

MB970

**Intel® Ivy Bridge / PCH
ATX Motherboard**

USER'S MANUAL

Version 1.0

Acknowledgments

AMI is a registered trademark of American Megatrends Inc.

PS/2 is a trademark of International Business Machines Corporation.

Intel and Intel® Ivy Bridge (Sandy Bridge) DC/QC Processor are registered trademarks of Intel Corporation.

Microsoft Windows is a registered trademark of Microsoft Corporation.

Fintek is a registered trademark of Fintek Electronics Corporation.

All other product names or trademarks are properties of their respective owners.

Table of Contents

Introduction	1
Product Description.....	1
Checklist.....	2
MB970 Specifications.....	3
Board Dimensions.....	5
Installations	6
Installing the CPU.....	7
Installing the Memory.....	8
Setting the Jumpers.....	9
Connectors on MB970.....	13
BIOS Setup	錯誤! 尚未定義書籤。
Drivers Installation	錯誤! 尚未定義書籤。
Intel Chipset Software Installation Utility.....	錯誤! 尚未定義書籤。
VGA Drivers Installation.....	錯誤! 尚未定義書籤。
Realtek HD Audio Driver Installation.....	錯誤! 尚未定義書籤。
LAN Drivers Installation.....	錯誤! 尚未定義書籤。
Intel® Management Engine Interface.....	錯誤! 尚未定義書籤。
ASMedia USB 3.0 Drivers.....	錯誤! 尚未定義書籤。
Appendix	錯誤! 尚未定義書籤。
A. I/O Port Address Map.....	錯誤! 尚未定義書籤。
B. Interrupt Request Lines (IRQ).....	錯誤! 尚未定義書籤。
C. Watchdog Timer Configuration.....	錯誤! 尚未定義書籤。

This page is intentionally left blank.

Introduction

Product Description

The MB970 ATX motherboard is based on the latest Intel® Q77 chipset. The platform supports 3rd generation Intel® Core processor family with LGA1155 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 Q77 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 MB970 ATX board utilizes the dramatic increase in performance provided this Intel's latest cutting-edge technology. Measuring 305mm x 244mm, the MB970 offers fast 6Gbps SATA support (2 ports), USB3.0 (2 ports) and interfaces for DVI-D, DVI-I and DP displays. MB970VF features Intel Active Management Technology 8.0.

MB970 FEATURES:

- Supports Intel® 3rd 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
- 4x SATA 2.0, 2x SATA 3.0, 10x USB 2.0, USB 3.0 (4 ports), 4x COM, Watchdog timer
- 1x PCI-E (x16), 3x PCI-E (x1), 3x PCI
- Optional AMT (MB970VF only)

Checklist

Your MB970 package should include the items listed below.

- The MB970 ATX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Serial ATA cable

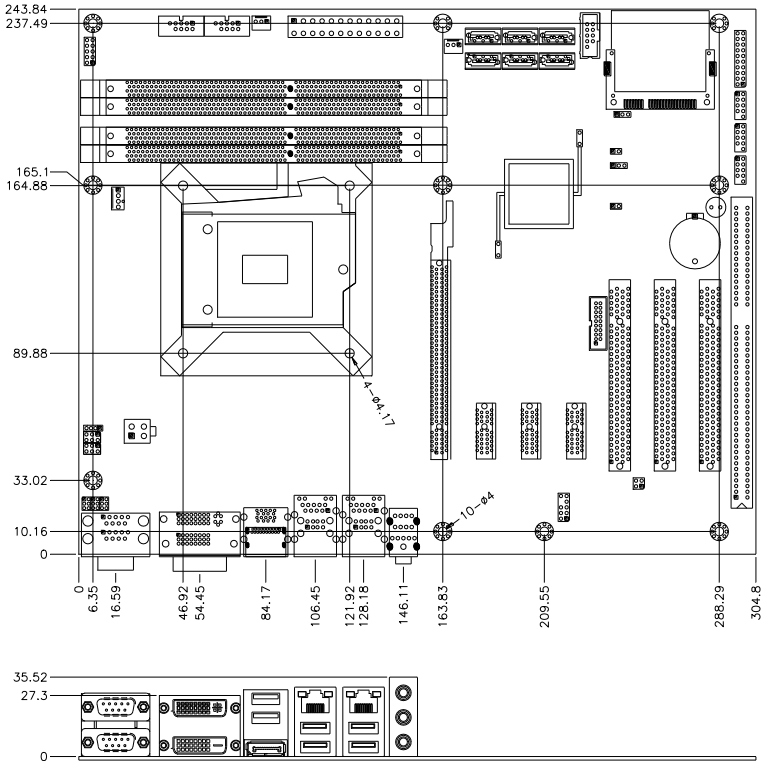
MB970 Specifications

Product Name	MB97VF/MB970F
Form Factor	ATX
CPU Type	- Intel® Ivy Bridge 22nm QC/DC DT processor - LGA package 37.5 mm x 37.5mm(TDP: QC= 95W/65W/45W ; DC=65W/45W) **Ivy-DT CPU socket compatible with Sandy Bridge
CPU Speed	Up to 3.8GHz
Cache	Up to 8MB
CPU Socket	LGA1155 (Socket H2)
Chipset	Intel® Q77[MB970VF] / B75[MB970F] PCH 27 x 27 mm package size
BIOS	AMI BIOS, support ACPI Function
Memory	Intel® Ivy-Bridge DT processors integrated memory controller DDRIII 1067/1333/1600 MHz - DIMM x 4 (w/o ECC), Max.32GB
VGA	- Intel® Ivy-Bridge DT processor integrated Gfx - Supports 3 independent displays - Improvement in 3D graphic performance (DX 11.1, OpenGL 3.1, Open CL1.1) - 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 DP to DVI converter PS161) DisplayPort X 1
LAN	1. Intel® Lewisville 82579LM GbE PHY[MI970VF only] or 82579V GbE PHY [MI970F only] 2. Intel® 82583V as 2 nd GbE
USB	USB 2.0 host controller, supports 8 or 10 ports w/ two EHCI, 7 UHCI controllers - 4 ports in the rear panel - Others reserved for onboard pin header - 6 ports for MB970VF ; 4 ports for MB970F USB 3.0 host controller, supports 4 ports
Serial ATA	Intel® Q77 / B75 PCH built-in SATA controller, supports total 6 ports 2 x SATA (3.0) 6Gbps/+ 4 x SATA (2.0) 3Gbps ports [MB970VF] 1x SATA (3.0) 6Gbps/+ 4 x SATA (2.0) 3Gbps ports [MB970F]
Storage Device	CFast [SATA CF] connector x1
Audio	Intel® Q77 PCH built-in High Definition Audio controller+ ALC892 w/ 7.1 CH
LPC I/O	Fintek F81866AD-I (Ver. C) COM1 (RS232/422/485), COM2--COM4 (RS232) Hardware Monitor (2 thermal inputs, 4 voltage monitor inputs & 3 x fan headers) COM1/2 with pin-9 with power for 2 ports (500mA for each port)
Digital IO	4 in & 4 out
IAMT(8.0)	Intel® Q77 PCH built-in (MB970VF only) - Intel® Active Management Technology Version 8.0
TPM 1.2	Winbond WPCT210A (MB970VF only)
PCI to ISA	ITE IT8888G x1 for high ISA bus
Expansion Slots	- PCI-Express (16x) x1 [PEG]; PCI-Express 1x) x3; PCI x3; ISA x1
Edge Connectors	DVI-D + DVI-I stack connector; Dual DB9 stack connector for COM #1, #2 Dual USB (3.0) dual stack connector; DP stack connector Gigabit LAN RJ-45 + dual USB (2.0) stack connector x2 RCA Jack 3 x 1 for HD Audio
Onboard Header/ Connector	2 ports x SATA III [Blue color]; 4 ports x SATA II 2x5 pin-header x3 for 6 ports USB; 2x5 pin-header for front panel audio 2x10 box-header for COM3 (RS232) & COM4 (RS232) 2x5 pin-header for Digital IO
Watchdog Timer	Yes (256 segments, 0, 1, 2...255 sec/min)
System Voltage	ATX
Others	LAN Wakeup, vProTM [MB970VF only], EuP feature (F81866AD-I integrated)

INTRODUCTION

Board Size	305mm x 244mm
-------------------	---------------

Board Dimensions



Installations

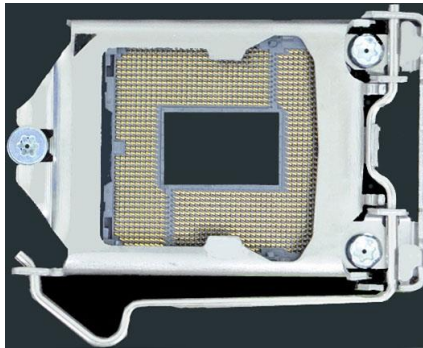
This section provides information on how to use the jumpers and connectors on the MB970 in order to set up a workable system. The topics covered are:

Installing the CPU.....	7
Installing the Memory.....	8
Setting the Jumpers.....	9
Connectors on MB970.....	13

Installing the CPU

The MB970 board supports an LGA1155 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.*

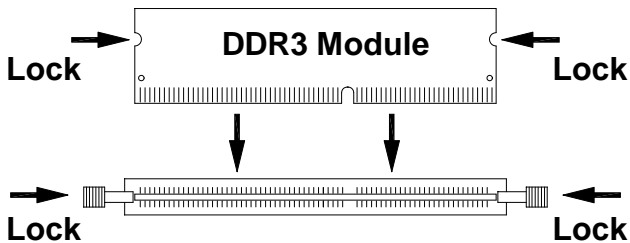
Installing the Memory

The MB970 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.

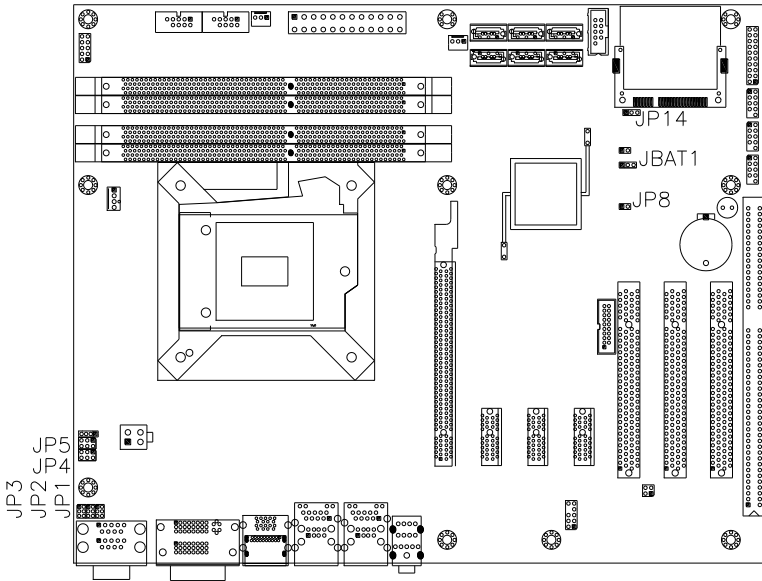


Setting the Jumpers

Jumpers are used on MB970 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 MB970 and their respective functions.



Jumper Locations on MB970	10
JBAT1: Clear CMOS Contents	11
JP1, JP2, JP3: RS232/RS422/RS485 (COM1) Selection	11
JP4: COM1 RS232 RI/+5V/+12V Power Setting	11
JP5: COM2 RS232 RI/+5V/+12V Power Setting	11
JP8: Flash Descriptor Security Override (Factory use only)	12
JP14: SATA (CN12) / CFAST(CN16) Selection	12

Jumper Locations on MB970

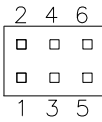


Jumpers on MB970.....	Page
JBAT1: Clear CMOS Contents	11
JP1, JP2, JP3: RS232/RS422/RS485 (COM1) Selection	11
JP4: COM1 RS232 RI/+5V/+12V Power Setting.....	11
JP5: COM2 RS232 RI/+5V/+12V Power Setting.....	11
JP8: Flash Descriptor Security Override (Factory use only)	12
JP14: SATA (CN12) / CFAST(CN16) Selection.....	12

JBAT1: Clear CMOS Contents

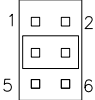
JBAT1	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

JP1, JP2, JP3: RS232/RS422/RS485 (COM1) Selection




COM1 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP1: 3-5&4-6	JP2: 1-3&2-4	JP1: 1-3&2-4
	JP3: 1-2	JP3: 3-4	JP3: 5-6
	JP2: 3-5 & 4-6	JP2: 1-3 & 2-4	JP2: 1-3 & 2-4

JP4: COM1 RS232 RI/+5V/+12V Power Setting

JP4	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V

JP5: COM2 RS232 RI/+5V/+12V Power Setting



JP5	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V

INSTALLATIONS

JP8: Flash Descriptor Security Override (Factory use only)

JP8	Flash Descriptor Security Override
Open	Disabled (Default)
Close	Enabled

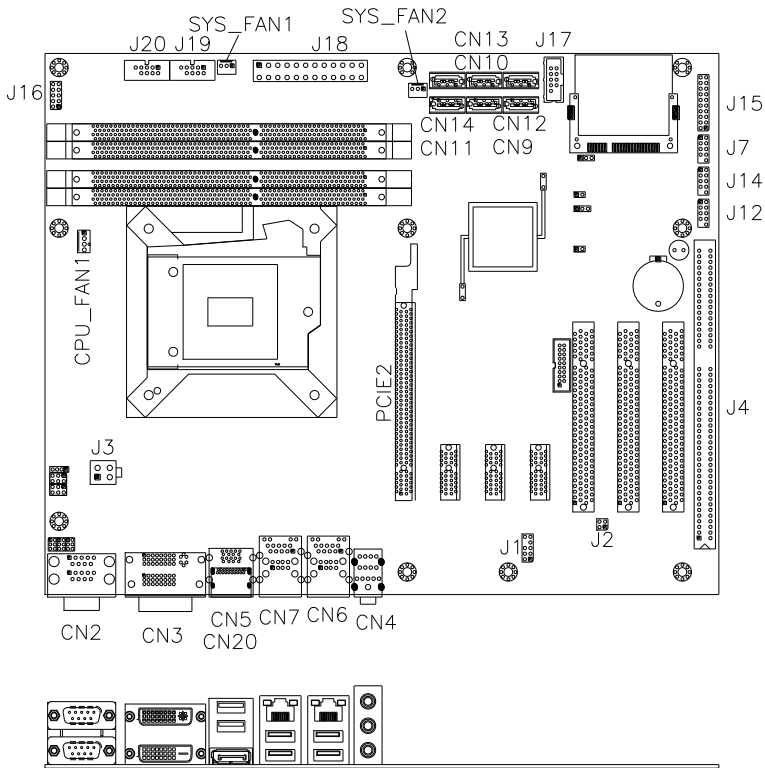
JP14: SATA (CN12) / CFAST (CN16) Selection

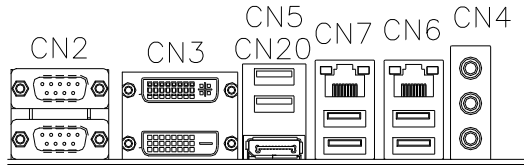
JBAT1	Setting	Function
 1 2 3	Pin 1-2 Short/Closed	CFAST
 1 2 3	Pin 2-3 Short/Closed	SATA

Connectors on MB970

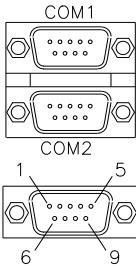
Connector Locations on MB970	14
CN2: COM1 and COM2 Serial Ports	15
CN3: DVI-D and DVI-I Connector.....	15
CN20: USB3.0 Connector	16
J19, J20: COM3, COM4 RS232 Serial Ports.....	16
CN7: Gigabit LAN (Intel 82579LM) + USB 2/3	16
CN6: Gigabit LAN (Intel 82583V) + USB 0/1	16
CN4: HD Audio Connector	16
CN5: Display Port Connector	17
CN9, CN10, CN11, CN12, CN13, CN14: SATA Connectors	17
CN8: Compact Flash Connector.....	17
J1: Audio Pin Header for Chassis Front Panel	17
J2: SPDIF I/O.....	17
J3: ATX 12V Power Connector	17
J4: ISA Slot (shared with PCI1)	17
J19, J20: COM3, COM4 RS232 Serial Ports.....	17
J7, J12, J14: USB Connectors.....	18
J15: Front Panel Function Connector	18
J16: Digital I/O	18
J17: SPI Flash Connector (Factory use only).....	18
J18: ATX Power Supply Connector	19
CPU_FAN1: CPU Fan Power Connector.....	19
SYS_FAN1: System Fan1 Power Connector.....	19
SYS_FAN2: System Fan2 Power Connector.....	19
PCIE2: PCI-E X16 Slot.....	19
PCIE3, PCIE4, PCIE5: PCI-E X1 Slot	19
PCI1-PCI3: PCI 32-bit Slot	19

Connector Locations on MB970



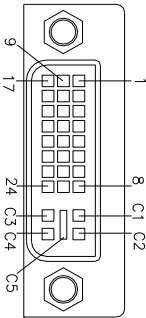


CN2: COM1 and COM2 Serial Ports

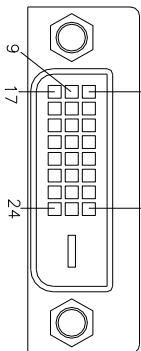
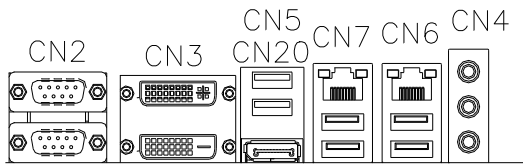


Pin #	Signal Name		
	RS-232	R2-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

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
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	A GROUND2
A GROUND 1	15	C6	A GROUND3



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.

CN20: USB3.0 Connector

J19, J20: COM3, COM4 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

CN7: Gigabit LAN (Intel 82579LM) + USB 2/3

CN6: Gigabit LAN (Intel 82583V) + USB 0/1

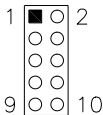
CN4: HD Audio Connector

CN5: Display Port Connector

CN9, CN10, CN11, CN12, CN13, CN14: SATA Connectors

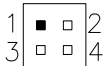
CN8: Compact Flash Connector

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	Ground
Sense	7	8	KEY
LINE_L	9	10	Ground


J2: SPDIF I/O



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

J3: ATX 12V Power Connector

This connector supplies the CPU operating voltage.



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

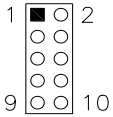
J4: ISA Slot (shared with PCI1)

J19, J20: COM3, COM4 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

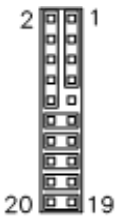
INSTALLATIONS

J7, J12, J14: USB Connectors



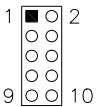
Signal Name	Pin	Pin	Signal Name
VCC	1	2	VCC
D0-	3	4	D1-
D0+	5	6	D1+
GND	7	8	GND
KEY	9	10	NC

J15: Front Panel Function Connector



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

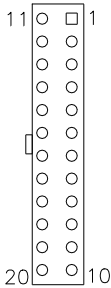
J16: Digital I/O



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

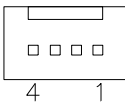
J17: SPI Flash Connector (Factory use only)

J18: ATX Power Supply Connector



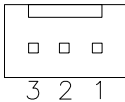
Signal Name	Pin #	Pin #	Signal Name
3.3V	11	1	3.3V
-12V	12	2	3.3V
Ground	13	3	Ground
PS-ON	14	4	+5V
Ground	15	5	Ground
Ground	16	6	+5V
Ground	17	7	Ground
-5V	18	8	Power good
+5V	19	9	5VSB
+5V	20	10	+12V

CPU_FAN1: CPU Fan Power Connector



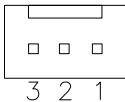
Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

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

PCIE2: PCI-E X16 Slot

PCIE3, PCIE4, PCIE5: PCI-E X1 Slot

PCI1-PCI3: PCI 32-bit Slot

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:

BIOS Introduction.....	20
BIOS Setup	20
Advanced Settings	22
Chipset Settings.....	35
Boot Settings.....	40
Security Settings.....	41
Save & Exit Settings.....	42

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 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 key immediately allows you to enter the Setup utility. If you are a little bit late pressing the 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	
Access Level			Administrator	Enter: Select	
				+- 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"> ▶ PCI Subsystem Settings ▶ ACPI Settings ▶ Wake up event setting ▶ Trusted Computing ▶ CPU Configuration ▶ SATA Configuration ▶ Shutdown Temperature Configuration ▶ iSmart Controller ▶ AMT Configuration ▶ Acoustic Management Configuration ▶ USB Configuration ▶ F81866 Super IO Configuration ▶ F81866 H/W Monitor ▶ CPU PPM Configuration 				→ ← 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		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
	PCI 64bit Resources Handling				
	Above 4G Decoding		Disabled		
	PCI Common Settings				
	PCI Latency Timer		32 PCI Bus Clocks		
	VGA Palette Snoop		Disabled		
	PERR# Generation		Disabled		
	SERR# Generation		Disabled		
	▶ PCI Express Settings				

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).

BIOS SETUP

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

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'.

ACPI Settings

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
ACPI Settings					
Enable Hibernation			Enabled		
ACPI Sleep State			S3 (Suspend to R...)		
Lock Legacy Resources			Disabled		
S3 Video Repost			Disabled		
				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- 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.

Wake up event settings

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Wake system with Fixed Time			Disabled		
Wake up hour			0		
Wake up minute			0		
Wake up second			0		
Wake on Ring			Disabled		→ ← Select Screen
Wake on PCI PME			Disabled		↑ ↓ Select Item
Wake on PCIE Wake Event			Disabled		Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

Wake system with Fixed Time

Enables or Disables System wake on alarm event. When enabled, System will wake on the hr::min:: sec specified.

Wake on PCIE PME Wake Event

The options are Disabled and Enabled.

Trusted Computing

Aptio Setup Utility

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

TPM Support

This configuration is supported only with MB970VF. 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.

CPU Configuration

This section shows the CPU configuration parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
CPU Configuration					
Intel® Core™ i7-3770 CPU @ 3.40GHz					
Processor Stepping			306a8		
Microcode Revision			c		
Max CPU Speed			3400 MHz		
Min CPU Speed			1600 MHz		
CPU Speed			3400 MHz		
Processor Cores			4		
Intel HT Technology			Supported		
Intel VT-x Technology			Supported		
Intel SMX Technology			Supported		
64-bit			Supported		
Hyper-threading			Enabled		→ ← Select Screen
Active Processor Cores			All		↑ ↓ Select Item
Limit CPUID Maximum			Disabled		Enter: Select
Execute Disable Bit			Enabled		+ - Change Field
Intel Virtualization Technology			Disabled		F1: General Help
Hardware Prefetcher			Disabled		F2: Previous Values
Adjacent Cache Line Prefetch			Enabled		F3: Optimized Default
					F4: Save ESC: Exit

Hyper-threading

Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled, only one thread per enabled core is enabled.

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.

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.

SATA Configuration

SATA Devices Configuration.

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

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 MB970VF (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 MB970VF (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 MB970VF (with iAMT function). Enable/Disable Watchdog Timer.

Acoustic Management Configuration

Aptio Setup Utility

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

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		
EHCI Hand-off			Enabled		
Port 60/64 Emulation			Enabled		
USB hardware delays and time-outs:					
USB Transfer time-out			20 sec		
Device reset time-out			20 sec		
Device power-up delay			Auto		
				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values 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.

Port 64/60 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSES.

USB Transfer time-out

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

Device reset tine-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		→ ← Select Screen	
▶ Serial Port 0 Configuration				↑ ↓ Select Item	
▶ Serial Port 1 Configuration				Enter: Select	
▶ Serial Port 2 Configuration				+- Change Field	
▶ Serial Port 3 Configuration				F1: General Help	
F81866 ERP Support		All Enable		F2: Previous Values	
USB3.0 Port0/1 POWER Management		Enabled		F3: Optimized Default	
USB3.0 Port2/3 POWER Management		Enabled		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_Fan1 smart fan control		Disabled		
	SYS_Fan1 smart fan control		Disabled		
	SYS_Fan2 smart fan control		Disabled		
	CPU temperature		+41 C		
	SYS temperature		+35 C		
	CPU_FAN1 Speed		2115 RPM		
	SYS_FAN1 Speed		N/A		→ ← Select Screen
	SYS_FAN2 Speed		N/A		↑ ↓ Select Item
	Vcore		+1.000 V		Enter: Select
	+5V		+5.213 V		+ - Change Field
	+12V		+12.408 V		F1: General Help
	1.5V		+1.544 V		F2: Previous Values
	+3.3V		+3.424 V		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 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.

CPU PPM Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
CPU PPM Configuration					
EIST			Enabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
Turbo Mode			Enabled		

EIST

Enable/Disable Intel SpeedStep.

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.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
<ul style="list-style-type: none"> ▶ PCH-IO Configuration ▶ System Agent (SA) Configuration 					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

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	1.1.0.0		
		Intel PCH SKU Name	Q77		
		Intel PCH Rev ID	O4/C1		
		▶ PCI Express Configuration			
		▶ USB Configuration			
		▶ PCH Azalia Configuration			
		PCH LAN Controller	Enabled		
		Wake on LAN	Enabled		
		High Precision Event Timer Configuration			
		High Precision Timer	Enabled		→ ← Select Screen
		SLP_S4 Assertion Width	4-5 Seconds		↑ ↓ Select Item
		Restore AC Power Loss	Power On		Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit

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_S4 Assertion Width

Select a minimum assertion width of the SLP_S4# signal.

Restore AC Power Loss

Select AC power state when power is re-applied after a power failure.

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		
<ul style="list-style-type: none"> ▶ 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 <ul style="list-style-type: none"> 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 PCI-E/PEG port.

USB Configuration

Main	Advanced	Chipset	Boot	Security	Save & Exit
USB Configuration					
		XHCI Pre-Boot Driver	Enabled		
		xHCI Mode	Smart Auto		
		HS Port #1 Switchable	Enabled		
		HS Port #2 Switchable	Enabled		
		HS Port #3 Switchable	Enabled		
		HS Port #4 Switchable	Enabled		
		xHCI Streams	Enabled		→ ← Select Screen
		EHCI1	Enabled		↑ ↓ Select Item
		EHCI2	Enabled		Enter: Select
					+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
		USB Ports Per-Port Disable Control	Disabled		F4: Save ESC: Exit

HS Port #1/2/3/4 Switchable

Allows for HS port switching between xHCI and EHCI. If disabled, port is routed to EHCI. If HS port is routed to xHCI, the corresponding SS port is enabled.

xHCI Streams

Enable or disable xHCI Maximum Primary Stream Array Size.

EHCI1/2

Control the USAB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.

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					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
Azalia			Auto		

Azalia

Control Detection of the Azalia device.

Disabled = Azalia will unconditionally disabled.

Enabled Azalia will be unconditionally enabled.

Auto = Azalia will enabled if present, disabled otherwise.

System Agent (SA) Configuration

Aptio Setup Utility

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

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			2132		
IGfx Frequency			350 MHz		
Primary Display			Auto		
Internal Graphics			Auto		
GTT Size			2MB	→ ← Select Screen	
Aperture Size			256MB	↑ ↓ Select Item	
DVMT Pre-Allocated			64M	Enter: Select	
DVMT Total Gfx Mode			Disabled	+- Change Field	
▶ LCD Control				F1: General Help	
				F2: Previous Values	
				F3: Optimized Default	
				F4: Save ESC: Exit	

Primary Display

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

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)		→ ← Select Screen
		DIMM#2	2048 MB (DDR3)		↑ ↓ Select Item
		DIMM#3	2048 MB (DDR3)		Enter: Select
		CAS Latency (tCL)	9		+ - Change Field
		Minimum delay time			F1: General Help
		CAS to RAS (tRCDmin)	9		F2: Previous Values
		Row Precharge (tRPmin)	9		F3: Optimized Default
		Active to Precharge (tRASmin)	24		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		
CSM16 Module Version			07.69		→ ← Select Screen
GateA20 Active			Upon Request		↑ ↓ Select Item
Option ROM Messages			Force BIOS		Enter: Select
INT19 Trap Response			Immediate		+ - Change Field
Boot Option Priorities					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save ESC: Exit
▶ 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.

GateA20 Active

UPON REQUEST – GA20 can be disabled using BIOS services.
ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

Option ROM Messages

Set display mode for Option ROM. Options are Force BIOS and Keep Current.

INT19 Trap Response

Enable: Allows Option ROMs to trap Int 19.

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.

Security 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
Password Description					
If ONLY the Administrator's password is set, then this only limit access to Setup and is only asked for when entering Setup.					
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights					
The password length must be in the following range:					
Minimum length			3		
Maximum length			20		
Administrator Password					
User Password					
					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

Administrator Password

Set Setup Administrator Password.

User Password

Set User Password.

Save & Exit Settings

Aptio Setup Utility	
Main	Advanced
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	Chipset Boot Security Save & Exit → ← 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	47
VGA Drivers Installation	50
Realtek HD Audio Driver Installation	53
LAN Drivers Installation.....	55
Intel® Management Engine Interface	59
Intel® USB 3.0 Drivers	62

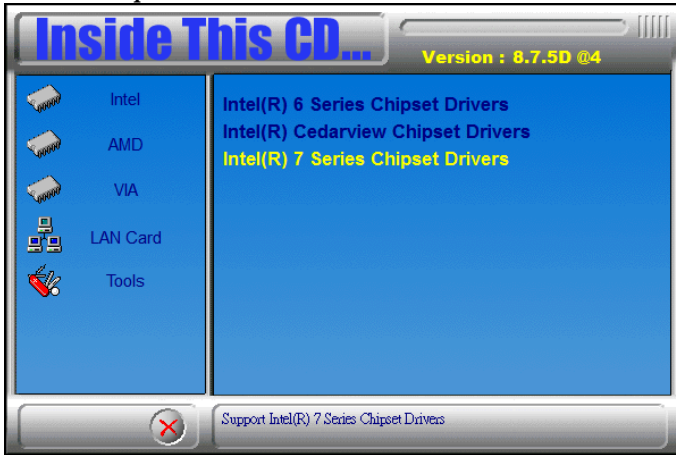
IMPORTANT NOTE:

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 CD that comes with the board. Click **Intel** and then **Intel(R) 7 Series Chipset Drivers**.



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



DRIVER INSTALLATION

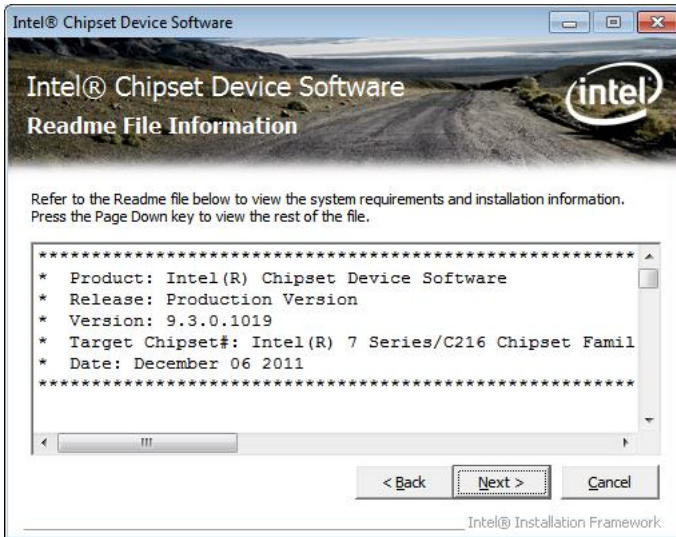
- When the Welcome screen to the Intel® Chipset Device Software appears, click *Next* to continue.



- 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.

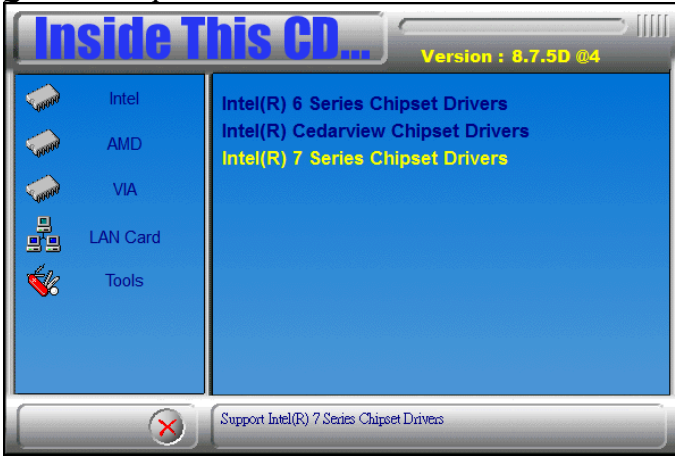


VGA Drivers Installation

NOTE: Before installing the *Intel(R) Q77 Chipset Family Graphics Driver*, the Microsoft .NET Framework 3.5 SPI should be first installed.

To install the VGA drivers, follow the steps below.

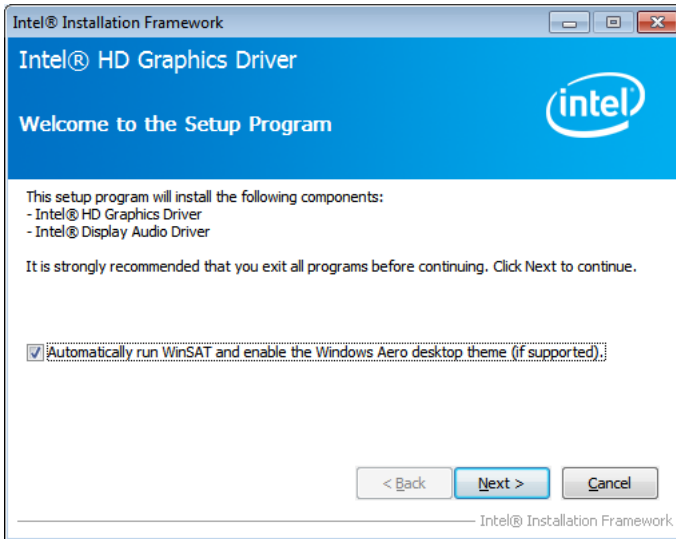
1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) Q7 Series Chipset Drivers*.



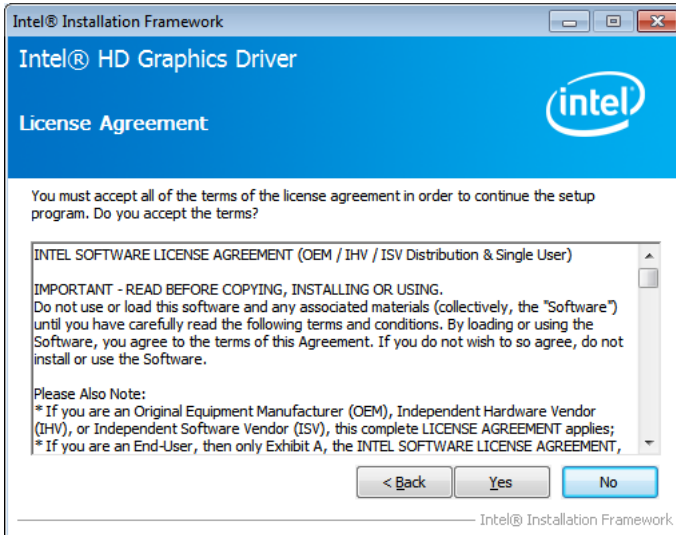
2. Click *Intel(R) Q77 Chipset Family Graphics Driver*.



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

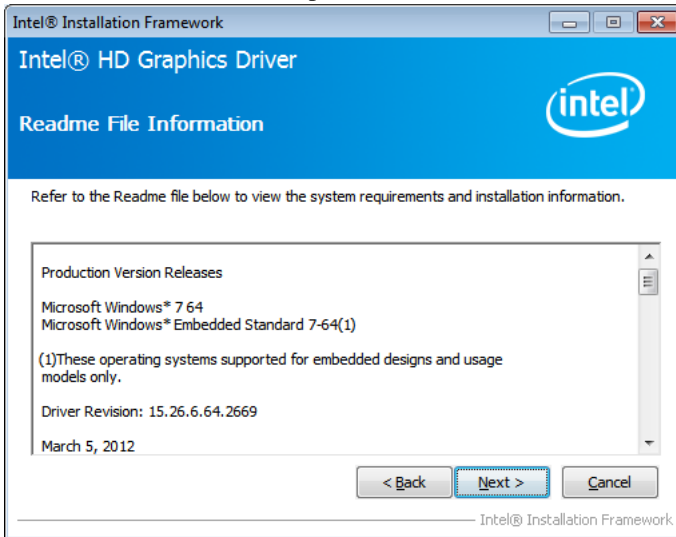


4. Click *Yes* to agree with the license agreement and continue the installation.

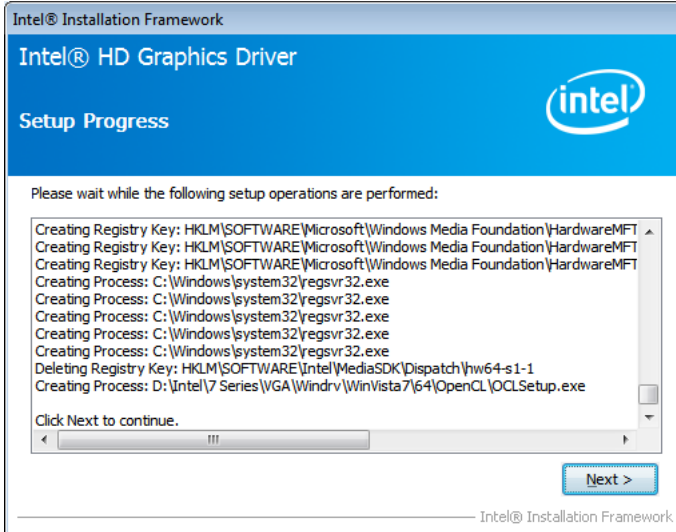


DRIVER INSTALLATION

5. On the Readme File Information screen, click *Next* to continue the installation of the Intel® Graphics Media Accelerator Driver.



6. On Setup Progress screen, click *Next* to continue.



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

Realtek HD Audio Driver Installation

Follow the steps below to install the Realtek HD Audio Drivers.

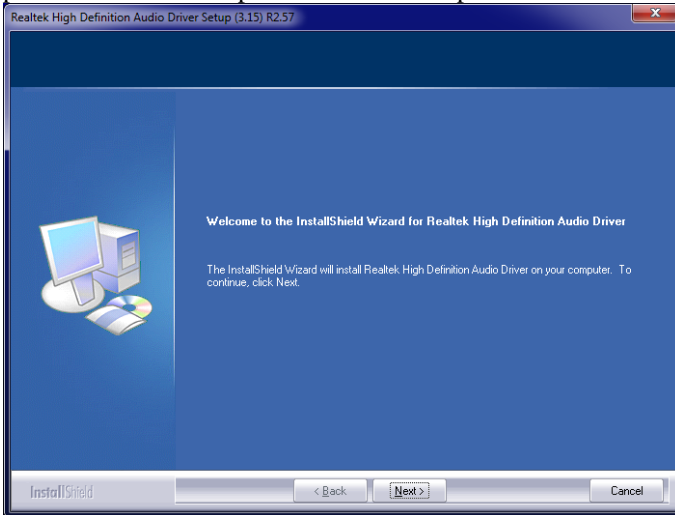
1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) O7 Series Chipset Drivers*.



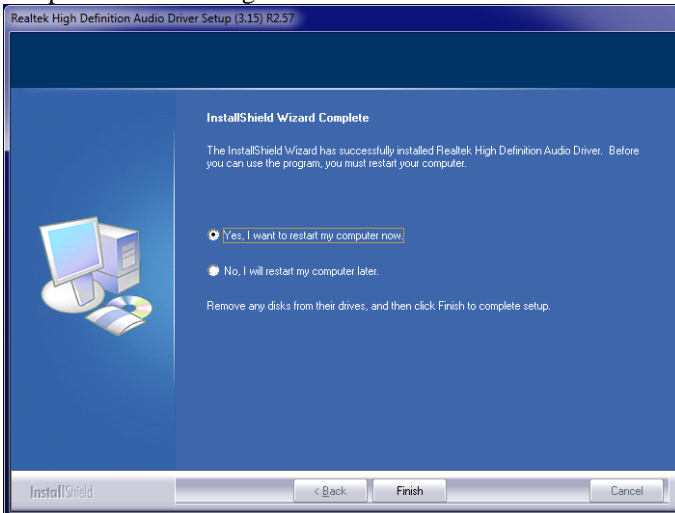
2. Click *Realtek High Definition Audio Driver*.



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

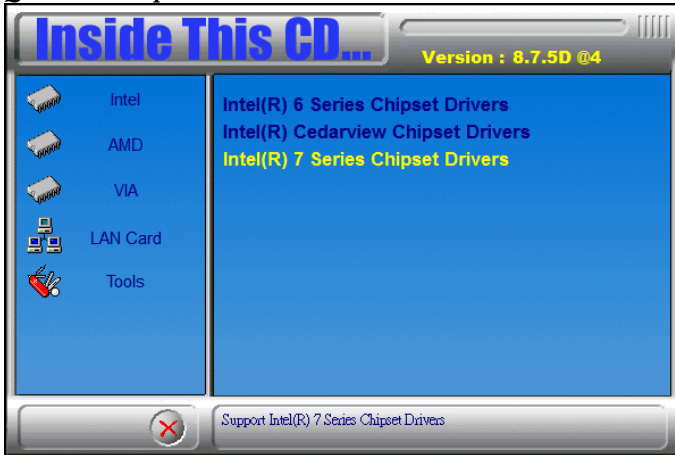


4. The InstallShield Wizard Complete. Click *Finish* to restart the computer and for changes to take effect.



LAN Drivers Installation

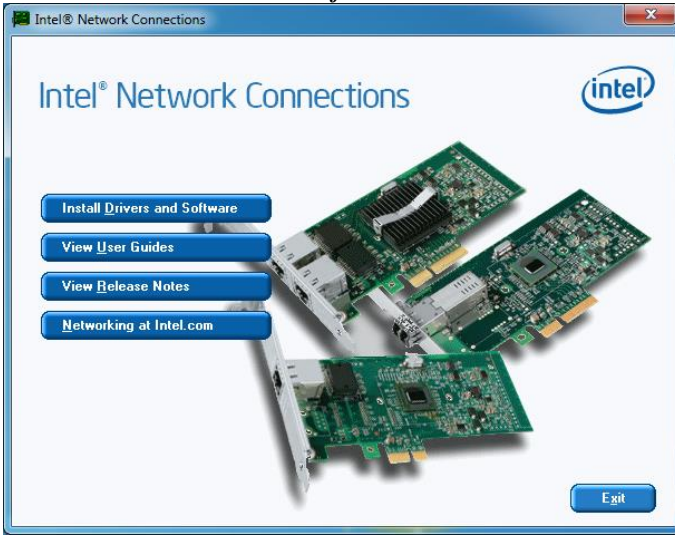
1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) O7 Series Chipset Drivers*.



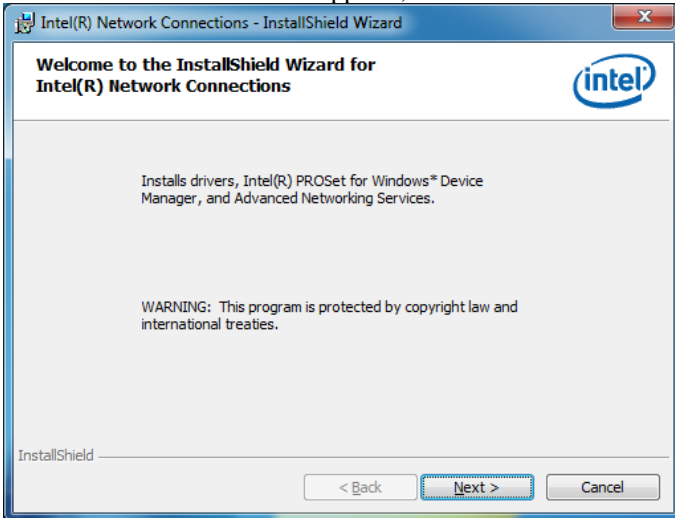
2. Click *Intel(R) PRO LAN Network Driver*.



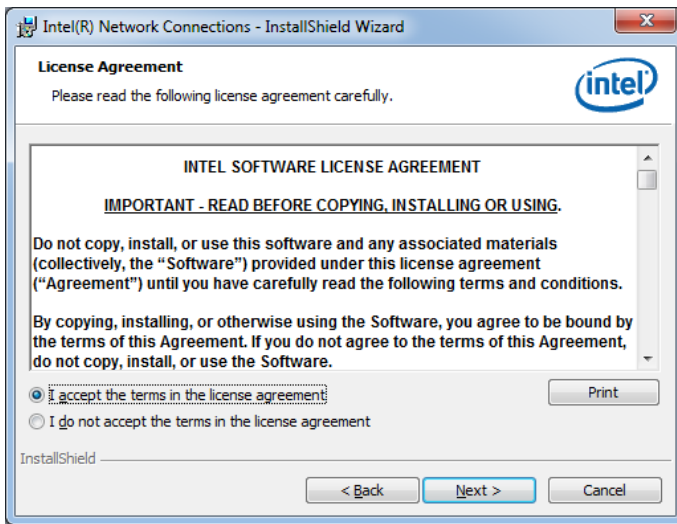
3. Click *Install Drivers and Software*.



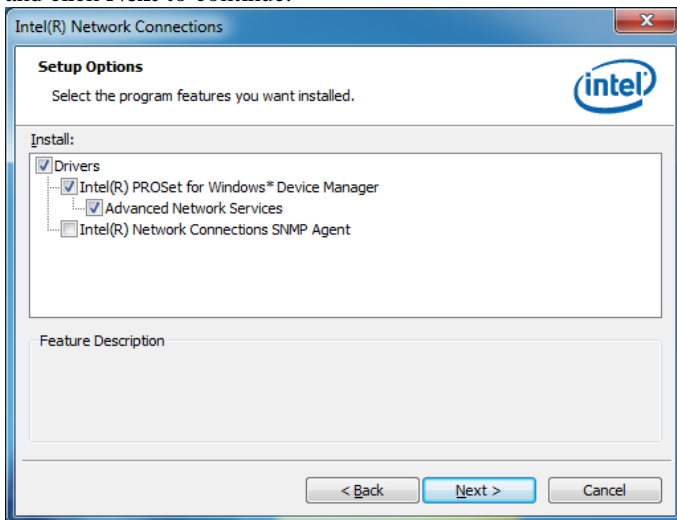
4. When the Welcome screen appears, click *Next*.



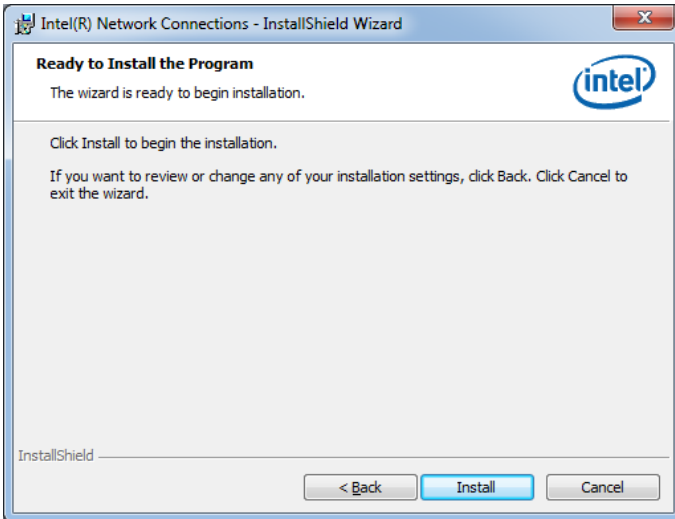
5. Click *Next* to to agree with the license agreement.



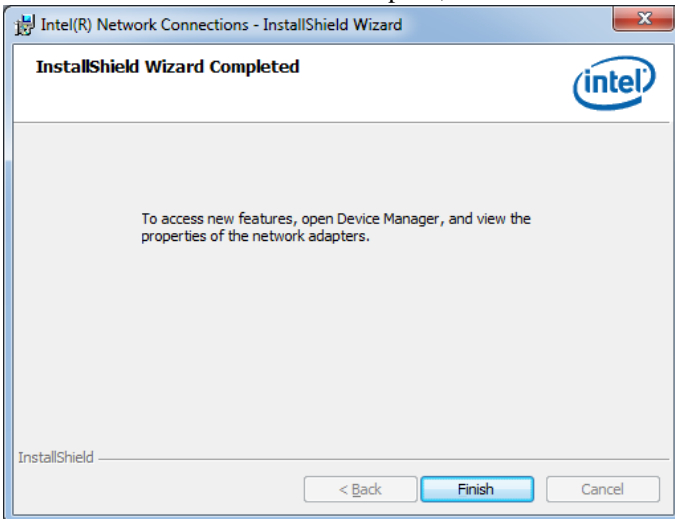
6. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.



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

REMARKS: The Intel iAMT 8.0 Drivers can be installed on MB970VF, not MB970F.



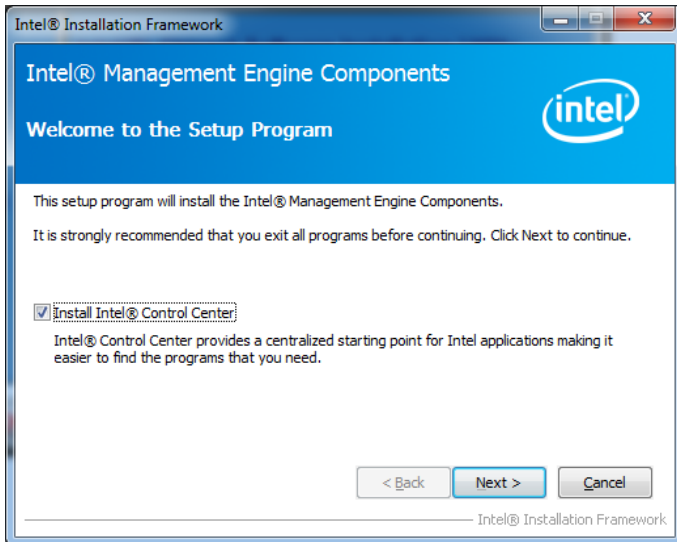
The following application requires Microsoft .NET Framework 3.5 or later: Intel® Management Engine Components. Please install the latest version of Microsoft .NET Framework from Microsoft Download Center to run this application correctly.

Follow the steps below to install the Intel Management Engine.

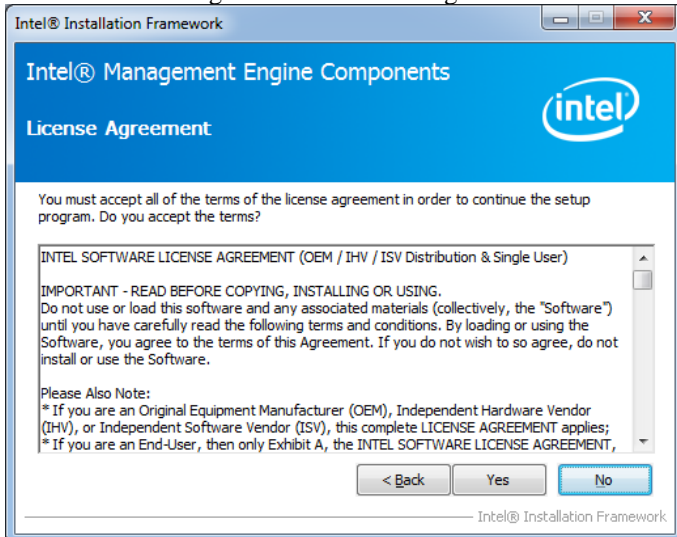
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) AMT 8.0 Drivers**.



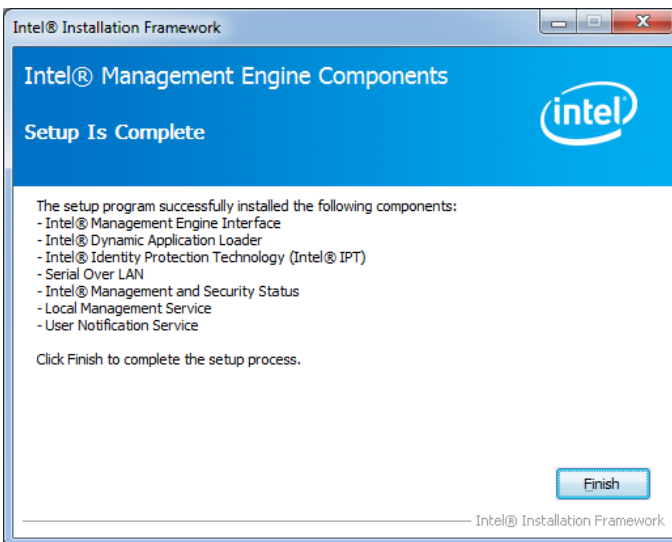
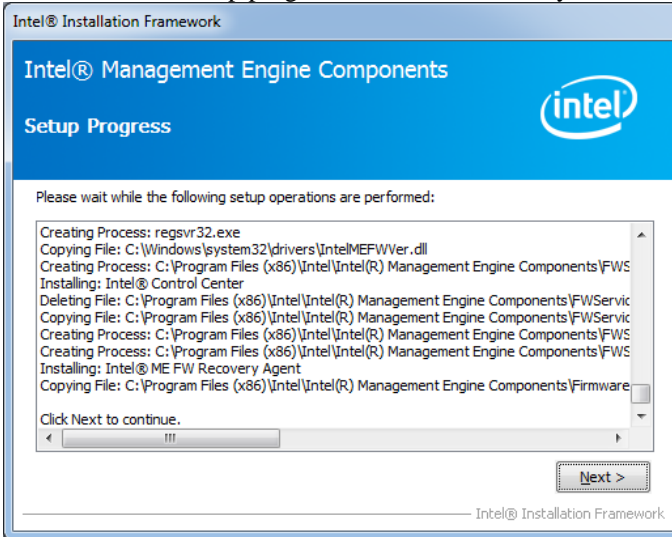
- When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click the checkbox for **Install Intel® Control Center** & click **Next**.



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

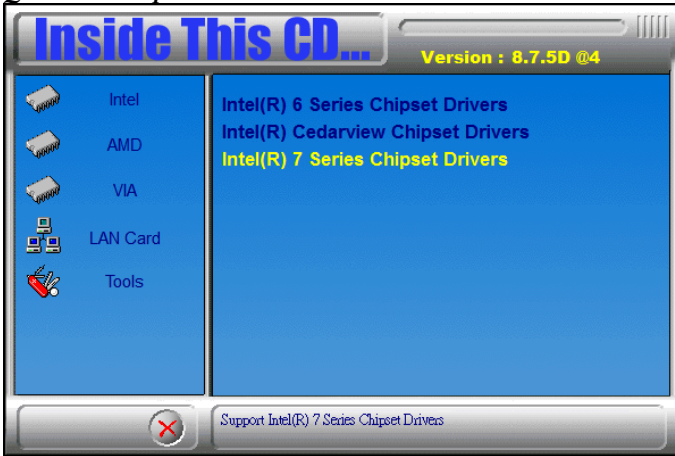


4. When the Setup Progress screen appears, click *Next*. Then, click *Finish* when the setup progress has been successfully installed.

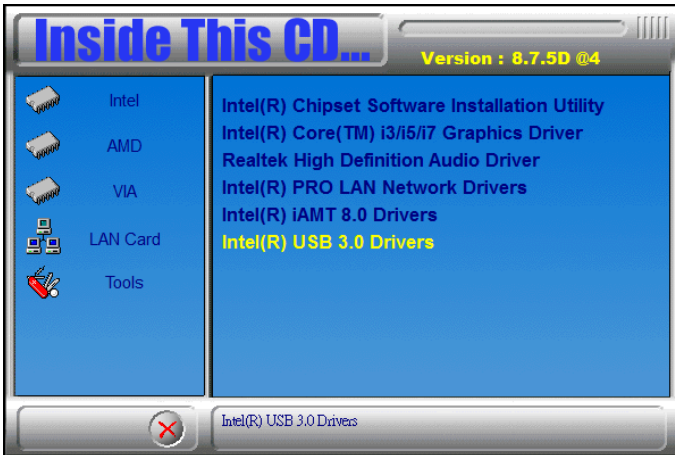


Intel® USB 3.0 Drivers

1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) O7 Series Chipset Drivers*.



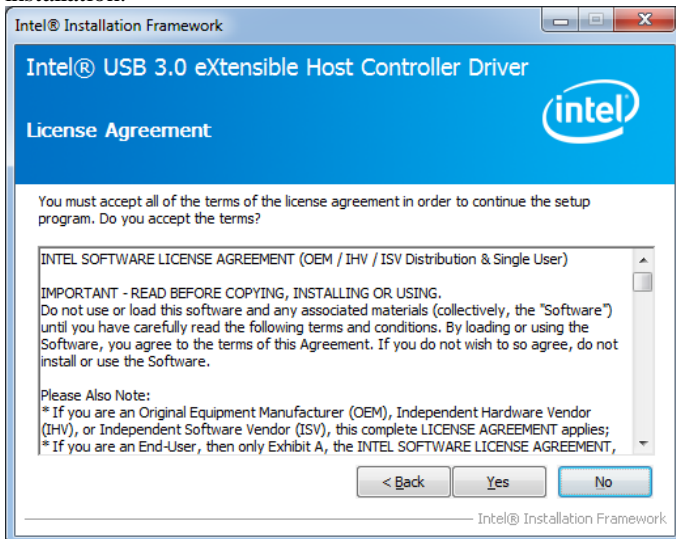
2. Click *Intel(R) USB 3.0 Drivers*.



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.



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.



This page is intentionally left blank.

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.

Address	Device Description
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.

Level	Function
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; //count mode is second
    Set_F81866_Reg(0xF5, bBuf);

    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; //start counting
    Set_F81866_Reg(0xF5, bBuf);
}
//-----
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; //disable WDT
    Set_F81866_Reg(0xF5, bBuf);
}
//-----

```

APPENDIX

```
//-----  
//  
// 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();  
}  
//-----
```

```

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

```