

Hardware Functional Overview

4.1 Overview

The A440 is an IBM PC/AT compatible notebook PC which supports the Socket 370 processor family. The following are the major features that A440 supports.

Microsoft PC99 and ACPI logo approves.

Offers 1024x768 high resolution LCD display with 12.1", 13.3" & 14.1" panel.

Supports the powerful & flexible Power Management modes.

Support PCI 2.1

Support AGP 2.0

Support ACPI 1.0.

Support SMBios 2.3

Support 66/100 MHz CPU Front Side Bus.

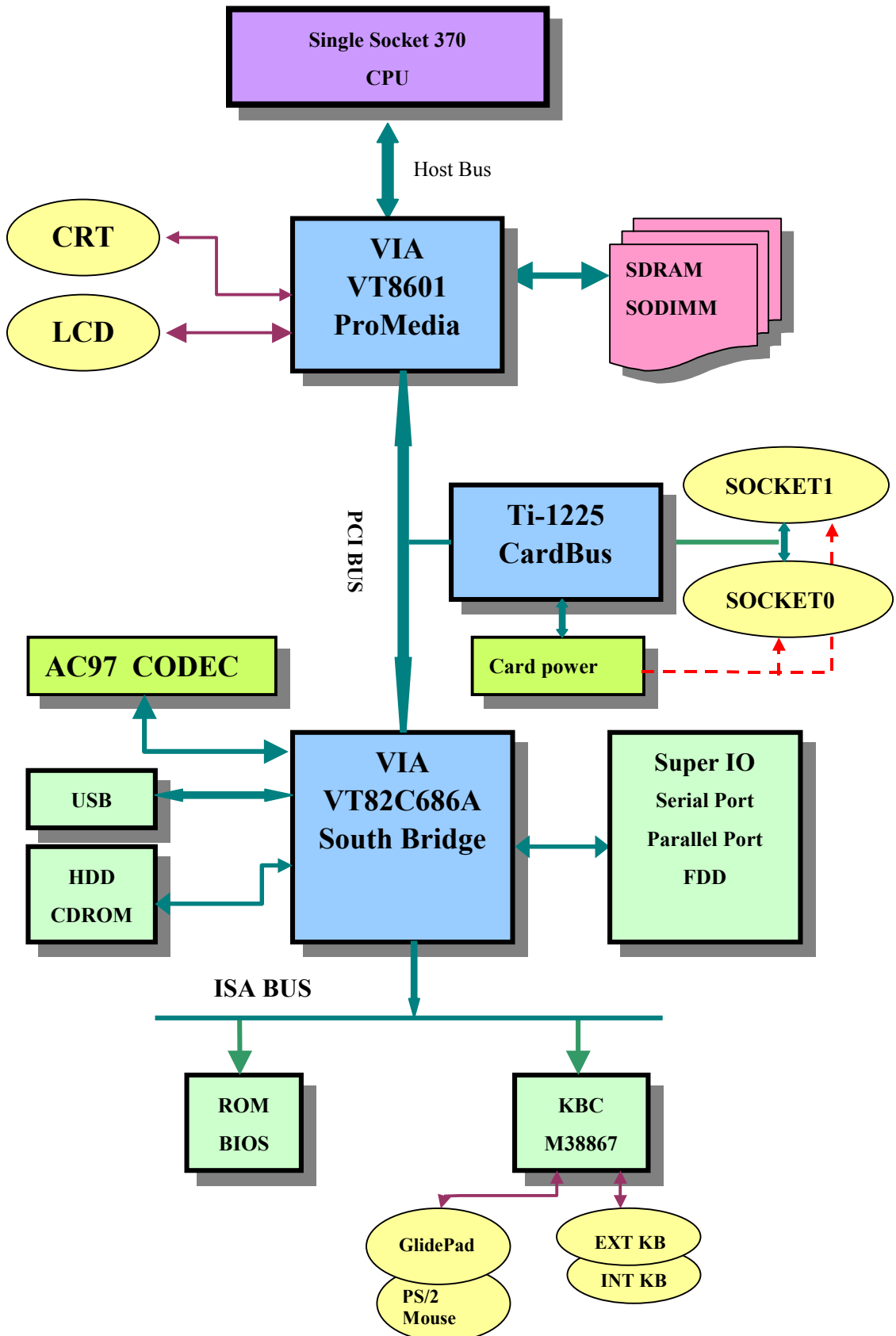
Support a proprietary Port Replicator.

4.2 Summary of H/W Related Spec.

This section describes about the key component list that using on A440 machine and it's related marketing specification.

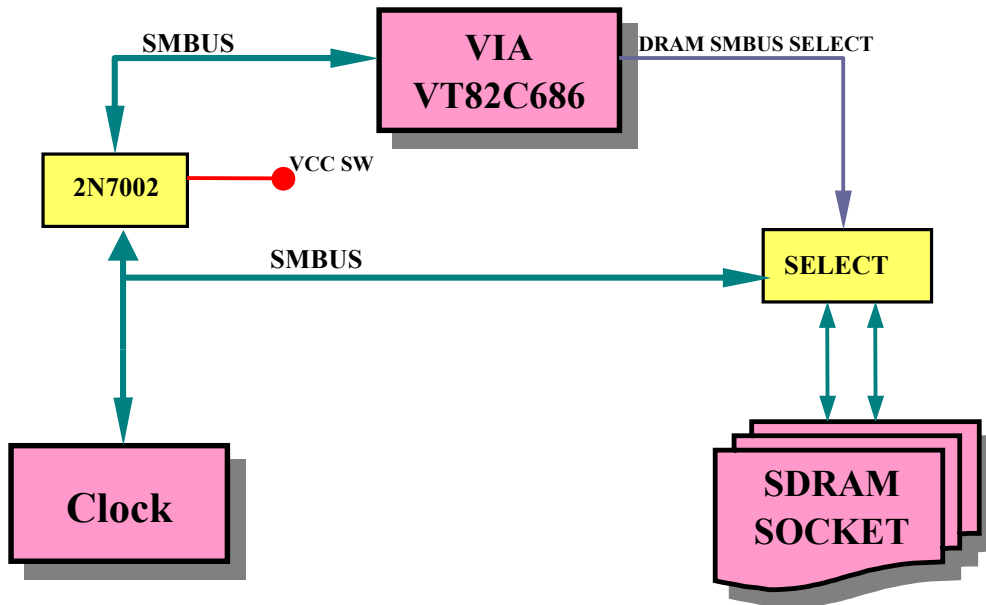
Hardware Functional Overview

Main components block diagram:

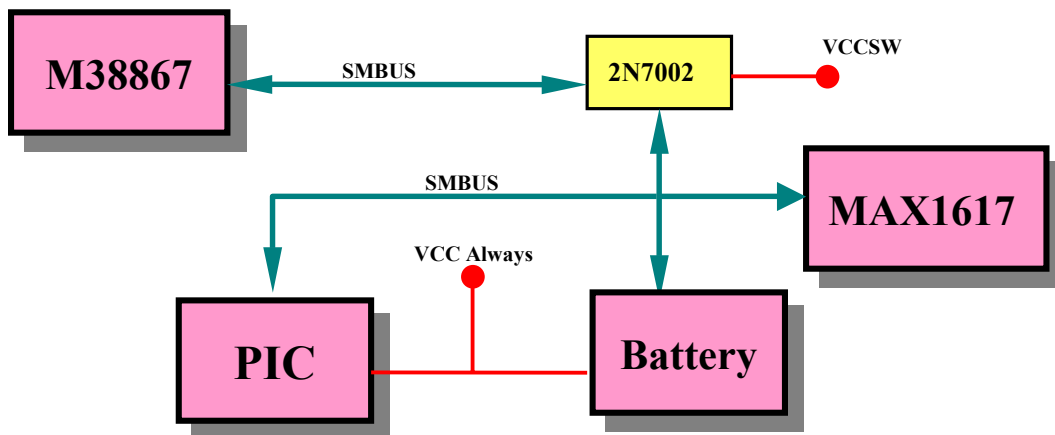


Hardware Functional Overview

System SMBUS block diagram:



Battery SMBUS block diagram:



Hardware Functional Overview

4.2.1 H/W Key ChipSet List

Controller Chip	Vender	Description
Processor	Intel	Pentium III 650- 850 Mhz Celeron 500 – 667 Mhz
North Bridge	VIA	ProMedia VT8601
South Bridge	VIA	ProMedia VT82C686A
VGA Controller	Trident	Trident 8400 North Bridge Integrated
PCMCIA Controller	Ti	Ti –1225
Supper I/O Controller	VIA	South Bridge Integrated
Audio Codec	WM	WM9701A(AC97 1.03) /WM9703(AC97 2.1)
Audio Amplifier	TI	TPA0102
Keyboard Controller	Mitsubishi	M38867
PMU Controller	MicroChip	PIC-16C62 B (SSOP)
ROM BIOS	Winbond	W29C040P
Clock Generator	IC Work	W156
Temperature Sensor	VIA	South Bridge embeded
LVDS		THC63LVDM63A
MODEM	Lucent	PCI bus S/W Modem Lucent Mars3
LAN	INTEL	Intel 82559

Hardware Functional Overview

4.3 Summary Of BIOS Spec.

Controller Chip	Description
BIOS Feature	<ul style="list-style-type: none"> ▪ Boot Block / Crisis Rescue ▪ APM 1.2 Compliance ▪ Support PCI 2.1 Spec ▪ Support Win98, Win2000. ▪ Support flash function for new BIOS update ▪ Support 3 Mode FDD ▪ Support DMI 2.0 spec. (SMBIOS 2.3) ▪ Support ACPI 1.0 spec. ▪ Support AGP 2.0. ▪ Support maximal 4 different keyboards on same bios.
CPU	Auto detect the CPU type and speed for the Socket 370 or Slot 1 based system
DRAM	Auto sizing and detection. Support PC-100 SDRAM.
Cache	<ul style="list-style-type: none"> ▪ Level 2 Sync/Async PBRAM auto sizing and detection ▪ Always enable CPU L1 and external L2 cache.
Shadow	Always enable VGA and System BIOS shadow
Display	<ul style="list-style-type: none"> ▪ System auto detects LCD or CRT presence on boot and lid closed. ▪ Support Panning while LCD in a display resolution greater than supported ▪ Support Microsoft Direct 3D
Hard Disk	<ul style="list-style-type: none"> ▪ Enhanced IDE spec. ▪ Support auto IDE detection. ▪ Support LBA mode for larger capacity HDD. ▪ Support 32-bit PIO transfer. ▪ Support Multi-sector transfer. ▪ Support Fast PIO mode 1-4 transfer. ▪ Support Ultra DMA 33.
Multi Boot	Allow the user to select boot from FDD, HDD, CD-ROM
Plug and Play	Support PnP Run Time Service and conflict-free allocation of resource during POST
Smart Battery	Support BIOS interface to pass battery information to the application via SMBus.
Keyboard Controller	Support Fn hot keys, two Windows hot keys, built-in Glide Pad and external PS/2 mouse/keyboard
PCMCIA	Compliant with PCMCIA 2.1 specification.
Port Replicator	I/O port replicator duplicates the following ports <ul style="list-style-type: none"> ▪ Video port ▪ Printer port ▪ COM1 port ▪ PS/2 Mouse & Standard Keyboard port ▪ USB Port ▪ DC In Jack
Pointing stick	The pointing stick device is the small red knob (it looks lie a pencil eraser) that sits just below the [G] and [H] keys of your keyboard. This pressure-sensitive device translates the pressure of your fingertip on the knob into movement of the cursor. Shift the pressure of your fingertip slightly in the direction in which you want to move the

Hardware Functional Overview

	cursor. The two switches below the touchpad serve as the left and right mouse buttons and can be used with either the pointing stick or the touchpad.
Power Management Support	<p>The power management is compliant with APM 1.2 specification and supports the following power state:</p> <ul style="list-style-type: none">▪ On Mode▪ Doze Mode (This mode is transparent to user)▪ Suspend to RAM (STR) Mode▪ Suspend to Disk (STD) Mode▪ Off Mode (Also support Soft-Off Mode, SOff)

Hardware Functional Overview

4.4 System

4.4.1 System Memory

The system main memory consists of SDRAM on 64-bit bus. The memory size options range from 32/64/128 MB upward. The BIOS will automatically detect the amount of memory in the system and configure CMOS accordingly during the POST (Power-On-Self-Test) process. This must be done in a way that requires no user interaction.

DRAM Combination Configuration

Base SO-DIMM DRAM slot (Bank 0&1)	Expansion SO-DIMM DRAM slot (Bank 2&3)	Total Size
32MB	NIL	32MB
32MB	32MB	64MB
32MB	64MB	96MB
32MB	128MB	160MB
64MB	NIL	64MB
64MB	32MB	96MB
64MB	64MB	128MB
64MB	128MB	192MB
128MB	NIL	128MB
128MB	32MB	160MB
128MB	64MB	192MB
128MB	128MB	256MB
NIL	32MB	32MB
NIL	64MB	64MB
NIL	128MB	128MB

4.4.2 Video

The Video subsystem used share memory of Video memory. The system will support the ZV port, simultaneous display, monitor sense for auto display on boot and VESA Super VGA function call.

Supported Video Mode

The following is all the display modes supported by the Trident 8400 in CRT only, panel only and simultaneous mode. The VGA BIOS will allow mode sets of resolutions greater than the panel size but only show as much mode display as will fit on the panel.

Hardware Functional Overview

Supported standard VGA modes:

Mode	Pixel Resolution	Colors	Dot Clock	Horiz.Freq.	Vert. Freq.
0, 1	320*400	16	27.175 Mhz	31.5 Khz	70 Hz
0*, 1*	320*350	16	25.175 Mhz	21.85 Khz	60 Hz
0+, 1+	360*400	16	28.322 Mhz	31.5 Khz	70 Hz
2, 3	640*200	16	25.175 Mhz	31.5 Khz	70 Hz
2*, 3*	640*350	16	25.175 Mhz	21.85 Khz	60 Hz
2+, 3+	720*400	16	28.322 Mhz	31.5 Khz	70 Hz
4, 5	320*200	4	25.175 Mhz	31.5 Khz	70 Hz
6	640*200	2	25.175 Mhz	31.5 Khz	70 Hz
7	720*400	Mono	28.322 Mhz	31.5 Khz	70 Hz
D	320*200	16	25.175 Mhz	31.5 Khz	70 Hz
E	640*200	16	25.175 Mhz	31.5 Khz	70 Hz
F	640*350	Mono	25.175 Mhz	31.5 Khz	70 Hz
10	640*350	16	25.175 Mhz	31.5 Khz	70 Hz
11	640*480	2	25.175 Mhz	31.5 Khz	60 Hz
12	640*480	16	25.175 Mhz	31.5 Khz	60 Hz
13	320*200	256	25.175 Mhz	31.5 Khz	70 Hz

Supported extended video modes:

VESA Mode	Pixel Resolution	Colors	Dot Clock	Horiz.Freq.	Vert. Freq.
100	640*400	256	25.175 Mhz	31.5 Khz	70 Hz
101	640*480	256	25.175 Mhz 31.5 Mhz 36.0 Mhz	31.5 Khz 37.5 Khz 43.3 Khz	60 Hz 75 Hz 85 Hz
103	800*600	256	40.0 Mhz 49.5 Mhz 56.25 Mhz	37.8 Khz 46.9 Khz 53.7 Khz	60 Hz 75 Hz 85 Hz
105	1024*768	256	65.0 Mhz 75.359 Mhz 78.75 Mhz	48.3 Khz 56.746 Khz 60.0 Khz	60 Hz 75 Hz 85 Hz
10D	320*200	32K	25.175 Mhz	31.5 Khz	70 Hz
10E	320*200	64K	25.175 Mhz	31.5 Khz	70 Hz
110	640*480	32K	25.175 Mhz 31.5 Mhz 36.0 Mhz	31.5 Khz 37.5 Khz 43.3 Khz	60 Hz 75 Hz 85 Hz
111	640*480	64K	25.175 Mhz 31.5 Mhz 36.0 Mhz	31.5 Khz 37.5 Khz 43.3 Khz	60 Hz 75 Hz 85 Hz
112	640*480	16M	25.175 Mhz 31.5 Mhz 36.0 Mhz	31.5 Khz 37.5 Khz 43.3 Khz	60 Hz 75 Hz 85 Hz
113	800*600	32K	40.0 Mhz 49.5 Mhz 56.25 Mhz	37.8 Khz 46.9 Khz 53.7 Khz	60 Hz 75 Hz 85 Hz
114	800*600	64K	40.0 Mhz 49.5 Mhz 56.25 Mhz	37.8 Khz 46.9 Khz 53.7 Khz	60 Hz 75 Hz 85 Hz
115	800*600	16M	40.0 Mhz 49.5 Mhz 56.25 Mhz	37.8 Khz 46.9 Khz 53.7 Khz	60 Hz 75 Hz 85 Hz
116	1024*768	32K	65.0 Mhz	48.3 Khz	60 Hz

Hardware Functional Overview

			75.359 Mhz 78.75 Mhz	56.746 Khz 60.0 Khz	75 Hz 85 Hz
117	1024*768	64K	65.0 Mhz 75.359 Mhz 78.75 Mhz	48.3 Khz 56.746 Khz 60.0 Khz	60 Hz 75 Hz 85 Hz
120	320*240	256	25.212 Mhz	31.5 Khz	60 Hz
121	320*240	64K	25.212 Mhz	31.5 Khz	60 Hz
122	400*300	256	40.091 Mhz	37.965 Khz	60 Hz
123	400*300	64K	40.091 Mhz	37.965 Khz	60 Hz
124	512*384	256	65.028 Mhz	48.384 Khz	60 Hz
125	512*384	64K	65.028 Mhz	48.384 Khz	60 Hz

Panel Type Initialization

The VGA BIOS will issue INT 15h function call during POST. This function call allows the system BIOS to specify the panel type to the VGA BIOS. The system BIOS should get the panel type from GPI pins before the VGA chip initialized, and passes this information to VGA BIOS through INT 15 Function 5F00h.

LCD Panel ID pin Definition:

GPI Pins			Panel Type
GPI [18]	GPI [10]	GPI [9]	
0	0	0	Reserved
0	0	1	Type 5
0	1	0	Reserved
0	1	1	Type 2
1	0	0	Type 3
1	0	1	Type 4
1	1	0	Type 1
1	1	1	Type 0

Supported LCD panel type: Panel Type	Display Size	Panel Description
Type 0	1024*768	14.1" TFT LG
Type 1	1024*768	14.1" TFT Hitachi
Type 2	1024*768	13.1" TFT Acer
Type 3	800*600	12.1" TFT Sanyo
Type 4	1024*768	14.1" TFT CPT
Type 5	800*600	12.1" DSTN Panasonic

4.4.3 Enhanced IDE

The system BIOS supports 4 IDE devices on two controllers up to 8 GB capacity. The BIOS support Ultra DMA 33 and also supports automatic configuration of drives using both the LBA and CHS large drive remapping method. In addition to supporting standard drives through an auto-configuration process that

Hardware Functional Overview

does NOT require user involvement or confirmation. The system should automatically do this at POST time in a way that is transparent to the user. If a drive is connected to the bus, the drive should be automatically recognized, configured and available for use under MS-DOS 6.2x.

4.4.4 Audio

The audio subsystem will support the requirements identified by the AC'97 specification. Both software and hardware will control the volume level for the internal audio subsystem. In addition to volume control, the user will be able to mute the sound to completely cut off the volume using both software and hardware.

4.4.5 Super I/O

This controller contains 16550A or FIFO Enabled UART, ECP/Standard/Bi-directional Parallel Port meeting the 1284 specification.

4.4.6 PCMCIA

- Support for 2 separate CardBus slots (one type III or two type II stacked).
- Individually accessed, dual-buffer implemented.
- Support for 3.3v, 5v and 12v (flash programming) cards.

4.4.7 LED Indicator

System Status LED (LCD panel side)

Indicator	Function Description
Power LED	Green – System is powered on. Yellow – Battery warning. (When plug-in AC the power LED will turn Green) Amber – Battery low. (When plug-in AC the power LED will turn Green) This LED will blink during the system is in Suspend to RAM mode.
Battery Charging LED	Amber – Battery is under charging mode Turn off – Battery full charged or no battery

System Status LED (Main system side)

Indicator	Function Description
IDE accessing LED	This LED will turn on while accessing the HDD.
Device Bay accessing LED	This LED will turn on while accessing the FDD
Caps Lock LED	This LED will turn on when the function of CapsLock is active.
Scroll Lock LED	This LED will turn on when the function of Scroll Lock is active.
Num Lock LED	This LED will turn on when the function of NumLock is active.

Hardware Functional Overview

4.4.8 Hot Keys Definition

All Hot keys must be active at all times under all operation systems.

Hot Keys by Internal Keyboard

Hot Key	Function
Fn + F1	Places the LCD display into a standby mode.
Fn + F2	If an external monitor is present, pressing this hot key combination toggles the display between the built-in LCD screen, the external monitor and simultaneous display on both screens.
Fn + F5	Toggles between expanded and non-expanded views when the computer is set to the 640x480 resolution.
Fn + F6	Decreases screen brightness.
Fn + F7	Increase screen brightness.
Fn + F8	Decrease screen contrast.
Fn + F9	Increase screen contrast.
Fn + F10	Mutes system audio.

4.4.9 Port Replicator

The Port Bar duplicates the following ports from the Notebook:

- CRT port
- Printer port
- COM1 port
- PS/2 Mouse port
- Standard Keyboard port
- USB Port
- DC in Jack

4.4.10 Plug & Play

The BIOS supports the Plug and Play Specification 1.0A. (Include ESCD)

This section describes the device management. The system board devices and its resources are as follows.

Device	Connect Type	Resources			
		I/O	IRQ	DMA	Memory
DMA Controller	Static	00~0F, 81~8F	-	DMA4	-
Interrupt Controller	Static	20~21, A0~A1	IRQ2	-	-
System Timer	Static	40~43	IRQ0	-	-
RTC	Static	70~71	IRQ8	-	-
ISA Bus	Static	-	-	-	-
System Speaker	Static	61	-	-	-
System Board	Static	-	-	-	E0000~FFFFFF
PnP Mother Board	Static	80	-	-	-
Keyboard Controller	Static	60, 64	IRQ1	-	-

Hardware Functional Overview

Math Coprocessor	Static	F0~FF	IRQ13	-	-
PS/2 Mouse	Enable/Disable	-	IRQ12	-	-
Video Controller	Static	3B0~3BB, 3C0~3DF	IRQ 5	-	A0000~BFFFF, C0000~C9FFF, FE800000~FEBFFFFF
Serial Port	Static	3F8~3FF	IRQ4	-	-
ECP, Parallel port	Static	378~37F, 778~77F	IRQ7	DMA1	-
FDC	Static	3F0~3F5, 3F7	IRQ6	DMA2	-
Dual IDE Controller	Static	170~177, 1F0~1F7, 3F6	IRQ14, 15	-	-
CardBus Controller	Static	3E0~3E1	IRQ 10	-	08000000~08001FFF
FAX/Modem	Static	1050~1057, 1400~14FF	IRQ 5	-	64000000~640000FF
LAN	Static	1080~10FF	IRQ 5	-	08003000~080033FF
SIR	Static	2F8-2FF, 108~10F	IRQ 3	DMA0	-
USB Host Controller	Static	EF80~EF9F	IRQ5	-	-
Audio Controller	Static		IRQ 5		

PCI Device

IDSEL Pin Allocation:

IDSEL Pin	PCI Device		
	Device Number	Function Number	Device Name
AD11	Device 00	Function 0	VT8601 Host to PCI bridge.
AD12	Device 01	Function 0	VT8601 PCI to PCI bridge.
AD17	Device 06	Function 0	MODEM / LAN
AD18	Device 07	Function 0	VT82C686A – PCI to ISA bridge
		Function 1	VT82C686A – IDE interface
		Function 2	VT82C686A – USB Port 0-1 Interface
		Function 3	VT82C686A – USB Port 2-3 Interface.
		Function 4	VT82C686A – PMU and SMBus interface
		Function 5	VT82C686A – AC97 Audio Interface.
AD21	Device 0A	Function 6	VT82C686A – AC97 Modem Interface.
		Function 0	Card Bus Socket A
		Function 1	Card Bus Socket B

INT Pin Allocation:

INT Pin	PCI Device
INTA	CardBus
INTB	Modem / LAN
INTC	VGA/Audio
INTD	USB

Hardware Functional Overview

PCI bus master Allocation:

REQ# Pin	PCI Device
REQ 0	CardBus
REQ 1	VGA
REQ 2	Audio
REQ 3	Modem / LAN

4.4.11 SMBus Devices

The SMBus is a two-wire interface through which the system can communicate with power-related chips. The BIOS should initialize the SMBus devices during POST.

SMBus Device	Host/Slave	Address	BIOS Need to Initialize
VIA VT82C686A	Both Host and Slave	10h	Enable SMBus interface and SMBus interrupt
PIC16C62 – Micro P	Both Host and Slave	04h	No need
IMISC671 – Clock Synthesizer	Slave	D2h	Program the desired clock frequency (Pin23 output 24MHz, Pin22 output 48MHz)
BQ 2040 – Smart Battery	Both Host and Slave	16h	No need

4.4.12 Resource Allocation

I/O Map

Hex Address	Device
000 – 01F	8237-1
020 – 021	8259-1
022	VIA VT82C686A
040 – 05F	8254
060 – 06F	Keyboard Controller
070 – 07F	RTC & NMI Mask
080 – 08F	DMA Page Registers
092	System Control Port
0A0 – 0A1	8259-2
0C0 – 0DF	8237-2
0F0 – 0FF	Math Coprocessor
170 – 177	Secondary IDE Controller
1F0 – 1F7	Primary IDE Controller
200 – 20F	Game Port
220 – 22F	Sound Blaster
279	PnP configuration – Address port
2F8 – 2FF	FIR

Hardware Functional Overview

330 – 333	MIDI
370 – 371	Sound chip control port
378 – 37A	Parallel Port
388 – 38B	FM Synthesizer
398 – 399	Super I/O Chip
3B0 – 3DF	Video Controller
3E0 – 3E1	PCMCIA Controller
3E8 – 3EF	Fax/Modem
3F0 – 3F7	Floppy Disk Controller
3F8 – 3FF	Serial Port 1
530 – 537	Windows Sound System
778 – 77B	ECP port
A79	PnP configuration – Write data port
CF8 – CFC	PCI BUS configuration register

ISA DMA Map

DMA Channel	Device
DMA 0	Unused
DMA 1	ECP
DMA 2	Floppy Disk
DMA 3	Audio
DMA 4	[Cascade]
DMA 5	Unused
DMA 6	Unused
DMA 7	Unused

Memory Map

Address Range	Length	Description
00000 ~ 9F7FFh	638KB	Base Memory
9F800 ~ 9FFFFh	2 KB	Extended BIOS Data Area
A0000 ~ BFFFFh	128 KB	Video Memory
C0000 ~ C9FFFh	40 KB	Video ROM
CA000 ~ DFFFFh	88 KB	Unused
E0000 ~ FFFFFh	128 KB	System ROM BIOS

IRQ Map

IRQ#	Description
IRQ 0	System Timer
IRQ 1	Keyboard
IRQ 2	[Cascade]
IRQ 3	SIR

Hardware Functional Overview

IRQ 4	Serial Port
IRQ 5	Audio / VGA / USB / (LAN/MODEM)
IRQ 6	Floppy Disk Drive
IRQ 7	Parallel Port
IRQ 8	RTC Alarm
IRQ 9	Reserved for PCMCIA card
IRQ10	Cardbus
IRQ11	Reserved for PCMCIA card
IRQ12	PS/2 Mouse
IRQ13	FPU
IRQ14	Hard Disk Drive
IRQ15	CDROM or DVD

4.4.13 GPIO Pin Assignment

The GPI and GPO pins connected to system devices. The BIOS can get device's status and control the device via the GPI and GPO pins.

PMU and GPIO Signal description

Pin Name	Signal Name	Description	Components
GPI [0]	LS120IN#	LS120 module inside.	VT82C686A
GPI [1]	PSCI#	System control interrupt for ACPI events	VT82C686A ← M38867
GPI [2]	PWRBTN#	Power button release check	VT82C686A
GPI [3]	PWSCI#	System control interrupt for wake-up events	VT82C686A ← M38867
GPI [4]	IRQ 6	Assign to IRQ 6.	VT82C686A
GPI [5]	PME#	PME#	VT82C686A
GPI [6]	CLRRTC#	Clear RTC	VT82C686A
GPI [7]	RING#	Ring indicate	VT82C686A
GPI [8]	NC		
GPI [9]	LCDID0	LCD Panel ID Pin 0	VT82C686A
GPI [10]	LCDID1	LCD Panel ID Pin 1	VT82C686A
GPI [11]	NC		
GPI [12]	NC		
GPI [13]	NC		
GPI [14]	NC		
GPI [15]	NC		
GPI [16]	KBID0	Keyboard type data 0	VT82C686A
GPI [17]	KBID1	Keyboard type data 1	VT82C686A
GPI [18]	LCDID 2	LCD Panel ID Pin 2	VT82C686A
GPI [19]	BATT_CHG	Battery Charge LED Indicator	VT82C686A
GPI [20]	CDIN#	CDROM module inside	VT82C686A
GPI [21]	DVDIN#	DVD module inside	VT82C686A
GPI [22]	NC		
GPI [23]	NC		

Hardware Functional Overview

GPO [0]	NC		
GPO [1]	NC		
GPO [2]	STR#	Suspend to ram.	VT82C686A → PIC
GPO [3]	SUSSTAT1#	Suspend status 1	VT82C686A
GPO [4]	CPUSTP#	CPU stop clock	VT82C686A
GPO [5]	PCISTP#	PCI stop clock	VT82C686A
GPO [6]	NC		
GPO [7]	NC		
GPO [8]	DRAMEN#	Select SO0DIMM Dram socket I2C Bus A or B.	VT82C686A
GPO [9]	NC		
GPO [10]	NC		
GPO [11]	L2ZZNC	Power down L2 Cache	VT82C686A
GPO [12]	PORT80CS#	Read/Write Port 80H	VT82C686A
GPO [13]	MCCS#	ACPI chip select	VT82C686A
GPO [14]	IRTX#	SIR	VT82C686A
GPO [15]	IRRX#	SIR	VT82C686A
GPO [16]	HDDREST#	HDD reset.	VT82C686A
GPO [17]	CdromReset#	CDROM reset.	VT82C686A
GPO [18]	NC		
GPO [19]	SERIRQ	Serial interrupt request	VT82C686A
GPO [20]	FANON#	Power on FAN.	VT82C686A
GPO [21]	PDCOM#	Power down COM	VT82C686A
GPO [22]	PDAMP#	Power down audio amplifier	VT82C686A
GPO [23]	STANDBY#	Inform to PIC the system is in Standby mode	VT82C686A → PIC
EXTSMI#	EXTSMI#	External SMI signal	VT82C686A ← M38867
RSMRST#	RSMRST#	Reset internal suspend logic(resume reset)	VT82C686A ← PIC
PWRBTN#	PWRBTN#	Power button for VT82C686A	VT82C686A ← PIC
SDA	SMBCLK	SM bus clock	M 38867 → PIC
SCL	SMBDATA	SM bus data	M 38867 → PIC
P40	KBCEXTSMI#	Keyboard SMI#	M38867
P54	BATLOW#	Battery low signal	M38867 ← PIC
P55	LID#	LCD lid closing	M38867
P56	CONADJ#	Panel contrast vary	M38867
P57	BACKADJ#	Panel backlight brightness vary	M38867
P60	IDA#	Battery Inside.	M38867
P62	WAKEUP#	SM bus Alert	M38867,PIC
P64	ACIN#	Adapter plug-in detect	M38867, PIC
P66	PME#		M38867
MCLR	PICRESET#	Reset PIC16C62	PIC
RA5	PWRON	Enable system power	PIC
RA1	LEDBATL#	Battery low led indicate	PIC
RB0	PWRSW#	Power switch for PIC	PIC
RA4	RSTGATE	Reset gate for wakeup inhibit reset	PIC
RB2	VEEENA	Enable panel form PIC	PIC

Hardware Functional Overview

RB3	LEDSUSP#	Suspend led indicate	PIC
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VT82C686A GPI pins signal

See H/W Function Specification for detail.

VT82C686A GPO pins signal

See H/W Function Specification for detail.

M38867 I/O port signal

See H/W Function Specification for detail.

PIC I/O port signal

4.5 Power Management

See H/W Function Specification for detail.

4.5.1 General Requirements

The BIOS must meet the following general Power Management requirements:

- Comply with APM 1.2 Spec.
- Full APM Support for Windows 95 Fuel Gauge and Power Management functionality.
- Support for Suspend-to-RAM and Suspend-to-Disk mode.
- Support for Resume on Modem Ring while in STR Mode. This is enabled by a CMOS setup option.
- Support resume on Time.

4.5.2 System Power Plane

Power Group	Power Control Pin	Controlled Devices
B+	Nil	IMM, (9V~20V)
5V _{ALWAYS}	Nil	PIC 16C62A
3V _{ALWAYS}	Nil	RTC I/F, Internal modem ring
RTCVCC	Nil	RTC
+12V	PWRON	PCMCIA card
+5V	PWRON	M38867, MAX 3243, PCMCIA Slot(5V VCC)
+3V	PWRON	VGA, Video RAM, PCMCIA chip, PCMCIA Slot(3V), DRAM
+3VS	SUSB#	Audio, Clock Generator, FIR(IMI651 SCLK), TAG RAM, PCI interface, Super-IO

Hardware Functional Overview

+5VS	SUSB#	HDD, CD-ROM, USB, Internal K/B, Glide Pad, External P/S2 Mouse, FDD, Audio AMP, BIOS ROM
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4.5.3 Power management mode

Full-On mode

The System State where no devices are power managed and the system can respond to applications with maximum performance.

Doze mode

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

Suspend to RAM (STR) mode

A suspend state where all motherboard components are powered-off. The CPU/L2 and PCI busses are powered off. All devices connected to the CPU/L2 and PCI busses must either be powered-off or isolate their bus interfaces. The system memory(include graphics frame buffer) is powered and refreshed by the Memory Bridge. 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 platform out of the Suspend to RAM (STR) state.

Suspend to disk (STD) mode

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 PowerBTN or RTC, can bring the platform out of the Suspend to disk (STD) state.

Soft off (SOFF) mode

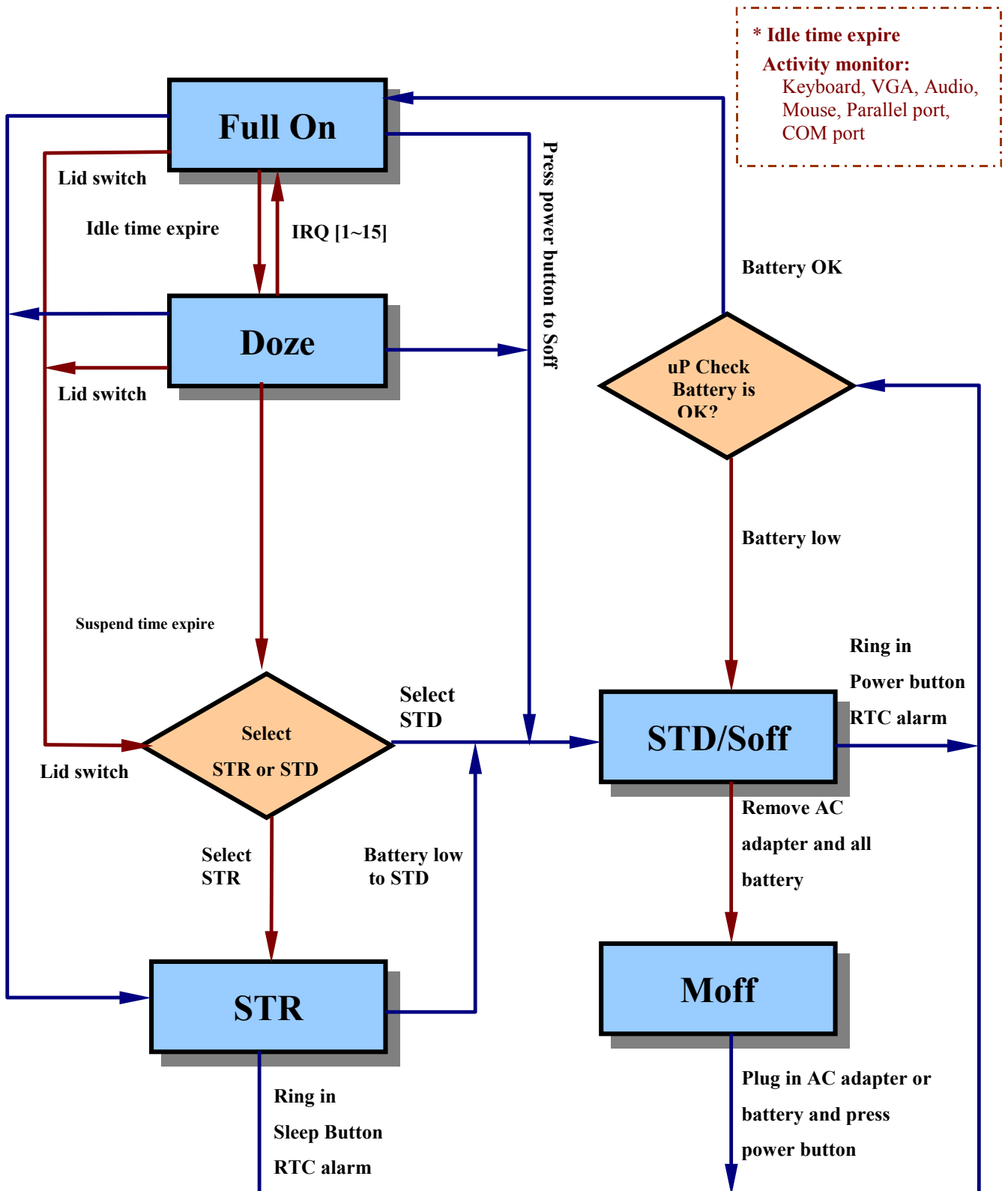
This is the same as suspend to disk except the context of memory is not saved.

Mechanical off (MOFF) mode

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

Hardware Functional Overview

4.5.4 PMU mode transition flow



Hardware Functional Overview

4.5.5 PMU mode transition event

The following table summarizes the entry events and wake-up events of each power state

Power State	Entry Event	Wake up Event
Doze	Doze Time out	Predefined Mem/IO range access Ring Indicator Keystroke(Int., Ex. and USB keyboard) Mouse movement IRQ 1-15
STR	Suspend Time out Lid close Sleep button STR hotkey pressed.	Sleep Button Ring Indicator Schedule Alarm Battery Low Lid Open
STD	Suspend Time out Battery Low Fn + Sleep Button	Sleep Button Schedule Alarm
Soft Off	Sleep button Execute Windows shutdown command	Sleep Button Schedule Alarm

4.5.6 Lid Switch

Warning!!When operating your notebook with an external video device(CRT or TV), you should not close the LCD panel of the Notebok.

Closing the LCD panel will block the ventilation system and can cause overheating and system.

Display Mode	Power State	Lid Close	Lid Open
LCD	Full on	STR	Resume
	STR	No active	Resume
	STD	No active	No active
CRT	Full on	No active	No active
	STR	No active	Resume
	STD	No active	No active
Both	Full on	CRT	Both
	STR	No active	Resume
	STD	No active	No active

4.5.7 Power/Sleep Button

The Power/Sleep Button can work as Power Button or Sleep Button, the working mode is selected by CMOS setup menu.

Working Mode	Power State					
	OFF	Full on	Doze	Stand by	STR	STD

Hardware Functional Overview

Power on/off	Power on	Power off	Power off	Power off	Full on	Full on
Suspend	Power on	STR/STD*	STR/STD	STR/STD	Full on	Full on

Note: As pressed Sleep button over 4 sec, the system will force to power off.

*The mode of STR/STD can be selected via CMOS setup.

4.5.8 Device Power management

Power state of local devices table

PowerState Component	Doze	Stand By	STR	STD/Soff
CPU	Stop Grant	Stop Clock	Power Off	Power Off
VT8601	ON	Stop Clock	Power Off (except Vcc)	Power Off
VT82C686A	ON	ON	Power Off (except SUSVcc, RTCVcc)	Power Off (except SUSVcc, RTCVcc)
DRAM	ON	Self Refresh	Self Refresh	Power Off
L2 CACHE	ON	Power down	Power Off	Power Off
CDROM	ON	Power down	Power Off	Power Off
HDD	ON	Power down	Power Off	Power Off
FDD	ON	Power down	Power Off	Power Off
KBC	ON	ON	Power down	Power Off
PIC 16C62A	ON	ON	Power down	Power down
VGA	ON	Power down	Power down	Power Off
O2 6833 (PCMCIA)	ON	Power down	Power down	Power Off
Sound	ON	Power down	Power Off	Power Off
LCD Backlight	ON	Power down	Power Off	Power Off
Serial (UART1)	ON	Power down	Power down	Power Off
LAN	ON	Power down	Power down	Power Off
Modem	ON	Power down	Power down	Power down
Parallel	ON	Power down	Power Off	Power Off

Device PM control during Stand by mode

Device	Power Down Controlled by	Description
CPU	Hardware	Controlled by SUS_STAT1# pin
VT8601	Hardware	Controlled by SUS_STAT1# pin
VGA Chip	Software	Enter PCI PM D3 state
PCMCIA Controller	Software	Enter PCI PM D3 state
KBC	Working	
FDD	Software	FDD support power down command
HDD	Software	HDD support power down command
CD-ROM	Software	CD-ROM support power down command
Audio AMP	Software	Controlled by GPO[22] pin
Modem	Software	Enter PCI PM D3hot state
LAN	Software	Enter PCI PM D3hot state

Hardware Functional Overview

LCD Backlight	Hardware	Controlled by VGA chip(FPBACK pin)
Clock Synthesizer	Hardware	Controlled by CPUTP# and PCISTP# pin
PIC 16C62A	Working	
MAX3243(RS232 Transceiver)	Software	Controlled by GPO[21] pin
L2 CACHE	Software	Controlled by GPO[3] pin

Device PM control during STR mode

Device	Power Down Controlled by	Description
VT8601	Hardware	Controlled by SUS_STAT1# pin
Super I/O	Hardware	Power off
VGA Chip	Software	Controlled by VT8501
HDD	Hardware	Power off
CD-ROM	Hardware	Power off.
PCMCIA Controller	Hardware	Controlled by PCI Bus.
Modem	Software	Power off
LAN	Hardware	See H/W Spec Chapter 18.
FDD	Hardware	Power off
Audio AMP	Hardware	Power off
LCD Backlight	Hardware	Power off
Clock Synthesizer	Hardware	Power off
KBC	Software	Controlled by M38867 power down command
MAX3243(RS232 transceiver)	Hardware	Controlled by GPO [21] Pin
L2 CACHE	Hardware	Power off
PIC 16C62A	Software	Controlled by PIC 16C62A power down command

Device PM control during STD mode

Device	Power Down Controlled by	Description
VT8601	Hardware	Power off
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
Modem	Hardware	Supply ring power
LAN	Hardware	Power off
FDD	Hardware	Power off
Audio AMP	Hardware	Power off
LCD Backlight	Hardware	Power off
Clock Synthesizer	Hardware	Power off
KBC	Hardware	Power off
MAX3243(RS232 transceiver)	Hardware	Power off
L2 CACHE	Hardware	Power off
PIC 16C62A	Software	Controlled by PIC 16C62A power down command

Hardware Functional Overview

4.6 ACPI

4.6.1 General Requirements

The BIOS must meet the following general Power Management requirements:

- ✂ Refers to the portion of the firmware that is compatible with the ACPI specifications.
- ✂ Support for Suspend-to-RAM (S3 state) and Suspend-to-Disk mode (S4 state).
- ✂ Support the Wake up event from Modem Ring in S2~S5 state. This is enabled by a ACPI driver or application.
- ✂ Support the Wake up event from RTC Time/Date alarm in S2~S5 state. This is enabled by a CMOS Setup option.
- ✂ Power Management must not substantially affect or degrade system performance.

4.6.2 Global System State Definitions

Global system states (Gx states) apply to the entire system and are visible to the user.

Following is a list of the system states:

G2/S5 - Soft Off:

Power is removed from most of system components except Suspend wakeup logic in PIC and RTC.

Wake up event refer to section 6.5

G1 - Sleeping:

CPU in stop clock mode (core logic in stop clock mode also)

Clock chip in Power down Mode

VGA chip enter suspend mode, LCD power is removed,

PCMCIA chip enter sleep mode,

Hard disk enter sleep mode,

CD-ROM enter sleep mode,

Modem in power down mode,

LAN is in power down mode

G0 - Working:

A computer state where the system dispatches user mode (application) threads and they execute. In this state, devices (peripherals) are dynamically having their power state changed. The user will be able to select (through some user interface) various performance/power characteristics of the system to have the software optimize for performance or battery life. The system responds to external events in real time. It is not safe to disassemble the machine in this state.

4.6.3 Sleeping State Definitions

Sleeping states (Sx states) are types of sleeping states within the global sleeping state, G1. The Sx states are briefly defined below. For a detailed definition of the system behavior within each Sx state, refer to ACPI specification section 7.5.2. For a detailed definition of the transitions between each of the Sx states, refer to ACPI specification section 9.1.

S1 Sleeping State:

Hardware Functional Overview

The S1 sleeping state is a low wake-up latency sleeping state. In this state, no system context is lost (CPU or chip set) and hardware maintains all system context.

S2 Sleeping State:

The S2 sleeping state is a low wake-up latency sleeping state. This state is similar to the S1 sleeping state except the CPU and system cache context is lost (the OS is responsible for maintaining the caches and CPU context). Control starts from the processor's reset vector after the wake-up event.

S3 Sleeping State:

The S3 sleeping state is a low wake-up latency sleeping state where all system context is lost except system memory. CPU, cache, and chip set context are lost in this state. Hardware maintains memory context and restores some CPU and L2 configuration context. Control starts from the processor's reset vector after the wake-up event.

S4 Sleeping State:

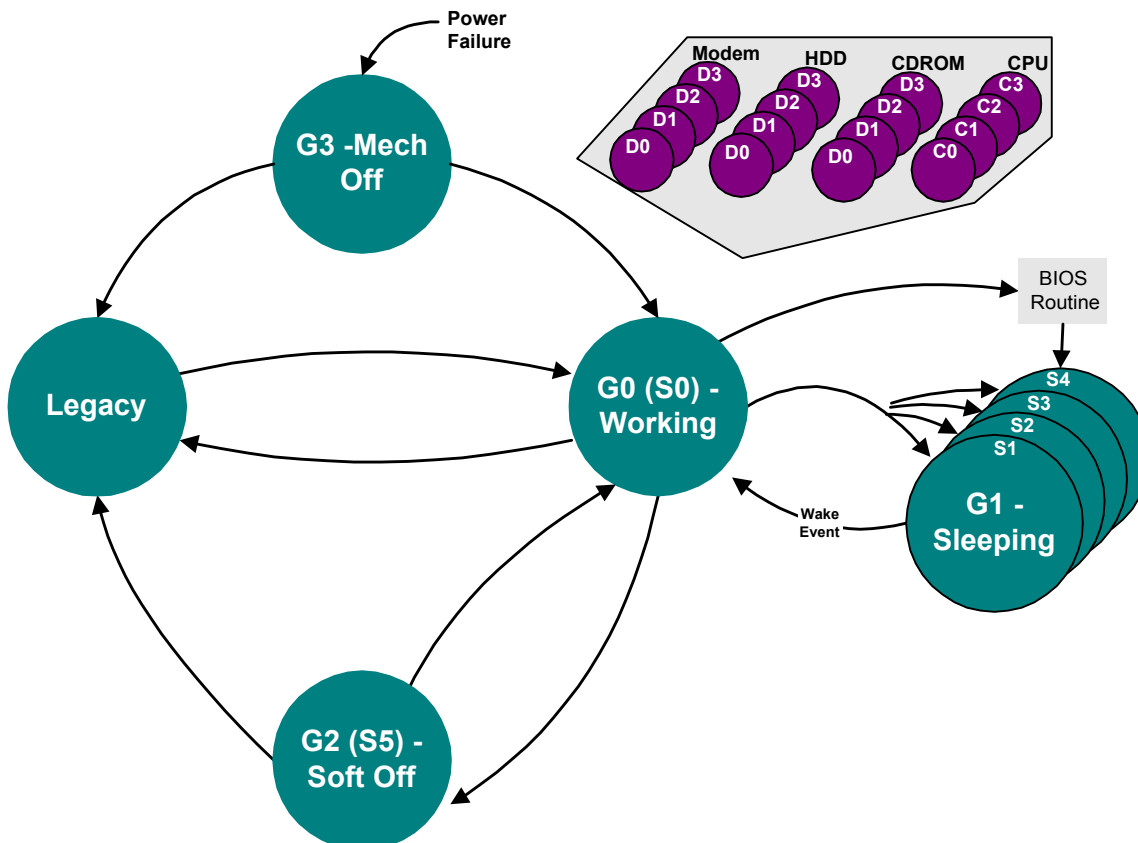
The S4 sleeping state is the lowest power, longest wake-up latency sleeping state supported by ACPI. In order to reduce power to a minimum, it is assumed that the hardware platform has powered off all devices. Platform context is saved in disk.

S5 Soft Off State:

The S5 state is similar to the S4 state except the OS does not save any context nor enable any devices to wake the system. The system is in the "SOFF" off state and requires a complete boot when awakened. Software uses a different state value to distinguish between the S5 state and the S4 state to allow for initial boot operations within the BIOS to distinguish whether or not the boot is going to wake from a saved memory image.

4.6.4 Power States

From a user-visible level, the system can be thought of as being one of the states in the following diagram:



Hardware Functional Overview

Figure: Global System Power States and Transitions

4.6.5 Power States transition event

The following table summarize the entry events and wake-up events of each power

Power State	Entry Event	Wake up Event
S1	OSPM* control	Predefined Mem/IO range access Ring Indicator Keystroke IRQ1-15 SMI# / ACPI SCI# / USB
S2	OSPM control	Predefined Mem/IO range access Battery Warning Battery Low Ring Indicator Keystroke (Int., Ex. And USB keyboard) Mouse movement Schedule Alarm SMI# / ACPI SCI# / USB
S3	OSPM control, Sleep Button, Lid Close	Sleep button Ring Indicator Schedule Alarm Lid Open PME# Battery Low
S4	OSPM control,	Sleep Button Ring Indicator Schedule Alarm
S5	OSPM control, Power Button	

*OSPM: OS-directed Power Management

4.6.6 Lid Switch

The function of Lid Switch is depends on the ACPI aware OS.

4.6.7 Power/Sleep Button

The function of Power/Sleep Button is depends on the ACPI aware OS.

4.6.8 Device Power management

Power state of local devices table

See section 5.8.1 “Power state of local devices table” for detail.

Hardware Functional Overview

Device PM control during Stand by mode

See section 5.8.2 “Device PM control during Stand by mode” for detail.

Device PM control during STR mode

See section 5.8.3 “Device PM control during STR mode” for detail.

Device PM control during STD mode

See section 5.8.4 “Device PM control during STD mode” for detail.

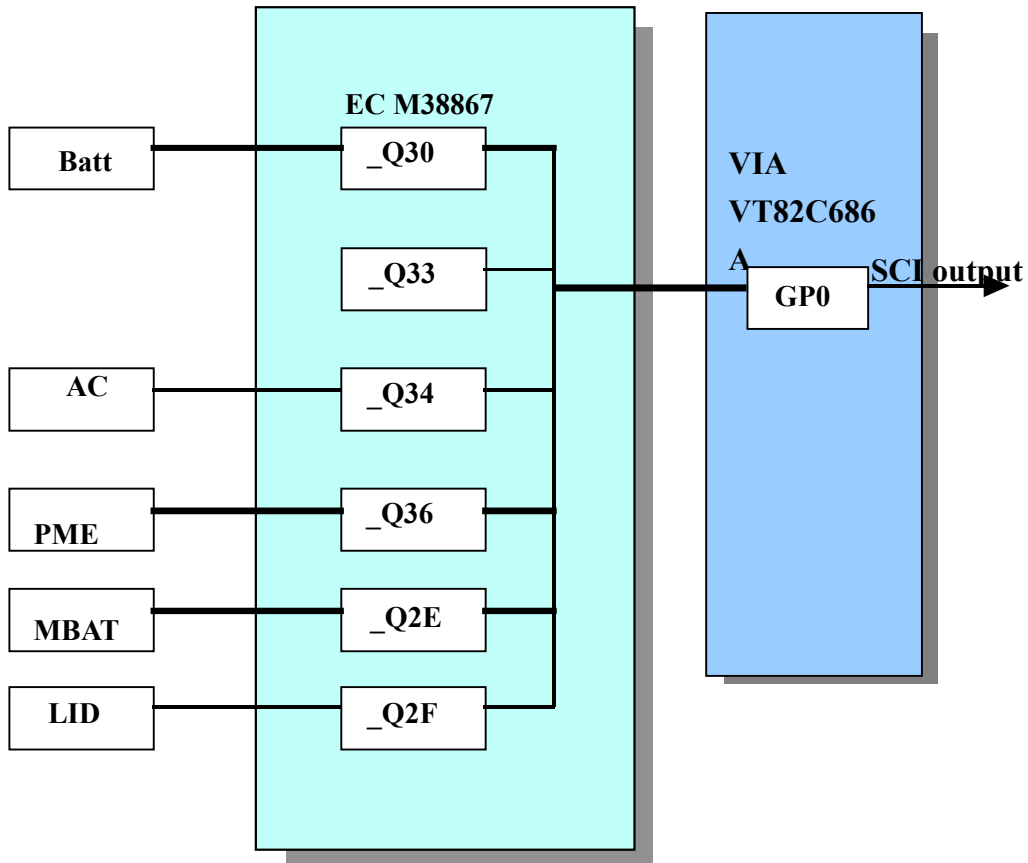
The power plane is divided as following:

See section 5.2 “System Power Plane” for detail.

Hardware Functional Overview

4.6.9 Expanding Event Through the Embedded Controller

The following figure shows the relationships between the devices that are wired to the embedded controller, the embedded controller queries, and the ACPI specified General



SCI Source and Query Event from M38867

M38867 GPI	Input Event	Query Event	Handler
Port 6.0	Battery	_Q30	AML Handler
Port 6.4	AC in	_Q34	AML Handler
Port 6.6	PME	_Q36	AML Handler
Port 5.4	Main battery low	_Q2E	AML Handler
Port 5.5	LID switch	_Q2F	AML Handler

Hardware Functional Overview

Control Method Battery Subsystem

EC should support all the battery information to ACPI-OS

- ✍ Designed Battery capacity
- ✍ Designed Voltage
- ✍ Designed Warning capacity
- ✍ Designed Low battery capacity
- ✍ Latest Full charged capacity
- ✍ Present Remaining capacity
- ✍ Present drain rate
- ✍ Present voltage
- ✍ Present Battery Status

4.6.10 Thermal Control **T.B.D**

There are three primary cooling policies that the OS uses to control the thermal state of the hardware.

Cooling Policy	Action	Temperature
Passive cooling	Throttle CPU Off	T_A
Active cooling	Throttle CPU On	T_B
Critical cooling	System shut down	T_C

Note: The temperature is $T_A < T_B < T_C$

Mobile CUP ($T_A = 62^\circ$, $T_B = 65^\circ$, $T_C = 80^\circ$)

Desktop CPU ($T_A = 52^\circ$, $T_B = 54^\circ$, $T_C = 70^\circ$)

Hardware Functional Overview

4.7 Battery Management

The A440 supports both Li-Ion and Ni-MH Battery Pack. There is only one battery pack activating at one time.

4.7.1 Battery Sub-system

⌘ The charger will stop charge the battery when the following condition is detected.

- The temperature of the system is too high.
- The battery voltage is too high.

⌘ Battery Life is around 2.5 Hours.

Note that the battery life depends on different configuration running. (E.g. the battery life is shorter with CDROM running, the battery life is longer with document keyin only; battery life is short while PMU disabled, battery life is longer while PMU enabled.)

⌘ Battery reading methodology is through M38867 SMBus.

4.7.2 Battery Warning

When the battery capacity remains 8%*, the M38867 will generate a battery warning SMI. The system will do the following action.

- The system issues a warning beep (3 beeps at once).

Note: *Under Win 98: It will depend on the setting of O/S. (Default is 10%)

4.7.3 Battery Low

When the battery capacity remains 3%*, the system will generate a battery low SMI. The system will do the following action.

- The Power LED will become amber.
- The system will enter Suspend To Disk mode even the power management is disabled.
- The function of power-on or Resume will be inhibited until the battery low condition is removed.

Note: *Under Win 98: It will depend on the setting of O/S. (Default is 3%)

4.7.4 AC Adapter

When plug in the AC adapter, the system will do the following action:

- The charger will charge the Battery.
- The Battery Charging Indicator will turn on if the battery is in changing mode.
- The power management function will be disabled, if the Setup item of "Power Management Mode" is set to "Battery Only".
- The "Battery Warning" and "Battery Low" condition will be removed.

Hardware Functional Overview

4.8 PIC16C62A - uP

The micro controller PIC16C62 acts as a supplement for power management control. It supports a lot of functions via SMBus interface.

4.8.1 The System Communication with PIC16C62

The system communicates with PIC16C62A via SMBus interface. The SMBus host (M38867) should be firstly initialized before starting the transaction. The following is the procedure for system communication with PIC16C62:

1. Enable SMBus interface by writing 01h to SmbHstCfg register.
2. Get SMBus I/O port base address by reading from SmbBA register.
3. Clear SMBus status by writing 1Eh to SmbHstSts register.
4. Write the PIC16C62A slave address to SmbHstAdd register.
 - i.) Send command to PIC16C62A -- Slave address is 04h.
 - ii.) Read data from PIC16C62A -- Slave address is 05h.
5. Write the desired command to SmbHstCmd register.
6. Write the desired parameters to SmbHstDat0(High byte) and SmbHstDat1(Low byte) registers if the system wants to send command to PIC16C62A.
7. Wait for SMBus interrupt occurred by monitoring SmbHstSts register INTR bit.
8. Get the desired data by reading from SmbHstDat0(High byte) and SmbHstDat1(Low byte) registers if the system wants to read data from PIC16C62A.

4.8.2 PIC16C62A Command List

Command/Data	Access	Unit	Function Description
0x00			Reserved
0x01	read	Word	Read PIC software version
0x02	read	Byte	Read LCD contrast level (DAC)
0x03	read	byte	Read LCD brightness level (DAC)
0x04	read	word byte0 byte1	Read primary battery DQ_NAC NACH NACL
0x05	read	word byte0 byte1	Read 1st battery DQ_LMD&NACH DQ_LMD DQ_NACH
0x06	read	byte	Read primary battery DQ_FLGS1
0x07	read	byte	Read primary battery DQ_TMPGG
0x08	read	byte	Read primary battery DQ_FLGS2
0x09	read	byte	Read primary battery DQ_PPD
0x0A	read	byte	Read primary battery DQ_PPU
0x0B	read	byte	Read primary battery DQ_VSB 2014
0x0C	read	byte	Read primary battery DQ_VTS 2014
0x0D	read	word byte0 byte1	Read secondary battery DQ_NAC NACH NACL

Hardware Functional Overview

0x0E	read	byte byte0 byte1	Read 2nd battery DQ_LMD&NACH DQ_LMD DQ_NACH
0x0F	read	byte	Read secondary battery DQ_FLGS1
0x10	read	byte	Read secondary battery DQ_TMPGG
0x11	read	byte	Read secondary battery DQ_FLGS2
0x12	read	byte	Read secondary battery DQ_PPD
0x13	read	byte	Read secondary battery DQ_PPU
0x14	read	byte	Read secondary battery DQ_VSB
0x15	read	byte	Read secondary battery DQ_VTS
0x16	read	word byte0 byte1	Read battery chemistry characteristic primary battery 0x00:non-battery 0x02:Li-ION 0x03:Ni-MH secondary battery 0x00:non-battery 0x02:Li-ION 0x03:Ni-MH
0x17	read	word byte0 byte1	Read primary battery NACL1,NACL2 at interval of 20s NACL2 NACL1
0x18	read	word byte0 byte1	Read secondary battery NACL1,NACL2 at interval of 20s NACL2 NACL1
0x19	read	word byte0 byte1	Read LCD contrast/brightness brightness contrast
0x1A	reserved		
0x1B	reserved		
0x1C	reserved		
0x1D	reserved		
0x1E	reserved		
0x1F	reserved		
0x20	write	byte	System command
0x20/00			NOP
0x20/01			System suspend request
0x20/02			System resume from suspend
0x20/03			Mask PICSMI ,BAT_L,BAT_LL
0x20/04			Enable PICSMI,BAT_L,BAT_LL
0x20/05			Blinking battery low LED
0x20/06			Un-blinking battery low LED
0x20/07			AC adapter plugged in
0x20/08			AC adapter plugged out
0x20/09			System power off
0x20/0A			Used in SMB system
0x20/0B			Used in DQ battery system
0x20/0C			Sound single set alarm beep
0x20/0D			Un-sound alarm beep

Hardware Functional Overview

0x20/0E			Blinking battery low LED & Sound single alarm beep
0x20/0F			Un-blinking battery low LED & Un-sound single alarm beep
0x20/10			Sound alarm beep twice per minute
0x20/11			Un-sound alarm beep twice per minute
0x20/12			Blinking battery low LED & Sound alarm beep twice per minute
0x20/13			Un-blinking battery low LED & Un-sound alarm beep twice per minute
0x20/14			Enable LCM VEENA
0x20/15			Disable LCM VEENA
0x20/16			System resume from suspend & Issue a low pulse 100mS
0x20/17			Set suspend LED ON
0x20/18			Set suspend LED OFF
0x20/19			Stop PWM1 & PWM2 function
0x20/1A			Resume PWM1 & PWM2 function
0x20/1B			Mask modem ring in resume
0x20/1C			Enable modem ring in resume
0x21	write	byte	Set LCD contrast level
0x22	write	byte	Set LCD contrast max. value
0x23	write	byte	Set LCD contrast min. value
0x24	write	word byte0 byte1	Set LCD adjust scale contrast scale brightness scale
0x25	write	byte	Set LCD brightness level
0x26	write	byte	Set LCD brightness max. value
0x27	write	byte	Set LCD brightness min. value
0x28	write	word byte0 byte1	First power on set LCD contrast, brightness level & for POST reset BAT_L, BAT_LL signal & LED contrast brightness
0x29	reserved		
0x2A	write	word byte0 byte1	Write data to primary battery BQ2010 command 0x80 (set bit7) i.e. 83H:write NACH 84H:write BATID 85H:write LMD 8CH:write VTS 2014 only Data
0x2B	write	word byte0 byte1	Write data to secondary battery BQ2010 command 0x80 (set bit7) i.e. 83H:write NACH 84H:write BATID 85H:write LMD 8CH:write VTS 2014 only Data

Hardware Functional Overview

4.9 Miscellaneous

4.9.1 Security

The user may enter up to 8 standard text characters to be a password. The password includes two levels. The higher priority is the “Supervisor Password”. The lower priority is the “User Password”. The Supervisor Password can access all the system resource, while the User Password may not access the floppy disk when it is protected by Supervisor Password. When the security function is enabled, the system will request the user to enter password during the following situation.

- I. Power On: The system will prompt the user to enter the password before booting the OS. If the user key in the wrong password for 3 times, the system will halt.
- II. Resume: The system will prompt the user to enter password while resuming from STR or STD mode. If the user keys in the wrong password for 3 times, the system will not resume and should return to Suspend mode again.
- III. Entering CMOS Setup: The system will prompt the user to enter the password before entering the CMOS Setup. If the user keys in the wrong password for 3 times, the system will halt.

4.9.2 SMBIOS Support

System Management BIOS 2.1 support DMI 2.0 interface.

4.10 CMOS Setup Utility

The Setup utility is used to configure the system. The Setup contains the information related to the hardware for boot & power management purpose. All the changed settings will take effect after the system rebooted.

4.10.1 Main Menu Default & Options

PhoenixBIOS Setup Utility						
Main	Advanced	Security	Power	Boot	Exit	Item Specific Help
System Time :	[12: 00 : 00]					<Tab>, <Shift-Tab>, or <Enter> selects Field.
System Date :	[05 / 22 / 2000]					
Diskette A:	[1.44/1.25 MB 3½"]					
Internal HDD	10056MB					
Internal DVD/CD-ROM	Installed					
Boot Display Device	[Both]					
System Memory	640 KB					
Extended Memory	60416 KB					
CPU Type	TBD					
CPU Speed	TBD					
BIOS Version	1.0F-5713-6221					
F1 Help	↑↓ Select Item	-/+ Change Values		F9 Setup Defaults		
ESC Exit	←→ Select Menu	Enter Select Sub-Menu	▶	F10 Save and Exit		

Hardware Functional Overview

\System Time:	[12:00:00]	<Tab>, <Shift-Tab>, or <Enter> selects Field.
System Date:	[07/01/1998]	<Tab>, <Shift-Tab>, or <Enter> selects field.
Diskette A:	[1.44/1.25 MB 3½"] / [Disabled]	Selects floppy type. Not that 1.25 MB 3½" references a 1024 byte/sector Japanese media format. The 1.25 MB, 3½" diskette requires a 3-Mode floppy-disk drive.
Language:	[English (US)]	
▶ Internal HDD	[10056MB]	<input type="checkbox"/> 10.1.1
Internal DVD/CD-ROM	Installed	(BIOS auto detect, display for information only)
Boot Display Device	[Both / LCD / CRT]	Choice the display device.
System Memory	640 KB	(BIOS auto detect, display for information only)
Extended Memory	60416 KB	(BIOS auto detect, display for information only)
CPU Type	Pentium® III	(BIOS auto detect, display for information only)
CPU Speed	800MHz	(BIOS auto detect, display for information only)
BIOS Version	1.0F-5713-6221	(BIOS-VGA- <input type="checkbox"/> P version)

4.10.1.1 Internal HDD Sub-Menu Default & Options

PhoenixBIOS Setup Utility		
Main		
Internal HDD: [10056MB]	Item Specific Help	
Type: Cylinders: 16383 Heads: 16 Sectors: 63 Maximum Capacity: 10056MB Multi-Sector Transfers: 16 Sectors LBA Mode Control: Enabled 32 Bit I/O: [Disabled] Transfer Mode: [FPIO 4 / DMA 2] Ultra DMA Mode: [Mode 2] SMART Monitoring: Enabled	Select the drive type correspond to the fixed disk installed in your System .If type USER is select, Cylinders ,Heads & Sectors are edited directly.	
F1 Help	↑↓ Select Item	-/+ Change Values
ESC Exit	←→ Select Menu	Enter Select Sub-Menu ▶ F10 Save and Exit
		F9 Setup Defaults

Type:	[Auto]	Select the drive type corresponding to the fixed disk installed in your system. If type USER is selected, Cylinders, Heads & Sectors edited directly.
Cylinders:	16383	
Heads:	16	
Sectors:	63	
Maximum Capacity:	10056MB	(BIOS auto detect, display for information only)
Multi-Sector Transfers:	[16 Sectors] / [Disabled] / [2 Sectors] / [4 Sectors] / [8 Sectors]	Specify the number of sectors per block for multiple sector transfers. 'MAX' refers to the size the disk returns when queried.
LBA Mode Control:	[Enabled] / [Disabled]	Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads & Sectors
32 Bit I/O :	[Disabled] / [Enabled]	This setting enables or disables 32 bit IDE data transfers
Transfer Mode:	[Standard] / [Fast PIO 1] /	Select the method for moving data to/from the drive.

Hardware Functional Overview

	[Fast PIO 2] / [Fast PIO 3] / [Fast PIO 4] / [FPIO 3 / DMA 1] / [FPIO 4 / DMA 2]	Autotype the drive to select the optimum transfer mode
Ultra DMA Mode:	[Disabled] / [Mode 0] / [Mode1] / [Mode 2] / [Mode3] / [Mode 4]	Selects the Ultra DMA mode used for moving data to / form the drive.
SMART Monitoring	Disabled / Enabled	

Hardware Functional Overview

4.10.2 Advanced Menu Default & Options

PhoenixBIOS Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
PS/2 Mouse : [Auto] Installed O/S : [WinME / Win200] Start-up Screen : [Disabled] Serial port : [Auto] Infrared port : [Auto] Mode : [IrDA] Parallel port : [Auto] Mode : [EPP]				Item Specification Help Selects Power on state for NumLock.	
F1 Help	↑↓ Select Item	-/+ Change Values		F9 Setup Defaults	
ESC Exit	←→ Select Menu	Enter Select Sub-Menu		▶ F10 Save and Exit	

PS/2 Mouse	[Auto] / [Both]/ [Disabled]	“Disabled” prevents any installed PS/2 mouse from functioning, but frees up IRQ12. [Both] allows both internal and external PS/2 mouse to be active. [Auto] will only allow the external PS/2 mouse to be active if it is detected.
Installed O/S	[WinME / Win2000] / [Other]	Select the operating system installed on your system which you will use most commonly. Note: An incorrect setting can cause some operating systems to display unexpected behavior.
Start-up Screen	[Enabled] / [Disabled]	Select boot screen using options: [Enabled] – Boot with POST screen. [Disabled] – Boot with black screen.

Serial port	[Auto] / [Disabled]	Configure serial port A using options: Disabled - No configuration, Auto - BIOS or OS chooses configuration.
Infrared port	[Auto] / [Disabled]	Configure Infrared port using options: Disabled - No configuration, Auto - BIOS or OS chooses configuration..
Parallel port	[Auto] / [Disabled]	Configure parallel port using options: Disabled - No configuration, Auto - BIOS or OS chooses configuration,
Mode	[Uni-directional] /[ECP] / [EPP]	Set the mode for the parallel port using options: Uni-directional, ECP, EPP.

Hardware Functional Overview

4.10.3 Security Menu Default & Security Menu Options

PhoenixBIOS Setup Utility						
Main	Advanced	Security	Power	Boot	Exit	Item Specification Help
Set Supervisor Password		[Enter]				Supervisor Password controls access to the setup utility.
Set User Password		[Enter]				
Password on boot:		[Disabled]				
Fixed disk boot sector:		[Normal]				
Diskette access:		[Supervisor]				
F1 Help	↑↓ Select Item	-/+ Change Values		F9 Setup Defaults		
ESC Exit	←→ Select Menu	Enter Select Sub-Menu		▶ F10 Save and Exit		

Set Supervisor Password	Press Enter	Supervisor Password controls access to the setup utility.
Set User Password	Press Enter	User Password controls access to the system at boot.
Password on boot	[Disabled] / [Enabled]	Enabled password entry on boot
Fixed disk boot sector	[Normal] / [Write protect]	Write protects boot sector on hard disk, to protect against viruses.
Diskette access	[Supervisor] / [User]	Control access to diskette drives.

Hardware Functional Overview

4.10.4 Power Saving Menu Default & Power Options

PhoenixBIOS Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
Resume On Time: Battery Calibration				[Off]	
				Item Specification Help	
				Enabled wakes the system up at a specific time.'	
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults ESC Exit ←→ Select Menu Enter Select Sub-Menu ► F10 Save and Exit					

Resume On Time	[On] / [Off]	Enabled wakes the system up at a specific time.
Battery Calibration		Reactivate the battery.

Hardware Functional Overview

4.10.5 Boot Menu Default & Boot Menu Options

PhoenixBIOS Setup Utility						
Main	Advanced	Security	Power	Boot	Exit	Item Specific Help
+Hard Drive +Removable Devices ATAPI CD-ROM Drive				Use <□> or <□ to select a device then press <+> or <-> to move the device up or down. <Enter> expands or collapses device. <Ctrl+Enter> expands all.		
F1 Help	↑↓ Select Item	-/+ Change Values		F9 Setup Defaults		
ESC Exit	←→ Select Menu	Enter Select Sub-Men▶		F10 Save and Exit		

Hardware Functional Overview

4.10.6 Exit Menu & Exit Options

PhoenixBIOS Setup Utility						
Main	Advanced	Security	Power Saving	Boot	Exit	Item Specific Help
<p>Exit Saving Changes Exit Discarding Changes Load Setup Defaults Discard Changes Save Changes</p>					<p>Exit System Setup and save your changes to CMOS.</p>	
<p>F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults ESC Exit ←→ Select Menu Enter Select Sub-Men▶ F10 Save and Exit</p>						

Exit Saving Changes	Exit System Setup and save your changes to CMOS.
Exit Discarding Changes	Exit utility without saving Setup data to CMOS.
Load Setup Defaults	Load default values for all SETUP items.
Discard Changes	Load previous values from CMOS for all SETUP items.
Save Changes	Save Setup Data to CMOS.

Hardware Functional Overview

4.11 Definitions of Terms

ACPI - Advanced Configuration and Power Management Interface.

Clock Throttling - VT82C686A function that allows the CPU clock to be stopped and started at a known duty cycle using the STPCLK# pin to enter and exit Stop Grant mode. Clock throttling is used for power savings, thermal management, and reducing the processing speed.

GPI - General Purpose Input.

GPO - General Purpose Output.

Lid Switch - A switch that indicates the notebook LCD Panel has been closed or not.

North Bridge - The CPU to PCI interface, also contains the memory and cache controllers.

South Bridge - The PCI to ISA interface, also contains many legacy devices.

SMM - System Management Mode, Mode of operation while an SMI is active.

SMI - System Management Interrupt. Non-maskable interrupt that causes the system to enter SMM. SMM functions includes power management, USB legacy keyboard control, security, hot keys, and thermal monitoring.

SMB - System Management Bus. It is used for managing smart batteries, reading SDRAM configuration information, and other miscellaneous system functions.

TBD -To Be Discussed. It means that the specification is not final yet and should be discussed with related groups.