Chapter 1

Service Overview

Carefully read through this chapter for a look at various components of the notebook and necessary cautions and tools before performing any service and repairs.

To provide the best service and support for the ASUS S62 Series, we have provided the below information for technicians from distributors and resellers to perform the complete notebook disassembly and assembly. But before performing the procedures, please be sure to read through the overview in this chapter for component overview, cautions and tools to avoid any unwarranted damages to the notebook's hardware.

The following chapter includes:

- S62 Series Overview
- Components
- Precautions
- Appropriate Tools

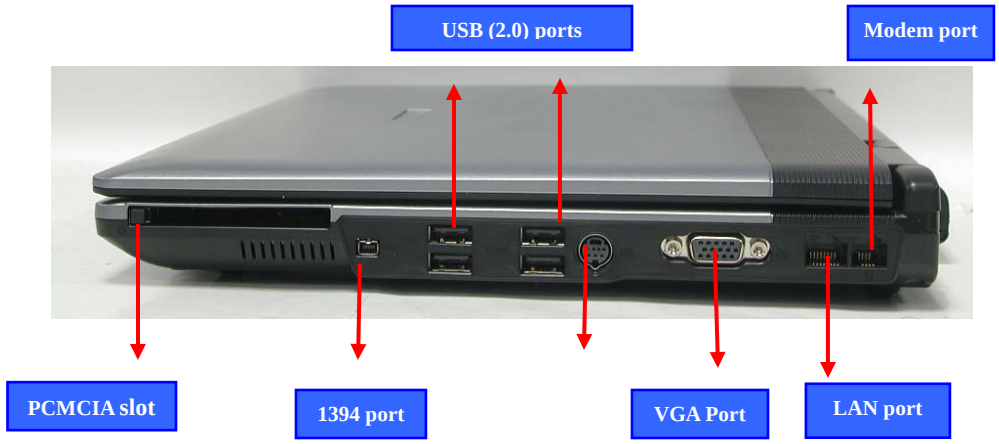
S62 Series Overview and Components

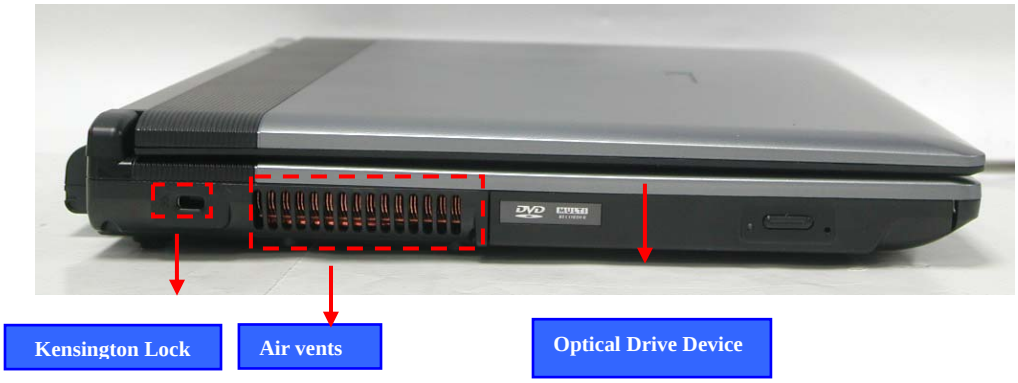
The ASUS S62 Series Notebook is a product combining the power of Intel® Pentium-M CPU. In this section, an overview for the S62 Series, along with its components, will be presented.

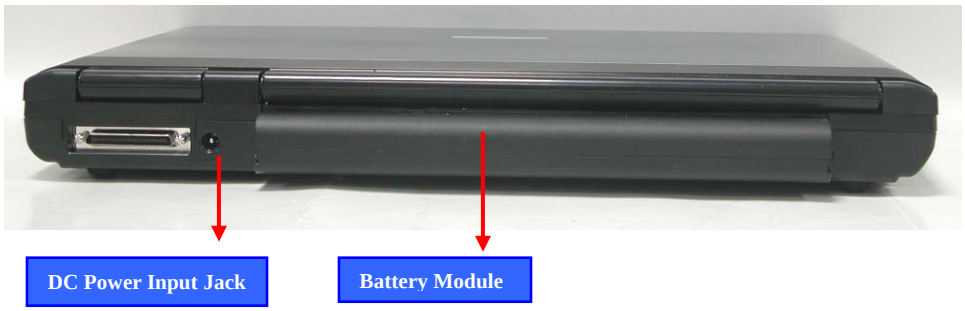
OVERVIEW

S62 Series Overview

The illustrations below show the notebook's overview from front view, right side view, left side view, and rear side view. Most of the parts will be discussed in this manual.


USB (2.0) ports
Modem port
PCMCIA slot
1394 port
VGA Port
LAN port


Kensington Lock
Air vents
Optical Drive Device


DC Power Input Jack
Battery Module

COMPONENTS

LCD

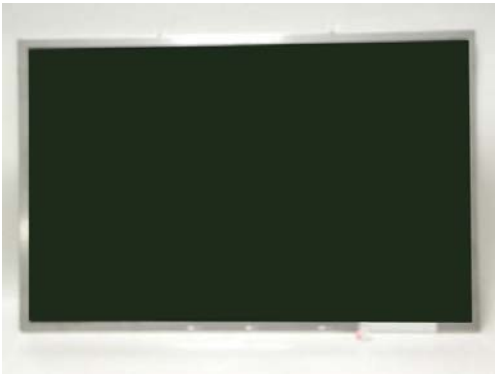
INVERTER BOARD

Components

The illustrations below show the components of the S62 Series.

LCD Panel*

The illustration below shows the LCD display panel. The S62 Series notebook comes with 15.0" TFT LCD Panel.



Inverter Board

The illustration below shows the inverter board, which is hidden underneath the lower edge of the LCD front bezel.

LCD BRACKETS

LCD bracket

The illustration below shows the LCD brackets.

HINGE COVER

Hinge Cover

The illustration below shows the Hinge Cover.

LCD CASE

LCD Case

The illustration below shows the LCD case. Here is the LCD bezel.

KEYBOARD

Keyboard

The illustration below shows the keyboard plate. It can be exchanged with keyboard plates with different language layouts, such as U.S., German, Russian, British, Italian and others.

TOP CASE

Top Case Module

The illustration below shows the top case of the notebook.

BATTERY

Battery Pack

The illustration below shows the battery pack of the notebook. It's located at bottom of the notebook.

OPTICAL DRIVE DEVICE

Optical Drive Device

The illustration below shows the Optical Drive Device

HDD

Hard Disk Drive

The illustration below shows the 2.5" industry-standard HDD with 9.5mm height.

HDD BRACKET

HDD Bracket

The illustration below shows the HDD Bracket that is placed over the HDD.

CPU

CPU

The illustration below shows the Intel Pentium-M CPU view.

CPU THERMAL MODULE

CPU Thermal Module

The illustration below shows the thermal module for the CPU. It's located on the top of CPU.

MEMORY

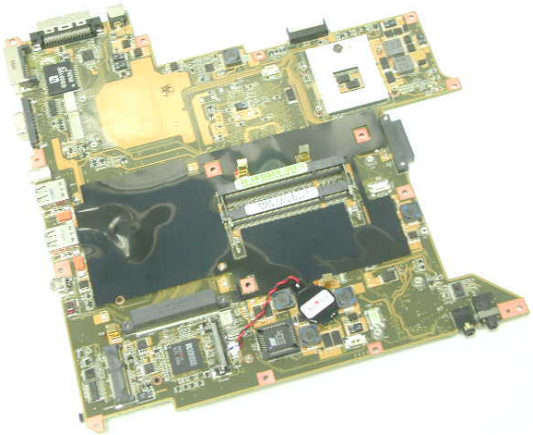
Memory Module

The illustration below shows the industry-standard 200pin SO-DIMM DDR SDRAM module for the notebook.

MOTHERBOARD

Motherboard

The illustration below shows the motherboard of the notebook.



MODEM MODULE

Modem Module

The illustration below shows the modem module of the notebook.

WALN MODULE

WALN Module

The illustration below shows the WALN module of the notebook.

TOP CASE

Top Case

The illustration below shows the TOP case of the notebook.

Service Overview

Please pay special attention to the cautions below to prevent any damages to the notebook and also please be sure to select the appropriate tools described in this section to perform any services desired.

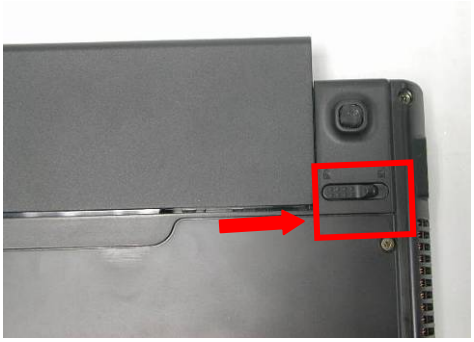
CAUTIONS

Precautions

Before you perform any service and/or repair on the notebook, please follow the steps below first.

1. Be sure that the notebook is powered down.
2. Disconnect the AC plug from the notebook

3. Turn the notebook over. Unlock and hold the latches, and remove the battery .



3. Remove all rings, watches and any other metal objects from your hands.

4. Always wear a ground strap on your hand to protect the notebook from static discharge.

TOOLS

Appropriate Tools

The illustrations below show the appropriate tools that should be used for the notebook's service and repair.

CROSS SCREW-DRIVER

Phillips-head Screwdriver

Use a Phillips-head screwdriver to fasten/remove the K- or B-typed screws.

FLATHEAD SCREW-DRIVER

Single-Slotted Screwdriver

Use a single-slotted screwdriver to lock/unlock the flexible cable connector locks

TWEEZERS

Tweezers

Use a pair of tweezers to remove/insert flexible cables.

INSERTION AND EXTRACTION TOOL FOR FPC CONNECTOR

Insertion and extraction tool for FPC connector

Use insertion and extraction tool for FPC connector to handle locking and unlocking of FPC connectors.

VACUUM HANDLING TOOL

Vacuum Handling Tool

Use Vacuum handling tool to handle CPU.

SPACER SCREW-DRIVER

Spacer Screwdriver

Use a spacer screwdriver to fasten/remove spacer screws or hex screws.

Chapter 2

Disassembly Procedure

Please follow the information provided in this section to perform the complete disassembly procedure of the notebook. Be sure to use proper tools described before.

ASUS S62 Series Notebook consists of various modules. This chapter describes the procedures for the complete notebook disassembly. In addition, in between procedures, the detailed disassembly procedure of individual modules will be provided for your service needs.

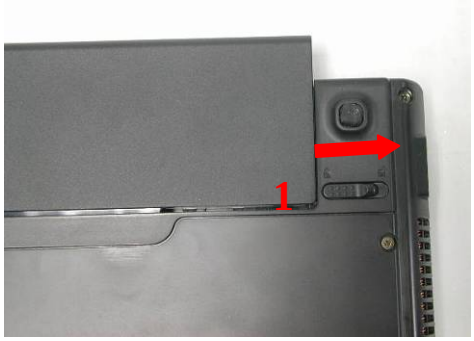
The disassembly procedure consists of the following steps:

- Battery Module
- HDD Module
- Wireless Module
- Memory Module
- CPU Module
- ODD Module
- Keyboard
- Top Case Module
- Motherboard
- Bottom case Module
- LCD Module

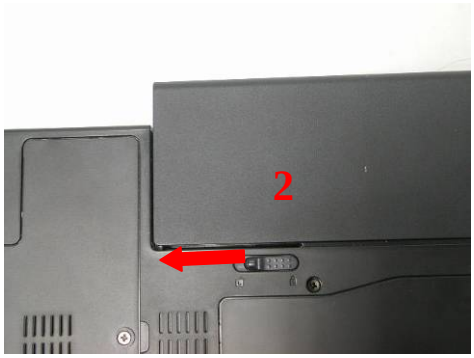
Battery Module

The illustration below shows how to remove the battery module.

1. Unlock and hold the latch No (1).



2. Slide the battery lock (No.2) and pull the battery pack out.



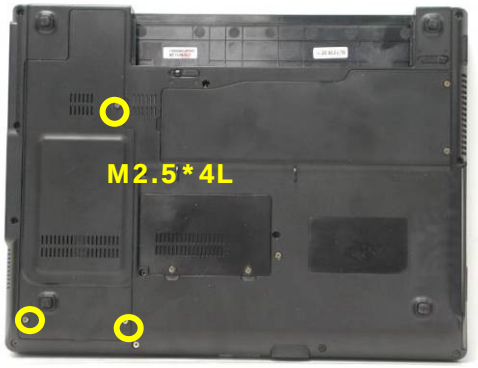
3. Pull the battery pack out.

HDD Module

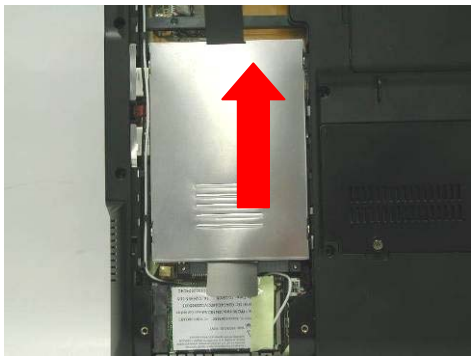
The illustrations below show how to remove the HDD module from the notebook.

Removing HDD Module

1. Remove 3 screws (M2.5*4L (K)), then remove the HDD door.



2. Lift the HDD module and then remove it.



3. Remove 4 screws [M3 * 4(L)] to separate HDD from HDD housing.

WIRELESS LAN

Wireless LAN Module

The illustration below shows how to remove the Wireless LAN module.

1. Remove 1 piece of tape and disconnect the MAIN & AUX antenna.

2. And open the two latches to pop the MINI PCI MODULE up then pull it out.

MEMORY MODULE

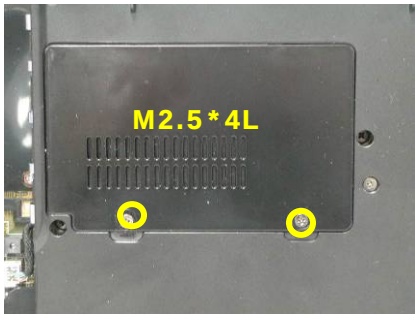
Memory Module

The S62 Series Notebook does not have RAM onboard. There is one SO-DIMM sockets for installing SO-DIMM RAM. It can upgrade the total memory size up to 1GB .

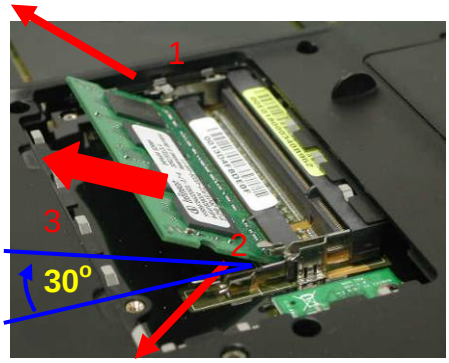
MEMORY REMOVAL

Removing Memory module

1. Remove 2 screws (M2.5*4L (K)), then remove the DIMM door.



2. Open the 2 latches aside (No. 1, 2), which will pop the memory module up to an angle of 30°, then pull out the memory module in that angle (No. 3).



CPU MODULE

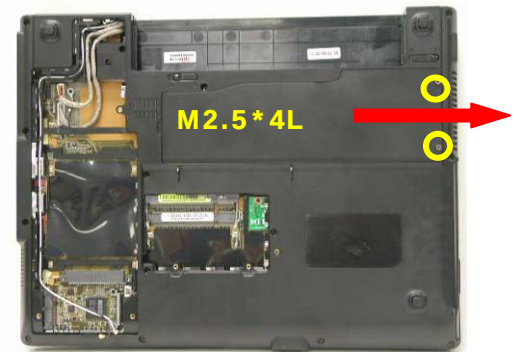
CPU REMOVAL

CPU Module

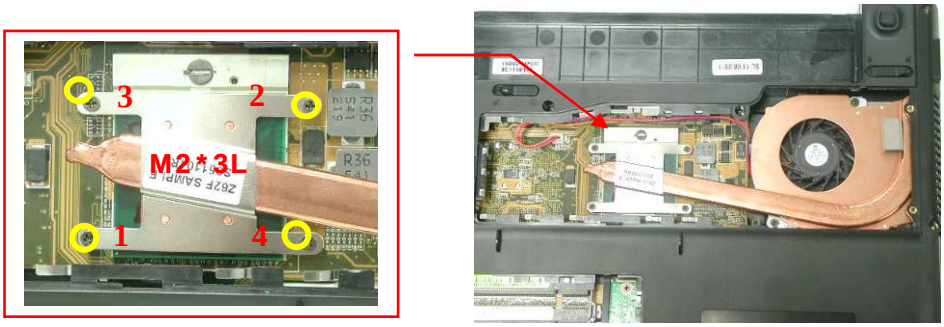
The illustrations below show how to remove the CPU module from the notebook.

Removing CPU Module

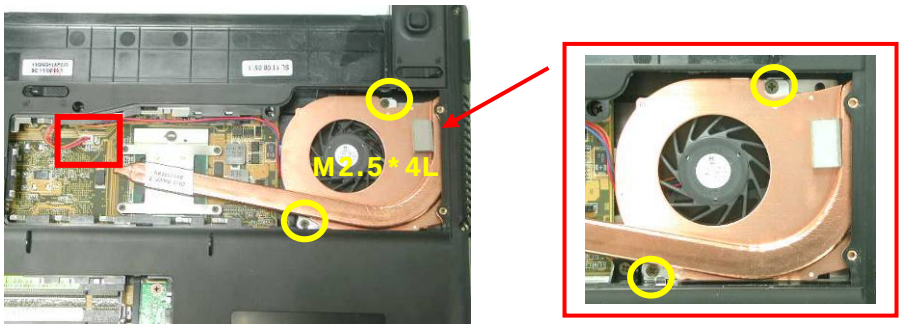
1. Remove 2 screws (M2.5*4L (K)), then remove the CPU door.



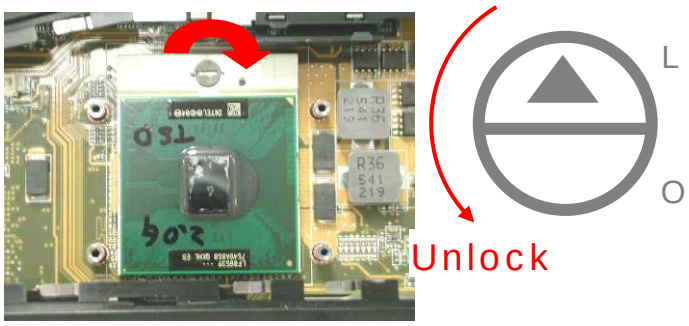
2. Remove 4 screws (M2*3L (K)) by order.



3. Disconnect the Fan cable and remove 2 screws (M2.5*4L (K)) then take away the CPU thermal module.



4. Turn the non-removable screw here 180 degrees counter-clockwise to loosen the CPU.



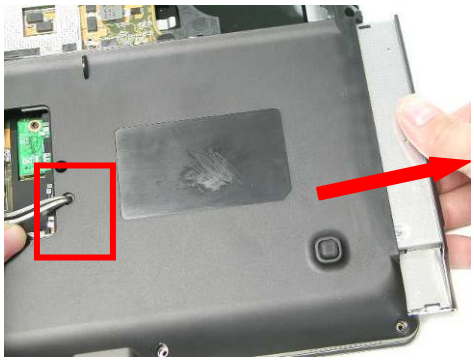
5. Squeeze the vacuum handling pump and use it to lift the CPU away.

ODD Module

The illustration below shows how to remove the ODD module.

1. Remove 1 screw (M2.5*4L (K)).

2. Push the ODD Module out by a pair of tweezers.



KEYBOARD

Keyboard

The illustration of below shows how to remove the keyboard.

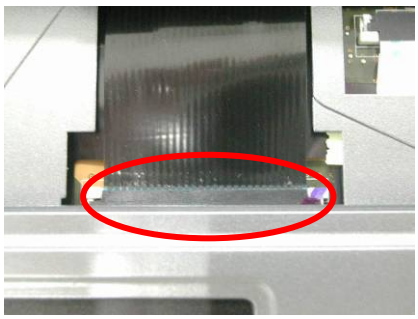
K/B REMOVAL

Removing Keyboard

1. Push the 4 latches in (No.1, No.2, No.3, No.4) with a pair of tweezers or a single-slotted screwdriver and lift the keyboard plate up.

2. Lay the keyboard down over the Top case. ***Do not remove the keyboard yet.** The keyboard cable is still attached.

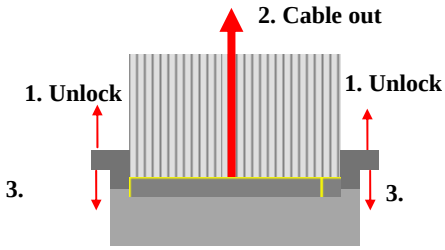
3. Disconnect the FPC connector by a pair of tweezers.



CABLE REMOVAL

Removing Keyboard Cable

1. Use a flexible connector tool to unlock the cable connector on both ends (no. 1).
2. Carefully pull out the keyboard cable (no. 2) with a pair of tweezers.
3. Lock the connector (no. 3) again to avoid possible breakage.



4. Remove keyboard from the top case.

TOP CASE MODULE

Top Case Module

The illustrations below show how to disassemble and remove the top case module of the notebook. The module contains the top case itself.

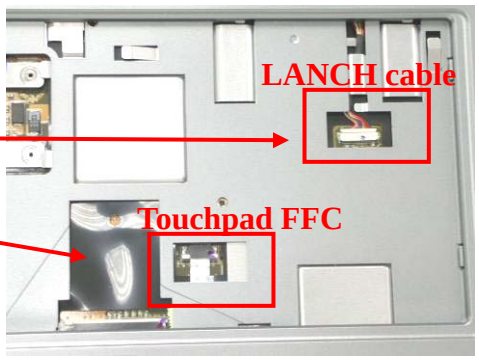
Removing top Case Module

HINGE COVER REMOVAL

1. Remove the MIDDLE cover.

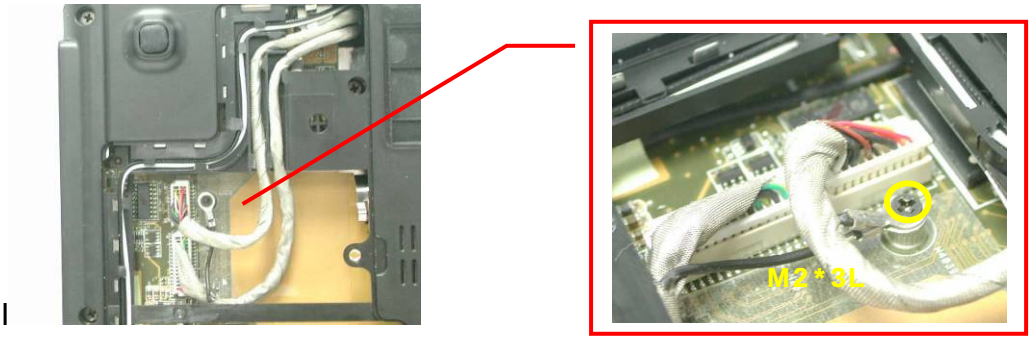
2. Use a pair of tweezers to remove both hinge Cover.

3. Disconnect the LANCH cable and touchpad FFC on the top case.

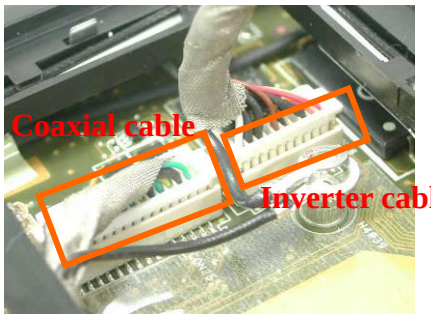


4. Turn over the NB and remove 1 screws (M2*3L (K)).

I



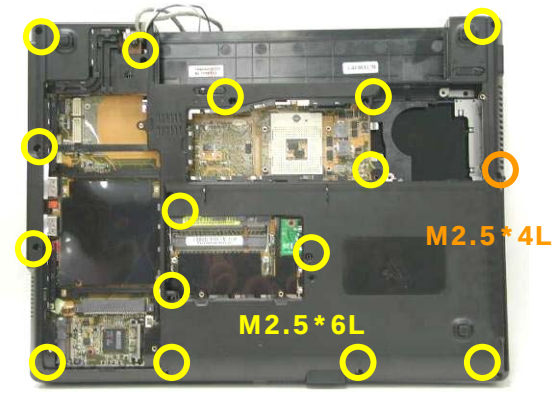
5. Disconnect the Coaxial & inverter cable.



6. Arrange the Coaxial & inverter cable and antenna on the bottom case.

BOTTOM CASE REMOVAL

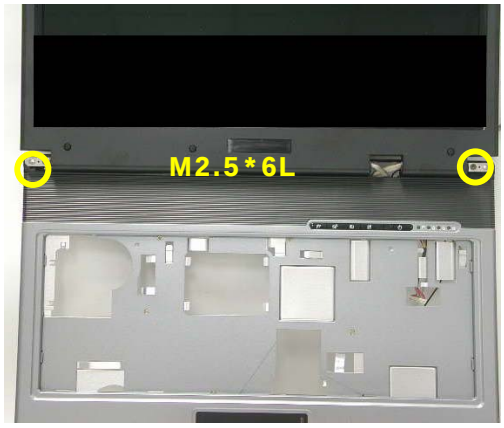
7. Remove 15 screws (M2.5*6L (K)) and 1 screw (M2.5*4L) (K)) on the bottom case.



8. Before separate the bottom case, remove a little bit bottom case and let the cable and antennas through out of hole.

9. Separate the bottom case from the top case.

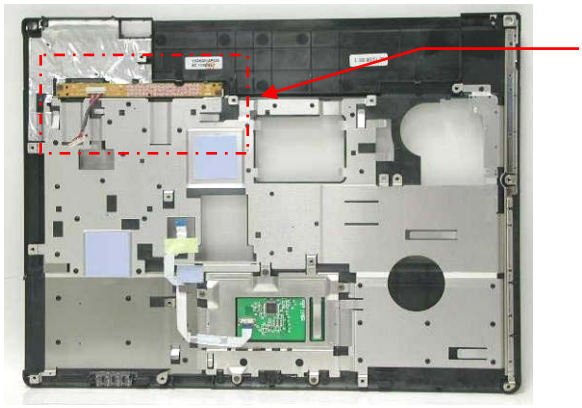
10. Remove 2 screws (M2.5*6L (K)) on both hinge.



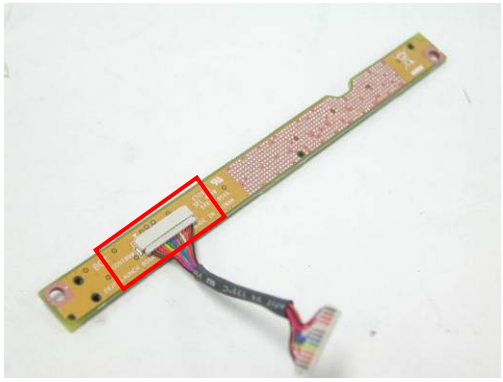
11. Separate the LCD module from the Top Case module

TOP CASE REMOVAL

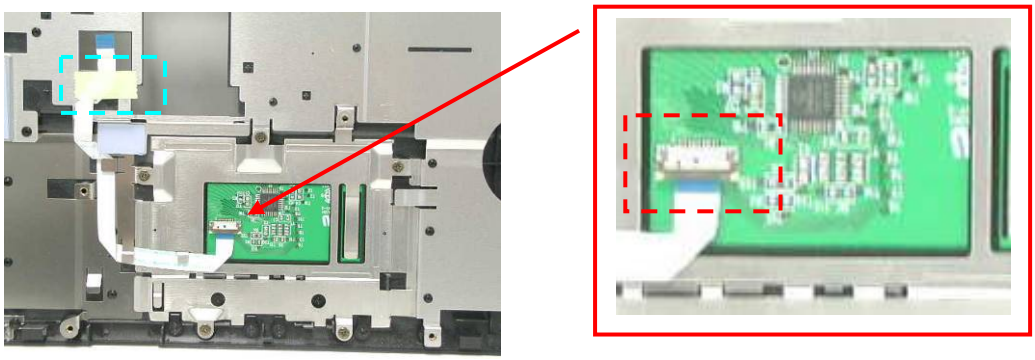
12. Remove 2 screws (M2.5*4L (K)) and take away the LANCH board.



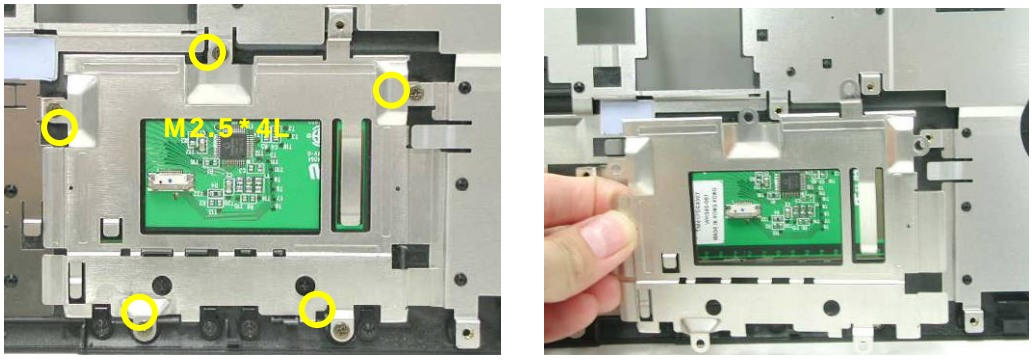
13. Remove the LANCH board cable.



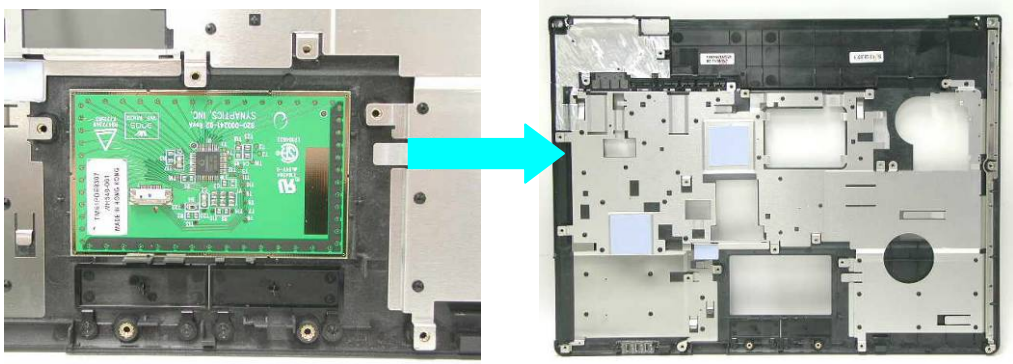
14. Disconnect the touch pad FFC and remove 1 piece of tape then take away the touch pad FFC.



15. Remove 5 screws (M2.5*4L (K)) and take away the touchpad bracket.



16. Take away the touchpad.



MOTHERBOARD

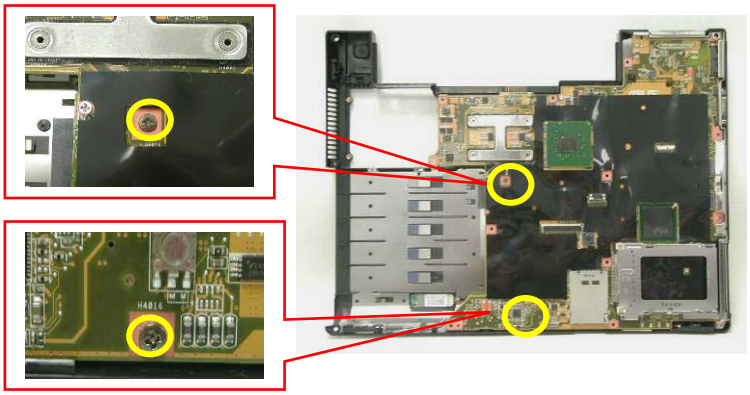
MOTHERBOARD REMOVAL

Motherboard

The illustrations below show how to disassemble and remove the Motherboard.

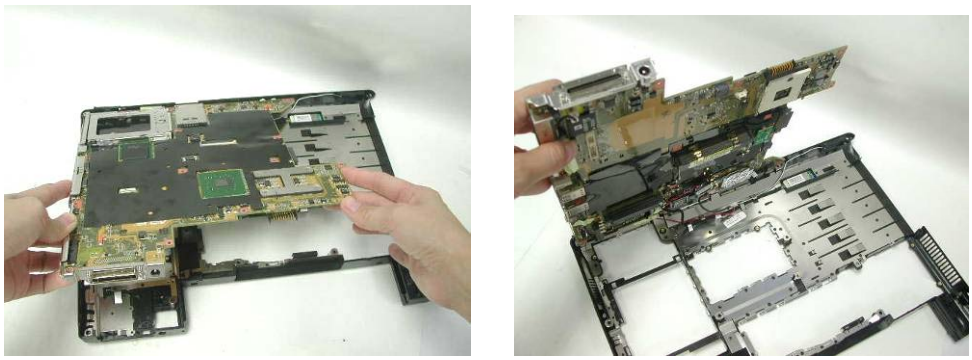
Removing Motherboard

1. Remove 2 screws (M2.5*4L (K)).

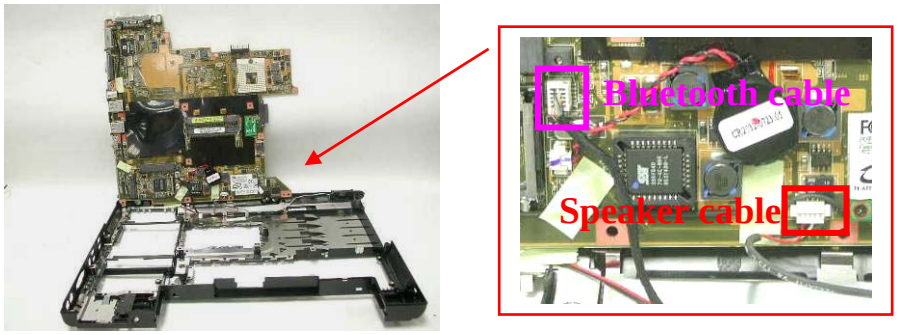


2. Remove 2 screws for CRT on the right side by a spacer screwdriver.

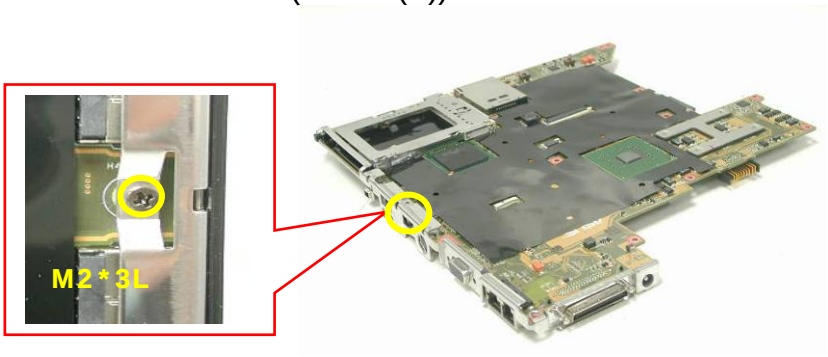
3. Separate the Motherboard from the bottom case. ***Do not remove the Motherboard yet.** The Bluetooth & Speaker cables are still attached.



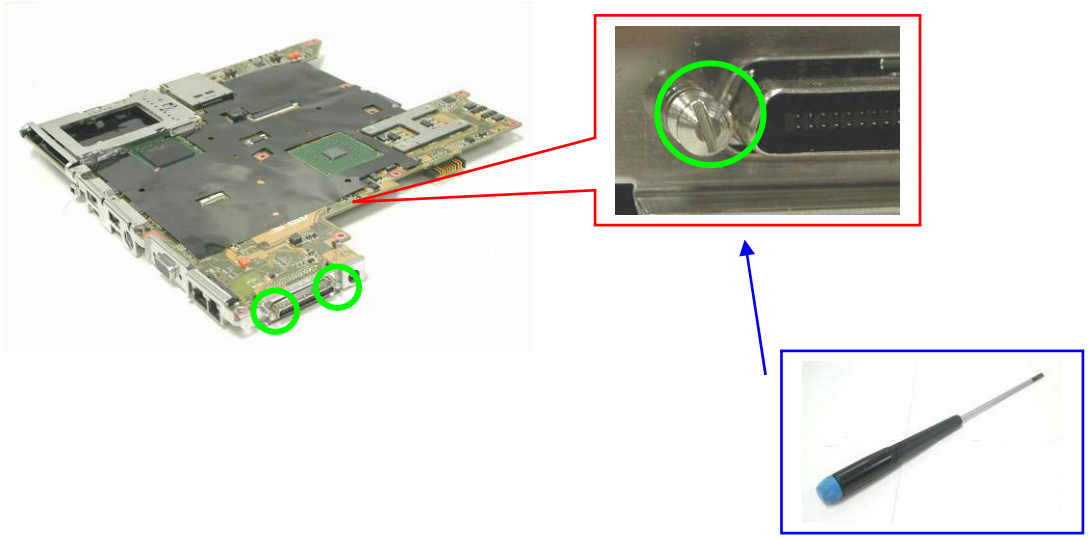
4. Disconnect the Bluetooth & Speaker cables then take away the Motherboard.



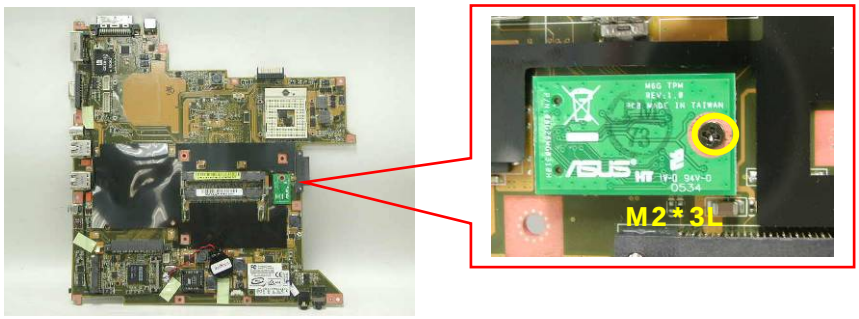
5. Remove 1 screw (M2*3L (K)) on the IO bracket.



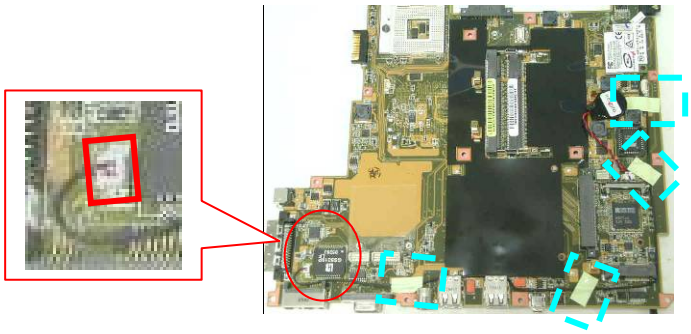
6. Use a single-slotted screwdriver to remove 2 screws HEX 5mm then take away the IO bracket.



7. Remove 1 screw (M2*3L (K)) and take away the TPM board .



8. Remove 4 pieces of tapes and disconnect the modem cable.



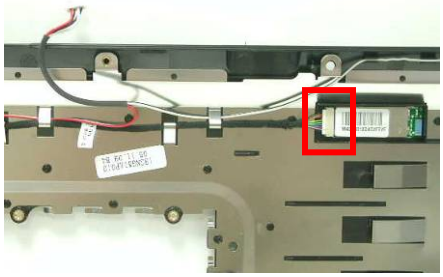
9. Remove 2 screws (M2*3L (K)) and take away the modem board.

Bottom Case Module

The illustrations below show how to remove and disassemble the Bottom case module. The module contains Bluetooth board, speaker cable.

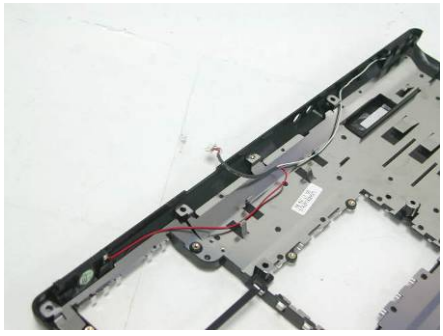
Disassembling Bottom case Module

1. Disconnect the Bluetooth cable and remove it.



2. Take away the Bluetooth board from the bottom case.

3. Take away the speaker module from the bottom case.

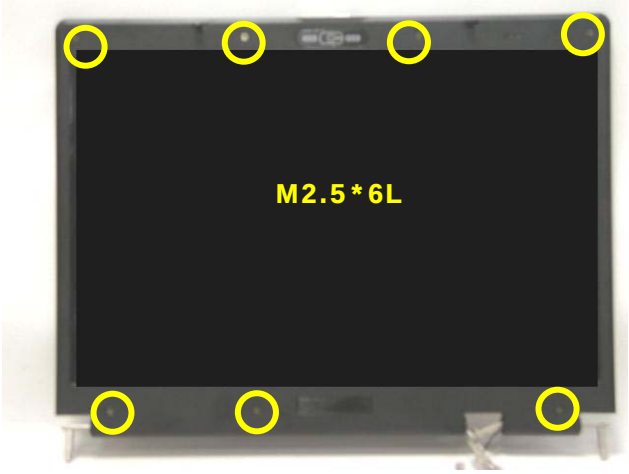


LCD Module

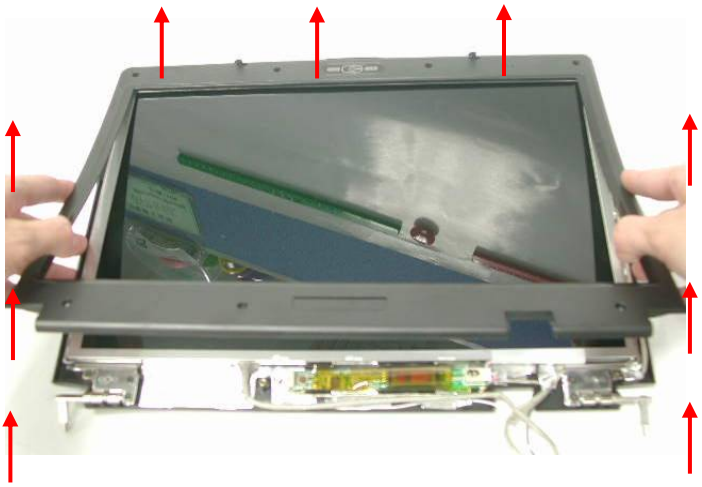
The illustrations below show how to remove and disassemble the LCD module. The module contains LCD panel, Inverter board, LCD bezel, LCD back cover.

Disassembling LCD Module

4. Remove 7 rubber pads and 7 screws (M2.5 x 6L) from LCD module.

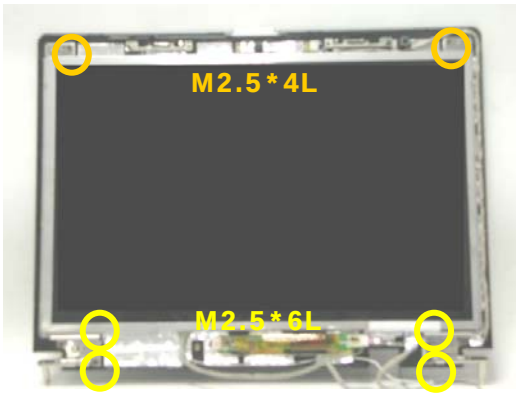


5. Prying the inside edges of the LCD bezel, and then separates it from LCD back cover.



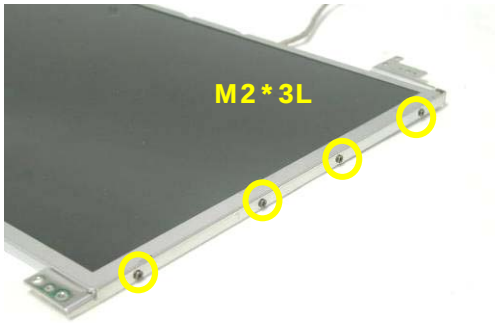
6. Disconnect the LCD cable.

7. Remove 2 screws (M2.5*4L (K)) & 4 screws (M2.5*6L (K)) and take away the LCD panel.

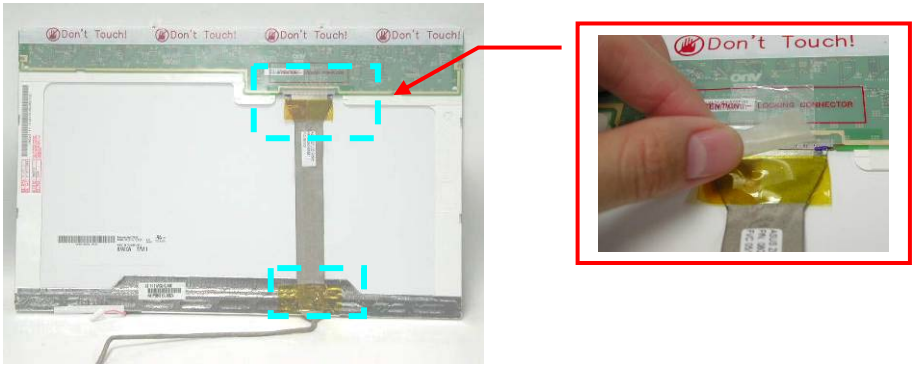


5. Remove 4 screws(M2*3L(K)) on the right LCD bracket to disassemble the LCD bracket.

6. Remove 4 screws(M2*3L(K)) on the left LCD bracket to disassemble the other LCD bracket.



7. Remove 2 pieces of tapes and disconnect the coaxial cable then take it away.



8. Remove 1 screw (M2x 4L).

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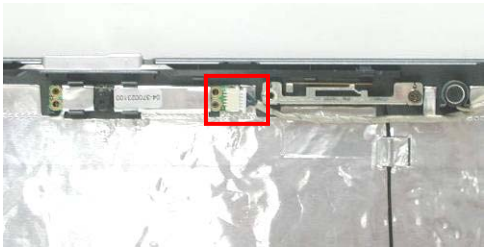
9. Lift a little bit the inverter board and disconnect the inverter cable and then take it away.

6. Remove 2 screws (M2x 6L) on both hinge and take them away.

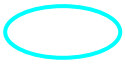
7. Disconnect the camera cable and remove the microphone.

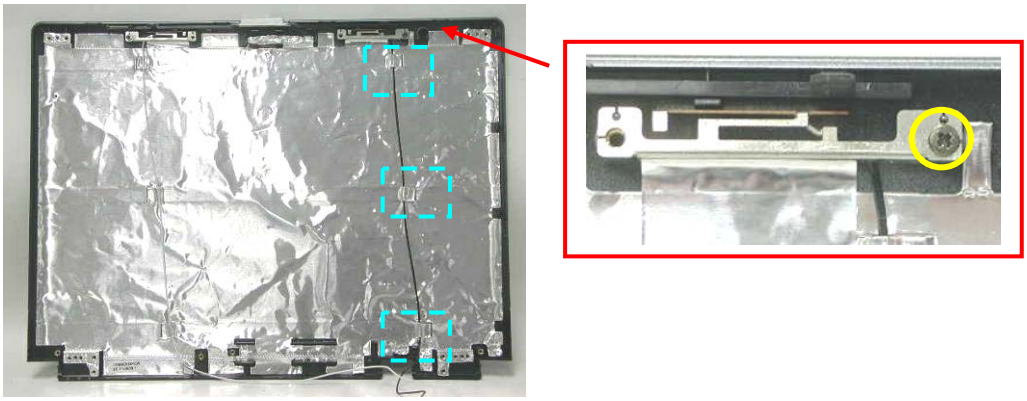



8. Remove the cable and remove mylar then take away the cable.

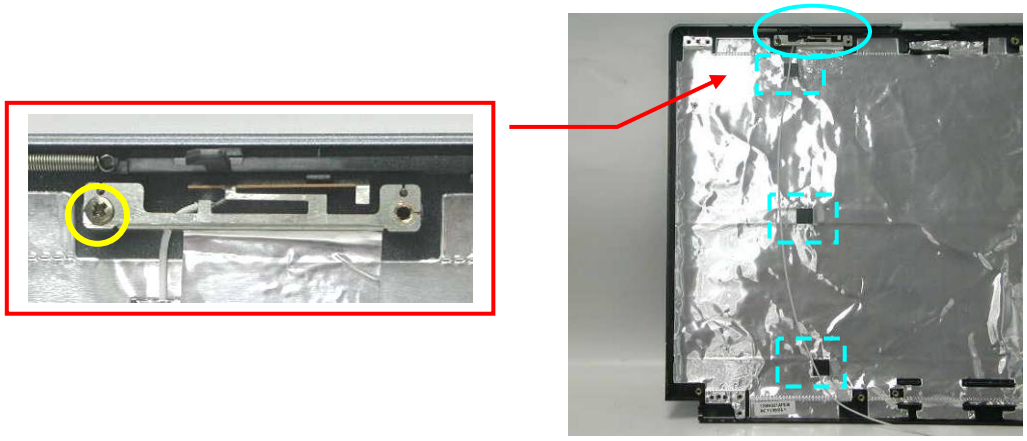

9. Take away the Camera module from the LCD back cover.

10. Remove 1 screw (M2x 4L) and remove 3 pieces of tapes then take away the wireless black wire.





11. Remove 1 screw (M2x 4L) and remove 3 pieces of tapes then take away the wireless white wire.



Chapter 3

Assembly Procedure

Please follow the information provided in this section to perform the complete assembly procedure of the notebook. Be sure to use proper tools described before.

After you have completed the previous chapter of complete disassembly, please follow this chapter to assemble the notebook back together. This chapter describes the procedures of the complete notebook assembly. In addition, in between procedures, the detailed assembly procedure of individual modules will be provided for your service needs.

The assembly procedure consists of the following steps:

- LCD Module
- Bottom case Module
- Motherboard
- Top Case Module
- Keyboard
- ODD Module
- CPU Module
- Memory Module
- Wireless Module
- HDD Module
- Battery Module

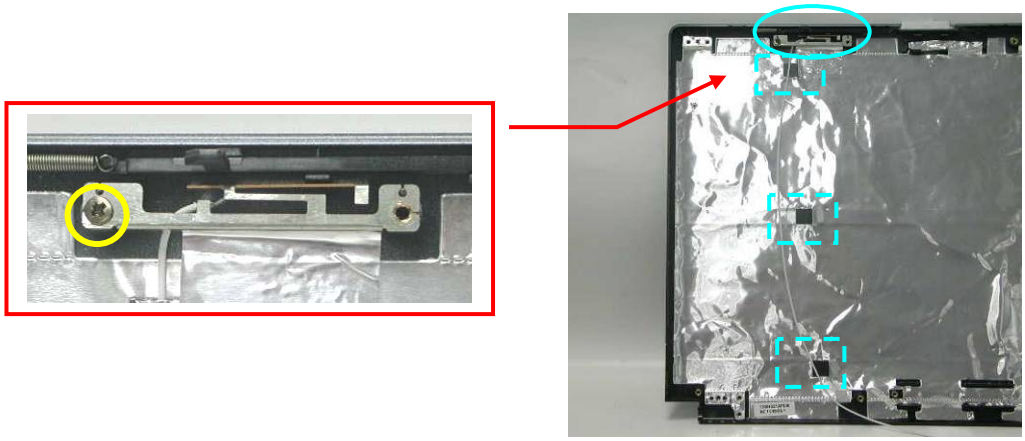
LCD MODULE

LCD Module

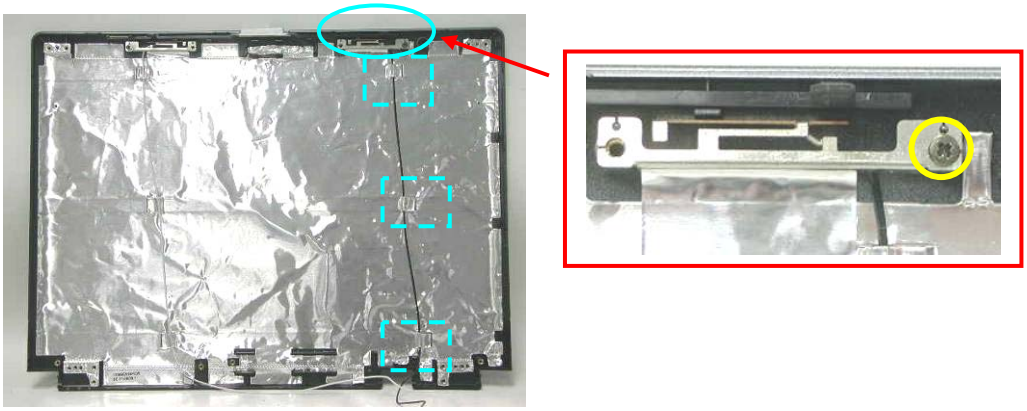
The illustrations below show how to assemble and install the LCD module of the notebook.

LCD MODULE ASSEMBLY

1. Install the wireless white wire module and secure 1 screw (M2x 4L) then paste 3 pieces of tapes to secure it.

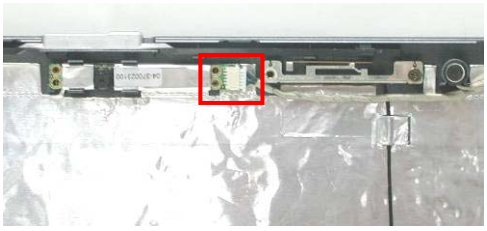


2. Install the wireless black wire module and secure 1 screw (M2x 4L) then paste 3 pieces of tapes to secure it.



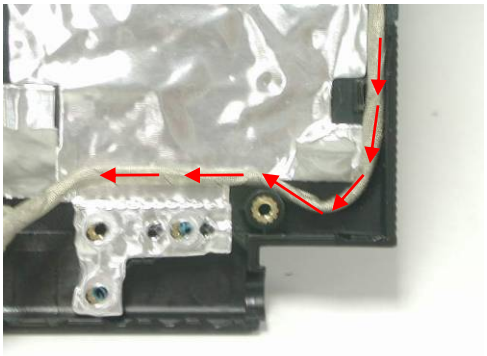
3. Install the Camera module on the LCD back cover.

4. Install the microphone on the LCD cover and connect the camera cable.

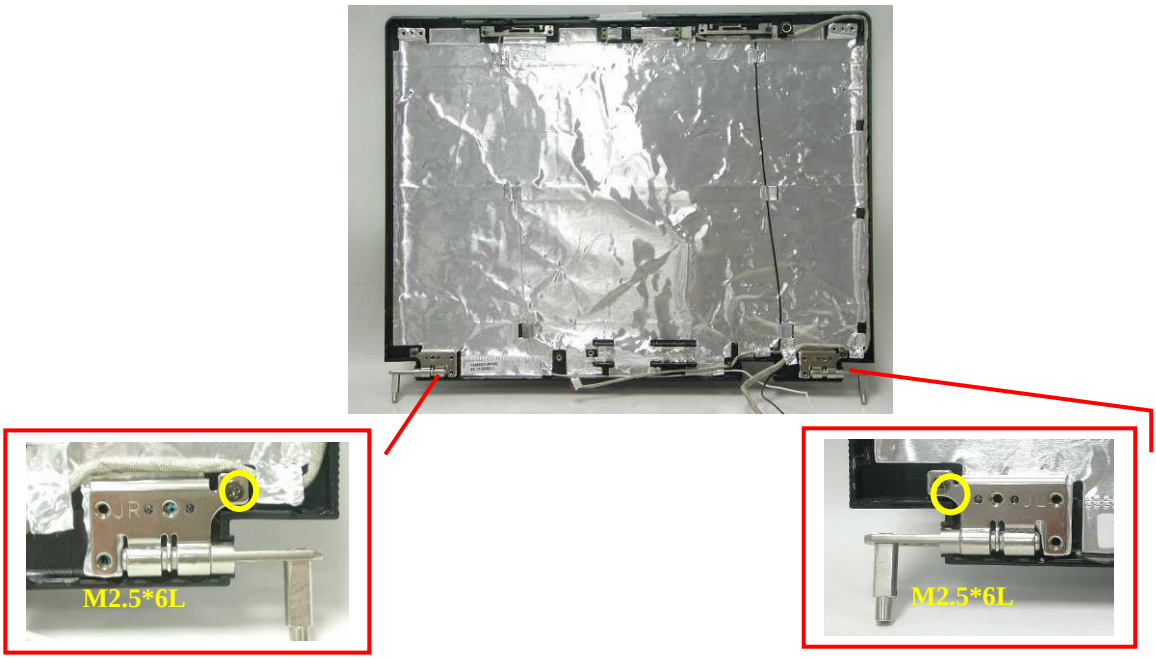
5. Lay the inverter cable through the locking trench on the LCD back cover.





6. Lay the inverter cable through the locking trench on the LCD back cover.


7. Install the both hinge on LCD back cover and secure 2 screws (M2x 6L) to secure them.



8. Install the inverter board on LCD back cover and connect the inverter cable.

9. Secure 1 screw (M2x 4L) to secure it.

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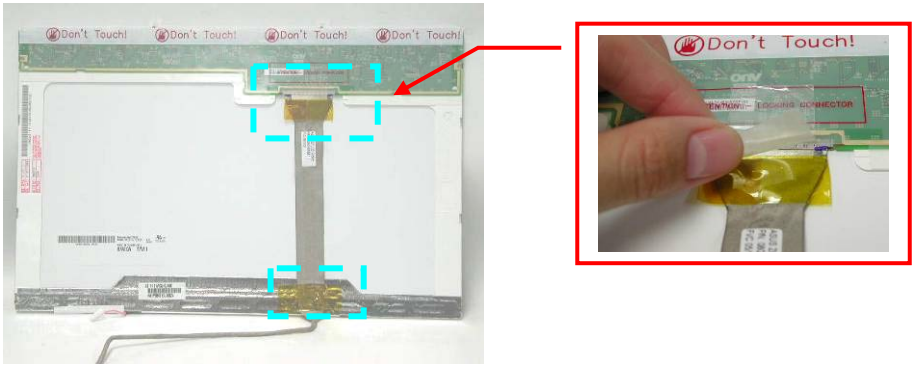
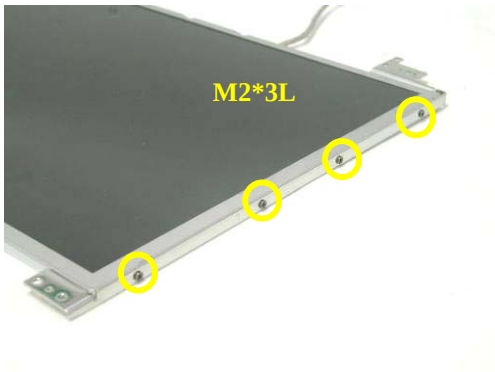
Assembly LCD Module

1. Connect the coaxial cable and paste 2 pieces of tapes to secure it.

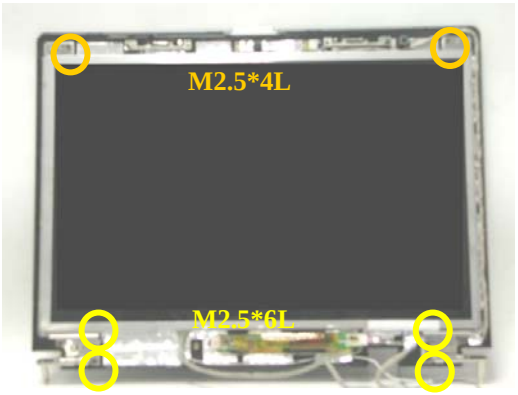


2. Install the left LCD bracket and secure 4 screws (M2*3L (K)) to fix it.

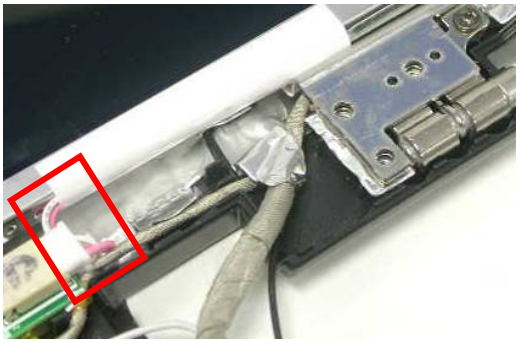


3. Install the right LCD bracket and 4 screws(M2*3L(K)) and secure 4 screws (M2*3L (K)) to fix it.

4. Install the LCD panel and secure 2 screws (M2.5*4L (K)) & 4 screws (M2.5*6L (K)) to secure it.

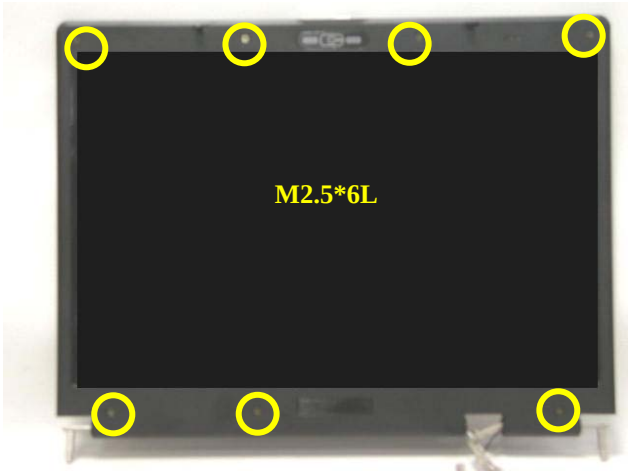


5. Connect the LCD cable.



6. Combine the LCD bezel and LCD Cover properly and press on all four edges until them snap into position.

7. Secure74 screws (M2.5 x 6L) on LCD front bezel then paste 7 rubber pads above.

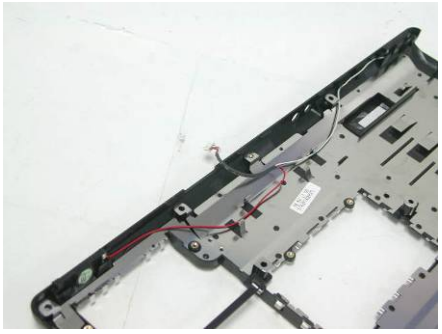


Bottom Case Module

The illustrations below show how to assembly the Bottom case module. The module contains Bluetooth board, speaker cable.

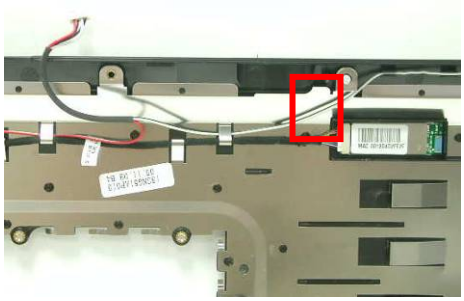
Assembling Bottom case Module

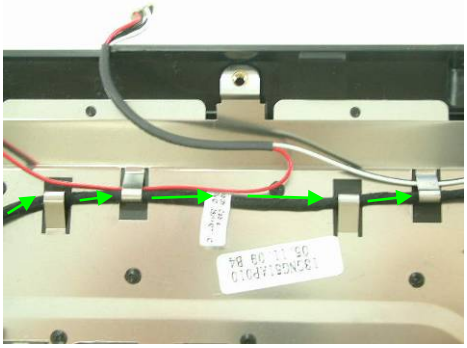
1. Install the speaker module on the bottom case.



2. Install the Bluetooth board on the bottom case.

3. Connect the Bluetooth cable and lay it through the locking trench on bottom case.





MOTHERBOARD

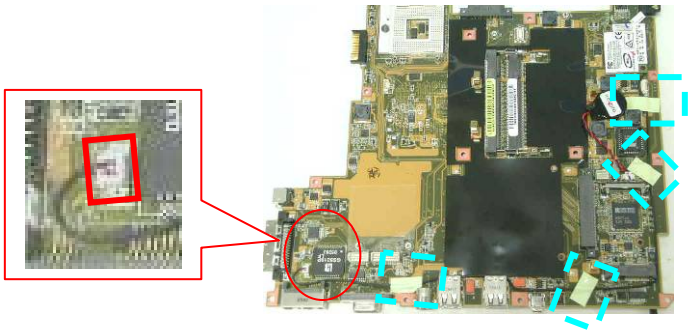
MOTHERBOARD ASSEMBLY

Motherboard

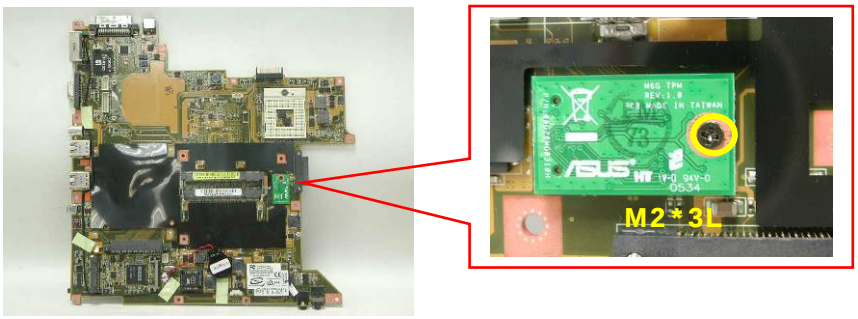
The illustrations below show how to assemble and install the motherboard of the notebook.

1. Install the modem board and secure 2 screws (M2.5*3L (K)).

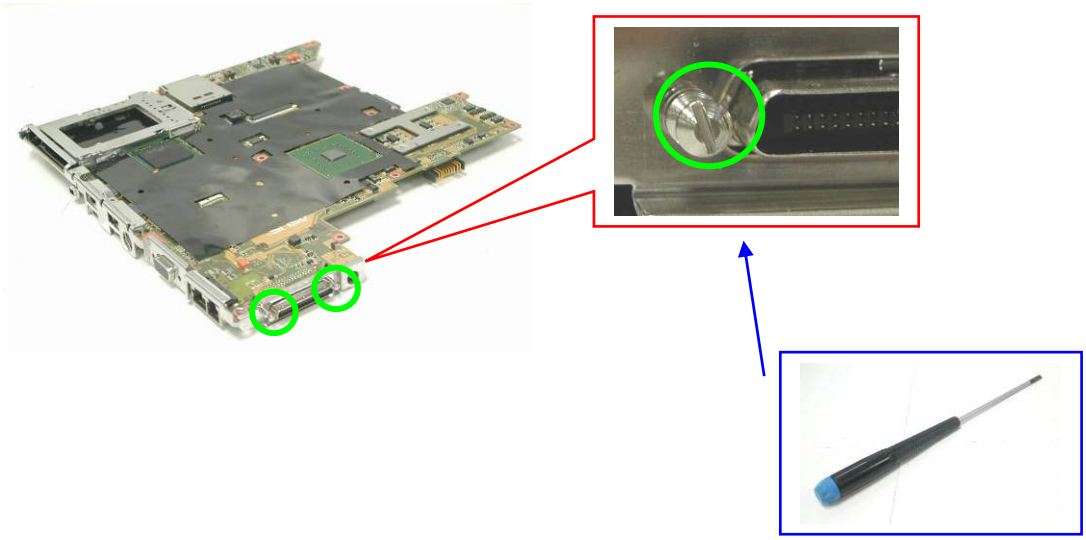
2. Connect the modem cable and paste 4 pieces of tape to fix the cable.



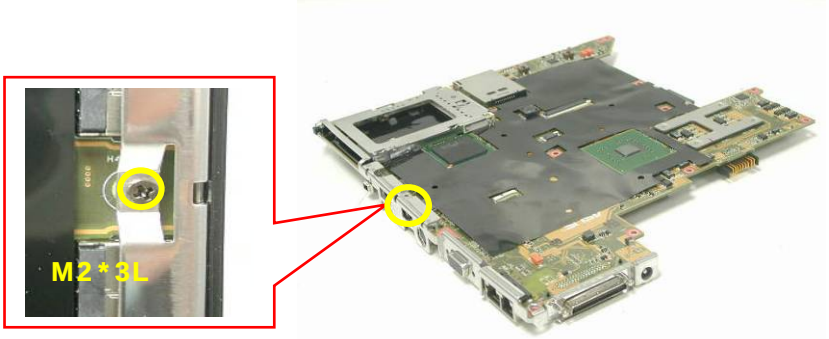
3. Install the TPM board and secure 1 screw (M2*3L (K)) to secure it.



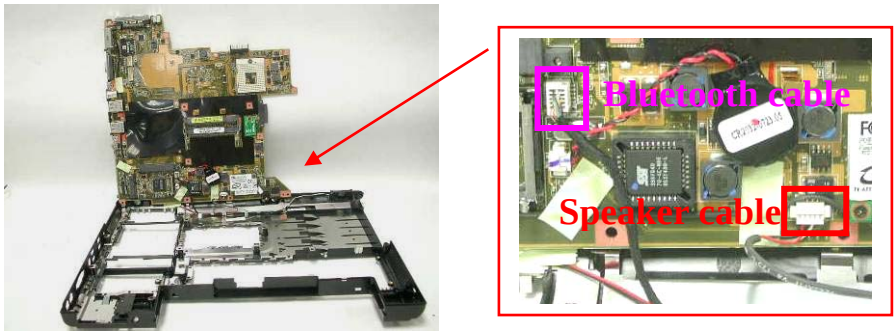
4. Install the IO bracket and use a single-slotted screwdriver to secure 2 screws HEX 5mm.



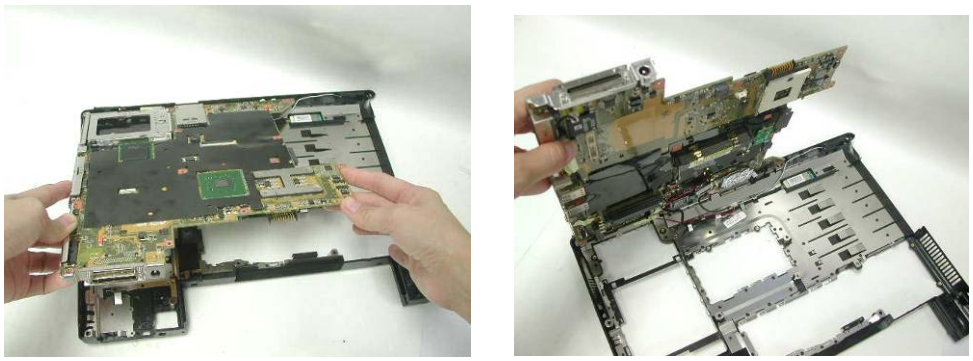
5. Secure 1 screw (M2*3L (K)) on the IO bracket to secure it.



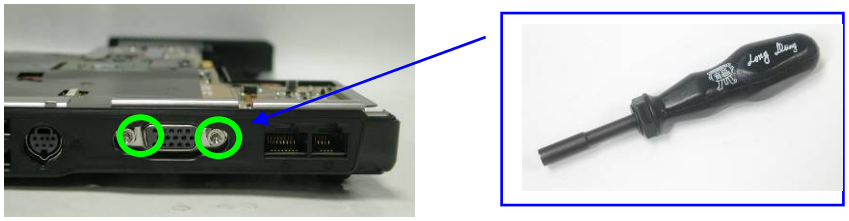
6. Connect the Bluetooth & Speaker cables, before install the Motherboard to the bottom case.



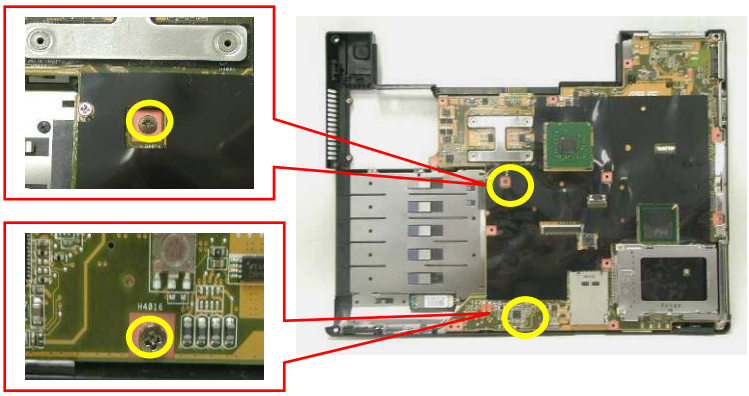
7. Combine the Motherboard and the bottom case.



8. Remove 2 screws for CRT on the right side by a spacer screwdriver.



9. Secure 2 screws (M2.5*4L (K)) to secure the motherboard.



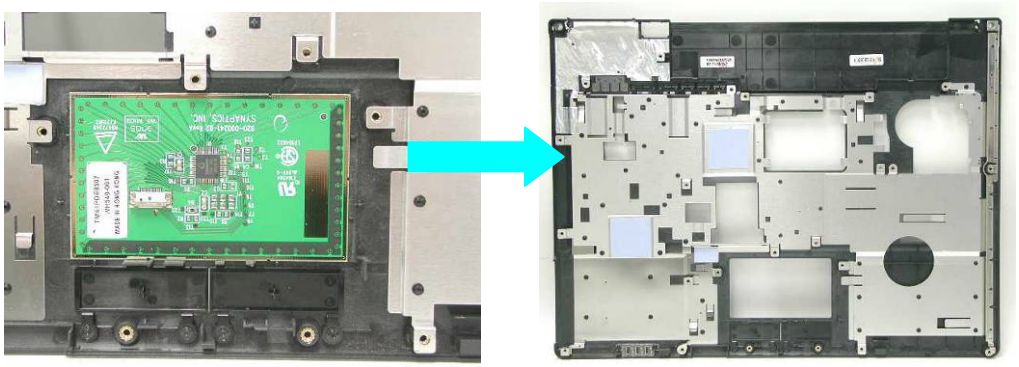
Top Case Module

TOP CASE MODULE

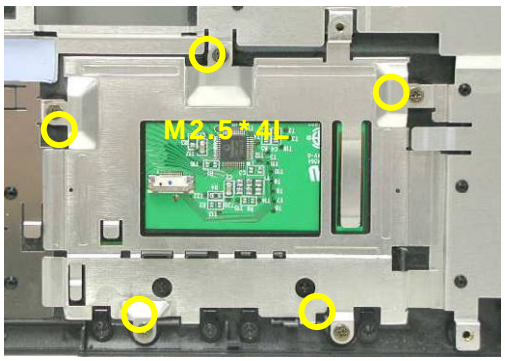
The illustrations below show how to assemble and install the top case module of the notebook.

TOP CASE ASSEMBLY

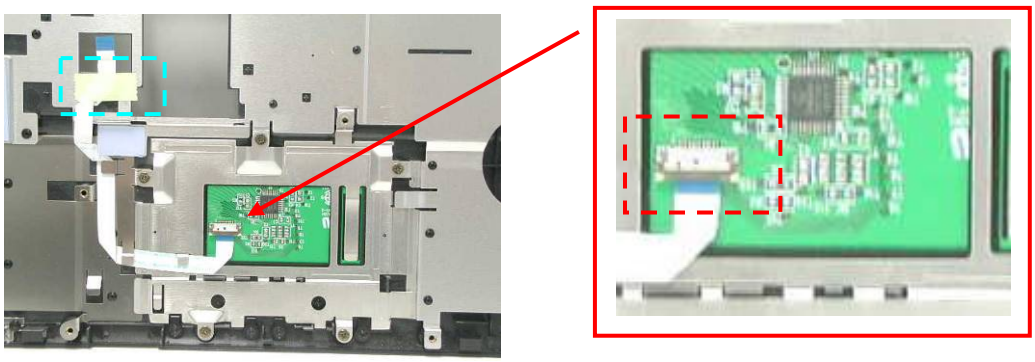
1. Install the touchpad on the top case.



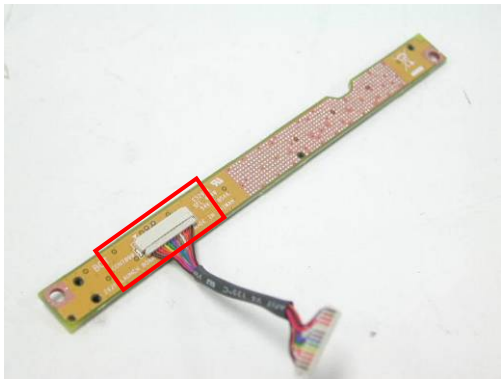
2. Install the touchpad bracket and secure 5 screws (M2.5*4L (K)) to secure it.



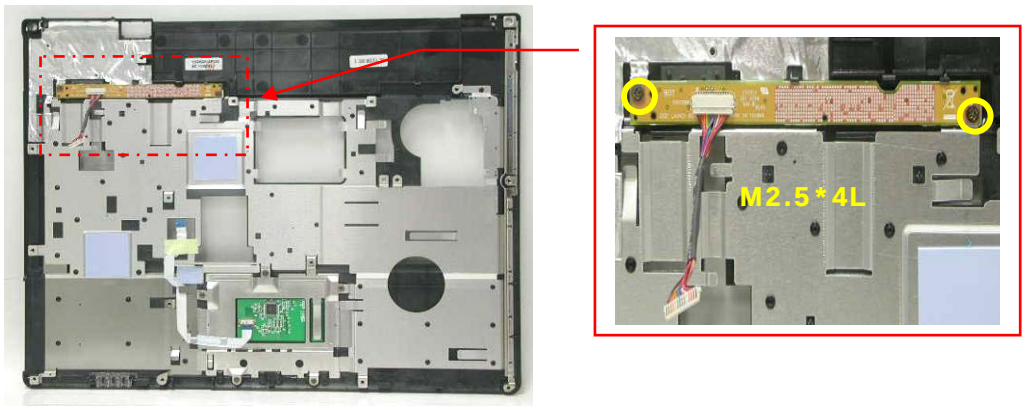
3. Connect the touch pad FFC and paste 1 piece of tape.



4. Connect the LANCH board cable.

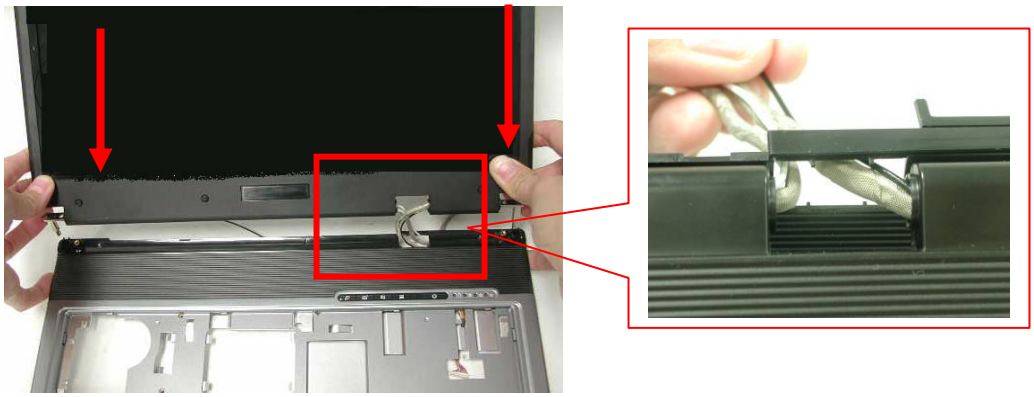


5. Install the LANCH board and secure 2 screws (M2.5*4L (K)).

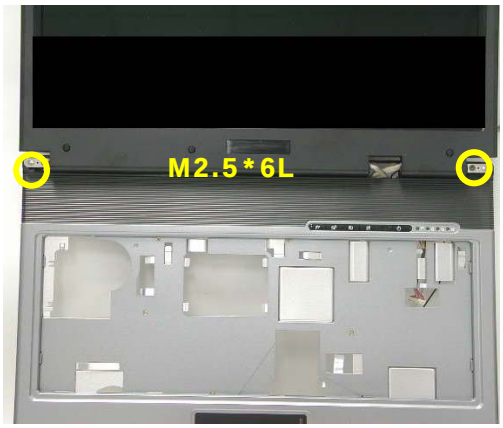


TOP CASE MODULE ASSEMBLY

1. Combine the Top case module and LCD module.



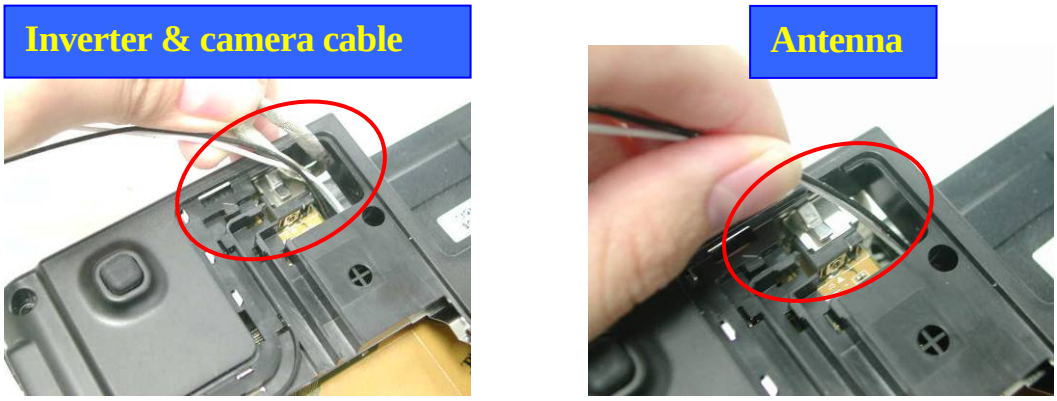
2. Secure 2 screws (M2.5*6L (K)) to fix the hinge.



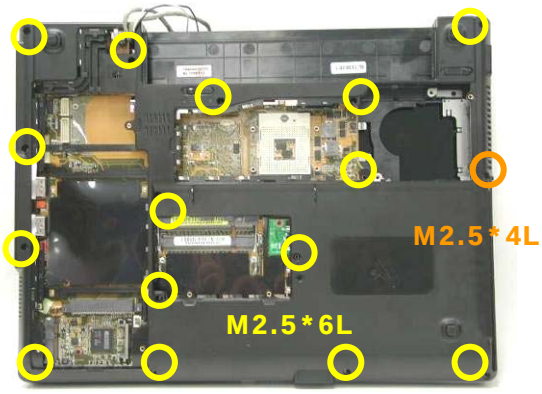
BOTTOM CASE ASSEMBLY

1. Combine the bottom case from the top case.

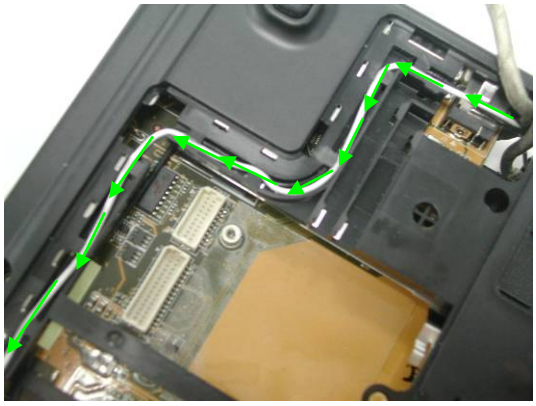
2. Before secure the bottom case, let the cable and antennas through in the hole.



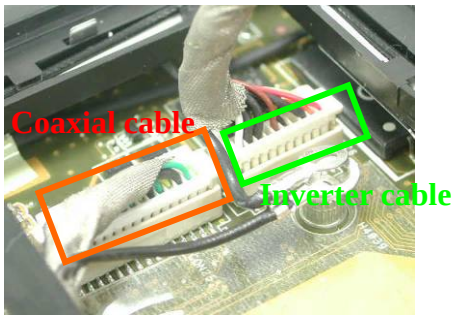
3. Secure 15 screws (M2.5*6L (K)) and 1 screw (M2.5*4L) (K)) to secure the bottom case.

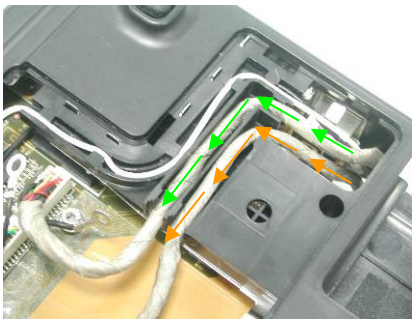


4. Lay the antennas through the locking trench on bottom case



5. Connect the Coaxial & inverter cable and lay the cables through the locking trench on bottom case.





6. Secure 1 screws (M2*3L (K)) to secure cables.

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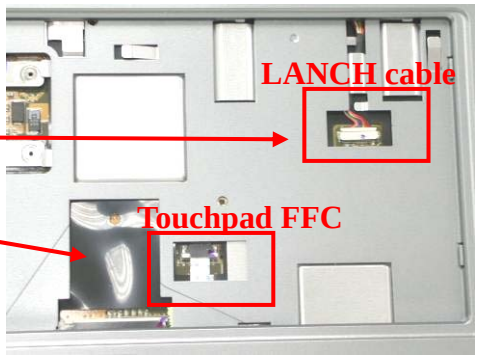
7. Turn over the NB and connect the LANCH cable and touchpad FFC on top case.



HINGE COVER ASSEMABLY

8. Install the both hinge Cover.

9. Install the MIDDLE cover.

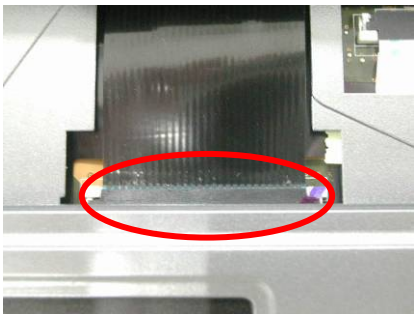
KEYBOARD

Assembling Keyboard

The illustrations below show how to assemble and install the Keyboard of the notebook.

KEYBOARD ASSEMBLY

1. Place the Keyboard module on front side of the top case. Then connect Keyboard FPC Cable with a pair of tweezers.



2. Install Keyboard properly and note the lower side should inset first. Push the 4 latches to fix the keyboard.

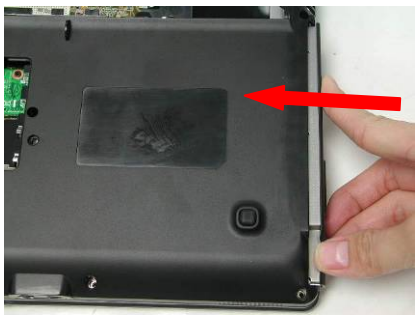
ODD MODULE

ODD MODULE INSTALLATION

ODD Module

The illustrations below show how to assemble and install the ODD Module of the notebook.

1. Insert the ODD module.



2. Secure 1 screw (M2.5*4L (K)) to secure it.

CPU MODULE

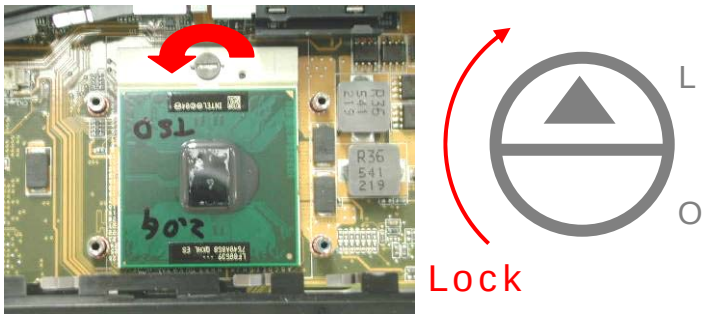
CPU INSTALLATION

CPU Module Assembly

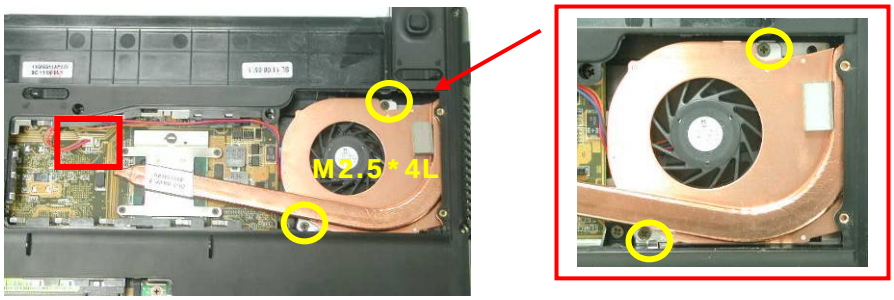
The illustration below shows how to install CPU and the CPU heat sink of the notebook.

1. Squeeze the vacuum handling pump and use it to install the CPU.

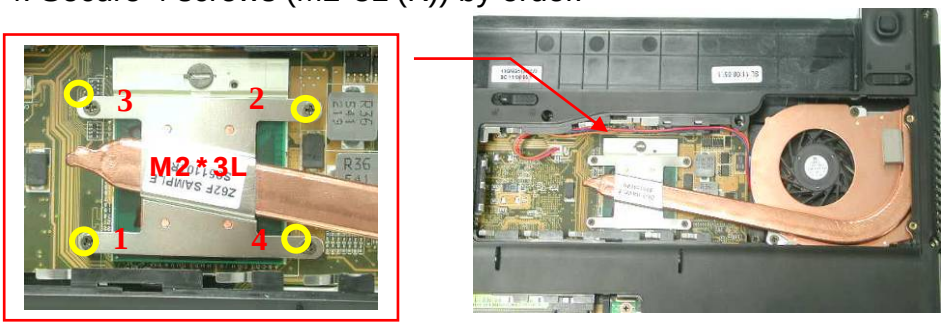
2. Turn the non-removable screw here 180 degrees clockwise to lock the CPU.



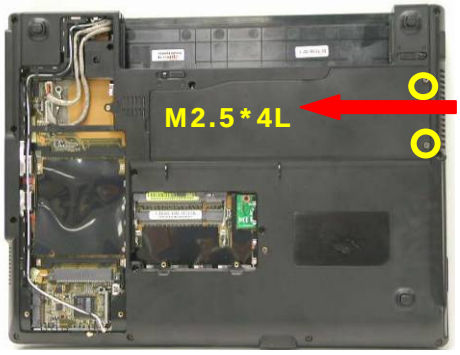
3. Install the CPU thernal module gently and connect the fan cable then secure 2 screws (M2.5*4L (K)) to secure it.



4. Secure 4 screws (M2*3L (K)) by order.



5. Install the CPU door and secure 2 screws (M2.5*4L (K)) to secure it.



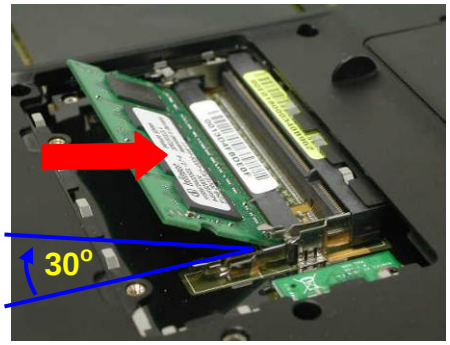
MEMORY MODULE

MEMORY INSTALLATION

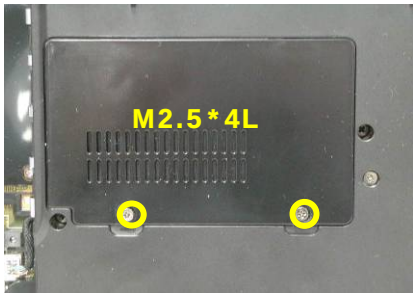
Assembling Memory Module

The illustrations below show how to assemble and install the memory module to the notebook.

1. Insert the Memory module into the memory socket by an angle of 30 degree, and push down to latch the memory module.



2. Install the DIMM door and secure 2 screws (M2.5*4L (K)) to secure it.



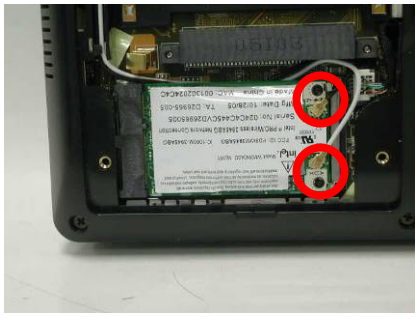
WIRELESS LAN

Wireless LAN Module

The illustration below shows how to assemble the Wireless LAN module.

1. Install the MINI PCI module into the socket by an angle of 30 degree, and push down to latch the MINI PCI module.

2. Connect the MAIN & AUX antenna and paste 1 piece of tape to secure antennas.



HDD MODULE

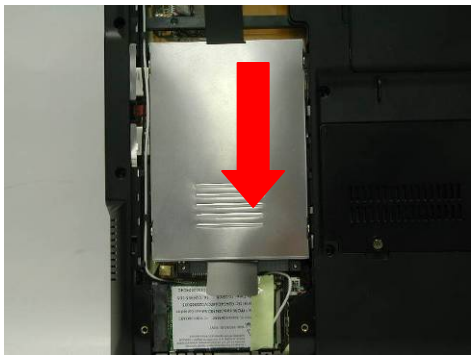
HDD Module

The illustrations below show how to assemble and install the HDD module of the notebook

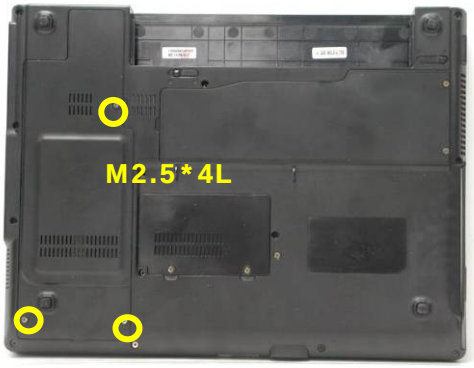
HDD INSTALLATION

1. Secure 4 screws [M3 * 4(L)] to fix HDD into HDD housing.

2. Insert the HDD module to connect the FPC connector until it's installed properly.



3. Install the bottom case and secure 3 screws (M2.5*4L(K)) to fix it.



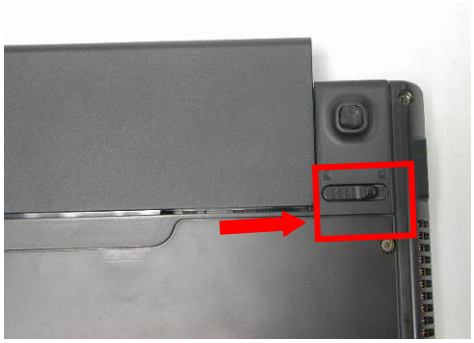
BATTERY MODULE

BATTERY INSTALLATION

Battery Module

The illustrations below show how to install battery module of the notebook.

1. Install the battery module. Slide the battery latch to close the battery lock.



Chapter 4

Upgrade & Replacement

Follow the individual procedures in this chapter to perform the notebook's upgrade and replacement of various major components.

Asus S62 Series Notebook is a 2 spindles product, which means there are less options for you to upgrade to. The key upgradeable and replaceable items include the CPU module, memory module, HDD module, and ODD module.

In order to avoid redundancy, please refer to chapters 2 and 3 of this manual for repeated and reused disassembly and assembly procedures, such as keyboard & heat sink replacement, which is used by several different procedures in this chapter. ***Be sure to follow the safety instructions described in Chapter 1 to safeguard the notebook against any potential damages.*** For any other components which you need to replace not covered in this chapter, please refer to Chapters 2 and 3 for detailed disassembly and assembly and perform necessary procedures accordingly.

This chapter includes the following items:

- CPU Upgrade
- Memory Upgrade
- HDD Upgrade
- ODD Replacement

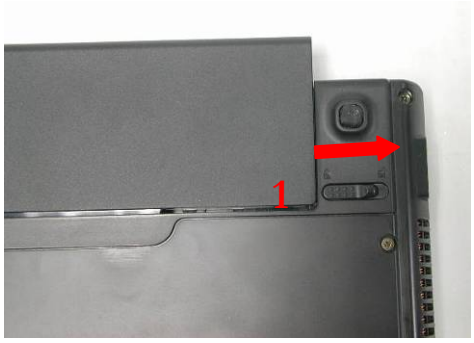
CPU Upgrade

The S62 Series Notebook comes standard with a Intel® Micro-FCPGA Socket on the motherboard, which means it can support all Intel Micro-FCPGA CPUs up to 2.13 GHz.

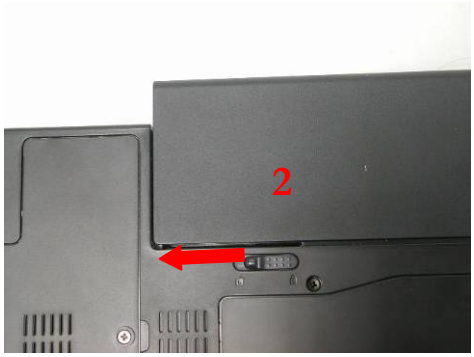
Upgrading CPU

Remove battery module

1. Unlock and hold the latch No (1).



2. Slide the battery lock (No.2) and pull the battery pack out.

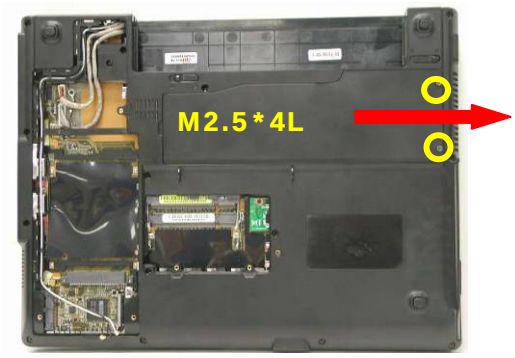


3. Pull the battery pack out.

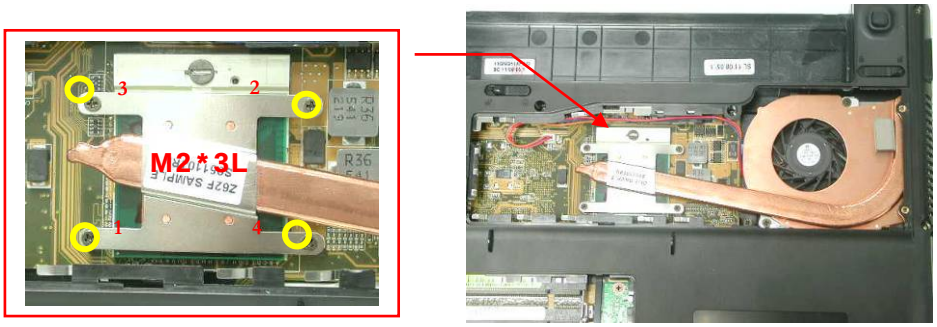
CPU REMOVAL

Removing CPU Module

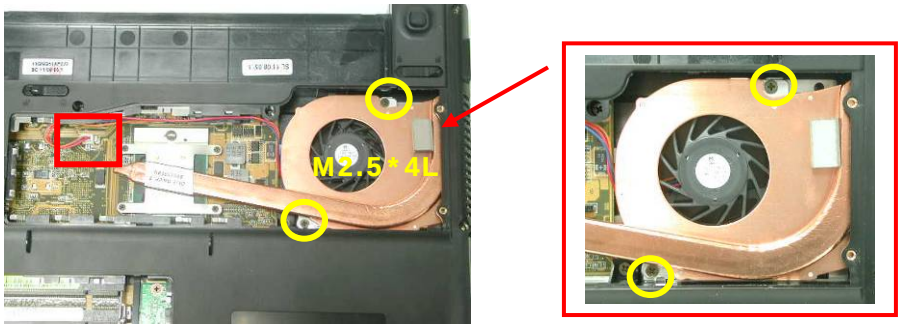
1. Remove 2 screws (M2.5*4L (K)), then remove the CPU door.



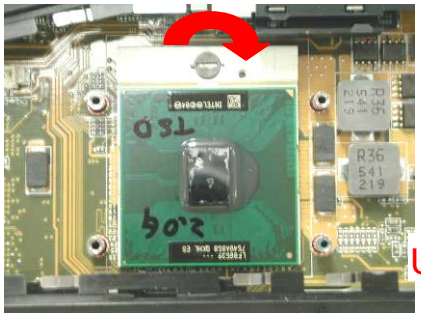
2. Remove 4 screws (M2*3L (K)) by order.

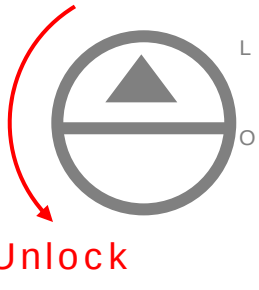


3. Disconnect the Fan cable and remove 2 screws (M2.5*4L (K)) then take away the CPU thermal module.



4. Turn the non-removable screw here 180 degrees counter-clockwise to loosen the CPU.





5. Squeeze the vacuum handling pump and use it to lift the CPU away.

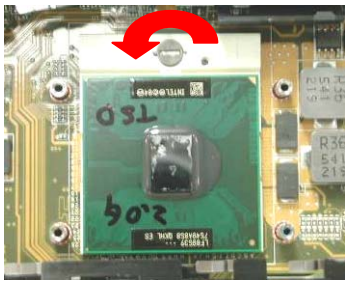
CPU INSTALLATION

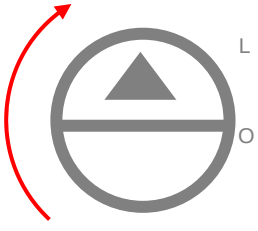
Installing CPU

The illustration below shows how to install CPU and the heat sink of the notebook.

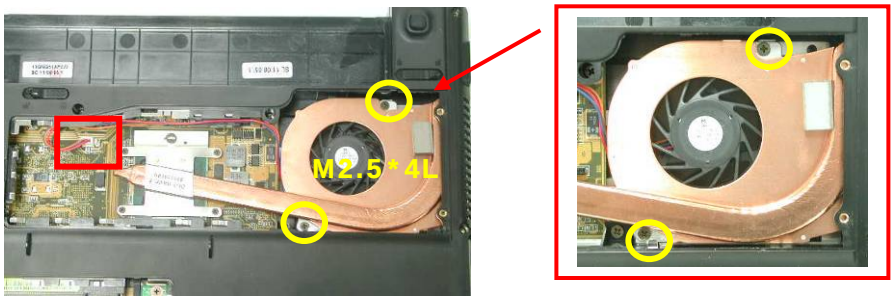
1. Squeeze the vacuum handling pump and use it to install the CPU.

2. Turn the non-removable screw here 180 degrees clockwise to lock the CPU.

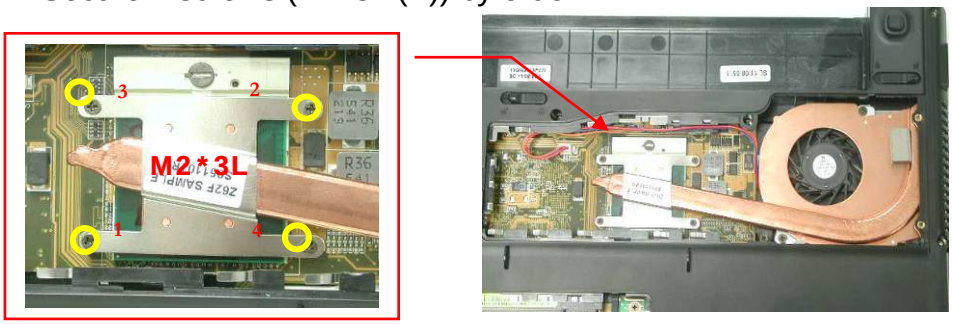




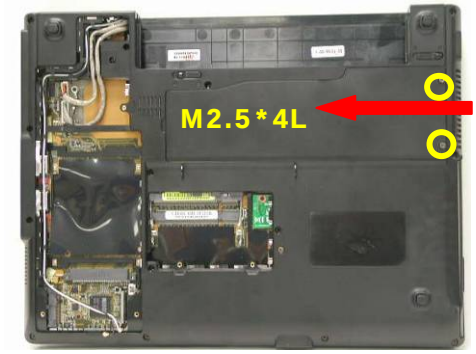
3. Install the CPU thermal module gently and connect the fan cable then secure 2 screws (M2.5*4L (K)) to secure it.



4. Secure 4 screws (M2*3L (K)) by order.



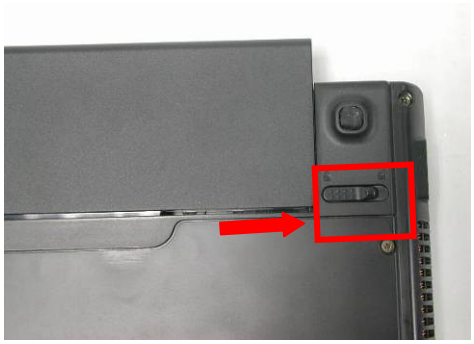
5. Install the CPU door and secure 2 screws (M2.5*4L (K)) to secure it.



BATTERY INSTALLATION

Install battery module

1. Install the battery module. Slide the battery latch to close the battery lock.



MEMORY

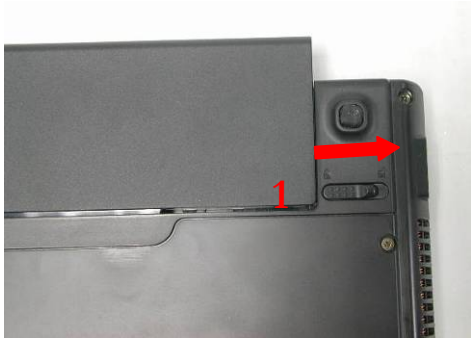
Second Memory Upgrade

The S62 Series Notebook does not have RAM onboard. There are two SO-DIMM sockets for installing SO-DIMM RAM. It can upgrade the total memory size up to 1GB with a 512MB module on each socket.

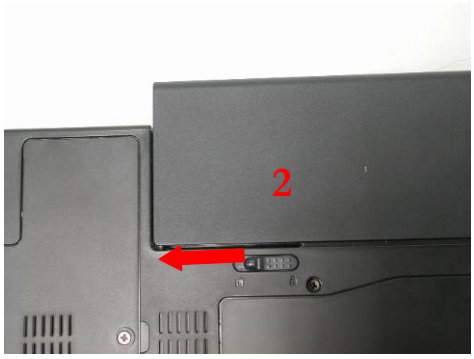
Upgrading Memory Module

Remove battery module

1. Unlock and hold the latch No (1).



2. Slide the battery lock (No.2) and pull the battery pack out.

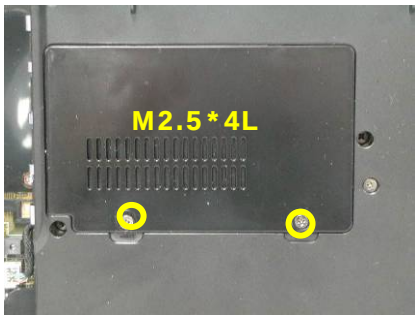


3. Pull the battery pack out.

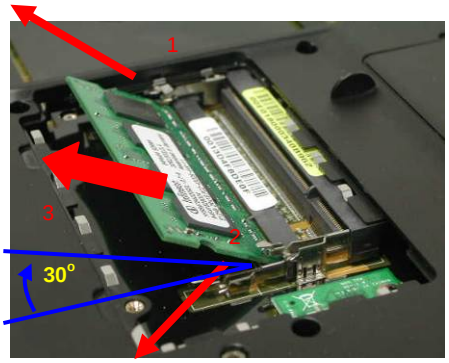
MEMORY REMOVAL

Removing Memory module

1. Remove 2 screws (M2.5*4L (K)), then remove the DIMM door.



2. Open the 2 latches aside (No. 1, 2), which will pop the memory module up to an angle of 30°, then pull out the memory module in that angle (No. 3).

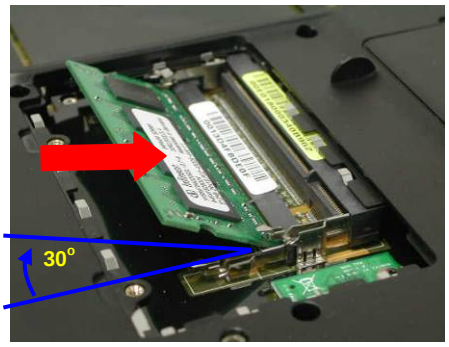


MEMORY INSTALLATION

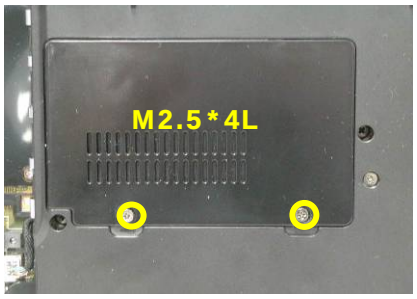
Installing Memory Module

1. Insert the Memory module into the memory socket by an angle of 30 degree, and push down to latch the memory module.

MEMORY INSTALLATION



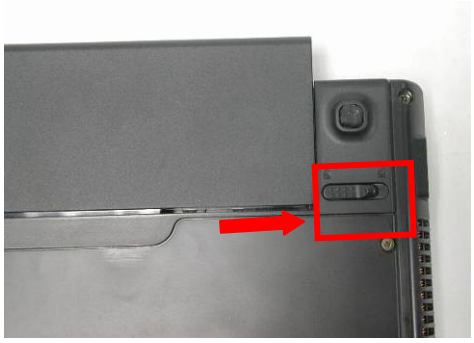
2. Install the DIMM door and secure 2 screws (M2.5*4L (K)) to secure it.



Install battery module

BATTERY INSTALLATION

3. Install the battery module. Slide the battery latch to close the battery lock.



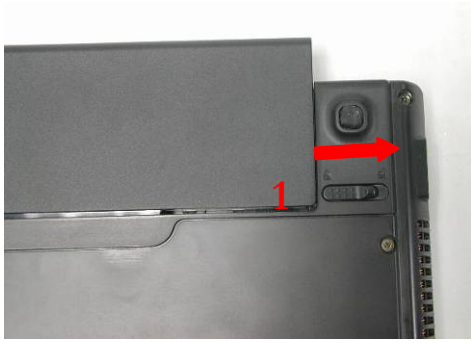
HDD Upgrade

The S62 Series Notebook uses an industry-standard 2½" HDD with IDE interface. You can replace the HDD to any capacity of your choice within our approval and prior test.

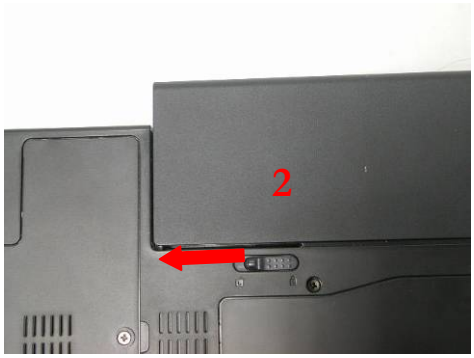
Upgrading HDD

Remove battery module

1. Unlock and hold the latch No (1).



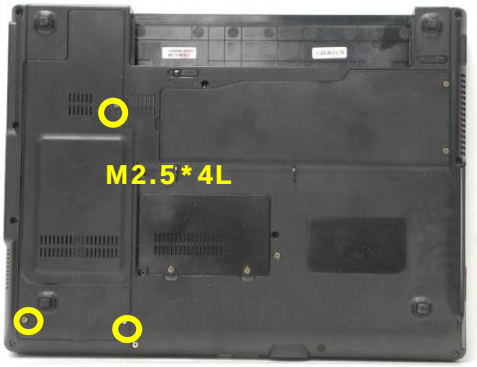
2. Slide the battery lock (No.2) and pull the battery pack out.



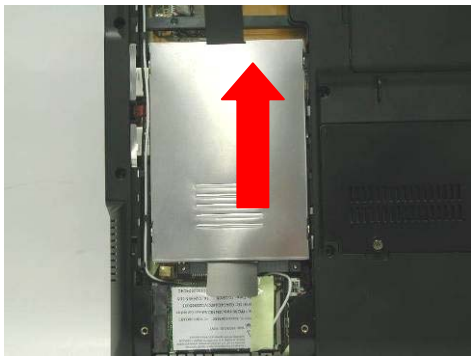
3. Pull the battery pack out.

Removing HDD Module

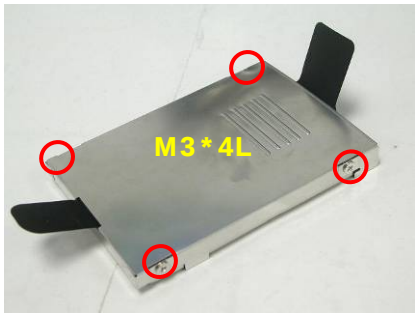
1. Remove 3 screws (M2.5*4L (K)), then remove the HDD door.



2. Lift the HDD module and then remove it.



3. Remove 4 screws [M3 * 4(L)] to separate HDD from HDD housing.

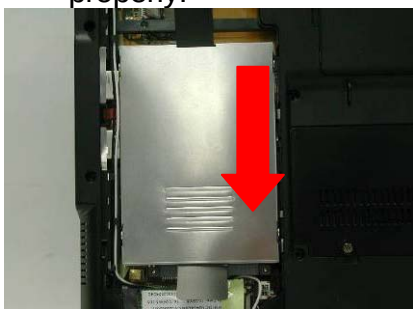


HDD INSTALLATION

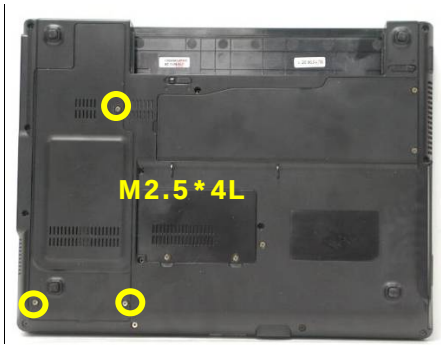
Installing new HDD module

4. Secure 4 screws [M3 * 4(L)] to fix HDD into HDD housing.

5. Insert the HDD module to connect the FPC connector until it's installed properly.



6. Install the bottom case and secure 3 screws (M2.5*4L(K)) to fix it.



BATTERY INSTALLATION

Install battery module

7. Install the battery module. Slide the battery latch to close the battery lock.

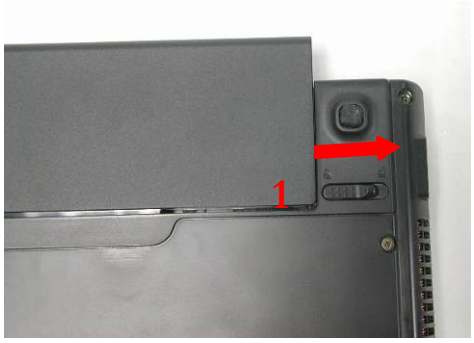
Wireless LAN Module

The illustration below shows how to remove the Wireless LAN module.

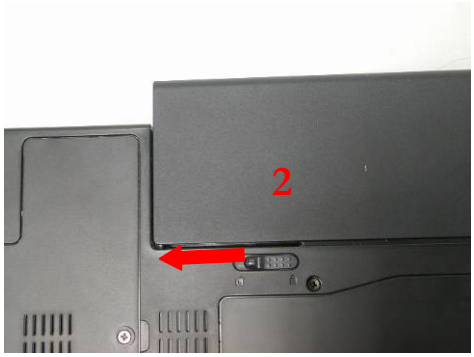
Replacing WLAN

Remove battery module

1. Unlock and hold the latch No (1).



2. Slide the battery lock (No.2) and pull the battery pack out.



3. Pull the battery pack out.

ODD REMOVAL

Removing WALN Module

1. Remove 1 piece of tape and disconnect the MAIN & AUX antenna.


2. And open the two latches to pop the MINI PCI MODULE up then pull it out.

WALN MODULE INSTALLATION

Installing new WALN module

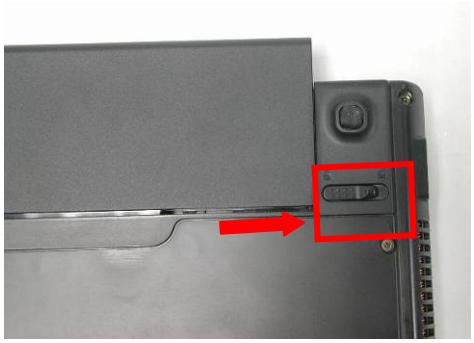
3. Install the MINI PCI module into the socket by an angle of 30 degree, and push down to latch the MINI PCI module.

4. Connect the MAIN & AUX antenna and paste 1 piece of tape to secure antennas.

Install battery module

BATTERY INSTALLATION

1. Install the battery module. Slide the battery latch to close the battery lock.



ODD

ODD Replacement

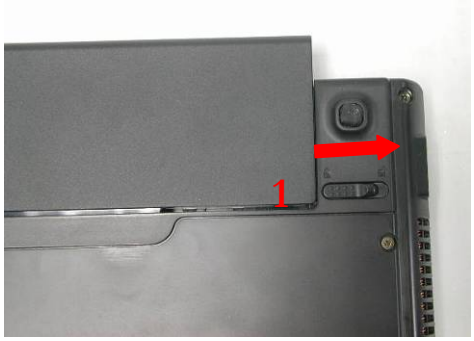
The S62 Series Notebook can support DVD-ROM (8x DVD), COMBO (CD-R 24x/ CD-RW 24x / DVD-ROM 8x/ CD 24x), and DVD-Dual (DVD-R/RW: 4x/2x, DVD+R/RW: 4x/2.4x, CD-R/RW: 24x/ 10x, DVD: 8x, CD: 24x).

Replacing ODD

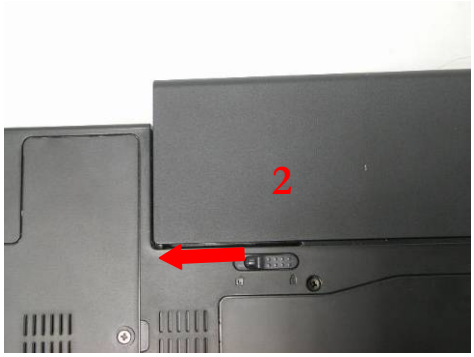
ODD REMOVAL

Remove battery module

1. Unlock and hold the latch No (1).



2. Slide the battery lock (No.2) and pull the battery pack out.



3. Pull the battery pack out.

ODD REMOVAL

Removing ODD Module

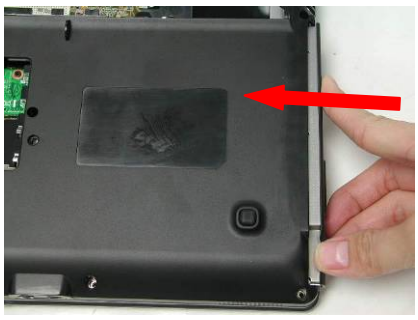
1. Remove 1 screw (M2.5*4L (K)).

2. Push the ODD Module out by a pair of tweezers.

ODD MODULE INSTALLATION

Installing new ODD module

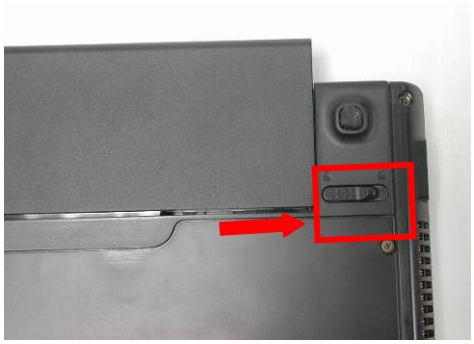
3. Insert the ODD module.



4. Secure 1 screw (M2.5*4L (K)) to secure it.

Install battery module

5. Install the battery module. Slide the battery latch to close the battery lock.



Chapter 5

Hardware Specifications

You can enjoy and utilize the S62 series Notebook more effectively with a better comprehension of detailed hardware specifications of the notebook.

This chapter lists the detailed specifications of the notebook's main system and modules. Please refer to this section when you need to find out specific technical data about the notebook.

This chapter contains the following information:

- System Specifications
- Chipset Specifications
- Key Parts List
- System Resource
- Module Specification

1 MARKETING SPEC

S62 Specification		(Two-Spindle Design)
Product Family	S62	
Dimension	328 x 288x 27-38mm	
Weight	2.4	
Color	Silver-Gray	
CPU Type	Intel Yonah 1M/2M	
Speed	1.66G,1.83G,2.0G,2.16G	
Package	Micro-PGA 479M	Socketable
L2 Cache	Yes	
Size	2M	On-die cache memory
Memory Type	DDR II SDRAM without ECC	
Base Memory	None	
Expansion Memory	256/512MB/1GB	SO-DIMM 1.25" x 2 Slot
MAX	2GB	
LCD Size	14.1”	
Resolution	WXGA,WXGA+	
Panel Type	TFT	
Interface	LVDS	
Contrast Control	None	
Brightness Control	Hot-key(16 steps)	
HDD type	2.5", 9.5mm	
Ultra DMA 100	Yes	
Size	60/80/100 GB	
CD Driver		
CD-ROM	N/A	
DVD	N/A	
COMBO	8X/24X/24X/24X COMBO	
DVD-RW	Super-Multi	
Chip Set		

North Bridge	INTEL 945GM	
South Bridge	INTEL ICH7M	
Super IO	SMSC LPC47N217	
Thermal Sensor	ADT7461ARMZ	
Micro-Processor	ITE8510E	
KBC	ITE8510E	
Flash ROM (ISA)	SST	4Mb
Graphic Accelerator	Intel 950 internal GPU	
3D	Yes	
Controller	Intel Internal graphic	
AGP Support	No	
Dual view/Dual App	Yes	
Graphic Memory	Share Memory	
TV Out Support	Yes	
PCMCIA		
Slot Type	Type II x 1	
Controller	RICOH R5C841	
Card Bus	Yes	
ZV port	No	
Sound System		
Controller	AD1986A	AC97 CODEC
SW wave table	Yes	
FM synthesizer	Yes	
Speaker	Stereo	
I/F	Azalia I/F	
PC99	Yes	
S/PDF	Yes	
6 channel output	Yes	
Audio Amplifier	TPA0212	
Microphone	Mono	
Modem	CONEXANT	RD02-D110
Controller	CONEXANT	

	Spec	56K	
	I/F	Azalia MDC	
	Jack	RJ-11	RJ-11 port
	ACPI	Yes	
	V.90	Yes	
	Voice Phone	No	
	Digital Line Protection	Yes	
	Wake On Ring	Yes	
BT		No	
	Controller	CSR	BT-183
	I/F	USB	
	ANT	Chip antenna	
LAN			
	Jack	RJ-45	RJ-45 port
	Wake On LAN	YES	
	Controller	RealTEK RTL8110SB	
Internal Keyboard			
	Vendor		
	Key	88 Keys (W/ MS-Windows function keys)	
	Stroke/Pitch	-	
	Function Key	12 Function Keys	
Hot Key Function		10 Hot Keys	
	Suspend (STR or STD)	Fn + F1	
	RF enable	Fn + F2	802.11b+g
	Display stretch	No	Not Implement
	Brightness Up	Fn + F6	
	Brightness Down	Fn + F5	
	Back light on/off	Fn + F7	
	LCD/CRT	Fn + F8	
	PC Speaker Volume	Fn + F10	On/Mute
	PC Speaker Volume	Fn + F12	Volume increase

	PC Speaker Volume	Fn + F11	Volume decrease
	Number Lock	Fn + Ins	
	Scroll Lock	Fn + Del	
Instant Keys			
	Power Saving	Power 4 Gear	
	E-mail	Direct button	
	Internet Browser	Direct button	
	Disable TouchPad	Direct button	
Status Indication		8 LEDs (Machine Base x 8)	
	Power Status	Yes (Green on LED when Power on. Blinking when in SUSPEND mode. OFF when power off.)	
	Battery Charge Status	Yes (Orange when charging. Blinking when battery low. OFF when fully charged/empty.)	
	HDD/CD-ROM LED	Yes (Green while accessing)	
	Number Lock LED	Yes (Green)	
	Caps Lock LED	Yes (Green)	
	Scroll Lock LED	Yes (Green)	
	E-mail notification	Yes (Orange)	
	W-LAN/BT LED	Yes (Blue)	
Pointing Device		Glide Pad	Synaptics
	Glide Pad	Yes	
	Right Button	Yes	
	Left Button	Yes	
	Scroll up button	No	
	Scroll down button	No	
Function Control			
	Power On Button	Yes	
	LCD Brightness	Yes	Hot Keys
	LCD Lid Switch	Yes	
	Sound Volume	Yes	Hot Keys
	Password Override	Yes (Master Password)	

Reset/Force Off	Yes (Force Off switch)	
I/O Port	All ports support hot-plug	
Parallel	NO	
CRT	Yes	15-pin D-sub
Port Bar port III	Yes	
Mouse/Keyboard	NO	
IrDA Port	NO	
Fax/Modem	Yes	RJ11
LAN Jack	Yes	RJ45
Line In	NO	
Mic In Jack	Yes	Mono
Head Phone Jack	Yes	Stereo out
USB port	Yes	4 Ports
DC-In	Yes	2-pin type/65W
Heat Solution		
Heat Pipe	Yes	
Heat Sink	Yes	
FAN Support	Yes	
AC Adaptor	Delta/Liteon	
Input	AC 100-240Volt, 50~60Hz	
Output	DC 19V, 3.42A, 65W	
1st Battery	9 Cells/6 Cells	11.2Vx4800mAh/2400mAh
Type	Li-ION(2400mAH)	
1st Battery	Celxpert	
2nd Battery	No	
Type		
2nd Battery		
Charging time		Li-ION (2400mAH)
Machine ON	TBD.	
Machine OFF	TBD.	
Battery Life	TBD.	
PM Off	TBD.	

PM On	TBD.	
Power Management	AMI BIOS	
LCD Close/Open	Yes	
LCD Back-light	Yes	
Suspend/Resume	Yes	
Hibernation (S2D)	Yes	
Thermal Control	Yes	DTS/Thermal diode
ACPI	Yes	
DMI 2.0	Yes	Support DMI BIOS 2.1
Security		
Password	Yes	Password overridden by Master password
Security Lock	Kensington Lock Hole	
TPM	Infineon TPM 1.2	Option
S/W		
Install OS	WinXP	
Option	Win2000	
Flash BIOS	Yes	
Drivers		
Chipset Driver	Yes	
VGA Driver	Yes	
AUDIO Driver	Yes	
LAN Driver	Yes	
Glide Pad Driver	Yes	
Modem Driver	Yes	
Blue tooth Driver	Yes	
WLAN Driver	Yes	
LOGO		
Audio Driver	Yes	
USB Port Bar 3	Yes	
Parallel Port	Yes	
VGA Port	Yes	
USB Port X 4	Yes	

	LAN Port	Yes	

2 CHIPSET LIST

Chipset Summary Table

Function	S62	HW ACPI/PC99
CPU	Intel Yonah	Not required
SRAM (L2 Cache)	2M	Not required
North Bridge	Intel 945GM	YES
South Bridge	Intel ICH7M	YES
MEMORY	DDR II SDRAM	Not required
BIOS ROM	SST 4Mb	Not required
VGA	Intel internal graphic	YES
SUPER I/O	SMSC LPC47N217	YES
PCMCIA	RICOH R5C841	YES
AUDIO	Azalia CODEC software Audio	YES
AUDIO AMPLIFIER	TPA0212	Not required
KB CONTROLLER	ITE8510E	YES
PIC (uP)	ITE8510E	YES
IrDA	NO	
CLOCK Generator	ICS954310BGLFT	YES
MODEM	CONEXANT	YES
Bluetooth	BT-183	
1394	RICOH R5C841	Yes
LAN	RealTEK RTL8110SB	YES

2.1 CPU

Processor Type:	Intel Yonah Processor
Processor frequency:	1.66 /1.83 /2.0/2.16 GHz
Construction method:	u-PGA479 with socket
Supply voltage:	Code:1.25V(High_Frequency_Mode)~0.725V(lowest_Frequency_Mode)
Function feature:	On-die , primary 32-KB instruction cache and 32-KB write-back data cache. On-die , 2MB second level cache with Advanced Transfer Cache Architecture. Data Prefetch. Streaming SIMD extensions 2(SSE2). Enhanced Intel SpeedStep technology 533/667 MHZ FSB support

2.2 CHIPSET

2.2.1 North Bridge

Function:

- Full support 32bits AGTL+ host bus addressing
- Supports 400/533/667 DDR2 device
- Integrates the graphic controller
- Support Intel Rapid Memory power management
- DMI x2/x4 Interface connect to ICH

Vendor: Intel

Parts Number: 945GM

Package: 1466-ball micro-FCBGA

2.2.2 South Bridge

Function:

- DMI x2/x4 interface link with GMCH
- Integrated PC/AT compatible system (DMA Controller, INT, Timer/Counters)
- Integrated one channels IDE controller with Ultra DMA/33/66/100 support
- Integrated USB 1.1 and 2.0 Host Bus controller with 8 USB ports
- Integrated HD Audio Interface
- Build-in RTC
- LPC Interface
  IRQ Controller

Vendor: Intel

Parts Number: ICH7M

Package: 652-ball BGA

2.3 DRAM MEMORY

2.3.1 ON-BOARD MEMORY

None

2.3.2 EXPANSION MEMORY

Number of sockets:	Two 200 pin SO-DIMM socket
Bus:	64-bit data path
Supply voltage:	1.8V
Functional features:	Supports up to 16 simultaneous open pages
Hardware features:	Supports DDR2 400/533/667 DDR devices Maximum of 2GB of system memory
Parity support:	without ECC

2.4 BIOS ROM

ROM Type:	SST Flash Memory
Package:	32-Lead PLCC
Supply voltage:	3.3V
Serviceability:	End user upgradeable for the firmware

2.5 INTERNAL VGA CONTROLLER

Function features:	3D Setup and Render Engine Integrated 24 bit RAMDAC that can drive a standard progressive scan analog monitor up to 2048 X 1536 CRT resolution at a maximum refresh rate of 75 Hz Single or dual channel LVDS panel support up to 112MHZ TV out resolution up to 1024x768
Vendor:	Intel
Chipset	945GM

2.6 I/O INTERFACE Controller

Function:	Full ACPI 1.0 and PC98/99 compliant Support 10 IRQ channel options Integrated PC/AT Floppy Disk Controller Support 5.25”/3.5”/2.5” FDD Support 3-mode FDD Integrated Serial Port RS-232C Controller Integrated Infrared Controller Support IrDA 1.0 Integrated Parallel Port Controller Support Standard, bi-directional, ECP, EPP mode Support 2 general purpose pins for game port control Support voltage 5V
Vendor:	SMSC
Parts Number:	LPC47N217
Package:	64-pin STQFP

2.7 PCMCIA Controller

Function:	PC99, ACPI 1.0 and PCI bus power management 1.1 Design compliant
	Integrated PC Card Controller
	Support 1995 PC Card (PCMCIA 2.2)
	Integrated Card Bus Controller
	PC98/99/2001 compliant
	Single Chip PCI-CardBus/1394 Bridge
	Compliant with PCI Specification2.2
	1394 PHY
	1394 OHCI-LINK Bridge
	Flash Memory Interface (3 in 1 Media Bay)
Vendor:	RICOH
Parts Number:	R5C841
Package:	208 pin CSP

2.8 KEYBOARD CONTROLLER

Function features:	Embedded controller-style host
	Support hardware speed-up of GateA20 and RC
	Local 16x8 keyboard switch matrix support
	Three industry standard serial keyboard interfaces
	All three ports are bi-directional
Vendor:	ITE
Parts Number:	8510E
Package:	176-pin TQFP

2.9 AUDIO CODEC

Function features:

- Fully Compliant HD Audio Compliant.
- 20-bit Stereo Digital to Analog Converters.
- 18-bit Stereo Analog to Digital Converters.
- High-quality pseudo-Differential CD input.
- Meets or exceeds the Microsoft PC99 Audio Performance requirements.
- S/PDIF digital audio output.
- 3D Stereo Enhancement.

Vendor:	ADI
Parts Number:	1986A
Package:	48-pin LFCSP

2.10 AUDIO AMPLIFIER

Function features:

- 2 X 1.8W BTL audio amplifier with 4ohm load.
- Depop circuitry integrated
- BTL or SE mode operation
- Thermal shutdown circuitry integrated

Vendor:	TI
Parts Number:	TPA0212
Package:	24-pin TSSOP

2.11 LAN & MODEM

2.11.1 LAN

Function features:

- Integrated Fast Ethernet MAC, Physical chip and transceiver in one chip
- 10Mb/s, 100Mb/s, 1000Mb/s operation
- Compliant to PCI Revision 2.2
- Compliant to PC99/PC2001 standard
- Support Wake-on-LAN function and remote wake up (Magic Packet, LinkChg and Microsoft wake-up frame)

Vendor:	Realtek
Parts Number:	RTL8110SB
Package:	128-Pin LQFP

2.11.2 MODEM

Function features:

- V.90 and K56 flex support
- Integrated PnP functionality
- PC99 compliant
- Support both APM and ACPI power management
- Support Wake-on-ring functionality

Vendor:	ASUS
Parts Number:	RD02-D110
Package:	Azalia MDC

3 KEY PARTS LIST

Key Parts Summary:

S62 Project Keyparts List				
Priority		**Vendor**	**Model No.**	**ASUS Part No.**
CPU				
1		**Intel**	**INT CO667 DC 2.16G T2600 L8VN**	
1		**Intel**	**INT CO667 DC 2.0G T2500 L8VP**	
		Intel	**INT CO667 DC 1.83G T2400 L8VQ**	
		Intel	**INT CO667 DC 1.66G T2300 L8VR**	
LCD				
14.1” WXGA				
1		**AUO**	**B141EW01 V1**	
	2	**AUO**	**B141EW01 V3(Glare)**	
	2	**CMO**	**N141I1_L02**	
	2	**CMO**	**N141I1_L03(Glare)**	
14.1” WXGA+				
1		**AUO**	**B141PW01 V0**	
1		**CMO**	**N141C1-L03 REV C1**	
		CMO	**N141C1-L02 REV C1**	
ODD				
DVD Combo				
1		**TSST**	**TS-L462C**	**17G112151102**
		KME	**UJDA770**	**17G112151201**
DVD Super Multi				
1		**KME**	**UJ-850BAL-A**	**17G141120000**
	2	**KME**	**UJ-841BAL-A**	**17G141113000**
		TSST	**TS-L632C**	**17G141115001**
Touchpad				
1		**SYNAPTICS**	**SYNAPTICS FOR A6**	**04G110001710**

MDC				
1		**ASUS**	**MODEM 56K Azalia(Green)**	**61-BMM011-01**
CMOS Camera Module				
1		**YA HSIN**	**N03P1BG_SM9**	**04G370030100**
		CHICONY	**CMN5622**	**04G370030000**
HDD				
1		**HGST**	**HTS421260H9AT00**	**17G013131708**
1		**HGST**	**HTS421280H9AT00**	**17G013132708**
1		**HGST**	**HTS421210H9AT00**	**17G013134701**
1		**Fujitsu**	**MHV2060AT PL**	**17G013131119**
	2	**Fujitsu**	**MHV-2100AT PL**	**17G013134114**
	2	**HGST**	**HTS421212H9AT00**	**17G013133900**
	2	**HGST**	**HTS541060G9AT00**	**17G013131706**
		HGST	**HTS541080G9AT00**	**17G013132707**
		HGST	**HTS541010G9AT00**	**17G013134700**
		Fujitsu	**MHV2100AH**	**17G013134112**
Minicard WLAN				
1		**Intel**	**INTEL/WM3945AGM1GEN**	**04G033051000**
1		**Intel**	**INTEL/WM3945AGM2GEN**	**04G033052000**
		Intel	**INTEL/WM3945AGRWGEN**	**04G033052010**
		Intel	**INTEL/WM3945AGJPGEN**	**04G033052020**
Keyboard				
1		**SUNREX**	**KEYBOARD S62 (USA)**	**04GNG51KUS00**
1		**SUNREX**	**KEYBOARD S62 (UKB)**	**04GNG51KUK00**
1		**SUNREX**	**KEYBOARD S62 (JPN)**	**04GNG51KJP00**
1		**DARFON**	**KEYBOARD S62 (US)**	**04GNG51KUS00-1**
	2	**DARFON**	**KEYBOARD S62 (UK)**	**04GNG51KUK00-1**
	2	**DARFON**	**KEYBOARD S62 (JPN)**	**04GNG51KJP00-1**
Battery				
1		**Celxpert**	**ICR18650-24E/3S2P 3.7V**	**07G016A61865**
1		**Celxpert**	**ICR18650-24E/3S3P 3.7V**	**07G016B31865**
AC Adapter				
1		**Delta**	**SADP65KB-ABH REV:01**	**04G266003183**

1		**Delta**	**SADP65KB-BFJ REV:01**	**04G266003163**
SO-DIMM				
512MB DDR2 533				
1		**UNIFOSA**	**GU33512AGHYQ612L3PC**	**04G001616673**
1		**NANYA**	**NT512T64UH8A1FN-37B**	**04G001616619**
1GB DDR2 533				
1		**NANYA**	**NT1GT64U8HA0BN-37B**	**04G001617633**
512MB DDR2 667				
		Infineon	**M470T6554CZ3-CE6**	**04G00161662F**
		Nanya	**NT512T64UH8A1FN-3C**	**04G00161661B**
1GB DDR2 667				
		Infineon	**M470T2953CZ3-CE6**	**04G001617641**
		Nanya	**NT1GT64U8HA0BN-3C**	**04G001617634**

3.1 Display

WXGA	Technology:	Active color (TFT: Thin Film Transistor)
	Size:	14.1”W
	Resolution:	WXGA (1280 X 800)
	Dimension:	
	Pixel Pitch:	0.279mm x 0.279mm
	Display Colors:	262,144
	Vendor:	AUO/CMO/Hansstar
WXGA+	Technology:	Active color (TFT: Thin Film Transistor)
	Size:	14.1”W
	Resolution:	WXGA+ (1440 X 900)
	Dimension:	
	Pixel Pitch:	0.297mm x 0.297mm
	Display Colors:	262,144
	Vendor:	AUO/CMO/Hansstar

3.2 Hard Disk Drive

Form factor:	2.5 inch
Capacity:	60/80/100 GB
Height:	9.5 mm
Interface:	Enhanced IDE conforming to ATA-5
Functional features:	Power Management APM 1.1 and 1.2 (standby/suspend)
	LBA-modes

Hardware features:	Standard I/O addresses: 1F0h to 1F7h and 3F6h
	Support of minimum IRQ 14
	Support of at least 3 DMA channels, if DMA is supported
	Easily removable and exchangeable for user's future upgrade
Vendor/Model:	HGST/ HTS421260H9AT00
	, HTS421280H9AT00

3.3 Combo Drive

Form factor:	5.25 Inch
Speed:	24X/24X/8X/24X
Height:	12.7mm
Interface:	**IDE (ATAPI)**
Functional features:	Power Management APM 1.1 and 1.2 (standby/suspend)
	Standard I/O addresses
	Support of minimum IRQ
Vendor/Model:	Easily removable and exchangeable for user's future upgradability
	Toshiba/TS-L462C , Panasonic/UJDA770

3.4 DVD-Dual Drive

Form factor:	5.25 Inch
Speed:	**DVD super-multi**
Height:	12.7mm
Interface:	IDE (ATAPI)
Functional features:	Power Management APM 1.1 and 1.2 (standby/suspend)
	Standard I/O addresses
	Support of minimum IRQ
Vendor/Model:	Easily removable and exchangeable for user's future upgradability
	Toshiba/TS-L632C, Panasonic/UJ-841BAL-A

3.5 Touch Pad

Dimensions:	65 mm(W) x 49 mm(H) x 2.82 mm(T)
Sensor effective areas:	62.5 mm(W) x 46.5 mm(H)
Interface:	PS/2
X/Y position resolution:	40 points / mm (graphics mode)
Customizing:	Custom color can be printed on the sensor pad.
Functional features:	Accurate positioning
	Low fatigue pointing action
	Low power consumption
	Software configurable
	Scanner function for signature
	Low profile, compact size and low weight
Vendor/Model	Synaptics : TM61PDE8G307

3.6 Keyboard

Compatibility:	MS-Windows 2000/XP
Functional features:	Standard Notebook-Keyboard
	MF2-Layout
Hardware feature:	Simultaneously use of internal and external keyboard
	Easily to assemble or disassemble
Dimensions:	(H) 300mm x (V) 116.5 mm
Type:	Key switch Membrane
Total travel:	3.0 ± 0.3 mm
Key top:	ABS material, TANPO printing with UV hardening English, Japanese, Chinese, Korean and European etc.,
Language versions:	
Vendor/ Model	InnovACE/K000962, Chicony/MP-0411

3.7 Battery

3.7.1 Main Battery

Purpose:	Main power supply battery
Gas-gauge:	SMBus interface

Chemistry:	Li-ion rechargeable battery
Voltage:	Nominal 11.1V (= 3.7V cell 3pcs in serial, 2pcs in parallel)
Capacity:	2400mAH/Cell
Vendor:	Celxpert
Duration:	Minimum 4 hour (w/o PMU)
Charge Method:	Fast Charge: 2.5A, 3.0 hour (while System off)
Charging Source:	AC Adapter
Gas-gauge:	BENCHMARQ bq2060H

3.7.2 RTC Backup Battery

Purpose:	Backup the RTC/CMOS data
	While AC adapter off & Main Battery removed
Chemistry:	Coin cell 2032 Li-ion battery
Voltage:	Nominal 3V
Capacity:	200mAH
Vendor:	TOSHIBA, Panasonic, KTS

3.8 AC/DC Adapter

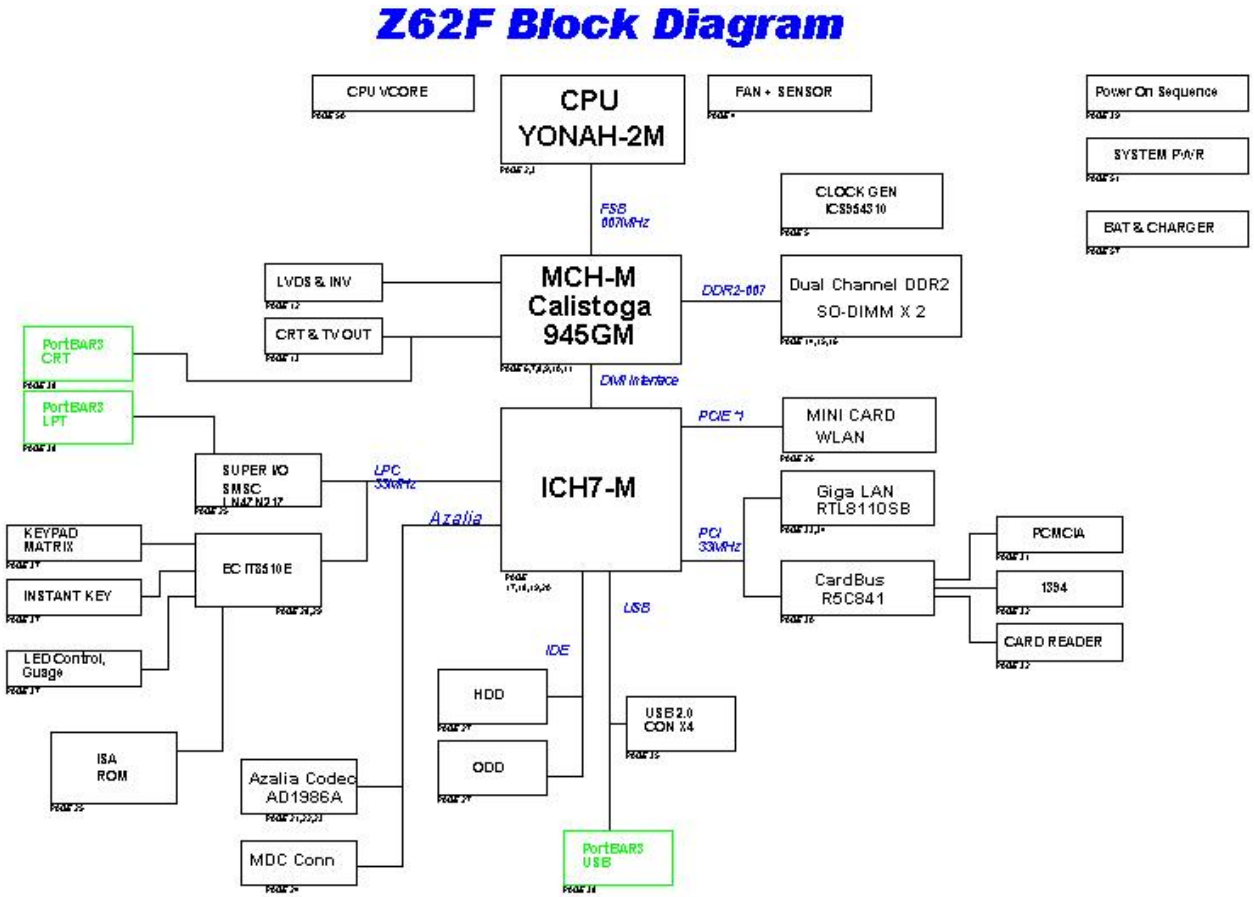
The notebook can be powered either by an external AC adapter or by an internal battery pack. The AC adapter is used as power source for the DC/DC converter and as constant current source for the battery pack.

Input Requirements:	
AC line voltage:	90V to 264V AC, Full Range
AC line current:	1.5A
AC line frequency	50 Hz to 60 Hz
Efficiency	85% min.
Output requirements:	
Output-Voltage	+19V DC +/- 3%
Output-Current	max.3.42A
Ripple voltage	500mV$_{P-P}$
Power cord:	Plug to the adapter
DC Cable length:	180 mm +/- 50mm

Regulatory:	
EMI:	FCC Class B
Safety:	CISPR 22 Class B
.Dimension:	(L) 114.5 x (W) 49.5 x (H) 29 mm

4 SYSTEM

4.1 System diagram



4.2 Main components block diagrams

4.3 System resource

4.3.1 IRQ Map

IRQ#	Description
IRQ 0	System Timer
IRQ 1	Keyboard
IRQ 2	[Cascade]
IRQ 3	IrDA
IRQ 4	USB Controller
IRQ 5	VGA / USB Controller
IRQ 6	Available
IRQ 7	Parallel Port
IRQ 8	System CMOS/RTC
IRQ 9	ACPI IRQ Holder
IRQ10	Available
IRQ11	Available
IRQ12	PS/2 Mouse
IRQ13	FPU
IRQ14	Primary IDE Controller
IRQ15	Secondary IDE Controller

4.3.2 ISA DMA Map

DMA Channel	Device
DMA 3	Parallel Port
DMA 4	DMA Controller

4.3.3 PCI INT Map

INT	Description
INTA	Giga LAN Chip
INTB	CARDBUS, 1394,
INTC	
INTD	

4.3.4 PCI Bus Master Map

REQ	Description
REQ0	CARDBUS, 1394
REQ1	
REQ2	LAN
REQ3	None
REQ4	None

4.3.5 IDSEL

IDSEL	CHIPSET
AD23	LAN
AD17	CARDBUS,1394

5 I/O PORT PIN ASSIGNMENT

No	FUNCTION	DESCRIPTION
	.CRT	Display (Analog)
	HDD	
	ODD	
	LCD	
	KEYBOARD	
	TOUCHPAD&LED	
	1ST BATTERY	
	.DC IN	Adapter Input
	.AUDIO	Headphone, Microphone-In
	.FAN	
	.INVERTER	
	.MDC	
	.1394	
	.USB	Universal Serial Bus
	Port Bar 3	USB, CRT, Parallel Port, RJ-45
	LAN & Modem	
	.Card Reader	
	TV OUT	

5.1 CRT

Vendor	Part No.	Pin No.
SUYIN	070546FR015S215ZU	15 Pin (DIP)

No	Pin Assignment (by: sort)	Description
1	RED Video (analog)	Red this DAC analog output drives the CRT interface.
2	GREEN Video (analog)	Green this DAC analog output drives the CRT interface.

3	BLUE Video (analog)	Blue this DAC analog output drives the CRT interface.
4	MONITOR ID Bit 2	NC
5	GROUND	Ground
6	RED Return (ground)	Ground
7	GREEN Return (ground)	Ground
8	BLUE Return (ground)	Ground
9	KEY	NC
10	SYNC Return (ground)	Ground
11	MONITOR ID Bit 0	NC
12	MONITOR ID Bit 1	DDC monitor data
13	HSYNC	CRT Horizontal Sync this output is The Horizontal sync pulse for the CRT Monitor.
14	VSYNC	CRT Vertical Sync this output is the Vertical sync pulse for the CRT Monitor.
15	MONITOR ID Bit 3	DDC monitor clock

5.2 Hard disk pin assignment

Vendor	Part No.	Pin No.
ALLTOP	C17851-144A1-L	44 Pin (SMT)

No.	Signal	Description	Type
44	IDERST#_5S	Reset primary disk	O
43	GND	Ground	P
42	PDD7	Primary disk data 7	I/O
41	PDD8	Primary disk data 8	I/O
40	PDD6	Primary disk data 6	I/O
39	PDD9	Primary disk data 9	I/O
38	PDD5	Primary disk data 5	I/O
37	PDD10	Primary disk data 10	I/O
36	PDD4	Primary disk data 4	I/O
35	PDD11	Primary disk data 11	I/O
34	PDD3	Primary disk data 3	I/O
33	PDD12	Primary disk data 12	I/O
32	PDD2	Primary disk data 2	I/O
31	PDD13	Primary disk data 13	I/O
30	PDD1	Primary disk data 1	I/O
29	PDD14	Primary disk data 14	I/O
28	PDD0	Primary disk data 0	I/O
27	PDD15	Primary disk data 15	I/O
26	GND	Ground	P
25	KEY	NC	
24	PDDRQ_3S	Primary DMA request	I
23	GND	Ground	P
22	PDIOW#_3S	Primary disk IO write	O
21	GND	Ground	P
20	PDIOR#_3S	Primary disk IO read	O

19	GND	Ground	P
18	PIORDY_3S	Primary disk IO channel ready	I
17	CSEL	Cable select (device configuration)	O
16	PDDACK#_3S	Primary DMA acknowledge	O
15	GND	Ground	P
14	IRQ14_3S	Primary disk interrupt	I
13	HIOCS16#	Indication to the host	I
12	PDA1_3S	Primary disk address 1	O
11	PDIAG#	Diagnostics status	I/O
10	PDA0_3S	Primary disk address 0	O
9	PDA2_3S	Primary disk address 2	O
8	PDCS1#_3S	Primary disk chip select for 100 range	O
7	PDCS3 #_3S	Primary disk chip select for 300 range	O
6	PDASP#_5S	Driver active/slave present	I/O
5	GND	Ground	P
4	+5Vs	+5V power supply	P
3	+5Vs	+5V power supply	P
2	GND	Ground	P
1	Reserved	NC	

5.3 ODD pin assignment

Vendor	Part No.	Pin No.
ALLTOP	C1240Z-250A1-L	50 Pin (DIP)

Pin No.	Pin No.	Remark
1. CD_L_A	2. CD_R_A	
3. CD_GND_A	4. CD_GND_A	
5. IDE_RST#	6. IDE_PD8	
7. IDE_PD7	8. IDE_PD9	
9. IDE_PD6	10. IDE_PD10	
11. IDE_PDD5	12. IDE_PDD11	

13. IDE_PDD4	14. IDE_PDD12	
15. IDE_PDD3	16. IDE_PDD13	
17. IDE_PDD2	18. IDE_PDD14	
19. IDE_PDD1	20. IDE_PDD15	
21. IDE_PDD0	22. IDE_PDDREQ	
23. GND	24. IDE_PDIOR#	
25. IDE_PDIOW#	26. GND	
27. IDE_PIORDY	28. IDE_PDDACK#	
29. INT_IRQ15#	30. IDE_PIOCS16#	
31. IDE_PDA1	32. IDE_PPDIAG#	
33. IDE_PDA0	34. IDE_PDA2	
35. IDE_PDCS1#	36. IDE_PDCS3#	
37. IDE_PDASP#	38. +V5S_IDE	
39. +5VS_IDE	40. +V5S_IDE	
41. +5VS_IDE	42. +V5S_IDE	
43. GND	44. GND	
45. GND	46. GND	
47. ODD_CSEL	48. GND	
49. NC	50. NC	

5.4 LCD pin assignment

Vendor	Part No.	Pin No.
ENTERY	3761-Q30C-01R	30 Pin (SMT)

No.	Signal	Description	Type
1	LVDS_U1N	Data channel 1- of Channel A	O
2	LVDS_L0N	Data channel 0+ of Channel B	O
3	LVDS_U1P	Data channel 1+ of Channel A	O
4	LVDS_L0P	Data channel 0- of Channel B	O
5	GND	Ground	P
6	GND	Ground	P
7	LVDS_U0N	Data channel 0- of Channel A	O
8	LVDS_L1N	Data channel 1- of Channel B	O
9	LVDS_U0P	Data channel 0+ of Channel A	O
10	LVDS_L1P	Data channel 1+ of Channel B	O
11	GND	Ground	P
12	GND	Ground	P
13	LVDS_U2N	Data channel 2- of Channel A	O
14	LVDS_L2N	Data channel 2- of Channel B	O
15	LVDS_U2P	Data channel 2+ of Channel A	O
16	LVDS_L2P	Data channel 2+ of Channel B	O
17	GND	Ground	P
18	GND	Ground	P
19	LVDS_UCLKN	Clock negative of Channel A	O
20	LVDS_LCLKN	Clock negative of Channel B	O
21	LVDS_UCLKP	Clock positive of Channel A	O
22	LVDS_LCLKP	Clock positive of Channel B	O
23	GND	Ground	P
24	GND	Ground	P
25	PID_1	Panel ID bit 1	I

26	EDID_CLK	EDID Clock	I
27	PID_0	Panel ID bit 0	I
28	EDID_DAT	EDID DATA	I
29	LCD_VCC	+3V power supply	P
30	LCD_VCC	+3V power supply	P

5.5 Internal keyboard pin assignment

Vendor	Part No.	Pin No.
ENTERY	6905-E28N-00R	28 Pin (SMT)

No	Signal	Description	Type
1	KSI1	Keyboard matrix column 1	I
2	KSO7	Keyboard matrix row 7	O
3	KSI7	Keyboard matrix column 7	I
4	KSO0	Keyboard matrix row 0	O
5	KSI6	Keyboard matrix column 6	I
6	KSO9	Keyboard matrix row 9	O
7	KSI5	Keyboard matrix column 5	I
8	KSO3	Keyboard matrix row 3	O
9	KSI4	Keyboard matrix column 4	I
10	KSO1	Keyboard matrix row 1	O
11	KSI2	Keyboard matrix column 2	I
12	KSI3	Keyboard matrix column 3	I
13	KSO5	Keyboard matrix row 5	O
14	KSO13	Keyboard matrix row 13	O
15	KSI0	Keyboard matrix column 0	I
16	KSO2	Keyboard matrix row 2	O
17	KSO4	Keyboard matrix row 4	O
18	KSO8	Keyboard matrix row 8	O
19	KSO6	Keyboard matrix row 6	O
20	KSO11	Keyboard matrix row 11	O
21	KSO10	Keyboard matrix row 10	O
22	KSO12	Keyboard matrix row 12	O
23	KSO14	Keyboard matrix row 14	O
24	KSO15	Keyboard matrix row 15	O
25	NC		

26	KEYDETECT0	Keyboard ID bit 0	I
27	GND	Ground	GND
28	KEYDETECT1	Keyboard ID bit 1	I

5.6 Internal Touch Pad Pin assignment

Vendor	Part No.	Pin No.
ENTERY	6701-20	10 Pin (SMT)

No	Signal	Description	Type
1	+5VS	Power	P
2	+5VS	Power	P
3	TPAD_DAT	PS/2 DATA	I/O
4	TPAD_DAT	PS/2 DATA	I/O
5	TPAD_CLK	PS/2 Clock	I/O
6	TPAD_CLK	PS/2 Clock	I/O
7	GND	Ground	P
8	GND	Ground	P
9	TP_LEFT_SW#	Left Switch	I
10	NC		
11	NC		
12	TP_RIGHT_SW#	Right Switch	I

5.7 1ST Battery pin assignment

No	Signal	Description	Type
1	BAT_CON	Battery input/output voltage	P
2	BAT_CON	Battery input/output voltage	P
3	BAT1_CNT1#	NVDC control pin 1	I
4	BAT1_CNT2#	NVDC control pin 2	I
5	SMCLK_BAT	SMB Bus Clock	I/O
6	SMDATA_BAT	SMB Bus DATA	I/O
7	TS#	Thermal Pin	O
8	GND	Ground	P
9	GND	Ground	P

5.8 DC in Jack pin assignment

Vendor	Part No.	Pin No.
SINGATRON	2DC-G026B201	4 Pin (DIP)

No	Signal	Description	Type
1	A/D_DOCK_IN	Adapter input voltage	P
2	GND	Ground	P
3	GND	Ground	P
4	GND	Ground	P

5.9 Audio Jack

5.9.1 Internal Speaker Jack

Vendor	Part No.	Pin No.
ACES	85204-04001	4 Pin (SMT)

No	Signal	Description	Type
1	INTSPKR+	Internal speaker signal channel positive	O

2	INTSPKR-	Internal speaker left sound negative	O
3	INTSPKL+	Internal speaker signal channel positive	O
4	INTSPKL-	Internal speaker left sound negative	O

5.9.2 Headphone Jack

Vendor	Part No.	Pin No.
SINGATRON	2SJ-A373-001	10 Pin (DIP)

No	Signal	Description	Type
1	EARR	Headphone right sound	O
4	EARL	Headphone left sound	O
5	GND	Ground	P
6	GND	Ground	P
7	JACK_IN#	S/PDIF/Headphone be plugged in	I
9	GND	Ground	P
10	GND	Ground	P
A	GND	Ground	P
B	+5VS	+5V power for S/PDIF	P
C	SPDIF_O	S/PDIF output	O

5.9.3 Microphone Jack

Vendor	Part No.	Pin No.
FOXCONN	JA6333L-B200-7F	5 Pin (DIP)

No	Signal	Description	Type
1	GND	Ground	P
2	MIC_CENTER	External microphone input	O
3	NC	No Connection	
4	MIC_BIAS	Internal MIC connection/BIAS.	I
5	NC	No Connection	
6	EXT_MIC	Internal Microphone switch out connection	O

5.10 Fan Pin Assignment

Vendor	Part No.	Pin No.
ACES	85205-03701	3 Pin (SMT)

No	Signal	Description	Type
1	+5VS_FAN	5V Power Supply	P
2	FANSP1	FAN speed signal input	I
3	GND	Ground	P

5.11 Inverter pin assignment

Vendor	Part No.	Pin No.
E&T	3753-20	20 Pin (SMT)

No	Signal	Description	Type
1	NC	No Connection	
2	AC_BAT_SYS	Ac in voltage	P
3	+5V_USB35	USB 5V power	P
4	AC_BAT_SYS	Ac in voltage	P
5	+5V_USB35	USB 5V power	P
6	GND	Ground	P
7	GND	Ground	I/O
8	LID_SW#	LID Switch signal output(Reserve)	O
9	GND	Ground	I/O
10	BACK_ADJ	Brightness signal adjustment	O
11	GND	Ground	P
12	BACK_OFF#	Turn Off Backlight	O
13	USB_P3-	USB- signals of CCD Camera	I/O
14	+3VA	3.3V power for LID switch	P
15	USB_P3+	USB+ signals of CCD Camera	I/O
16	GND	Ground	P

17	GND	Ground	P
18	INTMIC_A_GND	Audio Ground	P
19	GND	Ground	P
20	INVMIC_A	Internal MIC	I

***

5.12 MDC signal

Vendor	Part No.	Pin No.
AMP	1-179397-2	12 Pin (SMT)

No	Signal	Description	Type
1	GND	Ground	NC
2	NC	None	NC
3	SDOUT	DATA OUT	I
4	NC	None	NC
5	GND	Ground	NC
6	+3V	Power +3V	P
7	SYNC	SYNC	O
8	GND	Ground	P
9	SDIN	DATA IN	O
10	GND	Ground	P
11	RST#	AC Reset	I
12	BCLK	Azalia Clock	O

5.13 1394 pin assignment

Vendor	Part No.	Pin No.
SUYIN	020204FR004S502ZA	4 Pin (DIP)

No	Signal	Description	Type
1	LTPB0-	Twisted-pair cable A negative	I/O
2	LTPB0+	Twisted-pair cable B positive	I/O
3	LTPA0-	Twisted-pair cable A negative	I/O

4	LTPA0+	Twisted-pair cable A positive	I/O

5.14 USB pin assignment

Vendor	Part No.	Pin No.
SUYIN	020122MR008S523ZA	8 Pin (DIP)

No	Signal	Description	Type
1	+5V_USB01	USB 5V power	P
2	USB_P0-	USB port 0 negative signal	I/O
3	USB_P0+	USB port 0 positive signal	I/O
4	GND	USB 5V ground	P
5	+5V_USB01	USB 5V power	P
6	USB_P1-	USB port 1 negative signal	I/O
7	USB_P1+	USB port 1 positive signal	I/O
8	GND	USB 5V ground	P

Vendor	Part No.	Pin No.
SUYIN	020122MR008S523ZA	8 Pin (DIP)

No	Signal	Description	Type
1	+5V_USB23	USB 5V power	P
2	USB_P2-	USB port 2 negative signal	I/O
3	USB_P2+	USB port 2 positive signal	I/O
4	GND	USB 5V ground	P
5	+5V_USB23	USB 5V power	P
6	USB_P3-	USB port 3 negative signal	I/O
7	USB_P3+	USB port 3 positive signal	I/O
8	GND	USB 5V ground	P

5.15 LAN & Modem pin assignment

Vendor	Part No.	Pin No.

ALLTOP	C10089-112A4-Y	12 Pin (DIP)

No	Signal	Description	Type
1	None	None	NC
2	RJ11_RING	Modem signal	I/O
3	RJ11_TIP	Modem signal	I/O
4	None	None	NC
5	LAN_TXP	Transmit data positive signal	O
6	LAN_TXN	Transmit data negative signal	O
7	LAN_RXP	Receive data positive signal	I
8	LAN_MDI2P	GigaLan MDI2+	I
9	LAN_MDI2N	GigaLan MDI2-	I
10	LAN_RXN	Receive data negative signal	I
11	LAN_MDI3P	GigaLan MDI3+	I
12	LAN_MDI3N	GigaLan MDI3-	I

5.16 Card Reader pin assignment

Vendor	Part No.	Pin No.
TAITWUN	R009-030-LR	21 Pin (SMT)

Pin No	Signal	Remark
1.	SD_DAT1	
2.	SD_DAT0	
3	SD_GND	
4	MS_GND	
5	MS_BS	
6	SD_CLK	
7	MS_DATA1	
8	MS_DATA0	
9	VCC	
10	MS_DATA2	
11	SD_GND	

12	MS_CD	
13	MS_DATA3	
14	SD_CMD	
15	MS_SCLK	
16	MS_VCC	
17	SD_DAT3	
18	GND	
19	SD_DAT2	
20	SD_WP	
21	SD_CD	

6 POWER MANAGEMENT

6.1 System power plane

Power Group	Power Control Pin	Controlled Devices
+12V	SUSC#	Control
+5V	SUSC#	PCMCIA Slot 5V, USB
+3.3V	SUSC#	NB, DDR, PCMCIA Controller, PCMCIA Slot 3.3V, Keyboard Controller
+2.5VS	SUSC#	VGA DAC/GLAN power
+12VS	SUSB#	Control
+5VS	SUSB#	HDD, CD-ROM, Internal Touch Pad, Audio AMP
+3.3VS	SUSB#	SB, Audio, Clock Generator, PCI interface, Super I/O, VGA, AC97 CODEC, FWH, Thermal sensor, IR
+1.8V	SUSC#	PCMCIA chip power, DDR2 power
+1.5VS	SUSB#	NB Core
+0.9VS	SUSB#	DDR Termination
+1.05VS	SUSB#	CPU, NB AGTL+ Bus power, NB core
+VCORE	CPU_VRON	CPU power
+5VA		
+3.3VA		Resume Power, EC,ISA ROM
+V_RTC		ICH7-M(RTC)

6.2 Power management mode

6.2.1 Full-On mode

All system devices are not power managed and the system can respond to applications with maximum performance.

6.2.2 Doze mode

The CPU clock is slow down but all other devices are full on.

6.2.3 Stand by mode

A suspend state where all motherboard components are still powered-on except for the system clock generator device. The PCI and CPU buses are driven to the inactive idle state. The system memory is powered and refreshed by the memory bridge, and the graphics frame buffer is powered and refreshed by the graphic chip. The system provides a 32KHz clock (SUSCLK) in this suspend mode to support refresh of these memory subsystems. Only an enabled “resume event” can bring the system out of the stand by state. The south bridge also provides a resume timer that allows the system to resume after a programmed time has elapsed.

6.2.4 Suspend to RAM mode (STR)

A suspend state where all motherboard components are powered-off. The CPU and PCI busses are powered off. All devices connected to the CPU and PCI busses must either be powered-off or isolate their bus interfaces. The system memory is powered and refreshed by the memory bridge, and the graphics frame buffer is powered and refreshed by the graphics chip. The system provides a 32 kHz clock (SUSCLK) in this suspend mode to support refresh of these memory subsystems. Only an enabled “resume event” can bring the platform out of the suspend to RAM (STR) state.

6.2.5 Suspend to disk mode (STD)

A suspend state where the context of the entire system is saved to disk, all motherboard components are powered-off, and all clocks are stopped. Any enabled “resume event”, such as Power switch or RTC, can bring the platform out of the suspend to disk (STD) state.

6.2.6 Soft off mode (SOFF)

This is the same as suspend to disk except the context of memory is not saved. The system will resume from Soft Off as if a hard reset had occurred.

6.2.7 Mechanical off mode (MOFF)

All power except the RTC has been removed from the system.

6.3 PMU mode transition event

The following table summarizes the entry events and wake-up events of each power management mode.

Power State	Entry Event	Wake up Event
Doze	Doze Time out	Predefined Memory/IO range access Ring Indicator Keystroke Mouse movement

		IRQ 1-15
Stand by	Stand by Time out Stand by hot key pressed	Predefined Memory/IO range access Battery Warning Battery Low Ring Indicator Keystroke Mouse movement Schedule Alarm
STR	Suspend Time out STR hot key pressed Suspend button Battery Low	Power Button Ring Indicator Keystroke (Int. KB) Schedule Alarm
STD	Suspend Time out STD hot key pressed Hibernate Battery Low	Power Button Schedule Alarm
Soft Off	Power button Execute Windows shutdown command	Power Button Schedule Alarm

6.3.1 Lid switch

Display mode	State	Lid close	Lid open
LCD	Full on	LCD OFF	No action
	Stand by	LCD OFF	No action
	STR/STD	LCD OFF	No action
CRT	Full on	No action	No action
	Stand by	No action	No action
	STR/STD	No action	No action
SIMUL	Full on	LCD OFF/CRT ON	No action
	Stand by	No action	No action
	STR/STD	No action	No action

LCD display will be shut down while closing LCD.

6.3.2 Power button

Power button function depends on the definition in Windows power setting or you can force off by pressing power button for 4 seconds. To reset the system, you need to press the reset button.

6.4 Device Power management

Power state of local devices table

Power State / Component	Doze	Stand By	STR	STD/SOff
CPU	Quick Start	Stop Clock	Power Off	Power Off
North Bridge	ON	Stop Clock	Power Off	Power Off
South Bridge	ON	ON	Power Off (except +3.3VA,+1.8VA, RTCVCC)	Power Off (except +3.3VA,+1.8VA, RTCVCC)
DDR	ON	Self Refresh	Self Refresh	Power Off
CD-ROM (DVD)	ON	Power down	Power Off	Power Off
HDD	ON	Power down	Power Off	Power Off
FDD	ON	Power Off	Power Off	Power Off
KBC	ON	ON	Power down	Power Off
VGA	ON	Power down	Power Off	Power Off
PCMCIA	ON	Power down	Power down	Power Off

Super I/O	ON	Power down	Power Off	Power Off
Audio CODEC	ON	ON	Power Off	Power Off
Audio Amplifier	ON	Power down	Power Off	Power Off
LCD Backlight	ON	Power Off	Power Off	Power Off
LAN	ON	Power down	Power down	Power down
Modem	ON	Power down	Power Off	Power Off

6.4.1 Device PM control during Stand By mode

Device	Power Controlled by	Description
CPU	Hardware	Controlled by LDTSTP#
PCMCIA Controller	Software	Enter PCI PM D3Hot state
Super I/O Chip	Working	
Keyboard Controller	Working	M38857 support power down command
USB FDD	Working	
HDD	Software	HDD support power down command
CD-ROM	Software	CD-ROM support power down command
Audio AMP	Hardware	Controlled by Jack in detect
Internal Modem	Software	Enter PCI PM D3Hot state
LAN	Software	Enter PCI PM D3Hot state
LCD Panel Back light	Hardware	Controlled by M38857
Clock Synthesizer	Hardware	Controlled by SUSA#
EC	Working	

6.4.2 Device PM control during STR mode

Device	Power Down Controlled by	Description
Super I/O	Hardware	Power Down
HDD	Hardware	Power Off
CD-ROM	Hardware	Power Off
Internal Modem	Software	Power Off
LAN	Software	Power Down
USB FDD	Hardware	Power Down
Audio CODEC	Software	Power Off
Audio AMP	Hardware	Power Off
LCD Panel	Hardware	Power Off
LCD Back light	Hardware	Power Off
Clock Synthesizer	Hardware	Power Off
Keyboard Controller	Software	Power Off

6.4.3 Device PM control during STD mode

Device	Power Down Controlled by	Description
Core Logic	Hardware	Power off (except Resume Well)
Super I/O	Hardware	Power off
VGA Chip	Hardware	Power off
HDD	Hardware	Power off
CD-ROM	Hardware	Power off
PCMCIA Controller	Hardware	Power off
Internal Modem	Hardware	Power off
LAN	Hardware	Power off
USB FDD	Hardware	Power off
Audio Chip	Hardware	Power off
Audio AMP	Hardware	Power off
LCD Panel	Hardware	Power off
Back light	Hardware	Power off
Clock Synthesizer	Hardware	Power off
Keyboard Controller	EC Software	Power off

7 MODULE SPECIFICATION

7.1 Overall System

The notebook system consists of the following PCB assembly and modules.

7.1.1 Board assembly

Processor	Upgradeable CPU (u-PGA 479)
Main Board	Main System board
Inverter Board	LCD Module Back-light
TOUCH PAD	5 LED Indicators, 2 Touch Pad Button
SO-DIMM Module	Memory Expansion
Modem Board	MDC

7.2 Processor

Feature:	Intel Yonah processor with on-die L2 cache. u-PGA 479

[CPU Cooling System]

Function:	For cooling the CPU Cooling of CPU by heat sink and FAN. FAN is controlled by a thermal sensor and BIOS/ACPI OS.

7.3 Main board

7.3.1 Main system module spec

Feature:

CPU socket, Intel 945GM, Intel ICH7M,

Clock generator,

SDRAM & its expansion sockets,

PC/AT compatible system (RTC, DMA, INT, Timer, … etc)

IDE controller with PIO Mode 4 & Ultra-33/66/100,

PCMCIA /Cardbus controller & their sockets

I/O peripheral controller (LPT to Port Bar 3 connector)

Audio CODEC,

Audio amplifier,

CPU thermal sensor,

I/O connectors,

Power management control circuit,

Internal Graphic/Display controller,

Keyboard Controller,

Audio analog signal,

Power control, DC/DC,

Battery power

Regulated power

SM bus for Battery

Indication Charger LED

7.3.2 DC/DC module spec

Controller: MAX1987, TPS5130, LTC3728, TL494

Input voltage: 8-20V

Output voltage/current:

Voltage	Current	Ripple	Regulation
+5V/+5VS	4.5A	75mV	+-3%
+3.3V/+3.3VS	4.5A	75mV	+-3%
+12V/+12VS	150mA	200mV	+-5%
+3VALWAYS	50mA	75mV	+-5%
+1.5VALWAYS	50mA	75mV	+-5%
+5VSUS	50mA	75mV	+-5%
+v1.8/+V1.8S	1A	75mV	+-3%
+VCCP	1A	75mV	+-3%
+V1.2S	2A	75mV	+-3%
VCORE	22A	75mV	+-3%
+2.5V	5A	75mV	+-3%
+1.25VS	2A	75mV	+-3%

Support OVP

Support OCP

Frequency: 200~300KHz

7.3.3 Charger

Charger spec

Controller: IE8510E

Input voltage: +3VA

Charger Method: CV.CC

Li-Ion Battery:

Full charger sense I min.: 300mA

Max. charge voltage : 4.20V/cell

Charger Voltage: 12.6V

Charger current:

Input: Adapter			
Contain	Min	Typ.	Max
Charge current (3S3P)			
Charge current (3S2P)			
Ripple & Noise	500mV		
Efficiency	90%		

7.4 Inverter Board

Inverter spec
Input voltage: 12~20V
Output current: 6.5mA(max)
Start voltage: 1500Vrms(min)
Efficiency: 80%(min)
Brightness adjusted by input voltage.
Support output short protection
Frequency: 45~60KHz
Output connector for CCFT:

Pin no	I/O	Description
1	Input/ Output	Return
2	Input/ Output	High voltage

Brightness control duty: 0-100%

7.5 Adapter spec

7.5.1 Input

Input voltage: 90~240VAC, Full range

Input frequency: 47~63Hz

Input current: 1.5A(max)/100VAC

Inrush current: 60A(max)/100VAC, 120A(max)/240VAC

Efficiency: 80%(min)

7.5.2 Output

65W power output

Output Voltage/Current: 18.05~19.95V/3.42A

Ripple: 500mV

7.5.3 Protection

OVP: 24V(max)

SCP: Yes

OCP: 19V/5A(max)

7.6 Main Battery spec

Battery pack capacity:

	Vendor	Cells	Voltage	Capacity	Watts
Li-Ion	Samsung	8	14.8V	4400mAh	65.12W
Li-Ion	Samsung	4	14.8V	2200mAh	32.56W

Battery warning and low percentage (Li-Ion):

Battery low = 10%

Battery low low= 0%

Gauge controller (BQ2060H) setting:

Charging voltage: 16.8V

Charging efficiency: 90%

Low temperature capacity: 70%

7.7 LAN Spec

Controller: REALTEK RTL8110SB

Interface: PCI

Compliant to PCI 2.2

Support ACPI , PCI power management

Support for Wake-On-LAN during S3,S4

Integrated IEEE 802.3x 10BASE-T and 100 BASE-TX and Giga LAN compatible PHY and transceiver in one chip

Full duplex and half duplex support at both 10, 100M and 1000Mbps

Low power 3.3V device

128-Pin LQFP package

7.8 Modem spec

Part Number: ASUS RD02-D110

Controller: Conexant software modem

Interface: AC-link

Support Caller ID

Support Ring wake up function

ITU-T V.90 Data Mode with auto-fall back to K56flex and V.34

V.80 Video ready

Modem Data speed: 56Kbps

FAX transfer speed: 14.4Kbps

Modem modulation format: V.90 PCM

8 MISCELLANEOUS

8.1 Indicators

Power LED

Feature:	Show System power status
Type:	5 ϕ LED
Color:	Green
Indication:	On: System in ON Mode
	Flash (0.3Hz): System in SUSPEND Mode
	Off: System in OFF Mode
Location:	On board

Charging LED

Feature:	Show Battery status
Type:	5 ϕ LED
Color:	Orange
Indication:	On: Battery in Charging
	Flash (0.5Hz): Battery Low
	Off: Battery is fully charged or absent
Location:	On board

Email LED

Feature:	Show Receive mail status
Type:	5 ϕ LED
Color:	Orange
Indication:	On: Receive mail
	Off: No mail ststus
Location:	On board

WLAN & BT LED

Feature:	Show Receive mail status
Type:	5 ϕ LED
Color:	Blue

Indication:	On: RF on
	Off: No ststus
Location:	On board

Hard Disk Drive LED

Feature:	On: While HDD Read/Write access
Type:	5 ϕ LED
Color:	Green
Location:	LED Board (in top of System)

Caps LOCK LED

Feature:	On: While CAP Lock activate
Type:	5 ϕ LED
Color:	Green
Location:	LED Board (in top of System)

Num LOCK LED

Feature:	On: While Num Lock activate
Type:	5 ϕ LED
Color:	Green
Location:	LED Board (in top of System)

SCROLL LOCK LED

Feature:	On: While Num Lock activate
Type:	5 ϕ LED
Color:	Green
Location:	LED Board (in top of System)

8.2 Power cord list

Where	Description	Vendor
US	P-CORD 1.8m 125V 7A UL 2-PIN WS-027-T	Well shin
UK	P-CORD 1.8m 250V 2.5A UK 2-PIN WS-027-T	Well shin
Japan	P-CORD 1.8m 125V 7A T-MARK 2-PIN WS-027-T	Well shin

Europe	P-CORD 1.8m 250V 2.5A EUR 2-PIN WS-027-T	Well shin
Austria	P-CORD 1.8m 250V 2.5A AUS 2-PIN WS-027-T	Well shin
South Asia	P-CORD 1.8m 125V 7A WS016+WS027 WS-027-T	Well shin

8.3 Safety/ EMI Appliance (TBD):

Agency Approval	**EMC**	CE Mark (Europe) BCIQ (Taiwan)
	EMI	FCC Class B Certified (USA & Canada), VCCI (Japan)
	Safety	UL, CSA or CUL, NEMKO-CB (Norway), TUV, CE Mark (Europe)
	Telecomm.	FCC Part 68 (USA), DOC (Canada), JATE (Japan), AUSTEL (Australia), TELEPERWIT (New Zealand), CTR-21 (EU)
Other Requirements	**Industry Standards Compliance**	SPA Energy Star Compliance Designed for Windows 95/98 and Windows NT Logo (Compliance with Microsoft PC98)

The End…….

Chapter 6

Software Specifications

Get to know more about the S62 series Notebook with a detailed look at the software specifications.

The information contained in the chapter can be quite useful when you are troubleshooting the system's hardware. Each item has its individual usage for you to understand the software side of the notebook's architecture.

1. General Description

The specification is a guideline for BIOS development on S62 series platform. Anyone who needs the information of system BIOS can read it for reference.

The general device specification, SMBUS, PCI Devices IRQ Routing Table, GPIO pins definition and so on are subjected to be depicted in this document. Hotkeys implementation and other BIOS features are also included in.

S62 series is an IBM PC/AT compatible notebook PC. The system BIOS of S62 series is designed to comply with following specifications:

. PC2001 System Design Guide
. ACPI 1.0b/2.0
. SMBIOS 2.3.3
. PCI 2.2
. USB 2.0 EHCI
. PXE 2.0
. Intel Geyserville III
. PnP BIOS 1.0a
. ATA Specification

2. Summary of Hardware Configuration

2.1 KEY COMPONENTS LIST

The key components used on S62 series are listed below.

Table 2-1 Key components

Item	Vendor	Part's Name	Revision
CPU	Intel	Yonah 1.6G/1.8G/2.0G/2.16G	
North Bridge	Intel	Calitoga-945GM	
South Bridge	Intel	ICH7-M	
VGA	Intel	Calitoga-945GM	
Audio	Intel	High Definition Audio	
Audio Codec	Realtek	AD1986a	
USB	Intel	ICH7-M (USB2.0)	
LAN	Realtek	RTL8110	
Modem	Intel	ICH7-M	
Modem Codec	Conexant	SmartMC 3S	
Cardbus	Ricoh	R5C841	
IEEE1394	Ricoh	R5C841	
Clock Gen.	ICS	ICS954310	
Thermal	ADI	ADT7461	
KBC	ITE	ITE8510	
Super I/O	SMSC	47N217	
CMOS CAM	Vimicro	VC0321	
Blue tooth	ASUS	BT-183	
Wireless	INTEL	Wireless 3945ABG	

2.2 PERIPHERAL DEVICES LIST

Table 2-2 Peripheral Devices

Device	Description	Note
HDD	Ultra DMA 33/66/100, 100GB	
Keyboard	87-key keyboard supporting(US,JPN,UK)	
Pointing Device	Built-in Touchpad. 2 click buttons Support Pad-Lock Function (Hot Key on/off).	
Module Bay	NA	
LED Indicators	POWER LED : "ON" at power on, "BLINKING" at suspend. NUMLock LED : "ON" when numlock is pressed CAPLock LED : "ON" when capslock is pressed. SCRLock LED : "ON" When Srclock is pressed HDD LED : "BLINKING" when HDD accessing EMAIL LED : "ON" when new E-mail(s) coming. WIRELESS LED : "ON", when Wireless lan/Bluetooth activity. BATTERY LED : "ON" at charging, "OFF" when a battery is fully charged or there is no battery "BLINKING"Battery capacity is below 5%	
Ports	One VGA port/Mini D-sub 15-pin for external display Four USB2.0 ports One TV Out One Cable In One Headphone-out/ SPDIF One Mic-in One RJ45(LAN) One RJ11(Modem)	

	One IEEE 1394 B Type Jack One PCMCIA One Memory card reader(SD/MMC/MS)	
Power Supply	AC adapter : Output : 19 VDC, 3.42A, 65W, Input : 100~240V AC, 50/60Hz universal Battery Pack : Main : Li-Ion 6 cells, 14.8V, 4800mAh, 65W battery pack Run-down life 5.5hrs Charging time, 2hrs Quick charge 90% (Power off) / 4hrs (Power on) Battery low will enable the Power Management System under Windows environment. Enters Save-To-Disk mode automatically if less than 5%	

2.3 PCI DEVICES ALLOCATION

The H/W configuration of PCI Devices includes interrupt routing, device IDSEL allocation, device vendor/device IDs, sub-system/vendor Ids etc.

2.3.1 PCI IDSEL Allocation & IRQs routing

PCI devices allocation and interrupt routing are listed in the table below.

Table 2-3

Device	Vendor	IDSEL	Bus	Dev.	Fun.	INTA	INTB	INTC	INTD
Host Bridge	Intel		0	0	0	N/A	N/A	N/A	N/A
VGA	Intel		0	2	0	*PIRQA	N/A	N/A	N/A
High Definition Audio Controller	Intel		0	27	0	*PIQRA	N/A	N/A	N/A
USB0	Intel		0	29	0	*PIQRH	N/a	N/A	N/A
USB1	Intel		0	29	1	N/A	*PIQRD	N/A	N/A
USB2	Intel		0	29	2	N/A	N/A	*PIQRC	n/a
USB3	Intel		0	29	3	N/A	N/A	N/A	*PIQRA
USB2.0	Intel		0	29	7	*PIQRH	N/A	N/A	N/A
PCI2PCI Bridge	Intel		0	30	0	N/A	N/A	N/A	N/A
LPC Bridge	Intel		0	31	0	N/A	N/A	N/A	N/A
IDE Controller	Intel		0	31	1	*PIRQC	N/A	N/A	N/A
SMBus Controller	Intel		0	31	3	N/A	*PIRQD	N/A	N/A
PCIE(802.11)	Intel		1	1	0	*PIRQB	N/A	N/A	N/A
CardBus/1394/SD/MS	Ricoh	AD17	1	3	0/1/2/3/4	*PIRQB	*PIRQC	*PIRQD	N/A
LAN	Realtek	AD23	1	0	0	*PIRQA	N/A	N/A	N/A
WLAN	Intel		2	0	0	*PIRQB	*PIRQC	*PIRQD	*PIRQA

* : Device internal routing
[1] : Native mode routes to PIRQA
IRQs Available (Legacy) : 2,3,4,6,7,9,10,11,15
IRQs Available (ACPI) : 2,3,4,6,7,10,11,12,15,20,21,22

2.3.2 PCI Devices Vendor/Device IDs and Sub-System/Vendor IDs

As title, we list some IDs below.

Table 2-4 Vendor/Device IDs & Sub-System/Vendor IDs

Device	Vendor	Bus	Dev.	Fun.	Vendor ID	Device ID	Sub-Vendor ID	Sub-System ID
Host Bridge	Intel	0	0	0	8086h	27A0h	1043h	1297h
VGA	Intel	0	2	0	8086h	27A2h	1043h	1252h
VGA	Intel	0	2	1	8086h	27A6h	1043h	1252h
High Definition Audio Controller	Intel	0	27	0	8086h	27D8h	1043h	1213h
USB0	Intel	0	29	0	8086h	27C8h	1043h	1297h

USB1	Intel	0	29	1	8086h	27C9h	1043h	1297h
USB2	Intel	0	29	2	8086h	27CAh	1043h	1297h
USB3	Intel	0	29	3	8086h	27CBh	1043h	1297h
USB2.0	Intel	0	29	7	8086h	27CCh	1043h	1297h
PCI2PCI Bridge	Intel	0	30	0	8086h	2448h	1043h	1297h
LPC Bridge	Intel	0	31	0	8086h	27B9h	1043h	1297h
IDE Controller	Intel	0	31	1	8086h	27DFh	1043h	1297h
SMBus Controller	Intel	0	31	3	8086h	27Dah	1043h	1297h
PCIE(802.11)	Intel	2	1	0	8086h	4222h	8086h	1000h
CardBus Controller	Ricoh	3	1	0	1180h	0476h	1043h	1297h
1394	Ricoh	3	1	1	1180h	0552h	1043h	1297h
SD	Ricoh	3	1	2	1180h	0822h	1043h	1297h
MS	Ricoh	3	1	3	1180h	0592h	1043h	1297h
LAN	Realtek	3	7	0	11ABh	4320h	1043h	11E5h

2.4 PANEL DETECTION AND INITIALIZATION

During POST, the VGA BIOS will automatically detect the LCD panel type through EDID and set proper parameters for the LCD panel.

2.5 GPE EVENT

The GPE enable register and status register are located at offset 0x2C and 0x28 of PMIO range respectively. The GPI0~GPI15 could be set to trigger SCI, SMI, or nothing by setting their corresponding control bits in Dev#0/Func#0/Reg#B8h “GPI Routing Control Register” if being selected as general purpose input.

Table 2-5 GPE event table

GPE Bit	Source	Event		Description
		None-ACPI	ACPI	
3	USB device	Wake Up	Wake Up	USB Controller 1
4	USB device	Wake Up	Wake Up	USB Controller 2
8	Ring In(PM_RI#)	Wake Up	Wake Up	Modem ring/Cardbus ring
11	PCI_PME#	Wake Up / SMI	Wake Up / SCI	PME# of PCI device
12	USB device	Wake Up	Wake Up	USB Controller 3
13	ICH7-M internal device on bus #0	Wake Up / SMI	Wake Up / SCI	PME# of internal device on bus 0
14	USB device	Wake Up	Wake Up	USB Controller 4
24	EXTSMI#	SMI	SMI	External SMI from KBC ITE8510
28	KB_SCI#	N/A	SCI	SCI# from KBC ITE8510

3. Summary of BIOS Requirements

Item	Description
BIOS Vendor	AMI
Revision	8.0
Implemented Specification	PCI Express 1.0, ACPI 1.0b/2.0, PCI BIOS 2.0, PnP 1.0a, SMBIOS (DMI) 2.3.3, SMBus BIOS 1.0, PXE 2.0, Quick Boot, BIOS Boot Flag, Enhanced BIOS Services for Disk Drive, Bootable CD-ROM Format, ATAPI Removable Media Device BIOS, PARTIES, Intel's SpeedStep, and so on.
Supported Operating System (O.S.)	Windows XP SP2
Boot Block	32 KB boot block is used for initializing DRAM, checking BIOS integrity, decompressing POST/Run-Time BIOS, and doing crisis recovery of BIOS if necessary.
Crisis Recovery	Recover BIOS from a hard disk, a host PC connected to parallel port, or a proprietary debug card of ASUS.
BIOS Update	Update BIOS at DOS or Windows, or from a proprietary debug card, or from a host PC via parallel port.
CPU	Automatically detect the CPU type and speed; Support CPU host frequency selection.
DRAM	Support SPD and automatic memory sizing; always shadow VGA BIOS and system BIOS as well as shadow NIC boot ROM by selection.
Cache	Always enable L1 and L2 caches.
Security	Unique password protection for system and HDD; dynamic backdoor (master) password verification.
Display	Automatically detect and switch among LCD, CRT, and TV display devices when display-switching combination hot key, Fn+F8, pressed.
Floppy Drive	3 mode floppy supported
Hard Disk	Support automatic device detection, LBA (28/48 bits) mode for larger capacity HDD, 32-bit PIO transfer, multiple sector transfer, fast PIO mode 1-4, Multiword DMA mode 0-2, Ultra DMA (33/66/100) mode 0-5, SMART function, PARTIES function, and password protection.
Multiple Boot	Boot up an operating system from legacy floppy, IDE Hard Disk / CD-ROM, USB ZIP / CDROM / Floppy / LS-120 & 240 / Hard Disk / Flash Memory Device, or a remote server via LAN (PXE/INT18 Network Boot).
Plug and Play	Support PnP run time service and conflict-free allocation of resource during POST
ACPI	Support C0, C1, C2/C2E, C3, C4/C4E, S0, S3, S4, & S5 power management modes, control method battery, and proprietary on-screen display utility.
SpeedStep(Geyserville III)	Support Intel's applet (rev. 3.x) and Windows XP Native Process Performance Control.
PXE	Support PXE LAN boot.
Battery	Provide control method battery interface for ACPI-enabled O.S., support APM 1.2 "Get Power Status" function, and calibrate capacity when invoked from setup menu.
AC Power	Set AC power ON/OFF trigger conditions and report its state to operating system accordingly.
Keyboard/Mouse	Support U.S./Japan/U.K. keyboards, USB legacy keyboard, built-in Glide Pad, and function hot keys.
PCI / AMC'97 Device	Initialize and allocate required system source including IRQ, DMA channel, I/O port, memory range, and primary / subordinate bus number as well as sub-system and sub-vendor Ids.
Power Management	The power management methodology is compliant with ACPI 1.0B/2.0 specifications. The supported power states are: ▪ Full On ▪ Stand-by ▪ Suspend to RAM (STR or S3) on ACPI-enabled O.S. only ▪ Suspend to Disk (STD or S4) on ACPI-enabled O.S. only ▪ Soft Off (S5)

4. BIOS Features

4.1 SYSTEM SECURITY

The functions of all passwords are listed in following table.

Table 4-1 Password Function

Function	Password		
	User	Supervisor	Hard Disk
Access all setup items		V	
Access only part of setup items	V		
Enter system		V	
Unlock a hard disk			V
Disable “lock” of a hard disk			V

Here are some other rules should be followed:

If supervisor password is enabled, BIOS allows supervisor setting the authority level of the user password.

The authority levels of user password are listed below.

[No Access] : User can not access setup menu.
[View Only]/[Limited] : User can view setup menu but can not change it.
[Full Access] : User can fully access setup menu.

4.2 SYSTEM MEMORY

The system BIOS automatically detects the amount of memory in the system and configure the DRAM timing based on the SPD data of DIMM module and the CMOS settings during the POST (Power-On-Self-Test) process. The memory detection only supports DDR2 (Double Data Rate 2) SDRAM.

The DRAM clock is routed as follows:
DIMM 1 uses SCK0/SCK0#, SCK1/SCK1#, SCK2/SCK2#, CS0/CS1, CKE0/CKE1.
DIMM 2 uses SCK3/SCK3#, SCK4/SCK4#, SCK5/SCK5#, CS2/CS3, CKE2/CKE3.

4.3 LCD BRIGHTNESS CONTROL

During POST, the LCD brightness will be set by BIOS based on the LEVEL INDEX saved in a designated extended CMOS byte. If the CMOS’ checksum is incorrect or the CMOS is loaded with setup default setting, the LEVEL INDEX will be set to 0Fh in the designated CMOS byte for LCD brightness level. Whenever the function hot key Fn+F5 or Fn+F6 is pressed, the brightness level setting should be updated to the designated CMOS byte as well as setting the new brightness level.

In S62 series, there are 16 levels for brightness control. The setting values of these 16 levels are different between AC-powering and DC-powering modes. Table 4.3 shows the brightness level for each stage used by BIOS.

Table 4.3 LCD BRIGHTNESS LEVEL TABLE

	LCD BRIGHTNESS LEVEL															
LEVEL INDEX	00h	01h	02h	03h	04h	05h	06h	07h	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
AC	15h	24h	33h	42h	51h	60h	6Fh	7Fh	8Fh	9Fh	AFh	BFh	CFh	DFh	EFh	FFh
DC	0Fh	1Eh	2Dh	3Ch	4Bh	5Ah	69h	78h	87h	96h	A5h	B4h	C3h	D2h	E1h	F0h

4.4 SUPER I/O

The configuration index/data I/O ports are 2Eh/2Fh. And only Parallel Port function is enabled by BIOS. The Parallel Port Mode can be adjusted in BIOS SETUP MENU during POST. Table 4.4 shows all modes supported by BIOS.

Table 4.4 Parallel Port Mode supported by BIOS

	Parallel Port Mode
1	SPP/Bi-Directional
2	EPP/SPP
3	ECP
4	ECP/EPP

4.5 RESOURCE ALLOCATION

The system resources are allocated as follows at POST.

Table 4-2 System Resource Allocation

Device	Connect Type	Resources			
		I/O	IRQ	DMA	Memory
DMA Controller	Static	00~0F, 81~8F, C0~DF	-	DMA4	-
Interrupt Controller	Static	20~21, A0~A1	-	-	-
System Timer	Static	40~43	IRQ0	-	-
RTC	Static	70~71	IRQ8	-	-
ISA Bus	Static	-	-	-	-
System Speaker	Static	61	-	-	-
System Board	Static	-	-	-	E0000~FFFFF FED14000~FED19FFF
PnP Mother Board	Static	80	-	-	-
Keyboard Controller	Static	60, 62, 64, 66	IRQ1	-	-
Math Coprocessor	Static	F0~FF	IRQ13	-	-
Touch Pad	Static		IRQ12		
IDE Controller	Static	1F0~1F7, 3F6	IRQ14	-	-
USB Host Controller 1	Dynamic	E880~E89F	IRQ23	-	-
USB Host Controller 2	Dynamic	E800~E81F	IRQ19	-	-
USB Host Controller 3	Dynamic	E480~E49F	IRQ18	-	-
USB Host Controller 4	Dynamic	E400~E41F	IRQ16	-	-
USB 2.0 Host Controller	Dynamic		IRQ23	-	FEB3BC00~ FEB3BFFF
High Definition Audio Controller	Dynamic		IRQ16	-	FEB3C000~ FEB3FFFF
SMBus	Static	400~041F	IRQ5		
Video Controller	Static	3B0~3BB, 3C0~3DF D000-D0FF	IRQ16	-	D0000000~ D7FFFFFF FEAF0000~ FEAFFFFF 000A0000~ 000BFFFF
CardBus Controller	Dynamic	3E0~3E1 FE00~FEFF FD00~FDFF	IRQ17	-	FFEFF000~ FFEFFFFF FFEFE000~ FFEFFFFF F9F00000~ FDEFFFFF DF000~DFFFF
1394 Controller	Dynamic		IRQ18		FE8FF800~ FE8FFFFF

LAN Controller	Dynamic	D800~D8FF	IRQ16		FE8FEC00~ FE8FECFF
Wireless (802.11abg)	Static		IRQ17		FDFFF000~ FDFFFFFF
Ricoh MS	Dynamic		IRQ19		FE8FF000~ FE8FF0FF
Ricoh SD	Dynamic		IRQ19		FE8FF400~ FE8FF4FF

Note: The resources of dynamic devices will be changed if users change the settings. The IRQ 9 is reserved for SCI of ACPI O.S.

4.6 POWER MANAGEMENT

In addition to C1, C2/C2E, C3 and C4/C4E states at system full on state, the S62 series platform must also support suspend states described in next two sections.

4.6.1 ACPI-Enabled Environment

Table 4-5 Power Management in ACPI mode

Power State	Entry Event Source	Wake Up Event Source
S3	● Standby Timer Time out ● Select “Standby” in O.S. ● LID switch ● Power button	● PME (onboard LAN, CardBus card) ● High Definition Audio (modem) ● USB (USB devices) ● RTC Alarm ● Internal keystroke ● Power button
S4	● Standby Timer time out ● Select “Hibernate” in O.S. ● LID switch ● Power button	● PME (onboard LAN, AC Only) ● RTC Alarm ● Power button
Soft Off	● Select “Shut Down” in O.S. ● LID switch ● Power button	● RTC Alarm ● Power button ● PME (onboard LAN, AC Only)

Note : LID won’t trigger a wake up.

4.6.2 ACPI 2.0

S62 BIOS is ACPI 2.0 compliance. It supports Windows XP Native Processor Performance Control. In Windows XP, the processor performance control policy is linked to the Power Scheme setting in the standard control panel power options applet. No additional UI is employed to set the policy. Windows XP defines four control policies for processor performance control:

Constant	Always runs at lowest performance state
Adaptive	Performance state chosen based on CPU demand
Degrade	Starts at lowest performance state, then uses linear performance reduction (stop clock throttling) as battery discharges
None	Always runs at highest performance state

The following table shows the relationship between the Power Scheme selected and the control policy used.

Table 4-6 Power Scheme Table

Power Scheme	AC Power	DC Power
Home/office Desk	None	Adaptive
Portable/Laptop	Adaptive	Adaptive
Presentation	Adaptive	Degrade
Always On	None	None
Minimal Power Management	Adaptive	Adaptive
Max Battery	Adaptive	Degrade

Three control methods that are implemented to support Windows XP Native Processor Performance Control.

_PCT Processor performance control object.
_PSS The number of supported processor performance states.
_PPC Number of performance states currently supported by the platform.

4.6.3 Intel Geyserville iii & Enhanced intel speedstep

Geyserville III Technology allows the CPU performance and power consumption levels to be altered while the computer is functioning. It alters the performance of the CPU by changing the bus to core frequency ratio and CPU voltage. This allows the processor to run at different core frequencies and voltages depending upon the system power source(AC or battery in a mobile computer), CPU thermal state, or OS policy. Note that the external bus frequency(processor system bus) is not altered; only the internal core frequency is changed. In order to run at different speeds, the voltage is altered in step with the bus ratio. This works in accordance with voltage reduction technology that allows a given processor to run at higher frequency when a higher voltage is applied. The side result is that power is increased in a roughly cube-law fashion as the performance is altered in this manner.

A software model utilizing Geyserville III is currently referred to as Enhanced Intel SpeedStep Technology. This technology is a software mechanism that involves the fundamental mechanics of Intel SpeedStep Technology and includes demand-based CPU performance. Demand-based CPU performance uses the OS's knowledge of CPU demand to match the performance of the CPU to the workload of the system. As an example, if the highest performance state provided by the CPU is 1600MHz at 18W and the lowest performance state provided by the CPU is 800MHz at 6W, with performance states available at each 100MHz step in between, and the performance required by the system is effectively 1200MHz, a Geyserville III technology system can provide the required 1200MHz of performance without waste any additional power.

4.6.4 Battery management

S62 series supports Lithium-Ion battery pack and a battery calibration menu items in "Power Menu Group" for users to calibrate a battery.

4.7 THERMAL AND FAN CONTROL

The settings of cooling policies are based on the CPU temperature read back from the "Intel Digital Thermal Sensor" which is embedded in CPU and a external thermal sensor ADT7461. All parameters defined in BIOS are showed in Table 4-7.

Table 4-7 FAN Control Mode

FAN Control Mode	EC Linear
FAN STEP Number	N/A

Table 4-8 Parameters for FAN control

Definition	Parameter	Base Temperature	Thermal Monitor Label
EC CPU Shutdown temperature Threshold	110	CPU	EC S/D
OS Critical Shutdown Threshold (_CRT)	105	CPU	OS S/D
OS Passive Cooling Threshild (_PSV)	95	CPU	OS PSV

THRM Throttle On Threshold	95	CPU	THRM_ON
THRM Throttle Off Threshold	90	CPU	THRM_OFF
Fan Failure Temp Point	65	CPU	FANERR
Fan Stop Threshold	50	CPU	FSP
STEP Trip Point 1	55	CPU	TS1
STEP Trip Point 2	60	CPU	TS2
STEP Trip Point 3	65	CPU	TS3
STEP Trip Point 4	70	CPU	TS4
STEP Trip Point 5	75	CPU	TS5
STEP Trip Point 6	80	CPU	TS6
STEP Trip Point 7	85	CPU	TS7
STEP Trip Point 8	90	CPU	TS8
Fan Full Run Threshold	95	CPU	FFP
STEP Trip Pointer 1 Hysteresis Offset	3	CPU	HYS1
STEP Trip Pointer 2 Hysteresis Offset	3	CPU	HYS2
STEP Trip Pointer 3 Hysteresis Offset	3	CPU	HYS3
STEP Trip Pointer 4 Hysteresis Offset	3	CPU	HYS4
STEP Trip Pointer 5 Hysteresis Offset	3	CPU	HYS5
STEP Trip Pointer 6 Hysteresis Offset	3	CPU	HYS6
STEP Trip Pointer 7 Hysteresis Offset	3	CPU	HYS7
STEP Trip Pointer 8 Hysteresis Offset	3	CPU	HYS8
STEP Trip Pointer 1 Duty	73	CPU	DA1
STEP Trip Pointer 2 Duty	95	CPU	DA2
STEP Trip Pointer 3 Duty	117	CPU	DA3
STEP Trip Pointer 4 Duty	139	CPU	DA4
STEP Trip Pointer 5 Duty	161	CPU	DA5
STEP Trip Pointer 6 Duty	183	CPU	DA6
STEP Trip Pointer 7 Duty	205	CPU	DA7
STEP Trip Pointer 8 Duty	227	CPU	DA8
Rising Limit Range 1	6	CPU	Addscl1
Rising Limit Range 2	12	CPU	Addscl2
Rising Limit Range 3	22	CPU	Addscl3
Rising Limit Range 4	24	CPU	Addscl4
Rising Limit Value 1	1	CPU	AddDA1
Rising Limit Value 2	2	CPU	AddDA1
Rising Limit Value 3	4	CPU	AddDA1
Rising Limit Value 4	6	CPU	AddDA1
Falling Limit Range 1	6	CPU	Decscl1
Falling Limit Range 2	12	CPU	Decscl2
Falling Limit Range 3	22	CPU	Decscl3
Falling Limit Range 4	24	CPU	Decscl4
Falling Limit Value 1	1	CPU	DecDA1
Falling Limit Value 2	2	CPU	DecDA2
Falling Limit Value 3	4	CPU	DecDA3
Falling Limit Value 4	6	CPU	DecDA4

4.8 NUMERIC PAD CONTROL

There is a control switch in setup menu item for enabling or disabling numeric pad lock of an internal keyboard.

4.9 TOUCH PAD CONTROL

In ACPI environment, BIOS will notify ATK0100 to enable/disable Touch Pad when the Touch Pad Enable/Disable instant key is pressed.

4.10 HOTKEY USAGE DURING POST

The hot keys used during POST are:

	Hotkey	Description
1	TAB	Switch from “LOGO” screen to “message” screen, i.e. from “silent” mode to “verbose” mode
2	ESC	Pop up “BOOT SELECTION MENU”
3	F1	Load optimum CMOS setting and continue booting process if CMOS checksum is incorrect
4	F2	Enter setup menu

5. GPIO Pin Assignment

The following tables are the definition of GPIO pins. Some of GPIO pins need to be initialized by system BIOS and some of them need the driver to support. Please check the Description column for reference.

Table 5-1. ICH7-M GPIO Definition

GPIO	Type	Name	Usage	Power	Description
0	I	GPIO00/BM_BUSY#	BM_BUSY#	M	Native Function
1	I	GPIO01/REQ5#	REQ5#	M	Native Function
2	I	GPIO02/PIRQE#	PIRQE#	M	Native Function
3	I	GPIO03/PIRQF#	PIRQF#	M	Native Function
4	I	GPIO04/PIRQG#	PIRQG#	M	Native Function
5	I	GPIO05/PIRQH#	PIRQH#	M	Native Function
6	I/O	GPIO06	N/A	M	
7	I	GPIO07	RF_OFF_SW#	M	N/A
8	I	GPIO08	EXTSMI#	R	From KBC, it is to notify system an external SMI occurred.
9	I	GPIO09	SATA_DET#0	R	SATA indicator
10	I/O	GPIO10	N/A	R	
11	I	GPIO11/SMBALERT#	SMBALERT#	R	Native Function
12	I	GPIO12	KBDSCI	R	From KBC, runtime and wake up event will be sent to system through this pin.
13	I	GPIO13	SIO_SMI#	R	Super I/O SMI event
14	I/O	GPIO14	PWRLED_1Hz	R	1Hz On/Off cycle for Power LED
15	I/O	GPIO15	N/A	R	
16	O	GPIO16/GNT6#	GNT6#	M	Native Function
17	O	GPIO17/GNT5#	GNT5#	M	Native Function
18	O	GPIO18/STP_PCI#	STP_PCI#	M	This signal is an output to the external clock generator for it to turn off the PCI clock. Used to support PCI CLKRUN# protocol.
19	I	GPIO19/SATA1GP	SATA1GP	M	N/A
20	O	GPIO20/STP_CPU#	STP_CPU#	M	Output to the external clock generator for it to turn off the CPU clock. Used to support the C3 state.
21	I	GPIO21/SATA0GP	SATA0GP	M	Native Function
22	I	GPIO22/REQ4#	REQ4#	M	Native Function
23	I/O	GPIO23/LDRQ1#	LDRQ1#	M	Native Function
24	O	GPIO24	802_LED_EN#	R	Enable Wireless LED
25	O	GPIO25	CB_SD#	R	Disable CardBus function.
26	I/O	GPIO26		R	
27	O	GPIO27/EL_STATE0	BT_LED_EN#	R	Enable BlueTooth LED
28	I/O	GPIO28/EL_STATE1		R	
29	I	GPIO29/OC#5	OC#5	R	N/A
30	I	GPIO30/OC#6	OC#6	R	N/A
31	I	GPIO31/OC#7	OC#7	R	N/A
32	O	GPIO32/CLKRUN#	PM_CLKRUN#	M	Used to support PCI clock run protocol. Connects to PCI devices that need to request clock re-start, or prevention of clock stopping.
33	O	GPIO33/AZ_DOCK_EN#	BT_ON	M	Turn On/Off BlueTooth
34	O	GPIO34/AZ_DOCK_RST#	WLAN_ON#		Turn On/Off Wireless LAN
35	O	GPIO35/SATACLKREQ#	SATACLKREQ#	M	Native Function
36	I	GPIO36/SATA2GP	SATA2GP	M	Native Function
37	I	GPIO37/SATA3GP	SATA3GP	M	Native Function
38	I	GPIO38	PCB_ID0	M	1st PCB ID pin
39	I	GPIO39	PCB_ID1	M	2nd PCB ID pin
40	N/A	GPIO40	N/A	N/A	N/A

41	N/A	GPIO41	N/A	N/A	N/A
42	N/A	GPIO42	N/A	N/A	N/A
43	N/A	GPIO43	N/A	N/A	N/A
44	N/A	GPIO44	N/A	N/A	N/A
45	N/A	GPIO45	N/A	N/A	N/A
46	N/A	GPIO46	N/A	N/A	N/A
47	N/A	GPIO47	N/A	N/A	N/A
48	O	GPIO48/GNT4#	GNT4#	M	Native Function
49	O	CPUPWRGD	H_PWRGD	M	Processor I/F power well

1. Power field: M -> main power will, R-> resume power well
2. pins in light gray: used as Native Function pins
3. pins in gray: no function

Table 5-2. KBC GPIO Definition

Port	I/O Type	Input Pin Pull-up/down	Name	Output Pin Default Value	Description
A.0	O		BRIGHT_PWM	Low	Used to adjust LCD backlight
A.1			NC		
A.2	O		BAT1_CNT1#	High	BAT1_CNT1# signal to battery
A.3			NC		
A.4	O		CHG_LED_UP#	High	When battery is charging, charging LED will be turned on by this pin
A.5	O		PWR_LED_UP#	High	When system is powered on, power LED will be turned on by this pin
A.6	O		BATSEL_3S#	Low	BATSEL_3S# signal to battery charging circuit
A.7	O		LCD_BACKOFF#	Low	For LCD back light control
B.0	O		NUM_LED	Low	Number Lock Indicator
B.1	O		CAP_LED	Low	CAP Lock Indicator
B.2	O		SCRL_LED	Low	Scroll Lock Indicator
B.3	A		SMCLK_BAT		SMBUS clock pin (to battery)
B.4	A		SMDATA_BAT		SMBUS data pin (to battery)
B.5	O		A20GATE	Low	A20 is gated by this pin from KBC
B.6	O		RCIN#	Low	System reset signal from KBC
B.7	O		THRO_CPU	Low	This pin is used for CPU throttling. To set it high to enable CPU throttling. To set it low to disable CPU throttling.
C.0			NC		
C.1	A		SMB1_CLK		SMBUS1 clock pin (to thermal sensor)
C.2	A		SMB1_DAT		SMBUS1 data pin (to thermal sensor)
C.3	O		EMAIL_LED#	High	Email incoming Indicator
C.4	A		ACIN_OC#		For AC adapter in/out detection
C.5	O		OP_SD#	Low	EC MUTE on/off switch pin
C.6	A		BAT_IN_OC#		For battery in/out detection
C.7			NC		
D.0	I		PM_SUSB#		PM_SUSB signal from ICH7-M
D.1	I		PM_SUSC#		PM_SUSC signal from ICH7-M
D.2	A		PLT_RST#		Platform reset signal from ICH7-M
D.3	O		KB_SCI#	HIGH	SCI pin to notify system at runtime or wake up events from KBC
D.4			NC		
D.5			NC		
D.6	A		FAN0_TACH		FAN0 tachometer
D.7			NC		
E.0	I	Pull-Up	EMAIL#		For Email instant key
E.1	I	Pull-Up	INTERNET#		For Internet instant key
E.2	I	Pull-Up	MARATHON#		For Marathon instant key
E.3	I	Pull-Up	DISTP#		For Padlock instant key
E.4	A		PWRSW#_EC		For Power Button
E.5			NC		
E.6	I		LID_EC#		For LID Event
E.7			NC		
F.0	O		EXT_PS2_CLK	Low	External PS2 clock pin
F.1	O		EXT_PS2_DAT	Low	External PS2 data pin
F.2			NC		
F.3			NC		
F.4	A		TPAD_CLK		Touch Pad clock pin
F.5	A		TPAD_DAT		Touch Pad data pin
F.6	I	Pull-Up	PWRLMT#		For Power Limit function
F.7			NC		

G.0	A		FA16		To FLASH I/F
G.1	A		FA17		To FLASH I/F
G.2	A		FA18		To FLASH I/F
G.3			NC		
G.4	O		THRM_CPU#	Low	THRM_CPU# signal from external thermal sensor
G.5			NC		
G.6	I		PMTHERM#	Low	PMTHERM# signal to ICH7-M
G.7			NC		
H.0	O		VSUS_ON	Low	VSUS_ON signal to power circuit
H.1	I		VSUS_GD#		VSUS_GD# signal from power circuit
H.2	I		IMVPOK#		IMVPOK# signal from power circuit
H.3	O		PM_PWRBTN#	High	PM_PWRBTN# signal to ICH7-M
H.4	O		SUSC_EC#	Low	SUSC_EC# signal to ICH7-M
H.5	O		SUSB_EC#	Low	SUSB_EC# signal to ICH7-M
H.6	O		CPU_VRON	Low	CPU_VRON signal to power circuit
H.7	O		PM_RSMRST#	Low	At boot, KBCRSM needs to be set low for normal operation
I.0	O		ICH_PWROK	Low	ICH_PWROK signal to ICH7-M
I.1	O		VSUS_ON	High	VSUS_ON signal to power circuit
I.2	O		BAT1_CNT2#	Low	BAT1_CNT1# signal to battery
I.3	O		CHG_EN#	High	For Battery Charge function
I.4	O		PRECHG	Low	For Batter PreCharge function
I.5	O		BAT_LL	Low	When the pin is set as low, it represents that battery is in very low capacity.
I.6	O		BAT_LEARN	Low	This pin is used for battery learning (refresh). To set it low for battery charging. To set it high for battery discharging.

1. Name field: NC -> not connected

Table 5-3. Super I/O GPIO Definition

PIN#	GPIO	I/O Type	Name	Activated Level	Description
23	**40**	I	NC	NC	N/A
24	**41**	I	NC	NC	N/A
25	**42**	I	NC	NC	N/A
27	**43**	I	NC	NC	N/A
28	**44**	I	NC	NC	N/A
29	**45**	I	NC	NC	N/A
30	**46**	I	NC	NC	N/A
31	**47**	I	NC	NC	N/A
32	**10**	I	NC	NC	N/A
33	**11**	I	N/A	NC	N/A
34	**12**	O	SIOSMI#	Low	N/A
35	**13**	I	NC	NC	N/A
36	**14**	I	NC	NC	N/A
40	**23**	I	NC	NC	N/A

* : NC -> Not Connected, SI -> Selection ID.

6. Devices

6.0 CPU

The CPU supported by S62 series system is Intel mobile Yonah dual core processor.
The supported frequency is from 1.66GHz to 2.16GHz.

6.1 NORTH BRIDGE (CALISTOGA)

6.1.1 DRB Registers (dram row boundary registers)

The DRAM Row Boundary Register defines the upper boundary address of each pair of DRAM rows with granularity of 128MB. The offset of these registers are 100h~103h. The following is the mapping of the registers.

DRB0(row 0) : 100h
DRB1(row 1) : 101h
DRB2(row 2) : 102h
DRB3(row 3) : 103h

DRB0 = Total memory in row 0 (in 128MB increments)
DRB1 = Total memory in row 0 + row 1 (in 128MB increments)
DRB2 = Total memory in row 0 + row 1+ row 2 (in 128MB increments)
DBR3 = Total memory in row 0 + row 1 + row 2 + row 3 (in 128MB increments)

6.2 SOUTH BRIDGE (ICH7-M)

6.2.1 Hub Interface To PCI Bridge

6.2.1.1 Features

The device allows software to “hide” PCI devices(0~5) in terms of configuration space. Specifically, when PCI devices(0~5) are hidden, the configuration space is not accessible because the PCI IDSEL pin does not assert. The ICH7-M supports the hiding of 7 external devices, which matches the number of PCI request/grant pairs, and the ability to hide the integrated LAN device by masking out the configuration space decode of LAN controller.

6.2.2 LPC Interface Bridge

6.2.2.1 Specific I/O Base Address (PMBASE, GPIOBASE, TCOBASE)

Two specific I/O Base Addresses are defined in this device – PMBase, GPIOBase . PMBase is defined in register 0x40~0x43, also called ACPIBase. The registers offset based on PMBase(ACPIBase) are ACPI2.0 compliance. GPIOBase is defined in register 0x48~0x4B. OS/Utilities can read/write the related I/O registers based on it to control GPIO function, level and interrupt type. Following is the registers setting programmed by BIOS.

PMBase Address : 0*800h*
GPIOBase Address : 0*480h*

6.2.2.2 Interrupt

This section contains some interrupts configuration and relative PCI registers.

6.2.2.2.1 SCI Interrupt

SCI IRQ routing is generally set to **IRQ9**. (Power On Default). The relative register is PCI register 0x44. IRQ Selections are described below.

Bit2:0 : 000 -> IRQ9

001 -> IRQ10
010 -> IRQ11
011 -> Reserved
100 -> IRQ20(Only available if APIC enabled)
101 -> IRQ21(Only available if APIC enabled)
110 -> IRQ22(Only available if APIC enabled)
111 -> IRQ23(Only available if APIC enabled)

6.2.2.2.2 PIRQ[A,C,D,E,F,G,H] Routing Control

PIRQA Routing Control Register 0x60
PIRQB Routing Control Register 0x61
PIRQC Routing Control Register 0x62
PIRQD Routing Control Register 0x63
PIRQE Routing Control Register 0x68
PIRQF Routing Control Register 0x69
PIRQG Routing Control Register 0x6A
PIRQH Routing Control Register 0x6B

The description of bit fields are described below.

Bit7 : IRQEN Interrupt Routing Enable
0 -> The corresponding PIRQ is routed to one of the ISA-compatible interrupts specified in bits[3:0]
1 -> The PIRQ is not routed to the 8259.

Bit6~4 : Reserved

Bit3~0 :

0000 = Reserved,	1000 = Reserved
0001 = Reserved,	1001 = IRQ9
0010 = Reserved,	1010 = IRQ10
0011 = IRQ3,	1011 = IRQ11
0100 = IRQ4,	1100 = IRQ12
0101 = IRQ5,	1101 = Reserved
0110 = IRQ6,	1110 = IRQ14
0111 = IRQ7,	1111 = IRQ15

Currently BIOS setting is described below (Legacy Mode),

Table 6-1 IRQ Configuration Table

PIN	IRQ	PIN	IRQ
A	11	**E**	Disabled
B	5	**F**	Disabled
C	6	**G**	Disabled
D	4	**H**	3

6.2.2.3 DMA Configuration

The ICH7-M supports two types of DMA: LPC and PC/PCI. DMA via LPC is similar to ISA DMA. LPC DMA and PC/PCI DMA use the ICH7-M's DMA Controller.

S62 series uses LPC DMA I/F for Parallel Port because LPC LN47N217 Super I/O is used to support those functions.

Table 6-3 DMA Resource Allocation

Channel	Allocation	Channel	Allocation
0	Reserved	**4**	Cascade
1	Reserved	**5**	Reserved
2	Reserved	**6**	Reserved
3	ECP	**7**	Reserved

6.2.3 IDE Controller

6.2.3.1 Function and Feature

The ICH7-M IDE controller features two sets of interface signals(Primary and Secondary) that can be independently enabled, tri-stated or driven low.

The ICH7-M IDE controller supports both legacy mode and native mode IDE interface. In native mode, the IDE controller is a fully PCI compliant software interface and does not use any legacy I/O or interrupt resources.

The IDE interface of the ICH7-M can support several types of data transfers:

PIO(Programmed I/O) : CPU is in control of the data transfer.

DMA : DMA protocol that resembles the DMA on the ISA bus, although it does not use the 8237 in the ICH7-M. This protocol offloads the CPU from moving data. This allows higher transfer rate of up to 16MB/s.

Ultra DMA/33 : DMA protocol that redefines signals on the IDE cable to allow both host and target throttling of data and transfer rates of up to 33MB/s.

Ultra DMA/66 : DMA protocol that redefines signals on the IDE cable to allow both host and target throttling of data and transfer rates of up to 66 MB/s.

Ultra DMA/100 : DMA protocol that redefines signals on the IDE cable to allow both host and target throttling of data and transfer rates of up to 100 MB/s.

6.2.4 Audio

S62 series uses the internal High Definition Audio Host Controller of ICH7-M.

6.2.5 USB 2.0 (EHCI)

6.2.5.1 Overview

The ICH7-M contains an Enhanced Host Controller Interface(EHCI) compliant host controller which supports up to 8 USB 2.0 specification compliant root ports. USB 2.0 allows data transfer rate up to 480Mbps using the same pins as the 8 USB 1.1 ports. The ICH7-M contains port-routing logic that determines whether a USB port is controlled by one of the UHCI controllers or by the EHCI controller. USB2.0 based Debug Port is also implemented in the ICH7-M.

6.2.5.2 – Device Connects operation mode

1. Configure Flag = 0 and an USB 1.1-Only Device is connected.
   - In this case, the USB 1.1 Controller is the owner of the port both before and after the connection occurred. The EHC never sees the connection occurred. The UHCI driver handles the connection and initialization process.
2. Configure Flag = 0 and an USB 2.0-Capable Device is connected.
   - In this case, the USB 1.1 Controller is the owner of the port both before and after the connection occurred. The EHC never sees the connection occurred. The UHCI driver handles the connection and initialization process. Since the USB 1.1 Controller does not perform the high-speed chirp handshake, the device operates in compatible.
3. Configure Flag = 1 and an USB 1.1-only Device is connected.
   - In this case, the USB 2.0 controller is the owner of the port before the connection occurred. The EHCI driver handles the connection and performs the port reset. After the reset process completes, the EHC hardware has cleared(not set) the Port Enable bit in the EHC's PORTSC register. The EHCI driver then writes a 1 to the Port Owner bit in the

same register, causing the USB 1.1 controller to see a connect event and the EHC to see an 'electrical' disconnect event. The UHCI driver and hardware handle the connection and initialization process from that point on. The EHCI driver and hardware handle the perceived disconnect.

4. Configure Flag = 1 and an USB 2.0-capable Device is connected
   - In this case, the USB 2.0 Controller is the owner of the port before, and remains the owner after, the connection occurred. The EHCI driver handles the connection and performs the port reset. After the reset process completes, the EHC hardware has set the Port Enable bit in the EHC's PORTSC register. The port is functional at this point. The USB 1.1 Controller continues to see an unconnected port.

6.2.5.3 – Device Disconnects operation mode

1. Configure Flag = 0 and the device is disconnected
   - In this case, the USB 1.1 Controller is the owner of the port both before and after the disconnection occurred. The EHC never sees a device attached. The UHCI driver handles disconnection process.
2. Configure Flag = 1 and a USB 1.1-capable Device is disconnected.
   - In this case, the USB 1.1 Controller is the owner of the port before the disconnection occurred. The disconnection is reported by the USB 1.1 Controller and serviced by the associated UHCI driver. The port-routing logic in the EHC cluster forces the port owner bit to 0, indicating that the EHC owns the unconnected port.
3. Configure Flag = 1 and an USB 2.0-capable Device is disconnected.
   - In this case, the USB 2.0 Controller is the owner of the port before, and remains the owner after, the disconnection occurs. The EHCI hardware and driver handle the disconnection process. The USB 1.1 Controller never sees a device attached.

6.3 – SMBUS CONTROLLER

6.3.1 – Devices on SMBUS

On S62 series platform, totally there are 3 devices connected to ICH7-M SMBUS. They are Clock Generator ICS954310, SODIMM0 and SODIMM1. The slave addresses used by each device are listed in Table 6-5.

Table 6-5 SMBus Devices Slave Address

SMBus Device	Slave Address
Clock Generator – ICS954310	D2h
SODIMM0 – SA2,SA1,SA0 (0,0,0)	A0h
SODIMM1 – SA2,SA1,SA0 (0,0,1)	A2h

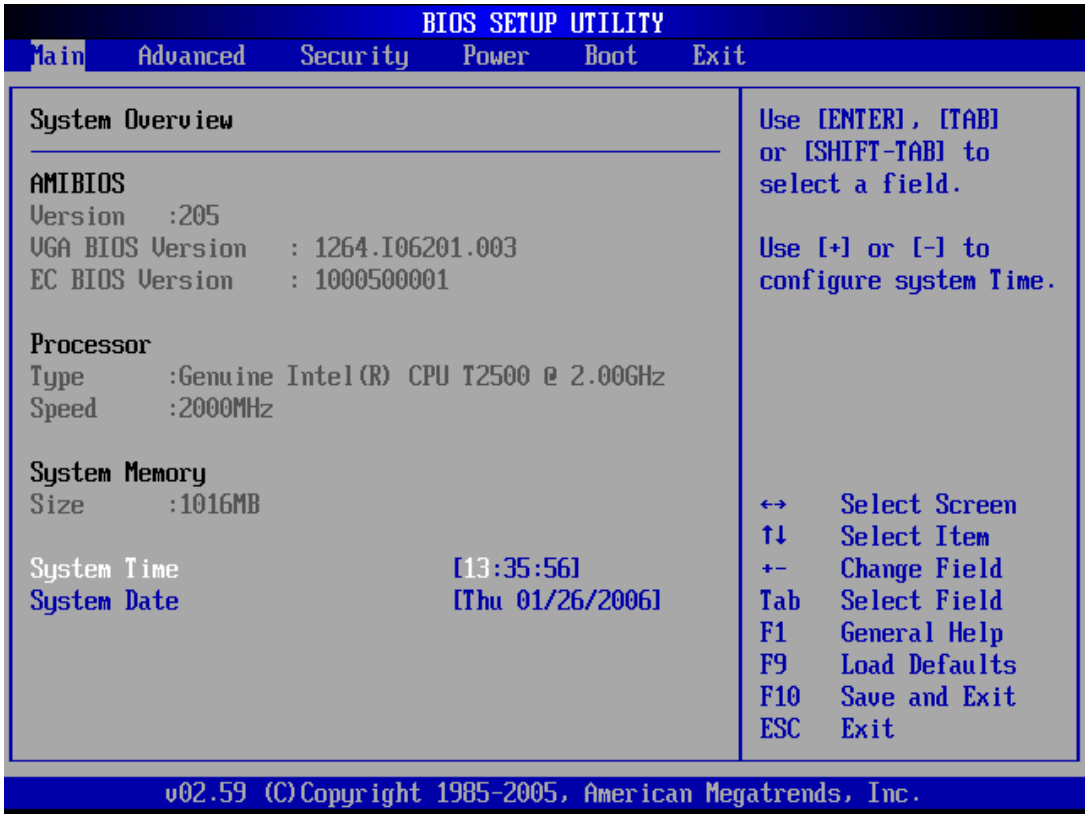
7. CMOS Setup Utility

S62 series system BIOS allows users to change some system hardware/function settings during POST (power on self test) stage, users may hit F2 key to enter SETUP mode in POST, the setup feature is categorized into 7 menus described as below:

7.1 MAIN MENU

7.1.1 Main menu:

Main menu describes system overall information with some user changeable setting, it contains below items:



AMI BIOS:

1. **Version:**[xxxx.xxx] -> Current system BIOS version
2. **VGA BIOS Version:**[xxxx.xxxxxx.xxx] -> Current VGA BIOS version
3. **EC BIOS Version:**[xxxxxxxxxx] -> Current EC BIOS version

Processor

1. **Type:** Current CPU model name
2. **Speed:** Current CPU speed

System Memory

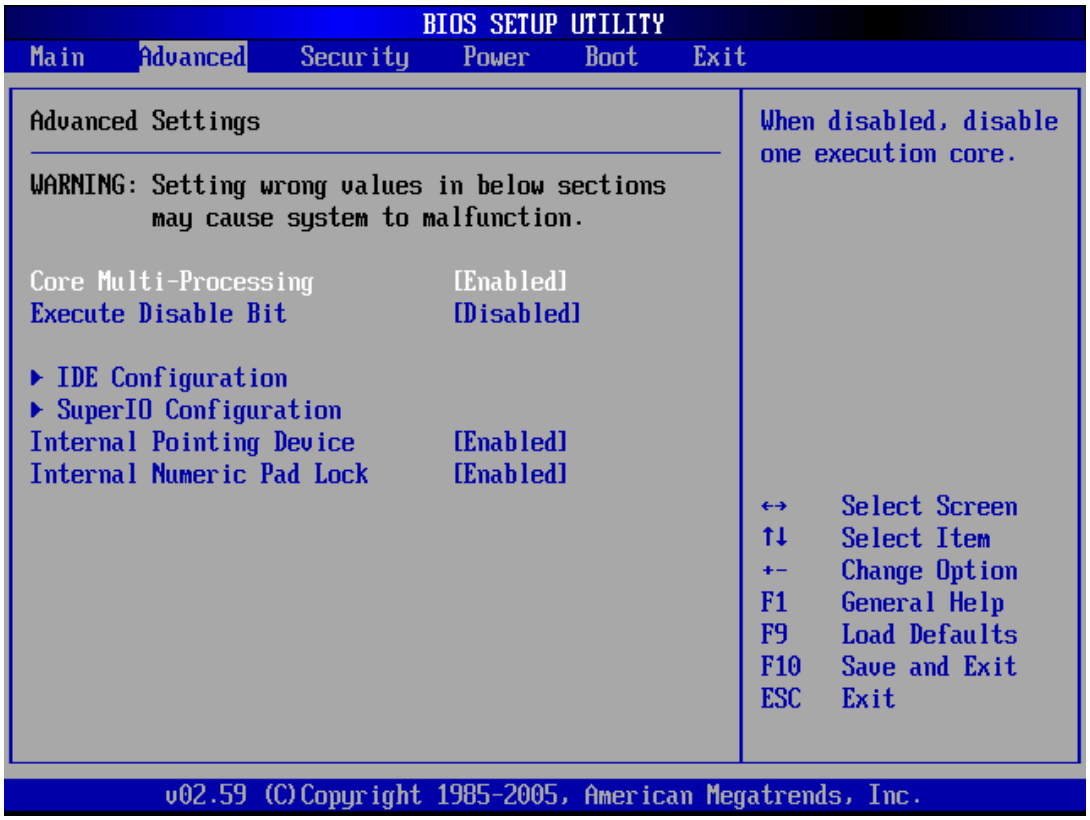
1. **Size:** The installed memory size

System Time:[HH/MM/SS] -> Current time
System Date:[X MM/DD/YYYY] -> Current date

带格式的: 项目符号和编号

7.2 ADVANCED MENU:

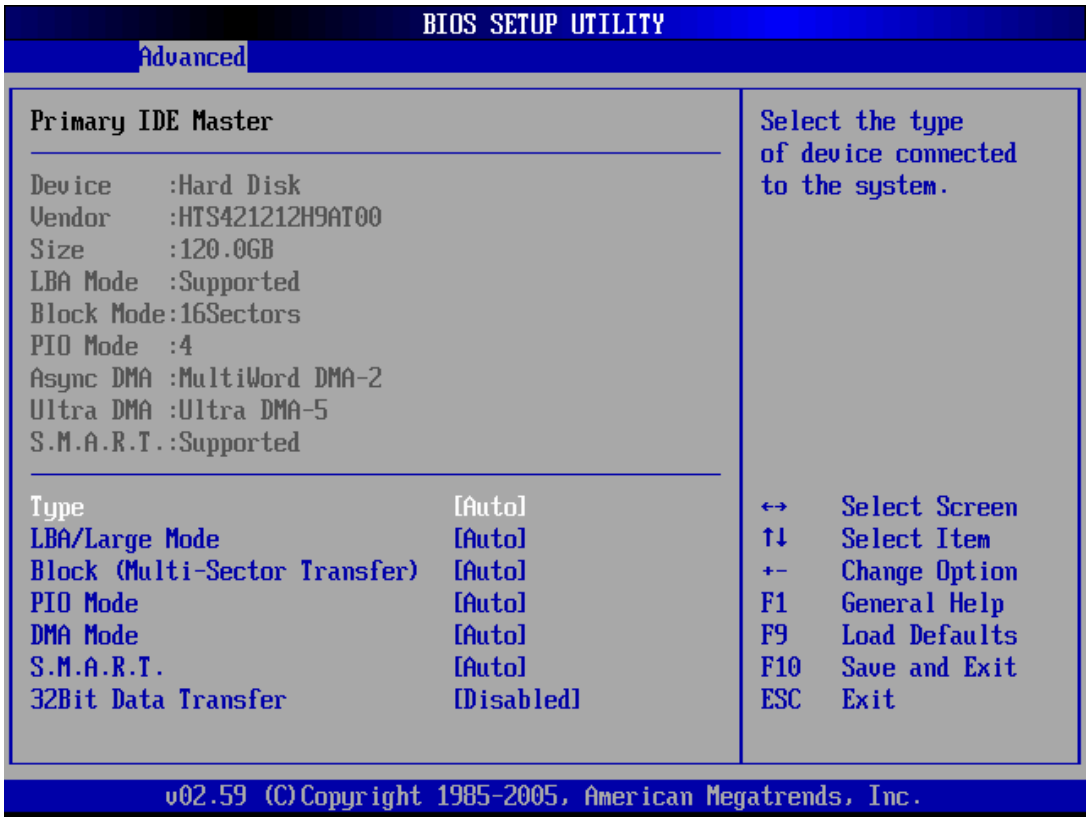
In advanced menu, users can configure I/O device resource such as I/O base, interrupt vector or DMA(Direct Memory Access) channel, some auxiliary settings may be changed as well. Detailed I/O device settings are described below:



Core Multi-Processing:[Enable] -> enable/disable dual core function
Execute Disable Bit:[Enable] -> enable/disable “Execute Disable” function
IDE configuration: See 7.2.1
Super I/O configuration: See 7.2.2
Internal pointing device:[Enable] -> enable/disable TouchPad function
Internal Numeric Pad Lock[Enable] -> enable/disable “Number Lock” function

7.2.1 IDE Configuration:

7.2.1.1 Primary Master/Slave IDE

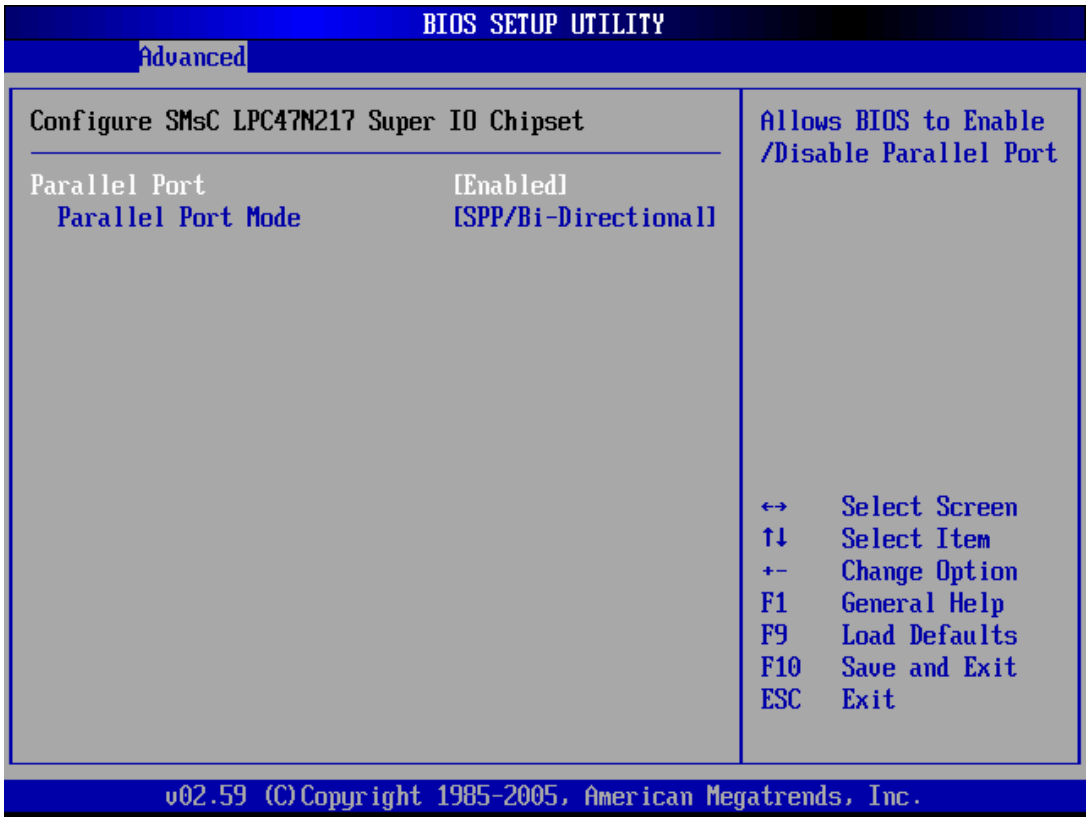


At system boot, the Intel Ultra ATA Storage Driver configures each ATA/ATAPI device to transfer data at particular transfer modes. These transfer modes are defined by ATA standards, and are either Programmed I/O (PIO) or Direct Memory Access (DMA or UltraDMA) type transfers. The Intel Ultra ATA Storage Driver usually configures devices for their fastest capable transfer modes; however, there may be times when a different (perhaps slower) transfer mode is appropriate for a particular device or system configuration.

For hard disks and CD-ROM drives, BIOS can detect them automatically. Users may enter the selected(highlighted) item to get more detailed information. The “Type” field can be set by users to force BIOS to apply different setting on the devices when it detects them. There are four types provided by BIOS for users. Detailed description for each type is described below

[Not Installed]: Disabled current device
[Auto]: To use BIOS default setting
[CD/DVD]: Apply CD/DVD setting on the device
[ARMD]: Apply ARMD setting on the device

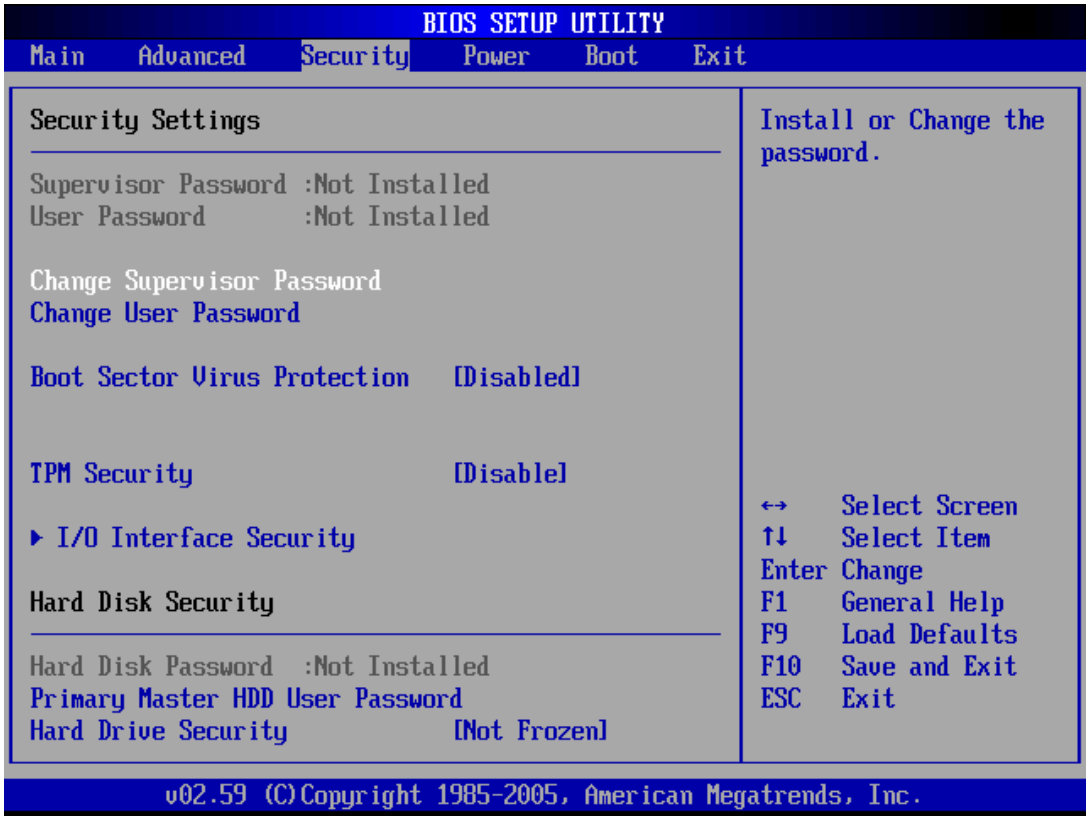
7.2.2 SuperIO Configuration:



Users can enable/disable Parallel port function and set Parallel Port mode in this page. The Parallel Port modes supported by this system are listed below.

1. **SPP/Bi-Directional**
2. **EPP/SPP**
3. **ECP**
4. **ECP/EPP**

7.3 SECURITY MENU:



BIOS supports two levels of password for security protection:

Supervisor password:

Users may set, change or erase system password, the password data is saved in non-volatile device (CMOS), system password check is done during POST(Power On Self Test). The BIOS will prompt a dialog message to ask user for password check when:

The system has password stored, and “Password on boot” setting in BIOS SETUP is enabled.

If password verification fails for 3 times, the system BIOS will halt the machine to inhibit users from operating.

User Password

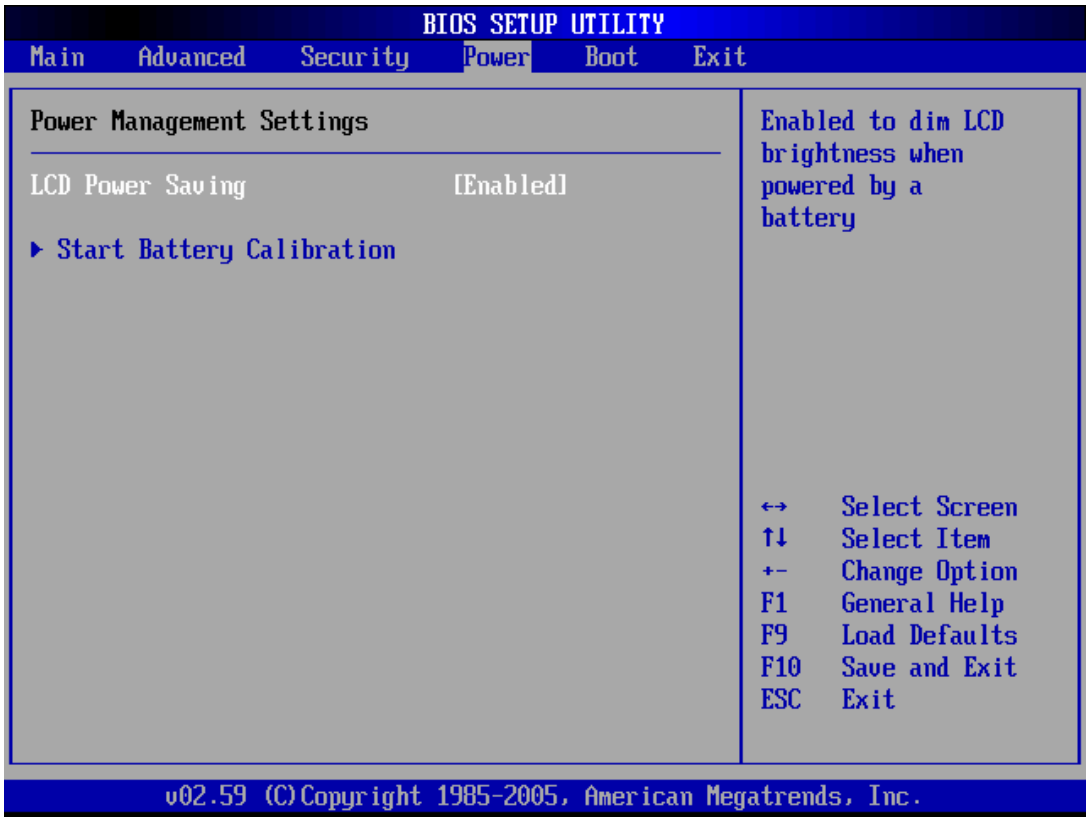
If your setting of BIOS have been modified by other, You can setting the function [Enable], and key in your password and confirm, Don’t modify BIOS setting if no password.

Hard disk password:

Users may set, change or erase hard disk password, the password data is stored in the drive itself, the BIOS prompts a dialog message for hard disk password verification whenever it finds the hard disk locked in POST.

If hard disk password verification fails for 3 times, the system BIOS will halt the machine to inhibit users from operating.

7.4 POWER MENU:



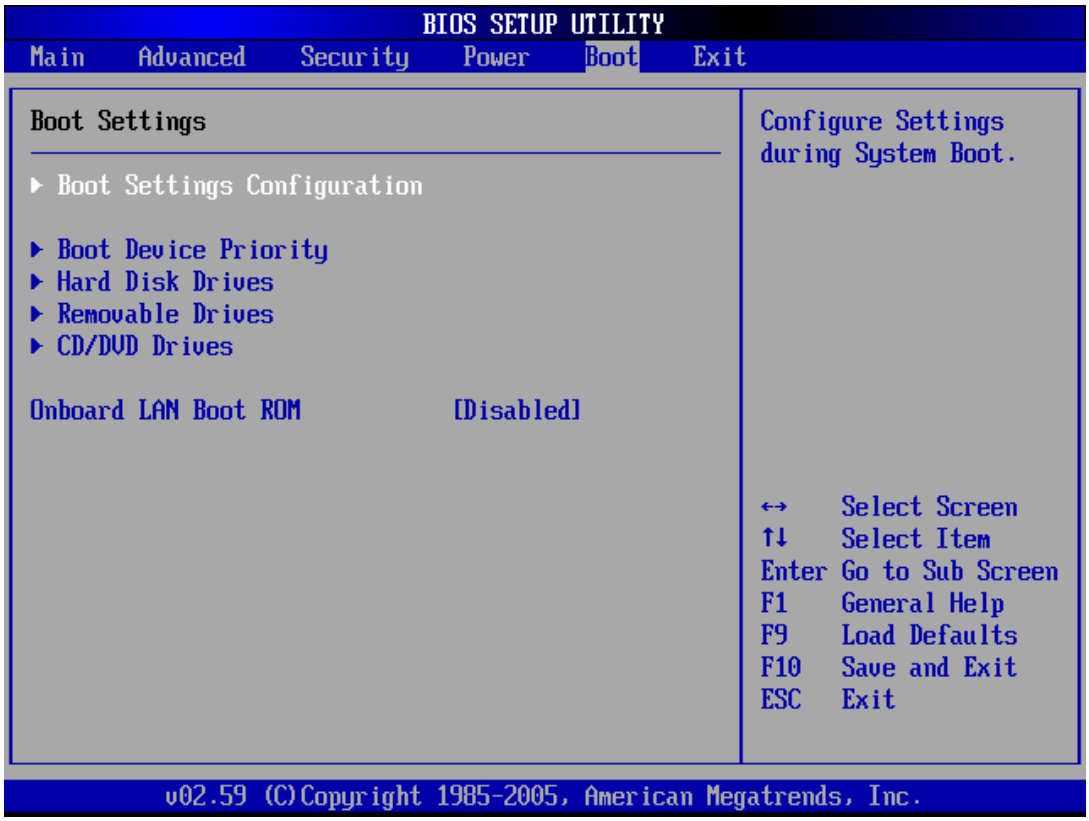
LCD Power Saving:

LCD exhausts the most part of power while the system is operating. S1A notebook system BIOS support auto backlight saving mode. When the system BIOS detects AC adapter removal, the LCD brightness is tuned down to 80% of its original setting, and back to normal when AC adapter is back inserted.

Battery Calibration:

After long time incomplete charge/discharge cycles, the battery meter becomes less and less accurate (the total power capacity is not significantly affected, however). Battery gauge needs to "*learn*", this item helps users to recalibrate the battery gauge.In the learning process, users need to follow system BIOS instruction to insert/remove the AC adapter so that a complete reset and learning cycle may start.

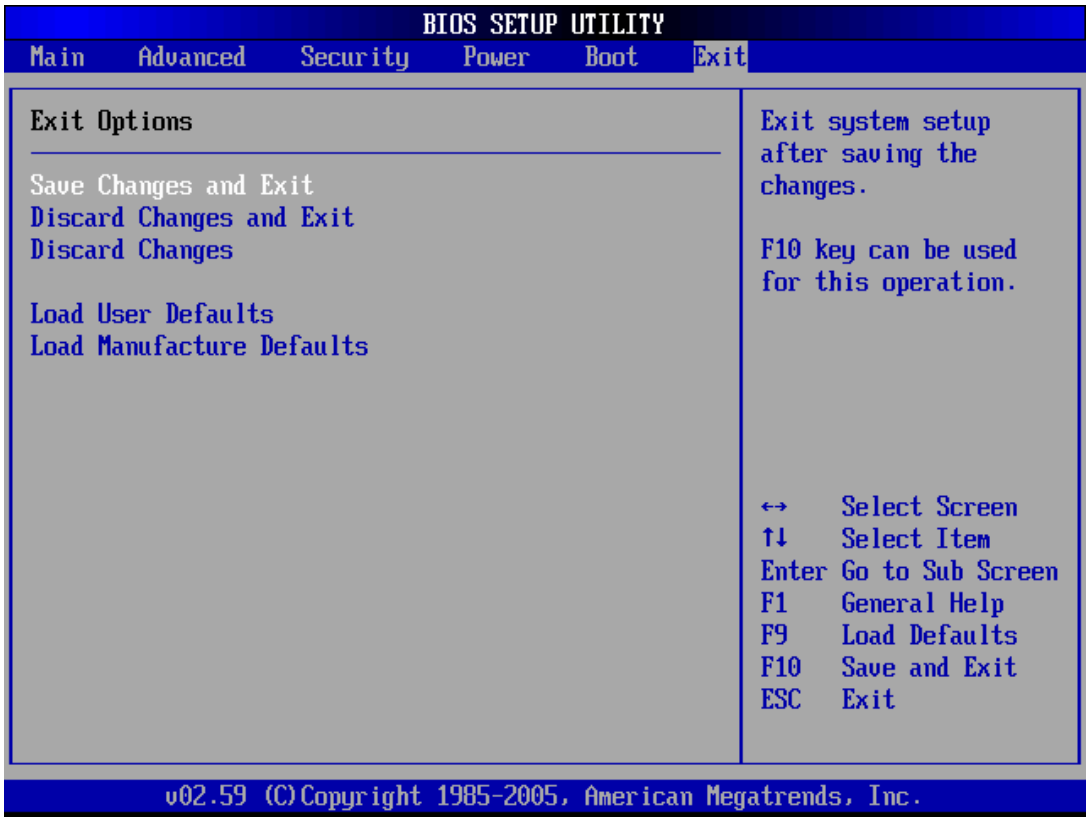
7.5 BOOT MENU:



In this menu users can decide the boot sequence, as long as the device with highest boot priority exists, system BIOS will boot from it, device boot priority is adjusted by pressing "+","-" or space key on the selected (highlighted) item. 3 bootable devices for S62 series system are listed in this menu (BIOS default boot sequence):

Removable Device: ← Legacy floppy/USB disk
Hard Disk Drives: ← Hard Disk
CD/DVD Driver: ← CD-ROM

7.6 EXIT MENU:



Exit BIOS setup, users may make final decision if they want to save the change just made, or load BIOS default setting, lists are:

Save changes and Exit
Discard changes and Exit
Discard changes
Load optimal Defaults
Load manufacture Defaults

8. BIOS Flash Utility

There are two utilities for updating S62 series BIOS. One is DOS mode utility and the other is Windows mode utility. The detailed information is in Table 8-1.

Table 8-1: BIOS Flash Utilities

Utility Name	Supported OS	Revision
Aflash2	DOS	2.10 and later
Winflash	Windows	2.18 and later

9. Embedded Controller (EC)

9.1 HOTKEYS

S62 series supported Fn+Hotkeys are listed in following table.

Table 9-1 Fn+Hotkey Table

	Fn+ Hotkey	Legacy	ACPI	Description
Function Hotkey	Fn+F1	N/A	SCI	Standby In ACPI OS, user needs to set sleep button behavior to “Standby” in property of Power Option.
	Fn+F2	N/A	SCI	Wireless console(WLAN RF status will be kept on next boot.)
	Fn+F3	N/A	N/A	Not used
	Fn+F4	N/A	SCI	Hibernation In ACPI OS, user can set power button behavior to “Hibernation” in property of Power Option.
	Fn+F5	SMI	SCI	Brightness Down (brightness level will be kept on next boot.)
	Fn+F6	SMI	SCI	Brightness Up (brightness level will be kept on next boot.)
	Fn+F7	SMI	SCI	LCD OFF
	Fn+F8	SMI	SCI	LCD/CRT/TV switch
	Fn+F9	N/A	N/A	Not used
	Fn+F10	SMI	SCI	Sound mute
	Fn+F11	SMI	SCI	Volume Down (sound level will be kept on next boot.)
	Fn+F12	SMI	SCI	Volume Up (sound level will be kept on next boot.)

9.2 INSTANT KEYS

Functions of Instant Keys support are listed below. Instant Keys only work in ACPI OS and the ATK driver has to be installed before using instant keys.

Table 9-2 Instant Key Table

Instant Key	ACPI	Description
Power4 Gear	SCI	Power4 Gear Key
Internet	SCI	Internet Key
Email	SCI	Email Key
Touch Pad Lock	SCI	Touch Pad Enable/Disable key

9.3 HOTKEY/INSTANT KEYS FUNCTIONS

9.3.1 Display-Switching Function Hotkey

When pressing Fn+F8 combination hotkey, it will switch display devices in the following sequence in Windows OS

LCD->CRT->LCD+CRT->TV->LCD+TV->CRT+TV->LCD

9.3.2 Internet Key

When pressing Internet instant key, BIOS will notify ATK to launch Internet browser application.

9.3.3 Email Key

When pressing Email instant key, BIOS will notify ATK to launch email application.

9.3.5 Touch Pad Enable/Disable Key

When pressing Touch Pad Enable/Disable instant key, BIOS will notify ATK to enable/disable Touch Pad.

9.3.4 Power4 Gear Key

When pressing Power4 Gear instant key, BIOS will notify ATK to switch system power scheme.