

# **MB980**

**Intel® 4th Generation Core / Q87 PCH  
ATX Motherboard**

# **USER'S MANUAL**

**Version 1.0**

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# Introduction

## Product Description

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The MB980 ATX motherboard is based on the latest Intel® Q87 chipset. The platform supports 4<sup>th</sup> Generation Intel® Core processor family with LGA1150 packing and features an integrated dual-channel DDR3 memory controller as well as a graphics core.

The latest Intel® processors provide advanced performance in both computing and graphics quality. This meets the requirement of customers in the gaming, POS, digital signage and server market segment.

The Q87 platform is made with 22-nanometer technology that supports Intel's first processor architecture to unite the CPU and the graphics core on the transistor level. The MB980 ATX board utilizes the dramatic increase in performance provided this Intel's latest cutting-edge technology. Measuring 305mm x 244mm, the MB980 offers fast 6Gbps SATA support (6 ports), USB3.0 (4 ports) and interfaces for DVI-D, DVI-I and DP displays. MB980VF features Intel® Active Management Technology 9.0.

### MB980 FEATURES:

- Supports Intel® 4th Generation Core i7/i5/i3 QC/DC desktop processors
- Four DDR3 DIMM, 1066/1333/1600MHz, Max. 32GB memory
- Dual Intel® PCI-Express Gigabit LAN
- Integrated Graphics for DVI-I, DVI-D/HDMI displays
- 6x SATA 3.0, 10x USB 2.0, USB 3.0 (4 ports), 6x COM, Watchdog timer
- 1x PCI-E (x16), 1x PCI-E (x8), 1x PCI-E (x1), 4x PCI
- Optional AMT (MB980VF only)

### **Checklist**

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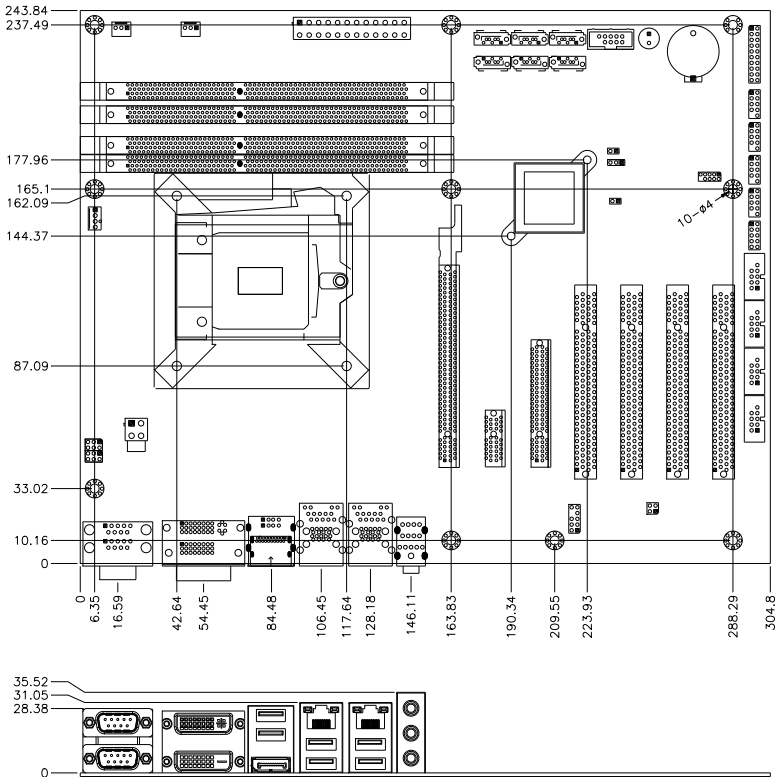
Your MB980 package should include the items listed below.

- The MB980 ATX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Serial ATA cable

## MB980 Specifications

<b>Product Name</b>	<b>MB980VF</b>
<b>Form Factor</b>	ATX
<b>CPU Type</b>	- Intel® 4th Generation Core 22nm QC/DC DT processor - LGA package 37.5 mm x 37.5mm(TDP: QC= 95W/65W/45W ; DC=65W/45W)
<b>CPU Speed</b>	Up to 3.8GHz
<b>Cache</b>	Up to 8MB
<b>CPU Socket</b>	<b>LGA1150 (Socket H3)</b>
<b>Chipset</b>	Intel® Q87 23 x 22 mm package size
<b>BIOS</b>	AMI BIOS, support ACPI Function
<b>Memory</b>	Intel® 4th Generation Core DT processors integrated memory controller DDRIII 1067/1333/1600 MHz - DIMM x 4 (w/o ECC), Max.32GB
<b>VGA</b>	- Intel® 4th Generation Core DT processor integrated Gfx - Supports 3 independent displays - Improvement in 3D graphic performance (DX 11.1, OpenGL 3.2, Open CL1.2) - One analog port (VGA) and 3 digital ports (DisplayPort, DVI/HDMI & SDVO) DVI-I X 1 (thru Level shifter ASM1442) DVI-D X 1 (thru Level shifter ASM1442) DisplayPort X 1
<b>LAN</b>	1. Intel® Clarkville I217LM GbE PHY 2. Intel® I211AT as 2 <sup>nd</sup> GbE
<b>USB</b>	USB <b>2.0</b> host controller, supports <b>14</b> ports w/ two EHCI, 7 UHCI controllers - <b>6</b> ports in the rear panel - Others reserved for onboard pin header USB <b>3.0</b> host controller, supports <b>4</b> ports
<b>Serial ATA</b>	Intel® Q87 PCH built-in SATA controller, supports total 6 ports <b>6</b> x SATA (3.0) 6Gbps
<b>Audio</b>	Intel® Q87 PCH built-in High Definition Audio controller + ALC892 w/ 7.1 CH
<b>LPC I/O</b>	Fintek <b>F81866AD-I</b> (Ver. C) COM1 (RS232/422/485), COM2~COM6 (RS232) Hardware Monitor (2 thermal inputs, 4 voltage monitor inputs & <b>3</b> x fan headers) COM1/2 with pin-9 with power for 2 ports (500mA for each port)
<b>Digital IO</b>	4 in & 4 out
<b>IAMT(9.0)</b>	Intel® Q87 PCH built-in - Intel® Active Management Technology Version 9.0
<b>TPM 1.2</b>	Winbond WPCT210A
<b>Expansion Slots</b>	PCI-Express (16x) x1 [PEG]; PCI-Express 8x) x1; PCI-Express 1x) x1; PCI x4
<b>Edge Connectors</b>	DVI-D + DVI-I stack connector; Dual DB9 stack connector for COM #1, #2 Dual USB (2.0) dual stack connector; DP stack connector Gigabit LAN RJ-45 + dual USB (3.0) stack connector x2 RCA Jack 3 x 1 for HD Audio
<b>Onboard Header/ Connector</b>	6 ports x SATA <b>III</b> [Blue color] 2x5 pin-header x4 for 8 ports USB; 2x5 pin-header for front panel audio 4x10 box-header for COM3 (RS232) ~ COM6 (RS232) 2x5 pin-header for Digital IO
<b>Watchdog Timer</b>	Yes (256 segments, 0, 1, 2...255 sec/min)
<b>System Voltage</b>	<b>ATX</b>
<b>Others</b>	LAN Wakeup, vPro™
<b>Board Size</b>	305mm x 244mm

# Board Dimensions





## Installations

This section provides information on how to use the jumpers and connectors on the MB980 in order to set up a workable system. The topics covered are:

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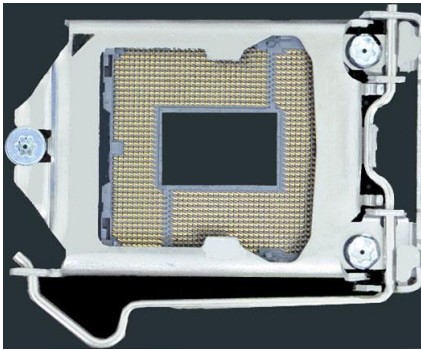
### **Installing the CPU**

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The MB980 board supports an LGA1150 Socket (shown below) for Intel Sandy Bridge processors.

To install the CPU, unlock first the socket by pressing the lever sideways, then lift it up to a 90-degree. Then, position the CPU above the socket such that the CPU corner aligns with the gold triangle matching the socket corner with a small triangle. Carefully insert the CPU into the socket and push down the lever to secure the CPU. Then, install the heat sink and fan.



**NOTE:** *Ensure that the CPU heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause your system to hang or be unstable.*

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## Installing the Memory

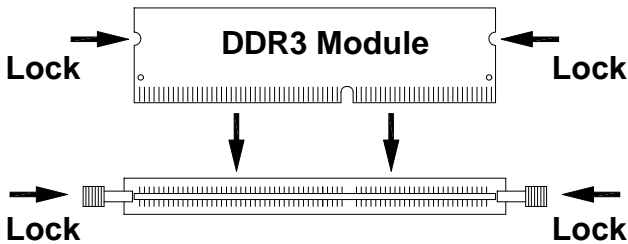
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The MB980 board supports four DDR3 memory socket for a maximum total memory of 32GB in DDR3 DIMM memory type.

### Installing and Removing Memory Modules

To install the DDR3 modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR3 module so that the key of the DDR3 module aligned with that on the memory slot.
2. Gently push the DDR3 module in an upright position until the clips of the slot close to hold the DDR3 module in place when the DDR3 module touches the bottom of the slot.
3. To remove the DDR3 module, press the clips with both hands.



## **Setting the Jumpers**

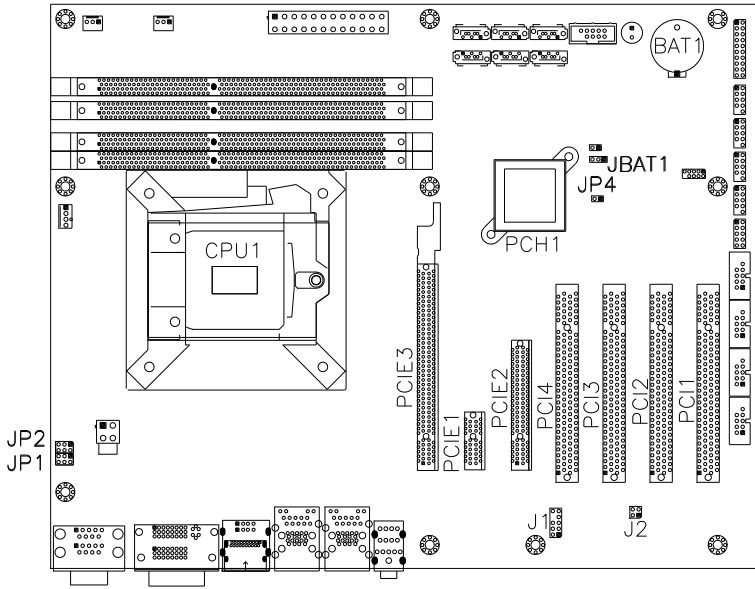
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Jumpers are used on MB980 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MB980 and their respective functions.

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

**Jumper Locations on MB980**

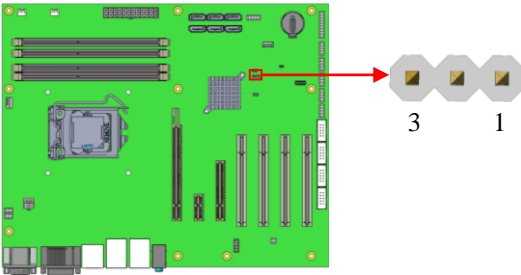


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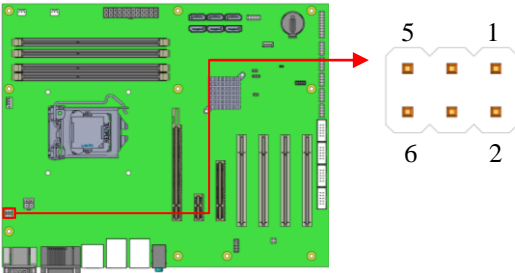
## INSTALLATIONS

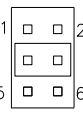
### JBAT1: Clear CMOS Contents

JBAT1	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

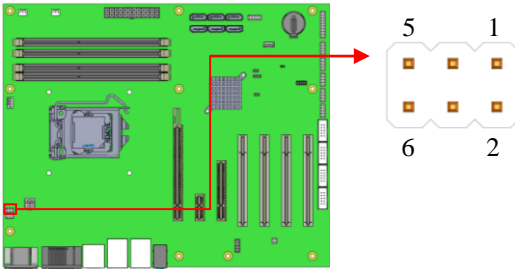


### JP1: COM1 RS232 RI/+5V/+12V Power Setting



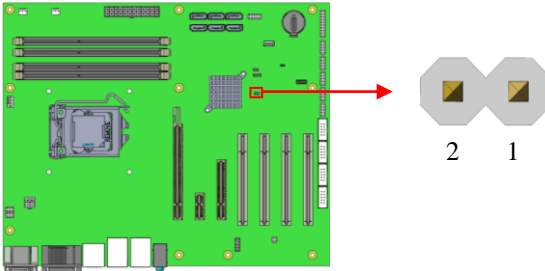
JP1	Setting	Function
	Pin 1-3 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-3 Short/Closed	+5V

**JP2: COM2 RS232 RI/+5V/+12V Power Setting**



JP2	Setting	Function
	Pin 1-3 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-3 Short/Closed	+5V

**JP4: Flash Descriptor Security Override (Factory use only)**



JP4	Flash Descriptor Security Override
Open	Disabled (Default)
Close	Enabled

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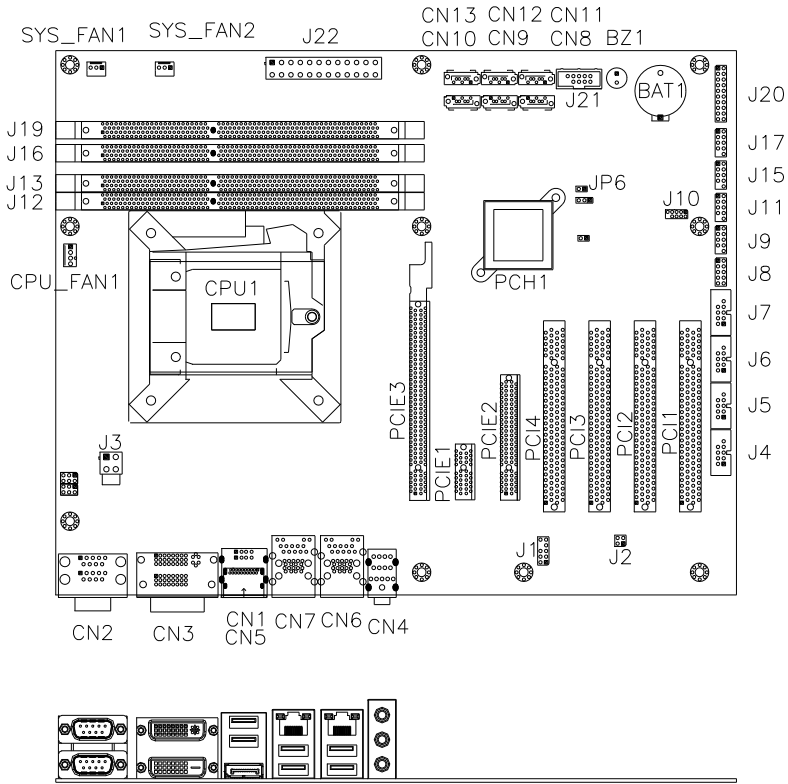
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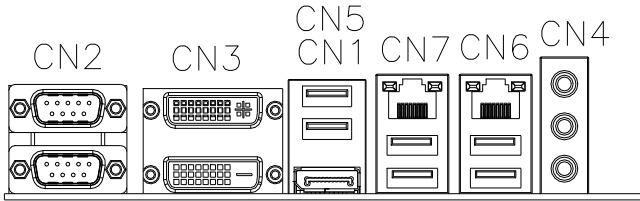
## **Connectors on MB980**

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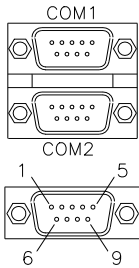
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**Connector Locations on MB980**



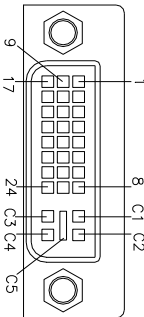


**CN2: COM1 and COM2 Serial Ports**



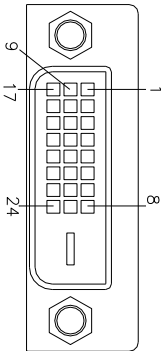
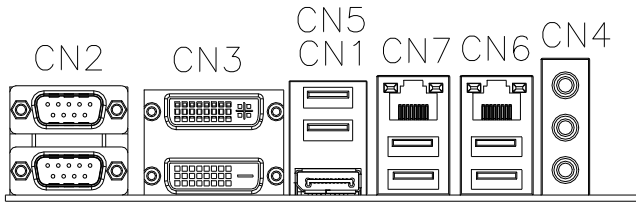
Pin #	Signal Name		
	RS-232	R2-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

**CN3: DVI-D and DVI-I Connector**



Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
VSYNC	8	23	CLOCK +
DATA 1-	9	24	CLOCK -
DATA 1+	10	C1	Red
SHIELD 1/3	11	C2	Green
DATA 3-	12	C3	Blue
DATA 3+	13	C4	HSYNC
DDC POWER	14	C5	A GROUND2
A GROUND 1	15	C6	A GROUND3

## INSTALLATIONS



Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
N.C	8	23	CLOCK +
DATA 1-	9	24	CLOCK -
DATA 1+	10	C1	N.C.
SHIELD 1/3	11	C2	N.C.
DATA 3-	12	C3	N.C.
DATA 3+	13	C4	N.C.
DDC POWER	14	C5	N.C.
A GROUND 1	15	C6	N.C.

**CN5: USB2.0 Connector**

**CN1: Display Port Connector**

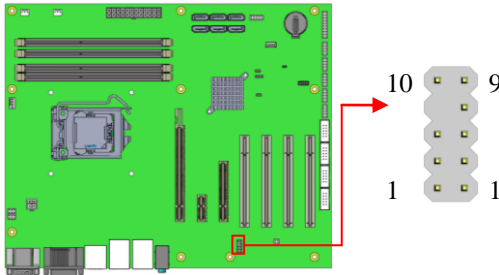
**CN7: Gigabit LAN (Intel I217LM) + USB 0/1**

**CN6: Gigabit LAN (Intel I211AT) + USB 2/3**

**CN4: HD Audio Connector**

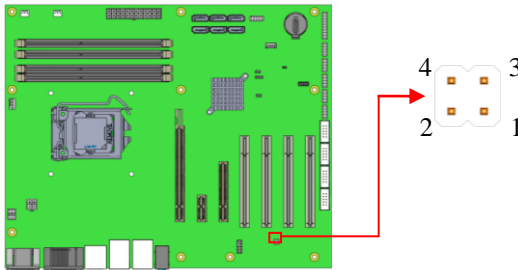
**CN8, CN9, CN10, CN11, CN12, CN13: SATA Connectors**

**J1: Audio Pin Header for Chassis Front Panel**



Signal Name	Pin #	Pin #	Signal Name
MIC IN_L	1	2	Ground
MIC IN_R	3	4	DET
LINE_R	5	6	Sense Ground
Sense	7	8	KEY
LINE_L	9	10	Sense Ground

**J2: SPDIF I/O**

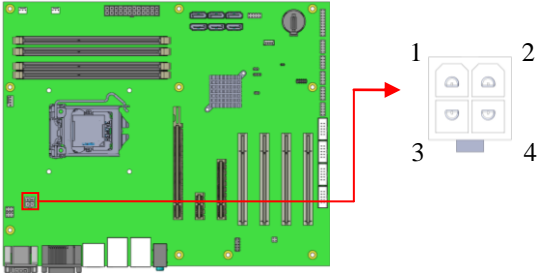


Pin #	Signal Name
1	SPDIF IN
2	Ground
3	SPDIF OUT
4	Ground

## INSTALLATIONS

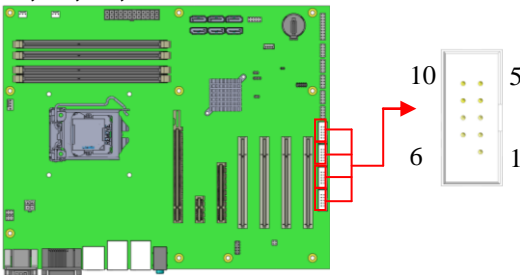
### J3: ATX 12V Power Connector

This connector supplies the CPU operating voltage.



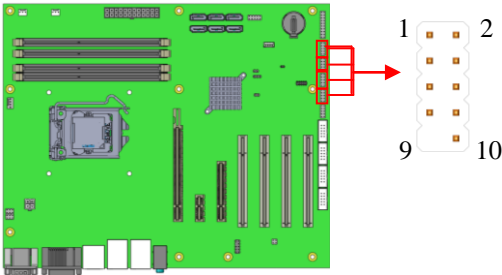
Pin #	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

### J4, J5, J6, J7: COM3~COM6 RS232 Serial Ports



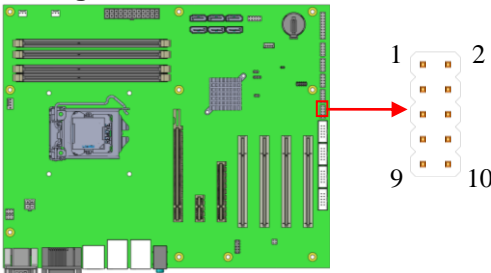
Signal Name	Pin #	Pin #	Signal Name
DCD#	1	6	DSR#
SIN	2	7	RTS#
SOUT	3	8	CTS#
DTR#	4	9	RI#
GND	5	X	KEY

**J9, J11, J15, J17: USB Connectors**



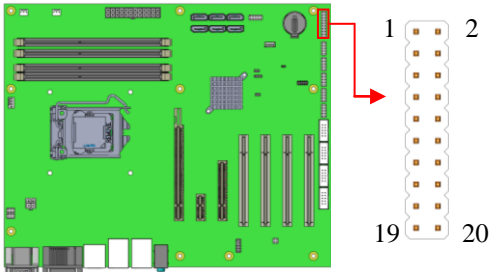
Signal Name	Pin #	Pin #	Signal Name
VCC	1	2	VCC
D0-	3	4	D1-
D0+	5	6	D1+
GND	7	8	GND
KEY	9	10	NC

**J8: Digital I/O**



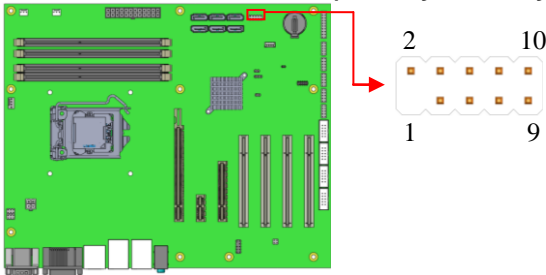
Signal Name	Pin #	Pin #	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

## J20: Front Panel Function Connector



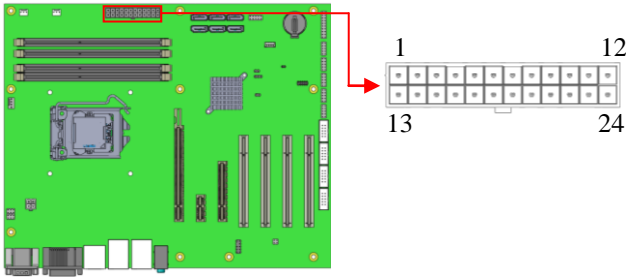
Signal Name	Pin #	Pin #	Signal Name
SPK +	2	1	PWR LED +
NC	4	3	PWR LED- (GND)
SPK - (GND)	6	5	PWR LED- (GND)
SPK - (GND)	8	7	NC
NC	10	9	NC
NC	12	11	NC
PWR_SW	14	13	PWR_SW
NC	16	15	NC
RST	18	17	GND
HDD LED -	20	19	HDD LED +

## J21: SPI Flash Connector (Factory use only)



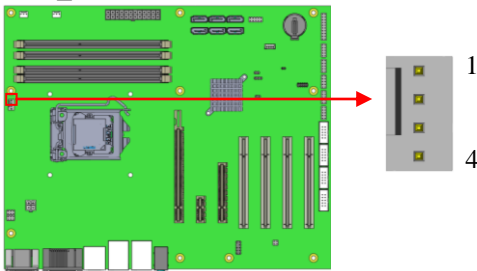


**J22: ATX Power Supply Connector**



Signal Name	Pin #	Pin #	Signal Name
3.3V	13	1	3.3V
-12V	14	2	3.3V
Ground	15	3	Ground
PS-ON	16	4	+5V
Ground	17	5	Ground
Ground	18	6	+5V
Ground	19	7	Ground
-5V	20	8	Power good
+5V	21	9	5VSB
+5V	22	10	+12V
+5V	23	11	+12V
Ground	24	12	+3.3V

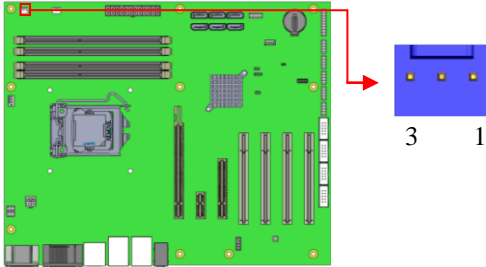
**CPU\_FAN1: CPU Fan Power Connector**



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

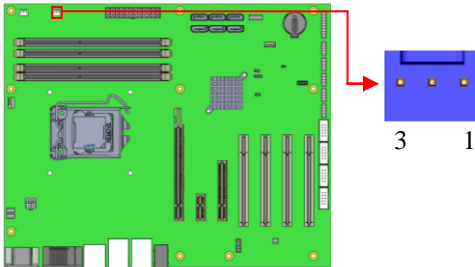
## INSTALLATIONS

### SYS\_FAN1: System Fan1 Power Connector



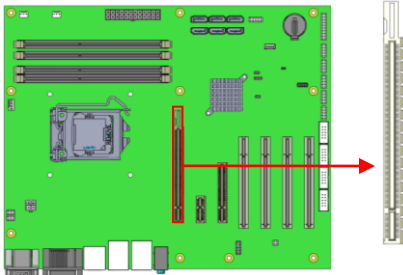
Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

### SYS\_FAN2: System Fan2 Power Connector

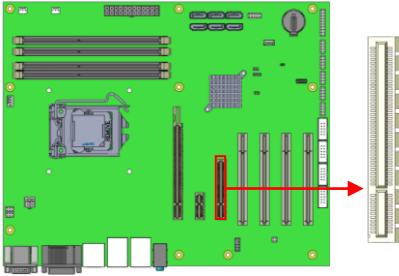


Pin #	Signal Name
1	Ground
2	+12V
3	NC

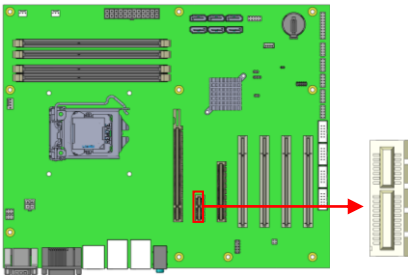
### PCIE3: PCI-E X16 Slot



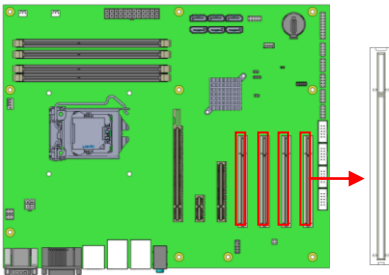
**PCIE2: PCI-E X8 Slot (PCI-E X4)**



**PCIE1: PCI-E X1 Slot**



**PCI1-PCI4: PCI 32-bit Slot**



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# BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

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### **BIOS Introduction**

The BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

### **BIOS Setup**

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

Press <DEL> to Enter Setup

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

**Warning:** *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

**Main Settings**

Aptio Setup Utility – Copyright © 2011 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
BIOS Information				Choose the system default language	
System Language			[English]		→ ← Select Screen
System Date			[Tue 01/20/2009]		↑ ↓ Select Item
System Time			[21:52:06]		Enter: Select
Access Level			Administrator		+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

**System Language**

Choose the system default language.

**System Date**

Set the Date. Use Tab to switch between Data elements.

**System Time**

Set the Time. Use Tab to switch between Data elements.

## Advanced Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
<ul style="list-style-type: none"> <li>▶ PCI Subsystem Settings</li> <li>▶ ACPI Settings</li> <li>▶ Trusted Computing</li> <li>▶ Wake up event setting</li> <li>▶ CPU Configuration</li> <li>▶ SATA Configuration</li> <li>▶ Shutdown Temperature Configuration</li> <li>▶ iSmart Controller</li> <li>▶ AMT Configuration</li> <li>▶ USB Configuration</li> <li>▶ F81866 Super IO Configuration</li> <li>▶ F81866 H/W Monitor</li> </ul>					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

## PCI Subsystem Settings

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
PCI Bus Driver Version		V 2.0502			
PCI Common Settings PCI Latency Timer VGA Palette Snoop PERR# Generation SERR# Generation ▶ PCI Express Settings					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
		32 PCI Bus Clocks			
		Disabled			
		Disabled			
		Disabled			

## Above 4G Decoding

Enables or Disables 64bit capable devices to be decoded in above 4G address space (only if system supports 64 bit PCI decoding).



**PCI Latency Timer**

Value to be programmed into PCI Latency Timer Register.

**VGA Palette Snoop**

Enables or disables VGA Palette Registers Snooping.

**PERR# Generation**

Enables or disables PCI device to generate PERR#.

**SERR# Generation**

Enables or disables PCI device to generate SERR#.

**PCI Express Settings**

Change PCI Express devices settings.

**PCI Express Settings**

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
PCI Express Device Register Settings					
	Relaxed Ordering		Disabled		
	Extended Tag		Disabled		
	No Snoop		Enabled		
	Maximum Payload		Auto		→ ← Select Screen
	Maximum Read Request		Auto		↑ ↓ Select Item
PCI Express Link Register Settings					
	ASPM Support		Disabled		Enter: Select
	WARNING: Enabling ASPM may cause some PCI-E devices to fail		Disabled		+ - Change Field
	Extended Synch		Disabled		F1: General Help
	Link Training Retry		5		F2: Previous Values
	Link Training Timeout (uS)		100		F3: Optimized Default
	Unpopulated Links		Keep Link ON		F4: Save ESC: Exit
	Restore PCIe Registers		Disabled		

**Relaxed Ordering**

Enables or disables PCI Express Device Relaxed Ordering.

**Extended Tag**

If ENABLED allows device to use 8-bit Tag field as a requester.

**No Snoop**

Enables or disables PCI Express Device No Snoop option.

### **Maximum Payload**

Set Maximum Payload of PCI Express Device or allow System BIOS to select the value.

### **Maximum Read Request**

Set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value.

### **ASPM Support**

Set the ASPM Level: Force L0s – Force all links to L0s State:  
AUTO – BIOS auto configure : DISABLE – Disables ASPM.

### **Extended Synch**

If ENABLED allows generation of Extended Synchronization patterns.

### **Link Training Retry**

Defines number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.

### **Link Training Timeout (uS)**

Defines number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Value range from 10 to 1000 uS.

### **Unpopulated Links**

In order to save power, software will disable unpopulated PCI Express links, if this option set to 'Disable Link'.

### **Restore PCIE Registers**

On non-PCI Express aware OS's (Pre Windows Vista) some devices may not be correctly reinitialized after S3. Enabling this restores PCI Express device configuration on S3 resume. Warning : Enabling this may cause issues with other hardware after S3 resume.

**ACPI Settings**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
ACPI Settings					
Enable Hibernation			Enabled		→ ← Select Screen
ACPI Sleep State			S3 (Suspend to R...)		↑ ↓ Select Item
Lock Legacy Resources			Disabled		Enter: Select
S3 Video Repost			Disabled		+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

**Enable Hibernation**

Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

**ACPI Sleep State**

Select ACPI sleep state the system will enter, when the SUSPEND button is pressed.

**Lock Legacy Resources**

Enabled or Disabled Lock of Legacy Resources.

**S3 Video Repost**

Enable or disable S3 Video Repost.

**Trusted Computing**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit	
TPM Configuration		TPM SUPPORT			Disabled	→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
Current TPM Status Information		TPM SUPPORT OFF				

**TPM Support**

This configuration is supported only with MB980VF. Enables or Disables TPM support. O.S. will not show TPM. Reset of platform is required.

**Security Device Support**

Enables or disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

**Wake up event settings**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit	
Wake on Ring		Wake on PCI PME			Disabled	→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
Wake on PCI PME		Wake on PCIE Wake Event			Disabled	
Wake on PCIE Wake Event					Disabled	

**Wake on PCIE PME Wake Event**

The options are Disabled and Enabled.

**CPU Configuration**

This section shows the CPU configuration parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Genuine Intel(R) CPU 0000 @ 2.6GHz					
CPU Signature			306c2		
Microcode Patch			Fff0006		
Max CPU Speed			2600 MHz		
Min CPU Speed			800 MHz		
CPU Speed			3400 MHz		
Processor Cores			4		
Intel HT Technology			Not Supported		
Intel VT-x Technology			Supported		
Intel SMX Technology			Supported		
64-bit			Supported		
EIST			Supported		
CPU C3 State			Supported		
CPU C6 State			Supported		
CPU C7 State			Supported		
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit
Active Processor Cores			All		
Limit CPUID Maximum			Disabled		
Execute Disable Bit			Enabled		
Intel Virtualization Technology			Enabled		
Hardware Prefetcher			Disabled		
Adjacent Cache Line Prefetch			Enabled		
EIST			Enabled		
Turbo Mode			Enabled		
Intel TXT(LT) Support			Disabled		

**Active Processor Cores**

Number of cores to enable in each processor package.

**Limit CPUID Maximum**

Disabled for Windows XP.

**Execute Disable Bit**

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, Re33dHat Enterprise 3 Update 3.)

**Intel Virtualization Technology**

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

## BIOS SETUP

### Hardware Prefetcher

To turn on/off the Mid level Cache (L2) streamer Prefetcher.

### Adjacent Cache Line Prefetch

To turn on/off prefetching of adjacent cache lines.

### EIST

Enabled/Disabled Intel Speedstep

### Intel TXT(LT) Support

Enables or Disables Intel (R)TXT (LT) Support.

## SATA Configuration

SATA Devices Configuration.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
		SATA Controller(s)	Enabled		
		SATA Mode Selection	AHCI		
		Aggressive LPM Support	Enabled		
		SATA Controller Speed	Gen3		
		SATA Port0	Empty		→ ← Select Screen
		Software Preserve	Unknown		↑ ↓ Select Item
		SATA Port1	Empty		Enter: Select
		Software Preserve	Unknown		+ - Change Field
		SATA Port2	Empty		F1: General Help
		Software Preserve	Unknown		F2: Previous Values
		SATA Port3	Empty		F3: Optimized Default
		Software Preserve	Unknown		F4: Save ESC: Exit
		SATA Port4	Empty		
		Software Preserve	Unknown		
		SATA Port5	Empty		
		Software Preserve	Unknown		

### SATA Controller(s)

Enable / Disable Serial ATA Controller.

### SATA Mode Selection

- (1) IDE Mode.
- (2) AHCI Mode.
- (3) RAID Mode.

## Shutdown Temperature Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
APCI Shutdown Temperature			Disabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

### ACPI Shutdown Temperature

The default setting is Disabled.

## iSmart Controller

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
iSmart Controller					
Eup/Erp standby power control			Keep standby power		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
Power-On after Power failure			Disable		
Schedule Slot 1			None		
Schedule Slot 2			None		

### Eup/Erp standby power control

Eup/Erp control on S5[Keep standby power] Enable all of the standby power and ignore Eup/Erp specification .[Ethernet Only] Only provide the standby power for Ethernet chip.[Disabled] Shutdown all of the standby power.

### iSmart Controller

Setup the power on time for the system.

### Schedule Slot 1 / 2

Setup the hour/minute for system power on.

**AMT Configuration**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
			Intel AMT	Enabled	
			BIOS Hotkey Pressed	Disabled	
			MEBx Selection Screen	Disabled	
			Hide Un-Configure ME Confirmation	Disabled	
			Un-Configure ME	Disabled	
			Amt Wait Timer	0	
			Activate Remote Assistance Process	Disabled	
			USB Configure	Enabled	→ ← Select Screen
			PET Progress	Enabled	↑ ↓ Select Item
			AMT CIRA Timeout	0	Enter: Select
			Watchdog	Disabled	+ - Change Field
			OS Timer	0	F1: General Help
			BIOS Timer	0	F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

**AMT Configuration**

This configuration is supported only with MB980VF (with iAMT function). Options are Enabled and Disabled.

Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.

**Unconfigure ME**

This configuration is supported only with MB980VF (with iAMT function). Perform AMT/ME unconfigure without password operation.

**Amt Wait Timer**

Set timer to wait before sending ASF\_GET\_BOOT\_OPTIONS.

**Activate Remote Assistance Process**

Trigger CIRA boot.

**PET Progress**

User can Enable/Disable PET Events progress to receive PET events or not.

**Watchdog Timer**

This configuration is supported only with MB980VF (with iAMT function). Enable/Disable Watchdog Timer.



**USB Configuration**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
USB Configuration					
USB Devices: 2 Hubs					
Legacy USB Support			Enabled		
USB3.0 Support			Enabled		
XHCI Hand-off			Enabled		→ ← Select Screen
EHCI Hand-off			Enabled		↑ ↓ Select Item
USB Mass Storage Driver Support			Enabled		Enter: Select
USB hardware delays and time-outs:					+ - Change Field
USB Transfer time-out			20 sec		F1: General Help
Device reset time-out			20 sec		F2: Previous Values
Device power-up delay			Auto		F3: Optimized Default
					F4: Save ESC: Exit

**Legacy USB Support**

Enables Legacy USB support.

AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

**USB3.0 Support**

Enable/Disable USB3.0 (XHCI) Controller support.

**XHCI Hand-off**

This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

### **EHCI Hand-off**

Enabled/Disabled. This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

### **USB Mass Storage Driver Support**

Enable/Disable USB Mass Storage Driver Support.

### **USB Transfer time-out**

The time-out value for Control, Bulk, and Interrupt transfers.

### **Device reset time-out**

USB mass Storage device start Unit command time-out.

### **Device power-up delay**

Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

**F81866 Super IO Configuration**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Super IO Configuration					
F81866 Super IO Chip		F81866			
<ul style="list-style-type: none"><li>▶ Serial Port 1 Configuration</li><li>▶ Serial Port 2 Configuration</li><li>▶ Serial Port 3 Configuration</li><li>▶ Serial Port 4 Configuration</li><li>▶ Serial Port 5 Configuration</li><li>▶ Serial Port 6 Configuration</li></ul>					
				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit	

**Serial Port Configuration**

Set Parameters of Serial Ports. User can Enable/Disable the serial port and Select an optimal settings for the Super IO Device.

**F81866 H/W Monitor**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
PC Health Status					
CPU temperature			+33 C		
SYS temperature			+34 C		
FAN1 Speed			2170 RPM		
FAN2 Speed			N/A		
FAN3 Speed			N/A		
Vcore			+1.800 V		
+5V			+5.087 V		
+12V			+12.408 V		→ ← Select Screen
1.5V			+1.560 V		↑ ↓ Select Item
VS5V			+5.016 V		Enter: Select
VCC3V			+3.392		+ - Change Field
Fan 1 smart fan control			Disabled		F1: General Help
Fan 2 smart fan control			Disabled		F2: Previous Values
Fan 3 smart fan control			Disabled		F3: Optimized Default
					F4: Save ESC: Exit

**Temperatures/Voltages**

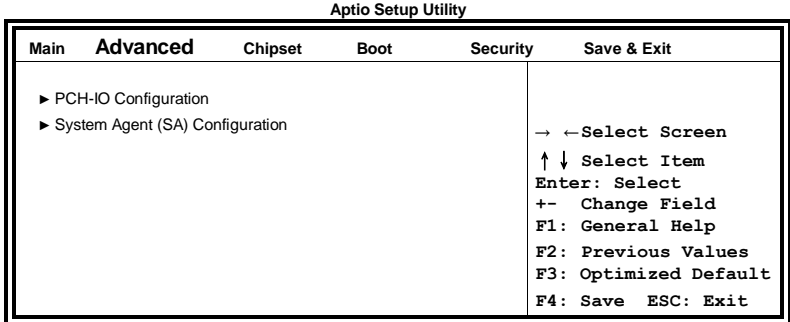
These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

**Fan1/Fan2/Fan3 Smart Fan Control**

This field enables or disables the smart fan feature. At a certain temperature, the fan starts turning. Once the temperature drops to a certain level, it stops turning again.

## Chipset Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



**PCH-IO Configuration**

This section allows you to configure the North Bridge Chipset.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
		Intel PCH RC Version	1.0.1.0		
		Intel PCH SKU Name	Q87		
		Intel PCH Rev ID	02/B0		
		▶ PCI Express Configuration			
		▶ USB Configuration			
		▶ PCH Azalia Configuration			
		Toggle EC	Disabled		
		PCH LAN Controller	Enabled		
		Wake on LAN	Enabled		
		SLP_LAN# Low on DC Power	Enabled		
		GP27 Wake From DeepSx	Enabled		→ ← Select Screen
		High Precision Event Timer Configuration			↑ ↓ Select Item
		SLP_S4 Assertion Width	4-5 Seconds		Enter: Select
		Port 80h Redirection	LPC Bus		+ - Change Field
		NFC Device	Disabled		F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

**Toggle EC**

Enable or Disable Toggle EC

**PCH LAN Controller**

Enable or disable onboard NIC.

**Wake on LAN**

Enable or disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)

**SLP\_LAN# Low on DC Power**

Enable or Disable SLP\_LAN# Low on DC Power

**GP27 Wake From DeepSx**

Wake from DeepSx by the assertion of GP27 pin

**SLP\_S4 Assertion Width**

Select a minimum assertion width of the SLP\_S4# signal.

**PCI Express Configuration**

Main	Advanced	Chipset	Boot	Security	Save & Exit
PCI Express Configuration					
		PCI Express Clock Gating	Enabled		
		DMI Link ASPM Control	Enabled		
		DMI Link Extended Synch Control	Disabled		
		PCIe-USB Glitch W/A	Disabled		
		Subtractive Decode	Disabled		
		▶ PCI Express Root Port 1			
		▶ PCI Express Root Port 2			
		▶ PCI Express Root Port 3			
		▶ PCI Express Root Port 4			
		▶ PCI Express Root Port 5			
		▶ PCI-E Port 6 is assigned to LAN			
		▶ PCI Express Root Port 7			
		▶ PCI Express Root Port 8			
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

**PCI Express Clock Gating**

Enable or disable PCI Express Clock Gating for each root port.

**DMI Link ASPM Control**

The control of Active State Power Management on both NB side and SB side of the DMI link.

**PCIe-USB Glitch W/A**

PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG port.

**USB Configuration**

Main	Advanced	Chipset	Boot	Security	Save & Exit
USB Configuration					
USB Precondition			Disabled		
xHCI Mode			Auto		
USB Ports Per-Port Disable Control			Disabled		
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

**USB Precondition**

Precondition work on USB host controller and root ports for faster enumeration.

**xHCI Mode**

Mode of operation of xHCI controller.

**USB Ports Per-Port Disable Control**

Control each of the USB ports (0~13) disabling.



**PCH Azalia Configuration**

Main	Advanced	Chipset	Boot	Security	Save & Exit
PCH Azalia Configuration					
Azalia			Auto		
Azalia Docking Support			Enabled		
Azalia PME			Enabled		
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

**Azalia**

Control Detection of the Azalia device.

Disabled = Azalia will unconditionally be disabled.

Enabled Azalia will be unconditionally be enabled.

Auto = Azalia will be enabled if present, disabled otherwise.

**Azalia Docking Support**

Enable or Disable Azalia Docking Support of Audio Controller.

**Azalia PME**

Enable or Disable power Management capability of Audio Controller.

**System Agent (SA) Configuration**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
		System Agent Bridge Name	IvyBridge		
		System Agent RC Version	1.1.0.0		
		VT-d Capability	Supported		
		VT-d	Enabled		
		CHAP Device (B0:D7:F0)	Disabled		→ ← Select Screen
		Thermal Device (B0:D4:F0)	Disabled		↑ ↓ Select Item
		Enable NB CRID	Disabled		Enter: Select
		BDAT ACPI Table Support	Disabled		+ - Change Field
		C-State Pre-Wake	Enabled		F1: General Help
		▶ Graphics Configuration			F2: Previous Values
		▶ Memory Configuration			F3: Optimized Default
					F4: Save ESC: Exit

**VT-d**

Check to enable VT-d function on MCH.

**Enable NB CRID**

Enable or disable NB CRID WorkAround.

**C-State Pre-Wake**

Controls C-State Pre-Wake feature for ARAT, in SSKPD[57].

**Graphics Configuration**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Graphics Configuration					
IGFX VBIOS Version			2164		
IGfx Frequency			800 MHz		
Primary Display			Auto		
Primary PEG			Auto		
Primary PCIE			Auto	→ ← Select Screen	
Internal Graphics			Auto	↑ ↓ Select Item	
GTT Size			2MB	Enter: Select	
Aperture Size			256MB	+- Change Field	
DVMT Pre-Allocated			64M	F1: General Help	
DVMT Total Gfx Mem			256MB	F2: Previous Values	
Gfx Low Power Mode			Disabled	F3: Optimized Default	
▶ LCD Control				F4: Save ESC: Exit	

**Primary Display**

Select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable Gfx.

**Primary PEG**

Select PEGO/PEG1/PEG2/PEG3 Graphics device should be Primary PEG.

**Primary PCIE**

Select PCIE0/PCIE1/PCIE2/PCIE3/PCIE4/PCIE5/PCIE6/PCIE7 Graphics device should be primary PCIE.

**Internal Graphics**

Keep IGD enabled based on the setup options.

**DVMT Pre-Allocated**

Select DVMT 5.0 Pre-Allocated (Fixed) graphics memory size used by the internal graphics device.

**DVMT Total Gfx Mem**

Select DVMT 5.0 total graphics memory size used by the internal graphics device.

### Gfx Low Power Mode

This option is applicable for SFF only.

### Primary IGFX Boot Display (LCD Control)

Select the Video Device that will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.

## Memory Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Memory Information					
Memory Frequency		1333 MHz			
Total Memory		8192 MB (DDR3)			
DIMM#0		2048 MB (DDR3)			
DIMM#1		2048 MB (DDR3)			
DIMM#2		2048 MB (DDR3)			
DIMM#3		2048 MB (DDR3)			
CAS Latency (tCL)		9			
Minimum delay time					
CAS to RAS (tRCDmin)		9			
Row Precharge (tRPmin)		9			
Active to Precharge (tRASmin)		24			
				→ ← Select Screen	
				↑ ↓ Select Item	
				Enter: Select	
				+- Change Field	
				F1: General Help	
				F2: Previous Values	
				F3: Optimized Default	
				F4: Save ESC: Exit	

## Boot Settings

This section allows you to configure the boot settings.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Boot Configuration					
Setup Prompt Timeout			1		
Bootup NumLock State			On		
Quiet Boot			Disabled		
Fast Boot			Disabled		
Boot Option Priorities					→ ← Select Screen
Boot Option #1					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit
Hard Drive BBS Priorities					
▶ CSM16 parameters					
CSM parameters					

### Setup Prompt Timeout

Number of seconds to wait for setup activation key.

65535(0xFFFF) means indefinite waiting.

### Bootup NumLock State

Select the keyboard NumLock state.

### Quiet Boot

Enables/Disables Quiet Boot option.

### Fast Boot

Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

### Boot Option Priorities

Sets the system boot order.

## CSM parameters

This section allows you to configure the boot settings.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Launch CSM			Always		
Boot option filter			UEFI and Legacy		
Launch PXE OpROM policy			Do not launch		
Launch Storage OpROM policy			Legacy only		
Launch Video OpROM policy			Legacy only		
Other PCI device ROM priority			Legacy OpROM		
					→ ← Select Screen
					↑ ↓ Select Item
					Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

### Boot option filter

This option controls what devices system can boot to.

### Launch PXE OpROM policy

Controls the execution of UEFI and Legacy PXE OpROM.

### Launch Storage OpROM policy

Controls the execution of UEFI and Legacy Storage OpROM.

### Launch Video OpROM policy

Controls the execution of UEFI and Legacy Video OpROM.

### Other PCI device ROM priority

For PCI devices other than Network, Mass storage or Video defines which OpROM to launch.



**Save & Exit Settings****Aptio Setup Utility**

Main	Advanced	Chipset	Boot	Security	Save & Exit
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset  Save Options Save Changes Discard Changes  Restore Defaults Save as User Defaults Restore User Defaults					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

**Save Changes and Exit**

Exit system setup after saving the changes.

**Discard Changes and Exit**

Exit system setup without saving any changes.

**Save Changes and Reset**

Reset the system after saving the changes.

**Discard Changes and Reset**

Reset system setup without saving any changes.

**Save Changes**

Save Changes done so far to any of the setup options.

**Discard Changes**

Discard Changes done so far to any of the setup options.

**Restore Defaults**

Restore/Load Defaults values for all the setup options.

**Save as User Defaults**

Save the changes done so far as User Defaults.

**Restore User Defaults**

Restore the User Defaults to all the setup options.



## Drivers Installation

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

Intel Chipset Software Installation Utility .....	54
VGA Drivers Installation .....	56
Realtek HD Audio Driver Installation .....	59
LAN Drivers Installation.....	61
Intel® Management Engine Interface .....	64
Intel® USB 3.0 Drivers .....	66

### **IMPORTANT NOTE:**

After installing your Windows operating system, you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

## **Intel Chipset Software Installation Utility**

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation.

1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.



2. Click **Intel(R) Chipset Software Installation Utility**.



3. When the Welcome screen to the Intel® Chipset Device Software appears, click **Next** to continue.
4. Click **Yes** to accept the software license agreement and proceed with the installation process.
5. On the Readme File Information screen, click **Next** to continue the installation.



6. The Setup process is now complete. Click **Finish** to restart the computer and for changes to take effect.

## VGA Drivers Installation

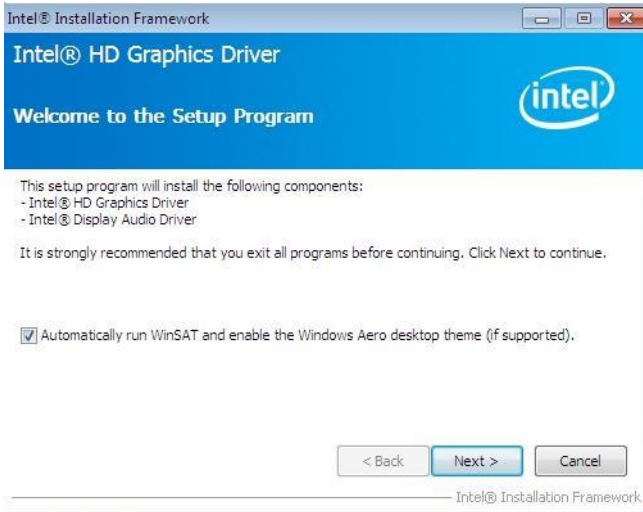
1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R) 8 Series Chipset Drivers*.



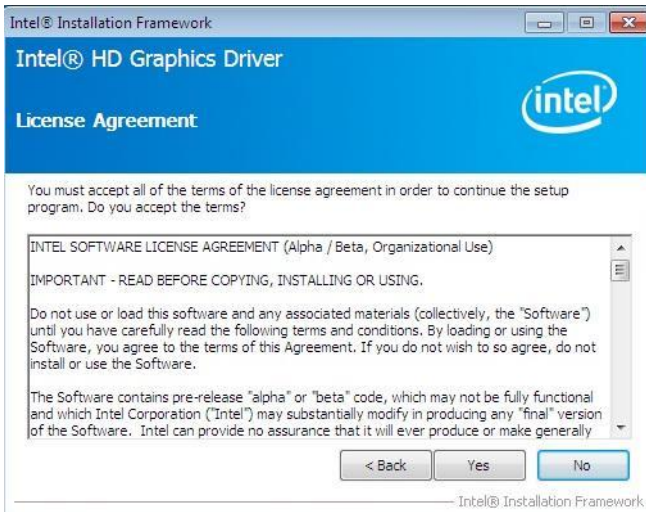
2. Click *Intel(R) Core(TM) i3/i5/i7 Graphics Driver*.



3. When the Welcome screen appears, click *Next* to continue.



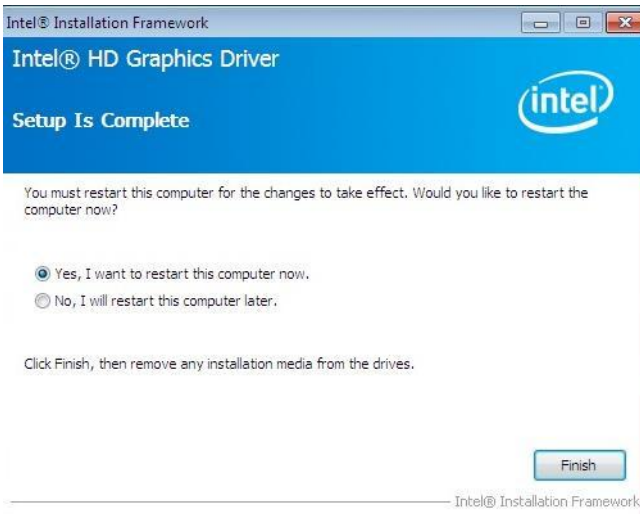
4. Click *Yes* to to agree with the license agreement and continue the installation.



5. On the screen shown below, click **Install** to continue.



6. Setup complete. Click **Finish** to restart the computer and for changes to take effect.



## Realtek HD Audio Driver Installation

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R) 8 Series Chipset Drivers*.

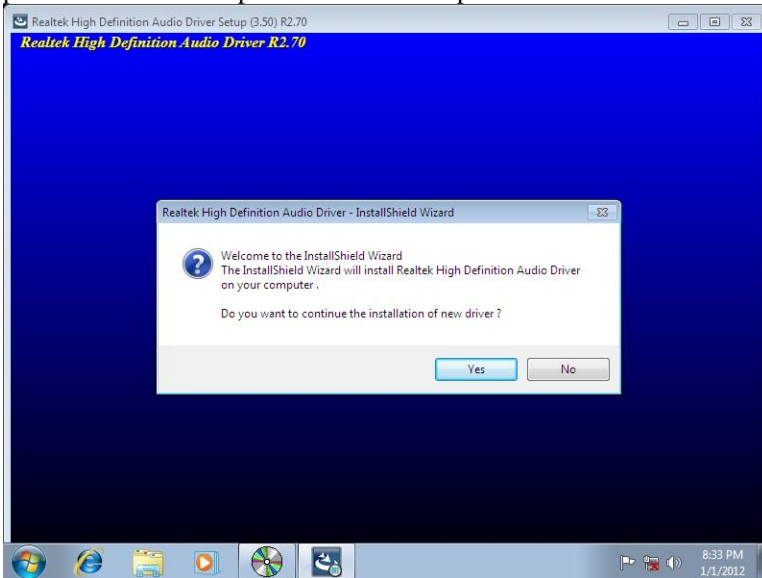


2. Click *Realtek High Definition Audio Driver*.

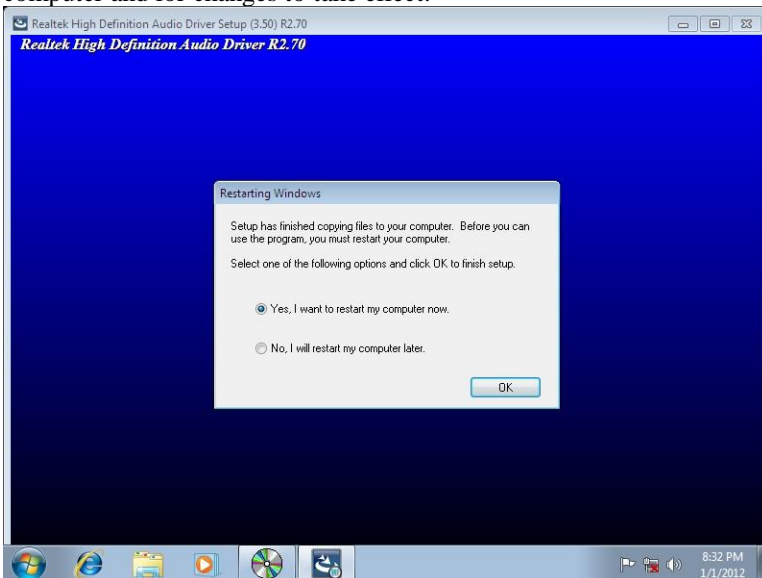


## DRIVER INSTALLATION

3. On the Welcome to the InstallShield Wizard screen, click **Yes** to proceed with and complete the installation process.



4. The InstallShield Wizard Complete. Click **Finish** to restart the computer and for changes to take effect.





## LAN Drivers Installation

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R) 8 Series Chipset Drivers*.

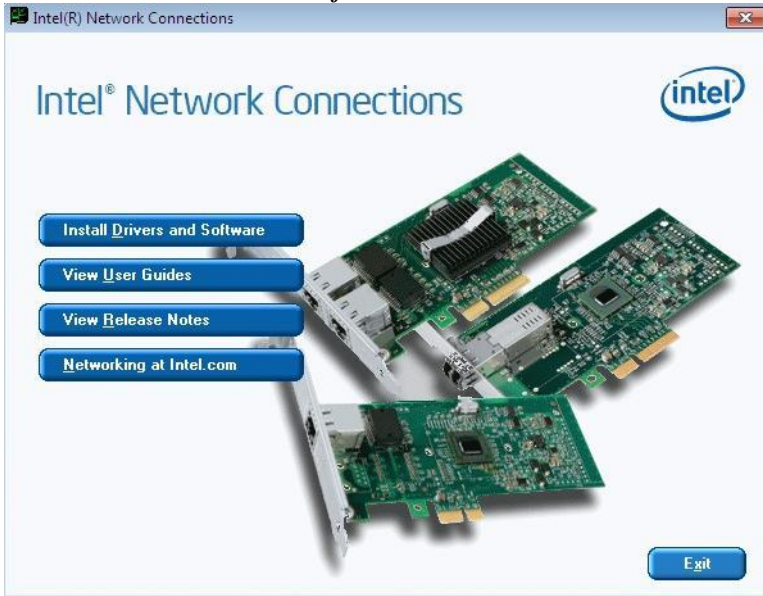


2. Click *Intel(R) PRO LAN Network Driver*.

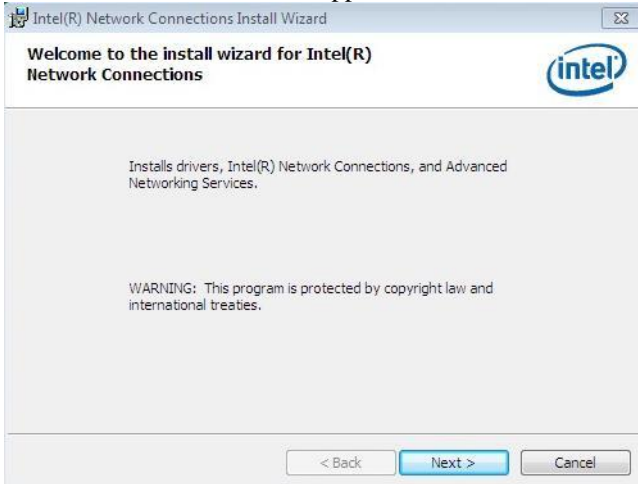


## DRIVER INSTALLATION

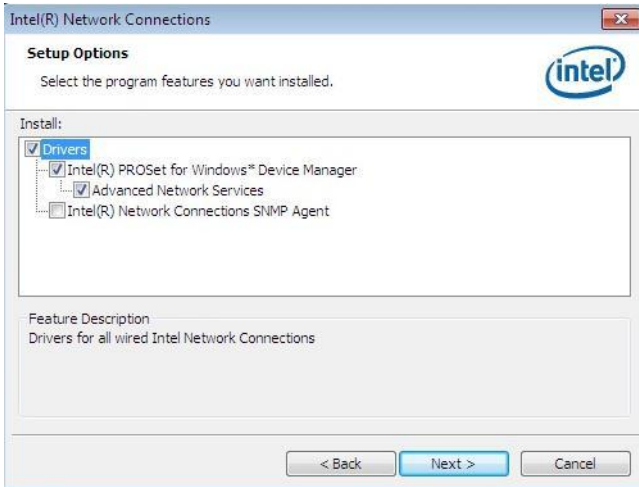
3. Click **Install Drivers and Software**.



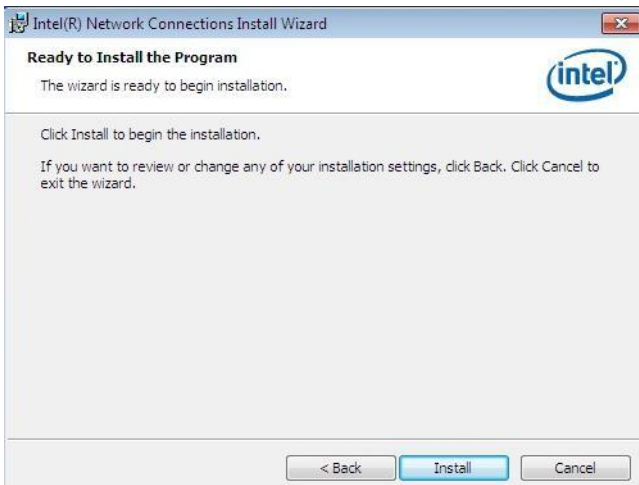
4. When the Welcome screen appears, click **Next**.



5. Click **Next** to agree with the license agreement.
6. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.



7. The wizard is ready to begin installation. Click **Install** to begin the installation.



8. When InstallShield Wizard is complete, click **Finish**.

## Intel® Management Engine Interface

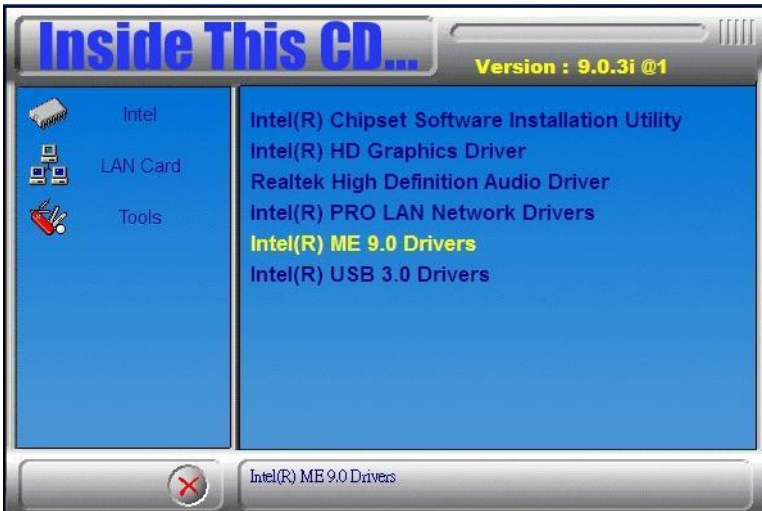
---



The following application requires Microsoft .NET Framework 3.5 or later: Intel® Management Engine Components. Please install the latest version of Microsoft .NET Framework from Microsoft Download Center to run this application correctly.

Follow the steps below to install the Intel Management Engine.

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R) 8 Series Chipset Drivers* and then *Intel(R) AMT 9.0 Drivers*.



- When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click the checkbox for **Install Intel® Control Center** & click **Next**.



- Click **Yes** to agree with the license agreement.



- When the Setup Progress screen appears, click **Next**. Then, click **Finish** when the setup progress has been successfully installed.

## Intel® USB 3.0 Drivers

1. Insert the DVD that comes with the board. Click *Intel* and then *Intel(R) 8 Series Chipset Drivers*.



2. Click *Intel(R) USB 3.0 Drivers*.



3. When the Welcome screen to the InstallShield Wizard for Intel® USB 3.0 eXtensible Host Controller Driver, click *Next*.



4. Click *Yes* to agree with the license agreement and continue the installation.





## **DRIVER INSTALLATION**

---

5. On the Readme File Information screen, click *Next* to continue the installation of the Intel® USB 3.0 eXtensible Host Controller Driver.

6. Setup complete. Click *Finish* to restart the computer and for changes to take effect.





## Appendix

### A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

<b>Address</b>	<b>Device Description</b>
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
2F8h - 2FFh	Serial Port #2(COM2)
2B0h- 2DFh	Graphics adapter Controller
360h - 36Fh	Network Ports
3F8h - 3FFh	Serial Port #1(COM1)

## **B. Interrupt Request Lines (IRQ)**

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

<b>Level</b>	<b>Function</b>
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ8	Real Time Clock
IRQ14	Primary IDE
IRQ15	Secondary IDE

## C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

### SAMPLE CODE:

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81866.H"
//-----
int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//-----
int main (int argc, char *argv[])
{
    unsigned char bBuf;
    unsigned char bTime;
    char **endptr;

    char SIO;

    printf("Fintek 81866 watch dog program\n");

    SIO = Init_F81866();
    if (SIO == 0)
    {
        printf("Can not detect Fintek 81866, program abort.\n");
        return(1);
    }/if (SIO == 0)

    if (argc != 2)
    {
        printf(" Parameter incorrect!!\n");
        return (1);
    }

    bTime = strtol (argv[1], endptr, 10);
    printf("System will reset after %d seconds\n", bTime);

    if (bTime)
    {
        EnableWDT(bTime); }
    else
    {
        DisableWDT(); }

    return 0;
}
```

```
}
//-----
void EnableWDT(int interval)
{
    unsigned char bBuf;

    bBuf = Get_F81866_Reg(0x2B);
    bBuf &= (~0x20);
    Set_F81866_Reg(0x2B, bBuf); //Enable WDTO

    Set_F81866_LD(0x07); //switch to logic device 7
    Set_F81866_Reg(0x30, 0x01); //enable timer

    bBuf = Get_F81866_Reg(0xF5);
    bBuf &= (~0x0F);
    bBuf |= 0x52;
    Set_F81866_Reg(0xF5, bBuf); //count mode is second

    Set_F81866_Reg(0xF6, interval); //set timer

    bBuf = Get_F81866_Reg(0xFA);
    bBuf |= 0x01;
    Set_F81866_Reg(0xFA, bBuf); //enable WDTO output

    bBuf = Get_F81866_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81866_Reg(0xF5, bBuf); //start counting
}
//-----
void DisableWDT(void)
{
    unsigned char bBuf;

    Set_F81866_LD(0x07); //switch to logic device 7

    bBuf = Get_F81866_Reg(0xFA);
    bBuf &= ~0x01;
    Set_F81866_Reg(0xFA, bBuf); //disable WDTO output

    bBuf = Get_F81866_Reg(0xF5);
    bBuf &= ~0x20;
    bBuf |= 0x40;
    Set_F81866_Reg(0xF5, bBuf); //disable WDT
}
//-----
```

```

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81866.H"
#include <dos.h>
//-----
unsigned int F81866_BASE;
void Unlock_F81866 (void);
void Lock_F81866 (void);
//-----
unsigned int Init_F81866(void)
{
    unsigned int result;
    unsigned char ucDid;

    F81866_BASE = 0x4E;
    result = F81866_BASE;

    ucDid = Get_F81866_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81866
    {
        goto Init_Finish;
    }

    F81866_BASE = 0x2E;
    result = F81866_BASE;

    ucDid = Get_F81866_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81866
    {
        goto Init_Finish;
    }

    F81866_BASE = 0x00;
    result = F81866_BASE;
}

Init_Finish:
    return (result);
}
//-----
void Unlock_F81866 (void)
{
    outportb(F81866_INDEX_PORT, F81866_UNLOCK);
    outportb(F81866_INDEX_PORT, F81866_UNLOCK);
}
//-----
void Lock_F81866 (void)
{
    outportb(F81866_INDEX_PORT, F81866_LOCK);
}
//-----
void Set_F81866_LD( unsigned char LD)
{
    Unlock_F81866();
    outportb(F81866_INDEX_PORT, F81866_REG_LD);
    outportb(F81866_DATA_PORT, LD);
    Lock_F81866();
}
//-----
void Set_F81866_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_F81866();
    outportb(F81866_INDEX_PORT, REG);
    outportb(F81866_DATA_PORT, DATA);
    Lock_F81866();
}
//-----

```

## APPENDIX

---

```
unsigned char Get_F81866_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_F81866();
    outportb(F81866_INDEX_PORT, REG);
    Result = inportb(F81866_DATA_PORT);
    Lock_F81866();
    return Result;
}
//-----

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#ifndef __F81866_H
#define __F81866_H                1
//-----
#define F81866_INDEX_PORT        (F81866_BASE)
#define F81866_DATA_PORT        (F81866_BASE+1)
//-----
#define F81866_REG_LD            0x07
//-----
#define F81866_UNLOCK            0x87
#define F81866_LOCK              0xAA
//-----
unsigned int Init_F81866(void);
void Set_F81866_LD( unsigned char);
void Set_F81866_Reg( unsigned char, unsigned char);
unsigned char Get_F81866_Reg( unsigned char);
//-----
#endif __F81866_H
```