

Toshiba Personal Computer
Satellite C800 and Satellite L800 Maintenance
Manual (960-Q08) Maintenance Manual

TOSHIBA CORPORATION

File Number 960-Q08

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Toshiba Personal Computer Satellite C800 and Satellite L800 Maintenance Manual (960-Q08) First edition March.2010

Disclaimer

The information presented in this manual has been reviewed and validated for accuracy. The included set of instructions and descriptions are accurate for the Satellite C800 and Satellite L800 Series at the time of this manual's production. However, succeeding computers and manuals are subject to change without notice. Therefore, Toshiba assumes no liability for damages incurred directly or indirectly from errors, omissions, or discrepancies between any succeeding product and this manual.

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite C800 and Satellite L800 Series.

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

SAFETY PRECAUTIONS

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

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

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

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

NOTE: “*Note*” contains general information that relates to your safe maintenance service.

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

- Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.
- If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

- Chapter 1 Hardware Overview describes the Satellite L600/L640/L645, Satellite Pro L600/Pro L640/Pro L645 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 code
 - Key layout
 - Wiring diagrams

Conventions

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

Acronyms

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

Read Only Memory (ROM)

Keys

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

Key operation

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

User input

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

DISKCOPY A: B:

The display

Text generated by the computer that appears on its display is presented in the typeface below:

Format complete
System transferred

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Chapter 1

Hardware Overview

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1.1 Features

The Satellite C800/C845/L800/L840/L845 (Intel Platform) features are listed below.

Microprocessor

Microprocessor that is used will be different by the model.

It supports processors as follows

1. Intel® Sandy Bridge Processor

CPU (988P) I3-2350M 2.3G

CPU (988P) I5-2410M 2.3G

CPU I3-2370 2.4G

CPU I5 2450 2.5G

2. Intel® Ivy Bridge processor

i3-3110M L-0 3MB 2c PGA 2.3GHz

i5-3210M L-0 3MB 2c PGA 2.5GHz

i5-3320M L-0 3MB 2c PGA 2.6GHz

i5-3360M L-0 3MB 2c PGA 2.8GHz

i7-3520M L-0 4MB 2c PGA 2.9GHz

i7-3612QM E-0 6MB 4c PGA 2.1GHz

i7-3612QM E-1 6MB 4c PGA 2.1GHz

Chipset

Panther Point

HM70, HM76(for USB3.0)

Memory

Focus on 1333 MHz and 1600 MHz DDR3 memory and support in systems running as 1600 MHz/1333MHz /1066MHz.

Two SODIMM with 1GB/2GB/ 4GB/8GB module

Max. 16GB (8GB x 2)

❑ VRAM

Both 1 Gbit VRAM and 2Gbit VRAM are supported.

❑ HDD

5400RPM: 320GB, 500GB, 640GB, 750GB, 1TB internal drives. 2.5 inch
9.5mm/7mm height.

❑ USB FDD (Option)

Toshiba external USB FDD for option

❑ Display

Aspect ratio 16:9, HD1366 x 768, LED type.

❑ CRT

Supported via a RGB connector.

❑ Keyboard

2012 new A4 keyboard w/ NUM.

It supports Windows keys and application keys.

❑ Optical devices

A DVD Super Multi drive is equipped.

❑ Battery

The RTC battery is equipped inside the computer.
The main battery is a detachable lithium ion battery.

3cell Li-Ion 2200mAh

6 cell Li-Ion 4400mAh

6 cell Li-Ion(high capacity) 6000mAh

❑ USB (Universal Serial Bus)

3 USB ports are provided. USB 3.0 port is supported depend on SKU.

USB Sleep and Charge function can be supported by only one port of the right side.
(Auto mode & Alternate mode)

If USB Sleep and Charge function is enabled, the computer's battery will discharge during hibernation or when the computer is turned off. It is recommended that user connect the AC adaptor to the computer when enabling the USB Sleep and Charge function.

❑ Sound system

Internal stereo speaker, internal speaker, external monaural microphone connector, stereo headphone connector.

❑ Wireless LAN

The wireless LAN is equipped on the mini card slot.

❑ LAN

Gigabit (10/100/1000M).

10/100M

❑ Bridge media slot

XD/MS//SD/MMC are supported

❑ Bluetooth & WLAN

Bluetooth is combo module with WLAN.

❑ 3G

GPS function is supported by 3G/LTE module.

❑ Security

2 level boot pass word by BIOS setup menu & TOSHIBA password utility.



Figure 1-1 Front of the computer

1.2 System Block Diagram

Figure 1-2 shows the system block diagram.

Chief River Block Diagram

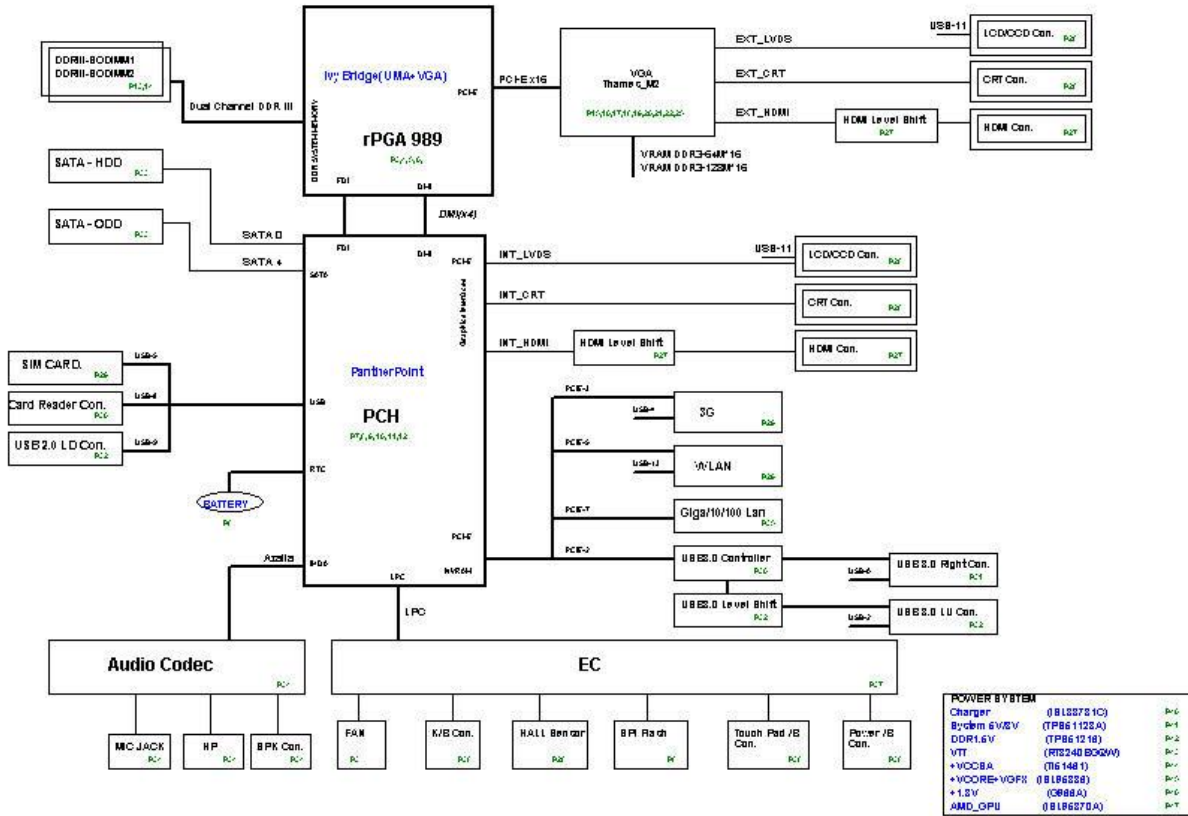


Figure 1-2 System block diagram for Intel Platform

The PC contains the following components.

CPU

11. Intel® Sandy Bridge Processor

CPU (988P) I3-2350M 2.3G

CPU (988P) I5-2410M 2.3G

CPU I3-2370 2.4G

CPU I5 2450 2.5G

2. Intel® Ivy Bridge processor

i3-3110M L-0 3MB 2c PGA 2.3GHz

i5-3210M L-0 3MB 2c PGA 2.5GHz

i5-3320M L-0 3MB 2c PGA 2.6GHz

i5-3360M L-0 3MB 2c PGA 2.8GHz

i7-3520M L-0 4MB 2c PGA 2.9GHz

i7-3612QM E-0 6MB 4c PGA 2.1GHz

i7-3612QM E-1 6MB 4c PGA 2.1GHz

Memory

Two memory slots capable of accepting DDRIII-SDRAM,1GB, 2GB, 4GB or 8GB memory modules for a maximum of 8GB.

- 204-pin SO-DIMM
- 1.5V operation

BIOS ROM (Flash memory)

- 32Mbit

Chipset (Chief River Platform)

This gate array has the following elements and functions.

- PCH (Intel HM70, HM76)
 - Direct Media Interface (DMI)
 - Intel® Flexible Display Interconnect (FDI)
 - PCH Display Interface
 - PCI Express* Interface
 - Serial ATA (SATA) Controller
 - AHCI
 - Intel® Rapid Storage Technology
 - Intel® Smart Response Technology
 - PCI Interface
 - Low Pin Count (LPC) Interface
 - Serial Peripheral Interface (SPI)
 - Compatibility Modules (DMA Controller, Timer/Counters, Interrupt Controller)
 - Advanced Programmable Interrupt Controller (APIC)
 - Universal Serial Bus (USB) Controllers
 - Gigabit Ethernet Controller
 - RTC
 - GPIO
 - Enhanced Power Management
 - Intel® Active Management Technology (Intel® AMT)
 - Manageability
 - System Management Bus (SMBus 2.0)
 - Intel® High Definition Audio Controller
 - Intel® Virtualization Technology for Directed I/O (Intel VT-d)
 - JTAG Boundary-Scan
 - Integrated Clock Controller
 - SOL Function
 - KVM
 - IDE-R Function

Other main system chips

- EC/KBC (Nuvoton NPCE885LA0DX)
- HD Audio (Conexant CX20671-21Z)
- Card Reader controller (Alcor AU6437)

- 10/100 LAN controller (Atheros AR8152)
- Gigabit 10/100/1000M LAN controller (Atheros AR8151)

Mini Card

Wireless LAN card

Support module type: 11a/b/g/n, 11b/g/n, 11ac/a/b/g/n
3G/LTE card

PS support and SIM card design ready.

- Bluetooth

Combo module with WLAN.

1.3 2.5-inch Hard Disk Drive

A compact, high-capacity HDD with a height of 9.5mm and 7mm. Contain a 2.5-inch magnetic disk and magnetic heads.

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

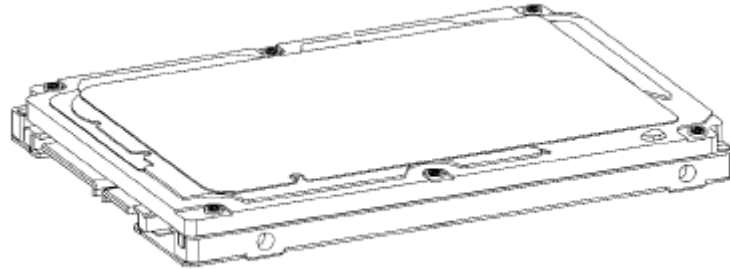


Figure 1-3 2.5-inch HDD

Table 1-1 2.5-inch HDD dimensions

| Parameter | | Standard value | | | | |
|---------------------------|-------------|--|--|--|--|---|
| | | TOSHIBA HDD(320G) MQ01ABD0 32-AAT | TOSHIBA HDD(500G) MQ01ABD0 50-AAT | TOSHIBA HDD(640G) MQ01ABD0 64-AAT | TOSHIBA HDD(750G) MQ01ABD0 75-AAT | TOSHIBA HDD(1TB)MQ 01ABD100- AAT |
| Outline dimensi ons | Width (mm) | 69.85 +/- 0.25 | | | | |
| | Height (mm) | 9.5 | | | | |
| | Depth (mm) | 100.45 +/- 0.25 | | | | |
| | Weight (g) | 102 | | 112 | | |

| Parameter | | Standard value | | | |
|---------------------------|-------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | | Toshiba(320GB)MK3275GSX | Toshiba(500GB)MK5075GSX | Toshiba(640GB)MK6475GSX | Toshiba(750GB)MK7575GSX |
| Outline dimensi ons | Width (mm) | 69.85 | | | |
| | Height (mm) | 9.5 | | | |
| | Depth (mm) | 100 | | | |
| | Weight (g) | 97 | | 101 | |

| Parameter | | Standard value | | | | |
|---------------------------|-------------|--|--|--|--|----------------------------------|
| | | HDD(320G)W DC WD3200BPV T-26JJ5T0 | HDD(500G)W DC WD5000BPV T-26HXZT3 | HDD(640G)W DC WD6400BPV T-26HXZT3 | HDD(750G)W DC WD7500BPV T-26HXZT3 | HDD(1TB)W D10JPVT- 26A1YT0 |
| Outline dimen sions | Width (mm) | 69.85 +/- 0.25 | | | | |
| | Height (mm) | 9.5 | | | | |
| | Depth (mm) | 100.2 +/- 0.25 | | | | |
| | Weight (g) | 98 | 98 | | | 115 |

Table 1-2 2.5-inch HDD dimension

| Parameter | | Standard value | | |
|---------------------------|-------------|--|--|--|
| | | Hitachi 7mm 250G HIT HTS545025A7E380 | Hitachi 7mm 320G HIT HTS545032A7E380 | Hitachi 7mm 500G HIT HTS545050A7E380 |
| Outline dimensi ons | Width (mm) | 69.85 +/- 0.25 | | |
| | Height (mm) | 6.8 +/- 0.2 | | |
| | Depth (mm) | 100.2 +/- 0.25 | | |
| | Weight (g) | 95(Max) | | |

Table 1-3 2.5-inch HDD specifications

| Parameter | Specification | | | | |
|---|--|--|--|--|---|
| | TOSHIBA HDD(320G)M Q01ABD032- AAT | TOSHIBA HDD(500G)M Q01ABD050- AAT | TOSHIBA HDD(640G) MQ01ABD0 64-AAT | TOSHIBA HDD(750G)MQ01AB D075-AAT | TOSHIBA HDD(1TB) MQ01AB D100-AAT |
| Storage size (formatted) | 320GB | 500GB | 640GB | 750 GB | 1TB |
| Speed (RPM) | 5,400 | | | | |
| Data transfer Rate - To/From Media - To/From Host | 638.9~1288.6(Mbits/sec) Media 3(Gbits/sec) Host | | | | |
| bus transfer rate (MB/s) | 1.5Gbps(150MB/s) | | | | |
| Average random seek time (read) (ms) | 12 | | | | |
| Power-on-to-ready (sec) | 3.5(typ)/9.5(Max) | | | | |

| Specification | | | | |
|---|--|-----------------------------|-----------------------------|-----------------------------|
| Parameter | Toshiba(320GB) MK3275GSX | Toshiba(500GB)M K5075GSX | Toshiba(640GB)MK 6475GSX | Toshiba(750GB)MK7575GSX |
| Storage size (formatted) | 320GB | 500GB | 640GB | 750GB |
| Speed (RPM) | 5,400 | | | |
| Data transfer Rate - To/From Media - To/From Host | 584.3~1195.5 (Mbits/sec) 3(Gbits/sec) | | | |
| bus transfer rate (MB/s) | 1.5Gbps(150MB/s) | | | |
| Average random seek time (read) (ms) | 12 | | | |
| Power-on-to-ready (sec) | 3.5(typ)/9.5(Max) | | | |

| Specification | | | | | |
|---|--|--|--|--|----------------------------------|
| Parameter | HDD(320G) WDC WD3200BPV T-26JJ5T0 | HDD(500G) WDC WD5000BPV T-26HXZT3 | HDD(640G) WDC WD6400BPV T-26HXZT3 | HDD(750G) WDC WD7500BPV T-26HXZT3 | HDD(1TB)W D10JPVT- 26A1YT0 |
| Storage size (formatted) | 320GB | 500GB | 640GB | 750GB | 1TB |
| Speed (RPM) | 5,400 | | | | |
| Data transfer Rate - To/From Media - To/From Host | 151MB/s 3(Gbits/sec) | | | | |
| bus transfer rate (MB/s) | 150 (MB/s) | | | | |
| Average random seek time (read) (ms) | 12 | | | | |
| Power-on-to-ready (sec) | 4 sec | | | | |

| Specification | | | |
|---|---|---|---|
| Parameter | Hitachi 7mm 250G HIT HTS545025A7E380 | Hitachi 7mm 320G HIT HTS545032A7E380 | Hitachi 7mm 500G HIT HTS545050A7E380 |
| Storage size(formatted) | 250GB | 320GB | 500GB |
| Speed (RPM) | 5,400 | | |
| Data transfer Rate - To/From Media - To/From Host | 1004(Mbits/sec) Max. 3(Gbits/sec) | 897(Mbits/sec) Max. 3(Gbits/sec) | 1004(Mbits/sec) Max. 3(Gbits/sec) |
| bus transfer rate (MB/s) | 1.5Gbps (150MB/s) | | |
| Average random seek time (read) (ms) | 13 (typ) | | |
| Power-on-to-ready (sec) | 3.5 (typ) | | |

1.4 Optical Drive

The DVD Super Multi drive accommodates either 12.7 cm (5-inch) or 9.5 cm (3.74-inch) CD/DVD-ROM, CD-R/RW, DVD±R/±RW and DVD-RAM. It is a high-performance drive that reads DVD-ROM at maximum 8-speed and CD at maximum 24-speed. Write speed of DVD±R/±RW and DVD-RAM is different depending on the drive.

The DVD Super Multi drive is shown in Figure 1-4. The dimensions and specifications of the DVD Super Multi drive are described in Table 1-3, Table 1-4, Table 1-5, Table 1-6, Table 1-7.

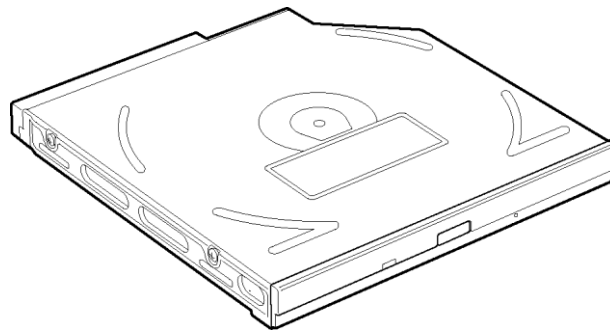


Figure 1-4 DVD Super Multi drive

Table 1-4 DVD Super Multi drive outline dimensions

| Parameter | | 12.7 mm Normal ODD |
|--------------------|-------------|-------------------------------|
| Outline dimensions | Maker | PCC (UJ8B0AWTJL-B) |
| | Width (mm) | 128 |
| | Height (mm) | 12.7 |
| | Depth (mm) | 129 |
| | Mass (g) | 165 |

| Parameter | | 12.7 mm Normal ODD |
|--------------------|-------------|---------------------------------|
| Outline dimensions | Maker | HLDS (GT51N.ATAK7N0) |
| | Width (mm) | 128 |
| | Height (mm) | 12.7 |
| | Depth (mm) | 127 |
| | Mass (g) | 155 |

| Parameter | | 12.7 mm Normal ODD |
|--------------------|-------------|---------------------------------|
| Outline dimensions | Maker | TSST (SN-208AB/TOJF) |
| | Width (mm) | 128 |
| | Height (mm) | 12.7 |
| | Depth (mm) | 127 |
| | Mass (g) | 150 |

| Parameter | | 12.7 mm Blue Ray ODD |
|--------------------|-------------|---------------------------------|
| Outline dimensions | Maker | HLDS (BT20N.ATAK1N1) |
| | Width (mm) | 128 |
| | Height (mm) | 12.7 |
| | Depth (mm) | 127 |
| | Mass (g) | 173 |

| Parameter | | 12.7 mm Bule Ray ODD | |
|--------------------|-------------|-------------------------|-------------------------|
| Outline dimensions | Maker | TSST (SN-506AB/TFNF) | TSST (TS-LB23D/TFJN) |
| | Width (mm) | 128 | |
| | Height (mm) | 12.7 | |
| | Depth (mm) | 127 | |
| | Mass (g) | 170 | |

Table 1-5 PCC DVD Super Multi drive specifications

| Parameter | | PCC Drive Specification | |
|---------------------------|---------------------|---|---------------------|
| | | UJ8B0AWTJL-B | |
| Label Flash Function | | No support | |
| Data transfer speed | Read | DVD-ROM :Max 8X CAV CD-ROM :Max 24X CAV | |
| | Write | CD-R : Max24X CAV CD-RW : 4X CLV High Speed CD-RW : 10XCLV Ultra Speed CD-RW : Max 24X Zone CLV DVD-R : Max.8X CAV DVD-R DL : Max.3.3x-6X PCAV DVD-RW : Max.6X Zone CLV DVD+R : Max.8X CAV DVD+R DL : Max.3.3x-6X PCAV DVD+RW : Max.8X Zone CLV DVD-RAM : Max.3-5X PCAV (4.7GB) | |
| | Burst Transfer mode | SATA Gen.1 | 1.5 G bps (150MB/s) |
| Access time (ms) (Random) | CD-ROM | 150ms (Typ.) | |
| | DVD-ROM | 180ms (Typ.) | |
| Buffer memory | | 1MB | |

Table 1-6 HLDS DVD Super Multi drive specifications

| Parameter | | HLDS Drive Specification | |
|---------------------------|---------------------|--------------------------------|---|
| | | GT51N.ATAK7N0 | |
| Label Flash Function | | No support | |
| Data transfer speed | Read | DVD-R/RW/ROM | 8x/8x/8x max. |
| | | DVD-R DL | 8x max. |
| | | DVD-RAM (Ver.2.2) | 2x, 3x, 5x |
| | | DVD-Video (CSS Compliant Disc) | 4x max. (Single/Dual layer) |
| | | DVD+R/+RW | 8x/8x max. |
| | | DVD+R DL | 8x max. |
| | | CD-R/RW/ROM | 24x/24x/24x max. |
| | | CD-DA (DAE) | 24x max. |
| | Write | DVD-R | 4x PCAV, 8x CAV |
| | | DVD-R DL | 2x CLV, 4x PCAV, 6x PCAV |
| | | DVD-RW | 2x CLV, 4x, 6x ZCLV |
| | | DVD-RAM | 2x, 3x CLV, 5x PCAV(Ver.2.2) |
| | | (12x Media: Not support) | |
| | | DVD+R | 4x PCAV, 8x CAV |
| | | DVD+R DL | 2.4x CLV, 4x PCAV, 6x PCAV |
| | | DVD+RW | 2.4x, 3.3x CLV, 4x ZCLV, 8x ZCLV(8x Speed disc: 3.3x CLV, 8x ZCLV) |
| | | CD-R | 10x CLV, 16x ZCLV, 24x CAV |
| | | CD-RW | 4x, 10x CLV, 16x ZCLV, 24x ZCLV(High Speed: 10x CLV, Ultra Speed: 24x ZCLV) |
| | Burst Transfer mode | SATA Gen.1 | 1.5 G bps (150MB/s) |
| Access time (ms) (Random) | CD-ROM | 140ms (Typ.) | |
| | DVD-ROM | 160ms (Typ.) | |
| | DVD-RAM | 260ms (Typ.) | |
| Buffer memory | | 1MB | |

Table 1-7 TSST DVD Super Multi drive specifications

| Parameter | | TSST Drive Specification | |
|---------------------------|--|--|--|
| | | SN-208AB/TOJF | |
| Label Flash Function | | No support | |
| Data transfer speed | Read | CD-ROM/RW DVD-Single DVD-Dual DVD-RAM | Max. 24X (3,600 KB/sec) CAV 24X Max. 8X (10,800 KB/sec) CAV 8X Max. 8X (10,800 KB/sec) CAV 8X Max. 5X (6,750 KB/sec) PCAV 5X/ CLV3X/2X |
| | Write | CD-R LS CD-RW HS CD-RW US CD-RW DVD±R DVD+RW DVD-RW DVD±R DUAL DVD-RAM | Max. 24X (3,600 KB/sec) PCAV 24X/20X/16X/10X Max. 4X (600 KB/sec) CLV 4X Max. 10X (1,500 KB/sec) CLV 10X Max. 24X (3,600 KB/sec) ZCLV 24X/20X/16X Max. 8X (10,800 KB/sec) PCAV 8X, CLV 3.3X/2.4(+)/2(-) Max. 8X (10,800 KB/sec) ZCLV 8X/6X/3.3X CLV 2.4X Max. 6X (8,100 KB/sec) ZCLV 6X/4X, CLV 2X Max. 6X (8,100 KB/sec) PCAV 6X/4X, CLV 2.4X(+)/2X(-) Max. 5X (6,750 KB/sec) PCAV 5X/ CLV3X/2X |
| | Burst Transfer mode | SATA Gen.1 | 145MB/s |
| Access time (ms) (Random) | CD-ROM/RW DVD-Single DVD-Dual DVD±R/RW DVD±R Dual DVD-RAM | 170 ms (Typ) 190 ms (Max) 170 ms (Typ) 190 ms (Max) 200 ms (Typ) 230 ms (Max) 190 ms (Typ) 220 ms (Max) 200 ms (Typ) 230 ms (Max) 250 ms (Typ) 350 ms (Max) | |
| Buffer memory | | 1MB | |

Table 1-8 HLDS Slim Blu-ray ODD specifications

| Parameter | | HLDS Drive Specification | |
|---------------------------|---------------------|----------------------------|---|
| | | BT20N.ATAK1N1 | |
| Label Flash Function | | No support | |
| Data transfer speed | Read | BD-ROM (SL/DL) | 6x CAV / 6x CAV |
| | | BD-R (SL/DL) | 6x CAV / 6x CAV |
| | | BD-R LTH | 6x CAV |
| | | BD-RE (SL/DL) | 6x CAV / 6x CAV |
| | | BDMV | 4.8x CAV |
| | | DVD-ROM | 8x CAV |
| | | DVD-R (SL/DL) | 8x/ 8x CAV |
| | | DVD+R (SL/DL) | 8x/ 8x CAV |
| | | DVD-RW | 8x CAV |
| | | DVD+RW | 8x CAV |
| | | DVD-Video (CSS Compliant) | 4x CAV |
| | | DVD-RAM (Ver.2.2) | 2x, 3x ZCLV, 5x PCAV |
| | | CD-R/RW/ROM | 24x CAV |
| | | CD-DA (Ripping/Audio Play) | 20x CAV/ 10x CAV |
| | Write | BD-R SL | 2x CLV, 4x PCAV, 6x CAV |
| | | BD-R DL | 2x CLV, 4x PCAV |
| | | BD-R LTH | 2x CLV, 4x PCAV, 6x CAV |
| | | BD-RE (SL/DL) | 2x CLV / 2x CLV |
| | | DVD-R (SL/DL) | 2x CLV, 4x PCAV, 8x CAV/ 2x CLV, 4x ZCLV |
| | | DVD+R (SL/DL) | 2.4x CLV, 4x PCAV, 8x CAV/ 2.4x CLV, 4x ZCLV |
| | | DVD-RW | 1x, 2x CLV, 4x, 6x ZCLV |
| | | DVD+RW | 2.4x, 3.3x CLV, 4x ZCLV, 8x ZCLV (8x disc: 3.3x , 8x) |
| | | DVD-RAM | 2x, 3x ZCLV, 5x PCAV(Ver.2.2) (12x disc: Not support) |
| | | CD-R | 10x CLV, 16x, 24x ZCLV |
| | | CD-RW | 4x, 10x CLV, 16x ZCLV |
| | Burst Transfer mode | SATA Gen.1 | 150MB/s |
| Access time (ms) (Random) | BD-ROM | | 230 ms typ. |
| | DVD-ROM | | 200 ms typ. |
| | DVD-RAM (Ver.2.2) | | 210 ms typ. |
| | CD-ROM | | 200 ms typ. |
| Buffer memory | | 1MB | |

| Parameter | | TSST Drive Specification | |
|---------------------------|--|---|--|
| | | SN-506AB/TFNF | TS-LB23D/TFJN |
| Label Flash Function | | No support | |
| Data transfer speed | Read | BD-ROM (SL/DL) BD-R (SL/DL) BD-R LTH BD-RE (SL/DL) BDMV DVD-ROM DVD-R (SL/DL) DVD+R (SL/DL) DVD-RW DVD+RW DVD-Video (CSS Compliant) DVD-RAM (Ver.2.2) CD-R/RW/ROM CD-DA (Ripping/Audio Play) | 6x CAV / 6x CAV 6x CAV / 6x CAV 6x CAV 6x CAV / 6x CAV 4.8x CAV 8x CAV 8x/ 8x CAV 8x/ 8x CAV 8x CAV 8x CAV 4x CAV 2x, 3x ZCLV, 5x PCAV 24x CAV 20x CAV/ 10x CAV |
| | Write | BD-R SL BD-R DL BD-R LTH BD-RE (SL/DL) DVD-R (SL/DL) DVD+R (SL/DL) DVD-RW DVD+RW DVD-RAM CD-R CD-RW | 2x CLV, 4x PCAV, 6x CAV 2x CLV, 4x PCAV 2x CLV, 4x PCAV, 6x CAV 2x CLV / 2x CLV 2x CLV, 4x PCAV, 8x CAV/ 2x CLV, 4x ZCLV 2.4x CLV, 4x PCAV, 8x CAV/ 2.4x CLV, 4x ZCLV 1x, 2x CLV, 4x, 6x ZCLV 2.4x, 3.3x CLV, 4x ZCLV, 8x ZCLV (8x disc: 3.3x , 8x) 2x, 3x ZCLV, 5x PCAV(Ver.2.2) (12x disc: Not support) 10x CLV, 16x, 24x ZCLV 4x, 10x CLV, 16x ZCLV |
| | Burst Transfer mode | SATA Gen.1 | 150MB/s |
| Access time (ms) (Random) | BD-ROM DVD-ROM DVD-RAM (Ver.2.2) CD-ROM | 230 ms typ. 200 ms typ. 210 ms typ. 200 ms typ. | |
| Buffer memory | | 1MB | |

1.5 Keyboard

The Capetown keyboard has three different kinds of placement, US style, UK style and JANPAN style.

Figure 1-5 is a view of the keyboard for US style

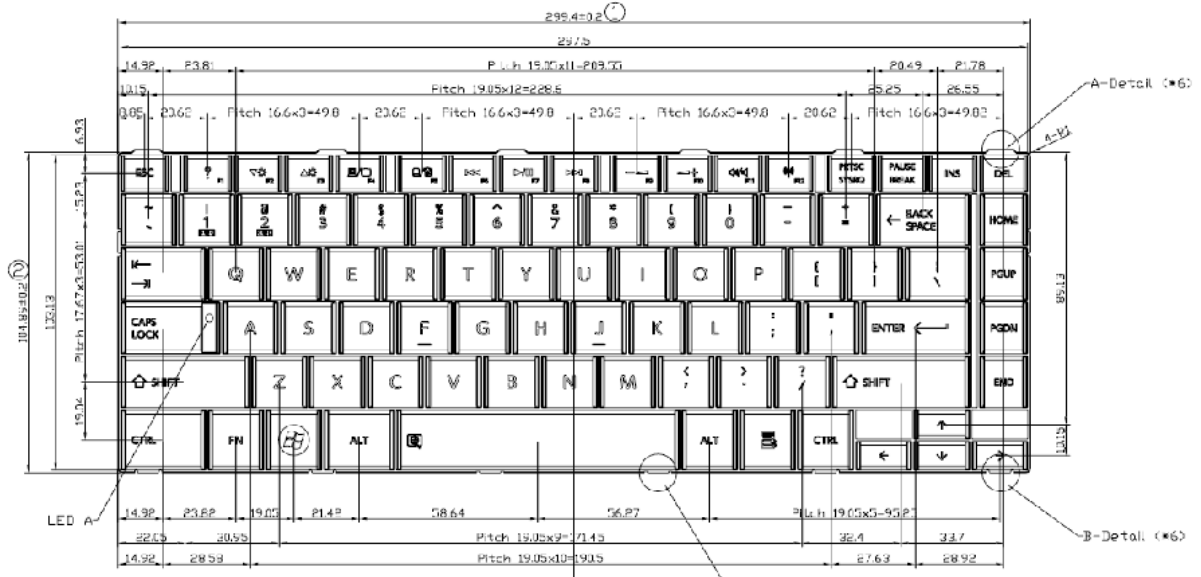


Figure 1-5 Keyboard for US style

Figure 1-6 is a view of the keyboard for UK style

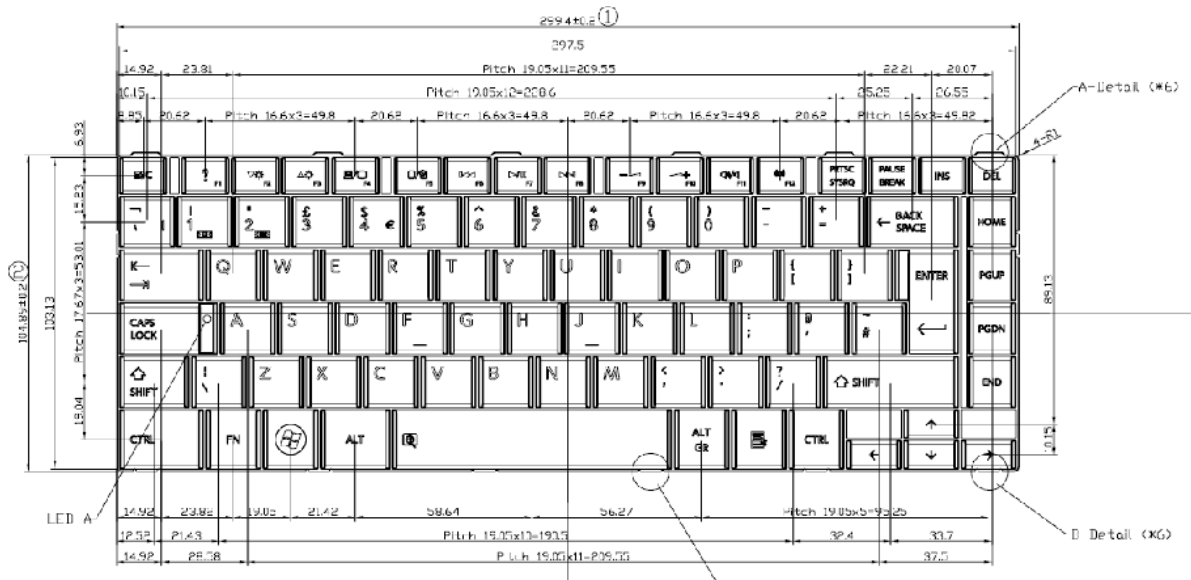


Figure 1-6 Keyboards for UK style

Figure 1-7 is a view of the keyboard for JAPAN style

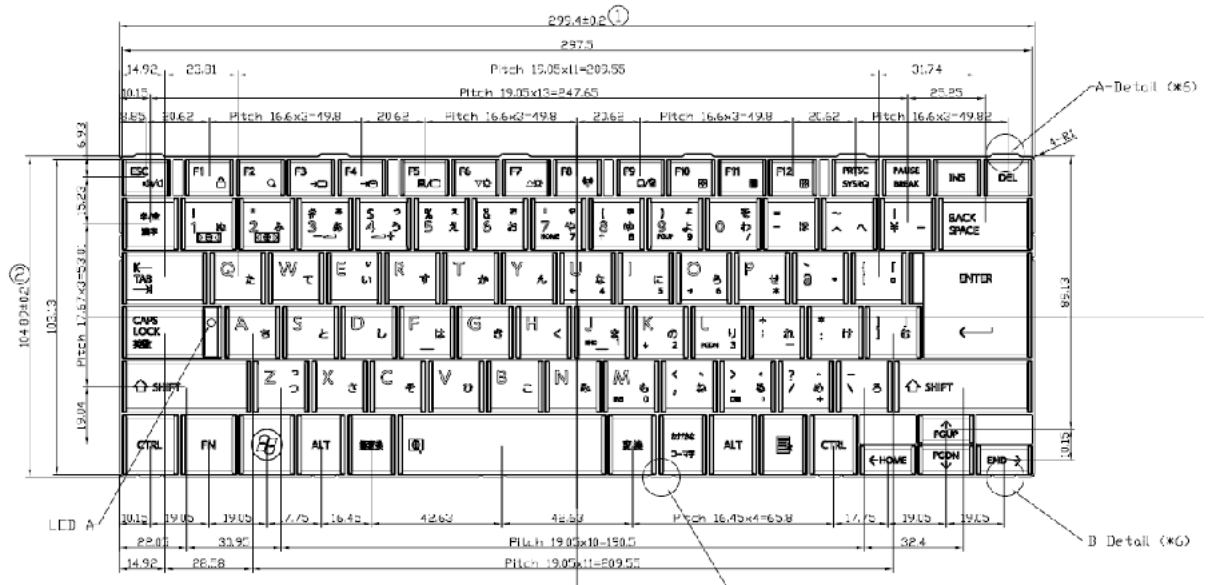


Figure 1-7 Keyboard for JAPAN style

1.6 TFT Color Display

The Capetown panel use TFT Liquid Crystal Display module with LED Backlight unit and 40 pins LVDS interface. This module supports 1366 x 768 HD mode and can display 262,144 colors.

1.6.1 LCD Module with LED Backlight

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

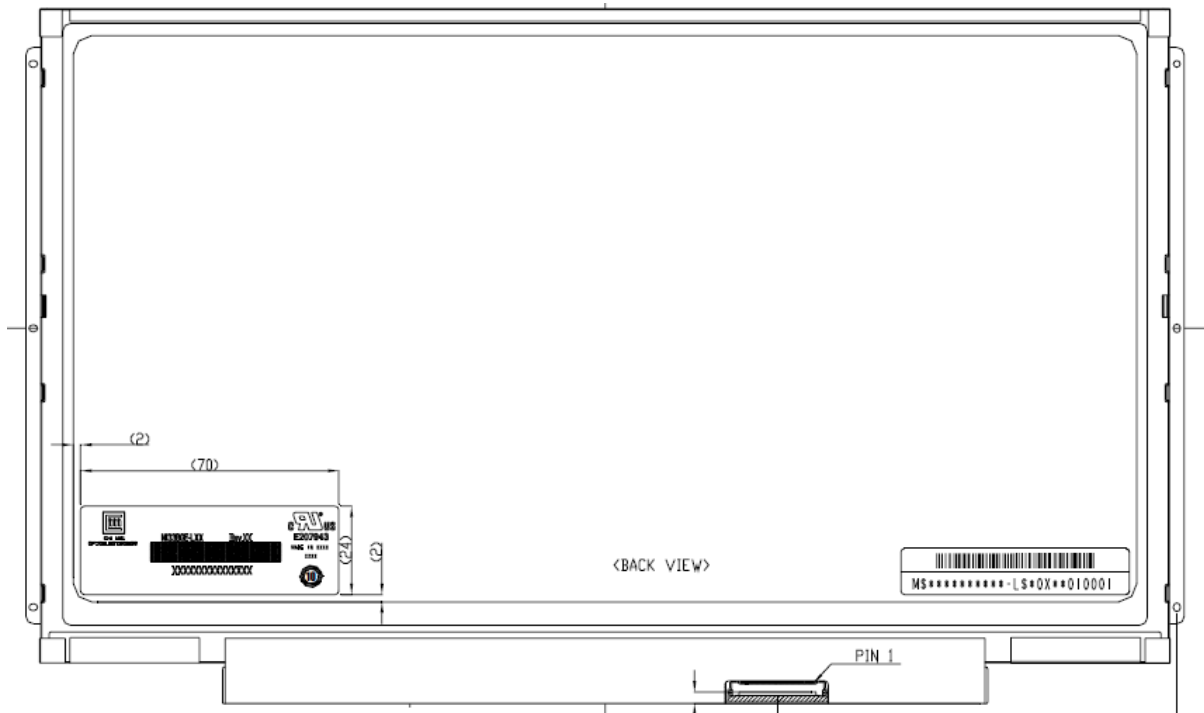


Figure 1-8 CHIMEI LCD Module

Table 1-9 LED module specifications (color gamut 45%)

| Item | Specifications | | | | |
|------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| | CHIMEI N140BGE-L22 | Samsung LTN140AT26-T01 | AUO B140XW01 V8 | LG LP140WH4- TLA1 | LG LP140WH4- TLN1 |
| Number of Pixel | 1366 x 768 | 1366 x 768 | 1366 x 768 | 1366 x 768 | 1366 x 768 |
| Dot spacing (mm) | 0.2265 (H)x0.2265 (V) | 0.2265 (H)x0.2265 (V) | 0.2265 (H)x0.2265 (V) | 0.2265 (H)x0.2265 (V) | 0.2265 (H)x0.2265 (V) |
| Display Colors | 262,144 colors | 262,144 colors | 262,144 colors | 262,144 colors | 262,144 colors |

Table 1-10 LED module specifications (color gamut 60%)

| Item | Specifications | | | |
|------------------|-------------------------------|---------------------------|--------------------------|-----------------------|
| | Samsung LTN140AT07- U07 | Samsung LTN140AT07-T03 | AUO B140XW01 V6 | LG LP140WH4-TLC1 |
| Number of Pixel | 1366 x 768 | 1366 x 768 | 1366 x 768 | 1366 x 768 |
| Dot spacing (mm) | 0.2265 (H)x0.2265 (V) | 0.2265 (H)x0.2265 (V) | 0.2265 (H)x0.2265 (V) | 0.2265 (H)x0.2265 (V) |
| Display Colors | 262,144 colors | 262,144 colors | 262,144 colors | 262,144 colors |

1.7 Power Rails

Table 1-11 lists the power rail output specifications of chief river platform.

Table 1-11 Power supply output rating

| Name | Power supply (Yes/No) | | | |
|--------------|-----------------------|------------------------|---------------------|------------|
| | Voltage [V] | Power OFF Suspend mode | Power OFF Boot mode | No Battery |
| +5VPCU | 5 | Yes | Yes | No |
| +5V | 5 | No | No | No |
| +3VPCU | 3.3 | Yes | Yes | No |
| +3V_S5 | 3.3 | Yes | No | No |
| +3VSUS | 3.3 | Yes | No | No |
| +3V | 3.3 | No | No | No |
| +1.8VSUS | 1.8 | Yes | No | No |
| +SMDDR_VTERM | 1.8 | Yes | No | No |
| +SMDDR_VREF | 1.8 | Yes | No | No |
| +1.8V | 1.8 | No | No | No |
| +1.5V | 1.5 | No | No | No |
| +1.2V | 1.25 | No | No | No |
| +1.05v | 1.05 | No | No | No |
| +NB_CORE | 1.0~1.2 | No | No | No |
| VCC_CORE | 0.7~1.2 | No | No | No |

1.8 Batteries

The PC has the following two batteries.

- Main battery
- Real time clock (RTC) battery

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

Table 1-12 Battery specifications

| Battery Name | | Battery Element | Output Voltage | Capacity |
|-------------------------------------|------------------------------------|-----------------|----------------|----------|
| Main battery | 3 Cells (For Intel UMA only) | LG | 10.8 v | 2200mAh |
| | | Sony | | |
| | | Sanyo | | |
| | 6 Cells | Sony | 10.8v | 4400mAh |
| | | Sanyo | | |
| | | LG | | |
| | | SDI | | |
| 6 Cells | Sanyo | 10.8v | 6000mAh | |
| | LG | | | |
| Real time clock (RTC) battery | BCR2032H4.5AM1GB | Lithium ion | 3V | 220mAh |

1.8.1 Main Battery

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

1.8.2 Battery Charging Control

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

Battery Charge

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

Table 1-13 Time required for charges of main battery

| Condition | Charging Time |
|------------------|-----------------|
| Power On Charge | About 12 hours- |
| Power Off Charge | About 4 hours |

Charge is stopped in the following cases.

1. The main battery is fully charged
2. The main battery is removed
3. Main battery or AC adapter voltage is abnormal
4. Charging current is abnormal

Data preservation time

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

Table 1-14 Data preservation time

| Condition | | preservation time |
|---|--------|------------------------------------|
| Standby | | About 3 days |
| Hibernation | | About 1 month |
| Battery Pack | 6 cell | Approximately 3 days(sleep mode) |
| | 3 cell | Approximately 1.5 days(sleep mode) |
| Approximately 1 month(shutdown mode,All type of battery pack) | | |

1.8.3 RTC Battery

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

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

Table 1-15 Time required for charges of RTC battery

| Condition | Time |
|---------------------------------------|----------------|
| Power ON (Lights Power LED) | About 24 hours |
| Data preservation tome (Full-charged) | About a month |

1.9 AC Adapter

The AC adapter is used to charge the battery.

Table 1-16 lists the AC adapter specifications.

Table 1-16 AC adapter specifications

| Parameter | Specification | | |
|-----------------|-------------------------------|-----------------------|-----------------------|
| With Led | Chiony/ DELTA/ LITE-ON | DELTA/ LITE-ON | DELTA/ LITE-ON |
| Power | 65W | 75W | 90W |
| Input voltage | AC 100V/240V | | |
| Input frequency | 50Hz~60Hz | | |
| Input current | $\leq 1.5A$ | | |
| Output voltage | DC 19V | | |
| Output current | 3.42A | 3.95A | 4.74A |

Chapter 2

Troubleshooting Procedures

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2.1 Troubleshooting

Chapter 2 describes how to determine which Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction.

The FRUs covered are:

- | | | |
|-----------------|-----------------------|------------------|
| 1. Power supply | 6. Touch pad | 11. Wireless LAN |
| 2. System Board | 7. Display | 12. Sound |
| 3. USB FDD | 8. Optical Disk Drive | 13. Bluetooth |
| 4. 2.5" HDD | 9. Modem | |
| 5. Keyboard | 10. LAN | |

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

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

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

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

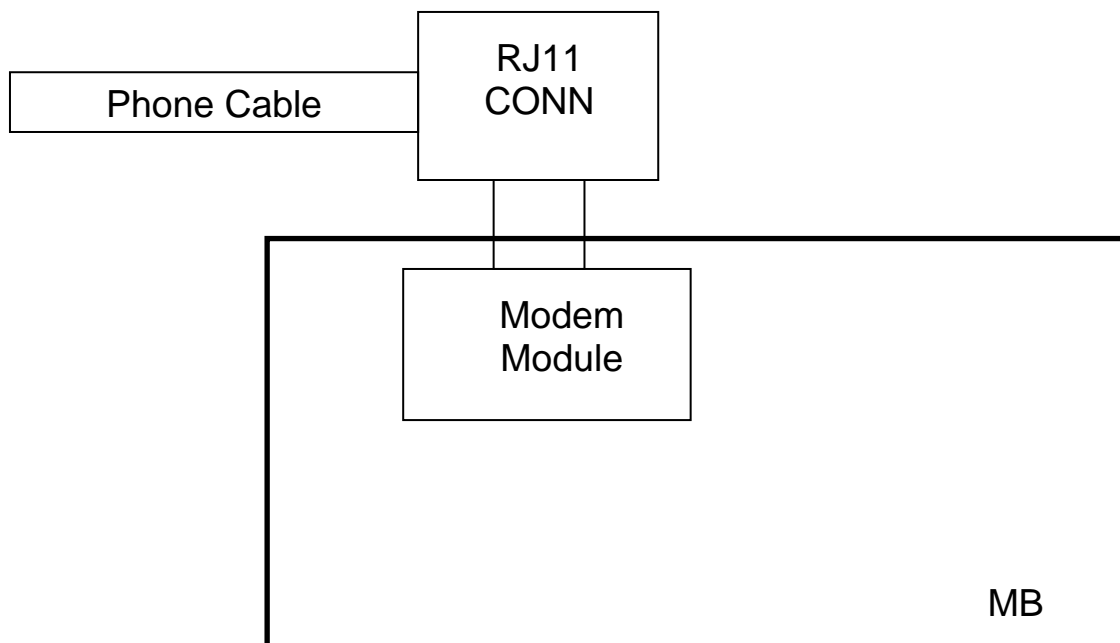
1. Phillips screwdrivers (For replacement procedures)
2. Implements for debugging port check
 - Toshiba Free-DOS system FD

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

(1) Cable connection is described in the figure as line.

(2) Pin connection is described in the figure as arrow.

<e.g.> Connection of modem



2.2 Troubleshooting Flowchart

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

- Ask customer to enter the password if a password is registered.
- Verify with the customer that Toshiba Windows is installed on the hard disk. Non-Windows operating systems can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.

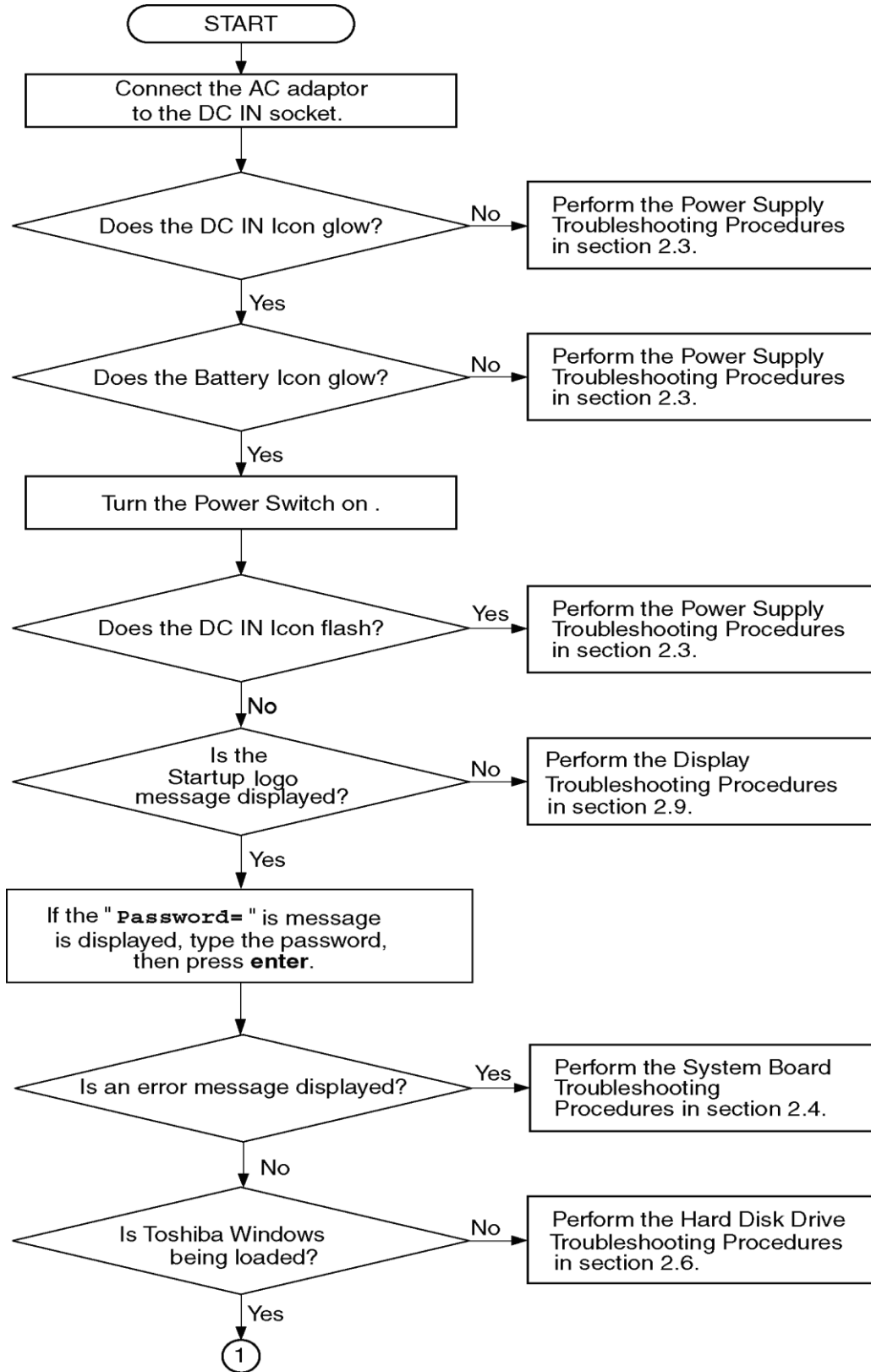


Figure 2-1 Troubleshooting flowchart (1/2)

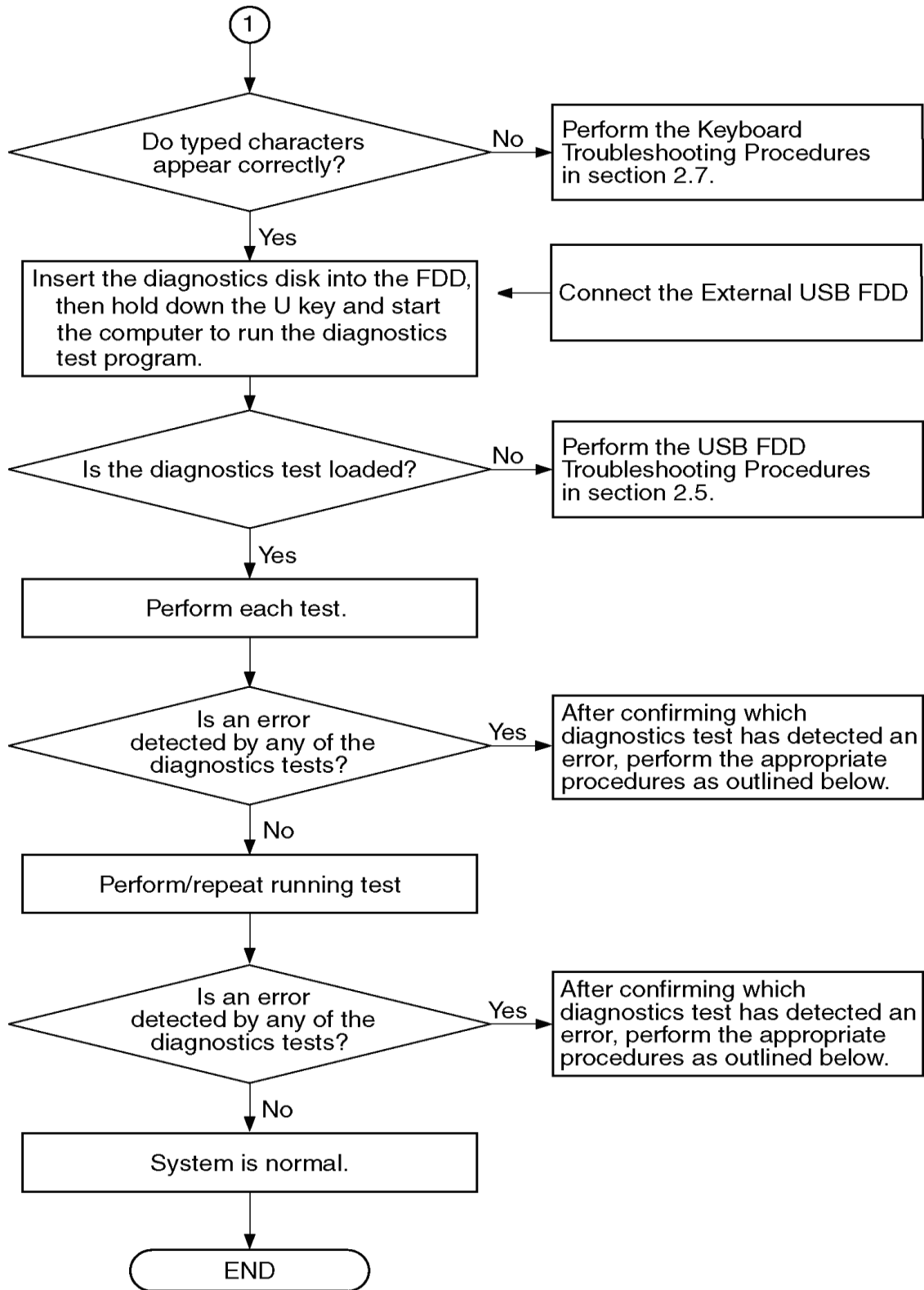


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the system test, memory test, display test, CD-ROM/DVD-ROM test, expansion test, real timer test, sound test or Modem/LAN/Bluetooth /IEEE1394 test, perform the System Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is found on the keyboard test and pressed key display test, perform the Keyboard Troubleshooting Procedures in Section 2.7.
5. If an error is found on the touch pad test, perform the touch pad Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Disk Drive Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.12.
10. If an error is detected on the wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.13.
11. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.14.
12. If an error is detected on the fingerprint test, perform the fingerprint Troubleshooting Procedures in Section 2.15.
13. If an error is detected on the Bluetooth test, perform the Bluetooth Troubleshooting Procedures in Section 2.16.

2.3 Power Supply Troubleshooting

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

- Procedure 1: Power Status Check
- Procedure 2: Connection Check
- Procedure 3: Charging Check
- Procedure 4: Replacement Check

Procedure 1 Power Status Check

The following LED indicates the power supply status:

- Battery LED
- DC IN LED

The Power Supply control displays the power supply status with the Battery LED and the DC IN LED as listed in the tables below.

Table 2-1 Battery icon

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

Table 2-2 DC IN icon

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

*1 When the power supply controller detects a malfunction, the DC IN icon blinks orange.

When the icon is blinking, perform the following procedure.

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

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

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

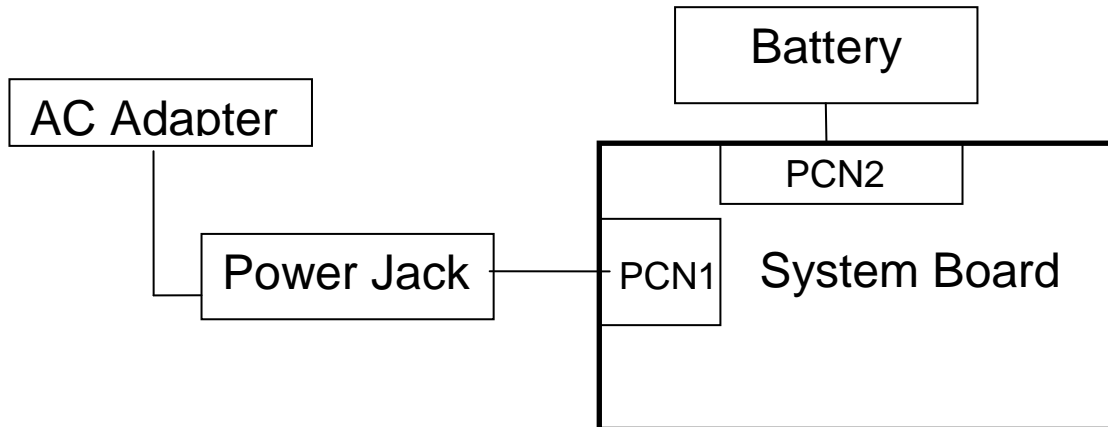
Check 2 If the DC IN icon does not light, go to Procedure 3.

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

NOTE: Use a supplied AC adapter.

Procedure 2 Connection Check

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



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

- Check 1 Make sure the AC adapter and the AC power cord is firmly plugged into the DC IN connector and wall outlet. If these cables are connected firmly, go to Check 2.
- Check 2 Replace the AC adapter and the AC power cord with new ones.
- If the DC IN icon does not light, go to Procedure 4.
 - If the battery icon does not light, go to Check 3.
- Check 3 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 3 Charging Check

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

- Check 1 Make sure the AC adapter is firmly plugged into the DC IN socket.
- Check 2 Make sure the battery pack is properly installed. If it is properly installed, go to Check 3.
- Check 3 The battery pack may be completely discharged. Wait a few minutes to charge the battery pack while connecting the battery pack and the AC adapter. If the battery pack is still not charged, go to Check 4.
- Check 4 The battery's temperature is too high or low. Leave the battery for a while to adjust it in the right temperature. If the battery pack is still not charged, go to

Check 5.

Check 5 Replace the battery pack with a new one. If the battery pack is still not charged, go to Procedure 4.

Procedure 4 Replacement Check

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

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

When AC adapter is connected;

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

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

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

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

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

2.4 System Board Troubleshooting

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

Procedure 1: Message Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Replacement Check

Procedure 1 Message Check

When the power is turned on, the system performs the Power On Self Test (POST) installed in the BIOS ROM. The POST 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 XP is properly loaded, go to Procedure 4.

Check 1 If one of the following error messages is displayed on the screen, press the **F2** 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 **F2** 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.

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 Diagnostic*, for more information on how to perform these tests.

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. Floppy Disk test
6. VGA test
7. VGA Memory test
8. Hard Disk test
9. CPU Temperature test
10. Main Battery test
11. BIOS test
12. CD-ROM/DVD-ROM test
13. System Status LED test
14. Wireless LAN test
15. LAN/Modem/Sound test
16. UUID test-DMI Information (Write DMI)

If an error is detected during these tests, go to Procedure 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 with a new one.

2.5 USB FDD Troubleshooting

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

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

Procedure 1 FDD Head Cleaning Check

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

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

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

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

Procedure 2 Diagnostic Test Program Execution Check

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

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

Table 2-7 FDD error code and status

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

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

Write protected

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

Procedure 3 Connector Check and Replacement Check

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

USB FDD can be connected to the following 4 ports on system board.

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

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

1. Cable can not be disconnected from the connector.
2. Cable is connected straight to the connector.
3. Cable is connected all the way seated in the connector.
4. Cable can not be broken.

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

Check 3 Connect USB FDD to each port embedded on system board.

If it does not work properly when connected to CN12, CN19, CN20 or all ports, perform Check 4.

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

2.6 2.5" HDD Troubleshooting

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

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

Procedure 1 Partition Check

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

- Check 1 Input **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.
- Check 2 Input **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed in the Display Partition Information, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition or a logical DOS drive on drive C. If the problem still occurs, go to Procedure 2.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Then go to Procedure 2.
- Check 4 Remove the system disk from the FDD and reboot the computer. If the problem still occurs, go to Procedure 2. Otherwise, the 2.5" HDD is operating normally.

Procedure 2 Message Check

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

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

Check 1 If either of the following messages appears, go to Check 3. If the following messages do not appear, perform Check 3.

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

If the following message appears on the display, the system program has been transferred to the HDD.

```
System Transferred
```

If an error message appears on the display, perform Check 3.

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.

Procedure 3 Format Check

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

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

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

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

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

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

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

Procedure 4 Diagnostic Test Program Execution Check

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

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

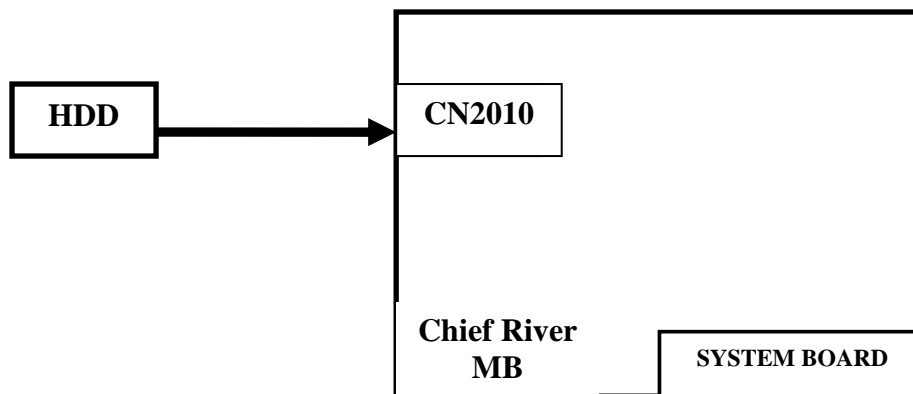
Table 2-8 2.5" Hard disk drive error code and status

| Code | Status |
|------|------------------------|
| 01 | Bad Command Error |
| 02 | Bad Address Mark Error |
| 04 | Record Not Found |
| 05 | HDC Not Reset Error |
| 07 | Drive Not Initialized |
| 09 | DMA Boundary Error |
| 0A | Bad Sector |
| 0B | Bad Track Error |
| 10 | ECC Error |
| 11 | ECC Recover Enabled |
| 20 | HDC Error |
| 40 | Seek Error |
| 80 | Time Out Error |
| AA | Drive Not Ready |
| BB | Undefined Error |
| CC | Write Fault |
| E0 | Status Error |
| F0 | No Sense Error |
| ?? | Other Error |

Procedure 5 Connector Check and Replacement Check

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

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



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

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

2.7 Keyboard Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

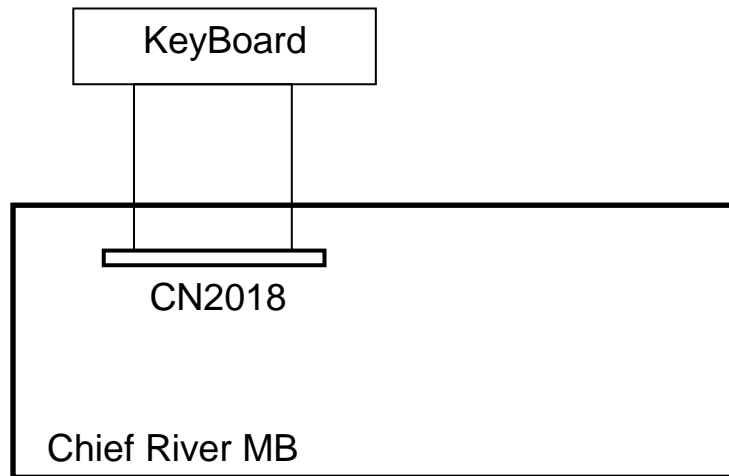
Execute the Keyboard Test (DIAGNOSTIC TEST) and Pressed key display test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

Procedure 2 Connector and Replacement Check

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

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



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

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

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

2.8 Touch pad Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

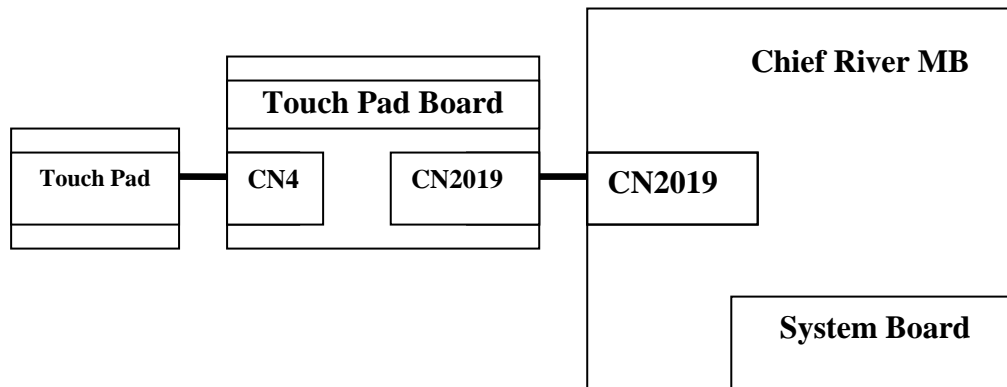
Execute the Touch pad test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

Procedure 2 Connector and Replacement Check

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

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



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

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

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

2.9 Display Troubleshooting

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

Procedure 1: External Monitor Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector and Cable Check

Procedure 4: Replacement Check

Procedure 1 External Monitor Check

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

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

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

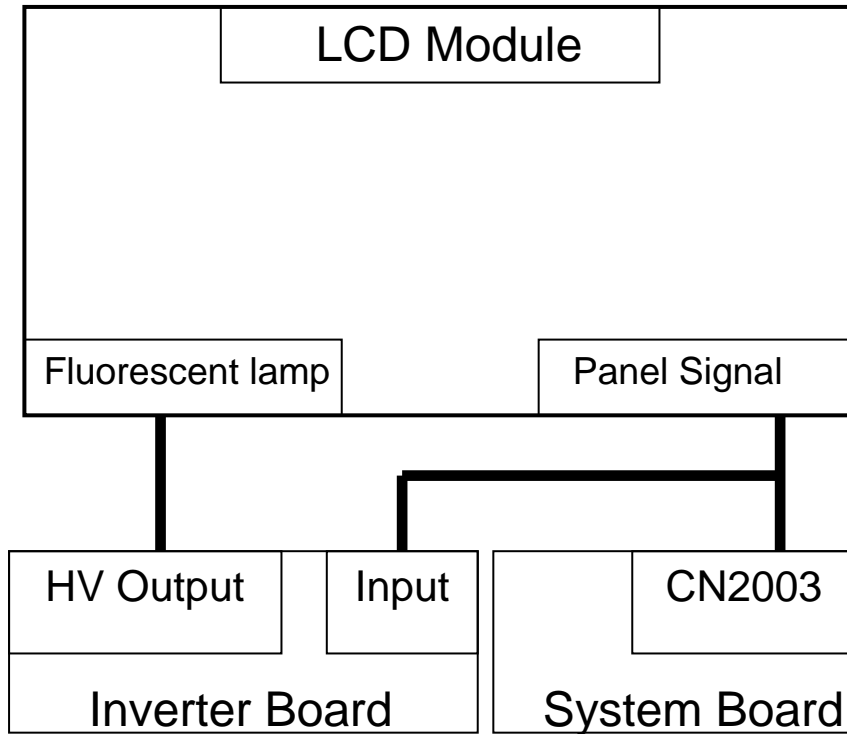
Procedure 2 Diagnostic Test Program Execution Check

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

Procedure 3 Connector and Cable Check

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

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



Procedure 4 Replacement Check

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

If f LED backlight does not light, perform Check 1.

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

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

If LED backlight remains lit when the display is closed, perform Check 5.

Check 1 LCD/FL cable may be faulty. Replace FL/LCD cable with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still occurs, perform Check 2.

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

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

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

2.10 Optical Disk Drive Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

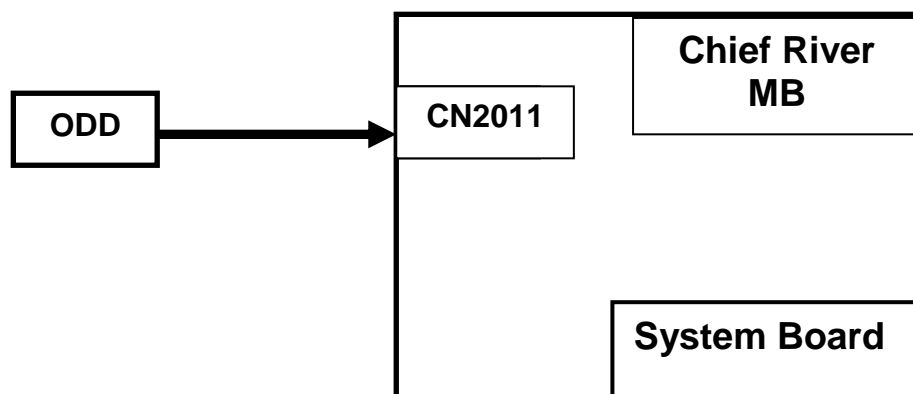
Prepare the tools before the test.

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

Procedure 2 Connector Check and Replacement Check

The connection of optical disk drive and system board 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 optical disk drive is firmly connected to the connector on system board.



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

Check 2 Optical disk drive may be faulty. Replace it with a new one following the steps in

Chapter 4. If the problem still occurs, perform Check 3.

Check 3 System board may be faulty. Replace it with new one following the instructions in Chapter 4.

2.11 Modem Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

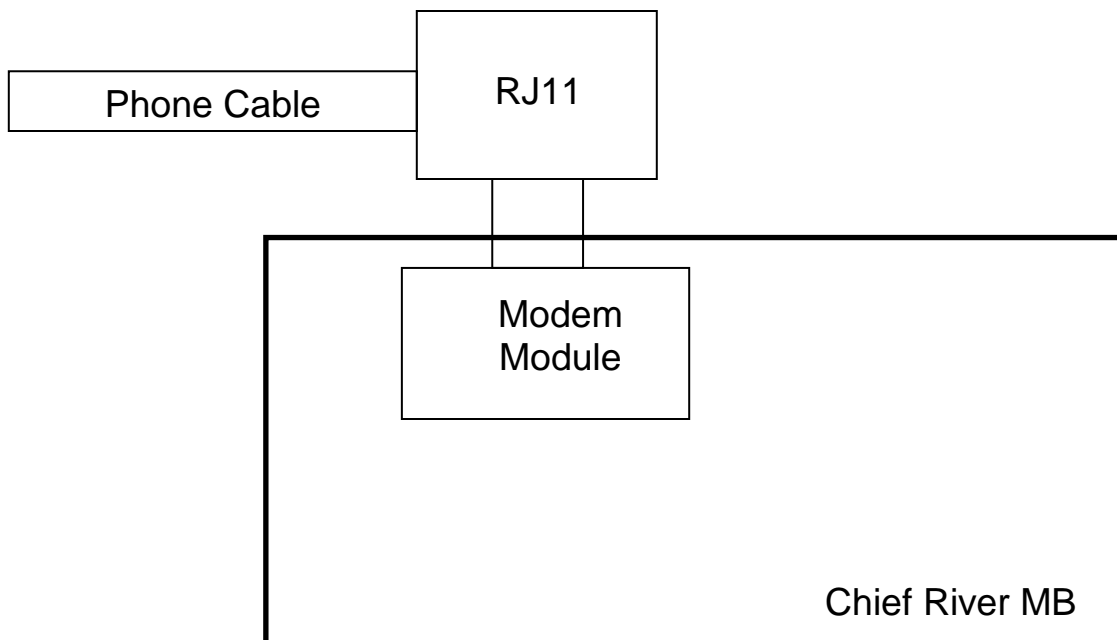
If any error is detected, perform Procedure 2.

Procedure 2 Connector Check and Replacement Check

MDC (Modem Daughter Card) is used as the modem for this computer. MDC is connected to system board by connector CN27. And also, MDC is connected to system and LAN board by modem cable. If modem malfunctions, the connection of cable, board and module may be defective. Otherwise, they may be faulty.

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

Check 1 Make sure the following connections are firmly connected.



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

Troubleshooting Procedures

- Check 2 Modem cable may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.
- Check 3 MDC may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 4.
- Check 4 Cable between MDC and system board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem still occurs, perform Check 5.
- Check 6 System board may be faulty. Replace it with a new one following the instruction in Chapter 4.

2.12 LAN Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

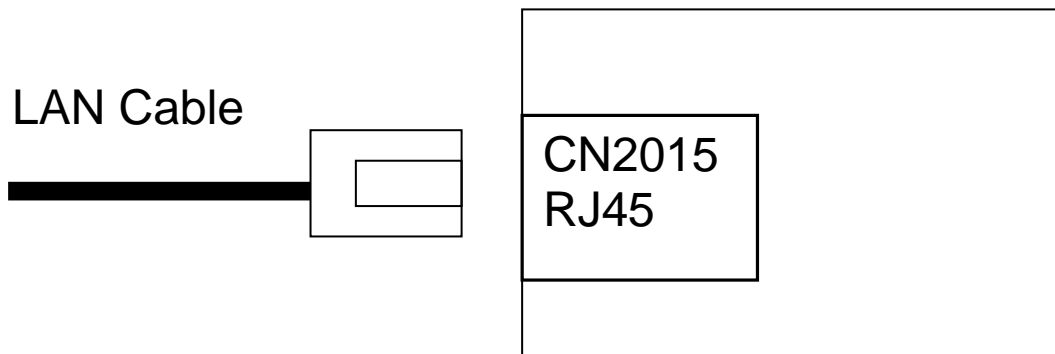
Execute LAN test in the LAN/Modem test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

Procedure 2 Connector Check and Replacement Check

The LAN function is embedded on system board. If LAN malfunctions, its connection is defective or LAN cable and system board may be faulty.

Check 1 Make sure LAN cable is firmly connected to the connector CN1. 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 System board may be faulty. Replace it with a new one following the instruction in Chapter 4.

2.13 Wireless LAN Troubleshooting

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

Procedure 1 Transmitting-Receiving Check

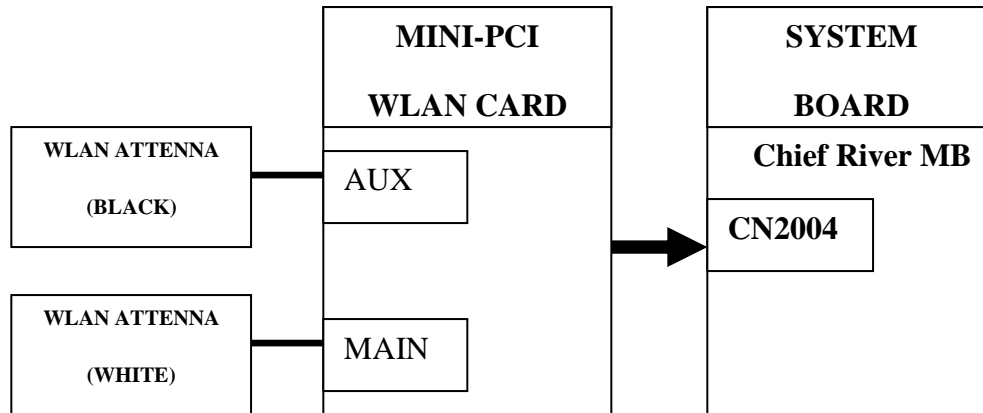
Before starting the test, make sure the wireless communication is Enabled in BIOS setup

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

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

Procedure 2 Antennas' Connection Check

The wireless LAN function-wiring diagram is shown below:



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

- Check 1 Make sure the wireless communication is Enabled in BIOS setup.
 If the Wireless communication is "Disabled", change it to "Enabled". If the problem still occurs, perform Check 2.

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

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

Procedure 3 Replacement Check

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

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

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

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

2.14 Sound Troubleshooting

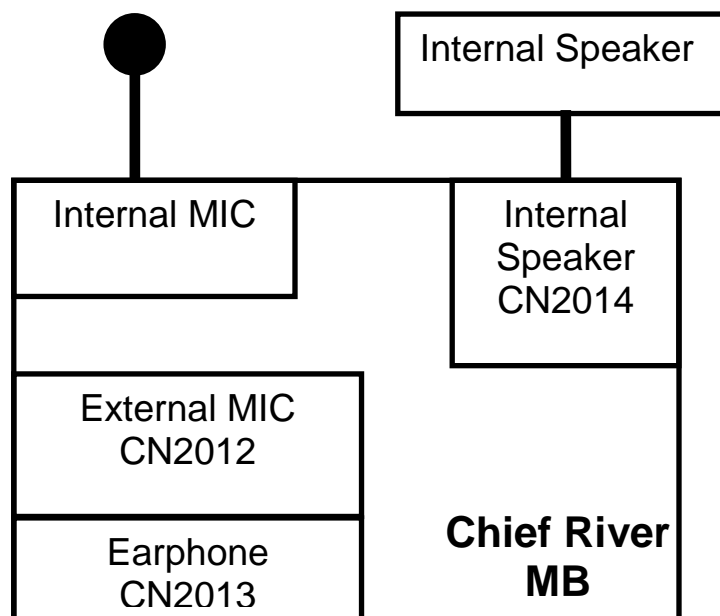
To check if the sound function is malfunctioning or not, follow the troubleshooting procedures below as instructed.

Procedure 1: Connector Check

Procedure 2: Replacement Check

Procedure 1 Connector Check

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



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

If the problem still occurs, go to Procedure 2.

Procedure 2 Replacement Check

- If External microphone/Headphone does not work properly, perform check 1.
- If internal microphone /Speaker do not work properly, perform check 2.
- If HP out does not work properly, perform check 3.
- If Volume control does not work properly, perform check 4.

Check 1 External microphone/Headphone may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 5.

Check 2 Internal microphone /Speaker may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 5.

Check 3 HP out may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem still occurs, perform Check 5.

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

Check 5 Flat cable between AD board/Speaker and system board may be faulty. Replace it with new cable following the instructions in Chapter 4. If the problem still occurs, perform Check 6.

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

2.15 Bluetooth Troubleshooting

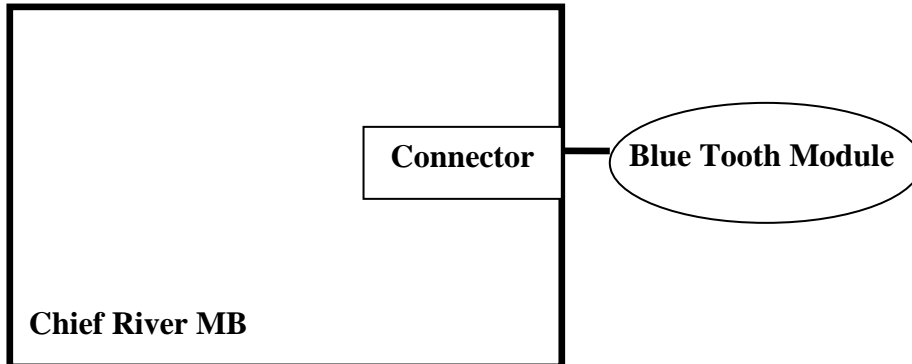
To check if the computer's Bluetooth is malfunctioning or not, follow the troubleshooting procedure below as instructed.

Procedure 1: Connector Check and Replacement Check

Procedure 1 Connector Check and Replacement Check

The Bluetooth function is connected to system board. If Bluetooth malfunctions, its connection is defective or Bluetooth cable and system board may be faulty.

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



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

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

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

Chapter 3

Diagnostic Programs

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Chapter 3

Diagnostic Programs

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3.1 Tests and Diagnostics Software Overview

This chapter explains how to use the Tests and Diagnostics Software for the Satellite L840 computer systems.

NOTES: *Before starting the Tests and Diagnostics software:*

1. *Check all cables for loose connections.*
2. *Exit any application and close Windows.*

The Diagnostics Menu consists of the following options:

- Diagnostic Test
- Running Test
- DMI Information
- Log Utilities
- System Configuration
- Option

The Diagnostic Test Menu consists of the following functional tests:

- System Test
- Memory Test
- Keyboard Test
- Display Test
- Floppy Disk Test
- Hard Disk Test
- Real Time Clock Test
- Cache Memory Test
- High Resolution Display Test
- Multimedia Test
- Memory2 Test
- FDD & HDD Error Retry Count Set

The following equipment is required to perform some of the diagnostic test programs:

- The Diagnostics Disk (all tests)
- A formatted working disk for the floppy disk drive test (all tests)
- A CD test media (Toshiba Backup CD ROM for the CD-ROM test)

The following sections detail the tests contained within the Diagnostic Test Menu. Refer to Sections 3.18, 3.19, 3.20 and, 3.21 for detailed information on the remaining functions of the Tests and Diagnostics software.

3.2 Executing the Diagnostic Test

Free-DOS is required to run the Diagnostics Program. To start the programs follow these steps:

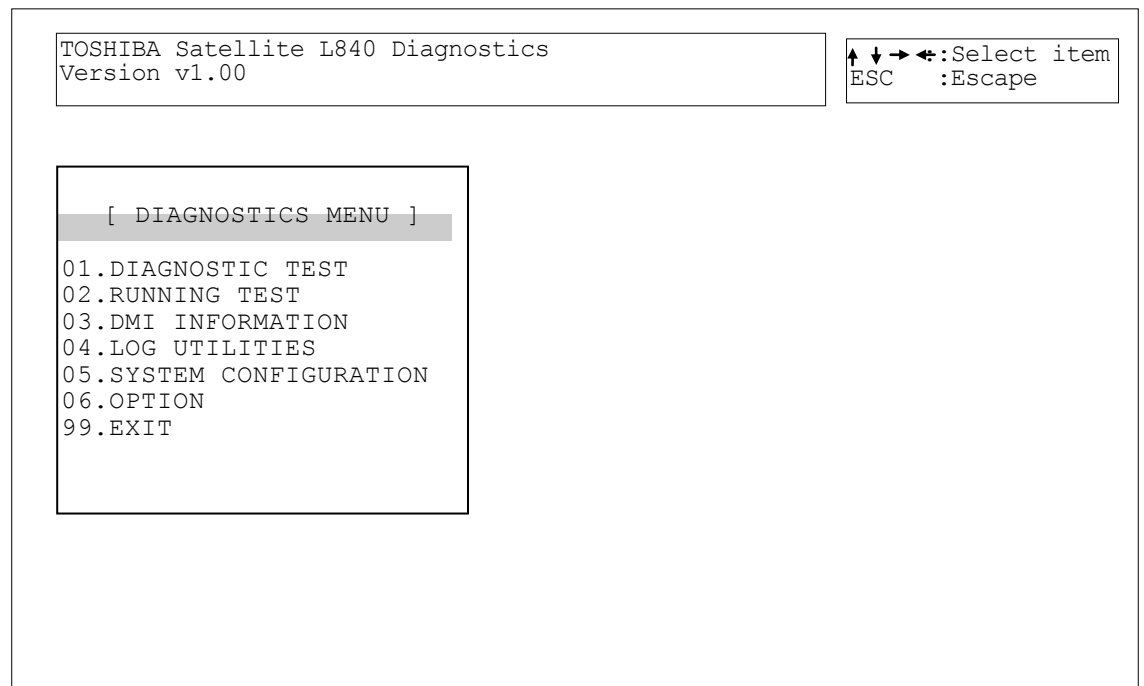
1. Create a Free-DOS bootable disk and copy all the files from the Tests and Diagnostics software to the disk.
2. Insert the boot USB memory into the computer's USB port and turn on the computer.

NOTES: *If error message display "Sorry. This Model Type Not Match This Machine":*

Please Check :

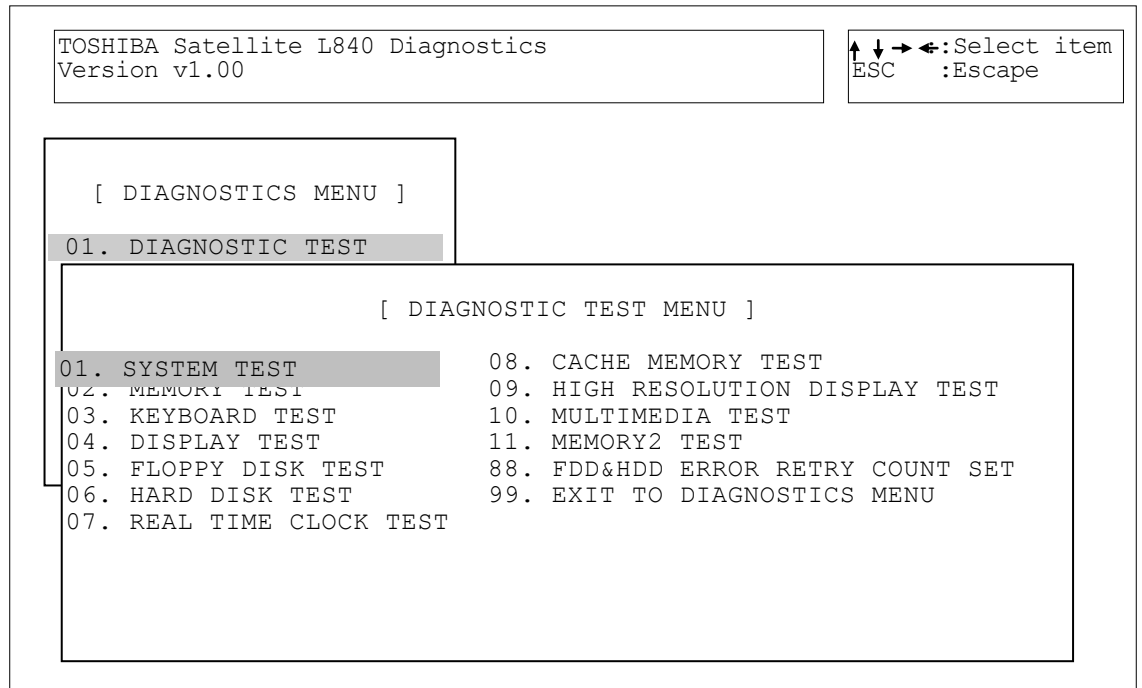
1. *You test disk is match this model , ex. disk is 14" but machine is 13" .*
2. *The M/B EEPROM project type is math your test disk , if not , please use WDMI3.EXE to modify with right LCD size .*

The following screen displays:



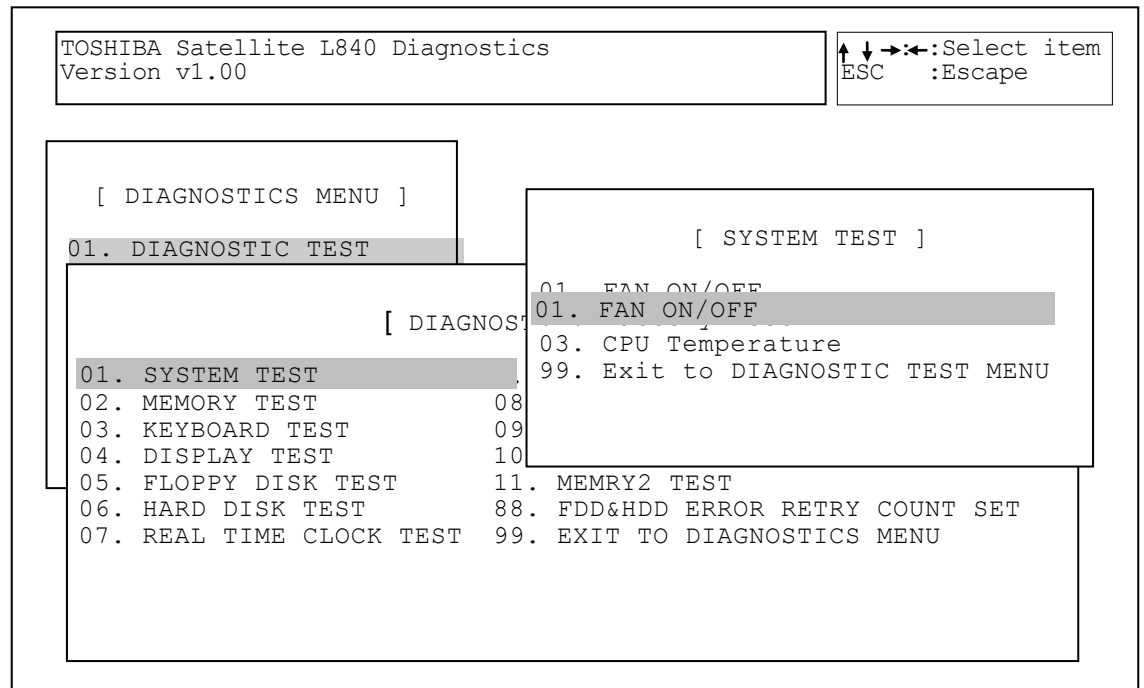
3. To select the Diagnostic Test from the Diagnostics Menu use the arrow keys to set the highlight bar to **01** and press **Enter**.

The following menu displays:

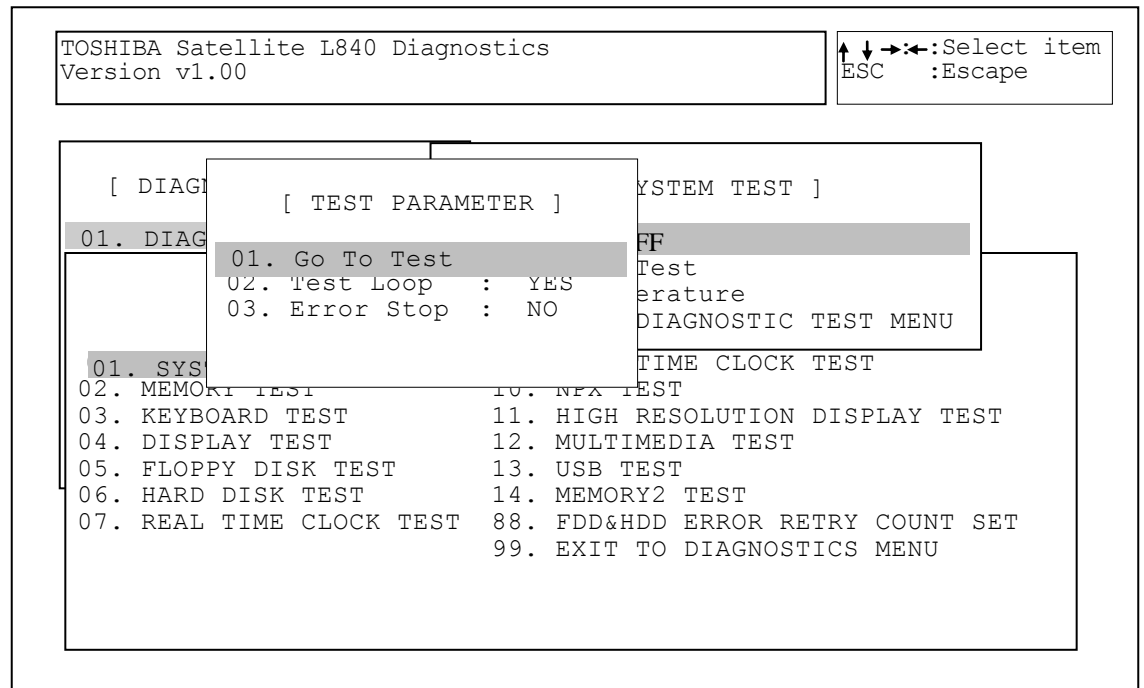


Refer to Sections 3.4 through 3.14 for detailed descriptions of Diagnostics Tests 1 through 11. Item 88 sets the floppy disk drive and hard disk drive error retry count. Item 99 exits the submenu of the Diagnostic Test and returns to the Diagnostics Menu.

4. Select the subtest you want to execute and press **Enter**. The following menu displays:



5. Select the desired test from the subtest menu and press **Enter**. The following Test Parameter menu displays:



Use the arrow keys to highlight the desired option and press **Enter**.

NOTES: The Item2 and 3 of Test Parameter are not used by some tests.

Go To Test

Move the highlight bar to *Go To Test* and press **Enter** to start executing the test.

Test Loop

Select **NO** to return the screen to the subtest menu after the test is complete.

Select **YES** to set the test to run continuously until it is halted by the user.

Error Stop

Select **NO** to keep the test running even if an error is found.

Select **YES** to stop the test program when an error is found and display the HALT OPERATION screen as shown below:

```
[ [ HALT OPERATION ] ]
  1: Test end
  2: Continue
  3: Retry
```

These three selections have the following functions:

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

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

Table 3-1 in Section 3.3 lists the function of each test on the subtest menu. Table 3-2 in Section 3.15 lists the error codes and error status for each error.

3.3 Subtest names

Table 3-1 lists the subtest names for each test program in the Diagnostic Test menu.

Table 3-1 Subtest Names(1/3)

| No. | Test Name | No. | Subtest Name |
|-----|---------------|-----|-------------------------------|
| 01 | SYSTEM TEST | 01 | FAN ON/OFF check |
| | | 02 | Battery TEST |
| | | 03 | CPU Temperature |
| 02 | MEMORY TEST | 01 | Conventional Memory |
| | | 02 | Protected Mode |
| | | 03 | Protected Mode (32MB-MAX) |
| | | 04 | RAM Refresh |
| | | 05 | Stress Test |
| 03 | KEYBOARD TEST | 01 | Pressed Key Display [JP KBD] |
| | | 02 | Pressed Key Display [UK KBD] |
| | | 03 | Pressed Key Display [US KBD] |
| | | 04 | PS/2 Mouse (Pointing 2Button) |
| 04 | DISPLAY TEST | 01 | Character Attributes |
| | | 02 | Character Set |
| | | 03 | 80* 25 Character Display |
| | | 04 | 320* 200 Graphics Display |
| | | 05 | 640* 200 Graphics Display |
| | | 06 | 640* 480 Graphics Display |
| | | 07 | Display Page |
| | | 08 | "H" Pattern Display |
| | | 09 | Video DAC Register W/R/C |
| | | 10 | Color Graphics Display |
| | | 11 | Color Attributes Display |
| | | 12 | Color Tiling |

Table 3-1 Subtest Names(2/3)

| No. | Test Name | No. | Subtest Name |
|------------|------------------------------|------------|---------------------------|
| 05 | FLOPPY DISK TEST | 01 | Sequential Read |
| | | 02 | Sequential W/R/C |
| | | 03 | Random Address/Data |
| | | 04 | Write Specified Address |
| | | 05 | Read Specified Address |
| 06 | HARD DISK TEST | 01 | Sequential Read |
| | | 02 | Address Uniqueness |
| | | 03 | Random Address Data |
| | | 04 | Cross Talk and Peek Shift |
| | | 05 | Write Specified Address |
| | | 06 | Read Specified Address |
| | | 07 | Sequential Write |
| | | 08 | W-R-C Specified Address |
| 07 | REAL TIME CLOCK TEST | 01 | Real Time Test |
| | | 02 | Backup Memory Test |
| | | 03 | Real Time Carry Test |
| 08 | CACHE MEMORY TEST | 01 | Constant Data Test |
| | | 02 | Address Pattern Test |
| | | 03 | Increment/Decrement Test |
| | | 04 | Bit Shift Pattern Test |
| | | 05 | *Write Disturb Test |
| | | 06 | Checker Board Test |
| | | 07 | Marching Test |
| | | 08 | Working Data Test |
| 09 | HIGH RESOLUTION DISPLAY TEST | 01 | VRAM W/R/C Test |
| | | 02 | 640* 480 Mode Display |
| | | 03 | 800* 600 Mode Display |
| | | 04 | 1024* 768 Mode Display |
| | | 05 | "H" Pattern Display |
| | | 06 | Focus Test ("E" Pattern) |

Table 3-1 Subtest Names(3/3)

| No. | Test Name | No. | Subtest Name |
|------------|------------------|------------|---------------------------------------|
| 10 | MULTIMEDIA TEST | 01 | Sequential Read Test |
| | | 02 | Random Read Test |
| | | 03 | Read Specified Address Test |
| | | 04 | 1 point W/R/C Test |
| 11 | MEMORY2 | 01 | All one/zero Test |
| | | 02 | Walking 1/Walking 0 Test(Left) |
| | | 03 | Walking 1/Walking 0 Test(Right) |
| | | 04 | Walking 1/Walking 0 Test(Left /Right) |

**This test cannot support.*

3.4 System Test

To execute the System Test select **01** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The System Test contains three subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 FAN ON/OFF Checking

Select 1,2,3 to control FAN on/off , 1=Fan on , 2=Fan off , 3=Exit .

[BOIFAN.EXE] Program Version : 1.0

1: Fan On 2: Fan Off 3: Exit

Fan1 Status On Fan1RPM : 5000 or Fan1 Status OFF Fan1RPM : 0

Subtest 02 Battery Test

This will display battery information for check , press [ESC] to exit .

| | | | |
|---|----------------------|--------------------------|----------------|
| [BOIPCU.EXE] Program Version : 1.1 03-20-2010 | | | |
| voltage | : 12891 mV | Remaining capacity alarm | : 600 mAh |
| temperature | : 24.5 °C | Remaining time alarm | : 10 min |
| current | : 0 mA | Battery mode | : 0 |
| average current | : 0 mA | AtRate | : 0 mA |
| relative state of charge | : 100 % | At rate time to full | : 65535 min |
| absolute state of charge | : 95 % | At rate time to empty | : 65535 min |
| remaining capacity | : 5690 mAh | At rate O. K. | : FFFF |
| full charge capacity | : 5704 mAh | Maximun error | : 0 % |
| run time to empty | : -1 min. | Charging current | : 0 mA |
| average time to empty | : -1 min. | Charging voltage | : 0 mA |
| average time to full | : -1 min. | Manufacturer name | : SANYO |
| cycle count | : 0 times | Device name | : NS2P3SZMC6WR |
| design capacity | : 6000 mAh | Device chemistry | : LION |
| design voltage | : 11100 mV | Manufacturer data | : 0 |
| specification information | : 2.1 | Manufacture date | : 10/18/2011 |
| serial no. | : 2229 | | |
| STATUS | : INIT DISK FULL_CHG | | |

Press [ESC] KEY to exit

Subtest 03 CPU Temperature

This will display CPU Temperature for check , press [ESC] to exit .

[CPU_TEMP.EXE] Program Version : 1.3 03-09-2009

CPU Temperature : XX

GPU Temperature : XX

NOTES: *If no external Graphics , GPU not report temperature . when read data is 255 mean no external Graphics .*

3.5 Memory Test

To execute the Memory Test select **02** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Memory Test contains five subtests that test the computer's memory. Move the highlight bar to the subtest you want to execute and press **Enter**.

***NOTE:** If **NO** is selected for Test Loop on the Test Parameter menu, the Test Status screen displays while the test is executing. When the test is complete the Memory Test menu displays.*

*If **YES** is selected for Test Loop on the Test Parameter menu, the Test Status screen displays while the test is executing. Press **Ctrl + break** to return to the Memory Test menu.*

Subtest 01 Conventional Memory

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

If a compare error occurs, the write data, read data, and test address display on the screen. Addresses are displayed in 4KB increments during the test.

Test Process:

1. Byte Enable Test
One bit write/ 8 bit read" is executed and the new data is compared with the original data.
Test data = CCAA5533H, 80000000H
2. Byte Enable Test
"One bit write/16 bit read" is executed and the new data is compared with the original data.
Test data = CCAA5533H, 80000000H
3. Data bus test
"One bit write/16 bit read" is executed and the new data is compared with the original data.
Test data = 1H, 2H, 4H, 8H, 10H, through 80000000H.
4. Fixed data test
"16 bit write/ 16 bit read" is executed and the new data is compared to the original data.
Test data = FFFFFFFFH, 00000000H, 80018001H

5. Address pattern test
“16 bit write and 16 bit read” of address pattern data is executed and the new data is compared with the original data.
Test data = 0000H, 0004H, 0008H, 000CH,...8000H, 8004H, through FFECH

Subtest 02 Protected Mode

This subtest first writes data patterns and address data from 1 to 32 MB, then reads the new data and compares the result with the original data patterns. Addresses are displayed in 64KB increments during the test.

Test Process:

1. Byte Enable Test
“One bit write/ 8 bit read” is executed and the new data is compared with the original data.
Test data = CCAA5533H, 80000000H
2. Byte Enable Test
“One bit write/16 bit read” is executed and the new data is compared with the original data.
Test data = CCAA5533H, 80000000H
3. Data bus test
“One bit write/16 bit read” is executed and the new data is compared with the original data.
Test data = 1H, 2H, 4H, 8H, 10H, through 80000000H.
4. Fixed data test
“16 bit write/ 16 bit read” is executed and the new data is compared to the original data.
Test data = FFFFFFFFH, 00000000H, 80018001H
5. Address pattern test
“16 bit write and 16 bit read” of address pattern data is executed and the new data is compared with the original data.
Test data = 0000H, 0004H, 0008H, 000CH,...8000H, 8004H, through FFECH

Subtest 03 Protected Mode [32MB - MAX]

This subtest first writes data patterns and address data from 32MB to the maximum installed memory, reads the new data, and then compares the result

with the original data patterns. Addresses are displayed in 64KB increments during the test.

Test Process:

1. Byte Enable Test
“One bit write/ 8 bit read” is executed and the new data is compared with the original data.
Test data = CCAA5533H, 80000000H
2. Byte Enable Test
“One bit write/16 bit read” is executed and the new data is compared with the original data.
Test data = CCAA5533H, 80000000H
3. Data bus test
“One bit write/16 bit read” is executed and the new data is compared with the original data.
Test data = 1H, 2H, 4H, 8H, 10H, through 80000000H.
4. Fixed data test
“16 bit write/ 16 bit read” is executed and the new data is compared to the original data.
Test data = FFFFFFFFH, 00000000H, 80018001H
5. Address pattern test
“16 bit write and 16 bit read” of address pattern data is executed and the new data is compared with the original data.
Test data = 0000H, 0004H, 0008H, 000CH,...8000H, 8004H, through FFECH

Subtest 04 RAM Refresh

This subtest writes a data pattern (CCAA5533H) in 4KB from 0 to the maximum installed memory, then waits for a memory refresh cycle (16 ms or more), reads the new data, and compares the result with the original data pattern.

Test Process:

1. Checks the memory size to determine the maximum size of installed memory.
2. Tests memory addresses 0 to the maximum installed.
3. Writes, reads, and compares test data after a memory refresh cycle (16ms or more).

NOTE: *There may be a short delay between write and read operations, depending on the memory size.*

Subtest 05 Stress Test

This subtest writes the following 16KB data patterns to the Write/Read Buffer in conventional memory.

```
data:  FFFFFFFFFFFFFFFFFF0000000000000000
       5555555555555555AAAAAAAAAAAAAAAA
       CCCCCCCCCCCCCCCC3333333333333333
       0000000000000000FFFFFFFFFFFFFFFF
       AAAAAAAAAAAAAAAAAA55555555555555
       3333333333333333CCCCCCCCCCCCCCCC
       FFFFFFFFFFFFFFFFFF0000000000000000
       0000000000000000FFFFFFFFFFFFFFFF
       5555555555555555AAAAAAAAAAAAAAAA
       AAAAAAAAAAAAAAAAAA55555555555555
       CCCCCCCCCCCCCCCC3333333333333333
       3333333333333333CCCCCCCCCCCCCCCC
```

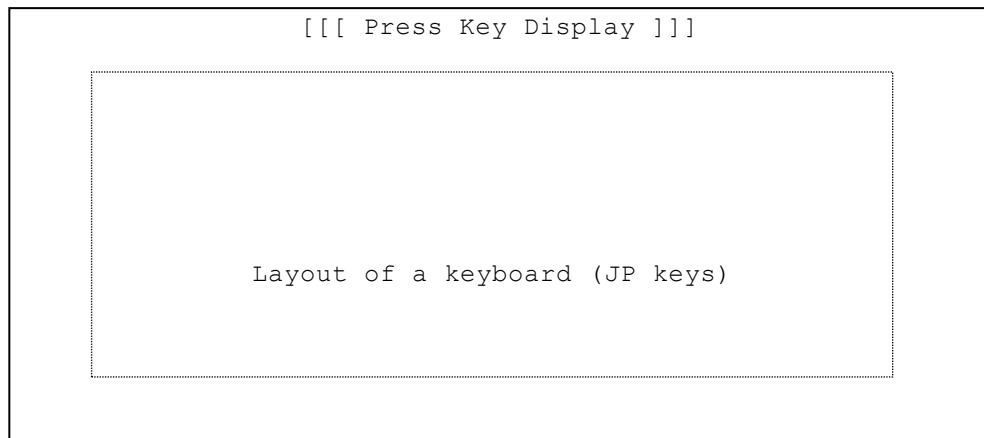
3.6 Keyboard Test

To execute the Keyboard Test select **03** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Keyboard Test contains four subtests that test the computer's keyboard and mouse actions. Move the highlight bar to the subtest you want to execute and press **Enter**.

***NOTE:** The Test Loop and Error Stop parameters are not enabled for the Keyboard test. When test Fn key need press "Fn + Space", "Space" is the same "Space" key .*

Subtest 01 Pressed Key Display [JP Keyboard] for Japan Keyboard

When you execute this subtest, the keyboard layout is drawn on the display. When any key is pressed, the corresponding key on the screen changes from light to dark. Holding a key down enables the auto-repeat function which causes the key's display character to blink .



Subtest 02 Pressed Key Display [UK Keyboard] for UK Keyboard

This subtest is used for the UK keyboard and functions the same as Subtest 1.

Subtest 03 Pressed Key Display [US Keyboard] for US Keyboard

This subtest is used for the US keyboard and functions the same as Subtest 1.

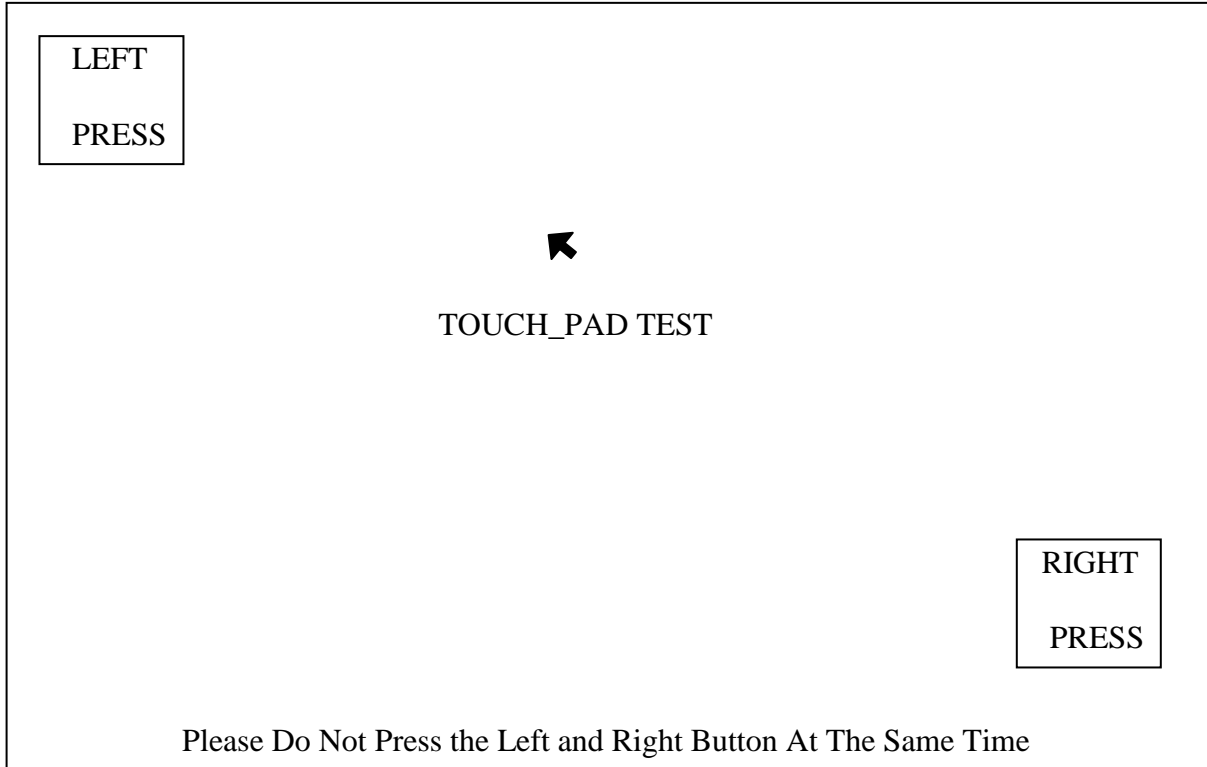
Subtest 04 PS/2 Mouse (Pointing)

This subtest checks the function of mouse as shown below.

- A) Pointing device (mouse)
- B) Mouse buttons

Please move cursor to upper left and press left button , screen will display <PRESS> in left rectangle , move cursor to lower right and press right button , screen will display <PRESS> in right rectangle , the program exit .

If left and right button short , screen will display <Left and Right Button maybe short > , the program exit .



3.7 Display Test

To execute the Display Test select **04** from the Diagnostic Test Menu, press **Enter** and follow the directions displayed on the screen. The Display Test contains twelve subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Character Attributes

This subtest displays character attributes and color attributes. The character attributes are: normal, intensified, reverse, and blinking. The color attributes are: blue, red, magenta, cyan, yellow, and white. These seven colors each display a background color, foreground color and high resolution color. The screen below displays when this subtest is executed.

```

CHARACTER ATTRIBUTES

NEXT LINE SHOWS NORMAL DISPLAY
NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN

NEXT LINE SHOWS INTENSIFIED DISPLAY
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII

NEXT LINE SHOWS REVERSE DISPLAY
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR

NEXT RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
  
```

| | | | |
|--|--|--|---------|
| | | | BLUE |
| | | | RED |
| | | | MAGENTA |
| | | | GREEN |
| | | | CYAN |
| | | | YELLOW |
| | | | WHITE |

Press [Enter] KEY

To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 02 Character Set

This subtest displays the character codes 00H - FFH, using Mode 01H (40*25). The screen below displays when this subtest is executed.

CHARACTER SET IN 40*25

```
  @ [ ] ♥ ♦ ♣ ♠ • ◻ ◼ ◽ ◾ ◿ ♂ ♀ ♫ ♬ ♭ ♯ ▶ ◀ ↕ !! ¶ § ■ ↕ ↑ ↓ → ← ⇐ ⇓ ⬅ ▶ ▴ ▾ ! " # $ % & '
( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z [ \ ] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w
x y z { | } ~ Δ Ç ü é â ä å ç è ë ì í î ï Ë Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Ù Û Ü Ö Ù Ç È ¥ Pt f
á î ó ú ñ Ñ ã ä å ç ê ë è ì í î ï Ë Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Ù Û Ü Ö Ù Ç È ¥ Pt f
  ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ; « » ¶ · ¸ ¹ º » ¼ ½ ¾ ;
  ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ;
  ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ;
```

Press [Enter] Key

To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 03 80 * 25 Character Display

This subtest uses 80*25 video resolution to display character codes 20H - 7EH using Mode 03H (80*25). The data displayed is shifted 1 byte to the left for each line as shown below.

```
80*25 CHARACTER DISPLAY
0123456789012345678901234567890123456789012345678901234567890123456789
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnop
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnop
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnopq
r
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
t
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
v
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
v
```

Shifted to the left one letter by one letter.

```
23456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
3456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
```

Press [Enter] KEY

To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 04 320 * 200 Character Display

This subtest uses 320*200 video resolution to display green, red and yellow followed by cyan, magenta, and white. The screen below shows the displays when this subtest is executed.

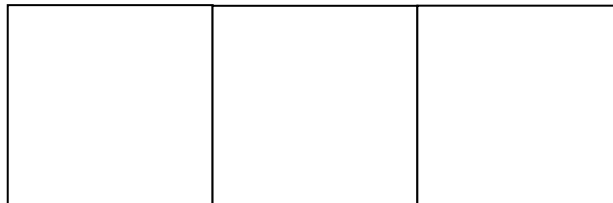
320 * 200 GRAPHICS DISPLAY

COLOR SET 0 : [4]

GREEN
CYAN

RED
MAGENTA

YELLOW
WHITE



Press **ENTER** to display the following sixteen colors: black, blue, green, cyan, red, magenta, brown, white, dark gray, light blue, light green, light cyan, light red, light magenta, yellow, and intensified white.

Test Program for Field.

320*200 GRAPHICS DISPLAY : [D]

| | | | | |
|---------------|----------------------|----------------------|---|---------|
| BLACK | <input type="text"/> | <input type="text"/> | D | GRAY |
| BLUE | <input type="text"/> | <input type="text"/> | L | BLUE |
| GREEN | <input type="text"/> | <input type="text"/> | L | GREEN |
| CYAN | <input type="text"/> | <input type="text"/> | L | CYAN |
| RED | <input type="text"/> | <input type="text"/> | L | RED |
| MAGENTA | <input type="text"/> | <input type="text"/> | L | MAGENTA |
| BROWN | <input type="text"/> | <input type="text"/> | | YELLOW |
| WHITE | <input type="text"/> | <input type="text"/> | I | WHITE |
| Press [Enter] | <input type="text"/> | <input type="text"/> | | |

Press **ENTER** to display 64 gradations of red, green, blue and white on the screen

320*200 GRAPHICS DISPLAY : [13]

64 gradations of red are displayed.

64 gradations of green are displayed.

64 gradations of blue are displayed.

64 gradations of white are displayed.

Press [Enter] KEY

To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 05 640 * 200 Character Display

This subtest uses 640*200 video resolution to display three windows, each window drives a different set of dots: even dots, odd dots and all dots. The screen below displays when this subtest is executed.

640 * 200 GRAPHICS DISPLAY : [6]

| EVEN DOTS DRIVEN | ODD DOTS DRIVEN | ALL DOTS DRIVEN |
|---------------------|--------------------|--------------------|
| | | |

Press **ENTER** to display the following 16 colors: black, blue, green, cyan, red, magenta, brown, white, dark gray, light blue, light green, light cyan, light red, light magenta, yellow, and intensified white.

640*200 GRAPHICS DISPLAY : [E]

| | | | |
|---------|--|--|-------------------|
| BLACK | | | DARK GRAY |
| BLUE | | | LIGHT BLUE |
| GREEN | | | LIGHT GREEN |
| CYAN | | | LIGHT CYAN |
| RED | | | LIGHT RED |
| MAGENTA | | | LIGHT MAGENTA |
| BROWN | | | YELLOW |
| WHITE | | | INTENSIFIED WHITE |

Press [Enter] KEY

To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
 Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Test Program for Field.

Subtest 06 640 * 480 Character Display

This subtest uses 640*350 video resolution to display 16 colors: black, blue, green, cyan, red, magenta, brown, white, dark gray, light blue, light green, light cyan, light red, light magenta, yellow, and intensified white. The screen below displays when this subtest is executed.

640*350 GRAPHICS DISPLAY : [10]

| | | | |
|---------------|----------------------|----------------------|-------------------|
| BLACK | <input type="text"/> | <input type="text"/> | DARK GRAY |
| BLUE | <input type="text"/> | <input type="text"/> | LIGHT BLUE |
| GREEN | <input type="text"/> | <input type="text"/> | LIGHT GREEN |
| CYAN | <input type="text"/> | <input type="text"/> | LIGHT CYAN |
| RED | <input type="text"/> | <input type="text"/> | LIGHT RED |
| MAGENTA | <input type="text"/> | <input type="text"/> | LIGHT MAGENTA |
| BROWN | <input type="text"/> | <input type="text"/> | YELLOW |
| WHITE | <input type="text"/> | <input type="text"/> | INTENSIFIED WHITE |
| Press [Enter] | <input type="text"/> | <input type="text"/> | |

Press **ENTER** to display the following 16 colors: black, blue, green, cyan, red, magenta, brown, white, dark gray, light blue, light green, light cyan, light red, light magenta, yellow, and intensified white using 640*480 video resolution.

640*480 GRAPHICS DISPLAY : [12]

| | | | |
|---------|----------------------|----------------------|-------------------|
| BLACK | <input type="text"/> | <input type="text"/> | DARK GRAY |
| BLUE | <input type="text"/> | <input type="text"/> | LIGHT BLUE |
| GREEN | <input type="text"/> | <input type="text"/> | LIGHT GREEN |
| CYAN | <input type="text"/> | <input type="text"/> | LIGHT CYAN |
| RED | <input type="text"/> | <input type="text"/> | LIGHT RED |
| MAGENTA | <input type="text"/> | <input type="text"/> | LIGHT MAGENTA |
| BROWN | <input type="text"/> | <input type="text"/> | YELLOW |
| WHITE | <input type="text"/> | <input type="text"/> | INTENSIFIED WHITE |
| | <input type="text"/> | <input type="text"/> | |

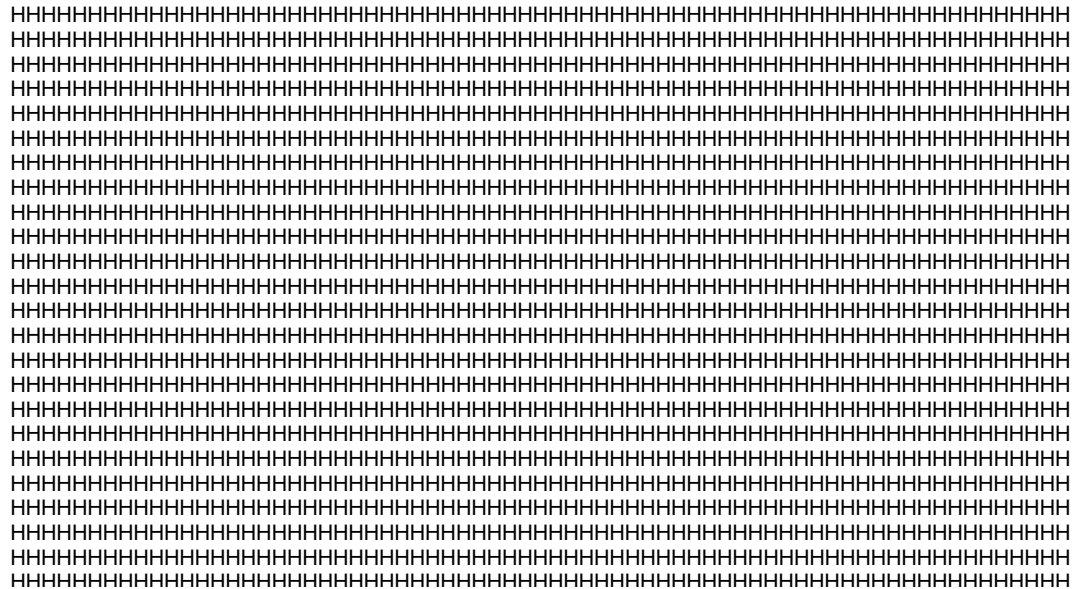
Press [Enter] KEY

To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 08 "H" Pattern Display

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



To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 9 Video DAC Register W/R/C

This subtest writes data patterns to the Video DAC register lookup table (PEL Address register), then reads the new data, and compares the result to the original data patterns. The original content of the Video DAC register is saved in RAM and restored after the test is completed.

The test data patterns are 00H,15H, 2AH and 3FH.

***NOTE:** If NO is selected for Test Loop on the Test Parameter menu, "Screen will remain blank" displays on the screen while the test is executing. When the test is complete the Display Test menu displays.
If YES is selected for Test Loop on the Test Parameter menu, "The Screen will remain blank" displays on the screen and then the screen flickers due to the fast screen refresh while the test is executing. Press **Ctrl + break** to return to the Display Test menu.*

Subtest 10 Color Graphics Display

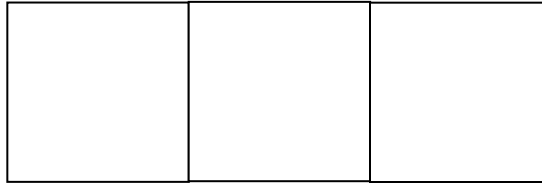
This subtest displays three colors, cyan, white and yellow on the screen as shown below.

640 * 480 GRAPHICS DISPLAY

CYAN

WHITE

YELLOW



To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 11 Color Attributes Display

This subtest displays 16 colors: black, blue, green, cyan, red, magenta, brown, white, dark gray, light blue, light green, light cyan, light red, light magenta, yellow, and intensified white. The screen below displays when this subtest is executed.

640*480 COLOR ATTRIBUTE DISPLAY

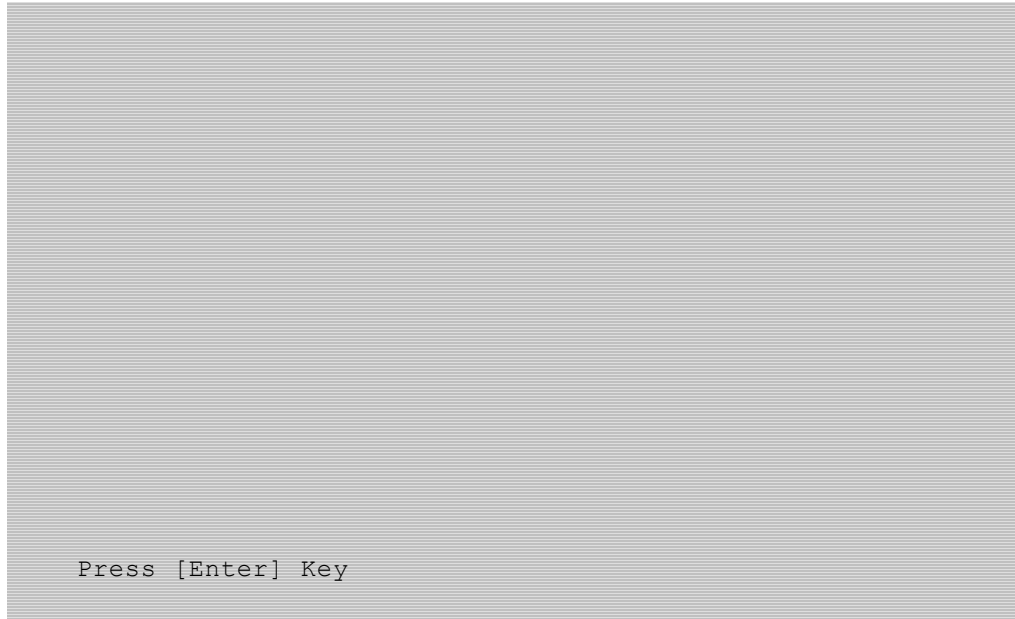
| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Press [Enter] Key

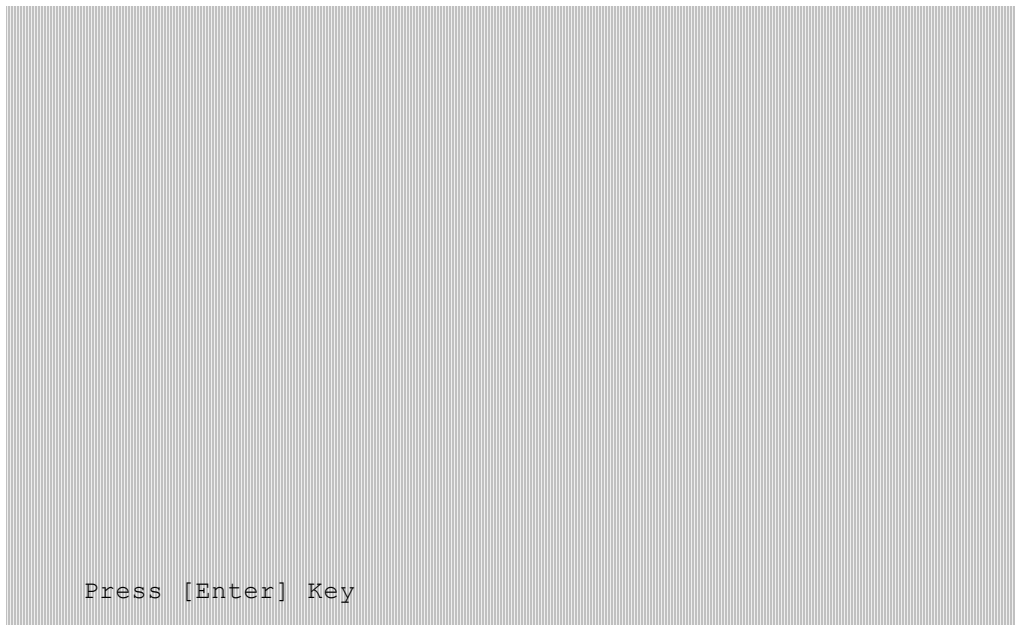
Pressing **Enter** executes VRAM mapping test which indicates vertical lines

Press **Enter** to execute the VRAM mapping test which displays a horizontal line at one dot intervals using Mode 12.

NOTE: *The following screen does not display correctly. It will be amended in the next version.*



Press **Enter** to execute the VRAM mapping test which displays a vertical line at four dot intervals using Mode 12.



Press **Enter** to display VRAM mapping test using the all dots Mode.



To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 12 Color Tiling

This subtest displays black, gray, white, and 3 gradations of red, green, and blue as shown in the following display.

| | | | |
|-------|------------------|--------------------|-------------------|
| Black | Red | Green | Blue |
| Gray | Red Gradation | Green Gradation | Blue Gradation |
| White | Red Gradation | Green Gradation | Blue Gradation |

To exit this subtest and return to the Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

3.8 Floppy Disk Test

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

To execute the Floppy Disk Test select **05** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Floppy Disk Test contains five subtests that test the FDD. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Sequential Read

This subtest sequentially reads all the tracks (Tracks 0 to 79) on the floppy disk.

Subtest 02 Sequential W/R/C

This subtest continuously writes the data pattern B5ADADh to all the specified tracks selected in Subtest 01. The data pattern is then read and compared to the original data.

Subtest 03 Random Address/Data

This subtest writes random data to random addresses on all tracks defined in Subtest 01. The data is then read and compared to the original data.

Subtest 04 Write Specified Address

NOTE: The first two digits of the ADDRESS indicate which track is being tested, the next two digits indicates the head, and the last two digits indicate the sector.

This subtest allows you to verify the errors from Subtest 02. It writes specified data to a specified track and head. Use the Log Utilities (see Section 3.21) to specify the track number and head number where the error(s) occurred during Subtest 02. The following message displays on the screen to enter the test data, track number, and head number.

```
TEST DATA ??  
TRACK NO (00~79) ??  
HEAD NO (0~1) ?
```

Subtest 05 Read Specified Address

This subtest reads data from a specified track and head.

The following message displays on the screen to enter the test track number and head number.

```
TRACK NO (00~79) ??  
HEAD NO (0~1) ?
```

3.9 Hard Disk Test

To execute the Hard Disk Test select **06** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Hard Disk Test contains eight subtests that test the functions of the hard disk drive. Move the highlight bar to the subtest you want to execute and press **Enter**.

NOTES:** The contents of the hard disk will be erased when subtest 02, 03, 04, 05, 07 or 08 is executed. Before running the test, transfer the contents of the hard disk to other disk. A password is necessary to execute the Hard Disk Test. The password is: **hard disk

Subtest 01 Sequential Read

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

Subtest 02 Address Uniqueness (This subtest need very long time)

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

- Forward sequential
- Reverse sequential
- Random

Subtest 03 Random Address Data

This subtest writes random data to 1000 different random addresses on the HDD. This data is then read and compared to the original data.

Subtest 04 Cross Talk and Peak Shift

This subtest writes eight of the most likely to fail data patterns (shown below) to a cylinder on the HDD, then reads the data while moving from cylinder to cylinder.

Data Pattern

B5ADADH
4A5252H
EB6DB6H
149249H
63B63BH
9C49C4H
2DB6DBH
D24924H

Subtest 05 Write Specified Address

***NOTE:** This subtest is designed to run with the Test Loop set to **NO**. This subtest is a debug tool and the operator should enter the Test Parameters each time.*

This subtest allows you to verify the errors from Subtest 01. It writes specified data to a specified LBA. Use the Log Utilities (see Section 3.18) to specify the LBA number where the error(s) occurred during Subtest 01. The following message displays on the screen to enter the test data, and Sector count.

```
TEST DATA      ??  
SECTOR COUNT (01~39) ??  
START ADDRESS (00000000~MAX Address) ?
```

Subtest 06 Read Specified Address

***NOTE:** This subtest is designed to run with the Test Loop set to **NO**. This subtest is a debug tool and the operator should enter the Test Parameters each time.*

This subtest allows you to verify the errors from Subtest 01. It reads specified data (Subtest 06) from a specified LBA. Use the Log Utilities (see Section 3.18) to specify the LBA number where the error(s) occurred during Subtest 01. The following message displays on the screen to enter the test sector count.

```
SECTOR COUNT (01~39) ??  
START ADDRESS (00000000~MAX Address) ?
```


Subtest 07 Sequential Write

This subtest writes specified data to all cylinders on the HDD. The following message displays on the screen to enter the test data.

TEST DATA ???? (=37b3H)

Subtest 08 W-R-C Specified Address

This subtest writes specified data to a specified sector count, then reads and compares the result. The following message displays on the screen to enter the test data, sector count.

TEST DATA ???? (=37b3H)
SECTOR COUNT (01~39) ??
START ADDRESS (00000000~Max Address) ?

3.10 Real Time Clock Test

To execute the Real Time Clock Test select **07** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Real Time Clock Test contains three subtests that test the computer's real time functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Real Time

This subtest allows you to change the date and time. To execute the Real Time Subtest, follow these steps:

1. Select Subtest **01** and the following displays:

```
[ REAL TIME TEST ]  
  
Current date : mm-dd-yyyy  
Current time : hh:mm:ss  
  
Enter new date : mm-dd-yyyy  
Enter new time : hh:mm:ss  
  
Press [Enter] key to exit test
```

2. If the current date is not correct, enter the correct date at the "Enter new date" prompt and press **Enter**. The following prompt displays:

```
Enter new time :
```

3. If the current time is not correct, enter the correct time using a 24-hour format and press **Enter**.

NOTE: If **NO** is selected for Test Loop on the Test Parameter menu, the Real Time Clock Test menu displays.

If **YES** is selected for Test Loop on the Test Parameter menu, the screen above displays and the test is executed again. Press **Ctrl + break** to return to the Real Time Clock Test menu.

Subtest 02 Backup Memory

This subtest writes 50 bytes of test data (FFH, AAH, 55H, and 00H) to the CMOS 14th address, then reads the new data and compares it to the original data.

Subtest 03 Real Time Carry

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

This subtest checks the clock's carry function.

```
                [ REAL TIME CARRY TEST ]  
  
Current date : 12-31-1999  
  
Current time : 23:59:55  
  
Press [Enter] key to exit test
```

The following is the display after the date carry function is executed.

```
                [ REAL TIME CARRY TEST ]  
  
Current date : 01-01-2000  
  
Current time : 00:00:01  
  
Press [Enter] key to exit test
```

To exit this subtest and return to the Real Time Clock menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

3.11 Cache Memory Test

To execute the Cache Memory Test select **08** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Cache Memory Test contains eight subtests that test the computer's cache memory. Move the highlight bar to the subtest you want to execute and press **Enter**.

***NOTE:** If **NO** is selected for Test Loop on the Test Parameter menu, the screen will remain blank while the subtest is executing. When the test is complete the Cache Memory Test menu displays.*

*If **YES** is selected for Test Loop on the Test Parameter menu, the Test Status screen displays while the subtest is executing. Press **Ctrl + break** to return to the Cache Memory Test menu.*

Subtest 01 Constant Data Test

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes constant data (FFFFH, AAAAH, 5555H, 0101H, 0000H), reads the new data and compares the result with the original data pattern. The original cache memory content is then restored to the cache memory.

Subtest 02 Address Pattern Test

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes address data patterns (0000H, 0001H, 0002H, through 3FFDH, 3FFEH, 3FFFH), reads the new data and compares the result with the original data. The original cache memory content is then restored to the cache memory.

Subtest 03 Increment/Decrement Test

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes the increment data (00H, 01H, 02H, through FDH, FEH, FFH), reads the new data and compares the result with the original data. After comparing the incremental data, decrement data (FFH, FEH, FEH, through 02H, 01H, 00H) is written and the new data is read and compared with the original data. The original cache memory content is then restored to the cache memory.

Subtest 04 Bit Shift Pattern Test

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes the bit shift data patterns (1 bit shifted every 4 bytes), reads the new data and compares the result with the original data. The original cache memory content is then restored to the cache memory.

Subtest 05 Write Disturb Test (We can't support this time)

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes the "write disturb data," reads the new data and compares the result with the original data. The original cache memory content is then restored to the cache memory.

Subtest 06 Checker Board Test

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes the "checker board data," (data which is inverted front/back and left/right) reads the new data and compares the result with the original data. The original cache memory content is then restored to the cache memory.

Subtest 07 Marching Test

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes the "marching data," (00H through 01H and 01H through 00H) reads the new data and compares the result with the original data. The original cache memory content is then restored to the cache memory.

Subtest 08 Working Data Test

This subtest reads the contents of cache memory and saves it into RAM. The subtest then writes the "working data," reads the new data and compares the result with the original data. The original cache memory content is then restored to the cache memory.

3.12 High Resolution Display Test

To execute the High Resolution Display Test select **09** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The High Resolution Display Test contains six subtests that test the computer's high resolution video display. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM W/R/C Test

This subtest writes address and data patterns to Video RAM, then reads the values from the Video RAM and compares them to the original test patterns. During the execution of this test 13 different color screens display: black, green, green, blue, blue, red, red, red, black, white, pink, cyan, and black.

Test Process:

1. Sets the video display to 1024*768 mode
2. Bank change test
Writes 1 byte data in order 0, 1, through Fh, and compares the result, at every bank, to the original data patterns.
3. Bit shift data test
Writes 01h data into addresses A000:0000h through A000:FFFFh for each bank, reads the new data and, then compares the results with the original data. Data is then shifted 1 bit to the left, and all bits (01h, 02h, 04h, 08h, through 80h) are tested again.
4. Fixed data test
Writes test data (in order FFh, AAh, 55h, 00h) into addresses A000:0000h through A000:FFFFh for each bank by, reads the new data and, then compares the results with the original data. Data is then shifted 1 bit to the left, and all bits are tested again

NOTE: *If **NO** is selected for Test Loop on the Test Parameter menu, the screen displays the colors listed above and then the High Resolution Display Test menu displays.*

*If **YES** is selected for Test Loop on the Test Parameter menu, the screen displays the colors listed above. Press **Ctrl + break** to return to the High Resolution Display Test menu.*

Subtest 02 640*480 Mode Display

This subtest uses 640*480 video resolution to display a high resolution white frame, 256 letter types (8*16 pixels) and 64 gradations of white, red, green, and blue as shown below.

[640*480 256]

Press [Enter] key

| | |
|-------|--|
| | 0---+---1---+---2---+---3---+---4---+---5---+---6--- |
| WHITE | 64 gradations |
| RED | 64 gradations |
| GREEN | 64 gradations |
| BLUE | 64 gradations |

To exit this subtest and return to the High Resolution Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
 Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Test Program for Field.

Subtest 03 800 * 600 Mode Display

This subtest uses 800*600 video resolution to display a high resolution white frame, 256 letter types (8*16 pixels) and 256 gradations of white, red, green, and blue as shown below.

[800*600 256]

Press [Enter] key

256 letter types indication

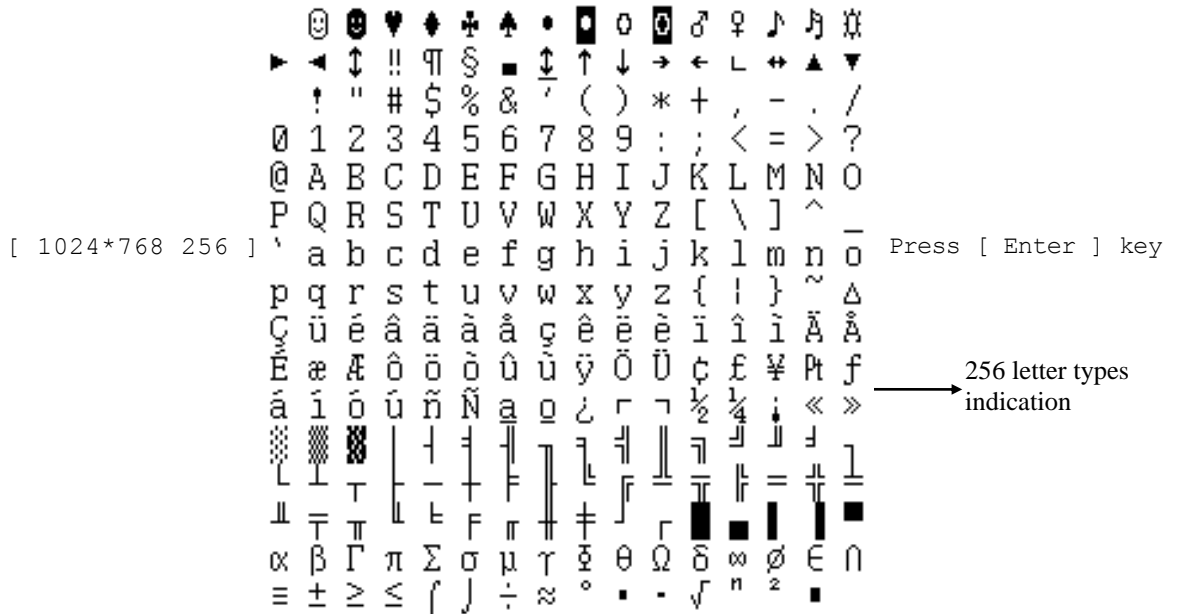
| | |
|-------|--|
| | 0---+---1---+---2---+---3---+---4---+---5---+---6--- |
| WHITE | 64 gradations |
| RED | 64 gradations |
| GREEN | 64 gradations |
| BLUE | 64 gradations |

To exit this subtest and return to the High Resolution Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
 Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu

Subtest 04 1024* 768 Mode Display

This subtest uses 1024*768 video resolution to display a high resolution white frame, 256 letter types (8*16 pixels) and 64 gradations of white, red, green, and blue as shown below.



| | |
|-------|---------------|
| WHITE | 64 gradations |
| RED | 64 gradations |
| GREEN | 64 gradations |
| BLUE | 64 gradations |

To exit this subtest and return to the High Resolution Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
 Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

Subtest 06 Focus Test ("E" Pattern)

This subtest sets the 1024*768 Mode and displays "E" patterns (18*18 dot fonts), at 56 letters *42 lines surrounded by a high resolution white frame.



To exit this subtest and return to the High Resolution Display Test menu:

Press **Enter** if **NO** was selected for *Test Loop* on the Test Parameter Menu.
Press **Ctrl + break** if **YES** was selected for *Test Loop* on the Test Parameter Menu.

3.13 Multimedia Test

To execute the Multimedia Test select **10** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Multimedia Test contains four subtests that test the computer's multimedia functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

***NOTE:** Use the Toshiba Backup CD-ROM for Subtests 01, 02, and 03.
Because CDRom driver issue , the Multimedia function can't test , this is limitation .*

Subtest 01 Sequential Read Test

This subtest sequentially reads one block unit (2K bytes) of all logical addresses from the test CD.

***NOTE:** If **NO** is selected for Test Loop on the Test Parameter Menu, the screen will remain blank while the subtest is executing. When the test is complete the Multimedia Test menu displays.
If **YES** is selected for Test Loop on the Test Parameter Menu, the Test Status screen displays while the subtest is executing. Press **Ctrl + break** to return to the Multimedia Test menu.*

Subtest 02 Random Read Test

This subtest randomly reads all addresses.

Subtest 03 Read Specified Address Test

This subtest reads data from a specified block of addresses.

The following message displays on the screen to enter the start and end block addresses:

```
START BLOCK ADDRESS ?  
END BLOCK ADDRESS  ?
```

Subtest 04 1 Point W/R/C (R/RW Media)

***NOTE:** Use CD-R or CD-RW, the CD-ROM and DVD cannot be used for this subtest, and some DVD-dual can't support this test.*

This subtest writes specified data to a specified block count, then reads and compares the result.

3.14 MEMORY2 Test

To execute the Expansion Test select **11** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The MEMORY2 Test contains four subtests that test the computer's. Move the highlight bar to the subtest you want to execute and press **Enter**.

NOTE: If NO is selected for Test Loop on the Test Parameter menu, the Test Status screen displays while the test is executing. When the test is complete the Memory Test menu displays.

*If YES is selected for Test Loop on the Test Parameter menu, the Test Status screen displays while the test is executing. Press **Ctrl + break** to return to the Memory Test menu
Memory Test2 is using burst transfer mode by cache memory .*

Subtest 01 All one/All zero test

This subtest performs pseudorandom data read/write. The data consists of “all ones”/”all zero” patterns produced by pseudorandom sequence generator. The test checks address error.

```
FFFFFFFFFFFFFFFFF0000000000000000000
00000000000000000000FFFFFFFFFFFFFFFFF
```

Subtest 02 Walking 1/Walking 0 test (Left)

This subtest uses “running one”/”running zero” patterns. This test sequence allows also to checking system bus in maximum noise conditions. The following test sequence is written.

```
7FFF7FFF7FFF7FFF8000800080008000
BFFFBFFFBFFFBFFF4000400040004000
```

After all the memory being tested is filled with the pattern, it is read in descending direction and compared with reference data. As the memory is read, the data is replaced with inverse test pattern. After all the memory is read and replaced with inverted pattern, it is read in descending direction and compare with new reference data. As the memory is read, the data is replaced with next pattern, which is like first one shifted to right.

Subtest 03 Walking 1/Walking 0 test (Right)

The test method is the same as Subtest2. However, the data to be used differs.

```
80008000800080007FFF7FFF7FFF7FFF
4000400040004000BFFFBFFFBFFFBFFF
```

Subtest 04 Walking 1/Walking 0 test (Left/ Right)

Tee test method is the same as Subtest2. However, the data to be used differs.

```
7FFF7FFF7FFF7FFF8000800080008000
BBBBBBBBBBBBBBBB4000400040004000
DDDDDDDDDDDDDDDD2000200020002000
```

```
FFFBFFFBFFFBFFFB0004000400040004
FFFDFFFDFFFDFFFD0002000200020002
FFFFFFFFFFFFFFFFE0001000100010001
80008000800080007FFF7FFF7FFF7FFF
4000400040004000BBBBBBBBBBBBBBBB
```

```
0004000400040004FFFBFFFBFFFBFFFB
0002000200020002FFFDFFFDFFFDFFFD
0001000100010001FFFFFFFFFFFFFFFFE
```

3.15 Error Codes and Error Status Names

The following table lists the error codes and error status names for the Diagnostic Tests.

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

| Device Name | Error Code | Error Status Name |
|--------------------|-------------------|----------------------------|
| (Common) | FF | Data Compare Error |
| Memory | 02 | Protected Mode Not Changed |
| | ?? | Other Error |
| FDD | 01 | Bad Command Error |
| | 02 | Address Mark Not Found |
| | 03 | Write Protected |
| | 04 | Record Not Found |
| | 06 | Media Change Line Error |
| | 08 | DMA Overrun Error |
| | 09 | DMA Boundary Error |
| | 0C | Select Media Error |
| | 10 | CRC Error |
| | 20 | FDC Error |
| | 40 | Seek Error |
| 80 | Time Out Error | |
| ?? | Other Error | |
| HDD | 01 | Bad Command Error |
| | 02 | Bad Address Mark Error |
| | 04 | Record Not Found |
| | 05 | HDC Not Reset Error |
| | 07 | Drive Not Initialized |
| | 09 | DMA Boundary Error |
| | 0A | Bad Sector |
| | 0B | Bad Track Error |
| | 10 | ECC Error |
| | 11 | ECC Recover Enabled |
| | 20 | HDC Error |
| | 40 | Seek Error |
| | 80 | Time Out Error |
| | AA | Drive Not Ready |

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

| Device Name | Error Code | Error Status Name |
|--------------------|-------------------|--------------------------|
| HDD | BB | Undefined Error |
| | CC | Write Fault |
| | E0 | Status Error |
| | F0 | No Sense Error |
| | ?? | Other Error |
| Cache Memory | 02 | Protect Mode Error |
| | 03 | Caching Error |
| | ?? | Other Error |
| Multimedia | 01 | Write Error |
| | 0F | Invalid Drive |
| | 15 | Drive Not Ready |
| | ?? | Other Error |

NOTE: If error status name is **Other Error** , please reference the **Error Code** for error information

3.16 Running Test

NOTES:

1. *You may add or delete subtests using the Running Test Edit Item function, see Section 3.20.*
2. *Do not forget to insert a work disk in the FDD. If a work disk is not inserted an error will be generated during the Floppy Disk Test.*
3. *If the test completes successfully an “PASS” sign with blue letters displays on the screen.*
4. *If the test fails or is interrupted before completion an “FAIL” sign with red letters displays on the screen.*
5. *If running item not select an “NOITEM” sign with green letters display on the screen.*
6. *All errors which occur during execution of the Running Test are logged in the Log File.*
7. *This program is executed according to the Count Loop number selected in the Running Test Edit Item, see Section 3.20. To terminate the program, press **Ctrl + Break**.*

3.17 DMI INFOEMATION

Select **03** from the Diagnostics Menu and press **Enter** to Check or Write DMI Information Data:

3.17.1 Check DMI Information

The Check DMI Configuration program contains the following configuration information for the computer:

***NOTE:** Please set the media of DVD before starting a test.*

AHCI cannot control under the DOS, Please change SATA Controller Mode to "Compatibility" Mode .

System information (Type 1)

1. Manufacture : TOSHIBA
2. Product Name : Protage M930
3. Version : PDW04U-123456 (TOSHIBA Part Number)
4. Serial Number : 12345678W (Serial Number)
5. UUID Number: 000B5F7142CADE11B11200238BF9F8FD

OEM Strings (Type 11)

1. OEM String : PDW04U-123456,S123456789,11V

On Board LAN MAC

1. MAC ADR : 047D7B12F597

DVD REGION CODE

1. User change times : 5
2. Region Code : 0

3.17.2 Write DMI Information

The Write DMI Information program contains the following information for the computer :

1. Manufacture Name (TOSHIBA)
2. Product Name (Satellite P500)
3. Part Number (PSP50U-123456)
4. Serial Number (12345678W)
5. OEM String (PSP50U-123456,S123456789,11V)
7. Write UUID (000B5F7142CADE11B11200238BF9F8FD)

8. Brightness Write (1A344C769EC5EDFF)
9. HDDs Numbers Flag [1]Single [2]Two
 - a. SLP2.0 Build Sig [1]Non OS [2]OS
 - b. Wireless LAN ID (001E4C123456)
 - c. AC Adapter Select [1]45W [2]65W [3]75W [4]90W [5]120W [6]180W

Select 1 ~ c to keyin new data , select 0 to exit program , program will compare input data length with the max length , if over will retry keyin

Note : Please Check New DMI Information After System Restart !!

V3.7

1. **** Manufacture Name (TOSHIBA) - (32)
2. **** Product Name (Satellite P500) - (32)
3. **** Part Number (PSP50U-123456) - (26)
4. **** Serial Number (12345678W) - (32)
5. **** OEM String (PSP50U-123456,S123456789,11V) - (64)
7. **** Write UUID (000B5F7142CADE11B11200238BF9F8FD) – (16)
8. **** Brightness Write (1A344C769EC5EDFF) – (8)
9. **** HDDs Numbers Flag [1]Single [2]Two –(1)
 - a. **** SLP2.0 Build Sig [1]Non OS [2]OS-(2)
 - b. **** Wireless LAN ID (001E4C123456) –(12)
 - c. **** AC Adapter Select [1]45W [2]65W [3]75W [4]90W [5]120W [6]180W –(1)
0. **** Exit

Please Select (1 ~ c) To Modify DMI String :

Current Data of EEPROM : Toshiba

1. Enter the Manufacture Name : TOSHIBA

Your Keyin is : TOSHIBA This is your keyin data

EEPROM return : TOSHIBA This is read from eeprom back

Press any key to continue

Note : Please Check New DMI Information After System Restart !!

If Keyin length too long will retry :

Current Data of EEPROM : 12345678WU

4. Enter the Serial Number : 12345678901234

Your Keyin String Length Not Correct 14 > 10 !!!

Current Data of EEPROM : 12345678WU

4. Enter the Serial Number :

NOTE: *The SLP2.0 is Microsoft SPEC , call “System Locked Pre-Installation” or “SLP”, It is for OEM pre install Windows and no need to Active , If you select Non OS , then you need to Active your OS before you use .*

Function Detail :

7. UUID :

Total is 16 byte data , Front 10 byte is time random data , last 6 byte is LAN MAC .

8. Brightness Table :

It depend on LCD EDID to set different brightness data .

9. HDD Numbers Flag :

[1]Single [2]Two , BIOS check this flag to set setup menu is RAID or AHCI mode .

a. SLP2.0 Build Sig :

[1]Non OS : EEPROM fill "MS" for non Microsoft OS , BIOS not load SLP OPROM function .

[2]OS : EEPROM fill Others for Microsoft OS , BIOS load SLP OPROM function .

b. Wireless LAN ID :

If change M/B , but wireless/B not change , need fill wireless MAC into new change M/B .

c. AC Adapter Select :

[1]45W : Machine need 45W AC Adapter .

[2]65W : Machine need 65W AC Adapter .

[3]75W : Machine need 75W AC Adapter .

[4]90W : Machine need 90W AC Adapter .

[5]120W : Machine need 120W AC Adapter .

[6]180W : Machine need 180W AC Adapter .

The AC Adapter request is base on machine power request , some high performance need 120W Adapter , low cost machine maybe only 75W can meet request .

Because AC Adapter do not had HWID for detect , so need key in data by menu .

(1) If machine setting 75W , AC Adapter use 120W , it's OK .

(2) If machine setting 120W , AC Adapter use 75W , because Adapter can't support enough power , it can't charge well .

(3) If machine setting 90W , AC adapter use 90W , Adapter Select 90 W , it's OK .

(4) If machine setting 90W , AC adapter use 90W , Adapter Select 120W , “PHM” and “ECO” utility will display wrong data , power consumption display double data more the machine actual use .

2. Error information displayed on the screen can be manipulated with the following number keys:

The **1** key scrolls the display to the next page.
The **2** key scrolls the display to the previous page.
The **3** key returns to the Diagnostics Menu.
The **4** key erases all error log information in RAM.
The **5** key reads the log information from a floppy disk.
The **6** key writes the log information to a floppy disk.
The **7** key save the log information to a floppy disk.

The following are the test abbreviations for each Diagnostics Test.

| Test Name | Test Abbreviations |
|--------------------------------|---------------------------|
| System Test | ROM |
| Memory Test | RAM |
| Keyboard Test | KBD |
| Display Test | CRT |
| Floppy Disk Test | FDD |
| Hard Disk Test | HDD |
| Real Time Clock Test | RTM |
| Cache Memory Test | CAH |
| Height Resolution Display Test | KIF |
| Multimedia Test | MLT |
| Memory2 Test | RAM |

3.19 System Configuration

Select **05** from the Diagnostics Menu and press **Enter** to display the following system configuration:

```
SYSTEM CONFIGURATION :  
  
* - BIOS VER = VX.XX   KBC VER = XXXX  
* - MAC ADDRESS : XXXXXXXXXXXX  
* - 0 ASYNC ADAPTER  
* - 1 HDD DRIVE(S) :XXXXXXXXXXXXXXXXXXXXXXXXXXXX  
      FW Rev.:XXXXXXXX  
      CUR LBA:XXXXXXXX  ORG LBA:XXXXXXXX  
* - BATTERY TYPE:XXXXXXXX  
* - XXXMB MEMORY SIZE  
* - XXX CPU  
* - 1 Vedio Chip XXXXXXXXXXXX  
* - 1 ODD DRIVE(S) :XXXXXXXX  
      FW Rev.:XXXX
```

Press **Enter** to return to the Diagnostics Menu.

3.20 OPTION

3.20.1 Function Description

Function description lets you add or delete the subtests used to execute the Running Test. The following screen displays after pressing the **Tab** key to edit an item in the Running Test.

KEY OPERATION

| | |
|-------|-------------|
| ↓ | Cursor Down |
| ↑ | Cursor Up |
| PgDn | Page Down |
| PgUp | Page Up |
| Home | Top of ITEM |
| End | End of ITEM |
| Ins | Insert ITEM |
| Del | Delete ITEM |
| Enter | End |

3.20.2 Operation Description

Select **05** from the Diagnostics Menu and press **Enter** to display the following:

```

                                Test Item Editor                                [RUNNING TEST]
Loop Count (1-65535, 0 = infinity)  Error Stop 

```

| T-No | Test Name | S-No | Subtest Name |
|------|----------------------|------------|----------------------------|
| 01 | System Test | Subtest 01 | ROM Checksum |
| 02 | Memory Test | Subtest 01 | Conventional Memory |
| 02 | Memory Test | Subtest 02 | Protect Mode |
| 02 | Memory Test | Subtest 03 | Protect Mode (32MB Max) |
| 02 | Memory Test | Subtest 04 | RAM Refresh |
| 04 | Display Test | Subtest 01 | VRAM W/R/C |
| 04 | Display Test | Subtest 02 | Character Attribute Set |
| 04 | Display Test | Subtest 03 | Character Set |
| 04 | Display Test | Subtest 04 | 80 * 25 Character Display |
| 04 | Display Test | Subtest 05 | 320 * 200 Graphics Display |
| 04 | Display Test | Subtest 06 | 640 * 200 Graphics Display |
| 04 | Display Test | Subtest 07 | 640 * 480 Graphics Display |
| 04 | Display Test | Subtest 08 | Display Page |
| 05 | Floppy Disk Test | Subtest 02 | Sequential W/R/C |
| 08 | Hard Disk Test | Subtest 01 | Sequential Read |
| 08 | Real Time Clock Test | Subtest 02 | Backup Memory Test |

Tab: HELP (Key Operation)

1. Enter a **number** or **0** for **Loop Count** and press **Enter**.

Select a number from 1 to 65535 to define the number of times the Running Test executes.

Select 0 to run the test continuously until halted by the user.

2. Select the **NO** or **YES** for **Error Stop** and press **Enter**.

Select **NO** to keep the test running even if an error is found.

Select **YES** to stop the test program when an error is found.

***NOTE:** All errors which occur during execution of the Running Test are logged in the Log File.*

3. Press **Insert** to add a subtest.
4. Press **Delete** to remove the selected subtest.
5. Press **Enter** when you have finished editing the Running Test list.
6. The following message displays:

Do you want to save the data?

Save to disk

Do not save

7. Select the option and press **Enter**.
8. Select **03** from the Diagnostics Menu and press **Enter** to execute the Running Test.

***NOTE:** If press **Ctrl+break** in the runin process, please press more one any key to exit.*

3.21 Common Tests and Operation

3.21.1 How to operate a window

To input parameters, or open a window use the following keys.

- ↑ ↓ → ← key : to move a highlight bar
- [Enter] key : to select an item at the highlight bar
- [Esc] key : to close the current window and go back to the previous window

3.21.2 How to Stop the Test Program

To stop a test:

[Ctrl]+[Break] Press the Ctrl key and the Break key simultaneously.

3.21.3 Test Status Screen

***NOTE:** The Test Status Screen does not display during all the tests. See the specific test description Sections 3.4 through 3.14.*

The following Test Status screen displays during most tests. See the description of each test Sections 3.4 through 3.14 for specific screen information.

```
Test Name
Sub Test      :0101
Pass Count    :00000      Error Count    :00000
Write Data    :00          Read Data     :00
Address       :00000000    Status        :00
```

Test Name Displays the name of the test being executed.

Subtest No. Displays the Subtest number in the following format:

ffgg
ff = Subtest No.

gg = Step Number (Will be blank if the test does not have a Step Number.)

| | |
|--------------|---|
| Pass Count | Displays the number of times the test has been executed. |
| Error Count | Displays the number of errors which have occurred during the test. |
| Write Data | Displays only the test data that has failed to compare during the test while being written during the test. |
| Read Data | Displays test data that has failed to compare during the test while being read during the test. |
| Test Address | Displays the Test Address. (The format differs for each test.) |
| Error Status | Displays the error status. |
| Error Name | Displays the name of the error. |

3.21.4 Test Stop Display

If an error occurs during a Subtest and YES is selected for Error Stop, the following message displays:

```
[HALT OPERATION]

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

* Select 1, 2, or 3

The three selections have the following functions:

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

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

3.21.5 How to enter data

Letters which must be entered are always shown in []. Simultaneous entries are displayed by a “+” mark. For example:

[a] [Enter]

Press the “a” key, then press the [Enter] key.

[Ctrl] + [c]

Press the [Ctrl] key and the “c” key simultaneously.

4.1 Overview

This chapter describes the procedure for removing and replacing the field replaceable units (FRUs) in the PC. It may not be necessary to remove all the FRUs in order to replace one. The chart below provides a guide as to which other FRUs must be removed before a particular FRU can be removed. The numbers in the chart indicate the relevant section numbers in this manual.

In all cases when removing an FRU, the battery pack must also be removed. When repairing an FRU that is the potential cause of a computer fault, use the chart to determine the order in which FRUs need to be removed.

The tilt stand, if it is installed, can be removed without any other FRUs removed.

| | |
|---|-----------------------|
| 4.2 Battery pack | |
| 4.3 HDD | |
| 4.4 Optical disk drive | |
| 4.5 Memory module | |
| 4.6 Keyboard | 4.7 Wireless LAN card |
| 4.9 Top Cover assembly | |
| 4.10 Touch pad | 4.8 Display assembly |
| 4.11 System Board | 4.13 LCD unit |
| 4.12 CPU | 4.15 Speaker Box |
| 4.14 Web Camera module | |
| 4.16 Use thermal pad and grease on CPU, North Bridge, and VGA board | |

Safety Precautions

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

- DANGER:**
- 1. In the case of the battery, always use authentic parts or equivalent parts approved by Toshiba. Other batteries may have different specifications that are incompatible with the computer and may result in fire or explosion.
Due to the risk of alkali fluid leaks, never attempt to heat or disassemble the battery. Similarly, due to the risk of explosion, never expose the battery to flame.*
 - 2. Some parts including the power supply and FL inverter generate high voltages. If you need to turn on the power while disassembling the computer, do not touch any connectors or other components due to the risk of electric shock. Also, do not disassemble individual parts when performing routine maintenance.*

- WARNING:**
- 1. To prevent electric shock, turn off the power unplug the AC adapter from the power source.*
 - 2. As the battery installed to the computer is typically already charged, the risk of electric shock remains even when the AC adapter is unplugged from the socket. To prevent electric shock, always take off any metal jewelry or accessories such as necklaces, bracelets or rings before working on the computer. Never work with wet or moist hands.*
 - 3. Take care not to injury yourself on any edges or corners.*

- CAUTION:**
- 1. Confirm that replacement parts have compatible specifications before replacing on the computer. Never use incorrect parts as these may cause faults on the computer.*
 - 2. To prevent internal damage such as short circuits or burning, do not allow any screws, paper clips, or other metal objects to fall into the computer. When removing screws, always replace with the same size screws. Ensure that all screws are fully tightened. Loose screws may result in short circuits leading to overheating, smoke or flame.*
 - 3. To prevent electric shock, check that you have disconnected all cables from a part before removing the part.*
 - 4. When connecting to the AC power supply, use only an AC adapter and cable approved by Toshiba.*
 - 5. To prevent electric shock, ensure that all replacement parts are compatible with the computer and that all cables and connectors are securely connected.*

Before You Begin

Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section “4.2 Battery Pack”.

1. Do not disassemble the computer unless it is operating abnormally.
2. Use the designated tools.
3. Ensure that the environment for working on and storing parts does not contain any of the following.
 - Dust or dirt
 - Static electricity
 - Extremely hot, cold or humid conditions
4. Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.
5. Do not perform any unnecessary work. Always work in accordance with the disassembly and reassembly procedures in this manual.
6. Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.
7. Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.
8. When reassembling, ensure that you use the correct screws and fit parts in the correct position. Screw sizes are noted in the text and figures.
9. As all parts have sharp edges and corners, take care not to cut yourself.
10. After replacing an FRU, check that the computer and replaced part operate correctly.

Disassembly Procedure

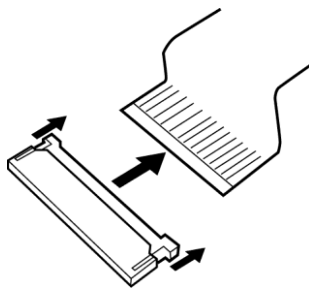
Three main types of cable connector are used.

- Pressure plate connector
- Spring connector
- Normal pin connector

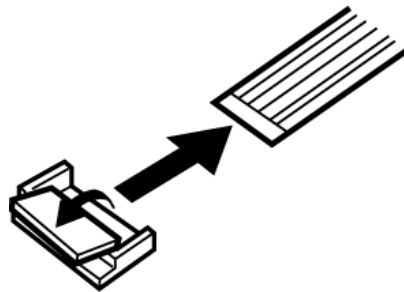
When disconnecting a pressure plate connector, lift up the tag on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, lift up the pressure plate to a suitable height and insert the cable into the connector. Press down on both sides of the pressure plate such that both sides of the plate and connector are at the same height and that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected. If the cable is disconnected from the connector, reconnect it making sure that you lift the pressure plate high enough to insert fully the cable.

For spring connectors, lifting up the stopper frees the cable and allows it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable.

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



Pressure plate connector



Spring connector

Assembly Procedure

After the computer has been disassembled and the part that caused the fault has been repaired or replaced, the computer must be reassembled.

Take note of the following general points when assembling the computer.

- Take your time and follow the instructions carefully. Hurrying the assembly work will only introduce new problems.
- Check that all cables and connectors are securely connected;
- Before fastening FRUs or other parts in place, ensure that no cables are caught on screws or the FRU.
- Check that all latches are securely closed.
- Ensure that you have installed all FRUs correctly and do not have any screws left over. Using an incorrect screw may damage the thread or screw head and result in the FRU not being securely fastened in place.

After installing FRUs, check that the computer operates correctly.

Tools and Equipment

For your safety and the safety of the people around you, it is important that you use Electrostatic Discharge (ESD) equipment. Correctly utilizing of the equipment increases the percentage of successful repairs and saves on the cost of damaged or destroyed parts. The following equipment is required for disassembly and assembly.

- One Philips screwdriver with type 0 bit (for THIN HEAD screws)
- One Philips screwdriver with type 1 bit (for screws other than above)
- Tweezers (for lifting screws)
- ESD mats (lay on work table or floor)
- An ESD wrist strap and heel grounder
- Anti-static carpet or flooring

Screw Tightening Torque

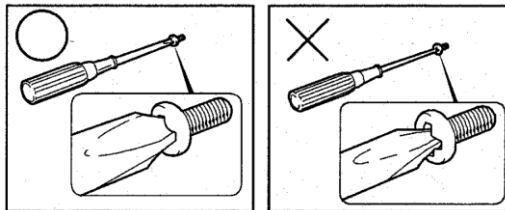
Use the following torque when tightening screws.

CAUTION: *Overtightening may damage screws or parts. Undertightening may allow screws to loosen (and possibly fall out) causing a short circuit or other damage.*

NOTE: *To tighten screws quickly and accurately, an electric screwdriver is recommended.*

- M2 (2mm) 0.167 N·m (1.7 kgf·cm)
- M2.5 (2.5mm) 0.245 N·m(2.5 kgf·cm)
- M2.5 (2.5mm) 0.392 N·m(4.0 kgf·cm) for Hinge support
- M3.0 (3mm) 0.245 N·m (2.5 kgf·cm)

NOTE: *To prevent damage to THIN HEAD screws, press along the axis of the screwdriver while turning the screw. This is because the contact area between the screw and driver is less than for a pan head screw (standard pan-shaped screw head).*



Grip Color

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

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



“Special length screw” means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.8 mm and so on.

Screw Notation

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths are indicated on the computer body.

Format:

Screw shape + Screw length (mm)

Screw shape

B: Bind screw

F: Thin head screw

S: Super thin head screw

T: Tapping screw

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

Example: B6 ... 6mm bind screw

4.2 Battery pack

Removing the battery pack

The following describes the procedure for removing the battery pack (See Figure 4-2-1).

CAUTION: Take care not to short circuit the terminals when removing the battery pack. Similarly, do not drop, knock, scratch, disassemble, twist, or bend the battery pack.

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all external devices from the computer.
3. Turn the computer upside down.
4. Slide and hold the battery release latch (1) to free the battery pack after moving the battery release lock (2) into it unlock position – pick the battery pack out of the computer from fillister.

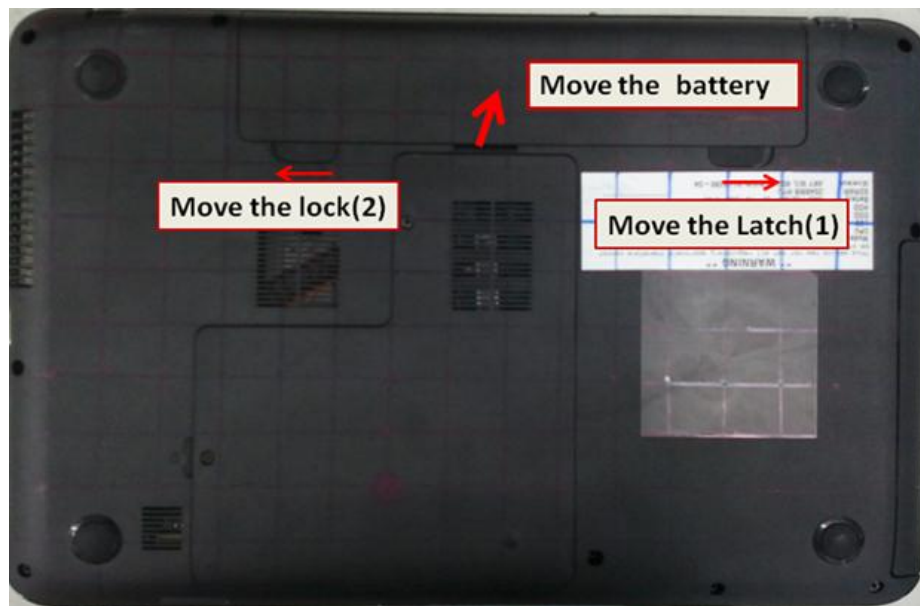


Figure 4-2-1 Remove the battery pack

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

Installing the battery pack

The following describes the procedure for installing the battery pack (See Figure 4-2-2).

CAUTION: *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispose always the used battery pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.*

NOTE: *Check visually the battery terminals and clean off any dirt with a dry cloth.*

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all external devices from the computer.
3. Insert the battery pack.
4. Ensure the battery release lock (2) is moved into its locked position.

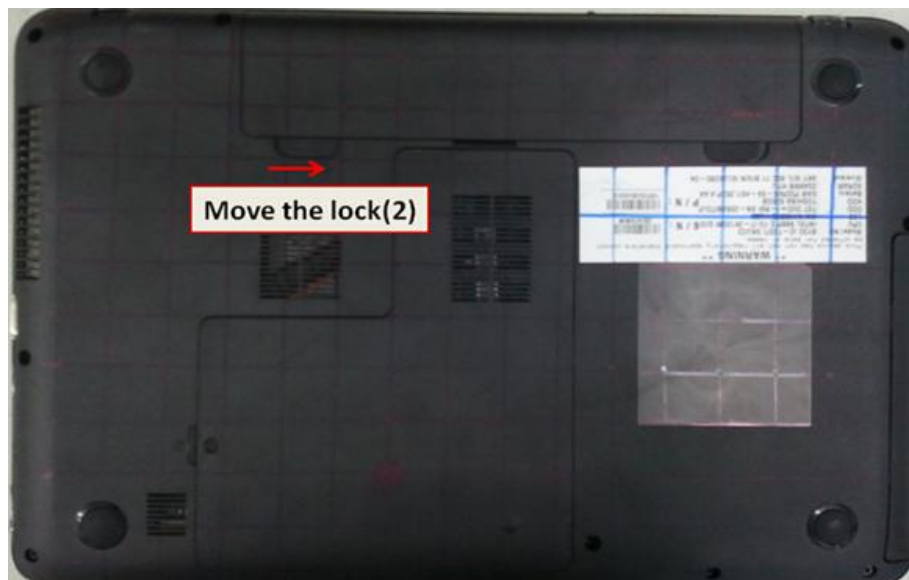


Figure 4-2-2 Install the battery pack

4.3 HDD

Removing HDD-H9.5mm

The following describes the procedure for removing the HDD (See Figure 4-3-1 to 4-3-3).

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

1. Turn the computer upside down.
2. Remove the battery.
3. Loosen the following **screws** securing HDD Door and then remove the door.
 - M2.5×4.0B FLAT BIND screw x2
4. Remove the following **screws** securing the **HDD assembly** and ODD
 - M2×3.0B FLAT BIND screw x2
5. Remove ODD and then disconnect the **HDD assembly** from the connector on the system board.

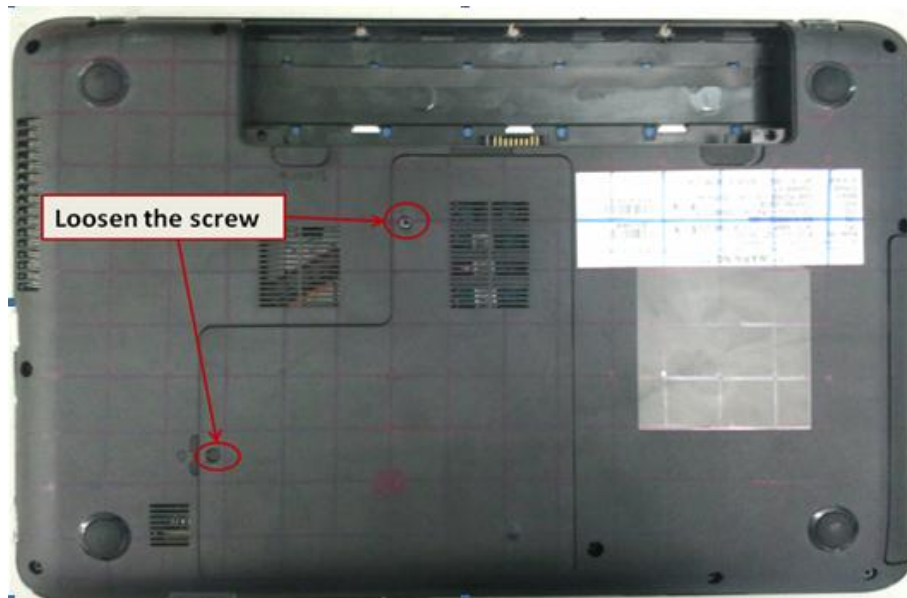


Figure 4-3-1 Remove HDD Door

CAUTION: When a HDD is installed, they are installed in the position as the following figure.

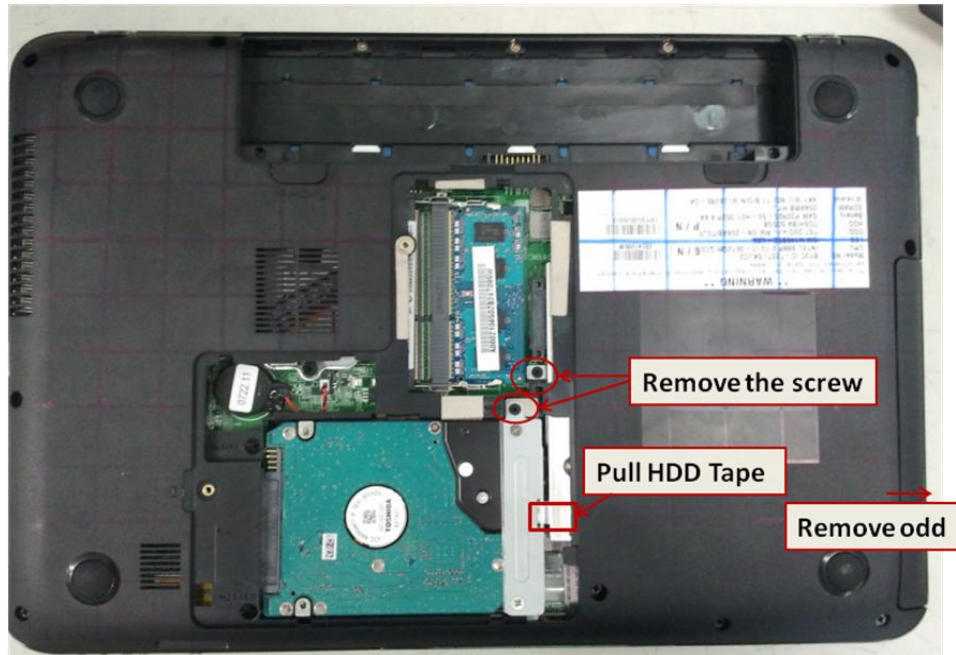


Figure 4-3-2 Remove the HDD assembly

6. Remove the following **screws** securing the HDD.

- M3.0×3.5B FLAT BIND screw x2



Figure 4-3-3 Remove HDD bracket

Installing HDD-H9.5mm

The following describes the procedure for installing the main HDD.

1. Install a HDD bracket.

- M3.0×3.5B FLAT BIND screw x2

| |
|---|
| <p>NOTE: <i>Although they are 3mm head screws, screw torque must be set in 2.5kg-cm for four screws securing the HDD holder.</i></p> |
|---|

2. Insert the **HDD assembly** into the HDD slot and connect it carefully to the **HDD** on the system board.

3. Secure the **HDD assembly** with the following **screw**.

- M2×3.0B FLAT BIND screw x2

4. Secure the HDD Door with the following screws.

- M2.5×4.0B FLAT BIND screw x2

4.4 Optical disk drive

NOTE: Do not apply excessive force to the top of an optical disk drive.
Do not touch the shaded portion of the figure below, when the drive is removed or installed.

Removing an optical disk drive

The following describes the procedure for removing an optical disk drive (See Figure 4-4-1 and 4-4-2).

1. Remove the HDD Door.
2. Remove the following screws securing an optical disk drive.
 - M2×3.0B FLAT BIND screw x1
3. Disconnect an **optical disk drive** toward the arrow direction.

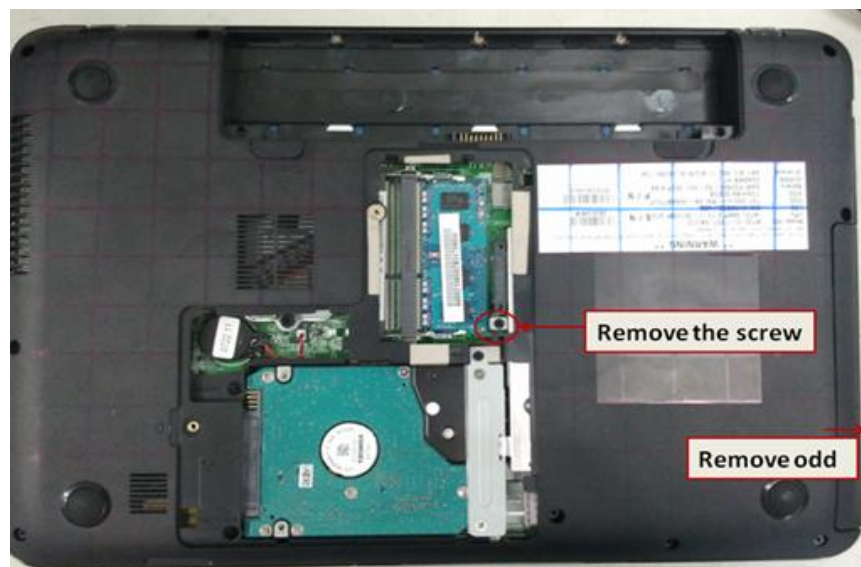


Figure 4-4-1 Remove an optical disk drive

4. Remove screws securing side bracket.
 - M2×3.0B FLAT BIND screw x2

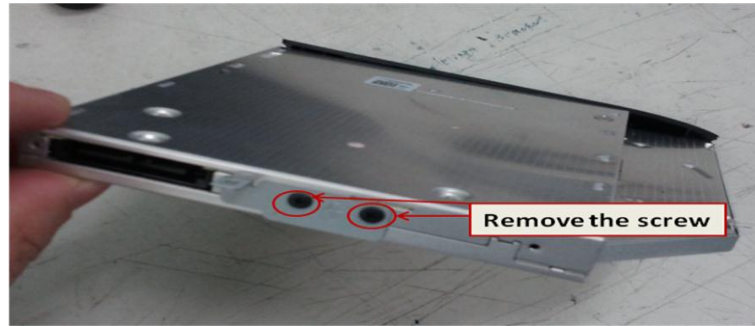


Figure 4-4-2 Disassemble the side bracket

5. Remove the optical disk drive bezel toward a slope side.

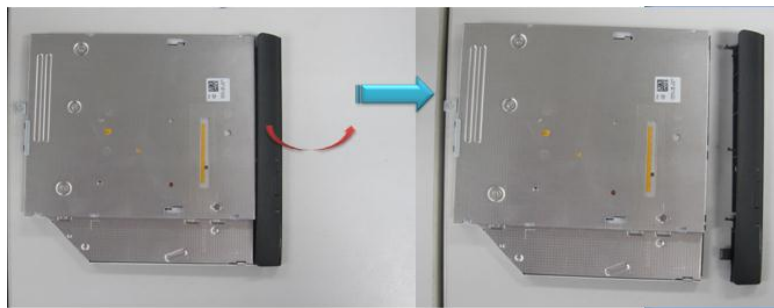


Figure 4-4-3 Disassemble the ODD bezel

Installing an optical disk drive

The following describes the procedure for installing an optical disk drive.

1. Attach the **ODD bracket** to an optical disk drive and secure it with the following **screws**.
 - M2.0×3.0 Flat BIND screw x2
2. Insert an optical disk drive assembly into the slot and connect it to the connector on the system board.
3. Secure the ODD drive with the following **screw** and assemble the ODD bezel(see figure 4-4-3)
 - M2 X3 Flat BIND screw x1

4.5 Memory module

CAUTION: *The power of the computer must be turned off when you remove a memory module. Remove a memory module with the power on risks damaging the module or the computer itself.*

Do not touch memory module terminals. Any dirt on the terminals may cause memory access problems.

Never press hard or bend a memory module.

Removing a memory module

To remove a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-5-1).

1. Remove HDD Door.
2. Press the left and right brackets and remove a **memory module**.

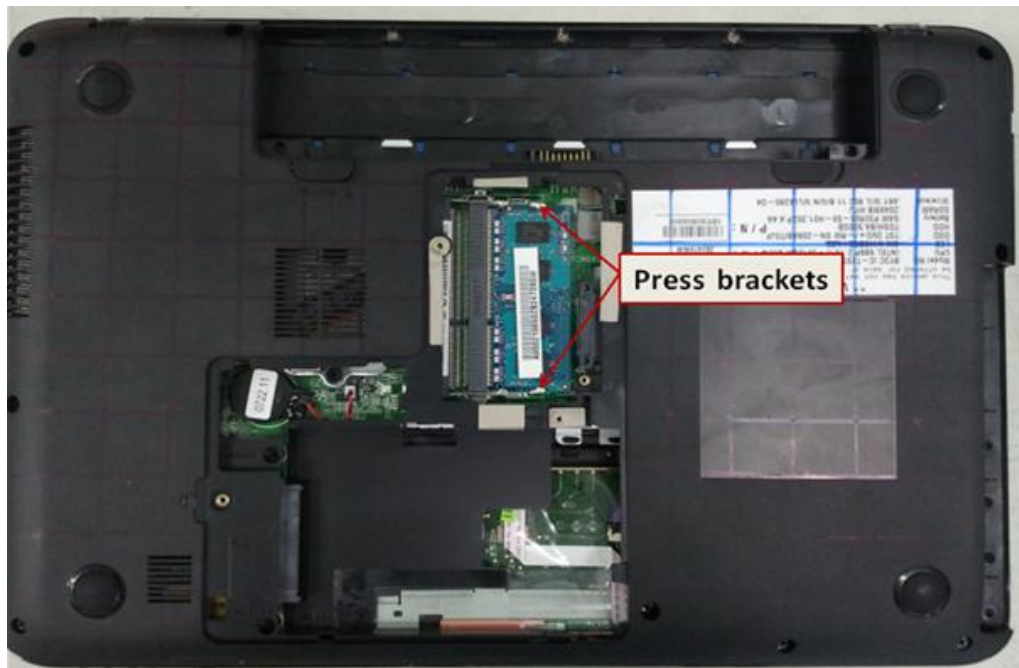


Figure 4-5-1 Remove memory

Installing a memory module

To install a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-5-2).

1. Insert a **memory module** into the connector of the computer slantwise (terminal side first) and press it to connect firmly.

CAUTION: *The power must be turned off when you insert a memory module. Inserting a memory module with the power on might damage the module or the computer itself.*

Never press hard or bend a memory module.

2. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.
3. If the memory is not detected, check that it is connected correctly.

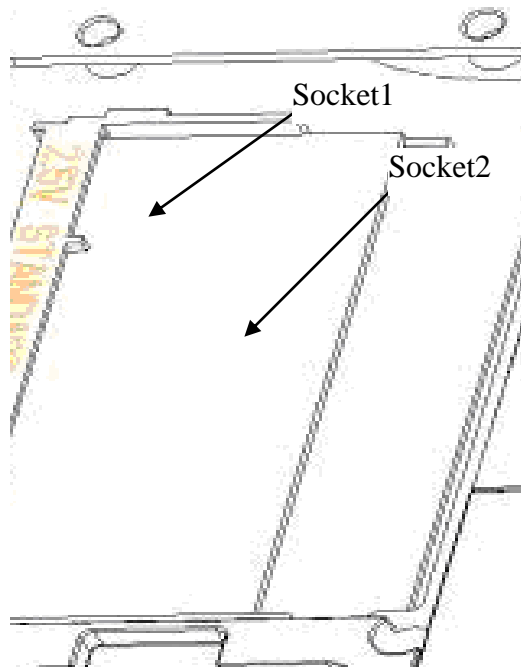


Figure 4-5-2 Insert a memory module

4.6 Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard (See Figure 4-6-1~4-6-3).

CAUTION: *As the keycap may fall out, when handling the keyboard always hold it by the frame and do not touch the keycap.*

1. Upside down the computer.
2. Remove Battery、HDD Door、ODD and HDD.
3. Push the hook and the keyboard following the direction of the arrows, then turn over the machine, insert your finger into the gap between the Keyboard and Top. Then, lift up the **keyboard** to remove it.
4. Disconnect keyboard cable.
5. Remove keyboard.

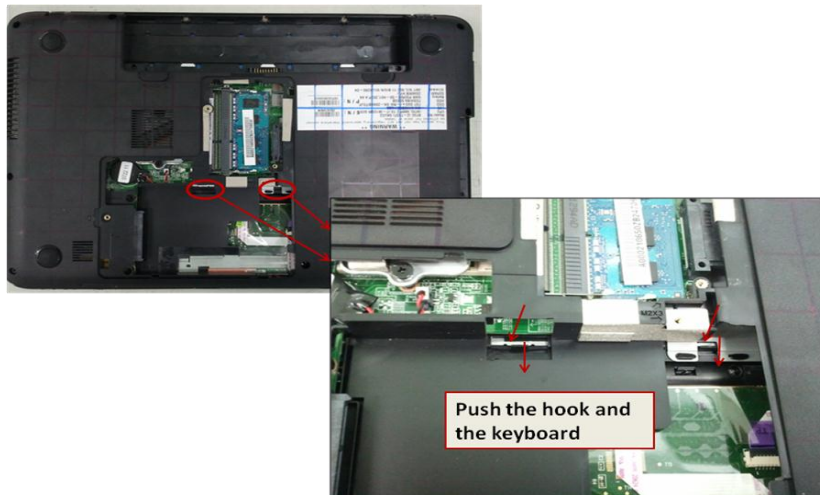


Figure 4-6-1 push the hook and the keyboard



Figure 4-6-2 Lift up the keyboard



Figure 4-6-3 Disconnect the cable and remove the keyboard

Installing the keyboard

The following describes the procedure for installing the keyboard.

1. Turn the **keyboard** upside down and place it on the palm rest as its face down. Connect the **keyboard flexible cable** to the connector on the system board.
2. Press the keyboard from the topside to make top hook to fix the keyboard.

4.7 Wireless LAN card

Removing a Wireless LAN card

The following describes the procedure for removing a Wireless LAN card (See Figure 4-7-1 to 4-7-4).

1. Remove battery, HDD door, ODD and HDD.
2. Remove the following screws securing base and top.

- M2.5. x 6.5B BIND screw x11
- M2. x 3.0B BIND screw x3
- M2.5. x 3.0B BIND screw x1

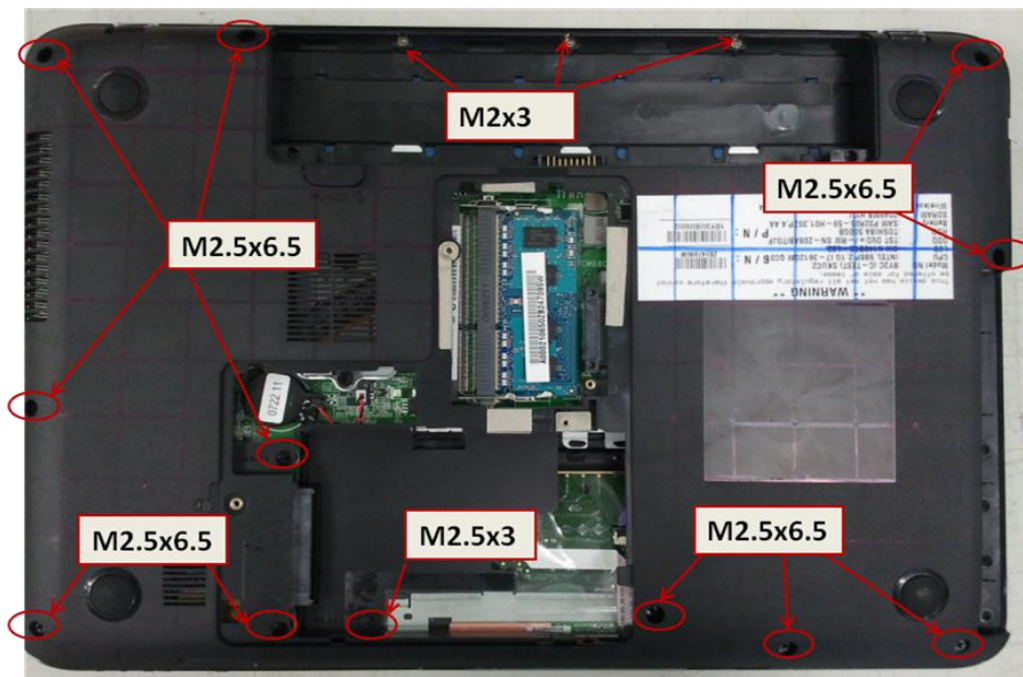


Figure 4-7-1 Remove screws of base

3. Remove the keyboard and remove the following screws securing the top.

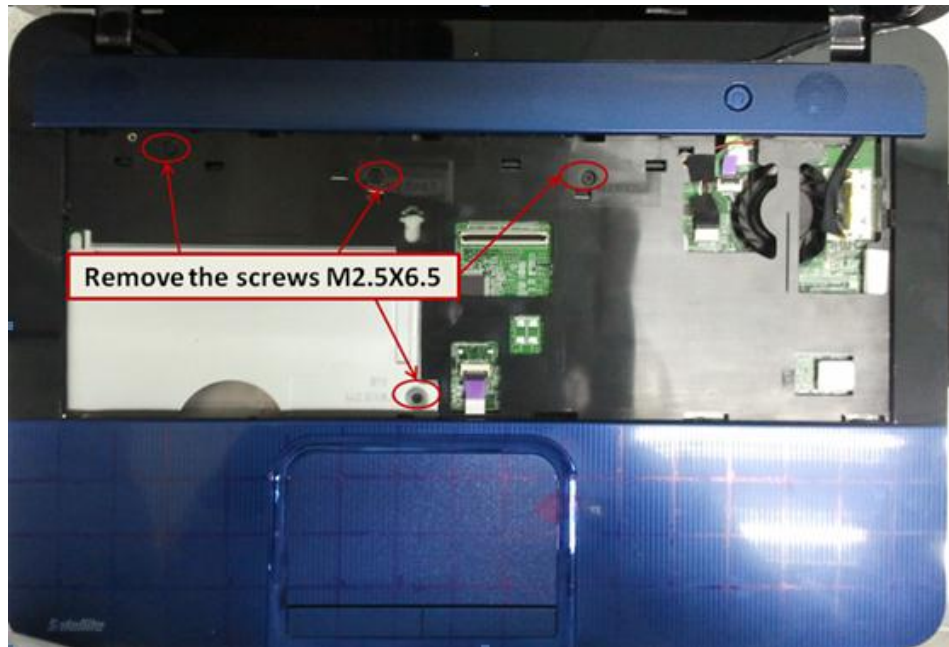


Figure 4-7-2 Remove screws of top

4. Turn the computer upside down and remove the base.
5. Disconnect the wireless cable and remove the screw securing the wireless card.

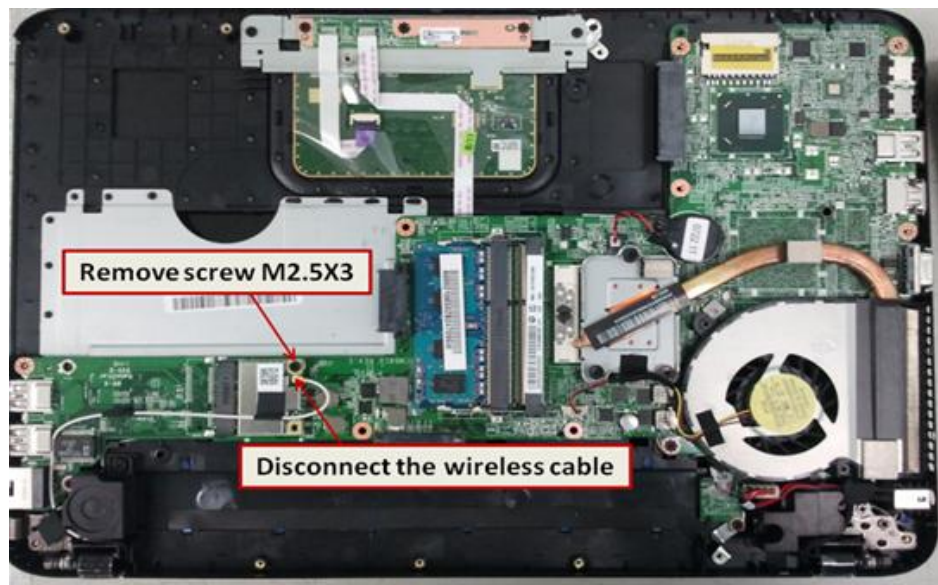


Figure 4-7-3 Remove wireless card

6. Remove wireless card.

Installing a Wireless LAN card

The following describes the procedure for installing a Wireless LAN card.

1. Insert a **wireless LAN card** terminals slantwise into the connector on the computer and press a wireless LAN card and lock the secure screws.
 - M2.5. x 3.0B BIND screw x1
2. Connect the **wireless LAN antenna cable** to the terminals on a wireless LAN card.
3. Put the **wireless LAN antenna cable** on the right location from the guide.
4. Stick the tape of cables on the surface. If fail to stick, replace tape with new adhesive tape. (See Figure 4-7-4).

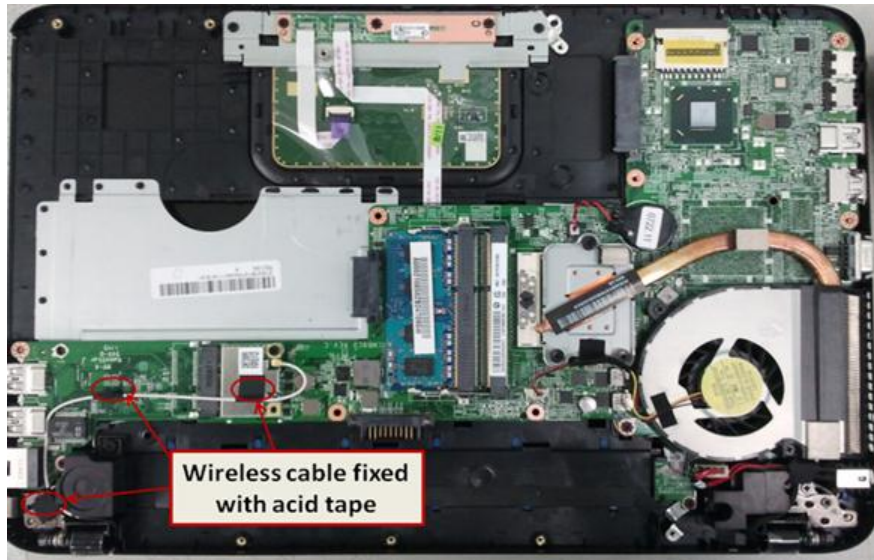


Figure 4-7-4 Cables layout on motherboard

4.8 Display assembly

Removing the display assembly

The following describes the procedure for removing the display assembly (See Figure 4-8-1 to 4-8-4).

1. Close the display and turn the computer upside down.
2. Remove the battery pack, HDD Door, ODD, HDD, Keyboard and Base.
3. Disconnect the speaker cable, power FFC, button FFC and LCD cable following the direction of arrows.(Figure 4-8-1)
4. Disconnect the wireless cable and lift up the DC cable. (Figure 4-8-2)
5. Remove MB screws and hinge screws. (Figure 4-8-3)
 - M2.5×3.0 FLAT BIND screw x3
 - M2.5×6.5 FLAT BIND screw x4

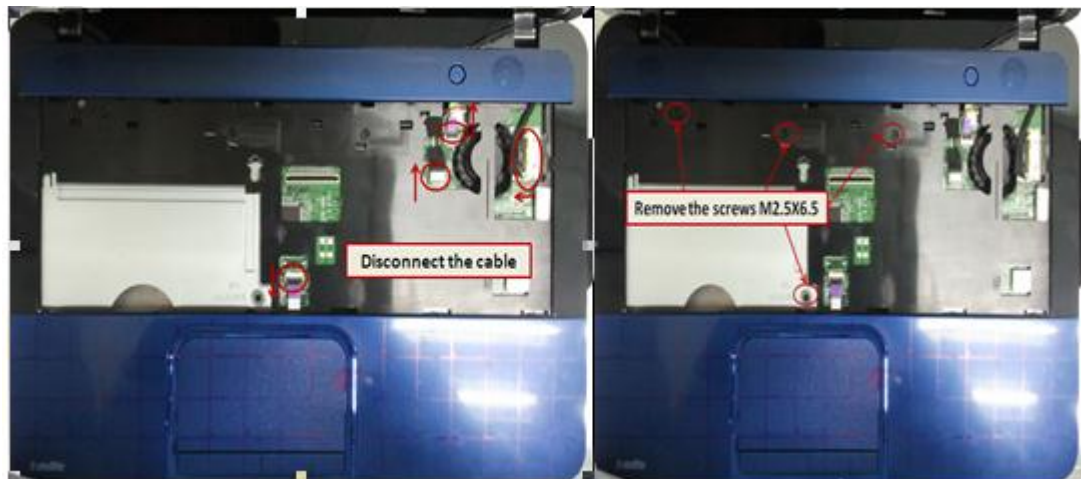


Figure 4-8-1 disconnect the cables/remove the screws

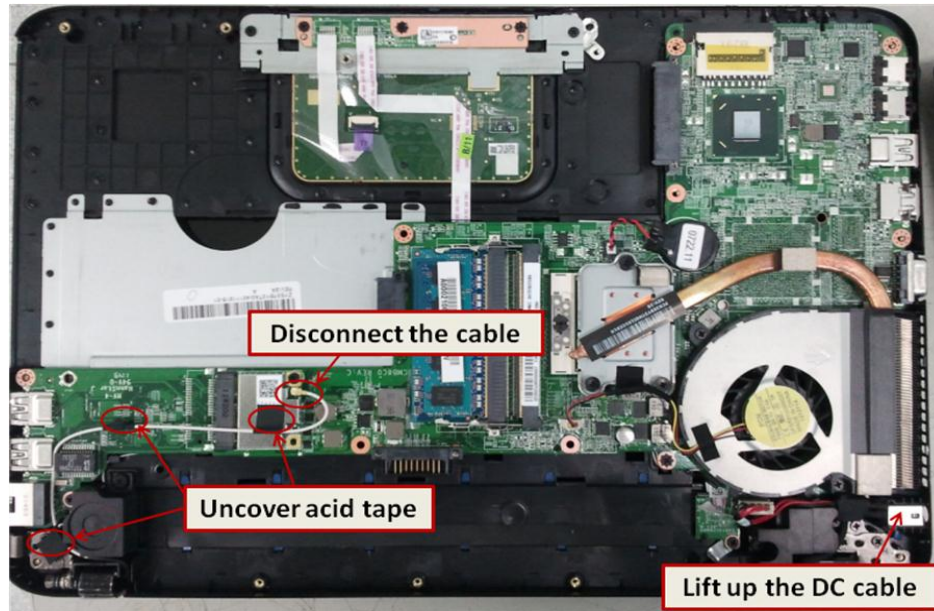


Figure 4-8-2 disconnect and lift up the cable

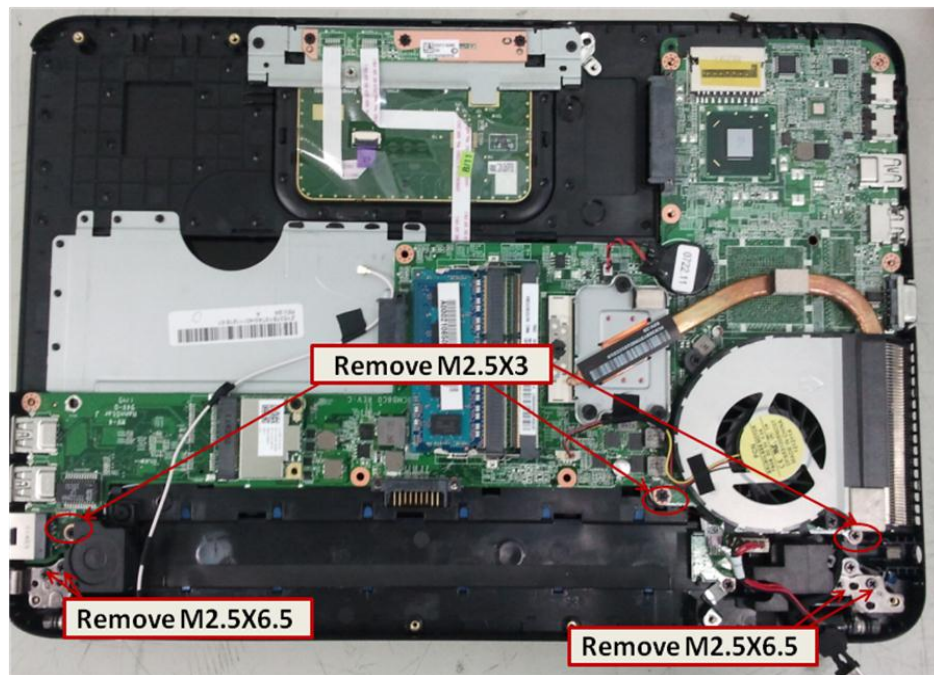


Figure 4-8-3 remove MB and hinge screws

6. Remove the MB and remove Top.

Installing display assembly

The following describes the procedure for installing the display assembly.

1. Put top assembly on display assembly and turn the hinge bracket to make the top boss insert into hinge bracket hole.
2. Put LCD cable in the right place and put MB on the top. (Figure 4-8-4)

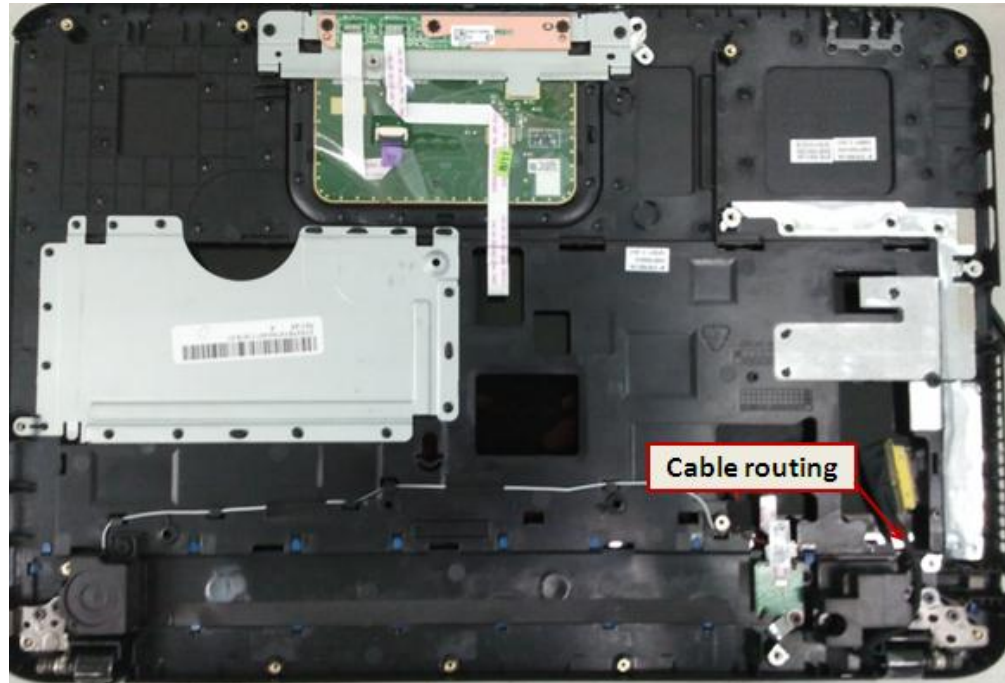


Figure 4-8-4 LCD cable routing

3. Secure the hinges with the following screws.
 - M2.5×6.5 FLAT BIND screw x4
4. Secure the system board with the following screws.
 - M2.5×3 FLAT BIND screw x3
5. Put the wireless LAN antenna cable on the right location from the guide.
6. Put the base on the top and secure the base with the following screws.
 - M2.5. x 6.5B BIND screw x11
 - M2. x 3.0B BIND screw x3
 - M2.5. x 3.0B BIND screw x1

Replacement Procedures

7. Install HDD and ODD and secure them with the following screws.
 - M2x3.0 Flat BIND screws x2
8. Install HDD Door.
9. Turn the computer upside and secure the top with screws.
 - M2.5×6.5 FLAT BIND screw x4
10. Connect the Speaker Cable, Button FFC, Power FFC, LCD cable.
11. Connect the keyboard cable, insert the keyboard and press keyboard to make top hook fix the keyboard.
12. Insert the battery.

NOTE: *If Fingerprint or Dust left on LCD screen during disassembly and assembly LCD units, please follow Appendix A to clean it.*

4.9 Top Cover assembly

Removing the Top cover assembly

Top assembly will be removed during the disassembly of the display, so please see the procedure of it. (See figure 4-9-1 to 4-9-4)

1. Remove battery, HDD door, ODD and HDD.
2. Remove the following screws securing base and top. (see figure 4-9-1)
 - M2.5. x 6.5B BIND screw x11
 - M2. x 3.0B BIND screw x3
 - M2.5. x 3.0B BIND screw x1

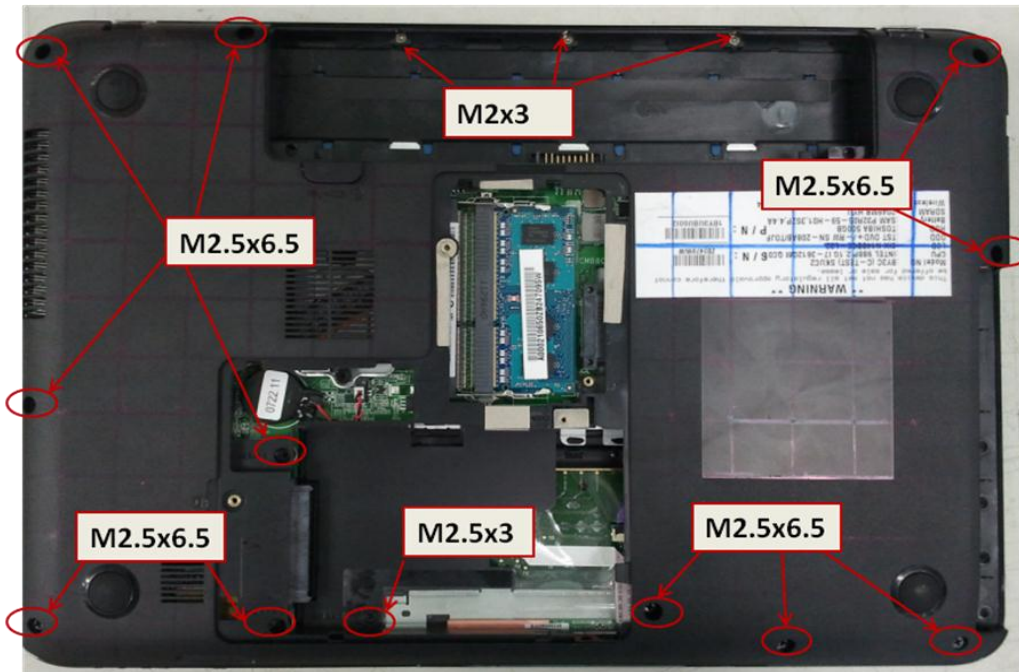


Figure 4-9-1 Remove screws of base

3. Remove the KB (see 4.6) and remove the following screws securing the top.
4. Disconnect the speaker cable, power FFC, button FFC and LCD cable following the direction of arrows.(Figure 4-9-2)

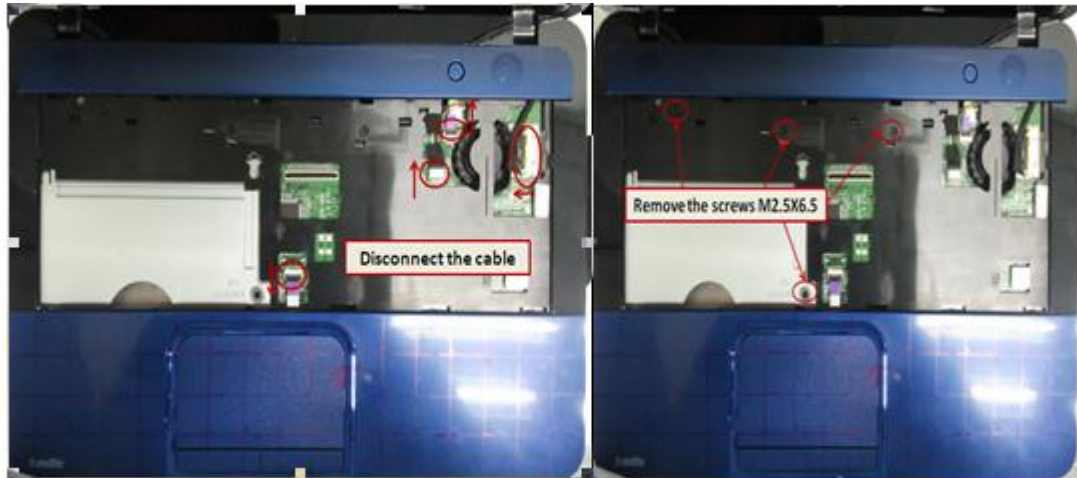


Figure 4-9-2 Disconnect the cables/remove the screws

5. Turn the computer upside down and remove the base
6. Disconnect the wireless cable and remove screws on PCB(See figure 4-9-3/4-9-4), then take out the board

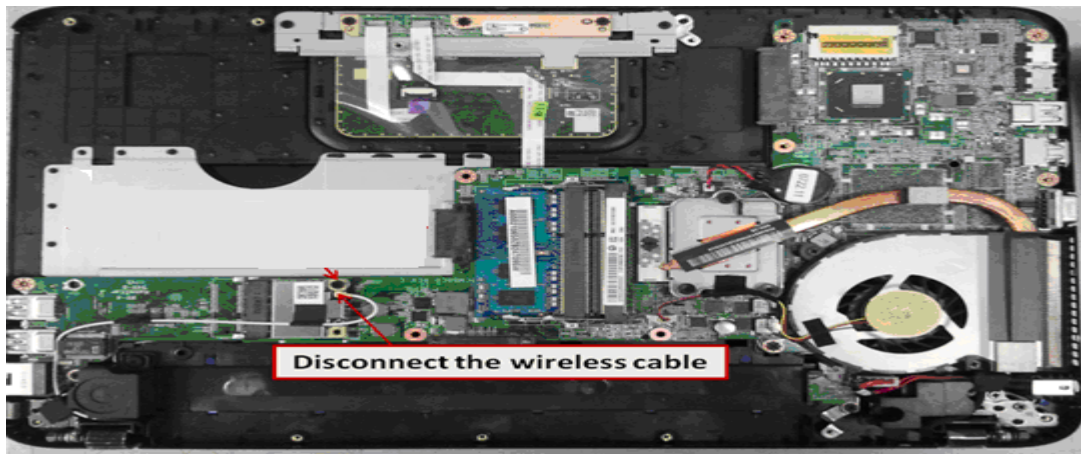


Figure 4-9-3 Disconnect the wireless cable

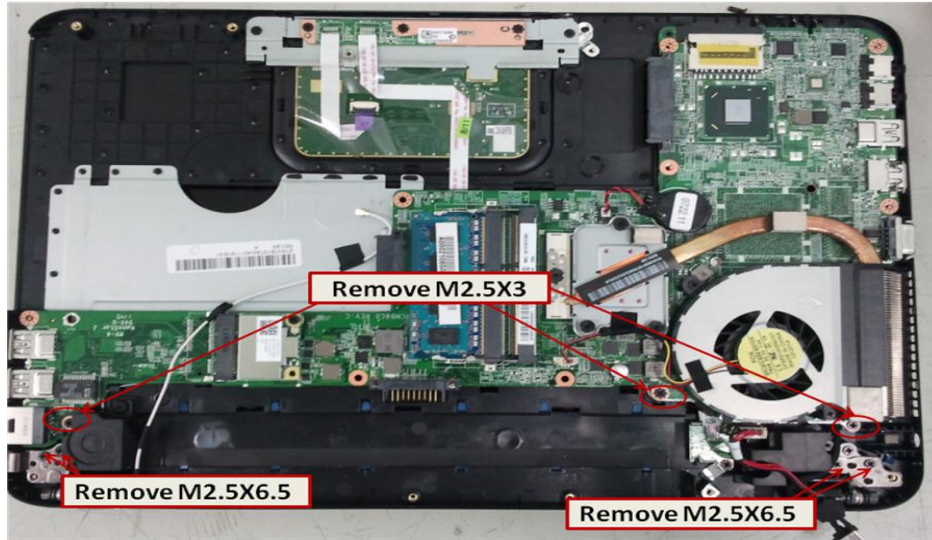


Figure 4-9-4 Remove MB and hinge screws

6. Remove the MB and remove Top cover

Installing Top Cover assembly

Top assembly will be assembled during the assembly of the display, so please see the procedure of it.

1. Install the top cover and then install motherboard by securing hinge screws(see figure 4-9-4)
2. Assemble wireless cable(see figure 4-9-3)
3. Install the base assembly by securing the screws(see figure 4-9-1)
4. Secure the top by screws and connect the speaker cable, power FFC, button FFC and LCD cable(see figure 4-9-2)

4.10 Touch pad

Removing the touch pad

The following describes the procedure for removing the touch pad (See Figure 4-10-1 to 4-10-2).

1. Peel off the protect Mylar and disconnect the button FFC from the connector on the touch pad. (Figure 4-10-1)
2. Remove the following **screws** securing the button bracket.
 - M2.0×3.0 Flat BIND screws x2
3. Remove the following **screws** securing the button board.
 - M2.0×3.0 Flat BIND screws x3
4. Remove the bracket from the top cover assembly following the arrows. (Figure 4-10-2)
5. Peel off the touch pad from the top assembly.

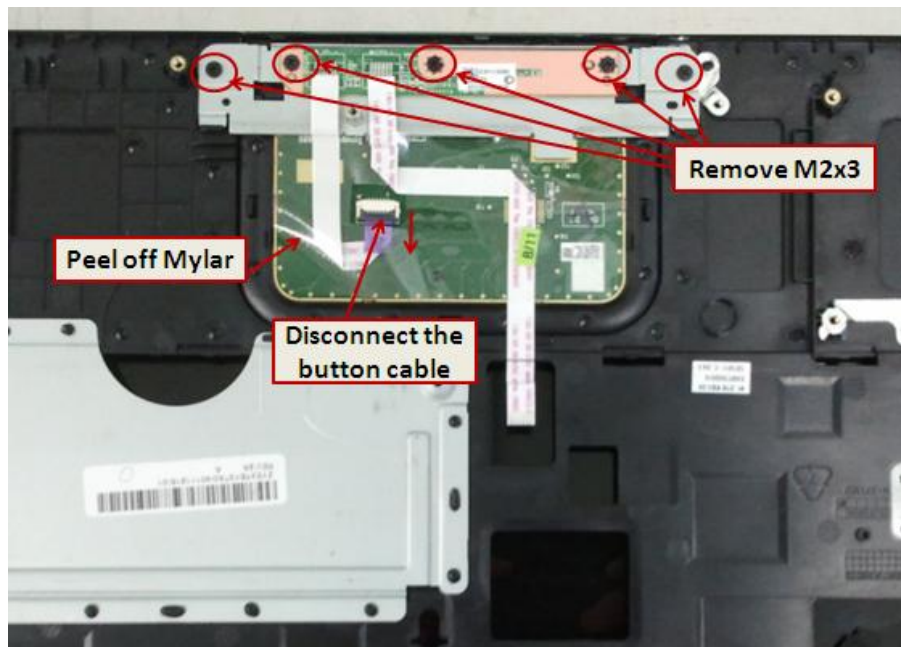


Figure 4-10-1 Remove the touch FFC and screws

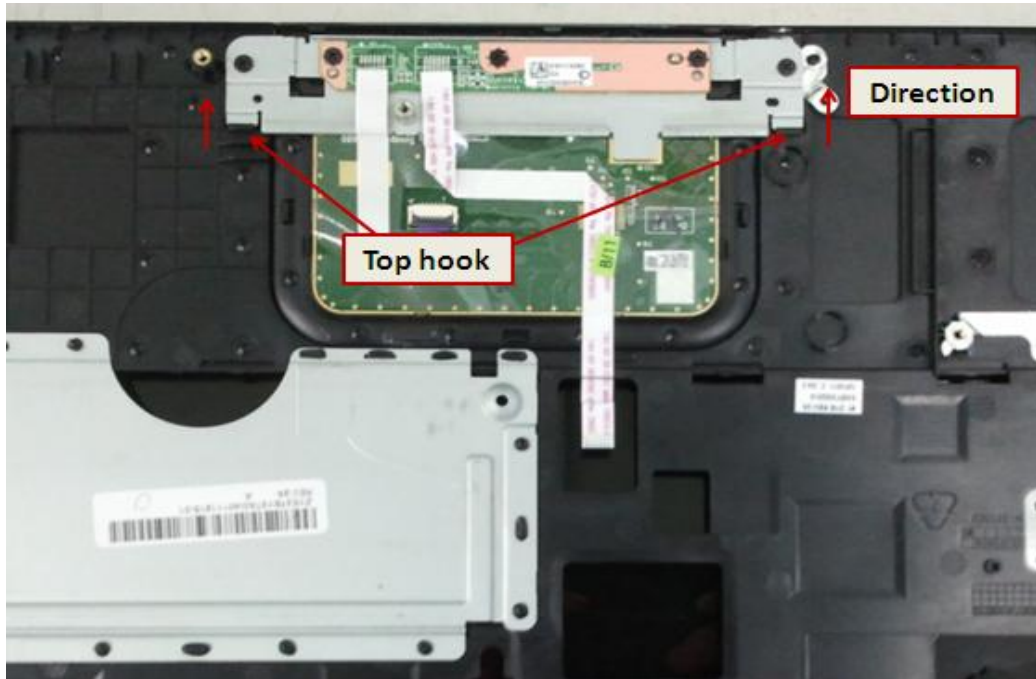


Figure 4-10-2 Remove bracket from top assembly

Installing the touch pad

The following describes the procedure for installing the touch pad.

1. Stick and install the touch pad on the top cover assembly.
2. Insert the bracket into top hook and make top boss insert into bracket hole.

NOTE: *Do not reuse the touch pad so that it can not be used after peeling off from the computer. Be sure to stick a new touch pad.*

When sticking the touch pad, be careful not to get the bubbles under the touch pad.

3. Secure the bracket and button board with the following **screws**.
 - M2.0×3.0 Flat BIND screws x5
4. Stick the protect Mylar on the touch pad plate.
5. Connect the **touch pad flat cable** to the connector on the touch pad

4.11 System Board

CAUTION: 1. when handling the system board, always hold by the edges. Do not touch the printed circuit face.
2. if replacing with a new system board, execute the subtest01 Initial configuration in section 3.3 “Setting of the hardware configuration”. Also update with the latest BIOS

Removing the System Board

The following describes the procedure for removing the system board (See Figure 4-11-1 to 4-11-2).

1. Remove battery, HDD Door, HDD, ODD, Keyboard and base.
2. Disconnect speaker cable, LCD cable, power cable, touch pad cable and wireless cable.
3. Remove system board from the top assembly. (See Figure 4-11-1 to 4-11-4)
4. Disconnect the power cable and fan cable from the system board.

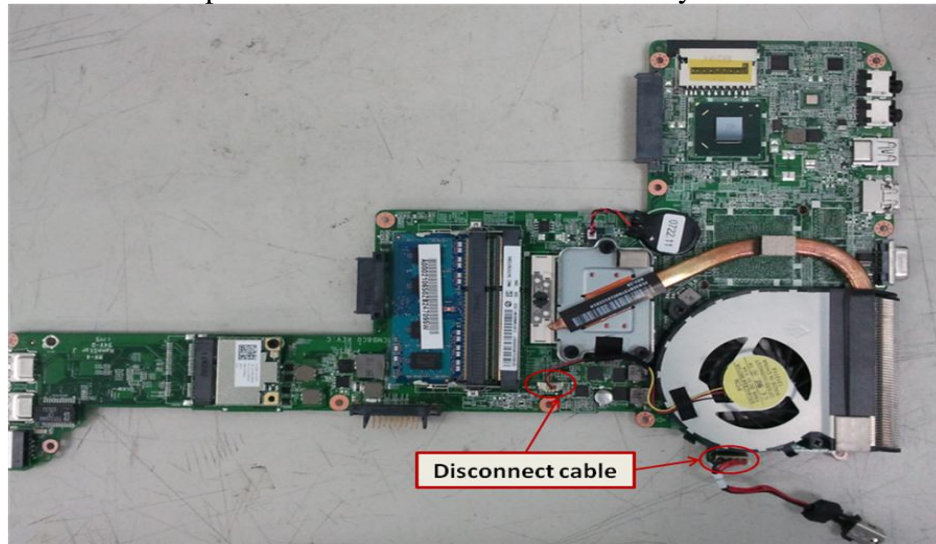


Figure 4-11-1 Disconnect the power cable and fan cable

Removing RTC battery

The following describes the procedure for removing the RTC battery unit (See Figure 4-19-2).

Replacement Procedures

1. Disconnect the RTC battery cable and then peel off the battery.

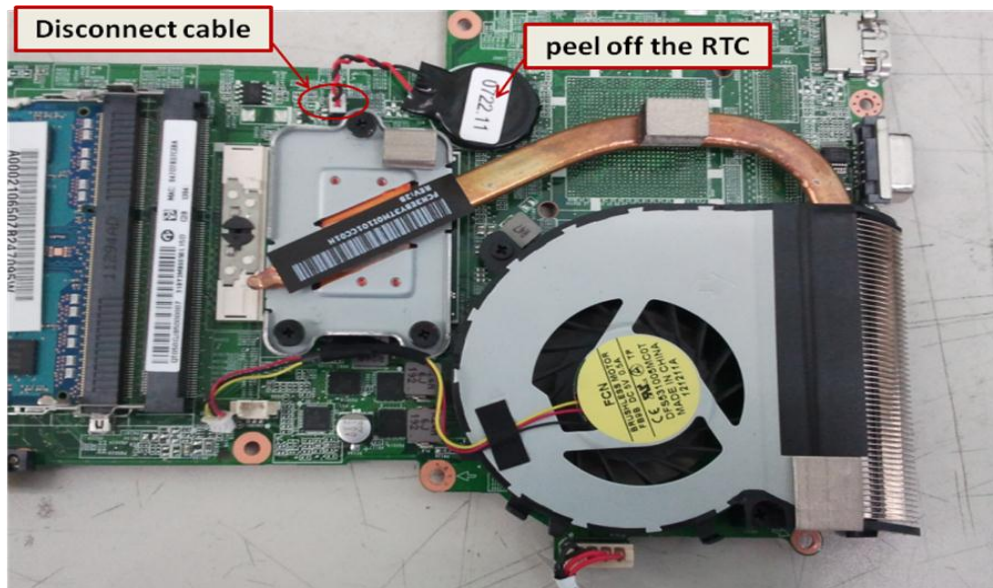


Figure 4-11-2 Disconnect the cable and peel off the battery

Installing the System Board

The following describes the procedure for installing the system board.

1. Put LCD cable in the right place and put MB on the top.
2. Secure the system board with the following **screws**.

M2.5×6.5 screw x3

3. Connect the Fan Cable, Power cable, Wireless Cable, RTC Cable, to the connector on the system board.
4. Connect the speaker cable, power FFC cable, LCD cable to the system board.

Installing RTC battery

The following describes the procedure for installing the RTC battery unit

1. Connect the RTC cable to the system board and then stick the RTC battery to the system board in the right place marked with white circle.

4.12 CPU

Removing the CPU heat sink

The following describes the procedure for removing the CPU heat sink (See Figure 4-12-1 to 4-12-3).

1. Disconnect fan cable from the connector on the system board
2. Remove the following **screws** securing the heat sink holder along 1 to 3.
3. Remove fan screw.

M2.5x3.0 screw x2

NOTE: When removing the heat sink holder, be sure to remove the screws in the reverse order of the number marked on the holder.

4. Remove the **CPU heat sink**.

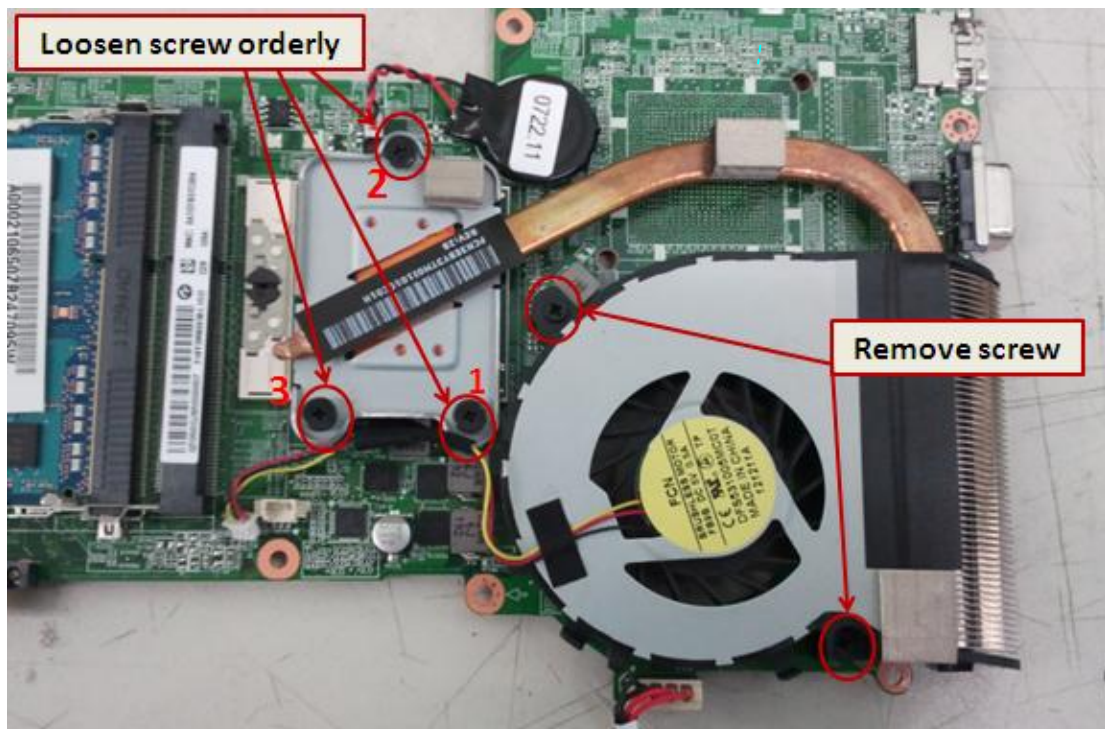


Figure 4-12-1 Remove the CPU heat sink

Replacement Procedures

5. Unlock the **CPU** by rotating the **cam** on the CPU socket 120 degrees to the counterclockwise with a flat-blade screwdriver.
6. Remove the **CPU**.

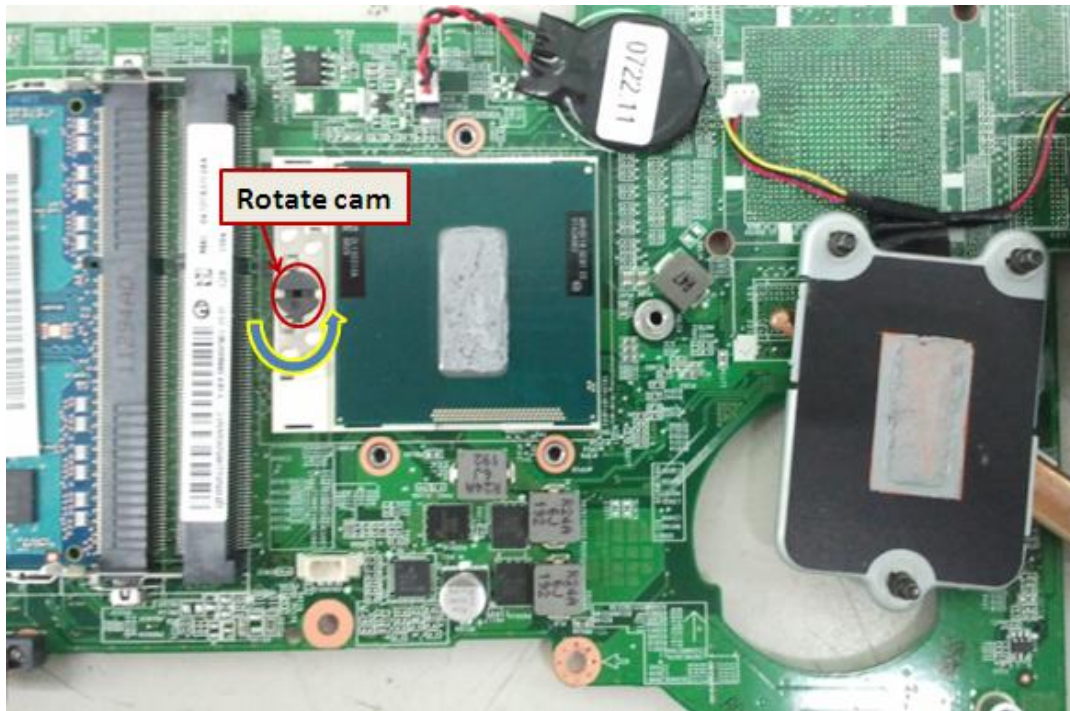
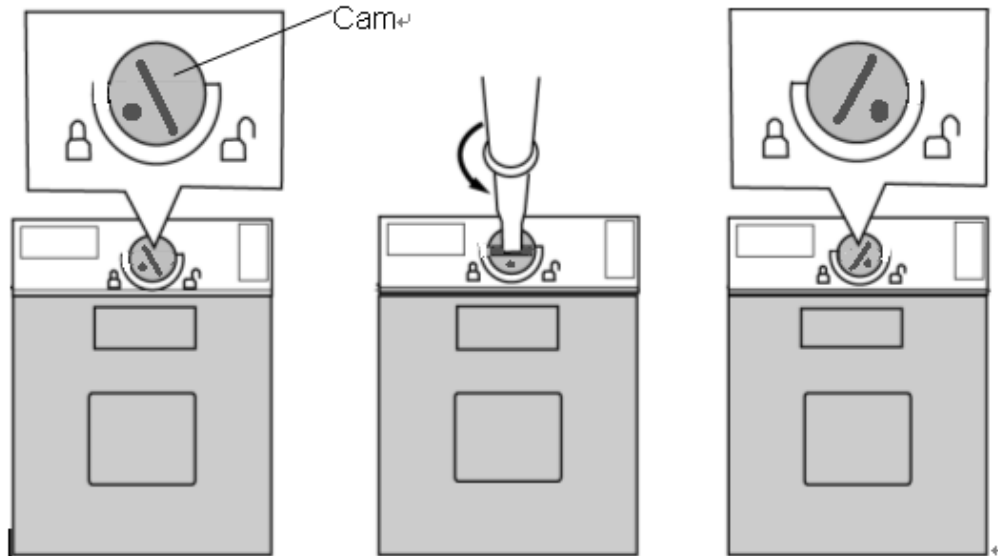


Figure 4-12-2 Remove the CPU

Installing the CPU

Replacement Procedures

The following describes the procedure for installing the CPU (see Figure 4-12-3)

1. Check that the mark of cam is in the unlocking position.
2. Attach the **CPU** to the correct position in the **CPU socket**.
3. Fix the **CPU** by rotating the cam 120 degrees to the clockwise with a flat-blade screwdriver.
4. If there is already silicon grease on the CPU, clean it with a cloth.
Using a special applicator, apply silicon grease so that the CPU chip on the CPU is completely covered.
5. Please apply 0.15cc silicon grease (Shinetsu 7762) for each repair. And apply Thermal pad for N-bridge, VGA&V-RAM for each repair

NOTE: *Apply the silicon grease enough to cover the chip surface using the special applicator. Thermal pad is fixed for each one, no need special applicator.*

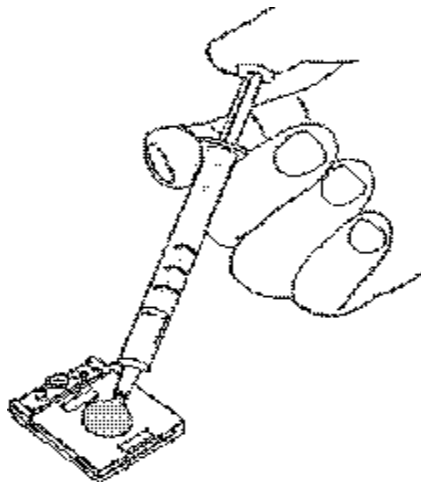


Figure 4-12-3 Apply silicon grease

6. Install the **CPU heat sink** and **heat sink holder** and secure them with the following **screws** along 1 to 3.
7. Disconnect fan cable to the connector on the system board.

NOTE: *When securing the heat sink holder, be sure to secure the screws in the order of the number marked on the holder.*

4.13 LCD unit

CAUTION: When replacing a LCD, it is required that SVP parameter is set. Update with the latest EC/KBC as described in Appendix H “EC/KBC Rewrite Procedures”.

Removing the LCD unit

The following describes the procedure for removing the LCD unit (See Figure 4-13-1 to 4-13-5).

1. Remove Screw MYLAR X4
2. Remove the following screws securing the display mask

M2.5×5 screw X4

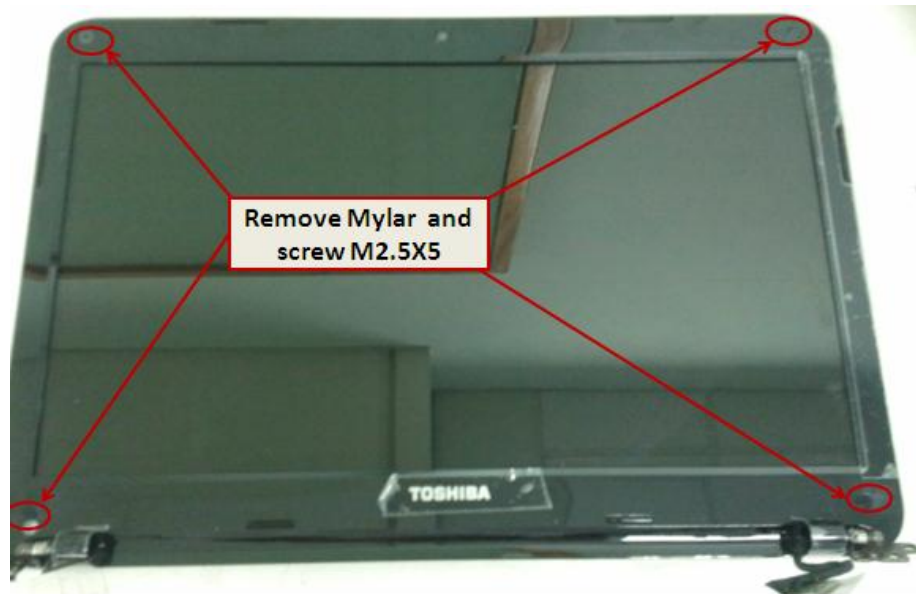


Figure 4-13-1 Remove the display mask

3. Insert your finger between the edge of the display mask and the LCD, and remove the display mask.
4. Remove the following screws securing the LCD unit.

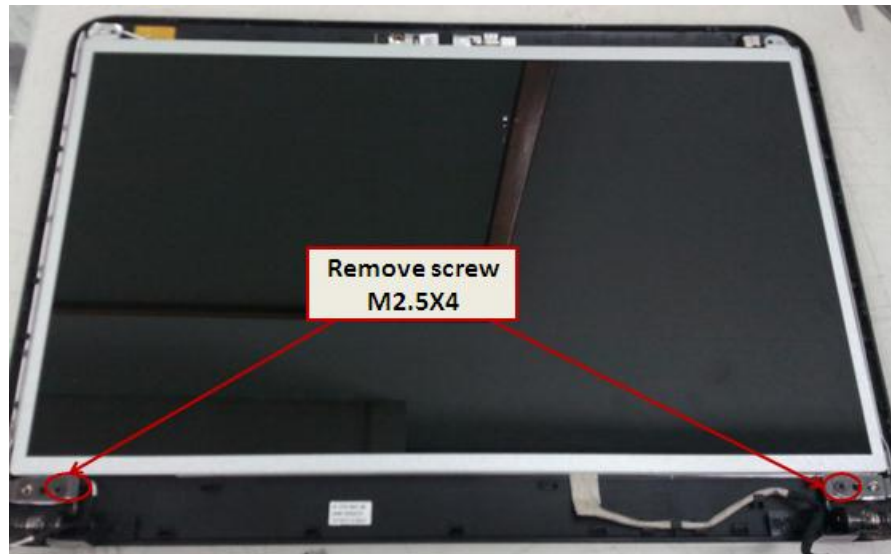


Figure 4-13-2 Remove screw

5. Disconnect LCD cable from the camera connect.

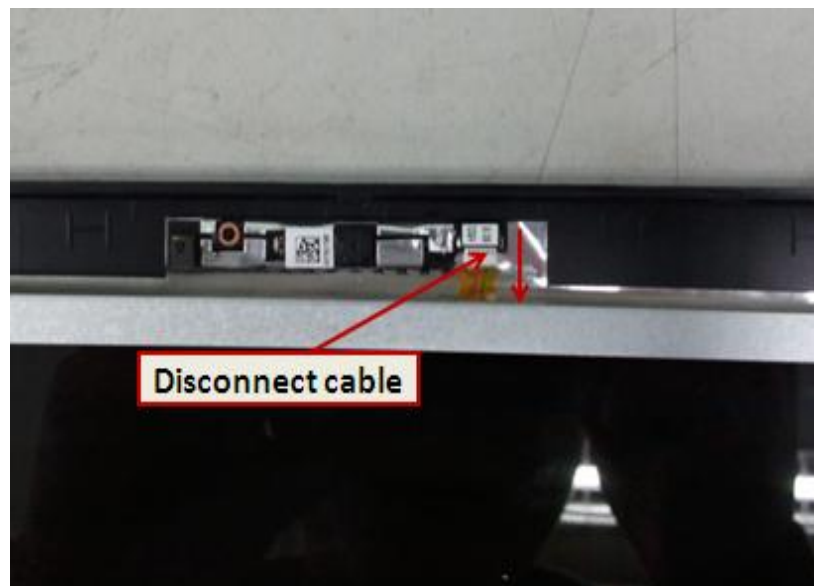


Figure 4-13-3 Disconnect cable

6. Remove LCD unit, turn over the LCD unit, disconnect LCD cable.

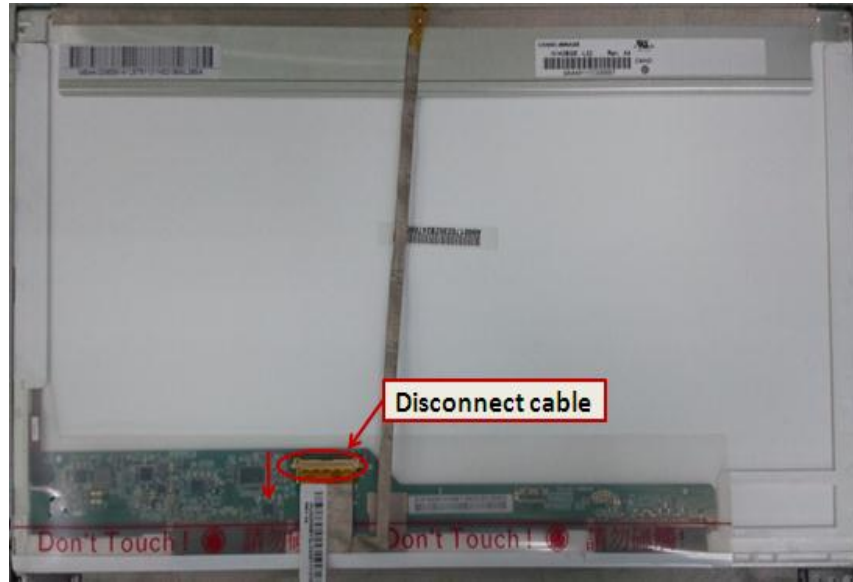


Figure 4-13-4 Disconnect cable

7. Remove the following **screws** securing the LCD support (LCD unit side) and remove the **hinge** from the LCD unit.

- M2.0x3 screw x4

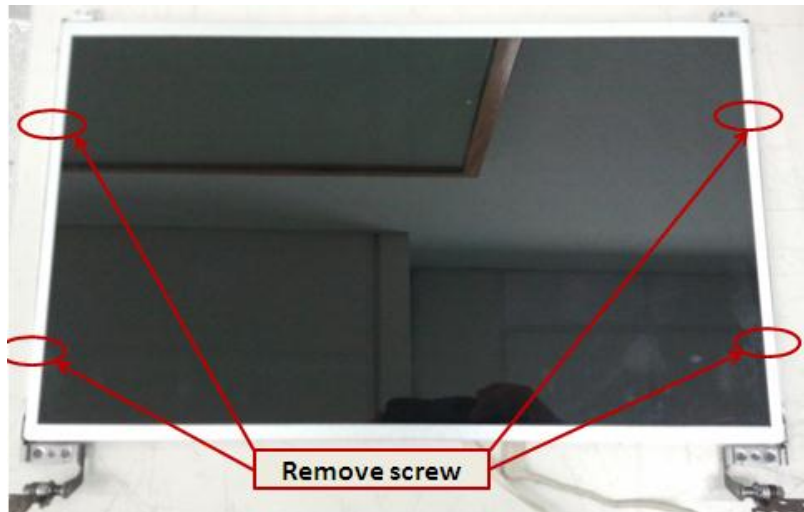


Figure 4-13-5 remove hinge

Installing the LCD unit

Replacement Procedures

The following describes the procedure for installing the LCD unit.

1. Install the LCD hinge to the LCD and secure them with the following screws.

- M2.0×3 BINK screw x4

2. Connect the LCD cable to the connector on the back of LCD.

3. Stick the conductive tape on the connector of LCD cable.

4. Secure the LCD unit with the following screws.

- M2.5x4.0 screw x2

5. Connect LCD cable to the connector of the camera.

6. Install the display mask.

7. Secure the display mask with following **screws**

- M2.5×5 screw X4

8. Cover screws with Screw MYLAR X4

NOTE: When installing the display mask, make sure there is no gap between the display mask and the display cover.

4.14 Web Camera module

Removing Web Camera module

The following describes the procedure for removing the Web Camera module.

(See Figure 4-14-1 to 4-14-2).

1. Disconnect cable and peel off the camera.

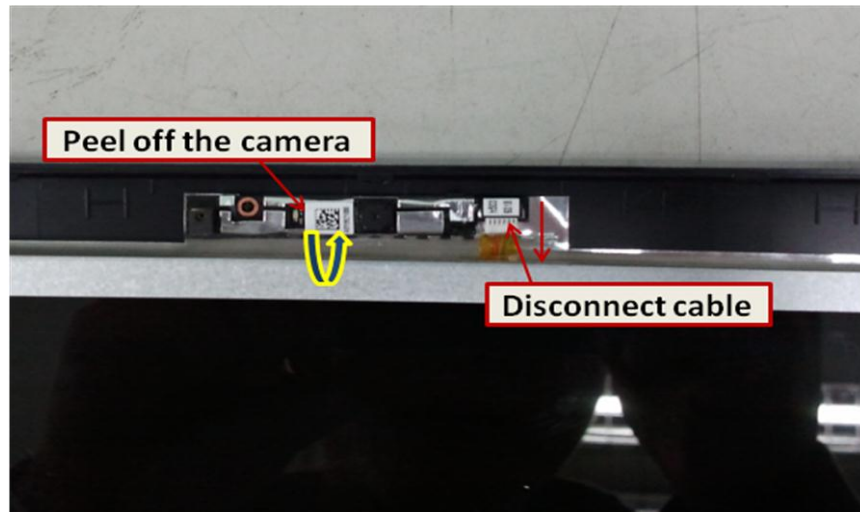


Figure 4-14-1 Remove Web Camera module

Installing Web Camera module

The following describes the procedure for installing the Web Camera module.

1. Connect the connector of Web Camera module
2. Pull in the glue of Web Camera Module.

4.15 Speaker Box

Removing Speaker Box

The following describes the procedure for removing Speaker Box.(See Figure 4-15-1to Figure 4-15-2).

1. Remove the following **screws** securing Speaker Box.

- M2.0×5.5 screw x 4

2. Peel off acid tape fixing the speaking cable X3pcs

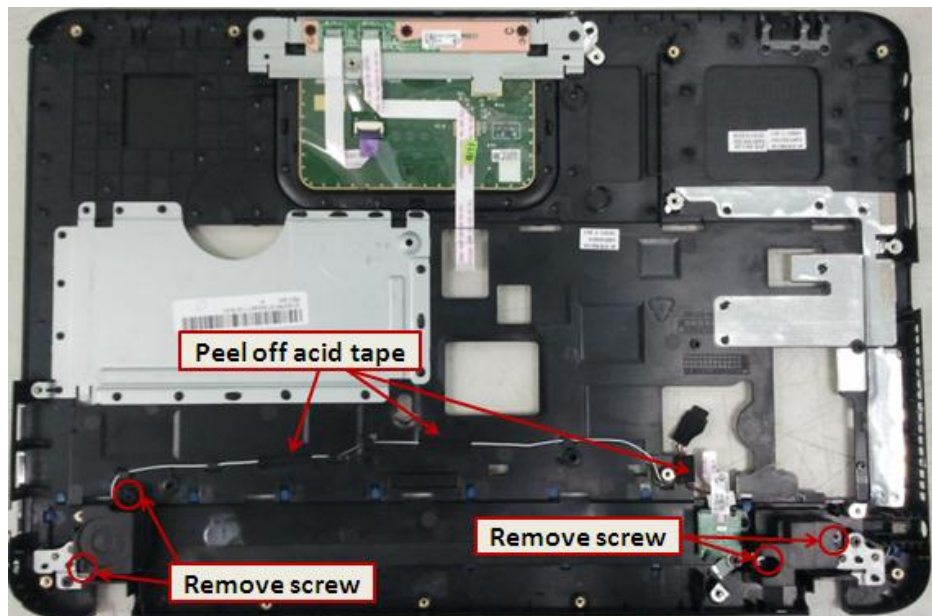


Figure 4-15-1 Remove the securing screws and acid tape

3. Removing the Speaker Box.

Installing Speaker Box

The following describes the procedure for installing Speaker Box.

1. Installing the Speaker Box.
2. Securing Speaker Box of following **screws**.

- M2.0×5.5 screw x 4

3. Put the speaker cable in the top hook and fix with acid tape.

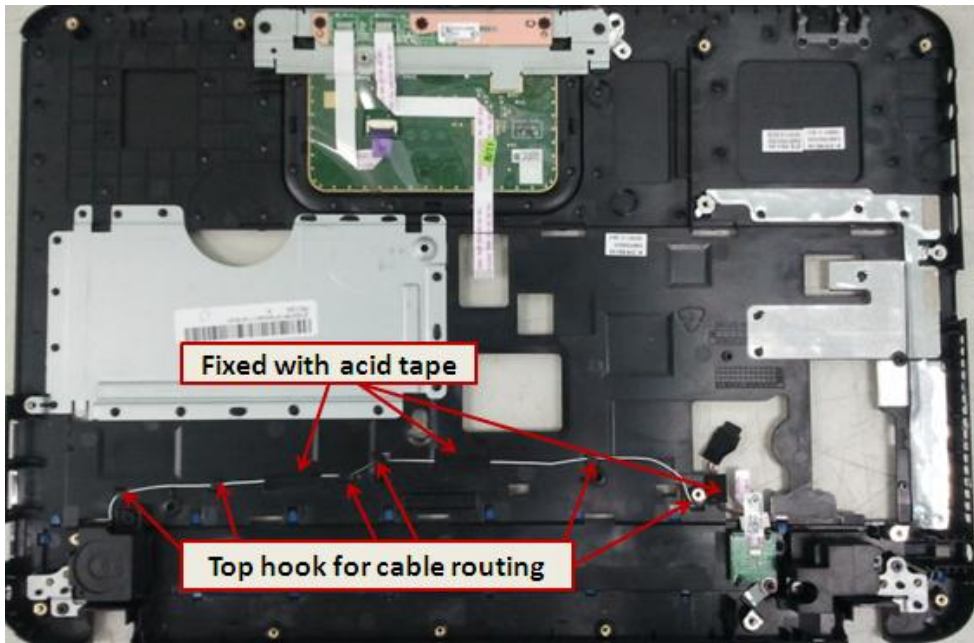


Figure 4-15-2 speaker cable routing

4.16 Use thermal pad and grease on CPU, North Bridge, and VGA board (see Figure 4-16-1 to 4-16-2)

I. For thermal pad grease on CPU

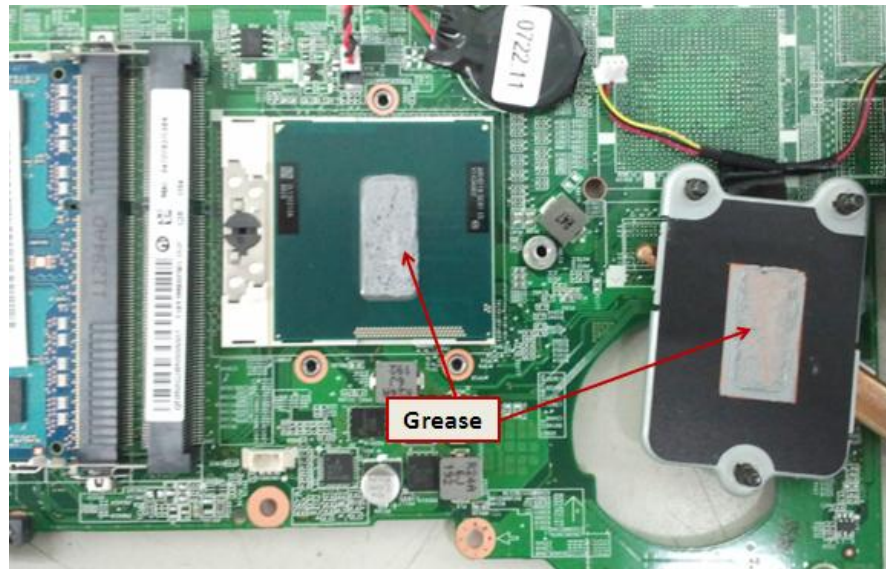


Figure 4-16-1 Intel &AMD Thermal pad on CPU

II. Use silicon grease and Thermal pad on VGA

1. 0.15cc for one repair.

Please use 0.15cc silicon grease (Shinetsu 7762) for each repair and use thermal pad on North Bridge, VGA and VRAM

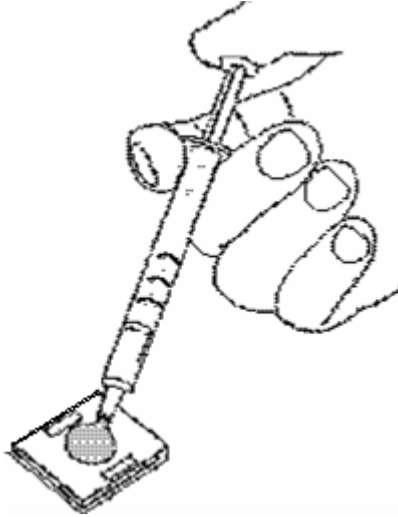


Figure 4-16-2 Use silicon grease for North Bridge

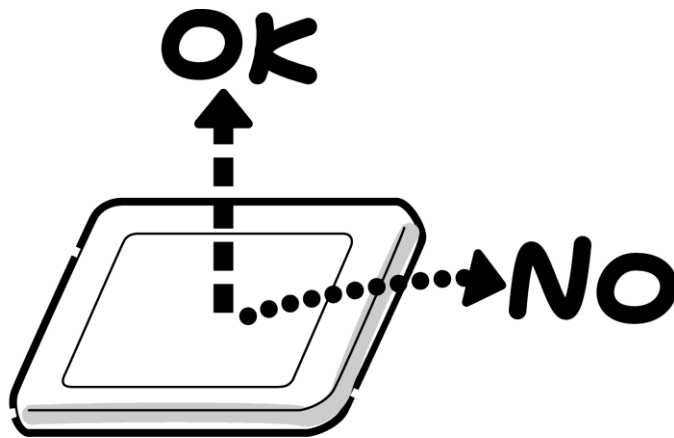
NOTE: *Use the silicon grease enough to cover the chip surface using the special applicator. Thermal pad is fixed for each one, no need special applicator.*

Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be careful when handling it.



3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

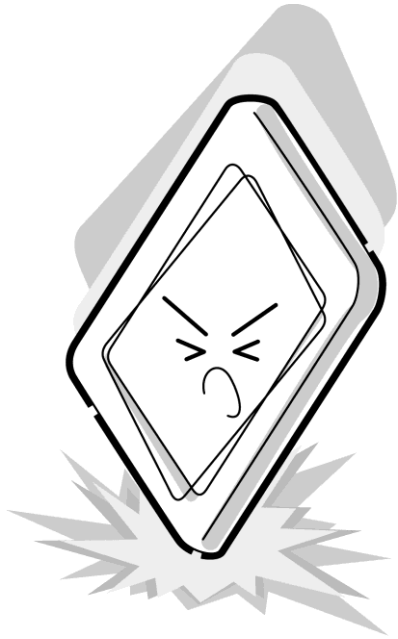
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



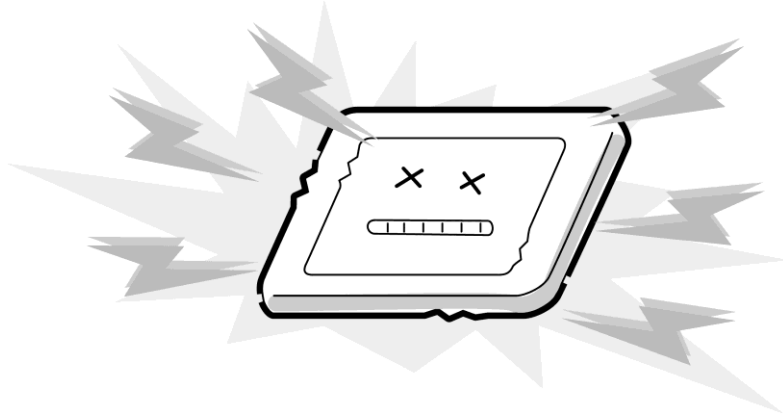
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



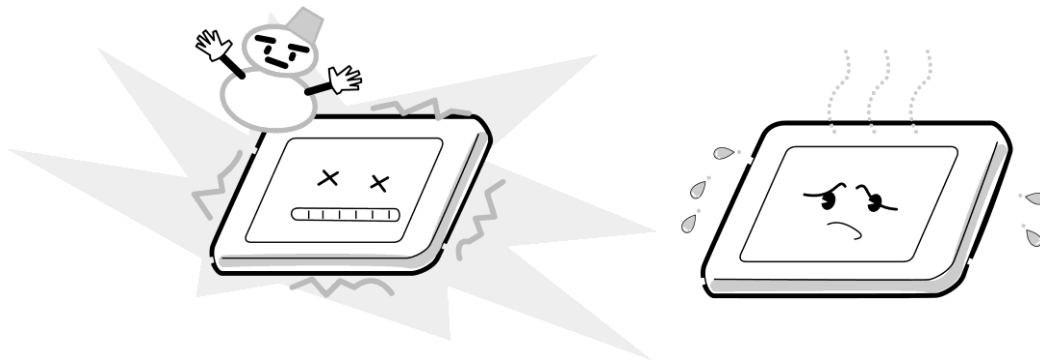
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



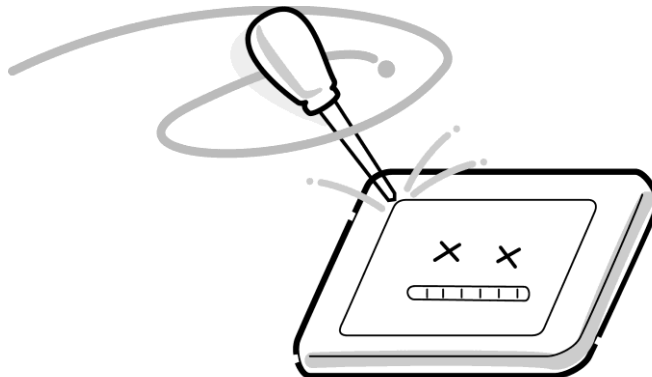
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



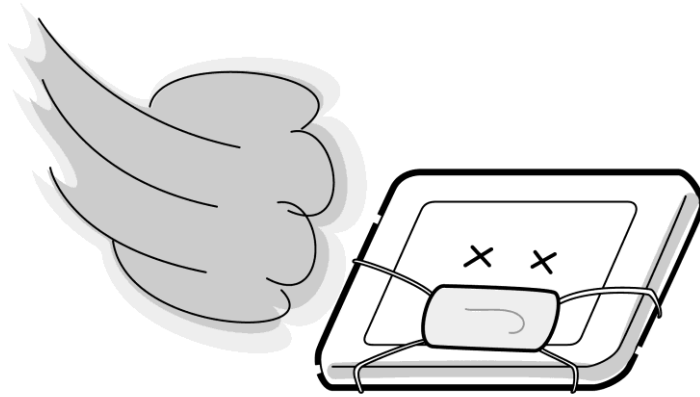
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxide). These materials can release gas that can damage the panel's polarization.



Appendix B Board Layout

B.1 System Board

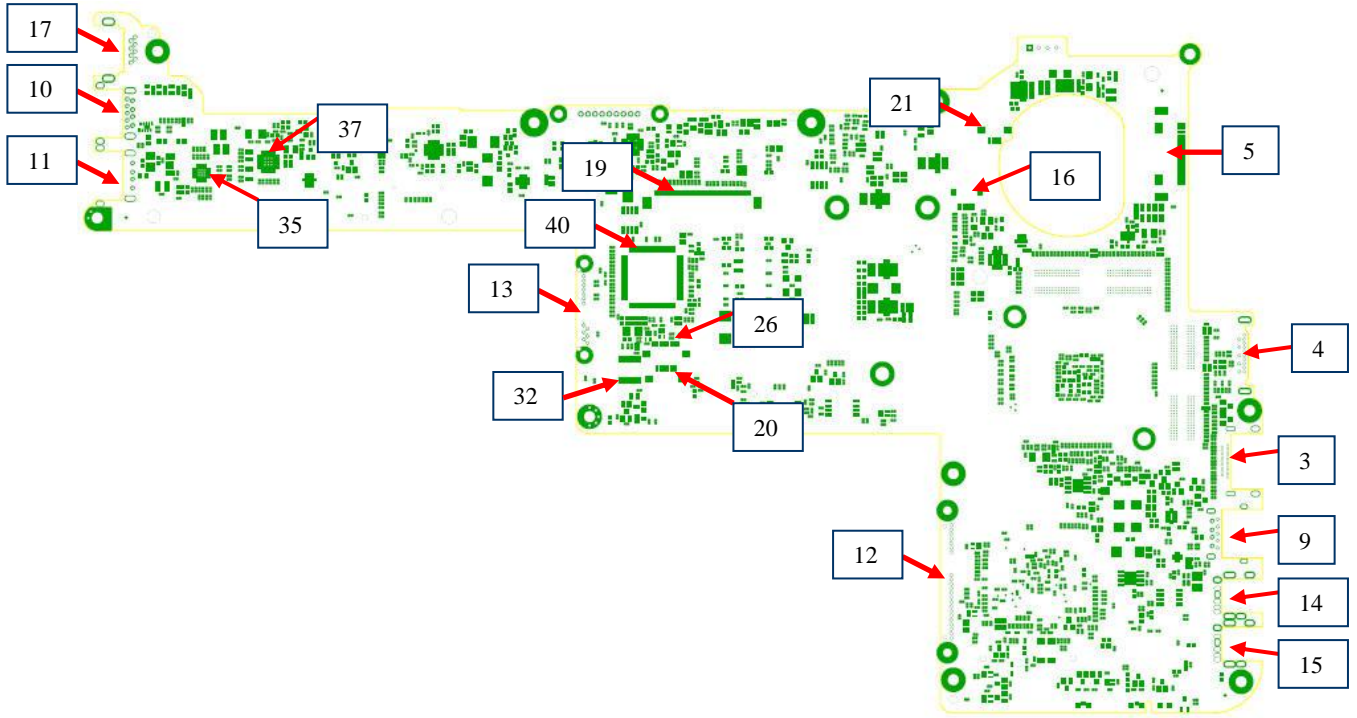


Figure B-1 System board layout (front)

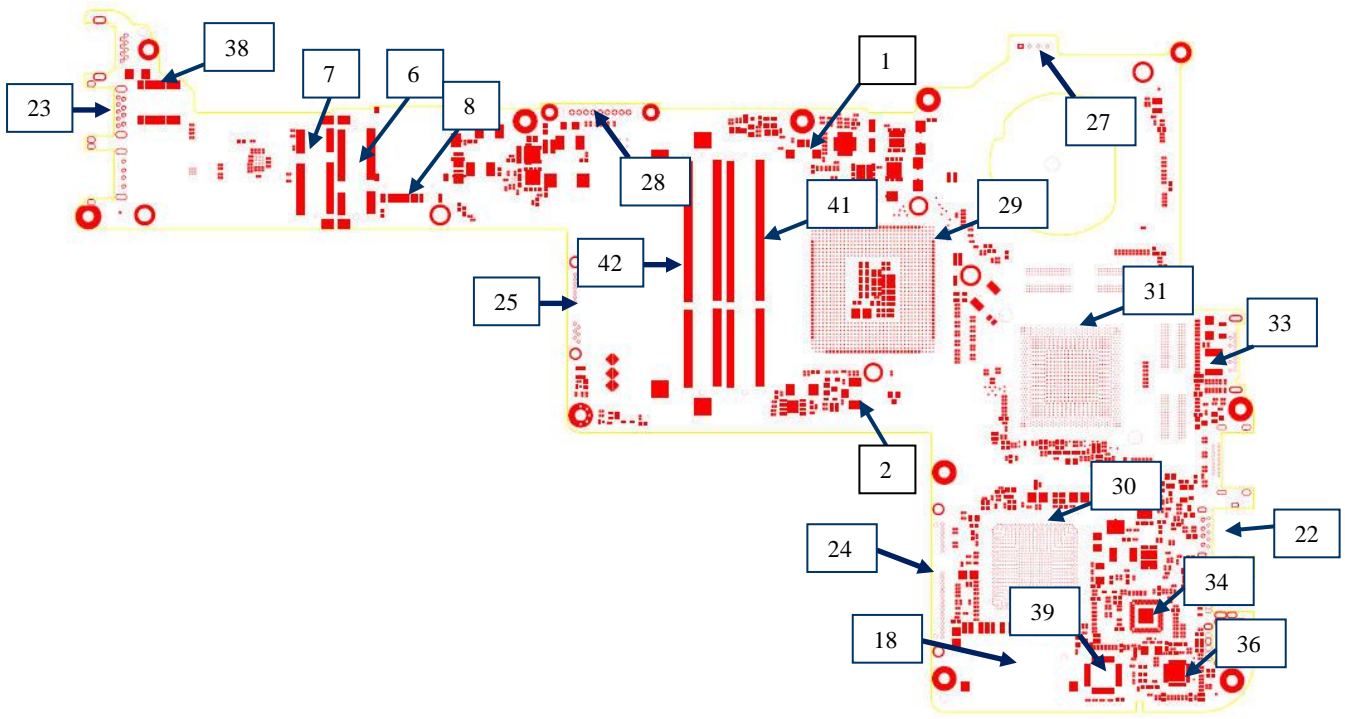


Figure B-2 System board layout (Back)

Board Layout

Table B-1-1 System board ICs and connectors

| NUM | Location | Function |
|-------------|-----------------|------------------------------|
| (01) | CN1001 | FAN CONN |
| (02) | CN2000 | RTC Battery CONN |
| (03) | CN2001 | HDMI CONN |
| (04) | CN2002 | CRT CONN |
| (05) | CN2003 | LCD CONN |
| (06) | CN2004 | WiFi CONN |
| (07) | CN2005 | 3G CONN |
| (08) | CN2006 | SIM CONN |
| (09) | CN2007 | USB3.0 CONN(Right) |
| (10) | CN2008 | USB3.0 CONN(Left) |
| (11) | CN2009 | USB2.0 CONN(Left) |
| (12) | CN2010 | SATA HDD CONN |
| (13) | CN2011 | SATA ODD CONN |
| (14) | CN2012 | External MIC CONN |
| (15) | CN2013 | Headphone CONN |
| (16) | CN2014 | Internal Speaker CONN |
| (17) | CN2015 | LAN CONN |
| (18) | CN2016 | CardReader CONN |
| (19) | CN2018 | KeyBoard CONN |
| (20) | CN2019 | TouchPad CONN |
| (21) | CN2020 | Power Board CONN |

| | | |
|------|----------|------------------------------------|
| (22) | CN2021 | USB2.0 CONN(Right) Co-lay CN2007 |
| (23) | CN2022 | USB2.0 CONN(Left) Co-lay CN2008 |
| (24) | CN2023 | SATA HDD CONN(Luxor) Co-lay CN2010 |
| (25) | CN2024 | SATA ODD CONN(Luxor) Co-lay CN2011 |
| (26) | CN2025 | TouchPad CONN |
| (27) | PCN1 | DC-IN CONN |
| (28) | PCN2 | Battery CONN |
| (29) | U1001 | CPU |
| (30) | U2000 | PCH |
| (31) | U5000 | GPU |
| (32) | U5014 | HDMI CEC IC |
| (33) | U5018 | CRT ESD Protect IC |
| (34) | U5019 | USB 3.0 Controller IC |
| (35) | U5024 | USB 3.0 Re-driver IC |
| (36) | U5026 | Codec IC |
| (37) | U5027 | LAN IC |
| (38) | U5028 | LAN Transformer |
| (39) | U5029 | CardReader Controller |
| (40) | U5030 | Embedded Controller |
| (41) | JDIM3001 | DDR3 CONN |
| (42) | JDIM3002 | DDR3 CONN |

B.2 BY3 Touch Pad Board (3V Power supply)

<Front layout>

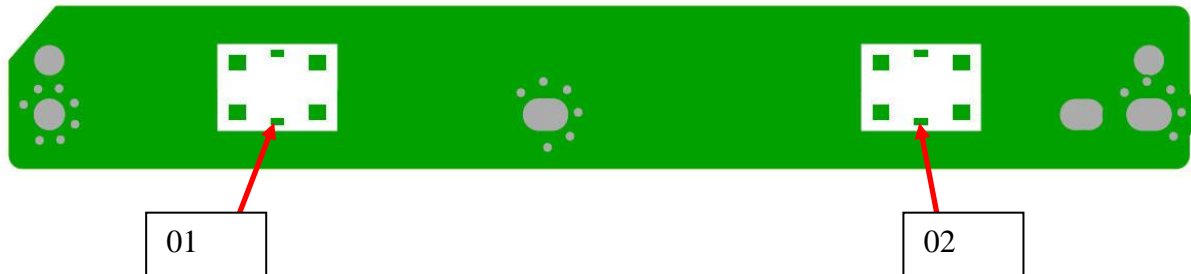


Figure B-2-1 3V Touch Pad board layout (Front)

Table B-2-1 3V Touch Pad board connectors

| NUM | Location | Function |
|-------------|-----------------|-------------------------------|
| (01) | SW1 | Mouse Button Left key |
| (02) | SW2 | Mouse Button Right key |

<Back layout>

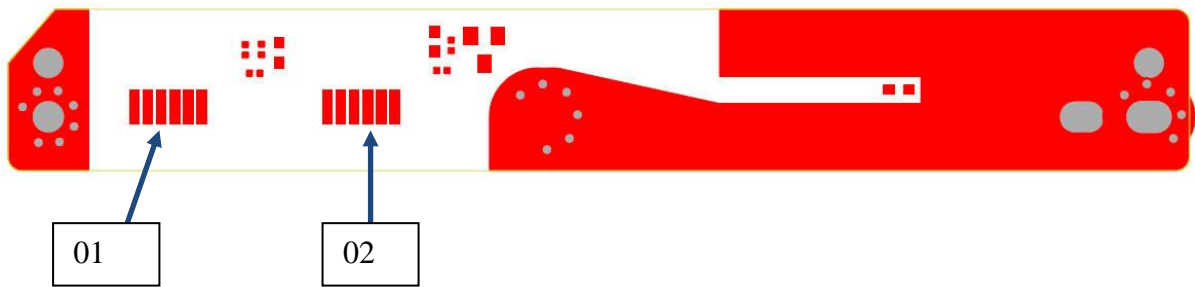


Figure B-2-2 3V Touch Pad board layout (Back)

Table B-2-2 3V Touch Pad board connectors

| NUM | Location | Function |
|------|----------|----------------------------|
| (01) | CN4 | TP Board to TP Module CONN |
| (02) | CN2019 | TP Board to M/B CONN |

B.3 BY3 Touch Pad Board (5V Power Supply)

<Front layout>

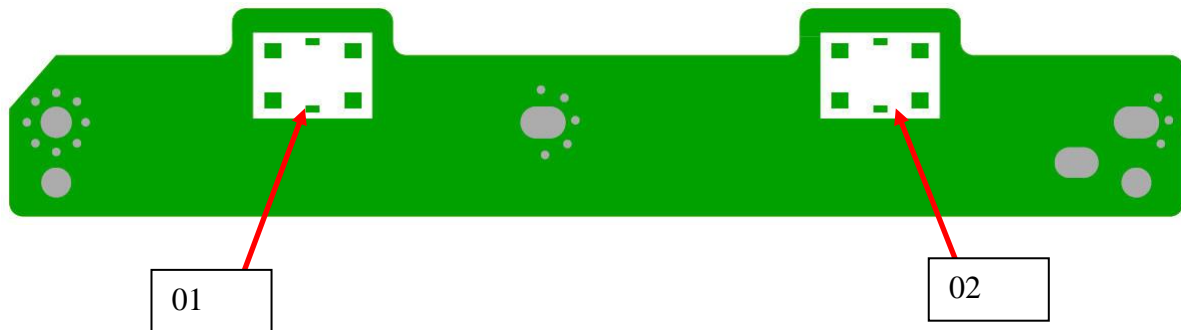


Figure B-3-1 5V Touch Pad board layout (Front)

Table B-3-1 5V Touch Pad board connectors

| NUM | Location | Function |
|-------------|-----------------|-------------------------------|
| (01) | SW1 | Mouse Button Left key |
| (02) | SW2 | Mouse Button Right key |

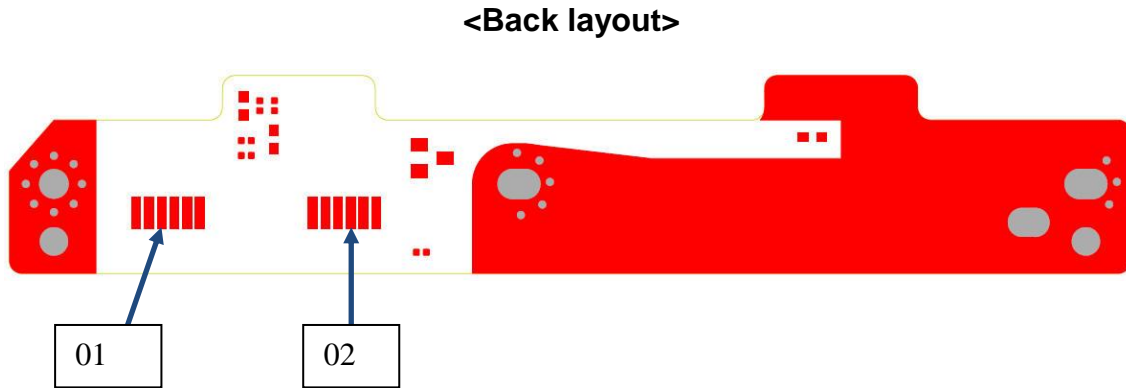


Figure B-3-2 5V Touch Pad board layout (Back)

Table B-3-2 5V Touch Pad board connectors

| NUM | Location | Function |
|------|----------|----------------------------|
| (01) | CN4 | TP Board to TP Module CONN |
| (02) | CN2019 | TP Board to M/B CONN |

B.4 BY4 Touch Pad Board

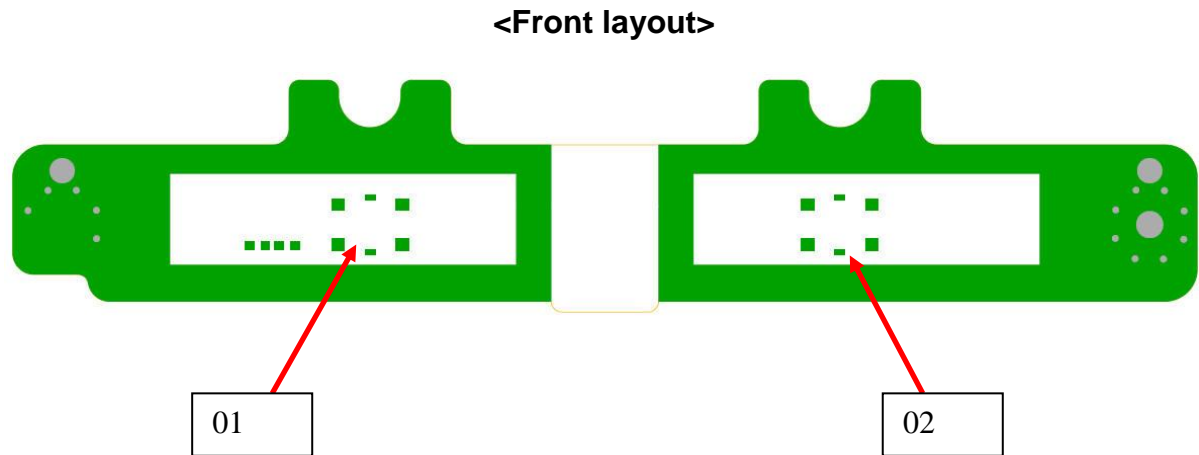


Figure B-4-1 BY4 Touch Pad board layout (Front)

Table B-4-1 BY4 Touch Pad board connectors

| NUM | Location | Function |
|-------------|-----------------|-------------------------------|
| (01) | SW1 | Mouse Button Left key |
| (02) | SW2 | Mouse Button Right key |

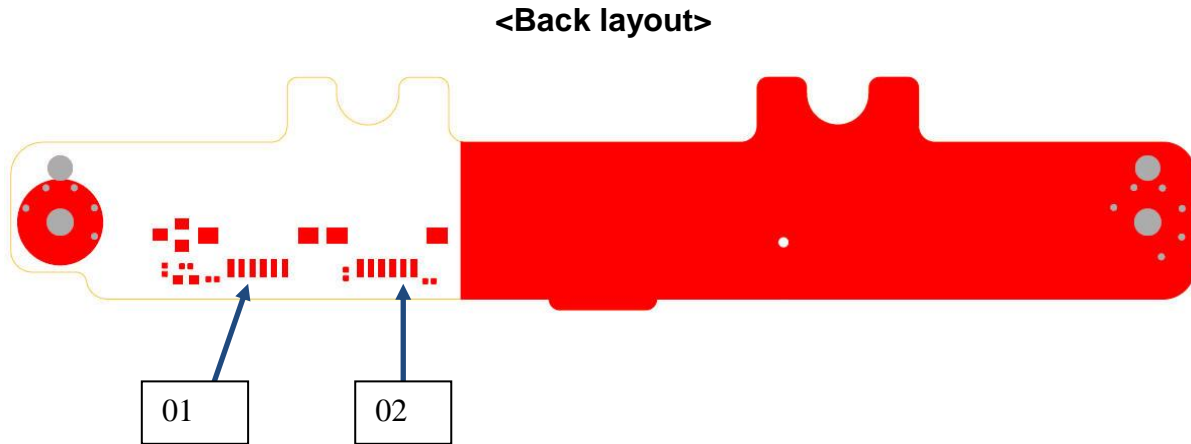


Figure B-4-2 BY4 Touch Pad board layout (Back)

Table B-4-2 BY4 Touch Pad board connectors

| NUM | Location | Function |
|-------------|-----------------|-----------------------------------|
| (01) | CN4 | TP Board to TP Module CONN |
| (02) | CN5 | TP Board to M/B CONN |

B.5 Power Board

<Front layout>

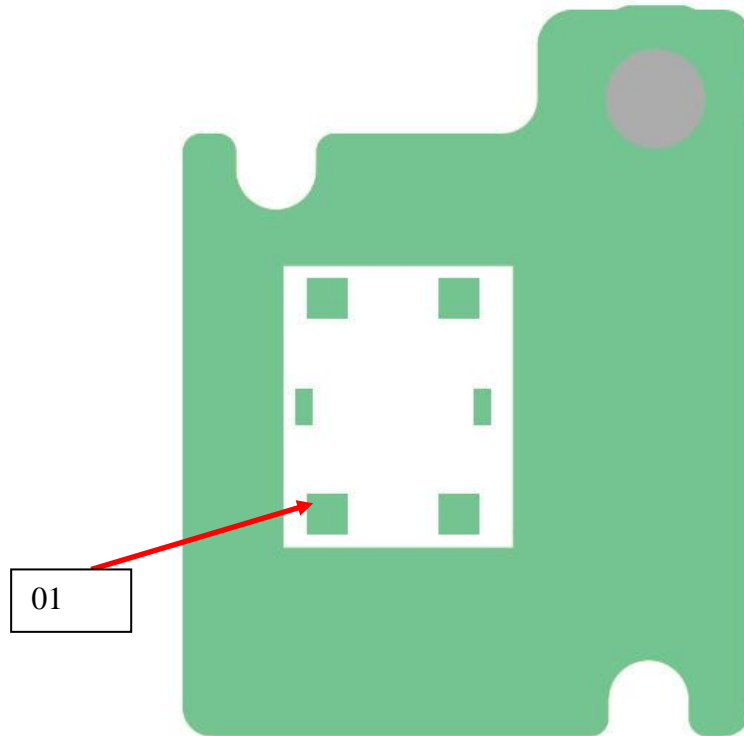


Figure B-5-1 Power board layout (Front)

Table B-5-1 Power board connectors

| NUM | Location | Function |
|-------------|-----------------|---------------------|
| (01) | SW1 | Power Button |

<Back layout>

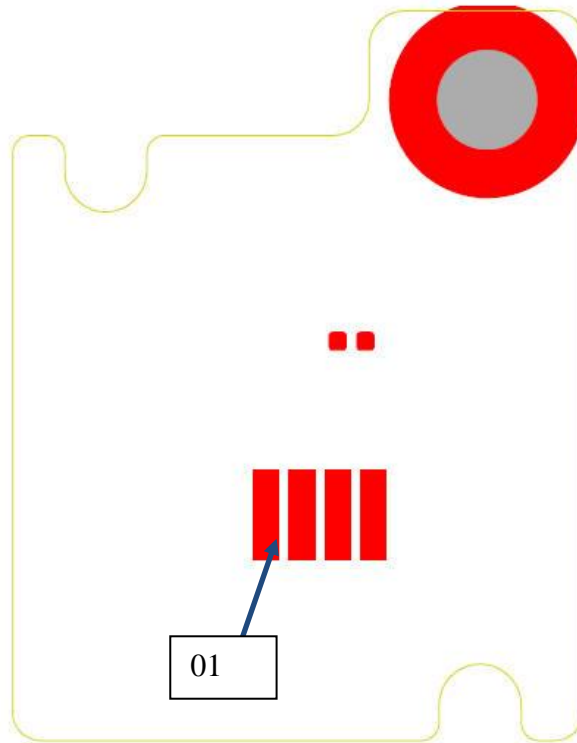


Figure B-5-2 Power board layout (Back)

Table B-5-2 Power board connectors

| NUM | Location | Function |
|-------------|-----------------|--------------------------------|
| (01) | PAD | Power Board to M/B CONN |

Appendix C Pin Assignment

CN1001 Fan Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | TH_FAN_POWER1 | I | 2 | GND | --- |
| 3 | FANSIG1 | O | | | |

CN2000 RTC Battery Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | R_3VRTC_R | I | 2 | GND | --- |

CN2001 HDMI Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | HDMITX2_R | I/O | 2 | GND | --- |
| 3 | HDMITX2#_R | I/O | 4 | HDMITX1_R | I/O |
| 5 | GND | --- | 6 | HDMITX1#_R | I/O |
| 7 | HDMITX0_R | I/O | 8 | GND | --- |
| 9 | HDMITX0#_R | I/O | 10 | HDMICLK_R | I/O |
| 11 | GND | --- | 12 | HDMICLK#_R | I/O |
| 13 | HDMI_CON_CEC | I/O | 14 | --- | --- |
| 15 | HDMI_CON_DDCCLK | I/O | 16 | HDMI_CON_DDCDATA | I/O |
| 17 | GND | --- | 18 | +5V_HDMI | --- |
| 19 | HDMI_CON_HP | I/O | 20 | GND | --- |
| 21 | GND | --- | 22 | GND | --- |
| 23 | GND | --- | | | |

CN2002 CRT Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | CRT_R1 | O | 2 | CRT_G1 | O |
| 3 | CRT_B1 | O | 4 | NC | --- |
| 5 | GND | --- | 6 | GND | --- |
| 7 | GND | --- | 8 | GND | --- |
| 9 | +5V_CRT | --- | 10 | GND | --- |
| 11 | NC | --- | 12 | CRTDDAT | O |
| 13 | CRTHSYNC | O | 14 | CRTVSYNC | O |
| 15 | CRTDCLK | O | 16 | GND | --- |
| 17 | GND | --- | | | |

CN2003 LCD Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|----------------|-----|---------|----------------|-----|
| 1 | VIN | --- | 2 | VIN | --- |
| 3 | NC | --- | 4 | +3V | --- |
| 5 | LCD_EDIDCLK | I/O | 6 | LCD_EDIDDATA | I/O |
| 7 | GND | --- | 8 | LCD_TXLOUT0- | I/O |
| 9 | LCD_TXLOUT0+ | I/O | 10 | GND | --- |
| 11 | LCD_TXLOUT1- | I/O | 12 | LCD_TXLOUT1+ | I/O |
| 13 | GND | --- | 14 | LCD_TXLOUT2- | I/O |
| 15 | LCD_TXLOUT2+ | I/O | 16 | GND | --- |
| 17 | LCD_TXLCLKOUT- | I/O | 18 | LCD_TXLCLKOUT+ | I/O |
| 19 | GND | --- | 20 | LVDS_PWM_R | I/O |
| 21 | DISPON_O_R | I/O | 22 | LCDVCC | --- |
| 23 | LCDVCC | --- | 24 | NC | --- |

Pin Assignment

| | | | | | |
|----|---------------|-----|----|--------------|-----|
| 25 | CCD_POWER | --- | 26 | USB_CCD#_R | --- |
| 27 | USB_CCD_R | --- | 28 | GND | --- |
| 29 | INT_DMIC_DATA | --- | 30 | INT_DMIC_CLK | --- |
| 31 | GND | --- | 32 | GND | --- |
| 33 | GND | --- | 34 | GND | --- |

CN2004 Mini Card WiFi Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|----------------------|-----|---------|--------------|-----|
| 1 | WLAN_WAKE# | O | 2 | WIMAX_P | --- |
| 3 | NC | --- | 4 | GND | --- |
| 5 | NC | --- | 6 | +1.5V | --- |
| 7 | PCIE_CLK_WLAN_REQ#_R | --- | 8 | LAD0_PCIE | I/O |
| 9 | GND | --- | 10 | LAD1_PCIE | I/O |
| 11 | CLK_PCIE_WLAN# | I | 12 | LAD2_PCIE | I/O |
| 13 | CLK_PCIE_WLAN | I | 14 | LAD3_PCIE | I/O |
| 15 | GND | --- | 16 | LFRAME#_PCIE | I |
| 17 | NC | --- | 18 | GND | --- |
| 19 | NC | --- | 20 | RF_EN | I |
| 21 | GND | --- | 22 | PLTRST# | I |
| 23 | PCIE_RXN_WLAN# | O | 24 | WIMAX_P | --- |
| 25 | PCIE_RXP_WLAN | O | 26 | GND | --- |
| 27 | GND | --- | 28 | +1.5V | --- |
| 29 | GND | --- | 30 | SCLK_WLAN | I/O |
| 31 | PCIE_TXN_WLAN# | I | 32 | SDATA_WLAN | I/O |
| 33 | PCIE_TXP_WLAN | I | 34 | GND | --- |
| 35 | GND | --- | 36 | USB_WLAN# | I/O |

| | | | | | |
|----|-------------------|-----|----|----------|-----|
| 37 | GND | --- | 38 | USB_WLAN | I/O |
| 39 | WIMAX_P | --- | 40 | GND | --- |
| 41 | WIMAX_P | --- | 42 | NC | --- |
| 43 | GND | --- | 44 | NC | --- |
| 45 | PCLK_debug_R | I/O | 46 | NC | --- |
| 47 | PLTRST#_debug | I/O | 48 | +1.5V | --- |
| 49 | NC | --- | 50 | GND | --- |
| 51 | BT_DISABLE#_INTEL | O | 52 | WIMAX_P | --- |

CN2005 Mini Card 3G Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | NC | --- | 2 | +3V | --- |
| 3 | NC | --- | 4 | GND | --- |
| 5 | NC | --- | 6 | +1.5V | --- |
| 7 | PCIE_CLK_3G_REQ# | O | 8 | UIM_PWR | --- |
| 9 | GND | --- | 10 | UIM_DATA | I/O |
| 11 | CLK_PCIE_3G# | I | 12 | UIM_CLK | I/O |
| 13 | CLK_PCIE_3G | I | 14 | UIM_RST | I/O |
| 15 | GND | --- | 16 | UIM_VPP | --- |
| 17 | NC | --- | 18 | GND | --- |
| 19 | NC | --- | 20 | 3G_EN | I |
| 21 | GND | --- | 22 | PLTRST# | I |
| 23 | PCIE_RXN_3G# | O | 24 | +3V | --- |
| 25 | PCIE_RXP_3G | O | 26 | GND | --- |
| 27 | GND | --- | 28 | +1.5V | --- |
| 29 | GND | --- | 30 | CGCLK_SMB | I/O |

Pin Assignment

| | | | | | |
|----|--------------|-----|----|-----------|-----|
| 31 | PCIE_TXN_3G# | I | 32 | CGDAT_SMB | I/O |
| 33 | PCIE_TXP_3G | I | 34 | GND | --- |
| 35 | GND | --- | 36 | USB_3G# | I/O |
| 37 | NC | --- | 38 | USB_3G | I/O |
| 39 | +3V | --- | 40 | CPUSB# | O |
| 41 | +3V | --- | 42 | NC | --- |
| 43 | GND | --- | 44 | NC | --- |
| 45 | NC | --- | 46 | NC | --- |
| 47 | NC | --- | 48 | +1.5V | --- |
| 49 | NC | --- | 50 | GND | --- |
| 51 | NC | --- | 52 | +3V | --- |

CN2006 SIM Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | GND | --- | 2 | UIM_PWR | --- |
| 3 | UIM_VPP | --- | 4 | UIM_RST | I/O |
| 5 | UIM_DATA | I/O | 6 | UIM_CLK | I/O |
| 7 | USB_SIM# | I/O | 8 | USB_SIM | I/O |
| 9 | NC | --- | 10 | NC | --- |
| 11 | GND | --- | 12 | GND | --- |
| 13 | GND | --- | 14 | GND | --- |

CN2007 USB 3.0 Connector (Right)

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|---------------|-----|---------|---------------|-----|
| 1 | +5VSUS_USBP0 | --- | 2 | USB20N_CONN_C | I/O |
| 3 | USB20P_CONN_C | I/O | 4 | GND | --- |

| | | | | | |
|----|--------------|-----|----|--------------|-----|
| 5 | USB30_RX1-_C | I/O | 6 | USB30_RX1+_C | I/O |
| 7 | GND | --- | 8 | USB30_TX1-_C | I/O |
| 9 | USB30_TX1+_C | I/O | 10 | GND | --- |
| 11 | GND | --- | 12 | GND | --- |
| 13 | GND | --- | | | |

CN2008 USB 3.0 Connector (Left)

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|--------------|-----|---------|--------------|-----|
| 1 | +5VSUS_USBP1 | --- | 2 | USB20N_L1_C | I/O |
| 3 | USB20P_L1_C | I/O | 4 | GND | --- |
| 5 | USB30_RX3-_C | I/O | 6 | USB30_RX3+_C | I/O |
| 7 | GND | --- | 8 | USB30_TX3-_C | I/O |
| 9 | USB30_TX3+_C | I/O | 10 | GND | --- |
| 11 | GND | --- | 12 | GND | --- |
| 13 | GND | --- | | | |

CN2009 USB 2.0 Connector (Left)

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|--------------|-----|---------|-------------|-----|
| 1 | +5VSUS_USBP1 | --- | 2 | USBP9-_C | I/O |
| 3 | USBP9+_C | I/O | 4 | GND | --- |
| 5 | GND | --- | 6 | GND | --- |
| 7 | GND | --- | 8 | GND | --- |

CN2010 Cape Town SATA HDD Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|--------------------|-----|
| 1 | GND | --- | 2 | SATA_TXP_1ST_HDD_C | I/O |

Pin Assignment

| | | | | | |
|----|---------------------|-----|----|--------------------|-----|
| 3 | SATA_TXN_1ST_HDD#_C | I/O | 4 | GND | --- |
| 5 | SATA_RXN_1ST_HDD#_C | I/O | 6 | SATA_RXP_1ST_HDD_C | I/O |
| 7 | GND | --- | 8 | NC | --- |
| 9 | NC | --- | 10 | NC | --- |
| 11 | GND | --- | 12 | GND | --- |
| 13 | GND | --- | 14 | +5V_HDD1 | --- |
| 15 | +5V_HDD1 | --- | 16 | +5V_HDD1 | --- |
| 17 | GND | --- | 18 | NC | --- |
| 19 | GND | --- | 20 | NC | --- |
| 21 | NC | --- | 22 | NC | --- |
| 23 | GND | --- | 24 | GND | --- |

CN2011 Cape Town SATA ODD Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | GND | --- | 2 | SATA_TXP_ODD_C | I/O |
| 3 | SATA_TXN_ODD#_C | I/O | 4 | GND | --- |
| 5 | SATA_RXN_ODD#_C | I/O | 6 | SATA_RXP_ODD_C | I/O |
| 7 | GND | --- | 8 | ODD_PRSENT# | I/O |
| 9 | +5V_ODD | --- | 10 | +5V_ODD | --- |
| 11 | ODD_MD# | I/O | 12 | GND | --- |
| 13 | GND | --- | 14 | GND | --- |
| 15 | GND | --- | | | |

CN2012 External MIC Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | ADOGND | --- | 2 | MIC1_L3 | O |

| | | | | | |
|---|------------|-----|----|--------|-----|
| 3 | MIC1_R3 | O | 4 | ADOGND | --- |
| 5 | Port_B# | O | 6 | NC | --- |
| 7 | Shield_GND | --- | 8 | GND | --- |
| 9 | Shield_GND | --- | 10 | GND | --- |

CN2013 Headphone Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | ADOGND | --- | 2 | HPOUT-L3 | O |
| 3 | HPOUT-R3 | O | 4 | ADOGND | --- |
| 5 | Port_A# | O | 6 | NC | --- |
| 7 | GND | --- | 8 | Shield_GND | --- |
| 9 | GND | --- | 10 | Shield_GND | --- |

CN2014 Internal Speaker Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | INSPKR+N | O | 2 | INSPKR-N | O |
| 3 | INSPKL-N | O | 4 | INSPKL+N | O |

CN2015 RJ45 Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | X-TX0P | I/O | 2 | X-TX0N | I/O |
| 3 | X-TX1P | I/O | 4 | X-TX2P | I/O |
| 5 | X-TX2N | I/O | 6 | X-TX1N | I/O |
| 7 | X-TX3P | I/O | 8 | X-TX3N | I/O |

CN2016 2 IN 1 Card Reader Connector

Pin Assignment

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | SD_D3 | I/O | 2 | SD_CMD | I/O |
| 3 | GND | --- | 4 | VCC_XD | --- |
| 5 | SD_CLK | I/O | 6 | GND | --- |
| 7 | SD_D0 | I/O | 8 | SD_D1 | I/O |
| 9 | SD_D2 | I/O | 10 | SD_WP | I/O |
| 11 | SD_CD# | I/O | 12 | GND | --- |
| 13 | GND | --- | 14 | NC | --- |
| 15 | NC | --- | | | |

CN2018 KeyBoard Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | K_LED_P | --- | 2 | MY16 | O |
| 3 | NC | --- | 4 | MX17 | O |
| 5 | NC | --- | 6 | K_LED_P | --- |
| 7 | MY2 | O | 8 | MY1 | O |
| 9 | MY0 | O | 10 | MY4 | O |
| 11 | MY3 | O | 12 | MY5 | O |
| 13 | MY14 | O | 14 | MY6 | O |
| 15 | MY7 | O | 16 | MY13 | O |
| 17 | MY8 | O | 18 | MY9 | O |
| 19 | MY10 | O | 20 | MY11 | O |
| 21 | MY12 | O | 22 | MY15 | O |
| 23 | MX7 | O | 24 | MX2 | O |
| 25 | MX3 | O | 26 | MX4 | O |

| | | | | | |
|----|---------|---|----|---------|---|
| 27 | MX0 | O | 28 | MX5 | O |
| 29 | MX6 | O | 30 | MX1 | O |
| 31 | K_LED_P | O | 32 | CAPSLED | O |
| 33 | NC | O | 34 | NC | O |

CN2019 Touch Pad Board Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | +5V_TP | --- | 2 | TPCLK_L | I/O |
| 3 | TPDATA_L | I/O | 4 | GND | --- |
| 5 | ID_Detect | O | 6 | +3V | --- |

CN2020 Power Board Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | NC | --- | 2 | NBSWON | I |
| 3 | NC | --- | 4 | GND | --- |

CN2021 USB 2.0 Connector (Right side Co-lay CN2007)

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|---------------|-----|---------|---------------|-----|
| 1 | +5VSUS_USBPO | --- | 2 | USB20N_CONN_C | I/O |
| 3 | USB20P_CONN_C | I/O | 4 | GND | --- |
| 5 | GND | --- | 6 | GND | --- |
| 7 | GND | --- | 8 | GND | --- |

CN2022 USB 2.0 Connector (Left side Co-lay CN2008)

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
|---------|-------------|-----|---------|-------------|-----|

Pin Assignment

| | | | | | |
|---|--------------|-----|---|--------------|-----|
| 1 | +5VSUS_USBP1 | --- | 2 | USB20N_L1_C | I/O |
| 3 | USB20P_L1_C | I/O | 4 | GND | --- |
| 5 | USB30_RX3-_C | I/O | 6 | USB30_RX3+_C | I/O |
| 7 | GND | --- | 8 | USB30_TX3-_C | I/O |

CN2023 Luxor SATA HDD (Co-lay CN2010)

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|---------------------|-----|---------|--------------------|-----|
| 1 | GND | --- | 2 | SATA_TXP_1ST_HDD_C | I/O |
| 3 | SATA_TXN_1ST_HDD#_C | I/O | 4 | GND | --- |
| 5 | SATA_RXN_1ST_HDD#_C | I/O | 6 | SATA_RXP_1ST_HDD_C | I/O |
| 7 | GND | --- | 8 | NC | --- |
| 9 | NC | --- | 10 | NC | --- |
| 11 | GND | --- | 12 | GND | --- |
| 13 | GND | --- | 14 | +5V_HDD1 | --- |
| 15 | +5V_HDD1 | --- | 16 | +5V_HDD1 | --- |
| 17 | GND | --- | 18 | NC | --- |
| 19 | GND | --- | 20 | NC | --- |
| 21 | NC | --- | 22 | NC | --- |
| 23 | GND | --- | 24 | GND | --- |

CN2024 Luxor SATA ODD (Co-lay CN2011)

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-----------------|-----|---------|----------------|-----|
| 1 | GND | --- | 2 | SATA_TXP_ODD_C | I/O |
| 3 | SATA_TXN_ODD#_C | I/O | 4 | GND | --- |
| 5 | SATA_RXN_ODD#_C | I/O | 6 | SATA_RXP_ODD_C | I/O |
| 7 | GND | --- | 8 | ODD_PRSENT# | --- |

| | | | | | |
|----|---------|-----|----|---------|-----|
| 9 | +5V_ODD | --- | 10 | +5V_ODD | --- |
| 11 | ODD_MD# | I/O | 12 | GND | --- |
| 13 | GND | --- | 14 | GND | --- |
| 15 | GND | --- | | | |

PCN1 DC-IN Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | GND | --- | 2 | GND | --- |
| 3 | DC_JACK | --- | 4 | DC_JACK | --- |

PCN2 Battery Connector

| PIN No. | Signal name | I/O | PIN No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | MBAT+ | --- | 2 | MBAT+ | I/O |
| 3 | ID | O | 4 | BAT-GND | --- |
| 5 | TEMP_MBAT_C | I/O | 6 | M-DATA | I/O |
| 7 | M-CLOCK | I | 8 | GND | --- |
| 9 | GND | --- | 10 | GND | --- |
| 11 | GND | --- | 12 | GND | --- |

JDIM3001 DDR3 Connector

| <i>PIN No.</i> | <i>Signal name</i> | <i>I/O</i> | <i>PIN No.</i> | <i>Signal name</i> | <i>I/O</i> |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 1 | SMDDR_VREF_DQ0_R | --- | 2 | GND | --- |
| 3 | GND | --- | 4 | M_A_DQ4 | I/O |
| 5 | M_A_DQ0 | I/O | 6 | M_A_DQ5 | I/O |
| 7 | M_A_DQ1 | I/O | 8 | GND | --- |
| 9 | GND | --- | 10 | M_A_DQSN0 | I/O |

Pin Assignment

| | | | | | |
|----|-----------|-----|----|---------------|-----|
| 11 | GND | I/O | 12 | M_A_DQSP0 | I/O |
| 13 | GND | I/O | 14 | GND | --- |
| 15 | M_A_DQ7 | I/O | 16 | M_A_DQ6 | I/O |
| 17 | M_A_DQ6 | I/O | 18 | M_A_DQ7 | I/O |
| 19 | GND | --- | 20 | GND | --- |
| 21 | M_A_DQ8 | I/O | 22 | M_A_DQ12 | I/O |
| 23 | M_A_DQ9 | I/O | 24 | M_A_DQ13 | I/O |
| 25 | GND | --- | 26 | GND | --- |
| 27 | M_A_DQSN1 | I/O | 28 | GND | I/O |
| 29 | M_A_DQSP1 | I/O | 30 | DDR3_DRAMRST# | I/O |
| 31 | GND | --- | 32 | GND | --- |
| 33 | M_A_DQ10 | I/O | 34 | M_A_DQ15 | I/O |
| 35 | M_A_DQ11 | I/O | 36 | M_A_DQ14 | I/O |
| 37 | GND | --- | 38 | GND | --- |
| 39 | M_A_DQ16 | I/O | 40 | M_A_DQ21 | I/O |
| 41 | M_A_DQ17 | I/O | 42 | M_A_DQ20 | I/O |
| 43 | GND | --- | 44 | GND | --- |
| 45 | M_A_DQSN2 | I/O | 46 | GND | I/O |
| 47 | M_A_DQSP2 | I/O | 48 | GND | --- |
| 49 | GND | --- | 50 | M_A_DQ22 | I/O |
| 51 | M_A_DQ18 | I/O | 52 | M_A_DQ19 | I/O |
| 53 | M_A_DQ23 | I/O | 54 | GND | --- |
| 55 | GND | --- | 56 | M_A_DQ29 | I/O |
| 57 | M_A_DQ28 | I/O | 58 | M_A_DQ24 | I/O |
| 59 | M_A_DQ25 | I/O | 60 | GND | --- |
| 61 | GND | --- | 62 | M_A_DQSN3 | I/O |

| | | | | | |
|-----|-----------|-----|-----|-----------|-----|
| 63 | GND | I/O | 64 | M_A_DQSP3 | I/O |
| 65 | GND | --- | 66 | GND | --- |
| 67 | M_A_DQ26 | I/O | 68 | M_A_DQ30 | I/O |
| 69 | M_A_DQ27 | I/O | 70 | M_A_DQ31 | I/O |
| 71 | GND | --- | 72 | GND | --- |
| 73 | M_A_CKE0 | I/O | 74 | M_A_CKE1 | I/O |
| 75 | +1.5VSUS | I/O | 76 | +1.5VSUS | I/O |
| 77 | NC | --- | 78 | M_A_A15 | I/O |
| 79 | M_A_BS#2 | I/O | 80 | M_A_A14 | I/O |
| 81 | +1.5VSUS | --- | 82 | +1.5VSUS | --- |
| 83 | M_A_A12 | I/O | 84 | M_A_A11 | I/O |
| 85 | M_A_A9 | I/O | 86 | M_A_A7 | I/O |
| 87 | +1.5VSUS | --- | 88 | +1.5VSUS | --- |
| 89 | M_A_A8 | I/O | 90 | M_A_A6 | I/O |
| 91 | M_A_A5 | I/O | 92 | M_A_A4 | I/O |
| 93 | +1.5VSUS | --- | 94 | +1.5VSUS | --- |
| 95 | M_A_A3 | I/O | 96 | M_A_A2 | I/O |
| 97 | M_A_A1 | I/O | 98 | M_A_A0 | I/O |
| 99 | +1.5VSUS | --- | 100 | +1.5VSUS | --- |
| 101 | M_A_CLKP0 | I/O | 102 | M_A_CLKP1 | I/O |
| 103 | M_A_CLKN0 | I/O | 104 | M_A_CLKN1 | I/O |
| 105 | +1.5VSUS | --- | 106 | +1.5VSUS | --- |
| 107 | M_A_A10 | I | 108 | M_A_BS#1 | I |
| 109 | M_A_BS#0 | I | 110 | M_A_RAS# | I |
| 111 | +1.5VSUS | --- | 112 | +1.5VSUS | --- |
| 113 | M_A_WE# | I | 114 | M_A_CS#0 | I |

Pin Assignment

| | | | | | |
|-----|-----------|-----|-----|-----------------|-----|
| 115 | M_A_CAS# | I | 116 | M_A_ODT0 | I |
| 117 | +1.5VSUS | --- | 118 | +1.5VSUS | --- |
| 119 | M_A_A13 | I | 120 | M_A_ODT1 | I |
| 121 | M_A_CS#1 | I | 122 | NC | --- |
| 123 | +1.5VSUS | --- | 124 | +1.5VSUS | --- |
| 125 | NC | --- | 126 | SMDDR_VREF_DIMM | I/O |
| 127 | GND | --- | 128 | GND | --- |
| 129 | M_A_DQ36 | I/O | 130 | M_A_DQ32 | I/O |
| 131 | M_A_DQ37 | I/O | 132 | M_A_DQ33 | I/O |
| 133 | GND | --- | 134 | GND | --- |
| 135 | M_A_DQSN4 | I/O | 136 | GND | I/O |
| 137 | M_A_DQSP4 | I/O | 138 | GND | --- |
| 139 | GND | --- | 140 | M_A_DQ39 | I/O |
| 141 | M_A_DQ35 | I/O | 142 | M_A_DQ38 | I/O |
| 143 | M_A_DQ34 | I/O | 144 | GND | --- |
| 145 | GND | --- | 146 | M_A_DQ40 | I/O |
| 147 | M_A_DQ45 | I | 148 | M_A_DQ41 | I/O |
| 149 | M_A_DQ44 | I | 150 | GND | --- |
| 151 | GND | --- | 152 | M_A_DQSN5 | I/O |
| 153 | GND | I/O | 154 | M_A_DQSP5 | I/O |
| 155 | GND | --- | 156 | GND | --- |
| 157 | M_A_DQ47 | I/O | 158 | M_A_DQ42 | I/O |
| 159 | M_A_DQ46 | I/O | 160 | M_A_DQ43 | I/O |
| 161 | GND | --- | 162 | GND | --- |
| 163 | M_A_DQ48 | I/O | 164 | M_A_DQ52 | I/O |
| 165 | M_A_DQ53 | I/O | 166 | M_A_DQ49 | I/O |

| | | | | | |
|-----|--------------|-----|-----|--------------|-----|
| 167 | GND | --- | 168 | GND | --- |
| 169 | M_A_DQSN6 | I/O | 170 | GND | I/O |
| 171 | M_A_DQSP6 | I/O | 172 | GND | --- |
| 173 | GND | --- | 174 | M_A_DQ51 | I/O |
| 175 | M_A_DQ55 | I/O | 176 | M_A_DQ50 | I/O |
| 177 | M_A_DQ54 | I/O | 178 | GND | --- |
| 179 | GND | --- | 180 | M_A_DQ57 | I/O |
| 181 | M_A_DQ61 | I/O | 182 | M_A_DQ56 | I/O |
| 183 | M_A_DQ60 | I/O | 184 | GND | --- |
| 185 | GND | --- | 186 | M_A_DQSN7 | I/O |
| 187 | GND | I/O | 188 | M_A_DQSP7 | I/O |
| 189 | GND | --- | 190 | GND | --- |
| 191 | M_A_DQ58 | I/O | 192 | M_A_DQ62 | I/O |
| 193 | M_A_DQ59 | I/O | 194 | M_A_DQ63 | I/O |
| 195 | GND | --- | 196 | GND | --- |
| 197 | DIMM0_SA0 | --- | 198 | PM_EXITS#0 | --- |
| 199 | +3V | --- | 200 | CGDAT_SMB | I/O |
| 201 | DIMM0_SA1 | --- | 202 | CGCLK_SMB | I/O |
| 203 | +SMDDR_VTERM | --- | 204 | +SMDDR_VTERM | --- |
| 205 | GND | --- | 206 | NC | --- |

Appendix D Display Codes

D.1 Display Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

| Cap No. | Keypop | 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 | |
| 15 | BkSp | 0E | 8E | 66 | F0 | 66 | |
| 16 | Tab | 0F | 8F | 0D | F0 | 0D | |
| 17 | Q | 10 | 90 | 15 | F0 | 15 | |
| 18 | W | 11 | 91 | 1D | F0 | 1D | |
| 19 | E | 12 | 92 | 24 | F0 | 24 | |
| 20 | R | 13 | 93 | 2D | F0 | 2D | |
| 21 | T | 14 | 94 | 2C | F0 | 2C | |
| 22 | Y | 15 | 95 | 35 | F0 | 35 | |
| 23 | U | 16 | 96 | 3C | F0 | 3C | *2 |
| 24 | I | 17 | 97 | 43 | F0 | 43 | *2 |
| 25 | O | 13 | 98 | 44 | F0 | 44 | *2 |
| 26 | P | 19 | 99 | 4D | F0 | 4D | *2 |
| 27 | [{ | 1A | 9A | 54 | F0 | 54 | |
| 28 |] } | 1B | 9B | 5B | F0 | 5B | |

Table D-1 Scan codes (set 1 and set 2) (2/4)

| Cap No. | Keytop | Code set 1 | | Code set 2 | | Note |
|---------|------------|------------|-------|------------|-------|------|
| | | Make | Break | Make | Break | |
| 29 | \ | 2B | AB | 5D | F0 5D | *5 |
| 30 | Caps Lock | 3A | BA | 58 | F0 58 | |
| 31 | A | 1E | 9E | 1C | F0 1C | |
| 32 | S | 1F | 9F | 1B | F0 1B | |
| 33 | D | 20 | A0 | 23 | F0 23 | |
| 34 | F | 21 | A1 | 2B | F0 2B | |
| 35 | G | 22 | A2 | 34 | F0 34 | |
| 36 | H | 23 | A3 | 33 | F0 33 | |
| 37 | J | 24 | A4 | 3B | F0 3B | *2 |
| 38 | K | 25 | A5 | 42 | F0 42 | *2 |
| 39 | L | 26 | A6 | 4B | F0 4B | *2 |
| 40 | ; : | 27 | A7 | 4C | F0 4C | *2 |
| 41 | ' " | 28 | A8 | 52 | F0 52 | |
| 43 | Enter | 1C | 9C | 5A | F0 5A | *3 |
| 44 | Shift (L) | 2A | AA | 12 | F0 12 | |
| 45 | No.102 key | 56 | D6 | 61 | F0 61 | |
| 46 | Z | 2C | AC | 1A | F0 1A | |
| 47 | X | 2D | AD | 22 | F0 22 | |
| 48 | C | 2E | AE | 21 | F0 21 | |
| 49 | V | 2F | AF | 2A | F0 2A | |
| 50 | B | 30 | B0 | 32 | F0 32 | |
| 51 | N | 31 | B1 | 31 | F0 31 | |
| 52 | M | 32 | B2 | 3A | F0 3A | *2 |
| 53 | , < | 33 | B3 | 41 | F0 41 | *2 |
| 54 | . > | 34 | B4 | 49 | F0 49 | *2 |
| 55 | / ? | 35 | B5 | 4A | F0 4A | *2 |
| 57 | Shift (R) | 36 | B6 | 59 | F0 59 | |

Table D-1 Scan codes (set 1 and set 2) (3/4)

| Cap No. | Keytop | Code set 1 | | | | Code set 2 | | | | Note | |
|---------|----------|------------|----|-------|----|------------|----|-------|----|-------|----|
| | | Make | | Break | | Make | | Break | | | |
| 58 | CTRL (L) | 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 | |
| 64 | CTRL (R) | E0 | 1D | E0 | 9D | E0 | 14 | E0 | F0 | 14 | |
| 75 | Ins | E0 | 52 | E0 | D2 | E0 | 70 | E0 | F0 | 70 | *1 |
| 76 | Del | E0 | 53 | E0 | D3 | E0 | 71 | E0 | F0 | 71 | *1 |
| 79 | ← | E0 | 4B | E0 | CB | E0 | 6B | E0 | F0 | 6B | *1 |
| 80 | Home | E0 | 47 | E0 | C7 | E0 | 6C | E0 | F0 | 6C | *1 |
| 81 | End | E0 | 4F | E0 | CF | E0 | 69 | E0 | F0 | 69 | *1 |
| 83 | ↑ | E0 | 48 | E0 | C8 | E0 | 75 | E0 | F0 | 75 | *1 |
| 84 | ↓ | E0 | 50 | E0 | D0 | E0 | 72 | E0 | F0 | 72 | *1 |
| 85 | PgUp | E0 | 49 | E0 | C9 | E0 | 7D | E0 | F0 | 7D | *1 |
| 86 | PgDn | E0 | 51 | E0 | D1 | E0 | 7A | E0 | F0 | 7A | *1 |
| 89 | → | E0 | 4D | E0 | CD | E0 | 74 | E0 | F0 | 74 | *1 |
| 110 | Esc | 01 | | 81 | | 76 | | F0 | 76 | | |
| 112 | F1 | 3B | | BB | | 05 | | F0 | 05 | *8 | |
| 113 | F2 | 3C | | BC | | 06 | | F0 | 06 | *8 | |
| 114 | F3 | 3D | | BD | | 04 | | F0 | 04 | *8 | |
| 115 | F4 | 3E | | BE | | 0C | | F0 | 0C | *8 | |
| 116 | F5 | 3F | | BF | | 03 | | F0 | 03 | *8 | |
| 117 | F6 | 40 | | C0 | | 0B | | F0 | 0B | *8 | |
| 118 | F7 | 41 | | C1 | | 83 | | F0 | 83 | *8 | |
| 119 | F8 | 42 | | C2 | | 0A | | F0 | 0A | *8 | |
| 120 | F9 | 43 | | C3 | | 01 | | F0 | 01 | *8 | |
| 121 | F10 | 44 | | C4 | | 09 | | F0 | 09 | *3/*8 | |

Table D-1 Scan codes (set 1 and set 2) (4/4)

| Cap No. | Keytop | Code set 1 | | | | Code set 2 | | | | Note |
|---------|---------|------------|----|-------|----|------------|----|-------|-------|------|
| | | Make | | Break | | Make | | Break | | |
| 122 | F11 | 57 | D7 | 78 | F0 | 78 | | | *3/*8 | |
| 123 | F12 | 58 | D8 | 07 | F0 | 07 | | | *3/*8 | |
| 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.
8. * Keytop and Scan codes differ by keyboard region and Hotkey function.

Table D-2 Scan codes with left Shift key

| Cap No. | Key top | Code set 1 | | | | Code set 2 | | | |
|---------|---------|-------------|-------------|----------------|----------------|------------|--|-------|--|
| | | Make | | Break | | Make | | Break | |
| 55 | / | E0 AA E0 35 | E0 B5 E0 2A | E0 F0 12 E0 4A | E0 F0 4A E0 12 | | | | |
| 75 | INS | E0 AA E0 52 | E0 D2 E0 2A | E0 F0 12 E0 70 | E0 F0 70 E0 12 | | | | |
| 76 | DEL | E0 AA E0 53 | E0 D3 E0 2A | E0 F0 12 E0 71 | E0 F0 71 E0 12 | | | | |
| 79 | ← | E0 AA E0 4B | E0 CB E0 2A | E0 F0 12 E0 6B | E0 F0 6B E0 12 | | | | |
| 80 | Home | E0 AA E0 47 | E0 C7 E0 2A | E0 F0 12 E0 6C | E0 F0 6C E0 12 | | | | |
| 81 | End | E0 AA E0 4F | E0 CF E0 2A | E0 F0 12 E0 69 | E0 F0 69 E0 12 | | | | |
| 83 | ↑ | E0 AA E0 48 | E0 C8 E0 2A | E0 F0 12 E0 75 | E0 F0 75 E0 12 | | | | |
| 84 | ↓ | E0 AA E0 50 | E0 D0 E0 2A | E0 F0 12 E0 72 | E0 F0 72 E0 12 | | | | |
| 85 | PgUp | E0 AA E0 49 | E0 C9 E0 2A | E0 F0 12 E0 7D | E0 F0 7D E0 12 | | | | |
| 86 | PgDn | E0 AA E0 51 | E0 D1 E0 2A | E0 F0 12 E0 7A | E0 F0 7A E0 12 | | | | |
| 89 | → | E0 AA E0 4D | E0 CD E0 2A | E0 F0 12 E0 74 | E0 F0 74 E0 12 | | | | |
| 203 | Win | E0 AA E0 5B | E0 DB E0 2A | E0 F0 12 E0 1F | E0 F0 1F E0 12 | | | | |
| 204 | App | E0 AA E0 5D | E0 DD E0 2A | E0 F0 12 E0 2F | E0 F0 2F E0 12 | | | | |

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

| | With left Shift | With right Shift |
|-------|------------------------|-------------------------|
| Set 1 | E0 AA _____ | E0 B6 |
| | E0 2A _____ | E0 36 |
| Set 2 | E0 F0 12 _____ | E0 F0 59 |
| | E0 12 _____ | E0 59 |

Table D-3 Scan codes in Numlock mode

| Cap No. | Key top | 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 2 | | | |
|---------|---------|------------|-------|-------|-------|------------|-------|-------|-------------|
| | | Make | | Break | | Make | | Break | |
| Prt Sc | Common | E0 2A | E0 37 | E0 B7 | E0 AA | E0 12 | E0 7C | E0 F0 | 7C E0 F0 12 |
| | Ctrl + | E0 37 | | E0 B7 | | E0 7C | | E0 F0 | 7C |
| | Shift + | E0 37 | | E0 B7 | | E0 7C | | E0 F0 | 7C |
| | Alt + | | 54 | D4 | | 84 | | F0 | B4 |

Table D-7 No.126 key scan code

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

*: This key generates only make codes.

Appendix F Wiring Diagrams

F.1 RGB Monitor ID Wraparound connector

| | | | |
|------------|-------|-------|------|
| (1) RED | _____ | RED | (1) |
| (2) GREEN | _____ | GREEN | (2) |
| (3) BLUE | _____ | BLUE | (3) |
| (4) NC | _____ | NC | (4) |
| (5) GND | _____ | GND | (5) |
| (6) GND | _____ | GND | (6) |
| (7) GND | _____ | GND | (7) |
| (8) GND | _____ | GND | (8) |
| (9) 5V | _____ | 5V | (9) |
| (10) GND | _____ | GND | (10) |
| (11) NC | _____ | NC | (11) |
| (12) SDA | _____ | SDA | (12) |
| (13) HSYNC | _____ | HSYNC | (13) |
| (14) VSYNC | _____ | VSYNC | (14) |
| (15) SDL | _____ | SCL | (15) |

Figure F-1 RGB Monitor ID Wraparound connector (15PIN to 15PIN)

F.2 LAN Loopback Connector

| | | |
|-----------------|-------|-----------------|
| (1) BIBAP (TX+) | _____ | (3) BIDBP (RX+) |
| (2) BIDAN (TX-) | _____ | (4) BIDBN (RX-) |

Figure F-2 LAN loopback connector