest executes the following items and shows their contents in the display. When an item ends normally, the program proceeds automatically to the next one. When an error is found, the program stops and waits for key input. (After solving the problem, the program executes the item again.)

Setting of the CPU set table
Setting of the micro code
Setting of the EHSS
Inputting and writing of DMI information

When the DMI information is displayed, the following messages appear in order. Input each information. (If you do not replace the PCB, the DMI information should not be changed.)

1. "Enter Model Name?" is displayed. Input the computer's model name and press **Enter**. (e.g. DynaBook)

2. "Enter Version Number?" is displayed. Input the computer's version number and press **Enter**. (e.g. PC18070C313S)

3.   "Enter Serial Number?" is displayed. Input the computer's serial number and press **Enter**. (e.g. 12345678)

4. "Enter Model Number?" is displayed. Input the computer's sales model number and press **Enter**. (e.g. PP200-AAAAA)

5.   "Enter Bundle Number?" is displayed. Input the computer's PCN/Bundle number and press **Enter**.
(e.g. PMSREQ3Q34H/S0123456789)

6. "Write data OK (Y/N)?" is displayed. To write the DMI information to the Flash ROM, press **Y**, and then **Enter**.

7. "Create DMIINFO TXT (Y/N)?" is displayed. Press **Y,** then the DMI information (text data) is written to the Floppy disk, etc.

        Setting of the HWSC
        Setting of the UUID
        Display of the DMI information (including UUID)
        Setting of DVD region code (Yes/No)

After completion of the above settings, H/W configuration & DMI information are appeared in order. Check the contents and press **Enter**.

Subtest 02   Region write

This subtest executes the setting of the region code for DVD drive based on the destination of the machine.

When the region code is already written, test ends without setting.

The following message appears in the display after setting the region code. Press any key to return to the H/W initial information setting tool menu.

```
**********************************
 *******    It completed    *******
**********************************
*                                        *
 Press any key to continue...
```

Subtest 03   DMI information save

NOTE: Before replacing the system board, be sure to execute this subtest and save the DMI information to the floppy disk.

This is one of tools to copy the DMI information to a new PCB after replacing.

This subtest saves all the DMI data in a floppy disk.

Subtest 04   DMI information recovery

NOTE: 1. After replacing the system board, be sure to execute this subtest and copy the DMI information to a new system board.

*   2. Since the data of UUID is updated every time when this subtest, DMI information recovery, is done, the saved UUID data is not written*

This is one of tools to copy the DMI information to a new PCB after replacing.

This subtest writes all the DMI data in the floppy disk into the new PCB.

Subtest 08   System configuration display

                  This subtest displays the information of the system configuration.

                  Confirm the contents and press **Enter**.

                  For more details on the system configuration information, refer to 3.26 "System configuration".

Subtest 09   E2PROM test (MAC/GUID/DMI)

                  It checks whether the MAC address, GUID of IEEE1394 and DMI information are written.

3.5   Heatrun Test

To execute this program, select `3-Repair heatrun` in the startup menu, press **Enter**.

After selecting this test, the same subtests as 3.23 RUNNING TEST is executed successively.

For more details on the procedure and test content, refer to RUNNING TEST.

When the heatrun test ends, following message appears in the display.

```
************************************************
             HEATRUN TEST END
************************************************
Press any key to continue...
```

Press any key and return to the startup menu.

> *NOTE*: *The test result (Errorlog.txt) is stored in the floppy disk. The result is displayed in the same way as 3.23 LOG UTILITIES. For more detail in the display, refer to LOG UTILITIES.*

3.6　Subtest Names

Table 3-1 lists the subtest names for each test program in the DIAGNOSTIC TEST MENU.

Table 3-1 Subtest names (1/2)

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		02	Fan ON/OFF
		03	Geyserville
		04	Quick charge
		05	DMI read
2	MEMORY	01	Conventional memory
		02	Protected Mode
		03	Protected Mode (cache off)
		04	Cache memory (on/off)
		05	Stress
3	KEYBOARD	01	Pressed key code display
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on/off for LCD
		06	"H" pattern display
		07	LCD Brightness
5	FLOPPY DISK	01	Sequential read
		02	Sequential read/write
		03	Random address/data
		04	Write specified address
		05	Read specified address

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER [Not supported]	01	Ripple pattern
		02	Function
		03	Wrap around
7	ASYNC [Not supported]	01	FIR/SIR Point to point (send)
		02	FIR/SIR Point to point (receive)
		03	Wrap around (board)
8	HARD DISK	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		05	Partial Read
		06	Write specified address
		07	Read specified address
		08	Sequential write
		09	W-R-C specified address
9	REAL TIMER	01	Real time
		02	Backup memory
		03	Real time carry
10	NDP	01	NDP test
11	EXPANSION	01	PCMCIA wrap around [Not supported]
		03	RGB monitor ID
13	CD-ROM /DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	RW 1point W/R/C

3.7   System Test

To execute the System Test select **1** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   ROM Checksum

This subtest executes a checksum test of the BIOS ROM (range: F0000h to FFFFFh, 64KB) on the System Board.

Subtest 02   Fan ON/OFF

This subtest turns on/off the fan motor by force with Fan ON/OFF commands.

The following message will appear.

```
Fan number select (1;FAN#1, 2;FAN#2, 0; FAN#1&#2) ?
```

To check the CPU fan, press **1** and **Enter**.
To check the VGA fan, press **2** and **Enter**.
To check both CPU fan and VGA fan, press **0** and **Enter**.

The following message will appear.

```
*** Test Fan Revolution 0000RPM start
```

Make sure the fan does not rotate, then press **Enter**.

The following message will appear.

```
*** Test Fan Revolution Low speed Start
```

Make sure the fan rotates at low speed, then press **Enter**.

The following message will appear.

```
*** Test Fan Revolution High speed Start
```

Make sure the fan rotates at high speed, then press **Enter**.

After a while, the fan rotating will stop.

Subtest 03   Geyserville

If the CPU supports Gerserville (SpeedStep), this Subtest checks that the CPU operating clock speed can be changed.

Subtest 04   Quick Charge

This subtest checks the status for the quick charge.

Subtest 05   DMI read

This subtest displays the information in the Flash-ROM in the following format.

```
*** DMI Data Display Ver X.XX ***

Model Name       : XXXXXXXXXXX
Version Number   : XXXXXXXXXXXX
Serial Number    : XXXXXXXX
Model Number     : XXXXXX-XXXXX
UUID Number      : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Press [Enter] to EXIT
```

To exit this subtest and return to the SYSTEM test menu, press **Enter**.

3.8   Memory Test

To execute the Memory Test, select **2** from the DIAGNOSTIC TEST MENU, press **Enter**
and follow the directions on the screen. Move the highlight bar to the subtest you want to
execute and press **Enter**.

Subtest 01   Conventional memory

This subtest writes a constant data to conventional memory (0 to 640 KB),
then reads the new data and compares the result with the original data.

Subtest 02   Protected Mode

---

*NOTE: The CONFIG.SYS file must be configured without expanded memory manager
programs such as EMM386.EXE, EMM386.SYS or QEMM386.SYS. Also, the
HIMEM.SYS must be deleted from the CONFIG.SYS file.*

This subtest writes constant data and address data (from 1MB to maximum
MB), and reads the new data and compares the result with the original data.

Subtest 03   Protected Mode (Cache off)

This subtest executes the same way as the subtest 02 with the cache off.

Subtest 04   Cache Memory

To test the cache memory, a pass-through write-read comparison of '5Ah'
data is run repeatedly to the test area ('7000':'Program' size to '7000':'7FFF'
(32 KB)) to check the hit-miss ratio (on/off status) for CPU cache memory.
One test takes 3 seconds.

Number of misses < Number of hits $\rightarrow$ OK
Number of misses $\geq$ Number of hits $\rightarrow$ Fail

Subtest 05   Stress

Data (from 1MB to the maximum MB) is written from the 16KB write buffer
to the 16KB read buffer and compared the data in the buffers. The read buffer
starts from 0001 and the comparison is continued with the following read
buffer addresses: 0001, 0003, 0005, 0007, 0009, 000b, 000d and 000f.

3.9   Keyboard Test

To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   Pressed key code display

When a key is pressed, the scan code, character code, and key top name are displayed on the screen in the format shown below. The **Ins Lock**, **Caps Lock**, **Num Lock**, **Scroll Lock**, **Alt**, **Ctrl**, **Left Shift**, and **Right Shift** keys are displayed in reverse screen mode when pressed. The scan codes, character codes, and key top names are shown in Appendix D.

```
KEYBOARD TEST  IN PROGRESS  302000

        Scan code       =
        Character code  =
        Keytop          =
Ins Lock  Caps Lock  Num Lock    Scroll Lock
Alt       Ctrl       Left Shift  Right Shift

PRESS [Enter] KEY
```

3.10 Display Test
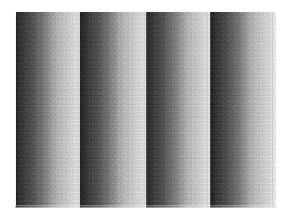
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   VRAM read/write for VGA

               This subtest writes the constant data (AAh and 55h) to the video RAM. The data is read and compared to the original data.

Subtest 02   Gradation for VGA

               This subtest displays four colors: red, green, blue and white from left to right across the screen from black to maximum brightness. The display below appears on the screen, when this subtest is executed.

               To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03   Gradation for LCD
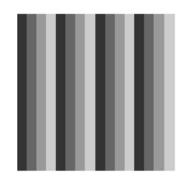
               This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. Each color displays for three seconds.

Subtest 04   Gradation & Mode test for VGA

This subtest displays gradations for following modes. To change the mode, press **Enter**.

```
[Mode 12]
[Mode 13]
[Mode 3]
[Mode 111   640*480  64K]
[Mode 112   640*480  16M]
[Mode 114   800*600  64K]
[Mode 115   800*600  16M]
[Mode 117  1024*768  64K]
[Mode 118  1024*768  16M]
```

The display below appears on the screen when this subtest is executed.

[Mode 12]

(Display example: Mode 12)

To exit this subtest and return to the DISPLAY TEST menu, press **Enter** after displaying the Mode 118**.**

Subtest 05   All dot on/off for LCD

This subtest displays an all-white screen then an all-black screen. The display changes automatically every three seconds, then returns to the DISPLAY TEST menu.

Subtest 06   "H" Pattern Display

This subtest displays a full screen of "H" patterns.

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

To exit this subtest and return to the DISPLAY TEST menu, press **Enter.**

> *NOTE*: *The last row may not be completely filled. This condition does not indicate on error.*

Subtest 07   LCD Brightness

The LCD brightness changes in the following order:

Super-Bright ⟶ Bright ⟶ Semi-Bright ⟶ Bright ⟶ Super-Bright

After displaying with Super-Bright of LCD brightness, return to the DISPLAY TEST menu.

3.11 Floppy Disk Test

> **CAUTION**: *Before running the floppy disk test, prepare a formatted work disk. Remove the Diagnostics Disk and insert the work disk into the FDD. The contents of the floppy disk will be erased.*

To execute the Floppy Disk Test, select **5** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen. After selecting the Floppy Disk Test from the DIAGNOSTIC TEST MENU, messages to execute the test drive number, media type and test start truck will be displayed successively. Answer each question with an appropriate response to execute the test.

1. The following message will appear. Select the media mode and start track to be tested, then press **Enter.**

    ```
    Test start track       (Enter:0/dd:00-79) ?
    ```

2. The Floppy Disk test contains five subtests that test the FDD.
    The floppy disk test menu will appear after you select FDD test parameters.

    ```
    FLOPPY DISK            XXXXXXX    XXX DIAGNOSTIC TEST VX.XX
                                       [Ctrl]+[Break] :  test end
                                       [Ctrl]+[C]     :  key stop


    SUB-TEST      : XX
    PASS COUNT    : XXXXX    ERROR COUNT   : XXXXX
    WRITE DATA    : XX       READ DATA     : XX
    ADDRESS       : XXXXX    STATUS        : XXX

    SUB-TEST MENU :

    01 - Sequential read
    02 - Sequential read/write
    03 - Random address/data
    04 - Write specified address
    05 - Read specified address
    99 - Exit to DIAGNOSTIC TEST MENU



                                       ↑↓→←   :  Select items
                                       Enter  :  Specify
                                       Esc    :  Exit
    ```

Select the number of the subtest you want to execute and press **Enter**. The following message will appear during the floppy disk test.

```
FLOPPY DISK  IN PROGRESS  XXXXXXX  xxx DIAGNOSTIC TEST VX.XX
                                    [Ctrl]+[Break] :  test end
                                    [Ctrl]+[C]     :  key stop


SUB-TEST      : XX
PASS COUNT    : XXXXX    ERROR COUNT  : XXXXX
WRITE DATA    : XX       READ DATA    : XX
ADDRESS       : XXXXXX   STATUS       : XXX
```

When the subtest 04 or 05 is selected, the following messages will appear on the screen. Select the test data (subtest 04 only), track number and head number you want to test.

```
Test data     ?? (subtest 04 only)
Track No.     ??
Head No.       ?
```

Subtest 01   Sequential read

> This subtest performs a Cyclic Redundancy Check (CRC) that continuously reads all the tracks (track: 0 to 39/0 to 79) on a floppy disk.

Subtest 02   Sequential read/write

> This subtest continuously writes data pattern B5ADADh to all the tracks (track: 0 to 39/0 to 79) on a floppy disk. The data is then read and compared to the original data.

Subtest 03   Random address/data

> This subtest writes random data to random addresses on all tracks (track: 0 to 39/0 to 79) on a floppy disk. The data is then read and compared to the original data.

Subtest 04   Write specified address

> This subtest writes the data specified by an operator to a specified track, head, and address.

Subtest 05   Read specified address

> This subtest reads data from a track, head, and address specified by an operator.

3.12 Printer Test


CAUTION: *Printer Test is not supported for this model.*

To execute the Printer Test, select **6** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The following messages will appear after selecting the Printer Test from the DIAGNOSTIC TEST MENU. Answer each of the questions with an appropriate response to execute the test.

NOTE: *An IBM compatible printer must be connected to the system to execute this test. Also, printer port wraparound connector must be connected.*

The following message will appear, after selecting the subtest 01 to 03 of the printer test:

```
        channel#1 = XXXXh
        channel#2 = XXXXh
        channel#3 = XXXXh

    Select the channel number (1-3) ?
```

The printer I/O port address is specified by the XXXXh number. The computer supports three printer channels. Select the printer channel number, and press **Enter** to execute the selected subtest.

Subtest 01   Ripple Pattern

This subtest prints characters for codes 20h through 7Eh line-by-line while shifting one character to the left at the beginning of each new line.

```
 !"#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
:"#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
```

Subtest 02   Function

This subtest is for IBM compatible printers, and tests the following functions:

>   Normal print
>   Double-width print
>   Compressed print
>   Emphasized print
>   Double-strike print
>   All characters print

This subtest prints the various print types shown below:

```
PRINTER TEST
1.   THIS LINE SHOWS NORMAL PRINT.
2. THIS LINE SHOWS DOUBLE-WIDTH PRINT.
3.    THIS LINE SHOWS COMPRESSED PRINT.
4.   THIS LINE SHOWS EMPHASIZED PRINT.
5.   THIS LINE SHOWS DOUBLE-STRIKE PRINT.
6.   ALL CHARACTERS PRINT
 !"#$%&'()*+,./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
opqrstuvwxyz{|}~
```

Subtest 03   Wraparound

NOTE: *To execute this subtest, a printer wraparound connector must be connected to the computer's printer port.*

This subtest checks the output and bi-directional modes of the data control and status lines through the parallel port wraparound connector (34M741986G01). (Both output and bi-directional modes are tested.)

3.13 Async Test

CAUTION: *Async Test is not supported for this model.*

To execute the Async Test, select **7** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtests 01 and 02 require the following data format:

Method:	Asynchronous
Speed:	38400BPS
Data:	8 bits and one parity bit (EVEN)
Data pattern:	20h to 7Eh

Subtest 01   FIR/SIR Point to point (send)

NOTE: To execute subtests 01 and 02, each computer must have access to the other computer's infrared port.

This subtest sends 20h through 7Eh data to the receive side, then receives the sent data and compares it to the original data through the FIR/SIR port.

Subtest 02   FIR/SIR Point to point (receive)

This subtest is used with subtest 01 described above. This subtest receives the data from the send side, then sends the received data through the FIR/SIR port.

Subtest 03   Wraparound (on board)

NOTE: To execute this subtest, a RS-232C wraparound connector must be connected to the RS-232C port.

This subtest checks the data send/receive function through the wraparound connector.

3.14 Hard Disk Test

To execute the Hard Disk Test, select **8** from the DIAGNOSTIC TEST MENU, press **Enter,** and follow the directions on the screen.

CAUTION: *The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 08,or 09 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk or another hard disk. If the customer has not or cannot perform the back-up, create back-up disks as described below.*

                Check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder. (This tool can be used only once.) If it exists, use it to back up the pre-installed software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files.

                Refer to the operating system instructions.

When a 2nd HDD is installed, the following messages will appear after selecting the hard disk test from the DIAGNOSTIC TEST MENU.

```
Test drive number select      (1:HDD#1, 2:HDD#2, 0:HDD#1&2) ?


                                    ↑↓→←  :  Select items
                                    Enter :  Specify
                                    Esc   :  Exit
```

1. Input the number of HDD test and press **Enter**.

2. This message is used to select the error dump operation when a data compare error is detected. Select **1** or **2**.

    ```
    Data compare error dump  (1:no, 2:yes)
    ```

3. This message is used to select whether or not the HDD status is displayed on the screen. The HDC status is described in section 3.19. Select **1** or **2**.

    ```
    Detail status display    (1:no, 2:yes)
    ```

4. The Hard Disk Test message will appear after you respond to the Detail Status prompt. Select the number of the subtest you want to execute and press Enter. The following message will appear during each subtest.

```
HARD DISK TEST XXXXXXX            ┌──────────────────────────────────┐
                                  │ XXX DIAGNOSTIC TEST VX.XX        │
                                  │  [Ctrl]+[Break] :  test end      │
                                  │  [Ctrl]+[C]     :  key stop      │
                                  └──────────────────────────────────┘
SUB TEST       : XX
PASS COUNT     : XXXXX       ERROR COUNT   : XXXXX
WRITE DATA     : XX          READ DATA     : XX
ADDRESS        : XXXXXX      STATUS        : XXX
```

The first three digits of the ADDRESS indicate which cylinder is being tested, the fourth digit indicates the head and the last two digits indicate the sector.

The first digit of the STATUS number indicates the drive being tested and the last two digits indicate the error status code as explained in table 3-2 of the section 3.18.

Subtest 01   Sequential read

                     This subtest is a sequential reading of all the tracks on the HDD starting at track 0. When all the tracks on the HDD have been read, the test starts at the maximum track and reads the tracks on the HDD sequentially back to track 0.

Subtest 02   Address uniqueness

                     This subtest writes unique address data to each sector of the HDD track-by-track. The data written to each sector is then read and compared with the original data. There are three ways the HDD can be read:

                     1. Forward sequential
                     2. Reverse sequential
                     3. Random

Subtest 03   Random address/data

                     This subtest writes random data in a random length to random addresses. This data is then read and compared to the original data.

Subtest 04   Cross talk & peak shift

This subtest writes eight types of worst pattern data (listed below) to a cylinder, then reads the data while moving from cylinder to cylinder. (Test the data interference in the neighbor track)

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'151149'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D25114'	7 cylinder

Subtest 05   Partial Read

This subtest reads 1GB data that is in minimum, middle and maximum address of the HDD area.

Subtest 06   Write specified address

This subtest writes specified data to a specified cylinder and head on the HDD.

Subtest 07   Read specified address

This subtest reads data, which has been written to a specified cylinder and head on the HDD.

Subtest 08   Sequential write

This subtest writes specified 2-byte data to all of the cylinders on the HDD.

Subtest 09   W-R-C specified address

This subtest writes data to a specified cylinder and head on the HDD, then reads the data and compares it to the original data.

3.15 Real Timer Test

To execute the Real Timer Test, select **9** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01   Real time

A new date and time can be input during this subtest. To execute the real time subtest, follow these steps:

1. Select subtest 01 and the following messages will appear:

```
Current date : XX-XX-XXXX
Current time : XX:XX:XX

Enter new date:

PRESS [ENTER] KEY TO EXIT TEST
```

2. If the current date is not correct, input the correct date at the "Enter new date" prompt and press **Enter**.

3. The following messages will appear:

```
Current date : XX-XX-XXXX
Current time : XX:XX:XX

Enter new time:

PRESS [ENTER] KEY TO EXIT TEST
```

4. If the current time is not correct, input the correct time in 24-hour format. To enter "**:**", press **Shift + ;**. The time is updated.

To exit the test, press **Enter**.

Subtest 02   Backup memory

This subtest checks the following backup memories:

Writes 1-bit of "on" data (01h through 80h) to address 0Eh through 7Fh

Writes 1-bit of "off" data (FEh through 7Fh) to address 0Eh through 7Fh

Writes the data pattern AAh and 55h to the address 0Eh to 7Fh

Then the subtest reads and compares this data with the original data.

Subtest 03   Real time carry

CAUTION: *When this subtest is executed, the current date and time are erased.*

This subtest checks the real time clock increments, making sure the date and time are displayed in the following format:

```
Current date  :  12-31-1999
Current time  :  23:59:58
```

The real time increments are automatically executed and the following is displayed:

```
Current date :   01-01-2000
Current time :   00:00:00

PRESS [Enter] KEY TO EXIT TEST
```

To exit the test, press **Enter**.

3.16 NDP Test

To execute the NDP test, select **10** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

Subtest 01   NDP

This test checks the following functions of NDP:

❑ Control word

❑ Status word

❑ Bus

❑ Addition

❑ Multiplication

3.17 Expansion Test

To execute the expansion test, select **11** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

Subtest 01   PCMCIA wraparound

CAUTION: *PCMCIA wraparound test is not supported for this model.*

NOTE: *To execute this subtest, the PC card wraparound connector is required.*

This subtest checks the following signal line of the PC card slot:

❑ Address line

❑ REG#, CE#1, CE#2 line

❑ Data line

❑ Speaker line

❑ Wait line

❑ BSY#, BVD1 line

This subtest is executed in the following order:

Sub#	Address	Good	Bad	Contents
01	00001 00001	nn nn	xx xx	Address line REG#, CE#1, CE#2 nn=A0, 90, 80, 00
02	00002	ww	rr	Data line ww=write data, rr=read data
03	00003	—	—	Speaker line
04	00004	40,80	xx	Wait line (40<xx<80)
05	00005	nn	xx	Other lines (BSY#, BVD1) NN=21, 00

NOTE: *Select the subtest number01, The following message will appear:*
       Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?

Subtest 02   RGB monitor ID

NOTE: *To execute this subtest, RGB monitor ID wraparound connector is required.*
The wiring diagram of the connector is described in Appendix F.

Connect a wraparound connector to CRT monitor for the test of ID
acquisition. This subtest is executed by using VESA command.

3.18 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

NOTE: *For the subtest 01, 02 and 03, use the TOSHIBA CD-ROM TEST DISK TDY-01 or ABEX TEST CD-ROM TCDR-702 and DVD-ROM TEST DISK TSD-1. For the subtest 04, use a CD-RW on the market.*

Subtest 01   Sequential read

This subtest is a sequential reading of one-block units (2K bytes) of all the logical addresses.

Subtest 02   Read specified address

This subtest reads one-block data from a specified address.

Subtest 03   Random address/data

This subtest reads one-block data and multi-block data from random addresses 200 times.

Subtest 04   RW 1point W/R/C

This subtest writes, reads and compares data at one point on a CD/RW media.

3.19 Error Code and Error Status Names

Table 3-2 lists the error codes and error status names for the Diagnostic Test.

Table 3-2 Error codes and error status names (1/3)

Device name	Error code	Error status name
(Common)	FF	Data Compare Error
System	01 03 04 05 06 07 08 09 10	ROM - CHECKSUM ERROR ROM - SERIAL ID WRITE ERROR ROM - NOT SUPPORTED PS-SYSTEM ROM - SENSING ERROR(AC-ADAPT) ROM - SENSING ERROR(1st Batt) ROM - SENSING ERROR(2nd Batt) ROM - THORMISTOR ERROR(1) ROM - THORMISTOR ERROR(2) ROM - THORMISTOR ERROR(3)
Memory	01 02 DD	RAM - PARITY ERROR RAM - PROTECTED MODE NO CHANGE' RAM - CACHE MEMORY ERROR
Keyboard	FE FD F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 FA EF ED	USB - GET DESCR.ERROR (FIRST) USB - SET ADDRESS ERROR HUB - GET DESCR.ERROR(Top 8B) HUB - GET DESCR.ERROR (Whole) HUB - SET CONFIGURATION ERROR HUB - GET DESCR.ERROR(DESCR.) HUB - SET FEATURE ERROR(P ON) HUB - GET STATUS ERROR HUB - SET FEATURE ERROR(RESET) HUB - CLEAR FEATURE ERROR HUB - CLEAR FEATURE1 ERROR HUB - SET FEATURE ERROR(Enab.) HUB - CLEAR FEATURE2 ERROR USB - OVER CURRENT ERROR USB - GET DESCR.ERROR(SECOND)'
Display	EE	VRAM SIZE NOT SUPPORT

Table 3-2 Error codes and error status names (2/3)

Device name	Error code	Error status name
FDD	01 02 03 04 08 09 10 20 40 80 60 06 EE	FDD - BAD COMMAND ERROR FDD - ADDRESS MARK NOT FOUND FDD - WRITE PROTECTED FDD - RECORD NOT FOUND FDD - DMA OVERRUN ERROR FDD - DMA BOUNDARY ERROR FDD - CRC ERROR FDD - FDC ERROR FDD - SEEK ERROR FDD - TIME OUT ERROR FDD - NOT DRIVE ERROR FDD - MEDIA REMOVED FDD - WRITE BUFFER ERROR
Printer	01 08 10 20 40 80	PRT - TIME OUT PRT – FAULT PRT - SELECT LINE PRT - OUT OF PAPER PRT - POWER OFF PRT - BUSY LINE
ASYNC	01 02 04 08 10 20 40 80 88 05 06	RS232C - [DTR ON] TIME OUT RS232C - [CTS ON] TIME OUT RS232C - [RX READY] TIME OUT RS232C - [TX FULL] TIME OUT RS232C - PARITY ERROR RS232C - FRAMING ERROR RS232C - OVERRUN ERROR RS232C - LINE STATUS ERROR RS232C - MODEM STATUS ERROR SIR - TIME OUT ERROR FIR - TIME OUT ERROR
HDD	05 07 09 0B BB 08 01 02 04 10 20 40 80 11 AA	HDD - HDC NOT RESET ERROR HDD - DRIVE NOT INITIALIZE HDD - DMA BOUNDARY ERROR HDD - BAD TRACK ERROR HDD - UNDEFINED ERROR HDD - OVERRUN ERROR (DRQ ON) HDD - BAD COMMAND ERROR HDD - ADDRESS MARK NOT FOUND HDD - RECORD NOT FOUND ERROR HDD - ECC ERROR HDD - HDC ERROR HDD - SEEK ERROR HDD - TIME OUT ERROR HDD - ECC RECOVER ENABLE HDD - DRIVE NOT READY

Table 3-2 Error codes and error status names (3/3)

Device name	Error code	Error status name
(HDD)	CC E0 0A EE DA 12	HDD - WRITE FAULT HDD - STATUS ERROR HDD - BAD SECTOR HDD - ACCESS TIME ERROR HDD - NO HDD HDD - DMA CRC ERROR
NDP	01 02 03 04 05 06	NDP - NO CO-PROCESSOR NDP - CONTROL WORD ERROR NDP - STATUS WORD ERROR NDP - BUS ERROR NDP - ADDITION ERROR NDP - MULTIPLAY ERROR
EXPANSION	C1 C3 C4 C5 C6 C7 C8 CB CC CE CF	ADDRESS LINE ERROR CE#1 LINE ERROR CE#2 LINE ERROR DATA LINE ERROR WAIT LINE ERROR BSY# LINE ERROR BVD1 LINE ERROR ZV-Port ERROR NO PCMCIA CARD TYPE ERROR ZV_CONT# ERROR
CD-ROM /DVD-ROM	01 02 03 04 05 06 09 11 20 40 80 90 B0	BAD COMMAND ILLEGAL LENGTH UNIT ATTENTION MEDIA CHANGE REQUEST MEDIA DETECTED ADDITIMAL SENSE BOUNDARY ERROR CORRECTED DATA ERROR DRIVE NOT READY SEEK ERROR TIME OUT RESET ERROR ADDRESS ERROR

3.20 Hard Disk Test Detail Status

When an error occurs in the hard disk test, the following message is displayed:

```
HDC status = XXXXXXXX
```

Detailed information about the hard disk test error is displayed on the screen by an eight-digit number. The first four digits represent the hard disk controller (HDC) error status number and the last four digits are not used.

The hard disk controller error status is composed of two bytes; the first byte displays the contents of the HDC status register in hexadecimal form and the second byte displays the HDC error register.

The contents of the HDC status register and error register are listed in Tables 3-3 and 3-4.

Table 3-3 Hard disk controller status register contents

Bit	Name	Description
7	BSY (Busy)	"0" … HDC is ready. "1" … HDC is busy.
6	DRY (Drive ready)	"0" … Hard disk drive is not ready to accept any command. "1" … Hard disk drive is ready.
5	DWF (Drive write fault)	"0" … DWF error is not detected. "1" … Write fault condition occurred.
4	DSC (Drive seek complete)	"0" … The hard disk drive heads are not settled over a track. "1" … The hard disk drive heads are settled over a track.
3	DRQ (Data request)	"0" … Drive is not ready for data transfer. "1" … Drive is ready for data transfer.
2	COR (Corrected data)	"0" … Not used "1" … Correctable data error is corrected.
1	IDX (Index)	"0" … Not used "1" … Index is sensed.
0	ERR (Error)	"0" … Normal "1" … The previous command was terminated with an error.

Tables 3-4 Error register contents

Bit	Name	Description
7	BBK (Bad block mark)	"0" … Not used "1" … A bad block mark is detected.
6	UNC (Uncorrectable)	"0" … There is no uncorrectable data error. "1" … Uncorrectable data error has been detected.
5	——	Not used
4	IDN (Identification)	"0" … Not used "1" … There is no ID field in the requested sector.
3	——	Not used
2	ABT (Abort)	"0" … Not used "1" … Illegal command error or command abort.
1	TK0 (Track 0)	"0" … The hard disk found track 0 during a recalibrate command. "1" … The hard disk could not find track 0 during a recalibrate command.
0	——	Not used

3.21 ONLY ONE TEST

3.21.1 Program Description

This program tests the unique functions of this model.

3.21.2 Operations

Select test **2** from the DIAGNOSTIC MENU and press **Enter**. The following menu appears in the display.

```
###############################################################
########          ONLY ONE TEST Menu (XXXXXXXXX)       #######
###############################################################
*                                                             *
*    1 ............   Pressed Key Display                     *
*    2 ............   Touch Pad                               *
*    3 ............   Touchsensor Button                      *
*    4 ...........    Kill Switch                             *
*    5 ...........    USB                                     *
*    6 ...........    Touch Pad ( Scroll Button )             *
*    7 ...........    LED                                     *
*    8 ...........    Remocon ( Remote control [Audio] )      *
*    9 ...........    Acceleration sensor                     *
*                                                             *
*    99 ...........   Common Test                             *
*                                                             *
*************************************************************** 
.... Press test number [1-9, 99]?
```
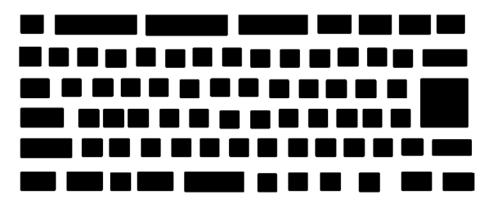
Select the subtest number you want to test and press **Enter**.

To return to the DIAGNOSTIC TEST menu, select **99** and press **Enter**.

Subtest 01   Pressed key display

When you execute this subtest, the keyboard layout is drawn on the display as shown below. When any key is pressed, the corresponding key on the screen changes to the key character that was pressed. Holding a key down enables the auto-repeat function that causes the key's display character to blink.

Press **Del + Enter** to end the test.
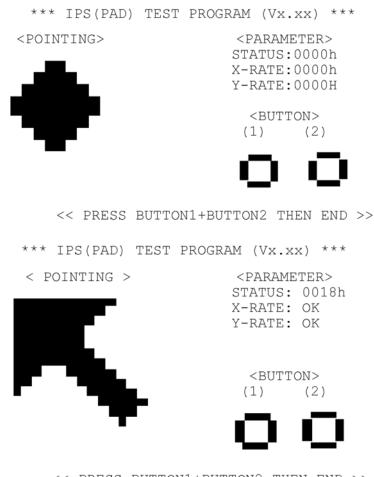
```
IF TEST OK, Press [Dell][Enter]key
```

Subtest 02   Touch Pad

This subtest checks the functions of the touch pad as shown below.

A) Direction and parameter
B) Switching function check.

This test displays the response from the touch pad and touch pad switch.
When moving your finger on the touch pad towards the upper left, the
<POINTING> display changes according to the following illustration. If a
touch pad switch is pressed, the <BUTTONS> displays appear on the right
side one by one. The parameters appear above the <BUTTONS> (1) or (2)
corresponding to the pressed touch pad switch highlights. To end this subtest,
press two touch pad switches at the same time.

```
        *** IPS(PAD) TEST PROGRAM (Vx.xx) ***

        <POINTING>                    <PARAMETER>
                                      STATUS:0000h
                                      X-RATE:0000h
                                      Y-RATE:0000H

                                         <BUTTON>
                                      (1)      (2)



        << PRESS BUTTON1+BUTTON2 THEN END >>


        *** IPS(PAD) TEST PROGRAM (Vx.xx) ***

        < POINTING >                  <PARAMETER>
                                      STATUS: 0018h
                                      X-RATE: OK
                                      Y-RATE: OK



                                         <BUTTON>
                                      (1)      (2)



        << PRESS BUTTON1+BUTTON2 THEN END >>
```

Subtest 03   Touch sensor button
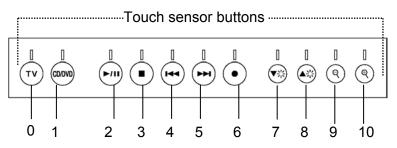
This subtest checks if the touch sensor buttons (11 buttons) work properly.

The following message appears in the display.

```
                    0 1 2 3 4 5 6 7 8 9 10

                    * * * * * * * * * * *
```

```
Press button [0]
```

Touch the first touch sensor button from the left. The name of touch sensor button in the message is described as number (0-10) from the left side. (Refer to the following picture.)

Press the indicated touch sensor button [0], then following message will appear in the display.

```
        Press button [1]
```

As the same way, press the indicated touch sensor button and carry on the touch sensor button test.

If wrong key is pressed, following message will appear in the display.

```
        Press any key !
```

Pressing any key, indication of pressing touch sensor button will appear in the display again. Unless the right touch sensor button is pressed, this operation is repeated.

After checking all touch sensor button, return to the ONLY ONE TEST menu automatically.

Subtest 04   Kill Switch

This subtest checks if the Wireless communication switch works properly.

If the test is started with the switch ON, following message appears in the display.

```
         Kill switch is set to a start position (OFF)
```

Slide the switch to OFF position. Then, following message appears in the display.

```
         KILL SWITCH ON !!
```

Slide the switch to ON position. Then, following message appears in the display.

```
         KILL SWITCH OFF !!
```

After Sliding the switch to OFF position, return to the ONLY ONE TEST menu automatically.

Subtest 05   USB

> *NOTE: When executing this subtest, USB test module and USB cable must be connected.*

This subtest checks if USB port works properly.

The following menu appears in the display.

```
################################################################
########          ONLY ONE TEST Menu (XXXXXXXXX)        #######
################################################################
*                                                              *
*    0 ............   Port 0  (Left side)                      *
*    1 ............   Port 1  (Back left)                      *
*    2 ............   Port 2  (Back right)                     *
*    3 ............   Port 3  (Right side)                     *
*    9 ............   EXIT                                     *
*                                                              *
****************************************************************
.... Press test number[0-3, 9] ?
```

Connect the USB test module and USB cable to the computer.

Input the port test number and press **Enter**.

OK message appears in the display if the test ends without a defective.

NG message appears in the display if a defective is found during the test. Confirm the connection of cable, then execute the test again.

Press **9** and return to ONLY ONE TESST menu.

Subtest 06   Touch Pad (Scroll Button)

This subtest checks if the scroll button of touch pad works properly.

The following message appears in the display.

```
****** Scroll button TEST (VX.XX) ******


Press Scroll button

   Up    Button OFF
   Down  Button OFF

   Press [ESC] key to EXIT
```

Check the message changes OFF<->ON while pressing UP or DOWN button of scroll button.

Press **ESC** and return to ONLY ONE TESST menu.

Subtest 07   LED

This subtest checks if each LED lights properly.

The following message appears in the display in order. Follow the instructions in the display to execute the test.

```
[HDD Access LED test]
```

Confirm the LED of HDD status blinks properly.

Press any key and following message appears in the display.

```
[Caps/Num/Overlay BT/W-LAN LED test]
```

Confirm each LED lights properly.

```
(1)    Press [Caps Lock ] key ! ...Caps      (on/off)

(2)    Press [Fn + F10  ] key ! ...Arrow     (on/off)

(3)    Press [Fn + F11  ] key ! ...Num       (on/off)

(4)    Slide [BT/W-LAN switch L&R]!          (on/off)
```

Press **Enter** and following message appears in the display.

```
Check [PowerSW-LED]= Green
```

Check if the Power Switch LED lights in the following order.
 (Green -> Orange -> Blue -> OFF)

Press any key and following message appears in the display.

```
Check [DC-IN]&[Power]&[Main Battery]LED= Green
```

Check if the each LED lights in the same color as the message in the display
(Message switches Green <-> Orange).

Press **Enter** and return to the ONLY ONE TEST menu.

Subtest 08   Remocon (Remote control, [AUDIO])

This subtest checks if AUDIO button of attached remote controller works
properly.

The following message appears in the display.

```
[[[Remote Control test]]]
```

```
Press [AUDIO] button!
```
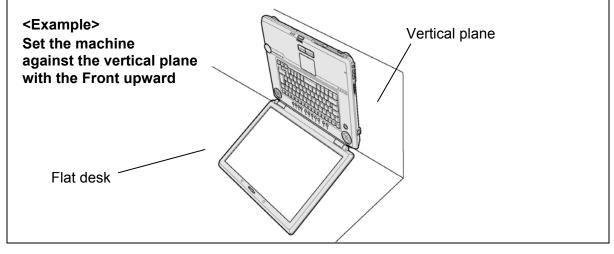
Press AUDIO button of the remote controller and return to the ONLY ONE
TEST menu.

Subtest 09   Acceleration sensor
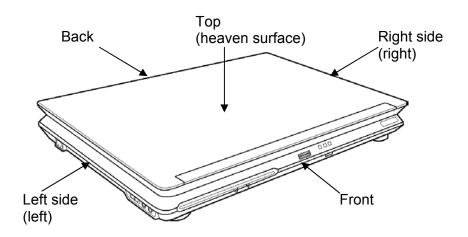
This subtest detects and corrects the each axis (X, Y, Z).

NOTE: *Make sure that this subtest is executed on the following condition:*

     1. Flat desk with vertical plane to get the stability of machine.

     2. Prevent the machine from shake or shock.

\<Example\>
Set the machine
against the vertical plane
with the Front upward

Vertical plane

Flat desk

The figure below shows the name and position of each side.

Back

Top
(heaven surface)

Right side
(right)

Left side
(left)

Front

When this subtest is selected, the following message appears in the display.

```
The heaven surface establishes in the upper direction
Press [Enter] key
```

NOTE: Be sure to execute the test with the display panel opened.

Set the machine on the flat desk. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The back establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the back of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The right establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the right side of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The front establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the front of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

```
The left establishes in the upper direction
Press [Enter] key
```

Set the machine against the vertical plane on the flat desk with the left side of machine upward. Then press **Enter** to detect the data on this setting of machine.

When there is no defective during the all checks above, the following message appears in the display. Then press **Enter** and return to the Only One Test menu.

```
** Setting OK! **
Press [Enter] key
```

When a defective is found during the each check above, the following
message appears in the display. The test is halted at the point when the
defective is found.

```
** Setting ERROR! **
Press [Enter] key
```

Press **Enter** and return to the Only One Test menu. Then execute the test
again.

3.22   Head Cleaning

3.22.1 Function Description

This function cleans the heads in the FDD by executing a series of head load/seek and read operations. A cleaning kit is necessary to perform this program.

3.22.2 Operations

1. Selecting test **4** from the DIAGNOSTIC MENU and pressing **Enter** displays the following messages:

    ```
    DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : VX.XX
    Mount cleaning disk(s) on drive(s).
    Press any key when ready.
    ```

2. Remove the Diagnostics Disk from the FDD, then insert the cleaning disk and press **Enter**.

3. When the "cleaning start" message appears, the FDD head cleaning has begun.

4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.

3.23 Log Utilities

3.23.1 Function Description

This function logs error information generated while a test is in progress and stores the results in RAM. This function can store data on a floppy disk or output the data to a printer.

The error information is displayed in the following order:

1. Error count (CNT)
2. Test name, Subtest number (TS-No)
3. Pass count (PASS)
4. Error status (STS)
5. FDD/HDD or memory address (ADDR)
6. Write data (WD)
7. Read data (RD)
8. HDC status (HSTS)
9. Error status name (ERROR STATUS NAME)

If the power switch is turned off, the error information will be lost.

3.23.2 Operations

1. Select **5** and press **Enter** in the DIAGNOSTIC MENU, logs error information into RAM or onto a floppy disk. The error information is displayed in the following format:

```
XXXXX ERRORS
CNT   TS-NO   PASS STS   ADDR    WD RD HSTS [ERROR STATUS NAME]

001   FDD 02  0000 103   00001   00 00 0000 FDD-WRITE PROTECTED
001   FDD 01  0000 180   00001   00 00 0000 FDD-TIME OUT ERROR
                                   Address
                         Error status        HDC status
                       Pass count
                    Subtest number          Read data
                                         Write data        Error status name
              Test name

  Error count

[[1:Next,2:Prev,3:Exit,4:Clear,5:Print,6:FD Log Read,7:FD Log Write]]
```

2. The error information displayed on the screen can be manipulated by the following number keys:

   The **1** key scrolls the display to the next page.

   The **2** key scrolls the display to the previous page.

   The **3** key returns to the Diagnostic Menu.

   The **4** key erases all error log information in RAM.

   The **5** key outputs the error log information to a printer.

   The **6** key reads the log information from a floppy disk.

   The **7** key writes the log information to a floppy disk.

3. In the case of "error retry OK," a capital "R" will be placed at the beginning of the error status. However, it is not added to the error count.

3.24   Running Test

3.24.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02, 06)
3. Display test (subtest 01)
4. Real timer test (subtest 02)
5. HDD test (subtests 01)

The system automatically detects the number of floppy disk drives connected to the computer for the FDD test.

3.24.2 Operations

1. Select **6** from the Diagnostic Menu and press **Enter,** the following messages will appear in the display in order.

   ```
   FDD write/read test (Y/N) ?

   Printer wrap around test (Y/N) ?

   Serial wrap around test (Y/N) ?

   CD-ROM/DVD-ROM test (Y/N) ?
   ```

2. To execute the test, press **Y (yes)** and **Enter**. To cancel the test, press **N (no)** and **Enter**. If you execute the selectable test, follow the indication message in the display.

3. After setting the selectable test, the test starts automatically. To terminate the program, press **Ctrl + Break.**

3.25 Floppy Disk Drive Utilities

3.25.1 Function Description

This function formats the FDD, copies the floppy disk and displays the dump list for both the FDD and HDD.

1. FORMAT

> *NOTE: This program is only for testing a floppy disk drive. The option is different from the Toshiba MS-DOS FORMAT command.*

This program can format a floppy disk in the following formats:

(a) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.

(b) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

2. COPY

This program copies data from a source floppy disk to a target floppy disk.

3. DUMP

This program displays the contents of the floppy disk and the designated sectors of the hard disk on the display.

4. HDD ID READ

This program reads the hard disk ID and displays hard disk information.

3.25.2 Operations

1. Selecting **7** from the DIAGNOSTIC MENU and pressing **Enter** displays the following message:

   ```
   [ FDD UTILITIES ]

   1 - FORMAT
   2 - COPY
   3 - DUMP
   4 - HDD-ID READ
   9 - EXIT TO DIAGNOSTICS MENU
   ```

2. FORMAT program

   (a) Selecting FORMAT displays the following message:

   ```
   DIAGNOSTICS - FLOPPY DISK FORMAT : VX.XX
   Drive number select (1:A, 2:B) ?
   ```

   (b) Select a drive number to display the following message:

   ```
   Type select (0:2DD, 3:2HD) ?
   ```

   (c) Select a media/drive type number and press **Enter**. A message similar to the one below will be displayed:

   ```
   Warning : Disk data will be destroyed.
   Insert work disk into drive A:
   Press any key when ready.
   ```

   (d) Remove the Diagnostics Disk from the FDD, insert the work disk and press any key.

   The following message will be displayed when the FDD format is executed:

   ```
   [ FDD TYPE ] : TRACK  = XXX
   [ FDD TYPE ] : HEAD   = X
   [ FDD TYPE ] : SECTOR = XX

   Format start
                   [[track, head = XXX X]]
   ```

   After the floppy disk is formatted, the following message will appear:

   ```
   Format complete
   Another format (1:Yes/2:No) ?
   ```

   (e) Typing **1** displays the message from step (c) above. Typing **2** returns the test to the DIAGNOSTIC MENU.

3. COPY program

   (a) When COPY is selected, the following message appears:

```
FLOPPY DISK FORMAT & COPY : VX.XX
Type select (0:2DD,3:2HD) ?
```

   (b) Selecting a media/drive type number will display a message similar to the one below:

```
Insert source disk into drive A:
Press any key when ready.
```

   (c) Remove the Diagnostics Disk from the FDD, insert the source disk and press any key. The following message will appear, indicating the program has started.

```
[ FDD TYPE ] : TRACK    = XXX
[ FDD TYPE ] : HEAD   = X
[ FDD TYPE ] : SECTOR   = XX

Copy start
                [[ track,head = XXX X ]]
```

   (d) The following message will appear.

```
Insert target disk into drive A:
Press any key when ready.
```

   (e) Remove the source disk from the FDD, then insert a formatted work disk and press any key. The following message will appear and start copying to the target disk.

```
                [[ track,head = XXX X ]]
```

   (f) When the amount of data is too large to be copied in one operation, the message from step (b) is displayed again. After the floppy disk has been copied, the following message will appear:

```
Copy complete
Another copy (1:Yes/2:No) ?
```

   (g) To copy another disk, type **1** and the message from step (a) is displayed again. Entering **2** returns the test program to the DIAGNOSTIC MENU.

4. DUMP program

   (a) When DUMP is selected, the following message appears:

   ```
   DIAGNOSTICS-HARD DISK & FLOPPY DISK DUMP : VX.XX
   Drive type select (1:FDD, 2:HDD) ?
   ```

   (b) Select a drive type. If 2:HDD is selected, the display will go to step (h). If 1:FDD is selected, the following message will appear:

   ```
   Select drive number   (1:A, 2:B) ?
   ```

   (c) Select a drive number and the following message will be displayed.

   ```
   Format type select (1:2DD, 3:2HD) ?
   ```

   (d) If 3:2HD is selected, the following message will appear. Select a media mode.

   ```
   2HD media mode (1:1.20MB, 2:1.44MB, 3:1.23MB)?
   ```

   (e) The following message will appear:

   ```
   Insert source disk into drive A:
   Press any key when ready.
   ```

   (f) Insert a source disk and press any key and the following message will appear:

   ```
   ── Max. address ──
   [Track ] = XXXX
   [Head  ] = XX
   [Sector] = XX

   Track number ????
   ```

   (g) Set the track number, head number and sector number you want to dump. The system will access the disk and dump a list. Then the message shown in (k) will appear.

   (h) The following message will appear when selecting 2:HDD in (a).

   ```
   Select drive number   (1:C, 2:D) ?
   ```

   (i) Select a drive number and the following message will be displayed.

   ```
   ---Max. address ---
   [LBA ] = XXXXXXXX

   LBA number ????????
   ```

   (j) Set the LBA number you want to dump. The system will access the disk and dump a list.

(k) The following message will appear. To finish the dump, select **3**.

```
Press number key (1:up,2:down,3:end) ?
```

(l) The following message will appear. Selecting **2** returns to the FDD
     UTILITIES MENU.

```
Another dump (1:Yes,2:No) ?
```

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

```
[HDD ID Read (VX.XX)] [Drive #1]        [Drive #2]
Model No.                = XXXXXXX      = XXXXXXX
```

NOTE: Only when a 2nd HDD is installed, [Drive #2] message appears in the display.

Press **Enter** to return to the FDD UTILITIES MENU.

3.26 System Configuration

3.26.1 Function Description

The System Configuration program contains the following configuration information for the computer:

1. Processor Type [Code/L2 cache]
2. Chip set [VRAM]
3. BIOS ROM version [1st ID, 2nd ID]
4. Boot ROM version
5. EC total version
6. PS Microprocessor version
7. SVP parameter version [Panel/Manufacture code/Product code]
8. Micro code revision [Processor number]
9. Total Memory Size [Conventional memory]
10. Battery code
11. HWSC
12. FSB [Voltage]
13. The number of printer ports
14. The number of ASYNC ports
15. Math co-processors
16. Floppy Disk Drive [Track/Head/Sector]
17. Hard Disk Drive [Sector/Drive size/Manufacture code]
18. Optical Disk Drive [Maker/Drive type/Manufacture code/Product code]
19. T&D total version
20. Date/Time

3.26.2 Operations

Select **8** from the DIAGNOSTIC MENU and press **Enter.** Then, the following system configuration appears in the display.

```
System Configuration Display: Ver X.XX [Machine Name???]

*  - Processor Type      = XXXXXX-XXXXXMHz      Code = XX     L2 Cache = XXXXXKB
*  - Chip set            = XXXXXX                 VRAM = XXXXMB
*  - BIOS ROM Version    = VX.XX      1st ID = XXH, 2nd ID = XXH
*  - BOOT ROM Version    = VX.XX
*  - EC Total Version    = VX.XX
*  - PS Micon Version    = VX.XX
*  - SVP Par. Version    = VX.XX    (Panel=XXXXXXXXX, Manu=XXXX, Prod=XXXX)
*  - Micro code Revision = VX.XX    (Processor=XXXh)
*  - Total Memory Size   = XXXXXXMB (Conventional Memory = XXXKB)
*  - Battery Code        = XXXXXXXXXXXX
*  - HWSC                = XXXXXXX
*  - FSB                 = XXXXXMHz (Voltage = XEh)
*  - X Printer Adapter    LPT1 = XXXX   LPT2 = XXXX   LPT3 = XXXX
*  - X ASYNC Adapter      COM1 = XXXX   COM2 = XXXX   COM3 = XXXX
*  - X Math CO-Processor

*  - X Floppy Disk Drive(s)   Track = XX    Head = XX, Sector = XX
*  - X Hard Disk Drive(s)     #1 Sectors  = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXX]
                              #2 Sectors  = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXX]
*  - ODD                = XXXX XXXXXXXX XXXXXXXX [XXXXXXXXXXXX]
*  - T&D Total Version  = VX.XX

Press [Enter] Key       [Date = XXXX-YY-ZZ, XX:YY:ZZ]
```

Press **Enter** to return to the DIAGNOSTIC MENU.

3.27 Wireless LAN Test Program (Intel-made b/g)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made Calexico 802.11b/g). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test. Finish the tests of the Main test program by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

Insert the Diagnostics disk for wireless LAN test into the Floppy Disk Drive. Turn on the power while pressing **U.**

The following menu appears in the display.

```
******Intel Calexico 11b/g Card Maintenance test Menu******
*                                                          *
*    1  : SKU check of Module                              *
*                                                          *
*    2  : MAC Address Check                                *
*                                                          *
*    3  : Antenna Check & communication test of 11b mode   *
*                                                          *
*    4  : Communication test of 11g mode                   *
*                                                          *
*    5  : All the tests of Calexico 11g Card               *
*         (SKU & MAC Check, 11b/g communication test)      *
*                                                          *
************************************************************


SELECT TEST No, (1-5):
```

To execute the subtest, input the subtest number and press **Enter**.

Subtest01   SKU check of module

               This subtest displays SKU information on the wireless LAN card installed.
               Selecting this subtest, following message will appear in the display. Confirm
               if the right information on the wireless LAN card is described.

```
               ************************************************************
               *                                                          *
               *     Module    : Intel Calexico 802.11b/g (MoW)          *
               *     G-code    : G36C0000X310                            *
               *     PBA No.   : C55369                                  *
               *                                                          *
               ************************************************************
```

               If a defective is found during the test, **NG** message will appear in the display.

               Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Using a wrong wireless LAN card (Using unspecified card)

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

This subtest displays the MAC address. Selecting this subtest, following message will appear in the display.

```
************************************************************

          MAC = XXXXXXXXXXXX

************************************************************

************************************************************
*                                                          *
*       MAC Address Check: OK !!                           *
*                                                          *
************************************************************
```

Press any key and return to the test menu.

If a defective is found during the test, following message will appear in the display.

```
************************************************************

          ERROR: MAC all 0
          MAC = XXXXXXXXXXXX

************************************************************

************************************************************
*                                                          *
*       MAC Address Check: NG !!                           *
*                                                          *
************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Antenna check & communication test of 11b mode

Caution: *To execute subtest 03-05, use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests. Access points are also required. (Access point for 802.11b and 802.11g)*

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

Setting the responder machine
Connect the responder machine to the access points (for 802.11b and 802.11g) with a cross cable and turn on the access points.

Insert the floppy disk containing the wireless LAN test program into the FDD of the responder machine and turn on the responder machine.

This subtest checks the connection and communication of wireless LAN antenna of Calexico 802.11b mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display. Check which antenna (Main/Aux) is defective.

```
*************************************************************
*                                                           *
*          Main Antenna Test: NG !!                         *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main/Aux)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest04   Communication test of 11g mode

This subtest checks the communication of wireless LAN antenna of Calexico 802.11g mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display.

```
****************************************************************
*                                                              *
*              11g Communication Test: NG !!                   *
*                                                              *
****************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest05   All the tests of Calexico 11b/g Card

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Calexico 802.11b/g card. The test stops at when a defective is found. For more details, refer to each subtest.

3.28 Wireless LAN Test Program (Intel-made a/b/g)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made Calexico 802.11a/b/g). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test. Finish the tests of the Main test program by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

Insert the Diagnostics disk for wireless LAN test into the Floppy Disk Drive. Turn on the power while pressing **U.**

The following menu appears in the display.

```
*************************************************************
*      Intel Calexico2 11a/g Maintenance T&D Menu          *
*                                                          *
*      1  : SKU check of Module                            *
*                                                          *
*      2  : MAC Address Check                              *
*                                                          *
*      3  : Antenna Check & communication test of 11b mode *
*                                                          *
*      4  : Communication test of 11a mode                 *
*                                                          *
*      5  : Communication test of 11g mode                 *
*                                                          *
*      6  : All the tests of Calexico2 11a/g Card          *
*         (SKU & MAC Check, 11a/b/g communication test)    *
*                                                          *
*************************************************************

SELECT TEST No, (1-6):
```

To execute the subtest, input the subtest number and press **Enter**.

Subtest01   SKU check of module

           This subtest displays SKU information on the wireless LAN card installed.
           Selecting this subtest, following message will appear in the display. Confirm
           if the right information on the wireless LAN card is described.

```
           *************************************************************
           *                                                          *
           *      Module  : Intel Calexico 802.11a/g (MoW)            *
           *      G-code  : G36C00018510                              *
           *      PBA No. : C67287                                    *
           *                                                          *
           *************************************************************
```

           Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display.

Press any key and following message will appear in the display.

```
***************************************************************
*                                                             *
*                    SKU NG !!                                *
*                                                             *
*          Other Card or Module not found                    *
*                                                             *
***************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Using a wrong wireless LAN card (Using unspecified card)

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

This subtest displays the MAC address. Selecting this subtest, following message will appear in the display.

```
***************************************************************

        MAC = XXXXXXXXXXXX

***************************************************************

***************************************************************
*                                                             *
*      MAC Address Check : OK !!                              *
*                                                             *
***************************************************************
```

Press any key and return to the test menu.

If a defective is found during the test, following message will appear in the display.

```
***************************************************************

        ERROR: MAC all F
        MAC = XXXXXXXXXXXX

***************************************************************

***************************************************************
*                                                             *
*      MAC Address Check : NG !!                              *
*                                                             *
***************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Antenna check & communication test of 11b mode

Caution: *To execute subtest 03-06, use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests. Access points are also required. (Access point for 802.11a, 802.11b and 802.11g)*

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

Setting the responder machine
Connect the responder machine to the access points (for 802.11a, 802.11b and 802.11g) with a cross cable and turn on the access points.

Insert the floppy disk containing the wireless LAN test program into the FDD of the responder machine and turn on the responder machine.

This subtest checks the connection and communication of wireless LAN antenna of Calexico 802.11b mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display. Check which antenna (Main/Aux) is defective.

```
************************************************************
*                                                          *
*            Aux Antenna Test : NG !!                      *
*                                                          *
************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main/Aux)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest04   Communication test of 11a mode

This subtest checks the communication of wireless LAN antenna of Calexico 802.11a mode.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display.

```
************************************************************
*                                                          *
*              11a Communication Test : NG !!              *
*                                                          *
************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest05   Communication test of 11g mode

              This subtest checks the communication of wireless LAN antenna of Calexico 802.11g mode.

              For more details on procedure and contens of this subtest, refer to Subtest04 Communication test of 11a mode.

Subtest06   All the tests of Calexico 11a/b/g Card

              This subtest checks SKU information, MAC address of Calexico 802.11a/b/g card, antenna connection and communication test of Calexico 802.11b card and communication test of Calexico 802.11a and Calexico 802.11g. The test stops at when a defective is found. For more details, refer to each subtest.

3.29 Wireless LAN Test Program (Askey-made)

This section describes how to perform the wireless LAN transmitting-receiving test (Askey-made Atheros b/g, a/b/g).

Caution: *To execute subtest 03-07, use another computer (with Atheros wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform those tests.*

Another wireless communication tool with 2.4GHz like Bluetooth is interfering with the test. Execute this test in the condition where no interference around the computer.

Be sure to turn the wireless communication switch ON before executing wireless LAN communication test. (The wireless communication LED lights orange.)

Release the write-protection of floppy disk for the test.

Setting the responder machine
To execute subtest 03-07, responder machine with wireless LAN communication function (Atheros-made) is required. To set the responder machine, follow the procedures below.
1. Insert the test program disk to the FDD of responder machine and turn on the power.

2. Start the program for responder machine automatically.

3. The program for responder machine is set.

Setting the tester (DUT) machine
1. Insert the test program disk 1 to the FDD of tester machine and turn on the power.

2. The program disk 1 is executed and following message will appear in the display.

```
*************************************************************
*                                                           *
*              Atheros MB4x Maintenance T&D (DUT)           *
*                                                           *
*              Please exchange for DUT media 2              *
*************************************************************

Please input the "S" key and push the "Enter" key:
```

3. Take out the program disk 1 and insert program disk 2. Then, press **S** and **Enter**.

4. Executing program disk 2, following menu will appear in the display. To execute the subtest, press test number and **Enter**.

```
***********************************************************
*      Atheros MB4x(MB44ag/43g) Maintenance T&D Menu        *
*                                                           *
*      1 : SKU check of Module                              *
*                                                           *
*      2 : MAC Address Check                                *
*                                                           *
*      3 : Communication test of 11a mode(MB44ag)           *
*                                                           *
*      4 : Communication test of 11b mode(MB44ag/MB43g)     *
*                                                           *
*      5 : Communication test of 11g mode(MB44ag/MB43g)     *
*                                                           *
*      6 : All the tests of MB43g Module                    *
*          (SKU & MAC Check, 11b/g communication test)      *
*                                                           *
*      7 : All the tests of MB44ag Module                   *
*          (SKU & MAC Check, 11a/b/g communication test)    *
*                                                           *
***********************************************************

SELECT TEST No, (1-7):
```

Subtest01   SKU check of module

This subtest displays SKU information on the wireless LAN card installed.
Selecting this subtest, following message will appear in the display. Confirm
if the right information on the wireless LAN card is described.

```
***********************************************************
*                                                           *
*      Module  : Atheros MB44ag (RoW)                       *
*      G code  : G36C00010310                               *
*                                                           *
***********************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Using a wrong wireless LAN card (Using unspecified card)

- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02   MAC Address Check

This subtest displays the MAC address. Selecting this subtest, following message will appear in the display.

```
*************************************************************
*                                                           *
*        MAC Address Check : OK !!                          *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Defective wireless LAN card

- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03   Communication test of 11a mode (MB44ag)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11a mode. Check the packet, throughput and RSSI and compare them with the standard.

After finishing the test, **OK** message will appear in the display. Press any key and return to the test menu.

When a defective is found during the test, **NG** message will appear in the display. Press any key and following message will appear in the display.

```
*************************************************************
*                                                           *
*              11a Communication Test : NG !!               *
*                                                           *
*              Please refer to log. txt                     *
*                                                           *
*************************************************************
```

Press any key and return to the test menu.

Open the log file (log.txt) and check the result.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card

- Connection of wireless LAN antenna cable (Main/Aux)

- Condition of wireless LAN communication (Interference/obstruction)

- Defective wireless LAN card

Checking the connection and condition, execute the subtest again.

Subtest04   Communication test of 11b mode (MB44ag/MB43g)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11b mode.

For more details on the contents, refer to subtest 03.

Subtest05   Communication test of 11g mode (MB44ag/MB43g)

This subtest checks the connection and communication of wireless LAN antenna of Atheros 802.11g mode.

For more details on the contents, refer to subtest 03.

Subtest06   All the tests of MB43g Module

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Atheros 802.11b mode and Atheros 802.11g mode. The test stops at when a defective is found. For more details, refer to each subtest.

Subtest07   All the tests of MB44ag Module

This subtest checks SKU information, MAC address, connection and communication of wireless LAN antenna of Atheros 802.11a mode, Atheros 802.11b mode and Atheros 802.11g mode. The test stops at when a defective is found. For more details, refer to each subtest.

3.30 LAN/Modem/Bluetooth/IEEE1394 Test Program

This section describes how to perform the LAN/Modem/Bluetooth/IEEE1394 test with the test program.

Insert the test program disk for LAN/Modem/Bluetooth/IEEE1394 test in FDD and turn on the power. The following message will appear:

```
Microsoft Windows XX Startup Menu
---------------------------------

        1.   LAN

        2.   Modem

        3.   Bluetooth

        4.   IEEE1394

Enter a choice:
```

Press the number you want to test and press **Enter**.

> *NOTE: It is impossible to go back to startup menu once you choose the test. Therefore, LAN/Modem/Bluetooth/IEEE1394 test can not be executed successively.*

3.30.1   LAN test

To execute LAN test, press **1** and **Enter**. The following message will appear:

```
################################################################
#########   i82562 ICHx GbE (i82540) Diagnostics program     #####
################################################################
*                                                              *
*   1 ............  (i82562 + ICHx)                            *
*                                                              *
*   2 ...........  (GbE)                                       *
*                                                              *
****************************************************************
.... Press test number[1-2] ?
```

Press the number you want to test and press **Enter**.

Subtest01   (i82562 + ICHx)

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip.

The following message will appear:

```
[LAN transmit & receive test !]
                       COMPLETED  Repeat count  =    00000
                                  Error count   =    00000
LOOPBACK TEST

100Mbps Auto-negotiation TxRx Test
 Destination Address    = xxxxxxxxxxxx
 Source Address         = xxxxxxxxxxxx

  ** 100Base-TX Full-Duplex **
  < TRANSMIT >
  < RECEIVE >
```

NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

If a defective is found, **NG** message will appear in the display.

Subtest02   (GbE)

CAUTION: *Gigabit Ethernet test is not supported for this model.*

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip. Select **2** to execute and press **Enter**.

The following message will appear:

```
Testing adaptor...hit <ESC> to abort.
*
External Loopback Test...PASSED
Testing completed.
*
*
Loopback Test Complete
*
*
*  1000Base Auto-negotiation TxRx Test
*
*  CE Test Complete
```

NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

If a defective is found, **NG** message will appear in the display.

3.30.2 Modem test

For this subtest, connect the modem PCB and RJ11 connector with a harness. Use the dedicated "FAT-MODE inspection device (product code: QE2000P01 made by Nitto Denki Seisakusyo)" for the tests.

To execute Modem test, press **2** and **Enter**. Following message will appear:

```
[Modem loopback test !]
ICHx MDC Test Program with Modem Sound (Line Test)
Version X.X
* Scorpio Modem Initialize        :OK
* Digital Loopback Test           :OK
* RJ11 Connector Check (LED)      :(Operator's Check!!)
```

> *NOTE*: *The menu displayed by your computer may be slightly different from the one shown above.*

RJ11 Connection Check (LED) (Operator's Check LED) test will be executed, and the following message will appear:

```
...Press Key (Y = OK , N =NG)
```

If the color in the LED of the connection checker is orange, press **Y**, otherwise, press **N**.

3.30.3   Bluetooth test

> *CAUTION*: *Bluetooth test is not supported for this model.*

To execute this test, input **3** and press **Enter**.

> *Note*: Use another computer that can communicate by the Bluetooth as a reference
>   machine to perform this test.

Insert a floppy disk containing the test program into the target machine and turn on the target machine. The following Bluetooth test menu will appear:

```
####################################################################
####          Bluetooth sub system test program VX.XX          ####
####################################################################
*                                                                  *
*              1....BD_ADDR check                                  *
*                                                                  *
*              3... Communications test (DUT mode)                 *
*                                                                  *
*              T....communications test (TEST mode)                *
*                                                                  *
********************************************************************
....Press test number [1, 3, T] ? _
```

Press **1** or **3** key to perform the corresponding subtest. To quit the Bluetooth test program, eject the floppy disk and turn the computer off while the menu above is displayed.

Subtest01   BD_ADDR check

This subtest checks the BD_ADDR functions. When the Bluetooth test menu is displayed, press **1** to select the test and press **Enter**. The following message will appear:

```
--------------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------------




   Initializing …
```

When the machine has passed the test, it displays BD_ADDR. If BD_ADDR has no problem, the following message is displayed.

```
--------------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------------


               My BD_ADDR = XXXXXXXXXXXX [h]



               PPPPPP    A     SSSSS    SSSSS
               P     P  A A   S    S S     S
               P     P  A   A  S         S
               PPPPPP  A     A SSSSS    SSSSS
               P      AAAAAAA       S        S
               P      A     A S    S S     S
               P      A     A  SSSSS    SSSSS
```

If the target machine has any problem, it displays Error CODE. The following
message is displayed.

```
--------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
--------------------------------------------------------------------------


                   My BD_ADDR = XXXXXXXXXXXX [h]



                   FFFFFF    A      III   L
                   F        A A      I    L
                   F        A  A     I    L
                   FFFFFF  A    A    I    L
                   F       AAAAAAA   I    L
                   F       A    A    I    L
                   F       A    A   III   LLLLLLL
```

Table 3-5 Error message

Message	Contents
Invalid BD_ADDR (all 00)	0x000000000000
Invalid BD_ADDR (all FF)	0xFFFFFFFFFFFF
Invalid BD_ADDR (bit0=1)	bit40=1b
Invalid BD_ADDR (bit1=1)	bit41=1b
Invalid BD_ADDR (define in the file)	Defined BD_ADDR

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-6 Error code for Bluetooth test (BD_ADDR) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

** See the Specification of the Bluetooth System for details.

Table 3-6 Error code for Bluetooth test (BD_ADDR) (2/2)

Error code	Meaning
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed.
0x22	LMP Response Timeout.
0x23	LMP Error Transaction Collision.
0x24	LMP PDU Not Allowed.
0x25	Not Exist
0x26	Not Exist
0x27	Not Exist
0x28	Not Exist
0x29	Not Exist
0x2a	Not Exist
0x2b	Not Exist
0x2c	Not Exist
0x2d	Not Exist
0x2e	Not Exist
0x2f	Not Exist
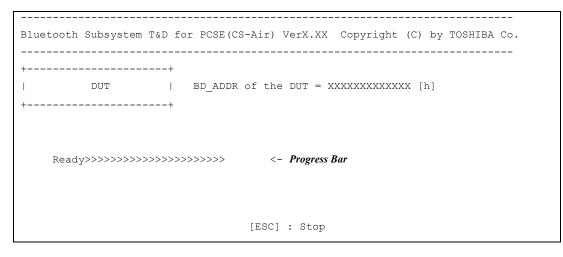
** See the Specification of the Bluetooth System in detail.

Subtest03   Communication test (DUT mode)

This subtest checks the Bluetooth communication functions. Preparing the tester machine for the Bluetooth test program. Insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Bluetooth test menu will appear:

Press **3** to select the test and press **Enter** in the target machine. The following message will appear:

When the test begins, the machine displays BD_ADDR of the DUT. The progress bar stops when the test is completed. The following message is displayed.

```
-------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
-------------------------------------------------------------------------
+---------------------+
|        DUT          |    BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+---------------------+



    Ready>>>>>>>>>>>>>>>>>>>>>>>          <- Progress Bar



                          [ESC] : Stop
```

When the Bluetooth test menu is displayed, press **T** to select the test and press **Enter** in the test machine. The following message will appear:

```
-------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
-------------------------------------------------------------------------
+-----------------+
|                 |
|     Tester      |
|                 |
+-----------------+




                          [ESC]:Finish Tester   [SPACE]:Start
                          Is DUT ready?

```

Then press **Space** to start the Bluetooth communication test.

When the machine has passed the test, it displays BD_ADDR of the DUT. If the connection with the tester is completed, the progress bar stops. The following message is shown.

```
-------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
-------------------------------------------------------------------------
+--------------------+
|        DUT         |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+--------------------+

    CCCC    OOO   M     M PPPPPP  L       EEEEEE TTTTTTT EEEEEE DDDDD
   C    C  O   O  MM   MM P     P L       E         T    E      D    D
   C       O   O M M M M P     P L       E         T    E      D     D
   C       O   O M  M  M PPPPPP  L       EEEEE     T    EEEEEE D     D
   C       O   O M     M P       L       E         T    E      D     D
    C    C O   O M     M P       L       E         T    E      D    D
    CCCC    OOO  M     M P       LLLLLLL EEEEE     T    EEEEEE DDDDD



                        Testing is finished

A>_
```

If the target machine has any problem, the following message "INCOMPLETE" is displayed
with the Error Code.

```
---------------------------------------------------------------------------
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX  Copyright (C) by TOSHIBA Co.
---------------------------------------------------------------------------


+--------------------+
|         DUT        |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+--------------------+



III  N     N  CCCC    OOO   M     M PPPPPP  L       EEEEE TTTTTTT EEEEEEE
 I   NN    N C    C  O   O  MM   MM P    P L       E        T    E
 I   N N   N C      O     O M M M M P    P L       E        T    E
 I   N  N  N C      O     O M  M  M PPPPPP  L       EEEEE    T    EEEEEEE
 I   N   N N C      O     O M     M P      L       E        T    E
 I   N    NN C    C O   O  M     M P      L       E        T    E
III  N     N  CCCC    OOO   M     M P       LLLLLLL EEEEE   T    EEEEEEE



                      Testing is finished



_Press any key to continue. . .
```

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-7 Error code for Bluetooth test (BD_ADDR of the DUT) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

** See the Specification of the Bluetooth System in detail.

Table 3-7 Error code for Bluetooth test (BD_ADDR of the DUT) (2/2)

Error code	Meaning
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed.
0x22	LMP Response Timeout.
0x23	LMP Error Transaction Collision.
0x24	LMP PDU Not Allowed.
0x25	Not Exist
0x26	Not Exist
0x27	Not Exist
0x28	Not Exist
0x29	Not Exist
0x2a	Not Exist
0x2b	Not Exist
0x2c	Not Exist
0x2d	Not Exist
0x2e	Not Exist
0x2f	Not Exist

** See the Specification of the Bluetooth System in detail.

3.30.4   IEEE1394 test

To execute this test, input **4** and press **Enter**.

NOTE: *Use another computer that can communicate by IEEE1394 (i. Link) cable as a reference machine to perform this test.*

The following menu will appear:

```
*********************************************************************
********      IEEE1394[XXXXX] Diagnostics program      **************
*********************************************************************
*                                                                   *
*            1 ....(Transmit & Receive test)                        *
*                                                                   *
*            2 ....(Responder set)                                  *
*                                                                   *
*            3 ....(1394 GUID Display)                              *
*                                                                   *
*********************************************************************
.... Press test number[1-3] ?
```

To execute the TEST, select the test number you want to execute and press **Enter**.

Subtest01   Transmit & Receive test

NOTE: *Before executing subtest 01, be sure to execute subtest 02 in the responder machine.*

     This program checks the data transporting between responder machine and target machine and compare them with the original data through the IEEE1394 cable.

Subtest02   Responder set

     This program is executed in the responder machine to initialize the responder machine with the IEEE1394 cable connected to the target machine before executing subtest 01.

Subtest03   IEEE1394 GUID Display

     This program checks the GUID of IEEE1394.

3.31 Sound Test program

This section describes how to perform the Sound test. To execute the sound test, refer to the following description.

Insert the test program disk for Sound test in the floppy disk drive and turn on the power. The following message will appear:

```
################################################################
######     WSS, Sound blaster pro Diagnostics program     ######
################################################################
*                                                              *
*      1 ............     Sound (Standard)                     *
*                                                              *
*      2 ...........      Sound (Legacy)                       *
*                                                              *
*      3 ...........      CD Sound (Standard)                  *
*                                                              *
*      4 ...........      CD Sound (Legacy)                    *
*                                                              *
*           ---It outputs at the speaker and lineout---        *
*                                                              *
****************************************************************
.... Press test number[1-4] ?
```

Input the test number and press **Enter**.

3.31.1 **Sound (Standard) test**

To execute the Sound (Standard) test, press **1** and **Enter**. The following menu will appear in the display.

```
################################################################
######      ICH4-M + AD1981A Diagnostics program       ######
################################################################
*                                                              *
*        1 ...........     (Microphone recording & play)       *
*        2 ...........     (Sine wave)                         *
*        3 ...........     (Line IN recording & play)          *
*                                                              *
*        9 ...........     Exit to Main                        *
*                                                              *
****************************************************************
.... Press test number[1-3, 9] ?
```

To return to the Sound test menu, Press **9** and **Enter**. Then following message will appear in the display.

```
**********************************
********   May I Restart ?   *******
**********************************
Press any key to continue…
```

After pressing any key, the machine starts rebooting and sound test menu will appear in the display.

Subtest01   Microphone recording & play

This subtest checks the function of the CODEC A/D, D/A converter.

When this subtest is selected, the following message will appear.

```
[Recording & play test !]
```

And the following message will appear.

```
DOS/4GW Protected Mode Run-time Version X.XX
Copyright (c) Tenberry Software, Inc. XXXX
```

After this message appears, display stops briefly. In this timing, sound is recorded from internal microphone.

After the recording is completed, the computer plays back the sound recorded after the following message.

```
STACWAVE Version X.XX
Build data: XXX XX XXXX at XX:XX:XX
Loading "mic.wav".
```

NOTE:	*The message in the display might have slight difference from those above.*

The display returns to the Sound (Standard) test menu after the test ends.

Subtest02   Sine Wave

This subtest is executed by loading the COM file (ADSIN.COM). The program expands sine wave data table from 16KB to 64KB, and creates the play data. Then it transfers the data between the DMA and the CODEC to play the sine wave. (It sounds like a continuous beep). By using wave measurable devices such as an oscilloscope, the data can be measured as a sine wave.

When the subtest is executed, the sine wave is played while expanding sine wave from 16KB to 64KB.

The display returns to the Sound (Standard) test menu after the test ends.

Subtest03   Line IN recording & play

This subtest executes the same test as the subtest01 by recorded sound from the different port (Line-in port).

For more details on the subtest, refer to the subtest01 Microphone recording & play.

The display returns to the Sound (Standard) test menu after the test ends.

3.31.2 Sound (Legacy) test

To execute the Sound (Legacy) test, select **2** and press **Enter**.

CAUTION: *Sound (Legacy) test is not supported in this model.*

3.31.3 CD Sound (Standard) test

To execute the CD Sound (Standard) test, press **3** and **Enter**. Insert the test media (TOSHIBA TEST CD-ROM or ABEX TEST CD-ROM) or music CD on the market (if the test media can not be prepared). Following menu appears in the display.

For details on use of test media, refer to (1) Test media (Toshiba-made test media).
For details on use of audio CD on the market, refer to (2) Audio CD.

(1) Test media (Toshiba-made test media)

```
   CD/DVD TEST  IN PROGRESS XXXXXXXX   xxxxxxx DIAGNOSTIC TEST VX.XX
                                       [Ctrl]+[Break] ; test end
                                       [Ctrl]+[C]     ; key stop


   SUB-TEST   : XX
   PASS COUNT : XXXXX      ERROR COUNT: XXXXX
   WRITE DATA : XX         READ DATA  : XX
   ADDRESS    : XXXXXX     STATUS     : XXX


   01 - Japanese Narration
   02 - English Narration
   03 - Test Tone A (100Hz - 20Hz)
   04 - Test Tone B (400Hz - 3KHz L-R)


                                  Drive # = 0, ATAPI status =00
                                  Command = XX
                                  [[Block address = XXXXXXXX]]
                                  [[Block length  = XXXXXXXX]]

                                  Final : Block address = XXXXXXXXX
```

Subtest01   Japanese Narration

Selected this subtest, narration in Japanese starts and following message appears in the display.

```
   Play start CD sound !
   Press any key <Play stop>.
```

Press any key and stop the narration. Then return to the CD Sound (Standard) test menu.

Subtest02   English Narration

                 Selected this subtest, narration in English starts.

                 For more details on the procedure, refer to the subtest01.

Subtest03   Test Tone A

Caution: *Before starting subtest03, be sure to set the sound at proper volume.*

                 This subtest plays sine wave while changing its table from 100Hz to 20Hz.

                 Return to the CD Sound (Standard) menu after the test ends.

Subtest 04   Test Tone B

                 This subtest plays sine wave while changing its table from 400Hz to 3KHz
                 and also changing the channel from left speaker to right speaker.

                 Return to the CD Sound (Standard) menu after the test ends.

(2) Audio CD

Insert an audio CD and the following menu appears in the display.

```
CD/DVD TEST  IN PROGRESS XXXXXXXX   xxxxxxx DIAGNOSTIC TEST VX.XX
                                    [Ctrl]+[Break] ; test end
                                    [Ctrl]+[C]     ; key stop


SUB-TEST   : XX
PASS COUNT : XXXXX      ERROR COUNT: XXXXX
WRITE DATA : XX         READ DATA  : XX
ADDRESS    : XXXXXX     STATUS     : XXX



CD Sound track number (01-98 : Track) ?
                           Drive # = 0, ATAPI status =00
                           Command = XX
                           [[Block address = XXXXXXXX]]
                           [[Block length  = XXXXXXXX]]

                           Final : Block address = XXXXXXXXX
```

Select the track number you want to test and press **Enter** twice.

The following message appears in the display and selected track is played.

```
        Play start CD sound !
        Press any key <play stop>
```

After pressing any key, the music stops and the display returns to the selection menu of the track number.

NOTE: *When the CD-ROM test is executed, [ALL DEVICE] must be selected in the "Device Config.=" of the BIOS SETUP. If the "ALL DEVICE" is not selected, music can not be played.*

3.31.4 CD Sound (Legacy) test

To execute the CD Sound (Legacy) test, select **4** and press **Enter**.

CAUTION: Sound (Legacy) test is not supported in this model.

3.32 SETUP

3.32.1 Function Description

This program displays the current system setup information as listed below:

1. Memory

2. System Date/Time

3. Battery

    (a) Battery Save Mode
    (b) PCI Express Link ASPM

4. Password

5. HDD Password

    (a) HDD
    (b) HDD Password Mode
    (c) User Password
    (d) Master Password

5. Boot Priority

    (a) Boot Priority
    (b) HDD Priority
    (c) Network Boot Protocol

6. Others

    (a) CPU Cache
    (b) Level 2 Cache
    (c) Dynamic CPU Frequency Mode
    (d) Execute-Disable Bit Capability
    (e) Auto Power On
    (f) Start Up Logo
    (g) Sound Logo
    (h) Front Operation Panel
    (i) Language During Bootup

7. Configuration

8. Drives I/O

    (a) Built-in HDD1
    (b) Built-in HDD2
    (c) CD-ROM

9. PCI Bus

10. Display

    (a) Power On Display
    (b) LCD Display Stretch
    (c) TV Type

11. Peripheral

    (a) Internal Pointing Device

12. Legacy Emulation

    (a) USB KB/Mouse Legacy Emulation
    (b) USB-FDD Legacy Emulation

13. PCI LAN

14. RAID Array

    (a) Current State
    (b) Create State
    (c) Execute Creation

3.32.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the followings:

```
                      SYSTEM SETUP (1/3)          ACPI BIOS version = X.XX

       MEMORY                          BOOT PRIORITY
 Total           = XXXXX KB     Boot Priorit = HDD → FDD → CD-ROM → LAN

                                HDD Priority
       SYSTEM DATE/TIME             =Built in HDD1 → Built in HDD2
 Date(MM-DD-YY)   = XX-XX-XXXX   Network Boot Protocol = PXE
 Time(HH:MM:SS)   = XX:XX:XX
                                            OTHERS
       BATTERY                  CPU Cache             = Enabled
 Battery Save Mode   = Full Power
 PCI Express Link ASPM = Auto    Level 2 Cache         = Enabled

                                Dynamic CPU Frequency Mode
       PASSWORD                                       = Dynamically Switchable
 Not Registered                 Execute-Disable Bit Capability
                                                      = Available

                                Auto Power On          = Disabled

                                Start UP Logo          = Animation

                                Sound Logo             = Enabled

                                Front operation Panel   = Enabled

                                Language During Bootup  = Enabled


  ↓↑←→: Select items   Space, BkSp: Change values   PgDn, PgUp: Change pages
  Esc: Exit without saving  Home : Set default values  End: Save changes and Exit



                      SYSTEM SETUP (2/3)          ACPI BIOS version = X.XX

       CONFIGURATION                    DISPLAY
 Device Config.   = Setup by OS   Power On Display     = Auto-Selected
                                 LCD Display Stretch   = Enabled
       DRIVERS I/O               TV Type               = NTSC (US)

 Built-in HDD1
           = Serial ATA Port0            PERIPHERAL
 Built-in HDD2
           = Serial ATA Port2    Internal Pointing Device = Enabled
 CD-ROM    = Primary IDE(1F0H/IRQ14)
                                        LEGACY EMULATION
       PCI BUS                   USB KB/Mouse Legacy Emulation
 PCI BUS    = IRQ10, IRQ11                            = Enabled

                                 USB-FDD Legacy Emulation   = Enabled


                                          PCI LAN
                                 Built-in LAN    = Enabled


  ↓↑←→: Select items   Space, BkSp: Change values   PgDn,PgUp: Change pages
  Esc: Exit without saving  Home : Set default values  End: Save changes and Exit
```

```
                    SYSTEM SETUP (3/3)          ACPI BIOS version = X.XX

         ─── DRIVERS I/O ───────────────────
       │ Current State                       │
       │    Built-in HDD1 = 1RAID-0          │
       │    Built-in HDD2 = JB0D             │
       │ Create State                        │
       │    Built-in HDD1 = 1RAID-0          │
       │    Built-in HDD2 = JB0D             │
       │                                     │
        ─────────────────────────────────────



                 Level    Status   Capacity
       LD0       1RAID-0  OPTIMAL  XXGB
       LD1       JB0D     OPTIMAL  XXGB


       Drive     Assign   Status   Size   Model                    Rev
       Built-in1 LD0-0    ONLINE   XXGB   XXXXXXX XXXXXXXXX   XXXXXXXX
       Built-in2 LD1-0    ONLINE   XXGB   XXXXXXX XXXXXXXXX   XXXXXXXX



       ↓↑←→: Select items   Space, BkSp: Change values    PgDn,PgUp: Change pages
       Esc: Exit without saving   Home : Set default values   End: Save changes and Exit
```

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press ↑ and ↓ to move between
    items in a column. Press **Fn**+↑ **(PgUp)** and **Fn** + ↓ **(PgDn)** to move between the
    two pages.

2. Press either the **Space bar** or **Back Space** to change the value.

Accepting Changes and Exiting the SETUP Window

1. Press **End** to accept the changes you made.

    If the changed item does not require the system to reboot, the following message is
    displayed:

    ```
    Are you sure? (Y/N)
    ```

    If the changed item requires the system to reboot, the following message is displayed:

    ```
    Are you sure? (Y/N)
    The changes you made will cause the system to reboot.
    ```

2. To make other changes, press **N**. Repeat the steps above.

3. To accept the changes, press **Y**.

---

*NOTE: You can press **Esc** to quit at any time without saving changes. SETUP asks you
to confirm that you do not want to save your changes. When SETUP is displayed
at the next time, the current configuration appears.*

The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.

2. To accept the default settings, press **End** and then press **Y**.

NOTE: When you execute the default setting, the following settings are not changed:
        (1) HDD Mode
        (2) Password
        (3) Write Policy

SETUP Options

The SETUP screen is divided into 14 functionally related groups. This section describes each group and its options.

1. Memory

   This group of options displays the computer's memory.

   > This field displays the total amount of memory installed and is automatically calculated by the computer. You cannot change this value.

2. System Date/Time

   Sets the date and time.

System Date	Sets date.
System Time	Sets time.

3. Battery

   (a) Battery Save Mode

   This option is used to select **Full Power**, **Low Power** or **User Setting** of the battery save mode. When you select the battery save mode, the followings will appear.

   Full Power   The following shows full power settings.

   ```
   ┌──────── BATTERY SAVE OPTIONS ────────┐
   │                                      │
   │  Processing Speed   = High           │
   │                                      │
   │  CPU Sleep Mode     = Enabled        │
   │                                      │
   │  LCD Brightness     = Bright (*1)    │
   │                                      │
   │                     = Super-Bright (*2) │
   │                                      │
   │  Cooling Method     = Maximum Performance │
   │                                      │
   └──────────────────────────────────────┘
   ```

   Low Power   The following shows low power settings.

   ```
   ┌──────── BATTERY SAVE OPTIONS ────────┐
   │                                      │
   │  Processing Speed   = Low            │
   │                                      │
   │  CPU Sleep Mode     = Enabled        │
   │                                      │
   │  LCD Brightness     = Semi-Bright (*1) │
   │                                      │
   │                     = Bright (*2)    │
   │                                      │
   │  Cooling Method     = Battery Optimized │
   │                                      │
   └──────────────────────────────────────┘
   ```

NOTE: Display of the LCD Brightness will be changed in the condition below:
        (*1) Operating the battery
        (*2) Using the AC adapter

User Setting   Use this option to set the battery save parameters on
                      the sub-window, **BATTERY SAVE OPTIONS**.

Battery Save Options

Processing Speed

This feature changes the CPU processing speed.

High   CPU operates at 1.60/1.73/1.87/2.00/2.13GHz(Pentium-M),
                       (Default in Full Power Mode)

Low   CPU operates at half processing speed.
                      (Default in Low Power Mode)

CPU Sleep Mode

Use this option to enable or disable the CPU sleep function.

Enabled   Enables sleep mode. (Default)

Disabled   Disables sleep mode.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright   Full brightness for maximum visibility.

Bright   Full brightness for high visibility.

Semi-Bright   Less than full brightness for saving power.

Cooling Method

Maximum Performance   If the CPU becomes too hot, the fan turns on
                          automatically in a high speed to cool down the
                          CPU.

Performance   If the CPU becomes too hot, the fan turns on
                          automatically. When the CPU temperature falls
                          to a normal range, the fan turns off.

Battery optimized   If the CPU becomes too hot, the processing speed is lowered. If the temperature is still too high, the fan turns on. When the CPU temperature falls to a normal range, the fan is turned off and the processing speed is increased.

NOTE: Too hot condition may cause defect on the CPU. When the hot condition continues, the power is automatically turned off in resume mode.

(b) PCI Express Link ASPM

This option set the power-saving function of PCI Express on the following conditions.

Auto   PCI Express devices are not used while battery operation. (Default)

Disabled   Disable the Power-saving function and drive with maximum performance.

Enabled   PCI Express devices are not used.

4. Password

This option sets or resets the user password for power on and instant security (**Fn+F1**).

Registered   The user password has been registered.

Not registered   The user password has not been registered.

For details on setting the user password, refer to the User's Manual.

(a) User Password

Sets the User HDD Password.
For details, refer to the User's Manual.

(b) Master Password

Sets the Master HDD Password. This can be set when **Master+User** is set in the HDD password Mode. For details, refer to the User's Manual.

5. Boot Priority

    (a) Boot Priority

       Use this option to set the priority for booting of the computer and the priority for the HDD for booting.

FDD→HDD→CD-ROM→LAN:	The computer looks for bootable files in the following order: FDD, HDD, CD-ROM (*1) and LAN
HDD→CD-ROM→LAN→FDD:	The computer looks for bootable files in the following order: HDD, CD-ROM, LAN and FDD.
FDD→CD-ROM→LAN→HDD:	The computer looks for bootable files in the following order: FDD, CD-ROM, LAN and HDD.
CD-ROM→LAN→HDD→FDD:	The computer looks for bootable files in the following order: CD-ROM, LAN, HDD and FDD.
CD-ROM→LAN→FDD→HDD:	The computer looks for bootable files in the following order: CD-ROM, LAN, FDD and HDD.
HDD→FDD→CD-ROM→LAN:	The computer looks for bootable files in the following order: HDD, FDD, CD-ROM and LAN. (Default)

       (*1) CD-ROM refers to a Optical Disk Drive.

    (b) HDD Priority

       Use this option to set the booting priority from HDD.

       Built in HDD1→Built in HDD2 (Default)

               : detecting boot-command from Built in HDD1

       Built in HDD2→Built in HDD1

               : detecting boot-command from Built in HDD2

> *NOTE: When 2nd HDD is not installed, this option does not appear in the menu.*
>
> *If the boot command can not be detected from the prior HDD, booting target changes to other devices. (Not detected from the other one)*

    (c) Network Boot Protocol

       Use this option to set the starting method via a network.

       PXE   Sets to PXE protocol. (Default)

       RPL   Sets to RPL protocol.

6. Others

   Whether or not you need to configure the computer with these options depends primarily on the kind of software or peripherals you use.

   (a) CPU Cache

   Use this option to enable or disable the CPU cache.

Enabled	Enables the CPU cache. (Default)
Disabled	Disables the CPU cache.

   (b) Level 2 Cache

   Use this option to enable or disable the level 2 cache. When "CPU Cache" is set to "Disabled", this option cannot be changed.

Enabled	Enables the level 2 cache. (Default)
Disabled	Disables the level 2 cache.

   (c) Dynamic CPU Frequency mode

   Use this option to choose a setting from the followings.

   Dynamically Switchable

   Enables Pentium-M processor featuring Intel SpeedStep technology. (Default)

Always High	Disables Pentium-M processor featuring Intel SpeedStep technology and always runs the processor at its maximum speed.
Always Low	Disables Pentium-M processor featuring Intel SpeedStep technology and always runs the processor at its default speed.

   (d) Execute-Disable Bit Capability

   This option set the Execute-Disable Bit function of CPU to the operation system. Execute-Disable Bit gives higher security function preventing the PC from the computer viruses and buffer overflow problem on unauthorized access.

Available	Enable the Execute-Disable Bit function.
Not Available	Disable the Execute-Disable Bit function.

(e) Auto Power On

This option displays setting for Auto Power On.

Disabled   Indicates auto power on is not set.

Enabled   Indicates auto power on is set.

When "Enabled" is selected, the following sub-window appears.

```
┌──  OPTIONS  ──────────────────────┐
│  Alarm Time              = 00:00:00 │
│  Alarm Date Option       = Disabled │
└─────────────────────────────────────┘
```

Set the parameters for the Auto Power On (automatic power on) function in the "OPTIONS" window. To set the time, use **Space** or **BackSpace**. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

For the **Alarm Time**, set the time to turn on the power automatically. The "second" cannot be set. When it is set to "Disabled", the time to turn on automatically is not set.

For the **Alarm Date Option**, set the date to turn on the power automatically. When it is set to "Disabled", the time to turn on automatically is not set.

> *NOTE:*   1.   *Do not remove the AC adaptor and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.*
>
>   2.   *If you have set a password and the computer boots by the Auto Power On function and Standby is on, the computer will start with the instant security function enabled. The **password** = message is not displayed; however, you must enter the password to use the computer.*
>
>   3.   *This option is enabled only once, the setting is reset, after booting up.*

(f) Start Up Logo

This option enables or disables an animation logo function.

Animation   Enables the animation logo function. (Default)

Picture   Disables the animation logo function

(g) Sound Logo

This option enables or disables sound logo function.

Enabled   Enables the sound logo function. (Default)

Disabled   Disables the sound logo function

(h) Front Operation Panel

This option enables or disables front operation panel.

Enabled   Enables the front operation panel. (Default)

Disabled   Disables the front operation panel

When "Enabled" is selected, the following sub-window appears.

```
┌───────  OPTIONS  ───────┐
│                         │
│                         │
│                         │
└─────────────────────────┘
```

Beep Volume

Off   No sound

Low   With Sound [Volume: small]

Medium   With sound [Volume: Middle] (Default)

High   With sound [Volume: Big]

LED Mode

Mode1   No LED is glowed in normal situation.
           LED is glowed when the button is touched.

Mode2   All LED is glowed in normal situation.
           LED is turned off when the button is touched. (Default)

(i) Language During Bootup

This option selects the language during bootup. This message appears only on the model for TCL (Canada).

English   Message is displayed in English. (Default)

French   Message is displayed in French.

7. Configuration

    This option lets you set the device configuration.

All Devices	BIOS sets all devices.
Setup by OS	Initializes devices, which is needed to load an operating system. Operating system initializes other devices.

    > *NOTE: (1)   When using installed OS, selecting "Setup by OS" is recommended.*
    >
    > *(2)   When executing test programs, be sure to select "ALL Device". And after the test end, select "Setup by OS".*

8. Drives I/O

    This option displays the address and interrupts level for hard disk drive and optical disk drive. It is for information only and cannot be changed.

Built-in HDD 1	This cannot be changed. If HDD 1 is not installed, "No Drive" is displayed.
Built-in HDD 2	This cannot be changed. If HDD 2 is not installed, "No Drive" is displayed.
CD-ROM	This cannot be changed. This is not displayed when a drive is not built-in.

9. PCI Bus

    This option displays the interrupt level for the Card Bus in the computer. It is for information only and cannot be changed.

    ```
    PCI BUS   = IRQ10, IRQ11
    ```

10. Display

    This group of options configures the computer's display.

    (a) Power On Display

    This option is used to select the display when booting up.

Auto-Selected	Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)
LCD+AnalogRGB	Selects both the internal LCD and the external CRT for simultaneous display.

NOTE: *When starting the computer in Standby or Hibernation, the last configuration is remembered. If data does not appear on the display you are using after starting in Standby or Hibernation, pressing **Fn+F5**.*

*Pressing **Fn+F5** changes the display setting as follows in order: the internal LCD, the external display, both the internal LCD and the external display.*

When an external display, which does not support SVGA mode is connected and "LCD+AnalogRGB" is selected, the external display is not displayed.

(b) LCD Display Stretch

LCD Display Stretch enables or disables a larger display area of the screen.

Enabled	Enables the LCD display stretch feature. (Default)
Disabled	Disables the LCD display stretch feature.

(c) TV Type

This option allows you to select the type of TV.

NTSC (Japan)	TV in Japanese system
NTSC (US)	TV in the U.S. system
PAL (S-Video)	TV in Europe and China system
525p (480p,D2)	High Definition Television with 480 progressive scan
750p (720p,D4)	High Definition Television with 720 progressive scan
1125i (1080i,D3)	High Definition Television with 1080 interlace
525i (480i,D1)	High Definition Television with 480 interlace
PAL (SCART)	TV in Europe system

11. Peripheral

Use this option to select the peripheral's mode.

(a) Internal Pointing Device

This option enables or disables the touch pad

Enabled	Enables the touch pad. (Default)
Disabled	Disables the touch pad.

---

12. LEGACY EMULATION

    (a) USB KB/Mouse Legacy Emulation

        This option sets the Legacy support condition of the USB keyboard and the USB mouse.

        Enabled   Enables LEGACY support. (Default)
                            USB keyboard/USB mouse are available without the driver.

        Disabled   Disables LEGACY support

    (b) USB-FDD Legacy Emulation

        This option sets the Legacy support condition of the USB floppy disk drive.
        When a computer is FDD built-in model, this option is not displayed.

        Enabled   Enables LEGACY support. (Default)
                            USB floppy disk is available without the driver.

        Disabled   Disables LEGACY support

13. PCI LAN

This option sets the Enable / Disable of the built-in LAN functions.

        Enabled   Enables built-in LAN functions. (Default)

        Disabled   Disables built-in LAN functions.

14. RAID ARRAY

This option sets the RAID configuration.

    (a) Current State

        This option indicates current hard disk condition. Content set in 「Create State」 is displayed, when booting BIOS setup next time.

        Built in HDD   Displays RAID configuration level of the built in HDD.

        Second HDD   Displays RAID configuration level of the second HDD.

(b) Create State

   This option sets the RAID configuration level.

NOTE: *Be careful that all data of the hard disk is deleted when setting of the RAID*
          configuration is changed in the BIOS setup.
          Therefore, recommend that the user password or the supervisor password is
          registered to prevent the setting of the RAID configuration is not changed by the
          third party.
          Moreover, registering the supervisor password can make the user who doesn't
          have the management authority prevent changing the setting of the BIOS setup.

   Built in HDD   Sets RAID configuration level of the built in HDD.

   Second HDD   Sets RAID configuration level of the second HDD.

(c) Execute Creation

   This option is displayed, only when the setting is changed in the "Create
   State".

   Set the cursor bar to "Execute Creation" and press **Space** or **Back Space**.
   The following message will appear:

   ```
   Warning: If you change RAID array, you need to install
   OSagain. Are you sure? All data on the HDD(s) will be
   destroyed. Do you really want to do this? If "Yes",
   please type the key string which is written in manual.
   ```

   Input 1234 (press **1**, **2**, **3**, **4** key) and press **Enter**.
   The change of the RAID configuration will be reflected.

Chapter 4

Replacement Procedures

Chapter 4   Contents

Figures

4.1   Overview

This chapter describes the procedure for removing and replacing the field replaceable units (FRUs) in the PC. It may not be necessary to remove all the FRUs in order to replace one. The chart below provides a guide as to which other FRUs must be removed before a particular FRU can be removed. The numbers in the chart indicate the relevant section numbers in this manual.

In all cases when removing an FRU, the battery pack must also be removed. When repairing an FRU that is the potential cause of a computer fault, use the chart to determine the order in which FRUs need to be removed.

The tilt stand, if it is installed, can be removed without any other FRUs removed.

• Chart Notation

The chart shows the case for the following example:

• Removing a Wireless LAN card

All FRUs down to the "4.2 Battery pack" to "4.8 Bottom cover assembly" above a 4.18 Wireless LAN card must be removed.

Safety Precautions

Please read the following safety instructions before disassembling the computer and always follow the instructions while working on the computer.

DANGER: *1. In the case of the battery, always use authentic parts or equivalent parts approved by Toshiba. Other batteries may have different specifications that are incompatible with the computer and may result in fire or explosion.*
Due to the risk of alkali fluid leaks, never attempt to heat or disassemble the battery. Similarly, due to the risk of explosion, never expose the battery to flame.

              2. Some parts including the power supply and FL inverter generate high voltages. If you need to turn on the power while disassembling the computer, do not touch any connectors or other components due to the risk of electric shock. Also, do not disassemble individual parts when performing routine maintenance.

WARNING: *1. To prevent electric shock, turn off the power unplug the AC adapter from the power source.*

              2. As the battery installed to the computer is typically already charged, the risk of electric shock remains even when the AC adapter is unplugged from the socket. To prevent electric shock, always take off any metal jewelry or accessories such as necklaces, bracelets or rings before working on the computer. Never work with wet or moist hands.

              3. Take care not to injury yourself on any edges or corners.

CAUTION*:*   *1. Confirm that replacement parts have compatible specifications before replacing on the computer. Never use incorrect parts as these may cause faults on the computer.*

              2. To prevent internal damage such as short circuits or burning, do not allow any screws, paper clips, or other metal objects to fall into the computer. When removing screws, always replace with the same size screw. Ensure that all screws are fully tightened. Loose screws may result in short circuits leading to overheating, smoke or flame.

              3. To prevent electric shock, check that you have disconnected all cables from a part before removing the part.

              4. When connecting to the AC power supply, use only an AC adapter and cable approved by Toshiba.

              5. To prevent electric shock, ensure that all replacement parts are compatible with the computer and that all cables and connectors are securely connected.

Before You Begin

Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section "4.2.1 Battery Pack".

1. Do not disassemble the computer unless it is operating abnormally.

2. Use the designated tools.

3. Ensure that the environment for working on and storing parts does not contain any of the following.

   - Dust or dirt

   - Static electricity

   - Extremely hot, cold or humid conditions

4. Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.

5. Do not perform any unnecessary work. Always work in accordance with the disassembly and reassembly procedures in this manual.

6. Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.

7. Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.

8. When reassembling, ensure that you use the correct screws and fit parts in the correct position. Screw sizes are noted in the text and figures.

9. As all parts have sharp edges and corners, take care not to cut yourself.

10. After replacing an FRU, check that the computer and replaced part operate correctly.

Disassembly Procedure
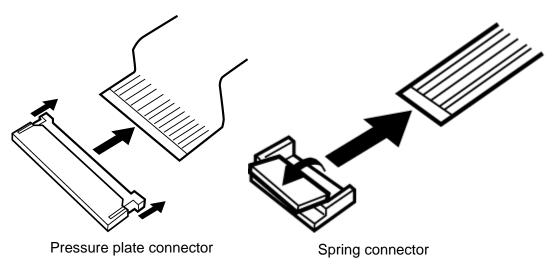
Three main types of cable connector are used.

- Pressure plate connector
- Spring connector
- Normal pin connector

When disconnecting a pressure plate connector, lift up the tag on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, lift up the pressure plate to a suitable height and insert the cable into the connector. Press down on both sides of the pressure plate such that both sides of the plate and connector are at the same height and that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected. If the cable is disconnected from the connector, reconnect it making sure that you lift the pressure plate high enough to insert fully the cable.

For spring connectors, lifting up the stopper frees the cable and allows it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable.

Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.

Pressure plate connector   Spring connector

Assembly Procedure

After the computer has been disassembled and the part that caused the fault has been repaired or replaced, the computer must be reassembled.

Take note of the following general points when assembling the computer.

➢ Take your time and follow the instructions carefully. Hurrying the assembly work will only introduce new problems.

➢ Check that all cables and connectors are securely connected.

➢ Before fastening FRUs or other parts in place, ensure that no cables are caught on screws or the FRU.

➢ Check that all latches are securely closed.

➢ Ensure that you have installed all FRUs correctly and do not have any screws left over. Using an incorrect screw may damage the thread or screw head and result in the FRU not being securely fastened in place.

After installing FRUs, check that the computer operates correctly.

Tools and Equipment

For your safety and the safety of the people around you, it is important that you use Electrostatic Discharge (ESD) equipment. Correctly utilizing of the equipment increases the percentage of successful repairs and saves on the cost of damaged or destroyed parts. The following equipment is required for disassembly and assembly.

➢ One Philips screwdriver with type 0 bit (for THIN HEAD screws)

➢ One Philips screwdriver with type 1 bit (for screws other than above)

➢ Tweezers (for lifting screws)

➢ ESD mats (lay on work table or floor)

➢ An ESD wrist strap and heel grounder

➢ Anti-static carpet or flooring

Screw Tightening Torque
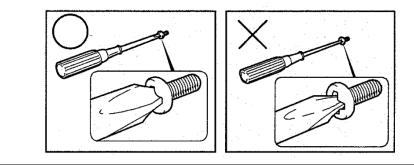
Use the following torque when tightening screws.

CAUTION: *Overtightening may damage screws or parts. Undertightening may allow
screws to loosen (and possibly fall out) causing a short circuit or other
damage.*

NOTE: *To tighten screws quickly and accurately, an electric screwdriver is
recommended.*

❑ M2 (2mm)   0.167 N· m (1.7 kgf· cm)

❑ M2.5 (2.5mm)   0.294 N· m(3.0 kgf· cm)

❑ M3.0 (3mm)   0.549 N·m (5.6 kgf·cm)

NOTE: *To prevent damage to THIN HEAD screws, press along the axis of the
screwdriver while turning the screw. This is because the contact area between
the screw and driver is less than for a pan head screw (standard pan-shaped
screw head).*

Grip Color

Some screws have a colored grip area to help you determine the length of the screw.

❑ Even numbered length screws: Brown

❑ Odd numbered length screws: White

❑ Special length screw: Blue

"Special length screw" means screws whose length is indicated in an integral number to the
first decimal places such as 2.5 mm, 2.8 mm and so on.

Screw Notation

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Format:

Screw shape + Screw length (mm)

Screw shape

B: Bind screw
F: Thin head screw
S: Super thin head screw
T: Tapping screw
U: Other screws (Unique screws: pan head, stud, etc.)

Example: B6 … 6mm bind screw

4.2   Battery pack

Removing the battery pack

The following describes the procedure for removing the battery pack (See Figure 4-1).

CAUTION: Take care not to short circuit the terminals when removing the battery pack. Similarly, do not drop, knock, scratch, disassemble, twist, or bend the battery pack.

1. Turn off the power of the computer.

2. Disconnect the AC adapter and all external devices from the computer.

3. Turn the computer upside down.

4. Release the **battery lock**.

5. Slide the **battery latch** to the arrow direction and pull up the **battery**.

6. Release the **hooks** of the battery cover and remove the **battery pack** from the **battery cover**.
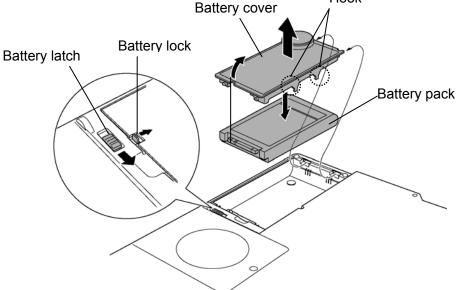
Figure 4-1 Removing the battery pack

NOTE: Dispose of the used battery pack in accordance with the laws and ordinances of your local authority.

Installing the battery pack

The following describes the procedure for installing the battery pack (See Figure 4-1).

CAUTION: *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispose always the used battery pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.*

NOTE: *Check visually the battery terminals and clean off any dirt with a dry cloth.*

1. Turn off the power of the computer.

2. Disconnect the AC adapter and all external devices from the computer.

3. Attach the **battery cover** to the **battery pack**.

4. Place the **battery pack** into the slot from the other side of the connector and insert it carefully.

5. Slide the **battery lock** to the lock position.

4.3   ExpressCard & PC card / Bridge media

4.3.1   ExpressCard & PC card

Removing an ExpressCard & PC card
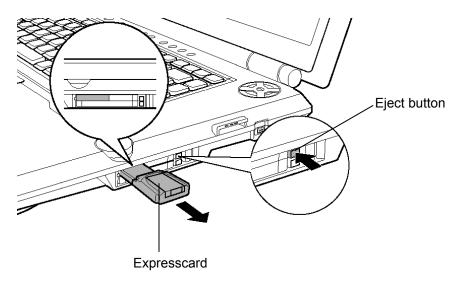
The following describes the procedure for removing an ExpressCard & PC card (See Figure 4-2).

CAUTION: Insert or remove an Express card & PC card in accordance with any instructions in their manual or the manuals of the computer system you are using.

---

1. Push the **eject button**. It will pop out when you release it. Then press the eject button once more to eject an ExpressCard or PC card.

2. Grasp an **ExpressCard** or **PC card** and remove it.

NOTE: *If an ExpressCard or PC card is not inserted all the way, the eject button may not pop out. Be sure to push an ExpressCard or PC card firmly and press the eject button again.*

[ExpressCard (Upper slot)]

Eject button

Expresscard

[PC Card (Lower slot)]
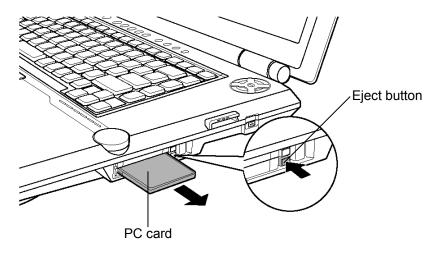
Figure 4-2 Removing an ExpressCard or PC card

Installing an ExpressCard & PC card

The following describes the procedure for inserting an ExpressCard & PC card (See Figure 4-2).

1. Make sure the **eject button** does not stick out.

2. Insert an **ExpressCard** or **PC card** and press it until it is securely connected.

4.3.2 Bridge media (SD Card/Memory Stick/xDPicture Card/MultiMedia card)

Removing a Bridge media

The following describes the procedure for removing a Bridge Media (See Figure 4-3).

CAUTION: *Insert or remove a Bridge Media in accordance with any instructions in the each Bridge Media manual or the manuals of the computer system you are using.*

---

1. Push a **Bridge media**. It will pop out partly when you release, so pull out the card.

(For an instance, SD card is described in the figure 4-3.)

Bridge media
(SD card)
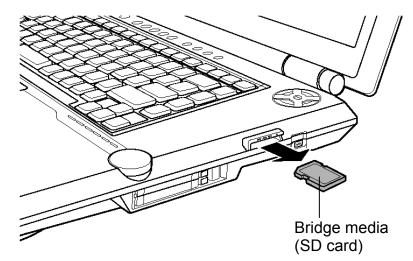
Figure 4-3 Removing a bridge media

Installing a Bridge media

The following describes the procedure for inserting a Bridge Media (See Figure 4-3).

1. Insert a **Bridge media** and press it until it is securely connected.

4.4 HDD

Removing a HDD

The following describes the procedure for removing a HDD (See Figure 4-4 to 4-6).

CAUTION: Take care not to press on the top or bottom of a HDD. Pressure may cause data loss or damage to the device.

1. Turn the computer upside down.

2. Turn the **screw (with e-ring)** securing an HDD-1 slot cover and remove an **HDD-1 slot cover**.

3. Remove the following **screw** securing the **HDD-1 assembly**.

   ❑ M2.5x6.0B   FLAT BIND screw   x 1

4. Disconnect the **HDD-1 assembly** from the connector **CN1850** on the system board while sliding along the cutting tab.
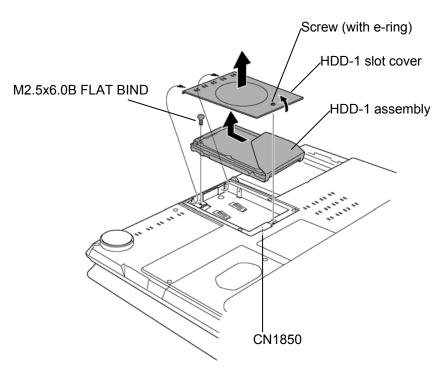
Figure 4-4 Removing a HDD-1 assembly

5.　(If an HDD-2 is installed) Turn the **screw (with e-ring)** securing an HDD-2 slot cover and remove an **HDD-2 slot cover**.

6.　Remove the following **screw** securing the **HDD-2 assembly**.

　　❑ M2.5x6.0B　　　　　FLAT BIND screw　　　　　x 1

7.　Disconnect the **HDD-2 assembly** from the connector **CN1860** on the system board by sliding it toward the arrow pointed.
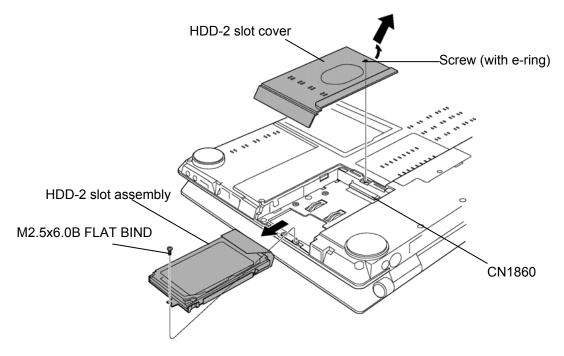
Figure 4-5　Removing the HDD-2 assembly

8. Remove the following **screws** securing the HDD holder and remove the **HDD holder** from HDD.

❑ M3.0x4.0Z   FLAT BIND screw   x4

M3.0x4.0Z FLAT BIND

M3.0x4.0Z FLAT BIND

HDD holder

HDD
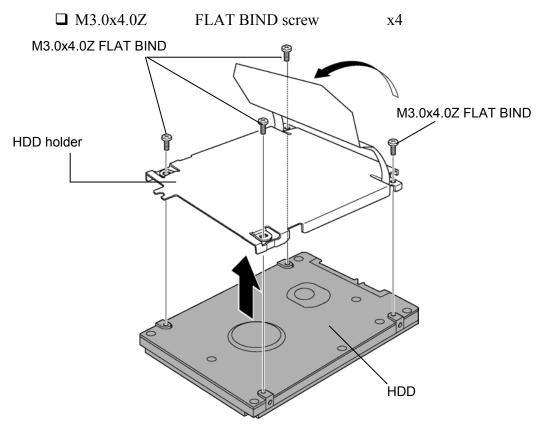
Figure 4-6 Removing a HDD

Installing a HDD

The following describes the procedure for installing a HDD (See Figure 4-4 to 4-6).

1. Install an HDD to the **HDD holder** and secure it with the following **screws**.

    ❑ M3.0x4.0Z   FLAT BIND screw   x4

> *NOTE:*   *Although they are 3mm head screws, screw torque must be set in 0.294 N·m*
> *(3.0Kgf·cm) for four screws securing the HDD holder.*

2. Slide the **HDD-2 assembly** into the HDD-2 slot from the screw hole side first and connect it carefully to the **CN1860** on the system board.

3. Secure the **HDD-2 assembly** with the following **screw**.

    ❑ M2.5x6.0B   FLAT BIND screw   x 1

4. Install the **HDD-2 slot cover** and secure it with the **screw (with e-ring)**.

5. Insert the **HDD-1 assembly** into the HDD slot while sliding along the cutting tab and connect it carefully to the **CN1850** on the system board.

6. Secure the **HDD-1 assembly** with the following **screw**.

    ❑ M2.5x6.0B   FLAT BIND screw   x 1

7. Install the **HDD-1 slot cover** and secure it with the **screw (with e-ring)**.

4.5 MDC

Removing a MDC

The following describes the procedure for removing a MDC (See Figure 4-7).

1. Turning up the **insulator**, remove the following **screws** securing a MDC.

   ❑ M2.0x4.0C   BIND screw   x2

2. Pull a MDC straight up and disconnect the **MDC** from the connector **CN3000** on the SD board.

3. Disconnect the **RJ11 harness** from the MDC.
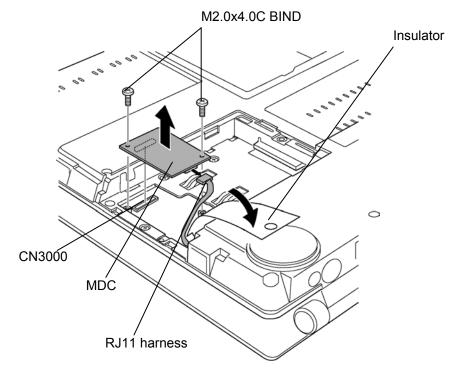
Figure 4-7 Removing a MDC

Installing a MDC

The following describes the procedure for installing a MDC (See Figure 4-7).

1. Connect the **RJ11 harness** to the connector of the MDC.

2. Install a **MDC** and connect it to the connector **CN3000** on the SD board.

3. Secure the MDC with the following **screws**.

   ❏ M2.0x4.0C   BIND screw   x2

4.6   Memory module

> *CAUTION:*   *The power of the computer must be turned off when you remove a memory module. Removing a memory module with the power on risks damaging the module or the computer itself.*
>
> *Do not touch memory module terminals. Any dirt on the terminals may cause memory access problems.*
>
> *Never press hard or bend a memory module.*

Removing a memory module

To remove a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-8).

1. Turn the **screw (with e-ring)** securing the **memory slot cover**.

2. Remove the **memory slot cover**.

3. Open the left and right **latches** and remove a **memory module**.
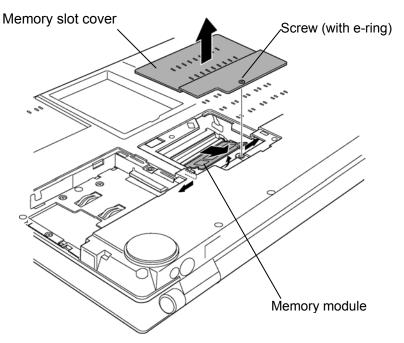
Figure 4-8 Removing a memory module

Installing a memory module

To install a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-8).

1. Insert a **memory module** into the connector of the computer slantwise (terminal side first) and press it to connect firmly.

CAUTION: *Be sure to install a memory module to slot A (CN1400). The computer does not boot when slot A is vacant.*

After installing the memory module, confirm that the memory module is fixed with the left and right latches.

Never press hard or bend a memory module.

---

2. Install the **memory slot cover** and secure it with the **screw (with e-ring)**.

3. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.

4. If the memory is not detected, check that it is connected correctly.

4.7 Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard (See Figure 4-9 and 4-10).

> ***CAUTION:*** *As the keytop may fall out, when handling the keyboard always hold it by the frame and do not touch the keytop.*

1. Open the display.

2. Insert your finger into the slot between the keyboard brace and the computer. Then, lift up the **keyboard brace** to unlatch and remove it.

3. Remove the following **screw** securing the **keyboard hold plate**.

   ❑ M2.0x4.0C   BIND screw   x1

4. Remove the following **screws** securing the keyboard.

   ❑ M2.5x4.0B   FLAT BIND screw   x2
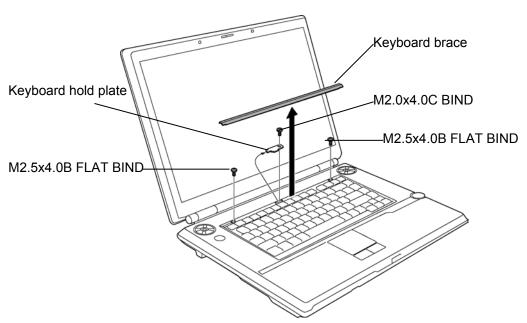
Figure 4-9 Removing the keyboard hold plate

5. Lift the upper side of the keyboard and turn it face down on the palm rest.

6. Remove the following **screws** securing the keyboard support plate and remove the **keyboard support plate**.

    ❑ M2.5x8.0B   FLAT BIND screw   x2

7. Disconnect the **keyboard cable** from the connector **CN3200** on the system board.

8. Remove the **keyboard**.
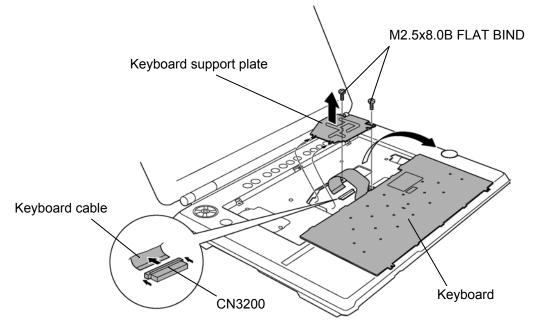
Figure 4-10 Removing the keyboard

Installing the keyboard

The following describes the procedure for installing the keyboard (See Figure 4-9 to 4-10).

1. Turn the **keyboard** upside down and place it on the palm rest as its face down. Connect the **keyboard cable** to the connector **CN3200** on the system board.

2. Install the **keyboard support plate** and secure it with the following **screws**.

   ❑ M2.5x8.0B   FLAT BIND screw   x2

3. Turn the **keyboard** face up and put it on the computer. Make sure that there is no space between the keyboard and the computer.

4. Secure the keyboard with the following **screws.**

   ❑ M2.5x4.0B   FLAT BIND screw   x2

5. Install the keyboard hold plate and secure it with the following **screw**.

   ❑ M2.0x4.0C   BIND screw   x1

6. Install the **keyboard brace** by pressing it from the topside.

4.8   Bottom cover assembly

Removing the bottom cover assembly

The following describes the procedure for removing the bottom cover assembly (See Figure 4-11 to 4-14).

1. Remove the following **screw** securing LCD harness cover and remove the **LCD harness cover**.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Disconnect the **LCD harness** from the connector **CN5000** on the system board.

3. Disconnect the **RJ45 harness** from the connector **CN4100** on the system board.

4. Disconnect the **Touch pad flat cable** from the connector **CN3201**.

5. Disconnect the **Volume harness** from the connector **CN3330**.

6. Disconnect the **Bluetooth flat cable** from the connector **CN4400**.

7. Disconnect the **Touch sensor flat cable** from the connector **CN3360**.

8. Remove the following **screws** securing the **cover assembly**.

   ❑ M2.5x8.0B   FLAT BIND screw   x5
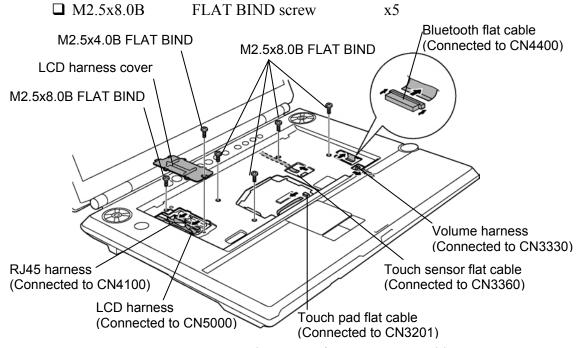
Figure 4-11 Removing the screws from cover assembly

9. Turn over the computer upside down.

10. Disconnect the **speaker cable (L)** from the connector **CN6002** under the insulator of HDD-2 slot.

11. Disconnect the **AV-IN harness** from the connector **CN5660** in the memory module slot.
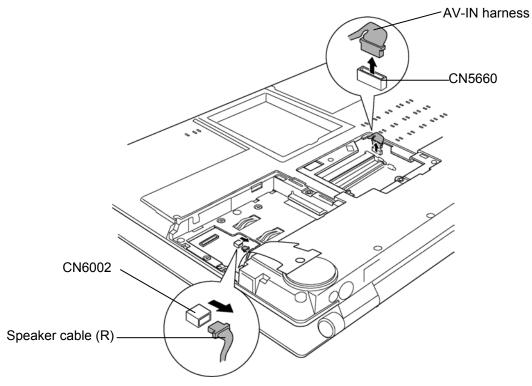
Figure 4-12 Disconnecting the cables

12. Remove the following **screws** securing the bottom cover assembly.

    ❏ M2.0x4.0B   BIND screw   x1 (Described as "4 or LH"
                        or   in the figure)
       M2.0x4.0B   LH STICK screw   x1

    ❏ M2.5x6.0B   FLAT BIND screw   x3 (Described as "6" in the figure)

    ❏ M2.5x8.0B   FLAT BIND screw   x9 (Described as "8" in the figure)

    ❏ M2.5x16.0B   FLAT BIND screw   x6 (Described as "16" in the figure)
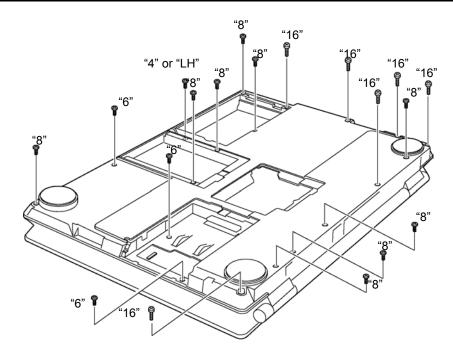
Figure 4-13 Removing the screws from bottom cover assembly

13. Pulling out the **RJ45 harness** from the slot, remove the **bottom cover assembly**.
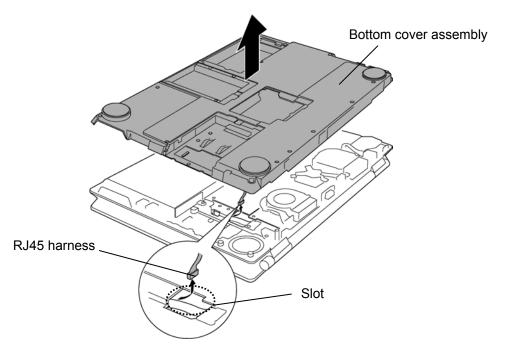
Figure 4-14 Removing the bottom cover assembly

Installing the bottom cover assembly

The following describes the procedure for installing the bottom cover assembly (See Figure 4-11 to 4-14).

1. Passing through the **RJ45 harness** into the slot, install the **bottom cover assembly**.

CAUTION: *Be careful not to catch the harnesses and cables between bottom cover assembly and cover assembly, and in addition, confirm that each harness and cable is set in the right position.*

---

2. Secure the bottom cover assembly with the following **screws**.

   ❑ M2.0x4.0B   BIND screw   x1 (Described as "4 or LH"
                              or   in the figure)
      M2.0x4.0B   LH STICK screw   x1

   ❑ M2.5x6.0B   FLAT BIND screw   x3 (Described as "6" in the figure)

   ❑ M2.5x8.0B   FLAT BIND screw   x9 (Described as "8" in the figure)

   ❑ M2.5x16.0B   FLAT BIND screw   x6 (Described as "16" in the figure)

3. Connect the **AV-IN harness** to the connector **CN5660** in the memory module slot.

4. Connect the **speaker cable (L)** to the connector **CN6002** under the insulator of HDD-2 slot.

5. Turn the computer right side up.

6. Secure the cover assembly with the following **screws**.

   ❑ M2.5x8.0B   FLAT BIND screw   x5

7. Connect the **Touch sensor flat cable** to the connector **CN3360**.

8. Connect the **Bluetooth flat cable** to the connector **CN4400**.

9. Connect the **Volume harness** to the connector **CN3330**.

10. Connect the **Touch pad flat cable** to the connector **CN3201**.

11. Connect the **RJ45 harness** to the connector **CN4100** on the system board.

12. Connect the **LCD harness** to the connector **CN5000** on the system board.

13. Install the **LCD harness cover** and secure it with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

4.9 LAN jack

Removing the LAN jack

The following describes the procedure for removing the LAN jack (See Figure 4-15).

1. Pull up and remove the **LAN jack** from the bottom cover assembly.
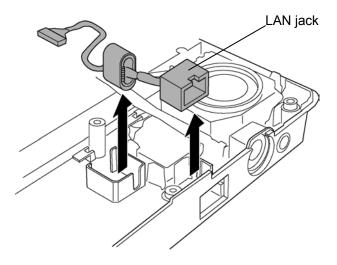
Figure 4-15 Removing the LAN jack

Installing the LAN jack

The following describes the procedure for installing the LAN jack (See Figure 4-15).

1. Install the **LAN jack** by sliding it to the slot of bottom cover assembly.

4.10 Speaker (L) & Modem jack

Removing the speaker (L) & Modem jack

The following describes the procedure for removing the speaker (L) & modem jack (See Figure 4-16).

1. Releasing the **AV-IN harness** from the guide of bottom cover assembly, disconnect the **AV-IN harness** from the connector **CN9614** on the AV-IN board.

2. Releasing the wound speaker (L) cable from the **guide** of bottom cover assembly, remove the **speaker (L)** from the slot.

3. Pull up and remove the **Modem jack** from the slot of bottom cover assembly.
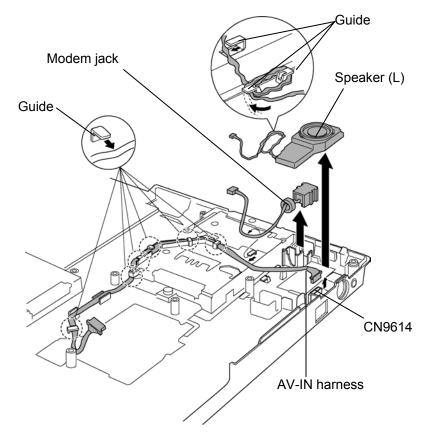
Figure 4-16 Removing the speaker (L) & modem jack

Installing the speaker (L) & Modem jack

The following describes the procedure for installing speaker (L) & modem jack (See Figure 4-16).

1. Install the **modem jack** to the bottom cover assembly.

2. Wind the speaker (L) cable to the guide of bottom cove assembly and install the **speaker (L)** in the slot.

3. Connect the **AV-IN harness** to the connector **CN9614** on the AV-IN board and arrange the harness along the **guides**.

4.11 AV-IN board

Removing the AV-IN board

The following describes the procedure for removing the AV-IN board (See Figure 4-17).

1. Remove the following **screw** securing the AV-IN board.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Remove **AV-IN board** from the bottom cover assembly.
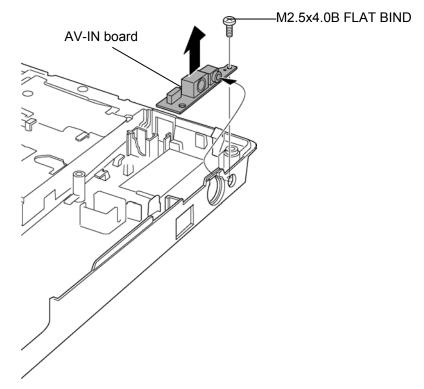
Figure 4-17 Removing the AV-IN board

Installing the AV-IN board

The following describes the procedure for installing the AV-IN board (See Figure 4-17).

1. Install the **AV-IN board** to the bottom cover assembly and secure it with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

4.12 Battery latch assembly

Removing the battery latch assembly

The following describes the procedure for removing the battery latch assembly (See Figure 4-18 and 4-19).

1. Remove the following **screws** securing the battery latch assembly.

   ❑ M2.5x4.0B   S-THIN FLAT BIND screw   x1

2. Remove the **battery latch assembly** from the bottom cover assembly.
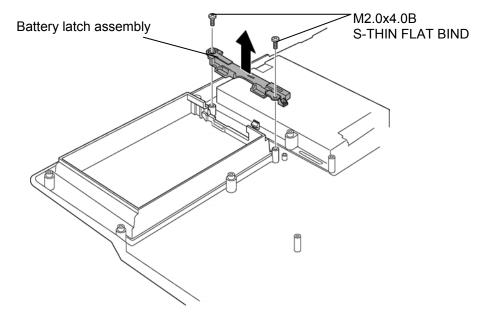
Figure 4-18 Removing the battery latch assembly

3. Remove the **battery lock** from the battery assembly.

4. Releasing the **tab**, disassembling the **battery latch slider** from **battery latch base**.
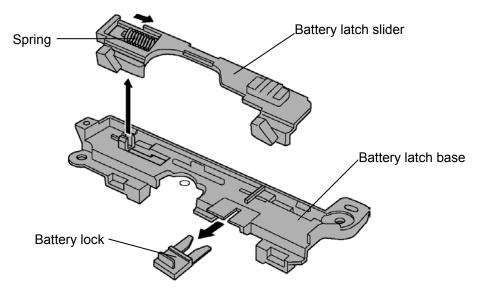
Figure 4-19 Removing the battery lock and battery latch slider

Installing the battery latch assembly

The following describes the procedure for installing the battery latch assembly (See Figure 4-18 and 4-19).

1. Assemble the **spring** and **battery latch slider** to the **battery latch base** while hooking the **tab**.

2. Install the **battery lock** to the battery latch assembly.

3. Install the battery latch assembly to the bottom cover assembly and secure it with the following **screws**.

   ❑ M2.5x4.0B   S-THIN FLAT BIND screw   x1

4.13 Optical disk drive

> **CAUTION:** *Do not perform 4.13.2 "Ejecting the optical disk" except for the emergency ejection of optical disk inside ODD.*

4.13.1 Replacing the optical disk drive

Removing the optical disk drive

The following describes the procedure for removing the optical disk drive (See Figure 4-20 and 4-21).

1. Remove the following **screw** securing the ODD assembly.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Disconnect the **ODD flat cable** from the connector **CN9680** on the ODD relay board.

3. Remove the **ODD assembly**.
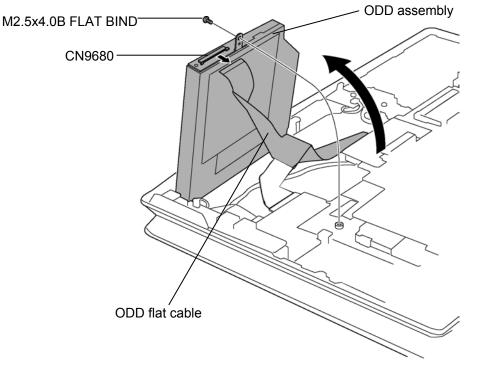
Figure 4-20 Removing the ODD assembly

4. Remove the following **screw** securing the ODD side bracket and remove the **ODD side bracket**.

   ❑ M2.0x3.0C   S-THIN FLAT BIND screw   x1

5. Remove the following **screws** securing the ODD rear bracket and ODD relay board.

   ❑ M2.0x4.0B   S-THIN FLAT BIND screw   x2

6. Remove the **ODD relay board** and **ODD rear bracket** from the optical disk drive.

ODD relay board

ODD side bracket

ODD rear bracket

M2.0x3.0C S-THIN FLAT BIND

M2.0x4.0B S-THIN FLAT BIND
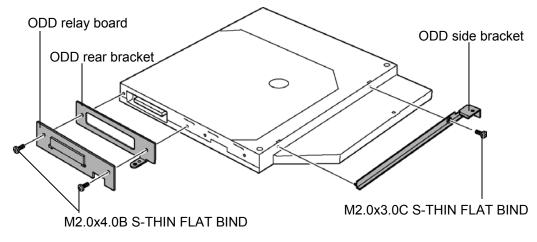
Figure 4-21 Removing the ODD rear bracket

Installing the optical disk drive

The following describes the procedure for installing the optical disk drive (See Figure 4-20 and 4-21).

1. Installing the **ODD relay board** and **ODD rear bracket** to the optical disk drive, secure them with the following **screws**.

   ❑ M2.0x4.0B   S-THIN FLAT BIND screw   x2

2. Installing the **ODD side bracket** to the optical disk drive, secure it with the following **screw**.

   ❑ M2.0x3.0C   S-THIN FLAT BIND screw   x1

3. Connect the **ODD flat cable** to the connector **CN9680** on the ODD relay board.

4. Install the **ODD assembly** and secure it with the following **screw**.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

4.13.2 Ejecting the optical disk

CAUTION: The following procedure is emergency cope only when the optical disk inside ODD can not be ejected because of some failure.

Disassembling the ODD assembly

The following describes the procedure for ejecting the optical disk from the optical disk drive (See Figure 4-22).

1. Remove the following **screws** securing the ODD cover.

   ❑ M1.8x2.0C   S-THIN FLAT BIND screw   x4

2. Remove the **ODD cover** from the ODD base assembly by opening it toward the arrow pointed.

3. Hold the **optical disk** and lift it out.
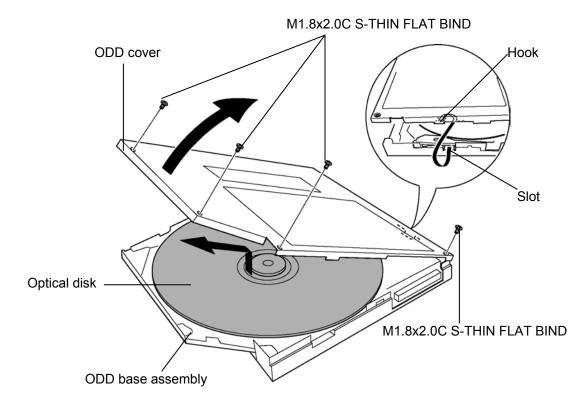
Figure 4-22 Ejecting the optical disk

Assembling the ODD assembly

The following describes the procedure for assembling the ODD assembly from the optical disk drive (See Figure 4-22).

1. Install the **ODD cover** to the ODD base assembly by sliding the **hook** into the slot of ODD base assembly.

2. Secure the ODD cover with the following **screws**.

    ❑ M1.8x2.0C   S-THIN FLAT BIND screw   x4

4.14 SJ board / Internal Microphone

4.14.1 SJ board

Removing the SJ board

The following describes the procedure for removing the SJ board (See Figure 4-23).

1. Disconnect the **sound jack flat cable** from the connector **CN9520** on the SD board.

2. Disconnect the **internal microphone cable** from the connector **CN6000** on the SJ board.

3. Remove the following **screw** and pull out the **SJ board** from the cover assembly by extracting jacks from the jack holes.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

4. Turning over the SJ board, disconnect the **sound jack flat cable** from the connector **CN9530** and the **USB harness** from the connector **CN4622** on the SJ board.
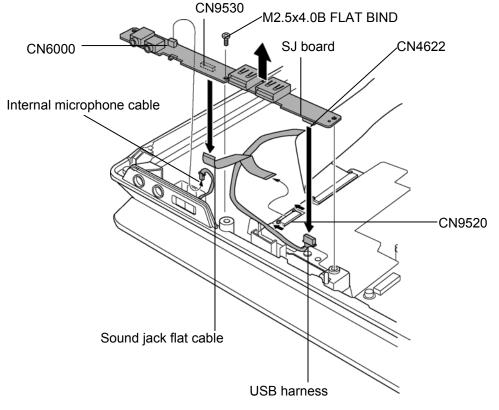
Figure 4-23 Removing the SJ board

Installing the SJ board

The following describes the procedure for installing the SJ board (See Figure 4-23).

1. Connect the **sound jack flat cable** to the connector **CN9530** and the **USB harness** to the connector **CN4622** on the SJ board.

2. Install the **SJ board** to the cover assembly by sliding jacks into the jack holes of cover assembly and secure it with the following **screw**.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

3. Connect the **internal microphone cable** to the connector **CN6000** on the SJ board.

4. Connect the **sound jack flat cable** to the connector **CN9520** on the SD board.

4.14.2 Internal Microphone

Removing the Internal microphone

The following describes the procedure for removing the internal microphone (See Figure 4-24).

1. Remove the following **screw** securing the internal microphone and remove the internal microphone assembly.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Pull out the **internal microphone** from the **mic holder**.
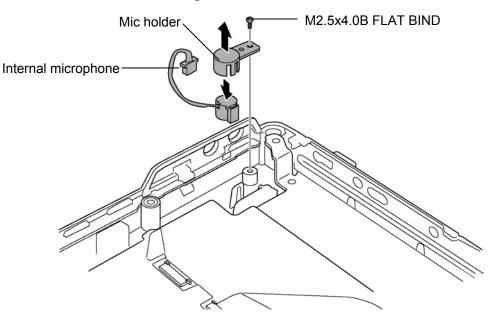
Figure 4-24 Removing the internal microphone

Installing the Internal microphone

The following describes the procedure for installing the internal microphone (See Figure 4-24).

1. Install the **internal microphone** to the **mic holder**.

2. Install the internal microphone assembly and secure it with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

4.15   Sound board

Removing the sound board

The following describes the procedure for removing the sound board (See Figure 4-25).

1. Disconnect the **Sound harness** from the connector **CN9510** on the SD board.

2. Disconnect the **Power SW harness** from the connector **CN9521** on the SD board.

3. Turning up the **insulator**, remove the following **screws** securing the SD board and remove the **SD board** from the cover assembly.

     ❑ M2.5x3.0S   FLAT BIND screw   x3
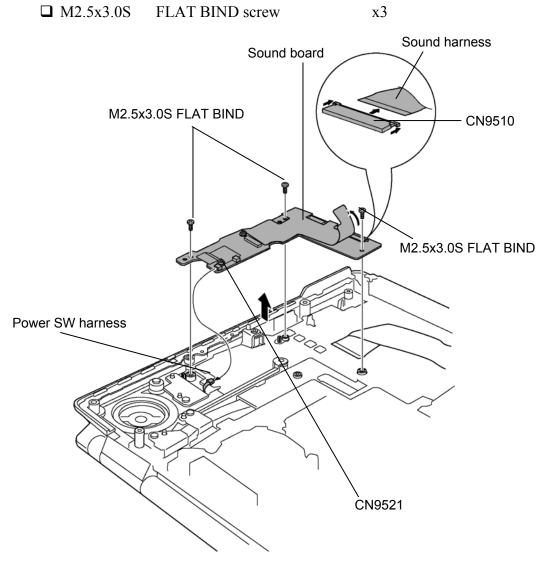
Figure 4-25 Removing the sound board

Installing the sound board

The following describes the procedure for installing the sound board (See Figure 4-25).

1. Install the **sound board** and secure it with the following **screws**.

    ❑ M2.5x3.0S   FLAT BIND screw   x3

2. Connect the **Power SW harness** to the connector **CN9521** on the SD board.

3. Connect the **Sound harness** to the connector **CN9510** on the SD board.

4.16 Power SW board

Removing the Power SW board

The following describes the procedure for removing the Power SW board (See Figure 4-26).

1. Remove the following **screw** securing the power SW board and pull up the **Power SW board** from the cover assembly.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Disconnect the **Power SW harness** from the connector **CN9622** on the Power SW board.
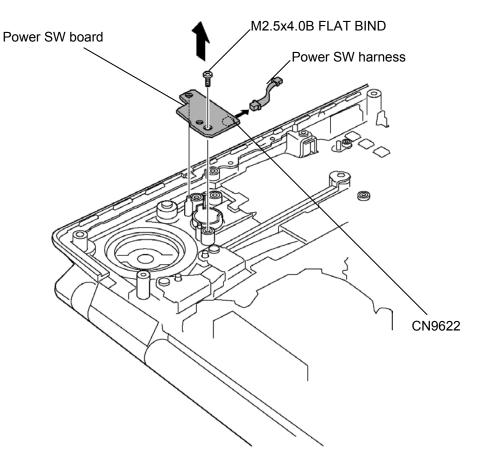
Figure 4-26 Removing the Power SW board

Installing the Power SW board

The following describes the procedure for installing the Power SW board (See Figure 4-26).

1. Connect the **Power SW harness** to the connector **CN9622** on the Power SW board.

2. Install the Power SW board to the cover assembly and secure it with the following screw.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

4.17 Battery board / RTC battery

4.17.1 Battery board

Removing the Battery board

The following describes the procedure for removing the Battery board (See Figure 4-27).

1. Disconnect the **RTC battery cable** from the connector **CN9990** on the battery board.

2. Remove the following **screws** securing the battery board.

   ❑ M2.5x4.0B   FLAT BIND screen   x2

3. Slightly pulling up the battery board, disconnect the **battery signal harness** from the connector **CN9691** and the **battery power harness** from the connector **CN9690** on the battery board.

4. Remove the **battery board** from the cover assembly.
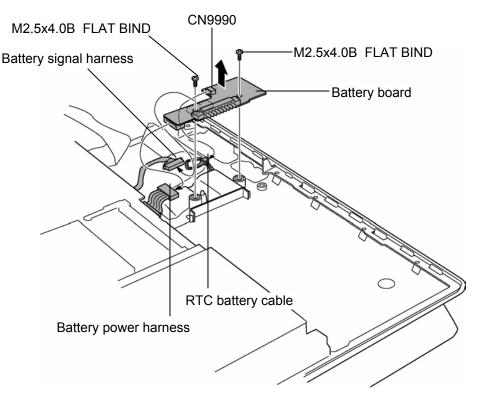
Figure 4-27 Removing the battery board

Installing the battery board

The following describes the procedure for installing the battery board (See Figure 4-27).

1. Connect the **battery power harness** to the connector **CN9690** and the **battery signal harness** to the connector **CN9691** on the battery board.

2. Install the **battery board** to the cover assembly and secure it with the following **screws**.

   ❑ M2.5x4.0B   FLAT BIND screw   x2

3. Connect the **RTC battery cable** to the connector **CN9990** on the battery board

4.17.2 RTC battery

Removing the RTC battery

The following describes the procedure for removing the RTC battery (See Figure 4-28).

1. Turning up the **insulator**, pull out the **RTC battery** from the insulator.

RTC battery

Insulator
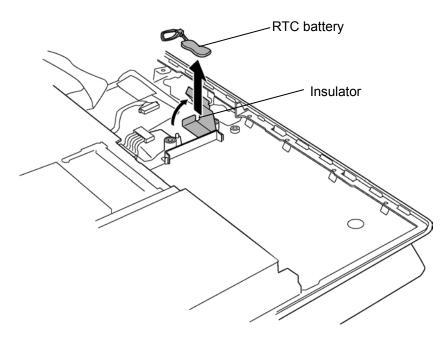
Figure 4-28 Removing the RTC battery

Installing the RTC battery

The following describes the procedure for installing the RTC battery (See Figure 4-28).

1. Turning up the insulator, set the **RTC battery** into the **insulator**.

4.18 Wireless LAN card

Removing the wireless LAN card

The following describes the procedure for removing the wireless LAN card (See Figure 4-29).

1. Disconnect the **wireless LAN antenna cables** (MAIN & AUX) from the connector on the wireless LAN card.

2. Open the left and right latches and remove a **wireless LAN card** from the connector **CN 2200** of mini PCI slot.
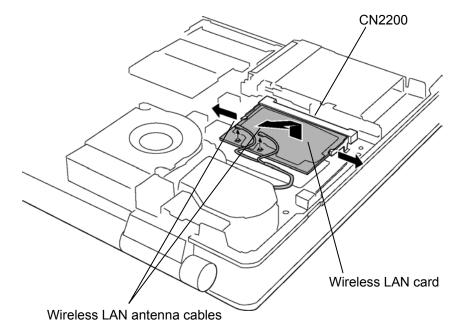
Figure 4-29 Removing the wireless LAN card

Installing the wireless LAN card

The following describes the procedure for installing the wireless LAN card (See Figure 4-29).

1. Insert a **wireless LAN card** into the connector **CN2200** of the mini PCI slot slantwise and press it to connect firmly.

2. Connect the **wireless LAN antenna cables** to the connector (White cable to MAIN, Black cable to AUX) on the wireless LAN card.

4.19 TV tuner module

Removing the TV tuner module

The following describes the procedure for removing the TV tuner module (See Figure 4-30).

1. Disconnect the **TV antenna harness** from the connector **PJ601** on the TV tuner module.

2. Disconnect the **TV tuner harness** from the connector **PJ621** on the TV tuner module and **CN5661** on the system board.

3. Remove the following **screws** securing the TV tuner module.

   ❑ M2.0x4.0C   BIND screw   x2

4. Open the left and right **latches** and remove the **TV tuner module** from the connector **CN 2220** of mini PCI slot.
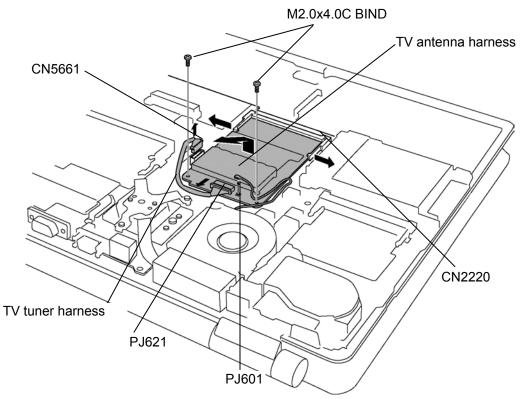
Figure 4-30 Removing the TV tuner module

Installing the TV tuner module

The following describes the procedure for installing the TV tuner module (See Figure 4-30).

1. Insert the **TV tuner module** into the connector **CN2220** of the mini PCI slot slantwise and press it to connect firmly.

2. Secure the TV tuner module with the following **screws**.

   ❑ M2.0x4.0C   BIND screw   x2

3. Connect the **TV tuner harness** to the connector **PJ621** on the TV tuner module and **CN5661** on the system board.

4. Connect the **TV antenna harness** to the connector **PJ601** on the TV tuner module.

4.20　CPU fan

Removing the CPU fan

The following describes the procedure for removing the CPU fan (See Figure 4-31).

1. Disconnect the **CPU fan cable** from the connector **CN8770** on the system board.

2. Remove the following **screws** securing the CPU fan and remove the **CPU fan**.

   ❑ M2.5x4.0B　　FLAT BIND screw　　　　　　　　x2
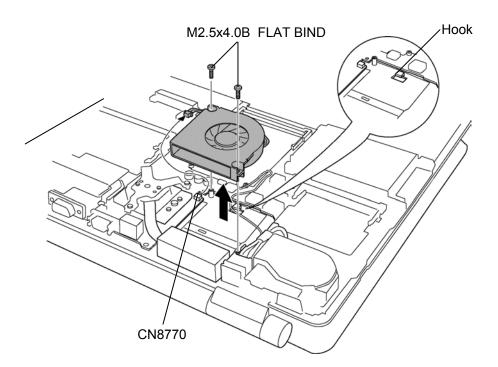
Figure 4-31　　Removing the CPU fan

Installing the CPU fan

The following describes the procedure for installing the CPU Fan (See Figure 4-31).

1. Arranging the CPU fan cable through the hook, connect the **CPU fan cable** to the connector **CN8770** on the system board.

2. Install the **CPU fan** and secure it with the following **screws**.

   ❑ M2.5x4.0B　　FLAT BIND screw　　　　　　　　x2

4.21 CPU fin & CPU

Removing the CPU fin & CPU

The following describes the procedure for removing the CPU fin & CPU (See Figure 4-32 and 4-33).

1. Remove the following **screws** securing the CPU holder.

    ❑ M2.0x4.0C   BIND screw   x3

NOTE: *When removing the CPU holder, be sure to remove the screws in the reverse order of the number marked on the holder.*

2. Remove the **CPU holder** and **CPU fin**.
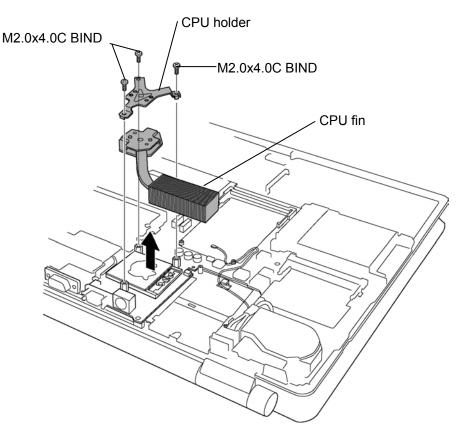
Figure 4-32   Removing the CPU fin

3. Unlock the **CPU** by rotating the **cam** on the CPU socket 180 degrees to the counterclockwise with a flat-blade screwdriver.

4. Remove the **CPU**.
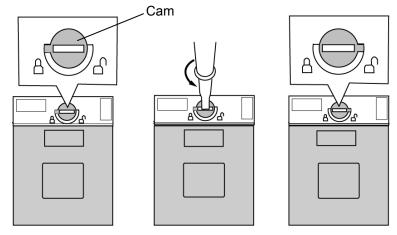
Figure 4-33   Removing the CPU

Installing the CPU fin & CPU

The following describes the procedure for installing the CPU fin & CPU (See Figure 4-32 to 4-34).

1. Check that the mark of cam is in the unlocking position.

2. Attach the **CPU** to the correct position in the **CPU socket**.

3. Fix the **CPU** by rotating the cam 180 degrees to the clockwise with a flat-blade screwdriver.

4. If there is already silicon grease on the CPU, clean it with a cloth.
   Using a special applicator, apply silicon grease so that the CPU chip on the CPU is completely covered.

NOTE: *Apply the silicon grease enough to cover the chip surface using the special*
          applicator.
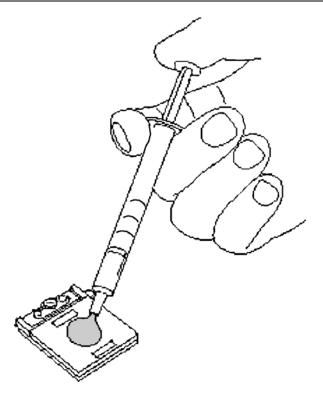
Figure 4-34   Applying silicon grease

5. Install the **CPU fin** and **CPU holder** and secure them with the following **screws**.

❑ M2.0x4.0C   BIND screw   x3

NOTE: *When securing the CPU holder, be sure to secure the screws in the order of the*
          number marked on the holder.

4.22 VGA fan & VGA fin

Removing the VGA fan & VGA fin

The following describes the procedure for removing the VGA fan & VGA fin (See Figure 4-35).

1. Peeling off the glass tape, disconnect the **VGA fan cable** from the connector **CN8780** on the system board.

2. Remove the following **screws** securing the VGA fan and remove the **VGA fan**.

   ❑ M2.5x4.0B   FLAT BIND screw   x2

3. Remove the following **screws** securing the VGA fin and remove the **VGA fin**.

   ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x2
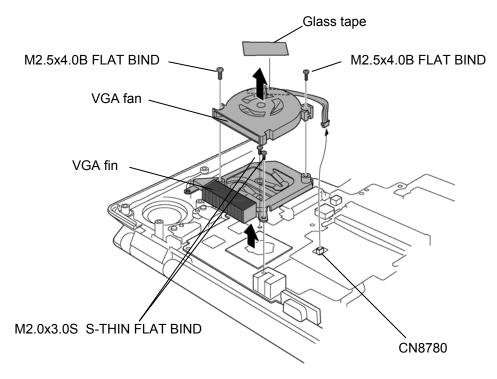
Figure 4-35   Removing the VGA fin

Installing the VGA fan & VGA fin

The following describes the procedure for installing the VGA fan & VGA fin (See Figure 4-35).

1. Install the **VGA fin**.

NOTE: *For details on applying the silicon grease, refer to "Installing the CPU".*

---

2. Secure the VGA fin with the following **screws**.

   ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x2

3. Install the **VGA fan** and secure it with the following **screws**.

   ❑ M2.5x4.0B   FLAT BIND screw   x2

4. Connect the **VGA fan cable** to the connector **CN8780** on the system board and stick the glass tape to fix the VGA fan cable.

4.23 GMCH heat sink

Removing the GMCH heat sink

The following describes the procedure for removing the GMCH heat sink (See Figure 4-36).

1. Remove the following **screws** securing the GMCH heat sink.

    ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x2

2. Remove the **GMCH heat sink**.
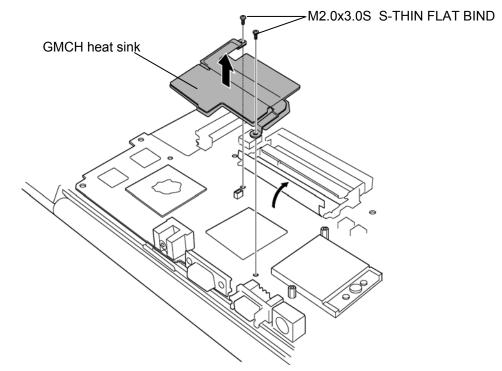
Figure 4-36   Removing the GMCH heat sink

Installing the GMCH heat sink

The following describes the procedure for installing the GMCH heat sink (See Figure 4-36).

1. Install the **GMCH heat sink**.

NOTE: For details on applying the silicon grease, refer to Installing the CPU.

2. Secure the GMCH heat sink with the following **screws**.

    ❑ M2.0x3.0S   S-THIN FLAT BIND screw   x2

4.24 Speaker (R)

Removing the speaker (R)

The following describes the procedure for removing the speaker (R) (See Figure 4-37).

1. Pull out the **DC-IN jack** from the guide of cover assembly.

2. Draw the **speaker (R)** from the slot of cover assembly.

3. Disconnect the **speaker (R) cable** from the connector **CN6003** on the system board.
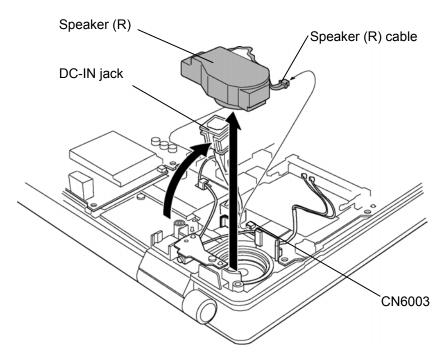
Figure 4-37 Removing the speaker (R)

Installing the speaker (R)

The following describes the procedure for installing the speaker (R) (See Figure 4-37).

1. Connect the **speaker (R) cable** to the connector **CN6003** on the system board.

2. Set the **speaker (R)** in the slot of cover assembly.

3. Install the **DC-IN jack** along the guide of cover assembly.

4.25 TV antenna board

Removing the TV antenna board

The following describes the procedure for removing the TV antenna board (See Figure 4-38).

1. Remove the following **screw** securing the TV antenna board.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Slightly pulling up the TV antenna board, disconnect the **TV antenna harness** from the connector **CN9611** on the TV antenna board.
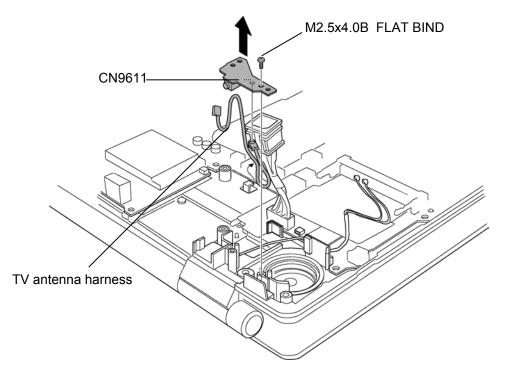
Figure 4-38 Removing the TV antenna board

Installing the TV antenna board

The following describes the procedure for installing the TV antenna board (See Figure 4-38).

1. Connect the **TV antenna harness** to the connector **CN9611** on the TV antenna board.

2. Install the **TV antenna board** to the cover assembly and secure it with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

4.26 System board

CAUTION: 1. *When handling the system board, always hold by the edges. Do not touch the printed circuit face.*

2. *If replacing with a new system board, execute the subtest01 Initial configuration in section 3.3 "Setting of the hardware configuration". Also update with the latest BIOS and EC/KBC as described in Appendix G and in Appendix H.*

Removing the system board

The following describes the procedure for removing the system board (See Figure 4-39).

1. Pull up and remove the **system board** from the cover assembly.

2. Disconnect the **battery power harness** from the connector **CN8020**.

3. Disconnect the **battery signal harness** from the connector **CN8811**.

4. Disconnect the **SD board flat cable** from the connector **CN9500**.

5. Disconnect the **ODD flat cable** from the connector **CN1810**.

6. Disconnect the **USB harness** from the connector **CN4611**.
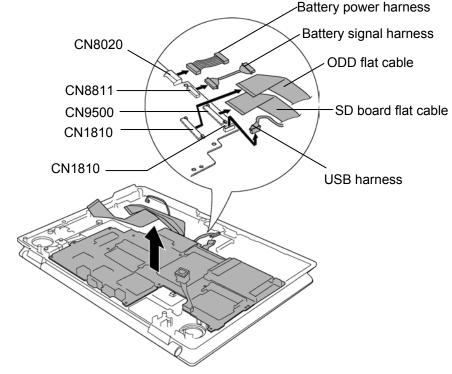
Figure 4-39   Removing the system board

Installing the system board

The following describes the procedure for installing the system board (See Figure 4-39).

1. Connect the **USB harness** to the connector **CN4611**.

2. Connect the **ODD flat cable** to the connector **CN1810**.

3. Connect the **SD board flat cable** to the connector **CN9500**.

4. Connect the **battery signal harness** to the connector **CN8811**.

5. Connect the **battery power harness** to the connector **CN8020**.

6. Install the **system board** to the cover assembly.

NOTE: *Confirm that volume harness is arranged in the right position while installing the system board.*

4.27 PC card slot

Removing the PC card slot

The following describes the procedure for removing the PC card slot (See Figure 4-40).

1. Remove the following **screws** securing the PC card slot.

   ❑ M2.0x3.0B   S-THIN FLAT BIND screw   x2

   ❑ M2.0x8.0B   BIND screw   x2

2. Pull up the **PC card slot** straight and remove it from the connector **CN2110** on the system board.
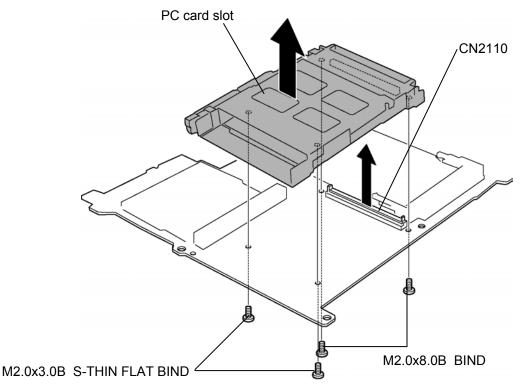
Figure 4-40   Removing the PC card slot

Installing the PC card slot

The following describes the procedure for installing the PC card slot (See Figure 4-40).

1. Insert the terminal of the PC card slot into the connector **CN2110** on the system board.

2. Secure the **PC card slot** with the following **screws**.

   ❑ M2.0x3.0B   S-THIN FLAT BIND screw   x2

   ❑ M2.0x8.0B   BIND screw   x2

4.28 Bluetooth module

Removing the bluetooth module

The following describes the procedure for removing the bluetooth module (See Figure 4-41).

1. Turning up the **insulator**, disconnect the **bluetooth antenna cable** from the connector on the bluetooth module.

2. Disconnect the **bluetooth flat cable** from the connector on the bluetooth module.

3. Remove the following **screw** securing the bluetooth module and remove the **bluetooth module**.

   ❑ M2.0x3.0C   S-THIN FLAT BIND screw   x1
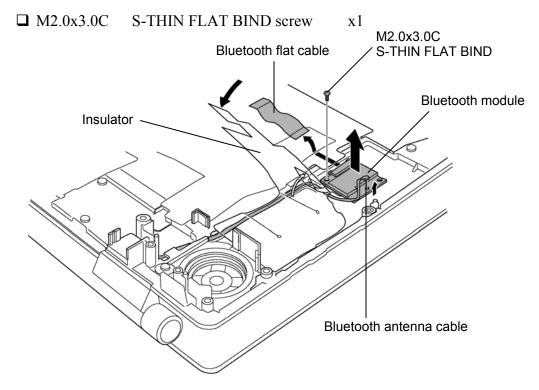
Figure 4-41   Removing the bluetooth module

Installing the bluetooth module

The following describes the procedure for installing the bluetooth module (See Figure 4-41).

1. Install the bluetooth module and secure it with the following **screw**.

   ❑ M2.0x3.0C   S-THIN FLAT BIND screw   x1

2. Connect the **bluetooth flat cable** to the connector on the bluetooth module.

3. Connect the **bluetooth antenna cable** from the connector on the bluetooth module.

4. Cover the bluetooth module slot with the **insulator**.

4.29 Volume sensor board

Removing the volume sensor board

The following describes the procedure for removing the volume sensor board (See Figure 4-42).

1. Remove the following **screws** securing the volume sensor holder and remove the **volume sensor holder**.

   ❑ M2.5x2.8B   FLAT BIND screw   x2

2. Draw the **volume harness** from the guide of cover assembly and remove **the volume sensor board** from the cover assembly.
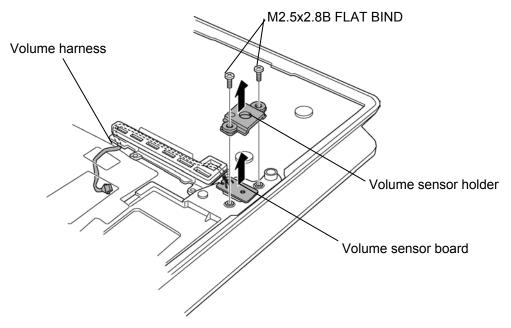
Figure 4-42 Removing the volume sensor board

Installing the volume sensor board

The following describes the procedure for installing the volume sensor board (See Figure 4-42).

1. Arranging the **volume harness** along the guide of cover assembly, install **the volume sensor board**.

2. Install **volume sensor holder** and secure it with the following **screws**.

   ❑ M2.5x2.8B   FLAT BIND screw   x2

4.30 Touch sensor board

Removing the touch sensor board

The following describes the procedure for removing touch sensor (See Figure 4-43).

1. Disconnect the **touch sensor flat cable** from the connector on the touch sensor board.

2. Peeling off the **insulator**, remove the following **screws** securing the touch sensor plate and remove the **touch sensor plate**.

   ❑ M2.5x4.0B   FLAT BIND screw   x9

3. Pull up and remove the **touch sensor board** from the cover assembly.

CAUTION: *The removed touch sensor board is not reusable. Therefore when installing the touch sensor board, it must be a new one.*
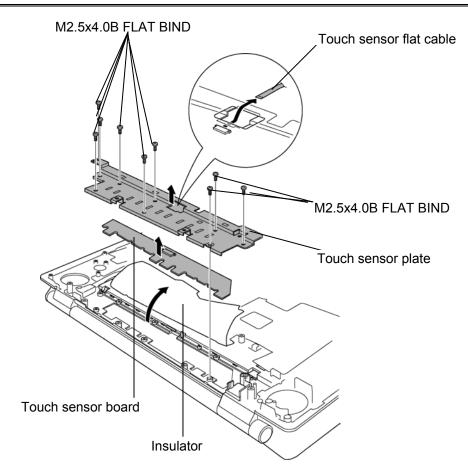
Figure 4-43   *Removing the touch sensor board*

Installing the touch sensor board

The following describes the procedure for installing touch sensor (See Figure 4-43).

1. Peel off the double-sided tape from the touch sensor board and stick the **touch sensor board** to the cover assembly.

CAUTION: *When sticking the touch sensor board, check the followings.*

    1. The touch sensor board once removed from the computer is not reusable. When installing the touch sensor board, be sure to use a new one.

    2. It is possible to stick a new touch sensor board over the double-sided tape remained on the cover assembly.

    3. Only three times can be acceptable for sticking the touch sensor panel on the cover assembly (The remained tapes on the cover assembly can keep its adhesion within three-ply stacked tapes). If exceeding the acceptable times, it is also necessary to replace the cover assembly.

---

2. Install the **touch sensor plate** and secure it with the following **screws**.

   ❑ M2.5x4.0B   FLAT BIND screw   x9

3. Cover the touch sensor plate with the **insulator**.

4. Connect the **touch sensor flat cable** to the connector on the touch sensor board.

4.31 Touch pad

Removing the touch pad

The following describes the procedure for removing the touch pad (See Figure 4-44).

1. Peel off the **glass tape** and disconnect the **touch pad flat cable** from the connector on the touch pad.

2. Remove the following **screws** securing the touch pad plate.

   ❑ M2.0x4.0C   BIND screw   x3

3. Turning up the **insulator**, remove the **touch pad plate**.

4. Peel off and remove the **touch pad** from the cover assembly.
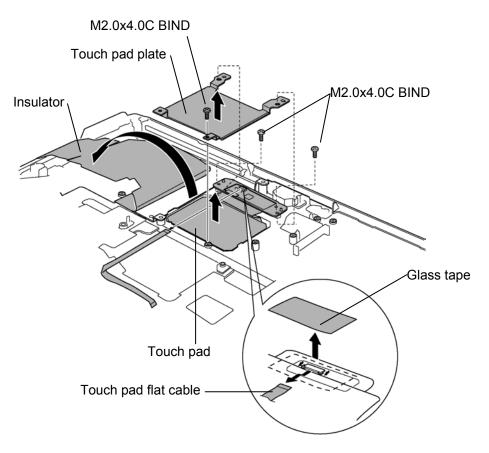
Figure 4-44 Removing the touch pad

Installing the touch pad

The following describes the procedure for installing the touch pad (See Figure 4-44).

1. Peel off the separator covering on the sensor portion of a new touch pad.

NOTE: *Do not reuse the touch pad so that it can not be used after peeling off from the computer. Be sure to stick a new touch pad.*

When installing the touch pad, be careful not to get the bubbles under the touch pad.

---

2. Stick and install the **touch pad** on the cover assembly.

3. Install the **touch pad plate** and secure it with the following **screws**.

   ❑ M2.0x4.0C   BIND screw   x3

NOTE: *When securing the touch pad with the screws, confirm the following position.*

---

4. Connect the **touch pad flat cable** to the connector on the touch pad and stick the **glass tape** on the connector.

5. Cover the **insulator** over the touch pad.

4.32   Latch assembly

Removing the latch assembly

The following describes the procedure for removing the latch assembly (See Figure 4-45).

1. Remove the following **screws** securing the latch assembly.

    ❑ M2.5x4.0B   FLAT BIND screw   x2

2. Pull up and remove the **latch assembly**.

3. Releasing hooks of latch assembly, disassemble the **latch slider** and **spring**.
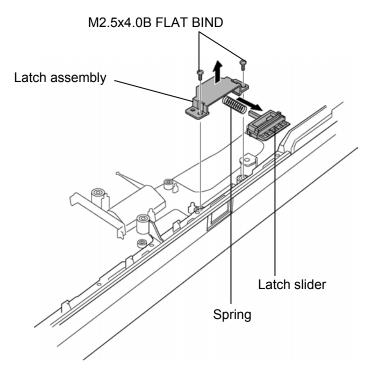
Figure 4-45 Removing the latch assembly

Installing the latch assembly

The following describes the procedure for installing the latch assembly (See Figure 4-45).

1. Assembling the **spring** and **latch slider**, fit the hooks of latch slider into the latch assembly.

2. Install the **latch assembly** to the cover assembly and secure it with the following **screws**.

   ❑ M2.5x4.0B   FLAT BIND screw   x2

4.33 LCD unit / FL inverter

CAUTION: *When replacing a LCD, it is required that SVP parameter is set. Update with the latest EC/KBC as described in Appendix H "EC/KBC Rewrite Procedures".*

Removing the LCD unit / FL inverter

The following describes the procedure for removing the LCD unit and FL inverter (See Figure 4-46 to 4-49).

1. Removing the **mask seal** and **mask pad**, remove the following **screws** securing the LCD mask.

   ❑ M2.5x8.0B   FLAT BIND screw   x4

   ❑ M2.5x6.0C   S-THIN FLAT BIND screw   x2

2. Insert your finger between the edge of the LCD mask and the display rear cover, and remove the **LCD mask** while releasing the latches.
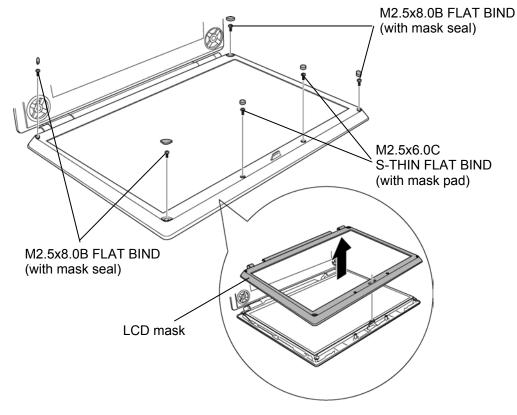
Figure 4-46 Removing the LCD mask

3. Remove the following **screw** securing the FL inverter.

    ❑ M2.0x4.0C   BIND screw   x1

4. Peel off the **insulator** adhered to the FL inverter.

5. Disconnect the **LCD harnesses** from the connectors **CN1** and **CN2** on the FL inverter.

6. Disconnect the **HV harnesses** from the connectors **CN3** and **CN4** on the FL inverter.

7. Remove the **FL inverter** from the display assembly.
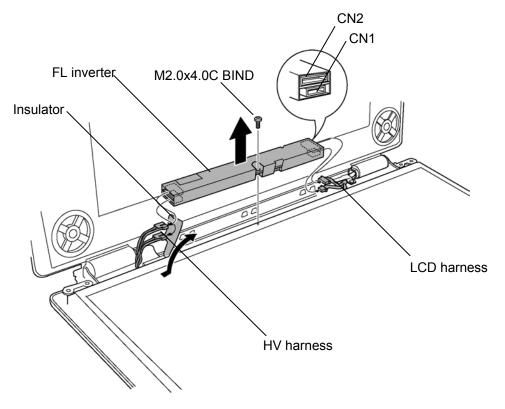
Figure 4-47   Removing the FL inverter

8. Remove the following **screws** securing the LCD unit.

    ❑ M2.0x4.0C   BIND screw   x4

9. With the bottom edge of the LCD unit on the display cover, lift only the top edge of the LCD unit. After peeling off the **copper tape**, disconnect the **LCD harness** from the connector on the back of the LCD.

10. Remove the **LCD unit**.
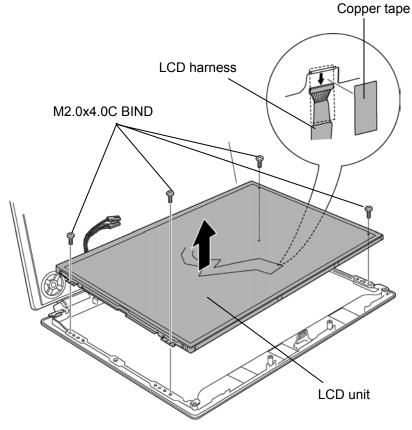
Figure 4-48   Removing the LCD unit

11. Remove the following **screws** securing the LCD support and remove the **LCD supports** from the LCD unit.

   ❑ M2.0x3.0C   S-THIN FLAT BIND screw   x4
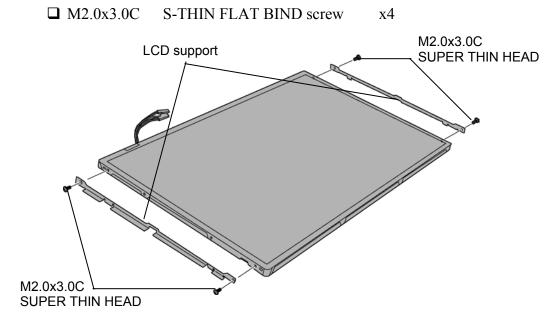
Figure 4-49   Removing the LCD support

Installing the LCD unit/FL Inverter

The following describes the procedure for installing the LCD unit and FL inverter (See Figure 4-46 to 4-49).

1. Install the **LCD support** to the LCD and secure them with the following **screws**.

    ❑ M2.0x3.0C   S-THIN FLAT BIND screw   x4

2. Stand the **LCD unit** on the display cover and connect the **LCD harness** to the connector on the back of LCD.

3. Stick the **copper tape** on the connector of LCD harness.

4. Secure the LCD unit with the following **screws**.

    ❑ M2.0x4.0C   BIND screw   x4

5. Connect **LCD harnesses** to the connector **CN1** and **CN2** of the FL inverter.

CAUTION: *Be careful not to connect the LCD harnesses to the wrong connectors of FL inverter (CN1=smaller one, CN2=larger one).*

6. Connect **HV harnesses** to the connector **CN3** and **CN4** of the FL inverter.

7. Stick the **insulator** to the FL inverter.

8. Install the **FL inverter** and secure it with the following **screw**.

    ❑ M2.0x4.0C   BIND screw   x1

9. Install the **LCD mask** while fitting the latches.

NOTE: *When installing the display mask, make sure there is no gap between the LCD mask and the display rear cover.*

10. Secure the LCD mask with the following **screws**.

    ❑ M2.5x8.0B   FLAT BIND screw   x4

    ❑ M2.5x6.0C   S-THIN FLAT BIND screw   x2

4.34 LCD harness

Removing the LCD harness

The following describes the procedure for removing LCD harness (See Figure 4-50 to 4-52).

1. Remove the following **screw** securing the LCD harness holder (cover assembly side) and remove the **LCD harness holder** from the cover assembly.

   ❑ M2.5x4.0B   FLAT BIND screw   x1

2. Remove the following **screw** securing the hinge cap (L) and remove the **hinge rear cap (L)** from the display assembly.

   ❑ M2.0x4.0B   FLAT BIND screw   x1

M2.5x4.0B FLAT BIND

LCD harness holder

Hinge rear cap (L)   M2.5x4.0B FLAT BIND
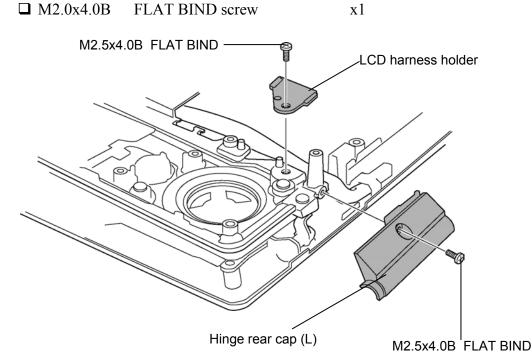
Figure 4-50 Removing the hinge rear cap (L)

3. Remove the **hinge front cap (L)** from the display assembly.

4. Remove the following **screw** securing the LCD harness holder (display rear cover side) and remove the **LCD harness holder** from the display rear cover.

   ❑ M2.5x4.0B   FLAT BIND screw   x1
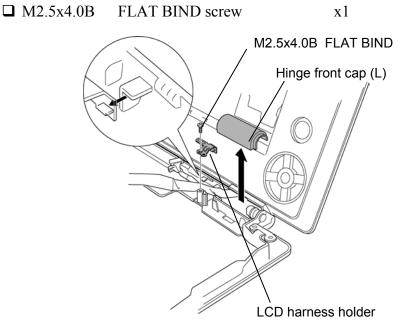
Figure 4-51 Removing the LCD harness holder

5. Remove the **LCD harness** from the slot of display assembly.
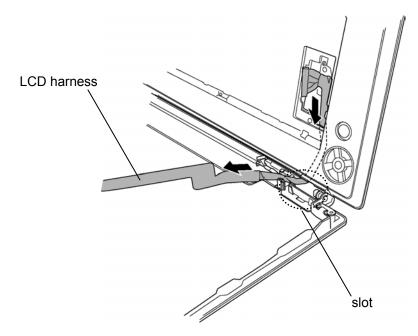
Figure 4-52 Removing the LCD harness

Installing the LCD harness

The following describes the procedure for installing the LCD harness (See Figure 4-50 and 4-52).

1. Arrange the **LCD harness** by putting the harness through the slot of display assembly.

2. Install the **LCD harness holder** (display rear cover side) to the display rear cover and secure it with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

3. Installing the **hinge front cap (L)** while hooking the tabs, install the **hinge rear cap (L)** and secure it with the following **screw**.

    ❑ M2.0x4.0B   FLAT BIND screw   x1

4. Install the **LCD harness holder** (cover assembly side) while holding the LCD harness and secure it with the following **screw**.

    ❑ M2.5x4.0B   FLAT BIND screw   x1

4.35 Wireless antennas

Removing the wireless antennas

The following describes the procedure for removing the wireless antennas (See Figure 4-53 and 4-54).

1. Remove the following **screw** securing the hinge cap (R) and remove the **hinge rear cap (R)** from the display assembly.

   ❑ M2.0x4.0B   FLAT BIND screw   x1

M2.0x4.0B FLAT BIND

Hinge rear cap (R)
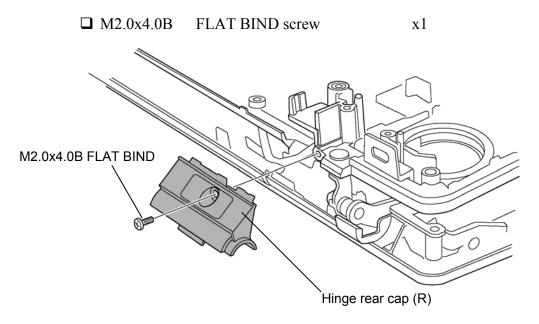
Figure 4-53   Removing the hinge rear cap (R)

2. Remove the **hinge front cap (R)** from the display assembly.

3. Peel off the **acetate tapes** fixing the wireless antenna cables.

4. Peeling off the **wireless LAN antennas** and **bluetooth antenna** from the display rear cover, remove the wireless antennas from the display assembly.
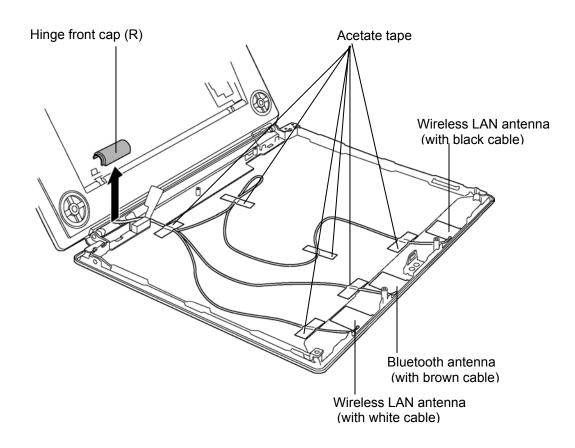
Figure 4-54 Removing the wireless antennas

Installing the wireless antennas

The following describes the procedure for installing the wireless antennas (See Figure 4-53 and 4-54).

1. Stick the wireless **LAN antennas** and **bluetooth antenna** on the display rear cover.

2. Arrange the wireless LAN antenna cables and bluetooth antenna cable on the display rear cover and fix them with **acetate tapes**.

3. Installing the **hinge front cap (R)** while hooking the tabs, install the **hinge rear cap (R)** and secure them with the following **screw**.

   ❑ M2.0x4.0B   FLAT BIND screw   x1

4.36 Display latch hook

Removing the display latch hook

The following describes the procedure for removing the display latch hook (See Figure 4-55).

1. Remove the following **screws** securing the display latch hook.

    ❑ M2.5x6.0C   PSP TIGHT screw   x2

2. Pull up and remove the **display latch hook** from the display rear cover.
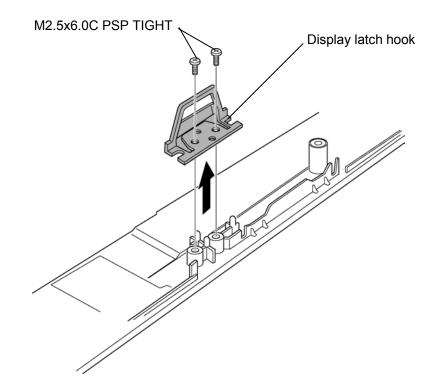
Figure 4-55 Removing the display latch hook

Installing the display latch hook

The following describes the procedure for installing the display latch hook (See Figure 4-55).

1. Install the **display latch hook** to the display rear cover and secure it with the following **screws**.

    ❑ M2.5x6.0C   PSP TIGHT screw   x2

4.37 Display rear cover

Removing the display rear cover

The following describes the procedure for removing the display rear cover (See Figure 4-56).

1. Remove the following **screws** securing the display rear cover.

    ❑ M2.5x4.0B   FLAT BIND screw   x4

2.   Remove the **display rear cover** from the cover assembly.

M2.5x4.0B FLAT BIND

M2.5x4.0B FLAT BIND

Display rear cover
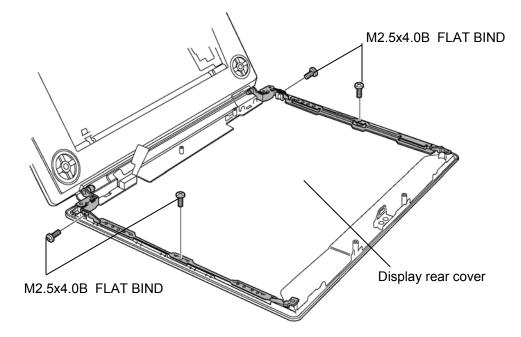
Figure 4-56   Removing the display rear cover

Installing the display rear cover

The following describes the procedure for installing the display rear cover (See Figure 4-56).

1. Install the **display rear cover** to the cover assembly and secure it with the following **screws**.

    ❑ M2.5x4.0B   FLAT BIND screw   x4

4.38   Hinge
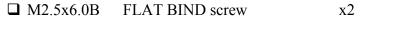
Removing the hinge

The following describes the procedure for removing the hinge (See Figure 4-57).

1.   Remove the following **screws** securing the hinge (L) and remove the **hinge (L)**.

❑ M2.5x6.0C   PSP TIGHT screw   x2

2.   Remove the following **screws** securing the hinge (R) and remove the **hinge (R)**.

❑ M2.5x6.0B   FLAT BIND screw   x2
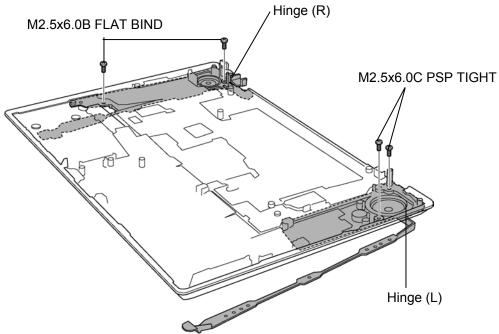
Figure 4-57   Removing the hinge

Installing the hinge

The following describes the procedure for installing the hinge (See Figure 4-57).

   1. Install the **hinge (R)** to the cover assembly and secure it with the following **screws**.

      ❑ M2.5x6.0B   FLAT BIND screw   x2

   2. Install the **hinge (L)** to the cover assembly and secure it with the following **screws**.

      ❑ M2.5x6.0C   PSP TIGHT screw   x2

Appendices

Appendix Contents

ODD relay board (FNN2D*)

Sound board (FNN2N*)

AV-IN board (FNN2V*)

Figures

Tables

Sound jack board (FNN2J*)

Battery board (FNN2B*)

Power switch board (FNN2P*)

Appendix A   Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.

2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

   Also, the panel's polarized surface is easily scarred, so be careful when handling it.

3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

   If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.
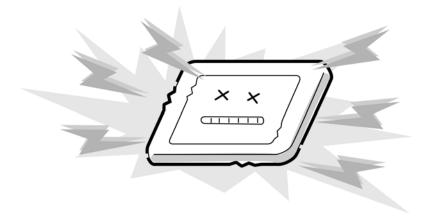
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.
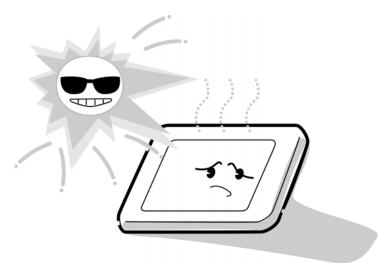
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.
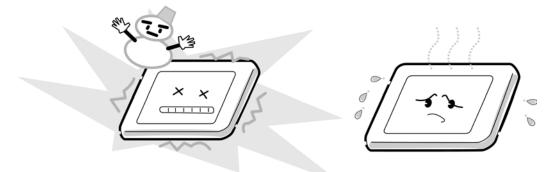
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.
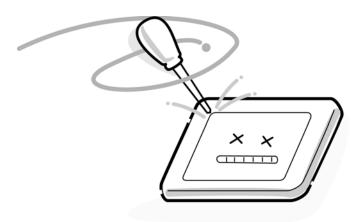
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.
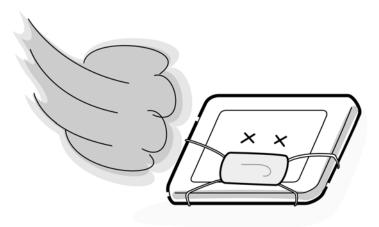
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.

9. Do not disassemble the LCD module. Disassembly can cause malfunctions.

10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxide). These materials can release gas that can damage the panel's polarization.

Appendix B   Board Layout

B.1   System Board Front View
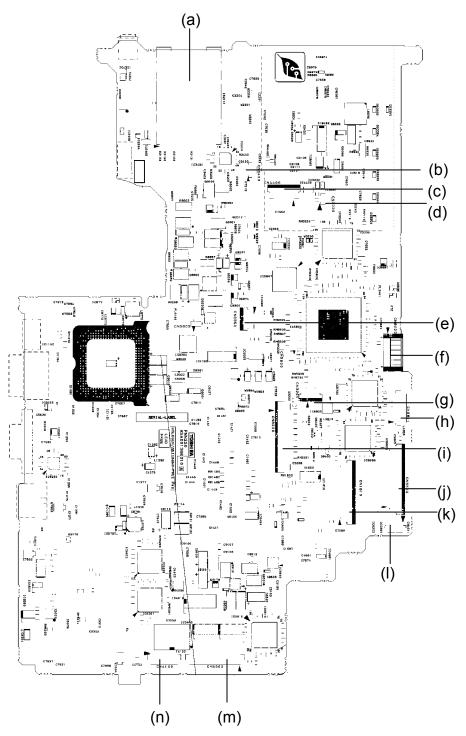
Figure B-1 System board layout (front)

Table B-1 System board ICs and connectors (front)

Mark	Number	Name
(a)	IS2101	Bridge Media slot
(b)	CN3400	Debugging port
(c)	CN4400	Bluetooth FFC connector
(d)	CN3330	Volume sensor cable connector
(e)	CN3360	Touch sensor FFC connector
(f)	CN8020	Battery power harness connector
(g)	CN3201	Touch pad FFC connector
(h)	CN8811	Battery signal harness connector
(i)	CN3200	Keyboard I/F connector
(j)	CN9500	Sound FFC I/F connector
(k)	CN1810	ODD relay board I/F connector
(l)	CN4611	USB harness connector
(m)	CN5000	LCD harness connector
(n)	CN4100	RJ45 harness connector

B.2   System Board Back View
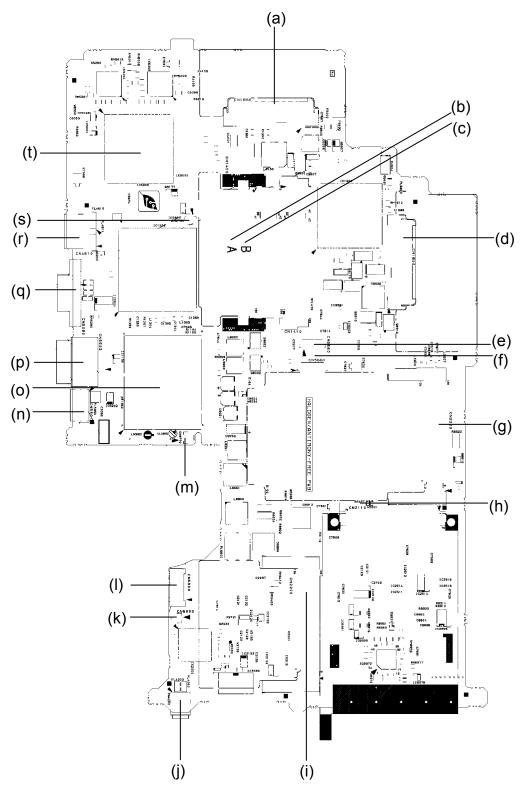
Figure B-2 System board layout (Back)

Table B-2 System board ICs and connectors (back)

Mark	Number	Name
(a)	CN1860	HDD-2 I/F connector
(b)	CN1400	Memory module (base) I/F connector
(c)	CN1410	Memory module (expansion) I/F connector
(d)	CN1850	HDD-1 I/F connector
(e)	CN5660	AV-IN harness connector
(f)	CN5661	TV tuner harness connector
(g)	CN2220	TV tuner module I/F connector
(h)	CN2110	PC card I/F connector
(i)	CN2200	Wireless LAN card I/F connector
(j)	CN4200	i.LINK (IEEE1394) port
(k)	CN6003	Speaker (R) cable connector
(l)	CN8800	DC-IN jack connector
(m)	CN8770	CPU fan cable connector
(n)	CN5501	S-VIDEO OUT I/F port
(o)	IS1050	CPU
(p)	CN5502	D-terminal port
(q)	CN5080	RGB I/F connector
(r)	CN4610	USB port 0 / USB port 2
(s)	CN8780	VGA fan cable connector
(t)	IS5000	GPU

B.3   BT board

\<Front layout\>   **\<Back layout\>**

Figure B-3 BT board layout

Table B-3 BT board connectors

Mark	Number	Name
(a)	CN9690	Battery power harness connector
(b)	CN9691	Battery signal harness connector
(c)	CN8810	Battery I/F connector
(c)	CN9990	RTC battery I/F connector

B.4   SD board

<Front layout>

<Back layout>
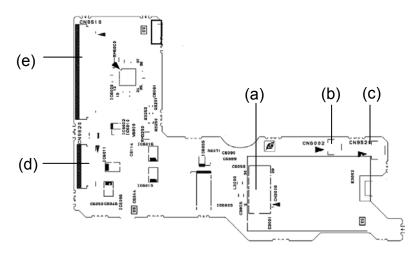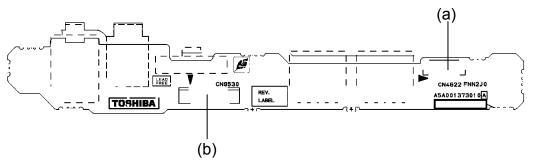
Figure B-4 SD board layout

Table B-4 SD board connectors

Mark	Number	Name
(a)	CN3000	MDC I/F connector
(b)	CN6002	Speaker (L) cable connector
(c)	CN9521	Power SW harness connector
(d)	CN9520	Sound jack FFC connector
(e)	CN9510	Sound FFC connector

B.5   SJ board

<Front layout>

<Back layout>
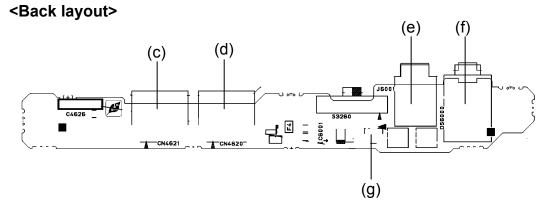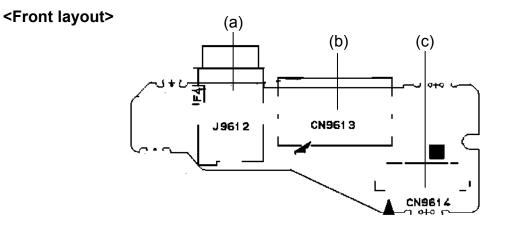
Figure B-5 SJ board layout

Table B-5 SJ board connectors

Mark	Number	Name
(a)	CN4620	USB harness connector
(b)	CN9530	Sound jack FFC connector
(c)	CN4621	USB port 6
(d)	CN4620	USB port 4
(e)	J600	External microphone jack
(f)	D5600	Headphone jack
(g)	CN4621	Internal microphone I/F connector

B.6   AV-IN board

<Front layout>

<Back layout>
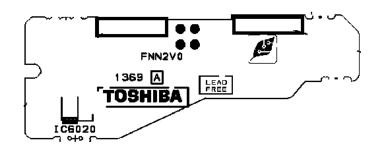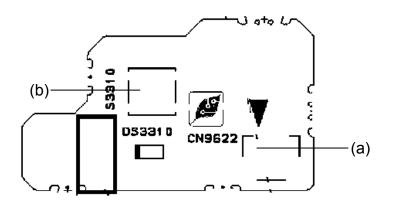
Figure B-6   AV-IN board layout

Table B-6 AV-IN board connectors

Mark	Number	Name
(a)	J9612	Monitor-IN I/F port
(b)	J9613	S-VIDEO IN I/F port
(c)	CN9613	AV-IN harness connector

B.7   Power SW board

<Front layout>

<Back layout>
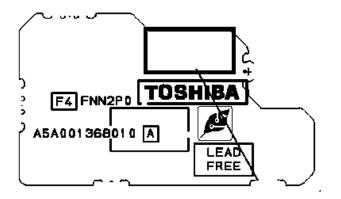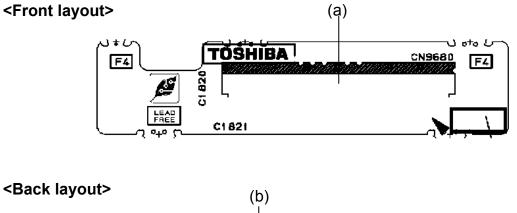
Figure B-7 Power SW board layout

Table B-7 Power SW board connectors

Mark	Number	Name
(a)	CN9622	Power SW harness connector
(b)	S3310	Power switch button

B.8   ODD relay board

<Front layout>

<Back layout>
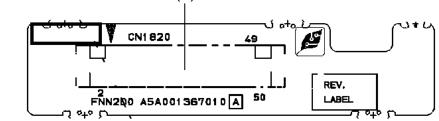
Figure B-8 ODD relay board layout

Table B-8 ODD relay board connectors

Mark	Number	Name
(a)	CN9680	ODD I/F connector
(b)	CN1820	ODD relay FFC I/F connector

B.9   TV antenna board

<Front layout>   **<Back layout>**
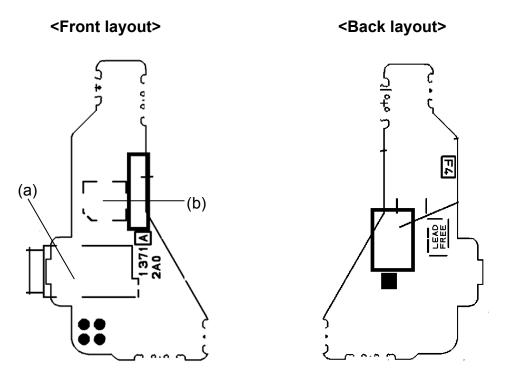
Figure B-9 TV antenna board layout

Table B-9 TV antenna board connectors

Mark	Number	Name
(a)	J9610	TV antenna cable jack
(b)	CN9611	TV antenna coaxial cable connector

Appendix C   Pin Assignment

System Board (FNN2S*)

C.1   CN1410   Memory Connector 0 (200-pin)

Table C-1 Memory connector 0 (200-pin) (1/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MR0R9-B0V	I	2	GND	-
3	GND	-	4	BDQ05-B1P	I/O
5	BDQ07-B1P	I/O	6	BDQ04-B1P	I/O
7	BDQ06-B1P	I/O	8	GND	-
9	GND	-	10	BDM0-B1P	I
11	BDQS0-B1N	I/O	12	GND	-
13	BDQS0-B1P	I/O	14	BDQ01-B1P	I/O
15	GND	-	16	BDQ00-B1P	I/O
17	BDQ03-B1P	I/O	18	GND	-
19	BDQ02-B1P	I/O	20	BDQ12-B1P	I/O
21	GND	-	22	BDQ13-B1P	I/O
23	BDQ11-B1P	I/O	24	GND	-
25	BDQ08-B1P	I/O	26	BDM0-B1P	I
27	GND	-	28	GND	-
29	BDQS1-B1N	I/O	30	MCK3-B1P	I
31	BDQS1-B1P	I/O	32	MCK3-B1N	I
33	GND	-	34	GND	-
35	BDQ09-B1P	I/O	36	BDQ15-B1P	I/O
37	BDQ14-B1P	I/O	38	BDQ10-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	BDQ16-B1P	I/O	44	BDQ21-B1P	I/O
45	BDQ18-B1P	I/O	46	BDQ17-B1P	I/O
47	GND	-	48	GND	-
49	BDQS2-B1N	I/O	50	N.C.	-
51	BDQS2-B1P	I/O	52	BDM2-B1P	I
53	GND	-	54	GND	-
55	BDQ23-B1P	I/O	56	BDQ19-B1P	I/O
57	BDQ22-B1P	I/O	58	BDQ20-B1P	I/O

Table C-1 Memory connector 0 (200-pin) (2/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	BDQ28-B1P	I/O	64	BDQ25-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I	68	BDQS3-B1N	I/O
69	N.C.	-	70	BDQS3-B1P	I/O
71	GND	-	72	GND	-
73	BDQ26-B1P	I/O	74	BDQ29-B1P	I/O
75	BDQ27-B1P	I/O	76	BDQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE2-B1P	I	80	MCKE3-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	BBS2-B1P	I	86	N.C	-
87	1R8-B1V	I	88	1R8-B1V	I
89	BMA12-B1P	I	90	BMA11-B1P	I
91	BMA09-B1P	I	92	BMA07-B1P	I
93	BMA08-B1P	I	94	BMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	BMA05-B1P	I	98	BMA04-B1P	I
99	BMA03-B1P	I	100	BMA02-B1P	I
101	BMA01-B1P	I	102	BMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	BMA10-B1P	I	106	BBS1-B1P	I
107	BBS0-B1P	I	108	BRAS-B1N	I
109	BWE-B1N	I	110	MCS2-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	BCAS-B1N	I	114	MODT2-B1P	I
115	MCS3-B1N	I	116	BMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT3-B1P	I	120	N.C	-
121	GND	-	122	GND	-
123	BDQ32-B1P	I/O	124	BDQ36-B1P	I/O
125	BDQ33-B1P	I/O	126	BDQ37-B1P	I/O
127	GND	-	128	GND	-
129	BDQS4-B1N	I/O	130	BDM4-B1P	I
127	SDQ38-B2P	I/O	128	SDQ36-B2P	I/O
129	SDQ34-B2P	I/O	130	SDQ37-B2P	I/O

Table C-1 Memory connector 0 (200-pin) (3/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
131	BDQS4-B1P	I/O	132	GND	-
133	GND	-	134	BDQ38-B1P	I/O
135	BDQ34-B1P	I/O	136	BDQ39-B1P	I/O
137	BDQ35-B1P	I/O	138	GND	-
139	GND	-	140	BDQ44-B1P	I/O
141	BDQ40-B1P	I/O	142	BDQ45-B1P	I/O
143	BDQ41-B1P	I/O	144	GND	-
145	GND	-	146	BDQS5-B1N	I/O
147	BMD5-B1P	I	148	BDQS5-B1P	I/O
149	GND	-	150	GND	-
151	BDQ43-B1P	I/O	152	BDQ46-B1P	I/O
153	BDQ42-B1P	I/O	154	BDQ47-B1P	I/O
155	GND	-	156	GND	-
157	BDQ48-B1P	I/O	158	BDQ52-B1N	I/O
159	BDQ54-B1P	I/O	160	BDQ53-B1N	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	MCK4-B1P	I
165	GND	-	166	MCK4-B1N	I
167	BDQS6-B1N	I/O	168	GND	-
169	BDQS6-B1P	I/O	170	BDM6-B1P	I
171	GND	-	172	GND	-
173	BDQ51-B1P	I/O	174	BDQ50-B1P	I/O
175	BDQ55-B1P	I/O	176	BDQ49-B1P	I/O
177	GND	-	178	GND	-
179	BDQ57-B1P	I/O	180	BDQ56-B1P	I/O
181	BDQ60-B1P	I/O	182	BDQ61-B1P	I/O
183	GND	-	184	GND	-
185	BDM7-B1P	I	186	BDQS7-B1N	I/O
187	GND	-	188	BDQS7-B1P	I/O
189	BDQ58-B1P	I/O	190	GND	-
191	BDQ59-B1P	I/O	192	BDQ62-B1P	I/O
193	GND	-	194	BDQ63-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	I	200	P3V	I

C.2   CN1400   Memory connector 1 (200-pin)

Table C-2   Memory connector 1 (200-pin)   (1/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MRVREF-BOV	I	2	GND	-
3	GND	-	4	ADQ04-B1P	I/O
5	ADQ00-B1P	I/O	6	ADQ05-B1P	I/O
7	ADQ01-B1P	I/O	8	GND	-
9	GND	-	10	ADM0-B1P	I
11	ADQS0-B1N	I/O	12	GND	-
13	ADQS0-B1P	I/O	14	ADQ02-B1P	I/O
15	GND	-	16	ADQ07-B1P	I/O
17	ADQ03-B1P	I/O	18	GND	-
19	ADQ06-B1P	I/O	20	ADQ12-B1P	I/O
21	GND	-	22	ADQ13-B1P	I/O
23	ADQ08-B1P	I/O	24	GND	-
25	ADQ09-B1P	I/O	26	ADM0-B1P	I
27	GND	-	28	GND	-
29	ADQS1-B1N	I/O	30	MCK0-B1P	I
31	ADQS1-B1P	I/O	32	MCK0-B1N	I
33	GND	-	34	GND	-
35	ADQ15-B1P	I/O	36	ADQ10-B1P	I/O
37	ADQ14-B1P	I/O	38	ADQ11-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ16-B1P	I/O	44	ADQ20-B1P	I/O
45	ADQ17-B1P	I/O	46	ADQ21-B1P	I/O
47	GND	-	48	GND	-
49	ADQS2-B1N	I/O	50	N.C.	-
51	ADQS2-B1P	I/O	52	ADM2-B1P	I
53	GND	-	54	GND	-
55	ADQ23-B1P	I/O	56	ADQ19-B1P	I/O
57	ADQ22-B1P	I/O	58	ADQ18-B1P	I/O
59	GND	-	60	GND	-
61	ADQ24-B1P	I/O	62	ADQ29-B1P	I/O

Table C-2 Memory connector 1 (200-pin) (2/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	ADQ25-B1P	I/O	64	ADQ28-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I	68	ADQS3-B1N	I/O
69	N.C.	-	70	ADQS3-B1P	I/O
71	GND	-	72	GND	-
73	ADQ27-B1P	I/O	74	ADQ30-B1P	I/O
75	ADQ26-B1P	I/O	76	ADQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE0-B1P	I	80	MCKE1-B1P	I
81	1R8-B1V	I	82	1R8-B1V	I
83	N.C.	-	84	N.C	-
85	ABS2-B1P	I	86	N.C	-
87	1R8-B1V	I	88	1R8-B1V	I
89	AMA12-B1P	I	90	AMA11-B1P	I
91	AMA09-B1P	I	92	AMA07-B1P	I
93	AMA08-B1P	I	94	AMA06-B1P	I
95	1R8-B1V	I	96	1R8-B1V	I
97	AMA05-B1P	I	98	AMA04-B1P	I
99	AMA03-B1P	I	100	AMA02-B1P	I
101	AMA01-B1P	I	102	AMA00-B1P	I
103	1R8-B1V	I	104	1R8-B1V	I
105	AMA10-B1P	I	106	ABS1-B1P	I
107	ABS0-B1P	I	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS0-B1N	I
111	1R8-B1V	I	112	1R8-B1V	I
113	ACAS-B1N	I	114	MODT0-B1P	I
115	MCS1-B1N	I	116	AMA13-B1P	I
117	1R8-B1V	I	118	1R8-B1V	I
119	MODT1-B1P	I	120	N.C	-
121	GND	-	122	GND	-
123	ADQ32-B1P	I/O	124	ADQ36-B1P	I/O
125	ADQ33-B1P	I/O	126	ADQ37-B1P	I/O
127	GND	-	128	GND	-
129	ADQS4-B1N	I/O	130	ADM4-B1P	I
131	ADQS4-B1P	I/O	132	GND	-
133	GND	-	134	ADQ38-B1P	I/O

Table C-2 Memory connector 1 (200-pin) (3/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
135	ADQ34-B1P	I/O	136	ADQ35-B1P	I/O
137	ADQ39-B1P	I/O	138	GND	-
139	GND	-	140	ADQ40-B1P	I/O
141	ADQ45-B1P	I/O	142	ADQ44-B1P	I/O
143	ADQ41-B1P	I/O	144	GND	-
145	GND	-	146	ADQS5-B1N	I/O
147	AMD5-B1P	I	148	ADQS5-B1P	I/O
149	GND	-	150	GND	-
151	ADQ42-B1P	I/O	152	ADQ46-B1P	I/O
153	ADQ43-B1P	I/O	154	ADQ47-B1P	I/O
155	GND	-	156	GND	-
157	ADQ48-B1P	I/O	158	ADQ52-B1N	I/O
159	ADQ49-B1P	I/O	160	ADQ53-B1N	I/O
161	GND	-	162	GND	-
163	N.C.	-	164	MCK1-B1P	I
165	GND	-	166	MCK1-B1N	I
167	ADQS6-B1N	I/O	168	GND	-
169	ADQS6-B1P	I/O	170	BDM6-B1P	I
171	GND	-	172	GND	-
173	ADQ55-B1P	I/O	174	ADQ54-B1P	I/O
175	ADQ51-B1P	I/O	176	ADQ50-B1P	I/O
177	GND	-	178	GND	-
179	ADQ56-B1P	I/O	180	ADQ60-B1P	I/O
181	ADQ57-B1P	I/O	182	ADQ61-B1P	I/O
183	GND	-	184	GND	-
185	ADM7-B1P	I	186	ADQS7-B1N	I/O
187	GND	-	188	ADQS7-B1P	I/O
189	ADQ58-B1P	I/O	190	GND	-
191	ADQ59-B1P	I/O	192	ADQ62-B1P	I/O
193	GND	-	194	ADQ63-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCLK-P3P	I/O	198	GND	-
199	P3V	I	200	GND	-

C.3   CN1850 1st HDD I/F connector (22-pin)

Table C-3 1st HDD I/F connector (22-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
S1	GND	-	S2	SATAT0-P3P	I
S3	SATAT0-P3N	I	S4	GND	-
S5	SATAR0-P3N	I	S6	SATAR0-P3P	I
S7	GND	-			
P1	P3V	I	P2	P3V	I
P3	P3V	I	P4	GND	-
P5	GND	-	P6	GND	-
P7	P5V	I	P8	P5V	I
P9	P5V	I	P10	GND	-
P11	GND	-	P12	GND	-
P13	N.C.	-	P14	N.C.	-
P15	N.C.	-			

C.4   CN1860 2nd HDD I/F connector (22-pin)

Table C-4 2nd HDD I/F connector (22-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
S1	GND	-	S2	SATAT2-P3P	I
S3	SATAT2-P3N	I	S4	GND	-
S5	SATAR2-P3N	I	S6	SATAR2-P3P	I
S7	GND	-			
P1	P3V	I	P2	P3V	I
P3	P3V	I	P4	GND	-
P5	GND	-	P6	GND	-
P7	P5V	I	P8	P5V	I
P9	P5V	I	P10	GND	-
P11	GND	-	P12	GND	-
P13	N.C.	-	P14	N.C.	-
P15	N.C.	-			

C.5   CN2100   PC card I/F connector (150-pin)

Table C-5 PC card I/F connector (150-pin) (1/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	USBP3-S3N	I/O	4	USBP3-S3P	I/O
5	GND	-	6	CPUSB-E3N	O
7	N.C (Reserve)	-	8	N.C (Reserve)	-
9	GND	-	10	N.C (Reserve)	-
11	CRD-E3V	I	12	CRD-E3V	I
13	CRD1R5-P1V	I	14	CRD1R5-P1V	I
15	CRD1R5-P1V	I	16	PEWAKE-S3N	I
17	GND	-	18	CRD-E3V	I
19	CRD-E3V	I	20	CRDRST-E3N	-
21	CRD-P3V	I	22	CRD-P3V	I
23	CRD-P3V	I	24	CRD-P3V	I
25	GND	-	26	CRDCRQ-E3N	O
27	CPPE-E3N	O	28	GND	-
29	GND	-	30	GND	-
31	XPECRD-P3N	I	32	XPECRD-P3P	I
33	GND	-	34	PERCRD-P3N	I
35	PERCRD-P3P	I	36	GND	-
37	GND	-	38	GND	-
39	GND	-	40	GND	-
41	PETCRD-P3N	I	42	PETCRD-P3P	I
43	GND	-	44	N.C	-
45	N.C	-	46	N.C	-
47	N.C	-	48	N.C	-
49	N.C	-	50	N.C	-
51	GND	-	52	N.C	-
53	N.C	-	54	N.C	-
55	N.C	-	56	N.C	-
57	N.C	-	58	N.C	-
59	GND	-	60	N.C	-

Table C-5 PC card I/F connector (150-pin) (2/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
61	N.C	-	62	N.C	-
63	N.C	-	64	N.C	-
65	N.C	-	66	N.C	-
67	GND	-	68	N.C	-
69	N.C	-	70	N.C	-
71	N.C	-	72	N.C	-
73	N.C	-	74	GND	-
75	GND	-			
76	GND	-	77	GND	-
78	ACCD1-E3N	I/O	79	ACAD00-EYP	I/O
80	ACAD02-EYP	I/O	81	ACAD01-EYP	I/O
82	ACAD04-EYP	I/O	83	ACAD03-EYP	I/O
84	GND	-	85	ACAD06-EYP	I/O
86	ACAD05-EYP	I/O	87	ACD14-EYP	I/O
88	ACAD07-EYP	I/O	89	ACAD08-EYP	I/O
90	ACCBE0-EYN	I/O	91	ACAD10-EYP	I/O
92	GND	-	93	ACAD09-EYP	I/O
94	ACVS1-E3P	I/O	95	ACAD11-EYP	I/O
96	ACAD13-EYP	I/O	97	ACAD12-EYP	I/O
98	ACAD15-EYP	I/O	99	ACAD14-EYP	I/O
100	GND	-	101	ACAD16-EYP	I/O
102	ACCBE1-EYN	I/O	103	ACA18-EYP	I/O
104	ACPAR-EYP	I/O	105	ACLOCK-EYN	I/O
106	ACPERR-EYN	I/O	107	ACSTOP-EYN	I/O
108	GND	-	109	ACGNT-EYN	-
110	ACDEVS-EYN	I/O	111	ACINT-EYN	I/O
112	MCVCCA-EYV	I/O	113	MCVCCA-EYV	I/O
114	MCVPPA-EYV	I/O	115	ACCLK-EYP	I/O
116	ACTRDY-EYN	I/O	117	ACIRDY-EYN	I/O
118	GND	-	119	ACFRAM-EYN	I/O

Table C-5 PC card I/F connector (150-pin) (3/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
120	ACCBE2-EYN	I/O	121	ACAD17-EYP	I/O
122	ACAD18-EYP	I/O	123	ACAD19-EYP	I/O
124	ACAD20-EYP	I/O	125	ACVS2-E3P	I/O
126	GND	-	127	ACAD21-EYP	I/O
128	ACRST-EYN	I/O	129	ACAD22-EYP	I/O
130	ACSERR-EYN	I/O	131	ACAD23-EYP	I/O
132	ACREQ-EYN	I/O	133	ACAD24-EYP	I/O
134	GND	-	135	ACCBE3-EYN	I/O
136	ACAD25-EYP	I/O	137	ACAUDI-EYP	I/O
138	ACAD26-EYP	I	139	ACSTSC-EYP	I/O
140	ACAD27-EYP	I/O	141	ACAD28-EYP	I/O
142	GND	-	143	ACAD29-EYP	I/O
144	ACAD30-EYP	I/O	145	ACD02-EYP	I/O
146	ACAD31-EYP	I/O	147	ACCLKR-EYN	I/O
148	ACCD2-E3N	I/O	149	GND	-
150	GND	-			

C.6   CN3200 Keyboard I/F connector (34-pin)

Table C-6 Keyboard I/F connector (34-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	NUMLED-P5N	I/O	2	ARWLED-P5N	I/O
3	CAPLED-P5N	I/O	4	P5V	-
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	O
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	O
17	KBRT02-S3N	O	18	KBRT03-S3N	O
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	O	22	KBRT05-S3N	O
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	O	26	KBRT07-S3N	O
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	P5V	-	30	N.C	-
31	N.C	-	32	N.C	-
33	N.C	-	34	P5V	-

C.7   CN3201 Touch pad I/F connector (4-pin)

Table C-7 Touch pad I/F connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	IPDCLK-P5P	I/O
3	IPDDAT-P5P	I/O	4	P5V	-

C.8   CN8770   CPU FAN connector (3-pin)

Table C-8   CPU FAN connector (3-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	FAN VCC	-	2	GND	-
3	FANG0-P3P	I			

C.9   CN8780   VGA FAN connector (3-pin)

Table C-9   VGA FAN connector (3-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	FAN VCC	-	2	GND	-
3	FANG1-P3P	I			

C.10 CN4610 USB I/F connector Port 0/Port 2 (8-pin)

Table C-10   USB I/F connector Port 0/Port 2 (8-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
A1	USB0PS-E5V	I	A2	USBP0-S3N	I/O
A3	USBP0-S3P	I/O	A4	GND	-
B1	USB0PS-E5V	I	B2	USBP2-S3N	I/O
B3	USBP2-S3P	I/O	B4	GND	-

C.11 CN4611 USB I/F connector Port 1 (8-pin)

Table C-11   USB I/F connector Port 1 (8-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	USBP4-S3P	I/O
3	USBP4-S3N	I/O	4	USB1PS-E5V	I
5	USB1PS-E5V	I	6	USBP6-S3P	I/O
7	USBP6-S3N	I/O	8	GND	-

C.12 CN8800 DC IN connector (4-pin)

Table C-12 DC IN connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PVL POWER	O	2	PVL POWER	O
3	GND	-	4	GND	-

C.13 IS2101 MEDIA BRIDGE I/F connector (42-pin)

Table C-13 MEDIA BRIDGE I/F connector (42-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MSDAT2-E3P	I/O	2	MSDAT3-E3P	I/O
3	MSBS-E3P	I/O	4	GND	-
5	GND	-	6	FM-E3V	I
7	MSCLK-E3P	I/O	8	MSDAT3-E3P	I/O
9	MSCD-E3N	O	10	MSDAT2-E3P	I/O
11	MSSDIO-E3P	I/O	12	MSDAT1-E3P	I/O
13	MSBS-E3P	I/O	14	GND	-
15	FM-E3V	I	16	MSCLK-E3P	I/O
17	GND	-	18	MSSDIO-E3P	I/O
19	MSDAT1-E3P	I/O	20	SM-E3V	I
21	SDAT3-E3P	I/O	22	SDAT2-E3P	I/O
23	SDAT1-E3P	I/O	24	SDAT0-E3P	I/O
25	MSDAT3-E3P	I/O	26	MSDAT2-E3P	I/O
27	MSDAT1-E3P	I/O	28	MSSDIO-E3P	I/O
29	GND	-	30	MSCLK-E3P	I/O
31	XDWE-E3N	I	32	SDCMD-E3P	I/O
33	SMCLE-E3P	I/O	34	XDCE-E3N	I
35	XDRE-E3N	I	36	SMRDY-E3P	I
37	SMCD-E3N	I	38	GND	-
39	GND	-	40	SDCD-E3N	O
41	GND	-	42	SDWP-E3P	O

C.14 CN2200 Wireless LAN card I/F connector (124-pin)

Table C-14 Wireless LAN card I/F connector (124-pin) (1/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	WLON-S3N	I	14	N.C.	-
15	GND	-	16	N.C.	-
17	PIRQF-P3N	I	18	P5V	I
19	P3V	I	20	PIRQG-P3N	O
21	N.C.	-	22	N.C.	-
23	GND	-	24	E3V	I
25	X33MPC-P3P	I	26	PCIRS1-S3N	O
27	GND	-	28	P3V	I
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	I	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	O
35	AD29-P3P	I/O	36	WCHCLK-P3P	O
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	I
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	WCHDAT-P3P	O	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD21-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-

Table C-14 Wireless LAN card connector (124-pin) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	P3V	I	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I/O	66	TRDY-P3N	I/O
67	SERR-P3N	I	68	STOP-P3N	I/O
69	GND	-	70	P3V	I
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/0
73	CBE1-P3N	I/O	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	I/O
87	AD07-P3P	I/O	88	P3V	I
89	P3V	I	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C.	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	I	98	N.C.	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	GND	-
103	N.C.	-	104	GND	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	N.C.	-
109	N.C.	-	110	N.C.	-
111	N.C.	-	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	N.C.	-
117	GND	-	118	N.C.	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	N.C.	-	124	E3V	I

C.15 CN2220 WW Tuner I/F connector (124-pin)

Table C-15 WW Tuner I/F connector (124-pin) (1/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	GND	-	10	GND	-
11	N.C.	-	12	N.C.	-
13	N.C.	-	14	N.C.	-
15	GND	-	16	N.C.	-
17	N.C.	-	18	T-P5V	I
19	P3V	-	20	PIRQD-P3N	I/O
21	N.C.	-	22	N.C.	-
23	GND	-	24	N.C.	-
25	X33MPT-P3P	I	26	PCIRS1-S3N	O
27	GND	-	28	P3V	I
29	PREQ1-P3N	I	30	PGNT1-P3N	O
31	T-P3V	I	32	GND	-
33	AD31-P3P	I/O	34	N.C.	-
35	AD29-P3P	I/O	36	N.C.	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	T-P3V	I
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	N.C.	-	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD25-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-

Table C-15 WW Tuner I/F connector (124-pin) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	T-P3V	I	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I/O	66	TRDY-P3N	I/O
67	SERR-P3N	I	68	STOP-P3N	I/O
69	GND	-	70	T-P3V	I
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/0
73	CBE1-P3N	I/O	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	I/O
87	AD07-P3P	I/O	88	T-P3V	-
89	T-P3V	I	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	T-P5V	I	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	T-P5V	I	98	T-P5V	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	GND	-
103	N.C.	-	104	N.C.	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	N.C.	-
109	N.C.	-	110	N.C.	-
111	N.C.	-	112	GND	-
113	GND	-	114	GND	-
115	N.C.	-	116	GND	-
117	GND	-	118	GND	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	T-P5V	I	124	N.C.	-

C.16 CN4100 Network I/F connector (14-pin)

Table C-16 Network I/F connector (14-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	GND	-
5	TDP-P3P	I	6	TDN-P3N	I
7	RDP-P3P	I	8	RDN-P3N	I/O
9	N.C.	-	10	N.C.	-
11	P3V	I	12	P3V	I
13	LNK-P3N	I/O	14	ACT-P3N	I/O

C.17 CN4200 1394 I/F connector (4-pin)

Table C-17 1394 I/F connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	TPB0-E3N	I/O	2	TPB0-E3P	I/O
3	TPA0-E3N	I/O	4	TPA0-E3P	I/O

C.18 CN5000 LCD I/F connector (41-pin)

Table C-18 LCD I/F connector (41-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	LTXCK0-P3N	I/O	2	LTXCK0-P3P	I/O
3	GND	-	4	LTXDT0-P3N	I/O
5	LTXDT0-P3P	I/O	6	LTXDT1-P3N	I/O
7	LTXDT1-P3P	I/O	8	LTXDT2-P3N	I/O
9	LTXDT2-P3P	I/O	10	GND	-
11	LTXCK1-P3N	I/O	12	LTXCK1-P3P	I/O
13	GND	-	14	LTXDT4-P3N	I/O
15	LTXDT4-P3P	I/O	16	LTXDT5-P3N	I/O
17	LTXDT5-P3P	I/O	18	LTXDT6-P3N	I/O
19	LTXDT6-P3P	I/O	20	GND	-
21	GND	-	22	NVCSCL-P3P	I/O
23	P3V	I	24	PNL-P3V	I
25	PNL-P3V	I	26	NVCSDA-P3P	I/O
27	GND	-	28	GND	-
29	GND	-	30	GND	-
31	GND	-	32	FL-GND	-
33	BRT0-P5P	I/O	34	BRT1-P5P	I/O
35	BRT2DA-S3P	I/O	36	FL-P5V	I
37	FL-P5V	I	38	FL-P5V	I
39	FL-P5V	I	40	FL-P5V	I
41	FL-P5V	I			

C.19 CN5080 CRT I/F connector (15-pin)

Table C-19 CRT I/F connector (15-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	NVARED-PXP	I	2	NVAGRN-PXP	I
3	NVABLU-PXP	I	4	N.C	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	DDC-P5V	I	10	GND	-
11	N.C	-	12	NVASDA-P5P	I/O
13	(AHSYNC-P3P)	I/O	14	(AVSYNC-P3P)	I/O
15	NVASCL-P5P	I/O			

C.20 CN5501 S-video out I/F connector (4-pin)

Table C-20 S-video out I/F connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	(NVBGRN-PXP)	I	4	(NVBRED-PXP)	I

C.21 CN5502 D-video I/F connector (14-pin)

Table C-21 D-video I/F connector (14-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	HDTVY-PXP	I	2	GND	-
3	HDTVPB-PXP	I	4	GND	-
5	HDTVPR-PXP	I	6	GND	-
7	LINOTL-PXP	I	8	(LINE1)	I/O
9	(LINE2)	I/O	10	LINOTR-PXP	I
11	(LINE3)	I/O	12	GND	-
13	LINOT-GND	O	14	(Plug)	I/O

C.22 CN6003 Speaker (Right) connector (2-pin)

Table C-22 Speaker (Right) connector (2-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SPOTR-PXN	O	2	SPOTR-PXP	I/O

C.23 CN3330 Volume I/F connector (3-pin)

Table C-23 Volume I/F connector (3-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	ROTENA-S3N	O	2	GND	-
3	ROTENB-S3N	O			

C.24 CN3360 Touch sensor I/F connector (10-pin)

Table C-24 Touch sensor I/F connector (10-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	MEPCLK-S5P	I
5	MEPACK-S5P	I	6	MEPDAT-S5P	I/O
7	TC-S5V	O	8	TC-S5V	O
9	PNLOFF-S3N	I	10	GND	-

C.25 CN3400 Debug port (4-pin)

Table C-25 Debug port connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	P3V	I	2	DBGRX-P3P	O
3	(TXD1)	I	4	GND	-

C.26 CN4400 Bluetooth I/F connector (20-pin)

Table C-26 Bluetooth I/F connector (20-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	N.C.	-
3	BTMDL-P3N	O	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	BTRST-S3N	I
9	N.C.	-	10	N.C.	-
11	GND	-	12	N.C.	-
13	GND	-	14	WCHCLK-P3P	O
15	N.C.	-	16	USBP1-S3P	I/O
17	USBP1-S3N	I/O	18	WCHDAT-P3P	I
19	N.C.	-	20	BT-P3V	I

C.27 CN5661 TV tuner I/F connector (12-pin)

Table C-27 TV tuner I/F connector (12-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	LINL-PXP	I/O
3	LIN-GND	I/O	4	LINR-PXP	I/O
5	GND	-	6	COMP01-PXP	I
7	GND	-	8	LUMA01-PXP	I
9	GND	-	10	CROM01-PXP	I
11	GND	-	12	GND	-

C.28 CN5800 SVP Host I/F connector (2-pin)

Table C-28 SVP Host I/F connector (2-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SVSCL-P3P	I/O	2	SVSDA-P3P	I/O

C.29 CN8020 Battery (Power) I/F connector (6-pin)

Table C-29 Battery (Power) I/F connector (6-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	PVBH1	O
5	PVBH1	O	6	PVBH1	O

C.30 CN8811 Battery (Signal) I/F connector (15-pin)

Table C-30 Battery (Signal) I/F connector (15-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	DBT10V-S5N	I/O	2	GND	-
3	PSDA-S5P	I/O	4	PSCL-S5P	I/O
5	M5V	I	6	BTMP1	I/O
7	S-R3V	O	8	BAT1OR-S5N	I
9	BAT1GR-S5N	I	10	PWLEOR-S3P	I
11	PWLEGR-S3P	I	12	DCINOR-S5N	I
13	DCINGR-S5N	I	14	GND	-
15	RCIRRX-S3P	I/O			

C.31 CN1810 ODD relay board (FNN2D*) I/F connector (50-pin)

Table C-31   ODD relay board (FNN2D*) I/F connector (50-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	CDRLED-P5N	I
5	P5V	I	6	P5V	I
7	P5V	I	8	P5V	I
9	P5V	I	10	PDCS3-P3N	I
11	PDCS1-P3N	I	12	PDA2-P3P	I
13	GND	-	14	PDA0-P3P	I
15	PDA1-P3P	I	16	IDEIRQ-P3P	O
17	PDDACK-P3N	I	18	GND	-
19	PIORDY-P3P	O	20	GND	-
21	PDIOR-P3N	I	22	GND	-
23	PDIOW-P3N	I	24	PDDREQ-P3P	O
25	PDD00-P3P	I/O	26	GND	-
27	PDD15-P3P	I/O	28	PDD01-P3P	I/O
29	PDD14-P3P	I/O	30	PDD02-P3P	I/O
31	GND	-	32	PDD13-P3P	I/O
33	PDD03-P3P	I/O	34	PDD12-P3P	I/O
35	PDD04-P3P	I/O	36	GND	-
37	PDD11-P3P	I/O	38	PDD05-P3P	I/O
39	PDD10-P3P	I/O	40	PDD06-P3P	I/O
41	GND	-	42	PDD09-P3P	I/O
43	PDD07-P3P	I/O	44	PDD08-P3P	I/O
45	PLTRS0-S3N	I	46	GND	-
47	CDAUDL-PXP	O	48	CD-GND	I
49	CDAUDR-PXP	O	50	GND	-

C.32 CN9500 Sound board (FNN2N*) I/F connector (57-pin)

Table C-32 Sound board (FNN2N*) I/F connector (57-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	CDAUDL-PXP	I	2	CD-GND	I
3	CDAUDR-PXP	I	4	LINOTR-PXP	I
5	LINOT-GND	I	6	LINOTL-PXP	I
7	GND	-	8	X97BC1-P3P	I/O
9	GND	-	10	SPKON-P3N	I/O
11	BTLED-S3P	I	12	FMLED-E3P	I/O
13	E3V	I	14	SATLED-P3P	I
15	M97IN2-E3P	I/O	16	M97IN1-P3P	I/O
17	GND	-	18	M97RS2-S3N	I/O
19	M97RS1-S3N	I/O	20	GND	-
21	M97OT2-P3P	I/O	22	M97OT1-P3P	I/O
23	GND	-	24	M97SY2-P3P	I/O
25	M97SY1-P3P	I/O	26	GND	-
27	X14SND-P3P	I/O	28	GND	-
29	SNDMUT-S3N	I/O	30	P3V	I
31	AMPSD-S3N	I/O	32	AMPSD-S3N	I
33	SND-P5V	O	34	SND-P5V	O
35	SND-P5V	O	36	SND-P5V	O
37	SND-P5V	O	38	BEEP-PXP	I
39	SND-GND	-	40	SND-GND	-
41	SND-GND	-	42	SND-GND	-
43	SND-GND	-	44	LINR-PXP	I/O
45	LIN-GND	I/O	46	LINL-PXP	I/O
47	GND	-	48	SPOTR-PXP	I/O
49	SPOTR-PXP	I/O	50	SPOTR-PXN	I/O
51	SPOTR-PXN	I/O	52	P5V	I
53	CDRLED	I	54	GND	-
55	PWRSW-S3N	I	56	BTSWON-S3P	I
57	S3V	I			

C.33 CN5660 AV-IN board (FNN2V*) I/F connector (10-pin)

Table C-33 AV-IN board (FNN2V*) I/F connector (10-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SND-P5V	I	2	LINR-PXP	I/O
3	LIN-GND	I/O	4	LINL-PXP	I/O
5	GND	-	6	COMPIN-PXP	I/O
7	GND	-	8	CROMIN-PXP	I/O
9	GND	-	10	LUMAIN-PXP	I/O

ODD relay board (FNN2D*)

C.34 CN1820 CD-ROM I/F connector (50-pin)

Table C-34 CD-ROM I/F connector (50-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	AUDL-PXP	I	2	AUDR-PXP	I
3	AUD-GND	-	4	N.C.	-
5	IDRSTB-P5N	O	6	PDD08-P3P	I/O
7	PDD07-P3P	I/O	8	PDD09-P3P	I/O
9	PDD06-P3P	I/O	10	PDD10-P3P	I/O
11	PDD05-P3P	I/O	12	PDD11-P3P	I/O
13	PDD04-P3P	I/O	14	PDD12-P3P	I/O
15	PDD03-P3P	I/O	16	PDD13-P3P	I/O
17	PDD02-P3P	I/O	18	PDD14-P3P	I/O
19	PDD01-P3P	I/O	20	PDD15-P3P	I/O
21	PDD00-P3P	I/O	22	PDDREQ-P3P	I
23	GND	-	24	PDIOR-P3N	O
25	PDIOW-P3N	O	26	GND	-
27	PIORDY-P3P	I	28	PDDACK-P3N	O
29	IDEIRQ-P3P	I	30	N.C.	-
31	PDA1-P3P	O	32	N.C.	-
33	PDA0-P3P	O	34	PDA2-P3P	O
35	PDCS1-P3P	O	36	PDCS3-P3P	O
37	CDRLED-P5N	I/O	38	P5V	O
39	P5V	O	40	P5V	O
41	P5V	O	42	P5V	O
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	N.C.	-	48	GND	-
49	N.C.	-	50	N.C.	-

C.35 CN9680 System board I/F connector (50-pin)

Table C-35 System board I/F connector (50-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	AUDR-PXP	O
3	AUD-GND	-	4	AUDL-PXP	O
5	GND	-	6	IDRSTB-P5N	I
7	PDD08-P3P	I/O	8	PDD07-P3P	I/O
9	PDD09-P3P	I/O	10	GND	-
11	PDD05-P3P	I/O	12	PDD10-P3P	I/O
13	PDD06-P3P	I/O	14	PDD11-P3P	I/O
15	GND	-	16	PDD04-P3P	I/O
17	PDD12-P3P	I/O	18	PDD03-P3P	I/O
19	PDD13-P3P	I/O	20	GND	-
21	PDD02-P3P	I/O	22	PDD14-P3P	I/O
23	PDD01-P3P	I/O	24	PDD15-P3P	I/O
25	GND	-	26	PDD00-P3P	I/O
27	PDDREQ-P3P	O	28	PDIOW-P3N	I
29	GND	-	30	PDIOR-P3N	I
31	GND	-	32	PIORDY-P3P	O
33	GND	-	34	PDDACK-P3N	I
35	IDEIRQ-P3P	O	36	PDA1-P3P	I
37	PDA0-P3P	I	38	GND	-
39	PDA2-P3P	I	40	PDCS1-P3P	I
41	PDCS3-P3P	I	42	P5V	I
43	P5V	I	44	P5V	I
45	P5V	I	46	P5V	I
47	CDRLED-P5N	I/O	48	GND	-
49	GND	-	50	GND	-

Sound board (FNN2N*)

C.36 CN3000 MDC I/F connector (30-pin)

Table C-36 MDC I/F connector (30-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C	-	2	GND	-
3	GND	-	4	N.C	-
5	N.C	-	6	N.C	-
7	N.C	-	8	GND	-
9	N.C	-	10	N.C	-
11	N.C	-	12	N.C	-
13	N.C	-	14	N.C	-
15	GND	-	16	E3V	I
17	E3V	I	18	N.C	-
19	GND	-	20	GND	-
21	N.C	-	22	M97SY2-P3P	O
23	M97OT2-P3P	I	24	N.C	-
25	M97RS2-S3N	I	26	M97IN2-E3P	O
27	GND	-	28	GND	-
29	GND	-	30	X97BC2-P3P	I/O

C.37 CN6002 Speaker (Left) connector (3-pin)

Table C-37 Speaker (Left) connector (3-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(SP_OUT_L-)	I	2	N.C.	-
3	(SP_OUT_L+)	I			

C.38 CN9510 System board I/F connector (57-pin)

Table C-38 System board I/F connector (57-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	CDAUDL-PXP	O	2	CD-GND	O
3	CDAUDR-PXP	O	4	LINOTR-PXP	O
5	A-GND	-	6	LINOTL-PXP	O
7	GND	-	8	X97BC1-P3P	I/O
9	GND	-	10	SPKON-P3N	I/O
11	BTLED-S3P	I/O	12	FMLED-E3P	I/O
13	E3V	O	14	SATLED-P3P	O
15	M97IN2-E3P	I/O	16	M97IN1-P3P	I/O
17	GND	-	18	M97RS2-S3N	I/O
19	M97RS1-S3N	I/O	20	GND	-
21	M97OT2-P3P	I/O	22	M97OT1-P3P	I/O
23	GND	-	24	M97SY2-P3P	I/O
25	M97SY1-P3P	I/O	26	GND	-
27	X14SND-P3P	I/O	28	GND	-
29	SNDMUT-S3N	I/O	30	P3V	O
31	P3V	O	32	AMPSD-S3N	O
33	SND-P5V	O	34	SND-P5V	O
35	SND-P5V	O	36	SND-P5V	O
37	SND-P5V	O	38	BEEP-PXP	O
39	SND-GND	O	40	SND-GND	O
41	SND-GND	O	42	SND-GND	O
43	SND-GND	O	44	LINR-PXP	I/O
45	A-GND	-	46	LINL-PXP	I/O
47	GND	-	48	SPOTR-PXP	I/O
49	SPOTR-PXP	I/O	50	SPOTR-PXN	I/O
51	SPOTR-PXN	I/O	52	P5V	O
53	CDRLED	O	54	GND	-
55	PWRSW-S3N	O	56	BTSWON-S3P	O
57	S3V	O			

C.39 CN9520 Sound jack board I/F connector (20-pin)

Table C-39 Sound jack board I/F connector (20-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	BTSWON-S3P	I	4	S3V	I
5	N.C.	-	6	SPD3V-P3V	I
7	DOUT-P3P	I	8	GND	-
9	A-GND	-	10	A-GND	-
11	MICIN-PXP	O	12	A4R7-P4V	I
13	A4R7-P4V	I	14	HEADR-PXP	I
15	A-GND	-	16	HEADL-PXP	I
17	VREF1-P2V	O	18	SPKEN-P4P	O
19	GND	-	20	SPDJIN-P3N	O

C.40 CN9521 Power switch board (FNN2P*) I/F connector (4-pin)

Table C-40 Power switch board (FNN2P) I/F connector (4-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	P5V	I	2	PWRSW-S3N	I
3	GND	-	4	GND	-

AV-IN board (FNN2V*)

C.41 CN9614 System board I/F connector (10-pin)

Table C-41 System board I/F connector (10-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SND-P5V	O	2	(LINR-PXP)	I/O
3	A-GND	-	4	(LINL-PXP)	I/O
5	TV-GND	-	6	COMPIN-PXP	I/O
7	TV-GND	-	8	CROMIN-PXP	I/O
9	TV-GND	-	10	LUMAIN-PXP	I/O

C.42 J9612 Composite-in connector (5-pin)

Table C-42 Composite-in connector (5-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(LINR-PXP)	O	2	TV-GND	-
3	COMPIN-PXP	I/O	4	(LINL-PXP)	O
5	TV-GND	-			

C.43 CN9613 S-video IN I/F connector (4-pin)

Table C-43 S-video IN I/F connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	TV-GND	-	2	TV-GND	-
3	LUMAIN-PXP	I/O	4	CROMIN-PXP	I/O

Antenna jack board (FNN2A*)

C.44 J9610 TV antenna connector (4-pin)

Table C-44 TV antenna connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(CN9611-3)	I/O	2	(CN9611-1)	I/O
3	(CN9611-2)	I/O	4	(CN9611-4)	I/O

C.45 CN9611 Coaxial connector (4-pin)

Table C-45 Coaxial connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(CN9610-2)	I/O	2	(CN9610-3)	I/O
3	(CN9610-1)	I/O	4	(CN9610-4)	I/O

Sound jack board (FNN2J*)

C.46 CN4622 System board I/F connector (8-pin)

Table C-46 System board I/F connector (8-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	(CN4620-3)	I/O
3	(CN4620-2)	I/O	4	(CN4620-1)	I/O
5	(CN4620-1)	I/O	6	(CN4621-3)	I/O
7	(CN4622-3)	I/O	8	GND	-

C.47 CN4620 USB I/F connector Port 4 (4-pin)

Table C-47 USB I/F connector Port 4 (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(CN4622-4)	I/O	2	(CN4622-3)	I/O
3	(CN4622-2)	I/O	4	GND	-

C.48 CN4621 USB I/F connector Port 6 (4-pin)

Table C-48 USB I/F connector Port 4 (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(CN4622-4)	I/O	2	(CN4622-7)	I/O
3	(CN4622-6)	I/O	4	GND	-

C.49 CN6000 Internal microphone connector (2-pin)

Table C-49 Internal microphone I/F connector (6-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(VREF1-P2V)	I	2	A-GND	-

C.50 J6001 External microphone I/F connector (6-pin)

Table C-50 External microphone I/F connector (6-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	A-GND	-	2	(MICIN-PXP)	O
3	(BIAS)	O	4	N.C.	-
5	N.C.	-	6	(VREF1-P2V)	O

C.51 DS6000 Headphone/SPDIF connector (10-pin)

Table C-51 Headphone/SPDIF connector (10-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(SPKEN-P4P)	I	2	HEADL-PXP	I
3	HEADR-PXP	I	4	A-GND	-
5	SPDJIN-P3N	O	6	N.C	-
7	DOUT-P3P	I	8	SPD3V-P3V	I
9	GND	-	10	N.C	-

C.52 CN9530 Sound board (FNN2N*) I/F connector (20-pin)

Table C-52 Sound board (FNN2N) I/F connector (20-pin)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	SPDJIN-P3N	O	2	GND	-
3	SPKEN-P4P	O	4	VREF1-P2V	O
5	HEADL-PXP	I	6	A-GND	-
7	HEADR-PXP	I	8	A4R7-P4V	I
9	A4R7-P4V	I	10	MICIN-PXP	O
11	A-GND	-	12	A-GND	-
13	GND	-	14	DOUT-P3P	I
15	SPD3V-P3V	I	16	N.C.	-
17	S3V	I	18	BTSWON-S3P	I
19	GND	-	20	GND	-

Battery board (FNN2B*)

C.53 CN9690 System board (Power) I/F connector (6-pin)

Table C-53 System board (Power) I/F connector (6-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PVBL1-BAT	I/O	2	PVBL1-BAT	I/O
3	PVBL1-BAT	I/O	4	BATGND1	I/O
5	BATGND1	I/O	6	BATGND1	I/O

C.54 CN9691 System board (Signal) I/F connector (15-pin)

Table C-54 System board (Signal) I/F connector (15-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(OV)	I/O	2	(VSS)	I/O
3	(MBDAT)	I/O	4	(MBCLK)	I/O
5	M5V	O	6	(Thrm+)	I/O
7	(CN9990-1)	I	8	BAT1OR	O
9	BAT1GR	O	10	PWLEOR-S5N	O
11	PWLEGR-S5N	O	12	DCINOR-S5N	O
13	DCINOR-S5N	O	14	GND	-
15	RCIRRX-S5P	I/O			

C.55 CN8810 Battery I/F connector (10-pin)

Table C-55   Battery I/F connector (10-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	PVBL1-BAT	I/O	2	(Thrm+)	I/O
3	BATDCHG1	I/O	4	R-M5V	I/O
5	(MBCLK)	I/O	6	(MBDAT)	I/O
7	(VSS)	I/O	8	(OV)	I/O
9	BATVSS1	I/O	10	BATGND1	I/O

C.56 CN9990 RTC battery connector (3-pin)

Table C-56   RTC battery connector (3-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	(CN9691-7)	O	2	N.C	-
3	GND	-			

Power switch board (FNN2P*)

C.57 CN9622 Sound board (FNN2N*) I/F connector (4-pin)

Table C-57 Sound board (FNN2N*) I/F connector (4-pin)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	LED-P5V	O	2	PWRSW-S3N	I
3	GND	-	4	GND	-

Appendix D   Display Codes

D.1   Display Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1 Make	Code set 1 Break	Code set 2 Make	Code set 2 Break		Note
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 $	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (	0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	13	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	**Break**	**Make**	**Break**		
29	\ |	2B	AB	5D	F0	5D	*5
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*2
38	K	25	A5	42	F0	42	*2
39	L	26	A6	4B	F0	4B	*2
40	; :	27	A7	4C	F0	4C	*2
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*2
53	, <	33	B3	41	F0	41	*2
54	. >	34	B4	49	F0	49	*2
55	/ ?	35	B5	4A	F0	4A	*2
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
58	Ctrl	1D	9D	14	F0	14	*3
60	Alt (L)	38	B8	11	F0	11	*3
61	Space	39	B9	29	F0	29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0	11	
75	Ins	E0 52	E0 D2	E0 70	E0 F0	70	*1
76	Del	E0 53	E0 D3	E0 71	E0 F0	71	*1
79	←	E0 4B	E0 CB	E0 6B	E0 F0	6B	*1
80	Home	E0 47	E0 C7	E0 6C	E0 F0	6C	*1
81	End	E0 4F	E0 CF	E0 69	E0 F0	69	*1
83	↑	E0 48	E0 C8	E0 75	E0 F0	75	*1
84	↓	E0 50	E0 D0	E0 72	E0 F0	72	*1
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0	7D	*1
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0	7A	*1
89	→	E0 4D	E0 CD	E0 74	E0 F0	74	*1
110	Esc	01	81	76	F0	76	
112	F1	3B	BB	05	F0	05	
113	F2	3C	BC	06	F0	06	
114	F3	3D	BD	04	F0	04	
115	F4	3E	BE	0C	F0	0C	
116	F5	3F	BF	03	F0	03	
117	F6	40	C0	0B	F0	0B	
118	F7	41	C1	83	F0	83	
119	F8	42	C2	0A	F0	0A	
120	F9	43	C3	01	F0	01	
121	F10	44	C4	09	F0	09	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1 Make		Code set 1 Break		Code set 2 Make		Code set 2 Break			Note
122	F11	57		D7		78		F0	78		*3
123	F12	58		D8		07		F0	07		*3
124	PrintSc	*6		*6		*6		*6			*6
126	Pause	*7		*7		*7		*7			*7
202	Fn	—		—		—		—			*4
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F	
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F	

Notes:

1. *   Scan codes differ by mode.
2. *   Scan codes differ by overlay function.
3. *   Combined with the **Fn** key makes different codes.
4. *   **Fn** key does not generate a code by itself.
5. *   This key corresponds to key No. 42 in a 102-key model.
6. *   Refer to Table D-6, No. 124 key scan code.
7. *   Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1								Code set 2							
		Make				Break				Make				Break			
55	/	E0	AA	E0	35	E0	B5	E0	2A	E0	F0	12	E0	4A	E0	F0	4A	E0	12
75	INS	E0	AA	E0	52	E0	D2	E0	2A	E0	F0	12	E0	70	E0	F0	70	E0	12
76	DEL	E0	AA	E0	53	E0	D3	E0	2A	E0	F0	12	E0	71	E0	F0	71	E0	12
79	←	E0	AA	E0	4B	E0	CB	E0	2A	E0	F0	12	E0	6B	E0	F0	6B	E0	12
80	Home	E0	AA	E0	47	E0	C7	E0	2A	E0	F0	12	E0	6C	E0	F0	6C	E0	12
81	End	E0	AA	E0	4F	E0	CF	E0	2A	E0	F0	12	E0	69	E0	F0	69	E0	12
83	↑	E0	AA	E0	48	E0	C8	E0	2A	E0	F0	12	E0	75	E0	F0	75	E0	12
84	↓	E0	AA	E0	50	E0	D0	E0	2A	E0	F0	12	E0	72	E0	F0	72	E0	12
85	PgUp	E0	AA	E0	49	E0	C9	E0	2A	E0	F0	12	E0	7D	E0	F0	7D	E0	12
86	PgDn	E0	AA	E0	51	E0	D1	E0	2A	E0	F0	12	E0	7A	E0	F0	7A	E0	12
89	→	E0	AA	E0	4D	E0	CD	E0	2A	E0	F0	12	E0	74	E0	F0	74	E0	12
203	Win	E0	AA	E0	5B	E0	DB	E0	2A	E0	F0	12	E0	1F	E0	F0	1F	E0	12
204	App	E0	AA	E0	5D	E0	DD	E0	2A	E0	F0	12	E0	2F	E0	F0	2F	E0	12

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap	Key	Code set 1								Code set 2								
No.	top	Make				Break				Make				Break				
75	INS	E0	2A	E0	52	E0	D2	E0	AA	E0	12	E0	70	E0	F0	70	E0	F0	12
76	DEL	E0	2A	E0	53	E0	D3	E0	AA	E0	12	E0	71	E0	F0	71	E0	F0	12
79	←	E0	2A	E0	4B	E0	CB	E0	AA	E0	12	E0	6B	E0	F0	6B	E0	F0	12
80	Home	E0	2A	E0	47	E0	C7	E0	AA	E0	12	E0	6C	E0	F0	6C	E0	F0	12
81	End	E0	2A	E0	4F	E0	CF	E0	AA	E0	12	E0	69	E0	F0	69	E0	F0	12
83	↑	E0	2A	E0	48	E0	C8	E0	AA	E0	12	E0	75	E0	F0	75	E0	F0	12
84	↓	E0	2A	E0	50	E0	D0	E0	AA	E0	12	E0	72	E0	F0	72	E0	F0	12
85	PgUp	E0	2A	E0	49	E0	C9	E0	AA	E0	12	E0	7D	E0	F0	7D	E0	F0	12
86	PgDn	E0	2A	E0	51	E0	D1	E0	AA	E0	12	E0	7A	E0	F0	7A	E0	F0	12
89	→	E0	2A	E0	4D	E0	CD	E0	AA	E0	12	E0	74	E0	F0	74	E0	F0	12
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	E0	F0	12

Table D-4 Scan codes with Fn key

Cap		Code set 1				Code set 2			
No.	Keytop	Make		Break		Make		Break	
43	ENT	E0	1C	E0	9C	E0	5A	E0	F0	5A
58	CTRL	E0	1D	E0	9D	E0	14	E0	F0	14
60	LALT	E0	38	E0	B8	E0	11	E0	F0	11
121	ARROW	45		C5		77		F0	77
122	NUMERIC	45		C5		77		F0	77
123	Scrl	46		C5		7E		F0	7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2	
			Make	Break	Make	Break
09	8	(8)	48	C8	75	F0 75
10	9	(9)	49	C9	7D	F0 7D
11	0	(*)	37	B7	7C	F0 7C
23	U	(4)	4B	CB	6B	F0 6B
24	I	(5)	4C	CC	73	F0 73
25	O	(6)	4D	CD	74	F0 74
26	P	(−)	4A	CA	7B	F0 7B
37	J	(1)	4F	CF	69	F0 69
38	K	(2)	50	D0	72	F0 72
39	L	(3)	51	D1	7A	F0 7A
40	;	(+)	4E	CE	79	F0 79
52	M	(0)	52	D2	70	F0 70
54	.	(.)	53	D3	71	F0 71
55	/	(/)	E0 35	E0 B5	40 4A	E0 F0 4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A E0 37		E0 B7 E0 AA		E0 12 E0 7C		E0 F0 7C E0 F0 12	
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Shift +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Alt +	54		D4		84		F0 B4	

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2						
		Make						Make						
Pause	Common*	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E		

*: This key generates only make codes.

Appendix E   Key Layout

E.1   United States (US) Keyboard

Figure E-1 US Keyboard layout

E.2   United Kingdom (UK) Keyboard

Figure E-2 UK Keyboard layout

Appendix F   Wiring Diagrams

F.1   RGB Monitor ID Wraparound connector

```
(1) RED        ——————————————————————  RED      (1)
(2) GREEN      ——————————————————————  GREEN    (2)
(3) BLUE       ——————————————————————  BLUE     (3)
(4) NC         ——————————————————————  NC       (4)
(5) GND        ——————————————————————  GND      (5)
(6) GND        ——————————————————————  GND      (6)
(7) GND        ——————————————————————  GND      (7)
(8) GND        ——————————————————————  GND      (8)
(9) 5V         ——————————————————————  5V       (9)
(10) GND       ——————————————————————  GND      (10)
(11) NC        ——————————————————————  NC       (11)
(12) SDA       ——————————————————————  SDA      (12)
(13) HSYNC     ——————————————————————  HSYNC    (13)
(14) VSYNC     ——————————————————————  VSYNC    (14)
(15) SDL       ——————————————————————  SCL      (15)
```

Figure F-1 RGB Monitor ID Wraparound connector (15PIN to 15PIN)

F.2   LAN loopback Connector

```
(1) BIBAP '(TX+)——————————————————————(3) BIDBP (RX+)
(2) BIDAN (TX-) ——————————————————————(4) BIDBN (RX-)
```

Figure F-2 LAN loopback connector

Appendix G   BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

❑ BIOS/EC/KBC rewriting disk

Rewriting the BIOS

1. Set the system to boot mode.

2. Turn off the power to the computer.

3. Remove the external cables and cards.

4. Connect an external FDD and insert the BIOS rewriting disk into the external FDD.

5. Turn on the power while holding down the tilde character key.

For example

  (US Keyboard)

   (UK Keyboard)
(Keep holding down the key.)

6. The BIOS rewriting starts.

7. When the process is completed, it beeps and the system automatically reboots.

NOTE: 1. *Connect the AC adapter to the computer when you rewrite the BIOS.*

2. *Do not turn off the power while you are rewriting the BIOS.
    If the rewrite fails, it might be impossible to start up the computer.*

3. *If you fail to rewrite BIOS, then when you next turn on the power, a
    message may be displayed that the contents of the BIOS have been erased.
    In this case, insert the BIOS rewriting disk and the BIOS will be rewritten.*

Appendix H EC/KBC Rewrite Procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

It is necessary to rewrite the EC/KBC system program when the following changes are made.

    1. Replacing of system board

    2. Replacing of LCD

Tools

To rewrite the EC/KBC, you need the following tool:

    ❑ EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

> *NOTE:* *1.* *Rewrite the EC/KBS only when instructed by a diagnostic disk release notice.*
>
>   *2.* *Connect the AC adaptor to the computer when you rewrite the EC/KBC.*
>
>   *3.* *Do not turn off the power while you are rewriting the EC/KBC.*
>   *If the rewrite fails, it might be impossible to start up the computer.*
>
>   *4.* *If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC have been erased. In this case, insert the EC/KBC rewriting disk, and the EC/KBC will be rewritten.*
>
>   *5.* *Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.*

    1. Set the system to boot mode.

    2. Turn off the power to the computer.

    3. Remove the external cables and cards.

4. Connect an external FDD and insert the EC/KBC rewriting disk into the external FDD.

5. Turn on the power while holding down the Tab key. (Keep holding down the key until a message appears on the screen.) The EC/KBC rewriting starts.

6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I   Reliability

The following table shows MTBF (Mean Time Between Failures) in maximum configuration.

Table I-1 MTBF

Component	Time (hours)
System	6704.32

Appendix J   Maintenance of TOSHIBA RAID

J.1 Outline of Maintenance (Repair) of TOSHIBA RAID

Follow the below procedures to repair TOSHIBA RAID
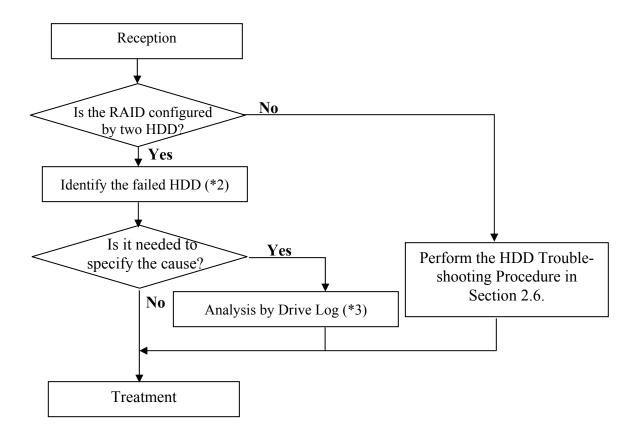
Figure J-1 Flowchart of repairing TOSHIBA RAID

*1: Refer to "Check of RAID configuration" in Section 3.2 in Chapter 3.

*2: Refer to "Identifying failed HDD" in Section 3.3.3 of Chapter 3.

*3: Refer to "Analysis by Drive Log" in section J.2.

J.2 Analysis and handling by Drive Log

Follow the below procedures to analyze.
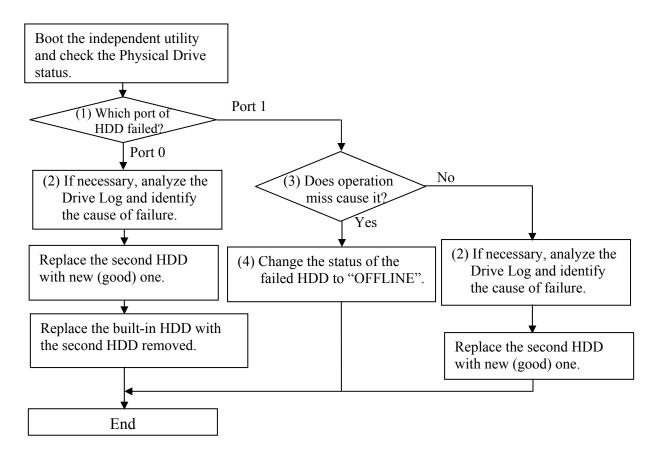
Figure J-2 Flowchart of Analysis and handling by Drive Log
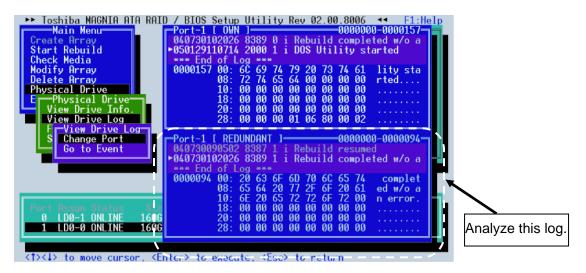
J.2.1   How to identify the cause of failure

(1) When "Fail" or "NODRIVE" is displayed

According to "Operation of Independent utility", boot the independent utility to display the Drive Log.

To identify the failure cause of Port 0, analyze the Drive Log of [REDUNDANT] side of Port 1.

To identify the failure cause of Port 1, analyze the Drive Log of [REDUNDANT] side of Port 0.
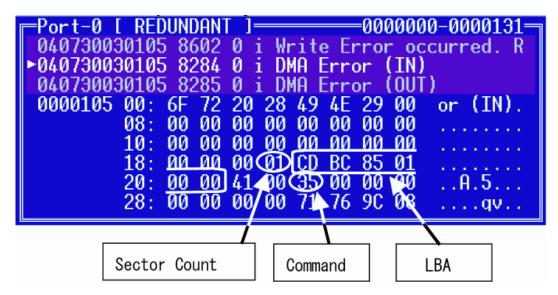
1. Find the log of message of "Fail this drive" last generated, using **[PgUp]** and **[PgDn]** keys.
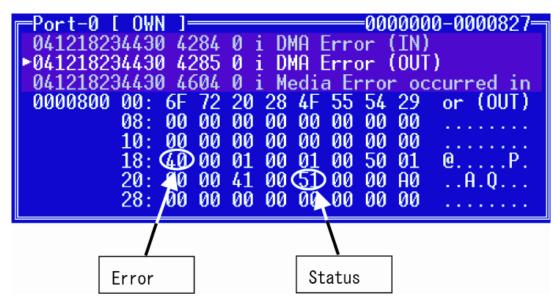
2. Analyze the detailed date of the message of right before of "xxx Error (IN)", "xxx Error (OUT)" (for example, "DMA Error (IN)", "DMA Error (OUT)") right before the log of "Fail this drive" message and identify the cause.

DMA Error (IN)

DMA Error (OUT)

Command : Indicates Command code caused an error. The following list indicates the command

Table J-1   List of Command (1/2)

Protocol	Command	Devices not implementing the PACKET Command feature set	Devices implementing the PACKET Command feature set	Command code
ND	NOP	O	M	00h
ND	CFA REQUEST EXTENDED ERROR	O	N	03h
DR	DEVICE RESET	O	M	08h
PI	READ SECTOR(S)	M	N	20h
PI	READ SECTOR(S) EXT	O	N	24h
DM	READ DMA EXT	O	N	25h
DMO	READ DMA QUEUED EXT	O	N	26h
ND	READ NATIVE MAX ADDRESS EXT	O	N	27h
PI	READ MULTIPLE EXT	O	N	29h
PI	READ LOG EXT	O	O	2Fh
PO	WRITE SECTOR (S)	M	N	30h
PO	WRITE SECTOR (S) EXT	O	N	34h
DM	WRITE DMA EXT	O	N	35h
DMO	READ DMA QUEUED EXT	O	N	36h
ND	SET MAX ADDRESS EXT	O	N	37h
PO	CFA WRITE SECTORS W/OUT ERASE	O	N	38h
PO	WRITE MULTIPLE EXT	O	N	39h
PO	WRITE LOG EXT	O	O	3Fh
ND	READ VERIFY SECOTR(S)	M	N	40h
ND	READ VERIFY SECOTR(S) EXT	O	N	42h
ND	SEEK	M	N	70h
PI	CFA TRANSLATE SECTOR	O	N	87h
DD	EXECUTE DEVICE DIAGNOSTIC	M	M	90h
PO	DOWNLOAD MICROCODE	O	N	92h
P	PACKET	N	M	A0h
PI	IDENTIFY PACKET DEVICE	N	M	A1h
P	SERVICE	O	O	A2h
ND	SMART DISABLE OPERATIONS	O	N	B0h
ND	SMART ENABLE/DISABLE AUTOSAVE	O	N	B0h
ND	SMART ENABLE OPERATIONS	O	N	B0h
ND	SMART EXECUTE OFF LINE	O	N	B0h
PI	SMART READ DATA	O	N	B0h
PI	SMART READ LOG SECTOR	O	N	B0h
ND	SMART RETURNS STATUS	O	N	B0h
PO	SMART WRITE LOG SECTOR	O	N	B0h
ND	DEVICE CONFIGURATION FREEZE	O	O	B1h
PI	DEVICE CONFIGURATION IDENTIFY	O	O	B1h
ND	DEVICE CONFIGURATION RESTORE	O	O	B1h
PO	DEVICE CONFIGURATION SET	O	O	B1h
ND	CFA ERASE SECTORS	O	N	C0h
PI	READ MULTIPLE	M	N	C4h
PO	WRITE MULTIPLE	M	N	C5h
ND	SET MULTIPLE MODE	M	N	C6h
DMO	READ DMA QUEUED	O	N	C7h

Table J-1   List of Command (2/2)

Protocol	Command	Devices not implementing the PACKET Command feature set	Devices implementing the PACKET Command feature set	Command code
DM	READ DMA	M	N	C8h
DM	WRITE DMA	M	N	Cah
DMO	WRITE DMA QUEUED	O	N	CCh
PO	CFA WRITE MULTIPLE W/OUT ERASE	O	N	CDh
ND	CHECK MEDIA CARD TYPE	O	N	D1h
ND	GET MEDIA STATUS	O	O	DAh
ND	MEDIA LOCK	O	N	DEh
ND	MEDIA UNLOCK	O	N	DFh
ND	STANDBY IMMEDIATE	M	M	E0h
ND	IDLE IMMEDIATE	M	M	E1h
ND	STANDBY	M	O	E2h
ND	IDLE	M	O	E3h
PI	READ BUFFER	O	N	E4h
ND	CHECK POWER MODE	M	M	E5h
ND	SLEEP	M	M	E6h
ND	FLUSH CACHE	M	O	E7h
PO	WRITE BUFFER	O	N	E8h
ND	FLUSH CACHE EXT	O	N	Eah
PI	IDENTIFY DEVICE	M	N	EC0
ND	MEDIA EJECT	O	N	EDh
ND	SET FEATURES	M	M	Efh
PO	SECURITY SET PASSWORD	O	O	F1h
PO	SECURITY UNLOCK	O	O	F2h
ND	SECURITY ERASE PREPARE	O	O	F3h
PO	SECURITY ERASE UNIT	O	O	F4h
ND	SECURITY FREEZE LOCK	O	O	F5h
PO	SECURITY DISABLE PASSWORD	O	O	F6h
ND	READ NATIVE MAX ADDRESS	O	O	F8h
ND	SET MAX ADDRESS	O	O	F9h

LBA (Logical Block Address): First sector address caused an error.

Sector Count: Number of sectors transmitted from the address indicated by LBA.

STATUS: Status of command. The lowest bit becomes "1", when an error occurs.

Error: Content of error. It indicates that an error occurs when the object bit is "1".

    Bit7:ICRC

        Indicates that a CRC error occurs on the transmission bus (SATA) between Host and HDD.

    Bit6:UNC

        Indicates that an uncorrectable (media) error occurs.

    Bit2:ABRT

        Indicate that the command aborts.

(2) Check if it is caused by an operation miss or is a failure.

To check if the cause of failure of Port1 is an operation miss or not, analyze the Drive Log of Port0.

1. In [REDUNDANT] of Port-0, find a log of "Fail this drive" message by **[PgUp]** and **[PgDn]** key.

2. If no message of "Fail this drive" message, it is judged that the second HDD is removed without the operation of removal by TOSHIBA RAID console and installed again.

(3) How to change the status to OFF LINE

Release the status of "Fail", using the menu of [Force OFFLINE]. This HDD is not necessary to be repaired.

J.3 Operation of Independent utility

J.3.1 Outline of Independent utility

This is a utility to display Drive Log of TOSHIBA RAID.

(1) Drive Log

   TOSHIBA RAID can store about 7,000 logs of Drive Log.

TOSHIBA RAID make Drive Log redundant and store it. The drive has own log and other drive's log.

In TOSHIBA RAID, the log of own drive is called "Own Log" and the redundant log of other drive's drive is called "Redundant Log". Each port has "Own Log" and "Redundant Log". As shown in the following figure, the Port 0 has "Own Log" of Port0 and "Redundant Log" of Port1. The Port1 has "Own Log" of Port1 and "Redundant Log" of Port0.
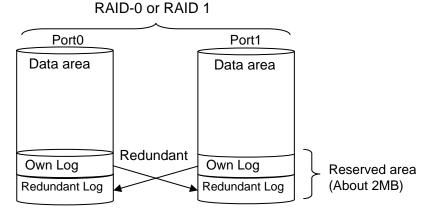
Figure J-3 Drive Log

(2) Information of Drive Log

TOSHIBA RAID writes the log when any change in RAID array or an error occurs. So, seeing the log can trace the history of the array or error information. In TOSHIBA RAID, about 7,000 logs can be stored and the past logs can be referred in detail.

J.3.2 How to operate the Independent Utility

(1) Booting PC

Connected the USB FDD to the PC to be repaired. Insert the FD storing the program of the Independent Utility in the FDD and boot the PC from the FD. The following display appears.

```
▶▶ Toshiba MAGNIA ATA RAID / BIOS Setup Utility Rev 01.00.9030  ◀◀    F1:Help
┌──Main Menu────────┐        ┌═════════════Logical Drive═════════════┐
│ Create Array       │                     LD0       LD1
│ Start Rebuild      │         Status
│ Check Media        │         RAID Level
│ Modify Array       │         # of Drive
│ Delete Array       │         RAID ID
│ Physical Drive     │         Capacity
│ Exit               │         Stripe Size
└────────────────────┘         Write Cache
                               Degrade Bootup
                               MBR Protection
                               S.M.A.R.T.
                               Last MC

                    ═══════════════Physical Drive═══════════════
   Port Assgn Status    Size Model            Rev        Progress
     0        OFFLINE  120GB ST3120023A       3.30
     1        OFFLINE   40GB ST340016A        3.19

<↑><↓> to move cursor, <Enter> to execute, <Esc> to return
```

In the Independent Utility, the cursor is moved by with **[↑]** key and **[↓]** key. Press **[Enter]** key to execute the option selected. Press **[Esc]** key to return to the previous menu.

Pressing **[F1]** key displays Help. Press **[Esc]** key to exit.

(2) Display of Logical/Physical Drive

Logical Drive

The status of RAID array is displayed in Logical Drive by array. The displayed items are follows.

Table J-2   Displayed item in Logical Drive

	Explanation
Status (Status of array)	Displays the status of array. The contents are follows. -OPTIMAL：The array works normally. -DEGRADE：The array is degraded. -CRITICAL：The array is failed. It can not be used.
RAID Level	Displays the RAID level.
# of Drive	Displays the number of physical drives incorporated in the array.
RAID ID	Displays peculiar ID by array.
Capacity	Displays the capacity of array.
Stripe Size	Item that is not set item.
Write Cache	Displays the setting of drive write cache. "Enable" or "Disable" is displayed. The default is "Enable". This option is displayed in RAID-1 (Mirroring).
Degrade Bootup	Displays if boot OS or not when the array is degraded. "Yes" (Boot up) or "No" (Not boot up) is displayed. The default is "Yes". This option is displayed in RAID-1 (Mirroring).
MBR Protection	Displays the setting of protection function of MBR (Master Boot Record). "Enable" (Protect) or "Disable" (Not protect) can be selected. The default is "Disable". When OS is installed by SetupInstructor, it is set automatically to "Enable". When OS is installed manually, it is set to "Enable". If necessary, change the setting.
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable".
Last MC	Displays the date when checking of media or rebuilding of array executed last. It displays "00/00/00" right after making new array or when the rebuild limit is changed.

Physical Drive

In Physical Drive, the condition of RAID array is displayed by array. The following items are displayed.

Table J-3   Items displayed in Physical Drive

	Explanation
Port	Displays the port number of Serial ATA connected to the drive.
Assign	Displays the array number and drive number of array that the drive is incorporated. The display format is LD [Array number] [Drive number]. For example, [LD0-1] means the disk drive 1 of Array 0.
Status	Displays the drive status. The followings are displayed. -ONLINE: The drive is working normally. -OFFLINE: The drive is not configured as array and is not used. -FAIL: The drive is failed and dose not work. -REBUILDING: The drive is been rebuilding by data of normal drive or the rebuilding is suspended. -UNKNOWN: There is controversy in the RAID information of other drive and the status is not decided. It is displayed when this drive was removed and used in the past. When this drive has been found good one, setting to OFFLINE is possible by executing [Force Offline].
Size	Displays the capacity of drive.
Model	Displays the model number of drive.
Rev	Displays the firmware revision of drive.
Progress	Displays the progress of rebuilding and Check media.

(3) Explanation of Main Menu

The Independent Utility has following Main Menu.

Table J-4   Item of Main Menu displayed

	Explanation
Create Array	Builds RAID array.
Start Rebuild	Rebuilds RAID-1. While the rebuild is suspended, the message of "Resume Rebuild" is displayed.
Check Media	Checks if any error in drives configuring array. This is available for the RAID-1 in the "Optimal" condition.
Modify Array	Changes the setting of array.
Delete Array	Delete array.
Physical Drive	Changes the setting of physical drive.
Exit	Exits from the utility.

CAUTION: Do not use the following item of the Independent Utility for maintenance.

[Create Array]
This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

[Start Rebuild (Resume Rebuild)]
This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

[Modify Array]
This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

[Media Check]
This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

[Delete Array]
This changes the current RAID configuration or information, and delete user's data. Do not use for maintenance.

The tree of Independent Menu is as follows.
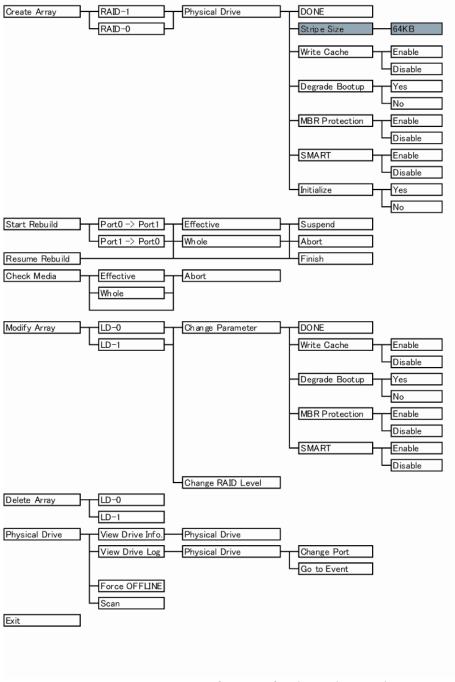
Figure J-4 Tree of menu of Independent Utility

Create Array

This section explains how to select option and build array. The [Create Array] option can be selected only when there is a drive not assigned. To build array, follow the procedure below.

1. Put the cursor on [Create Array] in [Main Menu] and press **[Enter]** key.

2. Select RAID level. Put the cursor on [RAID-1] or [RAID-0] and press **[Enter]** key.

3. Put the cursor on the drive to be incorporated in [Physical Drive] and press **[Space]** key to select a drive. When a drive selected, the status of [Physical Drive] changes to "ON LINE". When selecting plural, repeat the same operation.

4. After selecting a drive, press **[Enter]** key.

5. The [RAID Parameter] is displayed. The setting of parameter in the following table can be made.
   Put the cursor on the item to be set and press **[Enter]** key. Put the cursor on the value to be set and press **[Enter]** key.

Table J-5   Item of parameter set

Option	Explanation
DONE	When this option is selected after completing of setting in [Create Array] menu, building of RAID is decided.
Stripe Size	Designates the size of segment written in each disk of RAID-0 (Striping). The Stripe Size is only 64KB. This parameter can be set only in the RAID-0 configured by two drives.
Write Cache	Displays the setting of Write Cache of drive. This can select "Enable (use)" or "Disable (not use)". The default is "Enable (use)".
Degrade Bootup	Displays if boot up OS or not When the array is degraded. "Yes (boot up)" or "No (not boot up)" is selected. The default is "Yes (boot up)". This option can be selected in RAID-1 (Mirroring).
MBR Protection	Displays the setting of protection function of MBR (Master Boot Record). "Enable (protect)" or "Disable (not protect)" is selected. The default is "Disable (not protect)".
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable".
Initialize	Initialize the MBR of array. Normally, it is done when the array is made newly. For details, refer to " Initializing array". Initializing sets the rebuild limit to 10GB.

After completing the detailed setting, array is initialized. Put the cursor on "Initialize" and press **[Enter]** key. Put the cursor on the "Yes" and press **[Enter]** key. If the array is initialized, date of array is lost. Selecting "No" dose not initialize.

6. Put the cursor on the "DONE" and press **[Enter]** key. Pressing "OK" in [Confirmation] store the change.

CAUTION: *When the array is initialized, the data of drive is lost.*

```
►► Toshiba MAGNIA ATA RAID / BIOS Setup Utility Rev 01.00.9030  ◄◄   F1:Help
  ═Main Menu═                              ═Logical Drive═
 Create Array                                     LD0      LD1
 S ═Create Array═                        Status          OPTIMAL
 C ─RAID-1───                            RAID Level      RAID-1
 M R─RAID Parameter═                     # of Drive      2
 D  DONE                                 RAID ID         07B946C3
 Phys  Stripe Size                       Capacity        40GB
 Exit  Write Cache                       Stripe Size
       Degrade Bootup                    Write Cache     Enable
       MBR Protection                    Degrade Bootup  Yes
       S.M.A.R.T.                        MBR Protection  Disable
       Initialize                        S.M.A.R.T.      Enable
                                         Initialize      No


                           ═Physical Drive═
 Port Assgn Status     Size Model              Rev       Progress
  ►0   LD0-0 ONLINE   120GB ST3120023A         3.30
  ►1   LD0-1 ONLINE    40GB ST340016A          3.19


 <↑><↓> to move cursor, <Enter> to execute, <Esc> to return
```
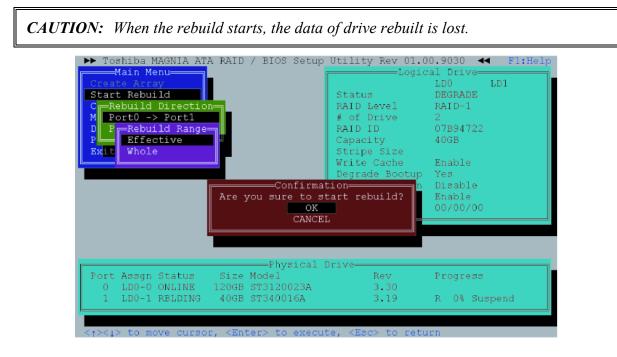
Start Rebuild

Selecting of this option starts rebuilding. [Start Rebuild] is displayed only in the RAID-1tion of with "OFFLINE" drive that has same or more size of capacity as the array in the condition of "Optimal" or "Degraded.
During halt of rebuilding, [Resume Rebuild] is displayed instead of [Start Rebuild].
The procedure to rebuild drives is as follows.

1. Put the cursor to the [Start Rebuild] in the main menu of Indent Utility and press **[Enter]** key.

2. Select the direction to rebuild in [Rebuild Direction] menu and press **[Enter]** key. When the array is "Degraded", the choice is only is one.

3. When [Rebuild Range] menu is displayed, the range to be rebuilt is designated. When [Effective] is selected, rebuild limit becomes valid and it rebuilds up to the rebuild limit. When [Whole] is selected, it rebuilds maximum capacity of array. The [Rebuild Range] menu is not displayed when the rebuild limit is not set or the rebuild limit is the same as the maximum capacity of array. Normally designation of [Effective] is adequate.

4. Put the cursor on "OK" in [Confirmation] and press **[Enter]** key. The rebuild starts.

CAUTION: *When the rebuild starts, the data of drive rebuilt is lost.*

---

5. During rebuilding, [Status] of [Physical Drive] becomes "Rebuilding" and the progress rate, expected remaining time and the number of errors are displayed. During rebuilding, the [Rebuilding] dialog to select [Suspend] or [Abort] is displayed. It may take time depending on the drive capacity.

6. To suspend the rebuilding, put the cursor on [Suspend] (when aborting, on the [Abort]) and press **[Enter]** key. When [Confirmation] is displayed, put the cursor on [OK] and press **[Enter]** key. During being suspended, [Suspend] is displayed in [Progress] of [Physical Drive].

7. When "Rebuild Limit" is set and [Rebuild Range] is set to [Whole], only [Finish] is can be selected after exceeding the Rebuild Limit. When [Finish] is selected and "OK" is selected in [Confirmation], the rebuilding is completed at the time. When OS is booted after exceeding the Rebuild Limit, the rebuild is completed.

```
▶▶ Toshiba MAGNIA ATA RAID / BIOS Setup Utility Rev 01.00.9030  ◀◀   F1:Help
    ═Main Menu═                        ═════════Logical Drive═
 Create Array                                       LD0      LD1
 Start Rebuild                         Status       DEGRADE
 C ═Rebuild Direction═                 RAID Level   RAID-1
 M  Port0 -> Port1                      # of Drive   2
 D  P ═Rebuild Range═                   RAID ID      07B94722
 P   Effective                          Capacity     40GB
 Exit  Whole                            Stripe Size
                                        Write Cache  Enable
                                        Degrade Bootup Yes
                          ═Rebuilding═  Protection   Disable
                           Suspend      .A.R.T.      Enable
                           Abort        t MC         00/00/00
                           Finish


                             ═Physical Drive═
  Port Assgn Status    Size Model            Rev      Progress
    0  LD0-0 ONLINE   120GB ST3120023A       3.30
    1  LD0-1 RBLDING   40GB ST340016A        3.19     R  6% 00:01:07


 <↑><↓> to move cursor, <Enter> to execute, <Esc> to return
```

8. When completing the rebuild, press "OK" to return to the main menu of Independent Setup Utility.

Resume Rebuild

During being suspended,[Resume Rebuild] is displayed in [Main Menu]. To start rebuilding suspended, follow the procedure below.

1. Put the cursor to the [Resume Rebuild] in the main menu of Indent Utility and press **[Enter]** key.

2. When [Rebuild Range] menu is displayed, the range to be rebuilt is designated. When [Effective] is selected, rebuild limit becomes valid and it rebuilds up to the rebuild limit. When [Whole] is selected, it rebuilds maximum capacity of array. The [Rebuild Range] menu is not displayed when the rebuild limit is not set or the rebuild limit is the same as the maximum capacity of array. Normally designation of [Effective] is adequate.

3. Put the cursor on "OK" in [Confirmation] and press **[Enter]** key. The rebuild starts.

4. During rebuilding, [Status] of [Physical Drive] becomes [REBILDING] and the progress rate, expected remaining time and the number of errors are displayed. During rebuilding, the [Rebuilding] dialog to select [Suspend] or [Abort] is displayed. It may take time depending on the drive capacity.

5. To suspend the rebuilding, put the cursor on [Suspend] (when aborting, on the [Abort]) and press **[Enter]** key. When [Confirmation] is displayed, put the cursor on [OK] and press **[Enter]** key.

6. When completing the rebuild, press "OK" to return to the main menu of Independent Setup Utility.

7. When "Rebuild Limit" is set and [Rebuild Range] is set to [Whole], only [Finish] is can be selected after exceeding the Rebuild Limit. When [Finish] is selected and "OK" is selected in [Confirmation], the rebuilding is completed at the time. When OS is booted after exceeding the Rebuild Limit, the rebuild is completed.

When completing the rebuild, press "OK" to return to the main menu of Independent Setup Utility.

Check Media

This option can check if there is an error in the HDD of array. The Check Media can be done only in RAID-1. To execute Check Media, follow the procedure below.

1. Put the cursor to the [Check Media] in [Main Menu] and press **[Enter]** key.

2. When [Check Range] is displayed, designate the range to be checked. When [Effective] is limited, it makes the rebuild limit effective and execute [Check Media] up to the rebuild limit. When [Whole] is selected, execute [Check Media] up to the maximum capacitor of RAID array. The [Rebuild Range] menu is not displayed when the rebuild limit is not set or the rebuild limit is the same as the maximum capacity of array. Normally designation of [Effective] is adequate.

3. To start the Check Media, put the cursor to the [Confirmation] and press **[Enter]** key. When an error is detected, it automatically correct.

4. During [Check Media], the progress rate, expected remaining time and the number of errors are displayed in [Progress] of [Physical Drive], [Check Media] may take time depending on the drive capacity.

5. When [Check Media] is completed, put the cursor on [OK] and press **[Enter]** key to return to the menu of Independent Utility.

The date when the [Check Media] was done last is displayed in [Last MC] of [Logical Drive]. [Last MC] is renewed when rebuilding is done. When "Rebuild Limit" is changed or right after building RAID array, the value of [Last MC] becomes [00/00/00].

Modify Array

This option changes the setting of array.

Change Parameter

Select [Change Parameter] in [Modify Array] menu. The following items can be set.

Table J-6   Item of array

Option	Explanation
Write Cache	Displays the setting of drive write cache. "Enable (use)" or "Disable (not use)" is displayed. The default is "Enable (use)".
Degrade Bootup	Displays if boot OS or not when the array is degraded. "Yes" (Boot up or "No" (Not boot up) is displayed. The default is "Yes". This option is displayed in RAID-1 (Mirroring).
MBR Protection	Displays the setting of protection function of MBR (Master Boot Record). "Enable" (Protect) or "Disable" (Not protect) can be selected. The default is "Disable".
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable".

Change RAID Level

To change RAID level, select [Modify Array] menu. When changing RAID-1 (Mirroring) to RAID-0 (Striping), refer "Changing RAID-1 to RAID-0". When changing RAID-0 to RAID-1, refer "Changing RAID-0 to RAID-1".

Changing RAID-1 to RAID-0 working by one drive

When changing RAID-1 array working by two drives to RAID-0 working by one drive, follow the procedure below.

1. Select [Modify Array] in [Main Menu].

2. In [Modify Array], select array [LDx] that you want to change.

3. In [Modify Array], select [RAID-1 -> RAID-0].

4. In [Physical Drive] select one drive, which is used as RAID-0, and press **[Space]** key

5. After selecting a drive, press **[Enter]** key. When [Confirmation] is displayed, select "OK" to store the setting.

Changing RAID-0 working by one drive to RAID-1

To change RAID-1 working by one drive to RAID-1 working by two drives, follow the procedure below.

1. Select [Modify Array] in [Main Menu].

2. In [Modify Array], select array [LDx] that you want to change.

3. In [Modify Array], select [RAID-0 -> RAID-1].

4. Select a drive in the condition of [OFFLINE] in [Physical Drive], which is expanded as RAID-1 with **[Space]** key. After selecting drive, [Status] changes to [REBUILDING]. The capacity of drive that is newly added must be same/more as/than original drive. The drive in the condition of [Fail] can not be incorporated.

5. After selecting a drive, press **[Enter]** key. When [Confirmation] is displayed, select "OK" to store the setting.

6. Select [Resume Rebuild] in [Main Menu], or select [Exit] to exit from Independent Utility. When automatic rebuilding is set in OS, rebuilding starts automatically after booting OS.

7. During rebuilding, the progress is displayed in [Physical Drive]. Suspending or aborting is possible.

8. When the rebuilding is completed, message is displayed, the select "OK".

Delete Array

Selects [Delete Array] of Setup Utility and delete array. Put the cursor on the array you want to delete and press **[Enter]** key.
When [Confirmation] is displayed, select "OK" to store the setting.
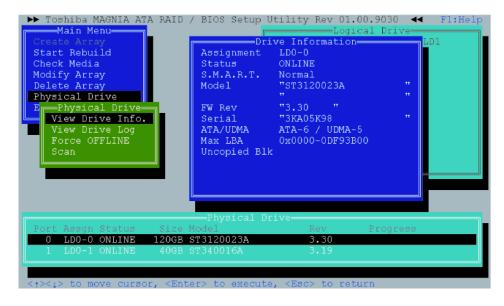
Physical Drive

Select [Physical Drive] in Setup Utility to set physical drive.

View Drive Info.

Select this option in [Physical Drive] to display information of physical drive. Select the drive that you want to display in [Physical Drive] at the lower of display and press **[Enter]** key. In the server with fault lamp (lamp displaying disk condition), the fault lamp of corresponded drive blinks while [Drive Information] display appears. Press **[Esc]** key to close the display. The following information is displayed.

Table J-7   Items set in View Drive Info.

Option	Explanation
Assignment	Displays Array number and drive number of array incorporated. The display format is LD [Array number] [Drive number]. For example, [LD0-1] means Disk drive 1 of array 0.
Status	Displays the drive status. The followings are displayed. -ONLINE: The drive is working normally. -OFFLINE : The drive is not configured as array and is not used. -FAIL: The drive is failed and dose not work. -REBUILDING: The rebuilding is suspended. -UNKNOWN: There is controversy in the RAID information of other drive and the status is not decided. It is displayed when this drive was removed and used in the past. When this drive has been found good one, setting to OFFLINE is possible by executing [Force Offline].
S.M.A.R.T.	Displays the setting of failure prediction function of drive. "Enable" or "Disable" is displayed. The default is "Enable". When the level reach to worming level, [Alert] is displayed. When [S.M.A.R.T.] is set to [Disable], [Normal] is displayed.
Model	Displays Model number of drive.
FW Rev	Displays the firmware revision of drive.
Serial	Displays the serial number of drive.
ATA/UDMA	Displays ATA standard and transmission mode that the drive corresponds to.
Max LBA	Displays the total number of sectors of drive in hexadecimal mode. (1 sector = 512B)
Uncopied Blk	In rebuilding, display the address of area that can not be used because of error in the original drive. When an error has been displayed in [Uncopied Blk], check if any error in the file system in the Windows scan disk. It is not necessary to check all the sectors. When any error is detected, any file is damaged. It is recommended to back up the data and rebuild RAID and restore.

View Drive Log

Select this option in [Physical Drive] menu and select the drive that you want to display the log. At the beginning, the latest log is displayed. The 7,168 logs from the latest is recorded in detail. For the older log, only ID is recorded. The options and functions of key in [View Drive Log] are as follows.

Table J-8   Function of option and key

Option	Explanation
Change Port	Changes log's port displayed and port's own log or redundant log.
Go to Event	Inputting the log number in this number moves to the log of the number.

Key	Function
[PageUp]	Scrolls upward one by one.
[PageDown]	Scrolls downward one by one.
[Home]	Jumps to oldest log in the latest 7,168 logs.
[End]	Jumps to the latest log.
[Ctrl]＋[Home]	Jumps to the oldest log that is older than 7,168 logs and the identification ID is recorded.
[Tab]	Switches [OWN] window and [REDUNDANT] window.

```
 ►► Toshiba MAGNIA ATA RAID / BIOS Setup Utility Rev 01.00.9030 ◄◄   F1:Help
 ►──Main Menu────────┐  ┌Port-0 [ OWN ]══════════════0000000-0000026═┐
 │ Create Array      │  │ 040208192110 2389 0 i Rebuild completed w/o a │
 │ Start Rebuild     │  │►040208192111 2001 1 i Rescaned by DOS Utilit  │
 │ Check Media       │  │ *** End of Log ***                            │
 │ Modify Array      │  │ 0000026 00: 65 64 20 62 79 20 44 4F   ed by DO│
 │ Delete Array      │  │         08: 53 20 55 74 69 6C 69 74   S Utilit│
 │ Physical Drive    │  │         10: 79 00 00 00 00 00 00 00   y.......│
 │ E┌─Physical Drive─┐│  │         18: 00 00 00 00 00 00 00 00   ........│
 │  │ View Drive Info.││  │        20: 00 00 00 00 00 00 00 00   ........│
 │  │ View Drive Log ││  │         28: 00 00 00 00 30 90 00 01   ....0...│
 │ F┌─View Drive Log─┐│┘  ┌Port-0 [ REDUNDANT ]════════0000000-0000020═┐
 │ S│ Change Port    ││   │ 040208192023 2387 1 i Rebuild resumed        │
 │  └┌─Change Port───┐│   │►040208192110 2389 1 i Rebuild completed w/o a│
 │   │ Port-0        ││   │ *** End of Log ***                           │
 │   └┌─Change Log───┐│   │ 0000020 00: 20 63 6F 6D 70 6C 65 74   complet│
 │    │ Own          ││   │         08: 65 64 20 77 2F 6F 20 61   ed w/o a│
 │    │ Redundant    ││   │         10: 6E 20 65 72 72 6F 72 00   n error.│
 │    └──────────────┘│   │         18: 00 00 00 00 00 00 00 00   ........│
 │ Port Assgn Status  Siz│         20: 00 00 00 00 00 00 00 00   ........│
 │  0  LD0-0 ONLINE   120G│         28: 00 00 00 00 00 00 00 00   ........│
 │  1  LD0-1 ONLINE    40G└──────────────────────────────────────────────┘
 <↑><↓> to move cursor, <Enter> to execute, <Esc> to return
```

Execute the following procedures to see the drive log in the independent utility.

1. Put on the cursor on [Physical Drive] in [Main Menu] and press **[Enter]** key.

2. Put on the cursor on [View Drive Log] and press **[Enter]** key.

3. Select drive that you want to display the log in [Physical Drive] at the lower of display with a cursor key and press **[Enter]** key.

4. The drive log is displayed. Press **[PageUp]** or **[PageDown]** key to scroll the drive log upward or downward.

5. To change log displayed, put the cursor on [Change Port] and press **[Enter]** key.

6. Select Drive log port to be displayed and [Own/Redundant]. For Example, [Own] log means the drive log of Port-0 own, [Redundant] log of Port-0 means the backup copy of the drive log of Port-1.

7. To switch the upper and lower of drive log frame, press **[Tab]** key. The selected frame is displayed more lightly than the other frame.

8. To move to the drive log wit arbitrary log number, put the cursor on the [Go to Event] and press **[Enter]** key. Next, input the log number you want to move to and press **[Enter]** key.

The 7,168 logs from the latest is recorded in detail. For the older than that, only identification ID is recorded.

The following is displayed.

Table J-9   Content of Drive Log display

No.	Option	Explanation
1	Port	Displays the port number of log displayed.
2	Own/Redundant	Displays if the displayed log is a log of own port (Own) or a copy of other port log (Redundant).
3	Time	Displays the time when the log is recorded in six digits. The format is [Year Month Day Hour Minute Second].
4	ID	Displays identification ID of log.
5	Port and Degree of importance	The number displays the port that the drive is connected when the log is recorded. The alphabet displays the degree of importance. [j] means information, [W] means warning and [e] means a error.
6	Message	Displays the content of log. When the log is too much and it can not displayed in the area, the remaining is displayed in [Detail] area.
7	Range of log	Displays the range of log number stored. In this case, it means that logs with the number of 0 to 26 are stored.
8	Log number	Displays the log number that is being displayed.
9	Detail	Displays the detailed contents and codes of log. When the number of logs is 7,168 or more, the details of old log is not displayed.

[View Drive Log] menu is as follows

Table J-10   Content of View Drive Log menu

Option	Explanation
Change Port	Changes the display of the own log and redundant log. At the beginning, the Port-0's own log and the redundant log are displayed.
Go to Event	When this option selected, it moves to the log with designated number.

The key function in [View Drive Log] key is as follows.

Table J-11   Function of key in View Drive Log

Key	Function
[PageUp]	Scrolls upward step one by one.
[PageDown]	Scrolls downward step one by one.
[Home]	Jumps to the oldest log in the latest 7,168 logs.
[End]	Jumps to the latest log.
[Ctrl]＋[Home]	Jumps to the oldest log that is older than 7,168 logs and the identification ID is recorded.
[Tab]	Switches [OWN] window and [REDUNDANT] window.

Force OFFLINE

Selecting this option in [Physical Drive] menu of Setup Utility can set the physical drive to offline by force. Follow the procedure below.

1. Select [Physical Drive] in [Main Menu].

2. Select [Force OFFLINE] in [Physical Drive].

3. Select the drive that you want to set it to offline with **[Space]** key in [Physical Drive] and press **[Enter]** key.

4. Selecting "OK" in [Confirmation] stores the setting.

Scan

When [Scan] in [Physical Drive] menu is selected, it scans physical drive. This is used to recognize the drive after replacing failed drive.

Exit

When this option is selected, the utility is finished. When [Confirmation] is displayed, select "OK".