

**Toshiba Personal Computer**  
**Tecra A6**  
**Maintenance Manual**

**TOSHIBA CORPORATION**

*[CONFIDENTIAL]*

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Toshiba Personal Computer Tecra A6 Maintenance Manual

First edition January 2006

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The information presented in this manual has been reviewed and validated for accuracy. The included set of instructions and descriptions are accurate for the A6 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

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This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Tecra A6, referred to as the A6 Series in this manual.

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 A6 Series system unit and each FRU.
- Chapter 2      Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3      Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4      Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices    The appendices describe the following:

- ✍ Handling the LCD module
- ✍ Board layout
- ✍ Pin assignments
- ✍ Keyboard scan/character codes
- ✍ Key layout
- ✍ Screw torque list
- ✍ Reliability



## 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 Tecra A6 Series Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight and high reliability. This computer incorporates the following features and benefits:

### ❑ CPU

- Intel Pentium M Yonah mobile dual core processor FSB 667MHz, C4E support (1.66GHz/1.83GHz/2GHz/2.16GHz/2.33GHz and higher with 31W TDP)
- Intel Pentium M Yonah mobile single core processor, FSB 667MHz, C4E support (1.66GHz/1.83GHz and higher with 31W TDP)

### ❑ Chipset

- Intel 945PM with ICH7M (Pentium® M + Extended Graphics model) or Intel 945GM with ICH7M (Pentium® M + Extended Graphics model + Integrated Graphics model)
- Extended Graphics:
  - ATI Radeon X1300 64MB/128MB
  - ATI Radeon X1400 64MB/128MB/256MB
  - Nvidia Quadro 64M/128M
- NVIDIA GeForce Go 7300 (64MB or 128MB)
- Realtek 861 Audio
- TI 7412 for PCMCIA, 6-in 1 Multimedia Card Reader, and IEEE 1394 controller  
Intel Enkron-R 10/100 or Intel Vidalia Gigabit for LAN

### ❑ Display

- 14" (16:10) TFT screen with a resolution of 1280 horizontal x 800 vertical pixels, non-CSV normal brightness, WXGA
- 14.1" (16:10) TFT screen with a resolution of 1280 horizontal x 800 vertical pixels, CSV normal brightness, WXGA
- 14.1" (16:10) TFT screen with a resolution of 1440 horizontal x 900 vertical pixels, CSV high brightness, WXGA

### ❑ Memory

- No on-board memory
- DDR-II 533/667MHz at FCS supported
- Dual channel support
- Two SODIMM with 256MB/512MB/1GB modules
- Easy upgrade from bottom of the chassis
- Maximum 2GB

Video RAM

- Up to 128MB integrated solution and shared with main memory for Mobile Intel 945GM Express Chipset
- 128MB, 256MB or 512MB HyperMemory™ (64MB or 128MB for local cache) for ATI Mobility™ Radeon® X1300 with HyperMemory™
- 128MB, 256MB or 512MB HyperMemory™ (64MB, 128MB or 256MB for local cache) for ATI Mobility™ Radeon® X1400 with HyperMemory™
- ATI does not share with main memory

 BIOS

- Phoenix First BIOS
- 1MB Flash ROM for system BIOS
- Suspend to RAM/Disk
- Password protection (Power on, supervisor, HDD)
- Windows 98 ready with PnP
- Various hot keys for system control
- Refreshable
- Complete ACPI 1.0B function
- APM, S4BIOS not supported
- USB memory boot support
- SD memory boot support

 Power

- Universal AC adapter, 90~264VAC, 47~63Hz.
  - 75W with 15V DC (UMA, UMA with docking and Discrete VGA without docking)
  - 90W with 15V DC (Discrete VGA with docking)
- 6 cells of Li-Ion 18650 size, smart battery pack with 4000mAh x 10.8V (43.2W)
- 9 cells of Li-Ion 18650 size, smart battery pack with 6000mAh x 10.8V (64.8W)
- 12 cells of Li-Ion 18650 size smart battery pack with 8600mAh x 10.8V (92.88W)
- Approximately 12 hours or longer charging time to 100% battery capacity with system switched on.
- Approximately 4 hours charge time to 100% battery capacity with system switched off.
- Approximately 2 days discharging time in Standby Mode for the 12-cell battery, 1.5 day for the 9-cell battery and 1 days for 6-cell battery.
- Discharge time in shutdown mode is approximately 1 month

HDD

- 9.5mm, 2.5" S-ATA HDD up to 120 GB, 5400rpm
- With 3D shock protection sensor and Dome protection
- Bus master IDE
- SATA1.5G support

 Fixed Device Drivers

- 5.25" 12.7mm height, DVD-ROM & CD-RW combo device
- 5.25" 12.7mm height, DVD-ROM device
- 5.25" 12.7mm height, DVD Super-multi device (DVD-RAM/-R/-RW/+R/+RW)

 Optional Devices

- 256MB/512MB/1024MB SO-DIMM DDR modules
- Intel 945GM for internal graphics, Intel 945 PM for external graphics, daughter board with ATI M52P/54P or Nvidia G72M
  - ATi M52P with 64MB/128MB
  - ATi M54P with 64MB/128MB/256MB
  - Nvidia G72MV with 64MB/128MB
- Realtek 861 audio controller
- PCIe mini card wireless module (802.11a+b+g Askey WLAN module, 802.11a+b+g Intel WLAN module)
- Dual-band built-in antenna for wireless LAN communication
- MDC Modem
- External PCMCIA form factor remote control devices
- Internal USB interface Bluetooth module V2.0 with EDR

 Keyboard

The computer's keyboard has 85/86 keys and the layouts are compatible with a 101/102-key enhanced keyboard. There are five types of keys: typewriter keys, keypad overlay, function keys, soft keys and cursor control keys. The typewriter keys and keypad overlay keys are gray. The other keys are dark gray. The keys have special functions, which is like G-sensor, TPM, Finger printer and so on.

 Touch Pad

This pointing control device, located in the center of the keyboard palm-rest, provides convenient control of the cursor without requiring desk space for a mouse. The Touch Pad incorporates two mouse (left and right) buttons for universal usage.

I/O Ports

- Four USB (V2.0) ports
- One DDC2b compliant 15-pin VGA port (RGB)
- One S-Video port
- One microphone port
- One headphone-out jack
- VR volume control
- Wireless communication switch
- FIR
- CIR for 10/10G
- 240-pin connector for advance port replicator III
- One DC-in jack
- One RJ-11 jack for 56kbps V.92 modem
- One RJ-45 jack with LED indicator
- Kensington lock
- One IEEE 1394 port
- Fingerprint authentication
- One 6-in-1 push-push type flash card connector and card reader
- Internal Mic-array
- One type II PCMCIA slot with shutter door

 PCMCIA Card Organization

- One type II card socket with shutter door
- TI 7412 controller
- PC card 95 supported
- No ZV-port support
- SRAM, OTPROM, FLASH ROM, mask ROM memory card up to 64MB
- Modem/LAN card
- CardBus card
- ACPI 1.0B compliant

 Multiple Digital Media Card Slot

- TI 7412 controller
- Supports SD/MMC/MS/MS Pro/xD/mini SD with adapter
- SD-IO supported
- High-speed SD support
- Dummy rubber cover for slot

- ❑ IEEE1394 port
  - TI 7412 controller
  - Enables high-speed data transfer directly from external device such as digital video cameras.
  
- ❑ Modem
  - Internal modem with MDC solution
  - Support for the V.90 or V.92 standards depending on the region and provides a modem jack for connection to a telephone line.
  - Speed of data and fax transfer depends on the analog telephone line conditions.
  
- ❑ Universal Serial Bus (USB)

The computer has four Universal Serial Bus (USB) ports that comply with the USB 2.0 standard, which enable data transfer speeds more than 40 times faster than USB 1.1 (which this computer also supports.) The USB drives may be used to transfer data at low, full, and high speeds.
  
- ❑ External monitor port

A 15-pin CRT port supporting DDC 2B enables connection of an external monitor, which is recognized automatically by Video Electronics Standards Association (VESA) Display Data Channel (DDC) compatible functions.
  
- ❑ Sound system
  - Realtek 861 module.
  - Windows<sup>®</sup> compatible sound system provides two internal stereo speakers as well as jacks for an external microphone and headphones.
  
- ❑ LAN port
  - 10/100M (Intel Enkron-R) or gigabit LAN (Intel Vidalia)
  - The computer comes with an RJ-45 Local Area Network (LAN) port. The computer has built-in support for Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 Mbps 100BASE-TX), or Gigabit Ethernet LAN (1000 Mbps, 1000BASE-T).
  
- ❑ Switches
  - Power button
  - Wireless communication switch
  - Toshiba presentation button
  - Toshiba Assist button

❑ Bluetooth module

Some computers in this series are equipped with Bluetooth functionality (Version 2.0 + EDR) with antenna. Bluetooth is a short-range wireless technology used to create PANs (Personal Area Networks) among your devices, as well as with other nearby devices such as cell phones and digital cameras.

❑ Excellent power management function

- Standby mode, Suspend to RAM or Suspend to disk mode, using time out or hot key
- HDD local standby mode by time out
- LCD local standby mode by time out
- Low battery alarm by beep
- Auto-backlight off when LCD cover closed
- Full ACPI 1.0B supported
- LCD auto-dim mode by time out



## 1.2 System Unit

The system unit is composed of the following major components:

- ❑ Processor (depending on the model you purchased)
  - Intel Pentium M Yonah mobile dual core processor T2300/T2400/T2500/T2600
  - Intel Pentium M Yonah mobile single core processor T1300/T1400
- ❑ System Logic
  - Intel 945PM with ICH7M (Pentium® M + Extended Graphics model) or Intel 945GM with ICH7M (Pentium® M + Extended Graphics model + Integrated Graphics model)
  - Extended Graphics:
    - ATI Radeon X1300 64MB/128MB
    - ATI Radeon X1400 64MB/128MB/256MB
    - Nvidia Quadro 64M/128M
  - NVIDIA GeForce Go 7300 (64MB or 128MB)
  - Realtek 861 Audio
  - TI 7412 for PCMCIA, 6-in 1 Multimedia Card Reader, and IEEE 1394 controller
  - Intel Enkron-R 10/100 or Intel Vidalia Gigabit for LAN
  - PCI express
  - Power management functions
  - Supports DMI
- ❑ Memory
  - No on-board memory
  - ROM BIOS for system
  - 1MB Flash ROM
  - DDR-II 533/667MHz at FCS supported
  - Dual channel support
  - Easy upgrade (Maximum 2GB) from bottom of the chassis
  - Two JEDEC standard 200-pin, 1.8V DDR II SO-DIMM memory support for 256MB/512MB/1024MB/2048MB.
  - Slot: 2 SO-DIMM up to 1GB can be upgraded through memory expansion slot. You need to remove existing SO-DIMM if SO-DIMM is installed in memory expansion slot. Maximum upgradeable system memory depends on the model.

Video RAM

- Up to 128MB integrated solution and shared with main memory for Mobile Intel 945GM Express Chipset
- 128MB, 256MB or 512MB HyperMemory™ (64MB or 128MB for local cache) for ATI Mobility™ Radeon® X1300 with HyperMemory™
- 128MB, 256MB or 512MB HyperMemory™ (64MB, 128MB or 256MB for local cache) for ATI Mobility™ Radeon® X1400 with HyperMemory™
- ATI does not share with main memory

 Audio subsystem

- Realtek 861 Audio
  - Microphone-in and headphone-out
  - Internal Microphone array
  - Two stereo speakers
  - Sound effect by SRS software
  - Driver level support for all applications by Toshiba virtual sound
  - Volume control: Dial type for Win XP
  - Stereo speakers with box or Harman/kardon(Odessey2)

### 1.3 2.5-inch Hard Disk Drive

The internal HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads. The computer supports up to 120G HDD.

The HDD is shown in Figure 1-1. Specifications are listed in Table 1-1.

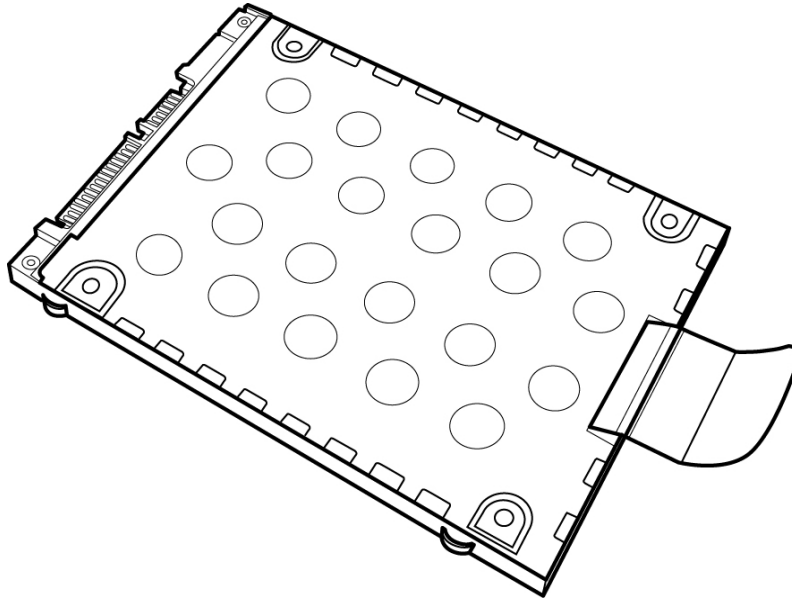


Figure 1-1 2.5-inch HDD

Items	40GB	60GB	80GB	100GB	120GB
Formatted capacity (GB)	37.26	55.89	74.52	93.15	111.8
Logical Blocks (LBA)	78,125,000	117,187,500	156,301,488	195,371,568	234,441,648
Rotational speed (rpm)	5400	5400/7200	5400/7200	5400/7200	5400
Toshiba HDD Buffer (MB)	16	16/NA	16/NA	16/NA	8
Hitachi HDD Buffer (MB)	8	8/8	8/8	8/8	NA
Fujitsu HDD Buffer (MB)	8	8	8	8	NA
Bytes per sector	512	512	512	512	512

Table 1-1 2.5-inch HDD specifications

## 1.4 Optical device Drives

### 1.4.1 DVD-ROM & CD-RW

The DVD-ROM and CD-RW drive accepts 12-cm (4.72-inch) and 8-cm (3.15-inch) discs. At maximum, the drive can play back a DVD at 8x speed, read CD-ROM at 24x speed, and write CD-R at 24x speed and CD-RW at 4x speed or High speed CD-RW at 24X or Ultra speed CD-RW at 24X speed.

The specifications of the DVD-ROM & CD-RW drive are listed in Table 1-2.

Item	DVD-ROM mode	CD-ROM mode
Data transfer rate (Mbytes/s)	33.3 (U-DMA transfer mode 2) 16.6 (PIO mode 4, Multiword DMA mode 2)	
Access time (ms) Average random access	180	150
Data buffer size (Mbytes)	2MB	
Formats supported	DVD: DVD-VIDEO, DVD-ROM CD: CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, PhotoCD (single/multi-session), CD-EXTRA, CD-Text	

Table 1-2 DVD-ROM & CD-RW drive specifications

### 1.4.2 DVD-ROM

The DVD-ROM drive accepts 12-cm (4.72-inch) and 8-cm (3.15-inch) discs. At maximum, the drive can play back a DVD at 8x speed, and read CD-ROM at 24x speed.

The specifications of the DVD-ROM drive are listed in Table 1-3

Item	DVD-ROM mode	CD-ROM mode
Data transfer rate (Mbytes/s)	33.3 (U-DMA transfer mode 2) 16.6 (PIO mode 4, Multiword DMA mode 2)	
Access time (ms) Average random access	180	150
Data buffer size (Mbytes)	256 KB	
Formats supported	DVD: DVD-VIDEO, DVD-ROM CD: CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, PhotoCD (single/multi-session), CD-EXTRA, CD-Text	

Table 1-3 DVD-ROM drive specifications

### 1.4.3 DVD Super Multi Double Layer

The DVD Super Multi drive accepts 12-cm (4.72-inch) and 8-cm (3.15-inch) discs. At maximum, the drive can play back a DVD at 8x speed, read CD-ROM at 24x speed, and write CD-R at 24x speed and CD-RW at 10x and DVD-R at 8x speed and DVD-RW at 4x speed and DVD+R at 8x speed and DVD+RW at 4x speed and DVD-RAM at 5x speed and DVD+R DL at 2.4x speed and DVD-R DL at 2x speed.

The specifications of the DVD Super Multi Double Layer drive are listed in Table 1-4

Item	DVD-ROM mode	CD-ROM mode
Data transfer rate (Mbytes/s)	33.3 (U-DMA transfer mode 2) 16.6 (PIO mode 4, Multiword DMA mode 2)	
Access time (ms) Average random access	180	150
Data buffer size (Mbytes)	2MB	
Formats supported	DVD: DVD-VIDEO, DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+RW, DVD+R DL, DVD-R DL CD: CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, PhotoCD (single/multi-session), CD-EXTRA, CD-Text	

Table 1-4 DVD Super Multi Double Layer drive specifications

## 1.5 Power Supply

This specification defines the performance and characteristics of the 75W AC adapter power supply. It supplies a constant voltage 15V output source for Tecra A6 series notebook computer.

- ❑ A/D conversion
  - The EC uses 10-bit sampling for A/D conversion to determine the following values:
    - Battery and temperature
  
- ❑ AC adaptor and battery check
  - The EC checks the following by A/D converted values:
    - Battery installed
  - The EC checks the following by GPIO values:
    - AC adaptor connected
  
- ❑ Abnormal check
  - The EC determines whether the condition is abnormal, and if so, stores an error code into the error register.
  
- ❑ Input port management
  - The EC monitors the following input signal status:
    - System power ON/OFF status
    - Direct CD power ON/OFF status
  
- ❑ Beep and LED control
  - Beep is caused by the low battery status.
  - The EC controls the following two kinds of LED
    - DC IN LED (one color: green)
  - Green: indicates AC adaptor is connected
    - Battery LED (two colors: orange and green)
  - Green solid: The battery is fully charged.
  - Orange: The computer is quick-charging the battery / the battery is low.
  
- ❑ Power ON/OFF sequence
  - When power is turned on or off, the EC starts the power on or off sequence.
    - SQ0-4: power ON sequence
    - SQ5-B: power OFF sequence

Battery charging control

- The EC controls the following.
  - The quick charging ON/OFF
  - The detection of full charge

 Detection of the low battery

- The EC detects the low battery point by the gas gauge.
  - LB10M: The system will be driven by the battery for 12 more minutes.
  - LB0: The battery won't be able to drive the system after 3 minutes.
  - LB1: The battery can drive the system only during the suspend process.
  - LB2: The battery cannot drive the system.

 New battery installation

- When a new battery is installed, the EC communicates with the E<sup>2</sup>PROM in the battery to read information of the newly installed battery.

 Battery capacity calculation

- The EC reads battery remaining and percentage capacity from the battery through SMBus.



## 1.6 Batteries

The computer has two types of battery:

- Main battery pack (18650 size)
- RTC battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached.

The battery specifications are listed in the table below.

Battery name	Material	Output voltage	Capacity
Main battery (6 cell)	Lithium-Ion	10.8V	4000 mAh
Main battery (9 cell)	Lithium-Ion	10.8V	6000 mAh
Main battery (12 cell)	Lithium-Ion	10.8V	8600 mAh
RTC battery	Lithium	3.0V	15 mAh

### 1.6.1 Main Battery

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

#### ❑ Quick Battery Charge

When the AC adaptor is attached, there are two types of quick charges: quick charge when the system is powered off and normal charge when the system is powered on.

The times required for charges are listed in the table below.

Status	Charging time
Normal charge (power on)	12 hours or longer
Quick charge (power off)	About 4 hours

#### **NOTES**

- The time required for normal charge is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.*
- Using quick charge, the power supply microprocessor automatically stops the charge after eight hours regardless of the condition of the battery. Overcharging could cause the battery to explode.*

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

- The battery becomes fully charged.
- The AC adaptor or battery is removed.
- The battery or output voltage is abnormal.
- The battery temperature is abnormal.
- The battery SMBus communication fails.
- The battery cell is bad.

#### ❑ Detection of full charge

A full charge is detected from the battery pack through SMBus when the battery is charging.

### 1.6.2 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. The table below lists the charging time and data preservation period of the RTC battery. The RTC battery is charged by the adaptor or main battery, while the computer is powered on.

Status	Time
Charging Time (power on)	About 24 hours
Data preservation period (full charge)	1 month

---

## **Chapter 2**

# **Troubleshooting Procedures**

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## 2.1 Troubleshooting Introduction

Chapter 2 describes how to determine if a Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. The FRUs covered are:

- |                            |                         |                                |
|----------------------------|-------------------------|--------------------------------|
| <u>1. Display</u>          | <u>6. TouchPad</u>      | <u>11. IEEE 1394 port</u>      |
| <u>2. USB Floppy Drive</u> | <u>7. Speaker</u>       | <u>12. Wireless LAN system</u> |
| <u>3. Keyboard</u>         | <u>8. Optical drive</u> | <u>13. 6IN1 card unit.</u>     |
| <u>4. USB ports</u>        | <u>9. Modem</u>         | <u>14. Bluetooth</u>           |
| <u>5. TV-out port</u>      | <u>10. PCMCIA unit</u>  | <u>15. Fingerprint Board</u>   |

The Diagnostics Disk operations are described in Chapter 3. Detailed replacement procedures are given in Chapter 4.

The following tools are necessary for implementing the troubleshooting procedures:

1. Diagnostics Disk (Repair and Sound Repair)
2. Phillips screwdriver (2 mm)
3. 6mm nut driver (for the helix screw nuts on the rear ports for CPU door)
4. 2DD or 2HD formatted work disk for floppy disk drive testing
5. Sycard (PCMCIA test card)
6. Cleaning kit for floppy disk drive troubleshooting
7. Cleaning kit for optical drive troubleshooting
8. Multimeter
9. External monitor
10. USB compatible keyboard
11. Multimedia sound system with line-in and line-out ports
12. Headphones
13. USB test module and USB cable
14. Music CD
15. 6IN1 Card (SD/MMC/MS/MS Pro/XD/mini SD)



## 2.2 Troubleshooting Flowchart

If you know the location of the malfunction, turn directly to the appropriate section of this chapter. If the problem is unspecified, use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedures to execute. Before performing any troubleshooting procedures, verify the following:

- ✍ Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- ✍ Verify with the customer that Toshiba Windows XP is installed on the hard disk. Operating systems that were not preinstalled by Toshiba can cause the computer to malfunction.
- ✍ Make sure all optional equipment is removed from the computer.
- ✍ Make sure the floppy disk drive, if installed, is empty. If no FDD module is installed, you should use an external FDD to run the diagnostics tests

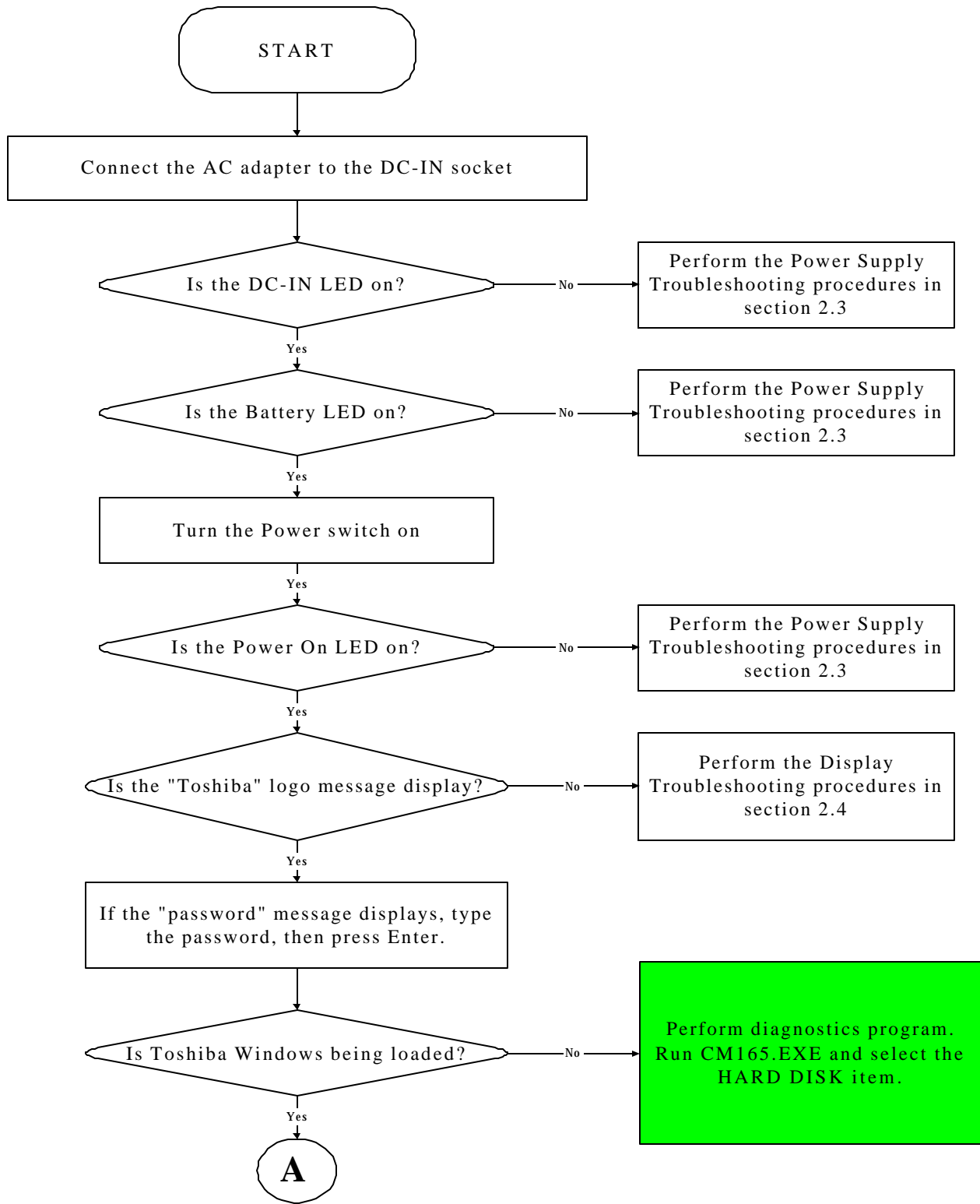


Figure 2-1 Troubleshooting flowchart (1/2)

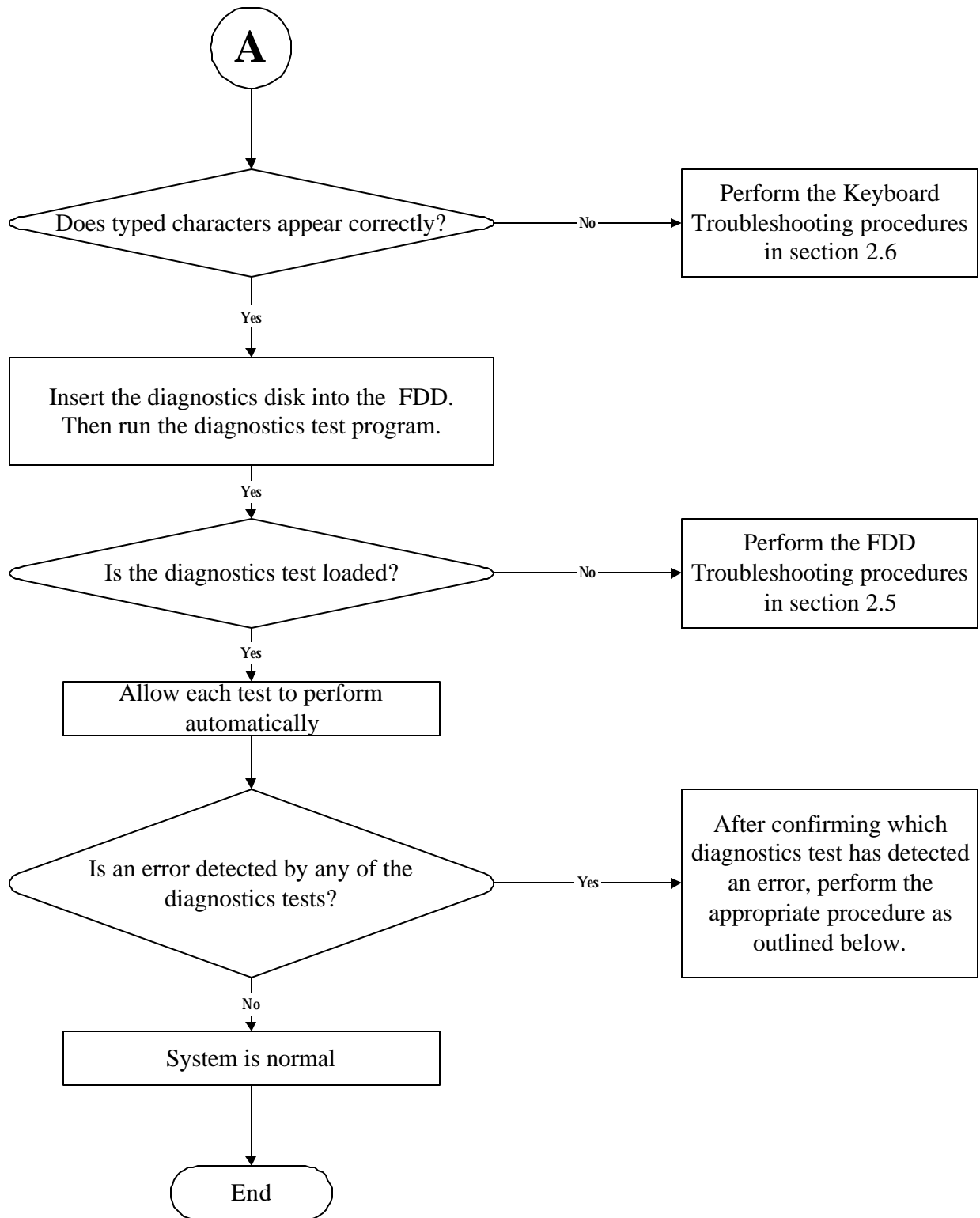


Figure 2-2 Troubleshooting flowchart (2/2)

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. When a problem has been located, perform the appropriate troubleshooting procedures as follows:

1. If an error is detected by the battery test, perform the Power Supply Troubleshooting procedures in Section 2.3.
2. If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 2.4.
3. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 2.5.
4. If an error is detected by the TouchPad test, perform the TouchPad Troubleshooting procedures in Section 2.8.
5. If an error is detected by the audio test, perform the Speaker Troubleshooting procedures in Section 2.9 and the Optical Drive Troubleshooting Procedures in Section 2.9.
6. If an error is detected by the modem test, perform the Modem Troubleshooting Procedures in Section 2.10.

Other problems that are not covered by the diagnostics program may be discovered by a user.

1. If an error is detected when using an external USB device, perform the External USB Devices Troubleshooting procedures in Section 2.6.
2. If an error is detected when using the TV-out connection, perform the TV-Out Failure Troubleshooting procedures in Section 2.7.
3. If an error is detected when using the speakers, perform the Speaker Troubleshooting procedures in Section 2.10.
4. If an error is detected when using the modem, perform the Modem Troubleshooting procedures in Section 2.12.
5. If an error is detected when using the PCMCIA unit, perform the PCMCIA Troubleshooting procedures in Section 2.13.
6. If an error is detected when using the IEEE1394 device, perform the IEEE1394 device Troubleshooting procedures in Section 2.14.
7. If an error is detected when using the Wireless LAN, perform the Wireless LAN Troubleshooting procedures in Section 2.15.

### 2.3 Power Supply Troubleshooting

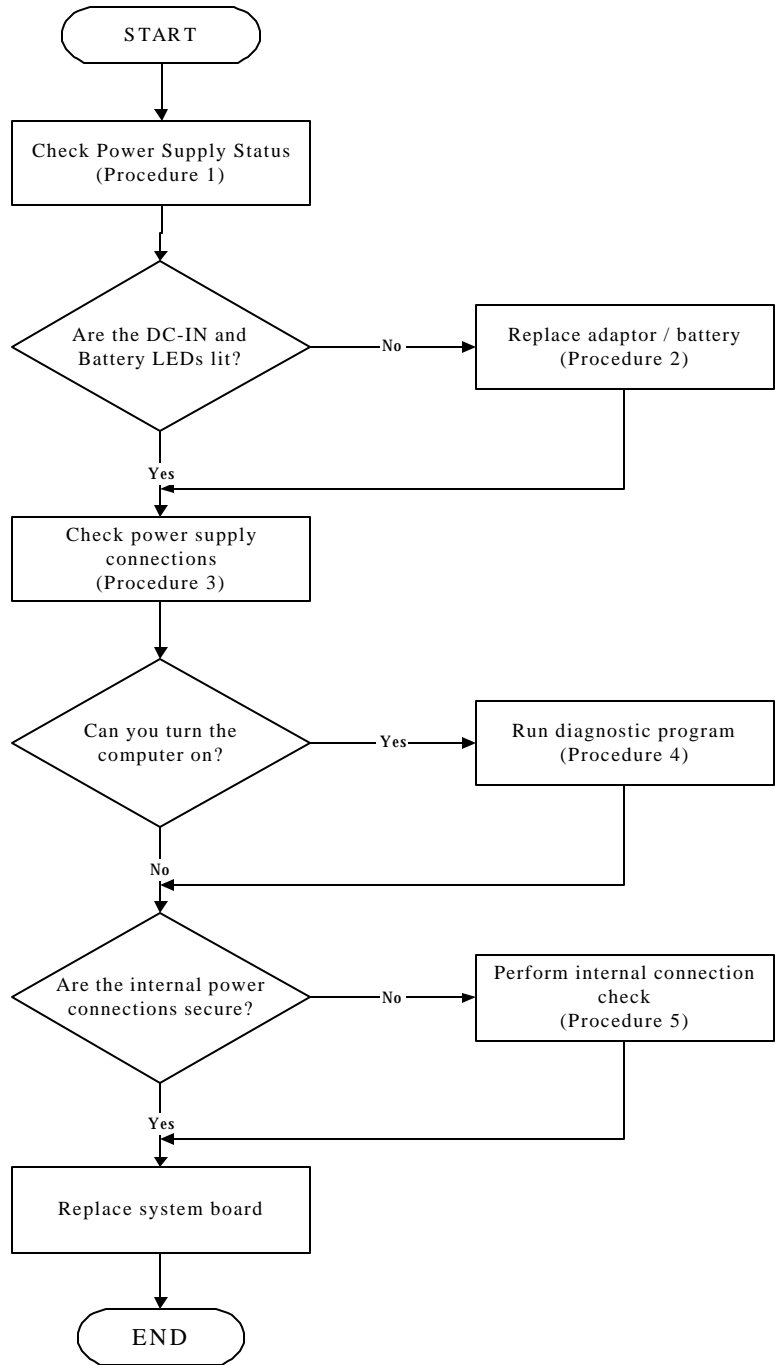


Figure 2-3 Power Supply Troubleshooting Process

The power supply 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 flowchart in Figure 2-3 gives a summary of the process. The procedures described in this section are:

- Procedure 1: Power status check
- Procedure 2: Adaptor / battery replacement
- Procedure 3: Power supply connection check
- Procedure 4: Diagnostic check
- Procedure 5: Internal connection check

### Procedure 1 Power Status Check

The following LEDS indicate the power supply status:

 Battery LED

 DC-IN LED

The power supply controller displays the power supply status through the Battery and the DC-IN LEDS as listed in the tables below.

*Table 2-1 Battery LED*

Battery State	LED colors	Definition
Charging	Amber, solid on	Battery charging with AC .
	Green, solid on	Battery fully charged by AC
	Green color off	Battery abnormal stop charging with AC (Bad cell/ Overheated)
Discharging	Amber, blinking (LED on for 1 second every 4 seconds)	Battery within low state: 12 minutes remaining
	Amber, blinking (LED on for 1 second every 2 seconds)	Battery within critical low state: 3 minutes remaining. The system is protected and cannot be re-powered on without the AC power connected.
	Amber color off	Battery not in low or critical low state; It's in discharging state

Table 2-2 DC-IN LED

<b>AC-IN LED</b>	<b>Power supply status</b>
Solid on	AC power exists (LED is solid green).
Off	No AC power exists.

To check the power supply status, install a battery pack and connect an AC adaptor to the DC-IN port on the computer and to a power supply.

If the DC-IN LED or Battery LED is not lit, go to Procedure 2.

### **Procedure 2    Adaptor / battery replacement**

A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

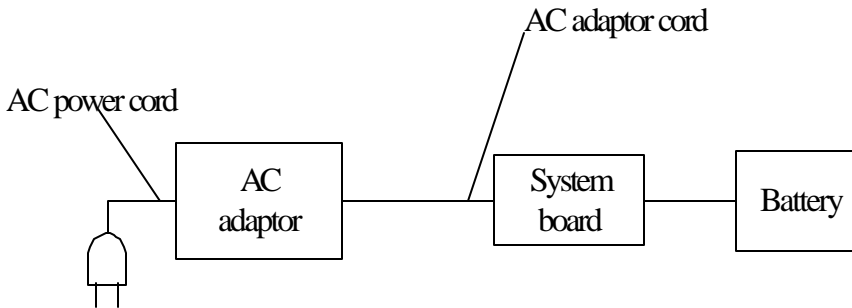
Check 1    Connect a new AC adaptor. If the problem is not resolved, go to Check 2.

Check 2    Insert a new battery. If the problem is still not resolved, go to Procedure 3.



**Procedure 3 Power supply connection check**

The power supply wiring diagram is shown below:



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

- Check 1 Disconnect the AC power cord from wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.
- Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN socket, AC adaptor inlet and wall outlet. If these cables are connected correctly, go to Check 3.
- Check 3 Make sure that the DC-IN input port socket is firmly secured to the system board of the computer.  
? If the DC-IN input socket is loose, go to Procedure 5.  
? If it is not loose, go to Check 4.
- Check 4 Use a multi-meter to make sure that the AC adaptor output voltage is close to 19 V. If the output is several percent lower than 19 V, go to Check 5. If the output is close to 19 V, go to Check 6.
- Check 5 Connect a new AC adaptor or AC power cord.  
? If the DC-IN LED does not light, go to Procedure 4.  
? If the battery LED does not light, go to Check 6.
- Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery LED still does not light, go to Procedure 4.

**Procedure 4 Diagnostic check**

The power supply may not charge the battery pack. Perform the following procedures:

1. Reinstall the battery pack.
2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
3. Run the Diagnostic test following the procedures described in Chapter 3, Tests and Diagnostics. If no problem is detected, the battery is functioning normally.

**Procedure 5 Replacement check**

The system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. Check the connection between the AC adaptor and the system board. After checking the connection, perform Check 1:

- Check 1 Use a multi-meter to make sure that the fuses on the system board are not blown. If a fuse is not blown, go to Check 2. If a fuse is blown, go to Check 3.
- Check 2 Make sure that the battery cable is firmly connected to the system board. If it is connected firmly, go to Check 3.
- Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.4 Display Troubleshooting

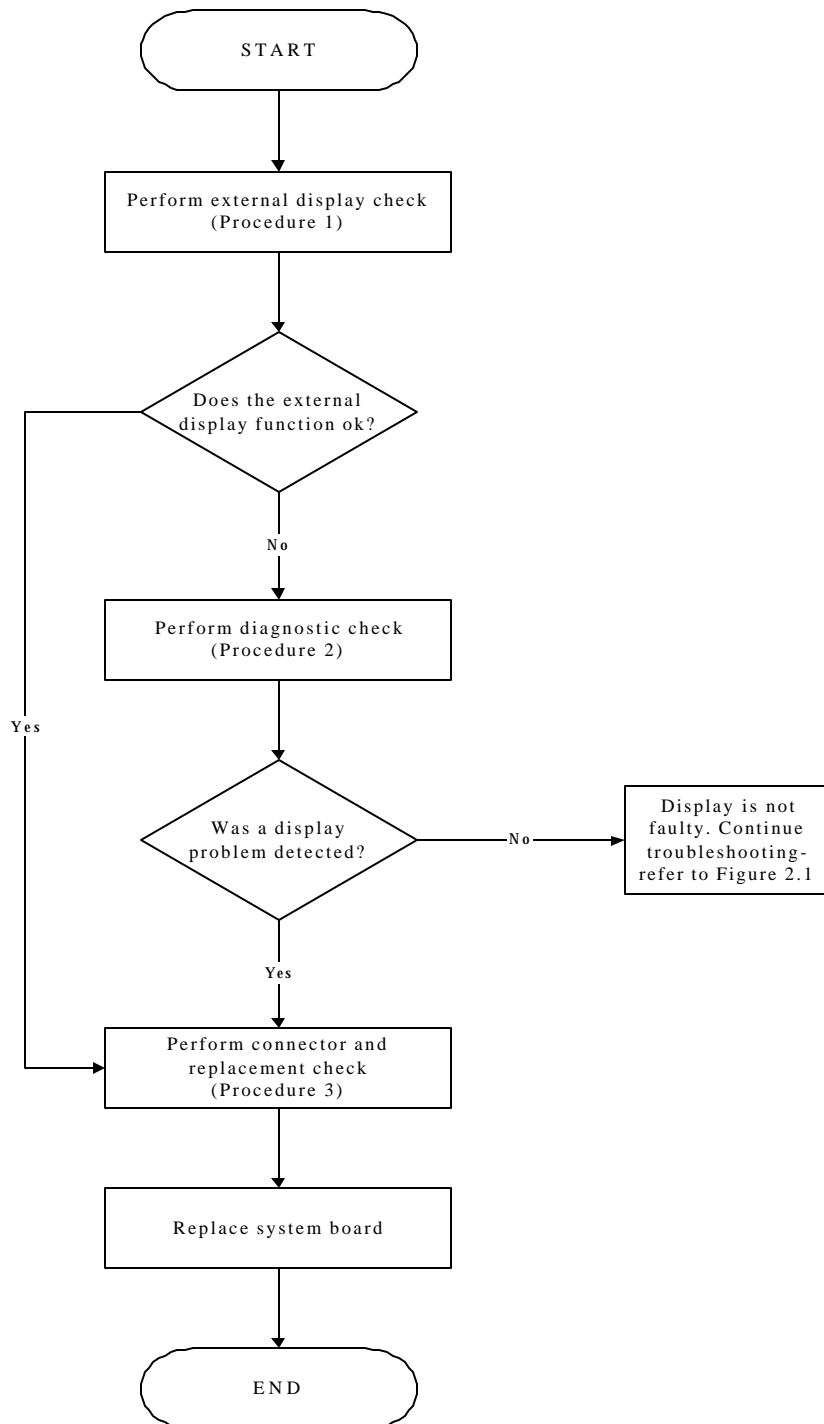


Figure 2-4 Display troubleshooting process

This section describes how to determine if the computer's display is functioning properly. The process is outlined in Figure 2-4. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External display check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

### **Procedure 1 External display check**

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

If the external display works correctly, the internal LCD may be damaged. Go to Procedure 3.

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

### **Procedure 2 Diagnostic check**

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, 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. If an error is not detected, the display is functioning properly.

**Procedure 3 Connector and replacement check**

The FL inverter board, LCD module, and system board are connected to the display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

- Check 1 Make sure the DDR RAM module is seated properly. Test display again. If the problem still exists, replace the DDR RAM module. If the problem still exists, perform Check 2.
- Check 2 Replace the FL inverter board with a new one and test display again. If the problem still exists, perform Check 3.
- Check 3 Replace the LCD module with a new one and test display again. If the problem still exists, perform Check 4.
- Check 4 Replace the LCD/FL cable with a new one and test display again. If the problem still exists, perform Check 5.
- Check 5 Replace the CPU with another of the same specifications. If the problem still exists, perform Check 6.
- Check 6 The system board may be damaged. Replace it with a new one.

## 2.5 Keyboard Troubleshooting

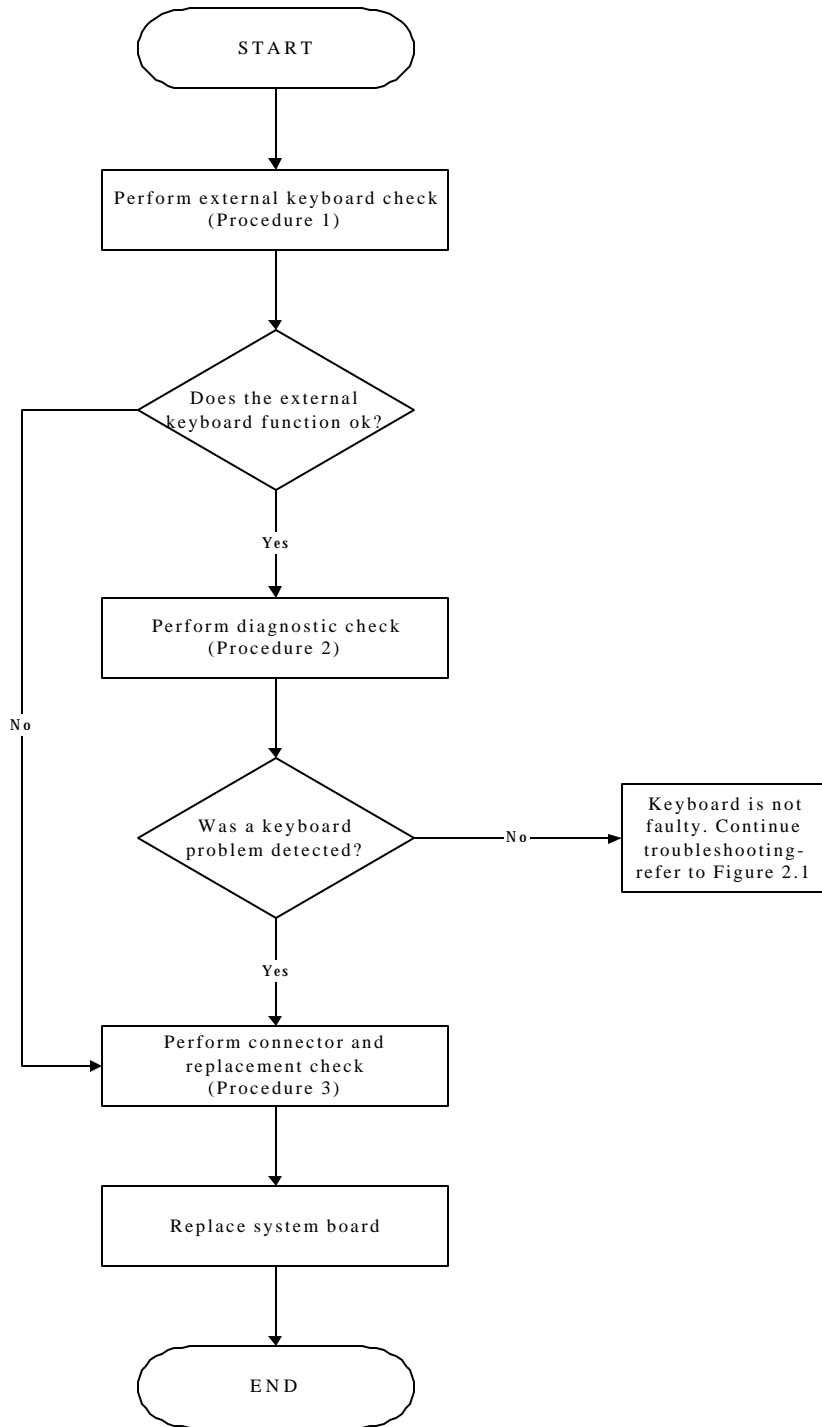


Figure 2-5 Keyboard troubleshooting process

To determine if the computer's keyboard is functioning properly, perform the following procedures. Figure 2-5 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External keyboard check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

### **Procedure 1 External keyboard check**

Connect a USB keyboard to one of the computer's USB ports, then boot the computer. The computer automatically detects the external keyboard.

If the external keyboard works correctly, the internal keyboard or its connections may be faulty. Go to Procedure 2.

If the external keyboard appears to have the same problem as the internal keyboard, the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

### **Procedure 2 Diagnostic check**

Run the Diagnostic Program, which will automatically execute the Keyboard Test. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the keyboard is functioning properly.

### **Procedure 3 Connector and replacement check**

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

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

If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2 The keyboard may be damaged. Replace it with a new one following the instructions in Chapter 4.

If the problem still exists, perform Check 3.

Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.6 External USB Devices Troubleshooting

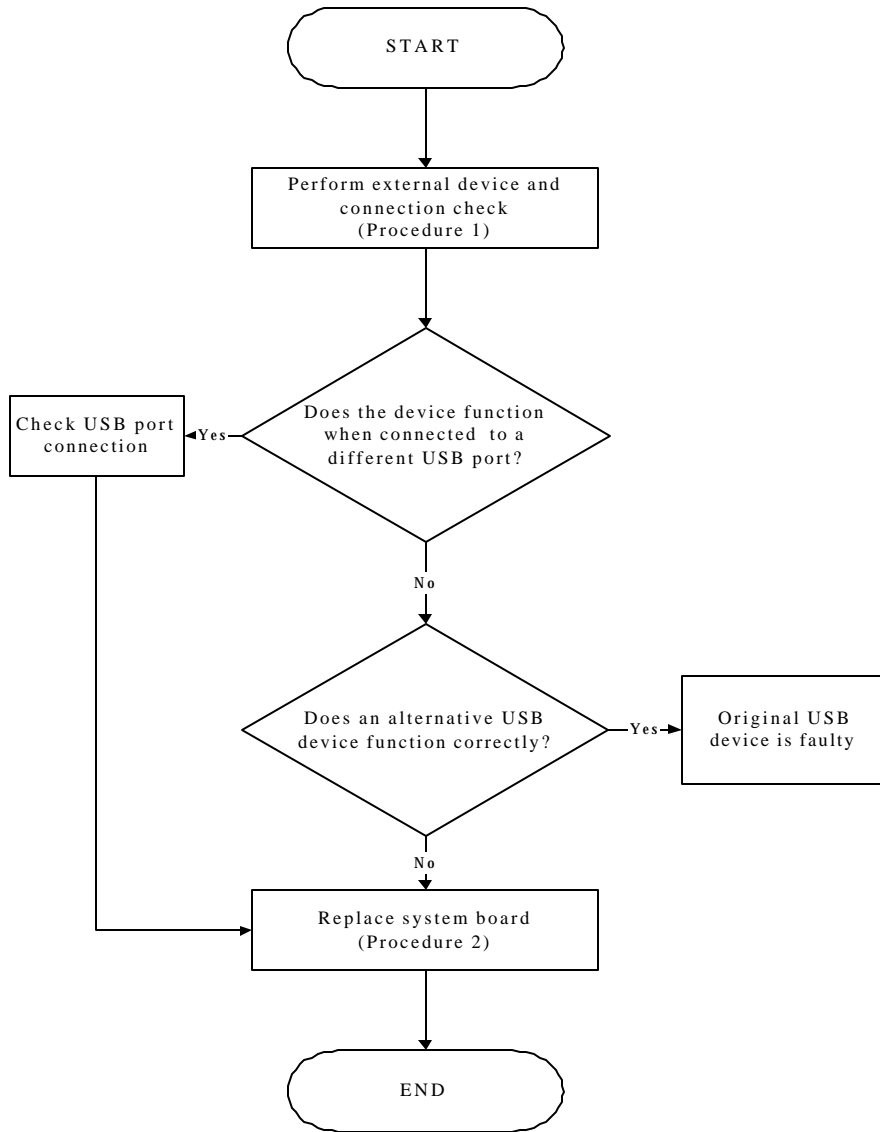


Figure 2-6 External USB device troubleshooting process



To determine if the computer's external USB devices are functioning properly, perform the following procedures. Figure 2-6 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: External device and connection check

Procedure 2: Replace system board

### **Procedure 1 External device and connection check**

The USB device may be damaged or the connection may be faulty. Perform Check 1.

Check 1 Make sure USB device cable is firmly plugged into one of the USB sockets. If the cable is connected correctly, go to Check 2.

Check 2 Plug the USB device into another USB socket (there are three in all). If the USB device still does not work, go to Check 4.

If the device functions correctly when connected to another USB port, go to Check 3.

Check 3 Make sure that the USB socket is firmly secured to the system board of the computer. If the malfunction remains, the system board may be damaged. Go to Procedure 2.

Check 4 Connect an alternative USB device to one of the computer's USB ports, and then boot the computer. The computer automatically detects the external device.

If the alternative USB device works correctly, the original device may be damaged and should be replaced.

If the alternative USB device appears to have the same problem as the original device, the system board may be damaged. Go to Procedure 2.

### **Procedure 2 Replace system board**

If the error persists, the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.7 TV-Out Failure Troubleshooting

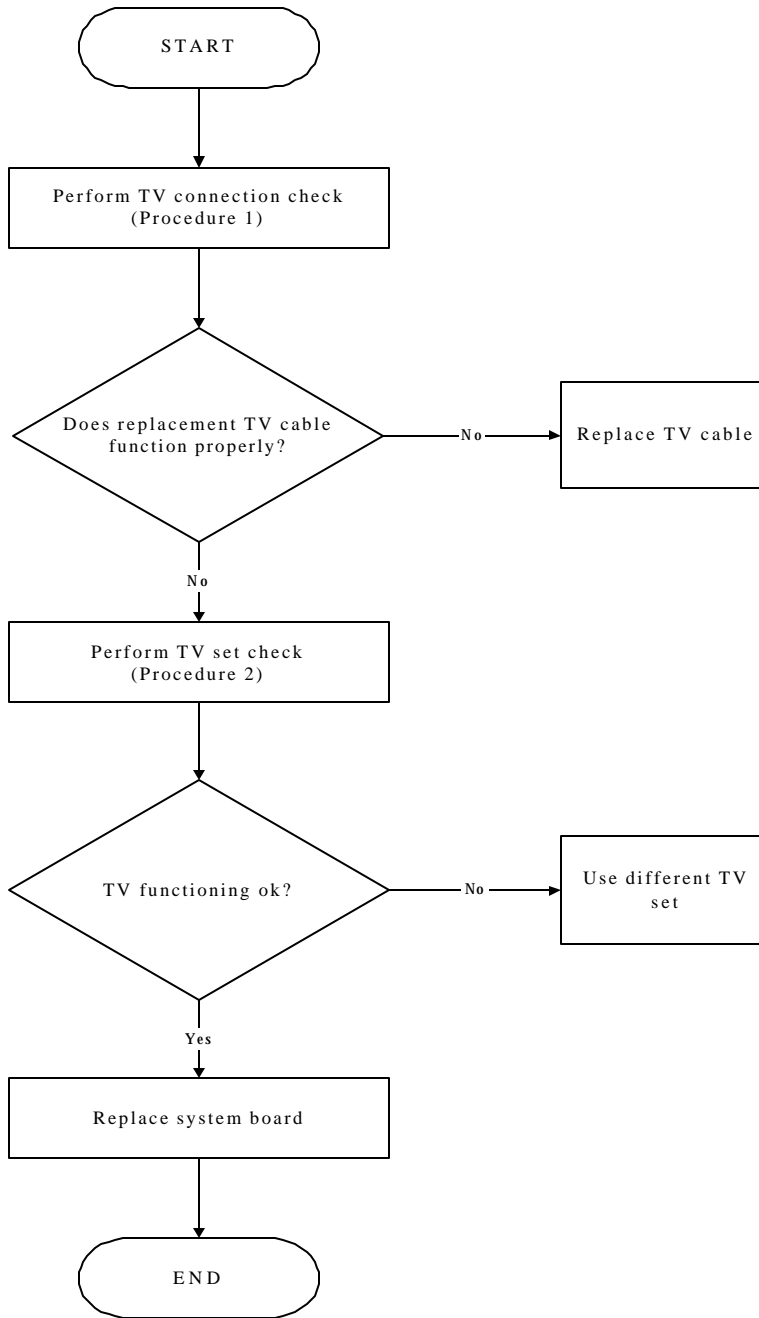


Figure 2-7 TV-out troubleshooting process

To determine if the computer's TV-out port is functioning properly, perform the following procedures. Figure 2-7 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: TV connection check

Procedure 2: TV set check

### **Procedure 1 TV connection check**

The TV cable may be damaged or the connections may be loose. Perform Check 1:

- Check 1 Make sure TV cable is firmly plugged into both the TV set and the TV-out port of the computer. If the cable is connected correctly, go to Check 2.
- Check 2 Make sure the TV-out port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.
- Check 3 The TV cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2.

### **Procedure 2 TV set check**

The TV set may be faulty. Perform Check 1:

- Check 1 Try using the set for television reception. If it does not work, the set may be damaged. If the set does work, perform Check 2.
- Check 2 Try connecting a different television to the computer. If the replacement television works, the original set may be damaged. If the replacement set does not work the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.8 TouchPad Troubleshooting

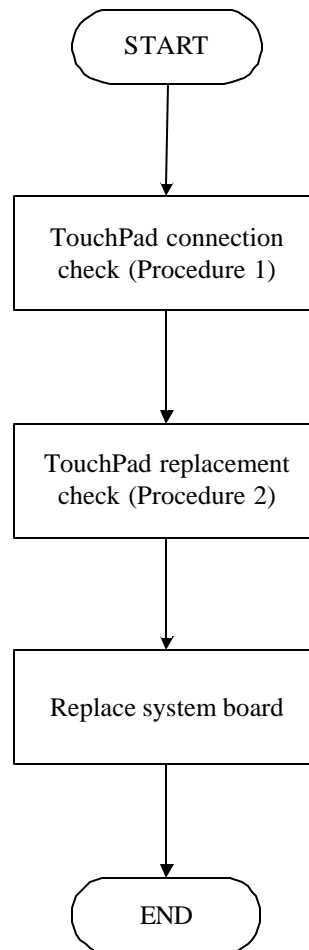


Figure 2-8 TouchPad troubleshooting process

To determine if the computer's built-in TouchPad is functioning properly, perform the following procedures. Figure 2-8 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: TouchPad connection check

Procedure 2: TouchPad replacement check

### **Procedure 1 TouchPad connection check**

The TouchPad is connected via the TouchPad FPC to the system board. Make sure the TouchPad FPC cable is firmly connected to the TouchPad and system board. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks.

If any of the connections are loose, reconnect firmly. If any of the connections is damaged, or there is still an error, go to Procedure 2.

### **Procedure 2 TouchPad replacement check**

The TouchPad unit or FPC may be defective or damaged. Replace each with a new one following the steps in Chapter 4. If the FDD is still not functioning properly, replace the system board with a new one following the steps in Chapter 4.

## 2.9 Speaker Troubleshooting

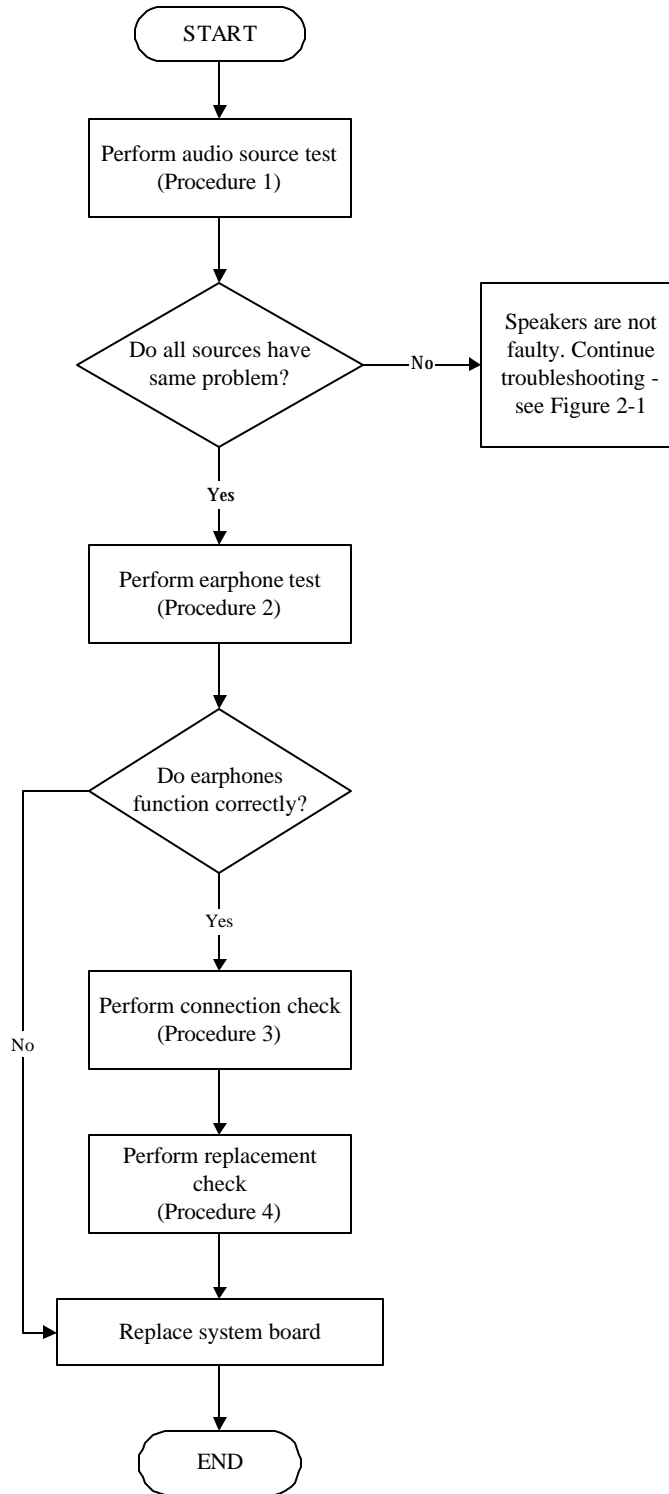


Figure 2-9 Speaker troubleshooting process

To determine if the computer's built-in speakers are functioning properly, perform the following procedures. Figure 2-9 outlines the process. First adjust the speaker volume to an appropriate level. Start with Procedure 1 and continue as instructed.

- Procedure 1: Audio source test
- Procedure 2: Earphone test
- Procedure 3: Connection check
- Procedure 4: Replacement check

### **Procedure 1 Audio source test**

Try different audio sources (e.g. an audio CD and digital music file) to determine whether the fault is in the speaker system or not. If not all sources have sound problem, the problem is in the source devices. If all have the same problem, continue with Procedure 2.

### **Procedure 2 Earphone test**

Connect a set of earphones or external speakers. If these function correctly, go to Procedure 3. If they do not function correctly, the system board may be defective or damaged. Replace it with a new one.

### **Procedure 3 Connection check**

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and make sure the speaker cable is firmly connected to the audio board. If the stereo speakers are still not functioning properly, go to Procedure 4.

### **Procedure 4 Replacement check**

If the stereo speakers don't sound properly, the stereo speakers may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly, try replacing in turn the audio board and system board.

### 2.10 Optical Drive Troubleshooting

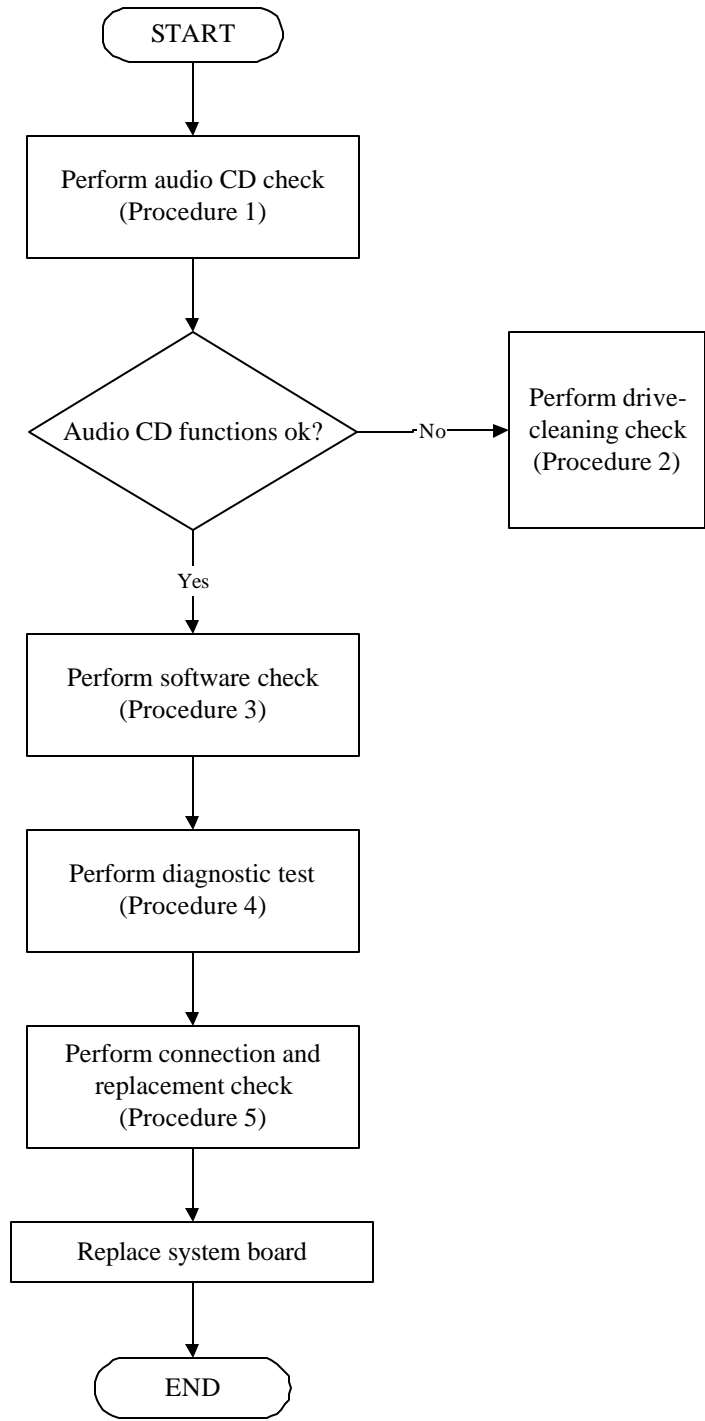


Figure 2-10 Optical drive troubleshooting process



This section describes how to determine if the computer's internal optical drive is functioning properly. The Satellite P10 module bays can accommodate the following optical drives:

- ? DVD-R/RW device
- ? DVD-ROM device
- ? DVD Multi-drive device
- ? COMBO device

Figure 2-11 outlines the process. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Audio CD test

Procedure 2: Drive cleaning check

Procedure 3: Software check

Procedure 4: Diagnostic test

Procedure 5: Connection and replacement check

### **Procedure 1 Audio CD check**

First, insert an audio CD into the CD/DVD drive. If it works, the problem is not with the drive. Go to Procedure 3. If the audio CD does not work, go to Procedure 2. If the CD/DVD LED on the front panel does not light when the disc is played and the drive gives no response, go straight to Procedure 3.

### **Procedure 2 Drive cleaning check**

Insert a CD/DVD drive-cleaning disk into the drive clean according to the drive-cleaning product instructions. If the problem persists, go to Procedure 3.

### **Procedure 3 Software check**

Ensure that the appropriate driver has been installed on the computer for the CD/DVD drive.

### **Procedure 4 Diagnostic test**

The audio test program stored in the Diagnostics Disk will test the drive's ability to play an audio CD. See Chapter 3 for details.

If any errors occur while executing the diagnostic program, go to Procedure 5.

**Procedure 5 Connection check and replacement check**

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

- Check 1 Make sure the drive is firmly connected to the system board. If the connection is good and there is still an error, go to Check 2.
- Check 2 The drive or drive cable may be defective or damaged. Replace each with a new one following the steps in Chapter 4, *Replacement Procedures*. If the drive is still not functioning properly, perform Check 3.
- Check 3 The system board may be damaged. Replace it with new one following the instructions in Chapter 4, *Replacement Procedures*.

## 2.11 Modem Troubleshooting

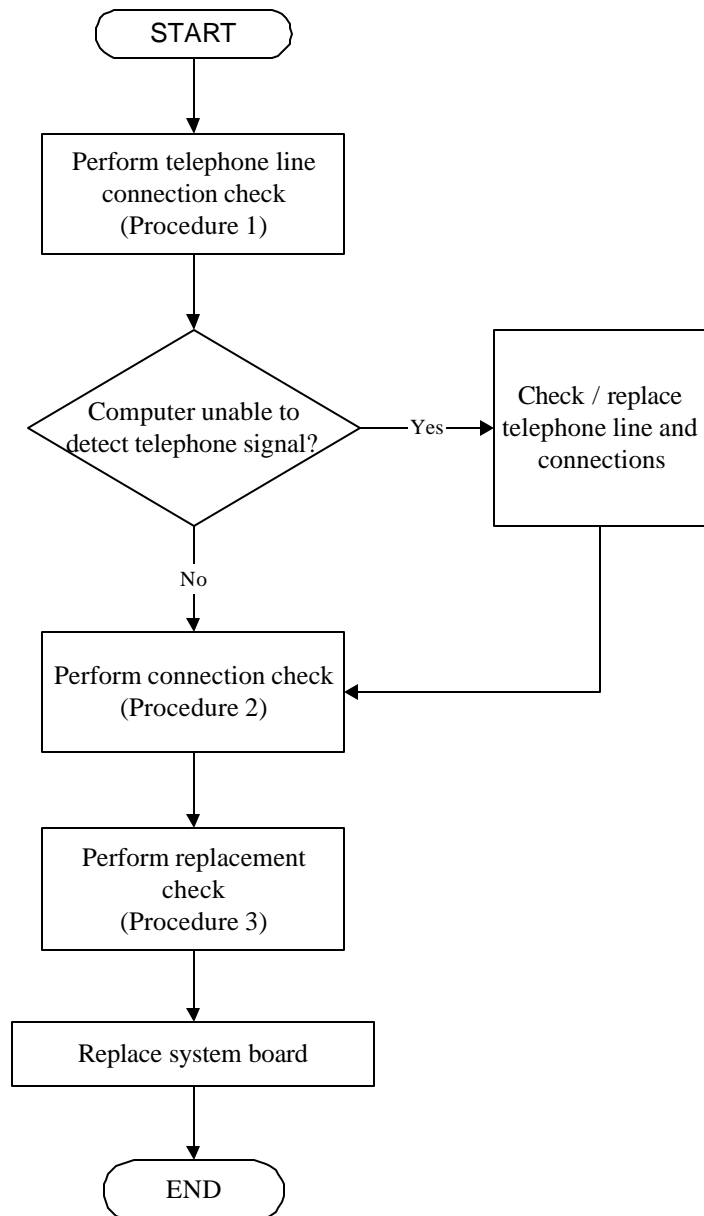


Figure 2-11 Modem troubleshooting process

This section describes how to determine if the computer's modem is functioning properly. Figure 2-11 outlines the process. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Telephone line connection check

Procedure 2: Modem card connection check

Procedure 3: Modem card replacement check

### **Procedure 1 Telephone line connection check**

The telephone cable may be damaged or the connections may be loose. Attempt to connect the computer to a network through using the modem. If the modem does not function at all, go to Procedure 3. If the attempt fails because the computer detects no telephone signal, the fault may be in the telephone cable, the wall socket or the modem port. Perform Check 1:

Check 1 Make sure telephone cable is firmly plugged into both the telephone wall socket and the modem port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the modem port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3 The telephone cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2.

### **Procedure 2 Modem card connection check**

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and ensure that the modem card is well connected to the system board. If the problem persists, perform Procedure 3.

### **Procedure 3 Modem replacement check**

The modem card or RJ-11 jack may be faulty. Try replacing them. If the problem persists, the system board may be defective or damaged. Replace the System Board with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.12 PCMCIA Troubleshooting

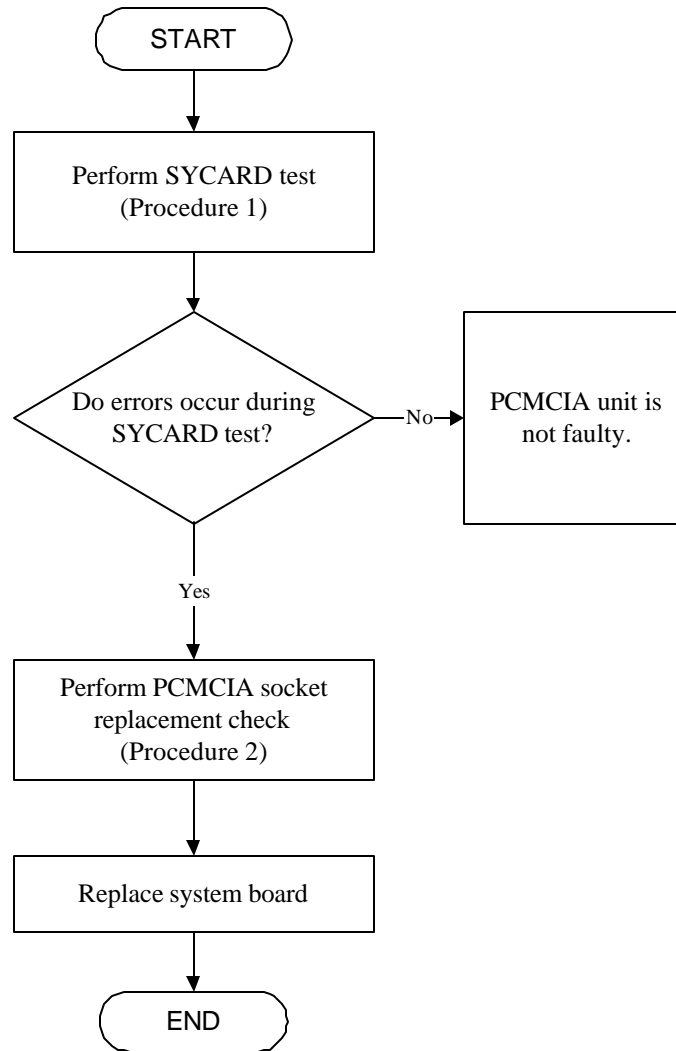


Figure 2-12 PCMCIA troubleshooting process

This section describes how to determine if the PCMCIA card player is functioning properly. The process is summarized in Figure 2-12. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Sycard test

Procedure 2: PCMCIA socket replacement check

### **Procedure 1 SYCARD test**

The SYCARD test card contains a PCMCIA test program. Ensure the card is fully inserted into the socket before running the program.

If an error occurs during the SYCARD test, perform Procedure 2. If no error occurs, it is likely that the original PC card was faulty.

### **Procedure 2 PCMCIA socket replacement check**

The PCMCIA socket may be damaged or defective, for instance the socket pins can be bent.

Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged.

Replace the system board with a new one following the steps in Chapter 4.

## 2.13 IEEE 1394 Troubleshooting

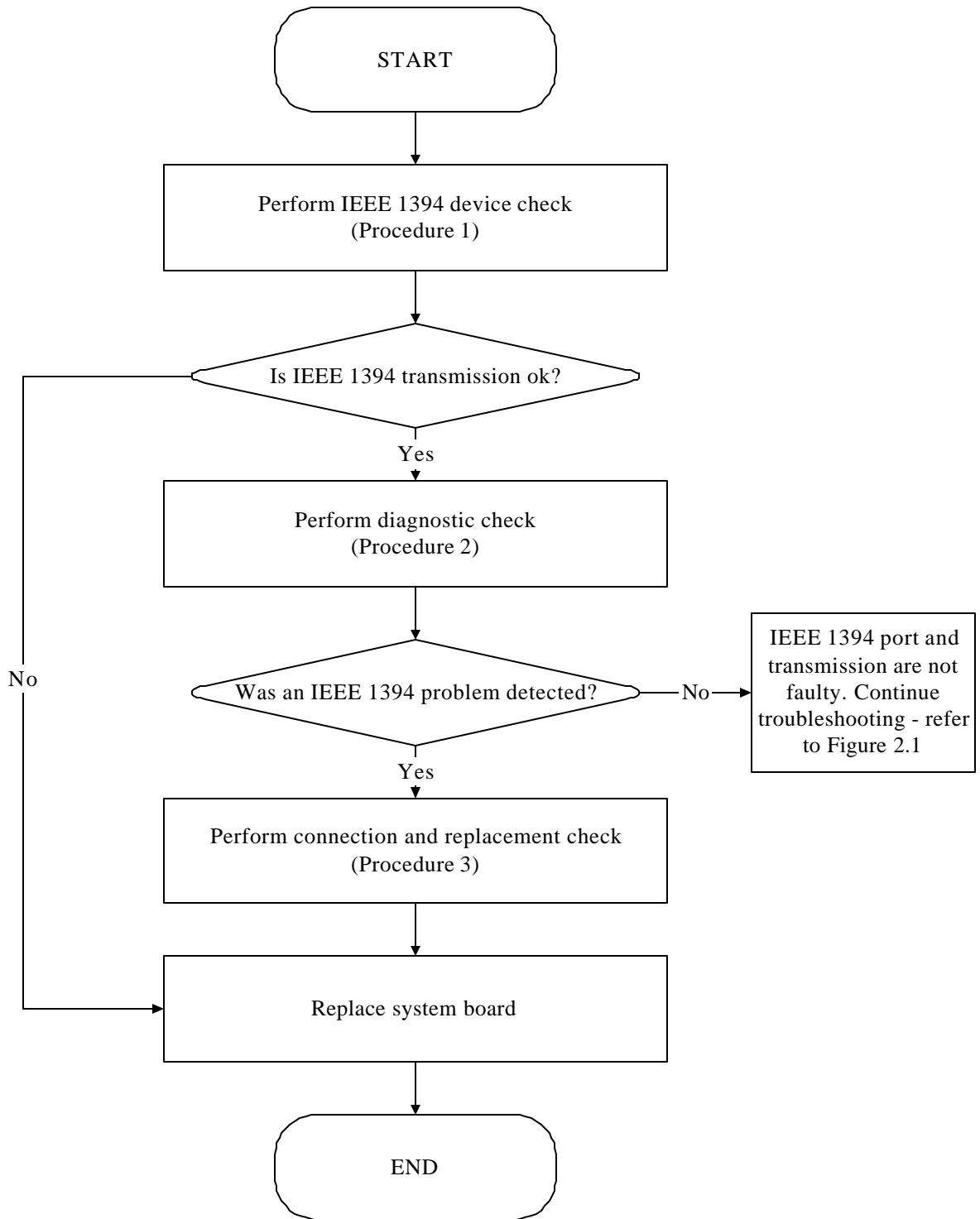


Figure 2-13 IEEE 1394 troubleshooting process

To determine if the computer's IEEE 1394 system is functioning properly, perform the following procedures. Figure 2-13 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: IEEE 1394 device check

Procedure 2: Diagnostic check

Procedure 3: Connection and replacement check

### **Procedure 1 IEEE 1394 device check**

Connect an IEEE 1394 device to the computer's IEEE 1394 port, then boot the computer for Windows XP. The computer should automatically detect the 1394 device. Check whether the device can transmit data to the computer.

If the device is able to communicate with the computer, the problem may be intermittent or connections may be faulty. Go to Procedure 2.

If communication is impaired, there may be a faulty connection. Go to Procedure 3.

### **Procedure 2 Diagnostic check**

Run the Diagnostic Program, which will automatically execute the IEEE 1394 port test for transmission. Refer to Chapter 3, Tests and Diagnostics for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the 1394 port is functioning properly.

### **Procedure 3 Connection and replacement check**

The transmission cable may be damaged or the connections may be loose. Perform Check 1:

Check 1 Make sure the transmission cable is firmly plugged into both the IEEE 1394-compatible device and the IEEE 1394 port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the IEEE 1394 port is firmly secured to the system board of the computer. If the malfunction persists, go to Check 3.

Check 3 The transmission cable may be damaged. Replace with a good cable. If the malfunction persists, go to Check 4

Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.



## 2.14 Wireless LAN Troubleshooting

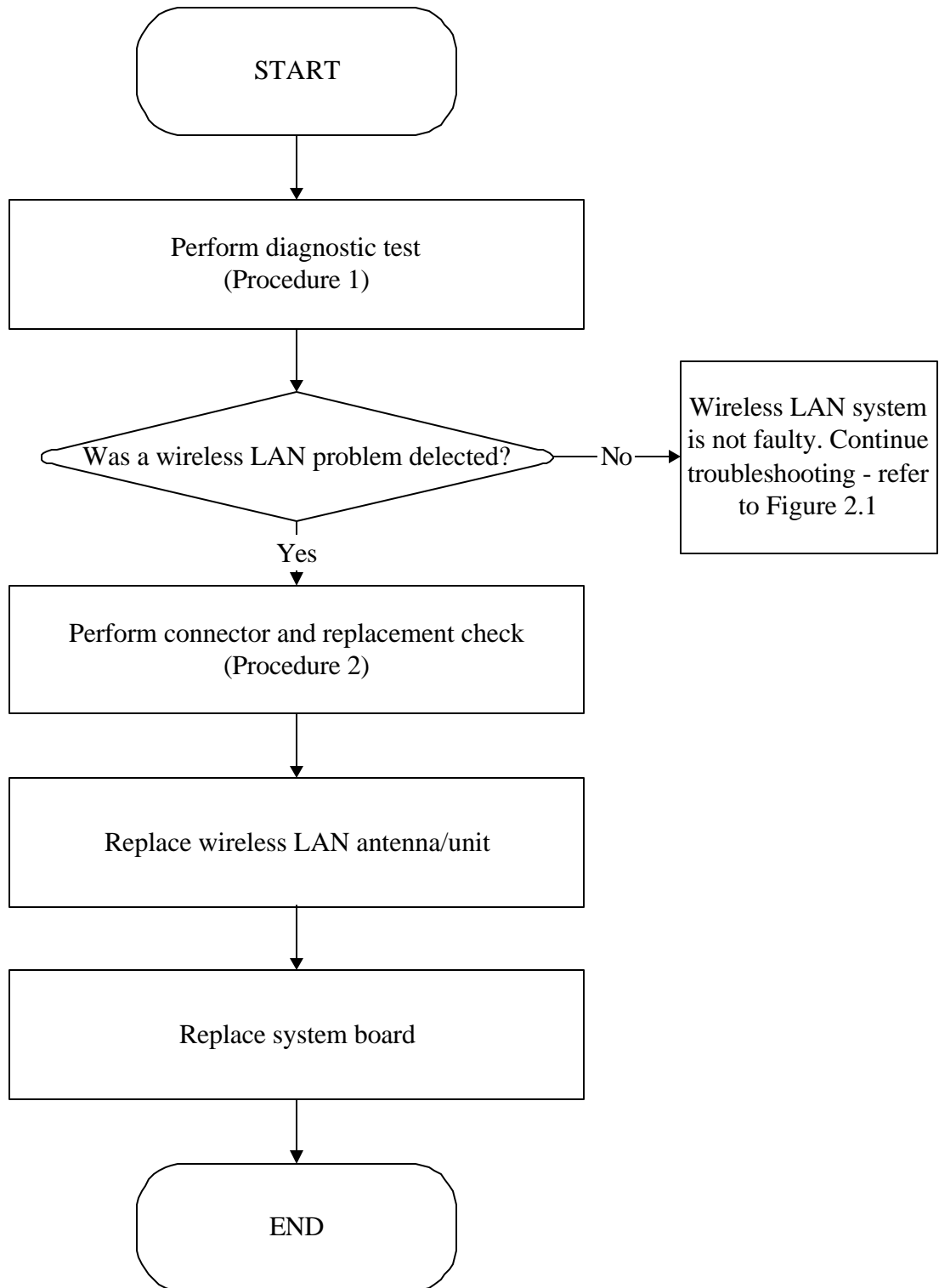


Figure 2-14 Wireless LAN troubleshooting process

The wireless LAN antenna wire, wireless LAN unit or system board may each be the source of a wireless LAN fault. Any of these components may be damaged. To determine if the computer's wireless LAN system is functioning properly, perform the following procedures. Figure 2-15 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

### **Procedure 1 Diagnostic test**

Run the Diagnostic Program, which will automatically execute the wireless LAN test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the wireless LAN system is functioning properly.

### **Procedure 2 Connector and replacement check**

The wireless LAN antenna, wireless LAN unit or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

- Check 1 Make sure that the wireless LAN antenna is firmly connected to the wireless LAN unit (refer to Chapter 4 for instructions) and that the wireless LAN unit is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 Check that the wireless communication switch is turned to "On", then make sure that the wireless communication LED on the front panel is lit. If the LED is lit but the wireless LAN function is still faulty, the antenna may be damaged. Replace with a new antenna following the steps in Chapter 4, *Replacement Procedures*. If the problem persists, or if the wireless LAN LED is not lit when the wireless communication switch is turned to "On", go to Check 3.
- Check 3 The wireless LAN unit may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.



### 2.15 5IN1 Card Troubleshooting

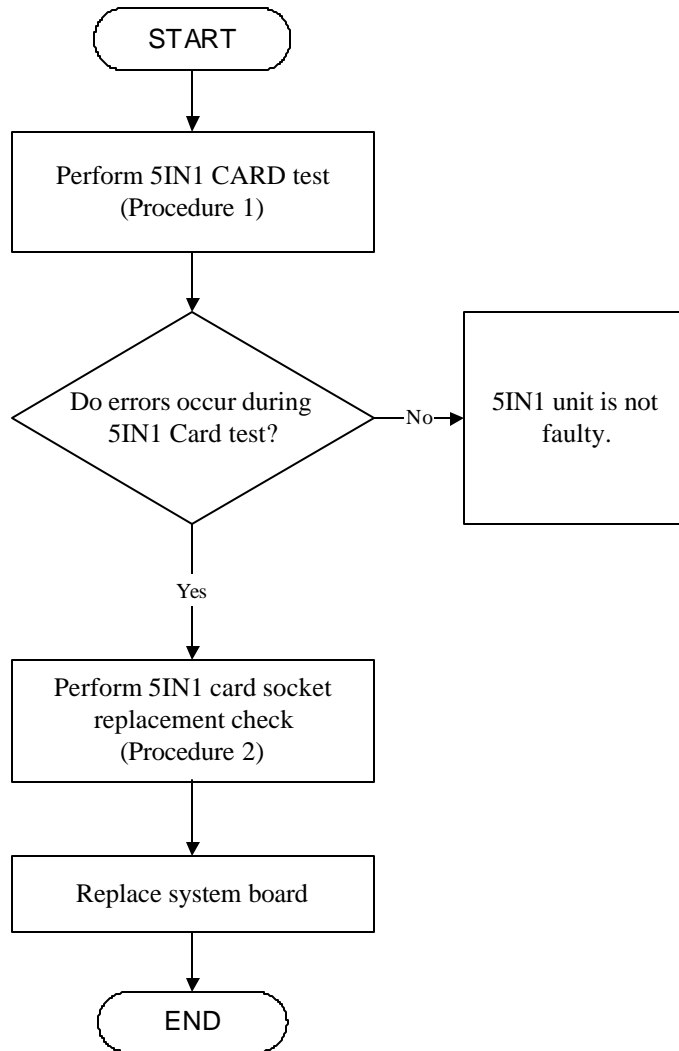


Figure 2-15 5IN1 card troubleshooting process

This section describes how to determine if the 5IN1 card player is functioning properly. The process is summarized in Figure 2-15. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: 5IN1 (SD/MMC/MS/MS Pro/XD) card test

Procedure 2: 5IN1 socket replacement check

### **Procedure 1 5IN1 card test**

The 5IN1 test card contains a 5IN1 test program. Ensure the card is fully inserted into the socket before running the program.

If an error occurs during the 5IN1 card test, perform Procedure 2. If no error occurs, it is likely that the original 5IN1 card was faulty.

### **Procedure 2 5IN1 card socket replacement check**

The 5IN1 card socket may be damaged or defective, for instance the socket pins can be bent. Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4.

## 2.16 Bluetooth Troubleshooting

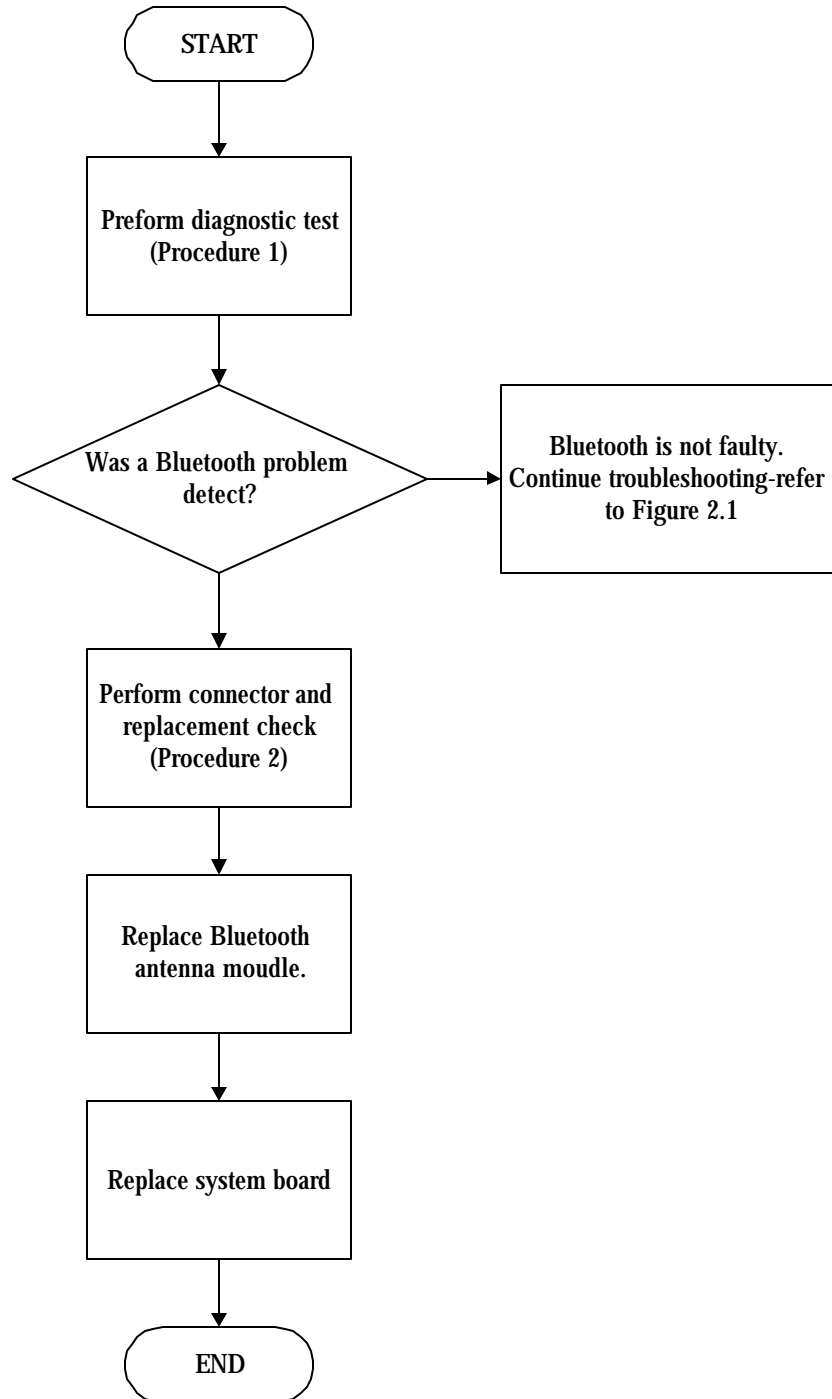


Figure 2-16 Bluetooth troubleshooting process

The Bluetooth antenna wire, Bluetooth module or system board may be the reason of a Bluetooth fault. Any of these components may be damaged. To determine if the computer's Bluetooth is functioning properly, perform the following procedures. Figure 2-16 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

### **Procedure 1 Diagnostic test**

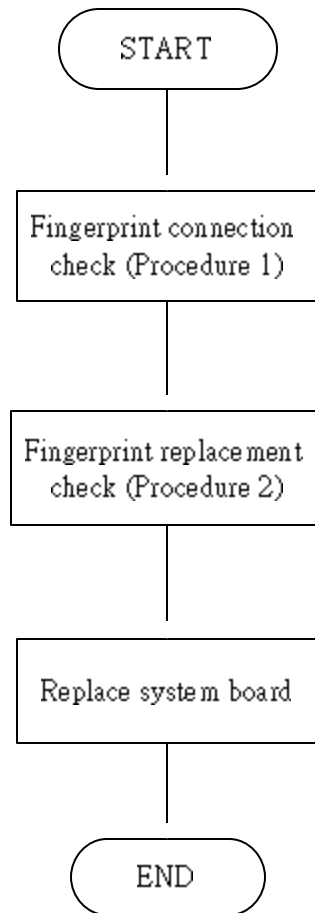
Run the Diagnostic Program, which will automatically execute the Bluetooth test. Refer to Chapter 3, Tests and Diagnostics for more information on the program. If an error is located, go to Procedure 2. If an error is not located, the Bluetooth system is functioning properly.

### **Procedure 2 Connector and replacement check**

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

- Check 1 Make sure that the Bluetooth antenna is firmly connected to the Bluetooth module (refer to Chapter 4 for instructions) and that the Bluetooth FFC is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 Check that the Bluetooth communication switch is turned to "On", then make sure that the communication LED on the left panel is lit. If the LED is lit but the Bluetooth function is still faulty, the antenna module may be damaged. Replace with a new antenna following the steps in Chapter 4, *Replacement Procedures*. If the problem persists, or if the Bluetooth communication LED is not lit when the Bluetooth communication switch is turned to "On", go to Check 3.
- Check 3 The Bluetooth module may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.17 Fingerprint Troubleshooting





To determine if the computer's built-in Fingerprint is functioning properly, perform the following procedures. Figure 2-17 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: Fingerprint connection check

Procedure 2: Fingerprint replacement check

### **Procedure 1 Fingerprint connection check**

The Fingerprint is connected via the Fingerprint FPC to the system board. Make sure the Fingerprint FPC cable is firmly connected to the Fingerprint and system board. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks.

If any of the connections are loose, reconnect firmly. If any of the connections is damaged, or there is still an error, go to Procedure 2.

### **Procedure 2 Fingerprint replacement check**

The Fingerprint unit or FPC may be defective or damaged. Replace each with a new one following the steps in Chapter 4. If the FDD is still not functioning properly, replace the system board with a new one following the steps in Chapter 4.

### 2.18 3D HDD Protection Troubleshooting

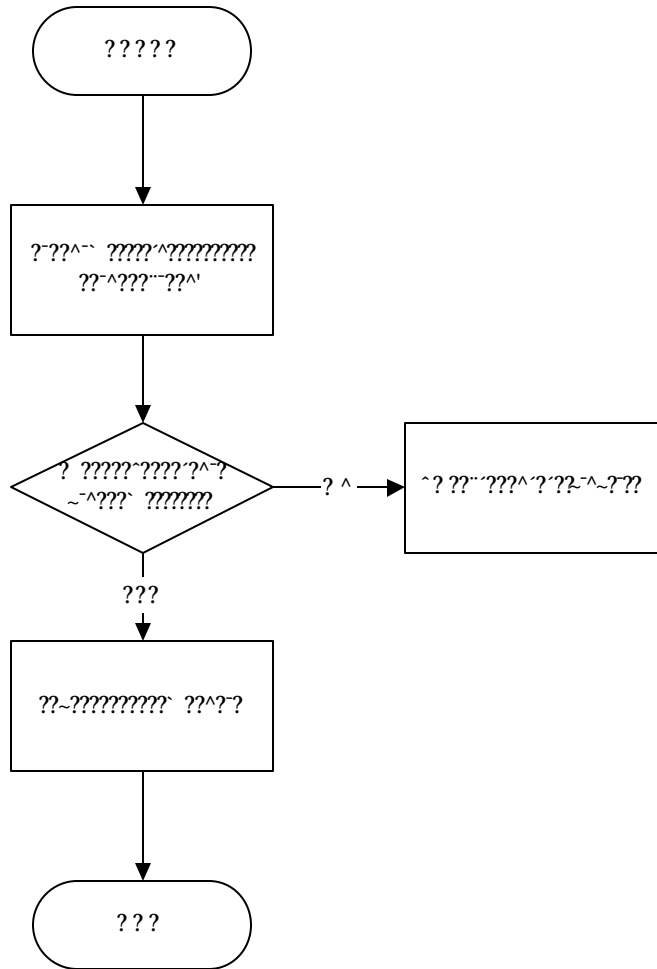


Figure 2-18 3D HDD protection troubleshooting process

To determine if the computer's built-in 3D HDD protection is functioning properly, perform the following procedures. Figure 2-18 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: Diagnostic test

### **Procedure 1 Diagnostic test**

Run the Diagnostic Program, which will automatically execute the 3D sensor test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is not located, the 3D HDD protection system is functioning properly.

---

# **Chapter 3**

## **Tests and Diagnostics**

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### 3.1 The Diagnostic Test

This chapter explains how to use the Test & Diagnostic program to test the functions of the **(Base on Cleveland10 T&D version 1.0)** hardware modules. The Test & Diagnostic Program is stored on the T&D diskettes. The program consists of a series of tests that run automatically when the Diagnostics Program items are selected and executed.

**NOTES:** To start the diagnostics, follow these steps

1. Check all cables for loose connections.
2. Exit this program when you are at Main Menu.

The TEST & DIAGNOSTIC PROGRAM contains the following functional tests:

- CONFIG CHECK TEST
- DMI CHECK TEST
- SPEAKER AUDIO TEST
- FAN ON/OFF TEST
- MAIN BATTERY CHARGE TEST
- FDD TEST
- ODD TEST
- KEYBOARD TEST
- MOUSE(PAD) TEST
- LCD PIXELS MODE TEST
- MAGNETIC SWITCH TEST
- HDD R/W TEST
- LAN TEST
- RTC TEST
- IEEE1394 CODE TEST
- Speaker EQ Check&Rewrite
- Button Test
- Fingerprint DOS Test
- 3D G-Sensor Test
- Clear FP(Fingerprint) Registered

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

- The diagnostics diskette (2 pcs)
- A formatted working diskette for the floppy disk drive test (Floppy Disk Drive Test)
- A data CD disc (ODD Test)

The following sections explain how to execute the Test & Diagnostic Program and detail the tests within the program.

## 3.2 Executing the Diagnostic Test

DOS is required to run the DIAGNOSTICS PROGRAM. To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the diagnostics diskette #1 in the floppy disk drive and turn on the computer. (The diagnostics diskette contains the DOS boot files.) And then follow the instructions to swap with the diagnostics diskette #2 for T&D program installed in RAM driver.

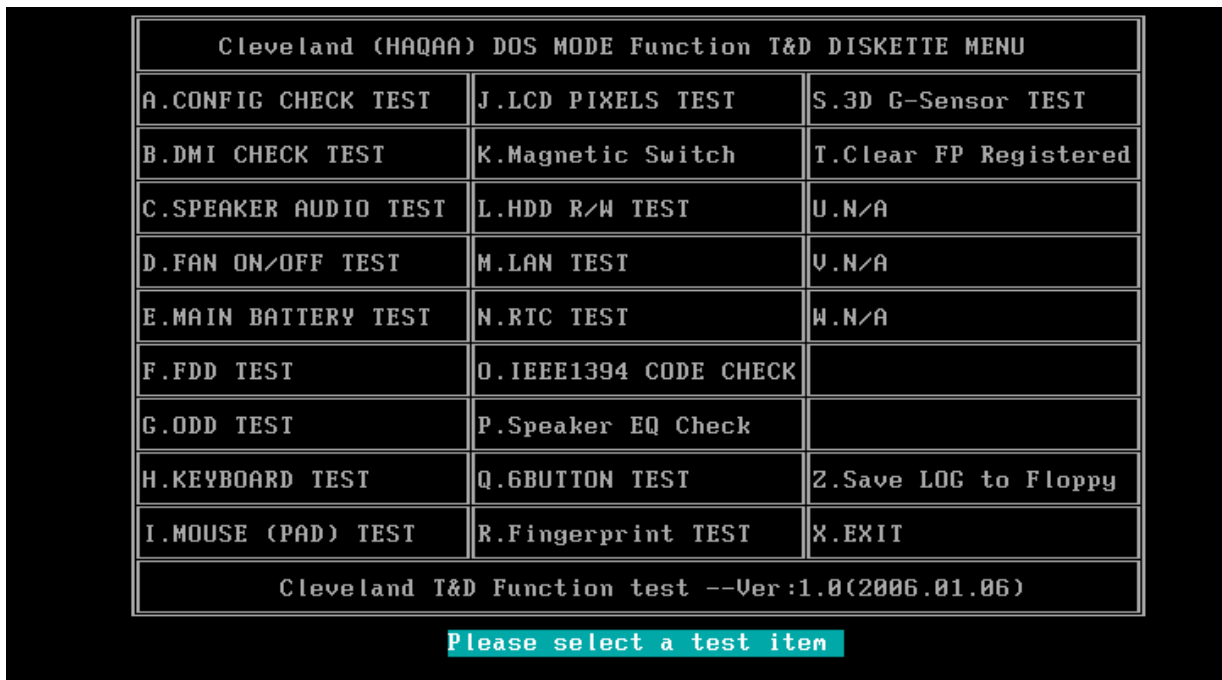
**NOTE:** To execute the CD test, make sure the CD is installed in the ODD drive.

The T&D Program can run by single test item when you press corresponsive English letter of test item, or run two or more test items what you like if you choose them by “Arrow cursors” and “Space Bar” – the wonderful thing is you can setup test loop by “Enter” button. And it also asks you if you like to copy test log file to diskette as reference at the end of test(s).

The test list is as the following:

- A. CONFIG CHECK TEST
- B. DMI CHECK TEST
- C. RTC TEST
- D. LAN TEST
- E. SPEAKER AUDIO TEST
- F. FAN ON/OFF TEST
- G. MAIN BATTERY CHARGE TEST
- H. FDD TEST
- I. ODD TEST
- J. KEYBOARD TEST
- K. MOUSE (PAD) TEST
- L. LCD PIXELS MODE TEST
- M. MAGNETIC SWITCH TEST
- N. HDD R/W TEST
- O. IEEE1394 CODE TEST
- P. Speaker EQ Check&Rewrite
- Q. Button test
- R. Fingerprint DOS Test
- S. 3D G-sensor DOS Test
- T. Clear FP(Fingerprint) Registered

The below display will show up at the beginning of T&D program



If the test result passes, the following display will show up:

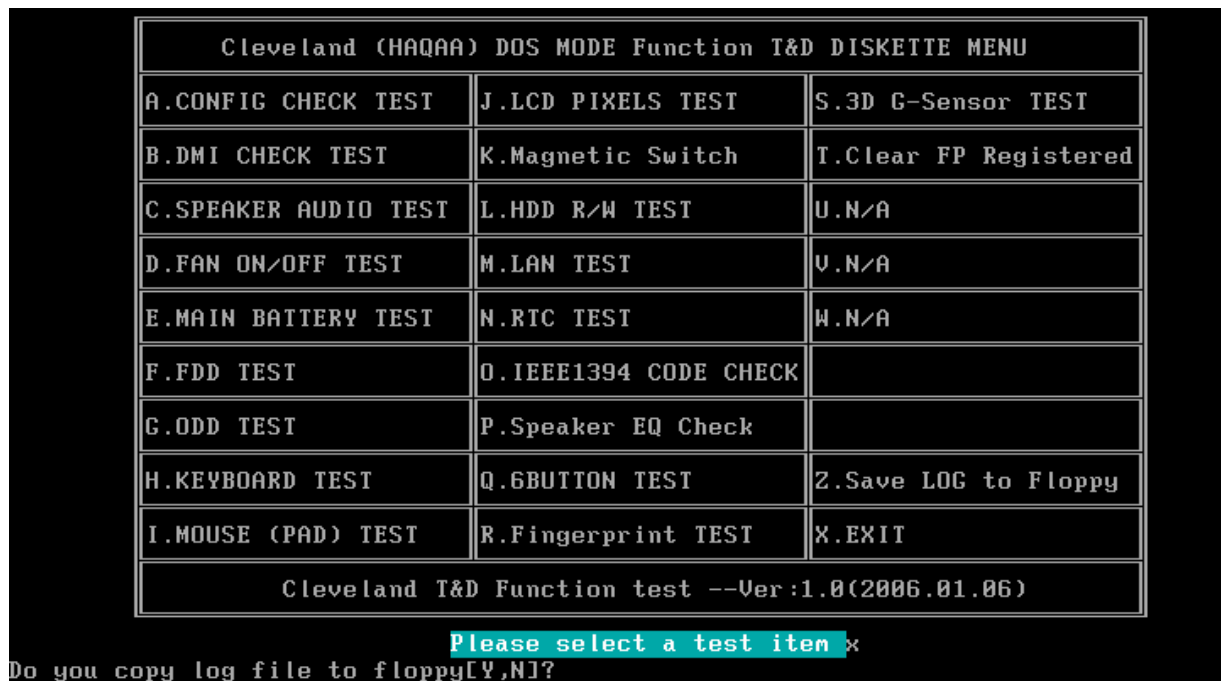




If an error is detected and a test fails, the following message displays:

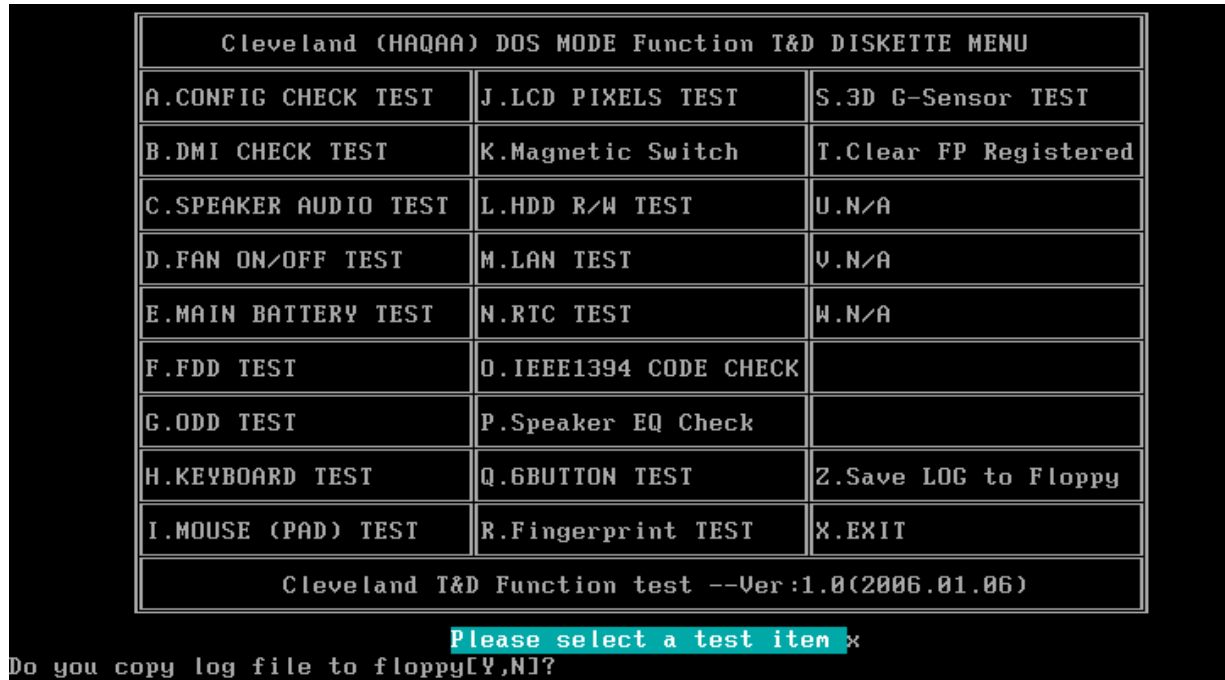


Then press any key for next actions – the below display presented if copying test log file onto diskette is necessary. This action will be executed when “Y” key pressed.



It will skip this process if “N” key pressed.

And then it will check if it’s necessary to leave this program. Program will quit when “Y” key pressed and it will go back main menu for next test if “N” key pressed.



### 3.3 Display Configuration

This Item will show the unit configuration. It includes:

- ◆ CPU type (Single/Dual Yunah; Cache ; CPU speed ;CPU FSB)
- ◆ DDRAM SIZE
- ◆ ODD TYPE ((DVD-SuperMulti; COMBO; ...)
- ◆ Panel ID
- ◆ HDD type & capacity (Vendor ID. Model .Firmware)
- ◆ VRAM size / VGA CHIP TYPE
- ◆ Battery cell (6cell;9cell;12cell)
- ◆ Wireless type
- ◆ LAN Type (Enkron-R; Vidalia)
- ◆ Bluetooth/FIR/Docking/1394
- ◆ SKU ID

The screen should display as below:

```

=====
Configuration as Below
=====

CPU TYPE=Dual-Yonah
CPUCatche=2048
CPUSpeed=1.66GHZ
CPUFSB=667MHZ
DDRAMSIZE=512MBRAM
ODDTYPE=SuperMulti
PanelID=CM014.1WXGA
HDDTYPE=100G54HDD
VRAMSIZE&VGATYPE=128MBM52P
BATT=6cell
WirelessTYPE=Intel_A+GEU
LANTYPE=Vidalia
Bluetooth=YES
FIR=NO_
Docking=NO
1394=YES
SKUID=04

ARE YOU TEST OK?[Y,N]?

```

### 3.4 DMI Check Test

This test will check if the computer's Desktop Management Interface (DMI) is correct.

DMI includes:

- ◆ Manufacturer
- ◆ Production Name
- ◆ Version
- ◆ Serial Number
- ◆ UUID
- ◆ OEM String

It needs to input unit Part Number by manual, then show this unit DMI information and makes comparison with SKU data.

**NOTE:** To execute this test, you must input unit **Part Number** as “**Uppercase Character**”.

The screen should display as below, indicating whether the test is passed or failed after comparison.



```

          PASS

Manufacturer : TOSHIBA
Product_Name : TECRA A6
Serial_Number : 40000000K
Version      : PTA61C-CU201E
Asset_Number : *
UUID        : E75BFC6D725B11DAA180000FB0D940CA
OEM_Strings : PTA61C-CU201E,CCU201E001
Press any key to continue . . .
```

### 3.5 Speaker Audio Test

The speaker audio test allows the user to aurally confirm the speaker functions. And check both speakers if they are OK within 3 times “Beep” sound generated.

**NOTE:** Remember to tune up the volume as “*Maximum*” before this test starts.

The screen should display as below, indicating whether the test is passed or failed after the question.

```
=====Speaker audio Test=====
1.Please adjust volume to max level.
2.Please listen to both of speaker will send out Beep sound
  (3 times).
Press any key to continue . . .
```

### 3.6 Fan ON/OFF Test

The fan test allows the user to test aurally whether the fan is working. And follow the below procedures for this test:

- ◆ The computer will let the fan be “ON” after any key pressed. Listen to check whether the fan is working.

**NOTE:** Remember to approach fan outlet that is near right side of unit whether fan is “ON”.

- ◆ The computer will stop the fan working after any key pressed. Listen to check if the fan is “OFF” – it means no rotating sound.

The screen should display as below, indicating whether the test is passed or failed after the question.

```
===== FAN TEST =====  
  
Please approach FAN outlet to listen to FAN rotating sound.  
  
Press any key to continue . . .
```

### 3.7 Main Battery Charge Test

**NOTE:** The AC adaptor (75W, 15V) should be connected to successfully run this test.

This test shows and measures the main battery:

- ◆ Battery type (Lion)
  - ◆ Manufacturer (Sanyo/Panasonic)
  - ◆ Remain charge capacity (0 ~ 100%)
  - ◆ Charge function (PASS/FAIL)
- “Battery Is Full” showed when “remain charge capacities” is 100%

The screen should display as below, indicating whether the test is passed or failed when finished.

```
ONLY FOR 87591 T&D Series Battery Test Program.[591] V1.0 2002/07/23
MAIN Battery

Battery Type: Lion
Manufacturer: Sanyo
Remain charge capacity : 43.7%

Charge Test-> [ PASS ]

Press any key to continue . . .
```

### 3. 8 FDD Test

**NOTE:** Before running the FDD test, prepare a formatted work diskette (1.44 MB). Remove the diagnostics diskette and insert the work diskette into the FDD. The contents of the floppy diskette may be erased.

The Floppy Disk Test includes three subtests of the:

1. Sequential seek/verify function (Range: Track 0 ~ 79)
2. Funnel code seek/verify function (Range: Track 0 ~ 79)
3. Write/Read/Compare pattern function (Range: Track 75 ~ 79)

**NOTE:** The write-protected device of this formatted diskette should be “Disable”.

The subtests run automatically.

**NOTE:** Press “Esc” key can skip the current subtest.

The screen should display as below, indicating whether the subtests pass or fail when finished.

```
***** Fdd Test Program V1.3 *****
Testing Driver A: [1.44 MByte (Cyl:80, Head:2, Sec:18)]...
Testing Seq. seek/verify... Head: 01, Track: 79... [ PASS ]
Testing Fun. seek/verify... Head: 01, Track: 06...
```



### 3.9 ODD Test

The ODD test allows a user to aurally confirm the ODD functions.

**NOTE:** A CD disc (including data file) must be inserted into the ODD drive then must wait ODD drive initial OK (ODD LED stop flashing) before this test starts.

The ODD test includes two subtests of the:

1. Random read/partial sequential read function
2. Eject ODD door

The screen should display as below, indicating whether the subtests pass or fail when finished.

```
LAP:00001(0000:09)>01-06-100> COMPAL TSEL/F:CDROM.SCY  IN:3  Version:1.64
<01| COMPACT DISC ROM |>
CD ROM Drive H:, MSCDEX ver.: 2.22, Driver name: FDCD0001, Vol.:
Total 149140482 sectors(46082 bytes/sector) = 744017924 bytes
Testing for DATA CD:
Testing CD ROM reset function...Passed.
Testing seq. read... sector: 143174836( 25)
Testing fun. read... sector: 71587428( 25) Passed.
<02| CDROM CHECK2 |>
CD ROM Drive H:, MSCDEX ver.: 2.22, Driver name: FDCD0001, Vol.: DBL10TESTHD
Total 149140482 sectors(46082 bytes/sector) = 744017924 bytes
Testing Eject/Close door:
```

### 3. 10 Keyboard Test

The keyboard test checks the all keys function.

**NOTE:** *The **Num Lock** and the **Overlay** mode must be off to execute the keyboard test.*

Before keyboard test starts, the keyboard matrix code should be chosen as below display:

1. **K** (UK, for Europe)
2. **S** (US, for America)

When you execute this test, the keyboard layout is drawn on the display. When any key is pressed, the corresponding key on the screen changes to black as shown below.

It will indicate whether the subtest is passed or failed after the question.

**NOTE:** *The “**Fn**” key cannot be tested in the keyboard test. To determine whether the “**Fn**” key is working correctly, press “**Fn+F6** ” or “**Fn+F7** ” keys to check if LCD display brightness change gradually.*



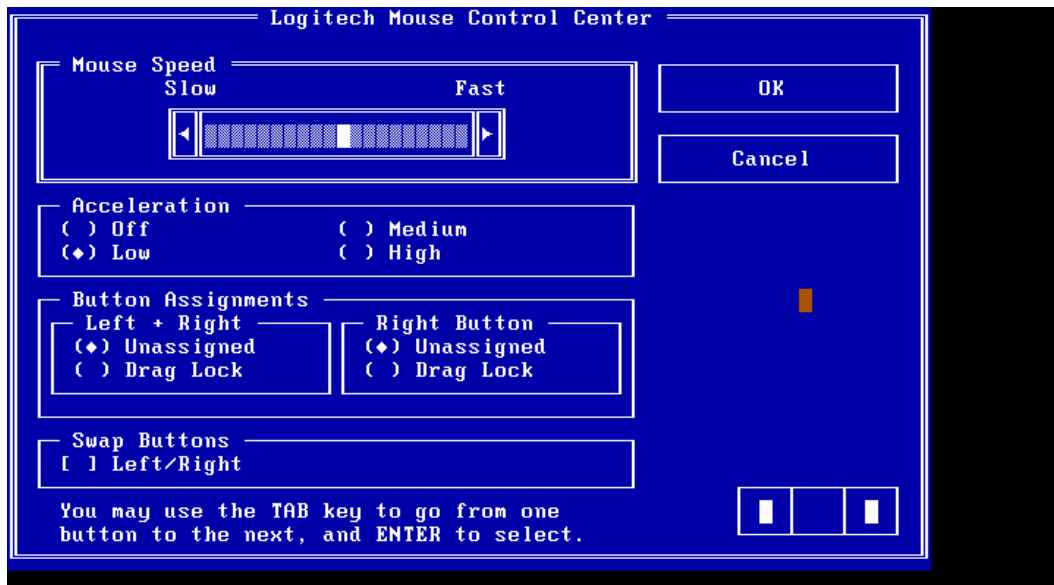
### 3.11 Mouse (Pad) Test

The Mouse test allows the user to select and assign values to the following, using the Touch Pad or “**Tab**” key to move between selections:

1. Mouse Speed (on a scale from slow to fast)
2. Acceleration (Off, Low, Medium, High)
3. Button Assignments (Left + Right / Right button, either Unassigned or Drag Lock)
4. Swap Buttons (Left /Right)

**NOTE:** The Touch Pad test cannot be used to test an external USB mouse.

The Touch Pad button subtest allows users to test their Touch Pad buttons. If the buttons are clicked, the cursors should appear in the corresponding box of the button figure that is displayed on the screen as below.



After checking T/Pad buttons and cursor's function, use "Tab" key or use T/Pad cursor to click the "OK" column will end this test.

It will indicate whether the subtests pass or fail after three questions.

**NOTE:** *The above figure has three compartments although the Touch Pad installed may only have two buttons. In this case, the central compartment in the figure does not correspond to any button.*

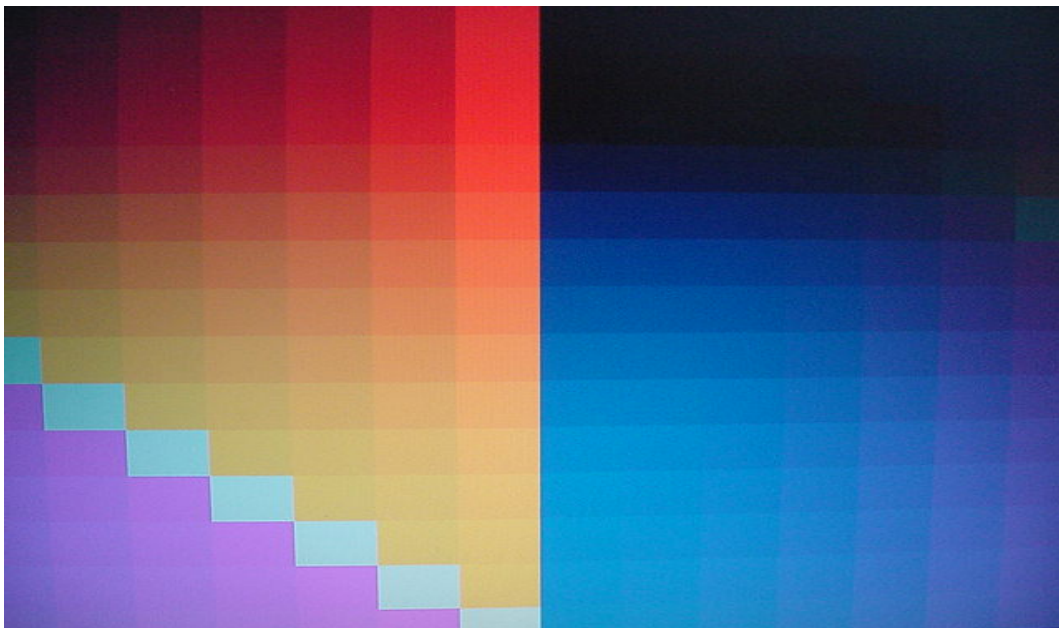
### 3. 12 LCD Pixels Mode Test

This LCD pixels mode test checks whether video display is fine.

This test includes two modes of the test:

1. Text Mode
  - including 40\*25 (16 colors) and 80\*25 (2/16colors).
2. VGA Mode
  - including 320\*200 (4/16/256 colors), 640\*200 (2/16 colors), 640\*350 (2/16 colors), 640\*480 (2/16/256 colors), 800\*600 (256 colors) and 1024\*768 (256 colors).

The screen should display as below, indicating whether the test is passed or failed after the question.



### 3.13 Magnetic Switch Test

The lid switch test checks the lid function of the unit. When LCD cover closed, the lid should enable to turn off the display.

**NOTE:** Remember to tune up the volume as “*Maximum*” before this test starts.

Follow below steps to run this test:

1. Close the LCD cover.
2. Heard 3 “Beep” sound happened during LCD closed.
3. Open the LCD.

Then it will indicate whether the test is passed or failed.

```
Compal Lid switch test program Ver 1.01
Please Close LCD Panel to Test Magnetic OR Press Ctrl+Q to quit the test!
```

### 3.14 HDD R/W Test

The HDD R/W test allows the user to test aurally HDD read/write function. For data security concern, it is necessary to input password - “**hard disk**” before HDD write test starts.

The HDD test includes three subtests of the:

1. Sequential read (all surface)
2. Sequential write (all surface)
3. Partial W/R + Random W/R

After the choice is made, HDD information will show as below:

- ◆ Model name
- ◆ Firmware revision
- ◆ Serial number
- ◆ CHR (Cylinder High Register) mode – including cylinders, heads, sectors and sizes.
- ◆ LBA (Logical Block Addressing) mode – including sectors and sizes.
- ◆ Support Ultra DMA Mode

```
HDD Utility (for Testing only) Ver 1.0
-----
Testing HDD Information ..... Press Ctrl+Break keys to stop testing
-----
Model name           = IC25N030ATCS04-0
Firmware revision    = CA30A71A
Serial number        =      CSL304D5CARPWA
CHR Mode cylinders   = 16383
CHR Mode heads       = 16
CHR Mode sectors     = 63
CHR Mode sizes       = 8063 MB
LBA Mode sectors     = 58605120
LBA Mode sizes       = 28615 MB
Support Ultra DMA Mode = 3f
Support PIO Mode     = 1f
-----

Begin Testing ..... Sequential read (all surface)
--> Testing of Sectors = 13300947
```



**NOTE:** Press "**Ctrl + Break**" keys can terminate the current subtest.

The screen should display as previous picture, indicating whether the subtest is passed or failed when finished.

**NOTE:** The AC adaptor should be connected to successfully run this test.

### 3.15 LAN Test

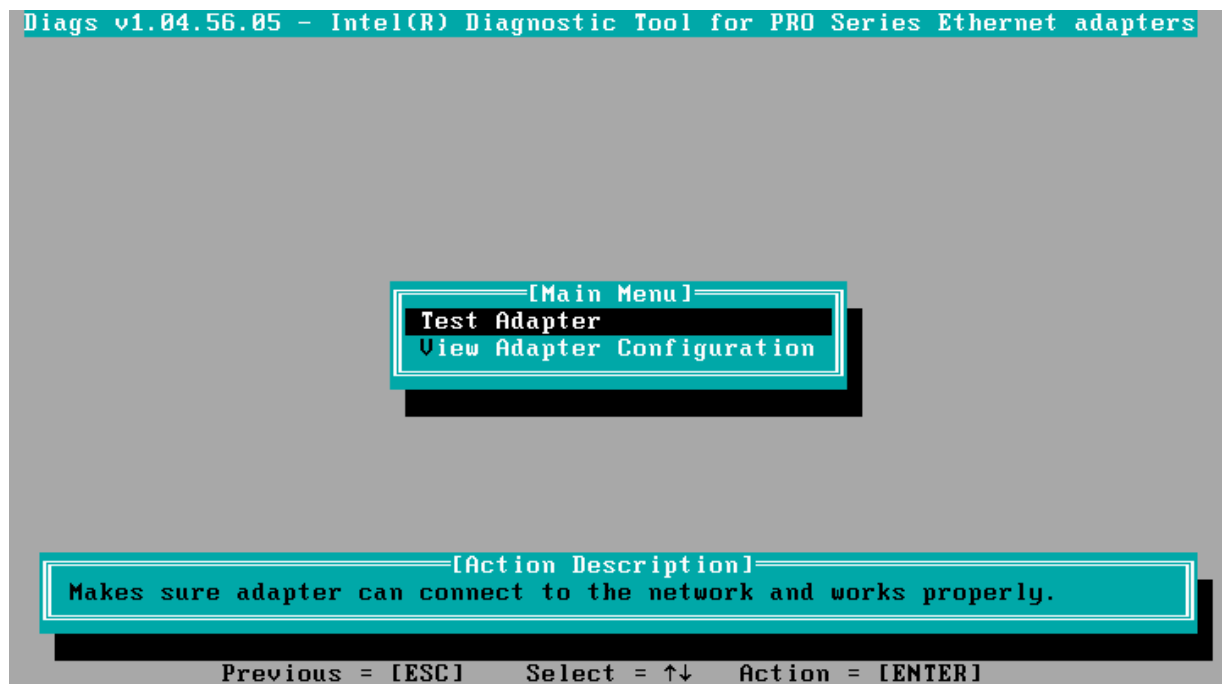
The LAN test checks the LAN full-duplex environment.

And LAN information will show on the test screen:

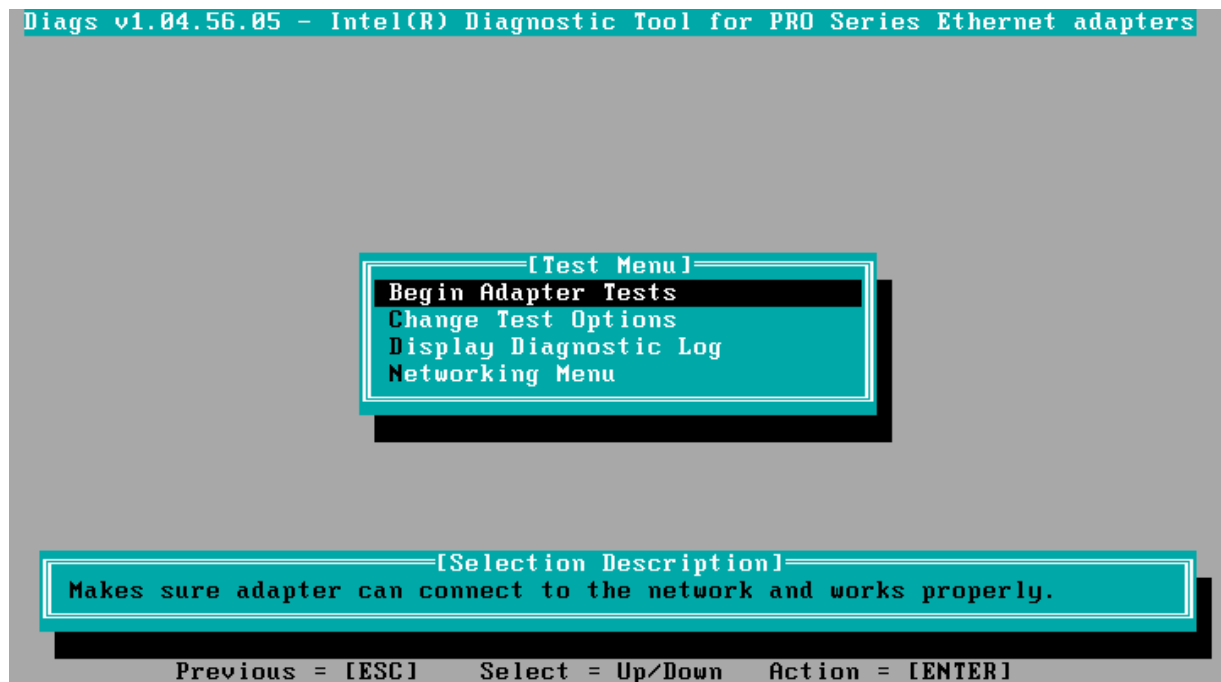
- ◆ Device Registers
- ◆ FIFOs
- ◆ EEPROM
- ◆ Interrupt
- ◆ Loopback Test (s)

The subtests run step by step: (As below)

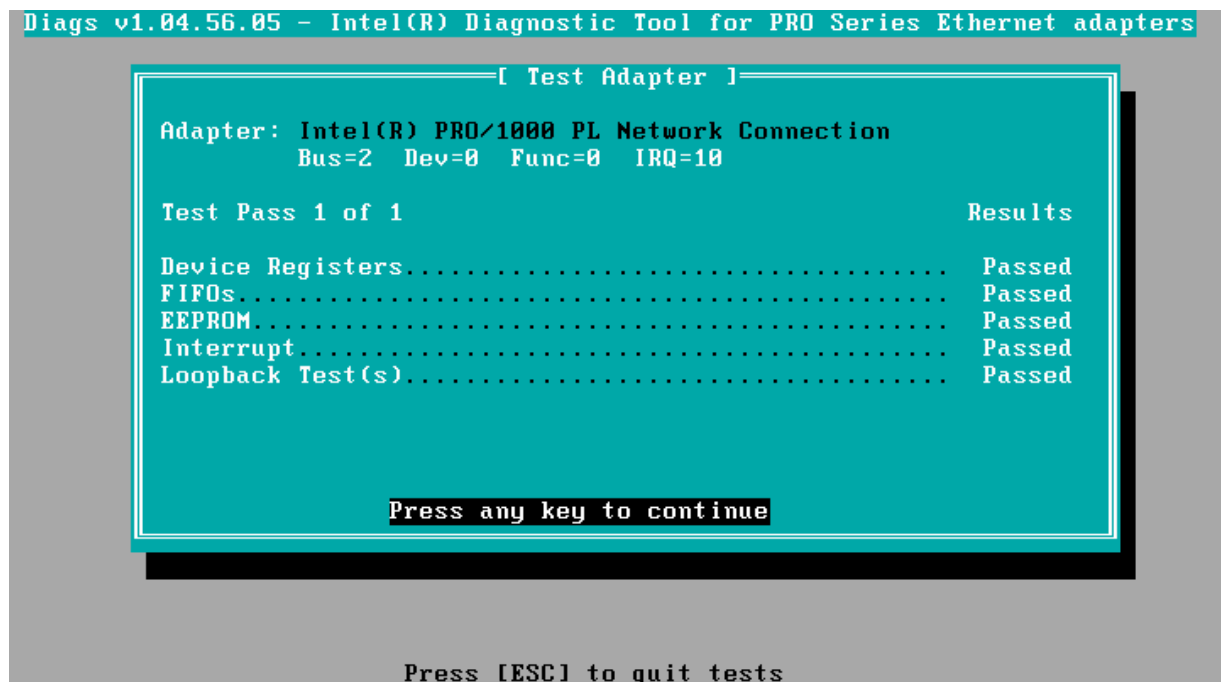
Step1. Select “Test Adapter” Item to press “Enter” key.



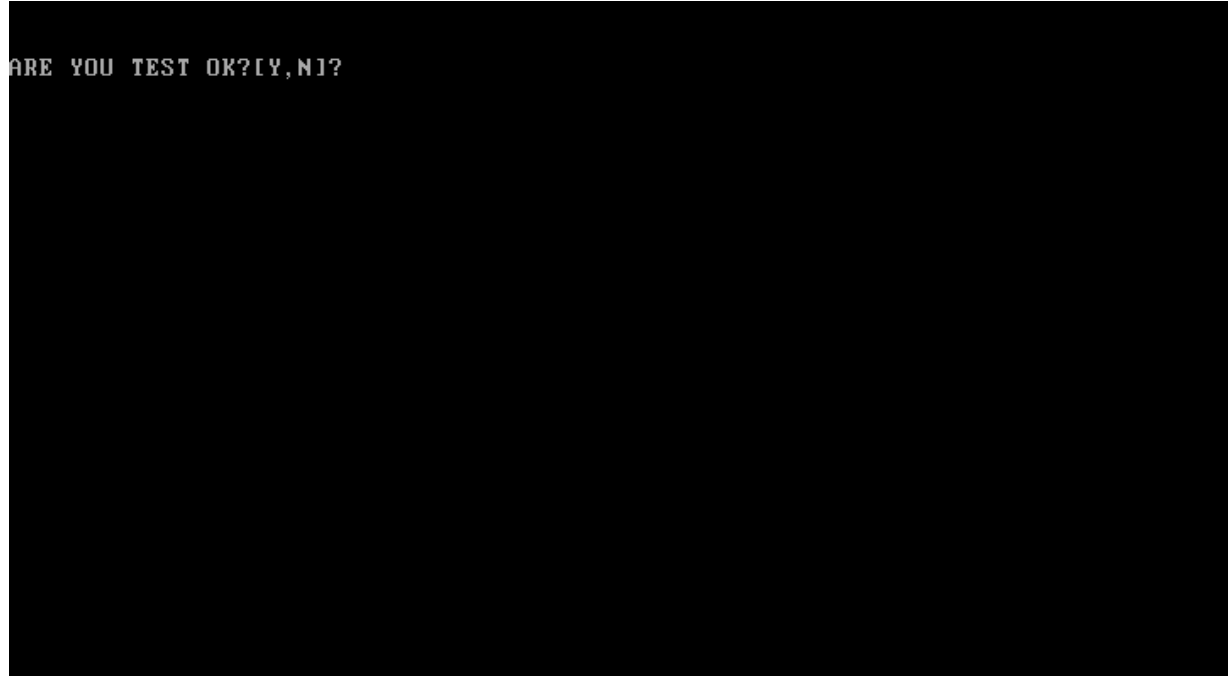
Step2. Select “Begin Adapter Tests” Item to press “Enter” key to begin function testing.



The screen should display as below, indicating whether the subtests pass or fail when finished



Step3. Press [ESC] key to EXIT LAN test MENU. The screen should display as below, Need you select your test result to show "PASS" or "Fail".



### 3.16 RTC Test

Checks the computer's RTC (Real Time Clock) and calendar functions by comparing the DOS and CMOS values.

The test runs automatically.

The screen should display as below, indicating whether the test is passed or failed when finished.

```
====RTC TEST====

Please Check the result after test.

Press any key to continue . . .

Wait for zero counter...
Testing...
DOS TIME = 22:33:48.04(8122804), CMOS TIME = 22:33:48(8122800)
DOS DATE: 09/19/2002, CMOS DATE: 09/19/2002
DATE & TIME test [ PASS ]

Press any key to continue . . .
```

### 3.17 Speaker EQ Type Check&Re-Write

This test will check if the computer's EEPROM EQ type is correct.

The EQ Type test includes two subtests of the:

1. Read EQ Type from EEPROM
2. Re-Write EQ Type to EEPROM

**NOTE:** To execute this test, you must select speaker type (Harman or No brand).

The figure below will be displayed:

```
Please select read or write EQ
1. Read EQ Type from EEPROM
2. Write EQ Type to EEPROM

[1,2]?1

=====EQ CHECK TEST=====

Please check LCD Bezel Right side mark then Select Speaker type
1: Harman/kardon
2: No brand
[1,2]?
```

The Item2 figure below will be displayed:

```
Please select read or write EQ
1. Read EQ Type from EEPROM
2. Write EQ Type to EEPROM

[1,2]?

=====Write EQ to EEPROM =====

Please Select Speaker type (1=Harman;2=No brand)
[1,2]?
```

**NOTE:** Write speaker EQ must reboot to enable EQ.

### 3.18 Read 1394 GUID

This test will check if the computer's EEPROM 1394GUID code is correct.

**NOTE:** Must open the RAM Door to see RAM connector GUID bar code before test item begins.

The figure below will be displayed:

```
=====guid read=====

Please check RAM Connector GUID bar code.

R1394 Code Check Program 1.0 PE/SW
1394code=00023F557640016D

Are you check OK? [Y,N]?
```

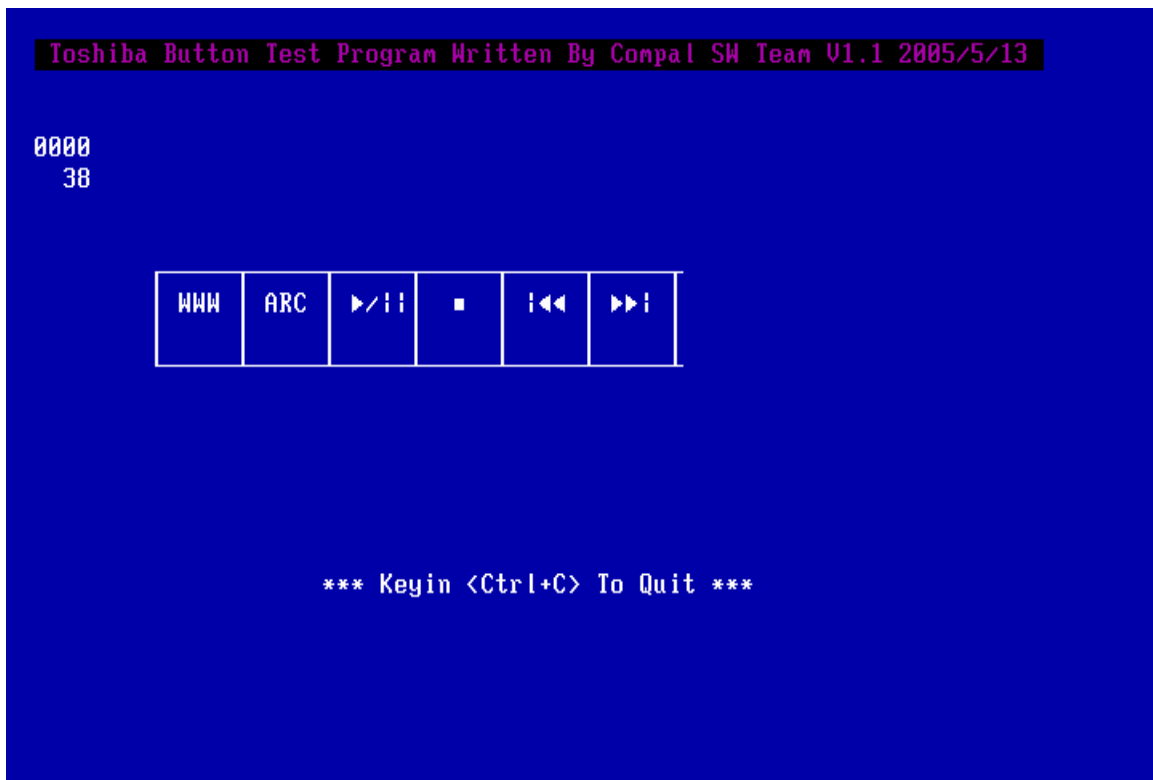


### 3.19 6Button Test

The control button test allows the user to manually test each of the five CD control buttons.

Key "WWW" need to press first. One will hear one "bi" sound when press "WWW" or "Audio" Sound and continuously "bi" sound for another key test.

The figure below will be displayed:



Press each of the buttons on the front panel in turn. A yellow bar will appear on the relevant section of the figure if the button passes the test.

Press **Ctrl +C** to quit the test.

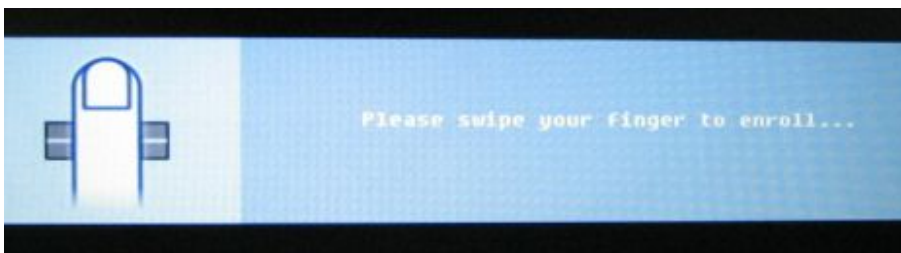
### 3.20 Fingerprint DOS Test

This test will check if the computer's Fingerprint function is OK.

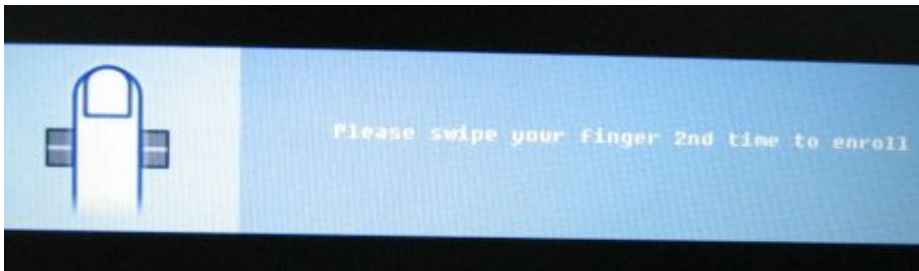
**NOTE: Execution of this test destroys fingerprint data**

The subtests run step by step: (As below)

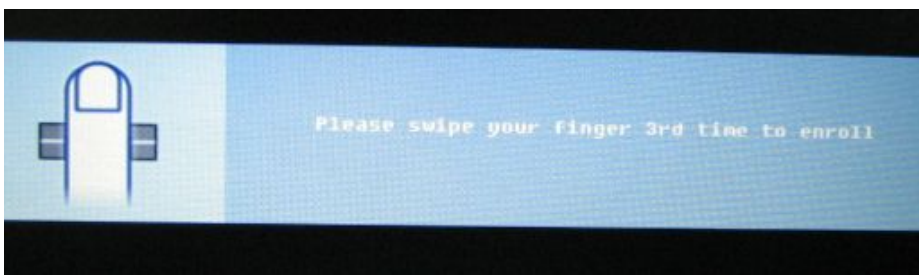
Step1. Need you swipe your finger to enroll.



Step2. Need you swipe your finger 2<sup>nd</sup> time to enroll.



Step3. Need you swipe your finger 3<sup>rd</sup> time to enroll.



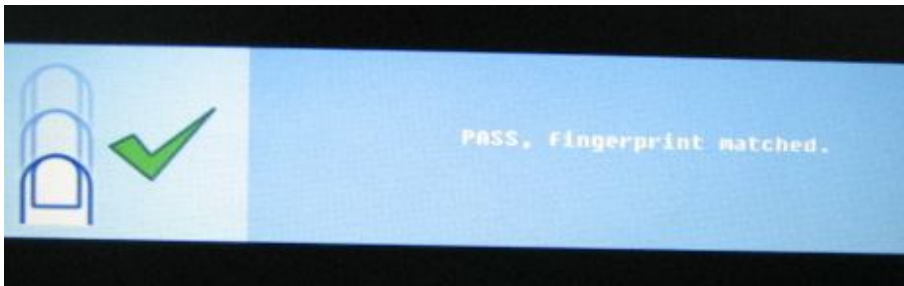
Step4. The test program auto compare 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> finger then to enroll.



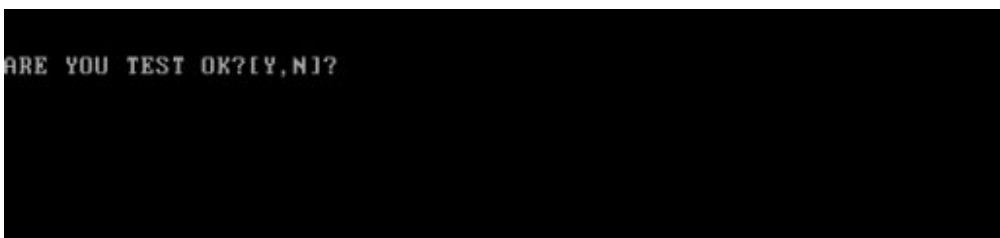
Step5. Need you swipe your finger then test program will verify it.



Step6. verify pass,



Step7. Need you select your test result to show "PASS" or "Fail".




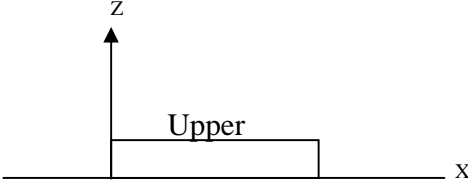
### 3.21 3D G-sensor DOS Test

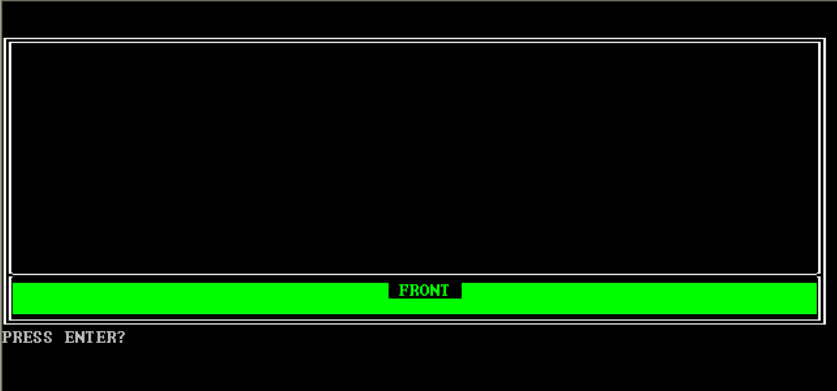
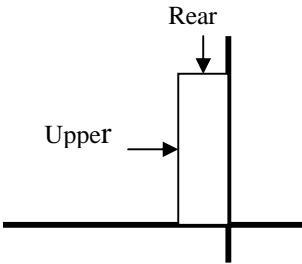
#### HDD 3D Protection check


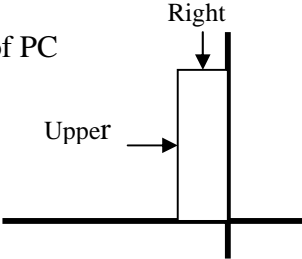
1. For Field inspection T&D.


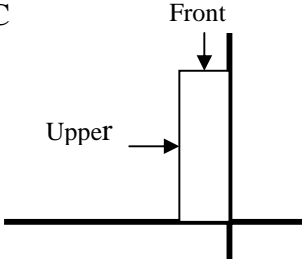
This program judges by sampling five kinds of data shown below.

No	Item	Contents
1	Access platform.	An access platform is leveling.
2	Test Fixture	The Fixture which fixes PC by 90 degree inclination is used. Vibration/shock doesn't take a PCB at the time of T&D inspection.


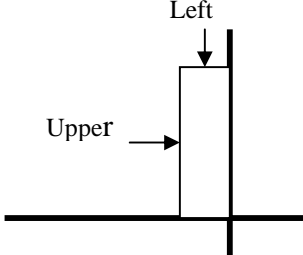
<p>3</p>	<p>Test1</p>	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p> <p>The portion which PC and Test-Fixture contact is green.</p>  <p>Set method of PC</p>  <p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
----------	--------------	---

4	Test2	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p> 
		<p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>

<p>5</p>	<p>Test3</p>	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p>  <p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
----------	--------------	---

<p>6</p>	<p>Test4</p>	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p> 
		<p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>



<p>7</p>	<p>Test5</p>	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p> 
		<p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
<p>8</p>	<p>Inspection</p>	<p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>

---

9	Setting Calibration data	When an inspection result is O.K., calibration at HPC.
---	--------------------------------	--

## 2. Test Result

A test result is displayed when a test is completed. A display of result is O.K. or NG.

And an error flag is returned at the end of a program.

OK is 0.

NG is 1.

### 3.23 Clear Fingerprint Registered

**NOTE:** Execution of this test destroys fingerprint data

Working Instruction:

Run command - "[HWTEST 0 29 0 1 -C](#)" to clear all information in TBX module

The subtests run step by step: (As below)

Step1:

```
====Clear Fingerprint Registered====  
  
Are YOU Clear Fingerprint Registered?[Y,N]?
```

Step2: Display **Notice** for clear registered.

```
1. RUN This tools at first.  
2. Reboot system to enter Windows mode.  
3. Remove "Protector Suite QL"(include user data), If you had installed.  
4. Clear Fingerprint Registered completely.  
  
Press any key to continue . . .
```

Step3: below information was the utility auto run.

```
Bus 0 Device 29 function 0 port 1
Sensor Info:
  FwVersion:          0x04020016.
  FwMinNextVersion:  0x04020016.
  FwVariant:          0x20000003.
  FwFunctionality:   0x0003006F.
  FwConfig:           0x00030018.
  Id:                 0x00000000.
  AuthenticateID:    0x00000005.
  CompanionVendorCode: 0x00020001.
  SystemID:           0x00030003.
  SystemName:        Toshiba Cleveland.

main return: 0
Press any key to continue . . .
```

Step4: Must to reboot system to make the setting effective.

```
**** You must reboot system to make the setting effective ****
**** You must remove FDD before the system reboot ****

ARE YOU reboot system?[Y,N]?
```

Step5: If you choice “Y”, the system will reboot.

If you choice “N”, the system will show Notice again (see be photo). You can press any key to go back test MEMU list.

```
**** You must reboot system to make the setting effective ****
**** You must inset T&D disk1 to FDD before the system reboot ****

Press any key to continue . . .
```



---

## **Chapter 4**

# **Replacement Procedures**

---

#### *4. Replacement Procedures*

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## 4.1 General

This chapter explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC Card or memory card, and then follow the chart downward removing only those FRUs necessary to reach the one you think is causing the computer to operate improperly. Refer to the example on the following page.

Battery pack						
HDD	Expansion Memory Module	Keyboard			Modem	Wireless LAN
ODD		Bluetooth Module	Memory Module	Direct Play Button Module	Display Assembly	
Top Cover					Display Mask	
Touch Pad	Fingerprint Module	Speakers	USB Module	System Board	FL Inverter Board	
VGA Module					LCD Module	
Heat sink		Fan				
CPU						

#### 4 Replacement Procedures

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The example below shows FRUs to be removed before the CPU can be removed. The CPU is located on the system board, under the VGA module. The system board itself is located under the top cover. The keyboard is on top of the top cover, along with the Bluetooth module, Memory module, and the Direct Play Button Module and must be removed. The HDD, wireless LAN card, expansion memory module, ODD, modem, and display assembly in turn need to be removed. Always start the disassembly process by removing the battery pack and optional devices and then move downwards through the table to access the required component.

Battery pack						
HDD	Expansion Memory Module		Keyboard		Modem Wireless LAN	
ODD			Bluetooth Module	Memory Module	Direct Play Button Module	Display Assembly
Top Cover					Display Mask	
Touch Pad	Fingerprint Module	Speakers	USB Module	System Board	FL Inverter Board	
VGA Module					LCD Module	
Heat sink		Fan				
CPU						

## Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

### **DANGER:**

1. *Always use the lithium ion battery pack or a backup battery that is authorized by Toshiba or is compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode. Heating or disassembling the battery pack could cause leakage of alkaline solution. Throwing the battery pack into a fire could cause the battery pack to explode.*
2. *The power supply, FL inverter and other components carry high voltages. To avoid the risk of electric shock when you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components. Also, do not disassemble individual components for first-level maintenance.*

### **WARNING: To avoid the risk of electric shock or other injury:**

1. *Always turn the power off and disconnect the AC adaptor from the power source.*
2. *Remove any metal jewelry or accessories such as watches, necklaces, bracelets, or rings. Batteries in the computer retain an electrical charge so there is a danger of electrical shock even when the computer is disconnected from an AC power source.*
3. *Never work with wet or damp hands.*
4. *The computer contains sharp edges and corners. Be careful not to injure yourself.*
5. *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened.*

### **CAUTION: To avoid damage to the computer:**

1. *When you change a component, make sure that the replacement component meets the required specifications. Never use foreign or incompatible parts.*
2. *Metal objects such as screws or paper clips which fall into the unit can cause a short-circuit, fire, or other internal damage.*
3. *When assembling the computer, make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figure. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke, or fire.*
4. *Before removing an FRU or other component, make sure all cables to the component have been disconnected.*
5. *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*

### Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adaptor and the battery pack as instructed in section 4.2.

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer.
  - Dust and contaminants
  - Static electricity
  - Extreme heat, cold and humidity
4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary troubleshooting and diagnostics tests described in chapters 2 and 3 of this manual.
5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer make sure you use the correct screws to secure the various pieces. Screw sizes are listed in their corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

## Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors
- Standard Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

## Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that no cables are pinched by screws or the FRUs.
- Check that all latches are closed securely.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.



## Tools and Equipment

The use of Electrostatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 Phillips screwdriver to remove and replace screws.
- One T5 security screwdriver.
- Tweezers, to lift out screws that you cannot grasp with your fingers.
- ESD mats for the floor and the table you are working on.
- ESD wrist strap or heel grounder.
- Anti-static carpeting or flooring.
- Air-ionizers in highly static sensitive areas.

## 4.2 Battery

### Removing the Battery Pack

To remove the battery pack from the battery bay, follow these steps:

1. Turn the computer upside down.
2. Unlock the battery compartment lock.

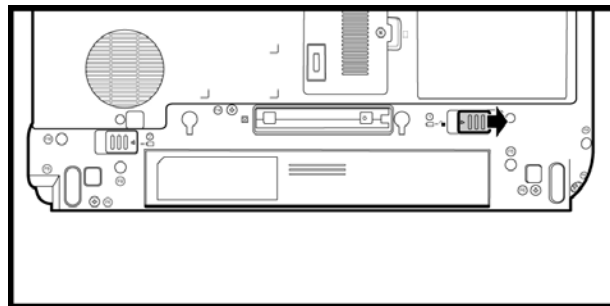


Figure 4-1 Unlocking the battery lock

3. Slide the battery bay latch to release the battery pack and then remove the battery pack from the bay.

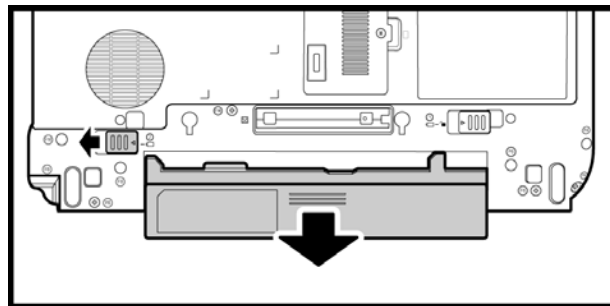


Figure 4-2 Removing the battery pack

**NOTE:** For environmental reasons, do not throw away a spent battery pack. Please return spent battery packs to Toshiba.

### Installing the Battery Pack

To install the battery pack in the battery bay, follow these steps and refer to the figures in the preceding section.

**WARNING:** *The battery is a lithium ion battery and can explode if not properly replaced, used, handled or disposed of. Use only batteries recommended by Toshiba as replacements.*

1. Slide the battery pack into the battery bay. The battery bay latch will click automatically.
2. Lock the battery double lock to secure the battery pack in position.

### 4.3 PC Card

#### Removing a PC Card

To remove a PC Card, follow the steps below.

1. Push the PC Card's eject button. The button pops out when you release it.
2. Push the eject button again to pop the PC Card out slightly.
3. Grasp the PC Card and remove it.

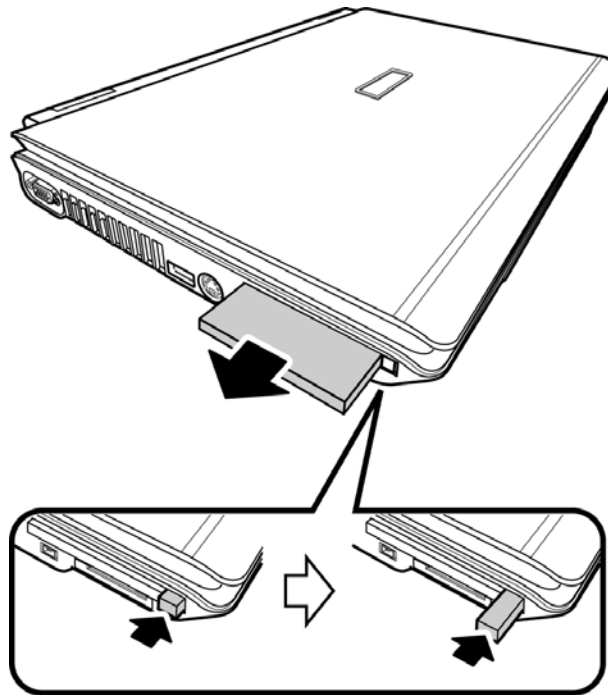


Figure 4-3 Removing the PC card

4. Push the eject button back into place, if necessary.

### Inserting the PC Card

To insert the PC Card, follow these steps:

1. Make sure the eject button does not stick out. Push it back into place if required.
2. Insert the PC Card in the slot and press gently to ensure a firm connection.

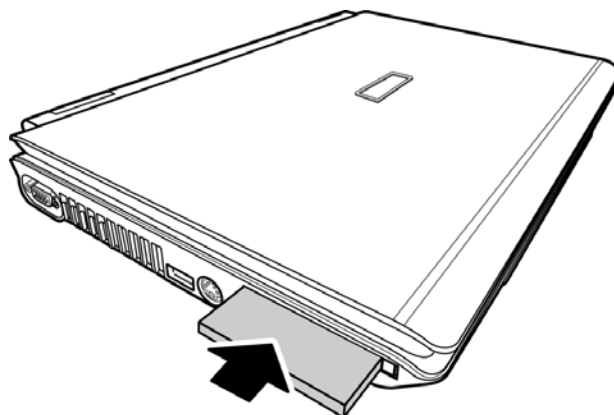


Figure 4-4 Installing the PC card

## 4.4 Memory Card

### Removing a Memory Card

To remove a Memory Card, follow the steps below.

1. Press the memory card gently into the socket until it pops out.

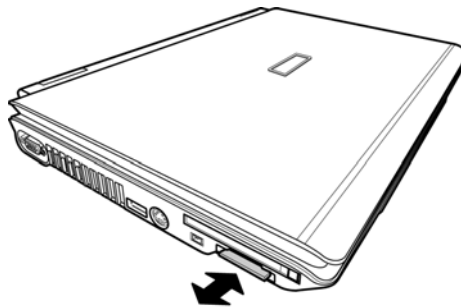


Figure 4-5 Pressing the Memory Card

2. Grasp the Memory Card and remove it.

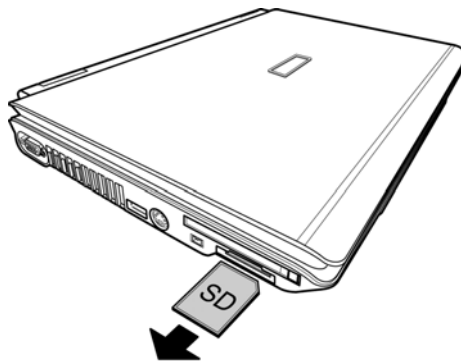


Figure 4-6 Removing the Memory Card

### Inserting the Memory Card

To insert the Memory Card, follow these steps:

1. Insert the Memory Card in the slot and press gently to ensure a firm connection.

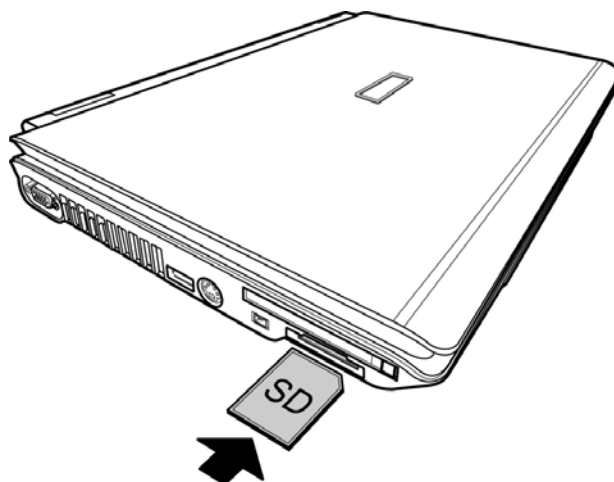


Figure 4-7 Installing the Memory Card

## 4.5 HDD

**CAUTION:** When handling the HDD, do not press the top surface. Hold the disk by the sides to prevent damage and loss of data.

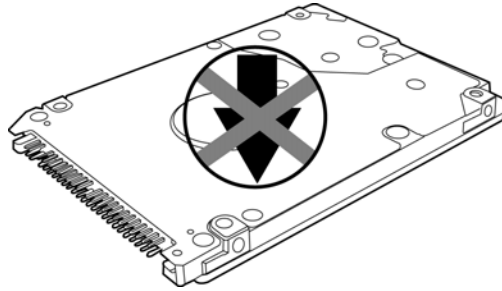


Figure 4-8 HDD

### Removing the HDD Module

Follow the steps below to remove HDD module:

1. Turn the computer upside down.
2. Release the black M2.5x4 screw to release the HDD door.

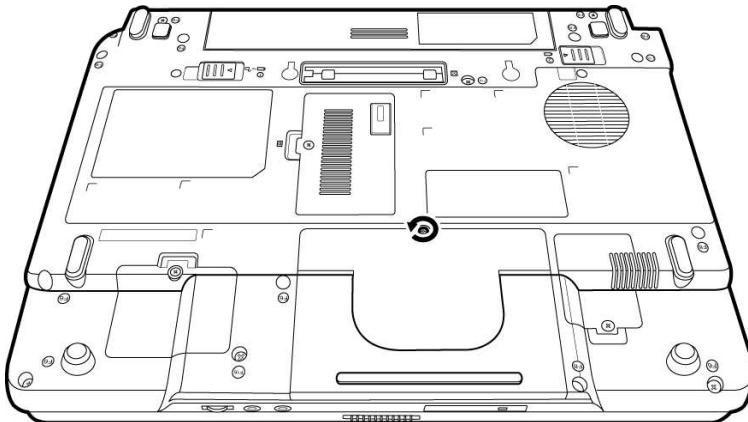


Figure 4-9 Releasing the HDD door screw



3. Pull up and lift the HDD door to remove it.

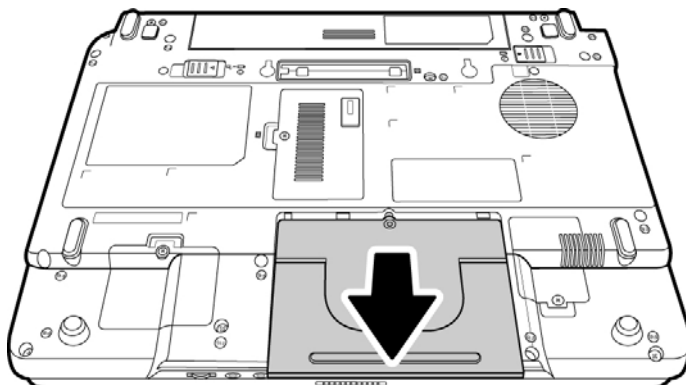


Figure 4-10 Removing the HDD door

4. Pull out the black Mylar tab to remove the HDD unit.

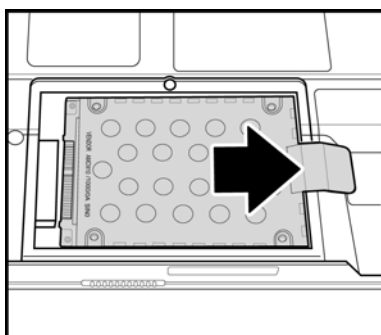


Figure 4-11 Removing the HDD

5. Remove the four M3x3 silver screws that secure the HDD case and bracket to the HDD.
6. Remove the HDD from the HDD case.

### Installing the HDD

To install the HDD, follow these steps and refer to the figures in the preceding section.

1. Seat the HDD in the HDD case and bracket, and secure it with four M3×3 silver screws.
2. Insert the HDD unit into the HDD slot.
3. Secure the HDD door with a black M2.5x4 screw.

## 4.6 Expansion Memory

### Removing the Expansion Memory Module

To remove the memory module, make sure the computer is in boot mode before removing the memory module. Remove the battery pack, cables and any optional devices before you start and then follow these steps:

1. Release the black M2.0x4 screw with RAM door securing the memory module socket cover.

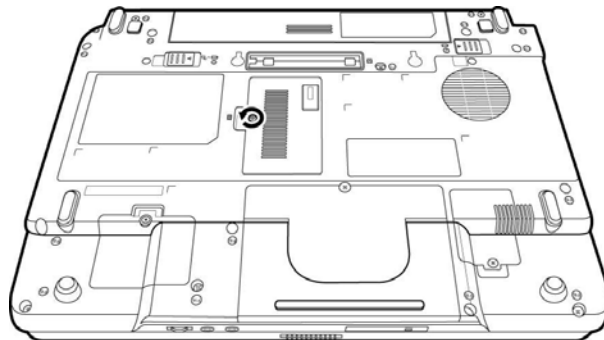


Figure 4-12 Releasing the cover screw

2. Slide your fingernail or a thin object under the cover and lift it off.

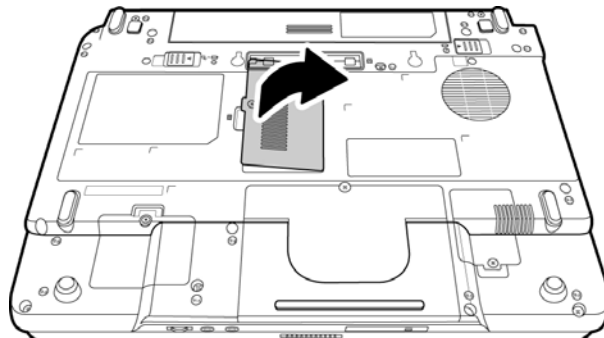


Figure 4-13 Removing the expansion memory module cover

3. Push the latches to release the memory module. A spring will force one end of the module up.

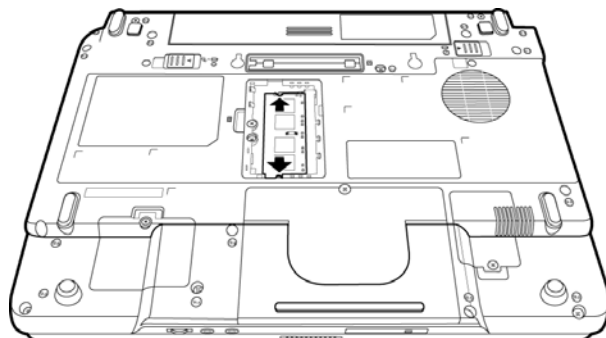


Figure 4-14 Releasing the memory module

4. Grasp the module and pull it out.

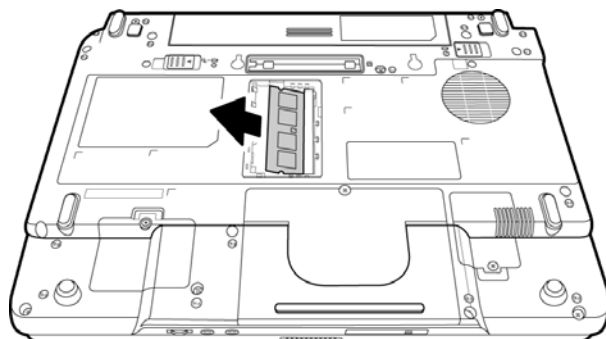


Figure 4-15 Removing the expansion memory module

**CAUTION:** Do not touch the connectors on the expansion memory module or on the computer. Debris on the connectors may cause memory access problems.

## Installing the Expansion Memory Module

**CAUTION:** Do not touch the connectors on the expansion memory module or on the computer. Debris on the connectors may cause memory access problems.

Follow these steps to install a memory module:

1. Set the computer to boot mode and turn off the power.
2. Remove the black Non separate Screw with RAM door M2.5x6.5 (Special Type) screw securing the memory module socket cover.
3. Slide your fingernail or a thin object under the cover and lift it off.
4. Fit the module's connectors into the computer's connectors at about a 45-degree angle and press the module carefully to ensure a firm connection.
5. Push the module down so it lies flat. The latches on either side will click into place to secure the module.

## 4.7 Optical Drive Module

### Removing the Optical Drive Module

To remove the optical drive module, you need to remove the expansion memory module cover first as described in the previous section. Follow the steps below:

1. Turn the computer upside down.
2. Remove the battery and the expansion memory module cover.
3. Remove the black M2.5x4 screw securing the optical drive module.

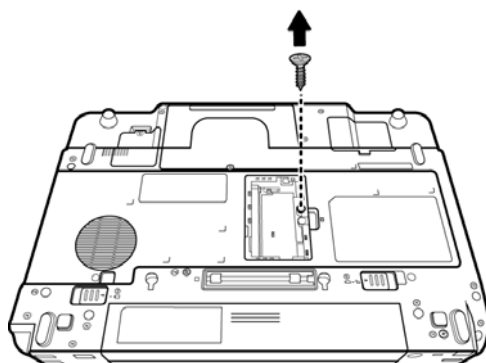


Figure 4-16 Removing the optical drive screw

4. Use your hand to push the module bracket and then slide the module from the bay.

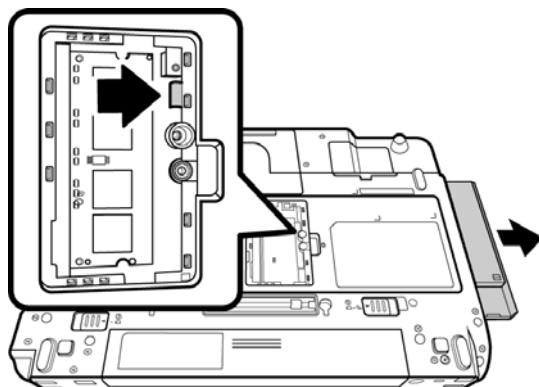


Figure 4-17 Removing the optical drive module

### **Installing the Optical Drive Module**

To install a device in the optical drive module bay, follow the steps below and refer to the figure in the preceding section.

1. Make sure that the expansion memory door is opened and the ODD screw (M2.5x4, black) is removed.
2. Slide the device into the optical drive module bay.
3. Use the black M2.5x4 screw to secure the optical drive module.
4. Replace the expansion memory module cover.

## 4.8 Optical Drive

This computer may be fitted with a:

- DVD-ROM device
- CD-RW/DVD-ROM combo device
- DVD Super Multi device

### Disassembling the Optical Drive

To disassemble the optical drive, first remove the drive from its module bay as described in the previous section, and then follow the steps below.

1. Remove the two silver M2.0x2.5 screws from the bracket plate. Remove the bracket plate.

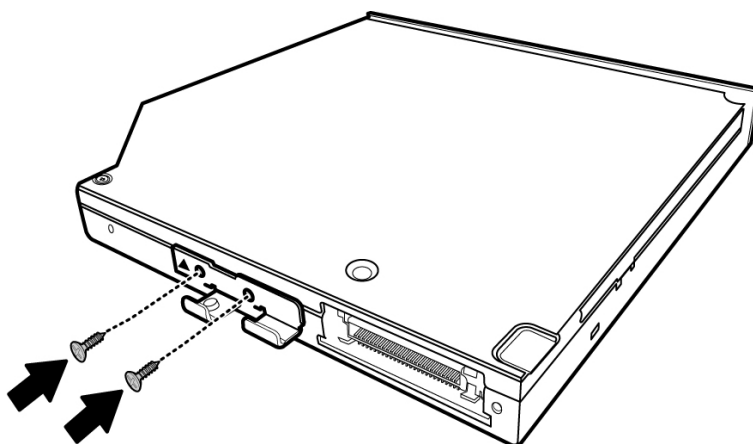


Figure 4-18 Removing the optical drive bracket

**NOTE:** The small arrow shown on the metal bracket indicates the top side of the optical bracket. Keep this in mind when removing or installing the drive.

### Reassembling the Optical Drive

**NOTE:** *The small arrow shown on the metal bracket indicates the top side of the optical bracket. Keep this in mind when removing or installing the drive.*

To reassemble an optical drive, follow the steps below and refer to the figure in the preceding section.

1. Position the optical drive bracket plate so that it is aligned with the rear panel of optical drive.
2. Secure the optical drive bracket plate with silver M2.0×2.5 screws.
3. Install the optical drive module into the bay as described in the preceding section.



## 4.9 Keyboard

### Removing the Keyboard

Before removing the keyboard, remove the battery and any optional devices. Follow the steps below to remove the keyboard:

1. Open the display panel.
2. Insert a thin tool such as a flat screwdriver into the gap between the strip cover and keyboard to lever the strip cover up.

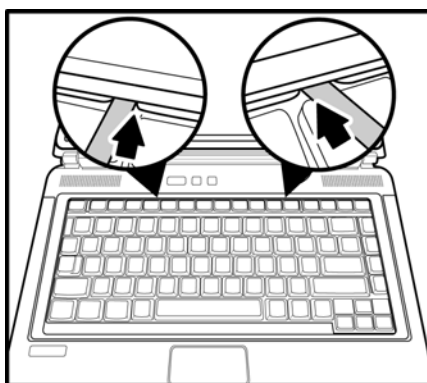


Figure 4-19 Removing the strip cover

3. Remove the strip cover.

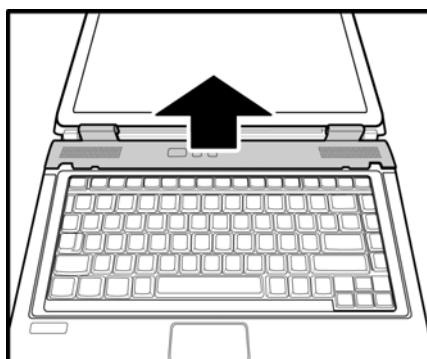


Figure 4-20 Removing the strip cover

4. Remove the two black M2.0x4 silver screws securing the keyboard.

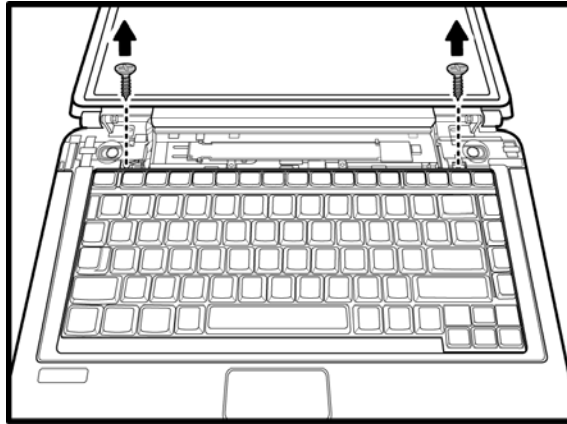


Figure 4-21 Removing the keyboard screws

5. Push the center of the keyboard, press the tab, and lift the keyboard out, revealing the keyboard cable underneath.

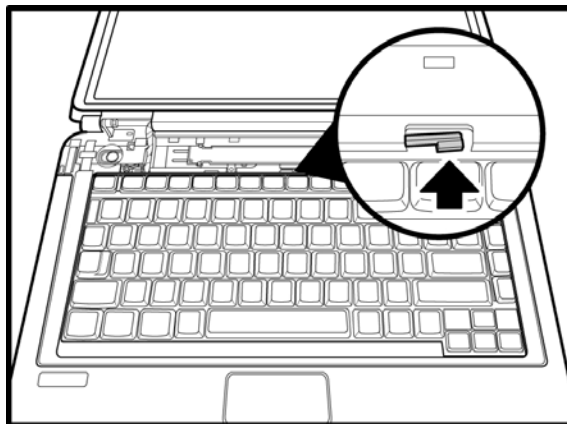


Figure 4-22 Removing the keyboard screws

6. Disconnect the keyboard cable from the system board.

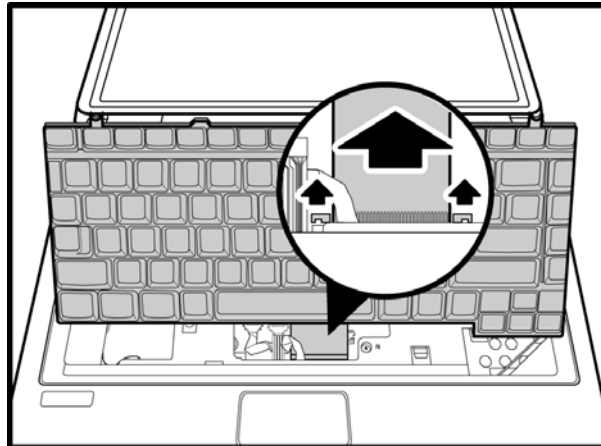


Figure 4-23 Disconnecting the keyboard cable

7. Lift and remove the keyboard.

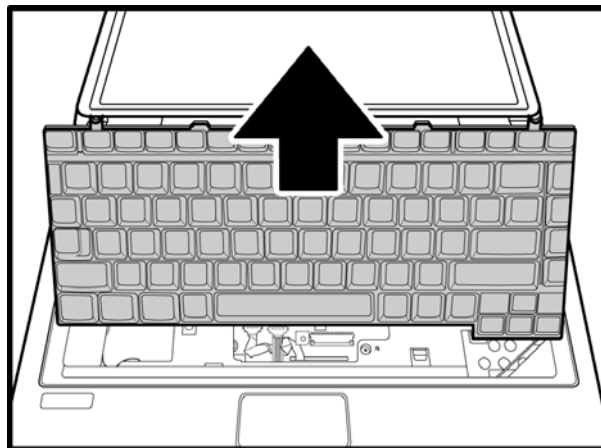


Figure 4-24 Removing the keyboard

### **Installing the Keyboard**

To install the keyboard, follow the steps below and refer to the figures in the preceding section.

1. Connect the keyboard cable to the system board.
2. Place the keyboard on the top cover, insert under the center tab, and secure it with two black M2.0x4 screws.
3. Set the strip cover and press down to secure the strip cover until the latches engage.

## 4.10 Direct play button board

### Removing the Direct Play button board

To disassemble the Direct Play Button Board, first remove the battery, optional devices, and the keyboard strip cover. Then follow the steps below.

1. Remove the Direct Play Button Board by sliding from the clasps.

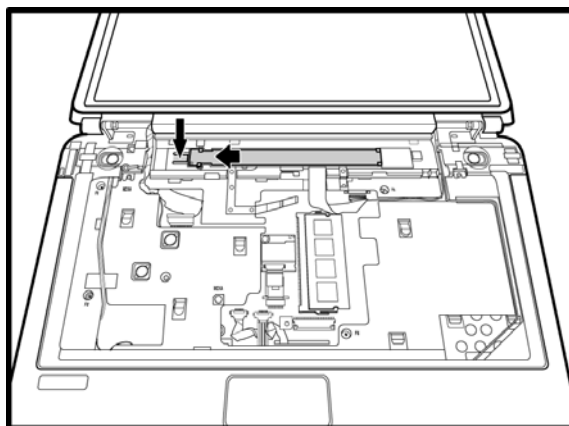


Figure 4-25 Removing the Direct Play Button Board

2. Remove the Direct Play Button Board Cable attached to the system board.

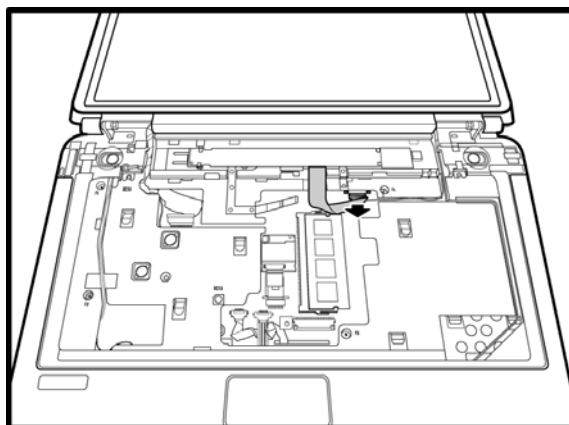


Figure 4-26 Removing the Direct Play Button Board cable

### **Installing the Direct Play Button Board**

To install the Direct Play Button Board, follow the steps below and refer to the figures in the preceding section.

1. Connect the cable to the connector on the system board.
2. Install the Direct Play Button Board in place while securing the clasps.

## 4.11 Bluetooth module

### Removing the Bluetooth Module

Remove the battery and any optional devices before removing the Bluetooth module. In addition, you have to remove the keyboard as described in the previous section to access the Bluetooth module. Follow these instructions:

1. Remove the silver M2.0x2.5 screw securing the Bluetooth module to the system board.

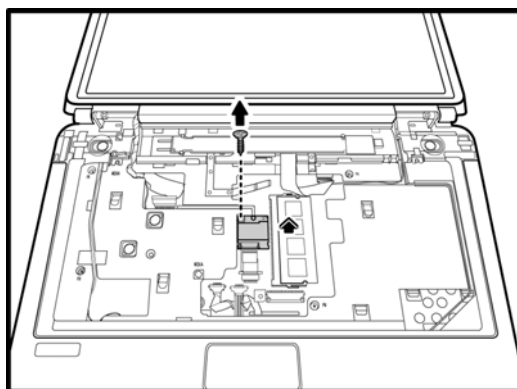


Figure 4-27 Removing the Bluetooth module screw

2. Disconnect the Bluetooth FFC cable from the system board.

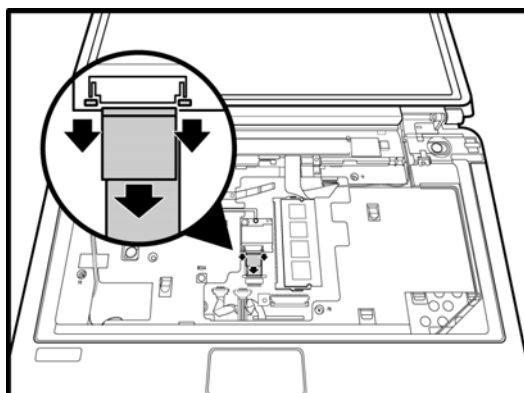


Figure 4-28 Disconnecting the FFC cable

3. Insert a screwdriver to gently lift the Bluetooth module.

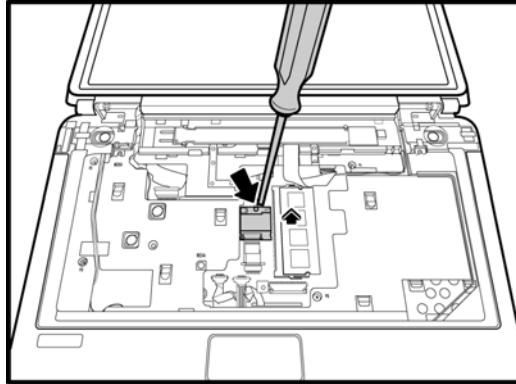


Figure 4-29 Lifting the Bluetooth module

4. Remove the Bluetooth module.

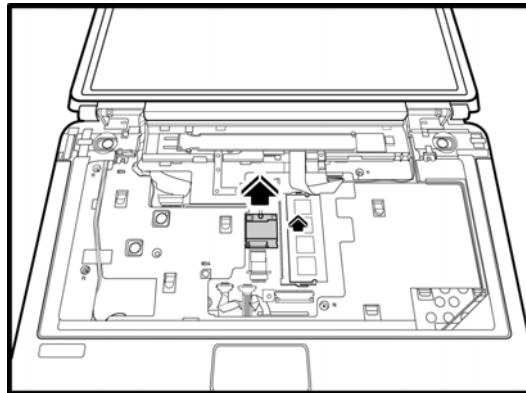


Figure 4-30 Removing the Bluetooth module



5. Disconnect the Bluetooth connector (brown) from the module.

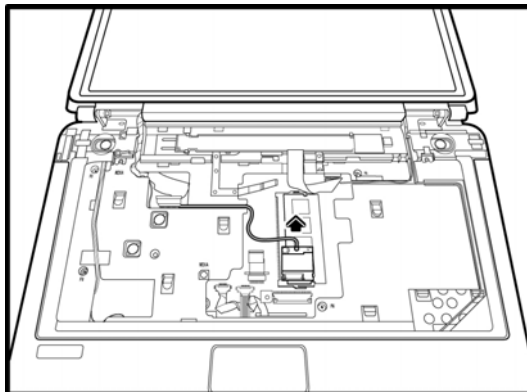


Figure 4-31 Disconnecting the Bluetooth connector

6. Separate the FFC cable from the Bluetooth module.

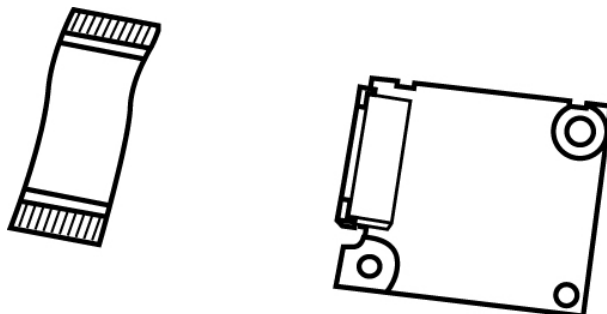


Figure 4-32 Removing the Bluetooth module cable

### **Installing the Bluetooth Module**

To install the Bluetooth module, follow the steps below and refer to the figures in the preceding section.

1. Secure the module to the system board using one silver M2.0x2.5 screw.
2. Connect the FFC cable to the module to connect to the system board.
3. Connect the Bluetooth connector (brown) to the module.

## 4.12 Memory

### Removing the Memory Module

Remove the battery pack, cables and any optional devices before you start. In addition, remove the keyboard and then follow these steps:

1. Remove the shield cover screws.

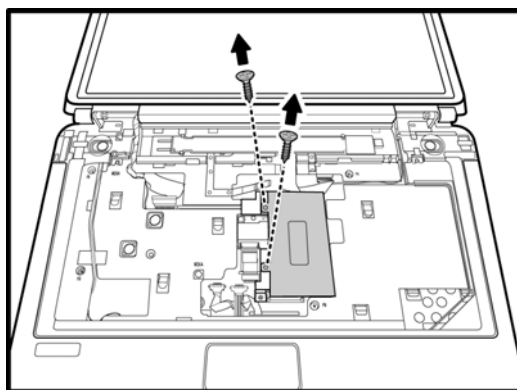


Figure 4-33 Removing the shield cover screws

2. Take off the shield cover.

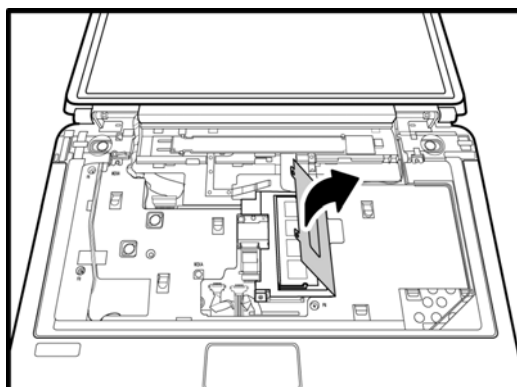


Figure 4-34 Removing the memory module

3. Grasp the module and pull it out.

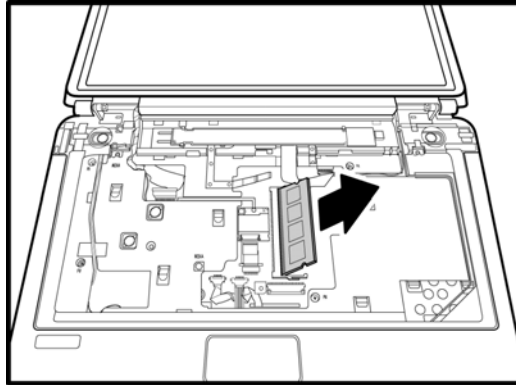


Figure 4-35 Removing the memory module

**CAUTION:** Do not touch the connectors on the memory module or on the computer. Debris on the connectors may cause memory access problems.

### Installing the Expansion Memory Module

**CAUTION:** Do not touch the connectors on the memory module or on the computer. Debris on the connectors may cause memory access problems.

Follow these steps to install a memory module, while referring to the illustrations on the previous page:

1. Fit the module's connectors into the computer's connectors at about a 45-degree angle and press the module carefully to ensure a firm connection.
2. Push the module down so it lies flat.
3. Place the shield cover about a 45-degree angle and push it down so it lies flat on the top of the module.
4. Secure the shield cover with screws.

## 4.13 Wireless LAN Unit

### Removing the Wireless LAN Unit

Remove the battery and any optional devices before removing the wireless LAN unit as described in the following instructions.

1. Remove the black M2.5x4 screw securing the wireless LAN door.

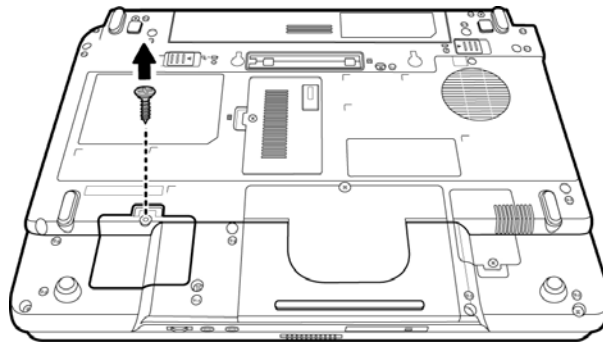


Figure 4-36 Removing the wireless LAN unit screw

2. Remove the wireless LAN door.

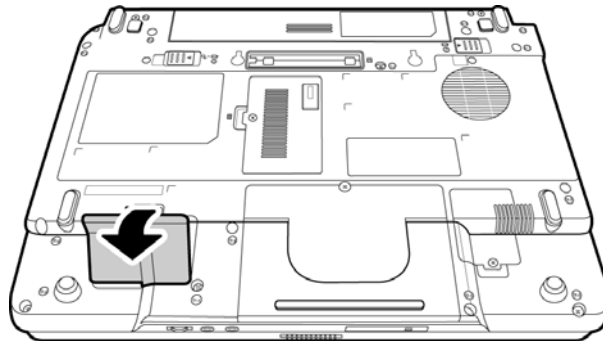


Figure 4-37 Removing the wireless LAN door

3. Remove the WLAN module by removing the clips connecting it to the system board.

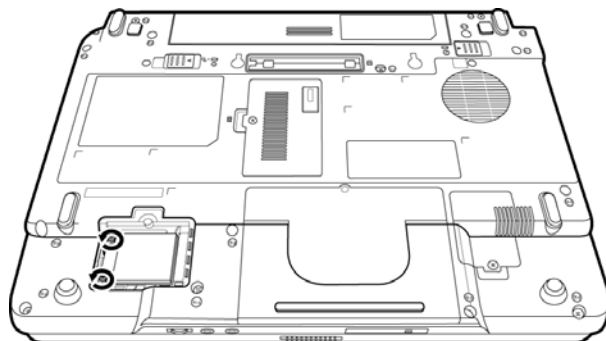


Figure 4-38 Removing the WLAN module screws

4. Detach the two ends of the WLAN antenna (black and white).

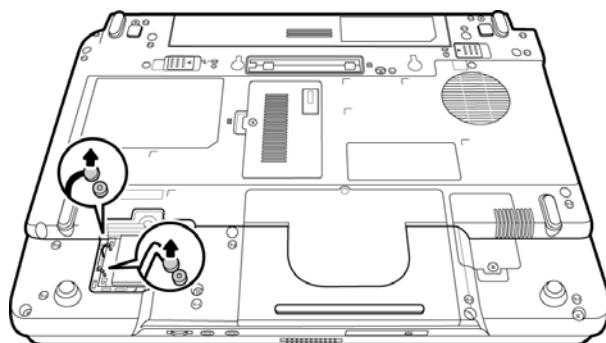


Figure 4-39 Removing the wireless LAN antenna connectors

5. Use your fingers to press the two latches of the LAN unit holder. The LAN unit pops up.

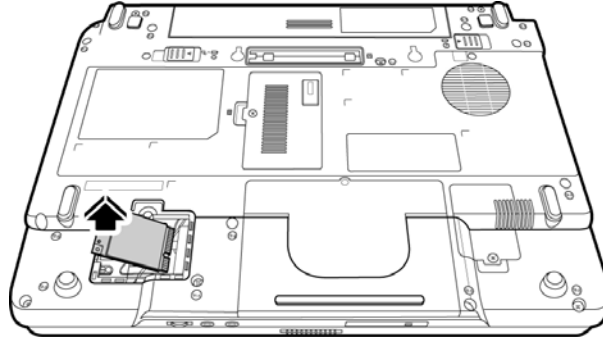


Figure 4-40 Releasing the wireless LAN unit

**CAUTION:** Do not touch the connectors on the wireless LAN unit or on the computer. Debris on the connectors may cause malfunction.



### Installing the Wireless LAN Unit

To install the wireless LAN unit, follow the steps below and refer to the figures in the preceding section.

1. Remove the black M2.5x3 screw securing the wireless LAN door, and then remove the wireless LAN door as described previously.

**CAUTION:** *Do not touch the connectors on the wireless LAN unit or on the computer. Debris on the connectors may cause malfunction.*

2. Place the wireless LAN unit in the wireless LAN holder and gently press down. The two latches of the holder will snap close to hold the unit.
3. Attach the white antenna to the main connector, and the black antenna to the Aux connector.
4. Use the black M2.5x4 screw to secure the wireless LAN door.

## 4.14 Modem

### Removing the Modem

Remove the battery and any optional devices before removing the modem as described in the following instructions:

1. Remove the M2.5x4 screw to release the modem cover.

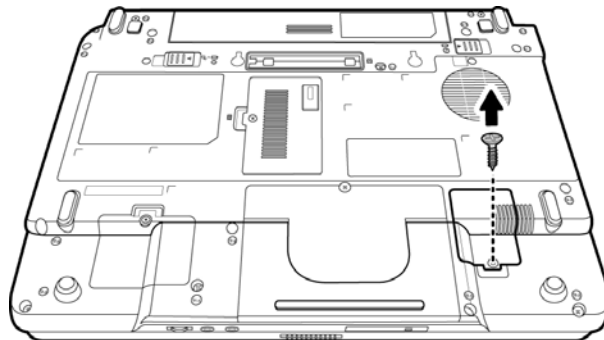


Figure 4-41 Removing the modem cover screw

2. Remove the modem cover.

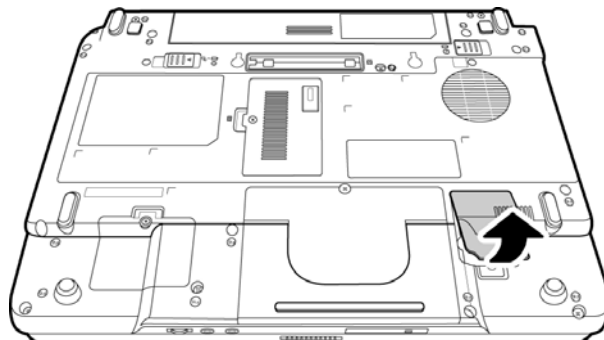


Figure 4-42 Removing the modem cover

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3. Remove two M2.5x4 black screws securing the modem module.

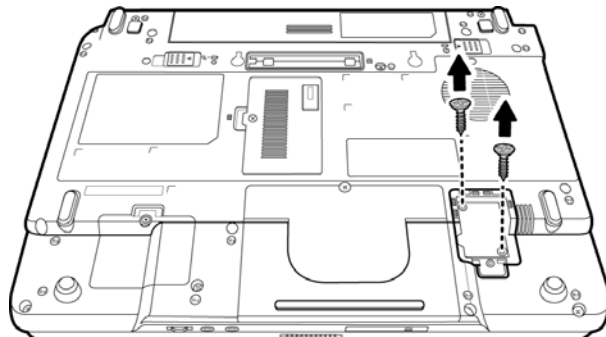


Figure 4-43 Removing the modem module screws

4. Disconnect the modem connector from the modem module and carefully lift the unit from its connector.

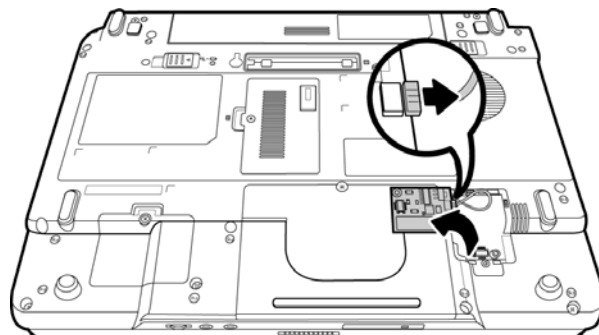


Figure 4-44 Removing the modem module

### **Installing the Modem**

To install a modem, follow the steps below and refer to the figures in the preceding section.

1. Connect the modem connector on the system board to the modem module.
2. Fit the modem onto its connector and secure it with two black M2.5x4 screws.
3. Replace the M2.5x4 screw to fix the modem cover.

## 4.15 Display Assembly

### Removing the Display Assembly

To remove the display assembly, first remove the battery and any optional devices. Also remove the keyboard, and the wireless LAN unit as described in the previous sections. Then follow the steps below:

1. Remove the keyboard and the wireless LAN unit. Separate the wireless LAN antenna connectors (black and white) from the top cover and place them on a side out of the way. Also remove the Bluetooth antenna connector (brown) from the module.
2. Disconnect the black LCD power (LVDS) cable, Bluetooth cable, and wireless LAN cable from the system board.

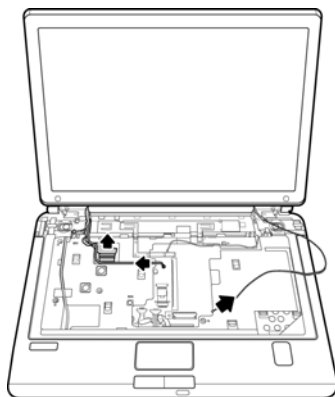


Figure 4-45 Disconnecting cables

3. Remove two M2.5x6 black screws securing the LCD assembly from the rear side.

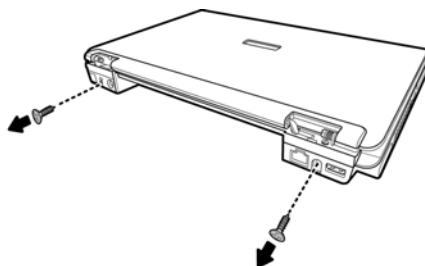


Figure 4-46 Disconnecting the rear screws

4. Remove two M2.5x6 screws securing the LCD assembly to the top cover.

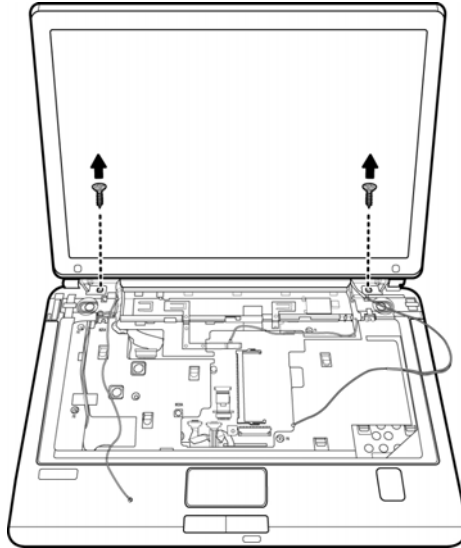


Figure 4-47 Removing the front screws

5. Remove the LCD assembly.

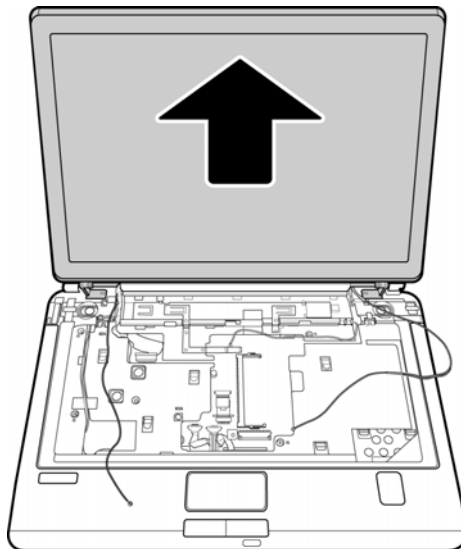


Figure 4-48 Removing the display assembly

### **Installing the Display Assembly**

To install the display assembly, follow the steps below and refer to the figures in the preceding section.

1. Seat the display assembly, taking care not to crush to the LCD display cable, the LCD power cable, the wireless LAN antenna connectors, or the Bluetooth connector.
2. Secure two M2.5x6 black screws to each hinge to connect the assembly to the top cover.
3. Secure two black M2.5x6 black screws to the computer's rear side. They hold the display assembly in place.
4. Feed the wireless LAN module's antennae wires through the indented track on the system board towards the rear side.
5. Connect the Bluetooth connector to the Bluetooth module.
6. Connect the LCD power cable to the top chassis.
7. Reinstall the keyboard and wireless LAN module.

## 4.16 Top Cover

### Removing the Cover

To remove the top cover, first remove the battery pack, HDD, expansion memory module, ODD, modem, wireless LAN unit, keyboard, function button board, Bluetooth module, and display assembly, as described in the preceding sections. Follow the steps below to remove the top cover.

1. Turn the computer upside down and remove the following 18 screws from the rear panel:
  - M2.5X6: seven screws
  - M2.5X8: six screws
  - M2.5x4: two screws from the HDD compartment
  - M2.5x16: three screws

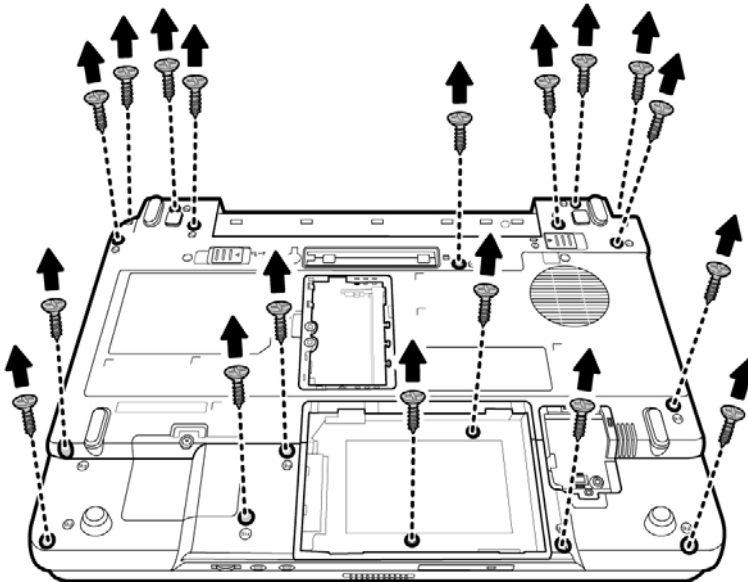


Figure 4-49 Removing the top cover (back panel screws)



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2. Turn the computer over again and remove the following screws securing the top cover.

- M2.5x8: two screws on the left side
- M2.5X6: two screws
- M2X4: one screw

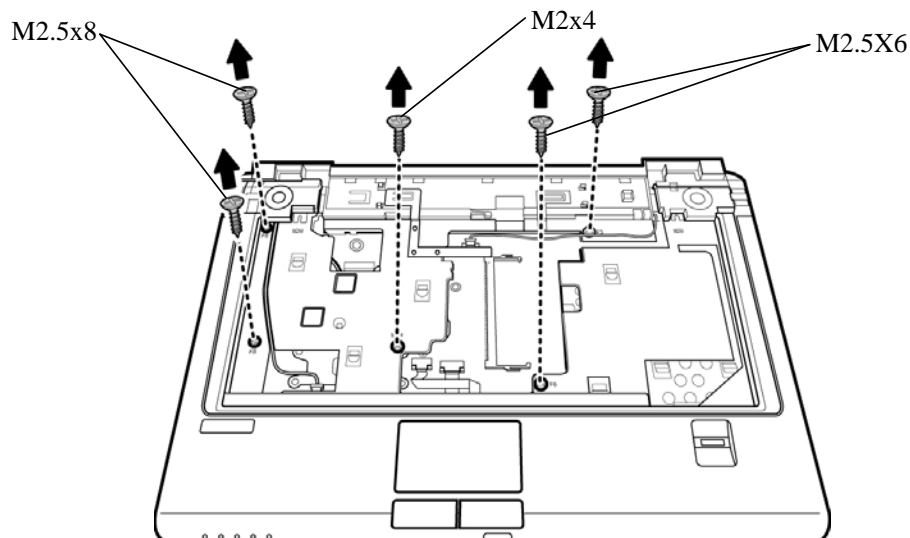


Figure 4-50 Removing the top cover (front panel screws)

3. Detach two speaker cables, touch pad FPC cable, and finger print unit FPC cable from the top cover.

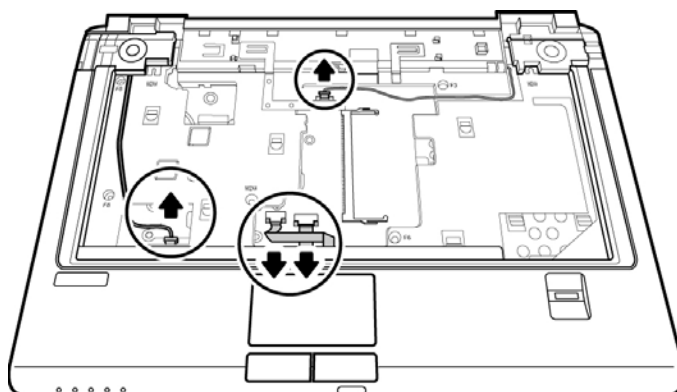


Figure 4-51 Removing the cables

4. Lift off the top cover.

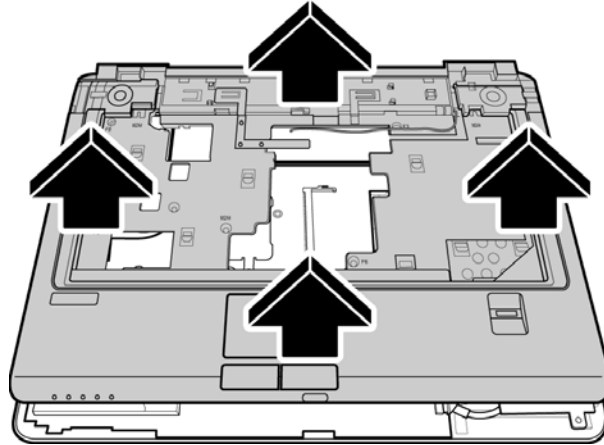


Figure 4-52 Removing the top cover

### **Installing the Top Cover**

To install the top cover, follow the steps below and refer to the figures in the preceding section.

1. Seat the top cover, and secure the speaker cables, finger print unit FFC cable, and touch pad unit FFC cable to the system board.
2. Secure the top cover with two M2.5x6 screws, two M2.5x8 screws, and one M2x4 screw.
3. Turn the computer upside down and secure the 18 screws to the rear panel.

## 4.17 Touch Pad

### Removing the Touch Pad

To remove the Touch Pad, first remove the battery pack, keyboard, and top cover, and then follow the steps below:

1. Remove one M2.5x3 screw securing the Touch Pad Bracket to the rear side of the top cover.

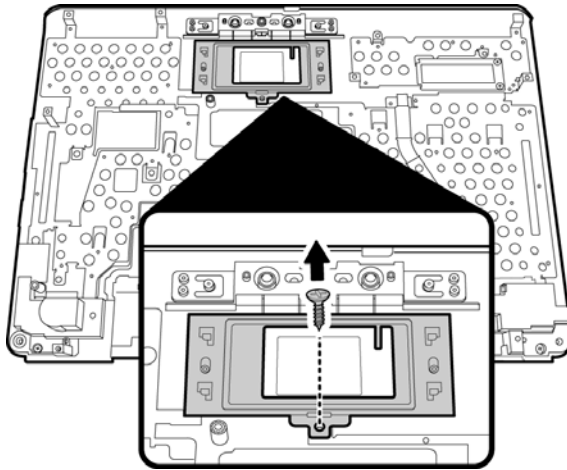


Figure 4-53 Removing the touch pad screw

2. Remove the bracket.

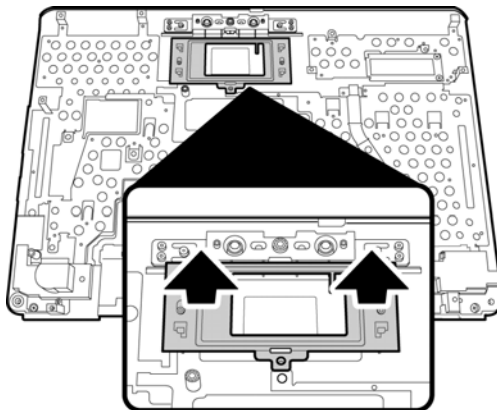


Figure 4-54 Removing the touch pad bracket

3. Remove the Touch Pad by lifting it gently.

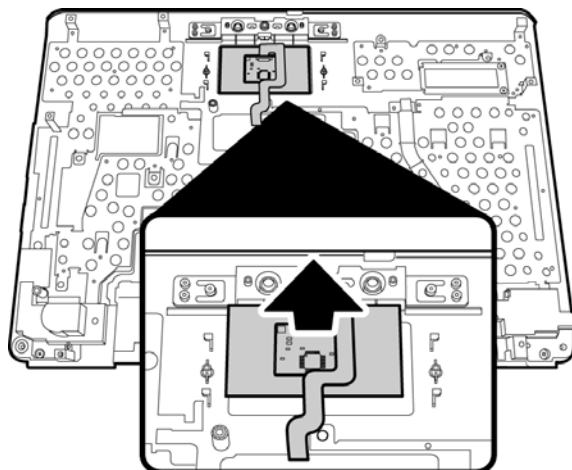


Figure 4-55 Removing the touch pad

### Installing the Touch Pad

To install the Touch Pad, follow the steps below and refer to the figures in the preceding section:

1. Turn the top cover upside down and place the Touch Pad and the Touch Pad Bracket in position on top.
2. Secure the Touch Pad bracket with one M2.5x3 screw.

## 4.18 Fingerprint Module

### Removing the Fingerprint Module

To remove the Fingerprint Module, first remove the battery pack, keyboard, and top cover, and then follow the steps below:

1. Remove two M2.5x2.5 screws securing the Fingerprint Module Bracket to the rear side of the top cover.

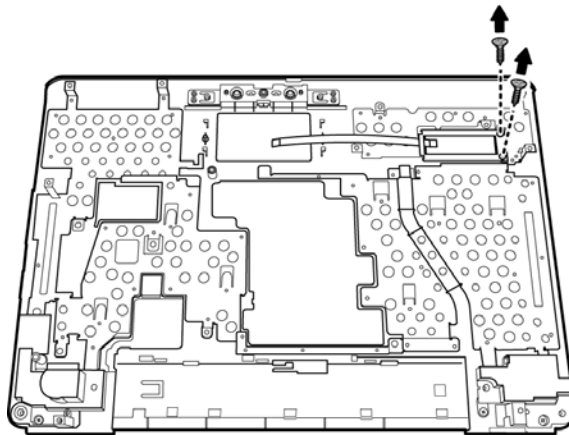


Figure 4-56 Removing the fingerprint module bracket screws

2. Remove the bracket.

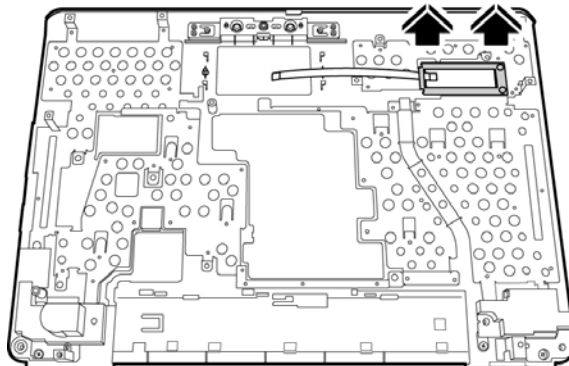


Figure 4-57 Removing the fingerprint module bracket

3. Remove the Fingerprint module by lifting it gently.

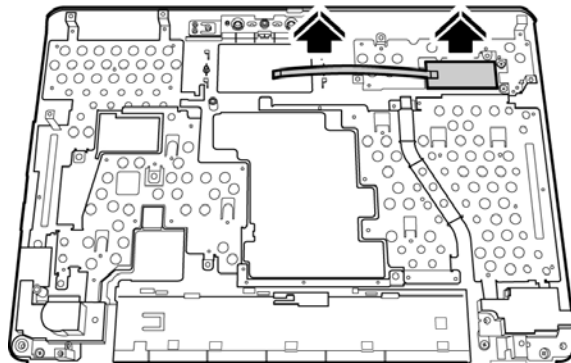


Figure 4-58 Removing the fingerprint module

### Installing the Fingerprint Module

To install the Touch Pad, follow the steps below and refer to the figures in the preceding section:

3. Turn the top cover upside down and place the Fingerprint Module and the Fingerprint Module Bracket in position on top.
4. Secure the Fingerprint Module bracket with two M2.5x2.5 screws.

## 4.19 Speakers

### Removing the Speakers

To remove the speakers, first remove the battery pack, keyboard, and top cover, and then follow the steps below:

1. Remove one M2.5x3 screw securing the left speaker to the rear side of the top cover. Remove one M2.5x3 screw securing the right speaker to the rear side of the top cover.

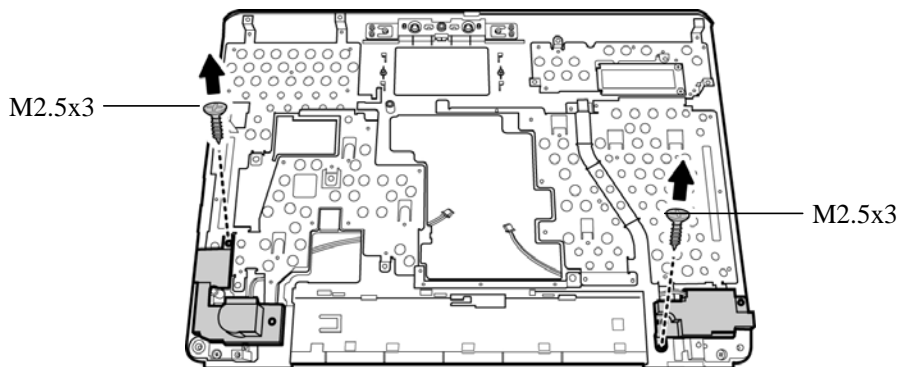


Figure 4-59 Removing the speaker screws

2. Remove the speakers.

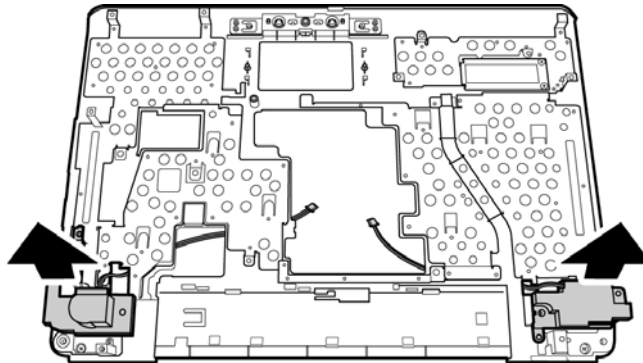


Figure 4-60 Removing the speakers



### **Installing the Speakers**

To install the speakers, follow the steps below and refer to the figures in the preceding section:

1. Turn the top cover upside down and place the speakers in position on top.
2. Secure the speakers with two M2.5x3 screws.

## 4.20 USB Board

### Removing the USB Board

To remove the speakers, first remove the battery pack, keyboard, and top cover, and then follow the steps below:

1. Remove two M2.5x4 screws securing the USB board to the system board.

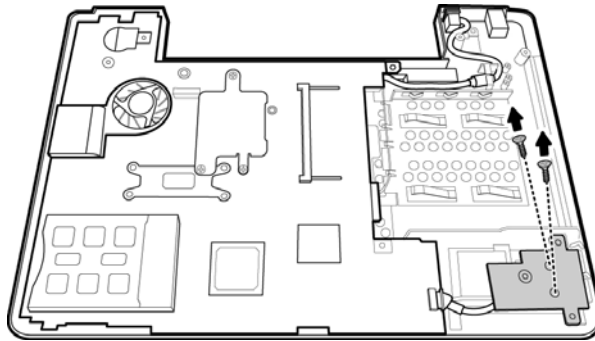


Figure 4-61 Removing the USB Board screws

2. Remove the USB board cable.

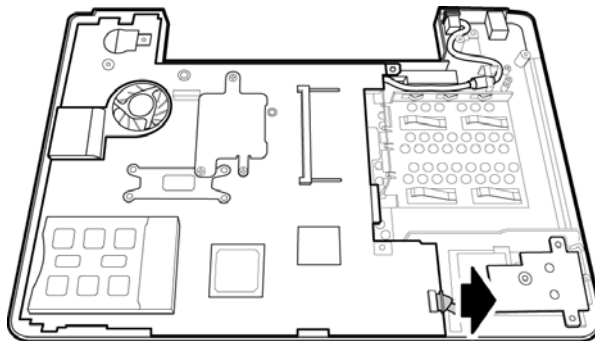
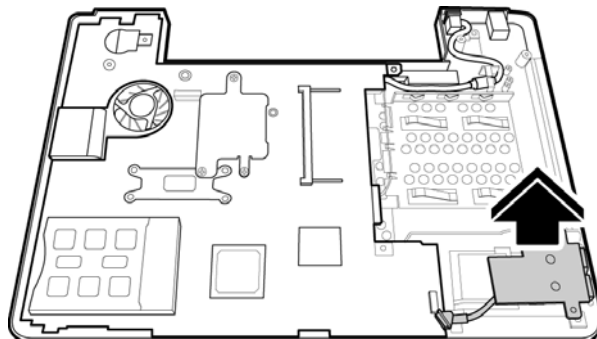


Figure 4-62 Removing the USB Board cable

3. Remove the USB board.



*Figure 4-63 Removing the USB Board*

### **Installing the USB Board**

To install the USB board, follow the steps below and refer to the figures in the preceding section:

1. Place the USB board in position next to the system board.
2. Connect the USB board cable to the system board.
3. Secure the USB board with two M2.5x4 screws.

## 4.21 System Board

### Removing the System Board

To remove the system board, first remove the display assembly, keyboard, and top cover, and then follow the steps below:

1. Disconnect the black cable from the system board.
2. Remove the DC connector from its socket.

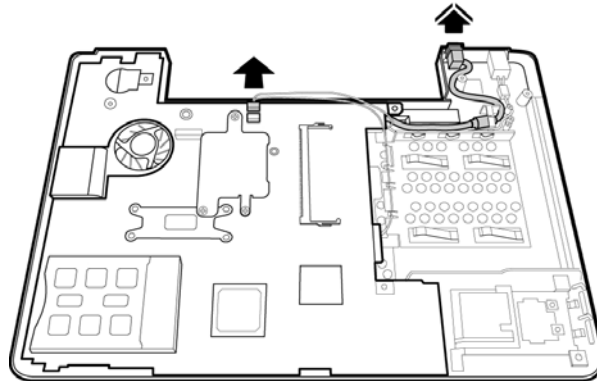


Figure 4-64 Removing the cable

3. Remove the two hexagonal VGA screws from the system board.

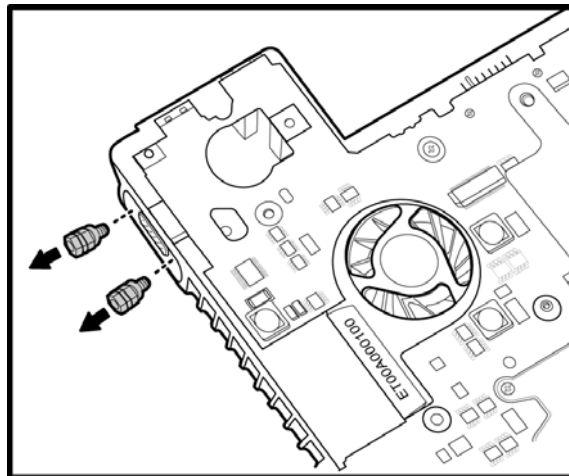


Figure 4-65 Removing the hexagonal screws

#### 4 Replacement Procedures

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4. Remove the system board after making sure that all connectors are removed from their respective sockets.

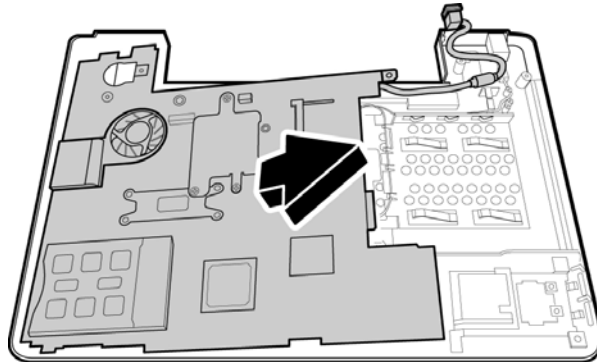


Figure 4-66 Removing the system board

### **Installing the System Board**

To install the system board, follow the steps below and refer to the figures in the preceding section.

1. Seat the system board in the chassis. Take care to align all the ports and connectors in their respective openings on the chassis.
2. Replace the two hexagonal screws to secure the VGA port.
3. Connect the black cable to its connector.
4. Connect the power connector in its socket.

## 4.22 VGA Module

### Removing the VGA Module

To remove the VGA module, you have to first remove the keyboard, top cover, and system board. Then follow the steps below:

1. Turn the system board over and remove the M2.5x6 screw and M2.5x16 screws securing the VGA module to the system board.

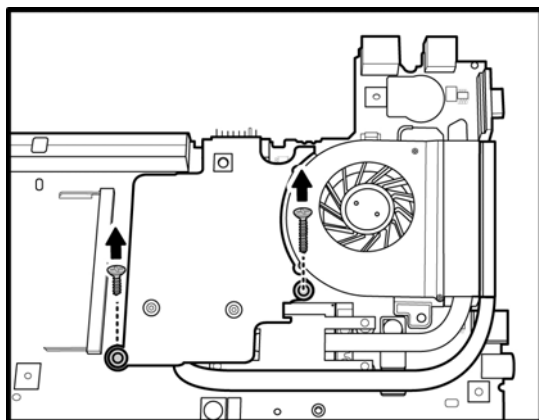


Figure 4-67 Removing the VGA module screws

2. Remove the VGA module from the system board.

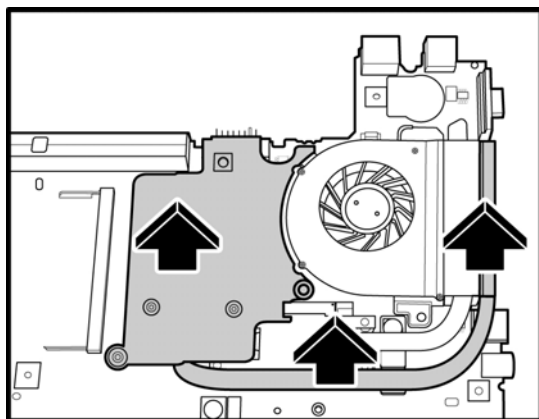


Figure 4-68 Removing the VGA module

3. Remove the heat sink from the VGA module by removing the three M2.5x3 screws. Follow the order indicated by the numbers on the heat sink to remove the screws.

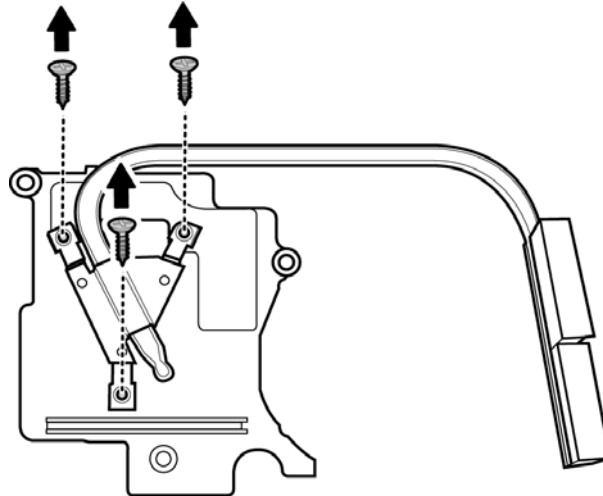


Figure 4-69 Removing the VGA module heat sink

### Installing the VGA Module

To install the VGA module, follow the steps below and refer to the figure in the preceding section:

**CAUTION:** *If you remove the heat sink, use the grease tool to remove the grease on the VGA board and heat sink. Reapply fresh grease before installing the heat sink.*

1. Connect the heat sink to the VGA module by securing it with three M2.5x3 screws. Follow the order indicated by the numbers on the heat sink to tighten the screws.
2. Seat the VGA module and secure the module by placing the M2.5x6 and M2.5x16 screws and tightening them.



## 4.23 Fan & CPU

### Removing the Fan & CPU

To remove the Fan, Heat Sink, and CPU, you must first remove the display assembly, keyboard, top cover and system board, and then follow the steps below:

1. Turn the system board upside down. Remove the four M2.0x4 screws from the heat sink.

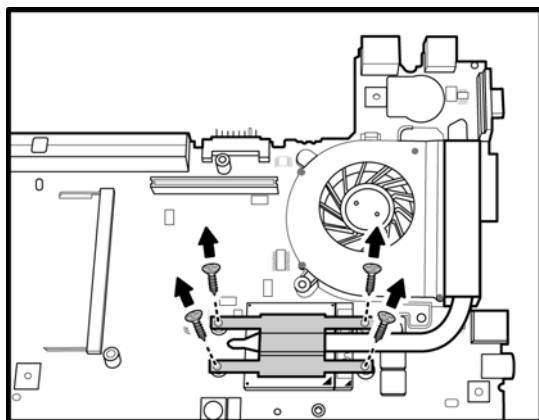


Figure 4-70 Removing the heat sink screws

2. Lift and remove the heat sink from the system board.

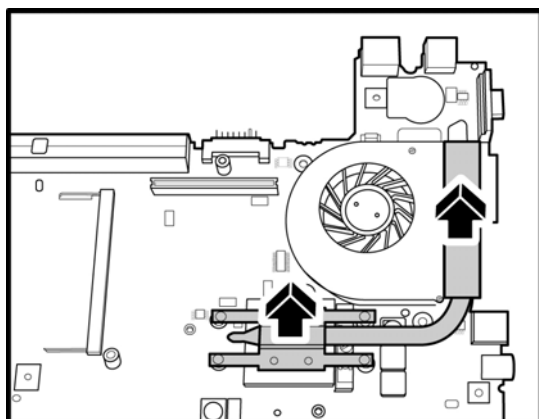


Figure 4-71 Removing the heat sink

3. Remove the fan connector from the system board.

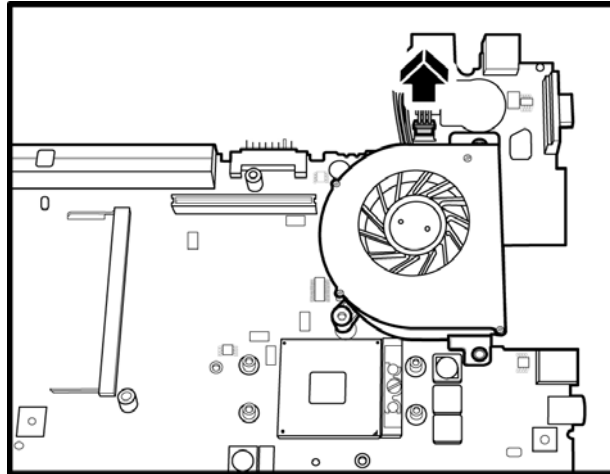


Figure 4-72 Removing the fan connector

4. Remove the M2.5x3 screw securing the fan from the top side of the system board.

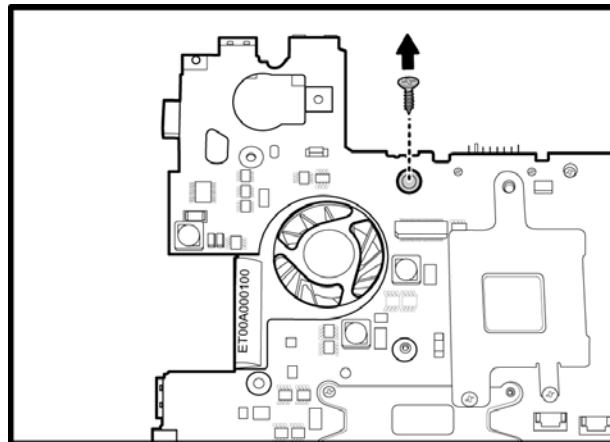


Figure 4-73 Removing the fan screw from the top side of the system board

5. Remove the fan module.

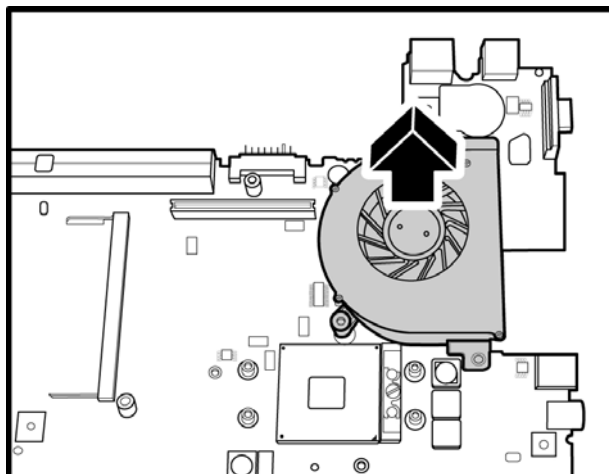


Figure 4-74 Removing the fan

6. Turn the cam on the CPU socket with a flat-blade screwdriver so that the notch on the cam is aligned with the *open* side of the CPU socket to unlock the CPU.

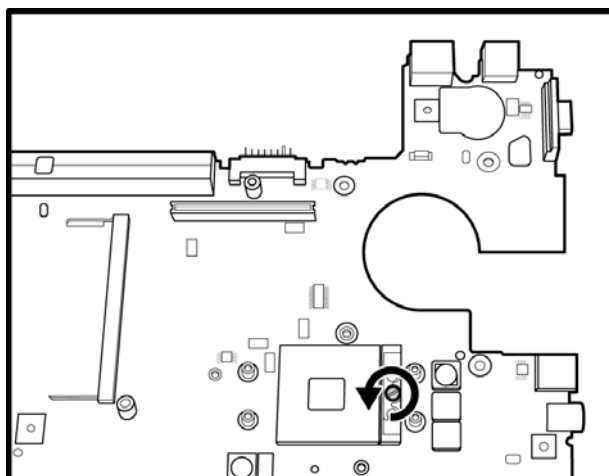


Figure 4-75 Turning the CPU cam

7. Gently lift out the CPU.

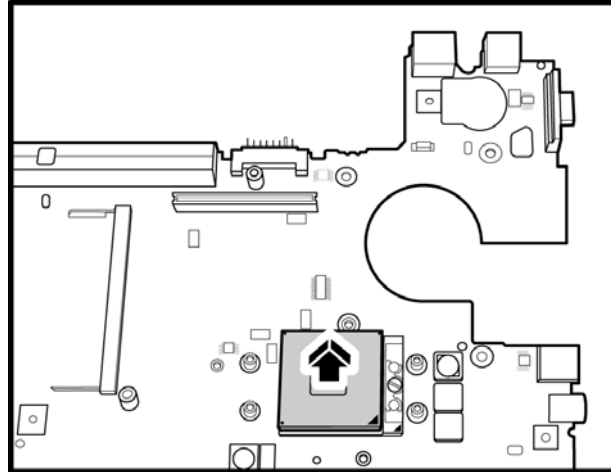


Figure 4-76 Removing the CPU

## Installing the CPU

To install the CPU, follow the steps below and refer to the figures in the preceding section.

**CAUTION:** *If you remove the heat sink, use the CPU grease tool to remove the grease on the CPU and heat sink. Reapply fresh grease before installing the heat sink.*

1. Make sure that the notch on the cam is aligned with the *open* position of the CPU slot.
2. Seat the CPU aligning the triangle mark on the CPU with the one on the CPU socket. Make sure the alignment is exact to avoid damaging pins on the CPU.
3. Press the CPU softly with your fingers to insert into the socket and turn the cam on the CPU socket to the *closed* position with a flat-blade screwdriver to secure the CPU.
4. Seat the fan module and secure with the M2.5x3 screw on the top side of the system board.
5. Attach the fan connector.
6. Seat the heat sink over the CPU and secure with four screws in the order indicated on the heat sink.

## 4.24 Display Mask

### Removing the Display Mask

To remove the display mask, first remove the display assembly as described earlier, and then follow the steps below:

1. Remove four M2.5x6 black screws securing the display mask to the LCD module.

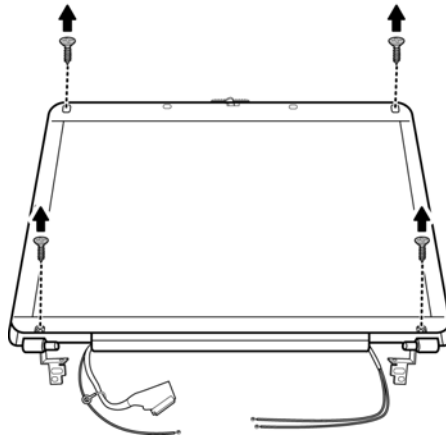


Figure 4-77 Removing the display mask screws

2. Carefully insert your fingers between the display mask and the LCD panel and pry open the snaps. Start with the four snaps at the top of the display mask. Continue unsnapping the display mask along the two sides and the bottom edge to remove the display mask.

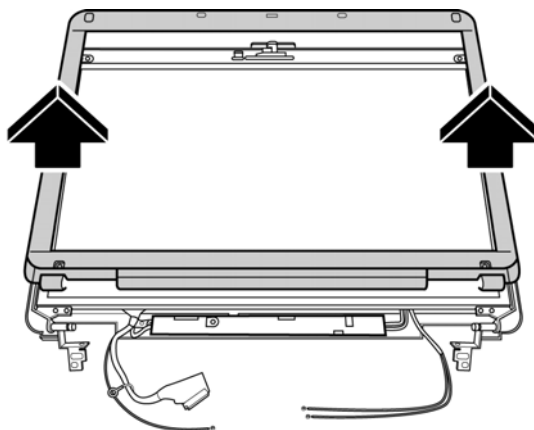


Figure 4-78 Removing the display mask

### **Installing the Display Mask**

To install the display mask, follow the steps below and refer to the figures in the preceding section.

1. Seat the display mask and secure the snaps on each side.
2. Secure the display mask with four M2.5x6 screws.

## 4.25 FL Inverter Board

### Removing the FL Inverter Board

To remove the FL inverter board, first remove the battery pack, display assembly, and display mask; then follow the steps below.

1. Remove one M2.5x4 black screw securing the FL inverter board to the LCD display assembly.

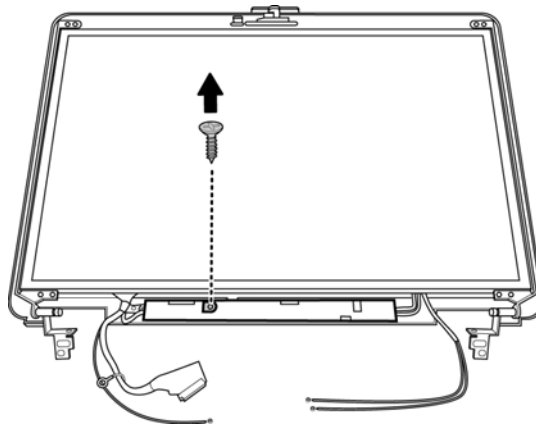


Figure 4-79 Removing the screws

2. Disconnect the two connectors on either side of the board.

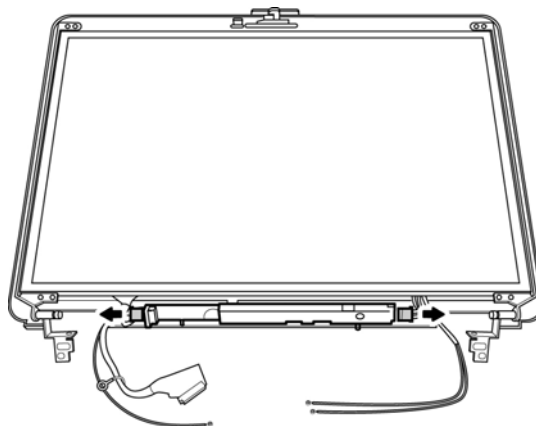


Figure 4-80 Removing the connectors



3. Remove the FL inverter board.

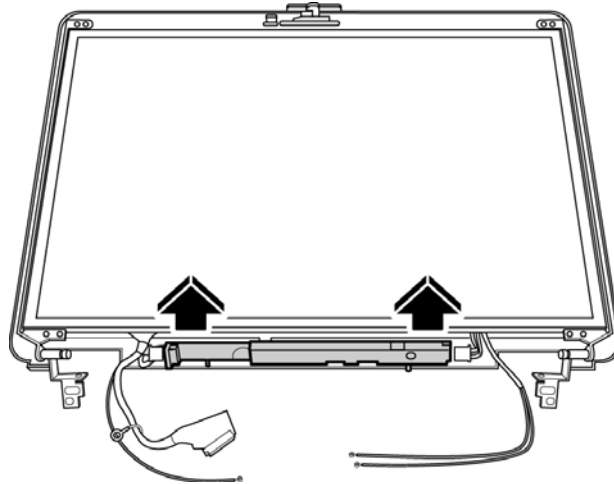


Figure 4-81 Removing the FL inverter board

### **Installing the FL Inverter Board**

To install the FL inverter board, follow the steps below and refer to the figure in the preceding section.

1. Place the FL inverter board on the LCD module.
2. Secure one M2.5x4 black screw connecting the FL inverter board to the LCD display assembly.
3. Connect the two connectors on either side of the board.

## 4.26 LCD Module

### Removing the LCD Module

To remove the LCD module, first remove the display assembly, display mask, and FL inverter board and then follow the steps below.

1. Remove the black M2.5x4 screw securing the LVDS cable to the chassis.

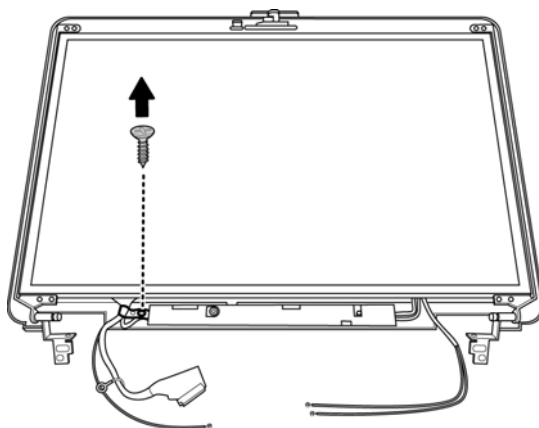


Figure 4-82 Removing the LVDS cable screw

2. Lift the LCD module from the top chassis.

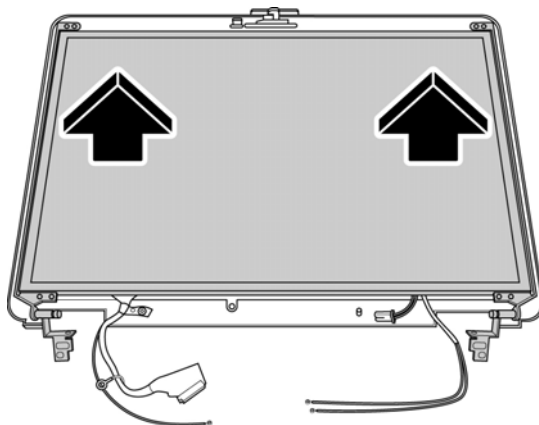


Figure 4-83 Removing the LCD Module

3. Remove six M2x3 screws securing the LCD module bracket to the LCD module.

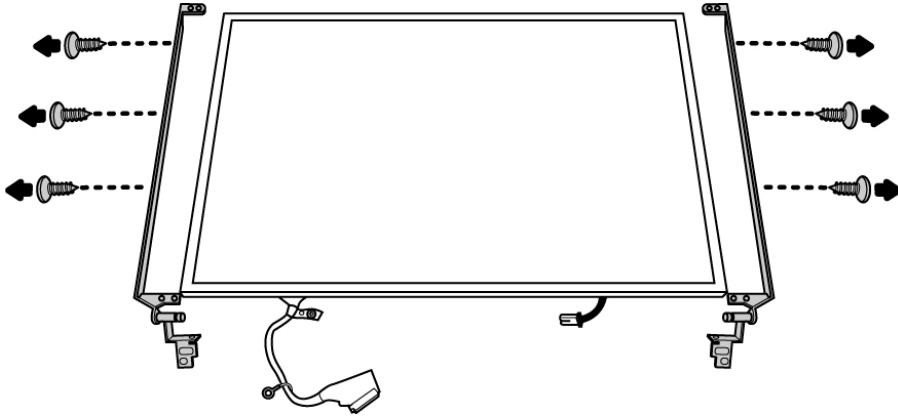


Figure 4-84 Removing the bracket screws

**NOTE:** If the LCD module malfunctions, remove the LCD cable and LCD bracket. Then replace the whole LCD module unit.

### **Installing the LCD Module**

To install the LCD module, follow the steps below and refer to the figures in the preceding section.

1. Seat the LCD module in the display assembly with the LCD module bracket and secure it with six M2x3 black screws. Note the L and R markings to make sure that the bracket arms are secured on the correct side.
2. Seat the LCD module with bracket on the chassis.
3. Secure the LVDS cable with the M2.5x4 screw to the chassis.

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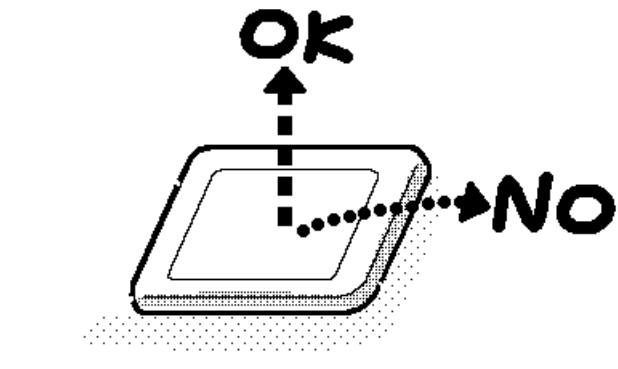
## Appendix A Handling the LCD Module

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### Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling it to prevent damaging it.

1. When installing the LCD module in the display assembly, make sure that you 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.

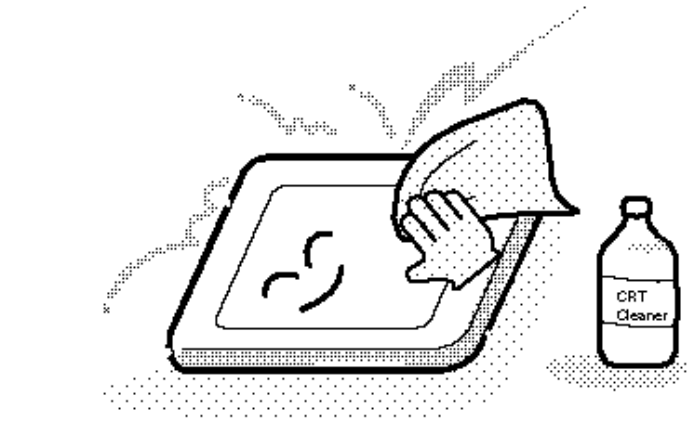
Note: The panel's polarized surface is easily scratched and damaged, so handle it carefully.



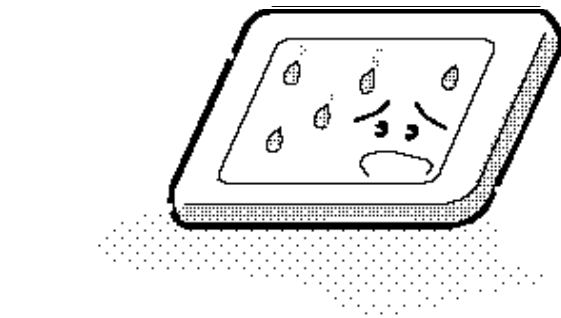


3. If the panel's surface gets dirty or moist, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

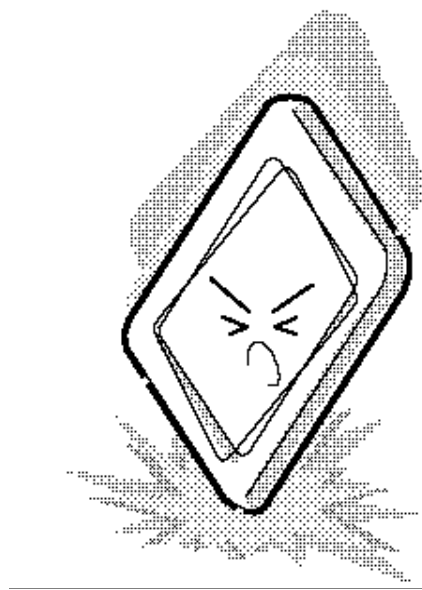
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a soft cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



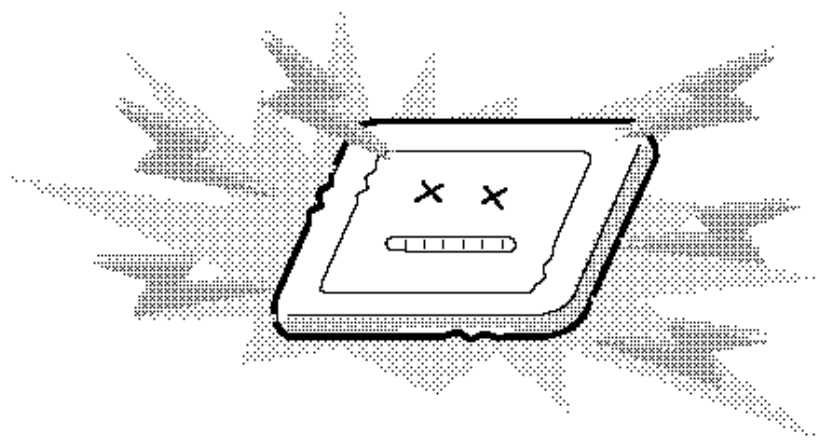
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



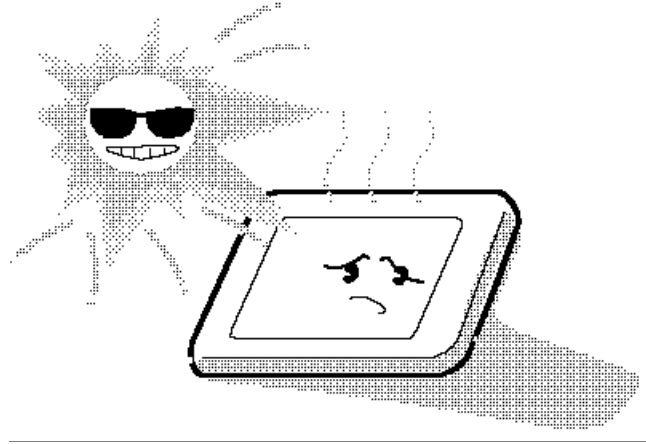
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



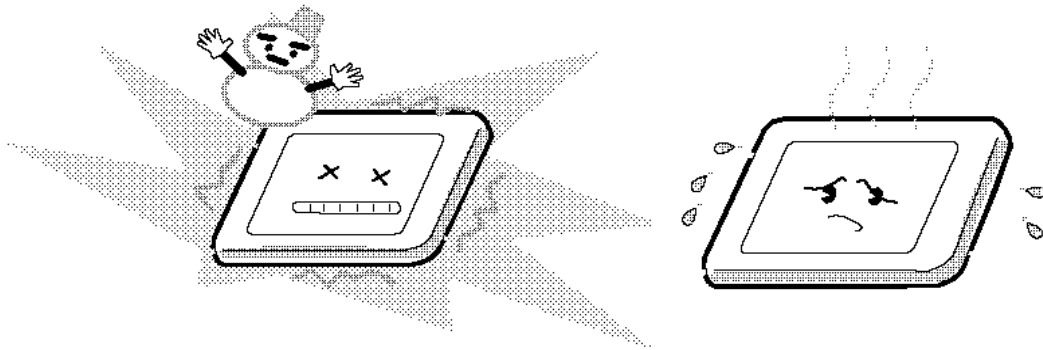
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle grounding device when handling the module.



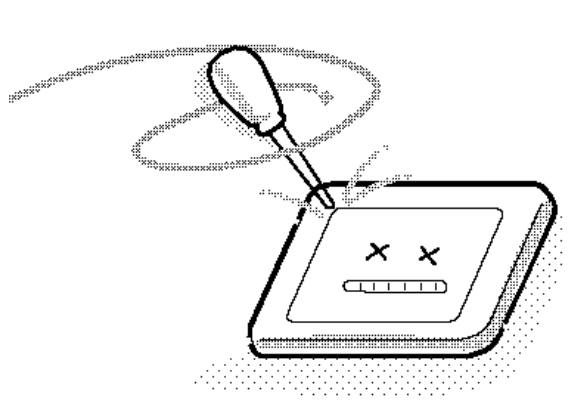
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



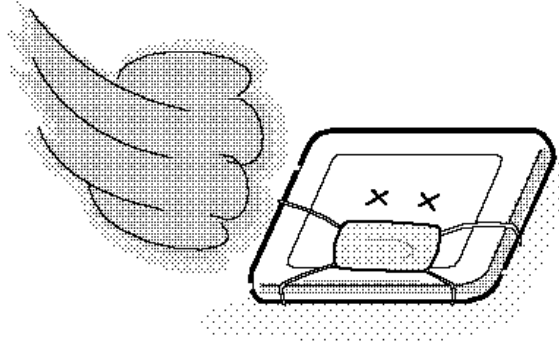
8. Do not store the module at temperatures below its specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



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 oxime). These materials can release gas that can damage the panel's polarization.





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## Appendix B Board Layout

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### B.1 System Board (FRDSY\*) Top View

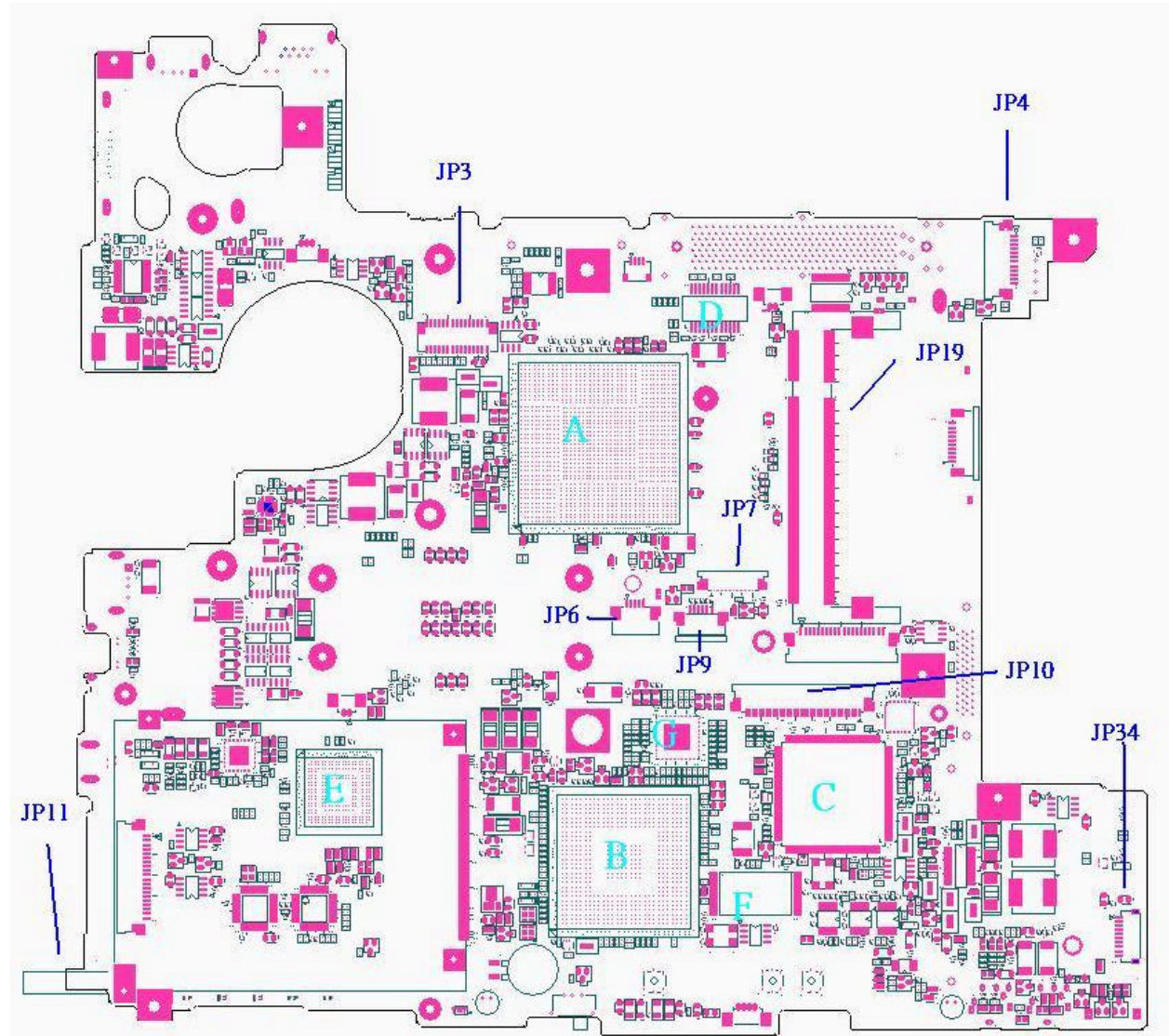


Figure B-1 System board (FRDSY\*) layout (Top)



## B.2 System Board (FRDSY\*) Bottom View

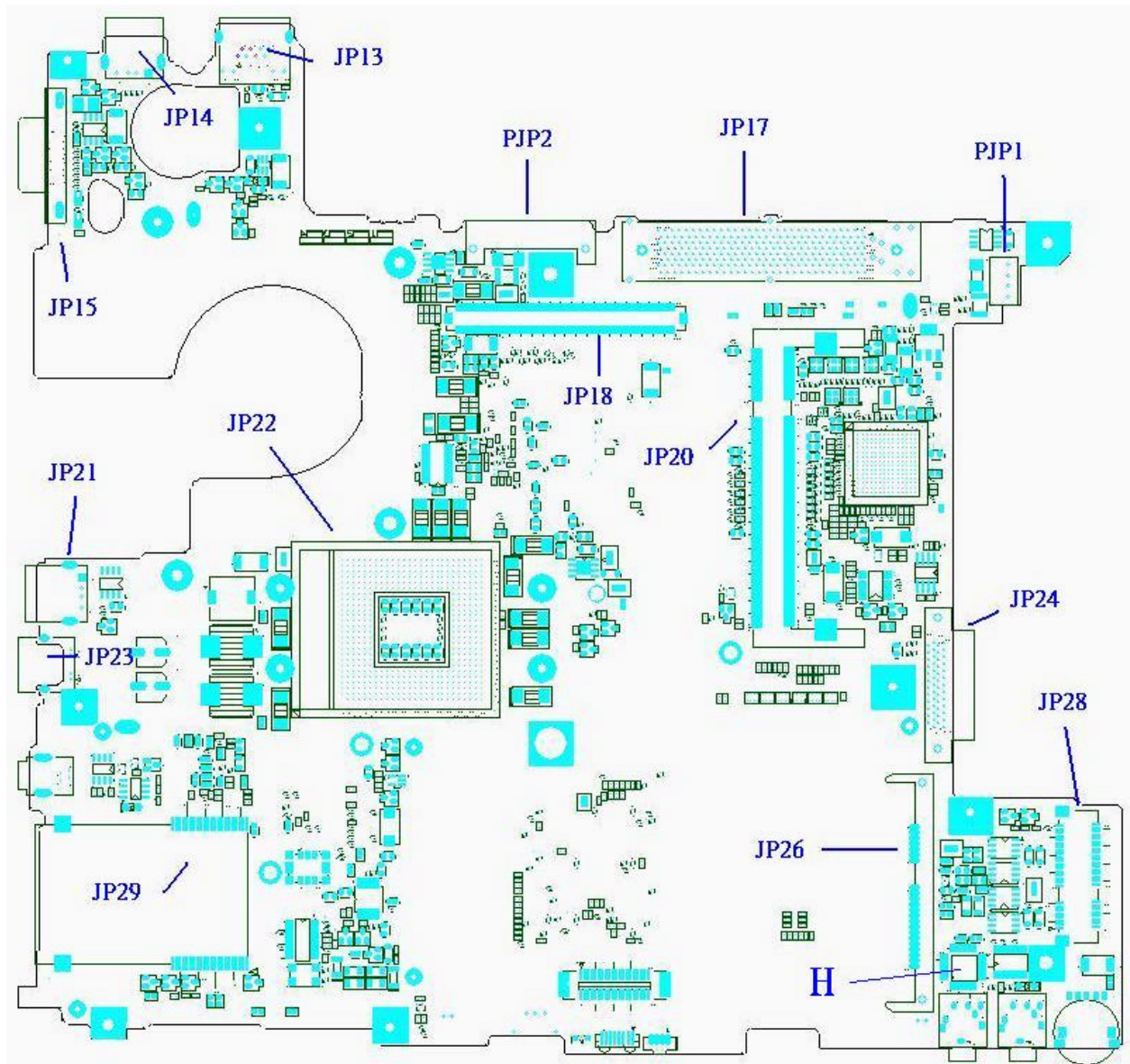


Figure B-2 System board (FRDSY\*) layout (Bottom)

*Table B-1 System board ICs (top and bottom)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	U6	NB
(B)	U21	SB
(C)	U14	ENE 910
(D)	T1	Transformer
(E)	U13	TI PCI7412
(F)	U23	BIOS ROM
(G)	U9	ICS9LPR325AKLFT
(H)	U48	Realtek ALC861



*Table B-2 System board connectors (top and bottom)*

<b>Number</b>	<b>Name</b>
JP15	CRT conn.
JP4	Power/B conn.
JP3	LVDS conn
JP22	CPU Stocket
JP2,JP33	Spearker conn
JP23	TV-Out
JP16	Fan conn
JP8	KB conn
JP9	TP conn
JP34	USB/B conn
JP26	HDD conn
JP11	PCMCIA Conn
JP19,JP20	DDRII conn
JP28	Mini-Express conn
JP25	1394 conn
JP24	ODD conn
JP27	MDC conn
VR1	VR conn
PJP1	Power core conn
PJP2	Battery conn
JP6	Fingerprint/B conn
JP29	5IN1 memory card conn
JP17	Docking conn

## Appendix C Pin Assignments

### System Board

#### C.1 JP19

Table C-1 SODIMM I/F pin assignments (200-PIN) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	VREF	O	2	VSS	-
3	VSS	-	4	DDR_DQ7	I/O
5	DDR_DQ0	I/O	6	DDR_DQ1	I/O
7	DDR_DQ4	I/O	8	VSS	-
9	VSS	-	10	DDR_DM0	I/O
11	DDR_DQS0	I/O	12	VSS	-
13	DDR_DQ0	I/O	14	DDR_DQ5	I/O
15	VSS	-	16	DDR_DQ6	I/O
17	DDR_DQ2	I/O	18	VSS	-
19	DDR_DQ3	I/O	20	DDR_DQ12	I/O
21	VSS	-	22	DDR_DQ13	O
23	DDR_DQ8	I/O	24	VSS	-
25	DDR_DQ14	I/O	26	DDR_DM1	I/O
27	VSS	-	28	VSS	-
29	DDR_DQS1#	I/O	30	DDR_CLK0	I/O
31	DDR_DQS1	I/O	32	DDR_CLK0#	I/O
33	VSS	-	34	VSS	-
35	DDR_DQ10	O	36	DDR_DQ9	I/O
37	DDR_DQ11	O	38	DDR_DQ15	I/O
39	VSS	-	40	VSS	-
41	VSS	-	42	VSS	-
43	DDR_DQ21	I/O	44	DDR_DQ20	I/O
45	DDR_DQ17	O	46	DDR_DQ16	I/O
47	VSS	-	48	VSS	-
49	DDR_DQS2#	I/O	50	DDR_TS	O

Table C-1 SODIMM I/F pin assignments (200-PIN) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
51	DDR_DQS2	I/O	52	DDR_DM2	I/O
53	VSS	-	54	VSS	-
55	DDR_DQ22	I/O	56	DDR_DQ18	I/O
57	DDR_DQ19	I/O	58	DDR_DQ23	I/O
59	VSS	-	60	VSS	-
61	DDR_DQ25	I/O	62	DDR_DQ29	I/O
63	DDR_DQ24	I/O	64	DDR_DQ28	I/O
65	VSS	-	66	VSS	-
67	DDR_DM3	I/O	68	DDR_DQS#3	I/O
69	NC	-	70	DDR_DQS3	I/O
71	VSS	-	72	VSS	-
73	DDR_DQ27	I/O	74	DDR_DQ26	I/O
75	DDR_DQ30	I/O	76	DDR_DQ31	I/O
77	VSS	-	78	VDD	O
79	DDR_CKE0	I/O	80	DDR_CKE1	I/O
81	VDD	O	82	VDD	O
83	NC	-	84	NC	-
85	DDR_BS#2	I/O	86	NC	-
87	VDD	O	88	VDD	-
89	DDR_MA12	I/O	90	DDR_MA11	I/O
91	DDR_MA9	I/O	92	DDR_MA7	I/O
93	DDR_MA8	I/O	94	DDR_MA6	I/O
95	VDD	O	A96	VDD	O
97	DDR_MA5	I/O	98	DDR_MA4	I/O
99	DDR_MA3	I/O	100	DDR_MA2	I/O
101	DDR_MA1	I/O	102	DDR_MA0	I/O
103	VDD	O	104	VDD	O
105	DDR_MA10	I/O	106	DDR_BS#1	I/O
107	DDR_BS#0	I/O	108	DDR_RAS#	I/O
109	DDR_WE#	I/O	110	DDR_CS0	I/O
111	VDD	O	112	VDD	O
113	DDR_CAS#	I/O	114	OTD	O

Table C-1 SODIMM I/F pin assignments (200-PIN) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
115	DDR_CS1	I/O	116	DDR_MA13	I/O
117	VDD	O	118	VDD	O
119	OTD1	O	120	NC	-
121	VSS	-	122	VSS	-
123	DDR_DQ35	I/O	124	DDR_DQ36	I/O
125	DDR_DQ32	I/O	126	DDR_DQ37	I/O
127	VSS	-	128	VSS	-
129	DDR_DQS4#	I/O	130	DDR_DM4	I/O
131	DDR_DQS4	I/O	132	VSS	-
133	VSS	-	134	DDR_DQ34	I/O
135	DDR_DQ39	I/O	136	DDR_DQ38	I/O
137	DDR_DQ33	I/O	138	VSS	-
139	VSS	-	140	DDR_DQ40	I/O
141	DDR_DQ45	I/O	142	DDR_DQ44	I/O
143	DDR_DQ41	I/O	144	VSS	-
145	VSS	-	146	DDR_DQS5#	I/O
147	DDR_DM5	I/O	148	DDR_DQS5	O
149	VSS	-	150	VSS	-
151	DDR_DQ42	I/O	152	DDR_DQ47	I/O
153	DDR_DQ43	I/O	154	DDR_DQ46	I/O
155	VSS	-	156	VSS	-
157	DDR_DQ52	I/O	A158	DDR_DQ48	I/O
159	DDR_DQ53	I/O	A160	DDR_DQ49	I/O
161	VSS	-	162	VSS	-
163	NC	-	164	DDR_CLK1	I/O
165	VSS	-	166	DDR_CLK1#	I/O
167	DDR_DQS6#	I/O	168	VSS	-
169	DDR_DQS6	I/O	170	DDR_DM6	O
171	VSS	-	172	VSS	-
173	DDR_DQ51	I/O	174	DDR_DQ50	I/O
175	DDR_DQ55	I/O	176	DDR_DQ54	I/O
177	VSS	-	178	VSS	-
179	DDR_DQ56	I/O	180	DDR_DQ60	I/O

Table C-1 SODIMM I/F pin assignments (200-PIN) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
181	DDR_DQ61	I/O	182	DDR_DQ57	I/O
183	VSS	-	184	VSS	-
185	DDR_DM7	-	186	DDR_DQS7#	I/O
187	VSS	-	188	DDR_DQS7	I/O
189	DDR_DQ58	I/O	190	VSS	-
191	DDR_DQ59	I/O	192	DDR_DQ62	I/O
193	VSS	-	194	DDR_DQ63	I/O
195	SMBDATA	I/O	196	VSS	-
197	SMBCLK	I/O	198	SA0	I
199	VDDSPD	O	200	SA1	I

## C.2 JP20

Table C-2 SODIMM I/F pin assignments (200-PIN) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	VREF	O	2	VSS	-
3	VSS	-	4	DDR_DQ4	I/O
5	DDR_DQ0	I/O	6	DDR_DQ1	I/O
7	DDR_DQ5	I/O	8	VSS	-
9	VSS	-	10	DDR_DM0	I/O
11	DDR_DQS0	I/O	12	VSS	-
13	DDR_DQ0	I/O	14	DDR_DQ6	I/O
15	VSS	-	16	DDR_DQ2	I/O
17	DDR_DQ7	I/O	18	VSS	-
19	DDR_DQ3	I/O	20	DDR_DQ12	I/O
21	VSS	-	22	DDR_DQ13	O
23	DDR_DQ8	I/O	24	VSS	-
25	DDR_DQ9	I/O	26	DDR_DM1	I/O
27	VSS	-	28	VSS	-
29	DDR_DQS1#	I/O	30	DDR_CLK3	I/O

Table C-2 SODIMM I/F pin assignments (200-PIN) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
31	DDR_DQS1	I/O	32	DDR_CLK3#	I/O
33	VSS	-	34	VSS	-
35	DDR_DQ10	O	36	DDR_DQ14	I/O
37	DDR_DQ11	O	38	DDR_DQ15	I/O
39	VSS	-	40	VSS	-
41	VSS	-	42	VSS	-
43	DDR_DQ21	I/O	44	DDR_DQ16	I/O
45	DDR_DQ17	O	46	DDR_DQ20	I/O
47	VSS	-	48	VSS	-
49	DDR_DQS2#	I/O	50	DDR_TS	O
51	DDR_DQS2	I/O	52	DDR_DM2	I/O
53	VSS	-	54	VSS	-
55	DDR_DQ22	I/O	56	DDR_DQ18	I/O
57	DDR_DQWE	I/O	58	DDR_DQ23	I/O
59	VSS	-	60	VSS	-
61	DDR_DQ24	I/O	62	DDR_DQ26	I/O
63	DDR_DQ25	I/O	64	DDR_DQ28	I/O
65	VSS	-	66	VSS	-
67	DDR_DM3	I/O	68	DDR_DQS#3	I/O
69	NC	-	70	DDR_DQS3	I/O
71	VSS	-	72	VSS	-
73	DDR_DQ30	I/O	74	DDR_DQ29	I/O
75	DDR_DQ31	I/O	76	DDR_DQ27	I/O
77	VSS	-	78	VDD	O
79	DDR_CKE2	I/O	80	DDR_CKE3	I/O
81	VDD	O	82	VDD	O
83	NC	-	84	NC	-
85	DDR_BS#2	I/O	86	NC	-
87	VDD	O	88	VDD	-
89	DDR_MA12	I/O	90	DDR_MA11	I/O
91	DDR_MA9	I/O	92	DDR_MA7	I/O
93	DDR_MA8	I/O	94	DDR_MA6	I/O
95	VDD	O	A96	VDD	O

97	DDR_MA5	I/O	98	DDR_MA4	I/O
99	DDR_MA3	I/O	100	DDR_MA2	I/O

Table C-2 SODIMM I/F pin assignments (200-PIN) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
101	DDR_MA1	I/O	102	DDR_MA0	I/O
103	VDD	O	104	VDD	O
105	DDR_MA10	I/O	106	DDR_BS#1	I/O
107	DDR_BS#0	I/O	108	DDR_RAS#	I/O
109	DDR_WE#	I/O	110	DDR_CS0	I/O
111	VDD	O	112	VDD	O
113	DDR_CAS#	I/O	114	OTD	O
115	DDR_CS3	I/O	116	DDR_MA13	I/O
117	VDD	O	118	VDD	O
119	OTD3	O	120	NC	-
121	VSS	-	122	VSS	-
123	DDR_DQ37	I/O	124	DDR_DQ33	I/O
125	DDR_DQ36	I/O	126	DDR_DQ32	I/O
127	VSS	-	128	VSS	-
129	DDR_DQS4#	I/O	130	DDR_DM4	I/O
131	DDR_DQS4	I/O	132	VSS	-
133	VSS	-	134	DDR_DQ38	I/O
135	DDR_DQ35	I/O	136	DDR_DQ39	I/O
137	DDR_DQ34	I/O	138	VSS	-
139	VSS	-	140	DDR_DQ44	I/O
141	DDR_DQ40	I/O	142	DDR_DQ45	I/O
143	DDR_DQ41	I/O	144	VSS	-
145	VSS	-	146	DDR_DQS5#	I/O
147	DDR_DM5	I/O	148	DDR_DQS5	O
149	VSS	-	150	VSS	-
151	DDR_DQ42	I/O	152	DDR_DQ43	I/O
153	DDR_DQ47	I/O	154	DDR_DQ46	I/O
155	VSS	-	156	VSS	-
157	DDR_DQ48	I/O	A158	DDR_DQ49	I/O
159	DDR_DQ53	I/O	A160	DDR_DQ52	I/O
161	VSS	-	162	VSS	-
163	NC	-	164	DDR_CLK2	I/O

165	VSS	-	166	DDR_CLK2#	I/O
167	DDR_DQS6#	I/O	168	VSS	-
169	DDR_DQS6	I/O	170	DDR_DM6	O

*Table C-2 SODIMM I/F pin assignments (200-PIN) (4/4)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
171	VSS	-	172	VSS	-
173	DDR_DQ51	I/O	174	DDR_DQ54	I/O
175	DDR_DQ50	I/O	176	DDR_DQ55	I/O
177	VSS	-	178	VSS	-
179	DDR_DQ60	I/O	180	DDR_DQ56	I/O
181	DDR_DQ61	I/O	182	DDR_DQ57	I/O
183	VSS	-	184	VSS	-
185	DDR_DM7	-	186	DDR_DQS7#	I/O
187	VSS	-	188	DDR_DQS7	I/O
189	DDR_DQ58	I/O	190	VSS	-
191	DDR_DQ59	I/O	192	DDR_DQ62	I/O
193	VSS	-	194	DDR_DQ63	I/O
195	SMBDATA	I/O	196	VSS	-
197	SMBCLK	I/O	198	SA0	I
199	VDDSPD	O	200	SA1	I



### C.3 JP15

Table C-3 RGB I/F pin assignments (15-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	CRT_R_L	O	2	CRT_G_L	O
3	CRT_B_L	O	4	GND	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	+CRT_VCC	-	10	GND	-
11	NC	-	12	DSUB_12	I/O
13	HSYNC_L	O	14	VSYNC_L	O
15	DSUB_15	I/O			

## C.4 JP26

Table C-4 HDD I/F pin assignments (22-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	SATA_TXP0	I/O
3	SATA_TXN0	I/O	4	GND	-
5	SATA_RXN0	I/O	6	SATA_RXP0	I/O
7	GND	-	8	VCC3	O
9	VCC3	O	10	VCC3	O
11	GND	-	12	GND	-
13	GND	-	14	VCC5	O
15	VCC5	O	16	VCC5	O
17	GND	-	18	RESERVE	-
19	GND	-	20	NC	-
21	NC	-	22	NC	-

## C.5 JP24

Table C-5 ODD I/F pin assignments (52-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	INT_CD_L	I	2	INT_CD_R	I
3	CD_AGND	-	4	GND	-
5	SIDE_RST#	O	6	SD_D8	I/O
7	SD_D7	I/O	8	SD_D9	I/O
9	SD_D6	I/O	10	SD_D10	I/O
11	SD_D5	I/O	12	SD_D11	I/O
13	SD_D4	I/O	14	SD_D12	I/O
15	SD_D3	I/O	16	SD_D13	I/O
17	SD_D2	I/O	18	SD_D14	I/O
19	SD_D1	I/O	20	SD_D15	I/O
21	SD_D0	I/O	22	SD_DREQ	I
23	GND	-	24	SD_IOR#	O
25	IDE_DIOW#	O	26	GND	O
27	IDE_DIORDY	I	28	IDE_DDACK#	O
29	IDE_IRQ	I	30	NC	O
31	IDE_DA1	O	32	+5VCD	I
33	IDE_DA0	O	34	IDE_DA2	I
35	SW_SD_CS#1	O	36	SW_SD_CS#3	-
37	SHDD_LED#	I	38	+5VCD	O
39	+5VCD	-	40	+5VCD	-
41	+5VCD	-	42	+5VCD	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	GND	-	48	GND	-
49	NC	-	50	+5VCD	-
51	GND	-	52	GND	-

## C.6

## JP11

Table C-6 PC Card I/F pin assignments (68-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	S1_D3	-
3	S1_D4	I/O	4	S1_D5	O
5	S1_D6	I/O	6	S1_D7	I/O
7	S1_CE1#	I/O	8	S1_A10	I/O
9	S1_OE#	I/O	10	S1_A11	I/O
11	S1_A9	I/O	12	S1_A8	I/O
13	S1_A13	I/O	14	S1_A14	I/O
15	S1_WE#	I	16	S1_RDY#	I/O
17	+S1_VCC	I/O	18	+S1_VPP	I
19	S1_A16	I	20	S1_A15	I/O
21	S1_A12	I	22	S1_A7	I
23	S1_A6	I	24	S1_A5	I
25	S1_A4	I	26	S1_A3	I
27	S1_A2	I	28	S1_A1	I
29	S1_A0	I	30	S1_D0	I
31	S1_D1	O	32	S1_D2	I
33	S1_WP	-	34	GND	-
35	GND	-	36	S1_CD1#	-
37	S1_D11	I	38	S1_D12	I
39	S1_D13	I	40	S1_D14	I
41	S1_D15	I	42	S1_CE2#	I
43	S1_VS1	I	44	S1_IORD#	I
45	S1_IOWR#	I	46	S1_A17	I
47	S1_A18	I	48	S1_A19	I
49	S1_A20	I	50	S1_A21	I
51	+S1_VCC	I	52	+S1_VPP	O
53	S1_A22	I	54	S1_A23	I
55	S1_A24	I	56	S1_A25	O
57	S1_VS2	I	58	S1_RST	I
59	S1_WAIT#	I	60	S1_INPACK#	I/O

*Table C-6 PC Card I/F pin assignments (68-pin) (2/2)*

<b>Pin No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>Pin No.</b>	<b>Signal Name</b>	<b>I/O</b>
61	S1_REG#	I/O	62	S1_BVD2	I/O
63	S1_BVD1	I/O	64	S1_D8	I/O
65	S1_D9	I/O	66	S1_D10	I
67	S1_CD2#	-	68	GND	-

**C.7****JP28***Table C-7 Mini-Express I I/F pin assignments (54-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	PCI_WAKE	I/O	2	+3VS	O
3	WLAN_DATA	I/O	4	VSS	
5	WLAN_CLK	I/O	6	+1.5VS	O
7	MINI_CLKREQ	I/O	8	NC	-
9	VSS	-	10	NC	-
11	CLK_PCIE#	I/O	12	NC	-
13	CLK_PCIE	I/O	14	NC	-
15	VSS	-	16	NC	-
17	NC	-	18	VSS	-
19	NC	-	20	XMIT_OFF#	I/O
21	VSS	-	22	PLT_RST#	I/O
23	PCIE_RXN2	I/O	24	+3VALW	O
25	PCIE_RXP2	I/O	26	VSS	-
27	VSS	-	28	+1.5VS	O
29	VSS	-	30	SMBCLK	I/O
31	PCIE_TXN2	I/O	32	SMBDATA	I/O
33	PCIE_TXP2	I/O	34	VSS	-
35	VSS	-	36	USB_N	I/O
37	NC	-	38	USB_P	I/O
39	NC	-	40	VSS	-
41	NC	-	42	NC	-
43	NC	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	+1.5VS	O
49	NC	-	50	VSS	-
51	NC	-	52	+3VS	O
53	VSS	-	54	VSS	-

**C.8****JP3***Table C-8 LVDS I/F pin assignments (30-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	B+	O	2	B+	O
3	DISPOFF#	I/O	4	DAC_BRIG	I/O
5	+LCDVDD	I/O	6	INVT_PWM	I/O
7	+LCDVDD	I/O	8	+3VS	O
9	LCD_DATA	I/O	10	LCD_CLK	I/O
11	VSS	-	12	VSS	-
13	TXCLK+	O	14	TZCLK+	O
15	TXCLK-	O	16	TZCLK-	O
17	VSS	I	18	VSS	-
19	TXOUT2+	O	20	TZOUT1-	O
21	TXOUT2-	O	22	TZOUT1+	O
23	TXOUT1-	O	24	TZOUT2+	O
25	TXOUT1+	O	26	TZOUT2-	O
27	TXOUT0-	O	28	TZOUT0+	O
29	TXOUT0+	O	30	TZOUT0-	O

## C.9 JP16

Table C-9 Fan I/F pin assignments (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	FAN1_VOUT	I	2	FAN-SPEED1	O
3	GND	-			

## C.10 PJP1

Table C-10 AC Adaptor Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	DC_IN_S1	I	2	DC_IN_S1	I
3	GND	-	4	GND	-

## C.11 JP23

Table C-11 S-Video Connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	LUMA_1	I	4	CRMA_1	I
5	GND	-	6	GND	-

## C.12 JP13

Table C-12 RJ11-45 Connector pin assignments (16-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	RJ45_PR1+	I/O	2	RJ45_PR1-	I
3	RJ45_PR2+	I/O	4	RJ45_PR3+	I/O
5	RJ45_PR3-	I/O	6	RJ45_PR2-	I/O
7	RJ45_PR4+	I/O	8	RJ45_PR4-	I/O
9	LED	-	10	LINK10_100#	O
11	ACTIVITY#	O	12	LED	-
13	GND	-	14	GND	-
15	GND	-	16	GND	-





## C.13 JP21

Table C-13 USB Connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+USB_VCCB	I	2	USB20D-	I/O
3	USB20P+	I/O	4	GND	-
5	GND	-	6	GND	-

## C.14 JP14

Table C-14 Single USB Connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+USB_VCCC	I	2	USB20P-	I/O
3	USB20P+	I/O	4	GND	-
5	GND	-	6	GND	-

## C.15 JP27

Table C-15 MDC Connector pin assignments (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	REV	-
3	ACZ_SDOOUT	O	4	REV	-
5	GND	-	6	3.3V	O
7	ACZ_SYNC	I/O	8	GND	-
9	ACZ_SDIN1	I/O	10	GND	-
11	REEST	I/O	12	ACZ_BITCLK	I/O

## C.16 JP4

Table C-16 SW/LED Connector pin assignments (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ON/OFF	O
3	BTN_ID	O	4	MODE	O
5	PWR_SUSPLED	O	6	PWR_LED	I
7	IBNTN	I	8	KSO17	I
9	KSI5	I	10	KSI4	I
11	KSI3	I	12	KSI2	I

## C.17 JP9

Table C-17 T/P Connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	5VS	O	2	GND	-
3	SW_R	I	4	SW_L	I
5	TP_DATA	I	6	TP_CLK	I

## C.18 JP8

Table C-18 KB Connector pin assignments (38-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	NUM_LED#	I	2	PADS_LED#	-
3	CAPS_LED#	I	4	+3VS	-
5	KSO15	O	6	KSO14	I
7	KSO10	O	8	KSO11	O
9	KSO8	O	10	KSO9	O
11	KSO13	O	12	KSI7	I
13	KSO3	O	14	KSO7	O
15	KSO12	O	16	KSI4	I
17	KSI6	I	18	KSI5	I
19	KSO6	O	20	KSO5	O
21	KSI6	I	22	KSI0	I
23	KSO0	O	24	KSO1	O
25	KSI1	I	26	KSI2	I
27	KSO2	O	28	KSO4	O
29	+3VS	O	30	NC	-
31	NC	-	32	NC	-
33	NC	-	34	+3VS	O

## C.19 JP25

Table C-19 1394 Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	TPB0-	I/O	2	TPB0+	I/O
3	TPA0-	I/O	4	TPA0+	I/O
5	GND	-	6	GND	-

## C.20 JP2

Table C-20 SPK Connector pin assignments (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	INTSPK_L1	I/O	2	INTSPK_L2	I/O

## C.21 JP33

Table C-21 SPK Connector pin assignments (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	INTSPK_R1	I/O	2	INTSPK_R2	I/O

## C.22 PJP2

Table C-22 BATT Connector pin assignments (7-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	BATT_S1	I	2	ALI/NIMH#	I
3	AB/I	I	4	TS_A	O
5	EC_SMDA	O	6	EC_SMCA	O
7	GND	-			

## C.23 JP6

*Table C-23 Fingerprint Board Connector pin assignments (5-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+3VS	O	2	NC	-
3	USB_N	I/O	4	USB_P	I/O
5	GND	-			

## C.24 JP34

*Table C-24 USB Board Connector pin assignments (10-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+5VALW	O	2	+5VALW	O
3	USB_EN#	I/O	4	GND	-
5	USB20_N2	I/O	6	USB20_P2	I/O
7	GND	-	8	USB20_N3	I/O
8	USB20_P3	I/O	10	GND	-

## C.25 JP17

Table C-25 Docking I/F pin assignments (240-pin) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	DKN_B+	-	2	DKN_B+	-
3	DCOCT1#		4	+5VS	
5	PS_CLK		6	KB_CLK	
7	GND		8	1394_PHYRST _S3P	
9	DPCONF_S5P		10	NC	
11	GND		12	D_DDC_CLK	
13	D_CRT_R		14	D_CRT_G	
15	D_CRT_B		16	D_CRT_VSYN C	
17	DVI_SCLK		18	NC	
19	GND		20	NC	
21	NC		22	DVI_TXD2+	
23	DVI_TXD2-		24	DVI_TXD1+	
25	DVI_TXD1-		26	DVI_TXD0+	
27	DVI_TXD0-		28	GND	
29	GND		30	DVI_TXC+	
31	DVI_TXC-		32	DVI_DET	
33	NC		34	NC	
35	NC		36	NC	
37	GND		38	NC	

Table C-25 Docking I/F pin assignments (240-pin) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
39	NC		40	NC	
41	GND		42	NC	
43	NC		44	NC	
45	GND		46	NC	
47	NC		48	NC	
49	GND		50	NC	
51	NC		52	NC	
53	NC		54	NC	
55	RJ45_MDI3+		56	RJ45_MDI3-	
57	NC		58	NC	
59	MDC1_RING		60	MDC2_TIP	
61	DKN_B+		62	DKN_B+	
63	EJCTSW#		64	+5VS	
65	PS_DATA		66	KB_DATA	
67	GND		68	NC	
69	1394_DILSON_ S3P		70	NC	
71	GND		72	D_DDC_DATA	
73	GND		74	GND	
75	GND		76	D_CRT_HSYN C	
77	DVI_SDATA		78	NC	
79	GND		80	NC	
81	NC		82	NC	
83	NC		84	NC	
85	NC		86	NC	
87	NC		88	GND	
89	GND		90	NC	
91	NC		92	NC	
93	NC		94	NC	
95	NC		96	NC	
97	GND		98	NC	
99	NC		100	NC	
101	GND		102	NC	
103	NC		104	NC	



105	GND		106	NC	
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Table C-25 Docking I/F pin assignments (240-pin) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
107	NC		108	NC	
109	GND		110	NC	
111	NC		112	NC	
113	NC		114	NC	
115	NC		116	NC	
117	NC		118	NC	
119	NC		120	NC	
121	DKN_B+		122	DKN_B+	
123	D_EC_SMB_C K2		124	+5VS	
125	+5VALW		126	TPA1+	
127	GND		128	TPB1+	
129	NC		130	NC	
131	GND		132	NC	
133	NC		134	AUD_SUDMUT _P3#	
135	NC		136	LINEOL	
137	LINEIL		138	LINEIR#	
139	GND		140	DOCK_ON/OF FBTN#	
141	DCD#		142	DSR#	
143	TXD		144	RI#	
145	LPTPE		146	FD7	
147	FD6		148	GND	
149	GND		150	FD4	
151	FD1		152	FD2	
153	FD0		154	R_LPTSTB#	
155	NC		156	NC	
157	GND		158	NC	
159	NC		160	NC	
161	GND		162	NC	
163	NC		164	NC	
165	GND		166	NC	
167	NC		168	NC	

169	GND		170	NC	
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Table C-25 Docking I/F pin assignments (240-pin) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
171	NC		172	NC	
173	GND		174	+3VALW	
175	NC		176	NC	
177	NC		178	RJ45_GND	
179	RJ45_MDI0+		180	RJ45_MDI0-	
181	DKN_B+		182	DKN_B+	
183	D_EC_SMB_D A2		184	+5VS	
185	NC		186	TPA1-	
187	GND		188	TPB1-	
189	USB20_P0		190	USB20_N0	
191	GND		192	NC	
193	NC		194	LINEOR	
195	LINEOR#		196	LINEOL#	
197	LINEIL#		198	LINEIR	
199	GND		200	RXD	
201	RTS#		202	CTS#	
203	DTR#		204	LPTSLCT	
205	LPTBUSY		206	LPTACK#	
207	FD5		208	GND	
209	GND		210	FD3	
211	LPTSLCTIN#		212	LPTINIT#	
213	LPTERR#		214	AFD#/3M#	
215	NC		216	NC	
217	GND		218	NC	
219	NC		220	NC	
221	GND		222	NC	
223	NC		224	NC	
225	GND		226	NC	
227	NC		228	NC	
229	GND		230	NC	
231	NC		232	NC	
233	GND		234	LAN_ACTIVITY #	

235	LAN_LINK#		236	DCOCT2#	
237	NC		238	NC	
239	RJ45_MDI1+		240	RJ45_MDI1-	

## C.26 JP18

Table C-26 VGA/B I/F pin assignments (200-pin) (1/5)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	B+	-	2	+1.8VS	-
3	B+	-	4	+1.8VS	
5	B+	-	6	+1.8VS	
7	B+	-	8	+1.8VS	
9	B+	-	10	+1.8VS	
11	B+	-	12	+1.8VS	
13	NC		14	+1.8VS	
15	+1.5VS		16	+1.8VS	
17	+1.5VS		18	+1.8VS	
19	+1.5VS		20	+1.8VS	
21	+1.5VS		22	+1.8VS	
23	+1.5VS		24	+1.8VS	
25	+1.5VS		26	+1.8VS	
27	+1.5VS		28	+1.8VS	
29	+1.5VS		30	+1.8VS	
31	+2.5VS		32	+1.8VS	
33	+2.5VS		34	+3VS	
35	+2.5VS		36	+3VS	
37	VGA_CLK		38	+3VS	
39	VGA_DATA		40	+5VS	
41	NC		42	NC	
43	LVDSBC-		44	LVDSAC-	
45	LVDSBC+		46	LVDSAC+	
47	GND		48	GND	

49	LVDSB0-		50	LVDSA0-	
51	LVDSB0+		52	LVDSA0+	

Table C-26 VGA/B I/F pin assignments (200-pin) (2/5)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
53	GND		54	GND	
55	LVDSB1-		56	LVDSA1-	
57	LVDSB1+		58	LVDSA1+	
59	GND		60	GND	
61	LVDSB2-		62	LVDSA2-	
63	LVDSB2+		64	LVDSA2+	
65	GND		66	GND	
67	PCIE_GTX_ MRX_P0		68	PCIE_MTX_ GRX_P0	
69	PCIE_GTX_ MRX_N0		70	PCIE_MTX_ GRX_N0	
71	GND		72	GND	
73	PCIE_GTX_ MRX_P1		74	PCIE_MTX_ GRX_P1	
75	PCIE_GTX_ MRX_N1		76	PCIE_MTX_ GRX_N1	
77	GND		78	GND	
79	PCIE_GTX_ MRX_P2		80	PCIE_MTX_ GRX_P2	
81	PCIE_GTX_ MRX_N2		82	PCIE_MTX_ GRX_N2	
83	GND		84	GND	
85	PCIE_GTX_ MRX_P3		86	PCIE_MTX_ GRX_P3	
87	PCIE_GTX_ MRX_N3		88	PCIE_MTX_ GRX_N3	
89	GND		90	GND	
91	PCIE_GTX_ MRX_P4		92	PCIE_MTX_ GRX_P4	
93	PCIE_GTX_ MRX_N4		94	PCIE_MTX_ GRX_N4	

Table C-26 VGA/B I/F pin assignments (200-pin) (3/5)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
95	GND		96	GND	
97	PCIE_GTX_ MRX_P5		98	PCIE_MTX_ GRX_P5	
99	PCIE_GTX_ MRX_N5		100	PCIE_MTX_ GRX_N5	
101	GND		102	GND	
103	PCIE_GTX_ MRX_P6		104	PCIE_MTX_ GRX_P6	
105	PCIE_GTX_ MRX_N6		106	PCIE_MTX_ GRX_N6	
107	GND		108	GND	
109	PCIE_GTX_ MRX_P7		110	PCIE_MTX_ GRX_P7	
111	PCIE_GTX_ MRX_N7		112	PCIE_MTX_ GRX_N7	
113	GND		114	GND	
115	PCIE_GTX_ MRX_P8		116	PCIE_MTX_ GRX_P8	
117	PCIE_GTX_ MRX_N8		118	PCIE_MTX_ GRX_N8	
119	GND		120	GND	
121	PCIE_GTX_ MRX_P9		122	PCIE_MTX_ GRX_P9	
123	PCIE_GTX_ MRX_N9		124	PCIE_MTX_ GRX_N9	
125	GND		126	GND	
127	PCIE_GTX_ MRX_P10		128	PCIE_MTX_ GRX_P10	
129	PCIE_GTX_ MRX_N10		130	PCIE_MTX_ GRX_N10	
131	GND		132	GND	

Table C-26 VGA/B I/F pin assignments (200-pin) (4/5)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
133	PCIE_GTX_MRX_P11		134	PCIE_MTX_GRX_P11	
135	PCIE_GTX_MRX_N11		136	PCIE_MTX_GRX_N11	
137	GND		138	GND	
139	PCIE_GTX_MRX_P12		140	PCIE_MTX_GRX_P12	
141	PCIE_GTX_MRX_N12		142	PCIE_MTX_GRX_N12	
143	GND		144	GND	
145	PCIE_GTX_MRX_P13		146	PCIE_MTX_GRX_P13	
147	PCIE_GTX_MRX_N13		148	PCIE_MTX_GRX_N13	
149	GND		150	GND	
151	PCIE_GTX_MRX_P14		152	PCIE_MTX_GRX_P14	
153	PCIE_GTX_MRX_N14		154	PCIE_MTX_GRX_N14	
155	GND		156	GND	
157	PCIE_GTX_MRX_P15		158	PCIE_MTX_GRX_P15	
159	PCIE_GTX_MRX_N15		160	PCIE_MTX_GRX_N15	
161	GND		162	GND	
163	CLK_PCIE		164	DDC_CLK	
165	CLKPCIE#		166	DDC_DAT	
167	GND		168	GND	
169	CRT_R		170	VGA_TV_LUMA	
171	GND		172	GND	

Table C-26 VGA/B I/F pin assignments (200-pin) (5/5)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
173	CRT_G		174	VGA_TV_CR MA	
175	GND		176	GND	
177	CRT_B		178	VSYNC	
179	GND		180	HYNC	
181	PLTRST#		182	GND	
183	SUSP#		184	DVI_DET#	
185	ENVDD		186	DVI_SCLK	
187	ENBKL		188	DVI_SDATA	
189	GND		190	GND	
191	DVI_TXC+		192	DVI_TXD1+	
193	DVI_TXC-		194	DVI_TXD1-	
195	GND		196	GND	
197	DVI_TXD0+		198	DVI_TXD2+	
199	DVI_TXD0-		200	DVI_TXD2-	





## Appendix D Keyboard Scan/Character Codes

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

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (	0A	8A	46	F0	46	*2
11	0 )	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
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	18	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	
113	F2	3C	BC	06	F0	06	
114	F3	3D	BD	04	F0	04	
115	F4	3E	BE	0C	F0	0C	
116	F5	3F	BF	03	F0	03	
117	F6	40	C0	0B	F0	0B	
118	F7	41	C1	83	F0	83	
119	F8	42	C2	0A	F0	0A	
120	F9	43	C3	01	F0	01	
121	F10	44	C4	09	F0	09	*3

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

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
122	F11	57		D7		78		F0 78		*3
123	F12	58		D8		07		F0 07		*3
124	PrintSc	*6		*6		*6		*6		*6
126	Pause	*7		*7		*7		*7		*7
X	Fn	—		—		—		—		*4
X	Win	E0	5B	E0	DB	E0	1F	E0	F0 1F	
x	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. \* Combination with the **Fn** key gives different codes.
4. \* The **Fn** key does not generate a code by itself.
5. \* This key corresponds to key No. 42 in a 102-key model.
6. \* Refer to Table D-6, No. 124 key scan code.
7. \* Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1		Code set 2			
		Make	Break	Make		Break	
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12		
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12		
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12		
79	? ?	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12		
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12		
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12		
83	??	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12		
84	??	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12		
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12		
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12		
89	? ?	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12		
X	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12		
X	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 <b>Shift</b>	With right <b>Shift</b>
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
X	Win	E0 2A	E0 5B	E0 DB	E0 AA	E0 12	E0 1F	E0 F0	1F E0 F0 12
X	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	L-CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	L-ALT	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	C6	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	E0 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	84		



*Table D-7 No.126 key scan code*

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

\*: This key generates only make codes.

## Appendix E Key Layout

### E.1 United States (US) Keyboard

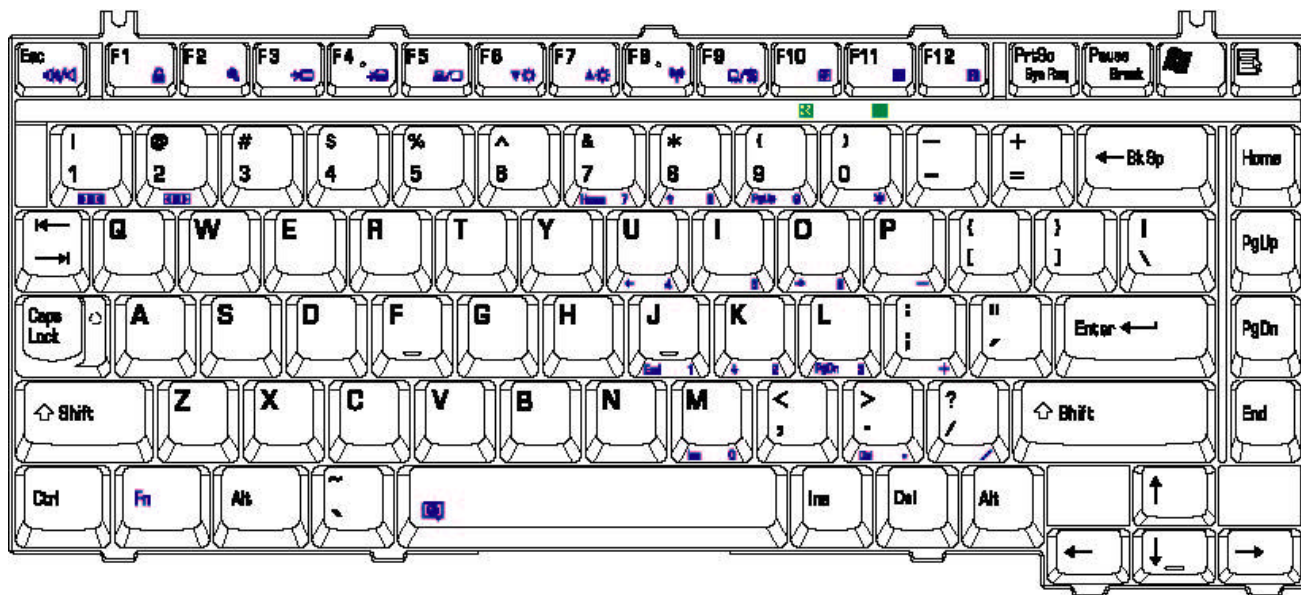


Figure E-1 US keyboard

### E.2 United Kingdom (UK) Keyboard

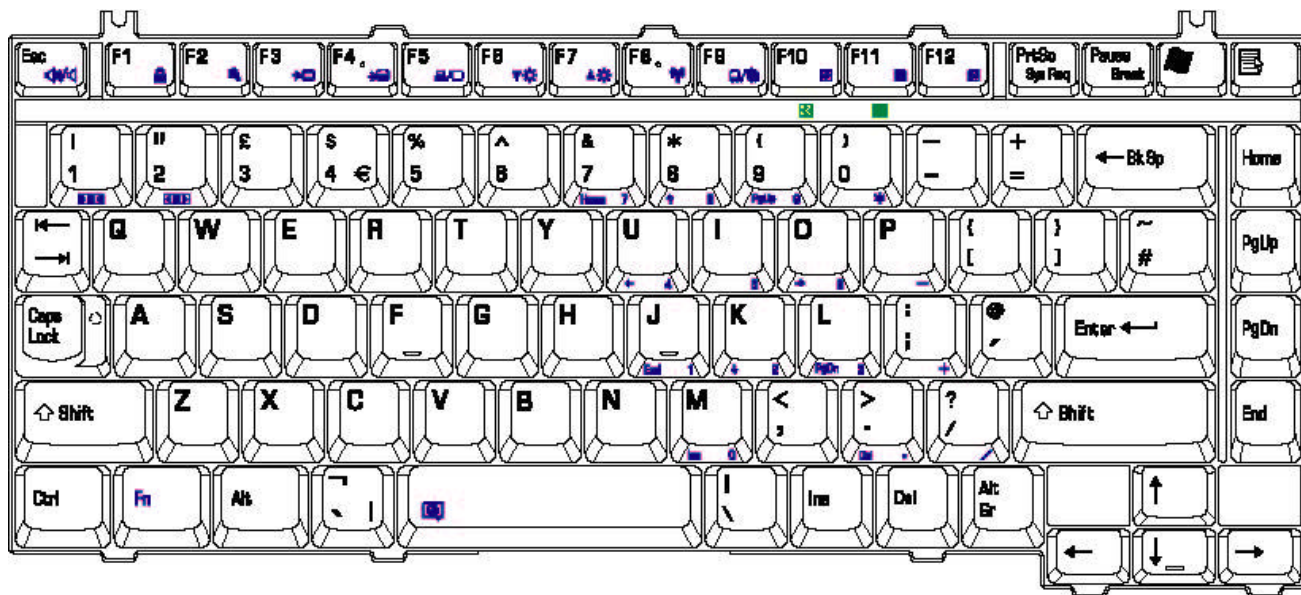


Figure E-2 UK keyboard

### E.3 Spanish (SP) Keyboard

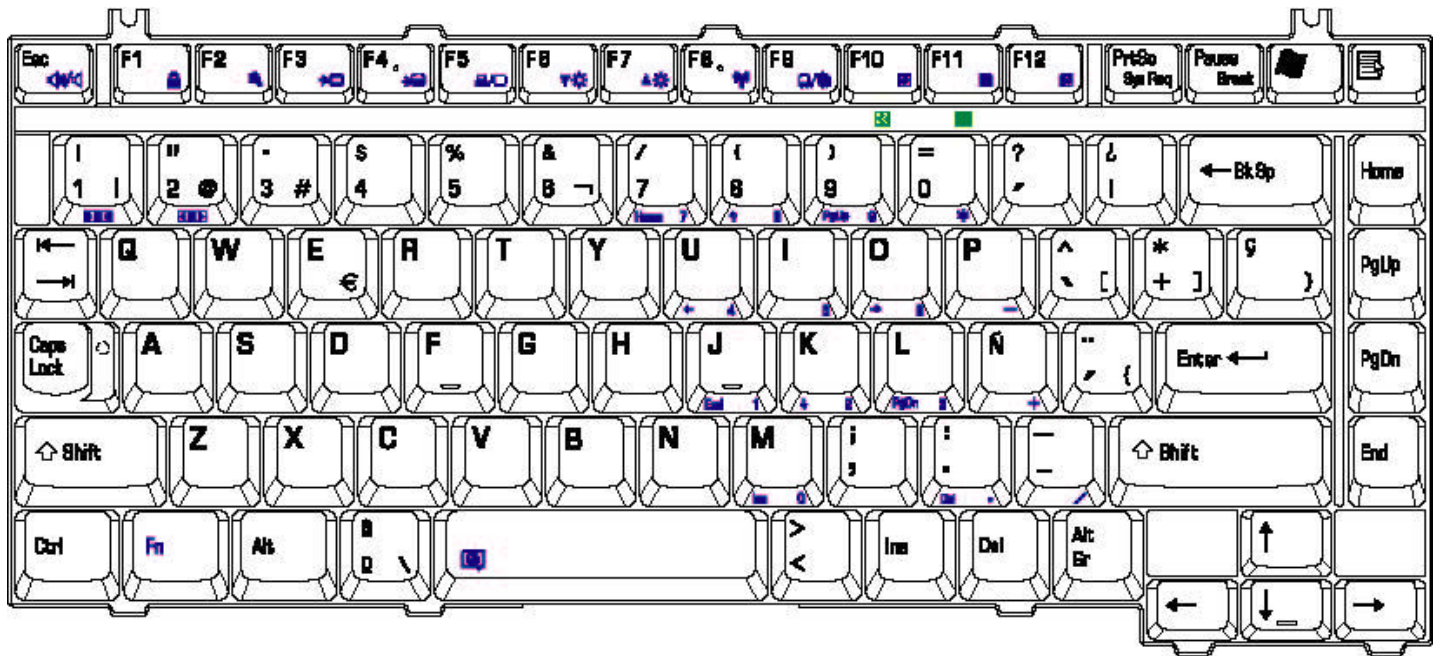


Figure E-3 SP keyboard

### E.4 Japanese (JA) Keyboard

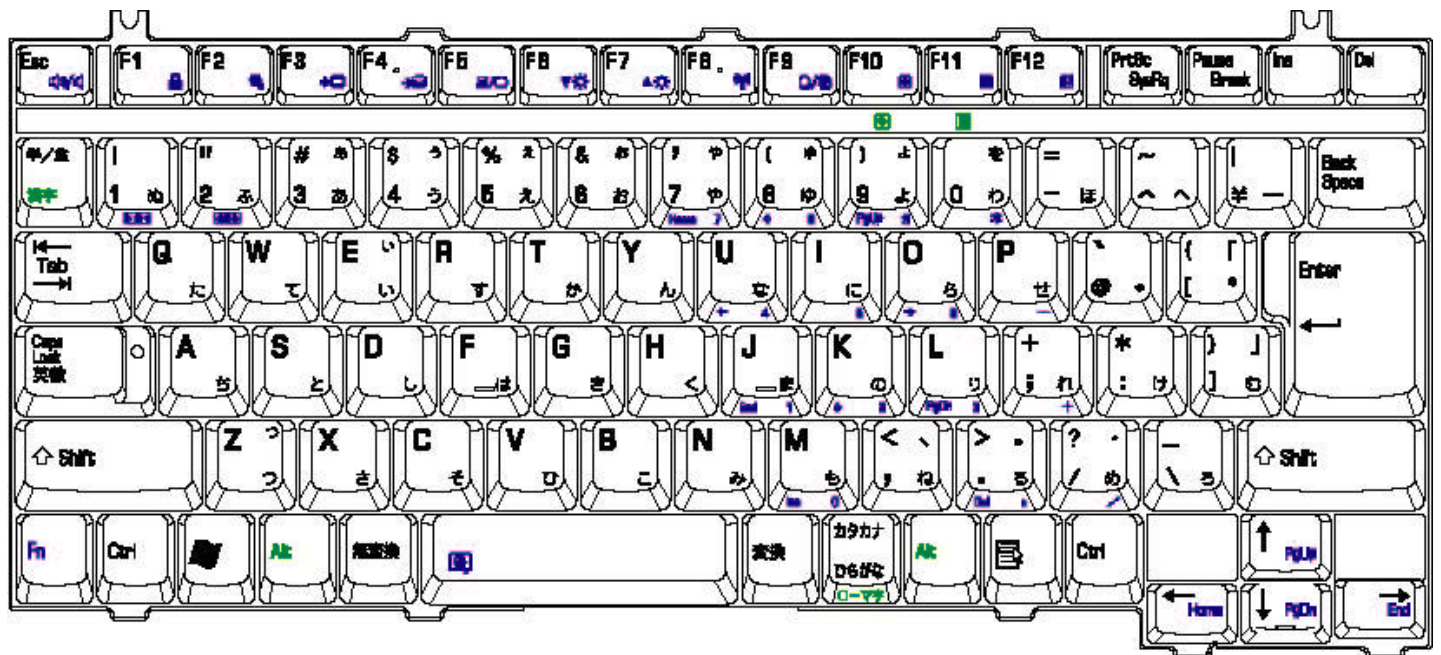


Figure E-4 JA keyboard



### E.5 Korean (KO) Keyboard

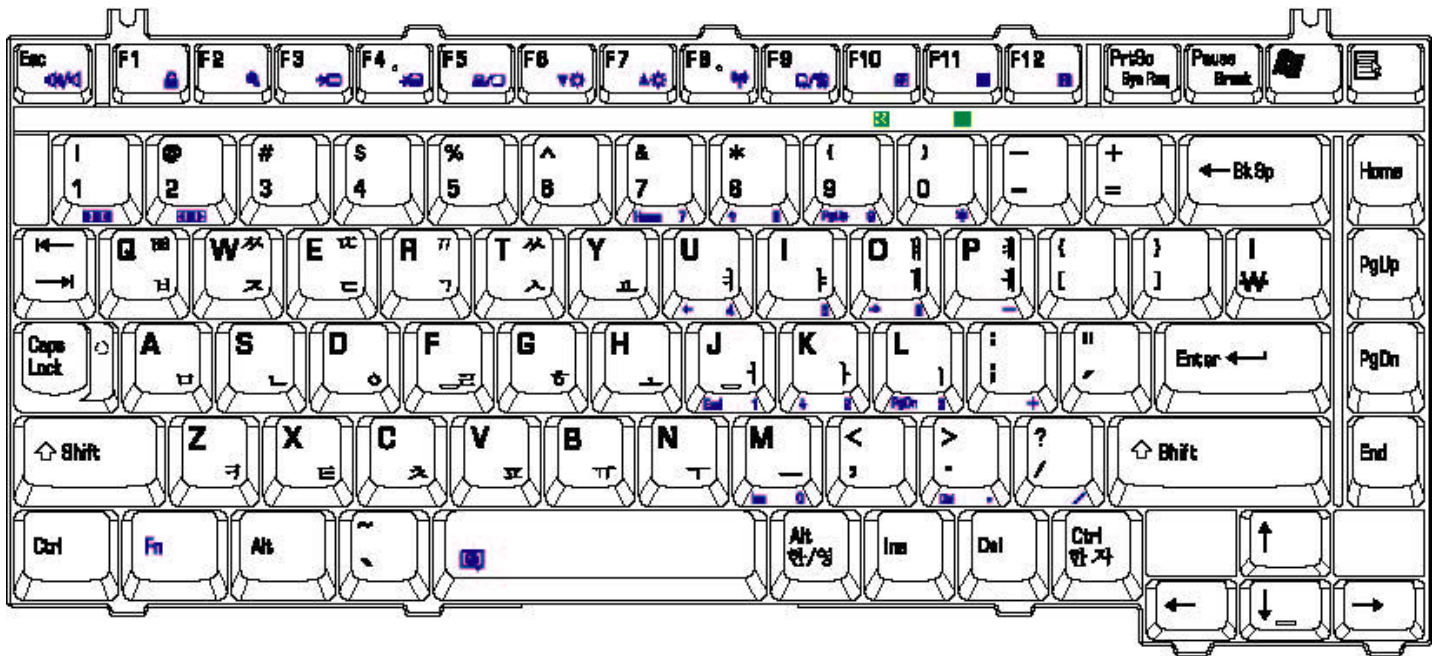


Figure E-5 KO keyboard

### E.6 Canadian French (CF) Keyboard

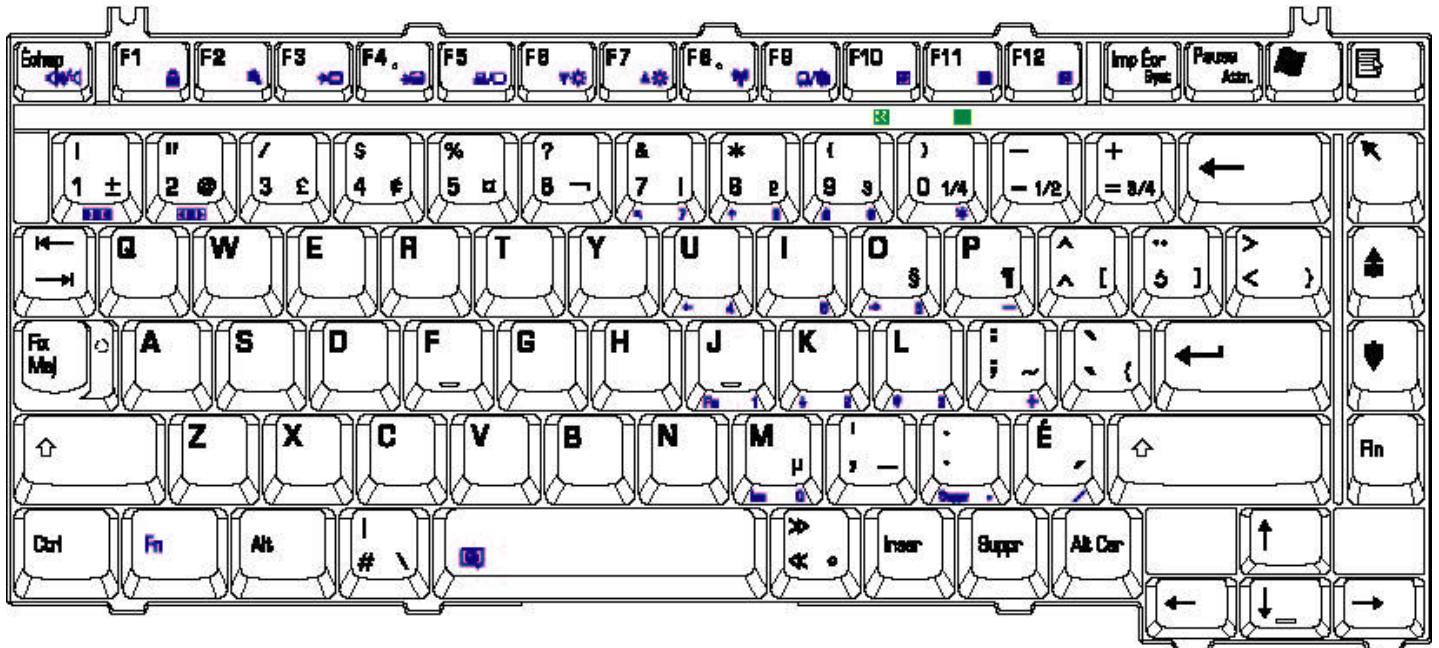


Figure E-6 CF keyboard

## E.7 Portuguese (PO) Keyboard

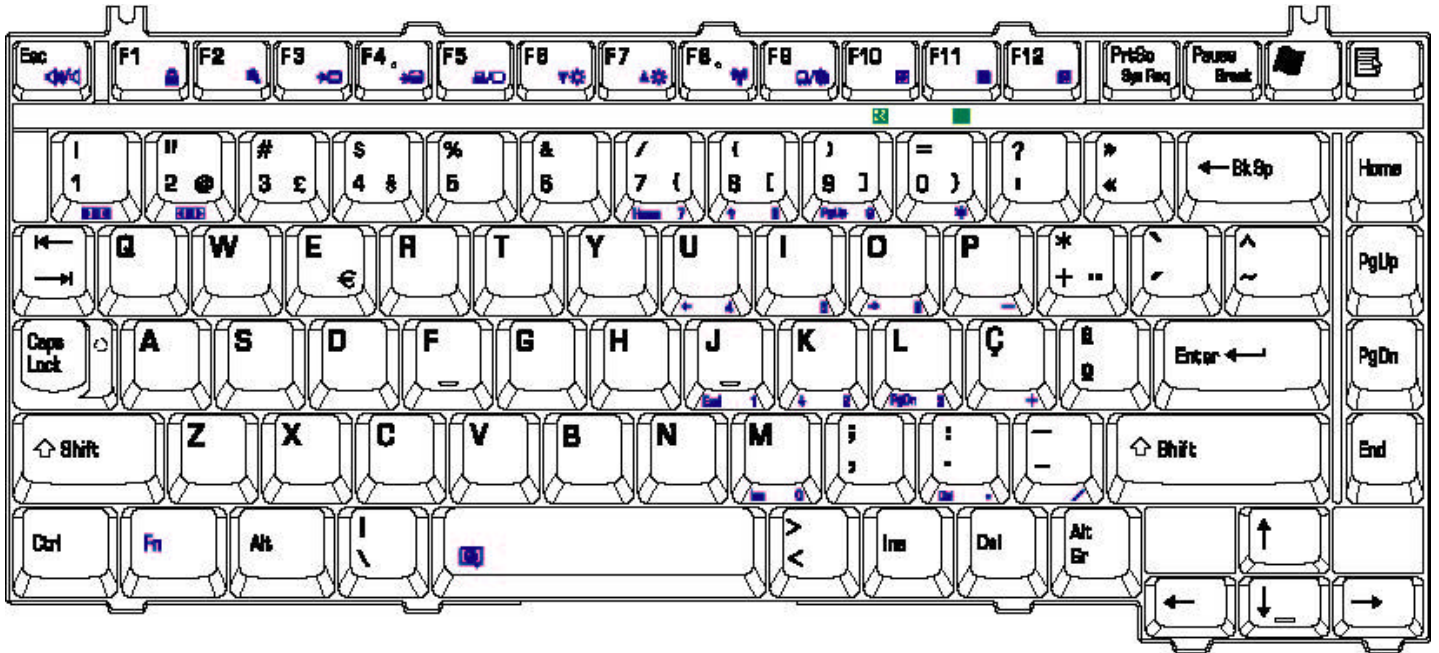


Figure E-7 PO keyboard

## E.8 US-INTE (US/INTE) Keyboard

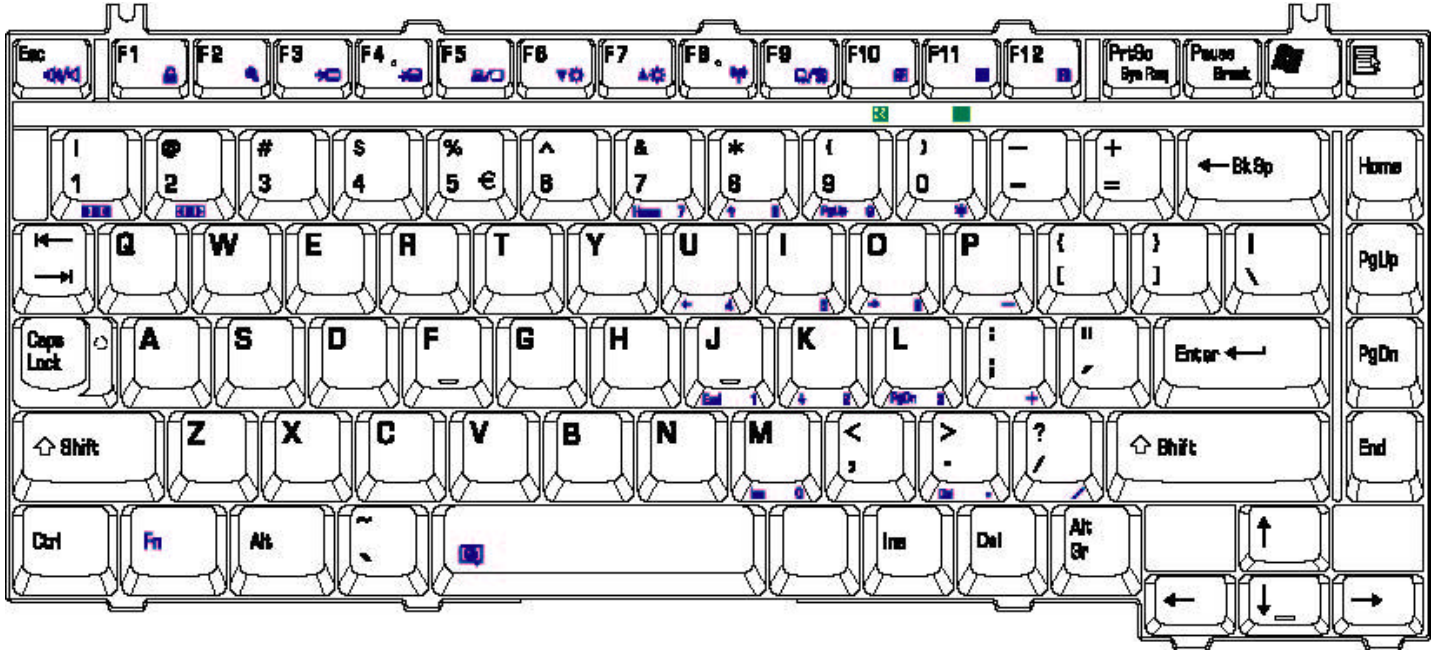


Figure E-8 US-INTE\_ALPS keyboard



### E.9 German (GR) Keyboard

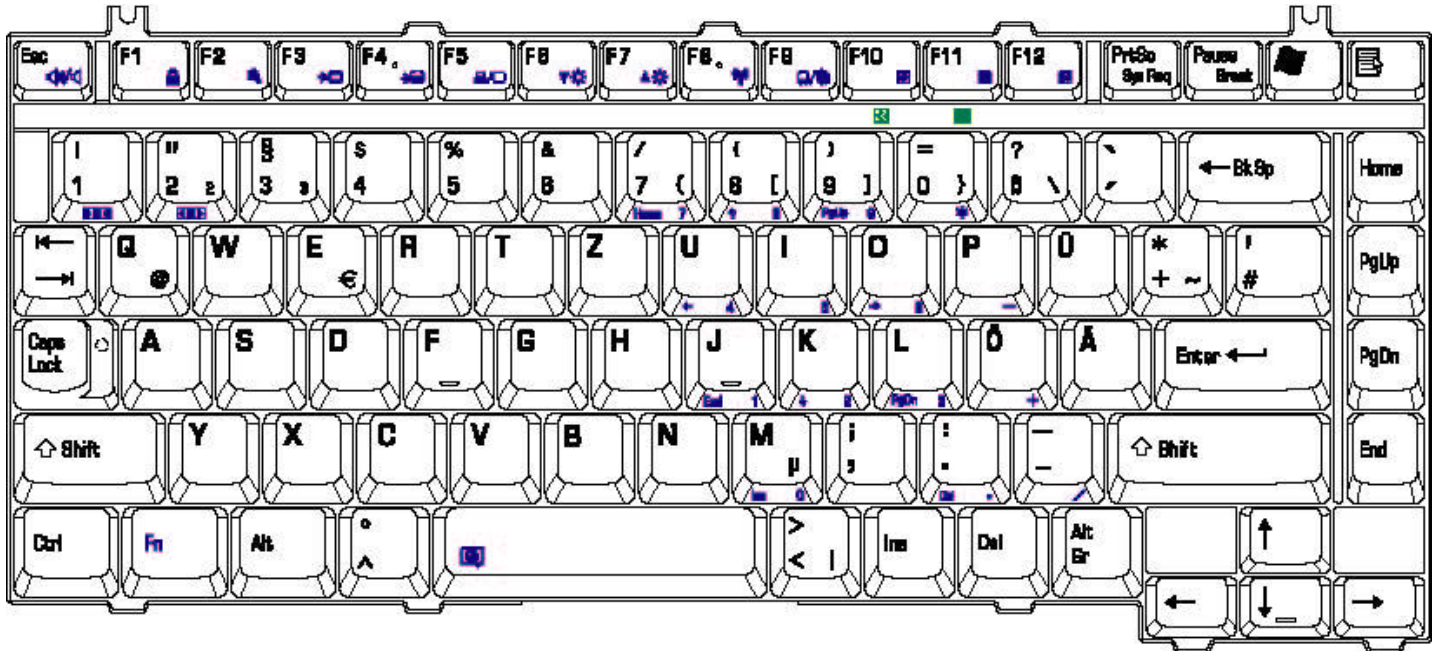


Figure E-9 GR keyboard

### E.10 French (FR) Keyboard

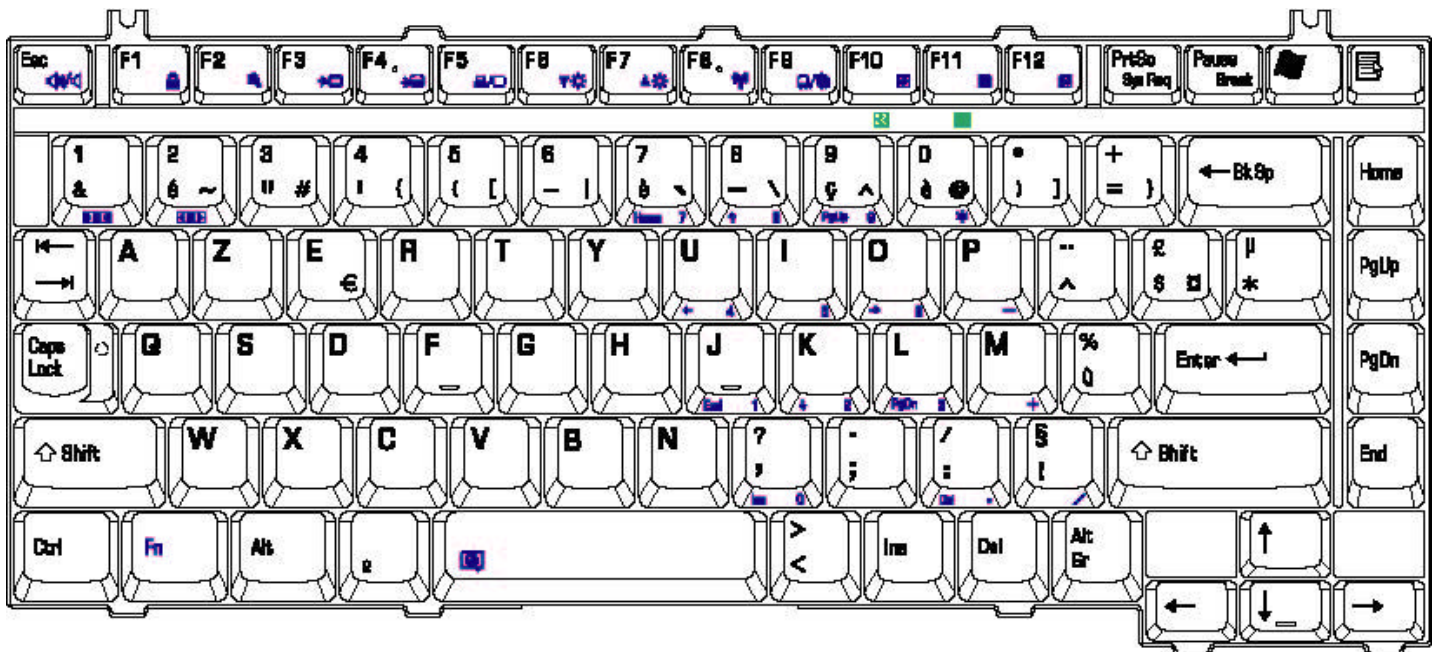


Figure E-10 FR keyboard

## E.11 Chinese (CH) Keyboard

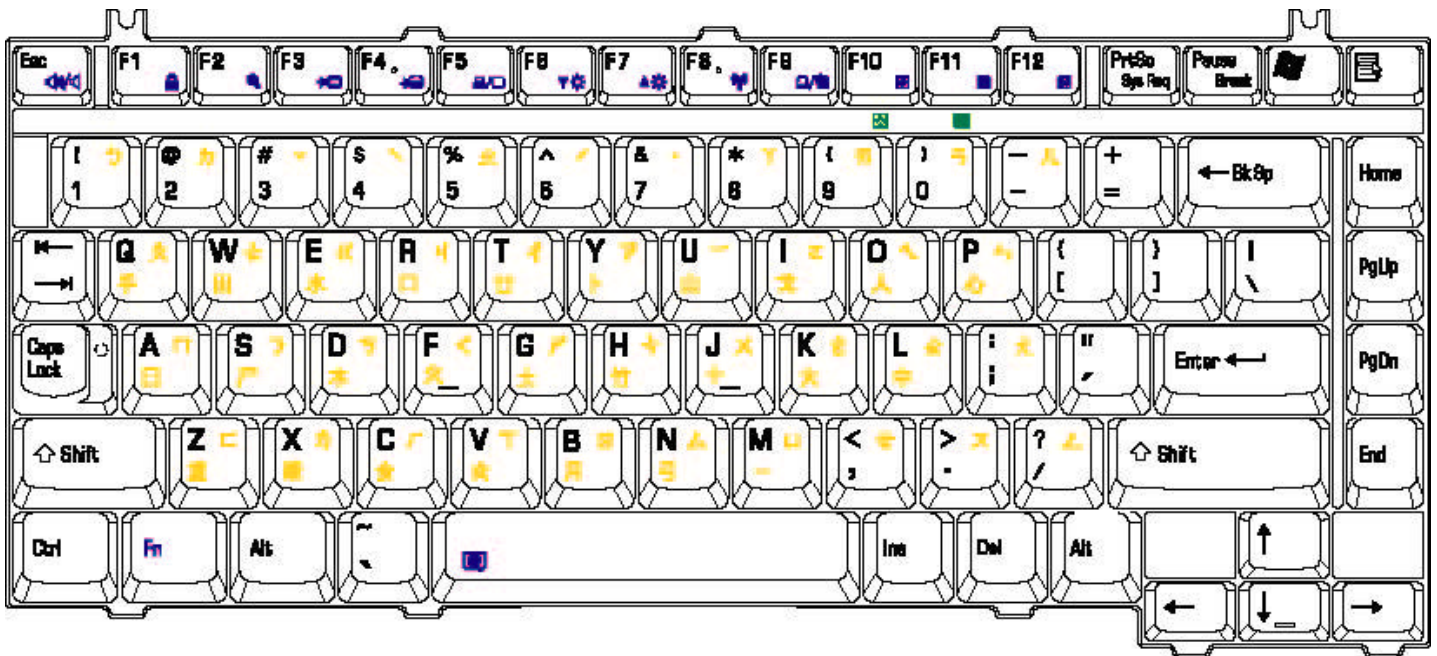


Figure E-11 CH keyboard

## E.12 Swiss-Darfon (SW) Keyboard

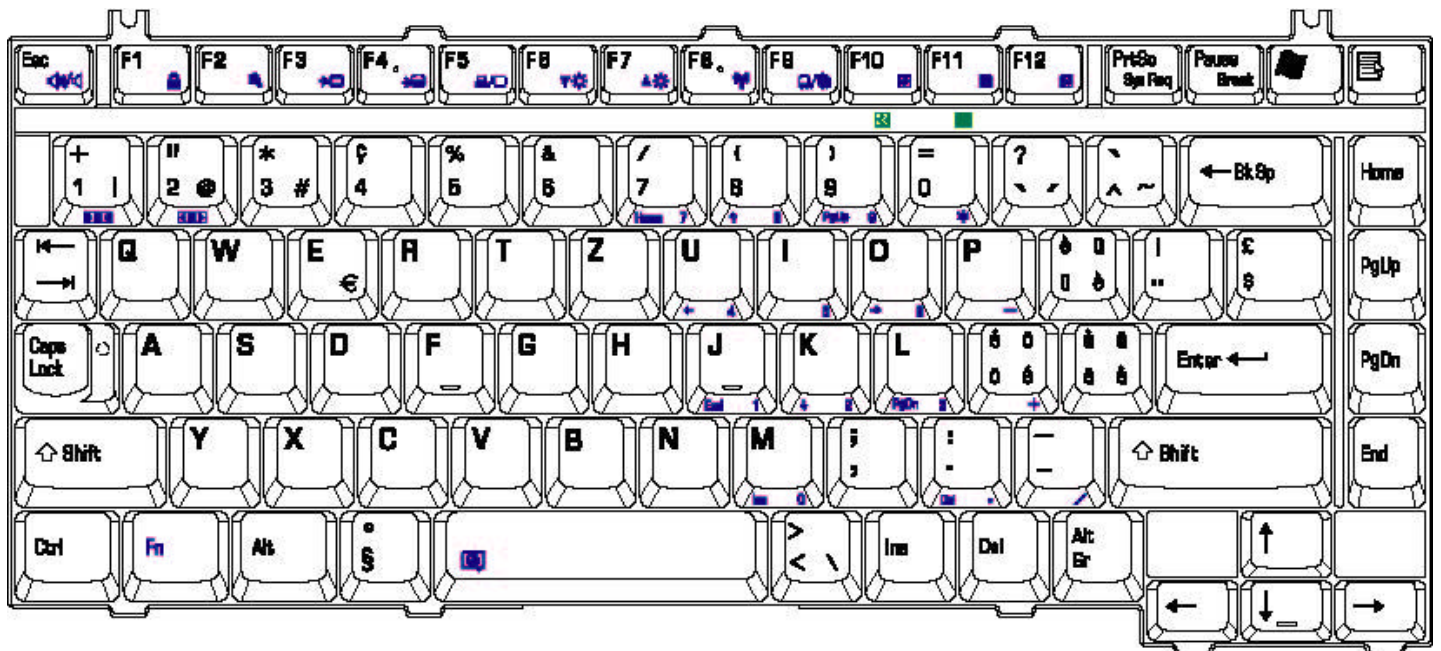


Figure E-12 Swiss-Darfon keyboard



### E.13 Italian (IT) Keyboard

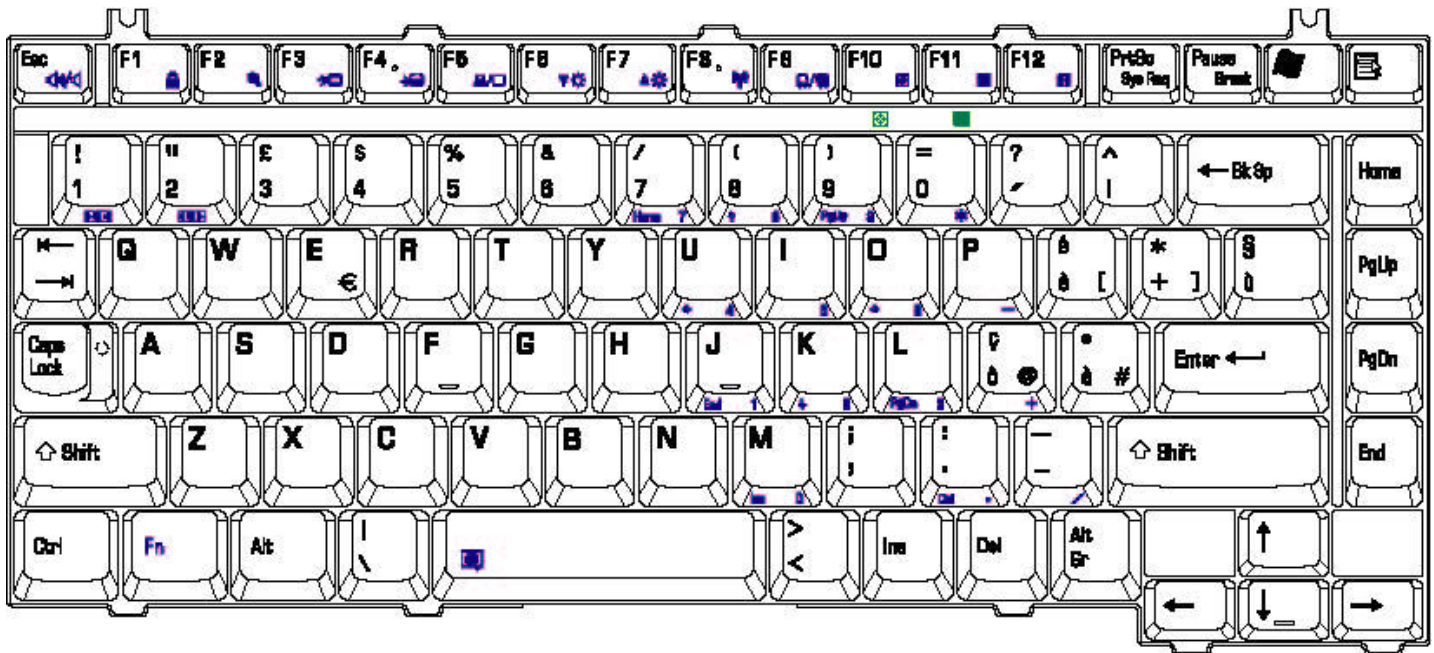


Figure E-13 IT keyboard

### E.14 Belgian (BE) Keyboard

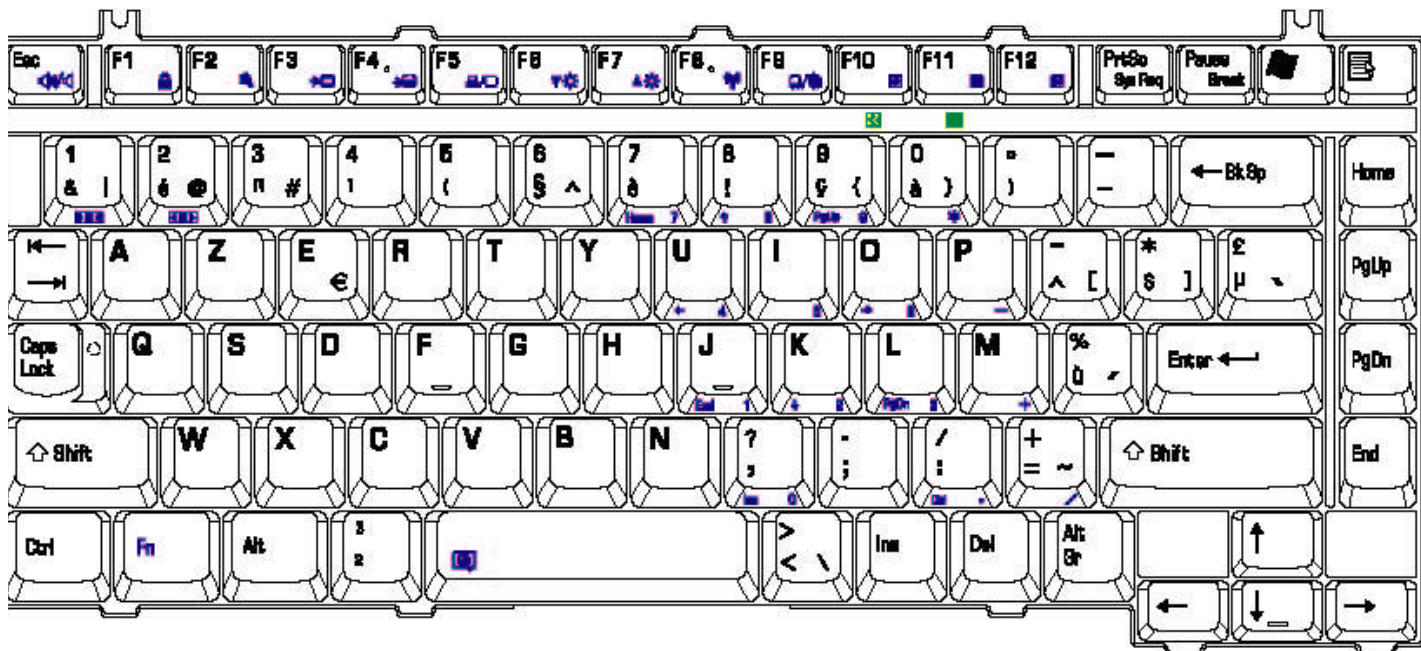


Figure E-14 BE keyboard



## E.15 Arabic (AR-E) Keyboard

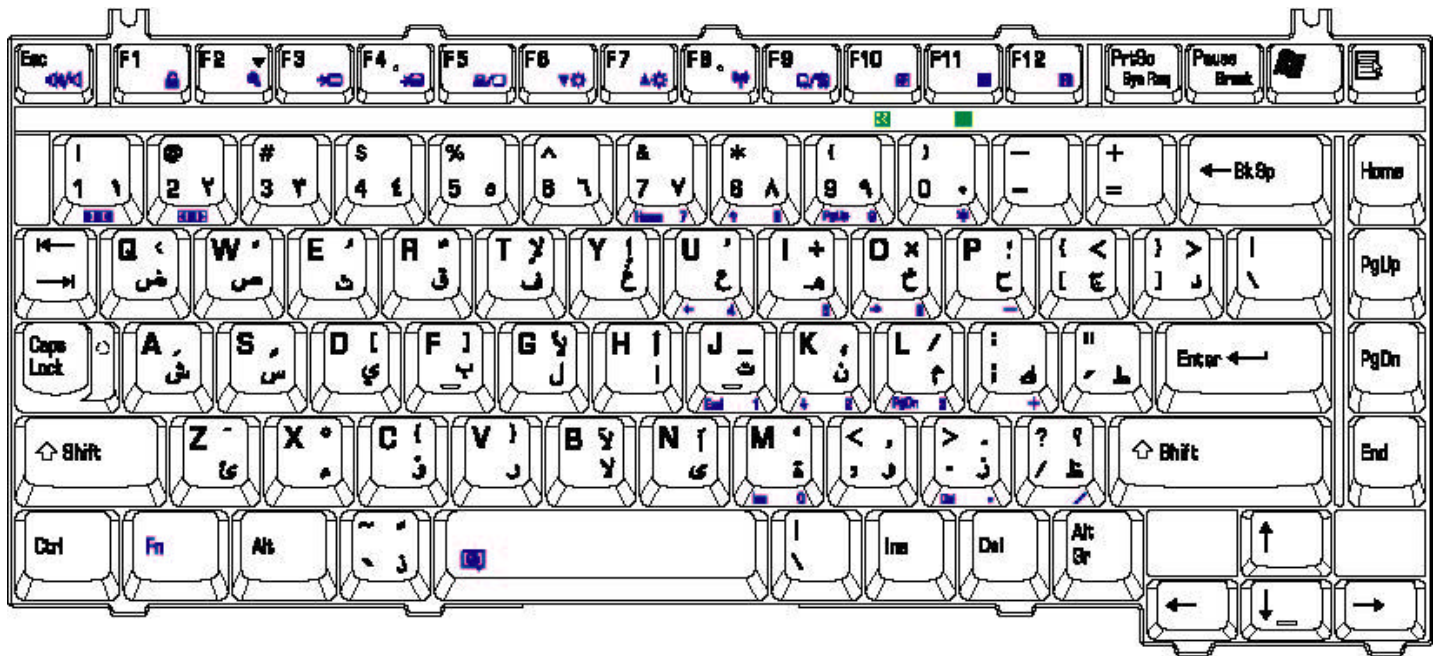


Figure E-15 AR-E keyboard

## E.16 Czech (CZ) Keyboard

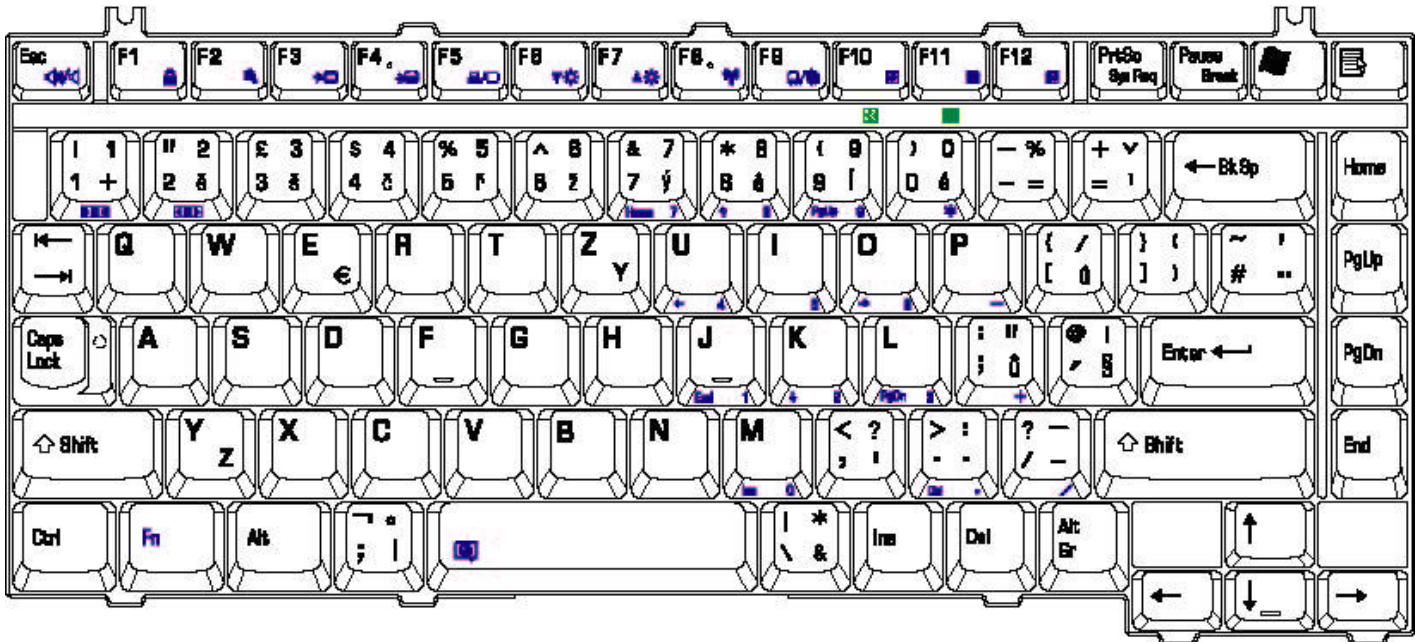


Figure E-16 CZ keyboard





## E.19 Hebrew (HB) Keyboard

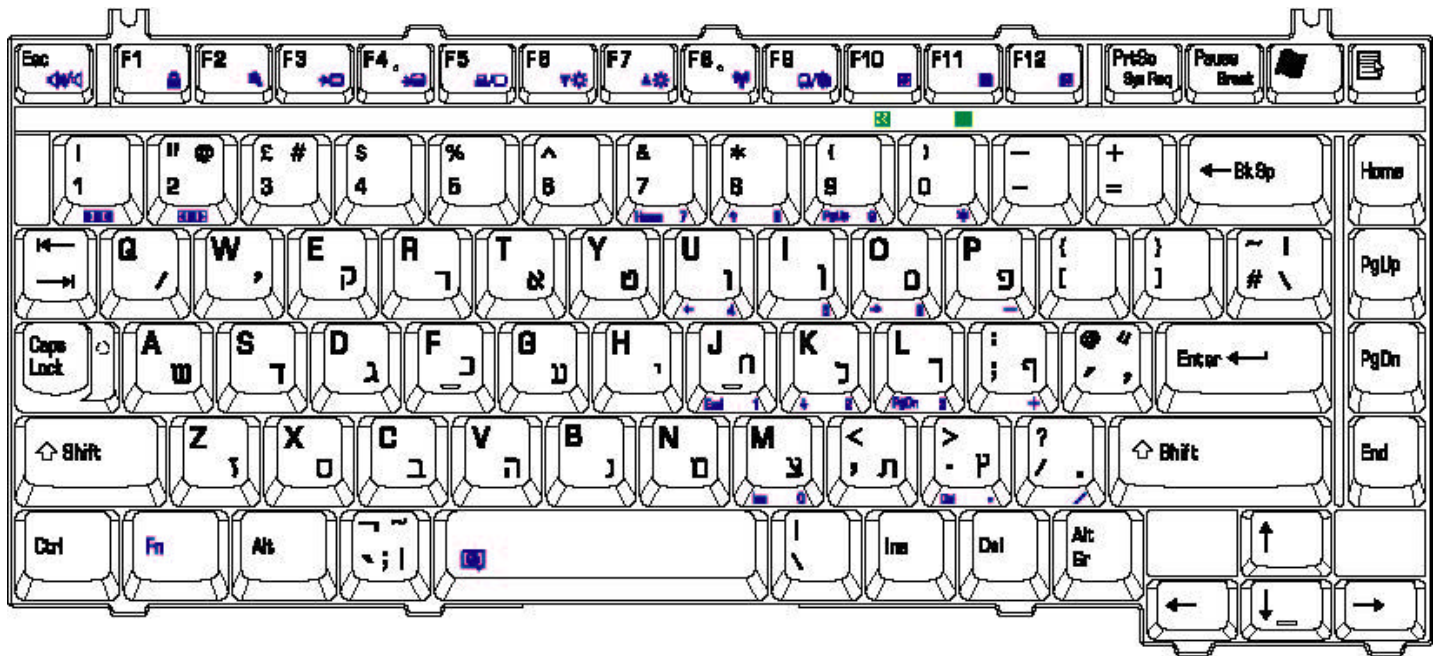


Figure E-19 HB keyboard

## E.20 Hungarian (HG) Keyboard

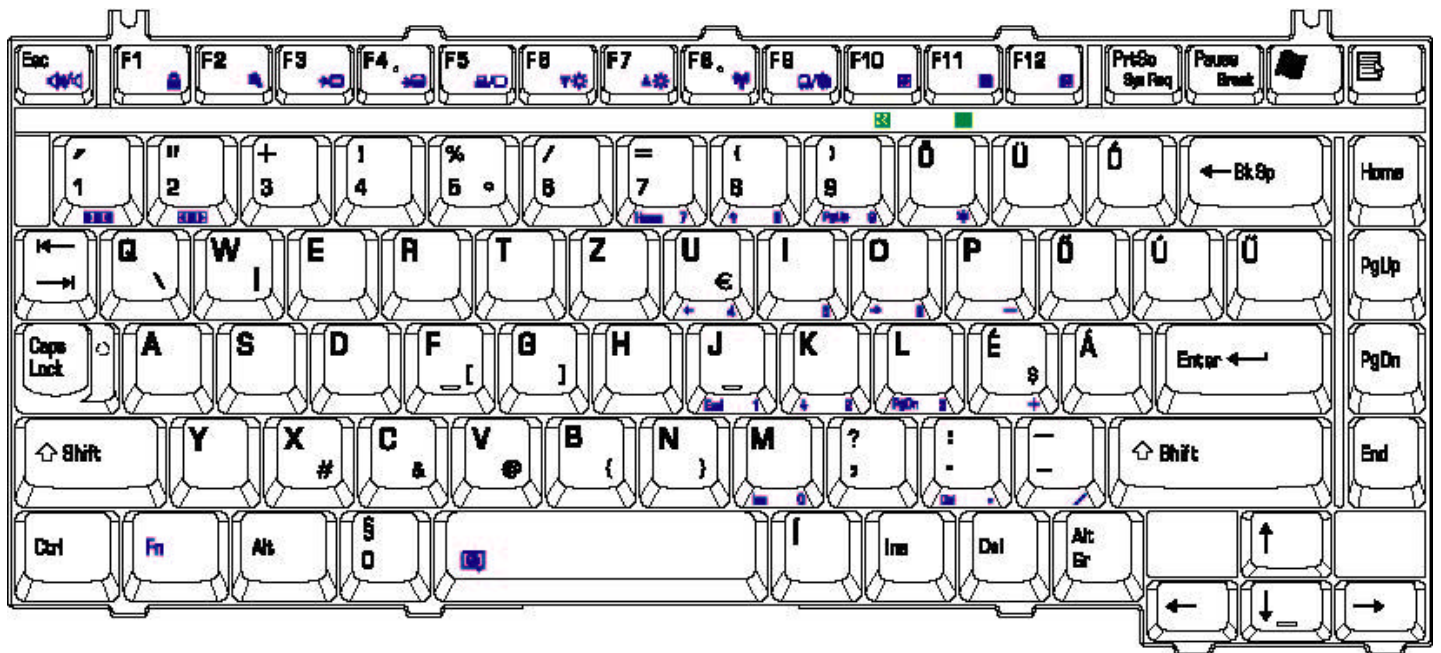


Figure E-20 HG keyboard

### E.21 Norwegian (NW) Keyboard

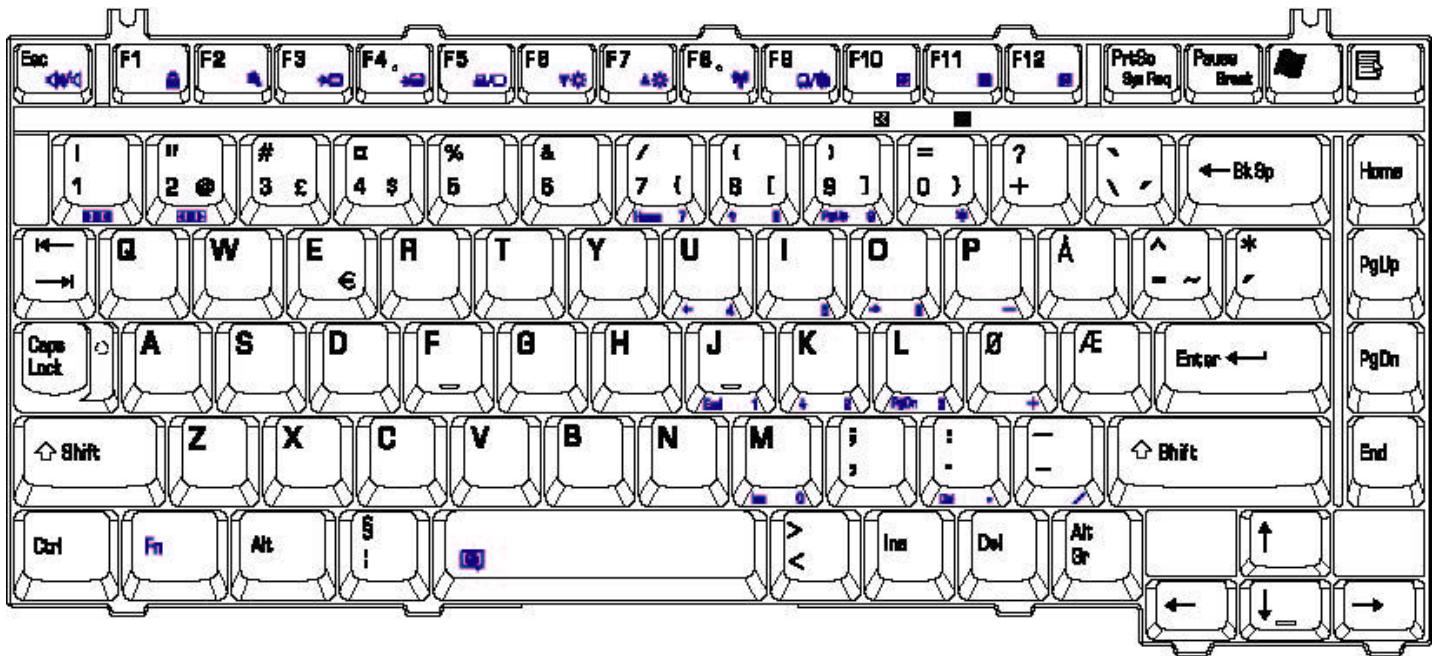


Figure E-21 NW keyboard

### E.22 Dutch (DU) Keyboard

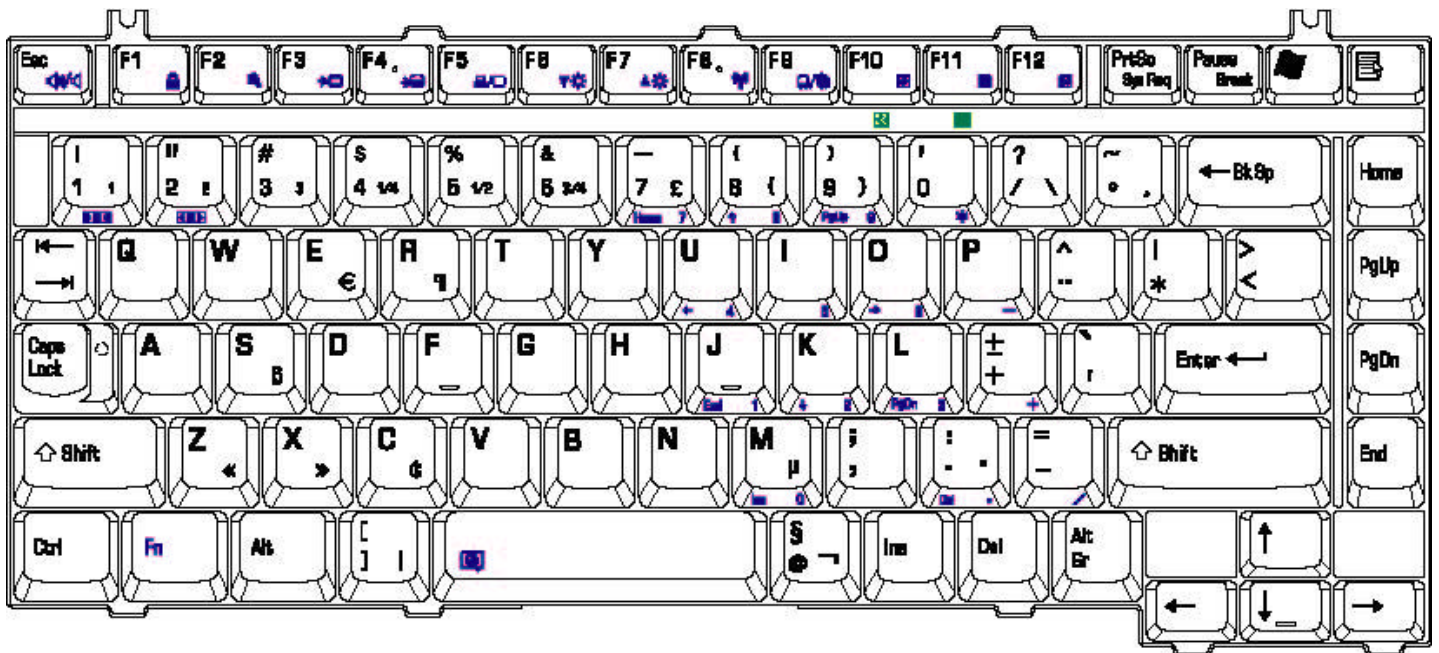


Figure E-22 DU keyboard



## E.23 Lithuanian (LI) Keyboard

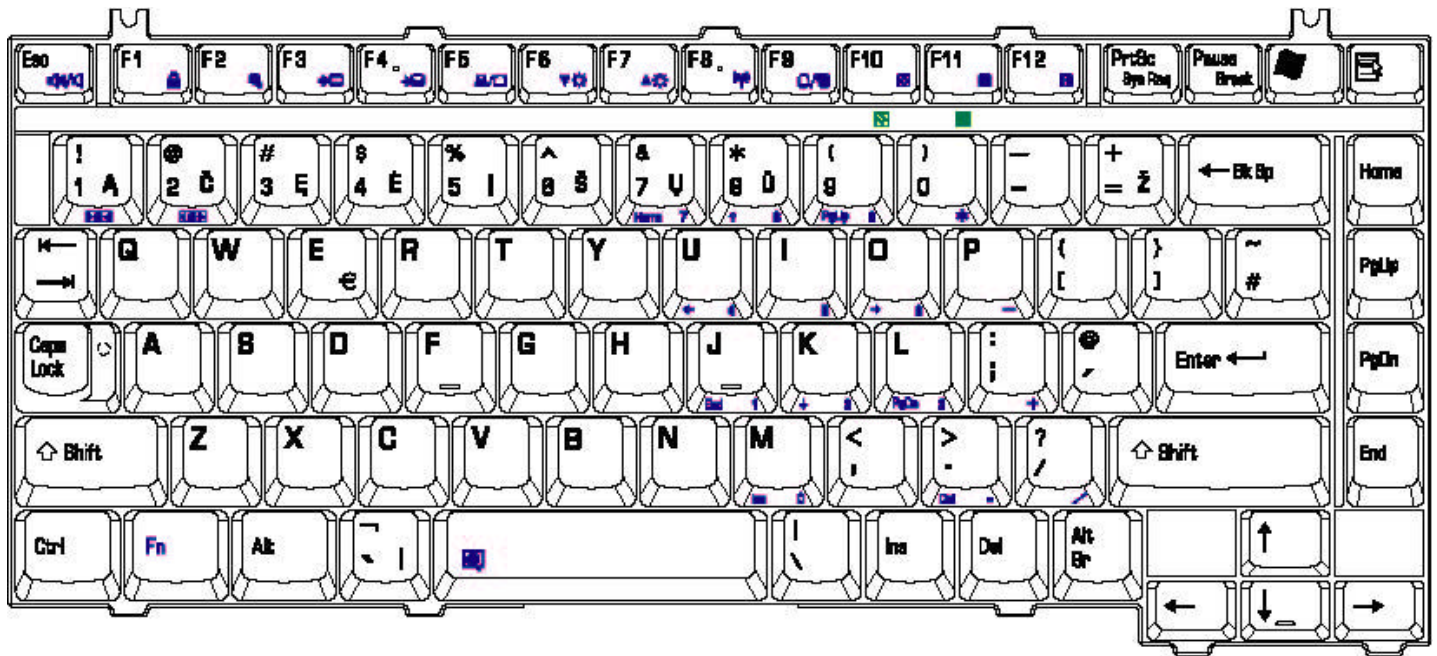


Figure E-23 LI keyboard

## E.24 Russian (RU) Keyboard

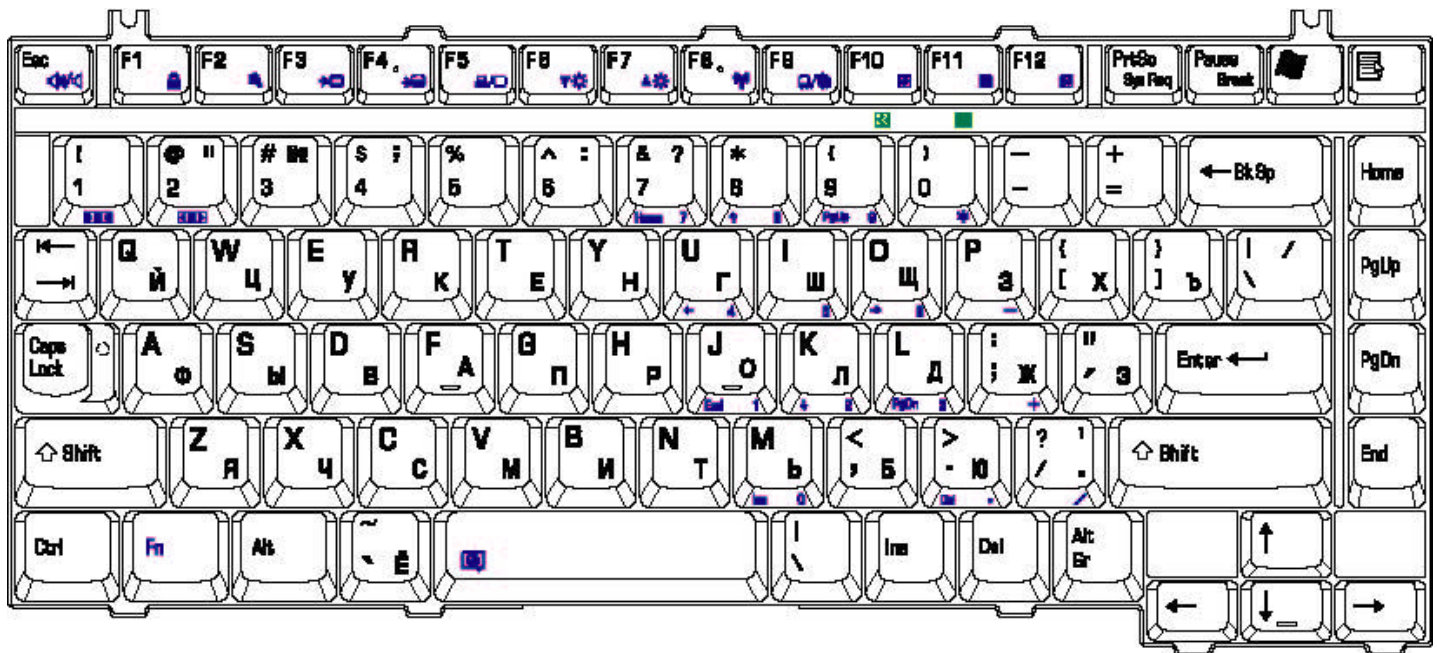


Figure E-24 RU keyboard

### E.25 Turkish (TR) Keyboard

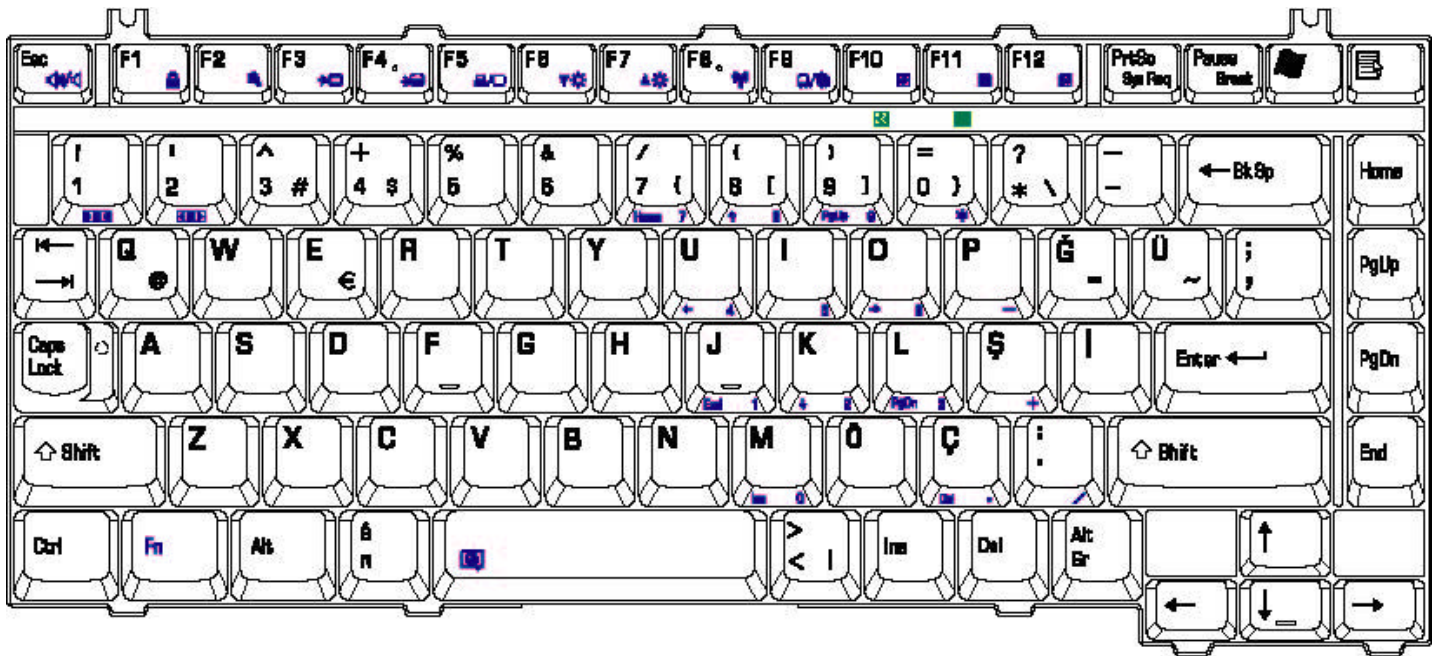


Figure E-25 TR keyboard

### E.26 Yugoslavian (YU) Keyboard

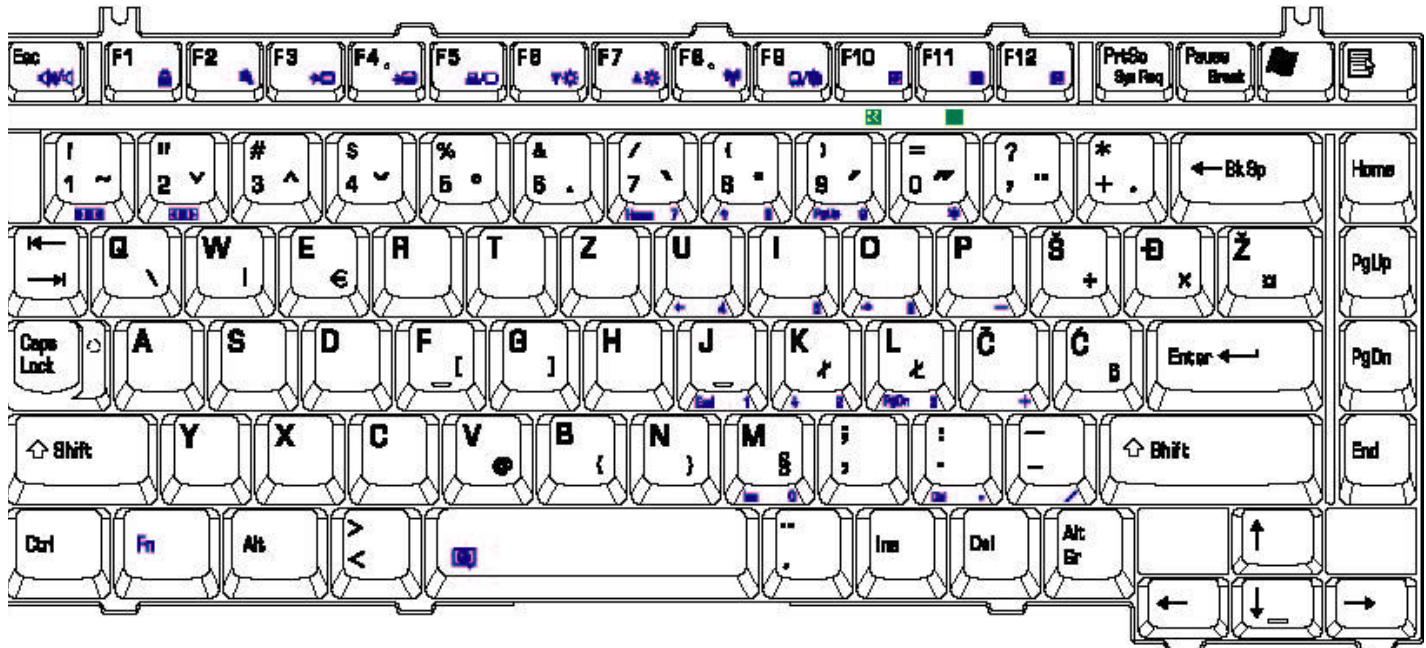


Figure E-26 YU keyboard



## E.27 Danish (DM) Keyboard

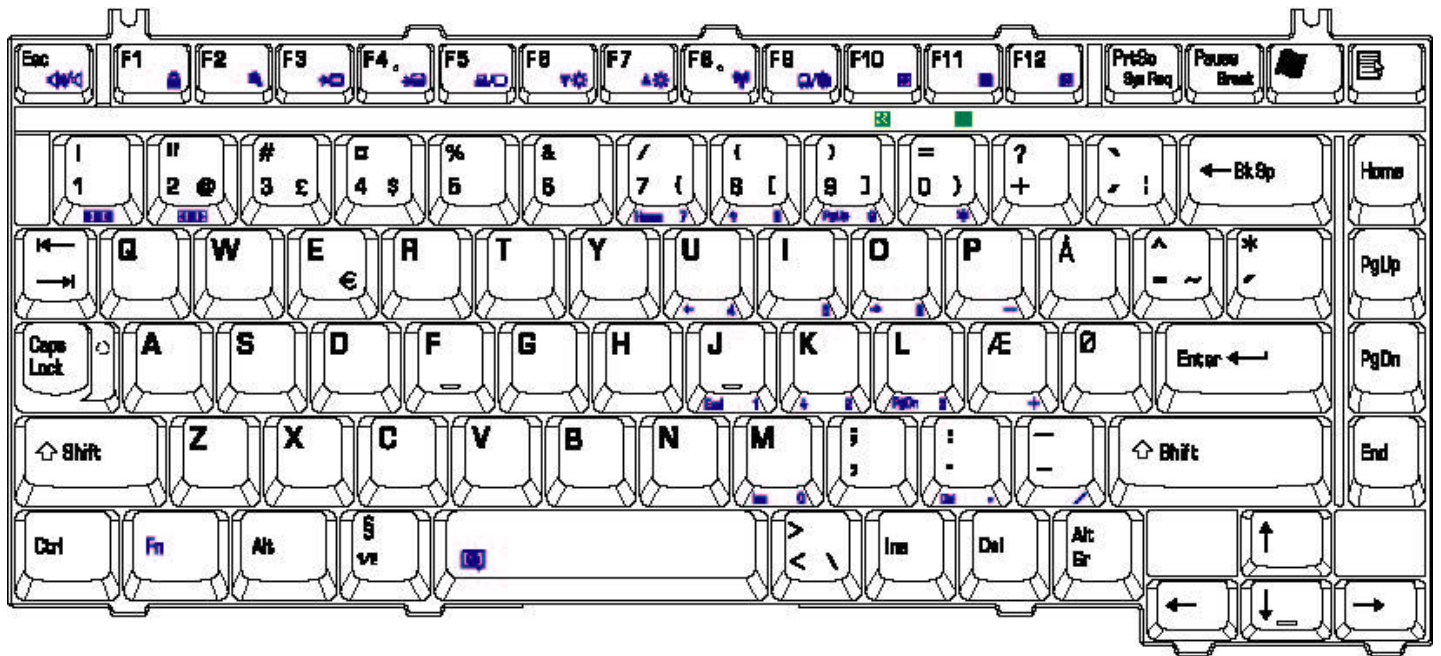


Figure E-27 DM keyboard

## E.28 Slovak (SV) Keyboard

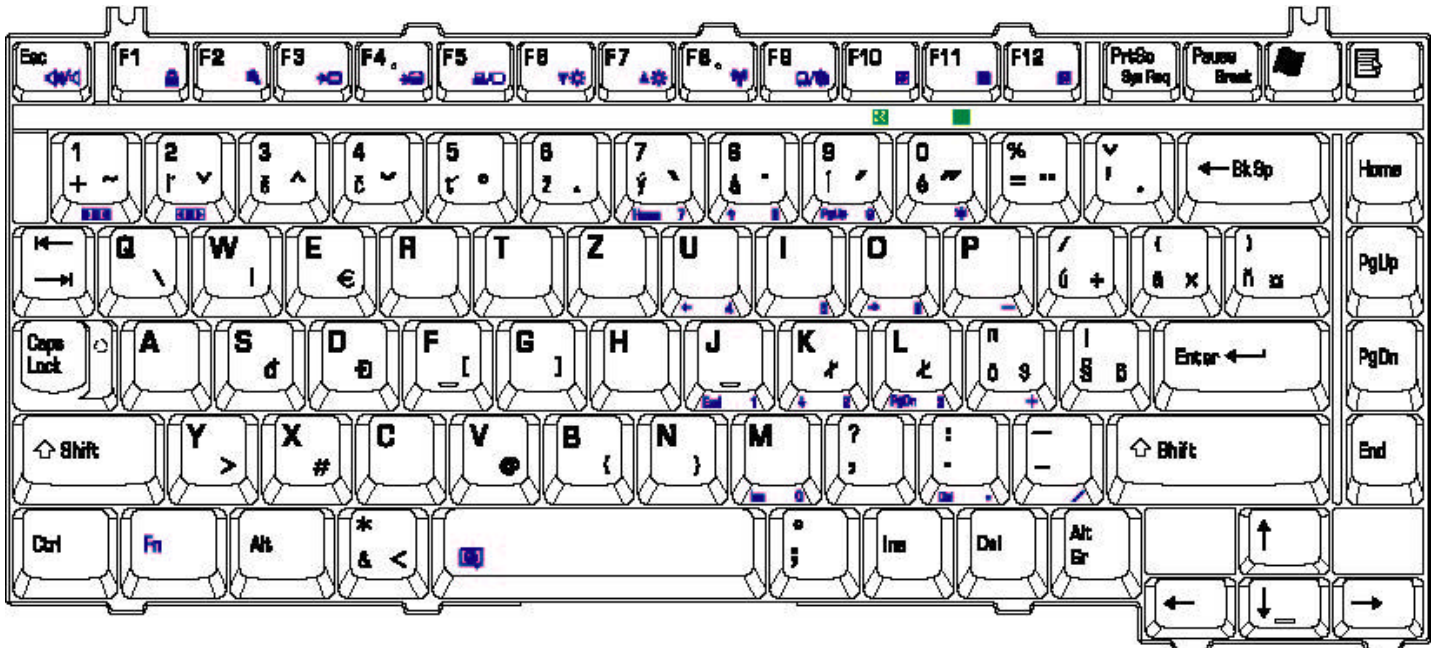


Figure E-28 SV keyboard





## Appendix F Series Screw Torque List

Table F-1 Series Screw Torque List

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
MMCK25030N0	M2.5*3 (silver)	1	THERMAL PLATE TO THERMAL MODULE	2.0~2.5kgfcm
MMCK25030N0	M2.5*3 (silver)	2	NB SUPPORT PLATE TO MB	2.0~2.5kgfcm
MMCK25030N0	M2.5*3 (silver)	1	TP TO TP BREAKET TO LOG UP	2.5~3.0kgfcm
MMCK25030N0	M2.5*3 (silver)	2	TP PCB TO LOG UP	2.5~3.0kgfcm
MAC9250030Z0	M2.5*3	1	BATT LATCH TO LATCH KNOB	1.8~2.2kgfcm
MMCK25030N0	M2.5*3 (silver)	3	LOG LOW-LOG UP (BATTERY)	2.5~3.0kgfcm
MMCK25030N0	M2.5*3 (silver)	1	KILL S/W PCB-LOG LOW	2.0~2.5kgfcm
MMCK25050Z0	M2.5*5	2	LCD BRK (L/R)-LCD COVER	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	LCD BEZEL-LCD BRK (L/R)-LCD COVER	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	MDC TO MB	2.0~2.5kgfcm
MMCK25050Z0	M2.5*5	1	SADDLE(R) TO UP SHIELD UP TO LOG UP	2.5~3.0kgfcm

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
MMCK25050Z0	M2.5*5	2	SADDLE (L) TO UP SHIELD LOW TO LOG UP	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	3	TP LED PCB TO LOG UP	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	HINGE TO SADDLE(R/L)	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	3	POWER PCB TO LOG UP	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	LOWER - SADDLE (BOTTOM SIDE)	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	LOWER - SHIELD - SADDLE - UPPER	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	LOWER - SADDLE - UPPER	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	1	LOWER - SPK - SADDLE - UPPER	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	LOG LOW-LOG UP	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	4	LOW -MB - UPSHD - UPPER	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	1	LOGLOW - ODD	2.5~3.0kgfcm
MMCK25050Z0	M2.5*5	2	SPEAKER (R/L)- LOG LOW	2.5~3.0kgfcm

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
MMCK25050Z0	M2.5*5	1	HDD DOOR-LOG LOW	2.5~3.0kgfcm
MACA0012304	M2.5*10	1	LOWER - SHIELD - MB - SADDLE- UPPER	2.5~3.0kgfcm
MACA0012304	M2.5*10	1	LOWER - SPK - SADDLE - UPPER	2.5~3.0kgfcm
MACA0012304	M2.5*10	1	LOWER - AUDIO/B - SADDLE - UPPER	2.5~3.0kgfcm
MACA0012304	M2.5*10	1	UPPER - THERMAL PLATE- THERMAL PLATE STAND OFF-MB- LOWSHD- LOWER	2.0~2.5kgfcm
MACA0012304	M2.5*10	1	LOG LOW-LOG UP	2.5~3.0kgfcm
MAAA0015320	2.0*3 ZBL (Black nickel)	6	LCD BRK (L/R) - LCD PANEL	1.2~1.5kgfcm
MAAA0015320	2.0*3 ZBL (Black nickel)	1	INVERTER - LCD COVER	1.5~2.0kgfcm
MAAA0015320	2.0*3 ZBL (Black nickel)	1	LCD CABLE TO COVER	1.5~2.0kgfcm
MAAA0015320	2.0*3 ZBL (Black nickel)	4	CPU PLATE TO MB STANDOFF	1.5~2.0kgfcm
MMCK20094Z0	M2.0*2_BLACK_ZN	2	KEYBOARD TO SHIELD UP TO	1.5~2.0kgfcm

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
			LOG UP	
ECAL202V000	M2.5*12	1	LOG UP-MINIPCI DOOR NORMA - MINIPCI STAND OFF-MB-LOG LOW SHIELD- LOG LOW	2.0~2.5kgfcm
ECAL202V000	M2.5*12	1	LOG UP-MDC DOOR-MINIPCI STAND OFF-MB- LOG LOW SHIELD-LOG LOW	2.0~2.5kgfcm
MAAA0004308	3.0*4-ZK	2	HDD DOOR - HDD	2.0~2.5kgfcm
AMAL202Y000	(M2*4.2+4 (Screw+Spring) IMS)	4	CPU THERMAL SINK TO CPU BRK STANDOFF	2.0~2.5kgfcm
MAFA94001N0	(D-SUB NUT WS 4.75*9.6 NI Zinc plated)	4	I/O PORT NUT - LOG_LOW_MB	2.0~2.5kgfcm
MAA20100302	(M2.0X12 silver)	2	PCMCIA SLOT TO MB	1.5~2.0kgfcm
MACK25080Z0	M2.5X8	2	LCD HINGE - HINGE SADDLE	4.0~4.5kgfcm
MACK25080Z0	M2.5X8	2	LOGIC LOWER - HINGE SADLE L/R (BACK SIDE)	2.5~3.0kgfcm
MMCK25400Z0	M2.5*4	2	HDD BREAKET- MB- LOG LOW	2.5~3.0kgfcm
MMCK25400Z0	M2.5*4	2	HDD BREAKET- LOG LOW	2.5~3.0kgfcm

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
ELAL203C000	M2.5*3.9 (Half thread)	1	RAM DOOR SCREW	2.5~3.0kgfcm
MMCK20050N0	M2*5	2	PCMCIA TO MB	1.5~2.0kgfcm
MMCK20050N0	M2*5	2	ODD CONN TO MB	1.5~2.0kgfcm
MMCK20050N0	M2*5	2	HDD CONN TO MB	1.5~2.0kgfcm
AMZKM000400	(M2*4,2+4 (Screw+Spring) IMS)	2	THERMAL PLATE TO MB	2.0~2.5kgfcm



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## Appendix G Reliability

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The following table shows MTBF (Mean Time Between Failures) for each component.

*Table G-1 MTBF*

<b>Component</b>	<b>Time (hours)</b>
LCD	50,000
Keyboard	40,000
HDD	300,000
Removable FDD	30,000
Optical (DVD/CD) drive	60,000
AC adaptor	60,000