

## *TOSHIBA NOTEBOOK*

# **Maintenance Manual (960-Q01)**

## **Satellite L10**

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# Chapter 1

## Hardware Overview

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## 1.1 Features

The Satellite L10 series are 2 spindle PCs running a Intel<sup>®</sup> Celeron<sup>®</sup>-M processor and Intel . Intel<sup>®</sup> Mobile Pentium<sup>®</sup>-M

The features are listed below.

Microprocessor

Microprocessor that is used will be different of the model.

If North Bridge is 852GM , it supports Celeron-M as follows

Intel <sup>®</sup> Celeron <sup>®</sup> -M	350 (1.30GHz)
	360 (1.40GHz)
	370 (1.50GHz)

L1 cache : 64KB (32KB + 32KB)

L2 cache : 1MB

If North Bridge is 855GME, it supports Pentium-M as follows

Intel<sup>®</sup> Mobile Pentium<sup>®</sup>-M

Pentium-M	1.60GHz (Processor Number ; 725)
	1.70GHz (Processor Number ; 735)
	1.80GHz (Processor Number ; 745)
	2.00GHz (Processor Number ; 755)
	2.10GHz (Processor Number ; 765)

L1 cache : 64KB (32KB + 32KB)

L2 cache : 2MB

Memory

If North Bridge is 852GM then

Two DDR266 SO-DIMM slots. Memory modules can be installed to provide a maximum of 1GB. Memory modules are available in 256MB and 512MB sizes.

If North Bridge is 855GME then

Two DDR333 SO-DIMM slots. Memory modules can be installed to provide a maximum of 2GB. Memory modules are available in 256MB 512MB and 1GB sizes.

VRAM

Shared with System RAM.

HDD

Double (or single) 40GB, 60GB and 80GB internal drives. 2.5 inch x 9.5mm height.

USB FDD (Option)

USB FDD supports 720KB and 1.44MB.



Display

LCD

Built-in 15.0-inch, XGA (1024 x 768 dots), 262,144 colors, amorphous silicon TFT color display.

CRT

Supported via a RGB connector.

TV-out

S-VIDEO OUT port supported.

Keyboard

An-easy-to-use 84(US)/85(Euro)-key keyboard provides a numeric keypad overlay for fast numeric data entry . The keyboard also includes two keys that have special functions in Microsoft® Windows® XP. It supports software that uses a 101- or 102-key enhanced keyboard.

PC card slot

The PC card slot (PCMCIA) accommodates one 5mm Type II card. The slot support 16-bit PC cards and Card Bus PC cards. CardBus supports 32-bit PC cards.

### Optical devices

A DVD-ROM & CD-R/RW drive or DVD Super Multi drive is equipped.

### Battery

The RTC battery is equipped inside the computer.

The main battery is a detachable lithium ion battery (4,300mAh:Li-Ion, 8cell).

### USB (Universal Serial Bus)

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

### Sound system

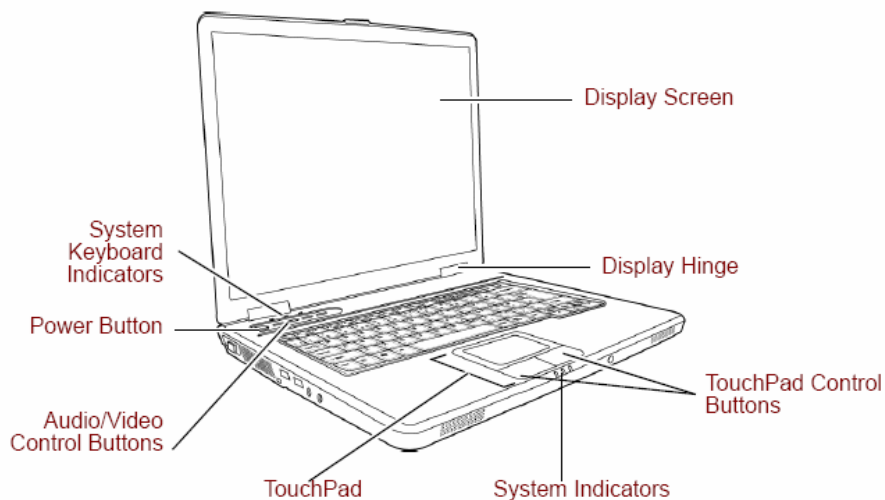
An internal stereo speaker, external monaural microphone connector, stereo headphone connector is also equipped.

### Wireless LAN (Mini PCI slot) (BTO)

The wireless LAN is equipped on the mini PCI slot.

### LAN/MODEM

Connectors for LAN and Modem are separately mounted.



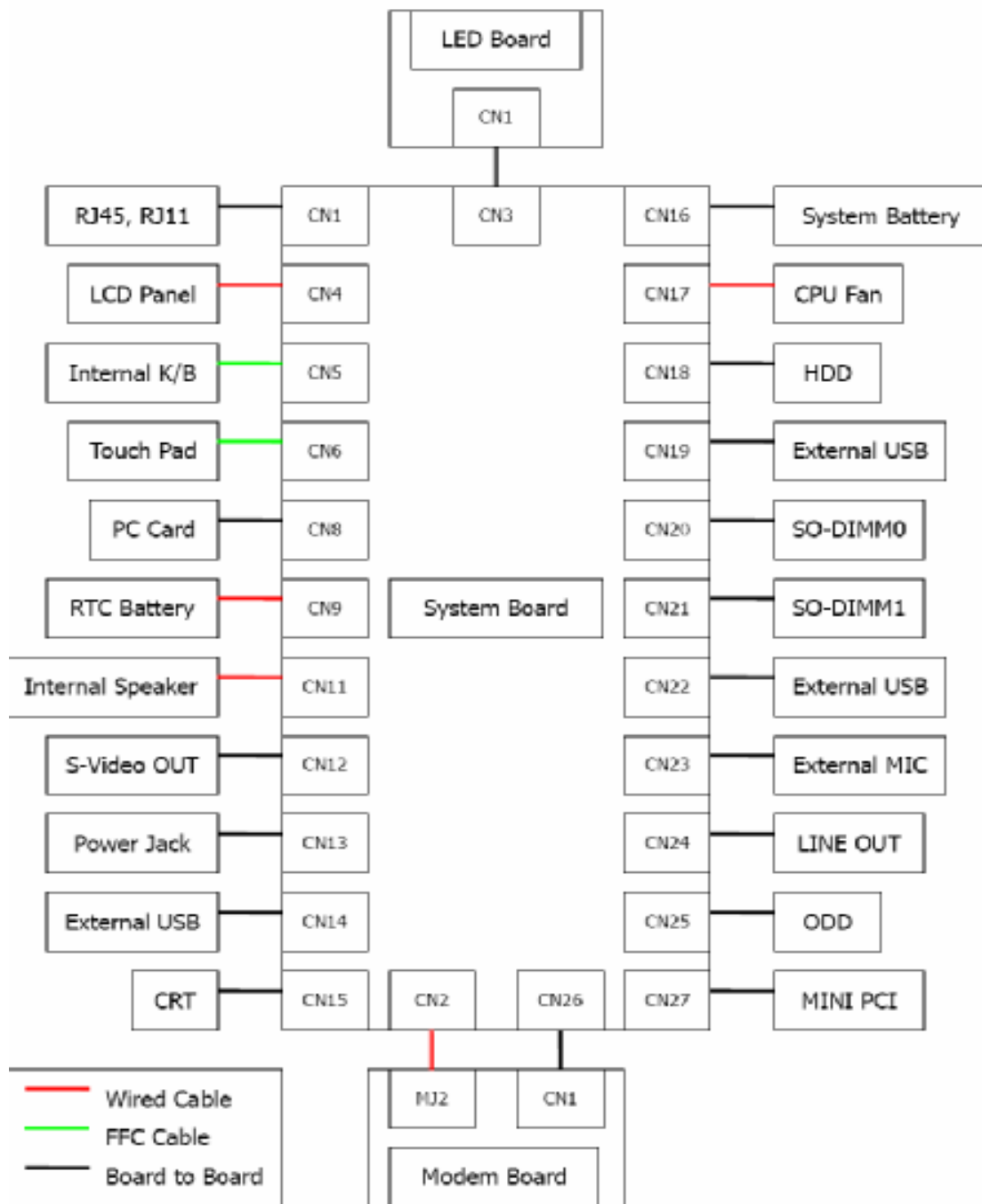
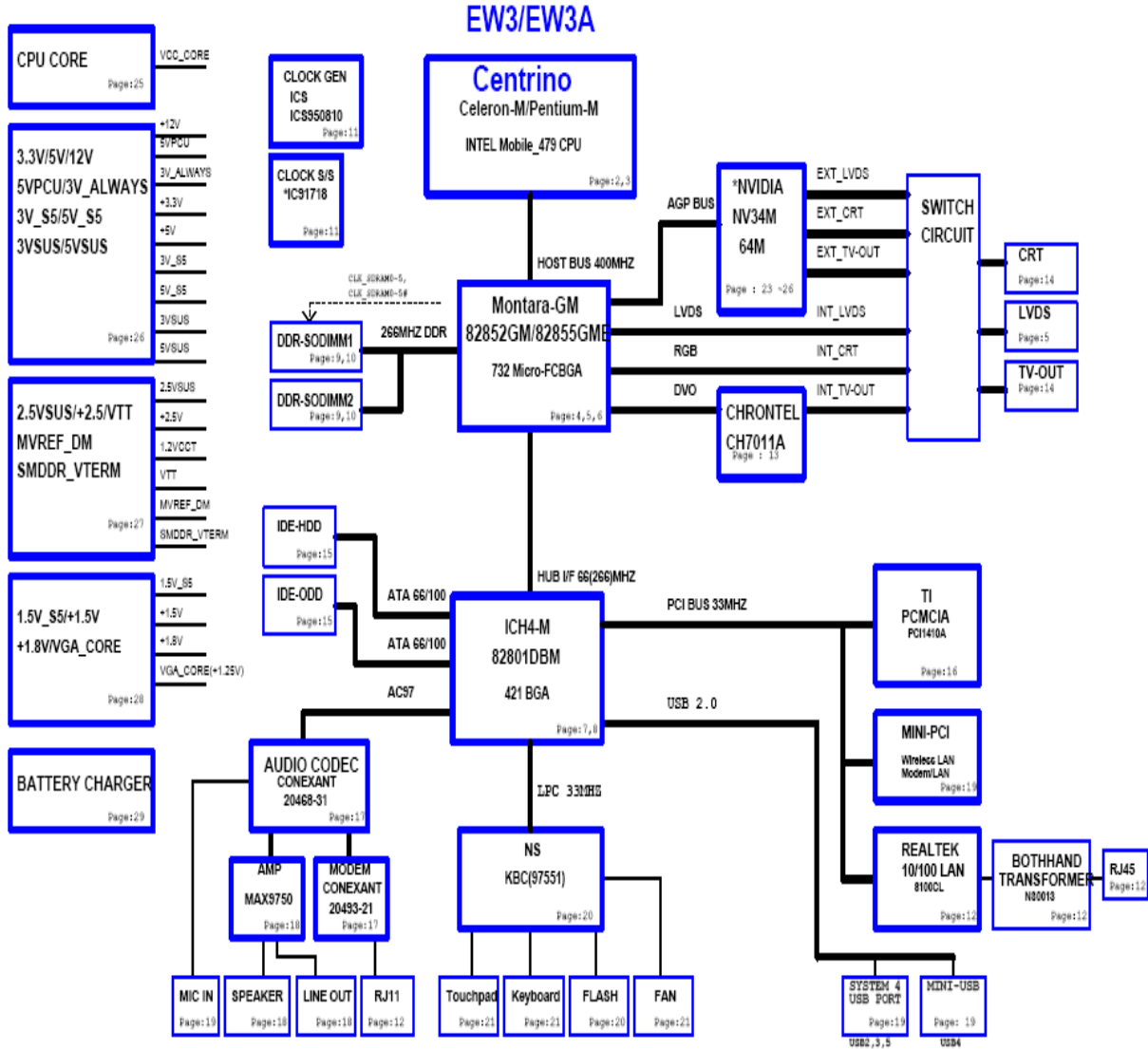


Figure 1-1 Front of the computer and the system units configuration

## 1.2 System Block Diagram

Figure 1-2 shows the system block diagram.



*Figure 1-2 System block diagram for 852GM/855GME Platform*

The PC contains the following components.

#### CPU

If the north bridge is 852GM , it supports Celeron-M CPU as follows

Intel® Celeron®-M 350 (1.30GHz)  
360 (1.40GHz)  
370 (1.50GHz)  
L1 cache : 64KB (32KB + 32KB)  
L2 cache : 1MB  
FSB : 400MHz Core voltage : 1.26V

If the North Bridge is 855GME , It supports Pentium-M CPU as follows

Intel® Mobile Pentium®-M  
Pentium-M 1.60GHz (Processor Number ; 725)  
1.70GHz (Processor Number ; 735)  
1.80GHz (Processor Number ; 745)  
2.00GHz (Processor Number ; 755)  
2.10GHz (Processor Number ; 765)  
  
L1 cache : 64KB (32KB + 32KB)  
L2 cache : 2MB  
  
FSB : 400MHz Core voltage : 1.340~0.748V

#### Memory

If North Bridge is 852GM

Two memory slots capable of accepting DDR-SDRAM 256MB, or 512MB memory modules for a maximum of 1GB.

- 200-pin SO-DIMM
- 2.5V operation
- PC2100 support

If North Bridge is 855GME

Two memory slots capable of accepting DDR-SDRAM 256MB, 512MB or 1GB memory modules for a maximum of 2GB.

- 200-pin SO-DIMM
- 2.5V operation
- PC2100 support

BIOS ROM (Flash memory)

- 4Mbit (512K×8-bit chip)

Chipset

This gate array has the following elements and functions.

- North Bridge (Intel 852GM (GMCH, B-step))
  - Celeron-M processor System Bus support
  - DRAM Controller : DDR266/DDR200 support
  - Hub Link Interface
  - 732-ball 37.5mmx37.5mm Mirco FC-BGA Package
- Or North Bridge (Intel 855GME (GMCH, B-step))
  - Pentium-M processor System Bus support
  - DRAM Controller : DDR333 support
  - Hub Link Interface
  - 732-ball 37.5mmx37.5mm Mirco FC-BGA Package
- South Bridge (Intel 82801DBM (ICH4-M))
  - PCI slot
  - IDE controller
  - DMA controller
  - USB host interface
  - USB 2.0 host controller
  - UHCI host controller
  - Interrupt controller
  - SM Bus interface
  - ACPI Power management
  - Firmware Hub interface
  - Low Pin count (LPC) interface
  - Real time clock
  - AC'97 Rev. 2.3 interface
  - Alert ON LAN (AOL)
  - 421-pin 31mmx31mm BGA Package

PC card controller (PCI1410, Texas Instrument-made)

- PCI Interface (PCI Rev. 2.3)
- PC Card Controller

VGA controller

- Intel VGA
  - VRAM 16MB/32MB/64MB
  - LVDS

Other main system chips

- Clock Generator (ICS-made ICS950810 x 1)
- EC/KBC (NS97551 x 1)
- AC97-CODEC (Conexant 20468-31 x1)
- Audio AMP (Maxim 9750x1)
- TV Encoder (Chrontel CH7011A)
- 

Mini PCI

Wireless LAN card (BTO)

2.4GHz DSSS/OFDM LAN card is equipped. Conformity with IEEE 802.11b/g .  
Transfer speed is maximum of 54Mbit/sec. Supports 128bit WEP.

LAN (Realtek RT8100CL x 1)

Controls LAN.

Supports 100Base-TX and 10Base-T.

MODEM (Conexant x 1)

Supported by on board Modem + DAA daughter card.

Data and FAX transmission is available.

Supports ITU-TV.90.

The transfer speed of data receiving is 56kbps, of data sending is 33.6kbps and of FAX is 14.4kbps. Actual speed depends on the quality of the line used.

Connected to telephone line through RJ11 MODEM jack.



### 1.3 2.5-inch Hard Disk Drive

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

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

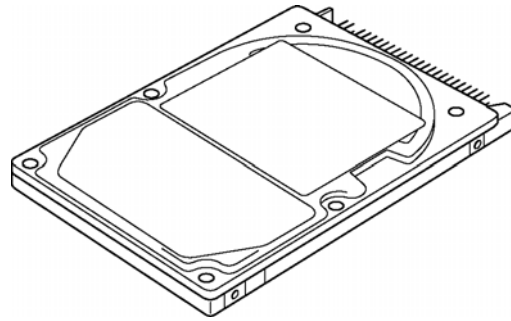


Figure 1-3 2.5-inch HDD

Table 1-1 2.5-inch HDD dimensions

Parameter		Standard value	
		TOSHIBA MK4025GAS	TOSHIBA MK6025GAS
Outline dimensions	Width (mm)	69.85	
	Height (mm)	9.5	
	Depth (mm)	100.0	
	Weight (g)	94 (typ.) / 95 (max.)	94 (typ.) / 99 (max.)

Table 1-2 2.5-inch HDD Specifications

Specification		
Parameter	TOSHIBA MK4025GAS	TOSHIBA MK6025GAS
Storage size (formatted)	40GB	60GB
Speed (RPM)	4,200	
Data transfer speed (Mbits/s)	175.0 ~ 341.7	201.6 ~ 307.5
Interface transfer rate (MB/s)	100 (Ultra DMA Mode)	
Storage density (Kbpi)	735 (max.)	658 (max.)
Track density (Ktpi)	88.1	88.1
Average random seek time (read) (ms)	12	
Average random seek time (write) (ms)	-	
Power-on-to-ready (sec)	4 (typ.) / 10 (max.)	

## 1.4 Optical Drive

### 1.4.1 DVD-ROM & CD-R/RW Drive

The DVD-ROM & CD-R/RW drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM and CD-R/RW. It is a high-performance drive that reads DVD at maximum 8-speed and CD at maximum 24-speed.

The DVD-ROM & CD-R/RW drive is shown in Figure 1-4. The dimensions and specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-3, Table 1-4.

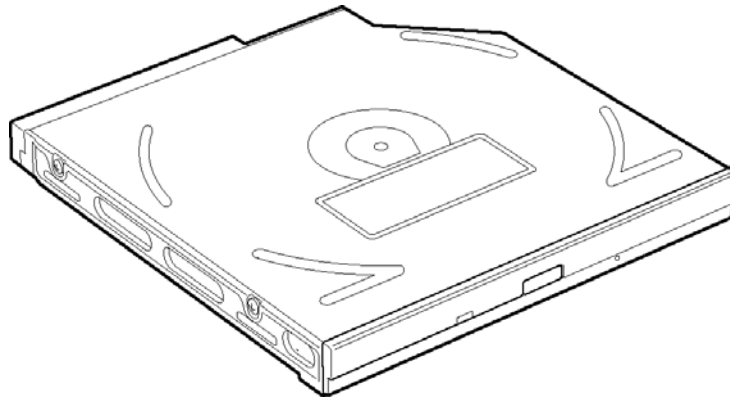


Figure 1-4 DVD-ROM & CD-R/RW drive

Table 1-3 DVD-ROM & CD-R/RW drive outline dimensions

Parameter		Standard value	
Outline dimensions	Maker	<b>MATSUSHITA (UJDA760TT-A)</b>	<b>TOSHIBA (TS-L462A)</b>
	Width (mm)	128	
	Height (mm)	12.7 (excluding projections)	
	Depth (mm)	129	127
	Mass (g)	190±10	180

Table 1-4 DVD-ROM & CD-R/RW drive specifications (1/2)

Parameter		Drive Specification
		MATSUSHITA (UJDA760TT-A)
Data transfer speed	Read (KB/s)	DVD-ROM MAX 8X CAV (MAX 10800 KB/s) DVD-R MAX 4X CAV (MAX 5400 KB/s) CD-ROM MAX 24X CAV (MAX 3600 KB/s)
	Write	CD-R 4X,8X(CLV), 16X(PCAV), MAX24x(CAV) CD-RW 4X (CLV) High Speed CD-RW 4X,8X,10X (CLV) Ultra Speed CD-RW 10X(CLV), Max24X(CAV)
	ATAPI interface (MB/s)	PIO Mode4 (MAX 16.6 MB/s) DMA Multiword Mode2 (MAX 16.6 MB/s) Ultra DMA Mode2 (MAX 33.3 MB/s)
Access time (ms) (Random)	CD-ROM	150ms
	DVD-ROM	180ms
Buffer memory		2MB
Supported disk format	CD	CD-DA,CD-ROM,CD-ROM XA CD-R,CD-RW Photo CD CD-Extra(CD+),CD-text
	DVD	DVD-ROM,DVD-Video DVD-RAM(2.6GB/4.7GB) DVD-R (DVD-R Multi Boarder supported) DVD-RW(Ver.1.1) DVD+R, DVD+RW (Support Multi Session)

Table 1-4 DVD-ROM & CD-R/RW drive specifications (2/2)

Parameter		Drive Specification
		TOSHIBA (TS-L462A)
Data transfer speed	Read (KB/s)	CD-ROM,CD-RW MAX 24X CAV (MAX 3,600KB/s) DVD-ROM MAX 8X CAV (MAX 10800KB/s) DVD±R,DVD±RW MAX 6X (MAX 8100 KB/s) DVD-RAM MAX 4X CAV (MAX 5400KB/s)
	Write	CD-R MAX 24X (P-CAV) CD-RW 4X (CLV) High Speed CD-RW 4X,10X (CLV) Ultra Speed CD-RW 24X (P-CAV)
	ATAPI interface (MB/s)	PIO Mode4 (MAX 16.7 MB/s) DMA Multiword Mode2 (MAX 16.7 MB/s) Ultra DMA Mode2 (MAX 33.3 MB/s)
Access time (ms) (Random)	CD-ROM	130ms (typ.) / 160ms (max.)
	DVD-ROM	130ms (typ.) / 160ms (max.)
Buffer memory		2MB
Supported disk format	CD	CD-ROM Mode1&2S CD-ROM XA Modo2 (Form1&2) CD-DA, CD-I, CD-Extra/CD-Plus, Video-CD
	DVD	DVD-ROM DVD Video DVD-R (General, Authoring) DVD-RW (Single/Multi-boarder, Packet) DVD-RAM DVD+R/RW

## 1.4.2 DVD Super Multi Drive

The DVD Super Multi drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD/DVD-ROM, CD-R/RW, DVD±R/±RW and DVD-RAM. It is a high-performance drive that reads DVD-ROM at maximum 8-speed and CD at maximum 24-speed. Write speed of DVD±R/±RW and DVD-RAM is different depending on the drive.

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



Figure 1-5 DVD Super Multi drive

Table 1-5 DVD Super Multi drive outline dimensions

Parameter		Standard value
Outline dimensions	Maker	<b>MATSUSHITA (UJ-830BTQ-A)</b>
	Width (mm)	128
	Height (mm)	12.7
	Depth (mm)	129.0
	Mass (g)	210±10

Table 1-6 DVD Super Multi drive specifications (1/1)

Parameter		Drive Specification
		MATSUSHITA (UJ-830BTQ-A)
Data transfer speed	Read(KB/s)	DVD-ROM MAX 8X CAV CD-ROM MAX 24X CAV
	Write	CD-R MAX 24X (Zone CLV) CD-RW 4X (CLV) High Speed CD-RW 10X (CLV) Ultra Speed CD-RW 10X (CLV) DVD-R MAX 8X (Zone CLV) DVD-RW MAX 4X (Zone CLV) DVD+R MAX 8X (Zone CLV) DVD+RW MAX 4X (Zone CLV) DVD-RAM 3X (ZCLV) (4.7GB)
	ATAPI interface (MB/s)	PIO Mode4 (MAX 16.6 MB/s) DMA Multiword Mode2 (MAX 16.6 MB/s) Ultra DMA Mode2 (MAX 33.3 MB/s)
Access time (ms)	CD-ROM	150 (Random)
	DVD-ROM	180 (Random)
Buffer memory		2MB
Supported disk format	CD	CD-DA, CD-ROM, Video CD CD-ROM XA, Photo CD CD-Extra(CD+),CD-text
	DVD	DVD-ROM DVD-R, DVD-RW (Ver1.1) DVD+R/+RW, DVD Video, DVD-RAM (2.6GB(read only)/4.7GB)

## **1.5 Keyboard**

A keyboard which consists of 84(US)/85(Euro) keys is mounted on the system unit. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure 1-6 is a view of the keyboard.



*Figure 1-6 Keyboard*

See Appendix E for details of the keyboard layout.



## 1.6 TFT Color Display

The TFT color display is 15.0 inch and consists of LCD module and FL inverter board.

### 1.6.1 LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display a maximum of 262,144 colors with 1,024 x 768 resolution.

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

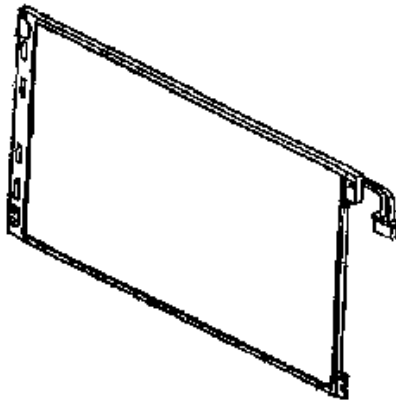


Figure 1-7 LCD module

Table 1-7 LCD module specifications

Item	Specifications		
	LG-Philips LP150X08	CPT CLAA150XH01	AU B150XG01V.2
Number of Dots	1,024(W) × 768(H)		
Dot spacing (mm)	0.297(H) × 0.297(V)		

### 1.6.2 FL Inverter Board

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

Table 1-10 lists the FL inverter board specifications.

Table 1-8 FL inverter board specifications

Item		Specifications		
		PI FL9030	DELTA DAC-08N009	SUMIDA IV002
Input	Voltage (V)	8 ~ 20	8 ~ 20	7.5 ~ 21
	Power (W)	5		
Output	Voltage (Vrms)	1500	1400 ~ 1800	1500 ~ 1900
	Current (f=55KHz) (mArms)	6		

## **1.7 Power Supply**

The power supply supplies 23 different voltages to the system board.

The power supply microcontroller has the following functions.

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

Table 1-11 lists the power supply output specifications.

Table 1-9 Power supply output rating

Name	Power supply (Yes/No)				Object
	Voltage [V]	Power OFF Suspend mode	Power OFF Boot mode	No Battery	
VCC_CORE	1.484 - 0.748	No	No	No	CPU
VTT	1.05	No	No	No	CPU, GMCH, ICH4-M
+1.8V	1.8	No	No	No	CPU
1.2VCCT	1.35	No	No	No	GMCH
SMDDR_VTERM	1.25	Yes	No	No	DDR-SDRAM Termination
+1.5V	1.5	No	No	No	GMCH, ICH4-M, TV Encoder
1.5V_S5	1.5	Yes	Yes	No	ICH4-M
2.5VSUS	2.5	Yes	No	No	GMCH, DDR-SDRAM
BT_POWER	3.3	No	No	No	Bluetooth
USBPWR2	5	Yes	No	No	USB
USBPWR3	5	Yes	No	No	USB
USBPWR5	5	Yes	No	No	USB
+3VA	3.3	No	No	No	Audio Codec
AVDD	5	No	No	No	MAX9755
+3V	3.3	No	No	No	Clock Generator, Thermal Sensor, Mini-PCI, SDRAM(SPD), GMCH, ICH4-M, FWH, LAN, TV Encoder, LCD, PCMCIA, EC, LED
+5V	5	No	No	No	Mini-PCI, HDD, ODD, TP, ICH4-M, CRT, PCMCIA, FAN
3VSUS	3.3	Yes	No	No	Card Cont, Mini-PCI, MDC
5VSUS	5	Yes	No	No	PC-Card, USB
3V_S5	3.3	Yes	Yes	No	ICH4-M
5V_S5	5	Yes	Yes	No	ICH4-M
3V_ALWAYS	3.3	Yes	Yes	No	EC/KBC
5VPCU	5	Yes	Yes	No	EC/KBC, System LED
VCCRTC	2.0 -3.6	Yes	Yes	Yes	ICH4-M (RTC)

## 1.8 Batteries

The PC has the following two batteries.

- Main battery
- Real time clock (RTC) battery

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

*Table 1-70 Battery specifications*

Battery Name		Battery Element	Output Voltage	Capacity
Main battery	Panasonic CGR-B/8B9BE	Lithium ion	14.4V	4,300mAh
	Simplo 916-4050		14.8V	4,400mAh
Real time clock (RTC) battery	ML1220E12	Nickel hydrogen	3V	14mAh

### 1.8.1 Main Battery

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

## 1.8.2 Battery Charging Control

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

### Battery Charge

When the AC adapter is connected, normal charging is used while the system is turned on and quick charge is used while the system is turned off. Refer to the following Table 1-11.

*Table 1-81 Time required for charges of main battery*

<b>Condition</b>	<b>Charging Time</b>
Power On Charge	About 6 hours
Power Off Charge	About 3 hours

Charge is stopped in the following cases.

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

### Data preservation time

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

*Table 1-12 Data preservation time*

<b>Condition</b>	<b>preservation time</b>
Standby	About 3 days
Hibernation	About 1 month

### **1.8.3 RTC Battery**

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

Table 1-13 lists the Time required for charges of RTC battery and data preservation time.

*Table 1-93 Time required for charges of RTC battery*

<b>Condition</b>	<b>Time</b>
Power ON (Lights Power LED)	About 24 hours
Data preservation tome (Full-charged)	About a month

## 1.9 AC Adapter

The AC adapter is used to charge the battery.

Table 1-14 lists the AC adapter specifications.

*Table 1-14 AC adapter specifications*

Parameter	Specification	
	DELTA SADP-65KB BFG	LITE-ON PA-1650-02QT
Power	65W	
Input voltage	AC 100V/240V	
Input frequency	50Hz/60Hz	
Input current	≅ 1.5A	≅ 1.8A
Output voltage	DC 19V	
Output current	3.42A	



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## **Chapter 2**

# **Troubleshooting Procedures**

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## **2.1 Troubleshooting**

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

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

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

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

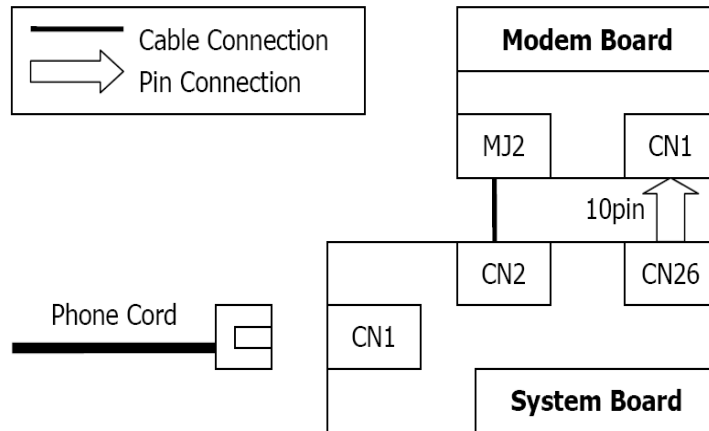
*After replacing the LCD, update with the latest EC/KBC as described in Appendix H “EC/KBC Rewrite Procedures” to set the SVP parameter.*

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

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

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

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



## **2.2 Troubleshooting Flowchart**

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

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

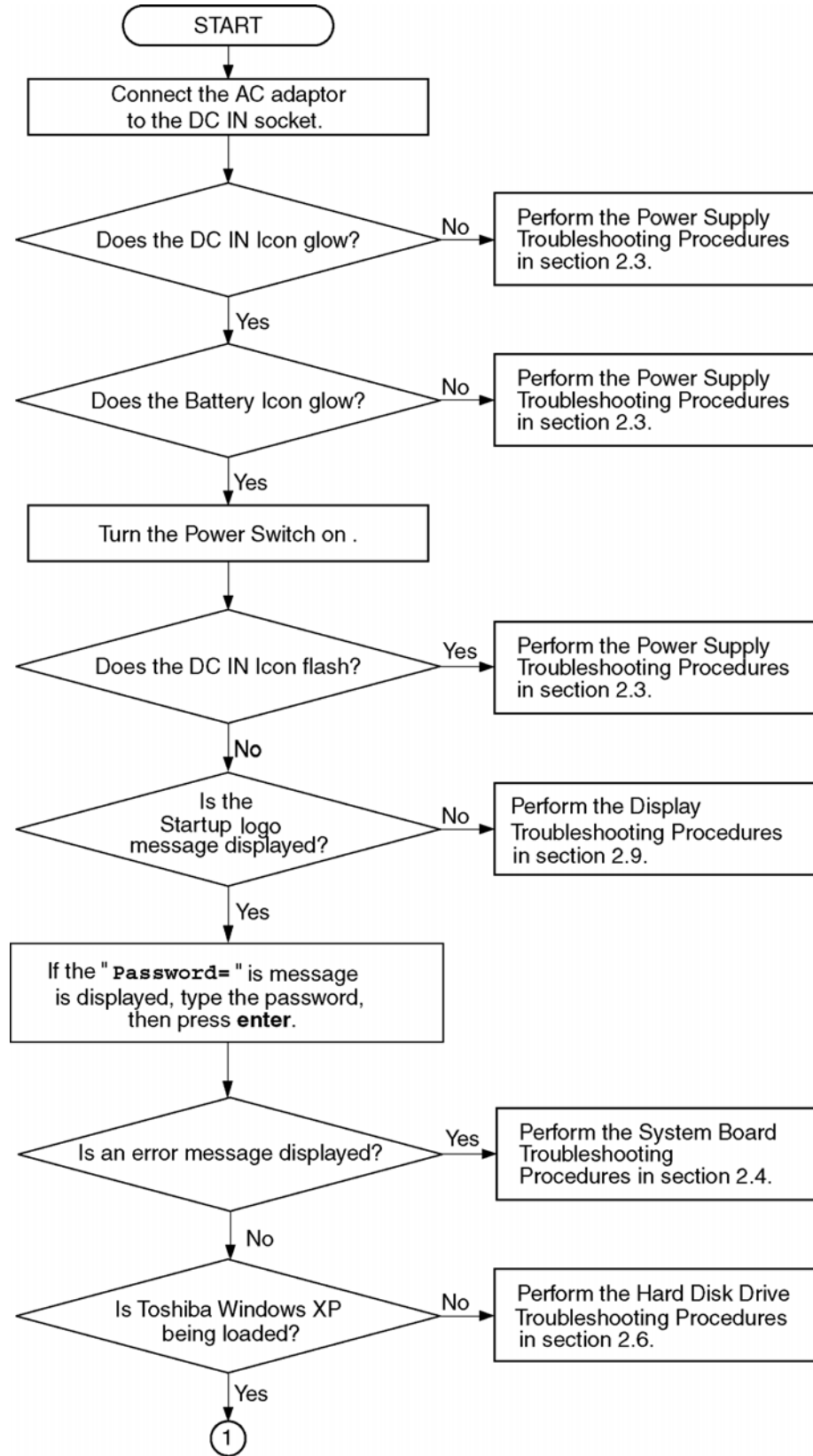


Figure 2-1 Troubleshooting flowchart (1/2)



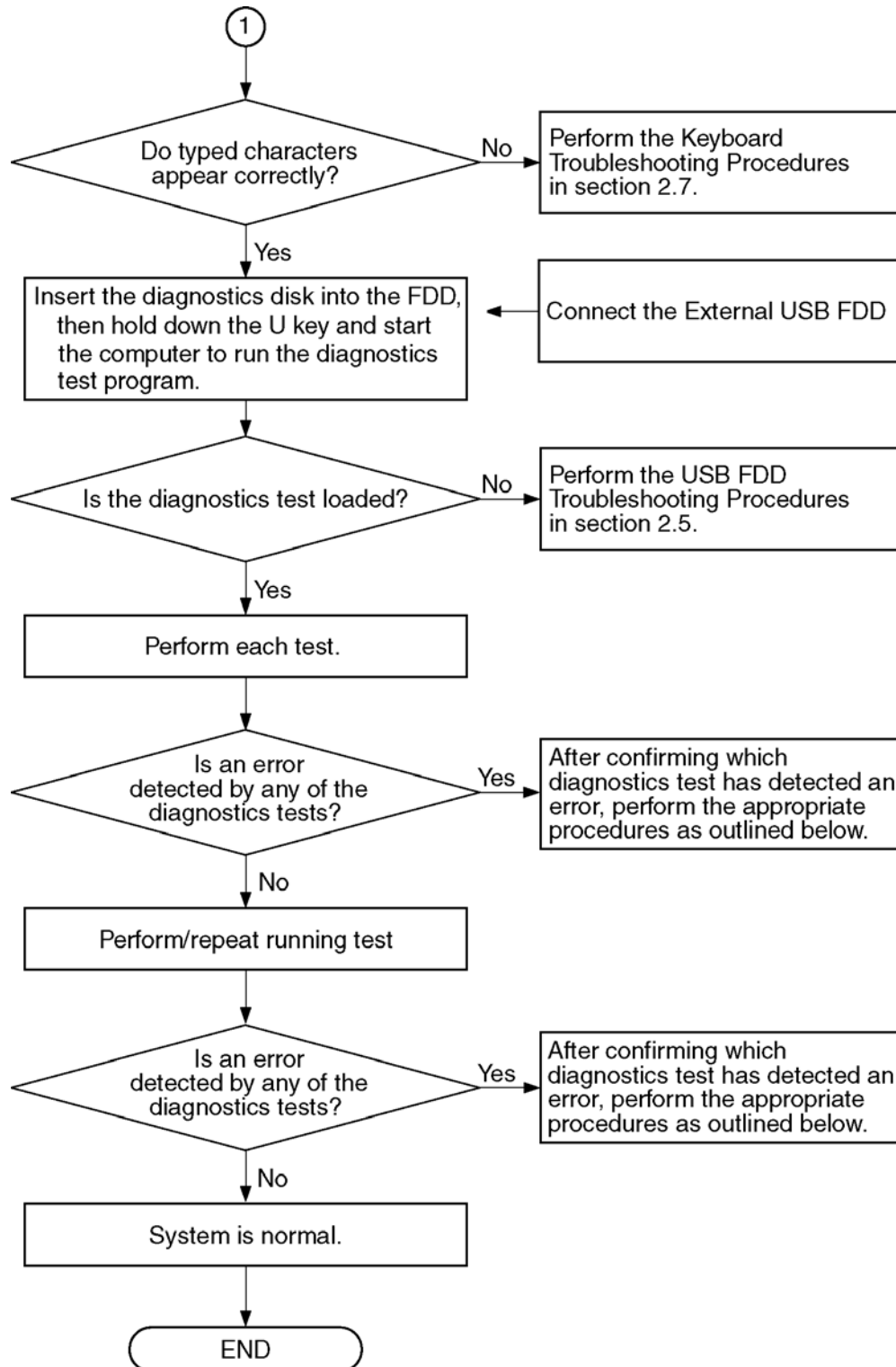


Figure 2-1 Troubleshooting flowchart (2/2)

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

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

## 2.3 Power Supply Troubleshooting

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

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

### Procedure 1 Power Status Check

The following LED indicate the power supply status:

- Battery LED
- DC IN LED

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

*Table 2-1 Battery icon*

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

Table 2-2 DC IN icon

DC IN icon	Power supply status
Lights green	DC power is being supplied from the AC adapter.
Doesn't light	Any condition other than those above.

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

When the icon is blinking, perform the following procedure.

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

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

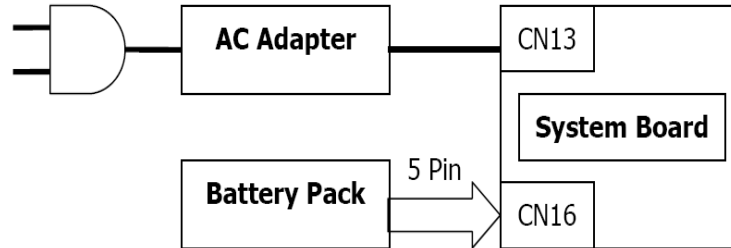
Check 1 If the DC IN icon does not light, go to Procedure 2.

Check 2 If the battery icon does not light orange or green, go to Procedure 3.

**NOTE:** Use a supplied AC adapter.

**Procedure 2 Connection Check**

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



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

**Check 1** Make sure the AC adapter and the AC power cord are firmly plugged into the DC IN socket (CN13) and wall outlet. If these cables are connected firmly, go to Check 2.

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

- If the DC IN icon does not light, go to Procedure 4.
- If the battery icon does not light, go to Check 3.

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

**Procedure 3 Charging Check**

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

**Check 1** Make sure the AC adapter is firmly plugged into the DC IN socket (CN13).

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

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

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

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

#### **Procedure 4 Replacement Check**

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

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

When AC adapter is connected ;

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

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

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

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

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

## **2.4 System Board Troubleshooting**

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

Procedure 1: Message Check

Procedure 2: Debugging Port Check

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

### Procedure 1 Message Check

When the power is turned on, the system performs the Power On Self Test (POST) installed in the BIOS ROM. The POST tests each IC on the system board and initializes it.

- If an error message is shown on the display, perform Check 1.
- If there is no error message, go to Procedure 2.
- If MS-DOS or Windows XP is properly loaded, go to Procedure 4.

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

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

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

**Check 2** If the following error message is displayed on the screen, press any key as the message instructs.

The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the system board is damaged. Go to Procedure 3.

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

If any other error message displays, perform Check 3.



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

If one of the following error messages (1) through (17), (24) or (25) is displayed, go to Procedure 4.

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

If error message (19), (20) or (21) is displayed, go to the 2.5" HDD Troubleshooting Procedures.

If error message (22) or (23) is displayed, go to the USB FDD Troubleshooting Procedures.

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

## Procedure 2 Debugging Port Check

Check the MiniPCI Debug board. The tool for debug port test is shown below.

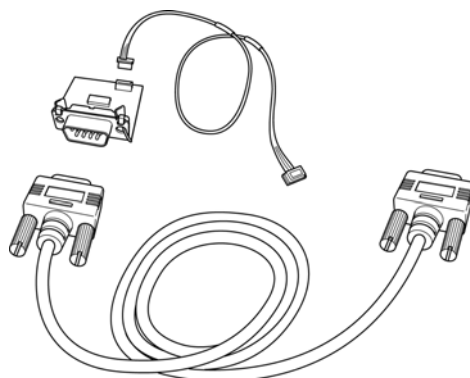


Figure 2-2 A set of tool for debug port test

The test procedures are follows:

1. Replace MiniPCI debug port with Wireless LAN card, check LED in the miniPCI debug board

The following is a list of the Test Point codes written to port 80h at the start of each routine, the beep codes issued for terminal errors, and a description of the POST routine. Unless otherwise noted, these codes are valid for PhoenixBIOS 4.0 Release 6.0.

NOTE: The following routines are sorted by their test point numbers assigned in the BIOS code. Their actual order as executed during POST can be quite different.

### Code Beeps POST Routine Description

02h	Verify Real Mode
03h	Disable Non-Maskable Interrupt (NMI)
04h	Get CPU type
06h	Initialize system hardware
08h	Initialize chipset with initial POST values
09h	Set IN POST flag
0Ah	Initialize CPU registers
0Bh	Enable CPU cache
0Ch	Initialize caches to initial POST values
0Eh	Initialize I/O component
0Fh	Initialize the local bus IDE
10h	Initialize Power Management
11h	Load alternate registers with initial POST values
12h	Restore CPU control word during warm boot
13h	Initialize PCI Bus Mastering devices

**Code Beeps POST Routine Description**

14h	Initialize keyboard controller
16h 1-2-2-3	BIOS ROM checksum
17h	Initialize cache before memory autosize
18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
20h 1-3-1-1	Test DRAM refresh
22h 1-3-1-3	Test 8742 Keyboard Controller
24h	Set ES segment register to 4 GB
26h	Enable A20 line
28h	Autosize DRAM
29h	Initialize POST Memory Manager
2Ah	Clear 512 KB base RAM
2Ch 1-3-4-1	RAM failure on address line <b>xxxx</b> *
2Eh 1-3-4-3	RAM failure on data bits <b>xxxx</b> * of low byte of memory bus
2Fh	Enable cache before system BIOS shadow
30h 1-4-1-1	RAM failure on data bits <b>xxxx</b> * of high byte of memory bus
32h	Test CPU bus-clock frequency
33h	Initialize Phoenix Dispatch Manager
36h	Warm start shut down
38h	Shadow system BIOS ROM
3Ah	Autosize cache
3Ch	Advanced configuration of chipset registers
3Dh	Load alternate registers with CMOS values
42h	Initialize interrupt vectors
45h	POST device initialization
46h 2-1-2-3	Check ROM copyright notice
48h	Check video configuration against CMOS
49h	Initialize PCI bus and devices
4Ah	Initialize all video adapters in system
4Bh	QuietBoot start (optional)
4Ch	Shadow video BIOS ROM
4Eh	Display BIOS copyright notice
50h	Display CPU type and speed
51h	Initialize EISA board
52h	Test keyboard
54h	Set key click if enabled
58h 2-2-3-1	Test for unexpected interrupts
59h	Initialize POST display service
5Ah	Display prompt "Press F2 to enter SETUP"
5Bh	Disable CPU cache
5Ch	Test RAM between 512 and 640 KB
60h	Test extended memory
62h	Test extended memory address lines
64h	Jump to UserPatch1

66h	Configure advanced cache registers
67h	Initialize Multi Processor APIC
68h	Enable external and CPU caches
69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size
6Bh	Load custom defaults (optional)
6Ch	Display shadow-area message
6Eh	Display possible high address for UMB recovery
70h	Display error messages
72h	Check for configuration errors
76h	Check for keyboard errors
7Ch	Set up hardware interrupt vectors
7Eh	Initialize coprocessor if present
80h	Disable onboard Super I/O ports and IRQs
81h	Late POST device initialization
82h	Detect and install external RS232 ports
83h	Configure non-MCD IDE controllers
84h	Detect and install external parallel ports
85h	Initialize PC-compatible PnP ISA devices
86h	Re-initialize onboard I/O ports.
87h	Configure Motheboard Configurable Devices (optional)
88h	Initialize BIOS Data Area
89h	Enable Non-Maskable Interrupts (NMIs)
8Ah	Initialize Extended BIOS Data Area
8Bh	Test and initialize PS/2 mouse
8Ch	Initialize floppy controller (optional)
8Fh	Determine number of ATA drives (optional)
90h	Initialize hard-disk controllers
91h	Initialize local-bus hard-disk controllers
92h	Jump to UserPatch2
93h	Build MPTABLE for multi-processor boards
95h	Install CD ROM for boot
96h	Clear huge ES segment register
97h	Fixup Multi Processor table
98h 1-2	Search for option ROMs. One long, two short beeps on checksum failure
99h	Check for SMART Drive (optional)
9Ah	Shadow option ROMs
9Ch	Set up Power Management
9Dh	Initialize security engine (optional)
9Eh	Enable hardware interrupts
9Fh	Determine number of ATA and SCSI drives
A0h	Set time of day
A2h	Check key lock
A4h	Initialize Typematic rate
A8h	Erase F2 prompt

**Code Beeps POST Routine Description**

AAh	Scan for F2 key stroke
ACh	Enter SETUP
A Eh	Clear Boot flag
B0h	Check for errors
B2h	POST done - prepare to boot operating system
B4h 1	One short beep before boot
B5h	Terminate QuietBoot (optional)
B6h	Check password (optional)
B9h	Prepare Boot
Bah	Initialize DMI parameters
BBh	Initialize PnP Option ROMs
BCh	Clear parity checkers
BDh	Display MultiBoot menu
BEh	Clear screen (optional)
BFh	Check virus and backup reminders
C0h	Try to boot with INT 19
C1h	Initialize POST Error Manager (PEM)
C2h	Initialize error logging
C3h	Initialize error display function
C4h	Initialize system error handler
C5h	PnPnd dual CMOS (optional)
C6h	Initialize notebook docking (optional)
C7h	Initialize notebook docking late
C8h	Force check (optional)
C9h	Extended checksum (optional)
D2h	Unknown interrupt

**Code Beeps For Boot Block in Flash ROM**

E0h	Initialize the chipset
E1h	Initialize the bridge
E2h	Initialize the CPU
E3h	Initialize system timer
E4h	Initialize system I/O
E5h	Check force recovery boot
E6h	Checksum BIOS ROM
E7h	Go to BIOS
E8h	Set Huge Segment
E9h	Initialize Multi Processor
EAh	Initialize OEM special code
EBh	Initialize PIC and DMA
ECh	Initialize Memory type
EDh	Initialize Memory size
EEh	Shadow Boot Block
EFh	System memory test
F0h	Initialize interrupt vectors
F1h	Initialize Run Time Clock
F2h	Initialize video
F3h	Initialize System Management Mode
F4h	1 Output one beep before boot
F5h	Boot to Mini DOS
F6h	Clear Huge Segment
F7h	Boot to Full DOS

*Procedure 3 Diagnostic Test Program Execution Check*

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

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

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

**Procedure 4 Replacement Check**

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

## **2.5 USB FDD Troubleshooting**

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

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

### **Procedure 1 FDD Head Cleaning Check**

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

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

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

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



**Procedure 2 Diagnostic Test Program Execution Check**

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

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

*Table 2-7 FDD error code and status*

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

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

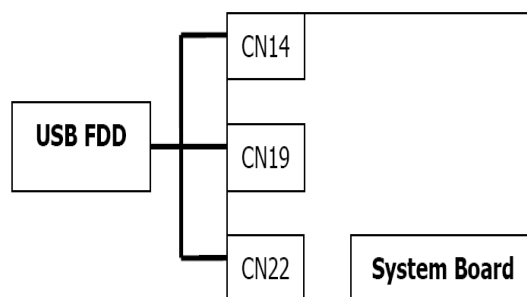
Write protected

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

**Procedure 3 Connector Check and Replacement Check**

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

USB FDD can be connected to the following 3 ports.  
(System board x 3 ports, US board x 1 port )



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

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

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

## *Chapter 2 Troubleshooting Procedures*

---

- Check 2 USB FDD may be faulty. Replace it with a new one. If the problem still occurs, perform Check 3.
- Check 3 Connect USB FDD to each port embedded on system board . If it does not work properly when connected to CN14, CN19, CN22 or all ports, perform Check 4.
- Check 4 System board may be faulty. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.6 2.5" HDD Troubleshooting

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

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

### Procedure 1 Partition Check

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

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

## **Procedure 2 Message Check**

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

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

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

HDC ERROR

or

HDD #X ERROR (After 5 seconds this message will disappear.)

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

Insert system disk in drive  
Press any key when ready .....

or

Non-System disk or disk error  
Replace and press any key when ready

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

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

System Transferred

If an error message appears on the display, perform Check 4.

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

### **Procedure 3    Format Check**

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

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

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

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

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

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

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

#### Procedure 4 Diagnostic Test Program Execution Check

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

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

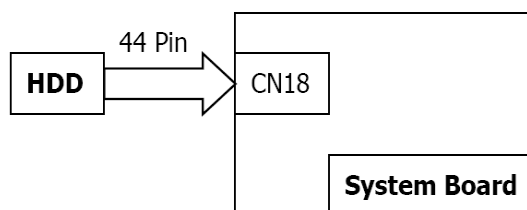
Table 2-8 2.5" Hard disk drive error code and status

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

### Procedure 5 Connector Check and Replacement Check

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

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



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

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



## **2.5 2.7 Keyboard Troubleshooting**

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

### **Procedure 1 Diagnostic Test Program Execution Check**

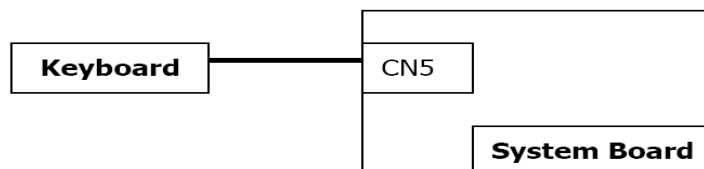
Execute the Keyboard Test (DIAGNOSTIC TEST) and Pressed key display test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

## Procedure 2 Connector and Replacement Check

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

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



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

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

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

## **2.8 Touch pad Troubleshooting**

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

### **Procedure 1 Diagnostic Test Program Execution Check**

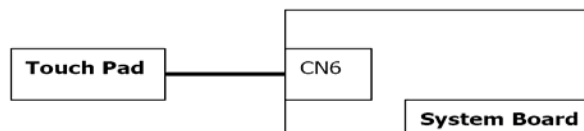
Execute the Touch pad test (ONLY ONE TEST) in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

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

## Procedure 2 Connector and Replacement Check

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

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



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

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

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

## **2.9 Display Troubleshooting**

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

Procedure 1: External Monitor Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector and Cable Check

Procedure 4: Replacement Check

### **Procedure 1 External Monitor Check**

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

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

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

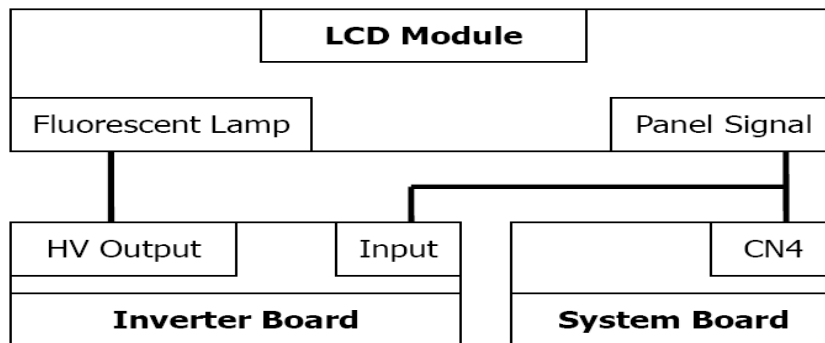
### **Procedure 2 Diagnostic Test Program Execution Check**

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

### **Procedure 3 Connector and Cable Check**

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

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



#### **Procedure 4 Replacement Check**

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

If fluorescent lamp does not light, perform Check 1.

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

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

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

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

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

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

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

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

## 2.10 Optical Disk Drive Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

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

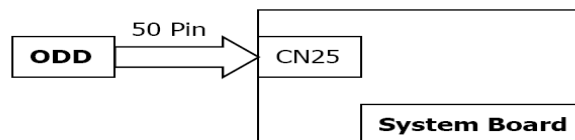
Prepare the tools before the test.

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

### Procedure 2 Connector Check and Replacement Check

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

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



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

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

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



## 2.11 Modem Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

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

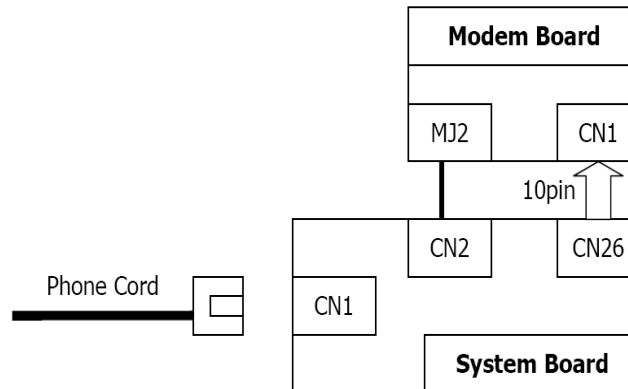
If any error is detected, perform Procedure 2.

### Procedure 2 Connector Check and Replacement Check

MDC (Modem Daughter Card) is used as the modem for this computer. MDC is connected to system board by CN26. And also, MDC is connected to system board by cable. If modem malfunctions, The connection of cable, board and module may be defective. Otherwise, they may be faulty.

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

Check 1 Make sure the following connections are firmly connected.



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

## ***Chapter 2 Troubleshooting Procedures***

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

## 2.12 LAN Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

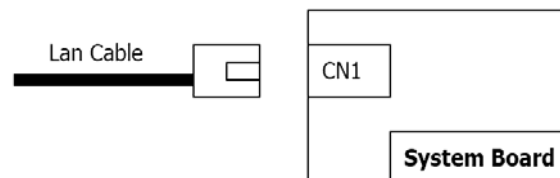
Execute LAN test in the LAN/Modem test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

### Procedure 2 Connector Check and Replacement Check

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

Check 1 Make sure LAN cable is firmly connected to the connector CN1. If the problem still occurs, perform Check 2.



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

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

## **2.13 Wireless LAN Troubleshooting**

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Replacement Check

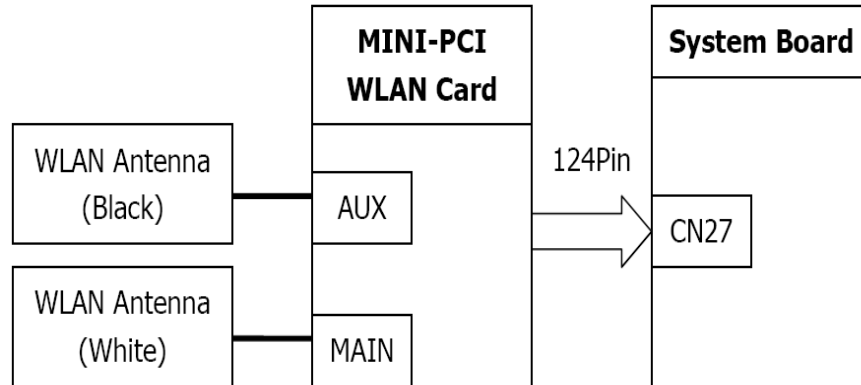
### **Procedure 1      Transmitting-Receiving Check**

Before starting the test, make sure the wireless communication switch is set in the ON position.

- Check 1    Execute Wireless LAN test program to check the transmitting-receiving function of wireless LAN. You will need a second computer that can communicate by wireless LAN. Perform the test following the instructions described in Chapter 3. If the computer passes the test, the function is correctly working. If the computer does not pass the test, perform Procedure 2.

## **Procedure 2      Antennas' Connection Check**

The wireless LAN function-wiring diagram is shown below:



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

- Check 1    Make sure the wireless communication switch is “On”.  
            If the switch is “Off”, turn it “On”. If the problem still occurs, perform Check 2.
- Check 2    Make sure wireless LAN card (Mini-PCI) is firmly connected to the CN2200 on system board. If the connector is defective, connect it firmly and perform Procedure 1. If the problem still occurs, perform Check 3.
- Check 3    Make sure that wireless LAN antenna cables (black and white) are firmly connected to the connectors on Wireless LAN card. If wireless LAN antenna cables are not connected properly, connect them firmly and perform Procedure 1. If the problem still occurs, go to the procedure 3.

**Procedure 3      Replacement Check**

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

- Check 1    Wireless LAN antenna may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 2.
  
- Check 2    Wireless LAN card may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still occurs, perform Check 3.
  
- Check3    System board may be faulty. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

## 2.14 Sound Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

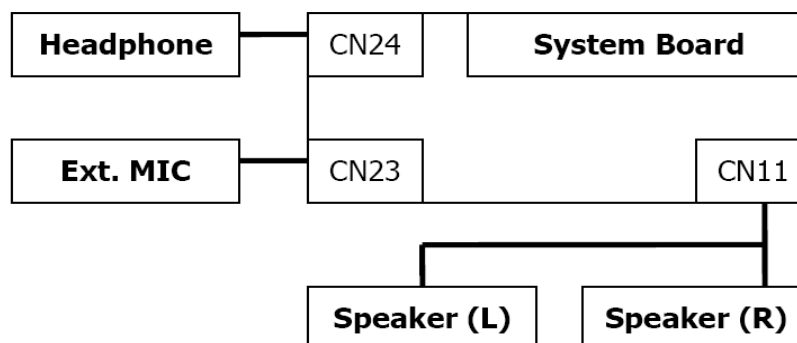
### Procedure 1 Diagnostic Test Program Execution Check

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

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

### Procedure 2 Connector Check

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



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

If the problem still occurs, go to Procedure 3.

**Procedure 3 Replacement Check**

- If external microphone does not work properly, perform check 1.
- If headphone does not work properly, perform check 2.
- If speaker does not work properly, perform check 4.

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

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

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

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

Check 5 Flat cable between SD board and system board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem still occurs, perform Check 7.

Check 7 System board may be faulty. Replace it with a new one following the instructions in Chapter 4.



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## **Chapter 3**

### Test Program for Field

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### **3.1 Tests and Diagnostics Software Overview**

This chapter explains how to use the Tests and Diagnostics Software for the Satellite™ L10 and Satellite™ Pro L10 computer systems.

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

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

**NOTE:** *This manual follows the Diagnostic Test Menu order of the Satellite L10. All tests are the same for the Satellite Pro L10.*

The Diagnostics Menu consists of the following options:

- Diagnostic Test
- Running Test
- Check DMI Information
- Log Utilities
- System Configuration
- Running Test Edit Item

The Diagnostic Test Menu consists of the following functional tests:

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

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

- The Diagnostics Disk (all tests)
- A formatted working disk for the floppy disk drive test (all tests)
- A printer wraparound connector for the printer wraparound test (printer test)
- A CD test media (Toshiba Backup CD ROM and music CD for the CD-ROM test)
- Serial port wraparound connector

The following sections detail the tests contained within the Diagnostic Test Menu. Refer to Sections 3.21, 3.22, 3.23 and, 3.24 for detailed information on the remaining functions of the Tests and Diagnostics software.

## 3.2 Executing the Diagnostic Test

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

1. Create a DOS bootable disk and copy all the files from the Tests and Diagnostics software to the disk. Label the new work disk the same as the original.
2. Insert the new work disk into the computer's floppy disk drive and turn on the computer.

The following screen displays:

```
TOSHIBA Satellite L10 Diagnostics
Version 0.90 (C) Copyright Toshiba Corp.
2004

[ DIAGNOSTICS MENU ]

01.DIAGNOSTIC TEST
02.RUNNING TEST
03.CHECK DMI
   INFORMATION
04.LOG UTILITIES
05.SYSTEM
   CONFIGURATION
06.OPTION
99.EXIT

↑ ↓ :Select
item
ESC :Escape
```

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

The following menu displays for the Satellite L10:

```
TOSHIBA Satellite L10 Diagnostics
Version 0.90 (C) Copyright Toshiba Corp. 2004

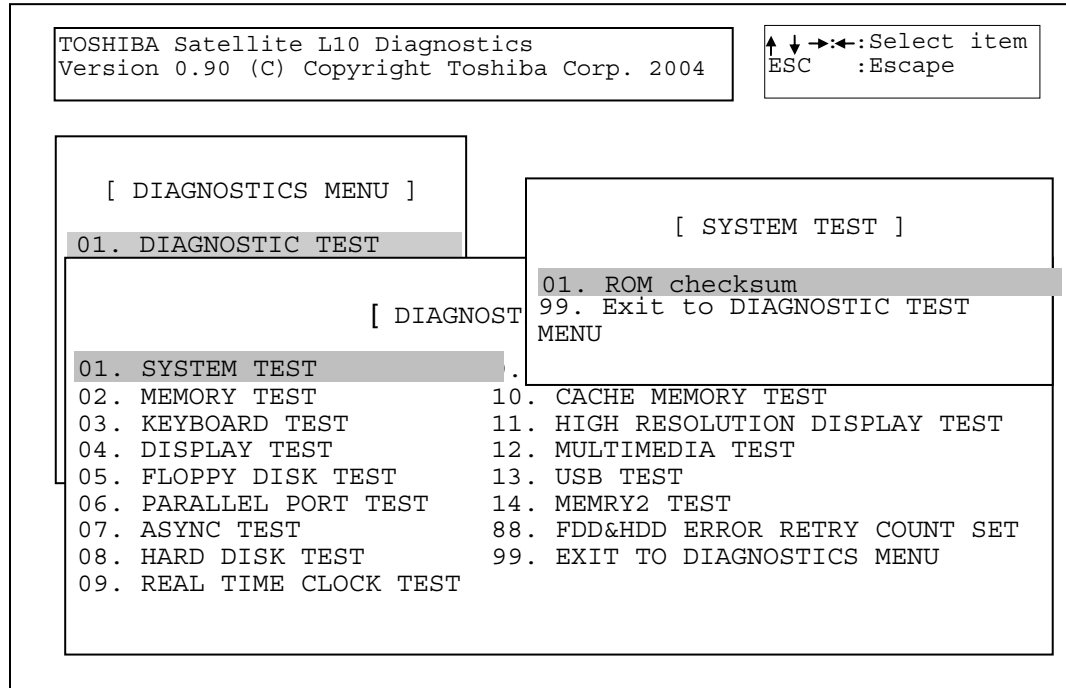
↑↓→←:Select item
ESC :Escape

[ DIAGNOSTICS MENU ]
01. DIAGNOSTIC TEST

[ DIAGNOSTIC TEST MENU ]
01. SYSTEM TEST          10. CACHE MEMORY TEST
02. MEMORY TEST         11. HIGH RESOLUTION DISPLAY TEST
03. KEYBOARD TEST       12. MULTIMEDIA TEST
04. DISPLAY TEST        13. USB TEST
05. FLOPPY DISK TEST    14. MEMORY2 TEST
06. PARALLEL PORT TEST  88. FDD&HDD ERROR RETRY COUNT SET
07. ASYNC TEST          99. EXIT TO DIAGNOSTICS MENU
08. HARD DISK TEST
09. REAL TIME CLOCK TEST
```

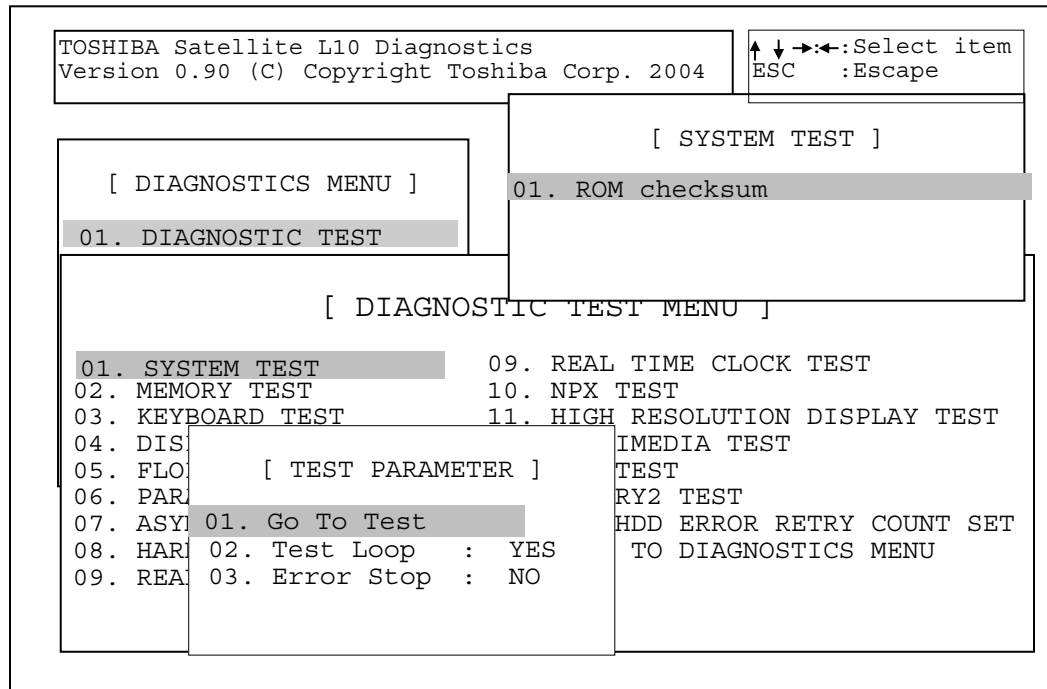
Refer to Sections 3.4 through 3.18 for detailed descriptions of Diagnostics Tests 1 through 14. Item 88 sets the floppy disk drive and hard disk drive error retry count. Item 99 exits the submenu of the Diagnostic Test and returns to the Diagnostics Menu.

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



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





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

**Go To Test**

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

**Test Loop**

Select **NO** to return the screen to the subtest menu after the test is complete.  
 Select **YES** to set the test to run continuously until it is halted by the user.

**Error Stop**

Select **NO** to keep the test running even if an error is found.  
 Select **YES** to stop the test program when an error is found and display the HALT OPERATION screen as shown below:

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

These three selections have the following functions:

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

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

Table 3-1 in Section 3.3 lists the function of each test on the subtest menu. Table 3-3 in Section 3.19 lists the error codes and error status for each error.

### 3.3 Subtest names

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

Table 3-1 Subtest Names(1/3)

No.	Test Name	No.	Subtest Name
01	SYSTEM TEST	01	ROM Checksum *FAN ON/OFF check(Cannot Support) *Battery TEST(Cannot Support)
02	MEMORY TEST	01	Conventional Memory
		02	Protected Mode
		03	Protected Mode (32MB-MAX)
		04	RAM Refresh
		05	Stress Test
03	KEYBOARD TEST	01	Pressed Key Display [90]
		02	Pressed Key Display [88]
		03	Pressed Key Display [87]
		04	Keyboard LED
		05	PS/2 Mouse (Pointing 2Button)
		06	PS/2 Mouse (Pointing 3Button)
04	DISPLAY TEST	01	Character Attributes
		02	Character Set
		03	80* 25 Character Display
		04	320* 200 Graphics Display
		05	640* 200 Graphics Display
		06	640* 480 Graphics Display
		07	Display Page
		08	"H" Pattern Display
		09	Video DAC Register W/R/C
		10	Color Graphics Display
		11	Color Attributes Display
		12	Color Tiling

*Table 3-1 Subtest Names(2/3)*

<b>No.</b>	<b>Test Name</b>	<b>No.</b>	<b>Subtest Name</b>
05	FLOPPY DISK TEST	01	Sequential Read
		02	Sequential W/R/C
		03	Random Address/Data
		04	Write Specified Address
		05	Read Specified Address
06	PARALLEL PORT TEST	01	Ripple Pattern
		02	Wraparound
07	ASYNC TEST	01	Wraparound (Channel 1)
		02	Wraparound (Channel 2)
08	HARD DISK TEST	01	Sequential Read
		02	Address Uniqueness
		03	Random Address Data
		04	Cross Talk and Peek Shift
		05	Write Specified Address
		06	Read Specified Address
		07	Sequential Write
		08	W-R-C Specified Address
		09	Unclip
09	REAL TIME CLOCK TEST	01	Real Time
		02	Backup Memory
		03	Real Time Carry

Table 3-1 Subtest Names(3/3)

No.	Test Name	No.	Subtest Name
10	CACHE MEMORY TEST	01	Constant Data Test
		02	Address Pattern Test
		03	Increment/Decrement Test
		04	Bit Shift Pattern Test
		05	Write Disturb Test
		06	Checker Board Test
		07	Marching Test
		08	Working Data Test
		09	Caching Data Test
11	HIGH RESOLUTION DISPLAY TEST	01	VRAM W/R/C Test
		02	640* 480 Mode Display
		03	800* 600 Mode Display
		04	1024* 768 Mode Display
		05	1280* 1024 Mode Display
		06	1600* 1200 Mode Display
		07	"H" Pattern Display
		08	Focus Test ("E" Pattern)
12	MULTIMEDIA TEST	01	Sequential Read Test
		02	Random Read Test
		03	Read Specified Address Test
		04	1 point W/R/C Test
14	USB	01	**Execute USB HPT test (DID:24x2)
		02	**Execute USB HPT test (DID:24x4)
		03	**Execute USB HPT test (DID:24x7)
		04	**Execute UPT test (3 port)
		05	**Execute UPT test (1 port)
15	MEMORY2	01	All one/zero
		02	Walking 1/Walking 0(Left)
		03	Walking 1/Walking 0(Right)
		04	Walking 1/Walking 0(Left /Right)

\*This test cannot support.

\*\*This test is possible if you have the USB test fixture of CATC

### 3.4 System Test

To execute the System Test select **01** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The System Test contains one subtest that tests the basic functionality of ROM, RAM, and the processor. This test, combined with all the other diagnostics tests, provides a complete overall system test. Move the highlight bar to the subtest you want to execute and press **Enter**.

#### Subtest 01 ROM Checksum

This subtest executes a checksum test of the ROM on the system board. It verifies that the processor is executing the program and the memory is holding the program. (Test range: 64KB at F0000H-FFFFFFH.)

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

*If **YES** is selected for Test Loop on the Test Parameter menu, the Test Status screen displays (see Section 3.24.3 for a description of the Test Status screen) while the test is executing. Press **Ctrl + break** to return to the System Test menu.*

#### Subtest 02 FAN ON/OFF Checking

Satellite L10 and Satellite Pro L10 cannot support. Next Version will be support.

#### Subtest 03 Battery Test

Satellite L10 and Satellite Pro L10 cannot support. Next Version will be support.

### 3.5 Memory Test

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

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

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

#### Subtest 01 Conventional Memory

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

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

#### **Test Process:**

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

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

Subtest 02      Protected Mode

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

**Test Process:**

1. Switch to Protected Mode. (INT 15H)
2. Tests 256KB - 640KB and 1MB to 32MB of installed memory. Executes Step 1 through Step 5 of Subtest 1. The test data is the same as Subtest 1.

Subtest 03      Protected Mode [32MB - MAX]

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

**Test Process:**

1. Switch to Protected Mode. (INT 15H)
2. Tests from 32MB to the maximum installed memory (extended memory). Executes Step 1 through Step 5 of Subtest 1. The test data is the same as Subtest 1.

Subtest 04      RAM Refresh

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

**Test Process:**

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

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

Subtest 05      Stress Test

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

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



### 3.6 Keyboard Test

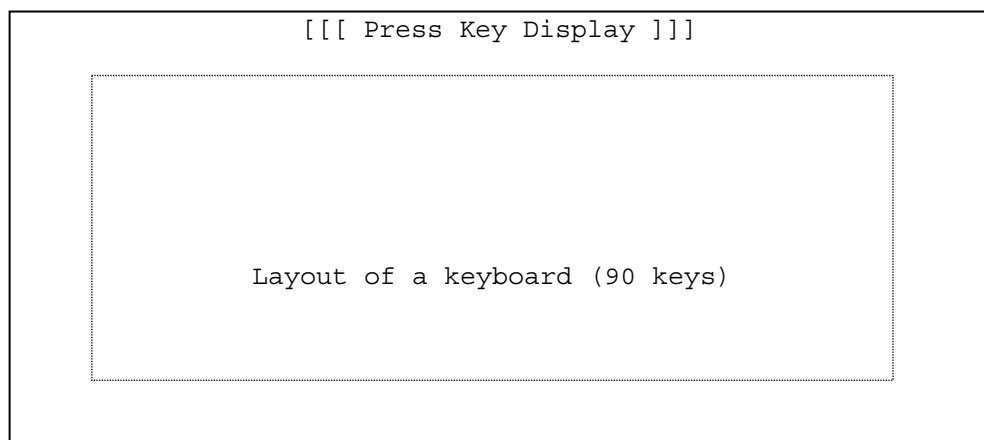
To execute the Keyboard Test select **03** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Keyboard Test contains six subtests that test the computer's keyboard and mouse actions. Move the highlight bar to the subtest you want to execute and press **Enter**.

***NOTE:** The Test Loop and Error Stop parameters are not enabled for the Keyboard test. The test of a keyboard test cannot be supported.(From Subtest1 to Subtest3)*

Subtest 01      Pressed Key Display [90 Keyboard]

***NOTE:** This keyboard layout does not correctly reflect the US keyboard and the "Print Scrn/SysRq" key does not function during this test. This will be amended in the next release.*

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



Subtest 02      Pressed Key Display [88 Keyboard]

This subtest is used for the 88 keyboard and functions the same as Subtest 1.

Subtest 03      Pressed Key Display [87 Keyboard]

This subtest is used for the 87 keyboard and functions the same as Subtest 1.

Subtest 04    Keyboard LED

The LED display for **Num Lock**, **Caps Lock**, and **Scroll Lock** (in that order) will flash repeatedly. Confirm this visually. The following screen displays while this test executes.

```
Keyboard LED "ON" CHECK !  
  
Press ANY KEY
```

If there is an error, a message displays as follows:

```
ERROR STATUS    : XX  
                  └──┬──┘  
                      Actual
```

Subtest 05    PS/2 Mouse (Pointing)

This subtest checks the functions of the mouse as shown below.

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

This subtest reports the mouse movements by displaying the location parameters. When the mouse is moved towards the upper left, the <POINTING> display changes according to the following illustration. If a mouse button is pressed, the <BUTTON> display alternates between black and white. Also, the parameters appear on the right side of the display.

To exit this subtest and return to the Keyboard Test menu using a .

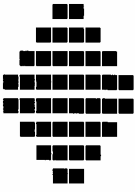
**Two-button Mouse**

Press both mouse buttons simultaneously.

**Three-button Mouse**

Press mouse buttons 1 and 3 simultaneously.


< POINTING >



< PARAMETER >  
STATUS:0008h  
X-RATE:0000h  
Y-RATE:0000h

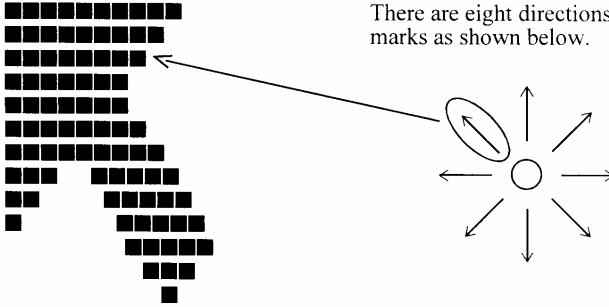
< BUTTON >

(1) (2)

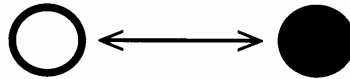


<< PRESS BUTTON1 + BUTTON2 THEN END >>

There are eight directions of arrow marks as shown below.



When a button is pressed, the display alternates as shown below.





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





Subtest 04    320 \* 200 Character Display

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

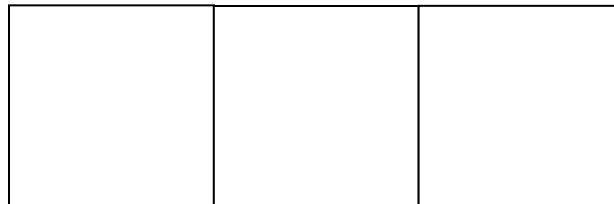
320 \* 200 GRAPHICS DISPLAY

COLOR SET 0 : [ 4 ]

GREEN  
CYAN

RED  
MAGENTA

YELLOW  
WHITE



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



320\*200 GRAPHICS DISPLAY : [ D ]

BLACK	<input type="text"/>	<input type="text"/>	D GRAY
BLUE	<input type="text"/>	<input type="text"/>	L BLUE
GREEN	<input type="text"/>	<input type="text"/>	L GREEN
CYAN	<input type="text"/>	<input type="text"/>	L CYAN
RED	<input type="text"/>	<input type="text"/>	L RED
MAGENTA	<input type="text"/>	<input type="text"/>	L MAGENTA
BROWN	<input type="text"/>	<input type="text"/>	YELLOW
WHITE	<input type="text"/>	<input type="text"/>	I WHITE

Press [Enter] KEY

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

320\*200 GRAPHICS DISPLAY : [ 13 ]

64 gradations of red are displayed.
64 gradations of green are displayed.
64 gradations of blue are displayed.
64 gradations of white are displayed.

Press [Enter] KEY




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

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

Subtest 05 640 \* 200 Character Display

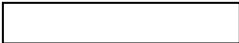

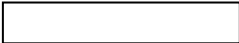
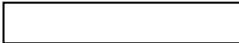
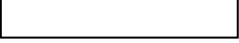
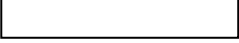
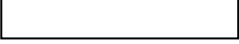
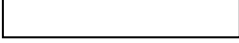
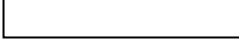




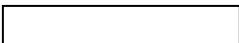
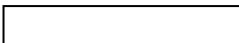
This subtest uses 640\*200 video resolution to display three windows, each window drives a different set of dots: even dots, odd dots and all dots. The screen below displays when this subtest is executed.

640 \* 200 GRAPHICS DISPLAY : [ 6 ]

EVEN DOTS DRIVEN	ODD DOTS DRIVEN	ALL DOTS DRIVEN
		

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

640\*200 GRAPHICS DISPLAY : [ E ]

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

Press [Enter] KEY

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

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

Subtest 06 640 \* 480 Character Display

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

640\*350 GRAPHICS DISPLAY : [10 ]

BLACK	<input type="text"/>	<input type="text"/>	GRAY
BLUE	<input type="text"/>	<input type="text"/>	T BLUE
GREEN	<input type="text"/>	<input type="text"/>	T GREEN
CYAN	<input type="text"/>	<input type="text"/>	T CYAN
RED	<input type="text"/>	<input type="text"/>	T RED
MAGENTA	<input type="text"/>	<input type="text"/>	T MAGENTA
BROWN	<input type="text"/>	<input type="text"/>	YELLOW
WHITE	<input type="text"/>	<input type="text"/>	T INTENSIFIED WHITE

Press [Enter] KEY

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

640\*480 GRAPHICS DISPLAY : [12 ]

BLACK	<input type="text"/>	<input type="text"/>	GRAY
BLUE	<input type="text"/>	<input type="text"/>	BLUE
GREEN	<input type="text"/>	<input type="text"/>	GREEN
CYAN	<input type="text"/>	<input type="text"/>	CYAN
RED	<input type="text"/>	<input type="text"/>	RED
MAGENTA	<input type="text"/>	<input type="text"/>	MAGENTA
BROWN	<input type="text"/>	<input type="text"/>	
WHITE	<input type="text"/>	<input type="text"/>	IFIED WHITE

Press [Enter] KEY

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

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





Subtest 10 Color Graphics Display

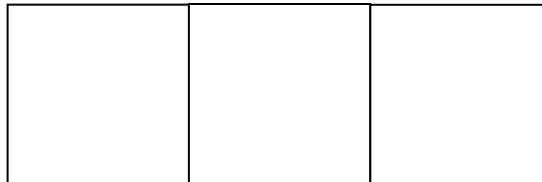
This subtest displays three colors, cyan, white and yellow on the screen as shown below.

640 \* 480 GRAPHICS DISPLAY

CYAN

WHITE

YELLOW



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

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

Subtest 11     Color Attributes Display

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

640\*480 COLOR ATTRIBUTE DISPLAY

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

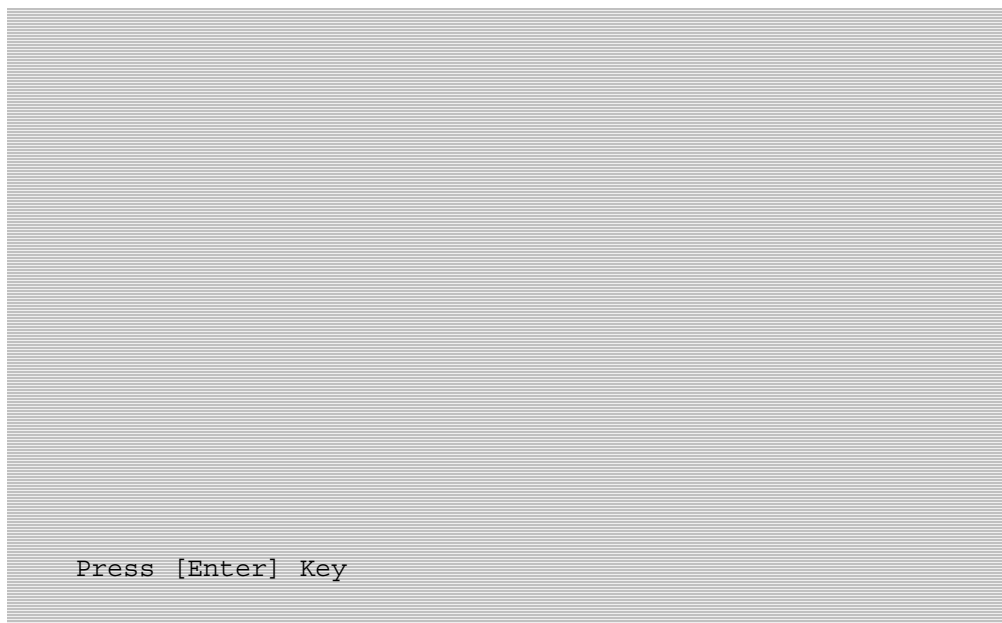
Press [Enter] Key

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

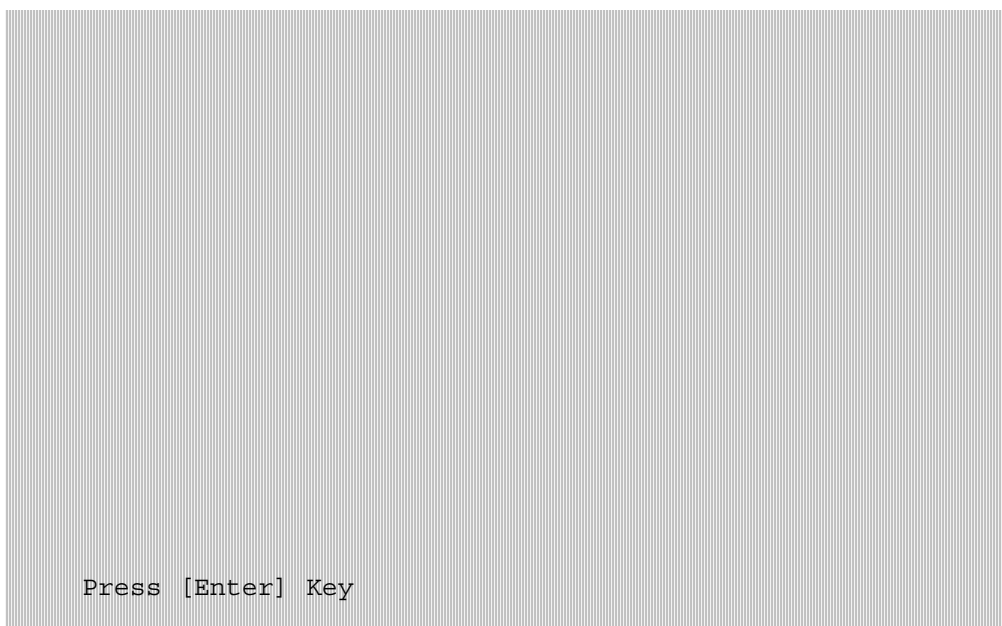
Press **Enter** to execute the VRAM mapping test which displays a horizontal line at one dot intervals using Mode 12.



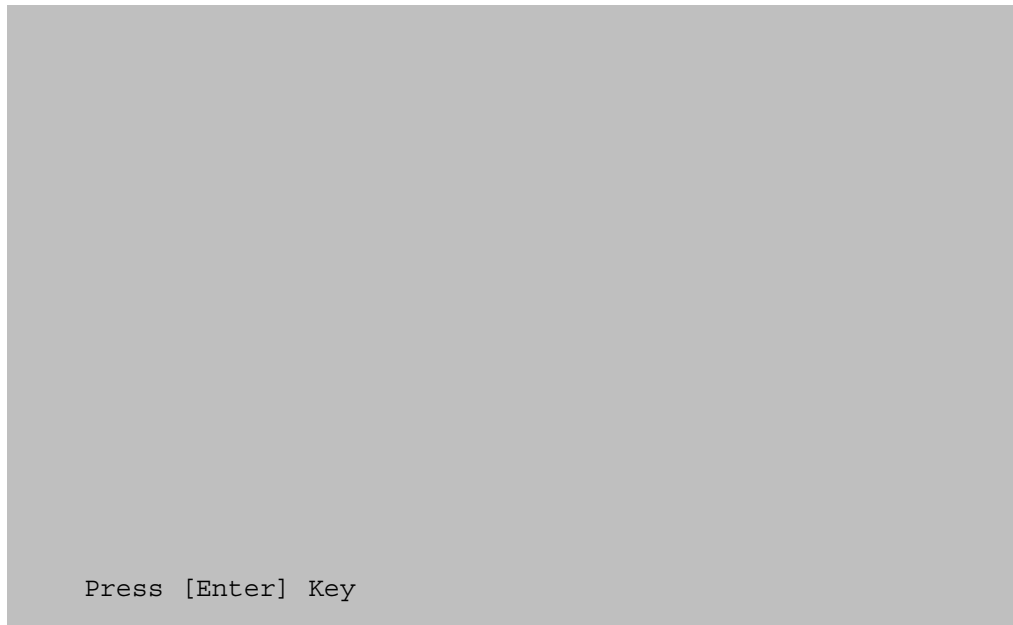
**NOTE:** The following screen does not display correctly. It will be amended in the next version.



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



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



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

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

Subtest 12    Color Tiling

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

Black	Red	Green	Blue
Gray	Red Gradation	Green Gradation	Blue Gradation
White	Red Gradation	Green Gradation	Blue Gradation

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

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

## 3.8 Floppy Disk Test

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

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

The Test Parameter menu displays after selecting each subtest of the Floppy Disk Test. Select the parameters to execute the test.

```
TEST PARAMETERS
Go To Test
Test Loop                NO
Error Stop               NO
Test Drive Number       1
Media Type               1.44MB
Test start track number 0
```

### 1. Go To Test

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

### 2. Test Loop

Select **YES** to set the test to run continuously until it is halted by the user. Select **NO** to return to the Floppy Disk Test menu after the test is complete.

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

If **YES** is selected for Test Loop on the Test Parameter menu, the Test Status screen displays, press **Ctrl + break** to return to the Floppy Disk menu.

### 3. Error Stop

Select **YES** to stop the test program when an error is found  
Select **NO** to keep the test running even if an error is found.

4. **Test Drive number**

```
Drive Number
 1&2  1  2
(1: A DRIVE  2:B DRIVE)
```

Select the drive number **1&2** , **1**, or **2** to be tested and press **Enter**.

5. **Media Type**

```
Media type
360KB  720KB  1.2MB  1.44MB
```

Select the media type for the floppy disk to be tested and press **Enter**.

6. **Test Start Track Number**

```
Test Start Track Number  (00-79) ?
```

Select the track where you want the test to start and press **Enter**. Pressing **Enter** without first specifying a track sets the start track to zero.

Subtest 01 Sequential Read

This subtest sequentially reads all the tracks on the floppy disk. The following tracks are read according to the media type in the floppy disk drive:

- Double-sided, double-density Tracks 0 to 39.
- Double-sided, high-density, double-track Tracks 0 to 79.

The start track is specified when the subtest is selected using the Test Parameter menu. Refer to Step 5 “Test Start Track Number” to set the start track.

Subtest 02 Sequential W/R/C

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

Subtest 03 Random Address/Data

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

Subtest 04 Write Specified Address

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

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

```
TEST DATA  ??  
TRACK NO   ??  
HEAD NO    ??
```

Subtest 05 Read Specified Address

This subtest reads data from a specified track and head.

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

```
TRACK NO   ??  
HEAD NO    ??
```

### 3.9 Parallel Port Test

To execute the Printer Test select **06** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Printer Test contains two subtests that test the output of the printer connected to the computer. Move the highlight bar to the subtest you want to execute and press **Enter**.

***NOTE:** An IBM-compatible printer must be connected to the system to execute this test.*

#### Subtest 01 Ripple Pattern

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

The following message displays when the Ripple Pattern test is selected:

```
Please select a Printer Size?(1:80 2:130)
```

Select **1** for 80 columns or **2** for 130 columns.

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

Subtest 02      Wraparound

**NOTE:** To execute this subtest, the parallel and serial ports must be enabled.

**NOTE:** To execute this subtest, a printer wraparound connector must be connected to the computer's printer port. The printer wraparound connector (34M741986G01) wiring diagram is shown below.

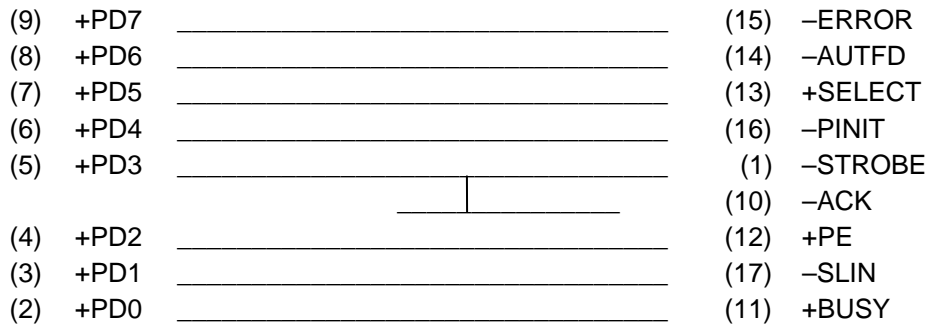


Figure 3-1 Parallel port wraparound connector

This subtest checks the output and bi-directional modes of the data, control status, and acknowledge lines through the printer wraparound connector.

**Test Process:**

1. Data line test
  - (a) Outputs a printer reset pulse to the printer control register (37AH).
  - (b) Outputs test data to the data register (378H).
  - (c) Inputs status from the parallel input port (37AH), and executes a comparison test with the test data.
  - (d) Inputs status from the printer status (379H), and executes a comparison test with the test data.

Test data :  
01H, 0EBH, 07H  
02H, 0E3H, 87H  
04H, 0EBH, 0A7H  
08H, 0EAH, 0C7H  
10H, 0EFH, 87H  
20H, 0E9H, 97H  
80H, 0EBH, 87H



2. Status line test

This test is the same as the data line test

3. ACK line test

This test checks the acknowledge line using INT 0FH.

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

*If **YES** is selected for Test Loop on the Test Parameter menu, the screen will remain blank while the test is executing. Press **Ctrl + break** to return to the Printer Test menu.*

### 3.10 Async Test

To execute the Async Test select **07** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Async Test contains two subtests that test the asynchronous communication functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

The subtests use the following data format:

Method: Asynchronous  
 Speed: 9600 BPS  
 Data: 8 bits and one parity bit (EVEN)  
 Data pattern: 20h to 7Eh

Subtest 01 Wraparound (Channel 1)

*NOTE: To execute this subtest, the parallel and serial ports must be enabled.*

*NOTE: To execute this subtest, a serial port wraparound connector (34M741621G01) must be connected to the system serial port. The RS-232-C wraparound connector wiring diagram is shown below .*

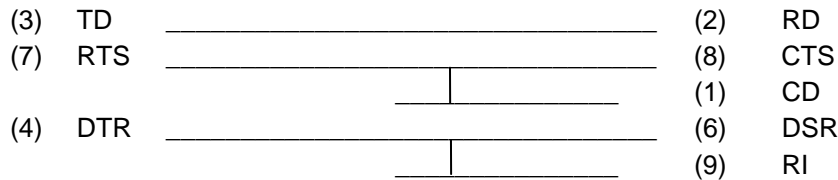


Figure 3-2 Serial port wraparound connector

This subtest checks the data send/receive function through the wraparound connector in channel 1. It also checks that the channel clock has the correct frequency.

**Test Process:**

1. Initial setup of test channel mode (INT 14H).
2. Test environment (INT 1CH: for timer wait, INT 0BH or INT 0CH: for confirmation that transmitting/receiving cuts in cutting in vector of each port).
3. Transmit Data (INT 14H).

4. Receive Data after confirmation of status.
5. Comparison of data transmitted/received.

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

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

Subtest 01      Wraparound (Channel 2)

Channel 2 is not supported in the Satellite L10 and Satellite Pro L10. If you try to execute this test an error will occur.

### 3.11 Hard Disk Test

To execute the Hard Disk Test select **08** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Hard Disk Test contains nine subtests that test the functions of the hard disk drive. Move the highlight bar to the subtest you want to execute and press **Enter**.

**NOTES:** *The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 08, or 09 is executed. Before running the test, transfer the contents of the hard disk to floppy disk.*

- 1. If MS-DOS 6.22/ Windows for Workgroups is selected, use the Master Diskette Creator (MDC) utility located in the Toshiba Utility folder to back up the preinstalled software. After backing up the preinstalled software, use the BACKUP command in the Toshiba Companion Utility to back up the entire disk, including the user's files.*
- 2. If Windows 95 is selected, check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) located in the System Tools folder. (This tool can be used only once.) If it still exists, use it to back up the preinstalled software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files*

*Refer to the appropriate instructions for each operating system.*

*A password is necessary to execute the Hard Disk Test. The password is: **hard disk***

When you select a subtest of the Hard Disk Test, the Test Parameter screen displays.

```
Test Parameters
Go To Test
Test Loop                Yes
Error Stop               Yes
Test Drive Number       1
HDC F/W error retry     Yes
Compare error dump      Yes
HDC status display      Yes
```

#### 1. **Go To Test**

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

#### 2. **Test Loop**

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

Select **NO** to return to the Hard Disk Test menu after the test is complete.

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

*If YES is selected for Test Loop, the Test Status screen displays. Press Ctrl + break to return to the Hard Disk Test menu.*

3. **Error Stop**

Select **YES** to stop the test program when an error is found.  
Select **NO** to keep the test running even if an error is found.

4. **Test Drive number**

Select the hard disk drive number **1&2, 1, or 2** to be tested and press **Enter**.

5. **HDC F/W error retry**

Select **YES** to select the retry operation when the hard disk controller detects an error.

Select **NO** to select the continue operation when the hard disk controller detects an error.

6. **Compare error dump**

Select **YES** to use error dump operation when a data compare error is detected.  
Select **NO** to use error dump operation when a data compare error is detected.

7. **HDC status display**

Select **YES** to display the HDD status on the screen.  
Select **NO** to not display the HDD status on the screen.

*NOTE: The ADDRESS indicate are LBA.*

Subtest 01      Sequential Read

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

Subtest 02      Address Uniqueness

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

- Forward sequential
- Reverse sequential
- Random

Subtest 03      Random Address Data

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

Subtest 04      Cross Talk and Peak Shift

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

**Data Pattern**

B5ADADH

4A5252H

EB6DB6H

149249H

63B63BH

9C49C4H

2DB6DBH

D24924H

Subtest 05      Write Specified Address

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

This subtest allows you to verify the errors from Subtest 01. It writes specified data to a specified LBA. Use the Log Utilities (see Section 3.21) to specify the LBA number where the error(s) occurred during Subtest 01. The following message displays on the screen to enter the test data, and Sector count.

```
TEST DATA            ??  
SECTOR COUNT        ?
```

Subtest 06      Read Specified Address

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

This subtest allows you to verify the errors from Subtest 01. It reads specified data (Subtest 06) from a specified LBA. Use the Log Utilities (see Section 3.21) to specify the LBA number where the error(s) occurred during Subtest 01. The following message displays on the screen to enter the test sector count.

SECTOR COUNT ?

Subtest 07 Sequential Write

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

TEST DATA ??

Subtest 08      W-R-C Specified Address

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

```
TEST DATA   ??? (=37b3H)
SECTOR COUNT ?
```

Subtest 09      Unclip

***NOTE:*** *This subtest is designed to run with the Test Loop set to NO. This subtest is a **debug tool**.*

This subtest sets the native address.



### 3.12 Real Time Clock Test

To execute the Real Time Clock Test select **09** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Real Time Clock Test contains three subtests that test the computer's real time functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

#### Subtest 01 Real Time

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

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

```
[ REAL TIME TEST ]  
  
Current date : xx-xx-xxxx  
Current time : xx:xx:xx  
  
Enter new date : xx-xx-xxxx  
Enter new time : xx:xx:xx  
  
Press [Enter] key to exit test
```

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

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

**NOTE:** If **NO** is selected for Test Loop on the Test Parameter menu, the Real Time Clock Test menu displays.  
If **YES** is selected for Test Loop on the Test Parameter menu, the screen above displays and the test is executed again. Press **Ctrl + break** to return to the Real Time Clock Test menu.

Subtest 02 Backup Memory

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

Subtest 03 Real Time Carry

<p><b>CAUTION:</b> <i>When this subtest is executed, the current date and time are reset.</i></p>
---

This subtest checks the clock's carry function.

```
[ REAL TIME CARRY TEST ]  
  
Current date : 12-31-1994  
Current time : 23:59:55  
  
Press [Enter] key to exit test
```

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

```
[ REAL TIME CARRY TEST ]  
  
Current date : 01-01-1995  
Current time : 00:00:01  
  
Press [Enter] key to exit test
```

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

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

### 3.13 Cache Memory Test

To execute the Cache Memory Test select **10** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Cache Memory Test contains eight subtests that test the computer's cache memory. Move the highlight bar to the subtest you want to execute and press **Enter**.

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

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

#### Subtest 01 Constant Data Test

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

#### Subtest 02 Address Pattern Test

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

#### Subtest 03 Increment/Decrement Test

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

Subtest 04 Bit Shift Pattern Test

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

Subtest 05 Write Disturb Test

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

Subtest 06 Checker Board Test

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

Subtest 07 Marching Test

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

Subtest 08 Working Data Test

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

### 3.14 High Resolution Display Test

To execute the High Resolution Display Test select **11** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The High Resolution Display Test contains eight subtests that test the computer's high resolution video display. Move the highlight bar to the subtest you want to execute and press **Enter**.

#### Subtest 01 VRAM W/R/C Test

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

#### Test Process:

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

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

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

Subtest 02 640\*480 Mode Display

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

[ 640\*480 64 ]

Press [ Enter ] key

256 letter types indication

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

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

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

Subtest 03 800 \* 600 Mode Display

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

[ 800\*600 256 ]

Press [ Enter ] key

256 letter types indication

WHITE	0----+---1----+---2----+---3----+---4----+---5----+---6---	256 gradations
RED		256 gradations
GREEN		256 gradations
BLUE		256 gradations

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

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

Subtest 04 1024\* 768 Mode Display

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

[ 1024\*768 64 ]

Press [ Enter ] key

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

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

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



Subtest 05 1280\* 1024 Mode Display

This subtest uses 1280\*1024 video resolution to display a high resolution white frame, 256 letter types (8\*16 pixels) and 64 gradations of white, red, green, and blue as shown below.

[ 1280\*1024 64]

Press [ Enter ] key

256 letter types indication

0-----1-----2-----3-----4-----5-----6--

WHITE	64 gradations
RED	64 gradations
GREEN	64 gradations
BLUE	64 gradations

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

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

Subtest 06 1600\* 1200 Mode Display

This subtest uses 1600\*1200 video resolution to display a high resolution white frame, 256 letter types (8\*16 pixels) and 256 gradations of white, red, green, and blue as shown below.

[ 1600\*1200 256]      Press [ Enter ]key

256 letter types indication

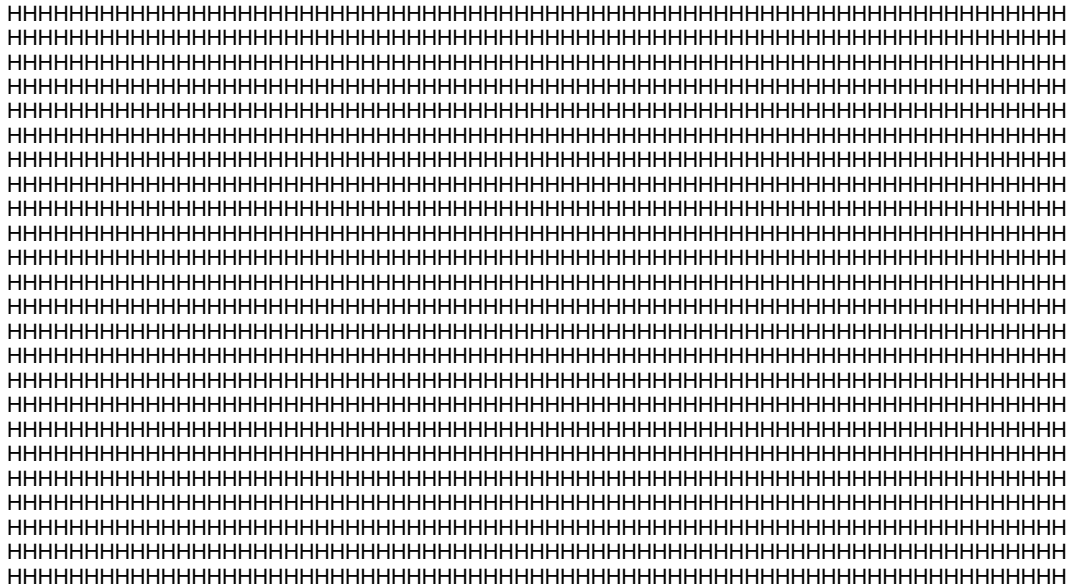
	0-----1-----2-----3-----4-----5-----6----- 256 gradations
WHITE	256 gradations
RED	256 gradations
GREEN	256 gradations
BLUE	

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

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

Subtest 07 “H” Pattern Display

This subtest uses the 1024\*768 Mode to display a high resolution white frame, “H” letters (8\*16 pixels fonts), at 128 letters by 48 lines.

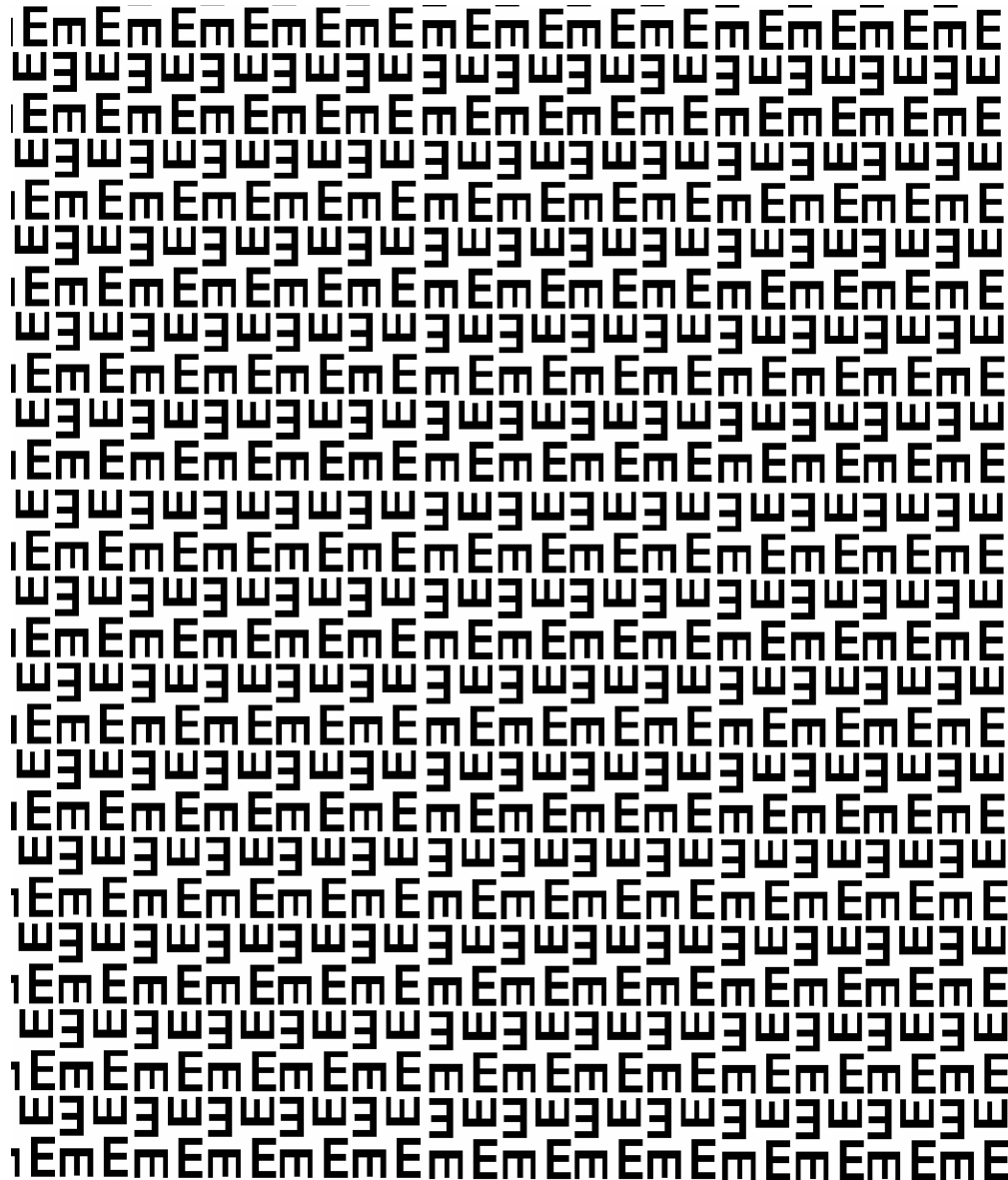


To exit this subtest and return to the High Resolution Display Test menu:

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

Subtest 08 Focus Test ( "E" Pattern)

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



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

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

### 3.15 Multimedia Test

To execute the Multimedia Test select **12** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The Multimedia Test contains four subtests that test the computer's multimedia functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

***NOTE:** Use the Toshiba Backup CD-ROM for Subtests 01, 02, and 03.*

Subtest 01 Sequential Read Test

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

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

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

Subtest 02 Random Read Test

This subtest randomly reads all addresses.

Subtest 03 Read Specified Address Test

This subtest reads data from a specified block of addresses.

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

START BLOCK ADDRESS ?  
END BLOCK ADDRESS ?

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

*NOTE: Use CD-R or CD-RW, the CD-ROM and DVD cannot be used for this subtest.*

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

### 3.16 USB Test

**NOTE:** This subtest used a test fixture. The test fixture was made by CATC. Please refer to the description of CATC for the details of a test.

When you cannot prepare a test fixture, please check by Windows.

To execute the USB Test select **13** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The USB Test contains five subtests.

Subtest 01     Execute USB HPT test (DID:24x2)

This subtest is used with Subtest 01 described above. This subtest receives the ASCII characters from the send machine, then sends the data back.

Subtest 02     Execute USB HPT test (DID:24x4)

This subtest is used with Subtest 01 described above. This subtest receives the ASCII characters from the send machine, then sends the data back.

Subtest 03     Execute USB HPT test (DID:24x7)

This subtest is used with Subtest 01 described above. This subtest receives the ASCII characters from the send machine, then sends the data back.

Subtest 04     Execute USB UPDT test (3 ports)

This subtest is used with Subtest 01 described above. This subtest receives the ASCII characters from the send machine, then sends the data back.

Subtest 05     Execute USB UPDT test (1 ports)

This subtest is used with Subtest 01 described above. This subtest receives the ASCII characters from the send machine, then sends the data back.

### 3.17 MEMORY2 Test

To execute the Expansion Test select **14** from the Diagnostic Test Menu, press **Enter** and follow the directions on the screen. The MEMORY2 Test contains four subtests that test the computer's. Move the highlight bar to the subtest you want to execute and press **Enter**.

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

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

Subtest 01 All one/All zero test

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

```
FFFFFFFFFFFFFFFFF0000000000000000000
0000000000000000FFFFFFFFFFFFFFFFF
```

Subtest 02 Walking 1/Walking 0 test (Left)

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

```
7FFF7FFF7FFF7FFF8000800080008000
BFFFBFFFBFFFBFFF4000400040004000
```

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

Subtest 03 Walking 1/Walking 0 test (Right)

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

```
80008000800080007FFF7FFF7FFF7FFF
4000400040004000BFFFBFFFBFFFBFFF
```

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



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

7FFF7FFF7FFF7FFF8000800080008000  
BFFFBFFFBFFFBFFF4000400040004000  
DFFFDFFFDFFFDFFF2000200020002000

FFFBFFFBFFFBFFFB0004000400040004  
FFFDFFFDFFFDFFFD0002000200020002  
FFFFFFFFFFFEE0001000100010001  
80008000800080007FFF7FFF7FFF7FFF  
4000400040004000BFFFBFFFBFFFBFFF

0004000400040004FFFBFFFBFFFBFFFB  
0002000200020002FFFDFFFDFFFDFFFD  
0001000100010001FFFFFFFFFFFEE

### 3.18 Error Codes and Error Status Names

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

Table 3-3 Error codes and error status names (1/4)

Device Name	Error Code	Error Status Name
(Common)	FF	Data Compare Error
System	01	ROM Checksum Error
Memory	01	Parity Error
	02	Protected Mode Not Changed
	14	Memory Read/Write Error
Keyboard	01	Clock Line Error L
	02	Clock Line Error H
	03	Data Line Error L
	04	Data Line Error H
	07	Interface Error
	08	Resending Error
	09	ID Error
FDD	01	Bad Command Error
	02	Address Mark Not Found
	03	Write Protected
	04	Record Not Found
	06	Media Change Line Error
	08	DMA Overrun Error
	09	DMA Boundary Error
	10	CRC Error
	20	FDC Error
	40	Seek Error
	60	FD Not In Drive Error
	80	Time Out Error
	EE	Write Buffer Error
0C	Select Media Error	

Table 3-3 Error codes and error status names (2/4)

Device Name	Error Code	Error Status Name
Parallel Port	01	Time Out
	08	Fault
	10	Select Line
	20	Out of Paper
	40	Power Off
	80	Busy Line
	FE	Acknowledge Interrupt Error
Async	01	DTR On Time Out
	02	CTS On Time Out
	04	RX-READY Time Out
	08	TX-BUFFER Full Time Out
	10	Parity Error
	20	Framing Error
	40	Overrun Error
	80	Line Status Error
	88	Modem Status Error
	EE	Clock Error
	FE	SIO DIP Switch Select Error
HDD	01	Bad Command Error
	02	Bad Address Mark Error
	04	Record Not Found
	05	HDC Not Reset Error
	07	Drive Not Initialized
	09	DMA Boundary Error
	0A	Bad Sector
	0B	Bad Track Error
	10	ECC Error
	11	ECC Recover Enabled
	20	HDC Error
	40	Seek Error
	80	Time Out Error
	90	Motor On/Off Error
	AA	Drive Not Ready
	BB	Undefined Error

*Table 3-3 Error codes and error status names (3/4)*

<b>Device Name</b>	<b>Error Code</b>	<b>Error Status Name</b>
HDD	CC	Write Fault
	E0	Status Error
	F0	No Sense Error
Cache Memory	02	Protect Mode Error
	03	Caching Error
Multimedia	01	Bad Command
	02	Illegal Length
	03	Unit Attention
	04	Media Change Request
	05	End Of Media Detect
	06	Check Condition
	07	Joystick Not Connected
	08	Check Condition or Bad Command
	09	64KB Boundary Error
	0A	Check Joystick Or Port
	11	Corrected Data Error
	20	Drive Not Ready
	40	Seek Error
80	Time Out	
90	Reset Error	

*Table 3-3 Error codes and error status names (4/4)*

<b>Device Name</b>	<b>Error Code</b>	<b>Error Status Name</b>
USB	01	Response Code Error
	02	Line Status Echo Timeout
	03	Line Status Response Timeout
	04	CTS On Timeout
	05	TX Entry Timeout
	06	Overrun Error
	07	Parity Error
	08	Flaming Error
	09	DSR On Timeout
	0F	Check Condition Or Bad Command
	13	Initialize Error
	14	Transmit Error
	15	Receive Data Set Error
	16	Data Compare Error
	17	RX Ready Timeout
	20	Execution Error
	21	File Access Error
22	Card Type Error	
23	TV Channel Not Detected	

## **3.19 Running Test**

### **3.19.1 Function Description**

This function automatically executes the following tests in sequence:

1. System Test (Subtest 01)
2. Memory Test (Subtest 01, 02, 03 and, 04))
3. Display Test (Subtest 01, 02, 03, 04, 05, 06,07 and, 08)
4. Floppy Disk Test (Subtest 02)
5. Hard Disk Test (Subtest 01 and 02)
6. Real Time Clock Test (Subtest 02)

The system automatically detects the number of FDDs connected to the computer for the Floppy Disk Test.

**NOTE:** *The above subtests are the default tests used in the Running Test. You may add or delete subtests using the Running Test Edit Item function, see Section 3.23.*

### **3.19.2 Operations**

**NOTE:** *Do not forget to insert a work disk in the FDD. If a work disk is not inserted an error will be generated during the Floppy Disk Test.*

**NOTES:**

1. *If the test completes successfully an “OK” sign with red letters displays on the screen.*
2. *If the test fails or is interrupted before completion an “NG” sign with red letters displays on the screen.*
3. *All errors which occur during execution of the Running Test are logged in the Log File.*

1. Remove the diagnostics disk from the floppy disk drive and insert the work disk.

2. Select **05** from the Diagnostics Menu and press **Enter**, the following message displays:

```
Mount the work disk on the drive,  
then press [Enter] key.  
[Warning : The contents of the disk,  
will be destroyed.]
```

3. This program is executed according to the *Count Loop* number selected in the Running Test Edit Item, see Section 3.23. To terminate the program, press **Ctrl + Break**.

## 3.20 CHECK DMI INFOEMATION

Select **03** from the Diagnostics Menu and press **Enter** to display the following DMI Information Data:

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

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

### **System information (Type 1)**

1. Manufacture : TOSHIBA
2. Product Name : Satellite XXXXXX
3. Version : (TOSHIBA Part Number)
4. Serial Number : Serial Number
5. UUID Number: xx

### **OEM Strings (Type 11)**

1. OEM String : xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

### **On Board LAN MAC**

### **DVD Region Code**

1. User Change Time : X
2. Region Code : X





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

The **1** key scrolls the display to the next page.

The **2** key scrolls the display to the previous page.

The **3** key returns to the Diagnostics Menu.

The **4** key erases all error log information in RAM.

The **5** key outputs the error log information to a printer.

The **6** key reads the log information from a floppy disk.

The **7** key writes the log information to a floppy disk.

3. In the case of an "error retry ok" a capital "R" will be placed at the beginning of the error status. However it is not added to the error count.

The following are the test abbreviations for each Diagnostics Test.

<b>Test Name</b>	<b>Test Abbreviations</b>
System Test	ROM
Memory Test	RAM
Keyboard Test	KBD
Display Test	CRT
Floppy Disk Test	FDD
Parallel Port Test	PRT
Async Test	RSC
Hard Disk Test	HDD
Real Time Clock Test	RTM
Cache Memory Test	CAH
Height Resolution Display Test	KIF
Multimedia Test	MLT
USB Test	USB
Memory2 Test	RAM

## 3.22 System Configuration

### 3.22.1 Function Description

**NOTE:** This module will be enhanced in the next release.

The System Configuration program contains the following configuration information for the computer:

2. BIOS ROM version
3. The main memory size
4. The number of floppy disk drives
5. The number of async ports
6. The number of hard disk drives
7. The number of printer ports
8. The expansion memory
9. The CPU
10. The LCD Type(Cannot support)
11. The Video chip Vender
12. The Number of ODD drives
13. The Wireless LAN
14. The BlueTooth

### 3.22.2 Operations

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

```
SYSTEM CONFIGURATION :  
  
* - BIOS ROM VERSION = VX.XX  
* - XXKB MEMORY  
* - 1 FLOPPY DISK DRIVE(S)  
* - 2 ASYNC ADAPTER  
* - 1 HARD DISK DRIVE(S)  
* - 1 PRINTER ADAPTER  
* - XXXMB EXPANSION MEMORY  
* - XXX CPU  
* - 1 MATH CO-PROCESSOR
```

Press [Enter] Key

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

### 3.23 Running Test Edit Item

#### 3.23.1 Function Description

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

```

KEY OPERATION
↓      Cursor Down
↑      Cursor Up
PgDn   Page Down
PgUp   Page Up
Home   Top of ITEM
End    End of ITEM
Ins    Insert ITEM
Del    Delete ITEM
Enter  End
    
```

#### 3.23.2 Operation Description

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

```

                                Test Item Editor                                [RUNNING TEST]
Loop Count (1-65534, 0 = xxxxxxxx)  Error Stop 

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

Tab: HELP (Key Operation)

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

Select a number from 1 to 65534 to define the number of times the Running Test executes.

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

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

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

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

<p><i><b>NOTE:</b> All errors which occur during execution of the Running Test are logged in the Log File.</i></p>
--

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

Do you want to save the data?

Save to disk  
Save to memory  
Do not save

7. Select the option and press **Enter**.

8. The following message displays:

Do you want to save the parameter data?

Save to disk  
Do not save

9. Select the option and press **Enter**.

10. Select **03** from the Diagnostics Menu and press **Enter** to execute the Running Test.

## 3.24 Common Tests and Operation

### 3.24.1 How to operate a window

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

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

### 3.24.2 How to Stop the Test Program

To stop a test:

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

### 3.24.3 Test Status Screen

***NOTE:** The Test Status Screen does not display during all the tests. See the specific test description Sections 3.4 through 3.18.*

The following Test Status screen displays during most tests. See the description of each test Sections 3.4 through 3.18 for specific screen information.

Test Name	Test Stage	Test Information
Sub Test :0101		
Pass Count :0000	Error Count :0000	
Write Data :0000	Read Data :0000	
Address :000000	Status :0000	Details :0000

Test Name Displays the name of the test being executed.

Test Stage Displays the test stage:

IN PROGRESS ---Displays during test execution.

COMPLETED ---Displays after test completion.

ABORTED ---Displays for an abnormal finish.

Test Information Displays test information in the following format:

aabbcddee  
aa = Test No.  
bb= Sub-test No.  
c = Drive No.  
d= Unit No.  
ee = Status

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

ffgg  
ff = Subtest No.  
gg= Step Number (Will be blank if the test does not have a Step Number.)

Pass Count Displays the number of times the test has been executed.  
Error Count Displays the number of errors which have occurred during the test.  
Write Data Displays only the test data that has failed to compare during the test while being written during the test.  
Read Data Displays test data that has failed to compare during the test while being read during the test.  
Test Address Displays the Test Address. (The format differs for each test.)  
Drive No. Displays the drive used for the test.  
Error Status Displays the error status.  
Error Details Displays the error details. (If no details, it will be blank.)  
Error Name Displays the name of the error.

### **3.24.4 Test Stop Display**

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

[HALT OPERATION]

1. Test end
2. Continue
3. Retry

\* Select 1, 2, or 3

The three selections have the following functions:

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

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

### **3.24.5 How to enter data**

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

**[a] [Enter]**

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

**[Ctrl] + [c]**

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



## 3.25 DMI Tool

**NOTE:** When you write DMI data, please be sure to turn off PC.

Otherwise, the correct DMI data cannot be displayed when you use DMIINF.EXE

DMI Tool consists of two following programs.

1. DMI Data Write
2. DMI Data Read

### 3.25.1 DMI Data Write

This program can be used when writing the following DMI data.

Program name is QDMI.EXE (By Quanta)

- 1.PA Number
- 2.Product Name
- 3.Serial Number
- 4.PV Number
- 5.Manufacture Name

The sample of input data is shown below.

PA Number : PSL10E-00D009DK  
Product Name : Satellite L10  
Serial Number : Y4012359W  
PV Number : SL100D009DK  
Manufacture Name : TOSHIBA

### 3.25.2 DMI Data Read

This program can be used when reading the DMI data for check. This program has option parameter.

Program name is DMIINF.EXE [F/f]

[F/f] : Screen data can be outputted to text file.

The file name is created by the serial number currently written to DMI.

When the serial number is not written to DMI, a file name is created by DMI\_INFO.TXT.

The sample of text file is shown below.

```
<< DMI Information Display : V1.00 >>    (c)Copyright TOSHIBA Corp. 2004-  
Manufacturer = TOSHIBA  
Product Name = Satellite L10  
Version      = 1EW3BYG0106  
Serial Number = Y4012416W  
OEM Strings #1 = ESL15E-00500HDU_EW3_TEST_PV_NUM_  
UUID = 802AC4A18D27D911A3D200C09F5E0ABB
```

---

## **Chapter 4**

# **Replacement Procedures**

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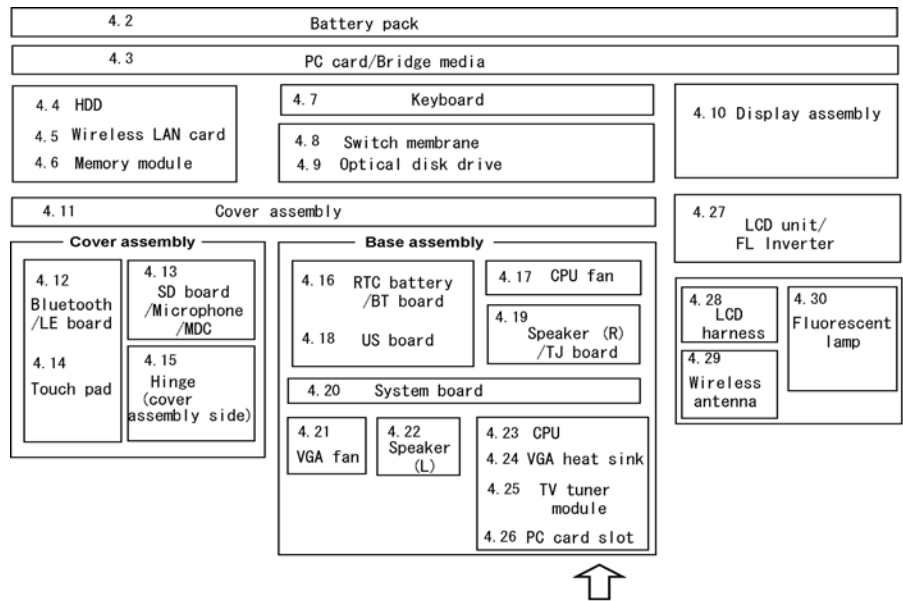
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## 4.1 Overview

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

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

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

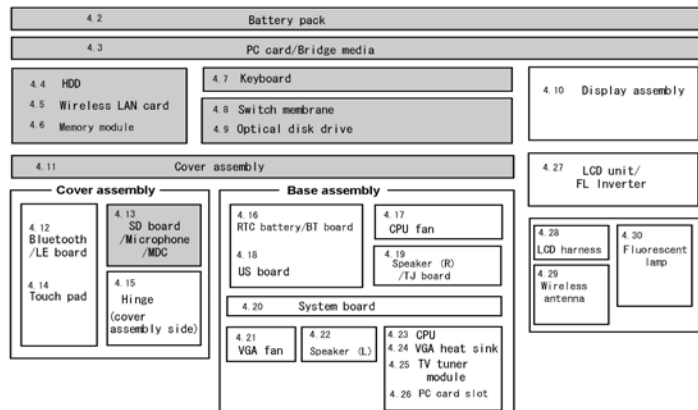


- Chart Notation

The chart shows the case for the following example:

- Removing a MDC

All FRUs down to the “4.2 Battery pack” to “4.11 Cover assembly” above a SD board/Microphone/MDC must be removed.





## **Safety Precautions**

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

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

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

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

## **Before You Begin**

Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section “4.2.1 Battery Pack”.

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

## **Disassembly Procedure**

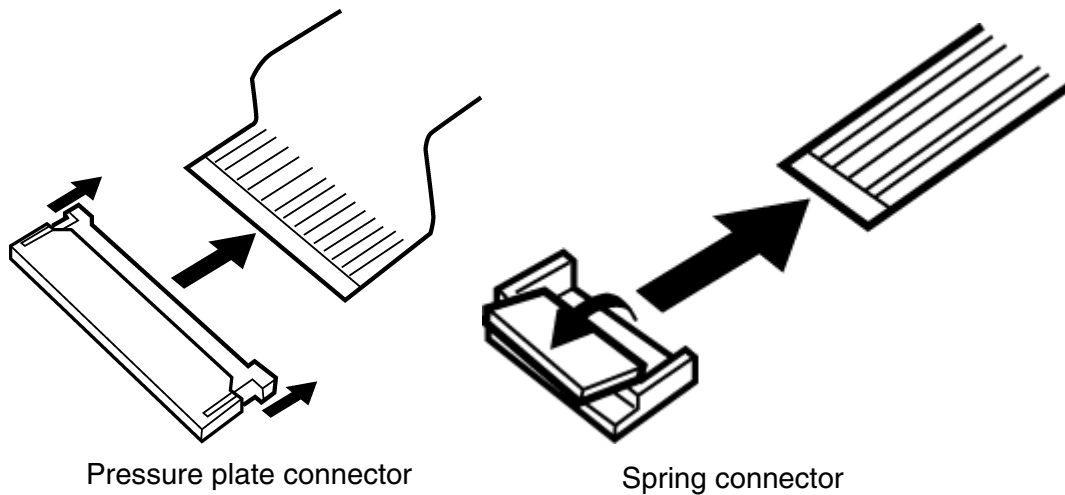
Three main types of cable connector are used.

- Pressure plate connector
- Spring connector
- Normal pin connector

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

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

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



## **Assembly Procedure**

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

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

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

After installing FRUs, check that the computer operates correctly.

## **Tools and Equipment**

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

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

## Screw Tightening Torque

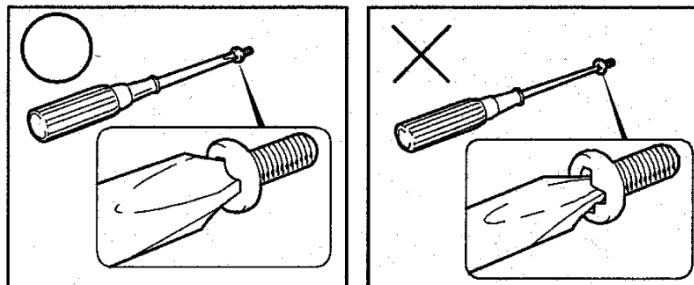
Use the following torque when tightening screws.

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

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

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

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



## Grip Color

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

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



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

## **Screw Notation**

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

Format:

Screw shape + Screw length (mm)

Screw shape

B: Bind screw

F: Thin head screw

S: Super thin head screw

T: Tapping screw

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

Example: B6 ... 6mm bind screw

## **4.2 Battery pack**

### **Removing the battery pack**

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

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

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

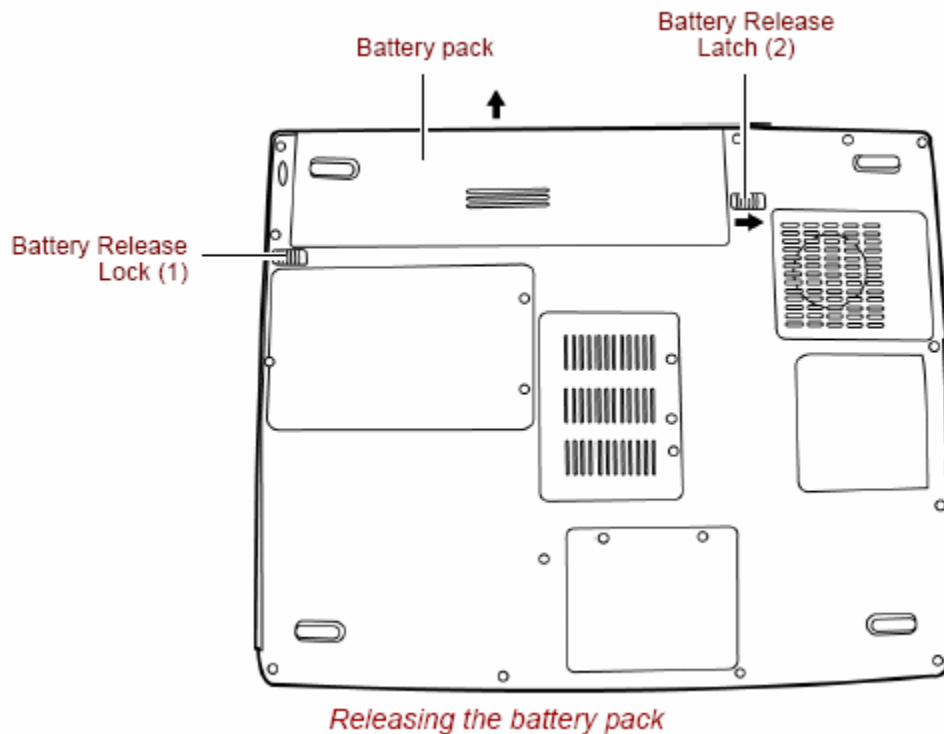


Figure 4-1 Removing the battery pack

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

### Installing the battery pack

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

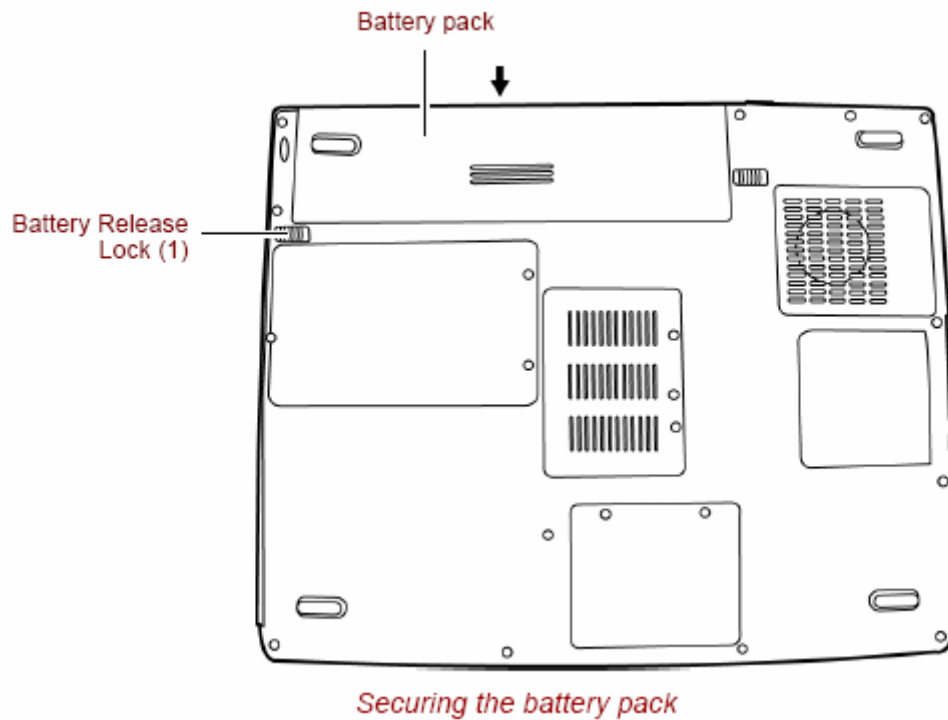
**CAUTION:** There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispose always the used battery pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.

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

1. Turn off the power of the computer.



2. Disconnect the AC adapter and all external devices from the computer.
3. Attach the **battery cover** to the **battery pack**.
4. Insert the battery pack
5. Ensure the battery release lock (1) is moved into its locked position



## 4.3 PC card

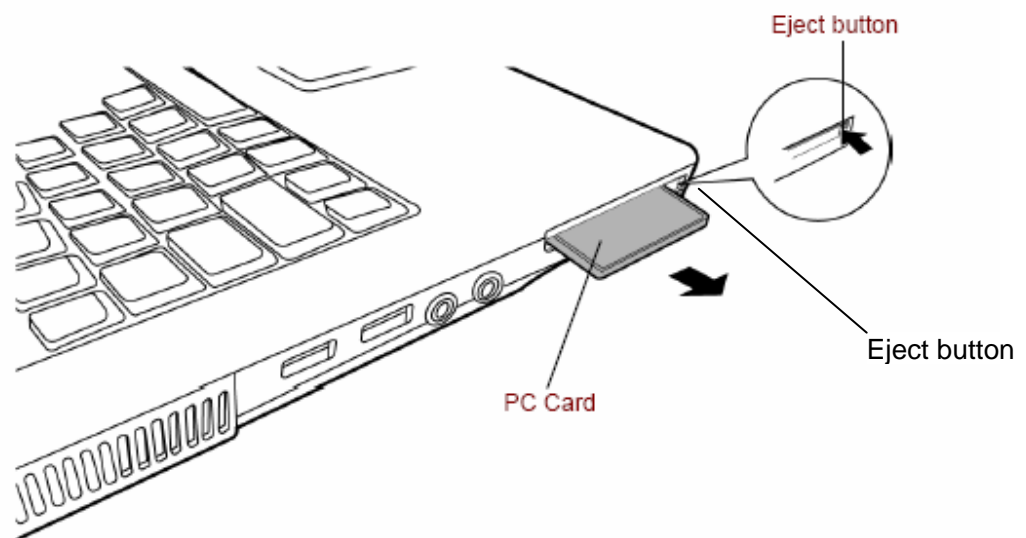
### Removing a PC card

The following describes the procedure for removing a PC card (See Figure 4-2).

**CAUTION:** Insert or remove a PC card in accordance with any instructions in a PC card manual or the manuals of the computer system you are using.

1. Push the **eject button**. It will pop out when you release it. Then press the eject button once more to eject a PC card.
2. Grasp a **PC card** and remove it.

**NOTE:** If a PC card is not inserted all the way, the eject button may not pop out. Be sure to push a PC card firmly and press the eject button again.



Removing the PC Card

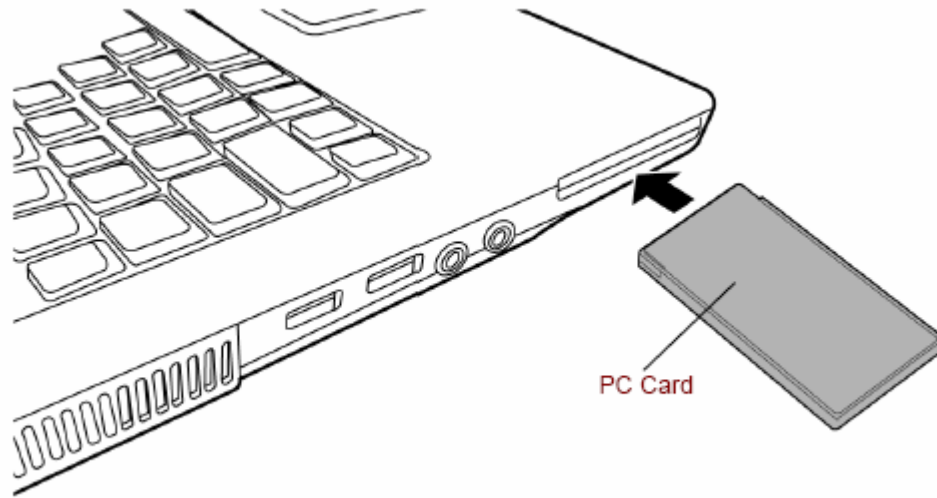
Figure 4-2 Removing a PC card

### Installing a PC card

The following describes the procedure for inserting a PC card (See Figure 4-2).

1. Make sure the **eject button** does not stick out.

2. Insert a **PC card** and press it until it is securely connected.



*Inserting the PC Card*

## **4.4 HDD**

### **Removing a HDD**

The following describes the procedure for removing a HDD (See Figure 4-4 to 4-5).

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

1. Turn the computer upside down.
2. Remove the following **screws** securing a HDD slot cover and remove a **HDD slot cover**.
  - M2.5×4.0B      FLAT BIND screw      x2
3. Remove the following **screws** securing the **HDD assembly**.
  - M2.5×4.0B      FLAT BIND screw      x 1
4. Disconnect the **HDD assembly** from the connector on the system board **CN18**.

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

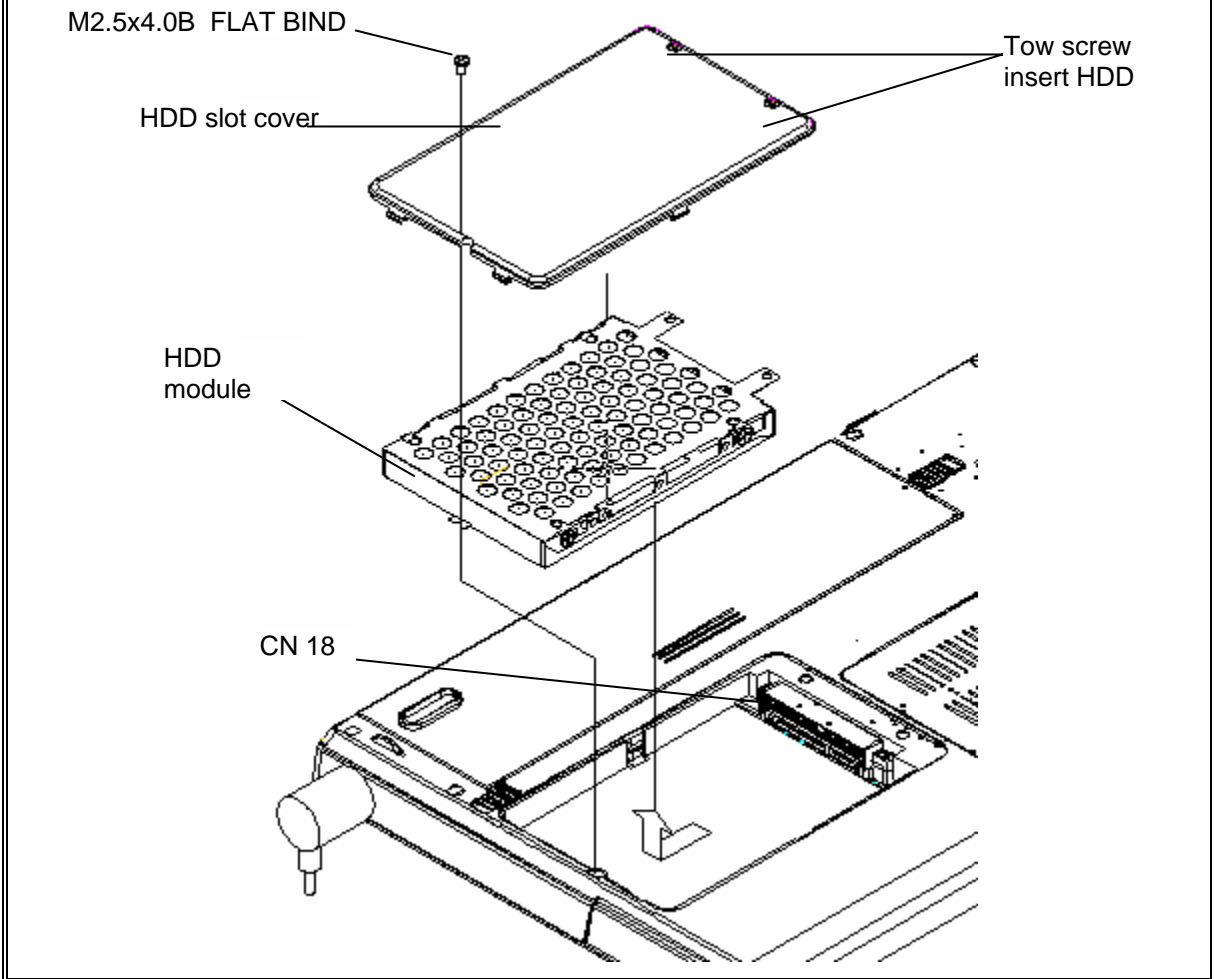
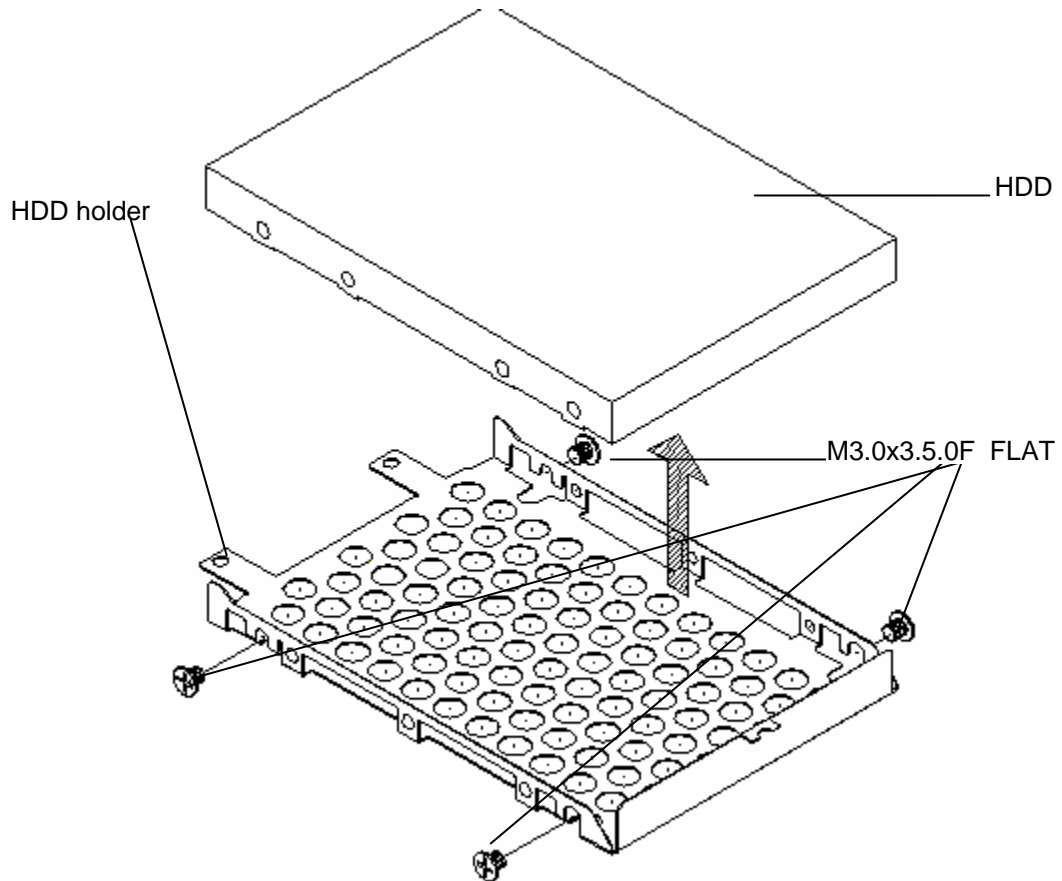


Figure 4-3 Removing the HDD assembly

5. Remove the following **screws** securing the HDD holder and remove the **HDD holder**.

- M3.0×4.0B FLAT BIND screw x4



*Figure 4-5 Removing a HDD*

## **Installing a HDD**

The following describes the procedure for installing a HDD (See Figure 4-4 to 4-5).

1. Install a HDD to the **HDD holder** and secure it with the following **screws**.

- M3.0×3.5F FLAT BIND screw x4

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

2. Insert the **HDD assembly** into the HDD slot and connect it carefully to the **CN18** on the system board.
3. Secure the **HDD assembly** with the following **screw**.

- M2.5×4.0B FLAT BIND screw x1

## 4.5 Wireless LAN card

### Removing a Wireless LAN card

The following describes the procedure for removing a Wireless LAN card (See Figure 4-6).

1. Remove the following **screw** of wireless cover securing **wireless LAN card cover** and remove it.
  - 2.5.0 x 4.0B BIND screw x2
2. Disconnect the **wireless LAN antenna cable Main** (Black cable) and **AUX** (White cable) from the connectors on a wireless LAN card.
3. Open the left and right latches holding a wireless LAN card and remove a **wireless LAN card** from the **connector CN27** on the system board.

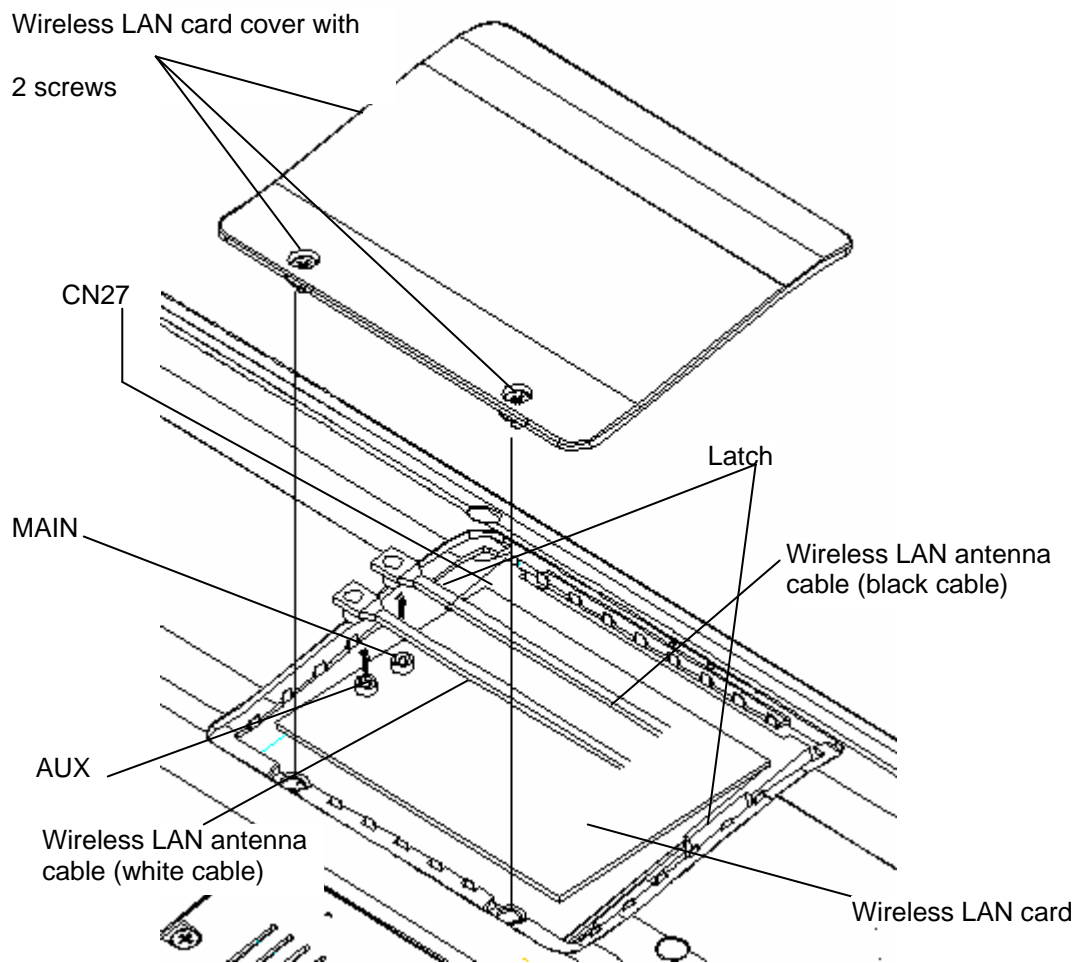


Figure 4-6 Removing a wireless LAN card



### **Installing a Wireless LAN card**

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

1. Insert a **wireless LAN card** terminals slantwise into the connector **CN27** on the computer and press a wireless LAN card until it is securely in place.
2. Connect the **wireless LAN antenna cables** (black and white) to the terminals on a wireless LAN card.
3. Install the **wireless LAN card cover** and secure it with the following **screw**.

## 4.6 Memory module

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

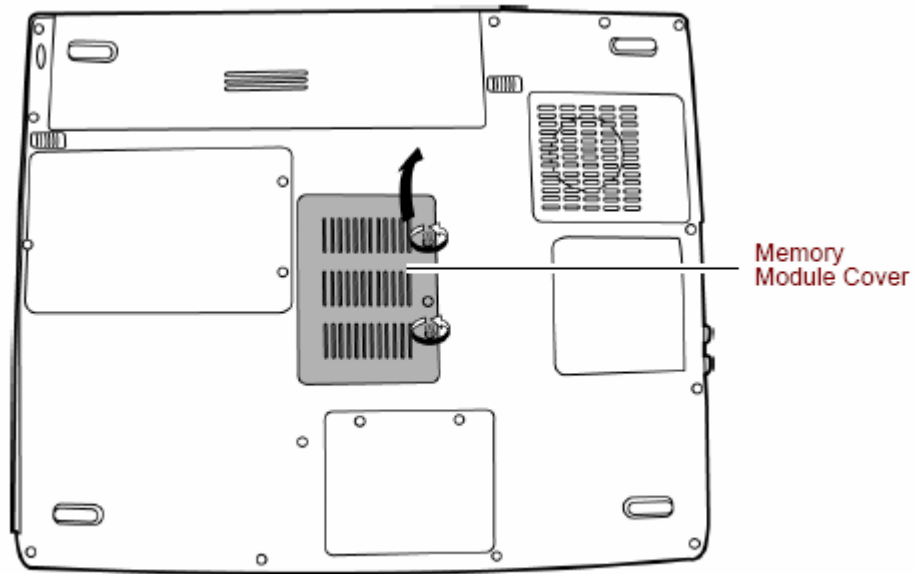
*Do not touch memory module terminals. Any dirt on the terminals may cause memory access problems.*

*Never press hard or bend a memory module.*

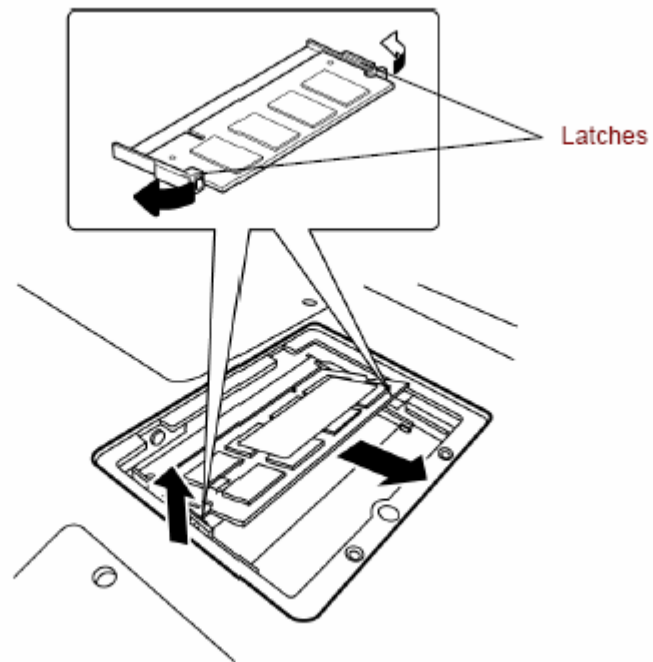
### Removing a memory module

To remove a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-8).

1. Loosen the **screw** securing the **memory slot cover**.
2. Remove the **memory slot cover**.
3. Open the left and right **latches** and remove a **memory module**.



Removing the memory module cover



Removing the memory module

Figure 4-4 Removing a memory module

## **Installing a memory module**

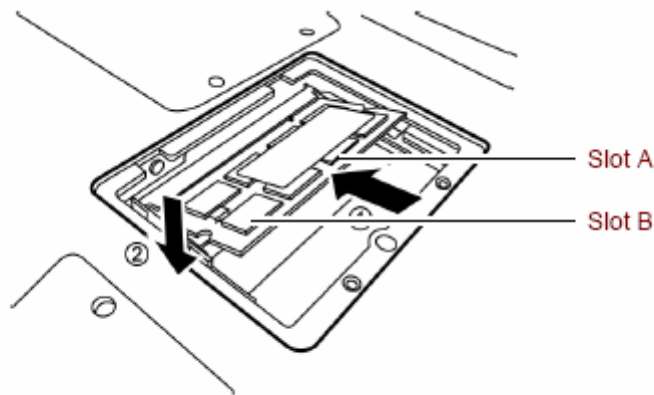
To install a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-8).

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

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

*Never press hard or bend a memory module.*

2. Install the **memory slot cover** and secure it with the **screw**.
3. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.
4. If the memory is not detected, check that it is connected correctly.



*Installing the memory module*

## **4.7 Keyboard**

### **Removing the keyboard**

The following describes the procedure for removing the keyboard (See Figure 4-9 to 4-11).

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

1. Turn the computer upside down
2. Loose the **screw** securing KBD cover.  
M2.0x3.0B                  Flat BIND screws x2
3. Loose the **screw** securing keyboard.  
M2.5x6.0B                  Flat BIND screws X2
4. Upside down the computer.
5. Open the display.
6. Remove KBD cover. Insert your finger into the slot between the keyboard cover and the keyboard. Then, lift up the **keyboard cover** to remove it.
7. Insert your finger into the keyboard slot and keyboard. Then lift up the keyboard to remove it.
8. Disconnect keyboard cable.

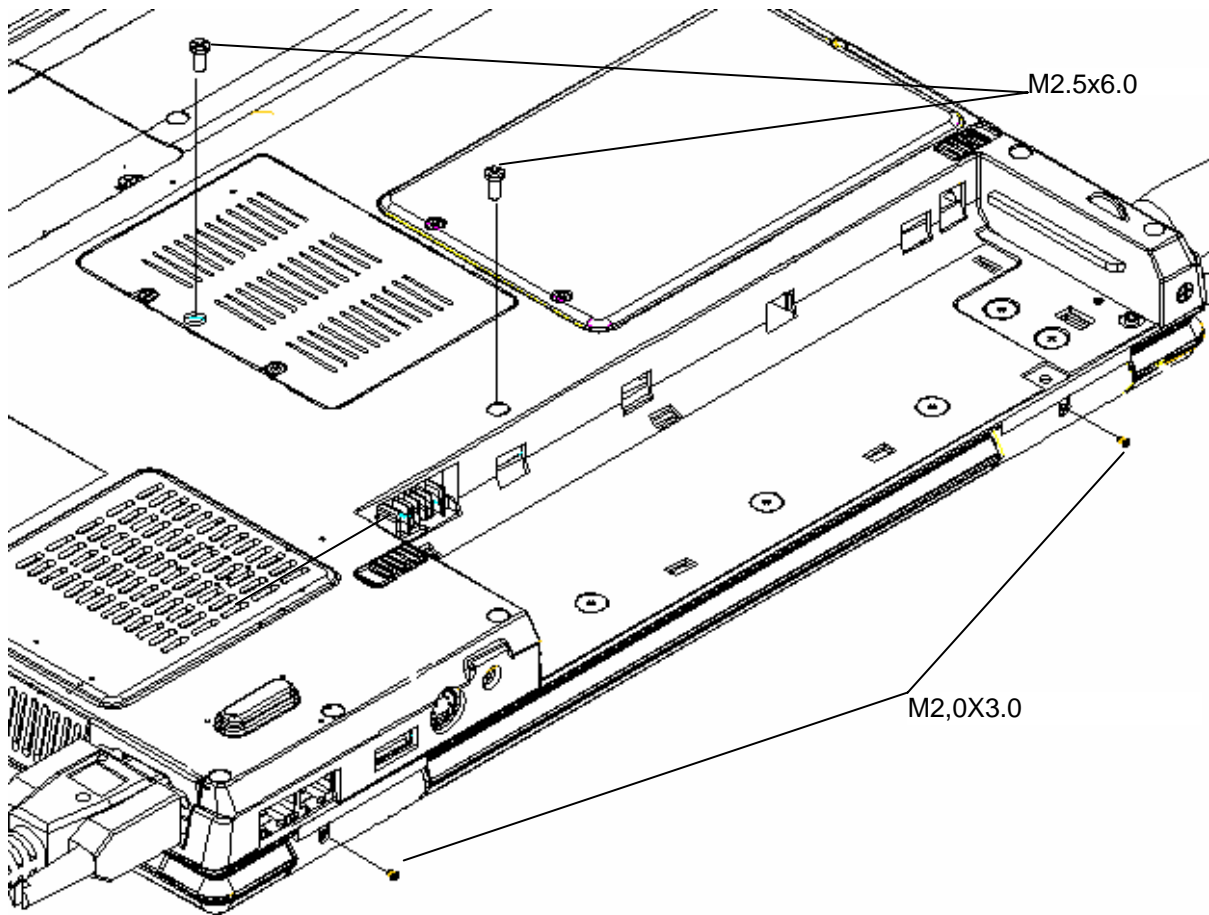
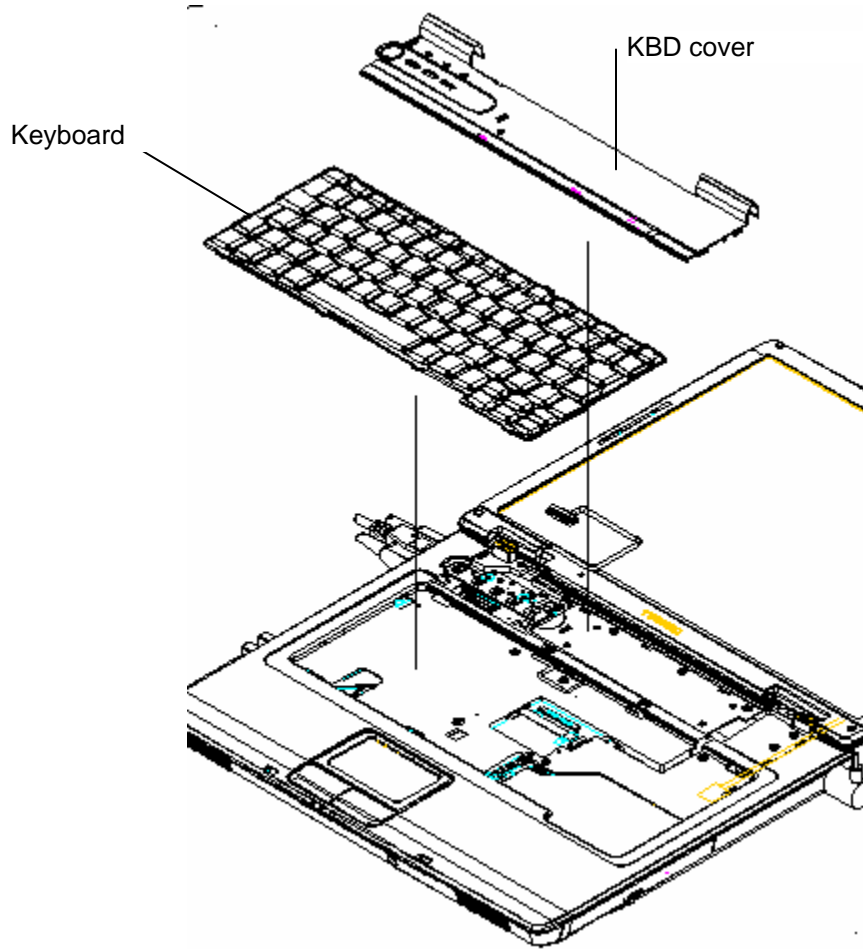


Figure 4-5 Removing screws for KBD cover/keyboard



*Figure 4-6 Removing the keyboard/KBD cover*

## **Installing the keyboard**

The following describes the procedure for installing the keyboard (See Figure 4-9 to 4-110).

1. Turn the **keyboard** upside down and place it on the palm rest as its face down.  
Connect the **keyboard flexible cable** to the connector **CN3200** on the system board.
2. Install the **keyboard support plate** and secure it with the following **screws**.
  - M2.5×8.0B FLAT BIND screw x2
3. Turn the **keyboard** face up and put it on the computer. Make sure that there is no space between the keyboard and the computer.
4. Secure the keyboard with the following **screws**.
  - M2.5×2.8B FLAT BIND screw x2
5. Slide and set the **speaker cover assembly** and secure it with the following **screw**.
  - M2.5×4.0B FLAT BIND screw x1
6. Install the **keyboard brace** by pressing it from the topside.



## 4.8 LED Board

### Removing the LED Board

The following describes the procedure for removing the LED board (See Figure 4-12).

1. Remove the following **screw** securing the switch membrane.
  - M2.5×3.0B FLAT BIND screw x2
2. Push up the **LED board** to the arrow direction and remove it.

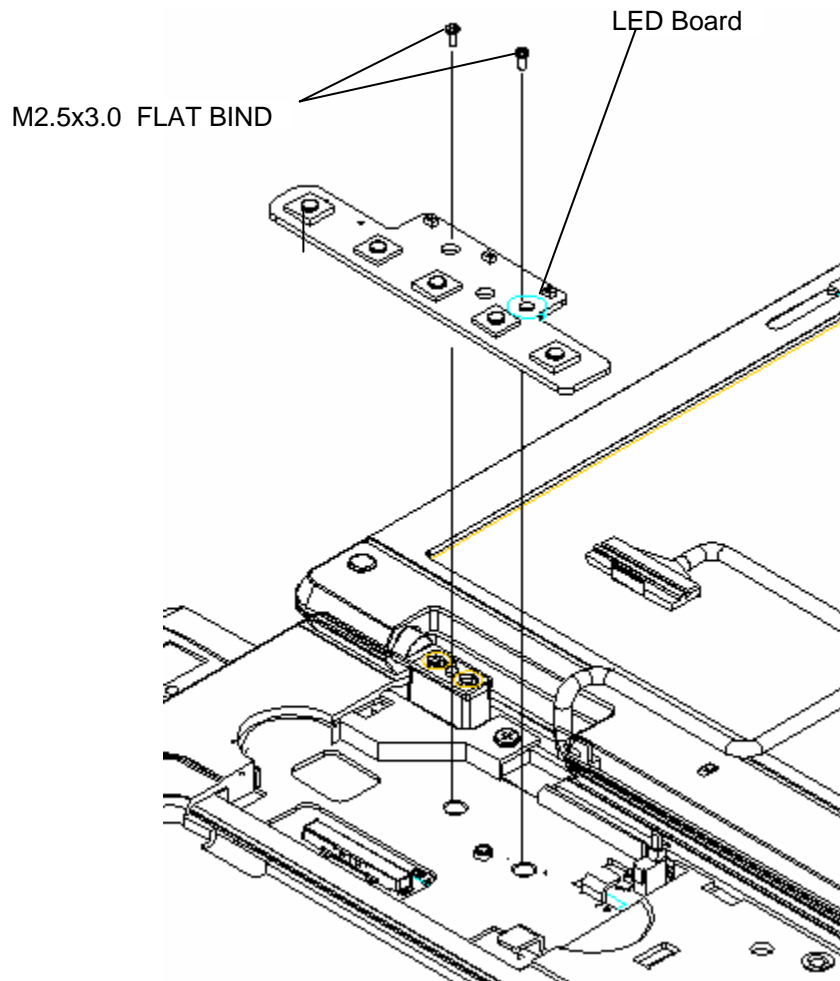


Figure 4-7 Removing the LED board

## **Installing the LED Board**

The following describes the procedure for installing the switch membrane (See Figure 4-12).

1. Press LED board in the computer.
2. Secure the LED board with the following **screw**.
  - M2.5×3.0B FLAT BIND screw x2

## 4.9 Optical disk drive

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

### Removing an optical disk drive

The following describes the procedure for removing an optical disk drive (See Figure 4-13 and 4-14).

1. Turn over the computer and remove the following **screws** securing an optical disk drive.

- M2.5×6.0B FLAT BIND screw x1

2. Upside down the computer.
3. Remove the following **screw** securing the ODD driver.

M2.5×6.0B Flat BIND screw x1

3. Disconnect an **optical disk drive** toward the arrow direction from the connector **CN25** on the system board.

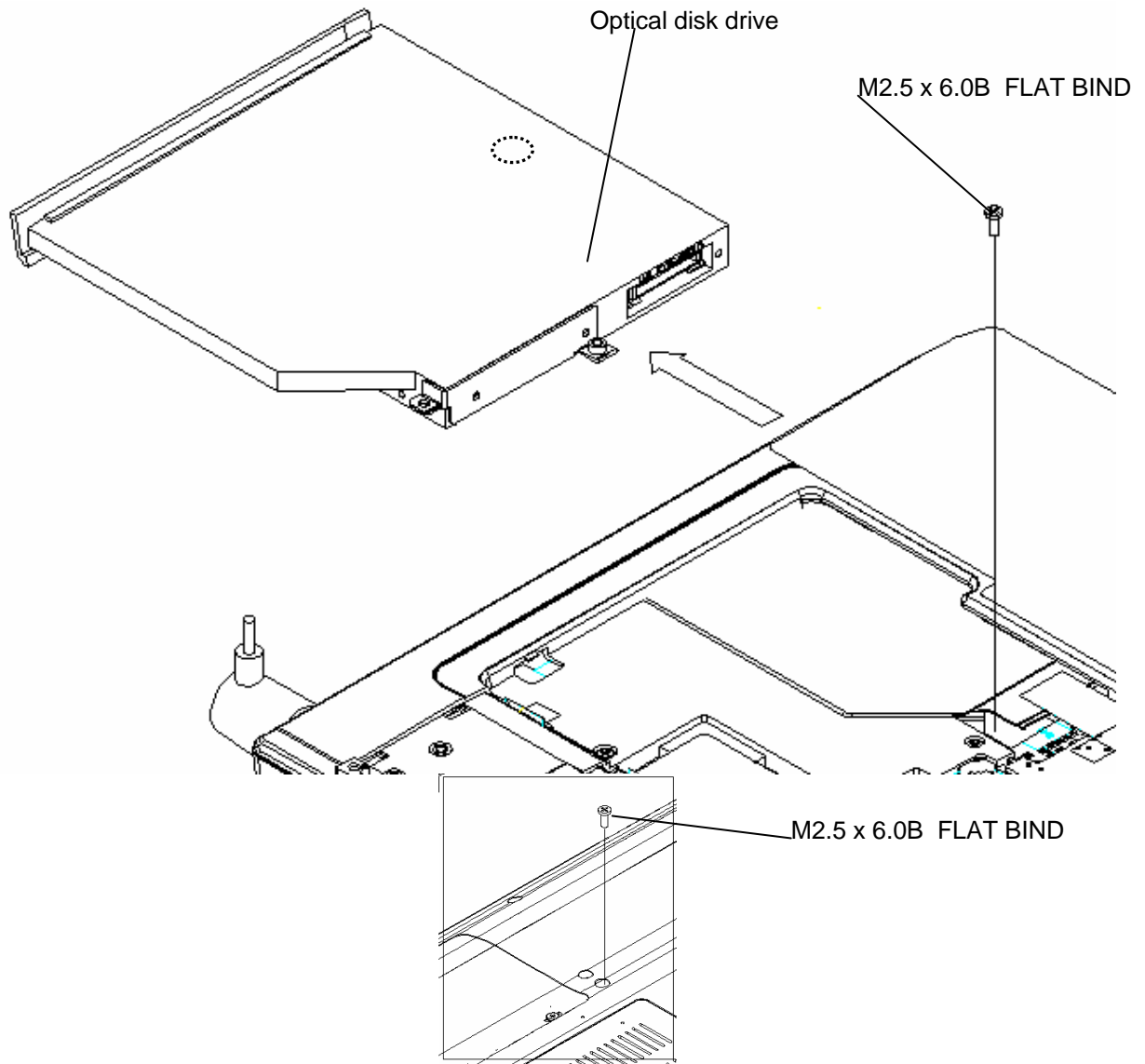


Figure 4-8 Removing an optical disk drive

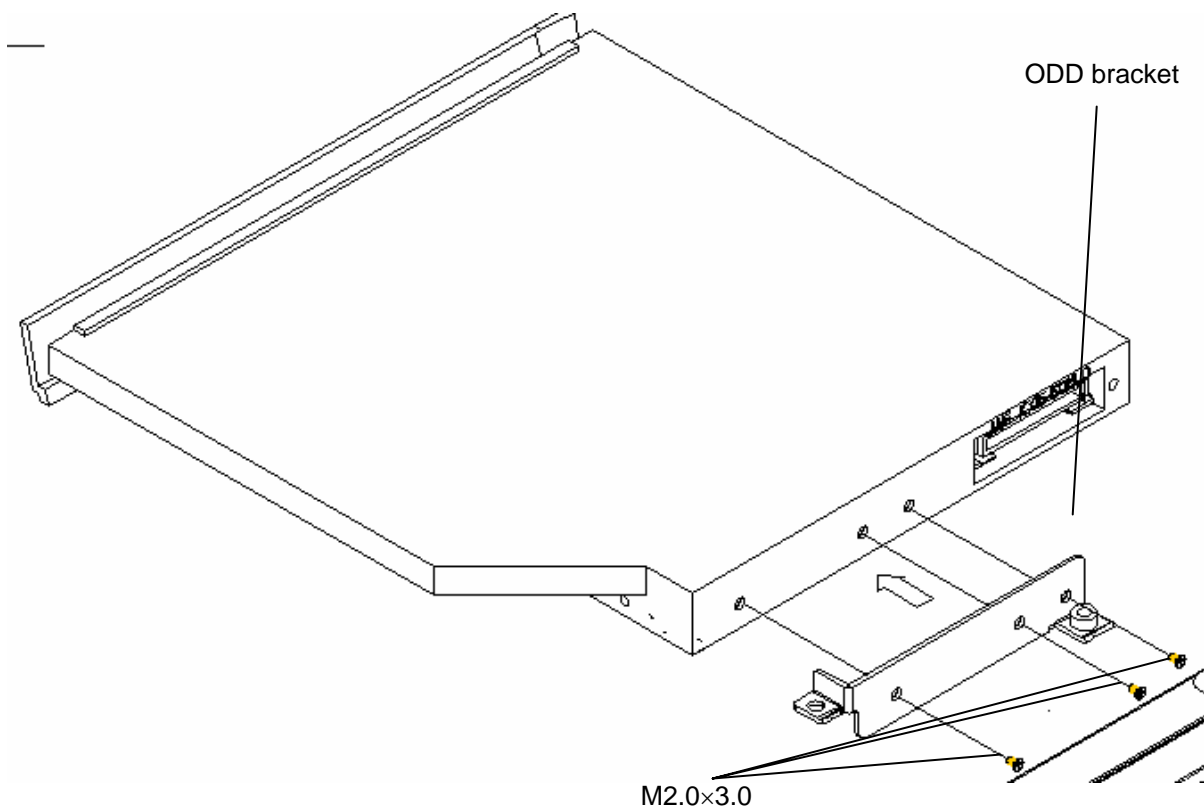


Figure 4-9 Disassembling the ODD bracket

### Installing an optical disk drive

The following describes the procedure for installing an optical disk drive (See Figure 4-13 and 4-14).

1. Attach the **ODD bracket** to an optical disk drive and secure it with the following **screws**.

- M2.0x3.0 Flat BIND screw                    x3

2. Insert an optical disk drive assembly into the slot and connect it to the connector **CN25** on the system board.

3. Secure the ODD drive with the following **screw**.

- M2.5X6.0                    Flat BIND screw   X1

4. Turn over the computer and secure **an optical disk drive** with the following

5. screws.M2.5×6.0B FLAT BIND screw x1

## 4.10 Display assembly

### Removing the display assembly

The following describes the procedure for removing the display assembly (See Figure 4-15 to 4-20).

6. Close the display and turn the computer upside down .
7. Remove the following screws from the k/b cover of the computer.
  - M2.0×3.0 FLAT BIND screw x2 (Locktight)
  - M2.5×6.0 FLAT BIND screw x2 (Locktight)

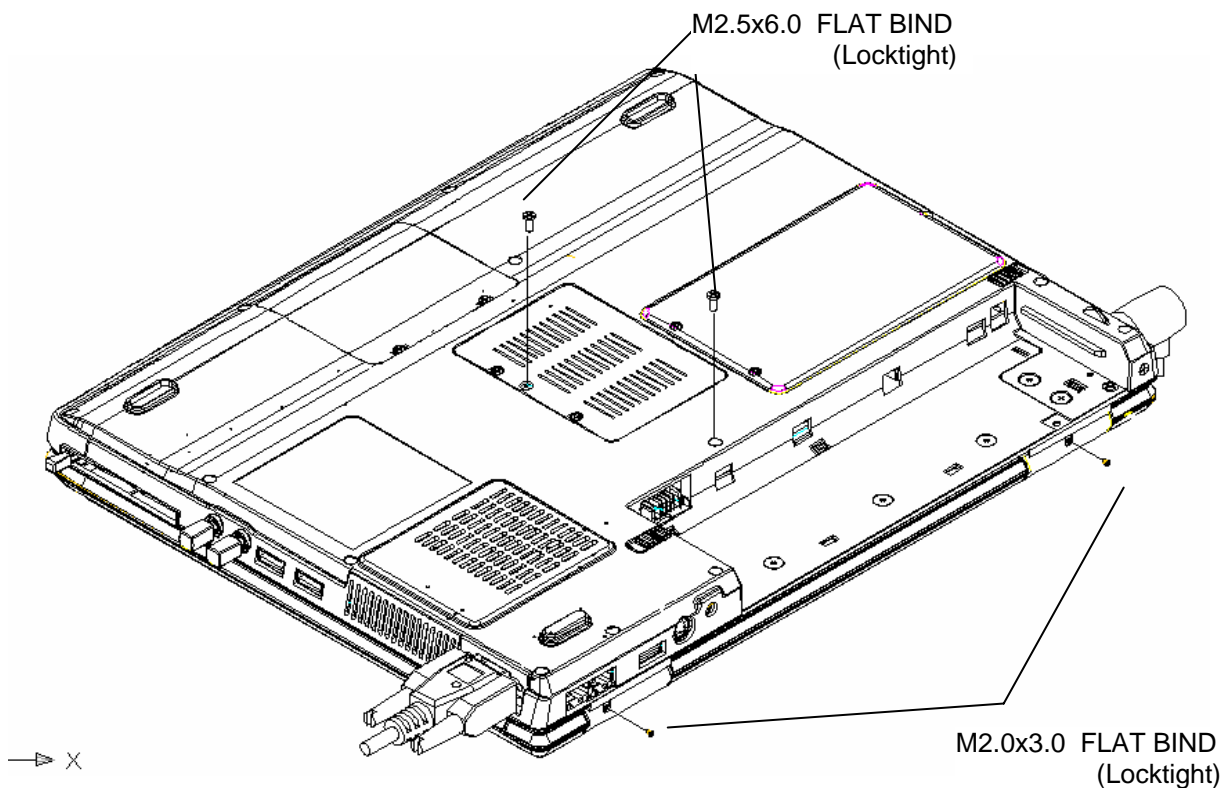
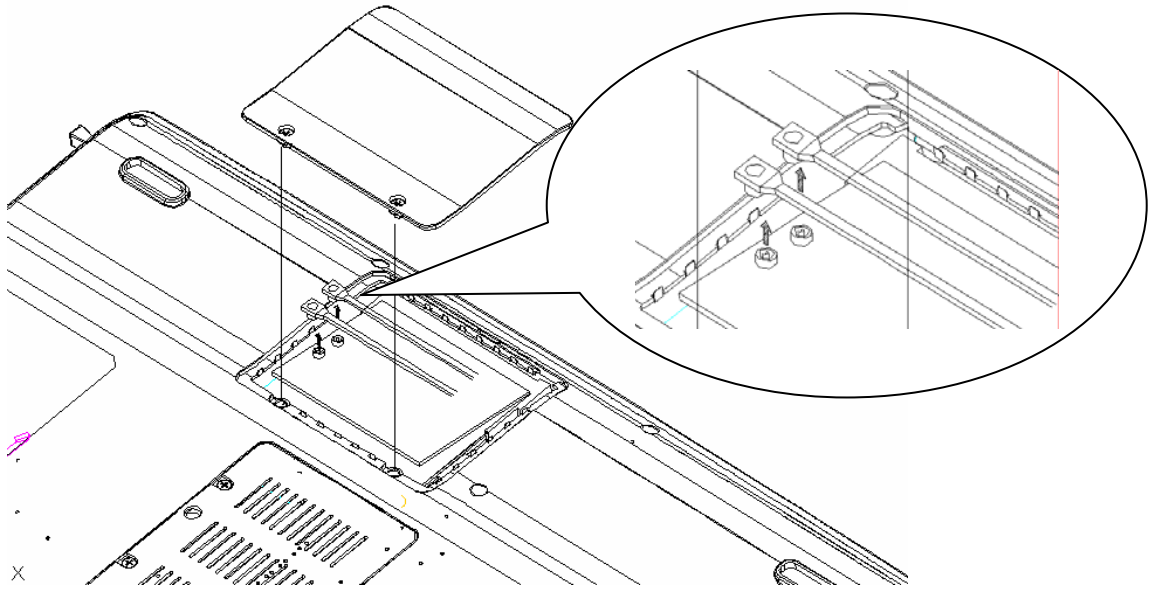


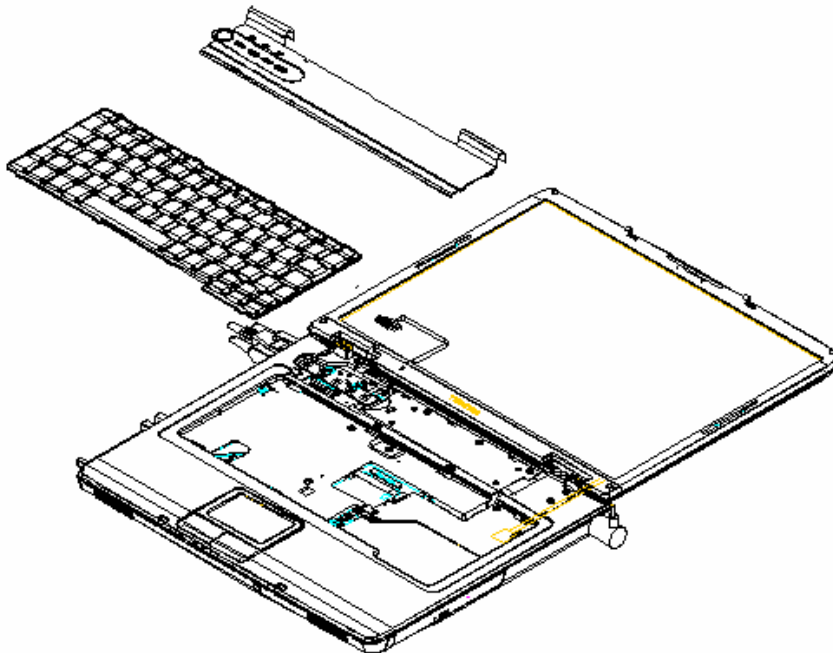
Figure 4-15 Removing the screws (securing display assembly)

8. Open the **MINIPCI Door** and remove the **wireless LAN antenna connector** .



*Figure 4-16 Removing the MINIPCI door and connetor (back)*

9. Open the display and removing the **k/b cover** and **keyboard** .



*Figure 4-177 Removing the cables (back)*



10. Pull out the **wireless LAN antenna cables** from the guide

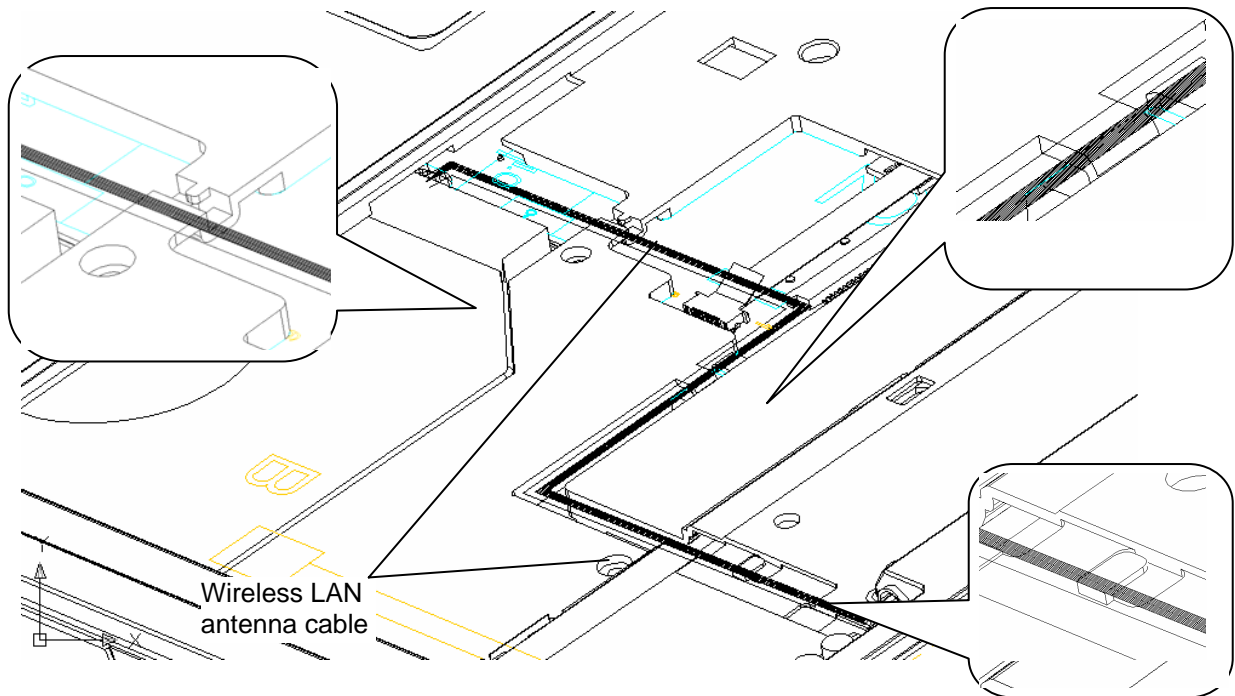
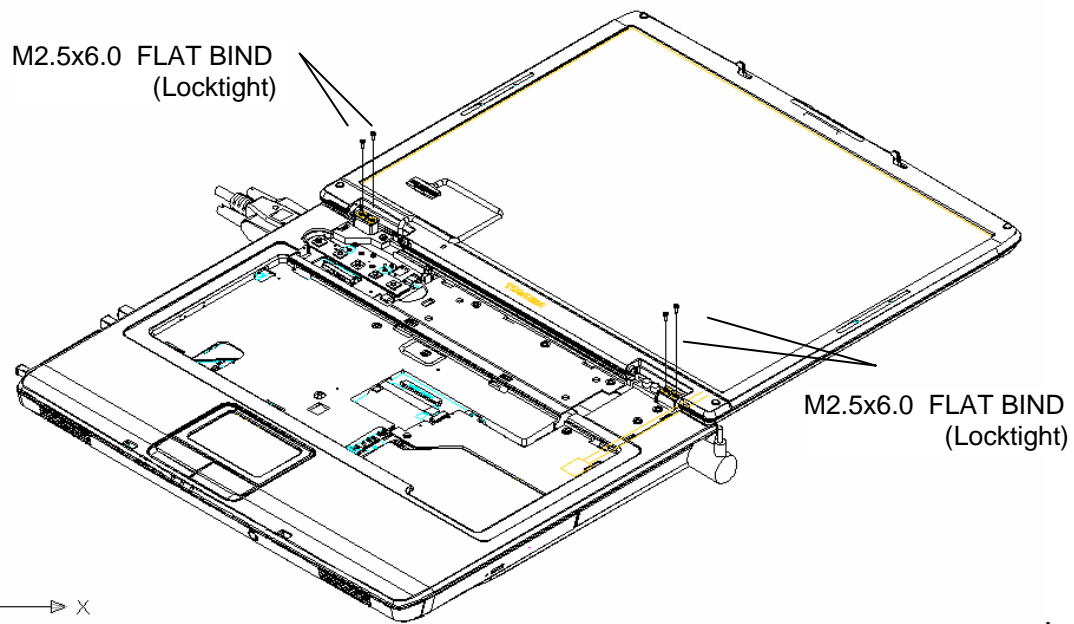


Figure 4-188 Removing the antenna cables (back)

11. Opening the display to 180 degree, and remove the hinge screw .

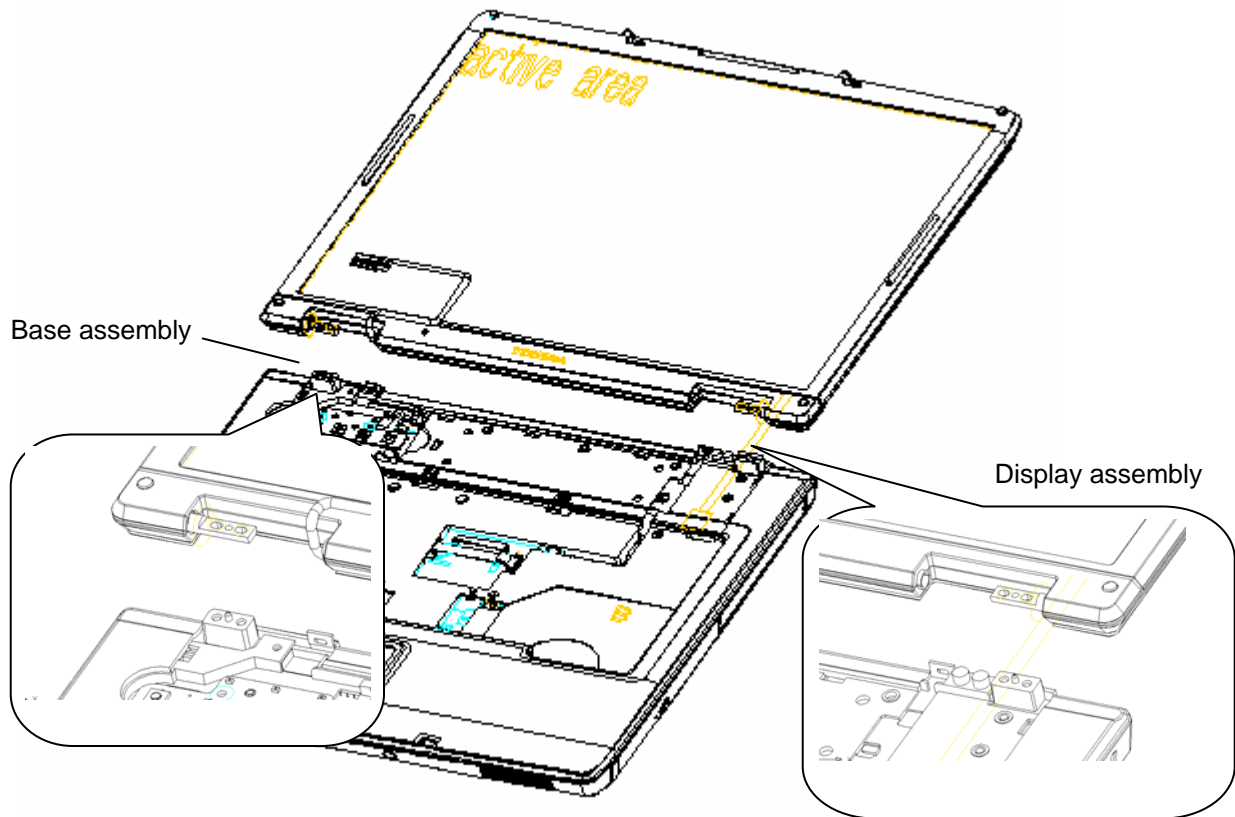
- M2.3x6.0 FLAT BIND screw x4 (Locktight)



*Figure 4-199 Removing the hinge screw (back)*

[back]

12. Remove the **LCD harness** from the connector on the system board and Pulling out the **pole of hinge** from the **hole** of hinge assembly, remove the **display assembly** from the base assembly.



*Figure 4-20 Removing the LCD harness and remove display assembly*

### **Installing the display assembly**

The following describes the procedure for installing the display assembly (See Figure 4-15 to 4-20).

13. Inserting the **pole of hinge** to the **hole** of hinge assembly, set the **display assembly** on the base assembly.
14. Secure the **hinges** with the following **screws** , Secure the **display mask** with the following **screws** and stick the **mask seal** on them.

- M2.5×6.0B FLAT BIND screw x4  
(Locktight)

**NOTE:** *Be sure to apply the locktight to the screws instructed in the figure above.*

15. Connect the **LCD harness** to the connector on the system board.
16. Arrange the wireless antenna cables along the guide (front) and secure them with **guide**.
17. Pass the cables to the back of computer through the **slot**.
18. Install the keyboard and k/b cover of the system .
19. Arrange the **wireless LAN antenna cables** along the guide and contact with the connector .
20. Secure the display assembly from the back of computer with the following **screws**.

- M2.5×6.0B FLAT BIND screw x4  
(Locktight)

## 4.11 Cover assembly

### Removing the cover assembly

The following describes the procedure for removing the cover assembly (See Figure 4-21 to 4-24).

1. Turn over the computer.
2. Remove the following **screws** securing the cover assembly from the back and bottom of computer.

- M2.5×6.0B FLAT BIND screw x18
- M2.5×2.0 FLAT BIND screw x3

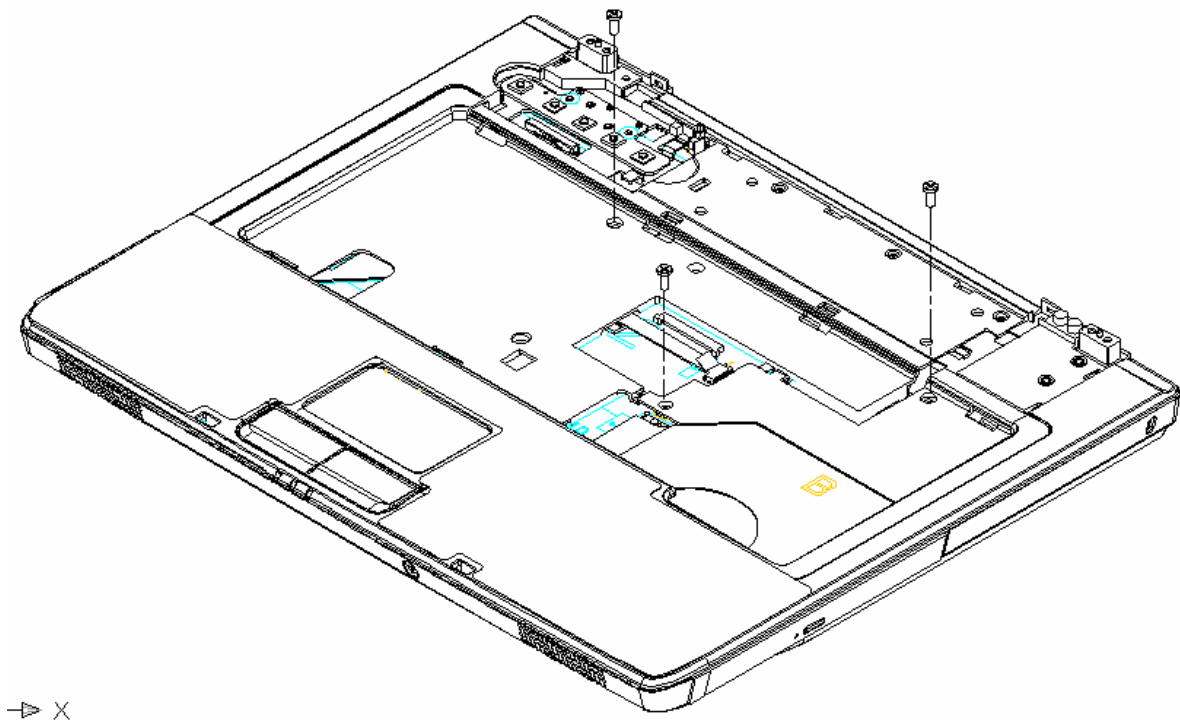


Figure 4-20 Removing the screws (back)

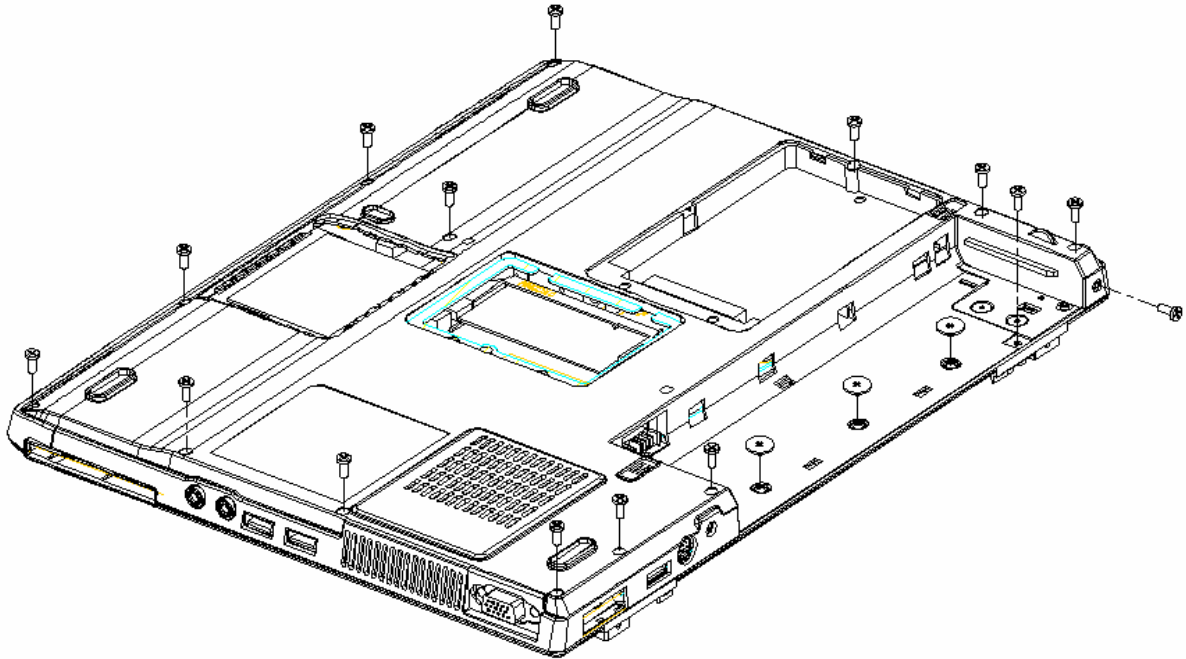


Figure 4-212 Removing the screws (back)

3. Disconnect the **touch pad flat cable** from the connector on the system board.
4. Removing the screw from power board and remove the power board .

M2.5×3.0B FLAT BIND screw x2

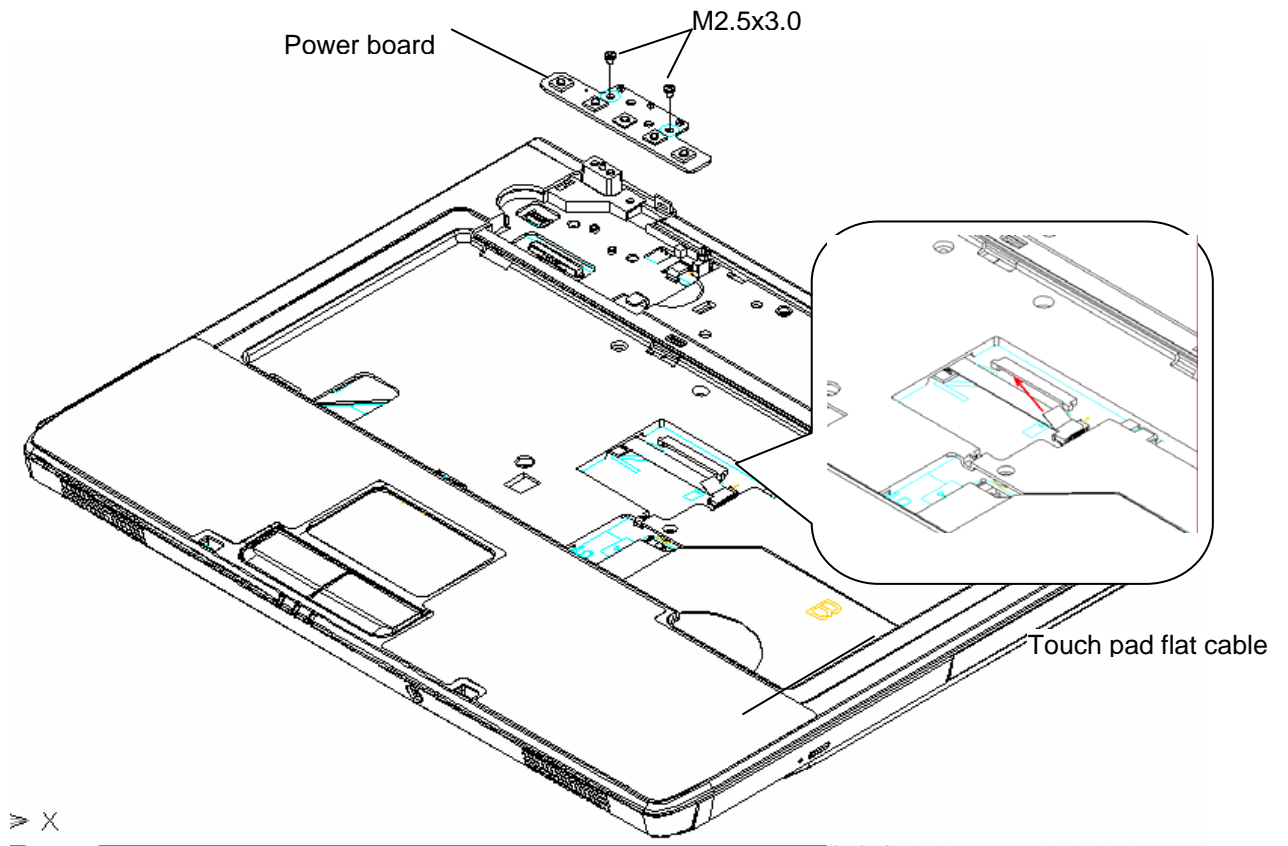
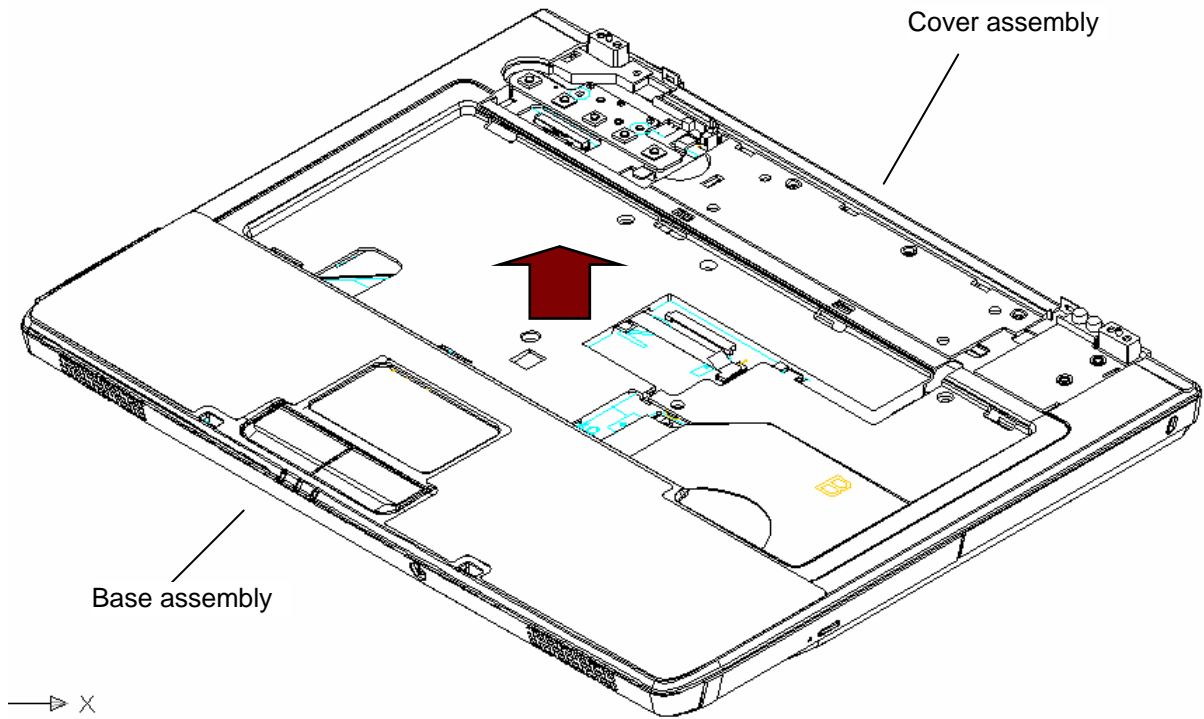


Figure 4-22 Removing the screws & cables (front)

5. Pull up and remove the **cover assembly** from the **base assembly**.



*Figure 4-23 Removing the cover assembly*



### **Installing the cover assembly**

The following describes the procedure for installing the cover assembly (See Figure 4-21 to 4-24).

1. Install the **cover assembly** to the base assembly.

<p><b>NOTE:</b> <i>Be careful not to catch the cables between cover assembly and base assembly.</i></p>
---

2. Connect the **touch pad flat cable** to the connector on the system board.
3. Secure the cover assembly with the following **screws** from the back and bottom of computer.

- M2.5×2.0B FLAT BIND screw x3
- M2.5×6.0B FLAT BIND screw x18
- M2.5×3.0B FLAT BIND screw x2

## 4.12 Touch pad

### Removing the touch pad

The following describes the procedure for removing the touch pad (See Figure 4-31).

1. Peel off the **glass tape** and disconnect the **touch pad flat cable** from the connector on the touch pad and peel the **al foil**.
2. Remove the following **screws** securing the touch pad plate.
  - M2.5x3.0B SUPER THIN HEAD screw x5
3. Turning up the **insulator**, remove the **touch pad plate**.
4. Peel off and remove the **touch pad** from the cover assembly.

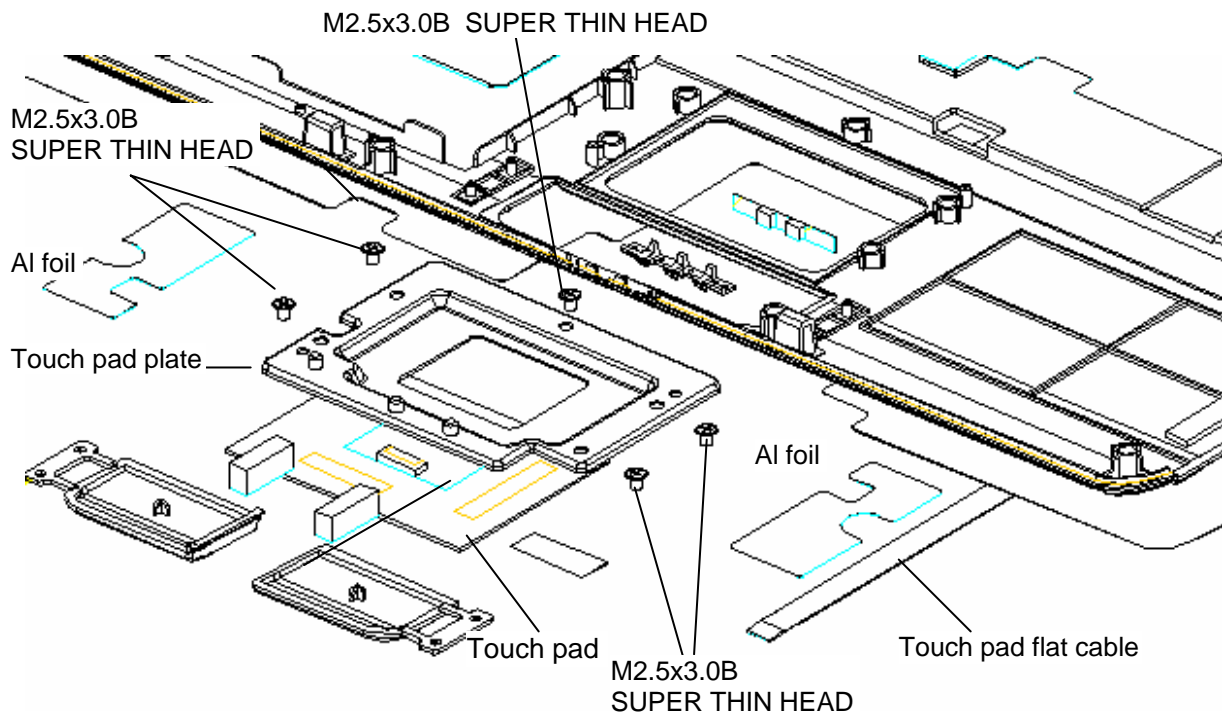


Figure 4-24 Removing the touch pad

### Installing the touch pad

The following describes the procedure for installing the touch pad (See Figure 4-31).

1. Peel off the separator covering on the sensor portion of a new touch pad.

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

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

2. Stick and install the **touch pad** on the cover assembly.
3. Install the **touch pad plate** and secure it with the following **screws**.
  - M2.5×3.0B SUPER THIN HEAD screw x5
4. Stick the **insulator** on the touch pad plate.
5. Connect the **touch pad flat cable** to the connector on the touch pad and stick the **glass tape** on the connector.

## 4.13 System board

**CAUTION:** 1. When handling the system board, always hold by the edges. Do not touch the printed circuit face.

2. If replacing with a new system board, execute the substest01 Initial configuration in section 3.3 “Setting of the hardware configuration”. Also update with the latest BIOS as described in Appendix G “BIOS Rewrite Procedures” and with the latest EC/KBC as described in Appendix H “EC/KBC Rewrite Procedures”.

### Removing the system board

The following describes the procedure for removing the system board (See Figure 4-41).

1. Disconnect the **speaker cable** from the connector **CN11** on the system board.
2. Remove the following **screws** securing the system board and remove the **system board**.

- M2.5×4.0 BIND screw x2

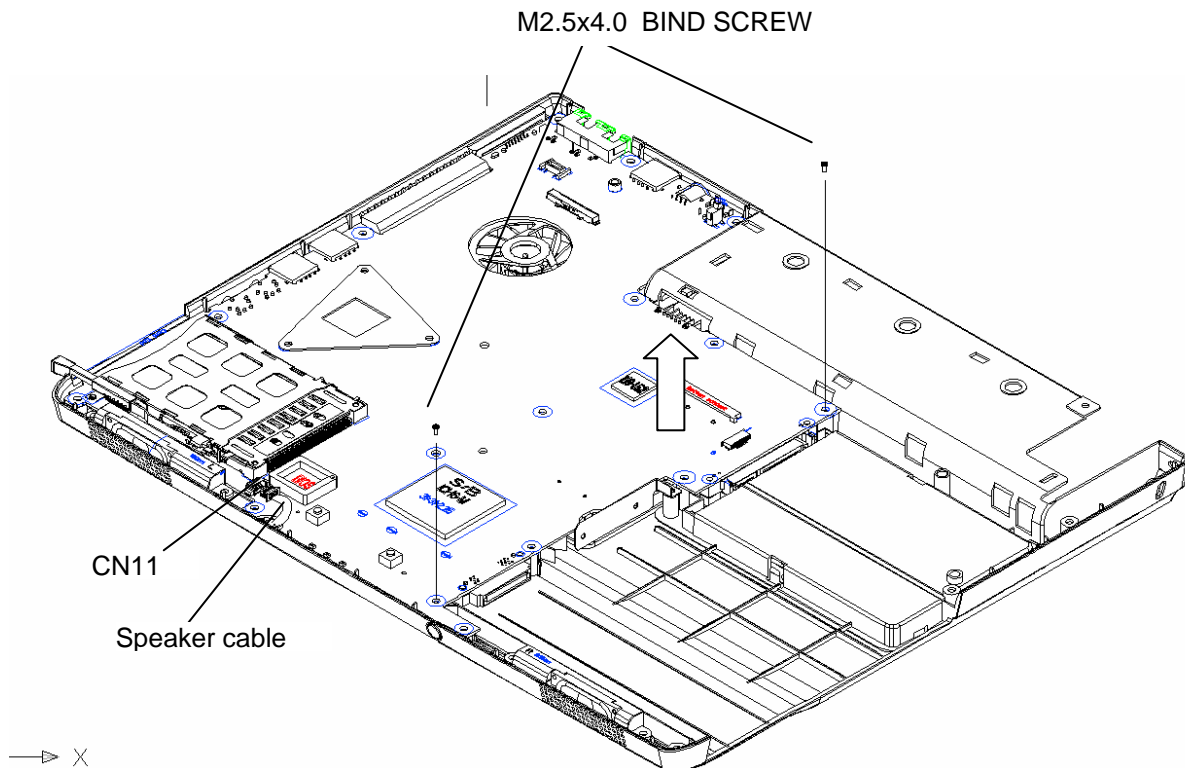


Figure 4-41 Removing the system board

### **Installing the system board**

The following describes the procedure for installing the system board (See Figure 4-41).

1. Secure the system board with the following **screws**.
  - M2.5×4.0 BIND screw x2
2. Connect the **speaker cable** to the connector **CN 11** on the system board.

## 4.14 CPU

### Removing the CPU

The following describes the procedure for removing the CPU heat sink (See Figure 4-44 ).

1. Disconnect the **Heat sink cable** from the connector **CN1** on the system board
2. Remove the following **screws** securing the heat sink holder.

- M2.0x4.0 BIND screw x3

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

3. Remove the **CPU heat sink** .

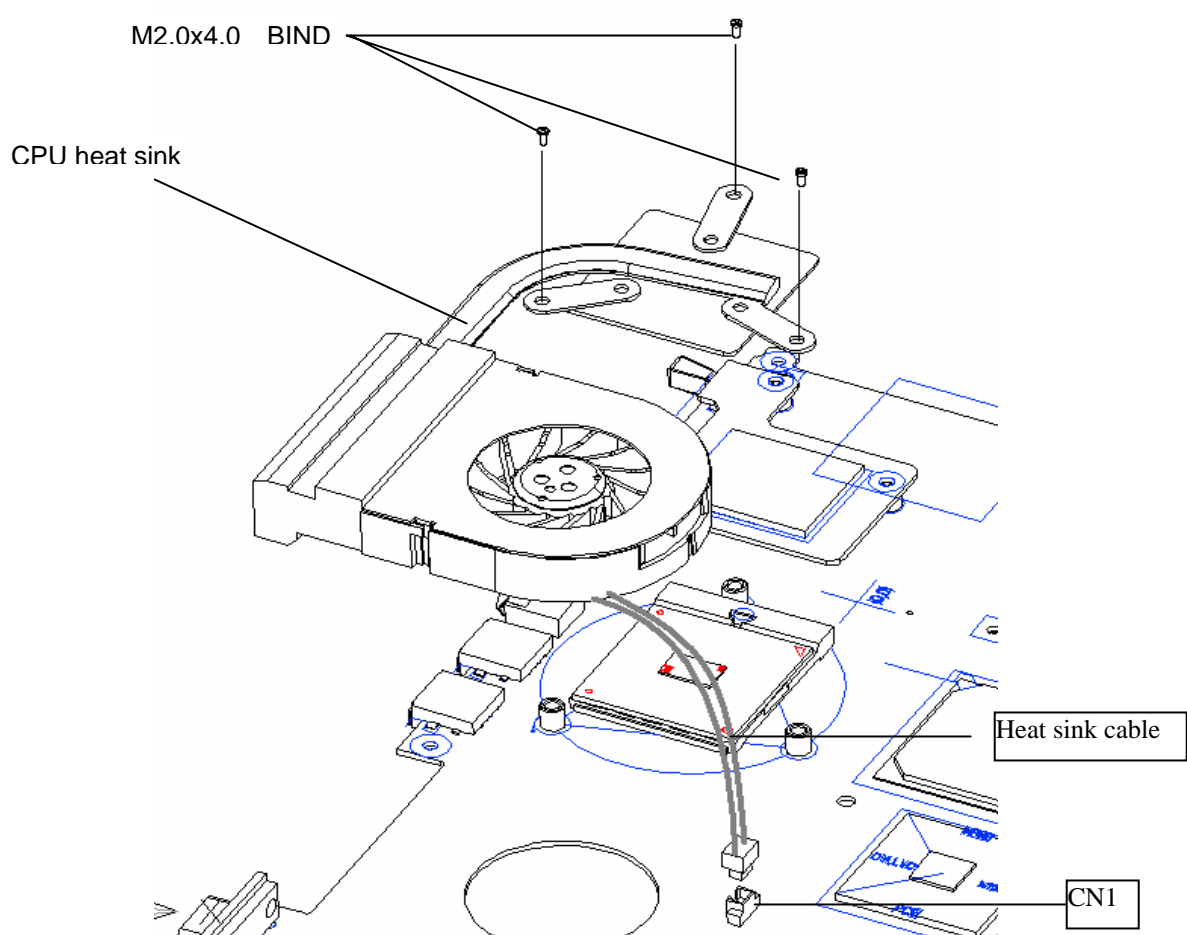
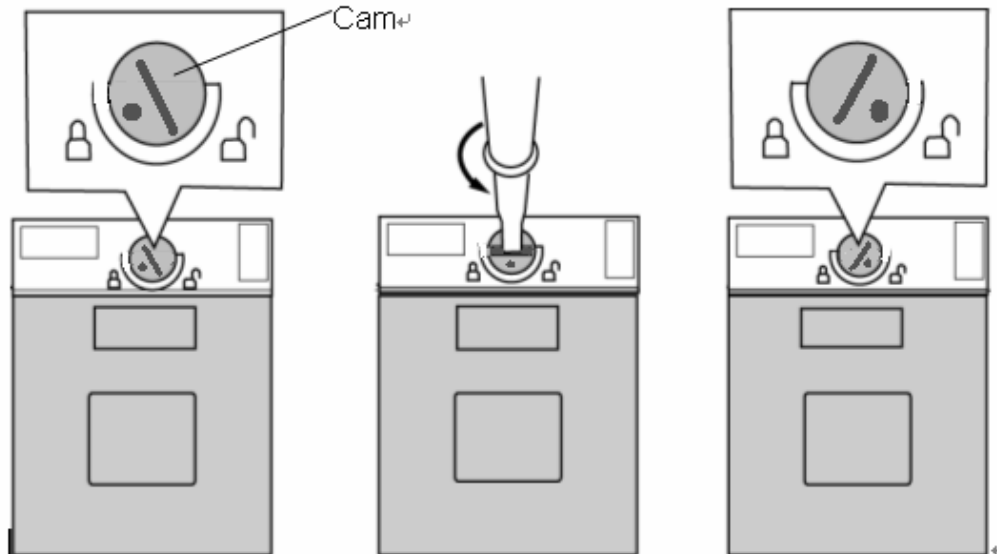


Figure 4-42 Removing the CPU heat sink

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



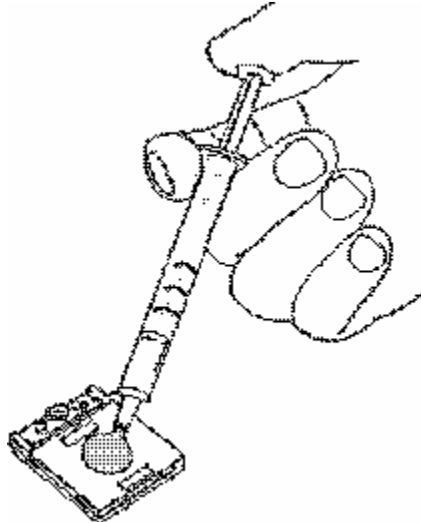
*Figure 4-43 Removing the CPU*

### **Installing the CPU**

The following describes the procedure for installing the CPU (See Figure 4-44 to 4-46).

1. Check that the mark of cam is in the unlocking position.
2. Attach the **CPU** to the correct position in the **CPU socket**.
3. Fix the **CPU** by rotating the cam 120 degrees to the clockwise with a flat-blade screwdriver.
4. If there is already silicon grease on the CPU, clean it with a cloth.  
Using a special applicator, apply silicon grease so that the CPU chip on the CPU is completely covered.

**NOTE:** Apply the silicon grease enough to cover the chip surface using the special applicator.



*Figure 4-44 Applying silicon grease*

5. Install the **CPU heat sink** and secure them with the following **screws**.

M2.0×4.0BIND screw            x3

6. Connect the **Heat sink cable** to the connector **CN 1** on the system board

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



## 4.15 VGA heat sink

### Removing the VGA heat sink

The following describes the procedure for removing the VGA heat sink (See Figure 4-47).

1. Remove the following screws securing the VGA heat sink.

- M2.0x3.0 BIND screw x2

2. Pull up the **VGA heat sink** straight and remove it.

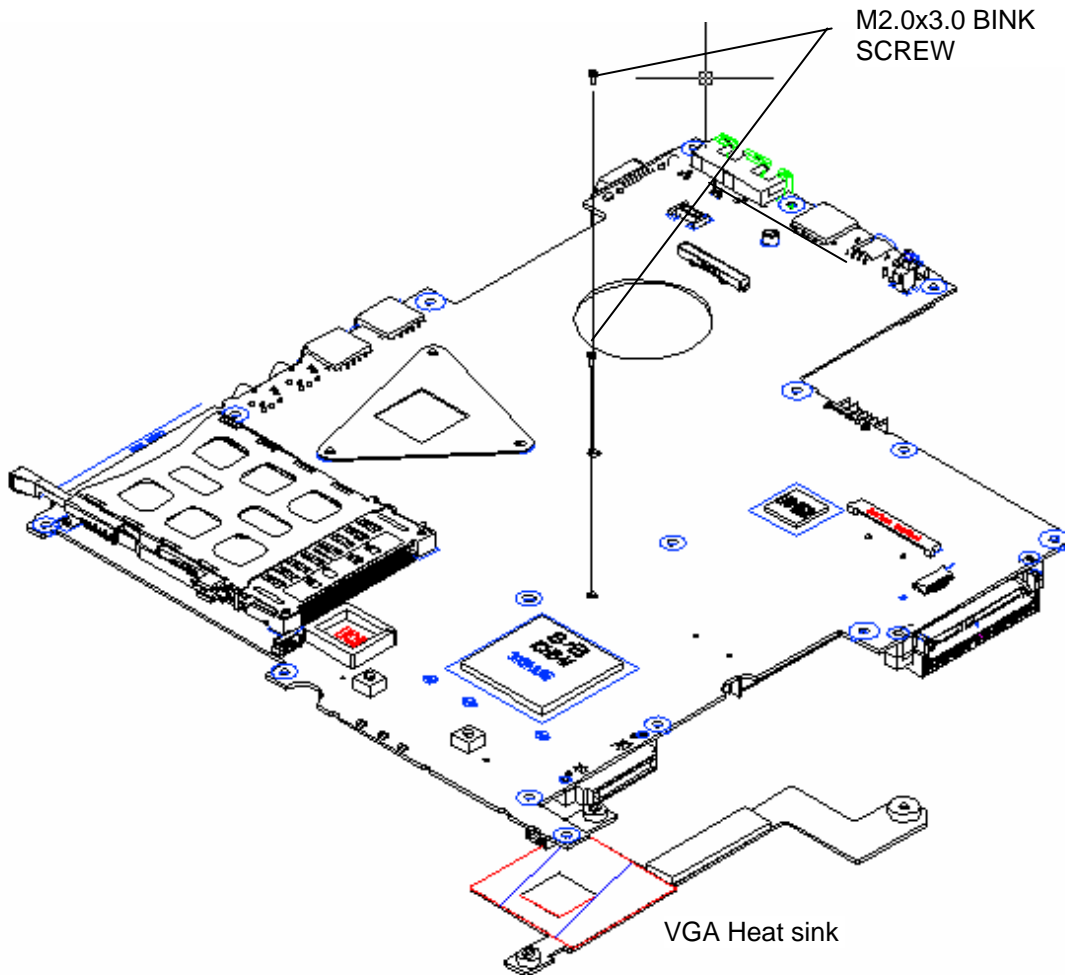


Figure 4-45 Removing the VGA heat sink

### Installing the VGA heat sink

The following describes the procedure for installing the VGA heat sink (See Figure 4-47).

1. Install the **VGA heat sink**.

**NOTE:** For details on applying the silicon grease, refer to *Installing the CPU*.

2. Secure the VGA heat sink with the following **screws**.

- M2.0×3.0 BIND screw      x2

## 4.16 LCD unit / FL inverter

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

### Removing the LCD unit / FL inverter

The following describes the procedure for removing the LCD unit and FL inverter (See Figure 4-52 to 4-55).

1. Remove Screw rubber cover X4
2. Remove the following **screws** securing the display mask  
M2.5×6.0 BIND screw X4
3. Insert your finger between the edge of the display mask and the **LCD**, and remove the **display mask** while releasing the latches of display mask.

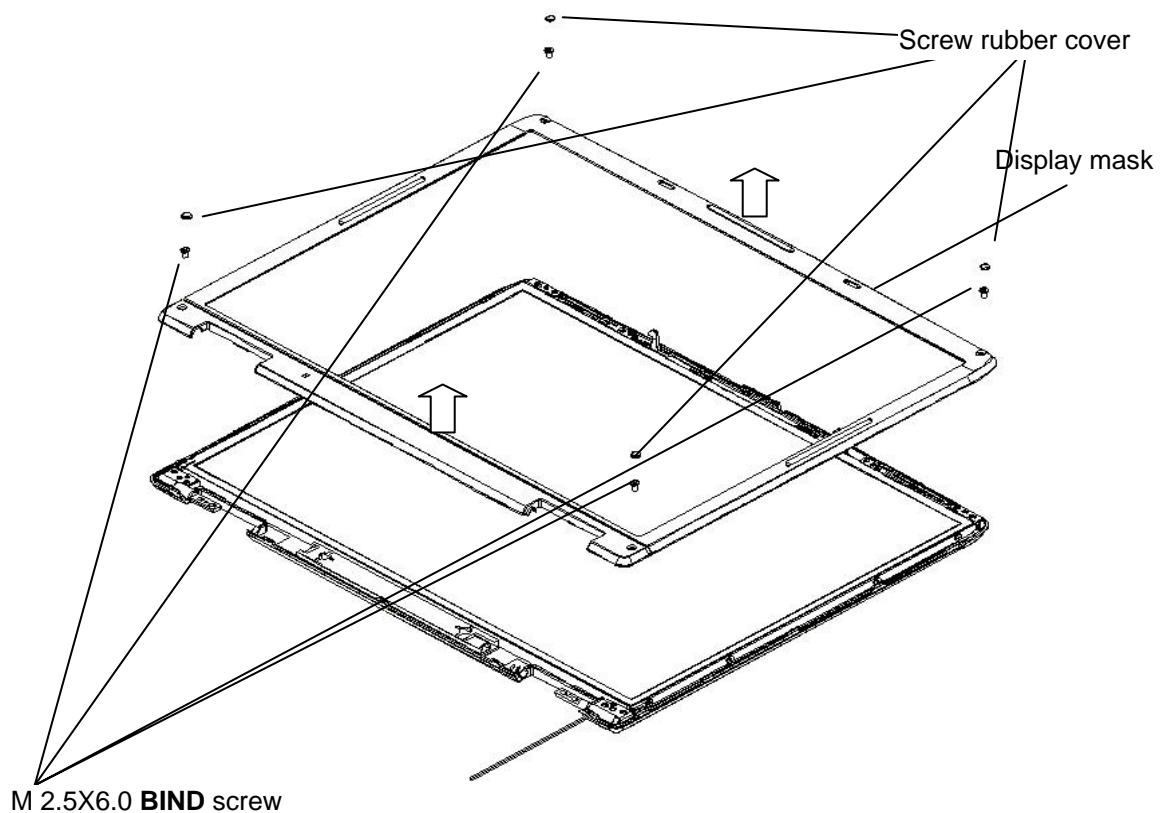
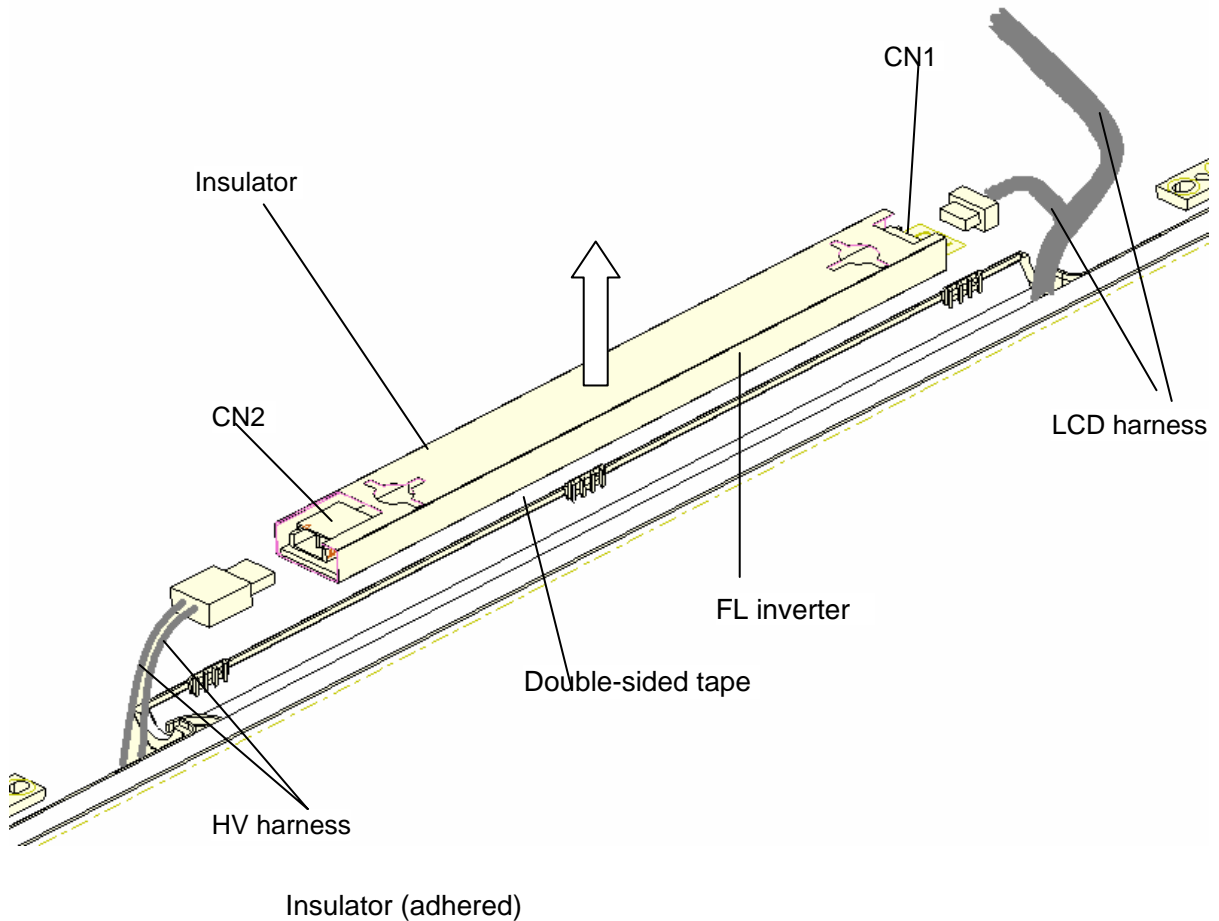


Figure 4-46 Removing the display mask

4. Pull out one **insulator** and peel off the other one adhered to the FL inverter.
5. Disconnect the **LCD harnesses** from the connectors **CN1** on the FL inverter.
6. Disconnect the **HV harnesses** from the connectors **CN2** on the FL inverter.
7. Remove the **FL inverter** while peeling off the **double-sided tape**.



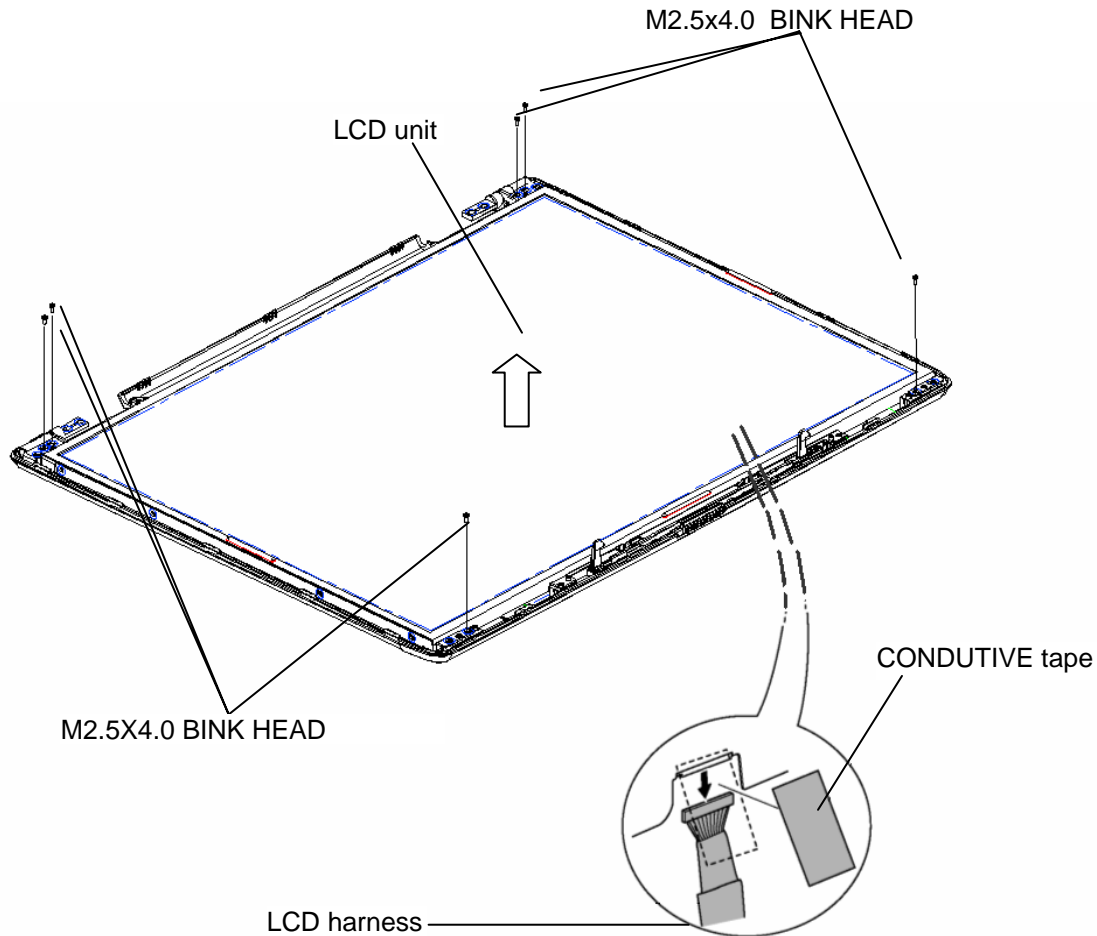
*Figure 4-47 Removing the FL inverter*

8. Remove the following **screws** securing the LCD unit.

- M2.5x4.0 BINK HEAD screw                      x6

9. With the bottom edge of the LCD unit on the display cover, lift only the top edge of the LCD unit. After peeling off the **CONDUTIVE tape**, disconnect the LCD harness from the connector on the back of the LCD.

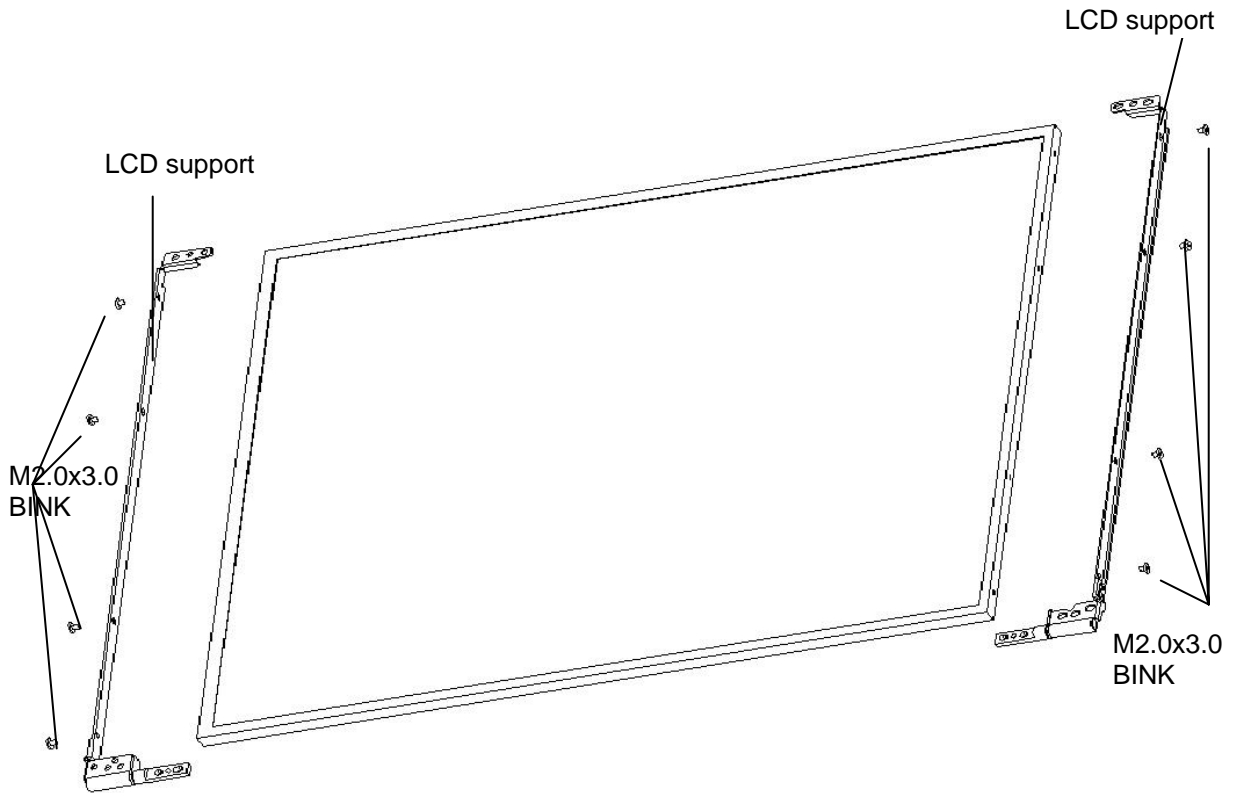
10. Remove the **LCD unit**.



*Figure 4-48 Removing the LCD unit*

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

- M2.0x3.0 BINK screw                    x8



*Figure 4-49 Removing the LCD supports*

## **Installing the LCD unit/FL Inverter**

The following describes the procedure for installing the LCD unit and FL inverter (See Figure 4-52 to 4-55).

1. Install the LCD supports (LCD unit side) to the LCD and secure them with the following **screws**.
  - M2.0×3.0 BINK screw           x8
2. Stand the **LCD unit** on the display cover and connect the **LCD harness** to the connector on the back of LCD.
3. Stick the **conductive tape** on the connector of LCD harness.
4. Secure the LCD unit with the following **screws**.
  - M2.5×4.0 BINK screw           x6
5. Connect **LCD harnesses** to the connector **CN1** of the FL inverter.

**CAUTION:** *Be careful not to connect the LCD harnesses to the wrong connectors of FL inverter.*

6. Connect **HV harnesses** to the connector **CN2** of the FL inverter.
7. Install the **display mask** while fitting the latches.
8. Secure the display mask with following **screws**  
M2.5×6.0           BINK screw   X4
9. Cover screws with Screw rubber cover   X4

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

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# Appendices

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## ***Appendix Contents***

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B.2	System Board Back View .....	B-3
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<b>Appendix C</b>	<b>Pin Assignment.....</b>	<b>C-1</b>
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### System Board

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C.2	CN2 Phone Signal Connector (2-PIN).....	C-1
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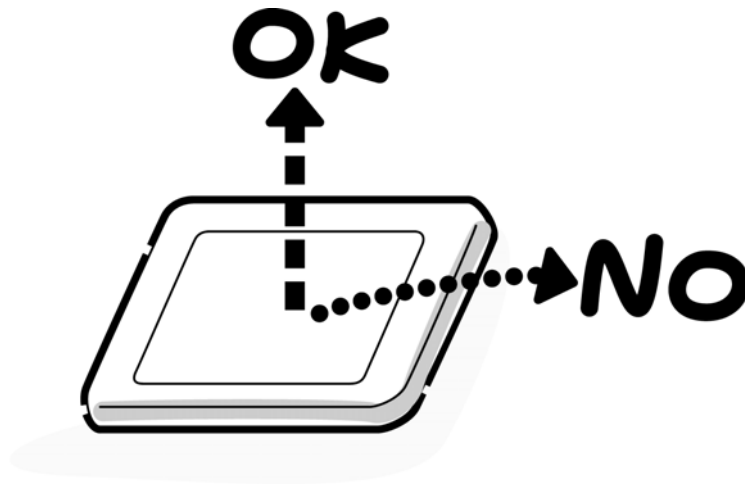
## Appendix A Handling the LCD Module

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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 the LCD module:

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



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

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



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

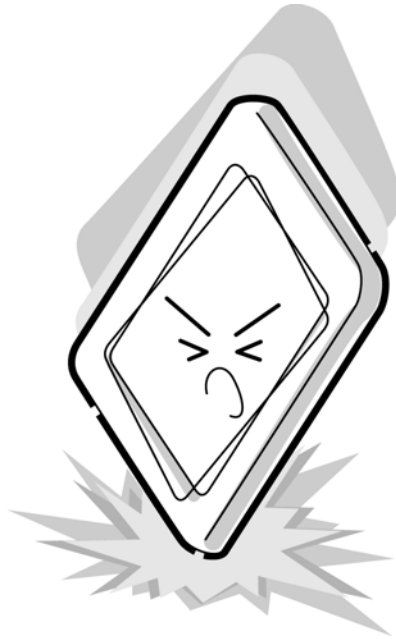
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



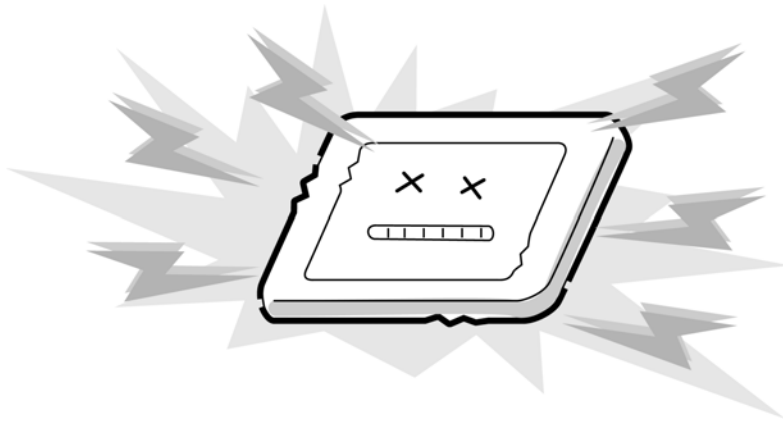
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



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



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



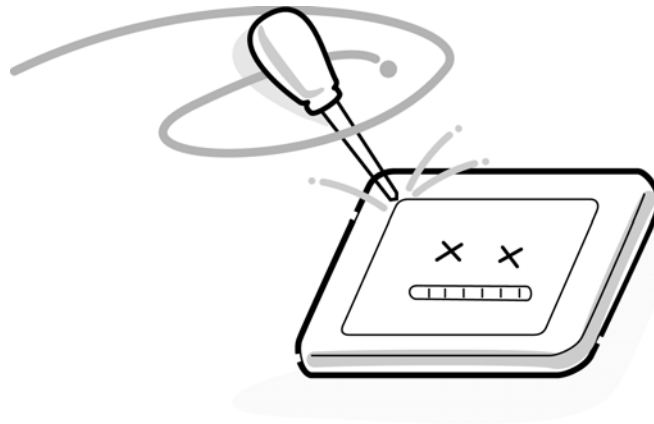
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



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

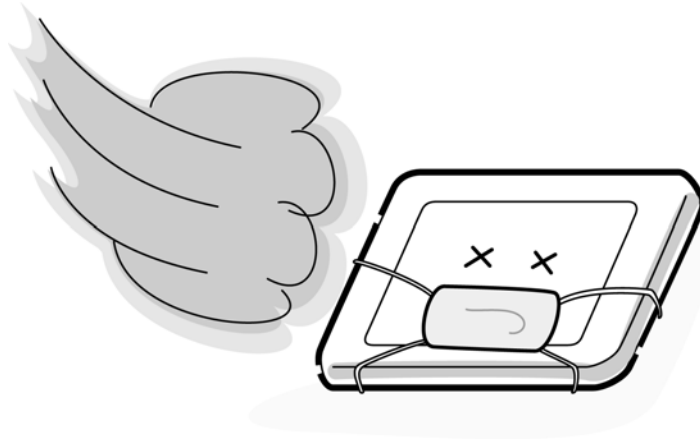


9. Do not disassemble the LCD module. Disassembly can cause malfunctions.





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





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## Appendix B Board Layout

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### B.1 System Board Front View

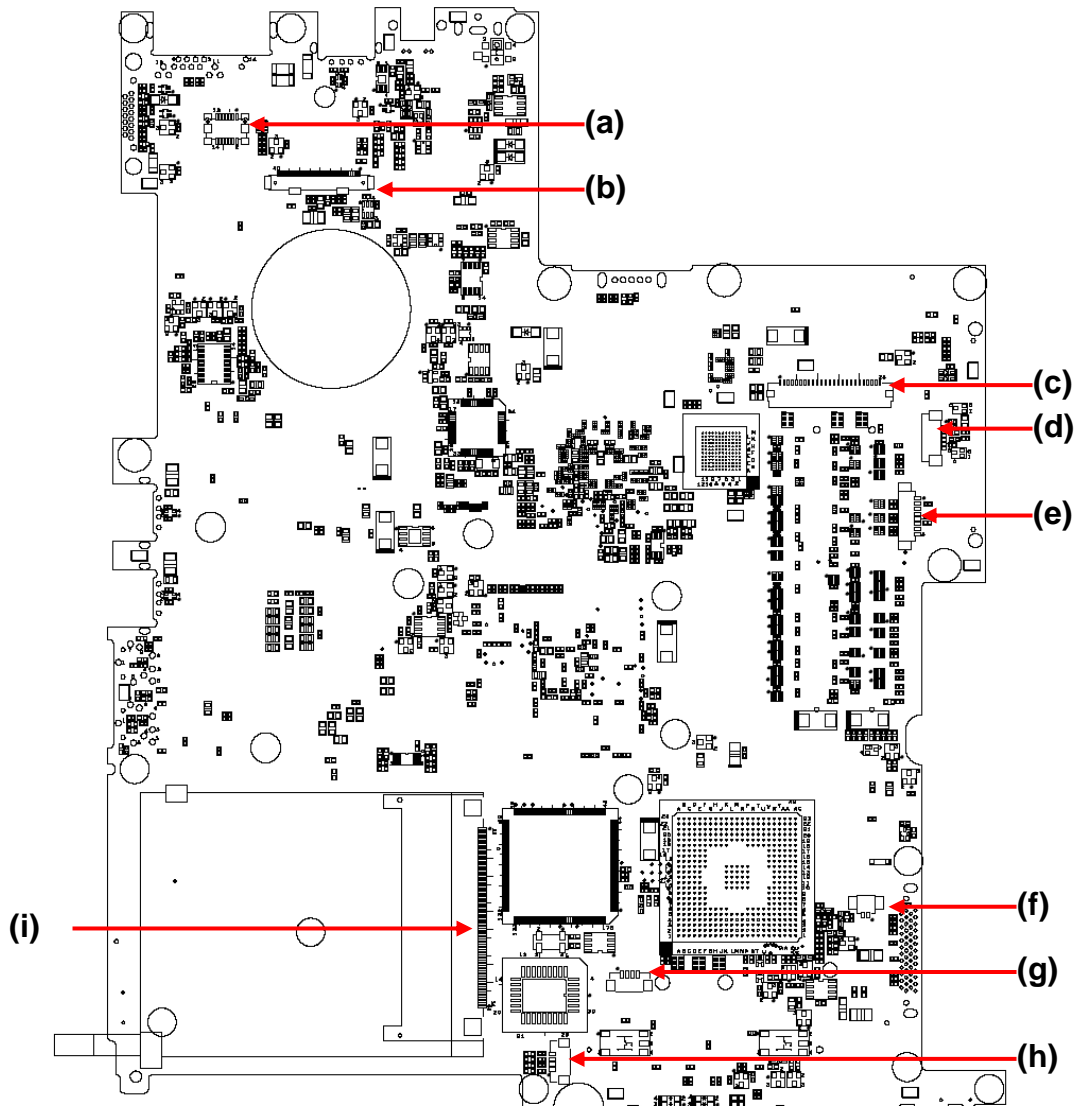


Figure B-1 System board layout (front)

*Table B-1 System board ICs and connectors (front)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(a)	CN3	LED Board Connector
(b)	CN4	LCD I/F Connector
(c)	CN5	Keyboard I/F Connector
(d)	CN6	Touch Pad Connector
(e)	CN7	Internal USB Connector (reserved)
(f)	CN9	RTC Battery Connector
(g)	CN10	EC Debug Port Connector (reserved)
(h)	CN11	System Speaker Connector
(i)	CN8	PC Card Connector

## B.2 System Board Back View

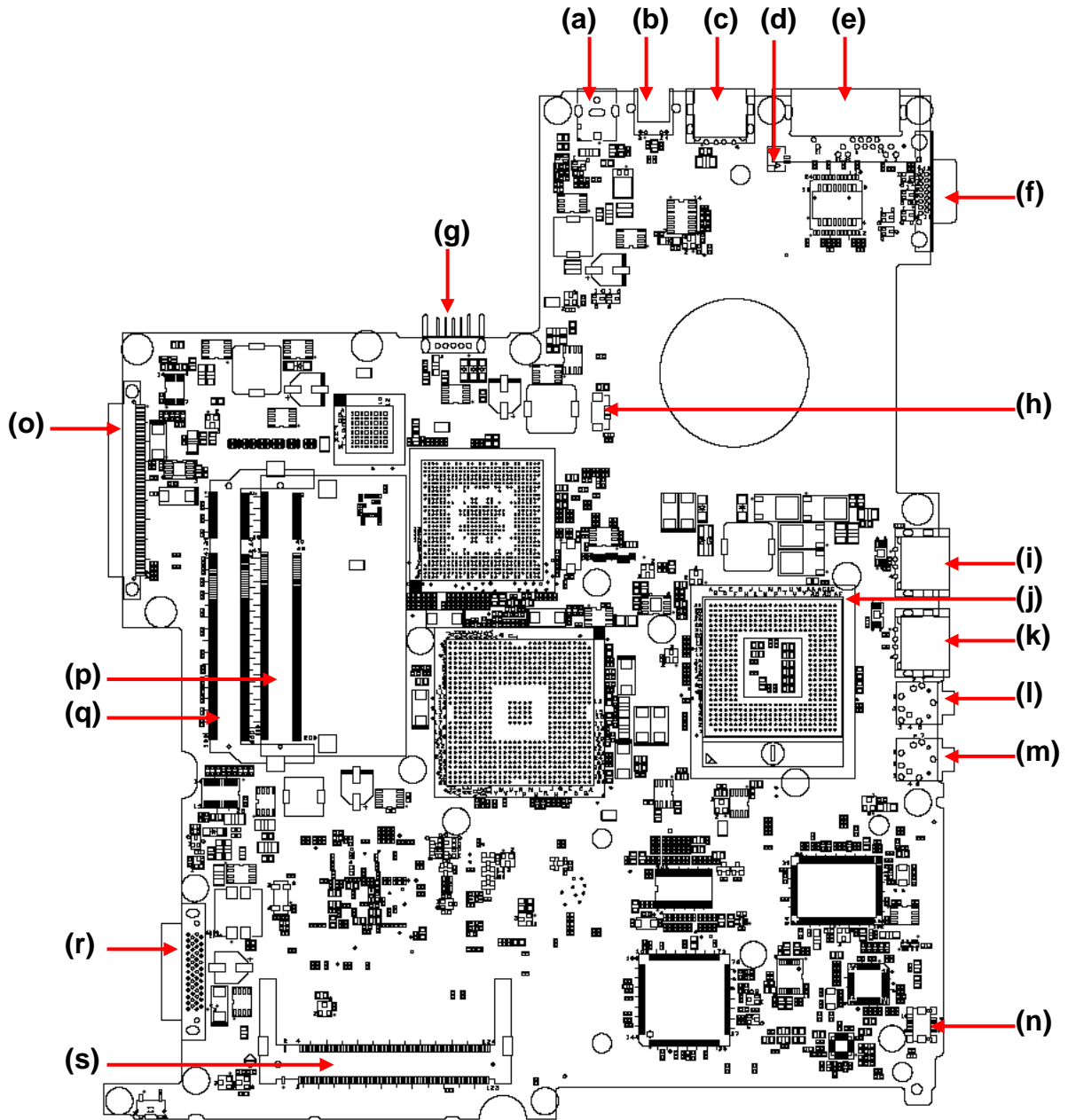


Figure B-2 System board layout (Back)

*Table B-2 System board ICs and connectors (back)*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(a)	CN13	DC Power Jack
(b)	CN12	S-VIDEO OUT connector
(c)	CN14	USB Connector
(d)	CN2	Phone Signal Connector
(e)	CN1	RJ11 + RJ45 Connector
(f)	CN15	CRT Connector
(g)	CN16	System Battery Connector
(h)	CN17	CPU Fan Connector
(i)	CN19	USB Connector
(j)	U25	CPU Socket
(k)	CN22	USB Connector
(l)	CN23	External MIC Connector
(m)	CN24	Headphone Out Connector
(n)	CN26	Modem Board Connector
(o)	CN18	HDD Connector
(p)	CN20	DDR SO-DIMM 0
(q)	CN21	DDR SO-DIMM 1
(r)	CN25	ODD Connector
(s)	CN27	MINI PCI Connector

**B.3 LED board**

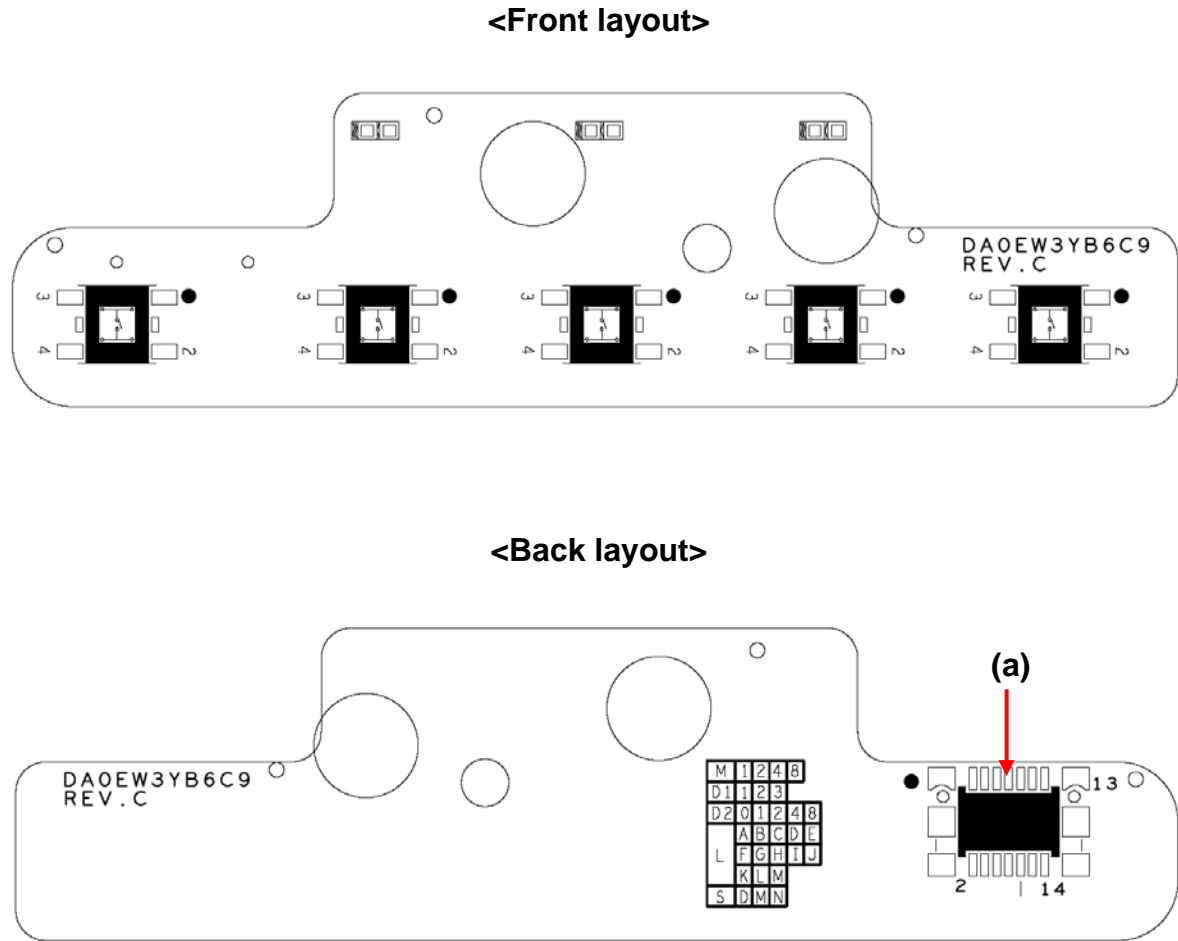


Figure B-3 LED board layout

Table B-3 LED board connectors

Mark	Number	Name
(a)	CN1	LED Board Connector

## B.4 Modem board

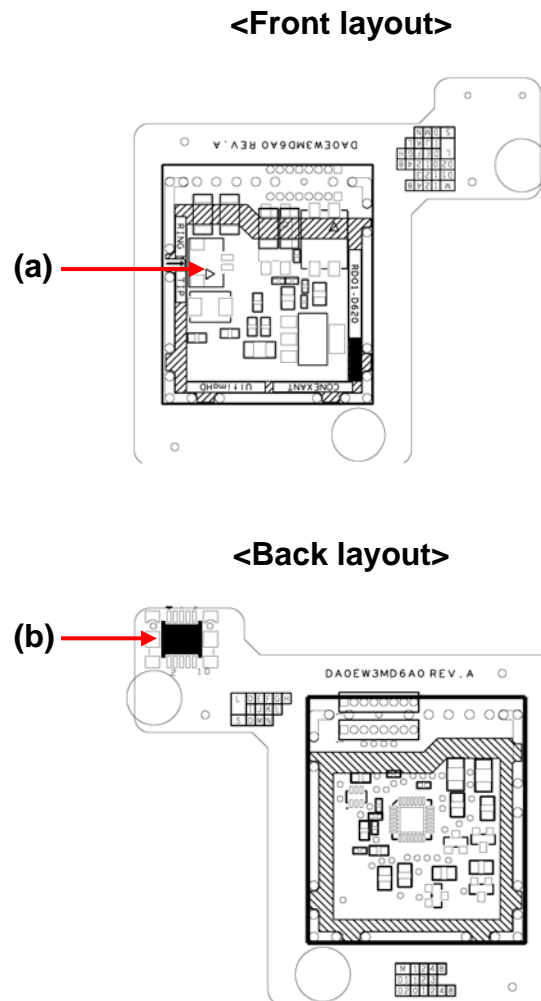


Figure B-4 Modem board layout

Table B-4 Modem board connectors

Mark	Number	Name
(a)	MJ2	Phone Signal Connector
(b)	CN1	Modem I/F Connector



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## Appendix C Pin Assignment

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### System Board

#### C.1 CN1 RJ11+RJ45 Connector (18-PIN)

*Table C-11 RJ11+RJ45 connector (18-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	100MBPS#	O	2	N.C.	-
3	RJ45_MX3-	I	4	RJ45_MX3+	I
5	RJ45_MX1-	I	6	RJ45_MX2-	O
7	RJ45_MX2+	O	8	RJ45_MX1+	I
9	RJ45_MX0-	O	10	RJ45_MX0+	O
11	N.C.	-	12	+3V	-
13	TIP_C	I/O	14	RING_C	I/O
15	+3V	-	16	GND	-
17	GND	-	18	ACT#	O

#### C.2 CN2 Phone Signal Connector (2-PIN)

*Table C-22 Phone Signal connector (2-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	TIP_C	I/O	2	RING_C	I/O

### **C.3 CN3 LED Board Connector (3-PIN)**

*Table C-3 LED Board connector (14-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	GND	-	2	GND	-
3	GND	-	4	GND	-
5	BT4#	I	6	NBSWON#	I
7	BT3#	I	8	NUMLED	O
9	BT2#	I	10	CAPSLED	O
11	BT1#	I	12	IDE_LED	O
13	N.C.	-	14	EMAIL_LED	I

## C.4 CN4 LCD I/F Connector (40-PIN)

*Table C-43 LCD I/F connector (40-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	+3V	-	2	+3V	-
3	LCDID2	I	4	GND	-
5	+5V	-	6	+5V	-
7	LCD3V	-	8	LCD3V	-
9	LCDID1	I	10	LCDID0	I
11	DISPON	O	12	VADJ	O
13	INVCC0	-	14	INVCC0	-
15	GND	-	16	TXUOUT1+	O
17	TXUOUT1-	O	18	GND	-
19	TXUOUT2+	O	20	TXUOUT2-	O
21	PHL_DATA	I/O	22	PHL_CLK	O
23	GND	-	24	TXLCLKOUT+	O
25	TXLCLKOUT-	O	26	GND	-
27	TXLOUT0+	O	28	TXLOUT0-	O
29	GND	-	30	TXLOUT1+	O
31	TXLOUT1-	O	32	GND	-
33	TXLOUT2+	O	34	TXLOUT2-	O
35	GND	-	36	TXUOUT0+	O
37	TXUOUT0-	O	38	GND	-
39	TXUCLKOUT+	O	40	TXUCLKOUT-	O

## C.5 CN5 Keyboard I/F Connector (25-PIN)

Table C-5 Keyboard I/F connector (25-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MX7	O	2	MX6	O
3	MX5	O	4	MY0	O
5	MY1	O	6	MY2	O
7	MX4	O	8	MY3	O
9	MY4	O	10	MY5	O
11	MY6	O	12	MY7	O
13	MY8	O	14	MX3	O
15	MY9	O	16	MX2	O
17	MX1	O	18	MY10	O
19	MY11	O	20	MX0	O
21	MY12	O	22	MY13	O
23	MY14	O	24	MY15	O
25	N.C.	-			

## C.6 CN6 Touch PAD I/F Connector (6-PIN)

Table C-6 Pad I/F connector (6-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	+5V_TP	-	2	GND	-
3	RIGHT#	O	4	LEFT#	O
5	TP_DATA	I/O	6	TP_CLK	O

## C.7 CN8 PC Card I/F Connector (68-PIN)

*Table C-7 PC Card I/F connector (68-PIN) (1/2)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	A_CAD0	I/O
3	A_CAD1	I/O	4	A_CAD3	I/O
5	A_CAD5	I/O	6	A_CAD7	I/O
7	A_CC/BE0#	I/O	8	A_CAD9	I/O
9	A_CAD11	I/O	10	A_CAD12	I/O
11	A_CAD14	I/O	12	A_CC/BE1#	I/O
13	A_CPAR	I/O	14	A_CPERR#	O
15	A_CGNT#	I	16	A_CINT#	O
17	VCCCB	-	18	AVPP	-
19	A_CCLK1	I	20	A_CIRDY#	O
21	A_CC/BE2#	I/O	22	A_CAD18	I/O
23	A_CAD20	I/O	24	A_CAD21	I/O
25	A_CAD22	I/O	26	A_CAD23	I/O
27	A_CAD24	I/O	28	A_CAD25	I/O
29	A_CAD26	I/O	30	A_CAD27	I/O
31	A_CAD29	I/O	32	A_CRSVD/D2	I/O
33	A_CCLKRUN#	O	34	GND	-
35	GND	-	36	A_CCD1#	I/O
37	A_CAD2	I/O	38	A_CAD4	I/O
39	A_CAD6	I/O	40	A_RSVD/D14	I/O
41	A_CAD8	I/O	42	A_CAD10	I/O
43	A_CVS1#	I/O	44	A_CAD13	I/O
45	A_CAD15	I/O	46	A_CAD16	I/O
47	A_CRSVD/A18	I/O	48	A_CBLOCK#	I/O
49	A_CSTOP#	O	50	A_CDEVSEL#	I/O
51	VCCCB	-	52	AVPP	-
53	A_CTRDY#	I/O	54	A_CFRAME#	I/O
55	A_CAD17	I/O	56	A_CAD19	I/O
57	A_CVS2#	I/O	58	A_CRST#	I
59	A_CSERR#	O	60	A_CREQ#	O

Table C-7 PC card I/F connector (68-PIN) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
61	A_CC/BE3#	I/O	62	A_CAUDIO	O
63	A_CSTSCHG	I/O	64	A_CAD28	I/O -
65	A_CAD30	I/O	66	A_CAD31	I/O -
67	A_CCD2#	I/O	68	GND	-

## C.8 CN9 RTC Battery Connector (2-PIN)

Table C-8 RTC battery connector (2-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	RTC_N02	O	2	GND	-

## C.9 CN11 System Speaker Connector (4-PIN)

Table C-9 System Speaker connector (4-PIN)

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

## C.10 CN12 S-Video I/F Connector (4-PIN)

Table C-10 S-Video I/F connector (4-PIN)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	GND	-	2	GND	-
3	TV-LUMA	O	4	TV-CHROMA	O

### **C.11 CN13 DC IN Connector (4-PIN)**

*Table C-4 DC IN connector (4-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	VA	I	2	GND	-
3	GND	-	4	GND	-

### **C.12 CN14 USB I/F Connector (4-PIN)**

*Table C-5 USB I/F connector (4-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	USB5POWER	-	2	BUSBP3-	I/O
3	BUSBP3+	I/O	4	GND	-

### **C.13 CN15 CRT I/F Connector (15-PIN)**

*Table C-13 CRT I/F connector (15-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	CRT_R1	O	2	CRT_G1	O
3	CRT_B1	O	4	N.C.	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	+5V_CRT2	-	10	GND	-
11	N.C.	-	12	CRTDDAT	I/O
13	CRTHSYNC	O	14	CRTVSYNC	O
15	CRTDCLK	O			

### **C.14 CN16 System Battery Connector (5-PIN)**

*Table C-64 USB I/F connector (4-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	GND	-	2	MBDATA	I/O
3	MBCLK	O	4	TEMP_MBAT	O
5	MBAT+	-			

### **C.15 CN17 CPU Fan Connector (3-PIN)**

*Table C-75 CPU FAN connector (3-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	FAN_PWR	-	2	GND	-
3	FANSIG	I			



## C.16 CN18 HDD I/F Connector (44-PIN)

*Table C-16 HDD I/F connector (44-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	GND	-
3	+5V	-	4	+5V	-
5	GND	-	6	HDLED#	O
7	PDCS3#	I	8	PDCS1#	I
9	PDA2	I	10	PDA0	I
11	PDIAG	I	12	PDA1	I
13	N.C.	-	14	IRQ14	I
15	GND	-	16	PDDACK#	I
17	PSEL	I	18	PHDRDY	I
19	GND	-	20	PDIOR#	I
21	GND	-	22	PDIOW#	I
23	GND	-	24	PDDREQ	I
25	N.C.	-	26	GND	-
27	PDD15	I/O	28	PDD0	I/O
29	PDD14	I/O	30	PDD1	I/O
31	PDD13	I/O	32	PDD2	I/O
33	PDD12	I/O	34	PDD3	I/O
35	PDD11	I/O	36	PDD4	I/O
37	PDD10	I/O	38	PDD5	I/O
39	PDD9	I/O	40	PDD6	I/O
41	PDD8	I/O	42	PDD7	I/O
43	GND	-	44	-RST_HDD0	I

## C.17 CN19 USB I/F Connector (4-PIN)

*Table C-17 USB I/F connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	USB3POWER	-	2	BUSBP1-	I/O
3	BUSBP1+	I/O	4	GND	-

## C.18 CN20 Memory Connector 0 (200-PIN)

Table C-18 Memory connector 0 (200-PIN) (1/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	MVREF_DM	-	2	MVREF_DM	-
3	GND	-	4	GND	-
5	MD5	I/O	6	MD4	I/O
7	MD1	I/O	8	MD0	I/O
9	2.5VSUS	-	10	2.5VSUS	-
11	SM_DQS0	I/O	12	SDM0	-
13	MD7	I/O	14	MD3	I/O
15	GND	-	16	GND	-
17	MD2	I/O	18	MD6	I/O
19	MD13	I/O	20	MD12	I/O
21	2.5VSUS	-	22	2.5VSUS	-
23	MD9	I/O	24	MD8	I/O
25	SM_DQS1	I/O	26	SDM1	-
27	GND	-	28	GND	-
29	MD10	I/O	30	MD15	I/O
31	MD14	I/O	32	MD11	I/O
33	2.5VSUS	-	34	2.5VSUS	-
35	CLK_SDRAM0	I	36	2.5VSUS	-
37	CLK_SDRAM0#	I	38	GND	-
39	GND	-	40	GND	-
41	MD16	I/O	42	MD20	I/O
43	MD17	I/O	44	MD21	I/O
45	2.5VSUS	-	46	2.5VSUS	-
47	SM_DQS2	I/O	48	SDM2	-
49	MD22	I/O	50	MD18	I/O
51	GND	-	52	GND	-
53	MD23	I/O	54	MD19	I/O
55	MD28	I/O	56	MD24	I/O
57	2.5VSUS	-	58	2.5VSUS	-
59	MD25	I/O	60	MD29	I/O
61	SM_DQS3	I/O	62	SDM3	-

*Table C-18 Memory connector 0 (200-PIN) (2/3)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
63	GND	-	64	GND	-
65	MD31	I/O	66	MD26	I/O
67	MD27	I/O	68	MD30	I/O
69	2.5VSUS	-	70	2.5VSUS	-
71	N.C.	I/O	72	N.C.	I/O
73	N.C.	I/O	74	N.C.	I/O
75	GND	-	76	GND	-
77	N.C.	I/O	78	N.C.	-
79	N.C.	I/O	80	N.C.	I/O
81	2.5VSUS	-	82	2.5VSUS	-
83	N.C.	I/O	84	N.C	I/O
85	N.C	-	86	N.C	-
87	GND	-	88	GND	-
89	N.C.	-	90	GND	-
91	N.C.	-	92	2.5VSUS	-
93	2.5VSUS	-	94	2.5VSUS	-
95	CKE1	I	96	CKE0	I
97	N.C	-	98	N.C.	-
99	MA12	I	100	MA11	I
101	MA9	I	102	MA8	I
103	GND	-	104	GND	-
105	MA7	I	106	MA6	I
107	R_MA5	I	108	R_MA4	I
109	MA3	I	110	R_MA2	I
111	R_MA1	I	112	MA0	I
113	2.5VSUS	-	114	2.5VSUS	-
115	MA10	I	116	BA1	I
117	BA0	I	118	SRASA#	I
119	BMWEA#	I	120	SCASA#	I
121	SM_CS0#	I	122	SM_CS1#	I
123	N.C	-	124	N.C	-
125	GND	-	126	GND	-
127	MD36	I/O	128	MD37	I/O
129	MD32	I/O	130	MD33	I/O
131	2.5VSUS	-	132	2.5VSUS	-
133	SM_DQS4	I/O	134	SDM4	-

Table C-18 Memory connector 0 (200-PIN) (3/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
135	MD38	I/O	136	MD34	I/O
137	GND	-	138	GND	-
139	MD35	I/O	140	MD39	I/O
141	MD44	I/O	142	MD45	I/O
143	2.5VSUS	-	144	2.5VSUS	-
145	MD41	I/O	146	MD40	I/O
147	SM_DQS5	I/O	148	SDM5	-
149	GND	-	150	GND	-
151	MD42	I/O	152	MD46	I/O
153	MD47	I/O	154	MD43	I/O
155	2.5VSUS	-	156	2.5VSUS	-
157	2.5VSUS	-	158	CLK_SDRAM1#	I
159	GND	-	160	CLK_SDRAM1	I
161	GND	-	162	GND	-
163	MD53	I/O	164	MD48	I/O
165	MD52	I/O	166	MD49	I/O
167	2.5VSUS	-	168	2.5VSUS	-
169	SM_DQS6	I/O	170	SDM6	-
171	MD55	I/O	172	MD50	I/O
173	GND	-	174	GND	-
175	MD51	I/O	176	MD54	I/O
177	MD56	I/O	178	MD60	I/O
179	2.5VSUS	-	180	2.5VSUS	-
181	MD61	I/O	182	MD57	I/O
183	SM_DQS7	I/O	184	SDM7	-
185	GND	-	186	GND	-
187	MD59	I/O	188	MD58	I/O
189	MD62	I/O	190	MD63	I/O
191	2.5VSUS	-	192	2.5VSUS	-
193	SMBDT	I/O	194	GND	-
195	SMBCK	I/O	196	GND	-
197	+3V	-	198	GND	-
199	N.C.	-	200	N.C	-

## C.19 CN21 Memory connector 1 (200-PIN)

*Table C-19 Memory connector 1 (200-PIN) (1/3)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	MVREF_DM	-	2	MVREF_DM	-
3	GND	-	4	GND	-
5	MD5	I/O	6	MD4	I/O
7	MD1	I/O	8	MD0	I/O
9	2.5VSUS	-	10	2.5VSUS	-
11	SM_DQS0	I/O	12	SDM0	-
13	MD7	I/O	14	MD3	I/O
15	GND	-	16	GND	-
17	MD2	I/O	18	MD6	I/O
19	MD13	I/O	20	MD12	I/O
21	2.5VSUS	-	22	2.5VSUS	-
23	MD9	I/O	24	MD8	I/O
25	SM_DQS1	I/O	26	SDM1	-
27	GND	-	28	GND	-
29	MD10	I/O	30	MD15	I/O
31	MD14	I/O	32	MD11	I/O
33	2.5VSUS	-	34	2.5VSUS	-
35	CLK_SDRAM3	I	36	2.5VSUS	-
37	CLK_SDRAM3#	I	38	GND	-
39	GND	-	40	GND	-
41	MD16	I/O	42	MD20	I/O
43	MD17	I/O	44	MD21	I/O
45	2.5VSUS	-	46	2.5VSUS	-
47	SM_DQS2	I/O	48	SDM2	-
49	MD22	I/O	50	MD18	I/O
51	GND	-	52	GND	-
53	MD23	I/O	54	MD19	I/O
55	MD28	I/O	56	MD24	I/O
57	2.5VSUS	-	58	2.5VSUS	-
59	MD25	I/O	60	MD29	I/O
61	SM_DQS3	I/O	62	SDM3	-

Table C-19 Memory connector 1 (200-PIN) (2/3)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	GND	-	64	GND	-
65	MD31	I/O	66	MD26	I/O
67	MD27	I/O	68	MD30	I/O
69	2.5VSUS	-	70	2.5VSUS	-
71	N.C.	I/O	72	N.C.	I/O
73	N.C.	I/O	74	N.C.	I/O
75	GND	-	76	GND	-
77	N.C.	I/O	78	N.C.	-
79	N.C.	I/O	80	N.C.	I/O
81	2.5VSUS	-	82	2.5VSUS	-
83	N.C.	I/O	84	N.C	I/O
85	N.C	-	86	N.C	-
87	GND	-	88	GND	-
89	N.C.	-	90	GND	-
91	N.C.	-	92	2.5VSUS	-
93	2.5VSUS	-	94	2.5VSUS	-
95	CKE3	I	96	CKE2	I
97	N.C	-	98	N.C.	-
99	R_MA12	I	100	R_MA11	I
101	R_MA9	I	102	R_MA8	I
103	GND	-	104	GND	-
105	R_MA7	I	106	R_MA6	I
107	SMA_B5	I	108	SMA_B4	I
109	R_MA3	I	110	SMA_B2	I
111	SMA_B1	I	112	R_MA0	I
113	2.5VSUS	-	114	2.5VSUS	-
115	R_MA10	I	116	R_BA1	I
117	R_BA0	I	118	R_SRASA#	I
119	R_BMWEA#	I	120	R_SCASA#	I
121	SM_CS2#	I	122	SM_CS3#	I
123	N.C	-	124	N.C	-
125	GND	-	126	GND	-
127	MD36	I/O	128	MD37	I/O
129	MD32	I/O	130	MD33	I/O
131	2.5VSUS	-	132	2.5VSUS	-
133	SM_DQS4	I/O	134	SDM4	-

*Table C-19 Memory connector 1 (200-PIN) (3/3)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
135	MD38	I/O	136	MD34	I/O
137	GND	-	138	GND	-
139	MD35	I/O	140	MD39	I/O
141	MD44	I/O	142	MD45	I/O
143	2.5VSUS	-	144	2.5VSUS	-
145	MD41	I/O	146	MD40	I/O
147	SM_DQS5	I/O	148	SDM5	-
149	GND	-	150	GND	-
151	MD42	I/O	152	MD46	I/O
153	MD47	I/O	154	MD43	I/O
155	2.5VSUS	-	156	2.5VSUS	-
157	2.5VSUS	-	158	CLK_SDRAM4#	I
159	GND	-	160	CLK_SDRAM4	I
161	GND	-	162	GND	-
163	MD53	I/O	164	MD48	I/O
165	MD52	I/O	166	MD49	I/O
167	2.5VSUS	-	168	2.5VSUS	-
169	SM_DQS6	I/O	170	SDM6	-
171	MD55	I/O	172	MD50	I/O
173	GND	-	174	GND	-
175	MD51	I/O	176	MD54	I/O
177	MD56	I/O	178	MD60	I/O
179	2.5VSUS	-	180	2.5VSUS	-
181	MD61	I/O	182	MD57	I/O
183	SM_DQS7	I/O	184	SDM7	-
185	GND	-	186	GND	-
187	MD59	I/O	188	MD58	I/O
189	MD62	I/O	190	MD63	I/O
191	2.5VSUS	-	192	2.5VSUS	-
193	SMBDT	I/O	194	+3V	-
195	SMBCK	I/O	196	GND	-
197	+3V	-	198	GND	-
199	N.C.	-	200	N.C	-

**C.20 CN22 USB I/F connector (4-PIN)***Table C-20 USB I/F connector (4-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	USB2POWER	I	2	BUSBP0-	I/O
3	BUSBP0+	I/O	4	GND	-

**C.21 CN23 External MIC Connector (8-PIN)***Table C-21 External MIC connector (8-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	AUDGND	-	2	SYS_MIC_1	I
3	MBIAS	O	4	AUDGND	-
5	AUDGND	-	6	N.C.	-
7	AUDGND	-	8	AUDGND	-

**C.22 CN24 Headphone OUT Connector (8-PIN)***Table C-22 Headphone OUT connector (8-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	AUDGND	-	2	SPKL_SYS	O
3	SPKR_SYS	O	4	AUDGND	-
5	HPS_PLUGIN	I	6	N.C.	-
7	AUDGND	-	8	AUDGND	-



## C.23 CN25 ODD I/F Connector (50-PIN)

*Table C-23 ODD I/F connector (50-PIN)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	GND	-
5	-RST_RBAY0	O	6	SDD8	I/O
7	SDD7	I/O	8	SDD9	I/O
9	SDD6	I/O	10	SDD10	I/O
11	SDD5	I/O	12	SDD11	I/O
13	SDD4	I/O	14	SDD12	I/O
15	SDD3	I/O	16	SDD13	I/O
17	SDD2	I/O	18	SDD14	I/O
19	SDD1	I/O	20	SDD15	I/O
21	SDD0	I/O	22	SDDREQ	I
23	GND	-	24	SDIOR#	O
25	SDIOW#	O	26	GND	-
27	SDIORDY	I	28	SDDACK#	O
29	IRQ15	I	30	N.C.	-
31	SDA1	O	32	N.C.	O
33	SDA0	O	34	SDA2	O
35	SDCS1#	O	36	SDCS3#	O
37	CDLED#	O	38	+5V	-
39	+5V	-	40	+5V	-
41	+5V	-	42	+5V	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	RCSEL_R	-	48	GND	-
49	N.C.	-	50	N.C.	-

## **C.24 CN26 Modem Board connector (10-PIN)**

*Table C-24 Modem Board connector (10-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	PWRCLKN1	O	2	GND	-
3	PWRCLKP1	O	4	GND	-
5	N.C.	-	6	GND	-
7	DIB_DATAP	I/O	8	GND	-
9	DIB_DATAN	I/O	10	GND	-

## C.25 CN27 MINI-PCI connector (124-PIN)

*Table C-25 MINI-PCI connector (124-PIN) (1/2)*

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	RF_EN	I	14	N.C.	-
15	N.C.	-	16	N.C.	-
17	INTC#	I	18	+5V	-
19	+3V	-	20	INTB#	O
21	N.C.	-	22	N.C.	-
23	GND	-	24	3VSUS	-
25	PCLK_MINI	I	26	PCIRST#	O
27	GND	-	28	+3V	-
29	REQ1#	I	30	GNT1#	O
31	+3V	-	32	GND	-
33	AD31	I/O	34	PME#	O
35	AD29	I/O	36	N.C.	-
37	GND	-	38	AD30	I/O
39	AD27	I/O	40	+3V	-
41	AD25	I/O	42	AD28	I/O
43	N.C.	O	44	AD26	I/O
45	CBE3#	I/O	46	AD24	I/O
47	AD23	I/O	48	AD20	I/O
49	GND	-	50	GND	-
51	AD21	I/O	52	AD22	I/O
53	AD19	I/O	54	AD20	I/O
55	GND	-	56	PAR	I/O
57	AD17	I/O	58	AD18	I/O
59	CBE2#	I/O	60	AD16	I/O
61	IRDY#	I/O	62	GND	-

Table C-25 MINI-PCI connector (124-PIN) (2/2)

PIN No.	Signal name	I/O	PIN No.	Signal name	I/O
63	+3V	-	64	FRAME#	I/O
65	CLKRUN#	I/O	66	TRDY#	I/O
67	SERR#	I	68	STOP#	I/O
69	GND	-	70	+3V	-
71	PERR#	I/O	72	DEVSEL#	I/O
73	CBE1#	I/O	74	GND	-
75	AD14	I/O	76	AD15	I/O
77	GND	-	78	AD13	I/O
79	AD12	I/O	80	AD11	I/O
81	AD10	I/O	82	GND	-
83	GND	-	84	AD9	I/O
85	AD8	I/O	86	CBE0#	I/O
87	AD7	I/O	88	+3V	-
89	+3V	-	90	AD6	I/O
91	AD5	I/O	92	AD4	I/O
93	N.C.	-	94	AD2	I/O
95	AD3	I/O	96	AD0	I/O
97	+5V	-	98	N.C.	-
99	AD1	I/O	100	SERIRQ	I
101	GND	-	102	GND	-
103	N.C.	-	104	N.C.	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	SDIN1_MINI	O
109	N.C.	-	110	N.C.	-
111	N.C.	-	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	N.C.	-
117	GND	-	118	GND	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	+5V	-	124	3VSUS	-

## LED Board

### C.26 CN1 LED Board connector (14-PIN)

*Table C-26 LED Board connector (14-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	GND	-	2	GND	-
3	GND	-	4	GND	-
5	BT4#	I	6	NBSWON#	I
7	BT3#	I	8	NUMLED	O
9	BT2#	I	10	CAPSLED	O
11	BT1#	I	12	IDE_LED	O
13	N.C.	-	14	N.C.	-

## **Modem Board**

### **C.27 CN1 Modem Signal connector (10-PIN)**

*Table C-27 Modem Signal connector (10-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	PWRCLKN	O	2	GND	-
3	PWRCLKP	O	4	GND	-
5	N.C.	-	6	GND	-
7	DIB_DATAP	I/O	8	GND	-
9	DIB_DATAN	I/O	10	GND	-

### **C.28 MJ2 Phone Signal connector (2-PIN)**

*Table C-28 Phone Signal connector (2-PIN)*

<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>	<b>PIN No.</b>	<b>Signal name</b>	<b>I/O</b>
1	RING_1	I/O	2	TIP_1	I/O

## Appendix D Display Codes

### D.1 Display Codes

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

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
01	‘ ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (	0A	8A	46	F0	46	*2
11	0 )	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	13	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[ {	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

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

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



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

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
58	Ctrl	1D		9D		14		F0 14		*3
60	Alt (L)	38		B8		11		F0 11		*3
61	Space	39		B9		29		F0 29		
62	ALT (R)	E0	38	E0	B8	E0	11	E0	F0 11	
75	Ins	E0	52	E0	D2	E0	70	E0	F0 70	*1
76	Del	E0	53	E0	D3	E0	71	E0	F0 71	*1
79	←	E0	4B	E0	CB	E0	6B	E0	F0 6B	*1
80	Home	E0	47	E0	C7	E0	6C	E0	F0 6C	*1
81	End	E0	4F	E0	CF	E0	69	E0	F0 69	*1
83	↑	E0	48	E0	C8	E0	75	E0	F0 75	*1
84	↓	E0	50	E0	D0	E0	72	E0	F0 72	*1
85	PgUp	E0	49	E0	C9	E0	7D	E0	F0 7D	*1
86	PgDn	E0	51	E0	D1	E0	7A	E0	F0 7A	*1
89	→	E0	4D	E0	CD	E0	74	E0	F0 74	*1
110	Esc	01		81		76		F0 76		
112	F1	3B		BB		05		F0 05		
113	F2	3C		BC		06		F0 06		
114	F3	3D		BD		04		F0 04		
115	F4	3E		BE		0C		F0 0C		
116	F5	3F		BF		03		F0 03		
117	F6	40		C0		0B		F0 0B		
118	F7	41		C1		83		F0 83		
119	F8	42		C2		0A		F0 0A		
120	F9	43		C3		01		F0 01		
121	F10	44		C4		09		F0 09		*3

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

Cap No.	Keytop	Code set 1				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	
202	Fn	—	—	—	—				*4	
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

**Notes:**

1. \* Scan codes differ by mode.
2. \* Scan codes differ by overlay function.
3. \* Combined with the **Fn** key makes different codes.
4. \* **Fn** key does not generate a code by itself.
5. \* This key corresponds to key No. 42 in a 102-key model.
6. \* Refer to Table D-6, No. 124 key scan code.
7. \* Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

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

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

	With left <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
203	Win	E0 2A	E0 5B	E0 DB	E0 AA	E0 12	E0 1F	E0 F0	1F E0 F0 12
204	App	E0 2A	E0 5D	E0 DD	E0 AA	E0 12	E0 2F	E0 F0	2F E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1				Code set 2			
			Make		Break		Make		Break	
09	8	(8)	48		C8			75	F0	75
10	9	(9)	49		C9			7D	F0	7D
11	0	(*)	37		B7			7C	F0	7C
23	U	(4)	4B		CB			6B	F0	6B
24	I	(5)	4C		CC			73	F0	73
25	O	(6)	4D		CD			74	F0	74
26	P	(-)	4A		CA			7B	F0	7B
37	J	(1)	4F		CF			69	F0	69
38	K	(2)	50		D0			72	F0	72
39	L	(3)	51		D1			7A	F0	7A
40	;	(+)	4E		CE			79	F0	79
52	M	(0)	52		D2			70	F0	70
54	.	(.)	53		D3			71	F0	71
55	/	(/)	E0 35		E0 B5			40 4A	E0 F0	4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A	E0 37	E0 B7	E0 AA	E0 12	E0 7C	E0 F0	7C E0 F0 12
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0	7C
	Shift +	E0 37		E0 B7		E0 7C		E0 F0	7C
	Alt +		54	D4		84		F0	B4

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

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

\*: This key generates only make codes.

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## Appendix E Keyboard Layout

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

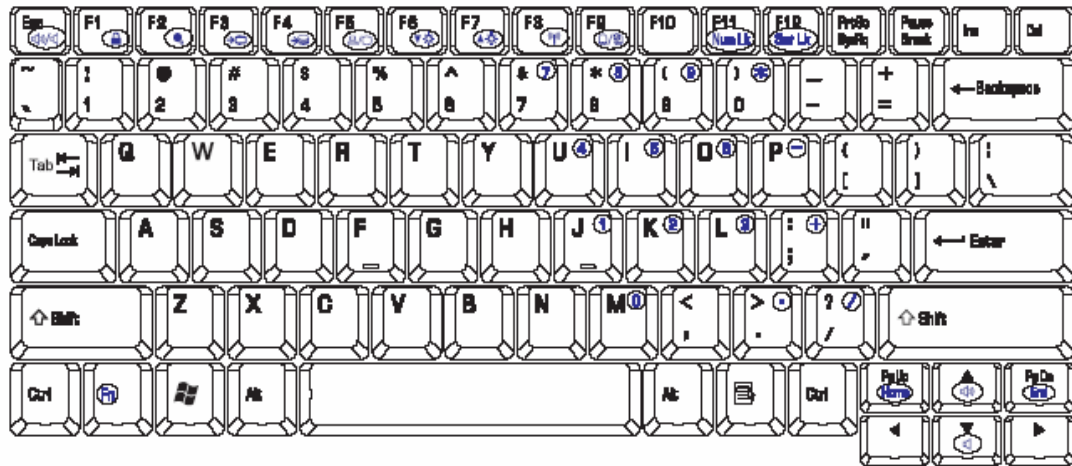


Figure E-1 US Keyboard layout

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

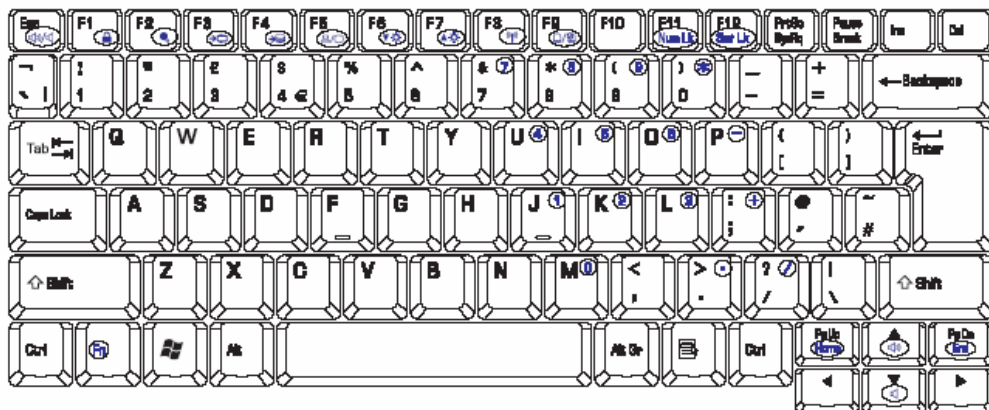


Figure E-2 UK Keyboard layout

### E.3 Arabia (AR) Keyboard

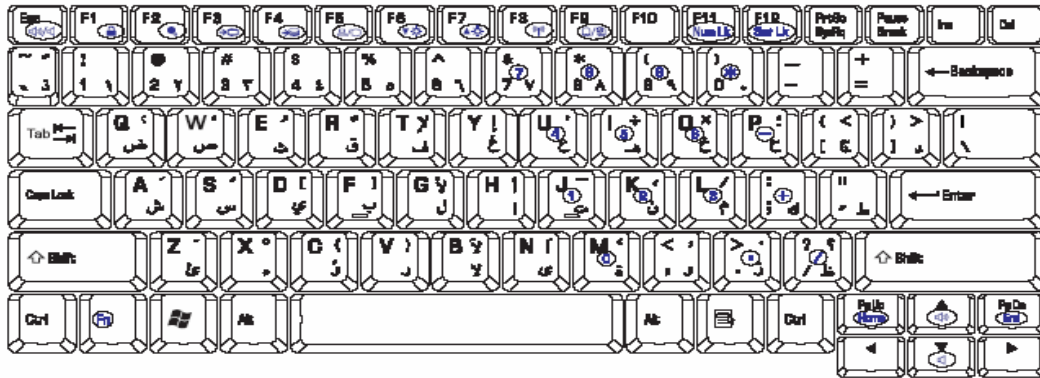


Figure E-3 AR Keyboard layout

### E.4 Belgium (BB) Keyboard

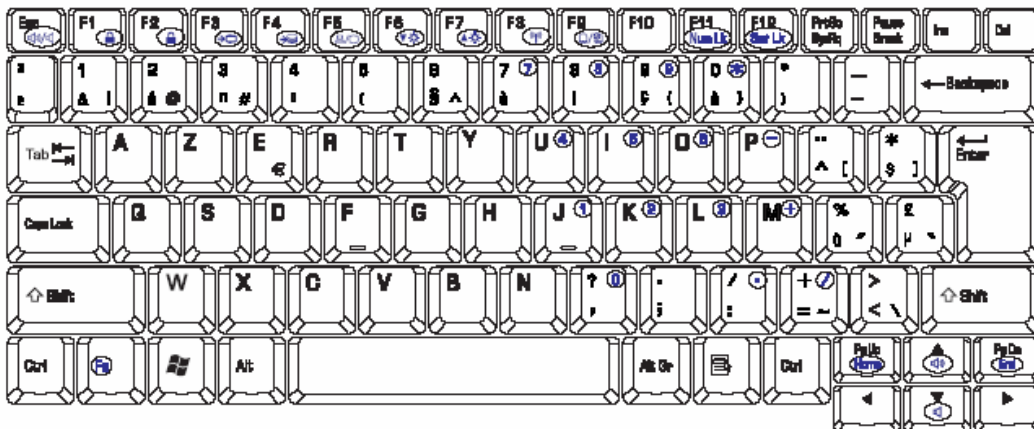


Figure E-4 BB Keyboard layout



### E.5 Czech (CZ) Keyboard

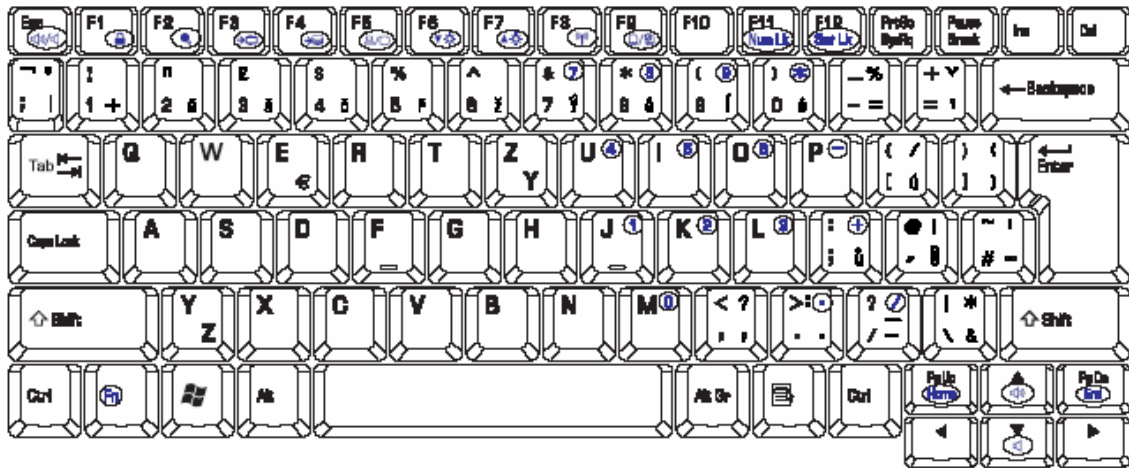


Figure E-5 CZ Keyboard layout

### E.6 German (GR) Keyboard

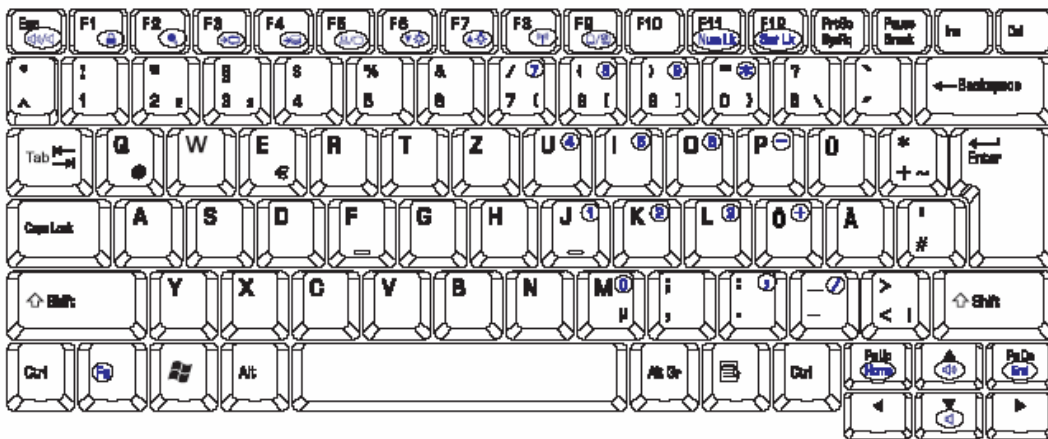


Figure E-6 GR Keyboard layout

## E.7 Danish (DK) Keyboard

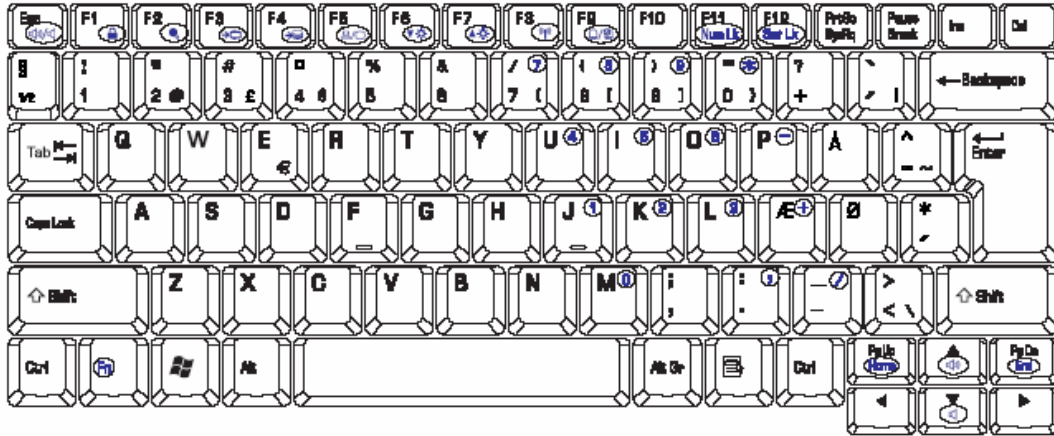


Figure E-7 DK Keyboard layout

## E.8 Spanish (SP) Keyboard

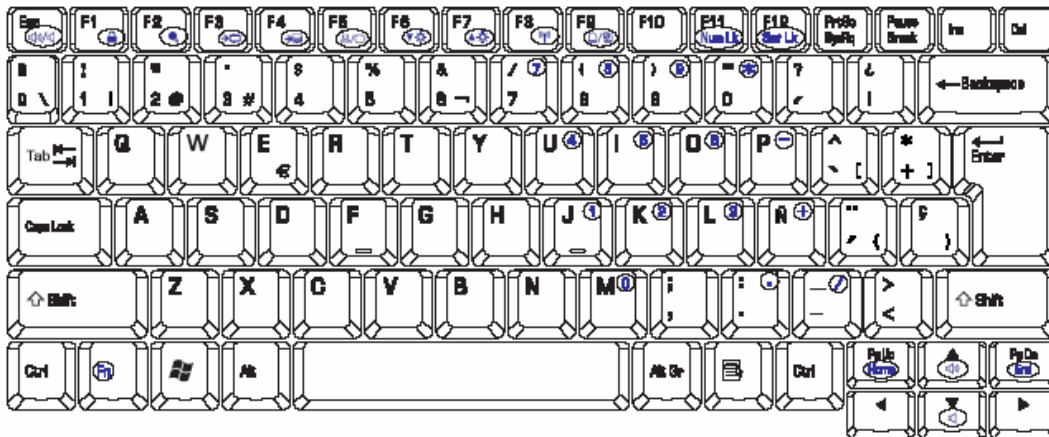


Figure E-8 SP Keyboard layout

### E.9 French (FR) Keyboard

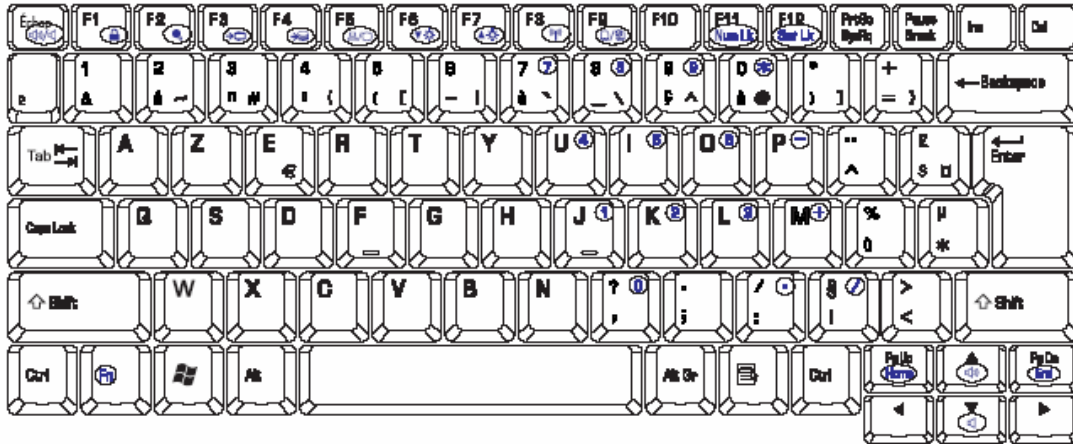


Figure E-9 FR Keyboard layout

### E.10 Hungary(HU) Keyboard

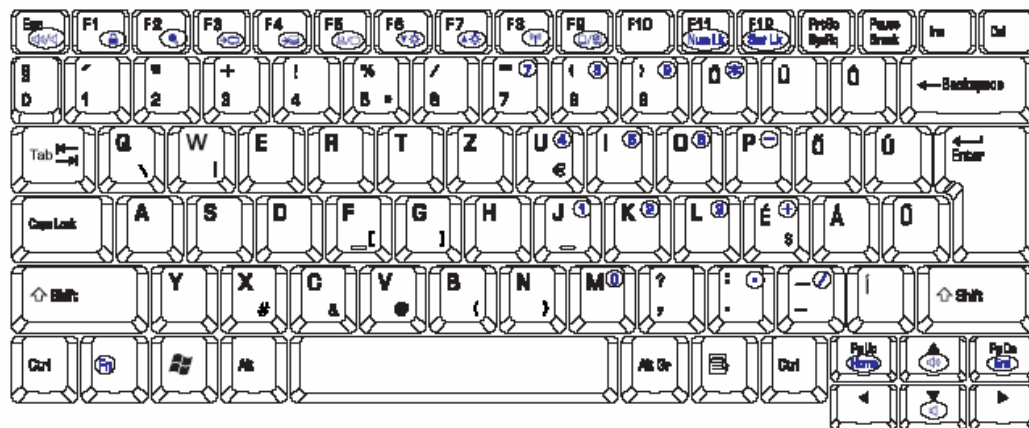


Figure E-10 HUR Keyboard layout

## E.11 Italian (IT) Keyboard

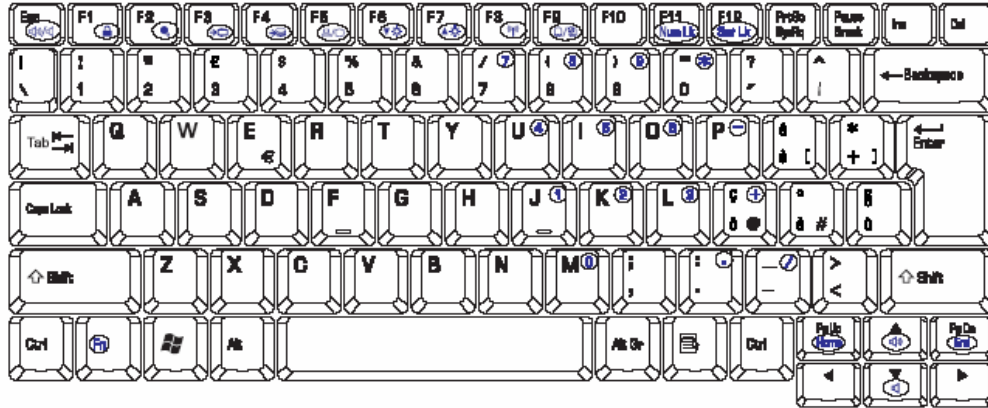


Figure E-11 IT Keyboard layout

## E.12 Korean (KR) Keyboard

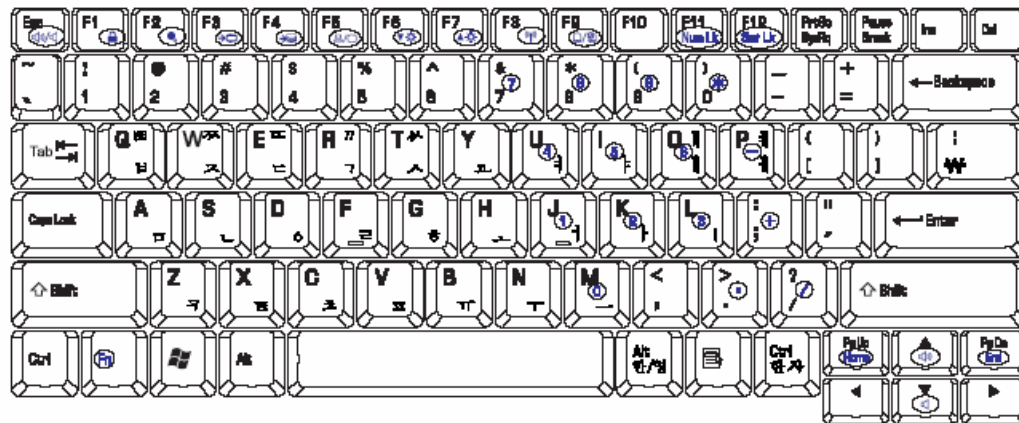


Figure E-12 KR Keyboard layout

### E.13 Norwegian (NO) Keyboard

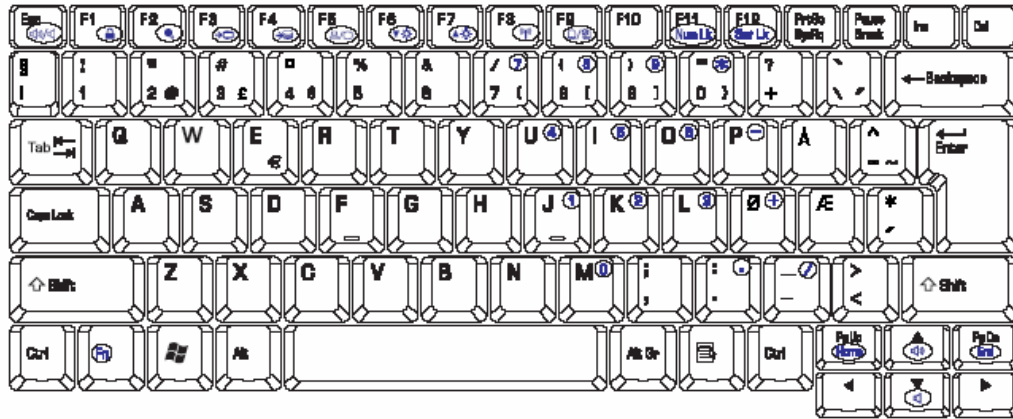


Figure E-13 NO Keyboard layout

### E.14 Portuguese (PT) Keyboard

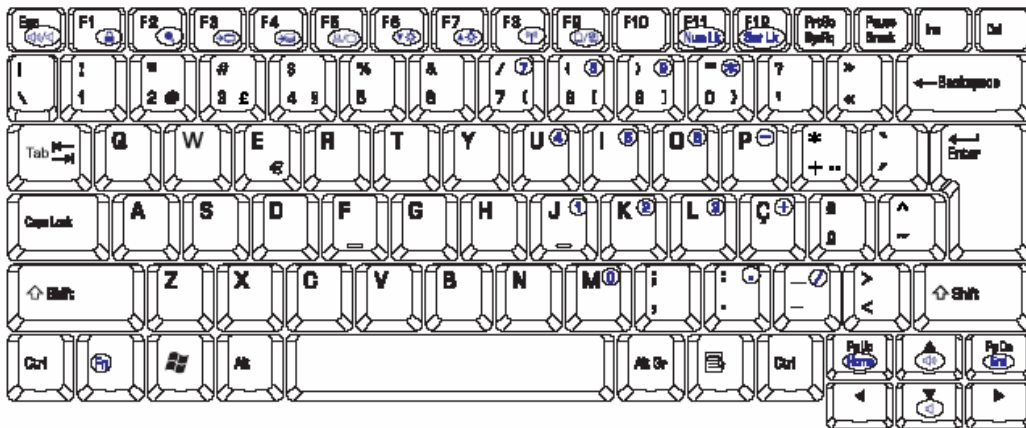


Figure E-14 PT Keyboard layout

### E.15 Traditional Chinese (TC) Keyboard

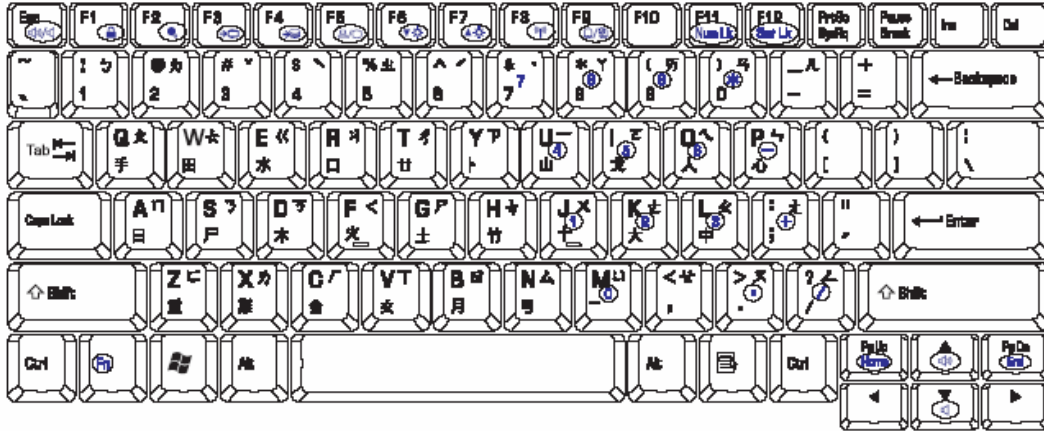


Figure E-15 TC Keyboard layout

### E.16 Swedish (SW) Keyboard

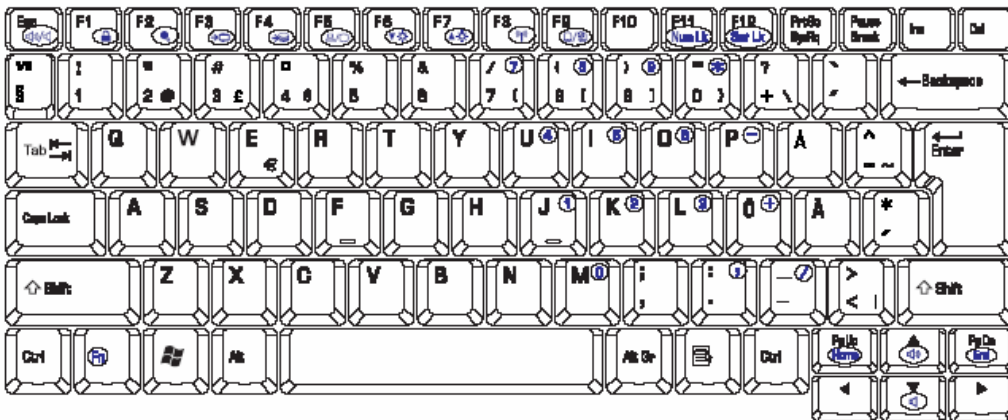


Figure E-16 SW Keyboard layout

### E.17 Russian (RU) Keyboard

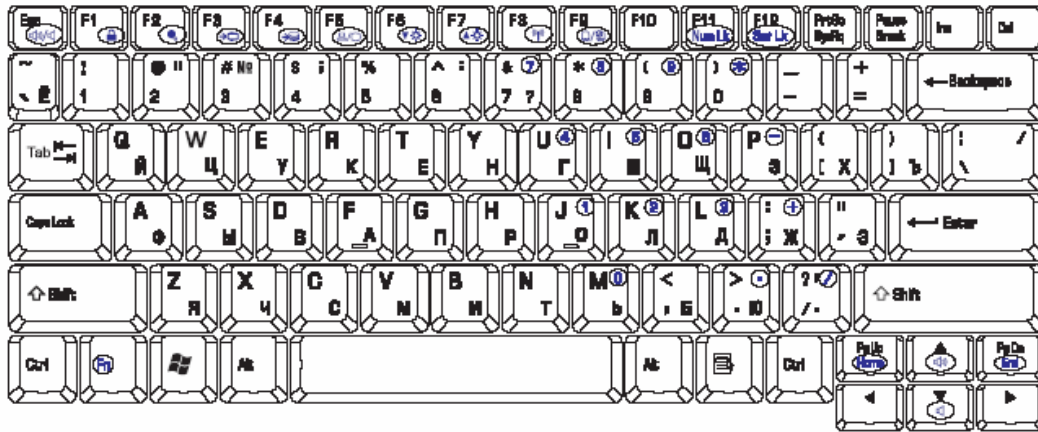


Figure E-17 RU Keyboard layout

### E.18 Turkish (TR) Keyboard

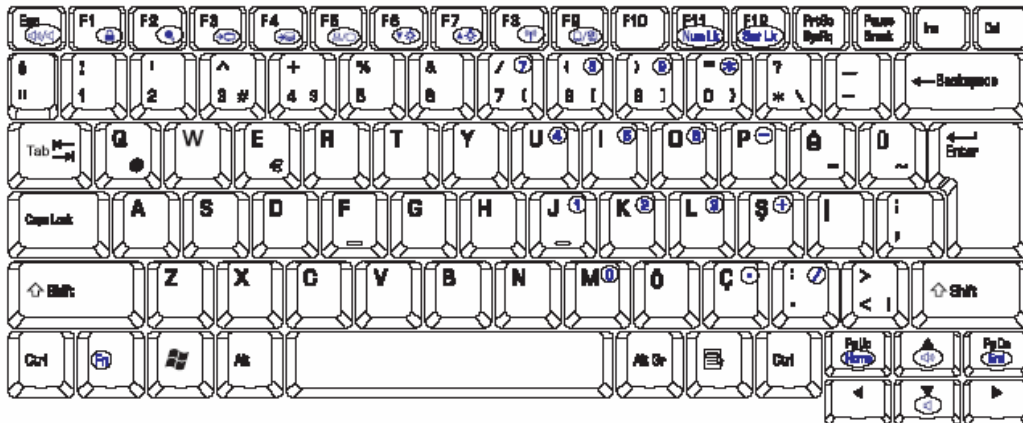


Figure E-18 TR Keyboard layout



### E.19 Japanese (JP) Keyboard

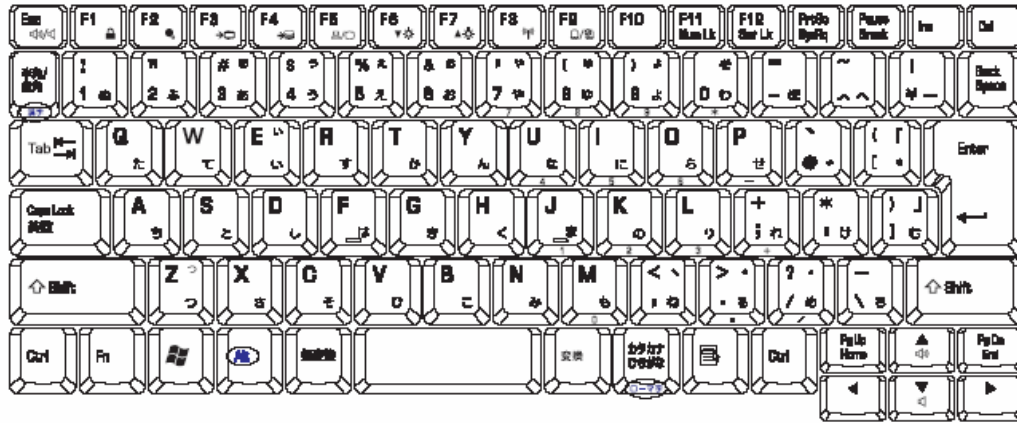


Figure E-19 JP Keyboard layout

### E.20 Swiss-German(SL) Keyboard

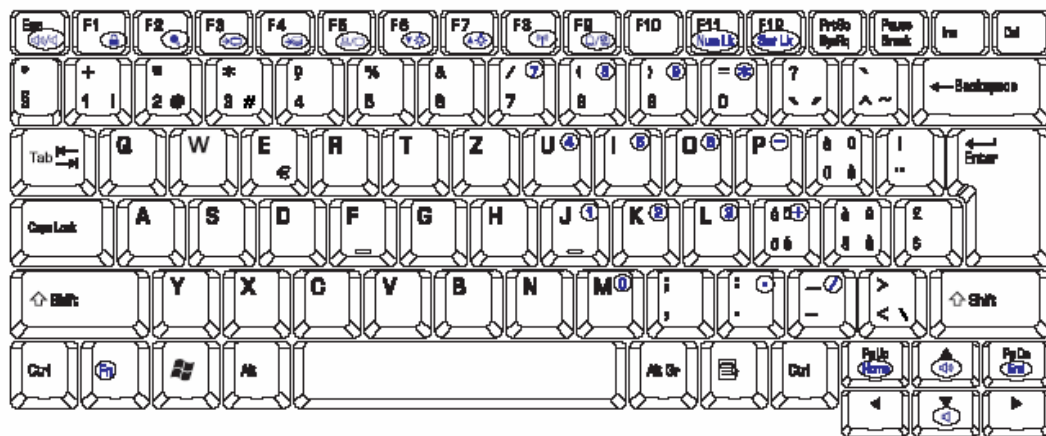


Figure E-20 SL Keyboard layout



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## Appendix F Wiring Diagrams

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### F.1 RGB Monitor ID Wraparound connector

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

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

### F.2 LAN Loopback Connector

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

*Figure F-2 LAN loopback connector*



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## Appendix G BIOS Rewrite Procedures

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

### Tools

To rewrite the BIOS, you need the following tool:

- BIOS/EC/KBC rewriting disk
- USB doggle

### Rewriting the BIOS

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cables and cards.
4. Connect an external FDD and insert the BIOS rewriting disk into the external FDD.
5. Connect the USB doggle special for BIOS rewrite
6. Turn on the power
7. The BIOS rewriting starts.
8. When the process is completed, it beeps and the system automatically reboots.

**NOTE:**

1. *Connect the AC adaptor to the computer when you rewrite the BIOS.*
2. *Do not turn off the power while you are rewriting the BIOS. If the rewrite fails, it might be impossible to start up the computer.*
3. *If you fail to rewrite BIOS, then when you next turn on the power, a message may be displayed that the contents of the BIOS have been erased or system can not boot . In this case, insert the BIOS rewriting disk, and the BIOS will be rewritten.*

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## **Appendix H EC/KBC Rewrite Procedures**

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Same as BIOS rewrite Procedures, please refer appendix G