dynabook

Maintenance Manual

dynabook T*5/TX/EX/BX/AX/AZ*5/BZ*5 Series

(P-No. PS59*)

T*/T*/CZ*5 Series

(P-No. PS59R)

File Number (960-922)

Revision History

Rev.	Rev. on	Description	Div. Dept	Prepared
00	2017-12-18	Initial release	[DT](SYD)	Quan Mingyan
01	2019-05-24	Update descriptions of " Keyboard and Click Pad " in chapter4	[DT](SYD)	Quan Mingyan
02	2020-06-12	Addition of information for PS59R model. (Whiskeylake model)	(DBI)(CSH1)	Kaori Takeda
03	2023-06-26	Update "Removing/Installing the LCD unit " part in chapter4	(DBH)[DT](SYD)	Dang Fengzhi
04	2023-08-28	Update to Dynabook version	(DBH)[DT](SYD)	Dang Fengzhi

Copyright

Disclaimer

This manual has been validated and reviewed for accuracy. The instructions and descriptions it contains are accurate for your computer at the time of this manual's production. However, succeeding computers and manuals are subject to change without notice. Dyanbook assumes no liability for damages incurred directly or indirectly from errors, omissions or discrepancies between the computer and the manual.

Trademarks

Intel, Intel logo, Thunderbolt, Thunderbolt logo are trademark of Intel Corporation or its subsidiaries in the United States and/or other countries.

Microsoft, Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

The Bluetooth® word mark is a registered trademark owned by Bluetooth SIG, Inc.

The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

Wi-Fi is a registered trademark of Wi-Fi Alliance.

All other product names and service names in this manual may be trademarks or registered trademarks of their respective companies.

Preface

This maintenance manual describes how to perform hardware service maintenance for the computer.

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 Icons

Safety icons are used in this manual to bring important information to your attention. Each type of message is identified as shown below.

Indicates a potentially hazardous situation, which could result in death or serious injury, if you do not follow instructions.

A caution informs you that improper use of equipment or failure to follow instructions may cause data loss, equipment damage, or may result in minor or moderate injury

Please read. A note is a hint or advice that helps you make best use of your equipment.

Improper repair of the computer may result in safety hazards. Dynabook 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. 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 Dynabook. 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 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 assignments
- Keyboard scan/character codes
- Key layout
- Wiring diagrams
- BIOS rewrite procedures
- EC/KBC rewrite procedures
- Reliability

Table of Contents

List of Figures

List of Tables

Chapter 1

Hardware Overview

1.1 Features and System Unit Block Diagram

This Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. This computer incorporates the following features/major components.

There are some models and options. Refer to the Parts List for the configuration of each model and options.

The system unit configuration is shown below:

Figure 1-1 System unit configurations
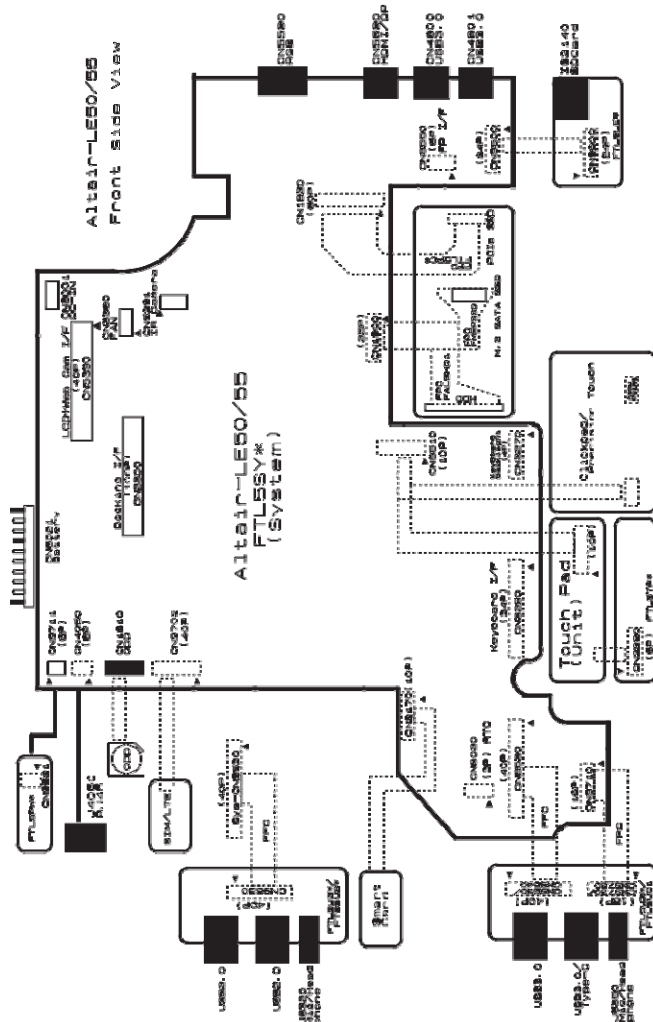
Figure 1-2 is a block diagram of the system unit.

Figure 1-2 System unit block diagram

Altair-LE65 CS Block Diagram
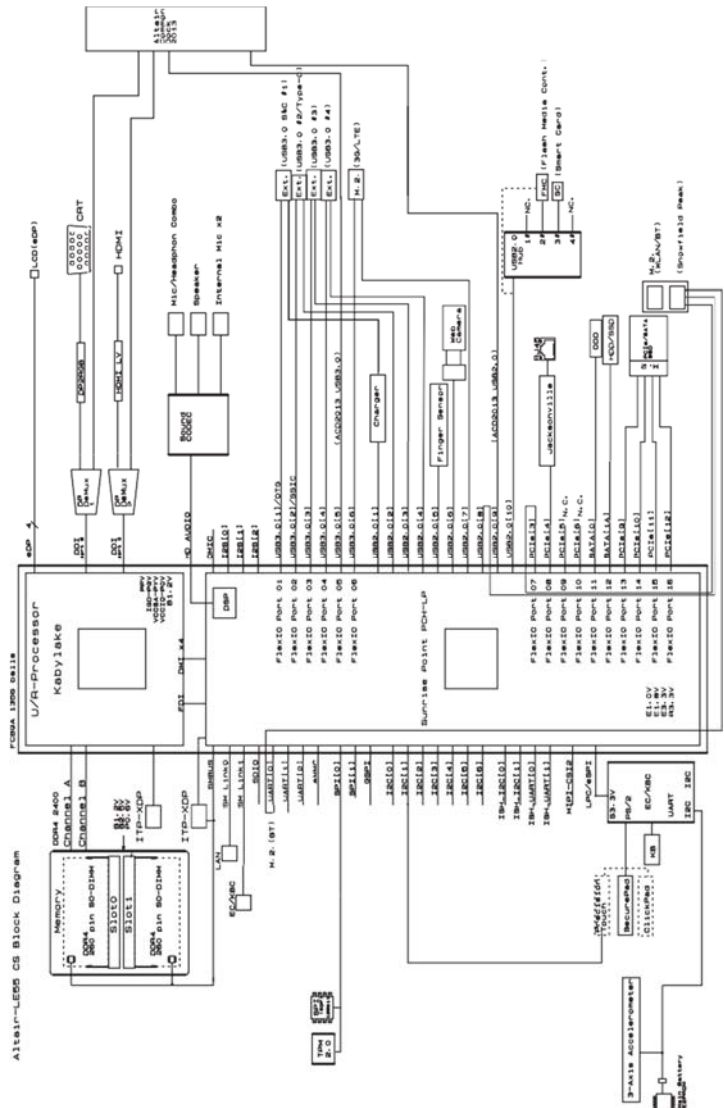
■ Microprocessor

The computer is equipped with an Intel® Processor.

The PC comes in with one of the following speeds:

Core Frequency	L3 Cache Size	Turbo	Number of cores/number of threads
Kaby lake-U Core i7-7500U (2.70GHz) Non-vPro	4MB	3.5GHz	2/4
Keby lake-U Core i5-7200U (2.50GHz) Non-vPro	3MB	3.1GHz	2/4
Kaby lake-U Core i3-7130U (2.70GHz) Non-vPro	3MB	2.7GHz	2/4
Kaby Lake-U Celeron 3865U(1.80GHz)	2MB	1.8GHz	2/2
Kaby Lake R-U Core i7-8550U (1.80GHz) Non-vPro	8MB	4.0GHz	4/8
Kaby Lake R-U Core i5-8250U (1.60GHz) Non-vPro	6MB	3.4GHz	4/8

Core Frequency	L3 Cache Size	Turbo	Number of cores/number of threads
Whiskey lake-U Core i7-8565U (1.80GHz) Non-vPro	8MB	4.6GHz	4/8
Whiskey lake-U Core i5-8265U (1.60GHz) Non-vPro	6MB	3.9GHz	4/8
Whiskey lake-U Core i3-8145U (2.10GHz) Non-vPro	4MB	3.9GHz	2/4
Celeron 4205U(1.80GHz)	2MB	-	2/2

■ Memory

Two DDR4-2133 or DDR4-2400 SDRAM slots. Memory modules can be installed to provide a maximum of 32GB (PS59* model) or 16GB. Memory modules are available in 4 GB, 8 GB and 16GB (PS59* model) sizes.

■ VGA Controller

The PC comes in with one of the following types:

■ The internal graphics controller in Intel Processor (Core i*) is used.

■ HDD/SSD

The computer is equipped with one of the following storage devices:

■ 2.5-inch SATA HDD: 500GB/1TB/2TB (PS59* model)

■ M.2 SATA SSD (PS59* model): 128GB/256GB/512GB

■ M.2 PCIe SSD: 128GB(PS59R model)/256GB/512GB/1T(PS59* model)

■ Optical Disk Drive (Some models)

A DVD Super Multi Drive or Blu-ray Disc can be installed.

■ Display

The PC comes in with one of the following two types:

- ■ 15.6"HD(1366x768) Non CSV
- ■ 15.6" FHD(1920x1080) CSV

■ Interface

To external monitor HDMI out port

■ Keyboard

The computer's keyboard layouts are compatible with a 104/105-key enhanced keyboard - by pressing some keys in combination, all of the 104/105-key enhanced keyboard functions can be performed on the computer.

The number of keys available on your keyboard will depend on which country/region your computer is configured for, with keyboards being available for numerous languages.

In use there are different types of keys, specifically typewriter keys, function keys, hot keys, Windows special keys and the keypad overlay.

■ Click Pad

The Click Pad located in the palm rest is used to control the movement of the on-screen pointer.

■ Batteries

The computer has two batteries: a rechargeable Lithium-Ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory).

■ Universal Serial Bus (USB 2.0)

Universal Serial Bus 2.0 ports comply with the USB 2.0

standard. The USB 2.0 port is not compatible with USB 3.0

devices.

■ Universal Serial Bus (USB 3.0)

The USB Port with blue color is USB 3.0 port. The USB 3.0 port is compliant with USB 3.0 standard and backward compatible with USB 2.0 devices.

The port with the icon ⚡ has Sleep and Charge function.

■ HDMI out port

HDMI out port can connect with Type A connector HDMI cable. Some models are equipped with an HDMI out port.

■ Memory media slot

This slot lets you insert an SD™/SDHC™/SDXC™ memory card, miniSD™/microSD™ Card and MultiMediaCard™.

■ Fingerprint sensor (Some models)

This sensor enables you to enroll and recognize a fingerprint. Some models are equipped with a Fingerprint Sensor.

■ Sound system

The sound system is equipped with the following features:

- ■ Stereo speakers
- ■ Built-in microphone (provided with some models)
- ■ Headphone/Microphone jack

■ Internal LAN

The computer has built-in support for Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100BASE-TX) and Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T).

■ LAN Controller

This controller has the following functions:

- ■ 10/100/1000Mbit Ethernet (Gigabit)
- ■ RJ45 port
- ■ WOL support

■ Wireless LAN

Some computers in this series are equipped with a Wireless LAN module that is compatible with other LAN systems based on Direct Sequence Spread Spectrum/Orthogonal Frequency Division Multiplexing radio technology that complies with the IEEE 802.11 Standard.

One PCI Express Mini Card slot1

- ■ Intel$^®$ Dual Band Wireless-AC 8265
- ■ Intel$^®$ Dual Band Wireless-AC 3165

WEP (not support for 11n)

■ Bluetooth

Some computers in this series have Bluetooth wireless communication function which eliminates the need for cables between electronic devices such as computers, printers and mobile phones. When it is enabled, Bluetooth provides the wireless personal area network environment which is safe and trustworthy, that is quick and easy.

■ Web Camera

Web Camera is a device that allows you to record video or take photographs with your computer. You can use it for video chatting or video conferences using a communication tool such as Windows Live Messenger. Some models have an IR camera as the face recognition sensor to support Face Recognition by Windows Hello.

■ EC/KBC (Embedded Controller/Keyboard Controller)

One SMSC MEC1632 micon chip functions as both EC and KBC.

■ Sensor

Acceleration Sensor : T353TR

IR Camera (Face Recognition Sensor) (BTO)

1.2 HDD & SSD

1.2.1 2.5-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads.

The HDD specifications are listed in tables below.

Table 1-1 2.5-inch HDD specifications (HGST)

Items	Specifications	
	G8BC000AL500	G8BC0008P1A0
Width (mm)	69.85±0.25	69.85±0.25
Height mm)	6.8±0.2	9.5±0.2
Depth (mm)	100.2±0.25	100.2±0.25
Weight (g)	95 Max	102 Max
Storage size (formatted)	500G	1000G
Speed (RPM)	5,400	5,400
Data transfer rate	6.0 Gbps	6.0 Gbps
Disk-buffer to/from media (Mbps)	1004	1340
Positioning Time (read and seek time)	13 typ/18 max	13 typ/18 max

Table 1-2 2.5-inch HDD specifications

Items	Specifications	
	G8BC0009A502	G8BC0008B1A4
Width (mm)	69.85	69.85
Height mm)	7.0	9.5
Depth (mm)	100.0	100.0
Weight (g)	92 Max	117 Max
Storage size (formatted)	500G	1000G
Speed (RPM)	5,400	5,400
Data transfer rate (Mb/s)	1469.7	1068.1
Buffer-host data transfer (GBit/sec)	6	6
Data buffer size	8,192 KB	8,192 KB
Positioning Time (read and seek time, ms)	12	12
Motor startup time (s)	3.5 s	3.5 s

< PS59R model >

Items	Specifications	
	G8BC0009A503	G8BC000C31A0
Width (mm)	69.85	69.85
Height mm)	7.0	7.0
Depth (mm)	100.0	100.0
Weight (g)	92 Max	92 Max
Storage size (formatted)	500G	1000G
Speed (RPM)	5,400	5,400
Data transfer rate (Mb/s)	1469.7	1733.6
Buffer-host data transfer (GBit/sec)	6	6
Data buffer size	8,192 KB	128 MiB
Positioning Time (read and seek time, ms)	12	12
Motor startup time (s)	3.5	3.0 (typ.)

Table 1-3 2.5-inch HDD specifications (Seagate)

Items	Specifications	
	G8BC000BX1A0	G8BC000BX2A0
Width (mm)	69.85	69.85
Height mm)	7.0	7.0
Depth (mm)	100.35	100.35
Weight (g)	92 Max	96 Max
Storage size (formatted)	1TB	2TB
Speed (RPM)	5,400	5,400
Data transfer rate	140MB/s	140MB/s
Positioning Time (read and seek time)	13 typ/18 max	13 typ/18 max

Table 1-4 2.5-inch HDD specifications (WD)

< PS59R model >

Items	Specifications	
	G8BC000C4500	G8BC000C41A0
Width (mm)	69.97	69.97
Height mm)	7.0	7.0
Depth (mm)	100.20	100.20
Weight (g)	92	92
Storage size (formatted)	500G	1000G
Speed (RPM)	5,400	5,400
Data transfer rate (Mb/s)	149MB/s (Max.)	149MB/s (Max.)
Data buffer size	128MB	128MB
Positioning Time (read and seek time, ms)	11.0 (ave.)	11.0 (ave.)

1.2.2 M.2 SSD

Some models are equipped with a SSD instead of a Hard Disk Drive. The SSD specifications are listed in tables below.

Table 1-5 M.2 SATA SSD specifications

Items	Specifications	
	G8BC000BZ250	G8BC000BZ510
Width (mm)	22.00 ± 0.15	22.00 ± 0.15
Height mm)	2.23 Max	2.23 Max
Depth (mm)	80.0 ± 0.15	80.0 ± 0.15
Weight (g)	6.9 typ.	6.9 typ.
Storage size (formatted)	256GB	512GB

Table 1-6 M.2 PCIe SSD specifications

< PS59R model >

Items	Specifications		
	G8BC000CD120	G8BC000CD250	G8BC000CD510
Width (mm)	22.00 ± 0.15	22.00 ± 0.15	22.00 ± 0.15
Height (mm)	2.23 (Max.)	2.23 (Max.)	2.23 (Max.)
Depth (mm)	80.00 ± 0.15	80.00 ± 0.15	80.00 ± 0.15
Weight (g)	5.2 (typ.)	5.2 (typ.)	5.2 (typ.)
Storage size (formatted)	128GB	256GB	512GB

Table 1-7 M.2 SATA SSD specifications (Samsung)

Items	Specifications		
	G8BC000BY120	G8BC000BY250	G8BC000BY510
Width (mm)	22.00 ± 0.15	22.00 ± 0.15	22.00 ± 0.15
Height mm)	2.38 Max	2.38 Max	2.38 Max
Depth (mm)	80.0 ± 0.15	80.0 ± 0.15	80.0 ± 0.15
Weight (g)	8 Max	8 Max	8 Max
Storage size (formatted)	128GB	256GB	512GB

Table 1-8 M.2 PCIe SSD specifications (Samsung)

Items	Specifications		
	G8BC000BU250	G8BC000BU510	G8BC000BUA10
Width (mm)	22.00 ± 0.15	22.00 ± 0.15	22.00 ± 0.15
Height mm)	2.38 Max	2.38 Max	2.38 Max
Depth (mm)	80.0 ± 0.15	80.0 ± 0.15	80.0 ± 0.15
Weight (g)	8 Max	8 Max	8 Max
Storage size (formatted)	256GB	512GB	1TB

< PS59R model >

Items	Specifications		
	G8BC000CL120	G8BC000CL250	G8BC000CL510
Width (mm)	22.00 ± 0.15	22.00 ± 0.15	22.00 ± 0.15
Height mm)	Max. 2.38	Max. 2.38	Max. 2.38
Depth (mm)	80.00 ± 0.15	80.00 ± 0.15	80.00 ± 0.15
Weight (g)	Max. 6.0	Max. 6.0	Max. 6.0
Storage size (formatted)	128GB	256GB	512GB

1.3 Optical Disc Drive (ODD)

1.3.1 DVD-ROM Drive

The DVD Super Multi drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD-ROM, DVD-ROM, CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW, DVD-RAM, DVD-R DL and DVD+R DL.

The specifications are described in Table 1-7.

The write-disable tool document no.: 360074226.

Table 1-9 DVD-ROM drive specifications

Specifications			
Item		**G8CC0006BZ50**	**G8CC0006BZ60**
Outline dimensions	Width (mm)	128 ± 0.2 (excluding projections)	128 ± 0.2 (excluding projections)
	Height (mm)	9.5 ± 0.4 (excluding projections)	9.5+0.5/-0.2 (excluding projections)
	Depth (mm)	127 ± 0.4(excluding projections)	127 ± 0.4(excluding projections)
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV	Max. 8x CAV Max. 24x CAV
Supported Disks		CD: CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-R DL,DVD-RW, DVD-RAM, DVD+R, DVD+R DL, DVD+RW	CD: CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-R DL,DVD-RW, DVD-RAM, DVD+R, DVD+R DL, DVD+RW
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, Video-CD, CD-Extra(CD+), CD-text, Hybrid SACD DVD: DVD-ROM, DVD-Video, DVD-R, DVD-R DL, DVD-RW , DVD+R, DVD+R DL, DVD+RW, DVD-RAM (4.7GB)	CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, Video-CD, CD-Extra(CD+), CD-text, Hybrid SACD DVD: DVD-ROM, DVD-Video, DVD-R, DVD-R DL, DVD-RW , DVD+R, DVD+R DL, DVD+RW, DVD-RAM (4.7GB)

< PS59R model >

Specifications			
Item		**TBD**	**G8CC0006PZ20**
Maker		HLDS	PLDS
Outline dimensions	Width (mm)	TBD	128 ± 0.2
	Height (mm)	TBD	9.5 +0.5/-0.2 (without Label)
	Depth (mm)	TBD	126.1 ± 0.2 (without bezel)
Data transfer speed (Read) DVD-ROM CD-ROM		TBD	Max. 8x CAV Max. 24x CAV
Supported Disks		TBD	CD: CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-R DL,DVD-RW, DVD-RAM, DVD+R, DVD+R DL, DVD+RW
Supported Formats		TBD	CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, Video-CD, CD-Extra(CD+), CD-text, Hybrid SACD DVD: DVD-ROM, DVD-Video, DVD-R, DVD-R DL, DVD-RW , DVD+R, DVD+R DL, DVD+RW, DVD-RAM (4.7GB)

1.3.2 Blu-ray™ Writer drive BDXL™

The drive supports the following formats: CD-ROM, DVD-ROM, DVD Video, CD-DA, CD-Text, Photo CD™ (single/multi-session), CD-ROM Mode1/Mode 2, CD-ROM XA Mode 2 (Form1, Form2), Enhanced CD (CDE XTRA), Addressing Method 2, DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM, DVD-R DL (Format1), DVD+R DL, BD-ROM, BD-ROM DL, BDR, BD-R DL, BD-RE, BD-RE DL,BD-R TL, BD-R QL BD-RE TL and BD-RE TL.

The specifications are listed in Table below.

Table 1-10 Blu-ray™ Writer drive BDXL™ outline dimensions

Specifications			
Item		**G8CC0006JZ20**	**G8CC0006LZ20**
Outline dimensions	Width (mm)	128 (excluding projections)	128 (excluding projections)
	Height (mm)	9.5 (excluding projections)	9.5 (excluding projections)
	Depth (mm)	127 (excluding projections)	127 (excluding projections)
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV	Max. 8x CAV Max. 24x CAV
Supported Disks		CD: CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-R DL,DVD-RW, DVD-RAM, DVD+R, DVD+R DL, DVD+RW,BD-R,BD-R DL,BD-R TL,BD-R QE,BD- RE,BD-RE DL,BD-RE TL	UHD-ROM,BD-ROM,BD-R,BD-R LTH,BD-RE ,DVD,DVD-R,DVD-R DL DVD-RW,DVD+R,DVD+R DL,DVD+RW,DVD-RAM,Photo CD,Video CD CD-DA,CD-Extra?Mixed-CD,CD-Text,CD-R ,CD-RW ,HS CD-RW,US+ CD-RW
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, CD-I, Video-CD, CD-Extra(CD+), CD-text, Hybrid SACD DVD: DVD-ROM, DVD-Video, DVD-R, DVD-R DL, DVD-RW , DVD+R, DVD+R DL, DVD+RW, DVD-RAM (4.7GB), BD-ROM, BD-ROM DL, BDR, BD-R DL, BD-RE, BD-RE DL,BD-R TL, BD-R QL BD-RE TL and BD-RE TL.	CD-ROM XA,Photo CD ,Video CD ,CD-DA ,CD Extra (CD+),CD text,CD-R,CD-RW,CD-ROM Mode1 DVD: DVD-ROM,DVD-R,DVD-R DL,DVD-RW,DVD+R,DVD+R DL,DVD+RW,DVD+RW high speed UHD-ROM,BD-ROM,BD-R,BD-RE,BD-R LtH)

1.4 Keyboard

The keyboard is mounted 104(US)/105(UK) keys that consist of character key and control key, and in conformity with JIS. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure 1-3 is a view of the keyboard. See Appendix E about the layout of the keyboard.

Figure 1-3 Keyboard

1.5 Display

The display consists of 15.6-inch HD LCD module or 15.6-inch FHD LCD module.

1.5.1 LCD Module

The LCD module used for the display uses a backlight as the light source and can display a maximum of 16M colors with15.6-inch HD (1366x768) resolutions or 15.6-inch FHD (1980x1080) resolutions.

Figure 1-4 shows a view of the LCD module and Table 1-9 lists the specifications.

Figure 1-4 LCD module
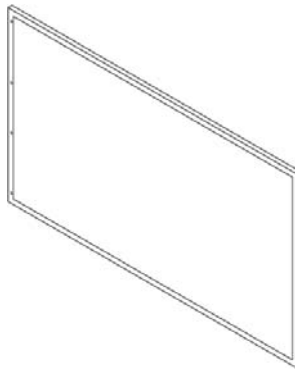
Table 1-11 LCD module specifications

Item	G33C0009A110	G33C00097110	G33C0009G110
Maker	BOE	LG	LG
Number of Dots	1366(W) × 768(H)	1920(W) × 1080(H)	1920(W) × 1080(H)
Dot pitch (mm)	0.252(H)×0.252(V)	0.179(H)×0.179(V)	0.179(H)×0.179(V)
Active area (mm)	344.23(W) × 193.54(H)	344.16(W) × 193.54(H)	344.16(W) × 193.59(H)
Outline (mm)	359.5(W) × 223.8(H) × 3.2Max(D) ±0.5	359.5(W) × 223.8(H) × 3.2Max(D) ±0.5	359.5(W) × 223.8(H) × 3.2Max(D) ±0.5

< PS59R model >

Item	G33C0009A110	G33C0009L110	G33C0009V110
Maker	BOE	LG	Sharp
Number of Dots	1366(W) × 768(H)	1920(W) × 1080(H)	1920(W) × 1080(H)
Dot pitch (mm)	0.252(H)×0.252(V)	0.179(H)×0.179(V)	0.179(H)×0.179(V)
Active area (mm)	344.23(W) × 193.54(H)	344.16(W)×193.59(H)	344.16(W) × 193.59(H)
Outline (mm)	359.5(W) × 223.8(H) × 3.2Max(D) ±0.5	359.5(W)×223.8(H)× 3.2Max(D)±0.5	359.5 ± 0.5 (W)× 223.8 ± 0.5 (H)× 3.2 (D)

1.6 Power Supply

The power supply supplies different voltages to the system board and performs the following functions:

1. Judges that the DC power supply (AC adaptor) is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls DC IN/Battery 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.

The power supply output rating is specified below.

Figure 1-5 Power supply output rating

系	電圧	Sig. Name	ACPI state	S0	S3		S4		S5		G3	使用先
			M state	M0	M3	Moff	M3	Moff	M3	Moff		
P	0~1.52	PPV		O/× (*1)	×	×	×	×	×	×	×	Processor (VCC)
	0.60	0R6-P0V		O/× (*2)	×	×	×	×	×	×	×	DDR4 Termination (VTT)
	1.0	VCCSTG-P1V		O	×	×	×	×	×	×	×	PCH (VCCIO, VCCSTG)
	0.55~ 1.15	VCCSA-PYV		O/× (*1)	×	×	×	×	×	×	×	Processor (VCCSA)
	0~1.5	IGD-PGV		O/× (*1)	×	×	×	×	×	×	×	Processor (VCCGT)
	3.3	P3V		O	×	×	×	×	×	×	×	M.2-SSD, Flash Media Controller, Web Camera Smart Card, LPC Debug, TPM(VDD), Codec(DVDD,DVDD-IO),HDMI Level Shift, DP deMUX, DP-VGA IC,Click Pad, Finger Print Sensor
		PNL-P3V		O	×	×	×	×	×	×	×	LCD(eDP)
	5.0	P5V		O	×	×	×	×	×	×	×	Smart Card Cont, Touch Panel, CPU FAN KB(CAPS LED,BackLight), Codec(AVDD1,PVDD),
B	1.0	VCCST-B1V		O	O	O	×	×	×	×	×	Processor(VCCPLL,VCCST)
	1.20	1R2-B1V		O	O	O	×	×	×	×	×	Processor (VDDQ, VDDQC, VCCPLL_OC), Memory(VDD,ODT), HDMI Level Shifter
	2.50	2R5-B2V		O	O	O	×	×	×	×	×	Memory(VDDP)
E	1.0	1R0-E1V		O	O	O	O/× (*3)	O/× (*3)	O/× (*3,4)	O/× (*3,4)	×	PCH(VCCPRIM_CORE, VCCPRIM_1P0, VCCMP HYGT_1P0, VCCAPLL_1P0, VCCCLK1-6) ITP-XD P,
	1.8	1R8-E1V		O	O	O	O/× (*3)	O/× (*3)	O/× (*3,4)	O/× (*3,4)	×	PCH(VCCPGPPF, VCCATS_1P8)
	3.3	E3V		O	O	O	O/× (*3)	O/× (*3)	O/× (*3,4)	O/× (*3,4)	×	PCH(VCCPRIM_3P3, VCCPGPPA-G, VCCDSW_3P3, VCCRTCPRIM_3P3), Memory(VDDSPD), M.2-SSD, NFC,SPI ROM
		LAN-E3V		O	O	O/× (*3)	O/× (*3)	O/× (*3)	O/× (*3,4)	O/× (*3,4)	×	X'tal(25MHz), LAN PHY(VDD3P3)
		WLAN-E3V		O	×	×	×	×	×	×	×	NGFF for WLAN
		3G-E3V		O	O	O	O/× (*3)	O/× (*3)	O/× (*3,4)	O/× (*3,4)	×	3G
	5.0	E5V		O	O	O	O/× (*3)	O/× (*3)	O/× (*3,4)	O/× (*3,4)	×	HDMI, NFC
		0DD-E5V		O	×	×	×	×	×	×	×	ODD
		US3PS0-E5V US3PS1-E5V US3PS2-E5V US3PS3-E5V		O	O	O	×	×	×	×	×	USB Ports
S	3.3	S3V		O	O	O	O	O	O	O	×	EC/KBC, ThermalSensor, Magnetic Sensor, JTAG for EC Reset Timer IC, Sound Codec(VD33_STB)
	5.0	M5V		O	O	O	O	O	O	O	×	LED, Dock
R	3.0	PCH-R3V		O	O	O	O	O	O	O	O	PCH(VCCRTC)

(*1)×: C9,C10 State

(*2)×: Power saving mode

(*3)O: Wake up Disable

(*4)O: USB Wake up Enable

1.7 Batteries

The computer has two types of batteries as follows:

■   Main battery pack
■   RTC battery

The battery specifications are listed in Table 1-10.

Table 1-12 Battery specifications

Battery name	Parts Code	Material	Output voltage	Capacity
Main battery (PS59∗ model)	G71C000JM510	Lithium-Ion	14.8 V	45Wh, 4 cell
	G71C000L6110	Lithium-Ion	14.8 V	45Wh, 4 cell
	G71C000KV110	Lithium-Ion	14.8 V	45Wh, 4 cell
	G71C000LA110	Lithium-Ion	14.6 V	45Wh, 4 cell
(PS59R model)	G71C000LV210	Lithium-Ion	14.8 V	45Wh, 4 cell
	G71C000LW110	Lithium-Ion	14.8 V	45Wh, 4 cell
RTC battery	GDM710000079	Lithium	3.0 V	220 mAh
	GDM710000083	Lithium	3.0 V	245 mAh

1.7.1 Main Battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached. The main battery maintains the state of the computer when the computer enters in sleep mode.

1.7.2 Battery Charging Control

Battery charging is controlled by a power supply microprocessor. The microprocessor controls whether the charge is on or off and detects a full charge when the AC adaptor and battery are attached to the computer. The system charges the battery.

Battery Charge

When the AC adaptor is attached, there are two types of charge: When the system is powered off and when the system is powered on. Table 1-11 lists the charging time required for charges.

Table 1-13 Time required for charges

Battery type	Power off	Power on
Battery(45Wh, 4 cell)	about 3.5 hours	about 3.5 to 10.0 hours

The time required when the system is powered on is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.

If any of the following occurs, the battery charge process stops.

1. The battery becomes fully charged.
2. The AC adaptor or battery is removed.
3. The battery or output voltage is abnormal.

Data preservation time

When turning off the power in being charged fully, the preservation time is as following Table 1-12.

Table 1-14 Data preservation time

Battery type	Sleep Mode	Shut Down Mode
Battery(45Wh, 4 cell)	about 6 days	about 100 days (PS59∗ model) about 40 days (PS59R model)

1.7.3 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-13 and Table 1-14 list the charging time and data preservation period of the RTC battery.

Table 1-15 RTC battery Time required for charges

Battery type	Power off	Power on
RTC battery	Doesn't charge	Doesn't charge

Table 1-16 RTC battery Data preservation time

Battery type	Sleep Mode	Shut Down Mode
RTC battery	about 7 years	about 7 years

1.8 AC adaptor

The AC adaptor is also used to charge the battery.

Table 1-15 lists the AC adaptor specifications.

Table 1-17 AC adaptor specifications

Parameter	Specification
Power	45W
Input voltage	100V/240V
Input frequency	50Hz to 60Hz
Input current	1.2 A (100V-240V)
Output voltage	19 V
Output current	2.37 A

Chapter 2

Troubleshooting Procedures

2.1 Troubleshooting

This chapter 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 here are as follows:

1. Power supply
2. System Board
3. 2.5" HDD & M.2 SSD
4. Keyboard
5. Click pad
6. Display
7. Optical Disc Drive (some models)
8. LAN
9. Wireless LAN / Bluetooth
10. Sound
11. Memory media slot
12. Web camera
13. HDMI
14. Fingerprint sensor

*Please note that some units are installed only on some models.

The Test Program operations are described in Chapter 3, *Tests and Diagnostics*. Detailed *Replacement Procedures* are described in Chapter 4.

1. Before exchanging a system board, the DMI information on TOP Menu is written down.

2. Please register DMI information after exchanging a system board.

3. Also update with the latest EC/KBC as described in Appendix H "EC/KBC Rewrite Procedures"

4. After replacing the LCD, update with the latest EC/KBC as described in Appendix H "EC/KBC Rewrite Procedures" to set the SVP parameter.

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 the user if a password has been registered and, if so, ask him or her to enter the password.

■ Make sure Windows or Free-DOS has been installed on the HDD/SSD. Any other operating system can cause the computer to malfunction.

■ Make sure all optional equipment is removed from the computer.

Figure 2-1 Troubleshooting flowchart (1/2)

```
                    ┌──────────────┐
                    │    START     │
                    └──────────────┘
                           │
                           ▼
         ┌────────────────────────────────┐
         │     Connect the AC Adapter      │
         └────────────────────────────────┘
                           │
                           ▼
              DC IN/Battery          No    ┌────────────────────────────┐
              indicator on?  ─────────────▶│ Follow the power supply    │
                           │                │ Diagnostic Procedure       │
                       Yes │                └────────────────────────────┘
                           ▼
         ┌────────────────────────────────┐
         │       Turn the power on.         │
         └────────────────────────────────┘
                           │
                           ▼
              Any error message     Yes    ┌────────────────────────────┐
              is displayed?  ─────────────▶│ Follow the system board    │
                           │                │ Diagnostic Procedure       │
                        No │                └────────────────────────────┘
                           ▼
              Startup logo          No     ┌────────────────────────────┐
              is displayed?  ─────────────▶│ Follow the display         │
                           │                │ Diagnostic Procedure       │
                       Yes │                └────────────────────────────┘
                           ▼
         ┌────────────────────────────────┐
         │ If the "Password=" message      │
         │ displays, type the password.    │
         └────────────────────────────────┘
                           │
                           ▼
              Does Windows OS       No     ┌────────────────────────────┐
              be loaded?     ─────────────▶│ Follow the HDD Diagnostic  │
                           │                │ Procedure                  │
                       Yes │                └────────────────────────────┘
                           ▼
                         ( 1 )
```

Figure 2-2 Troubleshooting flowchart (2/2)

①

Keyboard works well? — No → Follow the keyboard Diagnostic Procedure

↓ Yes

Touch pad works well? — No → Follow the touch pad Diagnostic Procedure

↓ Yes

Set the device containing the test program for maintenance to the PC, and start the test program.
(The reboot of the PC is required.)

↓

Diagnostic Program Loaded? — No → Follow the Diagnostic Procedure

↓ Yes

Perform each test

↓

Any error detected by the Diagnostic test? — Yes → Identify the test resulting in the error and perform the appropriate Diagnostic Procedure

↓ No

Perform/repeat running test

↓

Any error detected by the Diagnostic test? — Yes → Identify the test resulting in the error and perform the appropriate Diagnostic Procedure

↓ No

System is normal.

↓

END

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), and then perform the appropriate troubleshooting procedures as follows:

1. If an error is detected on the power supply, perform the power supply Troubleshooting Procedures in *2.3 Power Supply Troubleshooting*.

2. If an error is detected by error message or Memory test, perform the System Board Troubleshooting Procedures in *2.4 System Board Troubleshooting*

3. If an error is detected on the hard disk test, perform the HDD/SSD Troubleshooting Procedures in *2.5 HDD/SSD Troubleshooting*.

4. If an error is found on the keyboard test (DIAGNOSTICS TEST), perform the Keyboard Troubleshooting Procedures in *2.6 Keyboard Troubleshooting*.

5. If an error is found on the touch pad test, perform the touch pad Troubleshooting Procedures in *2.7 Click Pad Troubleshooting*.

6. If an error is detected on the display test, perform the Display Troubleshooting Procedures in *2.8 Display Troubleshooting*.

7. If an error is detected on the ODD test, perform the Optical Disk Drive Troubleshooting Procedures in *2.9 Optical Disk Drive Troubleshooting*.

8. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in *2.10 LAN Troubleshooting*.

9. If an error is detected on the Wireless LAN / Bluetooth test, perform the Wireless LAN Troubleshooting Procedures in *2.11 Wireless LAN or Bluetooth Troubleshooting*.

10. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in *2.12 Sound Troubleshooting*.

11. If an error is detected on the Memory media (Bridge Media) test, perform the Memory media (Bridge Media) troubleshooting Procedures in *2.13 Memory media (Bridge media) Slot Troubleshooting*.

12. If a malfunction is detected on the Web camera, perform the Web camera Troubleshooting Procedures in *2.14 Web camera Troubleshooting*.

13. If a malfunction is detected on the HDMI port perform the HDMI or Display port Troubleshooting Procedures in *2.15 HDMI Port Troubleshooting*.

14. If an error is detected on the Fingerprint sensor, perform the Fingerprint sensor Troubleshooting Procedures in *2.16 Fingerprint sensor Troubleshooting*.

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:

2.3.1 Procedure 1 Power Status Check

2.3.2 Procedure 2 Error Code Check

2.3.3 Procedure 3 Connection Check

2.3.4 Procedure 4 Charging Check

2.3.5 Procedure 5 Replacement Check

2.3.1 Procedure 1 Power Status Check

The following icons indicate the power supply status:

■ DC IN/Battery indicator

Check the **DC IN/Battery** indicator to determine the status of the battery pack and the power status with the AC adaptor connected. The following indicator conditions should be noted:

Table 2-1 DC IN/Battery indicator

DC IN/Battery indicator	Power supply status
Amber	Indicates the AC adaptor is connected and the battery is charging.
White	Indicates the AC adaptor is connected and the battery is fully charged.
Flashing Amber	The battery level is low while the system power is ON.
Flashing White	Indicates a problem with the computer.
Doesn't light	Any condition other than those above.

If the DC IN/Battery Charge LED is flashing white, follow the steps below:

1. Remove the battery pack and the AC adaptor to shut off power supply to the computer.
2. Attach the battery and AC adaptor back again.

If still exist, go to Procedure 2.

2.3.2 Procedure 2 Error Code Check

If the power supply microprocessor detects a malfunction, the DC IN/battery indicator flashes white. 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.)
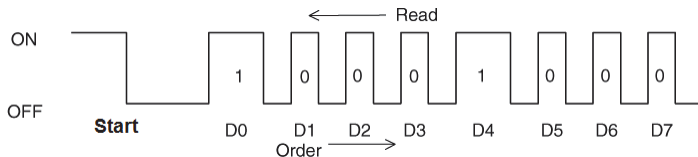
Check 1 Convert the DC IN/battery indicator blink pattern into the hexadecimal error code and compare it to the tables below. Then go to Check 2.

Table 2-2 Error code

Abnormal definition	Error code	Conditions
AC adapter [0A] offset value abnormal	10h	51.59mv?|A/D value – default value|
AC adapter power supply over rating	11h	AC exist and AC adapter output current over DCIN upper limit
AC adapter current over upper limit	12h	AC exist & all power supply off(no wakeup factor)& charge stop&AC adapter output current over 0.5A
AC adapter voltage over upper limit in PC side	13h	During power on status, system voltage over PC side AC adapter upper limit
AC adapter voltage over upper limit in dock side	14h	During power on status, system voltage over dock side AC adapter upper limit
E power output error during power on process	20h	During power on process, PCNFEV signal still de-assertion timeout more than 1s after EVON signal assertion.
E power output error during power on status	21h	During power on status, PCNFEV signal change to deassertion.
E power output error during power off status (output inactive)	22h	During power off (PS3/PS4 with wakeup facor) status, PCNFEV signal change to deassertion.
E power output error during power off status (output active)	23h	During power off (S5) status, PCNFEV signal change to assertion.
B power output error during power on process	30h	During power on process, PCNFBV signal timeout more than 1s after EVON signal assertion.
B power output error during power on status	31h	During power on status, PCNFBV signal change to deassertion.
B power output error during power off status (output inactive)	32h	During power off (PS3) status, PCNFBV signal change to deassertion.

B power output error during power off status (output active)	33h	During power off (S5) status, PCNFBV signal change to assertion.
P power output error during power on process	40h	During power on process, PPVOK(PCNFPV) signal timeout more than 1s after EVON signal assertion.
P power output error during power on status	41h	During power on status, PPVOK(PCNFPV) signal change to de-assertion.
P power output error during power off status (output active)	43h	During power off (S5) status, PPVOK(PCNFPV) signal change to assertion.
Other P power output error during power on process	50h	During power on process, OPGOOD signal timeout more than 1s after EVON signal assertion.
Other P power output error during power on status	51h	During power on status, OPGOOD signal change to deassertion.
Other P power output error during power off status (output active)	53h	During power off(S5) status, OPGOOD signal change to assertion.

2.3.3 **Procedure 3 Connection Check**

The wiring diagram related to the power supply is shown below:
Figure 2-3 Connection Check
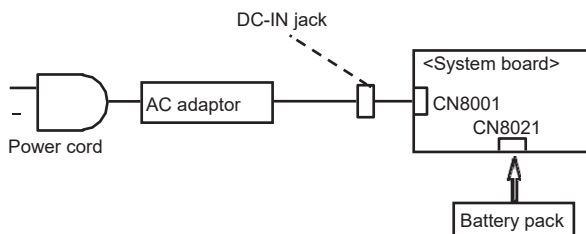
Any of the connectors may be disconnected. Perform Check 1.

■ Check 1 Make sure the AC adaptor and the AC power cord is 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 adaptor and the AC power cord with new ones.

■ 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 or flashes white, go to Procedure 4.

2.3.4 Procedure 4 Charging Check

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

1. Check 1 Make sure the AC adaptor is firmly plugged into the DC IN jack.
2. Check 2 Make sure the battery pack is properly installed. If it is properly installed, go to Check 3.
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 adaptor. If the battery pack is still not charged, go to Check 4.
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.
5. Check 5 Replace the battery pack with a new one. If the battery pack is still not charged, go to Procedure 5.

2.3.5 Procedure 5 Replacement Check

The power is supplied to the system board by the AC adaptor. If either the AC adaptor 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 adaptor is connected:

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

When AC adaptor is not connected (while powered by the battery pack):

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

2.4.1 Procedure 1 Message Check

2.4.2 Procedure 2 Diagnostic Test Program Execution Check

2.4.3 Procedure 3 Replacement Check

2.4.1 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) #2 ERROR
(16) IC #1 ERROR
(17) IC #2 ERROR
(18)KBC ERROR
(19)HDC ERROR
(20)HDD #0 ERROR
(21)HDD #1 ERROR
(22)NO FDD ERROR
(23)ER INTERRUPT ERROR
(24)RTC UPDATE ERROR
```

2.4.2 Procedure 2 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 Diagnostics* for more information on how to perform these tests.

Table 2-3 Main Test Menu

Test No	Test Name	Sub Test No	Sub Test Name
1	MEMORY	1 2	Main Memory Test V-RAM Memory Test
2	HDD/SSD Test	1 2 3 4 5	Sequential Read Test Partial Read Test Address Jump Test Address Uniqueness Test Specify Address Test
3	Keyboard Test	1 2	Key-code Test Touch Pad Test

Test No	Test Name	Sub Test No	Sub Test Name
4	LCD Panel Test	1 2 3 4	LCD Panel Test All dot on/off for LCD or All dot on/off Test H - pattern display or H - pattern Test LCD brightness
5	Battery Charge Test		
6	Fan Test		
7	Acceleration Sensor Test		

If an error is detected during these tests, go to Procedure 3.

2.4.3 Procedure 3 Replacement Check

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

2.5 HDD/SSD Troubleshooting

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

Procedure 1: Partition Check (Not Used)

Procedure 2: Message Check

Procedure 3: Format Check (Not Used)

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

The contents of the hard disk will be erased when the HDD troubleshooting procedures are executed. Save the required contents of the HDD to other storage drive in advance. For the backup, refer to the User's Manual.

2.5.1 Procedure 1 Partition Check (Not Used)

Insert the Dynabook DOS system disk and start the computer. Perform the following checks:

Check 1

> Type C: and press **Enter** key. 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** key. 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 HDD is operating normally.

2.5.2 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.

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

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.

2.5.3 Procedure 3 Format Check (Not Used)

The computer's HDD is formatted using the 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.

Format Check cannot be performed in Diagnostics Disk (CD)

Refer to the DOS Manual for the operation of DOS. For the format by the test program, refer to the Chapter 3, *Tests and Diagnostics*.

Check 1

Format the 2.5" HDD using DOS FORMAT command. Type as **FORMAT C: /S/U.**

If the 2.5" HDD cannot be formatted, perform Check 2.

Check 2

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

Check 3

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

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

2.5.4 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.

2.5.5 Procedure 5 Connector Check and Replacement Check

The HDD/SSD may be disconnected, or the HDD/SSD or system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

1. Check 1 Make sure the HDD/SSD is firmly connected to CN1900 on the system board.
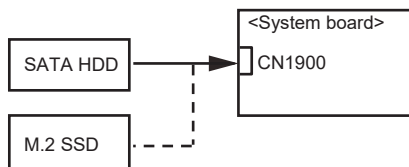
If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

2. Check 2 The HDD/SSD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and check the operation. If the problem still exists, perform Check 3.

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

2.6 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 Check and Replacement Check

2.6.1 Procedure 1 Diagnostic Test Program Execution Check

Execute the Keyboard Test (DIAGNOSTIC 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.

2.6.2 Procedure 2 Connector Check and Replacement Check

The connection of cable and board may be disconnected or 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.
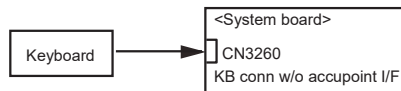
If the connection is loose, reconnect firmly and repeat Procedure 1. If the problem still occurs, go to Check 2.

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*.

2.7 Click Pad Troubleshooting

To check if the computer's Click Pad 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

2.7.1 Procedure 1 Diagnostic Test Program Execution Check

Execute the Click pad 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, Click pad is functioning properly.

2.7.2 Procedure 2 Connector Check and Replacement Check

The connection of the 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 cables are firmly connected to the system board.
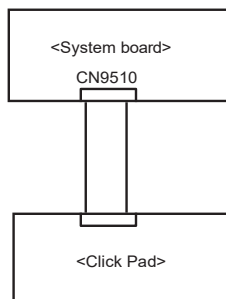
If the connection is loose, reconnect firmly and repeat Procedure 1.If the problem still occurs, go to Check 2.

Check 2

Click Pad or FFC may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

If Click Pad does not work properly, 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 Display Troubleshooting

This section describes how to determine if the computer's display is functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1 External Monitor Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Cable Check

Procedure 4: Replacement Check

2.8.1 Procedure 1 External Monitor Check

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

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

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

2.8.2 Procedure 2 Diagnostic Test Program Execution Check

Insert the diagnostics bootable CD in the computer's CD ROM, turn on the computer and run the test. See Chapter 3, *Tests and Diagnostics* for information on how to perform the test.

If an error is detected in the test, go to Procedure 3. If no error is detected, the display itself is normal.

2.8.3 Procedure 3 Connector Check and Cable Check

1. Check 1 Make sure the LCD cable is securely connected to CN5390 on the system board.
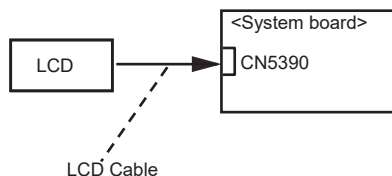
If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Procedure 4.

2.8.4 Procedure 4 Replacement Check

The LCD module and system board are connected to display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*.

Check 1

Replace the LCD cable with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 2.

Check 2

Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 3

Check 3

The display controller on the system board may be damaged. Replace the system board with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.9 Optical Disk Drive Troubleshooting

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

Procedure 1: ODD Cleaning Check (Not Used)

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

2.9.1 Procedure 1 ODD Cleaning Check (Not Used)

1. Turn off the power to the computer.
2. Open the ODD tray by inserting a slender object such as a straightened paper clip into the eject hole. The object must be long enough to activate the eject mechanism.
3. Clean the laser pickup lens with a lens cleaner. Apply the cleaner to a cloth and wipe the lens.
4. If the ODD drive still does not function properly after cleaning, go to Procedure 2.

2.9.2 Procedure 2 Diagnostic Test Program Execution Check

This procedure checks if the Optical Disk Drive is working properly by using the function of Windows.

If any error is detected by the test, go to Procedure 3.

2.9.3 Procedure 3 Connector Check and Replacement Check

The ODD may be disconnected, or the SATA ODD or system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1

Make sure the SATA ODD is firmly connected to CN1810 on the system board.

```
                          ┌──────────────────────┐
                          │ <System board>       │
┌──────────┐              │                       │
│ SATA ODD │────────▶     │ ▯ CN1810              │
└──────────┘              │                       │
                          └──────────────────────┘
```

If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2

The SATA ODD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

Check 3

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

2.10 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

2.10.1 Procedure 1 Diagnostic Test Program Execution Check

Execute LAN 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 by the test, go to Procedure 2.

2.10.2 Procedure 2 Connector Check and Replacement Check

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

Check 1

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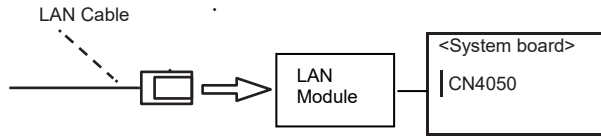
Check 2

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

Check 3

    LAN Module may be faulty. Replace it with a new one following the instruction 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 instruction in Chapter 4, *Replacement Procedures*.

2.11 Wireless LAN or Bluetooth Troubleshooting

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

Also in a wireless LAN + Bluetooth module, it checks by the same method except a test program.

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

2.11.1 Procedure 1 Transmitting-Receiving Check

Check 1

    Execute Wireless LAN test or Bluetooth test program to check the transmitting-receiving function of wireless LAN or Bluetooth. You will need a second computer that can communicate by Wireless LAN or Bluetooth. Perform the test following the instructions described in Chapter 3, *Tests and Diagnostics*.

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

2.11.2 Procedure 2 Antennas' Connection Check

The wireless LAN or Bluetooth function-wiring diagram is shown below:

WLAN antenna

```
 ┌─────────┐        ┌─────────┐      ┌──────────────────────┐
 │  black  │┄┄┄┄┄┤AUX    │   ⇨  │ <System board>       │
 ├─────────┤      │         │      │                      │
 │  white  │┄┄┄┄┄┤MAIN   │      │ CN2631/CN2630        │
 └─────────┘      └─────────┘      └──────────────────────┘
          WLAN antenna cable
```
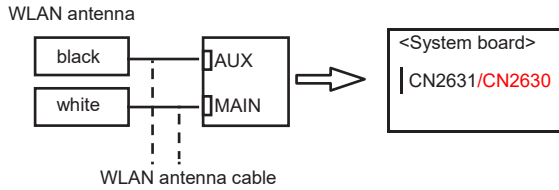
In addition, the antenna used by Wireless LAN and Bluetooth function is common use.

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 Wireless LAN or Wireless LAN/Bluetooth Combo card is firmly connected to the CN2631/CN2630 on the system board. If the connection is loose, connect it firmly and perform Procedure

Check 2   1. If the problem still occurs, perform Check 2.

> 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.

2.11.3 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 or Wireless LAN/Bluetooth Combo 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*.

2.12 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

2.12.1 Procedure 1 Diagnostic Test Program Execution Check

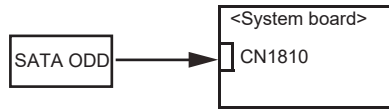This procedure checks if the Sound is working properly by using the function of Windows.

If any error is detected, go to Procedure 2.

2.12.2 Procedure 2 Connector Check

The connection of sound system is shown in the following figure.
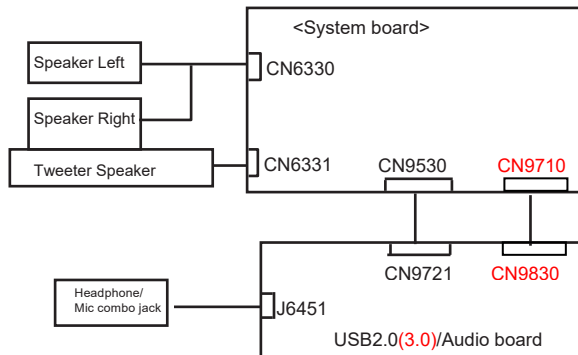
As the connection may be defective, disassemble the computer and check each connection.

If the problem still occurs, go to Procedure 3.

2.12.3 Procedure 3 Replacement Check

- If headphone/external microphone does not work properly, perform check 1.
- If internal microphone does not work properly, perform check 2.
- If Speaker Right does not work properly, perform check 3.
- If Speaker Left does not work properly, perform check 4.

Check 1

USB2.0(3.0)/Audio board FFC or FPC may be faulty. Replace the FFC or FPC with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.

Check 2

USB2.0(3.0)/Audio board may be faulty. Replace with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.

Check 3

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

Check 4

Speaker Left 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

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

2.13 Memory media (Bridge media) Slot Troubleshooting

This section describes how to determine if the computer's Memory media / 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

2.13.1 Procedure 1 Check on Windows OS

Insert a Memory media into the slot. Check if the installed Windows recognizes automatically the Memory media and the data in the Memory media can be read.

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

2.13.2 Procedure 2 Connector Check and Replacement Check

The SD/LED board is connected to CN9500 on the system board.

Memory media / Bridge media supports SD memory card/Multimedia card.

Check 1

SD/LED board and system board may be disconnected. Make sure the SD/LED board is firmly connected to CN9500 on the system board. If not, insert it firmly. If it is still not functioning properly, perform Check 2.

Check 2

SD/LED board 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

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

2.14 Web camera Troubleshooting

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

Procedure 1: Windows Application Test

Procedure 2: Connector Check and Replacement Check

2.14.1 Procedure 1 Windows Application Test

Execute Function Programs in Windows, the Camera LED should be turned on when Camera working, if Camera Module is not functioning properly, go to Procedure 2. If an error is not located, Camera system is functioning properly.

2.14.2 Procedure 2 Connector Check and Replacement Check

If Camera malfunctions, there may be a bad connection between Camera Module and system board, or either of these two components might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks.

Check 1

Make sure Camera Module harness has been firmly connected to the system board. Also make sure Camera Module is free of foreign matters. And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on Camera Module, remove it and then return to Procedure 1. If the problem still occurs, perform Check 2.
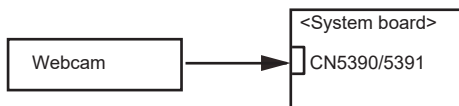
Check 2

Camera Module or the 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 3

Check 3

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

2.15 HDMI Port Troubleshooting

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

Procedure 1: Check on HDMI out port

Procedure 2: Connector Check and Replacement Check

2.15.1 Procedure 1 Check on HDMI TV

HDMI (High-Definition Multimedia Interface) port digitally transfers both video and audio data without reducing the quality. HDMI-compatible external display devices including televisions can be connected via the HDMI port.

To connect an HDMI-compatible display device, follow the steps as detailed below:

As the port operation of all HDMI (High-Definition Multimedia Interface) monitors have not been confirmed, some HDMI monitors may not function properly.

1. Plug one end of the HDMI cable into the HDMI in port of the HDMI display device.

2. Plug the other end of the HDMI cable into the HDMI out port on your computer.

3. Turn the HDMI display device's power on.

Figure 2-4 Connecting the HDMI out port

1. HDMI out port   2. HDMI cable

2.15.2 Procedure 2 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 HDMI cable is firmly connected to the HDMI out port on the system board. If the problem still occurs, perform Check 2.

Check 2

It checks whether there are any abnormalities in a setup of HDMI TV, and returns to Procedure 1. In addition, an HDMI setup of television should check "the instructions manual of attachment on HDMI TV." If the problem still exists, perform Check 3.

Check 3

HDMI cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 4.

Check 4

HDMI TV may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and check the operation. If the problem still exists, perform Check 5.

Check 5

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

2.16 Fingerprint sensor Troubleshooting

> ⚠ *To delete the account for confirming the fingerprint operation, it is necessary to log on by the account with the management authority. If the password has been set to log on, ask the Log-ON password to the user.*

To check if the Fingerprint sensor works correctly or not, follow the troubleshooting procedures below as instructed.

When failed in Procedure 1 to Procedure 3, execute Procedure 4.

Procedure 1: Setting Windows sign-in password

Procedure 2: Registration of PIN and fingerprint

Procedure 3: Authentication of fingerprint

Procedure 4: Connector Check and Replacement Check

Scan your finger shown below:

Straight your finger and touch the center of the fingerprint sensor lightly and lift your finger.

Figure 2-5 Swipe the finger
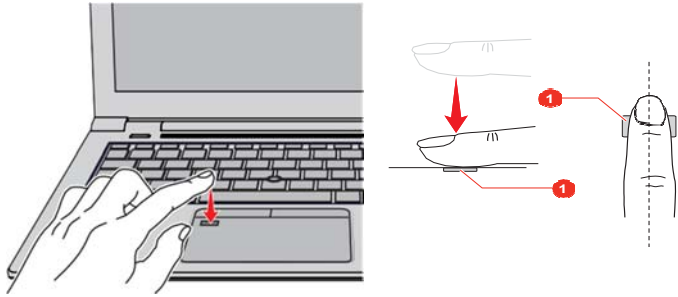
1. Fingerprint sensor

2.16.1 Procedure 1 Setting Windows sign-in password

To use the fingerprint functions, registration of your fingers on "Windows Hello" after setting the Windows sign-in password and PIN.

2.16.2 Procedure 2 Registration of PIN and fingerprint

1. Sign-in to a user account where you want to register the fingerprint information.
2. Click [Start] button.
3. Click [Settings].
4. Click [Accounts] -> [Sign-in options].
5. Click [Add] of [PIN].
   The message to confirm the account's password will appear.
6. Input the Windows password to [Password] and click [OK] button.
   The display to set PIN will appear.
7. Input numbers you want to set to [New PIN].
   Set four or more numbers as the PIN.
8. Input the PIN number you set to [PIN confirmation] and click [OK].
9. Then click [Setup] of [Fingerprint] of [Windows Hello] in [Sign-in options].
   [Windows Hello Setup] screen will appear.
10. Click [Start].
    The screen with a message for checking the user will appear.
11. Input PIN number to [PIN].
    The screen requesting to swipe on the fingerprint sensor will appear.
12. Touch your finger on the fingerprint sensor and lift it.
    Repeat it until setup is complete. (The message to show the completion will appear.)
13. When the message to show the registration completion appears, click [Close].
    To register another finger, click [Add another finger] and repeat steps from the step 12.

2.16.3 Procedure 3 Authentication of fingerprint

1. Turn on the computer to start up Windows.
2. Touch your registered finger on the fingerprint sensor and lift it. When your fingerprint is authenticated, you can sign-in Windows.

If you fail this authentication continually five times, you can not use the fingerprint authentication. In that case, type the password to sign in to Windows. If you want to type the password on the finger print authentication screen, press **BACKSPACE**.

2.16.4 Procedure 4 Connector Check and Replacement Check

The fingerprint sensor is installed in the Click Pad (Secure Pad) is connected as follows.
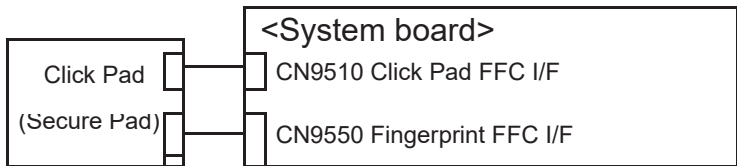
Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1

> The connection between Click Pad (Secure Pad) and System board may be loose. Make sure the cables are firmly connected to both the Click Pad (Secure Pad) and system board. If the problem still occurs, go to Check 2.

Check 2

> The cables may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.

Check 3

> The Click Pad (Secure Pad) 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 step in Chapter 4, *Replacement Procedures*.

Chapter 3

Tests and Diagnostics

3.1 Test program for maintenance

The test program for maintenance consists of the following items:

- Check and update of ME FW information
- Check of hardware information
- Check and update of BIOS information
- Check and update of EC/KBC information
- Diagnostic test programs

In addition, the tool for setting to "Battery Off mode" state might be released separately.

3.1.1 Check and update of ME FW information

The ME FW version is checked and if the update is needed, the message is displayed.

3.1.2 Check of hardware information

The information about hardware, such as HDD/SSD, memory and DMI, is displayed.

If no DMI information is registered, the message to request the DMI information registration is displayed.

3.1.3 Check and update of BIOS information

The BIOS version is checked and if it is not the latest one, the message to confirm if update is needed or not.

3.1.4 Check and update of EC/KBC information

The EC/KBC version is checked and if it is not the latest one, the message to confirm if update is needed or not.

3.1.5 Diagnostic test programs

There are programs to write the HW information and to check the function of HW components in the diagnostic test.

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

■ **The diagnostic program for maintenance (USB Memory),**

■ **A Headphones and microphone (Sound test)**

■ **The calibration tool for sensor (USB memory, depending on the model to be tested)**

3.1.6 Setting of Battery Off mode

Before returning to user, set the "Battery Off mode" to the PC.

Check the [Advanced] – [System Configuration] in the BIOS setup screen. When [Battery disconnect] item is prepared, connect the AC adapter and execute it to set the "Battery Off mode" state. If the item is not shown, you will need the following equipment for it.

■ **The Battery Off mode setting tool for maintenance (USB Memory)**

3.2 How to execute the test program

To start the test program for the maintenance, follow these steps below:

Step 1: Insert the USB memory which includes the test program into the USB connector.

Step 2: Turn on the computer while pressing F12 of the keyboard.

Step 3: Chose USB device on the selection screen, and press Enter of the keyboard.
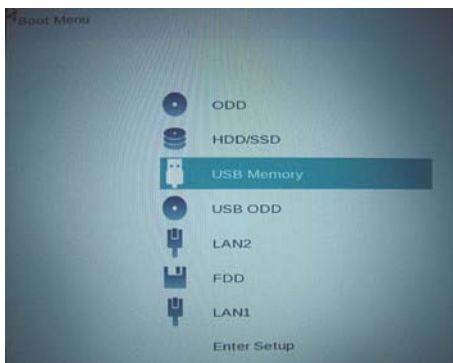
Step 4: Then this program executes the followings automatically.

> *If the test program doesn't start, set Secure Boot to "Disabled" in Setup program. As for Setup program, refer to 3.17 SETUP.*

Procedure 1: The Check and update of ME FW information

The ME FW version is checked and if the update is needed, the following message is displayed.

`Do you want to update ME-FW(AMT)?(Y)?` **or**

`Do you want to update ME-FW(NonAMT)?(Y)?`

When the message above is displayed, press **Y**. The ME FW will be updated and the computer will restart. Then repeat from Step 2.

Procedure 2: Check of hardware information

The program checks and displays the hardware information such as HDD and SSD of the computer.

When a system board is exchanged and DMI information is not written in, the DMI information can be registered with this program.

Refer to 3.3 Entry of the DMI information for details.

Procedure 3: Check and update of BIOS information

The BIOS version is checked and if it is not the latest one, the message to confirm if update is needed or not. The current version is displayed at upper part of the display.
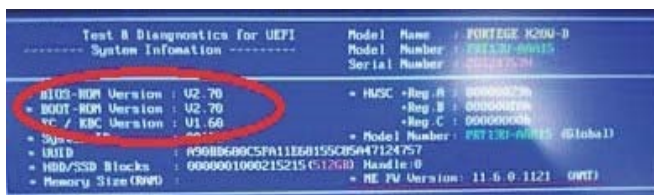
`Does it update BIOS (Vx.xx->Vx.xx)? (Y or N),`
`or press [Enter] (Selection=Y)?`

When the message above appears, pressing **ENTER** will start BIOS update.

Then, since the computer reboots automatically, repeat from Step 2.

If BIOS update is not needed, press **N**.

Procedure 4: Check and update of EC/KBC information

The EC/KBC version is checked and if it is not the latest one, the message to confirm if update is needed or not. The current version is displayed at upper part of the display.

```
Does it update EC/KBC (Vx.xx->Vx.xx)? (Y or
N), or press [Enter] (Selection=Y)?
```

When the message above appears, pressing **ENTER** will start EC/KBC update.

Then, since the computer reboots automatically, repeat from Step 2.

If BIOS update is not needed, press **N**.

1. *Connect the AC adaptor and the charged battery to the computer when you update the BIOS, EC/KBC or ME FW.*
2. *Do not turn off the power while you are updating the BIOS or EC/KBC. If the update fails, it might be impossible to start up the computer.*
3. *If the update rewrite fails, when you next turn on the power, a message may be displayed that the contents of the BIOS or EC/KBC have been erased. In that case, turn on the power again and perform Procedure 2 or 3.*

The following message will appear (depending on the model). If the PCB exchange or MDI information rewrite has been done, press **Y**. Otherwise, press **N**.

```
Change PCB ? or After Update DMI ? (y/n)
```

After the work for procedures 1- 4 is completed, the following test program menu (Top Menu) is displayed.

(The menu below shows an example of screen.)
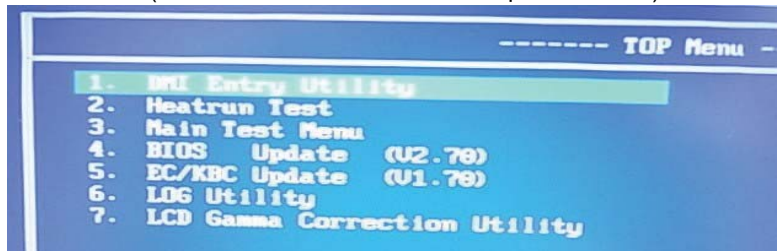
Select Menu ([NUm] or[↑][↓] – → [Enter]

To start the DMI Entry Utility, press **1** and **Enter**.

To start the Heatrun Test, press **2** and **Enter**.

To start the Main Test Menu, press **3** and **Enter**.

To start the LCD Gamma Correction Utility, press **7** and **Enter**.

> *Before starting the diagnostics, be sure to follow these steps:*
> *1. Check all cables are connected firmly.*
> *2. Exit any application and close Windows.*

3.3 Entry of the DMI information

To execute the DMI Entry Utility, select **1** from the test program menu (Top Menu), press **Enter**.

> When replacing the system board, be sure to execute the following procedures.
>
> Before replacing the system board, make a note of DMI information of the current PCB. The information can be confirmed by the "System Information" screen displayed after start of test program.
>
> After replacing the system board, execute "DMI Entry utility" to register the DMI information to the new system board according to the note.

The following message will appear. Press **Y**.

```
**** Warning : Update DMI really? (y/n) ***
```

The PC will restart. Press **F12** and select the USB memory as the boot device. Then the following screen will appear.

Input the information one by one. (If you have not replaced the system board, the DMI information should not be changed.)

- Model Name (e.g. PORTEGE Z830)
- Version Number (e.g. XF82BFGCTL7AA21)
- Serial number (e.g. 7G121732H)
- Model Number (e.g. PRT10N-AAAA2)
- PCN/BND Number (e.g. PCN3384T0Z01FA1F/XXX)

The meaning of buttons at the bottom is as follows:

- Load DMI : reads out the current DMI information and display it.
- Write DMI : writes the DMI information input to this screen when pressed.
- Cancel : ends this program.

When Write DMI button is pressed, the message will appear. Select WRITE button and then OK button.

To finish this utility, press Cancel button. The PC will restart. Press **F12** and select the USB memory as the boot device. Then this program will return to the test program screen.

3.4 Heatrun Test

The Heatrun test is an automatic test program that executes the following tests successively.

1. Main Memory test
2. V-RAM Memory test

---

3. Sequential Read Test

To execute this test, select **2** from the test program menu (Top Menu), and press **Enter**.

Explanation of each test:

1. Main Memory test
   Refer to Subtest 1 of 3.6 Memory Test

2. V-RAM Memory test
   Refer to Subtest 2 of 3.6 Memory Test

3. Sequential Read Test
   Refer to Subtest 1 of 3.7 Hard disk/SSD Test

To terminate the program, press **[SHIFT] + [Q]**.

3.5 Main Test Menu

To display the Main Test Menu, select **3** from the test program menu (Top Menu) and press **Enter**. (The menu below shows an example of screen.)
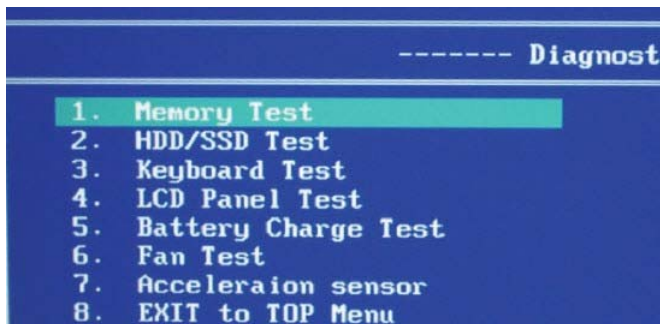
If you want to stop the test program under running temporarily, press **SHIFT + Q**.

After the stop, pressing **C** continues the test and pressing **E** ends the test.

To return to the Top menu, move the cursor to `EXIT to TOP Menu` on the screen above and press **ENTER**.

Others are the diagnostic tests. Move the cursor on the test item you want to execute and press **ENTER**.

The following table shows the subtests names of each test.

TEST NO.	TEST NAME	SUBTEST No.	SUBTEST NAME
1	MEMORY	1 2	Main Memory Test VRAM Memory Test
2	HDD/SSD Test	1 2 3 4 5	Sequential Read Test Partial Read Test Address Jump Test Address Uniqueness Test Specify Address Test
3	Keyboard Test	1 2	Key-code Test Touch Pad Test
4	LCD Panel Test	1 2 3 4	LCD Panel Test All dot on/off for LCD, All dot on/off Test H - pattern display, H - pattern Test LCD brightness Test
5	Battery Charge Test	-	-
6	Fan Test	-	-
7	Acceleration Sensor Test		
8	EXIT to TOP Menu		

After a subtest is selected, the following message may appear.

```
1. Go to Test
2. Test  Loop : YES
3. Error Stop : YES
```

The meaning of each item is as follows:

■ Test Loop

Select No: After testing, the program returns to the screen to select Error Stop and Test Loop item selection.

Select Yes: After testing, the pass count is increased by one, and the test is performed again from the test top. Repeat the test until **SHIFT + Q** is entered.

The setting of Yes/No can be changed by pressing **ENTER**.

■ Error Stop

Select Yes: if any error occurs during the test, the test is suspended and key input is required.

Enter **C** ……Restarts the test execution

Enter **E**…….Ends the test. The program returns to the screen to select Error Stop and Test Loop item selection.

Select No: though any error occurs during the test, the test is continued.

The setting of Yes/No can be changed by pressing **ENTER**.

■ Go to Test

The subtest is started in the conditions selected above by entering **ENTER**.

For more information about the tests in the Main Test Menu and other tests, refer to Section 3.6 or later.

3.6 Memory Test

To execute the Memory Test, select **1** from the DIAGNOSTIC TEST Menu (Main 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 1   **[Main memory Test]**

This test writes/reads the test data to/from the main memory, and compares them.

The test procedure is as follows:

(1) This test gets the memory map table.

(2) It seeks empty area more than 1MB.

(3) To the whole empty area, it writes the test data and reads out them to compare the test data and read data.

(4) Up to the maximum address of the mounted memory, it repeats to seek the empty area, to write the test data, to read out the data and to compare the test data and read data.

(5) It repeats the process from (1) to (4) above with the 4 test data.

The test patterns are 4-byte data: 00000000h, 55555555h, AAAAAAAAh and FFFFFFFFh. If empty area less than 3-byte length is found, the test data is not written.

If the empty memory is 64MB or less, this test is not executed. In the case that this test is never executed because of the memory size shortage, this test displays the message "Data Not Found "and writes the information to the text file

(errorlog.txt) as an error log.

If the test data and read data is not the same at comparing, this test displays the message "Data Compare error "and writes the information to the text file (errorlog.txt) as an error log.

As for the details of the error log, refer to 3.13 Log utility.

Subtest 2 **[V-RAM Memory test]**

This test sets the display mode to the maximum resolution. Then it writes/reads the test data to/from the VRAM area, and compares them.

This test checks the VRAM area in order with the following 4 test data:

FFFFFFFFh, AAAAAAAAh, 55555555h, 00000000h.

If the test data and read data is not the same, this test displays a message of the data comparing error and writes the information to the text file (errorlog.txt) as an error log.

As for the details of the error log, refer to 3.13 Log utility.

3.7 Hard Disk (&SSD) Test

To execute the Hard Disk Test, select **2** from the DIAGNOSTIC TEST MENU (Main 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 1 **[Sequential Read Test]**

This test reads out the whole data from the address of LBA 0 to the last. The data is read by 64-LBA unit.

If any errors occur, this test displays the message "HDD Read error "and writes the information to the text file (errorlog.txt) as an error log.

Subtest 2 **[Partial Read Test]**

This test reads the data from the top and middle of the HDD area by 1GB. It reads also from 1GB area before of the last address to the last.

If any errors occur, this test displays the message "HDD Read error "and writes the information to the text file (errorlog.txt) as an error log.

T&D Test Area	1GB
T&D Test Area	1GB
T&D Test Area	1GB
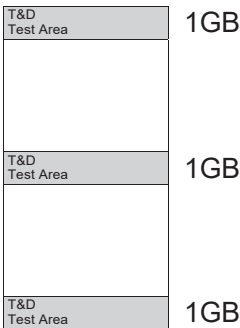
Subtest 3   [Address Jump Test]

This test writes the test data (AAAAAAAAh) to

1. LBA 63 (by 512-byte)
2. LBA 22 (=63 - 41) (by 512-byte)
3. LBA 86 (=22 + 64) (by 512-byte)
4. LBA 45 (=86 - 41) (by 512-byte)

At Step 1, this test starts from the LBA 63 and writes the test data by 512-byte.

At Step 2, it writes the 512-byte data to the LBA decreased by 41 LBAs from the LBA designated at the previous step.

At Step 3, it writes the 512-byte data to the LBA increased by 64 LBAs from the LBA designated at the previous step.

At Step 4, it writes the 512-byte data to the LBA decreased by 41 LBAs from the LBA designated at the previous step.

By repeating the decrease and increase of the LBA's address, this test continues to write the test data up to the last address. After that, it reads out the data from the same LBAs to compare.

If there are no 64 LBAs at last, this test is not executed for the last address.

If any errors occur, this test displays the message "HDD Write error "and writes the information to the text file (errorlog.txt) as an error log.

Subtest 4   [Address Uniqueness Test]

This test writes the number of passes (UNIT32) (default is 0) per LBA and the LBA number (UNIT32). To the rest of a LBA (calculated as "LBA size - (UNIT32)*2"), it writes "0".

This test writes the test data up to the last address. Then it reads out the data to compare. The number of passes will be 0 (default value) unless comparing of the whole data is completed. At the beginning of the test in the second round, the number would become 1 (when Test Loop Yes is selected. When Test Loop No is selected, the number will not be changed. In that case, the number remains 0 at the end of the test.) If the test data and read data is not the same, this test displays a message of "Data Compare error" and writes the information to the text file (errorlog.txt) as an error log.

(1 LBA (512-byte))

Number of Passes (UINT32)	LBA No. (UINT32)	0 0 0 0 0 0 . . . .

Subtest 5   **[Specify Address Test]**

First, specifying of the address of the start LBA, the data length and test data for writing (Dword) is needed for this test. Then this test writes the specified test data to the specified address and read them to compare.

If any errors occur at comparing, this test displays the message "Compare error" and writes the information to the text file (errorlog.txt) as an error log.

As for the details of the error log, refer to 3.13 Log utility.

3.8 Keyboard Test

To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST Menu (Main 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 1   **[key-code Test]**

(Displayed information)

```
( Pressed Key Code : xx )
( Pressed Scan Code : xx )
```

Subtest 2   **[Touch Pad Test]**

This test gets the information of moving amount of the touch pad, both for direction X and Y, and pressing (ON)/releasing (OFF) information of the button A (left click button) and B (right click button), and displays the information in real time. To back to the main menu screen, press the button A and B.

(Displayed information)

[X: xxxx] [Y: xxxx] [Button A : x] [Button B : x]

3.9 LCD Panel Test

To execute the LCD Panel Test, select **4** from the DIAGNOSTIC TEST Menu (Main 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**.

<u>Subtest 1</u>   <u>[LCD Panel Test]</u>

This test displays the following 4 colors, Red, Green, Blue and Yellow, from the left side of the display to right side, from the black to the maximum brightness. To back to the main menu screen, press **ENTER**.

(Screen sample)
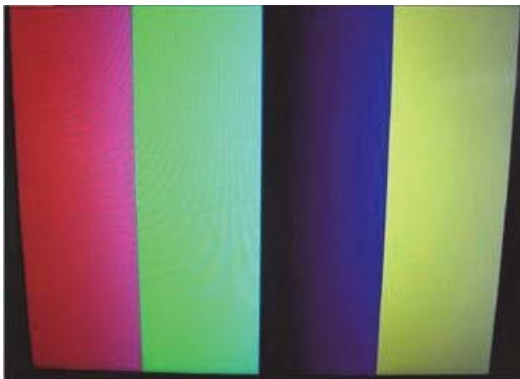
<u>Subtest 2</u>   <u>[All dot on/off for LCD]</u>**, [All dot on/off Test]**

This test displays the white screen for 5 sec. and then the black screen for 5 sec. After that, this test backs to the main menu screen automatically.

<u>Subtest 3</u>   <u>[H - pattern display]</u>**, [H - pattern Test]**

This test displays the letter "H" on the whole screen. To back to the main menu screen, press **ENTER**.

<u>Subtest 4</u>   <u>[LCD brightness Test]</u>

This test displays the white screen and changes the LCD brightness to the maximum, middle and low setting in order with 5-sec intervals. After that this test backs to the main menu screen automatically.

3.10 Battery Charge Test

To execute the Battery Charge Test, select **5** from the DIAGNOSTIC TEST Menu (Main Test Menu), press **Enter** and follow the directions on the screen.

When this test program is selected, the following message appears.
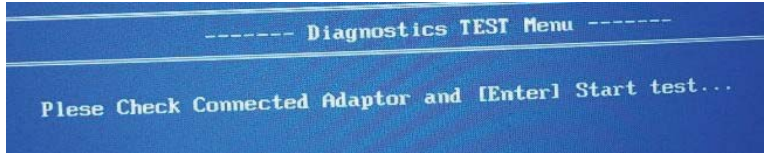
The test starts by pressing **ENTER**. The test gets the charging status of the mounted battery pack and displays the message.
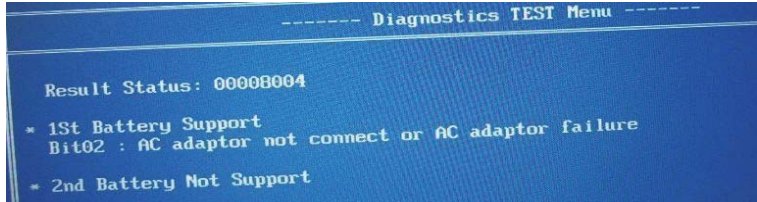
To back to the main menu screen, press **ENTER**.

3.11 Fan Test

To execute the FAN Test, select **6** from the test program menu (Top Menu), press **Enter** and follow the directions on the screen.

This subtest checks if FAN works properly.

```
FAN Low-speed ... Target Low: XXXX Rpm Result
Low: XXXX Rpm OK/NG

FAN High-speed... Target High: XXXX Rpm Result
High: XXXX Rpm OK/NG
```

OK appears in the display if the test ends without an error.

NG appears in the display if an error is found during the test.

To back to the main menu screen, press **ENTER**.

3.12 Acceleration sensor test

To execute the Acceleration Sensor Test, select **7** from the test program menu (Top Menu), press **ENTER** and follow the directions on the screen.

This subtest calibrates the output voltage of the acceleration sensor.

Remove the AC adapter and put a target PC on a flat and horizontal table. Keep each style specified in each step for several seconds.

To execute this test, you need to rotate the tested PC. So be sure not to damage the USB memory and the USB port where the USB memory is inserted.

Step 1: Open the LCD at 90 degrees.

Step 2: Press **ENTER**. When the message is changed, rotate the PC towards you by 90 degrees as the back of the PC faces up.

Step 3: Press **ENTER**. When the message is changed, rotate the PC counterclockwise by 90 degrees as the right side of the PC faces up.

Step 4: Press **ENTER**. When the message is changed, rotate the PC counterclockwise by 90 degrees as the front of the PC faces up.

Step 5: Press **ENTER**. When the message is changed, rotate the PC counterclockwise by 90 degrees as the left side of the PC faces up.

If any error is detected during the test, an error message will appear and the test will stop.

Press **ENTER** to return to the TOP MENU.

When the test ends without any error, the following message appears.

```
**** Test & Calibration OK ****
```
Press **ENTER** to return to the TOP MENU.

3.13 Log Utility

This function logs error information generated while a test is in progress and stores the results in USB memory.
(file name: errorlog.txt)

1. Each test description
To execute the Log Utility, select `LOG Utility` from the test program menu (Top Menu), and press **ENTER**. The following screen will appear.

Display examples

T-Name	Pass	Sts	Address	Write	Read
HDD_001_12345678_1234_1234567812345678_00000000_55555555					
RAM_001_12345678_1234_1000007812345678_00000000_55555555					

・ T-NAME. .... Test name

(Test name example)
RAM_01 .... Main Memory Test
HDD_01.... Sequential Read Test
HDD_02.... Partial Read Test
HDD_03.... Address Jump Test
HDD_04.... Address uniqueness Test
HDD_05.... Specify Address Test
BAT_01.....Battery Charge Test

・ Pass..... Pass count which the error occurred
・ Sts. ...... Status

(Value)
00FF .....Data compare error (Memory Test/HDD Test)
00E0.....Data Not Found (Memory Test) 0002.
 ....Protocol error (Memory Test/HDD Test)

・ Address… Address (Memory Test/HDD Test…Sector No.)

・ Write .... Write value (Memory Test/HDD Test)
・ Read ....Read value (Memory Test/HDD Test/ Battery Charge Test)

To clear the log information, press **C**. To back to the main menu screen, press **ENTER**.

3.14 LCD Gamma correction

To execute the LCD Gamma Correction Utility, select 7 from the test program menu (Top Menu), press Enter and follow the directions on the screen.

After replacing the system board, be sure to execute this program.

The following message will appear. Press Y.

```
* Restart system and Start utility *

*        Are you sure? (y/n)        *
```

The PC will restart. Press F12 and select the USB memory as the boot device. Then the following screen will appear and the correction is done automatically.
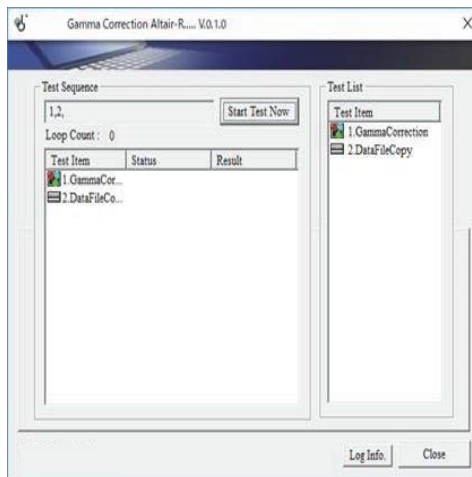
If this program ends successfully, "PASS" is displayed.

If any errors occurred, "FAIL" will be displayed.

Select "Close" button at the lower left to back to the start screen.
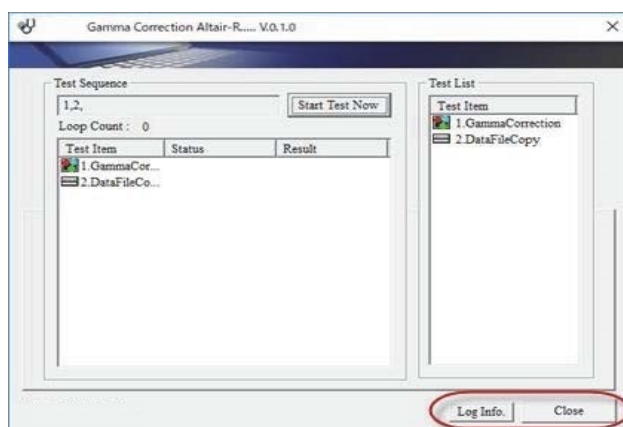
Any errors occurred during this program will be registered in the log. To check the content, select "LogInfo." button. As for the details of the log, refer to *3.19.5 Log* section.

When "Close" button is selected, the PC will restart. Press **F12** and select the USB memory as the boot device. Then this program will return to the original test program screen.

3.15 Wireless Module Test

Since there is no test program to check the wireless function, check if the wireless module and antenna are working without problem on Windows.

3.15.1 Check of the wireless module

Turn on the wireless communication function and check the module name via the application, PC system information. On this model, a combo module which has both wireless LAN and Bluetooth function is mounted.

<How to display PC system information screen>
1) Click Start button.
2) Click [dynabookサービスステーション(dynabook service station]-[システム情報(System information)]. Check the content of "ネットワーク(Netwrok)".

If "Wireless**" or any module name appears in the screen, it means the wireless module has been recognized.

3.15.2 Check of the antenna connection

Confirm that the icon for wireless LAN appears at the lower right of the screen under the circumstances the wireless communication function is available.

Click the icon. If the computer can find any AP (Access Point), the network names like below will appear. It shows the antenna cables are surely connected to the wireless module.

If the antenna cables are not connected to the wireless module or no available AP is found, the following icon will appear.

In the case of no-antenna connection

If AP should be ready but no AP point appears, any problem might occur on the wireless module or on the antenna connection.

3.16 Sound Test

Since there is no sound test in the test program for maintenance, check the functions related to sound on Windows with music data, etc.

3.17 SETUP

3.17.1 Function Description

This program displays the current system setup information as listed below:

< PS59* model >

Main menu

- System Time (System time)
- System Date (System time)
- CPU Type
- CPU Speed
- HDD/SSD
- Total Memory Size
- System BIOS Version
- EC Version
- Language

Security menu

- BIOS Password
    - User
    - Supervisor
- HDD/SSD Password
    - Mode
- Secure Boot
- Clear Secure Boot keys (*1)
- Clear Fingerprint data (*1)
- TPM
- Clear TPM Owner
- Hide TPM
- BIOS Access Rights (*1)
- Boot Menu (*1)
- USB Provisioning of AMT (*1)
- Device Access Control/Device Boot Control (*1)

*1 : This item is shown only when a supervisor password is set.

Power Management menu

- Wake-up on LAN
- Wake-up on LAN on Battery
- Wake-up on Keyboard
- Critical Battery Wake-up
- Panel Open – Power On
- Power on by AC
- Dynamic CPU Frequency Mode
- Core Multi-Processing
- Intel Turbo Boost Technology
- Intel Display Power Management
- SATA interface setting
- Keyboard Backlight Control Mode
- Backlight Lighting Time
- BIOS Power Management
  - Battery Save Mode
  - Processing Speed
  - CPU Sleep Mode
  - LCD Brightness
  - Cooling Method

Advanced menu

- Virtualization Technology
- Trusted Execution Technology
- SW Guard Extensions (SGX)
- Select Owner EPOCH input type
- Beep Sound
- Sleep and charge
- System ON CDP Charge Mode
- USB Power in Off State
- USB Legacy Emulation
- Change Boot Order
- System Configuration
  - Built-in LAN
  - Wireless LAN
  - Bluetooth
  - Web Camera
  - SD Host Controller
  - Fingerprint Sensor
  - Memory Performance Mode
  - LAN Boot Selection
  - Boot Mode
  - Power On Display
  - Boot Up NumLock Status
  - Large aperture graphics adapters
  - eco Charge Mode
- Diagnostic
  - HDD/SSD Test
  - Memory Test
  - Exit

Exit menu

- Exit Saving Changes
- Exit Discarding Changes
- Load Setup Defaults
- Save Changes and Power off

< PS59R model >

Main menu

- System Time (System time)
- System Time
- System Date
- CPU Type

■ CPU Speed

■ HDD/SSD

■ Total Memory Size

■ System BIOS Version

■ EC Version

■ AMT Setup Prompt (*2)

■ Language

Security menu

■ BIOS Password
   ■ User
   ■ Supervisor

■ BIOS Access Rights (*1)

■ HDD/SSD Password (*2)
   ■ User
   ■ Master

■ Bypass Mode at Restart (*2)(*3)

■ Secure Erase(*1)(*2)

■ Secure Boot

■ Clear Secure Boot keys (*1)

■ Clear Fingerprint data (*1) (*2)

■ TPM
   ■ Clear TPM Owner

■ USB provisioning of AMT (*2)

■ Device Access Control (*1)

■ Device Boot Control (*1)

*1 : This item is shown only when a supervisor password is set.

*2 : This item is shown only on some models.

*3 : This item is shown only when both the User and Master HDD Password.

Power Management menu

■ Wake-up on LAN

■ Wake-up on LAN on Battery

■ Wake on Keyboard

■ Critical Battery Wake-up

■ Panel Open – Power On

■ Power on by AC

■ Intel Turbo Boost Technology (*2)

■ Intel Display Power Management (*2)

■ SATA interface setting

■ Keyboard Backlight Control Mode (*2)

■ Backlight Lighting Time (*2)

Advanced menu

■ Virtualization Technology

■ Trusted Execution Technology (*2)

■ SW Guard Extensions （SGX）

■ Select Owner EPOCH input type

■ USB Power in Off State

■ USB Legacy Emulation

■ System Configuration

   ■ Built-in LAN

   ■ Wireless LAN (*2)

   ■ Auto Wireless LAN RF Switching(*2)

   ■ Wireless WAN (*2)

   ■ Bluetooth (*2)

   ■ Web Camera (*2)

   ■ SD Host Controller

   ■ Fingerprint Sensor (*2)

   ■ Microphone (*2)

   ■ LAN Boot Selection

   ■ Power On Display

   ■ External Display Device

   ■ Boot Up NumLock Status

   ■ Function Keys Mode (without pressing Fn first)

   ■ Large aperture graphics adapters

   ■ eco Charge Mode

   ■ Battery Disconnect

   ■ Absolute Persistence Configuration

   ■ Diagnostic

- Start HDD/SSD Test
- HDD/SSD Test Mode
- Start Memory Test

Boot menu

- Priority
  - Boot Option #1
  - Boot Option #2
  - Boot Option #3
  - Boot Option #4
- Priority for devices

Exit menu

- Exit Saving Changes
- Exit Discarding Changes
- Load Setup Defaults
- Save Changes and Power Off

3.17.2 Accessing the SETUP Program

Turn on the power SW.

Then press **F2** key of the keyboard. The following display appears.

< PS59 model >*

Main menu screen
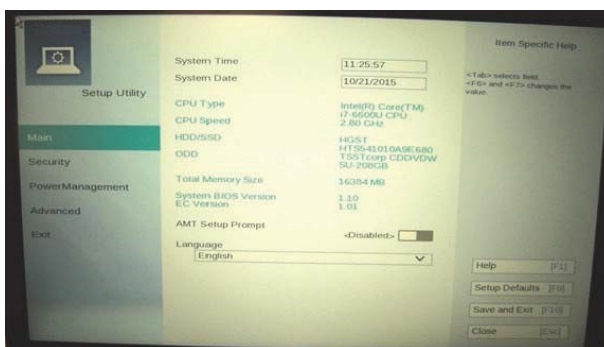
Security menu screen
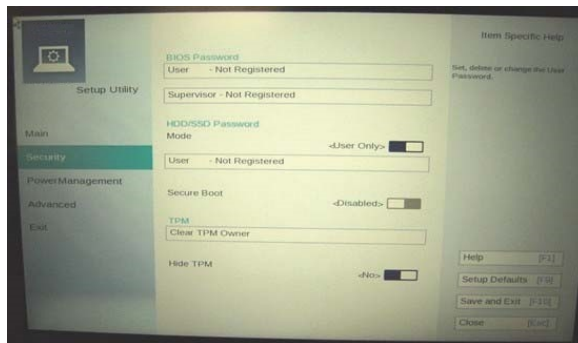
Power Management menu screen
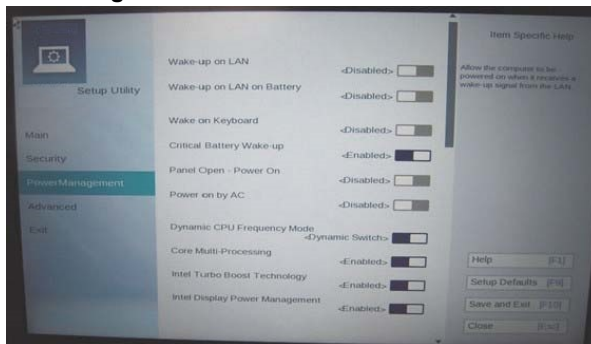
Advanced menu screen
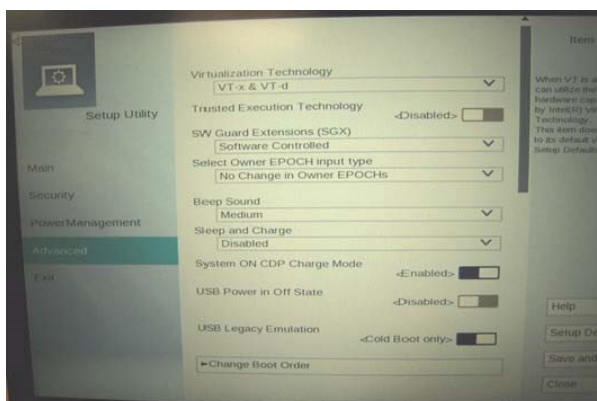
Exit menu screen
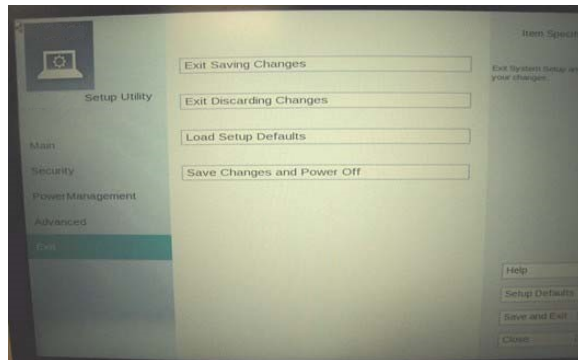
Main menu screen

Security menu screen

Power Management menu screen
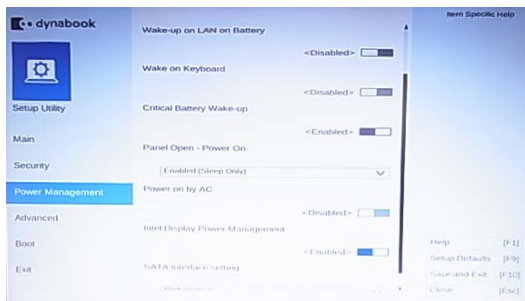
Advanced menu screen

Boot menu screen

Exit menu screen

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.

2. Press the **[Enter]** Key to change the value.

Accepting Changes and Exiting the SETUP Window

1. Press **[F10]** key to accept the changes you made.

2. To make other changes, press **N**. Repeat the steps above.

3. To accept the changes, press **Y**.

*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 load the factory preset configuration, press **[F9]** key.

2. To accept the default settings, press **[Y]** key.

How to change setup Options

Since a help is displayed on the right-hand side of each menu screen, refer to it before change.

3.18 Battery Off mode setting tool

3.18.1 Outline

"Battery Off mode" state will be set before returning the PC to the user. Check the [Advanced] – [System Configuration] in the BIOS setup screen to set the "Battery Off mode" state. When [Battery disconnect] item is shown, connect the AC adapter and execute it.

If the item is not shown, you will need this tool.

> Before implementing this tool, be sure to the version of EFI Shell is V2.1 or later.

3.18.2 Preparation

Download the tool to a USB memory.

Step 1: To get the EFI Shell start program (Shell.efi), click "Download" on the URL below.

https://github.com/tianocore/edk2/blob/master/ShellBinPkg/UefiShell/X64/Shell.efi

Step 2: Format a USB memory in FAT32.

Step 3: Create "efi\boot\" folder on the root folder of the USB memory.

Step 4: Change the name of the downloaded Shell.efi file to "BOOTx64.efi".

Step 5: Copy the "BOOTx64.efi" file to the "efi\boot\" folder on the USB memory.

Step 6: Download and unzip the SetBatOffMode_R***.zip, registered as 360082949 to the system, and copy to the root folder on the USB memory.

3.18.3 Start and procedure

> If the test program doesn't start, set Secure Boot to "Disabled" in Setup program. As for Setup program, refer to 3.17 SETUP.

Step 1: Insert the USB memory created in the preparation step into the USB connector.

Step 2: Turn on the computer while pressing **F12** to display the screen to select a boot device.

Step 3: Choose USB device on the selection screen, and press **Enter**. The following message will appear.

Battery Off Mode Setting tool

```
                                    Vx.xx
            Select test Menu
               [1] Set — Battery Off Mode

               [0] Exit
            =====================================
            Input key of 1 or 0.
```

Step 4: When you press **1**, the Battery Off mode should be set and display the result.

When the result shows "OK", the Battery Off mode should be set surely. Press any key to turn off the PC.

When the result shows "NG", check the message.

Message	Meaning
ERROR : Could not execute this tool because it is not a Support model	The Battery Off mode program doesn't support this PC. The Program ends automatically.
Error Code : (0x8300)	The written data is incorrect.
Get Status : Disabled (0x0000)	The setting was done but it but it has not affected.
Get Status : Error (0x****)	Any other error occurs. When any key is pressed, the program returns to Step 3. Retry to do this program several times. If NG continues, end the program in Step 3 by pressing 0 key and check the PC condition.

> When turning on the power just after setting this mode, it will take 13 to 14 sec until the logo display. Do not press the power button again before logo display.

3.19 Sensor calibration tool (Not used)

3.19.1 Outline

This tool should be needed if the following change is applied to the computer to calibrate the sensors such as Gyro sensor and Acceleration sensor.

- Replacing of System board (FMEKSY*)
- Replacing of the chassis or keyboard
- Disassembling/assembling of PC including removal and attachment of the sensor harness
- Replacing of the front Web camera

The following explains how to operate the tool.

3.19.2 Preparation

Decompress the following file (***.iso) with any application software.

■ **AltairME30SensorCalibrationToolV***.iso**

Step 1 Select iso file and right-click to execute "Mount".
    A virtual ODD is mounted and files are shown.
Step 2 Copy all the files to the root drive of a USB memory.

To end the virtual ODD, select the virtual drive and right-click to execute the Remove.

3.19.3 Start and Test procedure

Procedure 1: Insert the USB memory created in the preparation step into the USB connector.
Procedure 2: Turn on the computer while pressing F12 to display the screen to select a boot device.
Procedure 3: Chose USB device on the selection screen, and press Enter. Then the calibration tool appears.
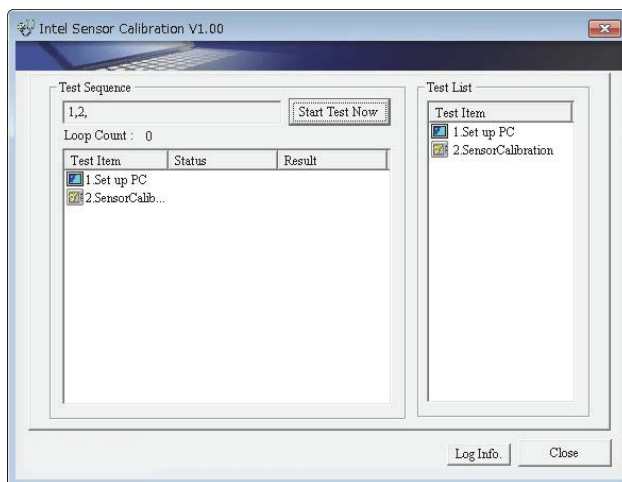
Procedure 4: Remove the USB memory.

Procedure 5: Change the PC to be tested into Tablet style and lay it on the horizontal and stable table as the screen faces up.

Procedure 6: Touch "Start Test Now " button to start the test.
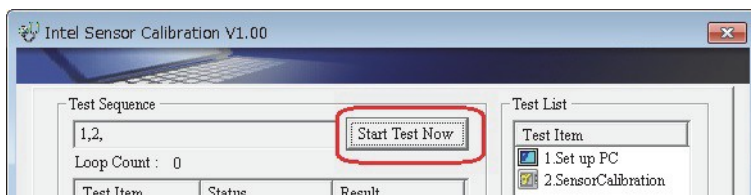
- *During the test, change the PC's position according to the directions on each step. After setting to the specified position, the tool will go to the next step automatically.*
- *Don't apply any vibration or shock to the PC.*
- *Keep the position specified in each Step for 2 to 3 seconds.*

Acceleration Calibration test

There are four steps in the Acceleration calibration test.

Step 1: Lay the PC as the display faces up.

Touch "Setup OK" button when the PC is ready.
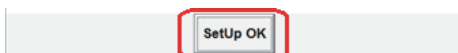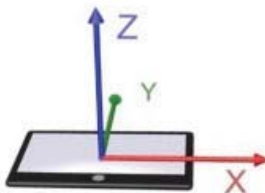
When "STEP 1 XXXXXX" is displayed, go to the next step.

Step 2: Make the side with the power button bottom side slowly.
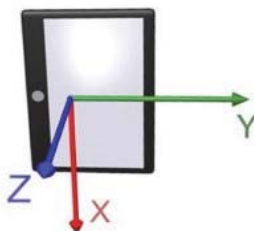
When "STEP 2 XXXXXX" is displayed, go to the next step.

Step 3: Rotate the PC 90 degrees counterclockwise slowly.
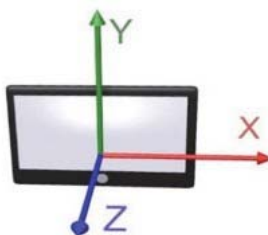
When "STEP 3 XXXXXX" is displayed, go to the next step.

Step 4: Lay the PC as the display faces up.
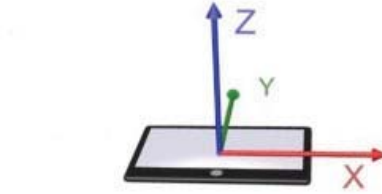
When "STEP 4 XXXXXX" is displayed, the Acceleration calibration test is completed.

3.19.4 Result

[PASS]

If this test ends successfully, "PASS" is displayed.

Tap "OK" button to back to the start screen.

[FAIL]

If any problem occurred, "FAIL" will be displayed.

Tap "OK" button to back to the start screen.

3.19.5 Log

< To check the log contents without save >

Select "Log Info." to display the "Log Information Display".
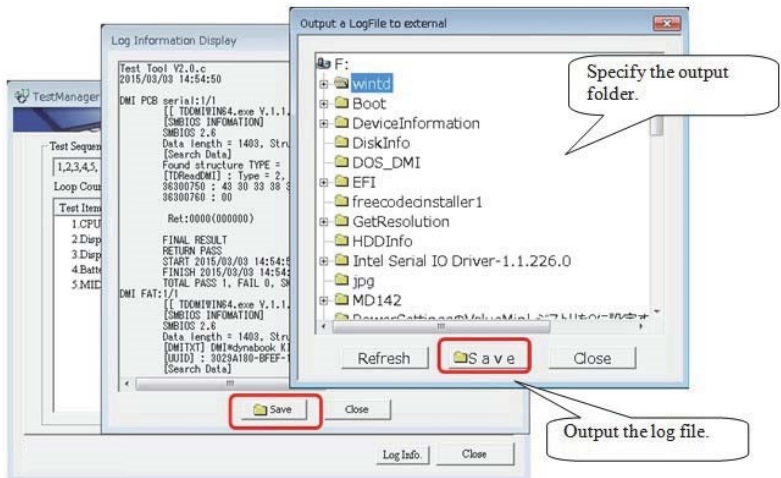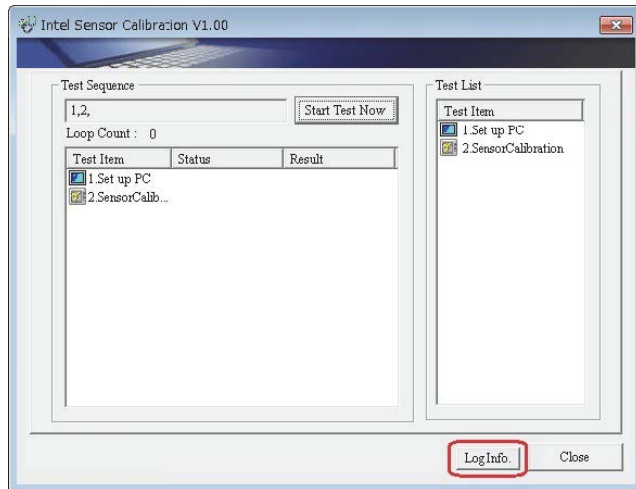
< To save the log contents in an external memory device >

The log contents can't be saved in the internal disk to keep the user files.

1. Select "Log Info." to display the "Log Information Display".
2. Select "Save" on "Log Information Display" to display "Output a LogFile to external".
3. Select a folder to save the information file and select "Save".

The log file named "wintndx.log" or "wintndx64.log" will be output to (saved in) the specified folder.

3.19.6 How to terminate this tool

Select "Close" on the tart screen. The computer is powered off.
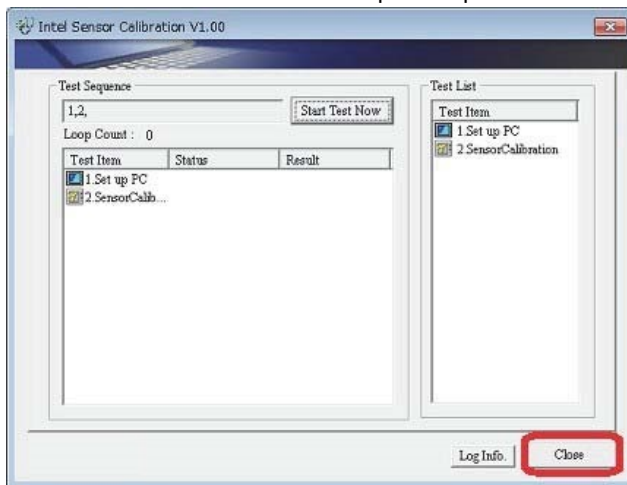
Chapter 4

Replacement Procedures

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.

Table 4-1 the case for the following example

Base	Cover					4.25 LCD assembly
4.12 Battery lock/Battery release latch	4.13 RTC battery	4.14 Optical disk drive	4.15 HDD/SSD	4.16 Memory module		4.26 Camera module/Wireless antennas

4.10 Battery pack
4.11 Cover assembly and base assembly

4.17 USB2.0(3.0)&Audio board
4.18 Speakers
4.19 SD/LED board
4.20 Wireless LAN card
4.21 FAN
4.22 Fin
4.23 System board/LAN Module/Power Button board

4.24 Keyboard and Click Pad

Chart Notation

The chart shows the case for the following example:

Removing the ODD unit

All FRUs (*4.10 Battery pack*, *4.11 Cover assembly and base assembly*) above " *4.14 Optical disk drive*" unit must be removed.

Please prepare required parts in advance, when replacing the relevant items.

4.1 Safety Precautions

Please read the following safety instructions before disassembling the computer and always follow the instructions while working on the computer.

1. Always use the genuine battery that is authorized by Dynabook or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.
   Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.

2. The power supply and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock.
   Also, do not disassemble individual components in first-level maintenance.

1. Turn off the power and disconnect the AC adaptor from the power source, to avoid exposure to electric shock.

2. Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.

3. Be careful of edges and corners as these may cut.

1. When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.
2. To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.
3. Before lifting out an FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.
4. If you use AC power, be sure to use the cable that came with the computer or one recommended by Dynabook.
5. Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.
6. Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.

4.2 Before You Begin

Take note of the following points before starting work. Always remove the AC adaptor and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in *4.10 Battery pack*.

1. Do not disassemble the computer unless it is operating abnormally.
2. Use the recommended 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 identify the FRU that has probably caused the system failure.
5. Do not perform any unnecessary work. Always work in accordance with the disassembly and re-assembly 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 re-assembling, 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.

4.3 Disassembly Procedure

Four main types of cable connector are used.

■ Pressure plate connector

■ Spring connector

■ Back flip connector

■ Normal pin connector

For pressure plate connectors, slide the pressure plate holding tags on both sides of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting the cable to the pressure plate connector, slide the pressure plate holding tags on both sides of the plastic pressure plate on the connector and insert the cable into the connector. Push both tags of the pressure plate such that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected.

For spring connectors, lift up the stopper frees the cable and allow 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. Pull the cable to ensure that it is securely connected.

For back flip connectors, lift up the flip plate frees the cable and allow it to be pulled out. To reconnect, hold the flip plate in the up position and insert the cable, then lower the flip plate to secure the cable. Pull the cable to ensure that it is securely connected.

Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.

Figure 4-1 Pressure plate connector/Spring connector/Back flip connector
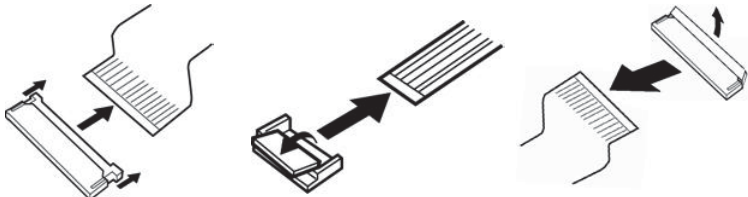
4.4 Assembly Procedures

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.

4.5 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 S-THIN HEAD screws)

■ One Philips screwdriver with type 1 bit (for screws other than above)

■ One flat-blade screwdriver (for removing the CPU)

■ Tweezers (for lifting screws)

■ ESD mats (lay on work table or floor)

■ An ESD wrist strap and heel grounder

■ Anti-static carpet or flooring

■ Air-ionizers in highly static sensitive areas

■ Antenna coaxial cable disconnector

■ Special syringe (for applying grease)

4.6 Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below.

Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.

Dynabook recommends that you use an electric screw driver for quick and easy operations.

■ M2 (2mm) 0.167 N•m (1.7 kgf cm)
■ M2.5 (2.5mm) 0.294 N•m (3.0 kgf cm) (When, securing the HDD and HDD holder)
■ M3 (3mm) 0.549 N•m (5.6 kgf cm)

To prevent damage to THIN HEAD screws, use type 0 bit philips screwdriver. 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).
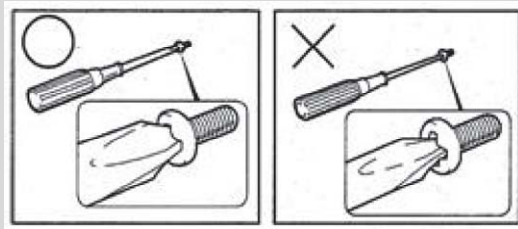
4.7 Grip Color

Some screws have a colored grip area to help you determine the length of the screw.

[Normal grip]

■ Even numbered length screws: Brown
■ Odd numbered length screws: White
■ Special length screw: Blue

[Special grip]

■ Even numbered length screws: Yellow
■ Odd numbered length screws: Pink
■ Special length screw: Green

 "Special length screw" means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.6 mm and so on.

Grip area

4.8 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.

Screw type + Screw length (mm)

Screw shape

B: Bind screw

F: Flat head screw

S: Super thin head screw

T: Tapping screw

U: Other screws (Unique screws: pan head, stud, etc.)

Example: B6 ... 6mm BIND screw

Screw color/material

B: Black/Nickel

C: Silver/Non-Hexavalent Chromate

U: Other screws (Unique screws: such as stud, etc.)

4.9 Memory media

Insert or remove a Memory media in accordance with any instructions in each Memory Media manual or the manuals of the computer system you are using.

4.9.1 Installing the Memory media

To insert memory media, follow the steps as detailed below.

1. Turn the memory media so that the contacts (metal areas) face down.
2. Insert the memory media into the memory media slot on your computer.
3. Press the memory media gently until it clicks into place.

Figure 4-2 Inserting memory media
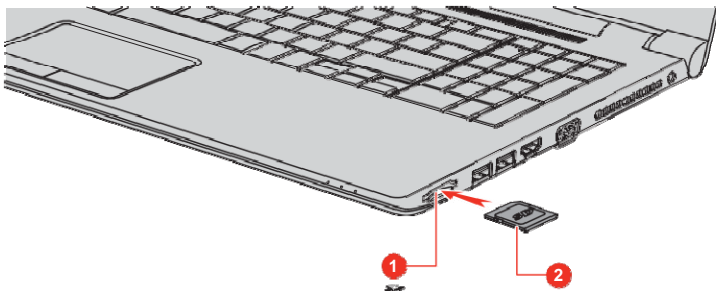
1. Memory media slot   2. Memory media

4.9.2 Removing the Memory media

To remove memory media, follow the steps as detailed below.

1. Open the **Safely Remove Hardware and Eject Media** icon on the Windows Taskbar.
2. Select **memory media**.
3. Push the memory media until you hear a click to partially release it.
4. Grasp the media and remove it.

4.10 Battery pack

4.10.1 Removing the Battery pack

To remove the battery pack, follow the steps below.

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 adaptor and other external devices from the computer.
3. Turn the computer face down.
4. Release the **battery lock** and remove the **battery pack** while sliding the **battery release latch**.

Figure 4-3 Releasing the battery pack
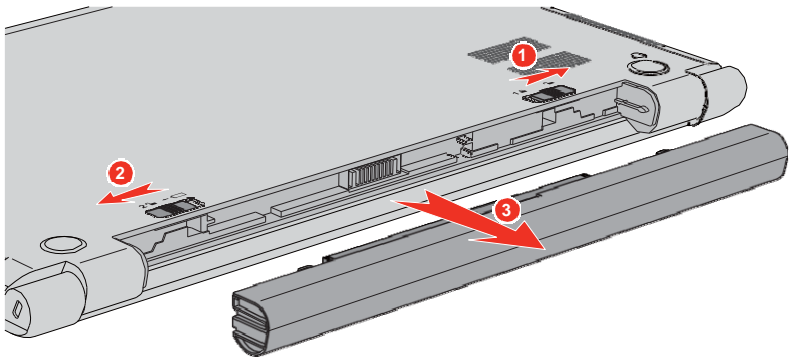
1. Battery lock   3. Battery pack
2. Battery release latch

Dispose of the used battery pack in accordance with the laws and ordinances of your local authority.

4.10.2 Installing the Battery pack

To install the battery pack, follow the steps below.

⚠️ 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 Dynabook.

ℹ️ Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.

1. Insert the battery pack as far as it will go into the computer.
2. Ensure that the battery pack is securely in place and the battery lock is in its locked position.
3. Turn your computer over.

4.11 Cover assembly and base assembly

4.11.1 Removing the Cover assembly and Base assembly

To remove the base assembly, follow the steps below.

1. Close the display panel and turn the computer face down and remove the battery pack.
2. For models with memory module cover, first remove the screw securing the memory module cover, and then remove the cover.
   Note that the screw is attached to the cover in order to prevent it from being lost.

Figure 4-4 Removing the memory module cover
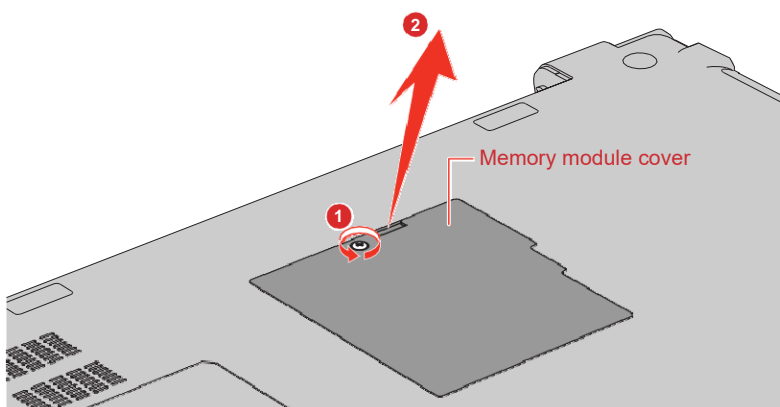
3. Remove the following screws securing the cover assembly and base assembly.

> The colour of screw might vary depending on the model's colour you purchased.
>
> White or Gold: F2.5 x 6CT
> Red or Black : F2.5 x 6BT
> White or Gold: F2.5 x 8CT
> Red or Black : F2.5 x 8BT

Figure 4-5 Removing the base assembly (1)
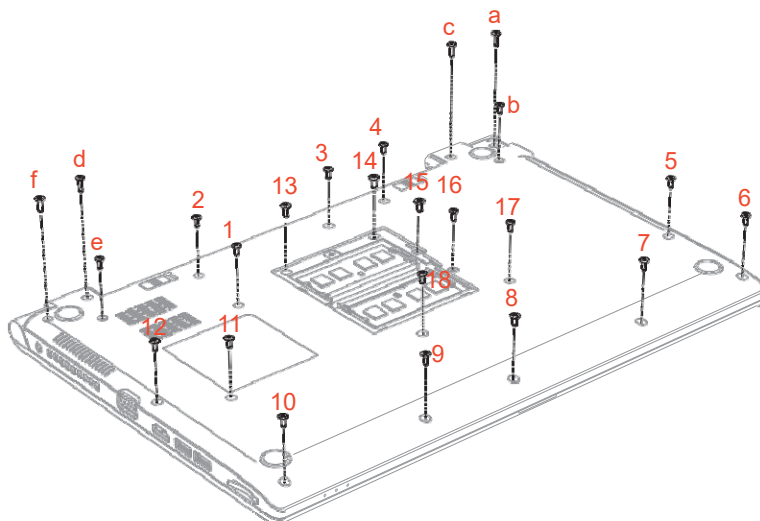
4. Separate the **base assembly** and **cover assembly** while releasing the **latches**.

Figure 4-6 Removing the base assembly (2)

Base assembly

Cover assembly

Latches
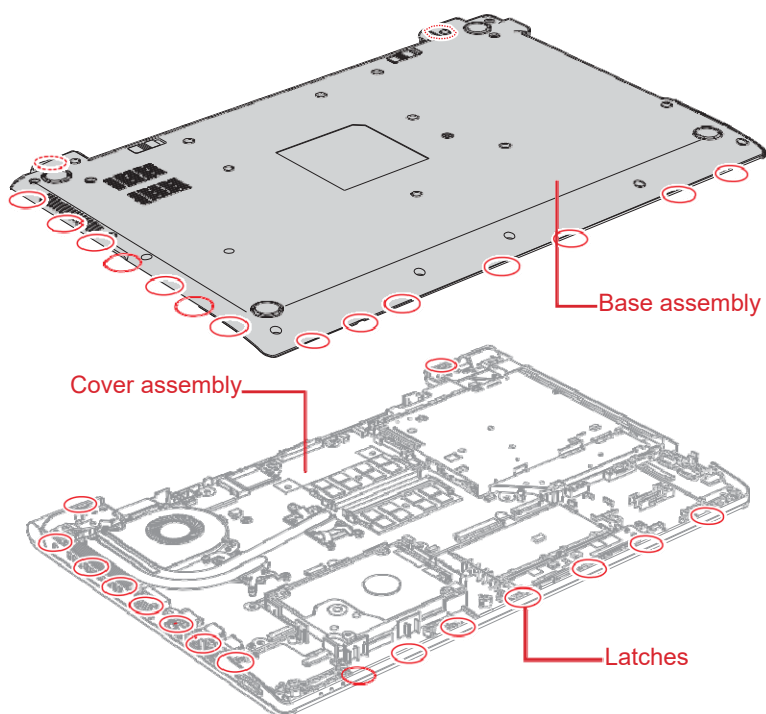
4.11.2 Installing the Base assembly

When replacing the Base Assembly for **HDD model**,
stick a new **INSU CUSHION** on the new Base Assembly in place.
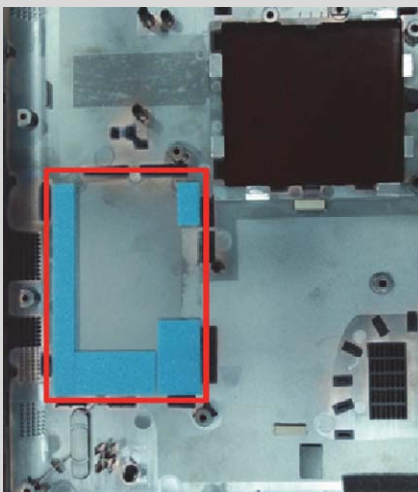
To install the base assembly, follow the steps below.

1. Set the cover assembly on the base assembly while securing the latches.
2. Secure the cover assembly and base assembly with the screws.
3. Seat the memory module cover in place and secure it with the screw.

When securing the base assembly, be sure to drive the screws in the order of the number on Figure 4-5 depending on the model.

M2.5 x 6B FLAT HEAD 1 to 18.

M2.5 x 8B FLAT HEAD a to f

4. Turn up the computer and open the display.

4.12 Battery lock/Battery release latch

4.12.1 Removing the Battery lock/ Battery release latch

To remove the battery lock, follow the steps below.

1. Remove the **battery lock/battery release latch** from the slot while pushing **latches** inside to release them.

Figure 4-7 Removing the Battery lock/ Battery release latch
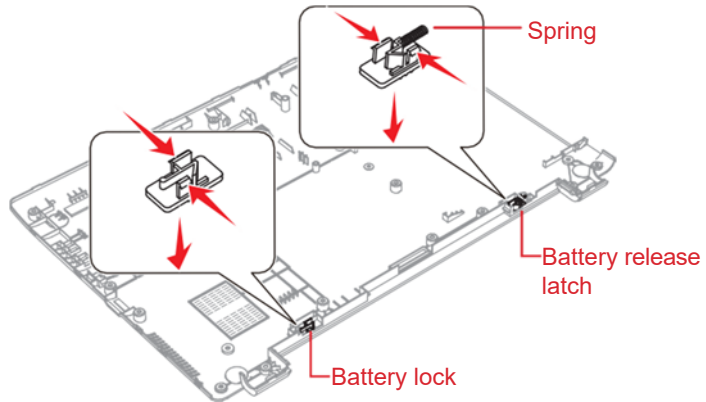
When removing the battery release latch, be careful not to lose the **spring**.

4.12.2 Installing the Battery lock/Battery release latch

To install the battery lock, follow the steps below.

1. Insert the **spring** into the battery release latch.
2. Set (push) the **battery lock/battery release latch** until the **latches** are engaged.

4.13 RTC battery

Risk of explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to the laws and ordinances of your local authority.

Figure 4-8 RTC battery and harness
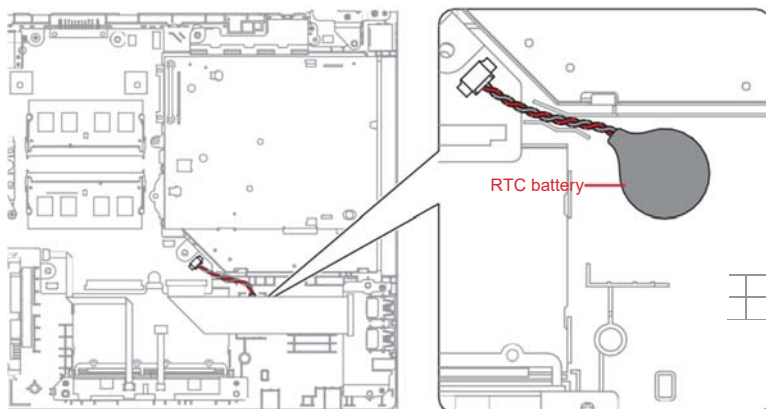
RTC battery

4.13.1 Removing the RTC battery

To remove the RTC battery, follow the steps below.

1. Disconnect the USB2.0(3.0)/Audio board FFC from the connector **CN9530** on the system board (FTL5SY*/F4L7SY*) so that the RTC battery is visible.

2. Disconnect the RTC battery harness from the connector **CN8020** on the system board (FTL5SY*/F4L7SY*).

3. Peel off the RTC battery (with the RTC MYLAR) from the cover assembly.

Figure 4-9 Removing the RTC battery

CN9530
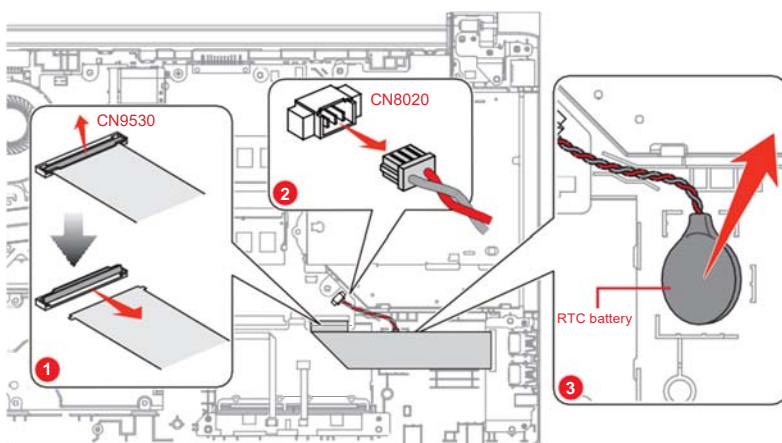
CN8020

RTC battery

4.13.2 Installing the RTC battery

To install the RTC battery, follow the steps below.

1. Place and stick the RTC battery (with the RTC MYLAR) to the cover assembly.
2. Connect the **RTC battery harness** to the connector **CN8020** on the system board (FTL5SY*/F4L7SY*).
3. Connect the **USB2.0(3.0)/Audio board FFC** to the connector **CN9530** on the system board (FTL5SY*/F4L7SY*).

Check the voltage range between below two test points, the properly voltage range should be within +2.94 V ~ +3.4 V.

黑表笔（**negative**）

红表笔（**positive**）
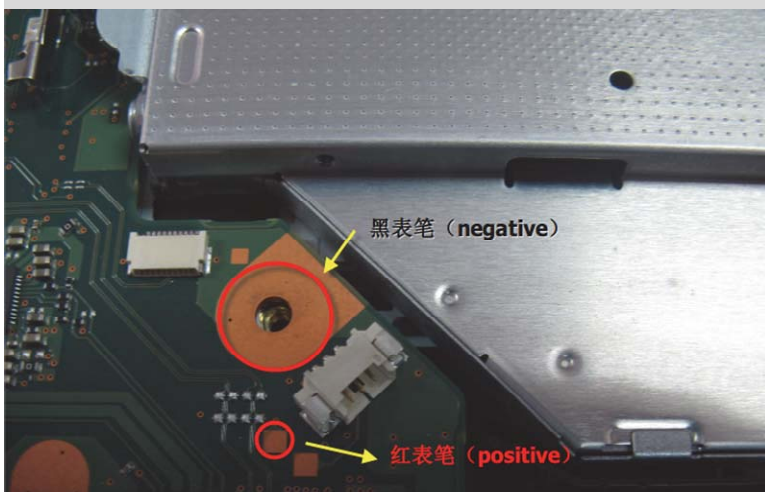
4.14 Optical disk drive

4.14.1 Removing the Optical disk drive

To remove the optical disk drive, follow the steps below.

When the optical disk inside the optical disk drive can not be ejected because of some failure, open the disc tray by inserting a slender object (about 15 mm) such as a straightened paper clip into the **eject hole** near the eject button.
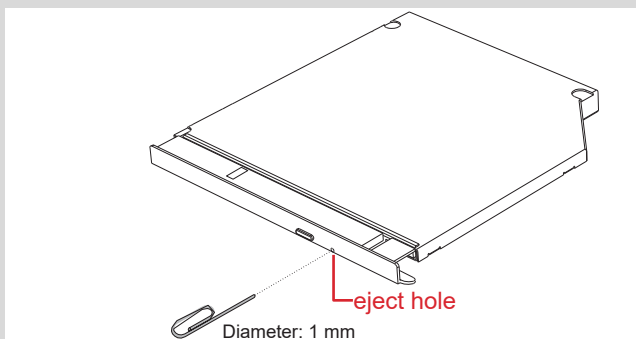
1. Remove the **optical disk drive assembly** from the connector **CN1810** on the system board while pushing it in the direction as shown in the figure below.

Figure 4-10 Removing the optical disk drive assembly (1)
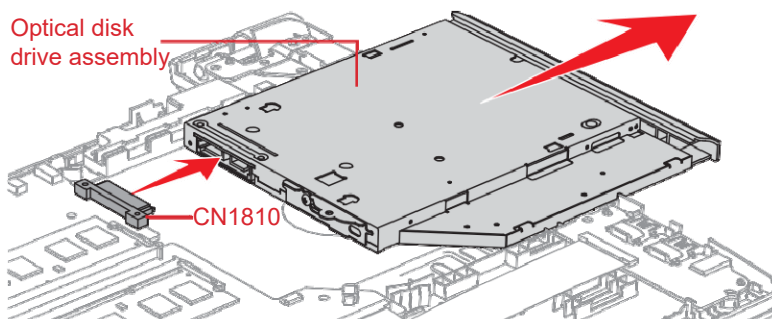
2. Remove the following screws and **ODD rear bracket** from the **optical disk drive**.

Figure 4-11 Removing the bracket from the optical disk drive (2)
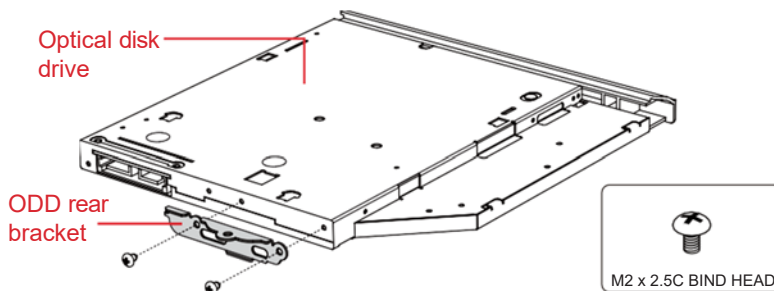
4.14.2 Installing the Optical disk drive

To install the Optical disk drive, follow the steps below.

1. When installing a new optical disk drive, set a new **ODD bezel** to the optical disk drive while securing the **latch**.

2. Set the **ODD rear bracket** to the optical disk drive and secure them with the screws.

3. Insert the **optical disk drive assembly** into the place to connect it to the **CN1810** connector on the system board.

4.15 HDD/SSD

4.15.1 Removing the HDD/SSD

To remove the HDD/SSD, follow the steps below.

⚠ Take care not to press on the top or bottom of a HDD/SSD. Pressure may cause the data loss or damage to the device.

1. Disconnect the **HDD FFC** from the connector **CN1900** on the system board.

Figure 4-12 Removing the HDD/SSD (1)
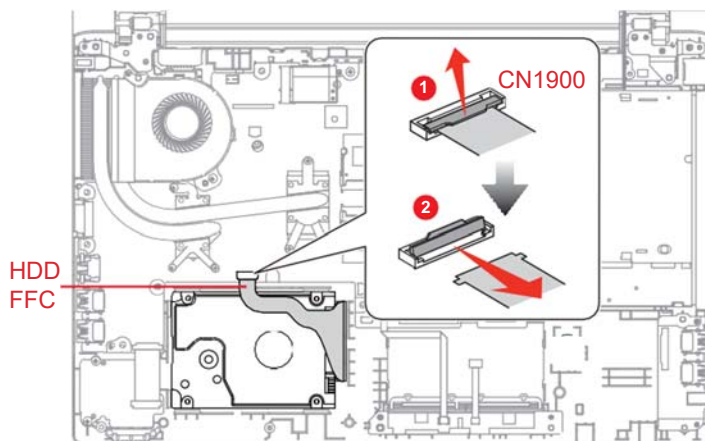
2. Remove the HDD/SSD following the direction of the arrows.

Figure 4-13 Removing the HDD/SSD (2)

HDD
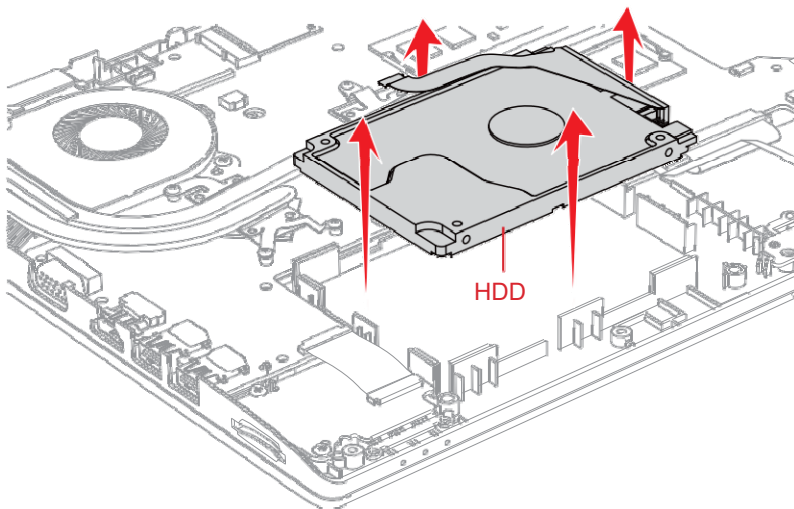
3. Remove the **HDD FFC** from the HDD/SSD.

Figure 4-14 Removing the HDD/SSD (3)

HDD FFC

HDD
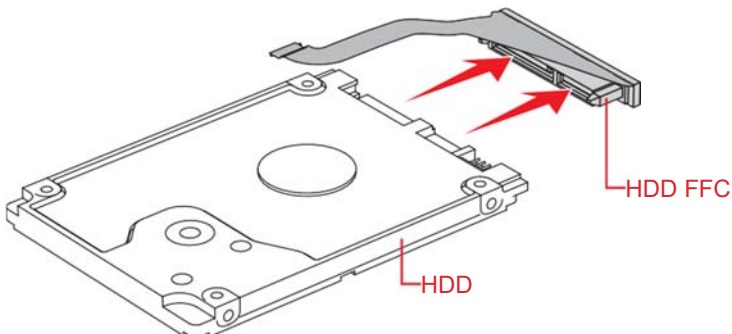
4. Remove the SSD from the SSD Holder.

Figure 4-15 Removing the HDD/SSD (4)
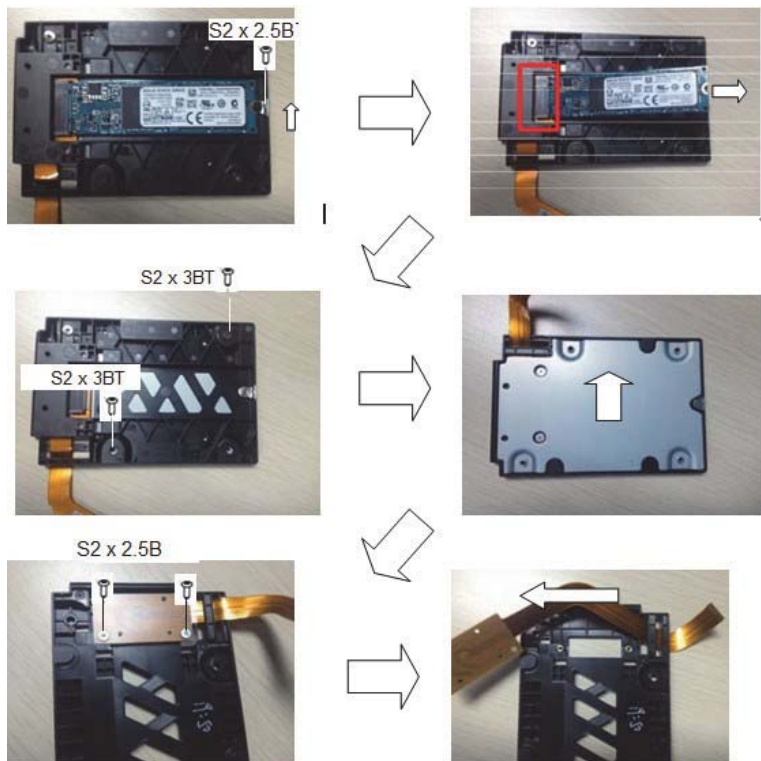
4.15.2 Installing the HDD/SSD

To install the HDD/SSD, follow the steps below.

> To avoid damage, always hold the HDD/SSD only by its sides.
>
> To prevent the HDD/SSD from being distorted when installing the HDD/SSD pack into the computer, do not press the center of the HDD/SSD pack. Always hold the HDD/SSD pack by its sides.

1. Connect the **HDD FFC** to the HDD/SSD.
2. Install the **HDD/SSD** into the correct position in the computer.
3. Connect the HDD FFC to the connector **CN1900** on the system board, holding the HDD/SSD by the sides.

4.16 Memory module

4.16.1 Removing the Memory module

To remove the memory module, follow the steps as detailed below:

⚠️ Do not touch the connectors on the memory module or on the computer. Dust or stains on the connectors may cause memory access problems.

Never press hard or bend the memory module.

1. Open the left and right **latches** outside and remove the **memory module(s)**.

Figure 4-16 Removing the memory module cover
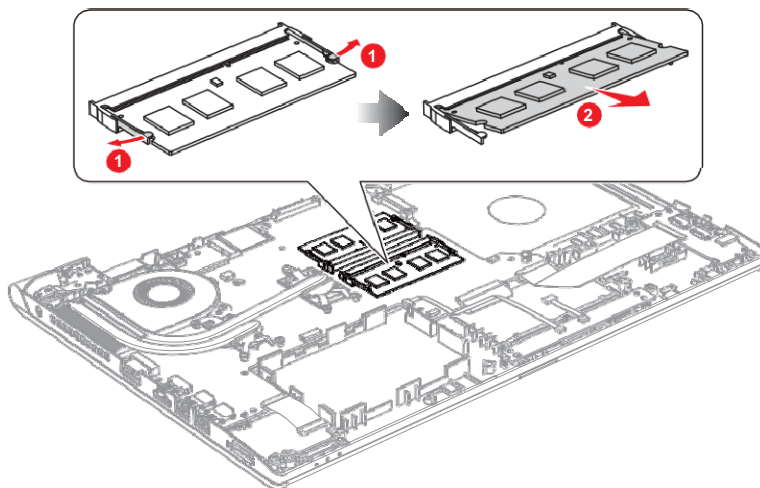
1. Latches   2. Memory module

4.16.2 Installing the Memory module

To install a memory module, follow the steps as detailed below:

1. Align the notch of the memory module with that of the memory slot and gently insert the module into the slot at about a 30 degree angle before holding it down until the latches on either side snap into place.

Figure 4-17 Seating the memory module
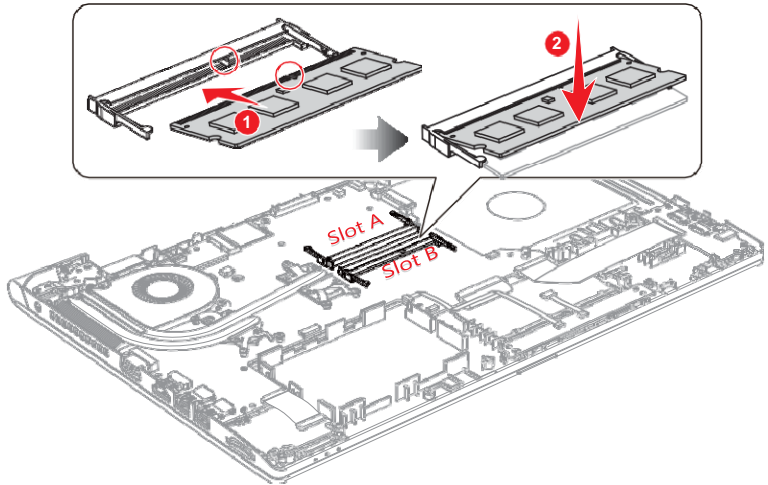
After installing the memory module, make sure that the memory module is secured with the left and right latches.

If only one module is installed, use Slot A.

When using different capacity of memory modules, insert a large capacity memory module into the Slot A.

4.17 USB2.0(3.0)&Audio board

4.17.1 Removing the USB2.0(3.0) & Audio board (FTL5U2*/F4L7A3*)

To remove the board, follow the steps below.

1. Disconnect **USB2.0(3.0)/Audio board FFC** from the connector **CN9530** on the **system board** (FTL5SY*/F4L7SY*).

   Figure 4-18 Removing the USB 2.0(3.0)/Audio board (1)
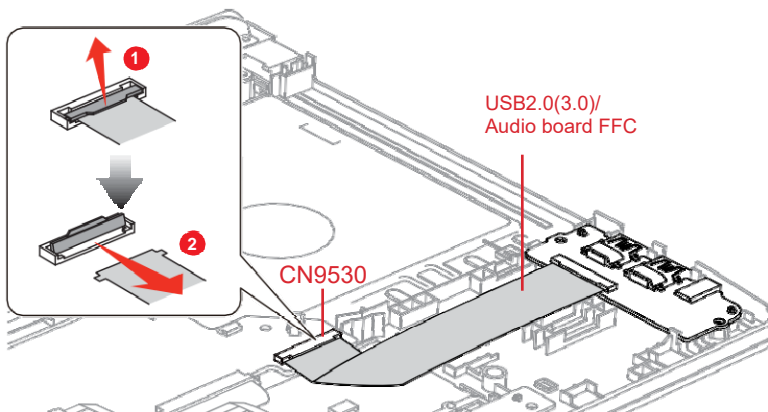
2. (PS59R model) Disconnect FPC from the connector CN9710 on the system board (F4L7SY*).

   Figure 4-19 Removing the USB 2.0(3.0)/Audio board (2)
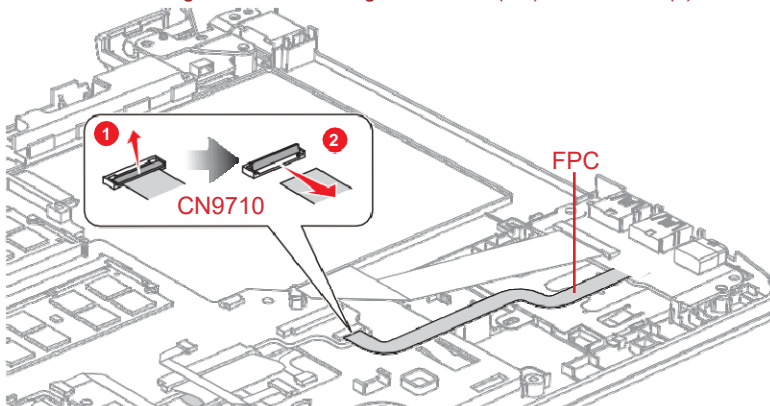
The shape of the **FPC** may be the one as shown below.

3. **(PS59* model)** Separate the USB2.0 & Audio board (FTL5U2*) while releasing the latch.

Figure 4-20 Removing the USB 2.0(3.0)/Audio board (3)
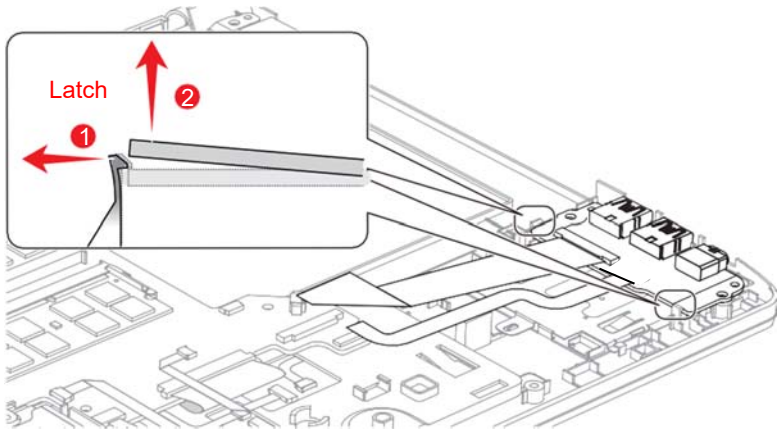
4. Disconnect the **USB2.0(3.0)/Audio board FFC** from the connector **CN9721** on the **USB2.0(3.0)&Audio board** (FTL5U2*/**F4L7A3***) and disconnect the **FPC** from **CN9830** on the back of the **USB3.0/Audio board** (F4L7A3*) (PS59R model).

Figure 4-21 Removing the USB 2.0(3.0)/Audio board (4)

CN9721   CN9830
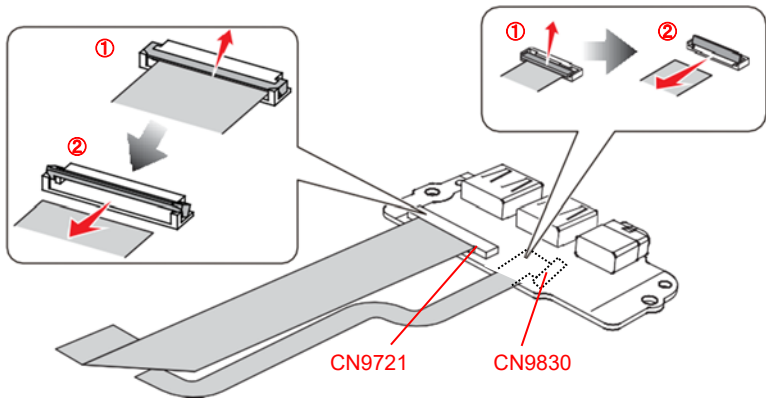
4.9.1 Installing the USB 2.0(3.0) &Audio board

(PS59* model) When replacing the USB2.0 &Audio board with a new one, stick a new **sponge tape** (GM9041325111) in place.

To install the USB2.0(3.0) &Audio board, follow the steps below.

1. Connect the **USB2.0(3.0) &Audio board FFC** to the connector **CN9721** on the **USB2.0(3.0)/Audio board** and the **FPC** to the connector **CN9830** on the **USB3.0/Audio board** (PS59R model).

2. Set the board in place and then engage the **latches (**PS59* model).

3. Connect the **USB2.0 &Audio board FFC** to the connector **CN9530** on the **system board** (FTL5SY*/F4L7SY*) and connect the **FPC** to the connector CN9710 on the **system board** (F4L7SY*) (PS59R model).

4.18 Speakers

4.18.1 Removing the speakers

To remove the speakers, follow the steps below.

1. Disconnect the **speaker harness** from the connectors **CN6330** and **CN6331** on the system board.

2. Remove the following **screws** and then open the **sponge tape.**

3. Remove the speakers and speaker harness.

Figure 4-22 Removing the speakers(1)
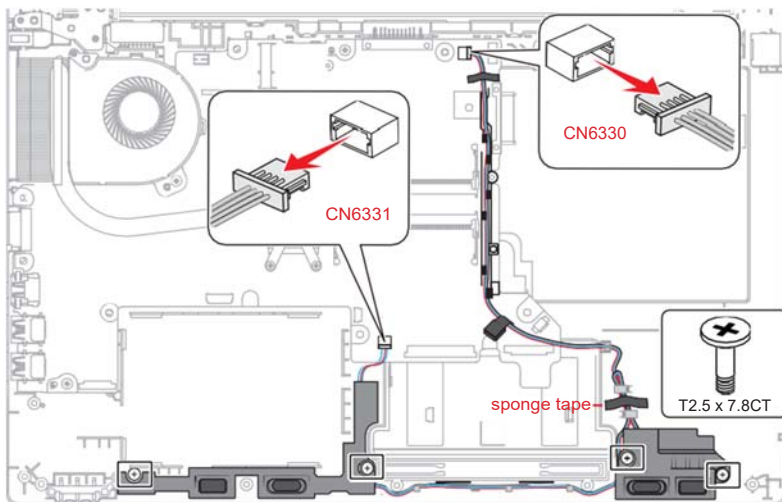
4.18.2 Installing the speakers

To install speakers, follow the steps as detailed below.

1. Set the speakers in place and secure it with the screws.

2. Arrange the speaker harness in place as shown above.

3. Connect the speaker harness to the connector **CN6330** and **CN6331** on the system board.

4.19 SD/LED board (FTL5LE*/F4L7LE*)

4.19.1 Removing the SD/LED board (FTL5LE*/F4L7LE*)

To remove the board, follow the steps below.

1. Disconnect the **SD/LED board (FTL5LE*) FFC** from the connector **CN9500** on the system board.

Figure 4-23 Removing the SD/LED board (1)
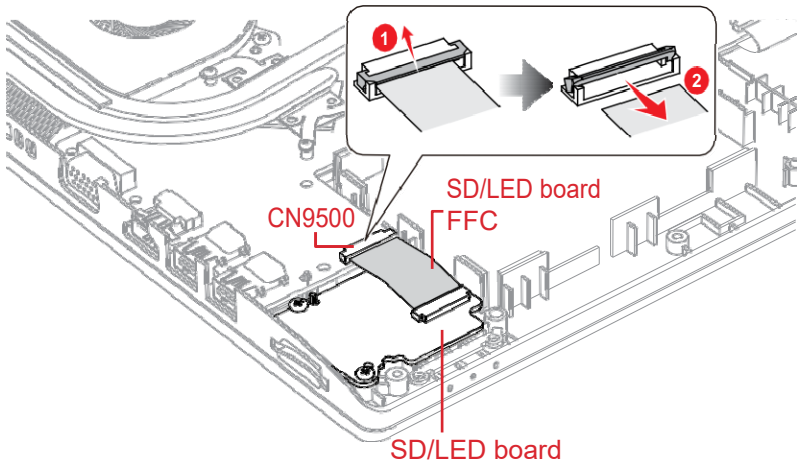
2. Remove the following screws securing the **SD/LED board** (FTL5LE*/F4L7LE*) and remove the board.

Figure 4-24 Removing the SD/LED board (2)

F2.5 x 4.5C FLAT HEAD
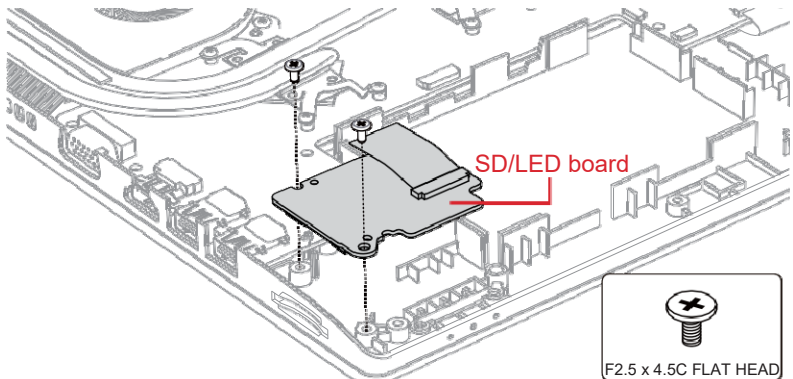
3. Disconnect the **SD/LED board FFC** from the connector **CN9600** on the **SD/LED board**.

Figure 4-25 Removing the SD/LED board (3)
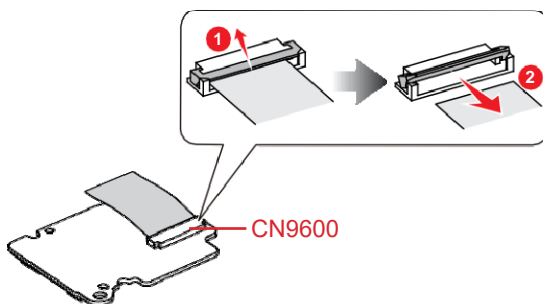
CN9600

4.19.2 Installing the SD/LED board

To install the SD/LED board, follow the steps below.

1. Connect the **SD/LED board** (FTL5LE*/F4L7LE*) **FFC** to the connector **CN9600** on the **SD/LED board**.

2. Set the **SD/LED board** in place and secure it with the screws.

3. Connect the **SD/LED board FFC** from the connector **CN9500** on the system board (FTL5SY*/F4L7SY*).

4.20 Wireless LAN card

4.20.1 Removing the Wireless LAN card

To remove the Wireless LAN card, follow the steps below.

1. Disconnect the **Wireless LAN antenna cables** from the connector on the Wireless LAN card (black cable from "**AUX** or "**1**" and white cable from "**Main**" or "**2**").

Figure 4-26 Removing the wireless LAN card (1)
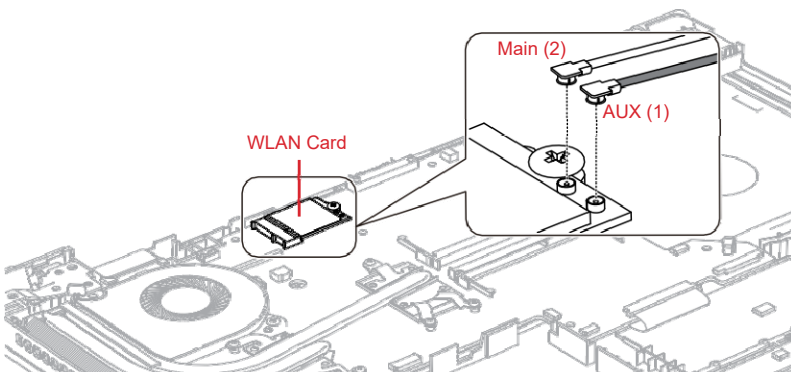
2. Peel off the **INSU WL**.
3. Remove the screws securing the **Wireless LAN card** and disconnect the **Wireless LAN card** from the connector **CN2631** on the system board (FTL5SY*/F4L7SY*).

Figure 4-27 Removing the wireless LAN card (2)
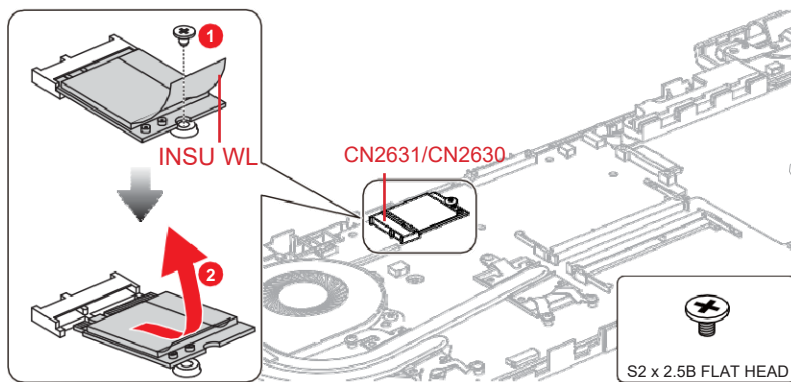
4.20.2 Installing the Wireless LAN card

To install the wireless LAN card, follow the steps below.

1. Insert the **Wireless LAN card** to the connector **CN2631**/**CN2630** on the system board (FTL5SY*/F4L7SY*) slantwise and press it to connect firmly.
2. Push down the **Wireless LAN card** and secure it with the **screws**.
3. Stick a new **INSU WL** in place.

4. Arrange the **Wireless LAN antenna cables** to the guides as below.

Figure 4-28 Arrange Wireless LAN antenna cable
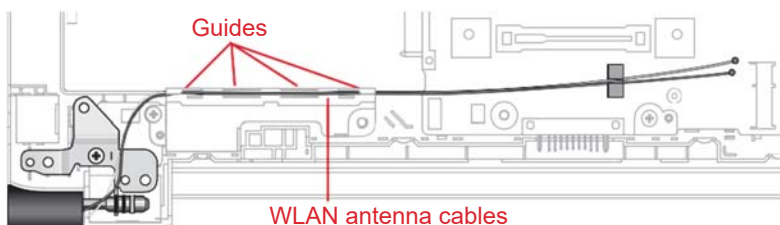
5. Connect the **Wireless LAN antenna cables** to the connectors (black cable to "**AUX**" or "**1**" and white cable to "**Main**" or "**2**") on the **Wireless LAN card**.

4.21 FAN

4.21.1 Removing the DC Fan

To remove the DC FAN, follow the steps below.

1. Disconnect the **fan harness** from the connector **CN3380** on the system board.

Figure 4-29 Removing the DC Fan (1)
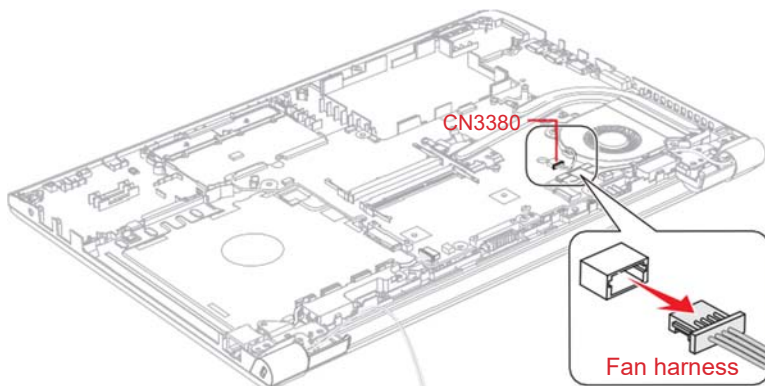
2. Disconnect the **LCD harness** from the connector **CN5390** on the system board and release the **LCD harness** from the guides on the fan.

Figure 4-30 Removing the DC Fan (2)

CN5390
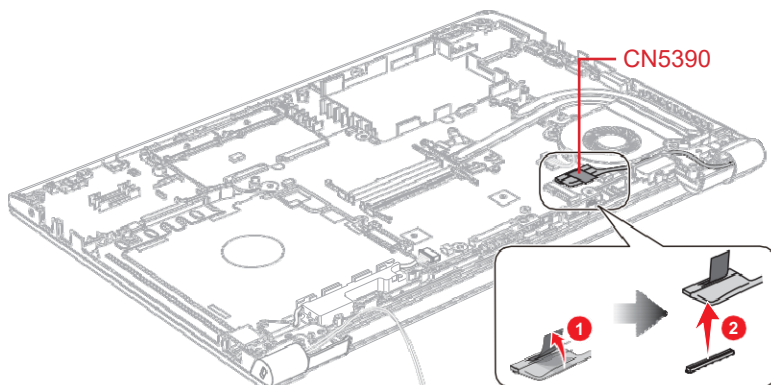
3. Disconnect the **DC-IN harness** from the connector **CN8001** on the system board. Release the **DC-IN harness** from the guides on the fan.

Figure 4-31 Removing the DC Fan (3)

CN8001
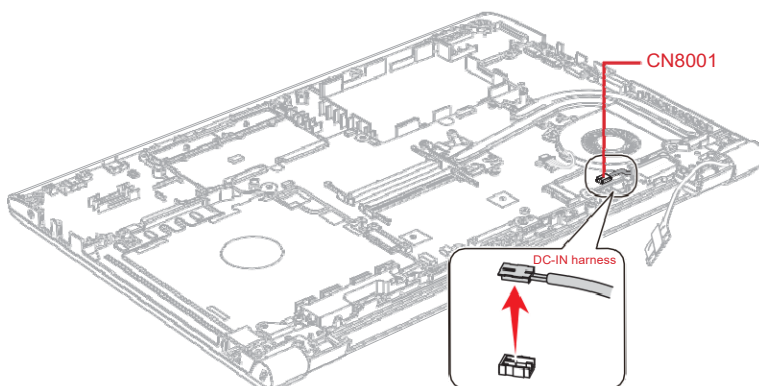
DC-IN harness

4. Remove the following **screw** and remove the **fan**.

Figure 4-32 Removing the DC Fan (4)
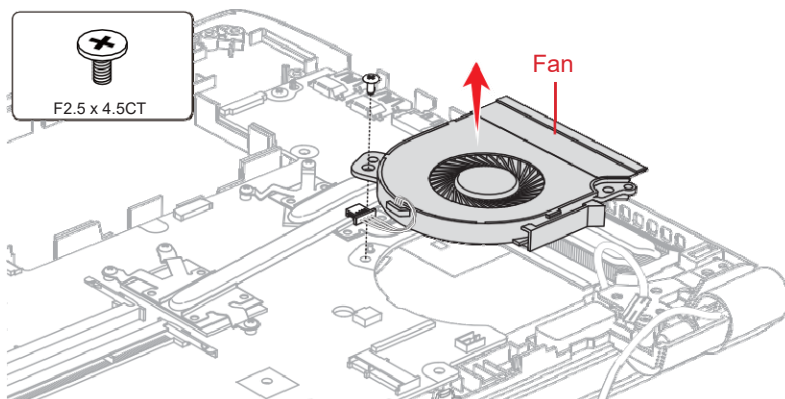
4.21.2 Installing the DC Fan

To install the DC Fan, follow the steps below.

1. Set the fan in place and secure it with the screw.

2. Connect the **fan harness** to the connector **CN3380** on the system board (FTL5SY*/F4L7SY*).

3. Arrange the **DC-IN harness** under the guides as shown below, and connect the **DC-IN harness** to the connector **CN8001** on the system board.

Figure 4-33 Arrange DC-IN harness
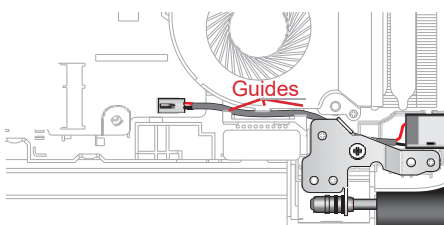
4. Arrange the **LCD harness** under the guides as shown below. Connect the **LCD harness** to the connector **CN5390** on the system board.

Figure 4-34 Arrange LCD harness(for HD Web Camera Model)
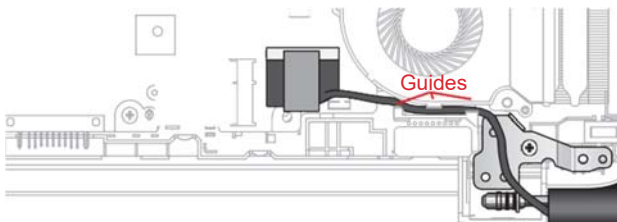
Figure 4-35 Arrange LCD harness(for IR Camera Model)
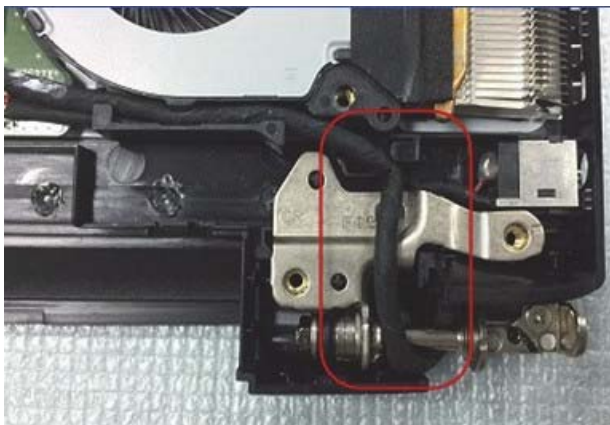
4.22 Fin

4.22.1 Removing the Fin

To remove the fin, follow the steps below.

1. Remove the following **screws** and **fin**.

Figure 4-36 Removing the fin
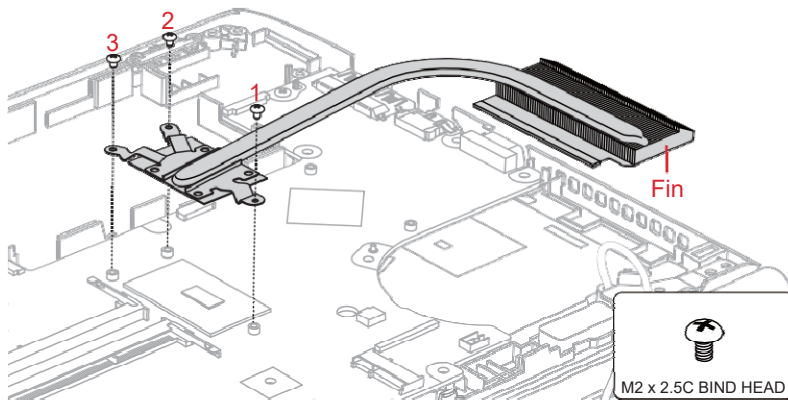
When removing the fin, be sure to remove the screws in the reverse order of the number marked on the fin.

4.22.2 Installing the fin

To install the fin, follow the steps below.

1. Set the **fin** in place and secure it with the screws.

When installing the fin, be sure to install the screws in the order of the number marked on the fin.

4.23 System board/LAN Module/Power Button board

1. If replacing with a new system board, update the DMI information as described in Chapter 3, *Tests and Diagnostics*. Also update with the latest BIOS and EC/KBC as described in Appendix G, *BIOS Rewrite Procedures*, and Appendix H, *EC/KBC Rewrite Procedures*.

2. When replacing the system board with a new one, the ProductKey (MBR-DPK) must be written on the system board.

3. When removing/installing the system board, do not handle with the handling prohibition area.
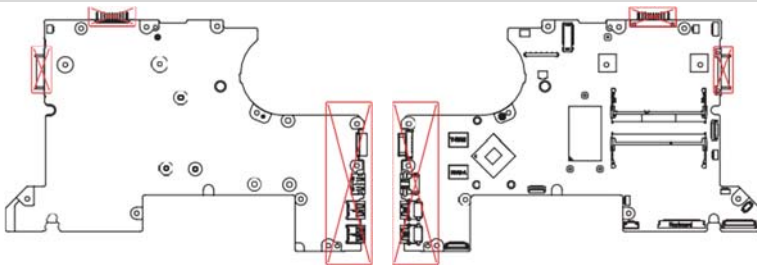
4.23.1 Removing the System board/LAN Module/Power button board

To remove the system board, follow the steps below.

1. Stand the **LCD cover** and remove the screws as the following:

Figure 4-37 Removing the system board (1)

LCD cover

M2.5 x 6CT FLAT HEAD
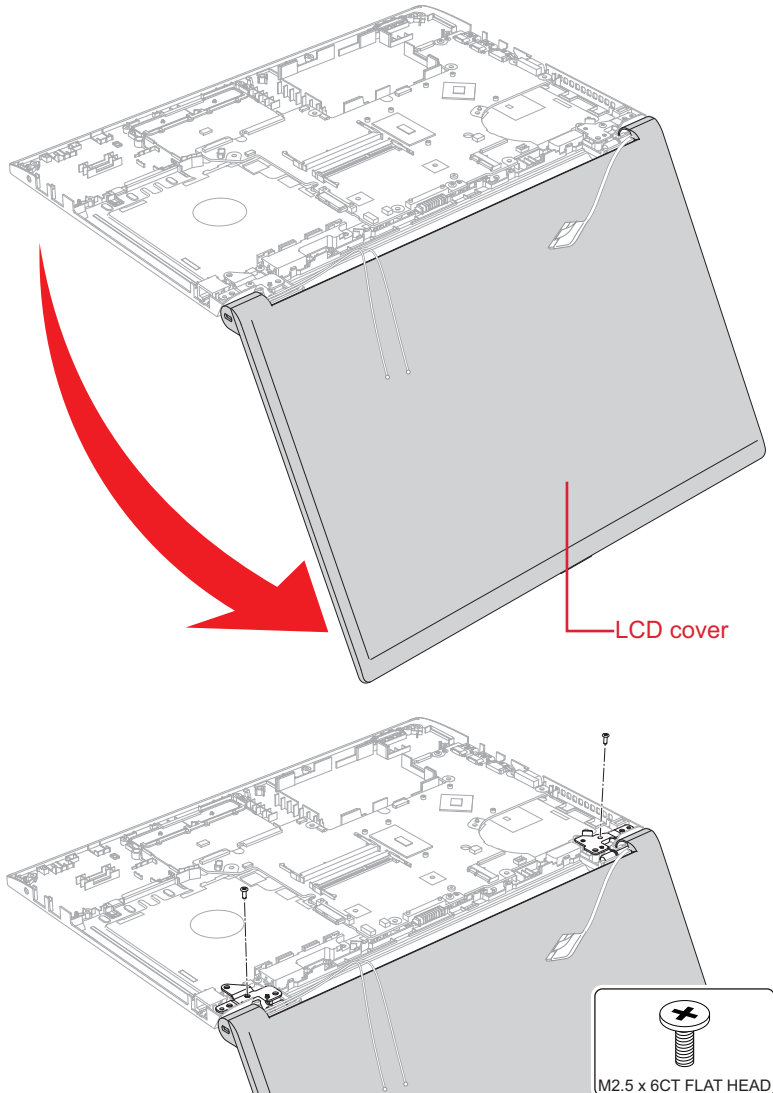
2. Take out the **DC-IN jack** from the slot.

Figure 4-38 Removing the system board (2)

DC-IN jack
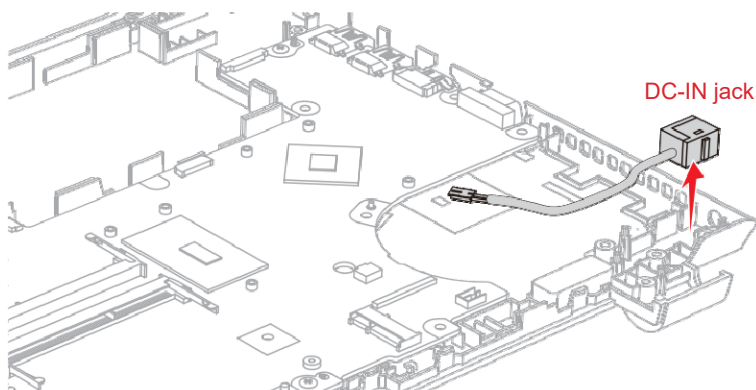
3. Take out the **LAN Module** from the slot, and then release the **LAN harness** from the guides, disconnect the **LAN harness** from the connector **CN4050** on the **system board** (FTL5SY*/F4L7SY*).

Figure 4-39 Removing the system board (3)

CN4050

LAN harness

LAN Module
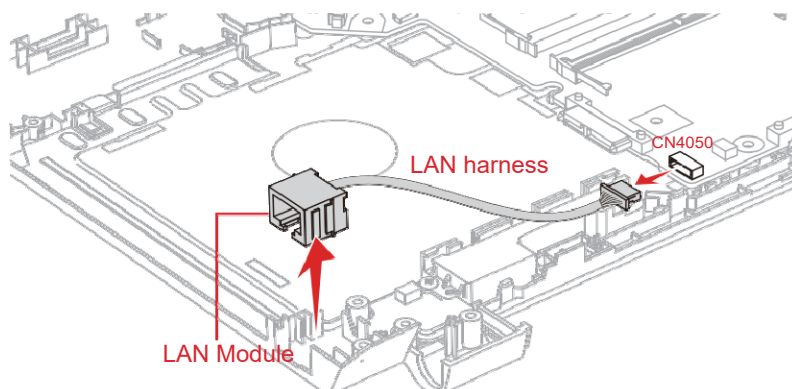
4. Disconnect the Keyboard FFC, Click pad FFC and Fingerprint FFC from the connector **CN3260**,**CN9510** and **CN9550** on the system board.

Figure 4-40 Removing the system board (5)
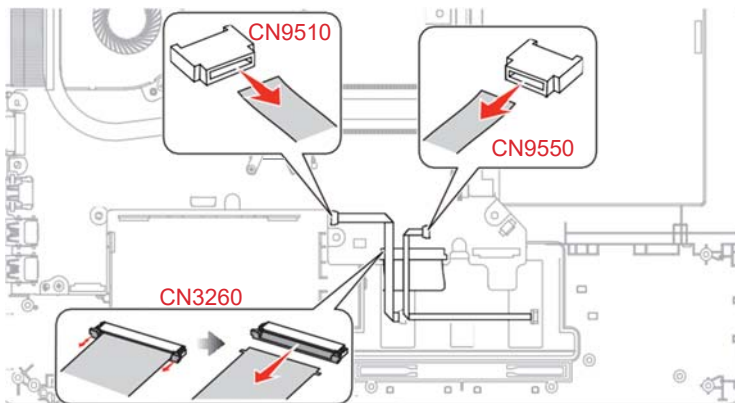
5. Remove the following the screws and system board, and then lift up the system board carefully.

Figure 4-41 Removing the system board (6)

M2.5 x 4.5CT
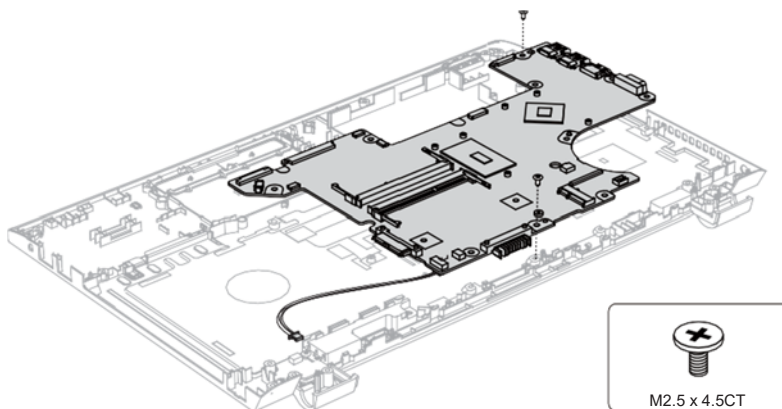
6. Disconnect the **Power Button board harness** from the connector **CN9621** on the **Power Button board (FTL5PW*/F4L7PW*)**.

Figure 4-42 Removing the system board (7)

CN9621

Power Button board

Power Button board harness
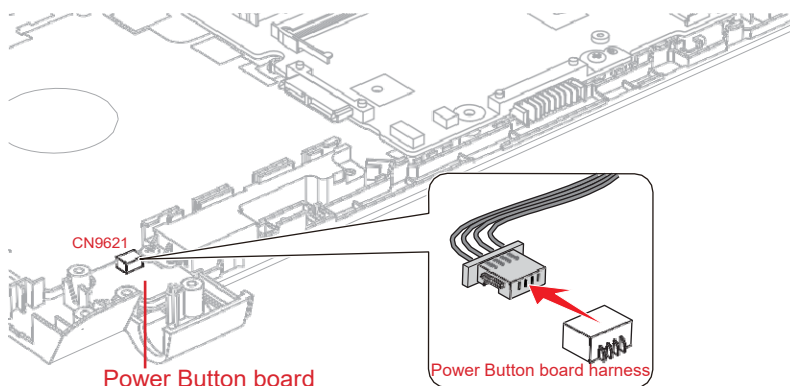
7. Disconnect the **Power Button board harness** from the connector **CN9711** on the **system board**.

Figure 4-43 Removing the system board (8)

CN9711

Power Button board harness
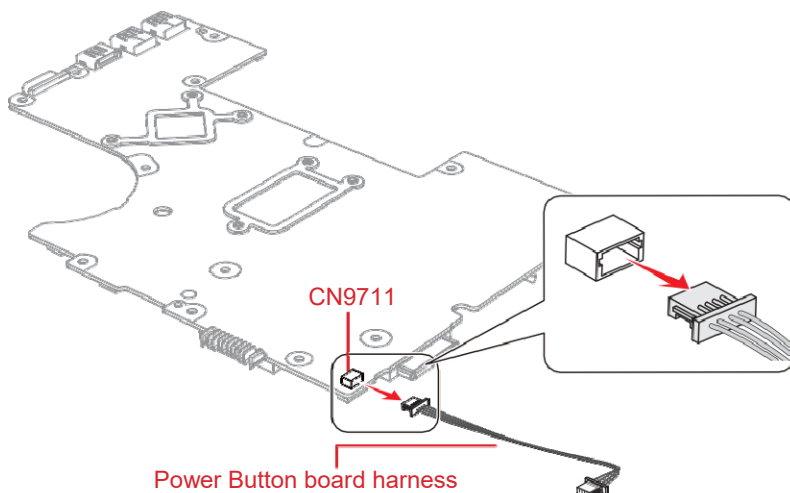
8. Remove the **screw** and **Power Button board**.

Figure 4-44 Removing the system board (10)

Power
Button board

F2.5 x 4.5CT
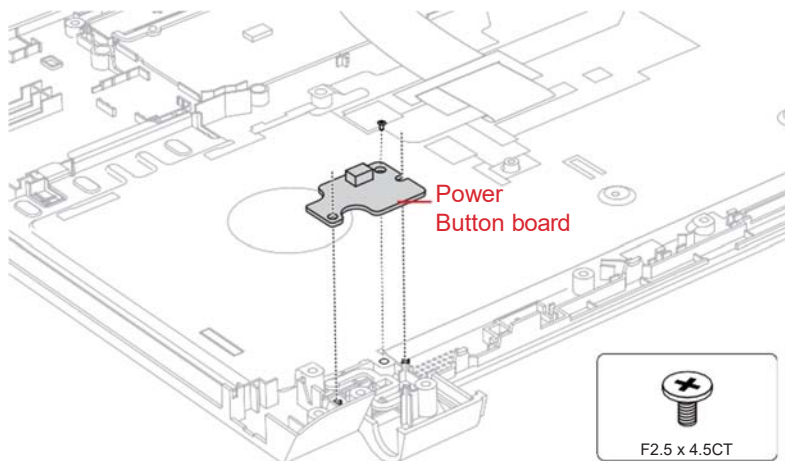
4.23.2 Installing the System board/LAN Module/Power button board

To install the system board, follow the steps below.

1. Set the **Power Button board (FTL5PW*/F4L7PW*)** in place and secure it with a screw.

2. Connect the **Power Button board harness** to the connector **CN9711** on the system board.

3. Set the system board in place and secure it with the screws.

4. Connect the Keyboard FFC, Touchpad FFC, Fingerprint FFC to the connector **CN3260**,**CN9510** and **CN9550** on the system board.

5. Arrange the **Power Button board harness** under the guides as shown below. Connect the **Power Button board harness** to the connector **CN9621** on Power Button board.

Figure 4-45 Arrange Power Button board (FTL5PW*/F4L7PW*) harness

CN9621   Guides
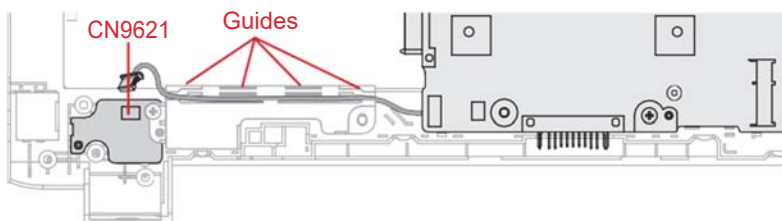
6. Connect the LAN harness to the connector **CN4050** on the system board. Set the **LAN Module** in slot, and arrange the **LAN Module harness**. Be sure not to cover the connector of the Power button board while arranging the LAN Module harness.

Figure 4-46 Arrange the LAN harness
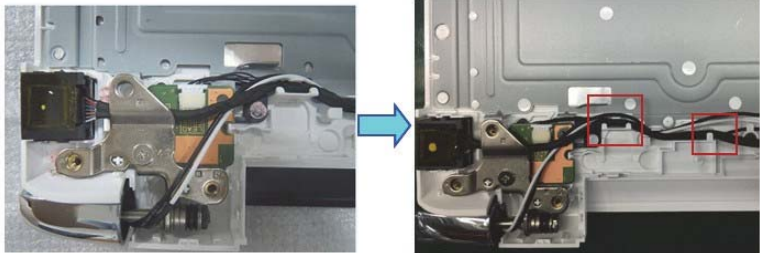
7. Place and set the **DC-IN harness** into the slot.
8. Secure the **LCD cover** with the screws and close the **LCD cover**.

4.24 Keyboard and Click Pad

The Keyboard and Click Pad cannot be removed. To install the Keyboard or Click Pad, follow the steps below.

1. Stick a new Keyboard or Click Pad to a new Cover Assy.
2. Stick a new **AL TAPE** on the back of the Click Pad.
3. Connect the **Click pad FFC** and **Fingerprint FFC** to the connectors on the Click Pad.

When replacing the Keyboard or Click Pad with a new one, stick new **AL tape** (GM9042336111) as shown in the figure below.
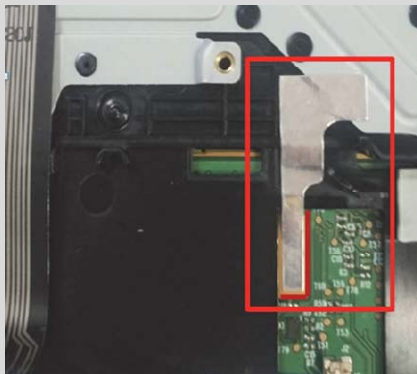
4.25 LCD assembly

4.25.1 Removing the LCD unit

To remove the LCD unit, follow the steps below.

1. Remove the hinge **caps** while releasing the latches.

Figure 4-47 Removing the LCD unit (1)
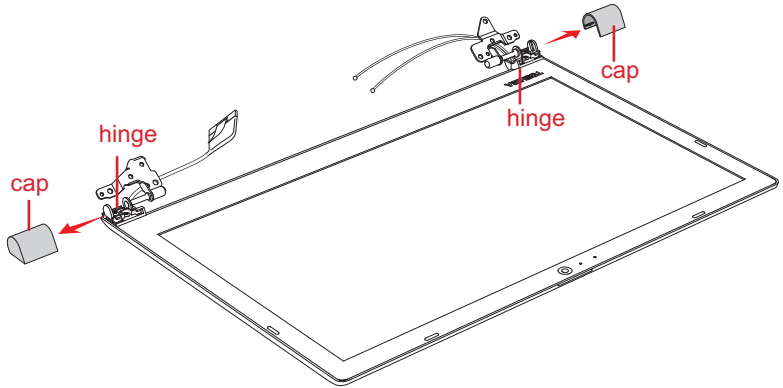
2. Remove the following screws securing the **LCD mask**, and then remove the **LCD mask** while releasing the latches.

Figure 4-48 Removing the LCD unit (2)

M2.5 x 6B FLAT HEAD

Be sure to release the latches follow the arrow order on below figure.
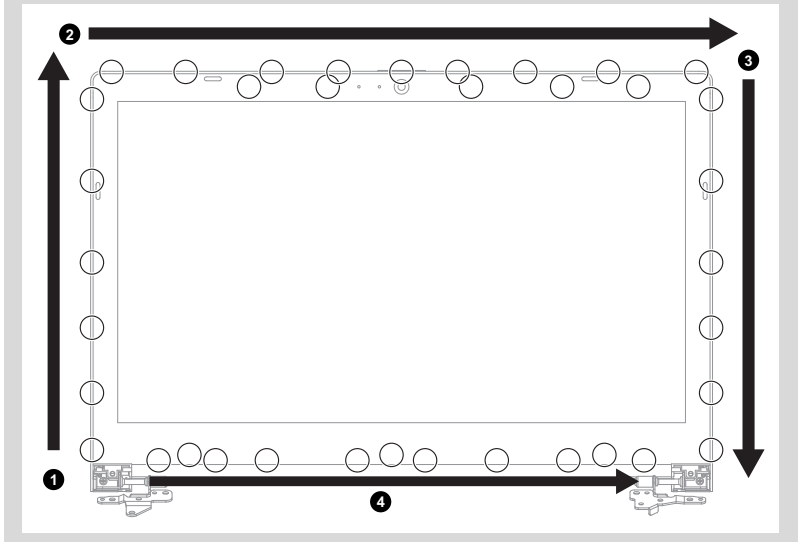
3. Remove the following screws and take out the LCD unit.

Be careful that the LCD harness is connected to the connector on the back of the LCD unit.

Figure 4-49 Removing the LCD unit (3)

S-THIN 2 x 3CS
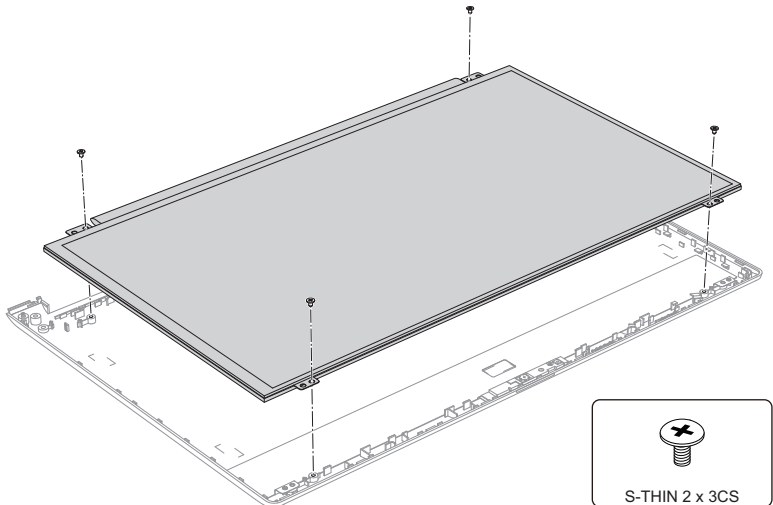
4. (For LCD cover with bound & detach tapes) Grasp the bound & detach tapes and pull out the tapes slowly and parallelly from the LCD cover.

Figure 4-50 Removing the LCD unit (4)
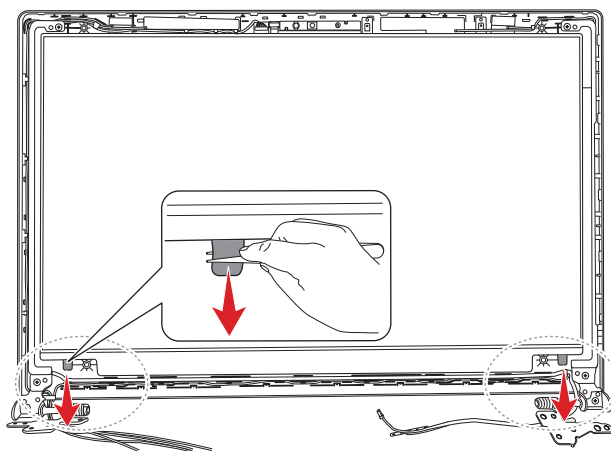
5. Peel the pull tape and disconnect the LCD harness from the connector on the LCD unit.

Figure 4-51 Removing the LCD unit (5)
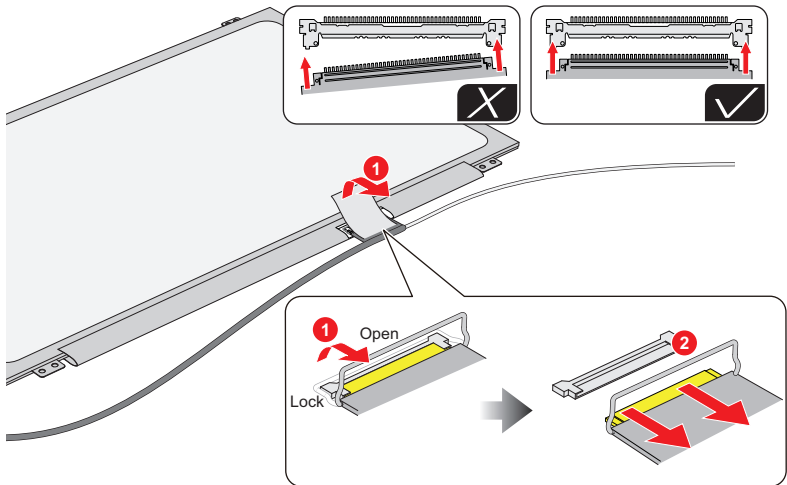
4.25.2 Installing the LCD unit

To install the LCD unit, follow the steps below.

1. Connect the LCD harness to the connector on the LCD unit and secure it with the pull tape and glass tape.

When connect the LCD harness, make sure to connect the right and left side at the same time as shown in the figure below.
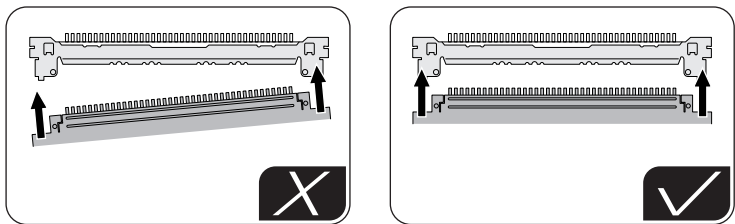
2. Arrange the LCD harness under the guides of the LCD cover.
3. Set the LCD unit in place and secure it with the screws.
4. Set the LCD mask on the LCD cover while engaging the latches.
5. (For LCD cover with bound & detach tapes) Stick two pieces of bound & detach tapes to the LCD cover.

Figure 4-52 Installing the LCD unit (1)
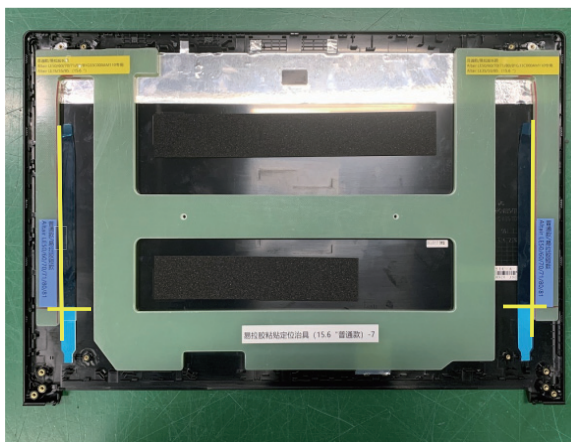
6. Peel off the separators on the bound & detach tapes, and then set the LCD unit in place.

Figure 4-53 Installing the LCD unit (2)
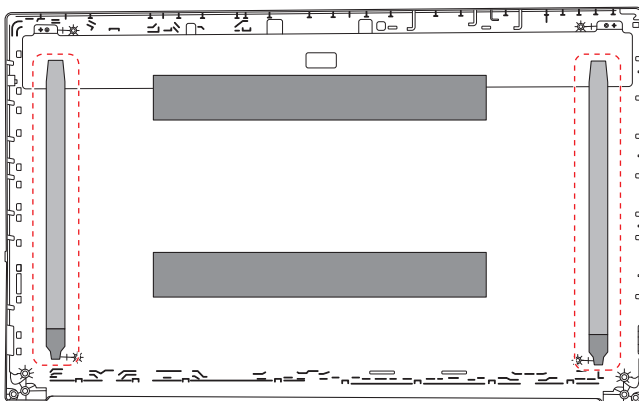
7. Set the left & right hinges.

■ Be sure to engaging the latches follow the arrow order on below figure. When setting the LCD mask, be careful not to pinch the cables.
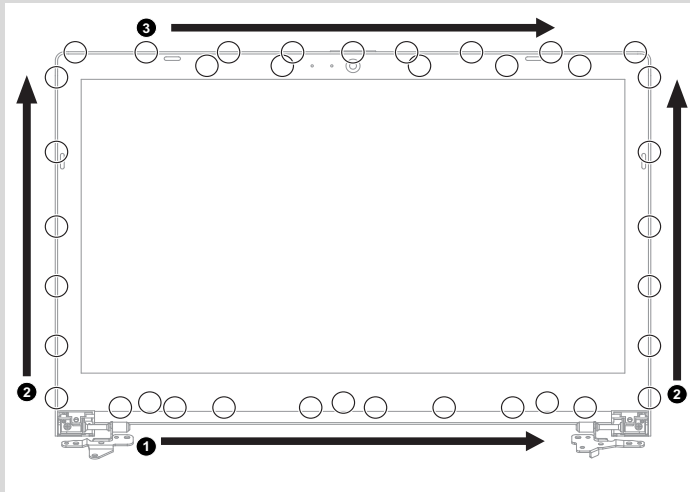
■ When replacing the **LCD Cover** for **FHD LCD model**, stick a new **Al tape** on the new cover in place.
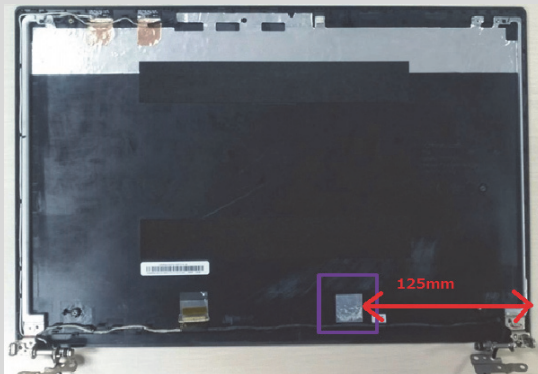
8. Set the LCD mask while engaging the latches, secure it with the screws.

When replacing the LCD mask for **FHD LCD** model, stick two new **CU tapes** in layers on the LCD mask in place.
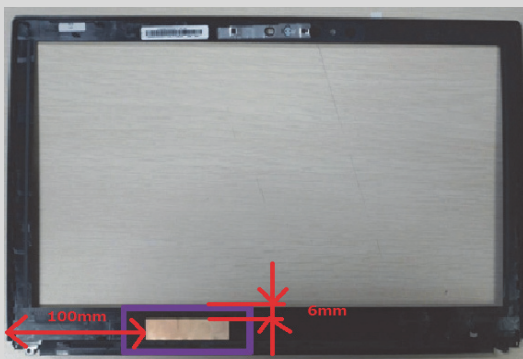
9. Set the hinge cap while engaging the latches.

4.26 Camera module/Wireless antennas

4.26.1 Removing the Camera module

To remove the camera module, follow the steps below.

1. Remove the following screws to release the **left hinge**.

Figure 4-54 Removing the camera module (1)
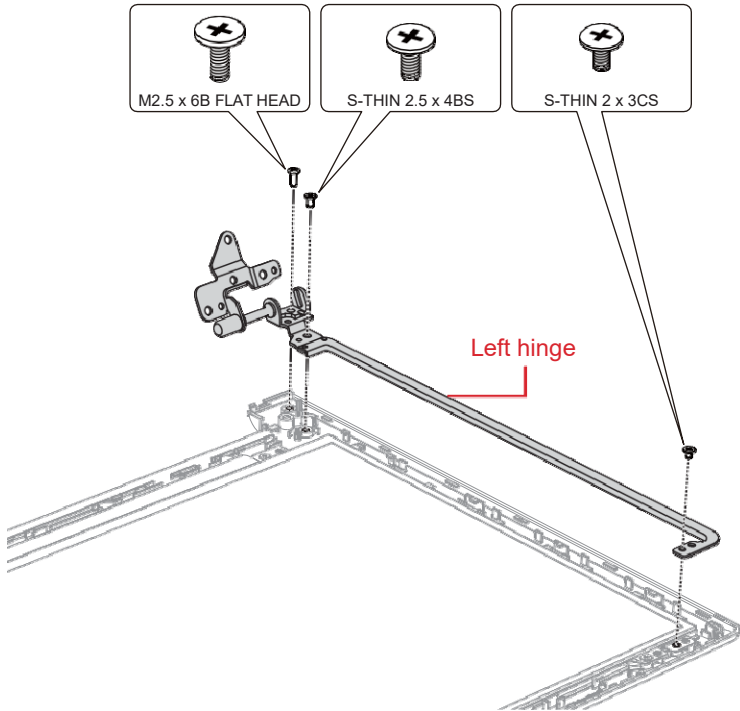
2. Remove the following screws to release the **right hinge**.

Figure 4-55 Removing the camera module (2)

Right hinge
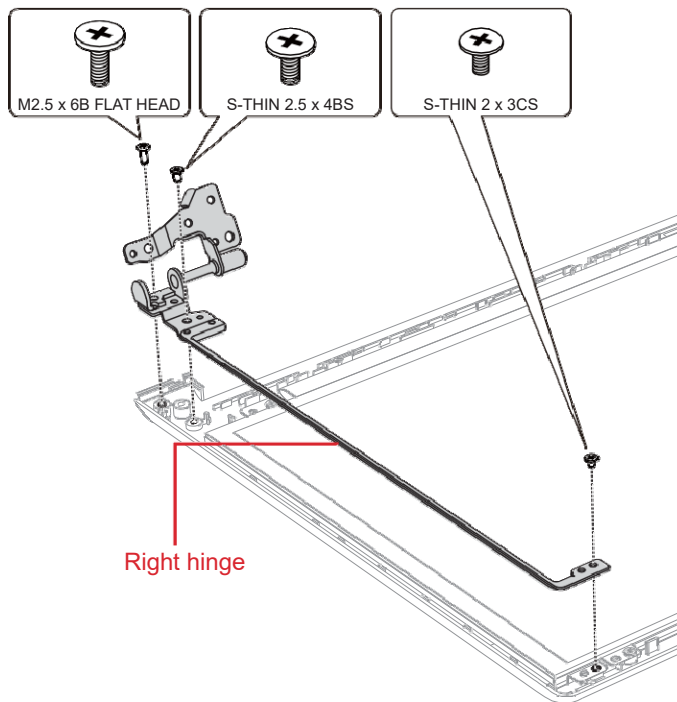
3. Disconnect the camera harness from the connector on the camera module.
4. Remove the camera module from the slot of the LCD cover.
5. Peel off the camera harness from the LCD cover.

Figure 4-56 Removing the camera module (for HD Web Camera Model)(3)
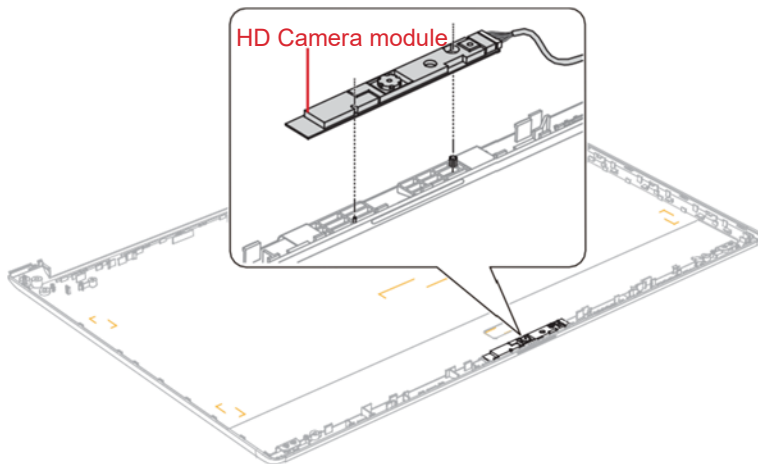
Figure 4-57 Removing the camera module (for IR Camera Model)(4)
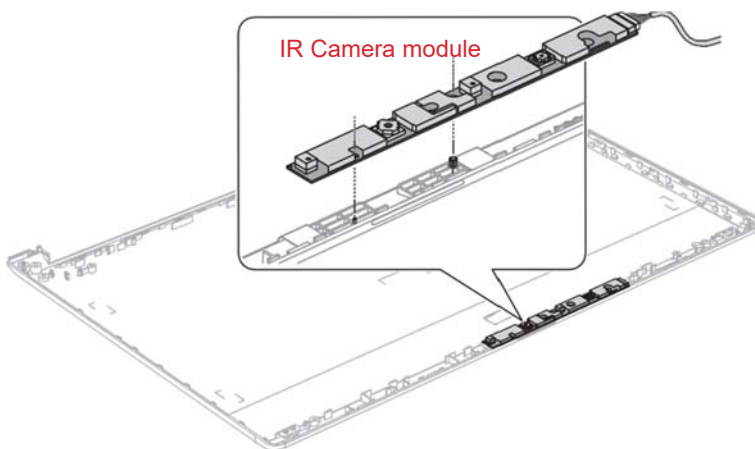
Do not reuse the removed camera module. Be sure to use new camera module.

Please prepare required parts in advance.

4.26.2 Removing the Wireless antennas

To remove the wireless antenna, follow the steps below.

1. Peel off the wireless LAN antennas from the LCD cover.

Do not reuse the removed wireless LAN antennas. Be sure to use new wireless LAN antenna.

4.26.3 Installing the Wireless antennas

To install the wireless antenna, follow the steps below.

1. Stick new **Wireless LAN antennas** in place and arrange the **Wireless LAN antenna cables** in place, and make sure that the antenna cables are under the guides.

Figure 4-58 Arrange WLAN antenna cables(for HD Web Camera Model)

WLAN antennas

WLAN antennas cable
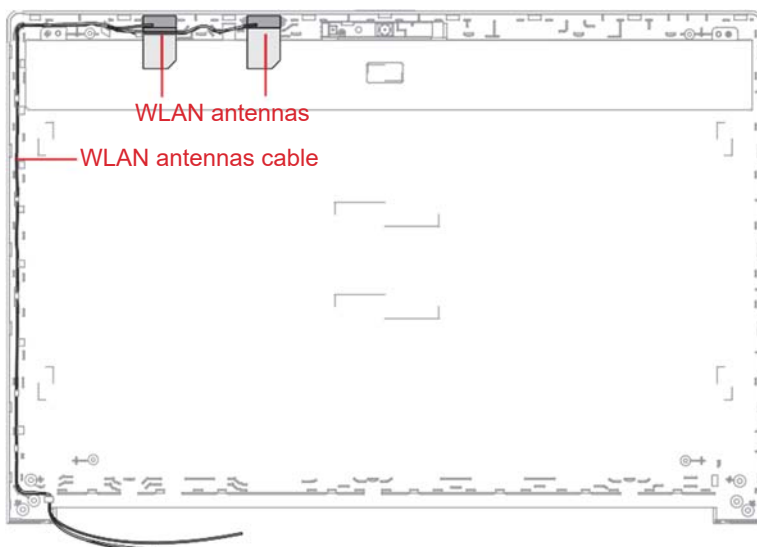
Figure 4-59 Arrange WLAN antenna cables(for IR Camera Model)

4.26.4 Installing the Camera module

To install the camera module, follow the steps below.

1. Peel off a protection sheet from a new camera module.
2. Stick the camera cushion and square cushion on the LCD mask.
3. Connect the **camera harness** to the connector on the camera module and set the camera module to the slot of the LCD cover.
4. Arrange the **camera harness** in place and secure it with the tape.
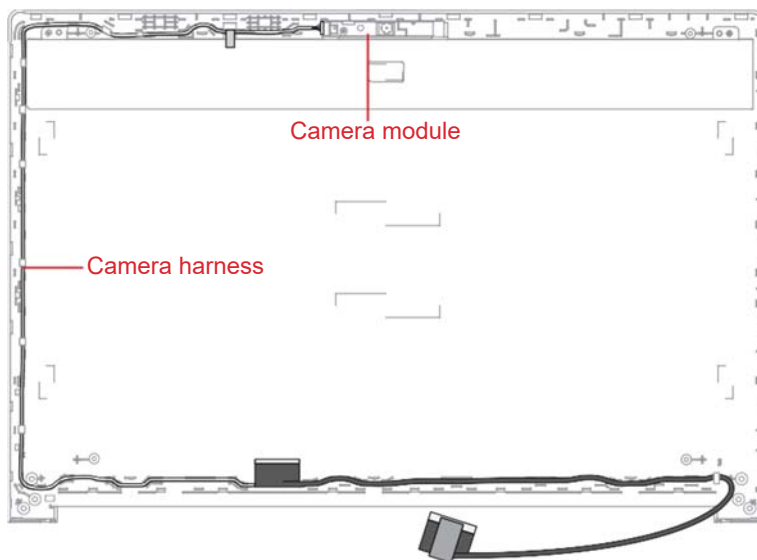
5. Set the right hinge in place and secure it with the screws.

6. Set the left hinge in place and secure it with the screws.

Appendix A

Handling the LCD Module

A.1 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.
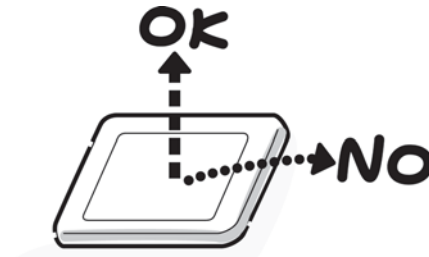
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws.
   Do not force the module into place, because stress can affect its performance.
   Also, the panel's polarized surface is easily scarred, so be 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.
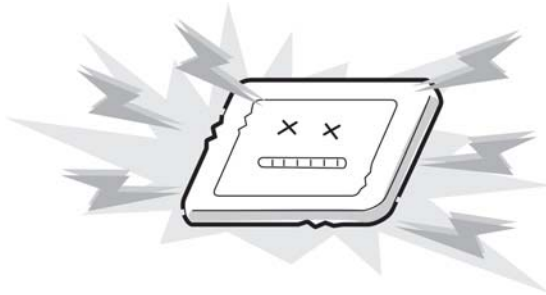
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.

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.
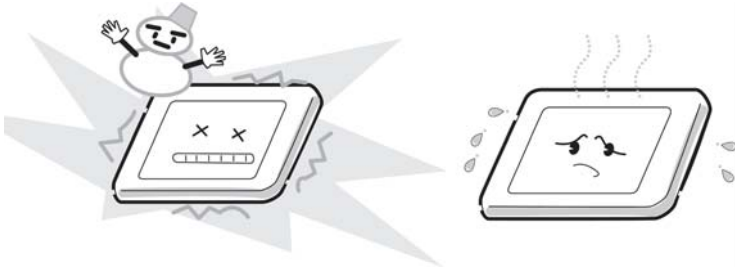
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
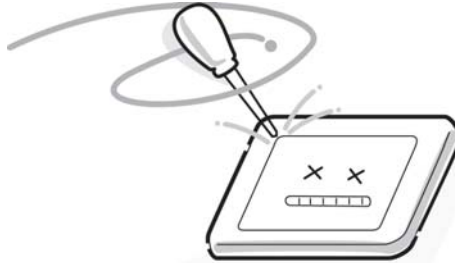
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxide). These materials can release gas that can damage the panel's polarization.
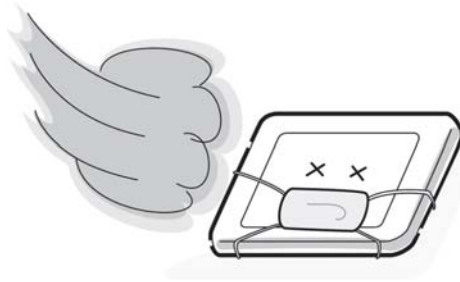
Appendix B

Board Layout

B.1 SYSTEM board (FTL5SY*/F4L7SY*) Front View

Figure B-1 System board (FTL5SY/F4L7SY*) layout (front)*
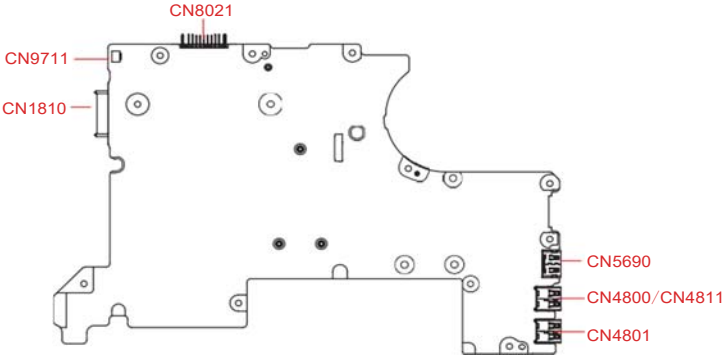
Table B-1 System board (FTL5SY/F4L7SY*) connectors and ICs (front)*

Number	Name
CN1810	SATA ODD interface connector
CN9711	Power Button board interface connector
CN8021	Battery interface connector
CN5690	HDMI port
CN4800/CN4811	USB 3.0 port
CN4801	USB 3.0 port

B.2 SYSTEM board (FTL5SY*/F4L7SY*) Back View

Figure B-2 System board (FTL5SY/F4L7SY*) layout (back)*
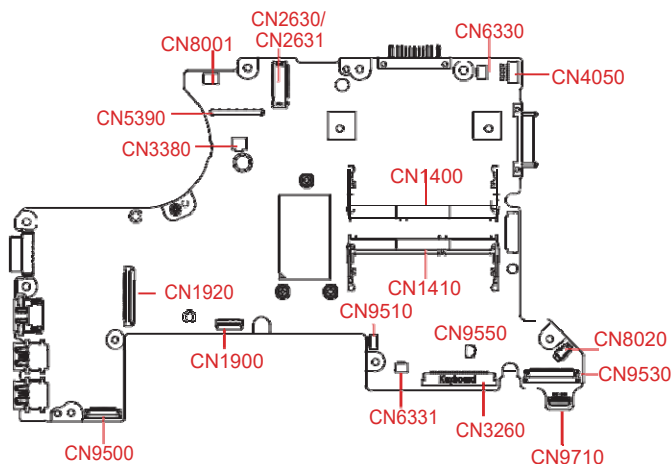
Table B-2 System board (FTL5SY/F4L7SY*) connectors and ICs (back)*

Number	Name
CN5390	LCD+Web Camera interface connector
CN6330	Speaker interface connector
CN6331	Tweeter Speaker interface connector
CN8020	RTC with harness connector
CN4050	LAN interface connector
CN2631/ CN2630	WLAN interface connector
CN9530	USB2.0(3.0)/Audio board (FTL5U2*/F4L7A3*) interface connector
CN9510	Click pad board (FTL5TP*/F4L7TP*) interface connector
CN9500	SD/LED board (FTL5LE*/F4L7LE*) interface connector
CN9550	Fingerprint interface connector
CN3260	Keyboard interface connector
CN1900	HDD/SATA SSD interface connector
CN1920	PCIe SSD interface connector

CN1400	Memory A connector
CN1410	Memory B connector
CN8001	DC-IN interface connector
CN9710	USB3.0/Audio board (F4L7A3*) interface connector

B.3 USB 2.0(3.0)/Audio board (FTL5U2*/F4L7A3*) Front View

Figure B-3 USB2.0(3.0)/Audio board (FTL5U2/F4L7A3*) layout (front)*
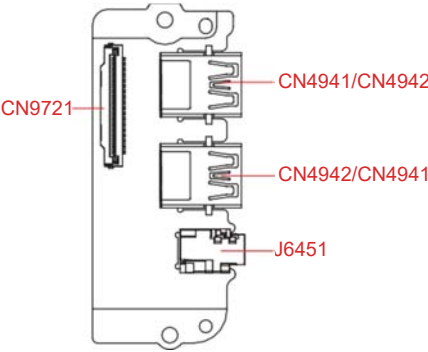
Table B-3 USB2.0(3.0)/Audio board (FTL5U2/F4L7A3*) connectors (front)*

Number	Name
CN4941/CN4942	USB 2.0 port/USB 3.0 port
CN4942/CN4941	USB 2.0 port/USB 3.0 port
J6451	HeadPhone/MIC Combo jack
CN9721	SYSTEM board (FTL5SY*/F4L7SY*) interface connector

B.4   USB2.0/Audio board (FTL5U2*) Back View

Figure B-4 USB2.0/Audio board (FTL5U2) layout (back)*
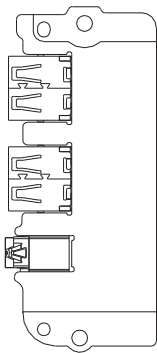
B.5   USB3.0/Audio board (F4L7A3*) Back View

Figure B-5 USB3.0/Audio board (F4L7A3) layout (back)*
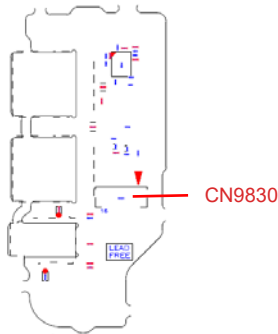
CN9830

Table B-4 USB3.0/Audio board (F4L7A3) connectors (back)*

Number	Name
CN9830	SYSTEM board (F4L7SY*) interface connector

Rev.02

B.6 Power Button board (FTL5PW*/F4L7PW*) Front View

Figure B-6 Power Button board (FTL5PW/F4L7PW*) layout (front)*
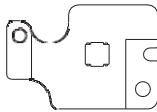
B.7 Power Button board (FTL5PW*/F4L7PW*) Back View

Figure B-7 Power Button board (FTL5PW/F4L7PW*) layout (back)*
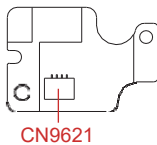
CN9621

Table B-5 Power Button board (FTL5PW/F4L7PW*) connectors (back)*

Number	Name
CN9621	SYSTEM board (FTL5SY*/F4L7SY*) interface connector

B.8 SD/LED board (FTL5LE*/F4L7LE*) Front View

Figure B-8 SD/LED board (FTL5LE/F4L7LE*) layout (front)*
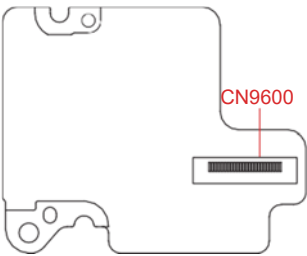
Table B-6 SD/LED board (FTL5LE/F4L7LE*) connectors and ICs (front)*

Number	Name
CN9600	SYSTEM board (FTL5SY*/F4L7SY*) interface connector

B.9 SD/LED board (FTL5LE*/F4L7LE*) Back View

Figure B-9 SD/LED board (FTL5LE/F4L7LE*) layout (back)*
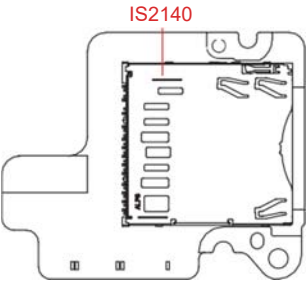
Table B-7 SD/LED board (FTL5LE/F4L7LE*) connectors and ICs (back)*

Number	Name
IS2140	Memory media slot

Appendix C

Pin Assignments

C.1 SYSTEM board (FTL5SY*/F4L7SY*)

C.1.1 CN1400 Memory A connector (260-pin)

Table C-1 CN1400 Memory A connector (260-pin)

Pin No.	Signal Name	Pin No.	Signal Name
108	MSMRST-B1N	12	1R2-B1V
139	XACK0-B1N	33	1R2-B1V
137	XACK0-B1P	54	1R2-B1V
140	XACK1-B1N	75	1R2-B1V
138	XACK1-B1P	178	1R2-B1V
109	ACKE0-B1P	199	1R2-B1V
110	ACKE1-B1P	220	1R2-B1V
155	AODT0-B1P	241	1R2-B1V
161	AODT1-B1P	96	1R2-B1V
149	ACS0-B1N	11	ADQS6-B1N
157	ACS1-B1N	13	ADQS6-B1P
162	NC	32	ADQS5-B1N
165	NC	34	ADQS5-B1P
114	AACT-B1N	53	ADQS2-B1N
115	ABG0-B1P	55	ADQS2-B1P
113	ABG1-B1P	74	ADQS0-B1N
144	AMA00-B1P	76	ADQS0-B1P
133	AMA01-B1P	177	ADQS7-B1N
132	AMA02-B1P	179	ADQS7-B1P
131	AMA03-B1P	198	ADQS4-B1N
128	AMA04-B1P	200	ADQS4-B1P
126	AMA05-B1P	219	ADQS3-B1N
127	AMA06-B1P	221	ADQS3-B1P
122	AMA07-B1P	240	ADQS1-B1N
125	AMA08-B1P	242	ADQS1-B1P
121	AMA09-B1P	95	SIG26312
146	AMA10-B1P	97	SIG26311
120	AMA11-B1P	143	APAR-B1P
119	AMA12-B1P	8	ADQ54-B1P
158	AMA13-B1P	7	ADQ55-B1P
151	AMA14-B1P	20	ADQ48-B1P
156	AMA15-B1P	21	ADQ52-B1P
152	AMA16-B1P	4	ADQ50-B1P
150	ABA0-B1P	3	ADQ51-B1P
145	ABA1-B1P	16	ADQ49-B1P

Pin No.	Signal Name	Pin No.	Signal Name
17	ADQ53-B1P	207	ADQ33-B1P
28	ADQ46-B1P	208	ADQ37-B1P
29	ADQ43-B1P	191	ADQ35-B1P
41	ADQ44-B1P	190	ADQ38-B1P
42	ADQ41-B1P	203	ADQ32-B1P
24	ADQ47-B1P	204	ADQ36-B1P
25	ADQ42-B1P	216	ADQ29-B1P
38	ADQ40-B1P	215	ADQ24-B1P
37	ADQ45-B1P	228	ADQ25-B1P
50	ADQ19-B1P	229	ADQ30-B1P
49	ADQ18-B1P	211	ADQ28-B1P
62	ADQ21-B1P	212	ADQ27-B1P
63	ADQ17-B1P	224	ADQ26-B1P
46	ADQ23-B1P	225	ADQ31-B1P
45	ADQ22-B1P	237	ADQ13-B1P
58	ADQ20-B1P	236	ADQ10-B1P
59	ADQ16-B1P	249	ADQ09-B1P
70	ADQ03-B1P	250	ADQ08-B1P
71	ADQ02-B1P	232	ADQ14-B1P
83	ADQ05-B1P	233	ADQ15-B1P
84	ADQ00-B1P	245	ADQ11-B1P
66	ADQ06-B1P	246	ADQ12-B1P
67	ADQ07-B1P	116	AALERT-B1N
79	ADQ01-B1P	92	NC
80	ADQ04-B1P	91	NC
174	ADQ62-B1P	101	NC
173	ADQ59-B1P	105	NC
187	ADQ56-B1P	88	NC
186	ADQ61-B1P	87	NC
170	ADQ63-B1P	100	NC
169	ADQ58-B1P	104	NC
183	ADQ57-B1P	1	GND
182	ADQ60-B1P	2	GND
195	ADQ39-B1P	5	GND
194	ADQ34-B1P	6	GND

Pin No.	Signal Name	Pin No.	Signal Name
9	GND	82	GND
10	GND	85	GND
14	GND	86	GND
15	GND	89	GND
18	GND	90	GND
19	GND	93	GND
22	GND	94	GND
23	GND	98	GND
26	GND	99	GND
27	GND	102	GND
30	GND	103	GND
31	GND	106	GND
35	GND	107	GND
36	GND	167	GND
39	GND	168	GND
40	GND	171	GND
43	GND	172	GND
44	GND	175	GND
47	GND	176	GND
48	GND	180	GND
51	GND	181	GND
52	GND	184	GND
56	GND	185	GND
57	GND	188	GND
60	GND	189	GND
61	GND	192	GND
64	GND	193	GND
65	GND	196	GND
68	GND	197	GND
69	GND	201	GND
72	GND	202	GND
73	GND	205	GND
77	GND	206	GND
78	GND	209	GND
81	GND	210	GND

Pin No.	Signal Name	Pin No.	Signal Name
213	GND	153	1R2-B1V
214	GND	159	1R2-B1V
217	GND	163	1R2-B1V
218	GND	111	1R2-B1V
222	GND	117	1R2-B1V
223	GND	123	1R2-B1V
226	GND	129	1R2-B1V
227	GND	136	1R2-B1V
230	GND	142	1R2-B1V
231	GND	148	1R2-B1V
234	GND	154	1R2-B1V
235	GND	160	1R2-B1V
238	GND	112	1R2-B1V
239	GND	118	1R2-B1V
243	GND	124	1R2-B1V
244	GND	130	1R2-B1V
247	GND	164	AVREFCA-B0V
248	GND	257	2R5-B2V
251	GND	259	2R5-B2V
252	GND	255	P3V
1T	GND	256	GND
2T	GND	260	GND
135	1R2-B1V	166	GND
141	1R2-B1V	253	SMBCLK-P3P
147	1R2-B1V	254	SMBDAT-P3P
		258	0R6-P0V
		134	SIG26375

C.1.2 CN1410 Memory B connector (260-pin)

Table C-2 CN1410 Memory B connector (260-pin)

Pin No.	Signal Name	Pin No.	Signal Name
108	MSMRST-B1N	12	1R2-B1V
139	XBCK0-B1N	33	1R2-B1V
137	XBCK0-B1P	54	1R2-B1V
140	XBCK1-B1N	75	1R2-B1V
138	XBCK1-B1P	178	1R2-B1V
109	BCKE0-B1P	199	1R2-B1V
110	BCKE1-B1P	220	1R2-B1V
155	BODT0-B1P	241	1R2-B1V
161	BODT1-B1P	96	1R2-B1V
149	BCS0-B1N	11	BDQS7-B1N
157	BCS1-B1N	13	BDQS7-B1P
162	NC	32	BDQS4-B1N
165	NC	34	BDQS4-B1P
114	BACT-B1N	53	BDQS0-B1N
115	BBG0-B1P	55	BDQS0-B1P
113	BBG1-B1P	74	BDQS3-B1N
144	BMA00-B1P	76	BDQS3-B1P
133	BMA01-B1P	177	BDQS6-B1N
132	BMA02-B1P	179	BDQS6-B1P
131	BMA03-B1P	198	BDQS5-B1N
128	BMA04-B1P	200	BDQS5-B1P
126	BMA05-B1P	219	BDQS2-B1N
127	BMA06-B1P	221	BDQS2-B1P
122	BMA07-B1P	240	BDQS1-B1N
125	BMA08-B1P	242	BDQS1-B1P
121	BMA09-B1P	95	SIG26428
146	BMA10-B1P	97	SIG26427
120	BMA11-B1P	143	BPAR-B1P
119	BMA12-B1P	8	BDQ62-B1P
158	BMA13-B1P	7	BDQ58-B1P
151	BMA14-B1P	20	BDQ61-B1P
156	BMA15-B1P	21	BDQ57-B1P
152	BMA16-B1P	4	BDQ63-B1P
150	BBA0-B1P	3	BDQ59-B1P
145	BBA1-B1P	16	BDQ60-B1P

Pin No.	Signal Name	Pin No.	Signal Name
17	BDQ56-B1P	207	BDQ41-B1P
28	BDQ33-B1P	208	BDQ40-B1P
29	BDQ39-B1P	191	BDQ42-B1P
41	BDQ36-B1P	190	BDQ47-B1P
42	BDQ32-B1P	203	BDQ44-B1P
24	BDQ35-B1P	204	BDQ45-B1P
25	BDQ38-B1P	216	BDQ18-B1P
38	BDQ37-B1P	215	BDQ22-B1P
37	BDQ34-B1P	228	BDQ17-B1P
50	BDQ02-B1P	229	BDQ21-B1P
49	BDQ05-B1P	211	BDQ23-B1P
62	BDQ03-B1P	212	BDQ19-B1P
63	BDQ01-B1P	224	BDQ16-B1P
46	BDQ04-B1P	225	BDQ20-B1P
45	BDQ00-B1P	237	BDQ14-B1P
58	BDQ07-B1P	236	BDQ09-B1P
59	BDQ06-B1P	249	BDQ10-B1P
70	BDQ27-B1P	250	BDQ11-B1P
71	BDQ31-B1P	232	BDQ08-B1P
83	BDQ24-B1P	233	BDQ12-B1P
84	BDQ28-B1P	245	BDQ13-B1P
66	BDQ26-B1P	246	BDQ15-B1P
67	BDQ30-B1P	116	BALERT-B1N
79	BDQ25-B1P	92	NC
80	BDQ29-B1P	91	NC
174	BDQ50-B1P	101	NC
173	BDQ55-B1P	105	NC
187	BDQ49-B1P	88	NC
186	BDQ52-B1P	87	NC
170	BDQ51-B1P	100	NC
169	BDQ54-B1P	104	NC
183	BDQ48-B1P	1	GND
182	BDQ53-B1P	2	GND
195	BDQ46-B1P	5	GND
194	BDQ43-B1P	6	GND

Pin No.	Signal Name	Pin No.	Signal Name
9	GND	82	GND
10	GND	85	GND
14	GND	86	GND
15	GND	89	GND
18	GND	90	GND
19	GND	93	GND
22	GND	94	GND
23	GND	98	GND
26	GND	99	GND
27	GND	102	GND
30	GND	103	GND
31	GND	106	GND
35	GND	107	GND
36	GND	167	GND
39	GND	168	GND
40	GND	171	GND
43	GND	172	GND
44	GND	175	GND
47	GND	176	GND
48	GND	180	GND
51	GND	181	GND
52	GND	184	GND
56	GND	185	GND
57	GND	188	GND
60	GND	189	GND
61	GND	192	GND
64	GND	193	GND
65	GND	196	GND
68	GND	197	GND
69	GND	201	GND
72	GND	202	GND
73	GND	205	GND
77	GND	206	GND
78	GND	209	GND
81	GND	210	GND

Pin No.	Signal Name	Pin No.	Signal Name
213	GND	111	1R2-B1V
214	GND	117	1R2-B1V
217	GND	123	1R2-B1V
218	GND	129	1R2-B1V
222	GND	136	1R2-B1V
223	GND	142	1R2-B1V
226	GND	148	1R2-B1V
227	GND	154	1R2-B1V
230	GND	160	1R2-B1V
231	GND	112	1R2-B1V
234	GND	118	1R2-B1V
235	GND	124	1R2-B1V
238	GND	130	1R2-B1V
239	GND	164	BVREFCA-B0V
243	GND	257	2R5-B2V
244	GND	259	2R5-B2V
247	GND	255	P3V
248	GND	256	GND
251	GND	260	P3V
252	GND	166	GND
1T	GND	253	SMBCLK-P3P
2T	GND	254	SMBDAT-P3P
135	1R2-B1V	258	0R6-P0V
141	1R2-B1V	134	SIG26508
147	1R2-B1V		
153	1R2-B1V		
159	1R2-B1V		
163	1R2-B1V		

C.1.3   CN1900 SATA HDD interface connector (25-pin)

Table C-3 CN1900 SATA HDD interface connector (25-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	16	P3V
2	ZSTTHD-E1P	17	P3V
3	ZSTTHD-E1N	18	P3V
4	GND	22	P5V
6	ZSTRHD-E1N	24	P5V
7	ZSTRHD-E1P	25	P5V
8	GND	5	GND
9	GND	19	P3V
10	GND	20	NC
11	GND	21	P5V
12	GND	23	P5V
13	SHDDT1-E3N	1T	GND
14	DVSLP1-E3P	2T	GND
15	P3V		

C.1.4   CN1920 PCIe SSD interface connector (60-pin)

Table C-4 CN1920 SATA HDD interface connector (60-pin)

Pin No.	Signal Name	Pin No.	Signal Name
40	GND	9	GND
39	GND	8	ZETSS0-E1N
38	GND	7	ZETSS0-E1P
37	GND	6	GND
36	GND	5	XSSDPCI-E0N
35	GND	4	XSSDPCI-E0P
34	GND	3	GND
33	PEDET-P3P	2	GND
32	SSDXRQ-P3N	1	GND
31	PLTRS0-E3N	56	P3V
30	GND	55	P3V
29	ZERSS3-E1N	54	P3V
28	ZERSS3-E1P	53	P3V
27	GND	52	P3V
26	ZETSS3-E1N	51	P3V
25	ZETSS3-E1P	50	P3V
24	GND	49	P3V
23	ZERSS2-E1N	48	P3V
22	ZERSS2-E1P	47	P3V
21	GND	46	P3V
20	ZETSS2-E1N	45	P3V
19	ZETSS2-E1P	44	P3V
18	GND	43	DVSLP2-E3P
17	ZERSS1-E1N	42	SHDDT2-E3N
16	ZERSS1-E1P	41	GND
15	GND	57	P3V
14	ZETSS1-E1N	58	P3V
13	ZETSS1-E1P	59	P3V
12	GND	60	P3V
11	ZERSS0-E1P	1T	GND
10	ZERSS0-E1N	2T	GND

C.1.5 CN1810 SATA ODD interface connector (13-pin)

Table C-5 CN1810 SATA ODD interface connector (13-pin)

Pin No.	Signal Name	Pin No.	Signal Name
S1	GND	P1	NC
S2	ZSAODT-E1P	P2	ODD-E5V
S3	ZSAODT-E1N	P3	ODD-E5V
S4	GND	P4	ODDATT-S3N
S5	ZSAODR-E1N	P5	GND
S6	ZSAODR-E1P	P6	GND
S7	GND		

C.1.6 CN2631/CN2630 WLAN interface connector

Table C-6 CN2631/CN2630 WLAN interface connector

Pin No.	Signal Name	Pin No.	Signal Name
2	WLAN-E3V	5	ZUSBBT-E3N
4	WLAN-E3V	7	GND
6	NC	17	NC
16	NC	19	NC
18	GND	21	NC
20	NC	23	GND
22	NC	25	NC
24	GND	27	NC
26	NC	29	GND
28	NC	31	NC
30	GND	33	GND
32	NC	35	ZETWL-E1P
34	NC	37	ZETWL-E1N
36	GND	39	GND
38	CLRST1-E3N	41	ZERWL-E1P
40	CLDAT1-E1P	43	ZERWL-E1N
42	XCLCK1-E1P	45	GND
44	NC	47	XPEWL-E0P
46	NC	49	XPEWL-E0N
48	NC	51	GND
50	XSUSCK-E3P	53	WLXRQ-P3N
52	PLTRS0-E3N	55	PEWAKE-E3N
54	BTRFON-S3P	57	GND
56	WLRFON-S3P	59	NC
58	NC	61	NC
60	NC	63	GND
62	NC	65	NC
64	NC	67	NC
66	NC	69	WLDET-P3N
68	NC	71	NC
70	NC	73	NC
72	WLAN-E3V	75	GND
74	WLAN-E3V	1T	GND
1	GND	2T	GND
3	ZUSBBT-E3P		

C.1.7   CN3260 KB interface connector(34-pin)

Table C-7 CN3260 KB interface connector(34-pin)

Pin No.	Signal Name	Pin No.	Signal Name
1	NUMLED-P5N	19	KBSC06-S3N
2	NC	20	KBSC08-S3N
3	CAPLED1-P5N	21	KBSC10-S3N
4	P5V	22	KBSC01-S3N
5	KBRT06-S3N	23	KBSC11-S3N
6	KBRT02-S3N	24	KBSC07-S3N
7	KBRT03-S3N	25	KBSC15-S3N
8	KBRT05-S3N	26	KBSC12-S3N
9	KBRT01-S3N	27	KBSC13-S3N
10	KBRT04-S3N	28	KBSC14-S3N
11	KBRT07-S3N	29	NC
12	KBRT00-S3N	30	NC
13	KBSC00-S3N	31	KBSC17-S3N
14	KBSC09-S3N	32	NC
15	KBSC03-S3N	33	KBSC16-S3N
16	KBSC02-S3N	34	P5V
17	KBSC05-S3N	1T	GND
18	KBSC04-S3N	2T	GND

C.1.8   CN3380 FAN interface connector (4-pin)

Table C-8 CN3380 FAN interface connector (4-pin)

Pin No.	Signal Name	Pin No.	Signal Name
4	FPWM0-P5P	1	P5V
3	GND	2T	GND
2	FANG0-P3P	1T	GND

C.1.9 CN4050 LAN(RJ45) interface connector (8-pin)

Table C-9 CN4050 LAN interface connector (8-pin)

Pin No.	Signal Name	Pin No.	Signal Name
7	SIG26820	1	SIG26813
6	SIG26819	2	SIG26814
5	SIG26818	8	SIG26821
4	SIG26816	1T	GND
3	SIG26815	2T	GND

C.1.10 CN4800/CN4811 USB3.0 interface connector (9-pin)

Table C-10 CN4800/CN4811 USB3.0 interface connector (9-pin)

Pin No.	Signal Name	Pin No.	Signal Name
9	ZU3D1T-E1P	2	ZUSBE0-E3N
8	ZU3D1T-E1N	1	US3PS1-E5V
7	GND	1T	GND
6	ZU3D1R-E1P	2T	GND
5	ZU3D1R-E1N	3T	GND
4	GND	4T	GND
3	ZUSBE0-E3P		

C.1.11 CN4801 USB3.0 interface connector (9-pin)

Table C-11 CN4801 USB3.0 interface connector (9-pin)

Pin No.	Signal Name	Pin No.	Signal Name
9	ZU3D3T-E1P	2	ZUSBP3-E3N
8	ZU3D3T-E1N	1	US3PS3-E5V
7	GND	1T	GND
6	ZU3D3R-E1P	2T	GND
5	ZU3D3R-E1N	3T	GND
4	GND	4T	GND
3	ZUSBP3-E3P		

C.1.12 CN5690 HDMI port

Table C-12 CN5690 HDMI port

Pin No.	Signal Name	Pin No.	Signal Name
19	LHDMHP-S5P	7	XLHDCK-P3N
18	HDMRGB-P5V	6	XLHDCK-P3N
17	GND	5	GND
16	LHDSDA-P5P	4	XLHDCK-P3N
15	LHDSCL-P5P	3	XLHDCK-P3N
14	NC	2	GND
13	NC	1	XLHDCK-P3N
12	XLHDCK-P3N	2T	GND
11	GND	1T	GND
10	XLHDCK-P3N	4T	GND
9	XLHDCK-P3N	3T	GND
8	GND		

C.1.13 CN5390 LCD/Webcam interface connector

Table C-13 CN5390 LCD/Webcam interface connector

Pin No.	Signal Name	Pin No.	Signal Name
40	DMICIN-P3P	14	GND
39	XDMCLK-Codec	13	ZEDPA1-P1P
38	CAMDET-P3N	12	ZEDPA1-P1N
37	GND	11	GND
36	SIG28323	10	ZEDPA2-P1P
35	SIG28322	9	ZEDPA2-P1N
34	P3V	8	GND
33	NC	7	ZEDPA3-P1P
32	PVT-EFV	6	ZEDPA3-P1N
31	PVT-EFV	5	GND
30	PVT-EFV	4	GND
29	BLEN-E3P	3	GND
28	BKLPWM-P3P	2	GND
27	GND	1	GND
26	GND	1T	GND
25	GND	2T	GND
24	EDPHPD-P3P	3T	GND
23	PNL-P3V	4T	GND
22	PNL-P3V	5T	GND
21	PNL-P3V	6T	GND
20	GND	7T	GND
19	ZEDPAU-P1N	8T	GND
18	ZEDPAU-P1P	9T	GND
17	GND	10T	GND
16	ZEDPA0-P1P	11T	GND
15	ZEDPA0-P1N		

C.1.14 CN5391 IR Camera Harness interface connector

Table C-14 CN5391 IR Camera Harness interface connector (4-pin)

Pin No.	Signal Name	Pin No.	Signal Name
4	P3V	1	GND
3	P3V	2T	GND
2	GND	1T	GND

C.1.15 CN6331 Tweeter Speaker interface connector (4-pin)

Table C-15 CN6331 Tweeter Speaker interface connector (4-pin)

Pin No.	Signal Name	Pin No.	Signal Name
4	SPOTR-PXN	1	SPOTL-PXN
3	SPOTR-PXP	2T	GND
2	SPOTL-PXP	1T	GND

C.1.16 CN6330 Speaker interface connector (4-pin)

Table C-16 CN6330 Speaker interface connector (4-pin)

Pin No.	Signal Name	Pin No.	Signal Name
4	SPOTR-PXN	1	SPOTL-PXN
3	SPOTR-PXP	2T	GND
2	SPOTL-PXP	1T	GND

C.1.17 CN8001 DC-IN connector (2-pin)

Table C-17 CN8001 DC-IN connector (2-pin)

Pin No.	Signal Name	Pin No.	Signal Name
2	SIG31521	2T	GND
1	GND	1T	GND

C.1.18 CN8020 RTC battery connector (3-pin)

Table C-18 CN8020 RTC battery connector 3-pin)

Pin No.	Signal Name	Pin No.	Signal Name
3	GND	2T	GND
2	NC	1T	GND
1	SIG30417		

C.1.19 CN9530 FTL5U2*/F4L7A3** interface connector

Table C-19 CN9530 FTL5U2/F4L7A3* interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
40	E5V	19	ZUSBP2-E3N(SIG80968)
39	E5V	18	ZUSBP2-E3P(SIG80967)
38	E5V	17	GND
37	E5V	16	ZUSBP4-E3P(SIG80966)
36	E5V	15	ZUSBP4-E3N(SIG80965)
35	E5V	14	GND
34	E5V	13	GND
33	E5V	12	GND
32	E5V	11	EMICB-P3V(SLEEVB-P3V)
31	TYCID-E5N(NC)	10	EMICB-P3V(SLEEVB-P3V)
30	USBON2-S3P	9	EMICB-P3V(SLEEVB-P3V)
29	USBOC2-E3N	8	EMICB-P3V(SLEEVB-P3V)
28	GND	7	EMCINL-PXP(HEADL-PXP)
27	GND	6	HEADR-PXP(HEADR-PXP)
26	USBON4-S3P(USBON3-S3P)	5	EMICB-P3V(RING2-PXP)
25	USBOC4-E3N(USBOC3-E3N)	4	EMICB-P3V(RING2-PXP)
24	EVON-S3P	3	EMICB-P3V(RING2-PXP)
23	GND	2	EMICB-P3V(RING2-PXP)
22	GND	1	DETECT-P3N
21	GND	1T	GND
20	GND	2T	GND

C.1.20 CN9500 FTL5LE*/F4L7LE* interface connector

Table C-20 CN9500 FTL5LE/F4L7LE* interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
1	NC	19	GND
2	M5V	20	NC
3	M5V	21	NC
4	NC	22	SDCD-P3V
5	NC	24	SDCD-P3V
6	NC	16	ZUSBHB-E3P
9	PWLEWH-M5N	7	RFLED-M5N
10	BAT1OR-M5N	8	PWLEOR-M5N
11	BAT1WH-M5N	23	SDCD-P3V
12	NC	17	ZUSBHB-E3N
13	GND	18	GND
14	GND	1T	GND
15	GND	2T	GND

C.1.21 CN9711 FTL5PW*/F4L7PW* interface connector

Table C-21 CN9711 FTL5PW/F4L7PW* interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
4	PWRSW-S3N	1	GND
3	S3V	2T	GND
2	PNLOFF-S3N	1T	GND

C.1.22 CN9510 FTL5TP*/F4L7TP* interface connector

Table C-22 CN9510 FTL5TP/F4L7TP* interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
10	I2CCK1-P3P	4	IPDCLK-P3P
9	GND	3	GND
8	I2CDT1-P3P	2	PDTINT-P3N
7	CPDDIS-P3N	1	P3V
6	IPDDAT-P3P	2T	GND
5	GND	1T	GND

C.1.23 CN8021 Battery (9 pin)

Table C-23 CN8021 Battery (9 pin)

Pin No.	Signal Name	Pin No.	Signal Name
8	GND	2	SIG30415
7	ESCL-S3P	9	GND
6	ESDA-S3P	1	SIG30415
5	BDET-S3N	1T	GND
4	SIG30414	2T	GND
3	NC		

C.1.24 CN9550 Fingerprint sensor interface connector (6 pin)

Table C-24 CN9550 Fingerprint sensor interface connector (6 pin)

Pin No.	Signal Name	Pin No.	Signal Name
6	FS-E3V	2	GND
5	FSDET-E3P	1	GND
4	ZUSBFS-E3N	2T	GND
3	ZUSBFS-E3P	1T	GND

C.2   USB 2.0(3.0)/Audio board (FTL5U2*/F4L7A3*)

C.2.1   CN9721 FTL5SY*/F4L7SY* interface connector

Table C-25 CN9721 FTL5SY/F4L7SY* interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
40	E5V	19	ZUSBP2-E3N
39	E5V	18	ZUSBP2-E3P
38	E5V	17	GND
37	E5V	16	ZUSBP4-E3P
36	E5V	15	ZUSBP4-E3N
35	E5V	14	GND
34	E5V	13	GND
33	E5V	12	GND
32	E5V	11	SLEEVE-PXP
31	SIG51	10	SLEEVE-PXP
30	USBON2-S3P	9	SLEEVE-PXP
29	USBOC2-E3N	8	SLEEVE-PXP
28	GND	7	EMCINL-PXP
27	GND	6	HEADR-PXP
26	USBON4-S3P	5	RING2-PXP
25	USBOC4-E3N	4	RING2-PXP
24	NC	3	RING2-PXP
23	GND	2	RING2-PXP
22	GND	1	DETECT-P3N
21	GND	1T	GND
20	GND	2T	GND

C.2.2 CN4941 USB2.0(3.0) interface connector

Table C-26 CN4941/CN4942 USB2.0(3.0) interface connector

Pin No.	Signal Name	Pin No.	Signal Name
9	SIG244	2	ZUSBP2-E3N
8	SIG210	1	US3PS2-E5V
7	GND	1T	GND
6	ZU3D2R-E1P	2T	GND
5	ZU3D2R-E1N	3T	GND
4	GND	4T	GND
3	ZUSBP2-E3P		

C.2.3 CN4942 USB2.0(3.0) interface connector

Table C-27 CN4942(CN4941 USB2.0(3.0) interface connector

Pin No.	Signal Name	Pin No.	Signal Name
9	SIG121	2	ZUSBP4-E3N
8	SIG122	1	US3PS4-E5V
7	GND	1T	GND
6	ZU3D4R-E1P	2T	GND
5	ZU3D4R-E1N	3T	GND
4	GND	4T	GND
3	ZUSBP4-E3P		

C.2.4 CN9830 F4L7SY* interface connector

Table C-28 CN9830 F4L7SY interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
16	NC	7	ZU3D4R-E1N
15	GND	6	ZU3D4R-E1P
14	ZU3D2R-E1N	5	GND
13	ZU3D2R-E1P	4	ZU3D4T-E1N
12	GND	3	ZU3D4T-E1P
11	ZU3D2T-E1N	2	GND
10	ZU3D2T-E1P	1	GND
9	GND	2T	GND
8	GND	1T	GND

C.3   SD/LED board (FTL5LE*/F4L7LE*)

C.3.1   CN9600 FTL5SY*/F4L7SY* interface connector

Table C-29 CN9600 FTL5SY/F4L7SY* interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
1	SDCD-P3V	19	NC
2	SDCD-P3V	20	NC
3	SDCD-P3V	21	NC
4	NC	22	M5V
5	NC	24	NC
6	GND	16	PWLEWH-M5N
9	ZUSFMC-E3P	7	GND
10	GND	8	ZUSFMC-E3N
11	GND	23	M5V
12	GND	17	PWLEOR-M5N
13	NC	18	RFLED-M5N
14	BAT1WH-M5N	1T	GND
15	BAT1OR-M5N	2T	GND

C.4   Power button board (FTL5PW*/F4L7PW*)

C.4.1   CN9621 FTL5SY*/F4L7SY* interface connector

Table C-30 CN9621 FTL5SY/F4L7SY* interface connector*

Pin No.	Signal Name	Pin No.	Signal Name
4	GND	1	PWRSW-S3N
3	PNLOFF-S3N	2T	GND
2	S3V	1T	GND

Appendix D

Keyboard Scan/Character Codes

D.1 Scan Codes

Table D-1 Scan codes (set 1 and set 2)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
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	

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make		Break	
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	
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	

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
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	
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

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
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
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.	Keytop	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 No.	Keytop	Code set 1		Code set 2	
		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 No.	Keytop	Code set 1		Code set 2	
		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 1		Code set 2		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

Keytop	Shift	Code set 1	Code set 2
		Make	**Make**
Pause	Common* Ctrl*	E1 1D 45 E1 9D C5 E0 46 E0 C6	E1 14 77 E1 F0 14 F0 77 E0 7E E0 F0 7E

*: This key generates only make codes.

Appendix E

Key Layout

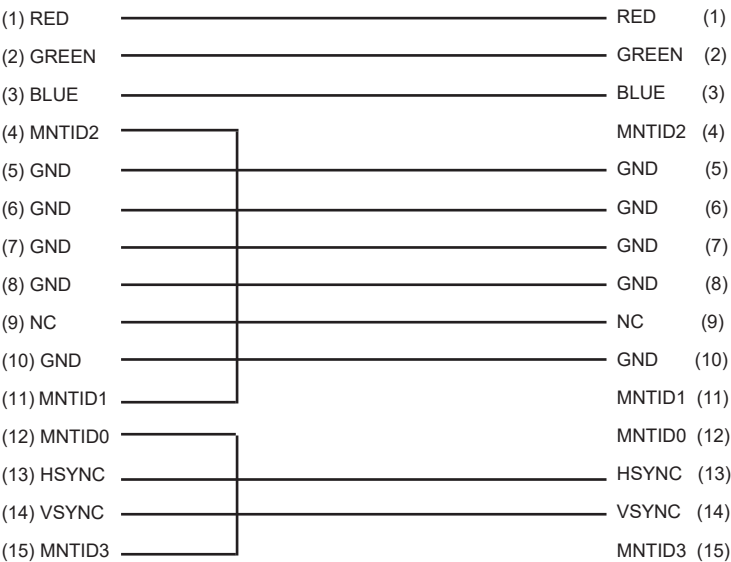## E.1 Japan (JP) Keyboard (+10 key)

Figure E-1 JP keyboard

Appendix F

Wiring diagrams

F.1   RGB Monitor Loopback Connector

Figure F-1 RGB Monitor Loopback Connector

(1) RED	———————————————	RED (1)
(2) GREEN	———————————————	GREEN (2)
(3) BLUE	———————————————	BLUE (3)
(4) MNTID2		MNTID2 (4)
(5) GND	———————————————	GND (5)
(6) GND	———————————————	GND (6)
(7) GND	———————————————	GND (7)
(8) GND	———————————————	GND (8)
(9) NC	———————————————	NC (9)
(10) GND	———————————————	GND (10)
(11) MNTID1		MNTID1 (11)
(12) MNTID0		MNTID0 (12)
(13) HSYNC	———————————————	HSYNC (13)
(14) VSYNC	———————————————	VSYNC (14)
(15) MNTID3		MNTID3 (15)

F.2   LAN Loopback Connector

Figure F-2 LAN Loopback Connector

(1) TX+

(2) TX-

(3) RX+

(4) (Not used)

(5) (Not used)

(6) RX-

(7) (Not used)

(8) (Not used)
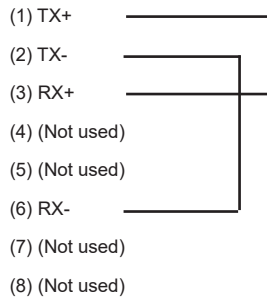
Appendix G

BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

G.1   Tools

To rewrite the BIOS, you need the following tool:

■   BIOS/EC/KBC rewriting disk

G.2   Rewriting the BIOS

1.   Turn off the power to the computer.
2.   Remove the external cables and cards.
3.   Set the USB Flash Memory containing BIOS rewriting data.
4.   Turn on the power while holding down the tilde character key or 半 / 全 key Until LED blinks or rewriting message appears.
5.   The BIOS rewriting starts.
6.   When the process is completed, the system automatically reboots.

1.   Connect the AC adaptor and the charged battery to the computer when you rewrite the BIOS.
2.   Do not turn off the power while you are rewriting the BIOS.
3.   If the rewrite fails, it might be impossible to start up the computer.
4.   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

< PS59* model >
H.1 Tools

To rewrite the EC/KBC, you need the following tool:

■ EC/KBC rewriting disk for the computer

H.2 Rewriting the EC/KBC (for PS59* model)

1. Turn off the power to the computer.
2. Remove the external cables and cards.
3. Set the USB Flash Memory containing EC/KBC rewriting data.
4. Turn on the power while holding down the Tab key. (Keep holding down the key until a beep sounds.) The EC/KBC rewriting starts.
5. When the EC/KBC rewrite is completed, the system is automatically turned off.

1. Rewrite the EC/KBC 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.

< PS59R model >

H.3 Rewriting the EC/KBC (for PS59R model)

The EC/KBC solely can't be updated. It is updated at the BIOS update simultaneously.
As for the BIOS update, refer to Appendix G

Appendix I

Reliability

The following table shows MTBF (Mean Time Between Failures) in maximum configuration.

Table I-1 MTBF

Time (hours)
5884 (PS59* model)
7874 (PS59R model)