

IB970

3rd Gen. Intel® Core™ i7/ i5
+ B75 PCH
Full Size CPU Card

USER'S MANUAL

Version 1.0

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Table of Contents

Introduction.....	1
Product Description.....	1
Checklist.....	2
IB970 Specifications	3
Board Dimensions	5
Installations	6
Installing the CPU	7
Installing the Memory.....	8
Setting the Jumpers.....	9
Connectors on IB970.....	14
BIOS Setup.....	23
Drivers Installation	49
Intel Chipset Software Installation Utility.....	50
VGA Drivers Installation.....	53
Realtek HD Audio Driver Installation	56
LAN Drivers Installation	58
Intel® Management Engine Interface	62
Intel® USB 3.0 Drivers.....	65
Appendix	69
A. I/O Port Address Map.....	69
B. Interrupt Request Lines (IRQ).....	70
C. Watchdog Timer Configuration	71

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Introduction

Product Description

The IB970 PICMG 1.0 full size CPU Card is based on the latest Intel® BD82B75 chipset. The platform supports 3rd Generation Intel® Core i7/i5 in FCLGA1155 LGA1155 packing and features an integrated dual-channel DDR3 memory controller as well as a graphics core (4000).

Display interfaces of the CPU card include VGA CRT and DVI-D, *while 24-bit dual channel LVDS is supported on IB970F and not IB970*. The edge connectors are for VGA CRT, USB 2.0, USB 3.0 and dual Gigabit LAN RJ45 connectors. One SATA III port and five SATA II ports are available. Expansion slot is provided with a Mini PCIe socket on the component side. Two serial ports and a parallel port are supported.

Dimensions of the board are 338mm x 122mm.

IB970 FEATURES:

- Supports Intel® 3rd Generation Core i7/i5 DT processors
- Two DDR3 DIMM, 1066/1333/1600MHz, Max. 16GB
- Dual Intel® PCI-Express Gigabit LAN
- Integrated Graphics for CRT, DVI-D, LVDS displays
- 5x SATA 2.0, 1x SATA III, 6x USB 2.0, 3x USB 3.0
2x COM, parallel port
- Mini PCIe socket, iSMART, Watchdog timer, Digital I/O

Checklist

Your IB970 package should include the items listed below.

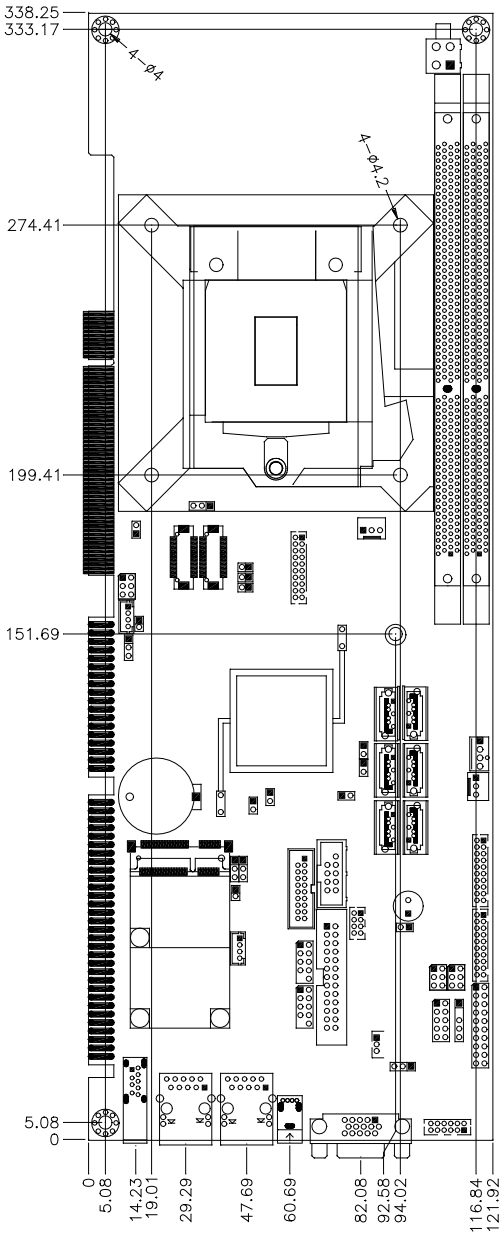
- The IB970 Full-Size CPU Card
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility

IB970 Specifications

Product Name	IB970F [with LVDS support] IB970 [w/o LVDS , w/oTPM] IB970RF [with LVDS support, Q77 on board]
Form Factor	PICMG 1.0 Full size CPU card
CPU Type	- 3 rd Generation Intel® Core™ i7/i5 DT processor - FCLGA1155 package [37.5 mm x 37.5mm] - TDP: QC= 77W/65W/45W/35W
CPU Speed	2.3GHz ~ 3.4GHz (TDP=45W~77W)
BIOS	AMI BIOS, support ACPI Function
CPU Socket	LGA1155
Chipset	Intel® BD82B75 PCH [IB970F / IB970] Intel® BD82Q77_PCH [IB970RF] 27mm x 27mm, FCBGA942 (TDP=6.7W)
Memory	3 rd Generation Intel® Core™ i7/i5 DT processor integrated memory controller DDR3-1600 MHz (Non-ECC) - DIMM x 2, Max. 16GB
Display interface	3 rd Generation Intel® Core™ i7/i5 DT processor integrated HD graphics 4000 - VGA - DVI-D (via level-shifter ASM1442, pin-header onboard) - LVDS (Chrontel CH7511 via DP, supports 24-bit dual channel)[IB970F only]
LAN	1. Intel® 82579V GbE PHY x1 2. Intel® 82583V PCI-e Gigabit LAN controller x1
USB	Intel® BD82B75/Q77 PCH integrated USB <u>2.0</u> host controller - 4 ports thru onboard pin-header - 1 port @ rear panel I/O - 1 port via MiniPCle @ component side Intel® BD82B75/Q77 PCH integrated USB <u>3.0</u> host controller - 1 port @ rear panel I/O - 2 ports via onboard box header [2*10 pins box header, Blue color]
Serial ATA Ports	Intel® BD82B75/Q77 PCH built-in SATA controller 1 x SATAIII + 5 x SATAII (one SATA II shared with mSATA)[IB970F/IB970] 2 x SATAIII + 4 x SATAII (one SATA II shared with mSATA)[IB970RF]
PCI-to-ISA bridge	ITE IT8888G x1 for high drive ISA bus
Audio	Intel® BD82B75/Q77 PCH built-in high definition audio w/ Realtek ALC662 Codec

LPC I/O	Fintek F81866AD-I (128-pin LQFP [14mm x 14 mm]) - COM1 (RS232/422/485), jumperless design (SP339) - COM2/COM3/COM4 (RS232), - Hardware monitoring (2 thermal inputs, 4 voltage monitor inputs & 2 Fan headers, one PWM fan type = 4-pin for CPU FAN; one DC fan type = 3-pin for SYS FAN) - Support Parallel port (share with one fan control)
Digital IO	4 in & 4 out
Keyboard/ Mouse	Supports PS/2 Keyboard/Mouse thru onboard pin-header
Expansion Slots	Mini PCIe socket x1@ component side [Full-sized, reserved one mounting for half-sized card also], [Support USB client & mSATA]
Edge Connector	DB15 x1 for VGA RJ45 x 2 for LAN 1 & 2 USB 2.0 x 1 USB 3.0 x 1
Onboard Header/ Connector	DF11-20 pins pin-header x1 for DVI-D DF13-20 pins pin-header x 2 for 24-bit dual channel LVDS (IB970F/RF) 1x 4 pins box header x 1 for LCD brightness control (IB970F/RF only) 2x13 pins box-header x1 for Printer (IB970 only) DF11-20 pins box-header x1 for COM1/2 DF11-20 pins box-header x1 for COM3/4 2x4 pins pin-header x 2 for USB 2.0 #1-4 2x6 pins pin-header x1 for Audio (Line-Out, Line-In & Mic) 2 x 5 pins pin-header x 1 for Digital I/O 2 x 5 pins pin-header x 1 for PS/2 KB/MS 4 pins pin-header x1 for CPU fan (PWM smart fan) 3 pins pin-header x1 for system fan SATA x 6 (Black connectors for SATA2; Blue connectors for SATA 3) 2X10 pins pin-header x 1 for front panel indicators
Watchdog Timer	Yes (256 segments, 0, 1, 2...255 sec/min)
System Voltage	+5V, +3.3V, +12V, -12V & 5VSB
RoHS	Yes
iSMART	Thru MCU Support Auto-scheduler & Power resume feature
Others	- LAN wake up - Reserved extra mounting hole as IB960 - TPM 1.2 supported (IB970F/ RF on board)
Board Size	338mm x 122mm

Board Dimensions



Installations

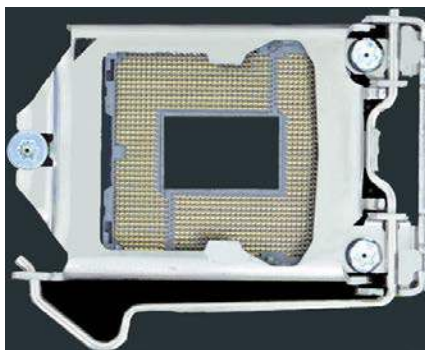
This section provides information on how to use the jumpers and connectors on the IB970 in order to set up a workable system. The topics covered are:

Installing the CPU.....	7
Installing the Memory	8
Setting the Jumpers.....	9
Connectors on IB970.....	14

Installing the CPU

The IB970 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.*

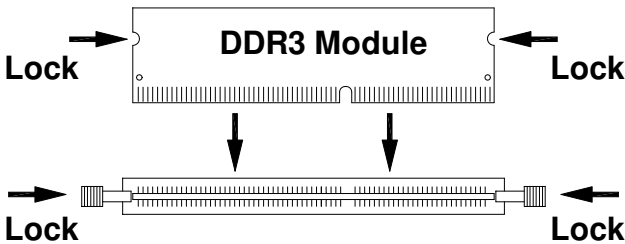
Installing the Memory

The IB970 board supports two DDR3 memory socket for a maximum total memory of 8GB 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.

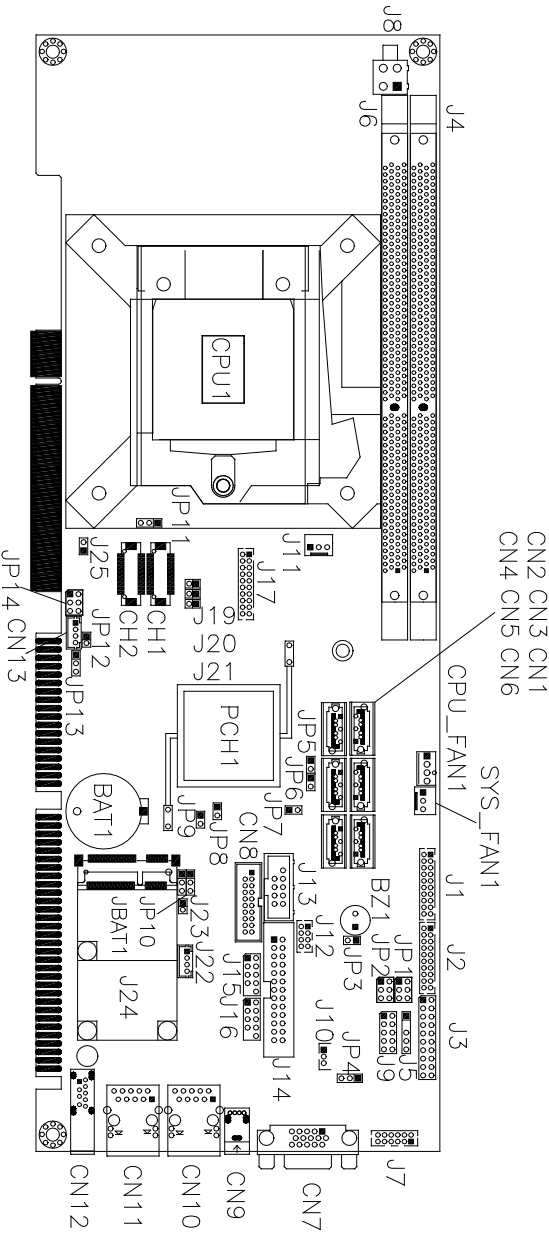


Setting the Jumpers

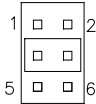
Jumpers are used on IB970 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on IB970 and their respective functions.

Jumper Locations on IB970	10
JP1: COM1 RS232 RI/+5V/+12V Power Setting.....	11
JP2: COM2 RS232 RI/+5V/+12V Power Setting.....	11
JP3: Power On Type	11
JP8: Flash Descriptor Security Override (Factory use only)	11
JP11: LVDS Panel Power Selection	12
JP12: LVDS EEPROM Flash Connector (factory use only).....	12
JP14: BL Voltage Setting	12
JP15: BL_ADJ_LEVEL Setting.....	12
JBAT1: Clear CMOS Contents	12
SW1: LVDS Panel Type Setting	13

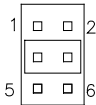
Jumper Locations on IB970



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

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

JP3: Power On Type

JP3	Function
Open	ATX Mode (Default)
Close	AT Mode

JP8: Flash Descriptor Security Override (Factory use only)

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

JP11: LVDS Panel Power Selection

JP11	Setting	Panel Voltage
	Pin 1-2 Short/Closed	3.3V (default)
	Pin 2-3 Short/Closed	5V

JP12: LVDS EEPROM Flash Connector (factory use only)

JP14: BL Voltage Setting

JP14	Setting	Function
	Pin 1-2 Short/Closed	+3.3V
	Pin 3-4 Short/Closed	+5V
	Pin 5-6 Short/Closed	+12V(Default)

JP15: BL_ADJ_LEVEL Setting

JP15	Function
Open	3.3V
Close	5V (default)

JBAT1: Clear CMOS Contents

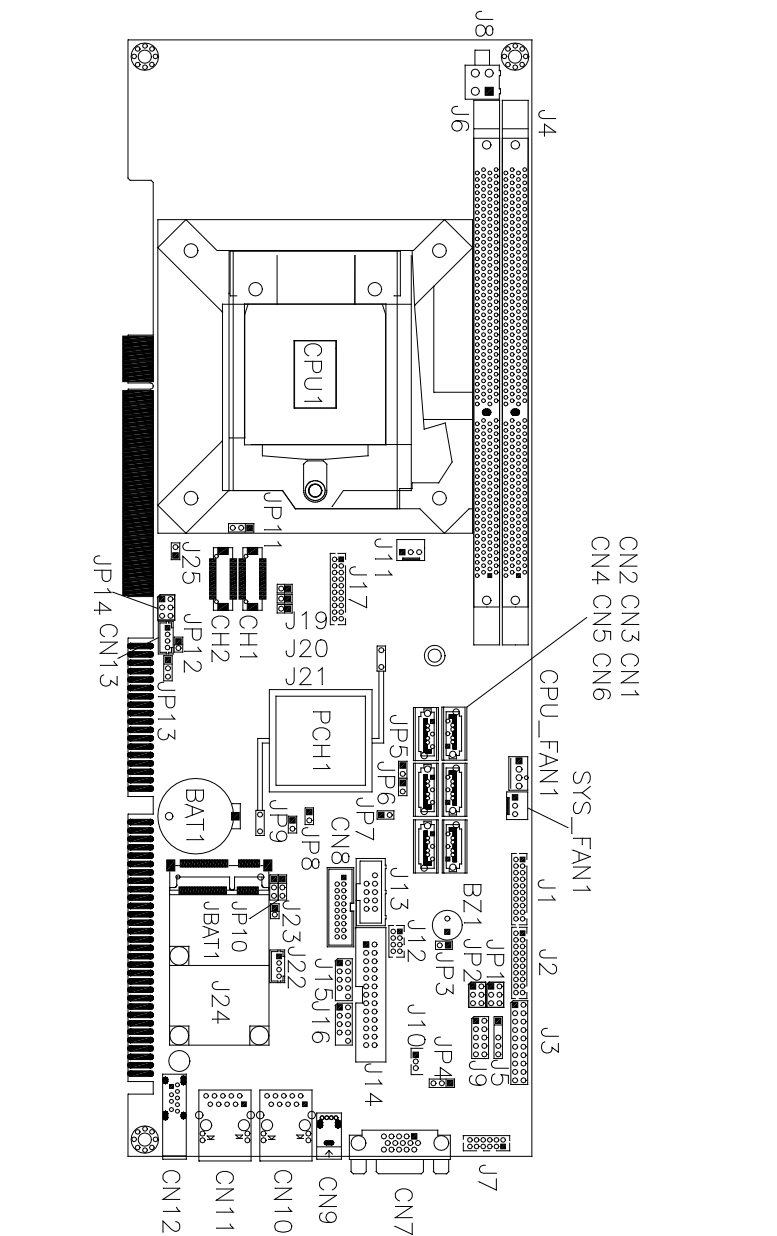
JBAT1	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

SW1: LVDS Panel Type Setting

SW1-4	SW1-3	SW1-2	SW1-1	Panel Type
ON	ON	ON	ON	800*600 18bit 1ch
ON	ON	ON	OFF	1024*768 18bit 1ch
ON	ON	OFF	ON	1024*768 24bit 1ch
ON	ON	OFF	OFF	1280*768 18bit 1ch
ON	OFF	ON	ON	1280*800 18bit 1ch
ON	OFF	ON	OFF	1280*960 18bit 1ch
ON	OFF	OFF	ON	1280*1024 24bit 2ch
ON	OFF	OFF	OFF	1366*768 18bit 1ch
OFF	ON	ON	ON	1366*768 24bit 1ch
OFF	ON	ON	OFF	1440*900 24bit 2ch
OFF	ON	OFF	ON	1440*1050 24bit 2ch
OFF	ON	OFF	OFF	1600*900 24bit 2ch
OFF	OFF	ON	ON	1680*1050 24bit 2ch
OFF	OFF	ON	OFF	1600*1200 24bit 2ch
OFF	OFF	OFF	ON	1920*1080 24bit 2ch
OFF	OFF	OFF	OFF	1920*1200 24bit 2ch

Connectors on IB970

Connector Locations on IB970	15
CN1, CN3, CN4, CN5, CN6: SATA2 Connectors	16
CN2: SATA3 Connectors	16
CN7: DB-15 VGA Connector	16
CN8: USB3 Connector	16
CN9: USB2.0 Connector	16
CN10: Gigabit LAN (Intel 82579V)	16
CN11: Gigabit LAN (Intel 82583V)	16
CN12: USB3.0 Connector	16
CN13: LCD Backlight Connector	17
J1: COM3, COM4 Serial Port (DF11 Connector)	17
J2: COM1, COM2 Serial Port (DF11 Connector)	17
J3: Front Panel Function Connector	18
J7: External Audio Connector	18
J8: ATX 12V Power Connector	18
J9: Digital I/O	18
J10: PCI LAN Wake up Connector	19
J11: External ATX Power Connector	19
J12: PS/2 Keyboard and PS/2 Mouse Connectors	19
J13: SPI Flash Connector (Factory use only)	19
J14: Parallel Port	19
J15, J16: USB Connectors	20
J17: DVI-D Port	20
J22: MCU Flash Connector (factory use only)	20
J24: Mini PCIE Connector	20
CPU_FAN1: CPU Fan Power Connector	20
SYS_FAN1: System Fan1 Power Connector	20
CH1, CH2: LVDS Connectors	21

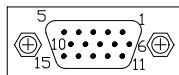


CN1, CN3, CN4, CN5, CN6: SATA2 Connectors

CN2: SATA3 Connectors

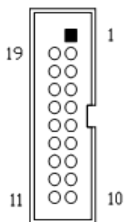
CN3: SATA3 Connectors (IB970RF only)

CN7: DB-15 VGA Connector



Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
N.C.	11	12	DDCDATA
HSYNC	13	14	VSYNC
DDCCLK	15		

CN8: USB3 Connector



Signal Name	Pin #	Pin #	Signal Name
Vcc	1	X	
P1_SSRX-	2	19	Vcc
P1_SSRX+	3	18	P2_SSRX-
GND	4	17	P2_SSRX+
P1_SSTX-	5	16	GND
P1_SSTX+	6	15	P2_SSTX-
GND	7	14	P2_SSTX+
P1_U2_D-	8	13	GND
P1_U2_D+	9	12	P2_U2_D-
NC	10	11	P2_U2_D+

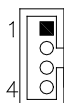
CN9: USB2.0 Connector

CN10: Gigabit LAN (Intel 82579V)

CN11: Gigabit LAN (Intel 82583V)

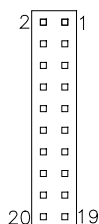
CN12: USB3.0 Connector

CN13: LCD Backlight Connector



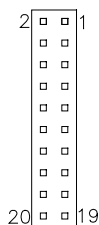
Pin #	Signal Name
1	Backlight Power
2	Backlight Enable
3	Brightness Control
4	Ground

J1: COM3, COM4 Serial Port (DF11 Connector)



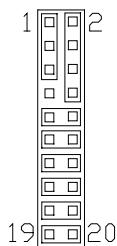
Signal Name	Pin #	Pin #	Signal Name
DSR3	2	1	DCD3
RTS3	4	3	RXD3
CTS3	6	5	TXD3
RI3	8	7	DTR3
NC	10	9	Ground
DSR4	12	11	DCD4
RTS4	14	13	RXD4
CTS4	16	15	TXD4
RI4	18	17	DTR4
NC	20	19	Ground

J2: COM1, COM2 Serial Port (DF11 Connector)



Signal Name	Pin #	Pin #	Signal Name
DSR1	2	1	DCD1
RTS1	4	3	RXD1
CTS1	6	5	TXD1
RI1	8	7	DTR1
NC	10	9	Ground
DSR2	12	11	DCD2
RTS2	14	13	RXD2
CTS2	16	15	TXD2
RI2	18	17	DTR2
NC	20	19	Ground

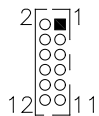
J3: Front Panel Function Connector



Signal Name	Pin #	Pin #	Signal Name
VCC	1	2	Speaker Out
NC	3	4	NC
Ground	5	6	Ground
NC	7	8	VCC
Ground	9	10	NC
Ground	11	12	NC
Ground	13	14	PWR_SW
NC	15	16	NC
Ground	17	18	RST
HDD LED +	19	20	HDD LED -

J7: External Audio Connector

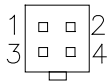
J7 is a 12-pin header that is used to connect to the optional audio cable.



Signal Name	Pin #	Pin #	Signal Name
LINE OUT_L	1	2	LINE OUT_R
JD_FRONT	3	4	Ground
LINE IN_L	5	6	LINE IN R
JD LINE IN	7	8	Ground
MIC-L	9	10	MIC-R
JD MIC1	11	12	Ground

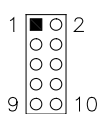
J8: ATX 12V Power Connector

This connector supplies the CPU operating voltage.



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

J9: Digital I/O

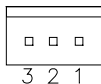


Signal Name	Pin #	Pin #	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

J10: PCI LAN Wake up Connector

J11: External ATX Power Connector

Pin #	Signal Name
1	Ground
2	PS-ON (soft on/off)
3	5VSB (Standby +5V)



J12: PS/2 Keyboard and PS/2 Mouse Connectors

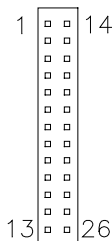
Signal Name	Pin #	Pin #	Signal Name
Vcc	2	1	VCC
KB_DATA	4	3	MS_DATA
KB_CLK	6	5	MS_CLK
Ground	8	7	Ground



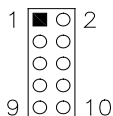
J13: SPI Flash Connector (Factory use only)

J14: Parallel Port

Signal Name	Pin #	Pin #	Signal Name
Line printer strobe	1	14	AutoFeed
PD0, parallel data 0	2	15	Error
PD1, parallel data 1	3	16	Initialize
PD2, parallel data 2	4	17	Select
PD3, parallel data 3	5	18	Ground
PD4, parallel data 4	6	19	Ground
PD5, parallel data 5	7	20	Ground
PD6, parallel data 6	8	21	Ground
PD7, parallel data 7	9	22	Ground
ACK, acknowledge	10	23	Ground
Busy	11	24	Ground
Paper empty	12	25	Ground
Select	13	26	Ground



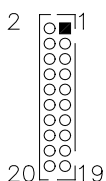
J15, J16: USB Connectors



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

J17: DVI-D Port

J17 is a 20-pin header that is used to connect to the optional DVI-D cable.

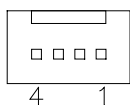


Signal Name	Pin #	Pin #	Signal Name
TDC1#_B	2	1	TDC1_B
Ground	4	3	Ground
TLC#_B	6	5	TLC_B
5V	8	7	Ground
N.C.	10	9	HPDET_B
TDC2#_B	12	11	TDC2_B
Ground	14	13	Ground
TDC0#_B	16	15	TDC0_B
N.C.	18	17	N.C.
SC_DDC_B	20	19	SD_DDC_B

J22: MCU Flash Connector (factory use only)

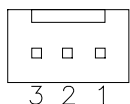
J24: Mini PCIE Connector

CPU_FAN1: CPU Fan Power Connector



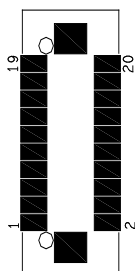
Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

SYS_FAN1: System Fan1 Power Connector



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

CH1, CH2: LVDS Connectors



Signal Name	Pin #	Pin #	Signal Name
N.C	19	20	N.C
ENABLE	17	18	LCD_PWR
CLK+	15	16	CLK-
GND	13	14	GND
LD2+	11	12	LD2-
LD3+	9	10	LD3-
GND	7	8	LCD_PWR
LD1+	5	6	LD1-
GND	3	4	GND
LD0+	1	2	LD0-

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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:

BIOS Introduction.....	24
BIOS Setup	24
Advanced Settings	26
Chipset Settings.....	37
Boot Settings.....	44
CSM parameters	45
Security Settings.....	46
Save & Exit Settings.....	47

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 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 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				→ ← Select Screen	
System Date				↑ ↓ Select Item	
System Time				Enter: Select	
Access Level				+- 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
▶ PCI Subsystem Settings ▶ ACPI Settings ▶ Wake up event setting ▶ Trusted Computing ▶ CPU Configuration ▶ SATA Configuration ▶ Shutdown Temperature Configuration ▶ iSmart Controller ▶ 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).

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

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

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		
Active Processor Cores			All		
Limit CPUID Maximum			Disabled		
Execute Disable Bit			Enabled		
Intel Virtualization Technology			Disabled		
Adjacent Cache Line Prefetch			Enabled		
				→ ← Select Screen	
				↑ ↓ Select Item	
				Enter: Select	
				+- Change Field	
				F1: General Help	
				F2: Previous Values	
				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, Red Hat Enterprise 3 Update 3.)

Intel Virtualization Technology

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

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	→ ← Select Screen ↑ ↓ Select Item Enter: Select + - Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
SATA Mode Selection				RAID	
Aggressive LPM Support				Enabled	
SATA Controller Speed				Gen3	
SATA Port0				Empty	
Software Preserve				Unknown	
SATA Port1				Empty	
Software Preserve				Unknown	
SATA Port2				Empty	
Software Preserve				Unknown	
SATA Port3				Empty	
Software Preserve				Unknown	
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.

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.

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 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	
▶ Serial Port 0 Configuration ▶ Serial Port 1 Configuration ▶ Serial Port 2 Configuration ▶ Serial Port 3 Configuration ▶ Parallel Port Configuration				→ ← 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_Fan1 smart fan control				Disabled	
SYS_Fan1 smart fan control				Disabled	
CPU temperature				+41 C	
SYS temperature				+35 C	
CPU_FAN Speed				2115 RPM	
SYS_FAN Speed				N/A	
Vcore				+1.000 V	→ ← Select Screen
+5V				+5.213 V	↑ ↓ Select Item
+12V				+12.408 V	Enter: Select
1.5V				+1.544 V	+ - Change Field
+3.3V				+3.424 V	F1: General Help
					F2: Previous Values
					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
Turbo Mode					Enabled
					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

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
▶ 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			B75		
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		
			↑ ↓ Select Item		
			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.)

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					
	XHCI Pre-Boot Driver		Disabled		
	xHCI Mode		Auto		
	HS Port #1 Switchable		Enabled		
	HS Port #2 Switchable		Enabled		
	HS Port #3 Switchable		Enabled		
	HS Port #4 Switchable		Enabled		
	xHCI Streams		Enabled		
	EHCI1		Enabled		
	EHCI2		Enabled		
	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

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
Azalia				Auto	↑ ↓ 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 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		
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			2132		
IGfx Frequency			350 MHz		
Primary Display			Auto		
Internal Graphics			Auto		→ ← Select Screen
GTT Size			2MB		↑ ↓ Select Item
Aperture Size			256MB		Enter: Select
DVMT Pre-Allocated			64M		+ - Change Field
DVMT Total Gfx Mode			Disabled		F1: General Help
Primary IGFX Boot Display			VBIOS Default		F2: Previous Values
LVDS Control			Disabled		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.

Primary IGFX Boot Display

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			4096 MB (DDR3)		
DIMM#A			2048 MB (DDR3)		
DIMM#B			2048 MB (DDR3)		
CAS Latency (tCL)			9	→ ← Select Screen	
Minimum delay time				↑ ↓ Select Item	
CAS to RAS (tRCDmin)			9	Enter: Select	
Row Precharge (tRPmin)			9	+- Change Field	
Active to Precharge (tRASmin)			24	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			1		
Setup Prompt Timeout			On		
Bootup NumLock State			Disabled		
Quiet Boot			Disabled		
Fast Boot			07.69		
CSM16 Module Version			Upon Request		
GateA20 Active			Force BIOS		
Option ROM Messages			Immediate		
INT19 Trap Response					
Boot Option Priorities					
► 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				→ ← Select Screen	
The password length must be in the following range:				↑ ↓ Select Item	
Minimum length 3				Enter: Select	
Maximum length 20				+- Change Field	
Administrator Password				F1: General Help	
User Password				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	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.

This page is intentionally left blank.

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	50
VGA Drivers Installation	53
Realtek HD Audio Driver Installation	56
LAN Drivers Installation.....	58
Intel® Management Engine Interface	62
Intel® USB 3.0 Drivers	65

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**.



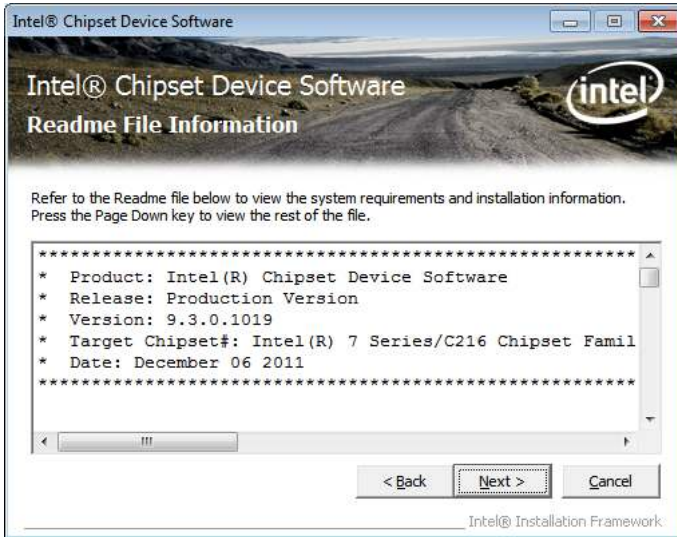
3. When the Welcome screen to the Intel® Chipset Device Software appears, click **Next** to continue.



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

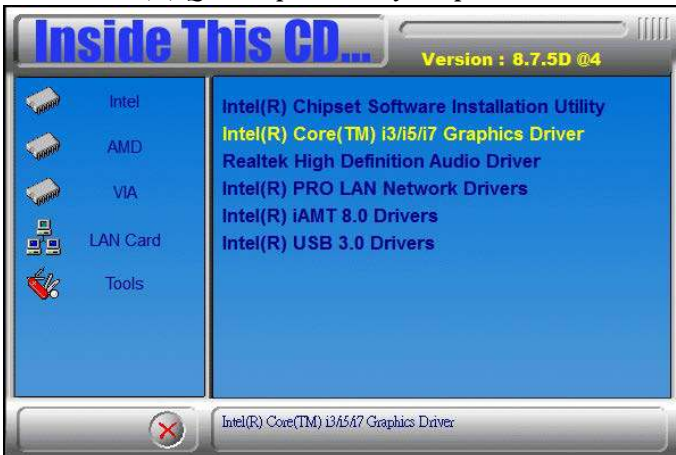
NOTE: Before installing the *Intel(R) Q77 Chipset Family Graphics Driver*, the Microsoft .NET Framework 3.5 SPI should be first installed.

To install the VGA drivers, follow the steps below.

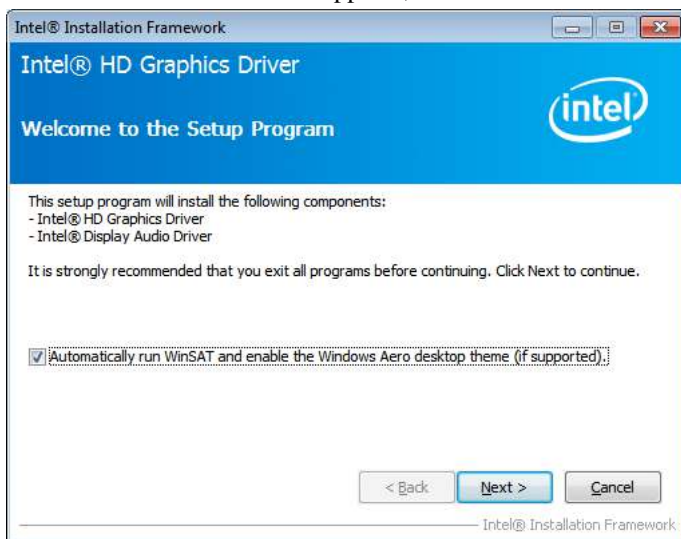
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) Q7 Series Chipset Drivers**.



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



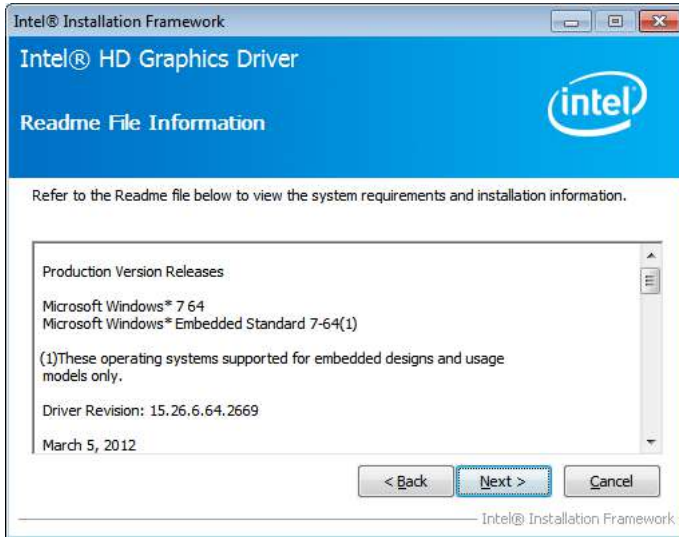
3. When the Welcome screen appears, click *Next* to continue.



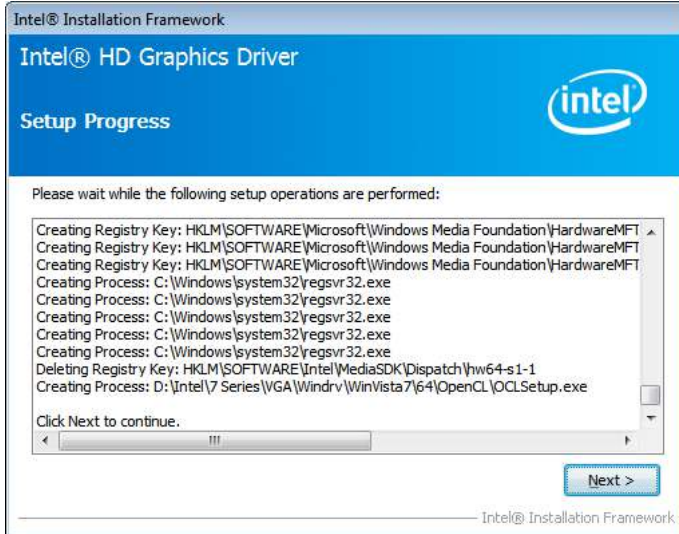
4. Click *Yes* to to agree with the license agreement and continue the installation.



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

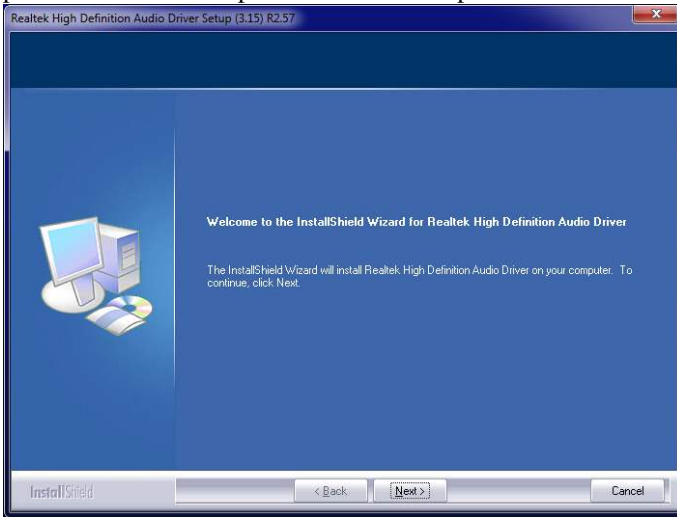
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) Q7 Series Chipset Drivers**.



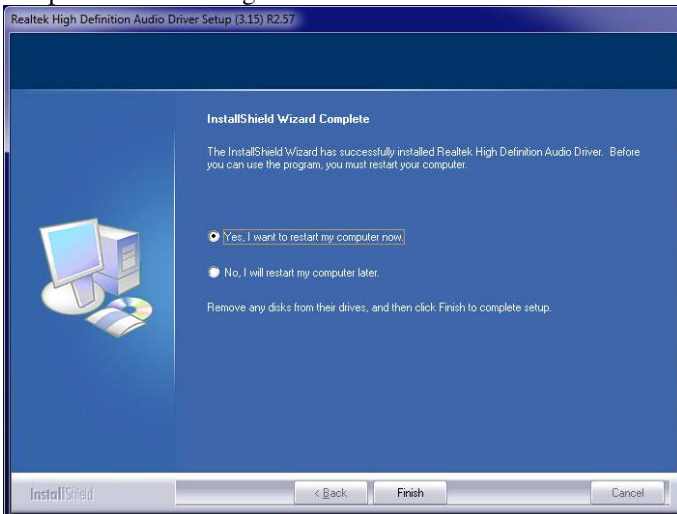
2. Click **Realtek High Definition Audio Driver**.



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

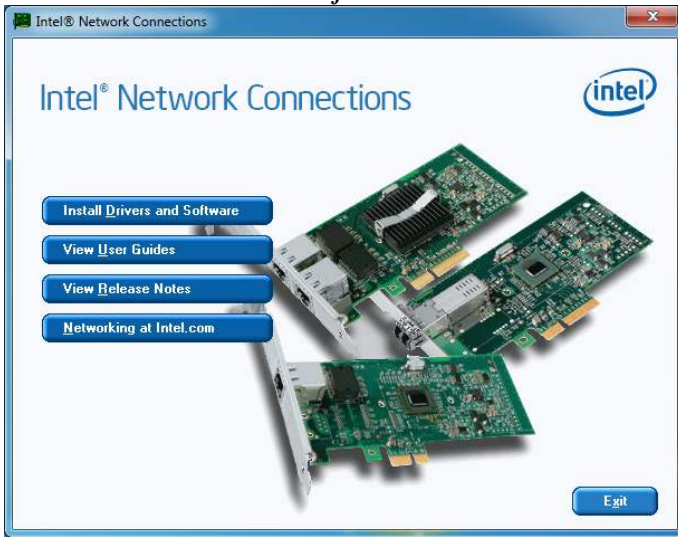
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) Q7 Series Chipset Drivers**.



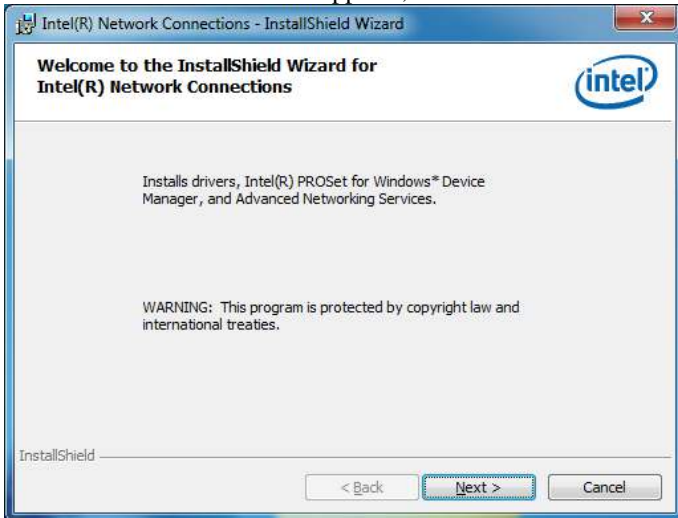
2. Click **Intel(R) PRO LAN Network Driver**.



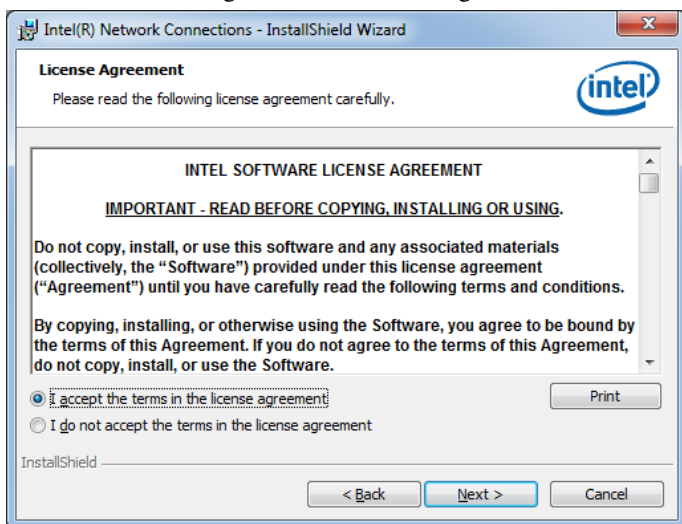
3. Click **Install Drivers and Software**.



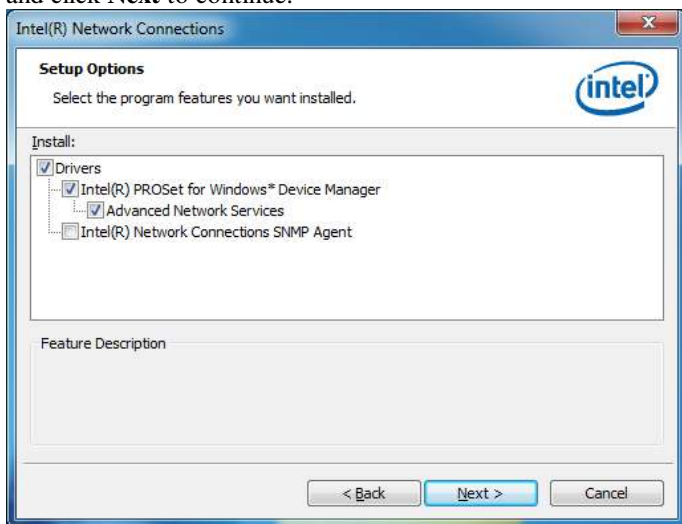
4. When the Welcome screen appears, click **Next**.



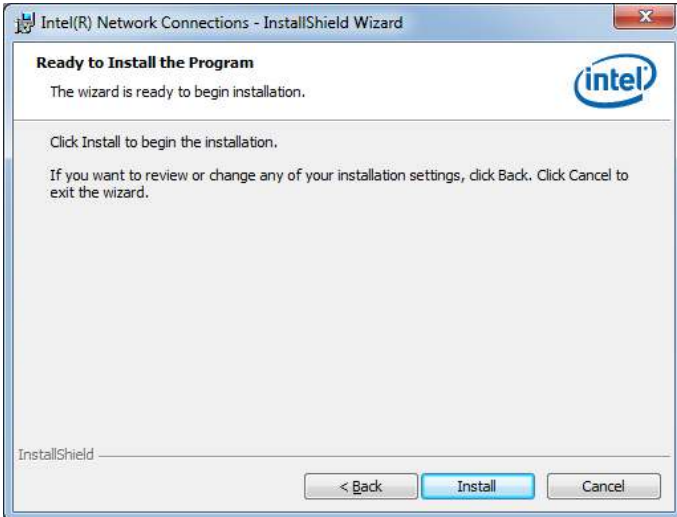
5. Click **Next** to to agree with the license agreement.



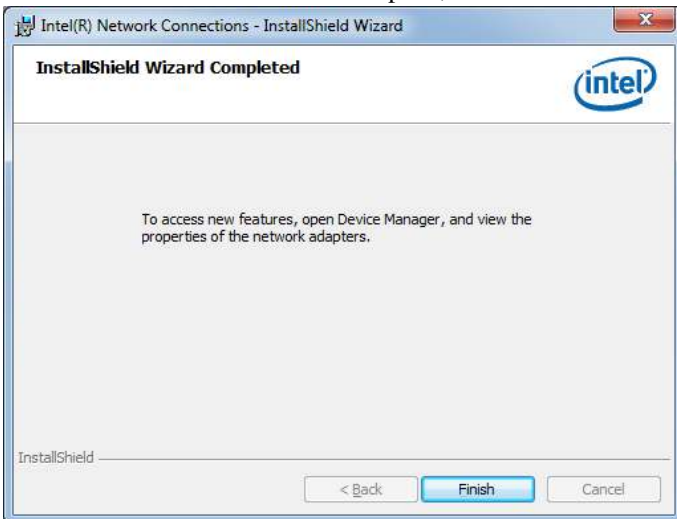
6. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.



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



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.

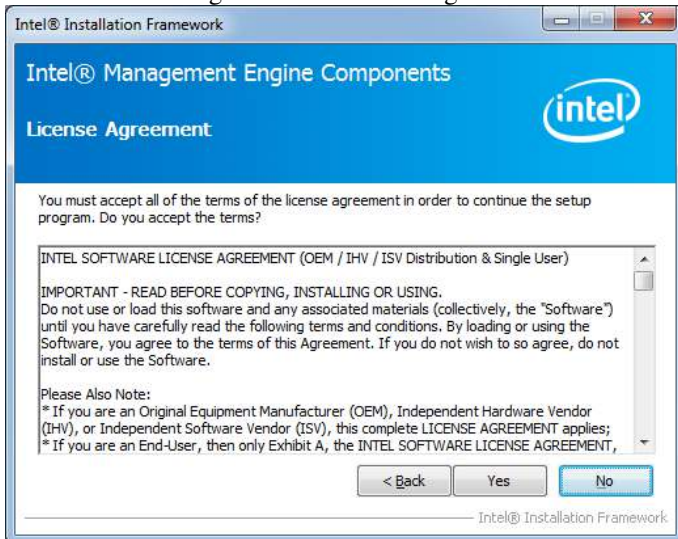
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) AMT 8.0 Drivers**.



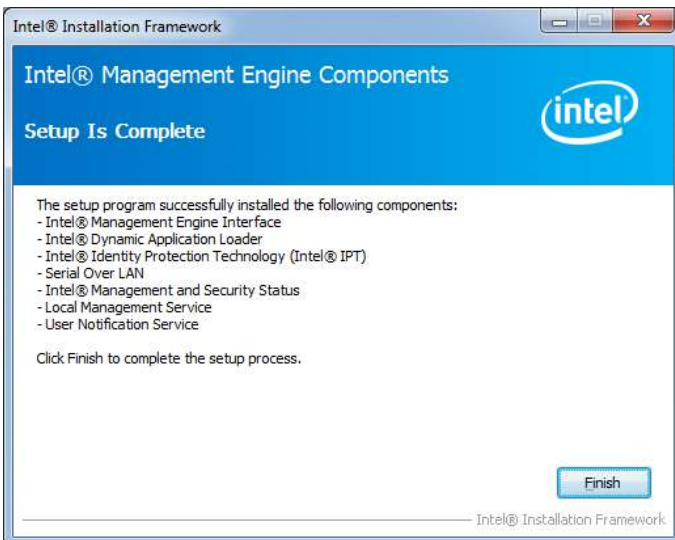
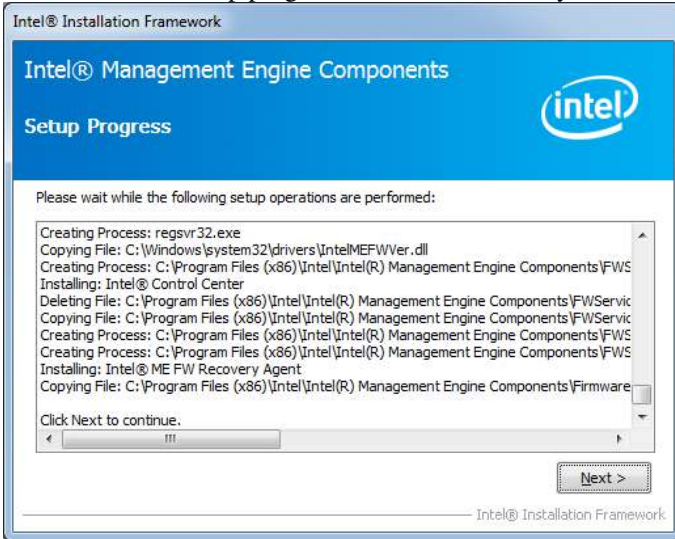
2. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click the checkbox for **Install Intel® Control Center** & click **Next**.



3. 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

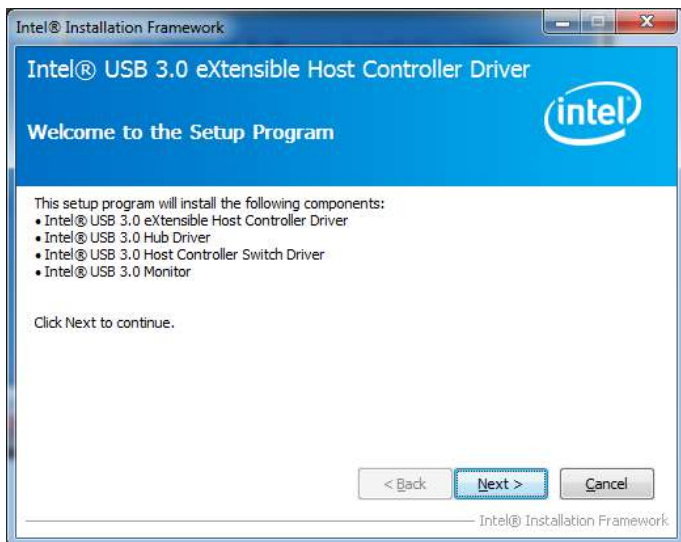
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) Q7 Series Chipset Drivers**.



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.



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

```

```
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
```