ET930

Intel® HM76

COM-Express Module

USER'S MANUAL

Version 1.0

Acknowledgments

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Introduction

Product Description

The ET930 COM-Express Module is based on the latest Intel® HM76 chipset with pin-out Type 6 that fully complies with the PICMG (PCI Industrial Computer Manufactures Group) COM.0 R2.0 specification.. The platform supports 3rd generation Intel® Core processor family with BGA packing and feature 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 HM76 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 ET930 COM-Express Module utilizes the dramatic increase in performance provided this Intel's latest cutting-edge technology. Measuring 125mm x 95mm, the ET930 offers fast 6Gbps SATA, USB3.0 and DisplayPort. ET930 features Intel Active Management Technology 8.0.

ET930 FEATURES:

- Supports Intel® 3rd Generation Core i7/i5/i3 QC/DC mobile processors
- Two DDR3 SO-DIMM, 1066/1333/1600MHz, Max. 16GB memory
- Intel® PCI-Express Gigabit LAN
- Integrated Graphics for VGA/DisplayPort/LVDS displays
- 2x SATA 2.0, 2x SATA 3.0, 8x USB 2.0, USB 3.0 (4 ports)
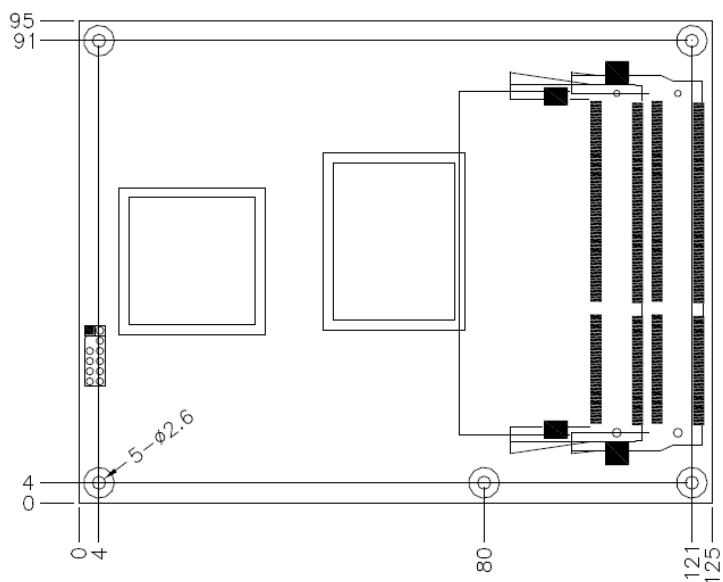- 1x PEG (x16), 7x PCI-EX1

Checklist

Your ET930 package should include the items listed below.

- The ET930 COM-Express Module
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- 1 heat-spreader

ET930 Specifications

Product Name	ET930-1G (Celeron-807UE, SC, TDP=10W) ET930-13 (i3-2340UE, DC, TDP=17W) ET930-16 (i3-3217UE, DC, TDP=17W)
Form Factor	COM Express Type VI
CPU Type	- Intel® Celeron® 807UE (1.0GHz, 1C/1T, 1MB cache, TDP=10W) - Intel® Core™ i3-2340UE (1.3GHz, 2C/4T, 3MB cache, TDP=17W) - Intel® Core™ i3-3217UE (1.6GHz, 2C/4T, 3MB cache, TDP=17W) - BGA1023 , 32nm, 31mm x 24mm
Chipset	Intel® BD82HM76 PCH - 25mm x 25mm , TDP = 3.9W
BIOS	AMI BIOS
Memory	DDR3-1333/1600 SO-DIMM x 2, Max. 8GB (Non-ECC) , single-channel, horizotal type
VGA	Intel® CPU integrated HD graphic, support dual independent displays Thru interface on carrier board
LVDS	Intel® BD82HM76 built-in 24-bit dual channels Thru interface on carrier board
LAN	Intel® 82579V PHY GbE x 1 Thru interface on carrier board
USB	Intel® BD82HM76 PCH built-in USB host controller, supports USB 3.0 x 4 ports & USB 2.0 x 8 ports
Serial ATA Ports	Intel® BD82HM76 PCH built-in controller, Supports 2 ports for SATA 2.0 (3Gb/sec.) 2 ports for SATA 3.0 (6Gb/sec.)
Audio	Intel® BD82HM76 PCH Built-in HD Audio controller with external HD codec on carrier board
RTC	Intel® BD82HM76 PCH built-in RTC, battery on carrier board
Connector to Carrier Board	Two 220-pin connectors (A-B & C-D) [COM Express 2.0 standard]
Power	+12V ,+5VSB
Others	heat-spreader
RoHS	Yes
Board Size	95mm x 125mm
OS support	Windows XP ; Windows 7 , Windows 8, Linux

Board Dimensions

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Installations

This section provides information on how to use the jumpers and connectors on the ET930 in order to set up a workable system. The topics covered are:

Installing the Memory

The ET930 board supports two DDR3 memory socket for a maximum total memory of 16GB in DDR3 SO-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.

DDR3 Module

Lock   Lock

Lock   Lock
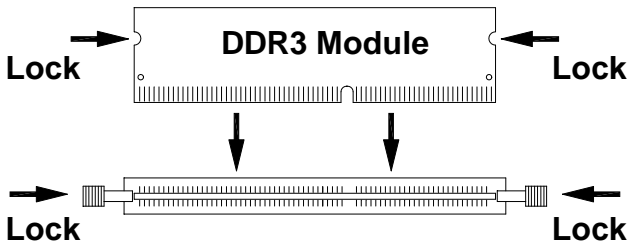
Setting the Jumpers

Jumpers are used on ET930 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 ET930 and their respective functions.

Jumper Locations on ET930
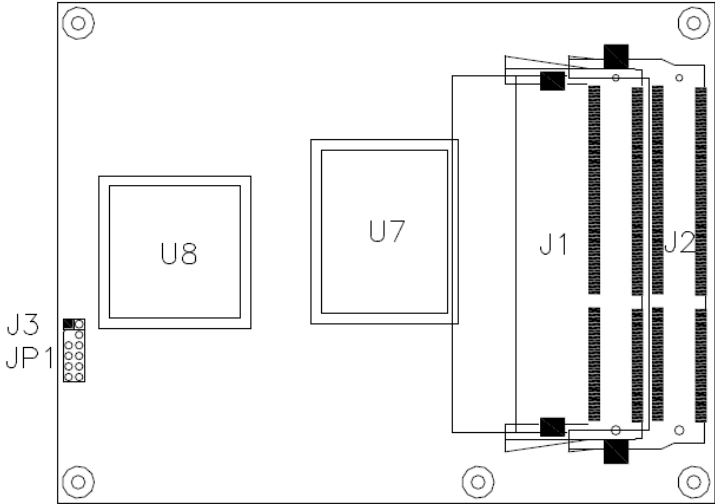
JP1: SPI Flash connector (Factory use only)

J3: Flash Descriptor Security Override (Factory use only)

| J3	Flash Descriptor Security Override
Open	Disabled (Default)
Close	Enabled

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

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

```
            Press  <DEL>  to  Enter  Setup
```

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

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

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

Main Settings

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

Main	Advanced	Chipset	Boot	Security	Save & Exit

BIOS Information		Choose the system default language
System Language	[English]	→ ←Select Screen
System Date	[Tue 01/20/2009]	↑ ↓ Select Item
System Time	[00.00.00]	Enter: Select
Access Level	Administrator	+- Change Field
		F1: General Help
		F2: Previous Values
		F3: Optimized Default
		F4: Save ESC: Exit

System Language
Choose the system default language.

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

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

Advanced Settings

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

Aptio Setup Utility

Main	**Advanced**	Chipset	Boot	Security	Save & Exit

► PCI Subsystem Settings
► ACPI Settings
► Wake up event setting
► Trusted Computing
► CPU Configuration
► SATA Configuration
► Shutdown Temperature Configuration
► Acoustic Management Configuration
► USB Configuration
► F81865 Super IO Configuration
► F81865 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

► PCI Express Settings

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

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
Maximum Read Request	Auto
PCI Express Link Register Settings	
ASPM Support	Disabled
WARNING: Enabling ASPM may cause	Disabled
some PCI-E devices to fail	
Extended Synch	Disabled
Link Training Retry	5
Link Training Timeout (uS)	100
Unpopulated Links	Keep Link ON

```
→ ←Select Screen
↑ ↓ Select Item
Enter: Select
+-  Change Field
F1: General Help
F2: Previous Values
F3: Optimized Default
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                                                        │
│                                          → ←Select Screen            │
│ Enable Hibernation        Enabled        ↑↓ Select Item              │
│ ACPI Sleep State          S3 (Suspend to R…)  Enter: Select          │
│ Lock Legacy Resources     Disabled       +-   Change Field           │
│ S3 Video Repost           Disabled       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 on Ring   Disabled
Wake on PCI PME   Disabled
Wake on PCIE Wake Event   Disabled

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

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

Current TPM Status Information
 TPM SUPPORT OFF

```
→ ←Select Screen
↑ ↓ Select Item
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		AHCI			
Aggressive LPM Support		Enabled			
SATA Controller Speed		Gen3			
SATA Port0		Empty			→ ←Select Screen
Software Preserve		Unknown			↑ ↓ Select Item
SATA Port1		Empty			Enter: Select
Software Preserve		Unknown			+- Change Field
SATA Port2		Empty			F1: General Help
Software Preserve		Unknown			F2: Previous Values
SATA Port3		Empty			F3: Optimized Default
Software Preserve		Unknown			F4: Save ESC: Exit
SATA Port4		Empty			
Software Preserve		Unknown			
SATA Port5		Empty			
Software Preserve		Unknown			

SATA Controller(s)
Enable / Disable Serial ATA Controller.

SATA Mode Selection
(1) IDE Mode.
(2) AHCI Mode.
(3) RAID Mode.

Shutdown Temperature Configuration

Aptio Setup Utility

Main	**Advanced**	Chipset	Boot	Security	Save & Exit

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

ACPI Shutdown Temperature

The default setting is Disabled.

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			→ ←Select Screen
EHCI Hand-off		Enabled			↑↓ Select Item
Port 60/64 Emulation		Enabled			Enter: Select
					+- Change Field
USB hardware delays and time-outs:					F1: General Help
USB Transfer time-out		20 sec			F2: Previous Values
Device reset tine-out		20 sec			F3: Optimized Default
Device power-up delay		Auto			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
F81866 ERP Support	All Enable
► Serial Port 0 Configuration	
► Serial Port 1 Configuration	
► Serial Port 2 Configuration	
► Serial Port 3 Configuration	
► IR Configuration	
LVDS Backlight Level Control	[Level-1 (3.3V)]

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

Serial Port Configuration

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

F81866 H/W Monitor

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit

PC Health Status

CPU temperature	+41 C
SYS temperature	+35 C
CPU FAN Speed	2115 RPM
SYS FAN Speed	N/A
Vcore	+1.000 V
+Vcc5V	+5.213 V
+Vcc12V	+12.408 V
+1.5V	+1.544 V
+Vcc3.3V	+3.424 V
Fan1 smart fan control	Disabled
Fan2 smart fan control	Disabled

```
→ ←Select Screen
↑↓ Select Item
Enter: Select
+-  Change Field
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	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
SLP_S4 Assertion Width	4-5 Seconds
Restore AC Power Loss	Power On

```
→ ←   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.)

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	
► PCI Express Root Port 1		
► PCI Express Root Port 2		
► PCI Express Root Port 3		→ ← **Select Screen**
► PCI Express Root Port 4		**↑ ↓ Select Item**
► PCI Express Root Port 5		**Enter: Select**
PCI-E Port 6 is assigned to LAN		**+- Change Field**
► PCI Express Root Port 7		**F1: General Help**
► PCI Express Root Port 8		**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		→ ←	Select Screen
xHCI Streams		Enabled		↑↓ Select Item	
				Enter: Select	
EHCI1		Enabled		+- Change Field	
				F1: General Help	
EHCI2		Enabled		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

Azalia   Auto

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

Azalia
Control Detection of the Azalia device.
Disabled = Azalia will unconditionally 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
Thermal Device (B0:D4:F0)	Disabled
Enable NB CRID	Disabled
BDAT ACPI Table Support	Disabled
C-State Pre-Wake	Enabled

► Graphics Configuration
► Memory Configuration

```
→ ←Select Screen
↑ ↓ Select Item
Enter: Select
+-  Change Field
F1: General Help
F2: Previous Values
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
GTT Size	2MB
Aperture Size	256MB
DVMT Pre-Allocated	64M
DVMT Total Gfx Mode	Disabled
► LCD Control	

```
→ ←Select Screen
↑ ↓ Select Item
Enter: Select
+-  Change Field
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 booty display selection will appear based on your selection. VGA modes will be supported only on primary display.

Memory Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit

Memory Information

Memory Frequency	1333 MHz
Total Memory	8192 MB (DDR3)
DIMM#0	2048 MB (DDR3)
DIMM#1	2048 MB (DDR3)
DIMM#2	2048 MB (DDR3)
DIMM#3	2048 MB (DDR3)
CAS Latency (tCL)	9
Minimum delay time	
CAS to RAS (tRCDmin)	9
Row Precharge (tRPmin)	9
Active to Precharge (tRASmin)	24

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

Boot Settings

This section allows you to configure the boot settings.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit

Boot Configuration		
Setup Prompt Timeout	1	
Bootup NumLock State	On	
Quiet Boot	Disabled	
Fast Boot	Disabled	
		→ ←Select Screen
CSM16 Module Version	07.69	↑↓ Select Item
		Enter: Select
GateA20 Active	Upon Request	+- Change Field
Option ROM Messages	Force BIOS	F1: General Help
INT19 Trap Response	Immediate	F2: Previous Values
		F3: Optimized Default
Boot Option Priorities		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	
		→ ←Select Screen
Other PCI device ROM priority	Legacy OpROM	↑ ↓ 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 Storatge 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

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 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:

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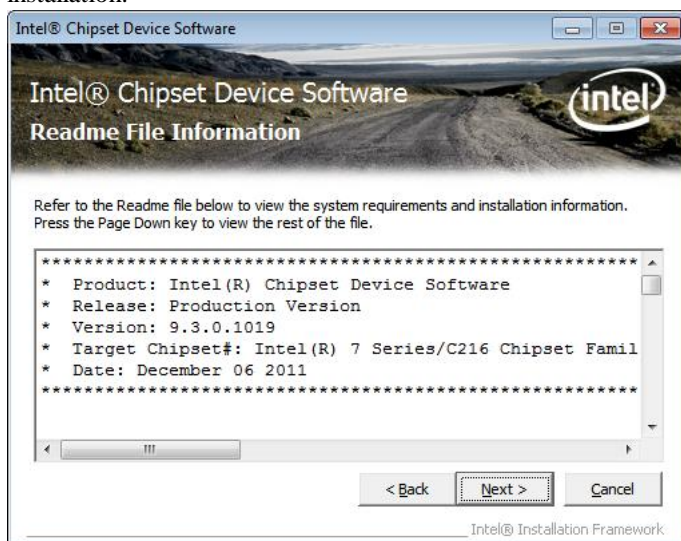
6. The Setup process is now complete. Click *Finish* to restart the computer and for changes to take effect.

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.

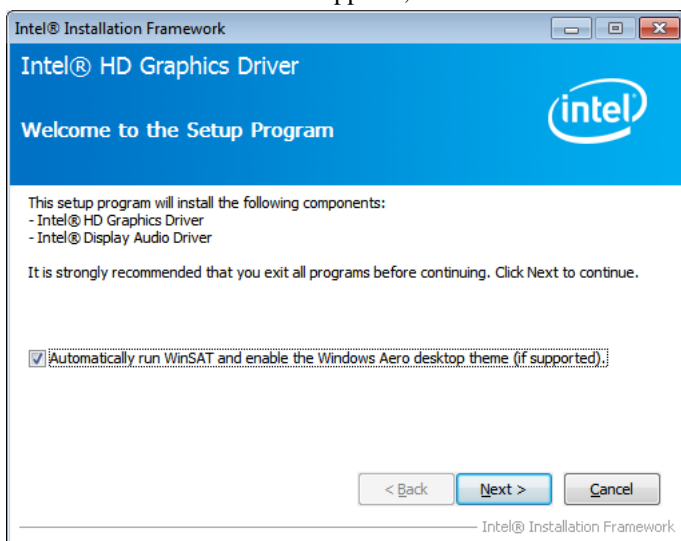To install the VGA drivers, follow the steps below.

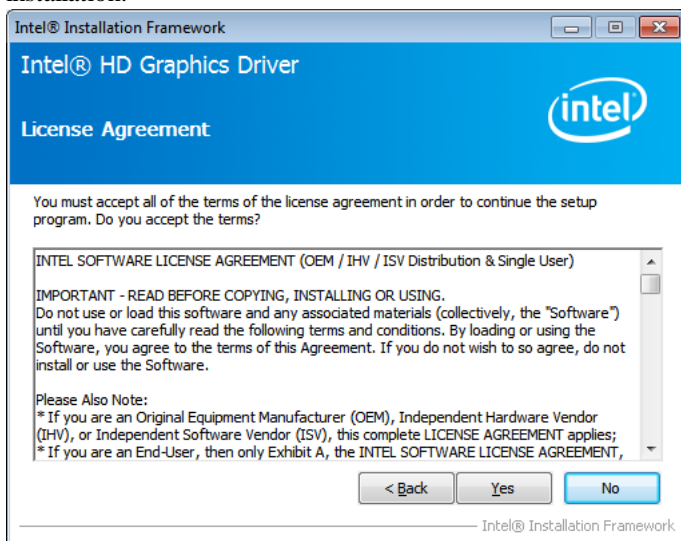1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) Q7 Series Chipset Drivers*.
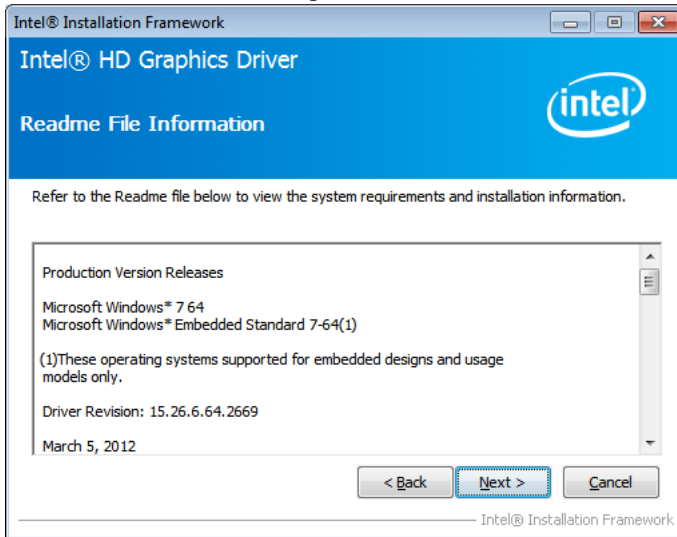

2. Click *Intel(R) Q77 Chipset Family Graphics Driver.*

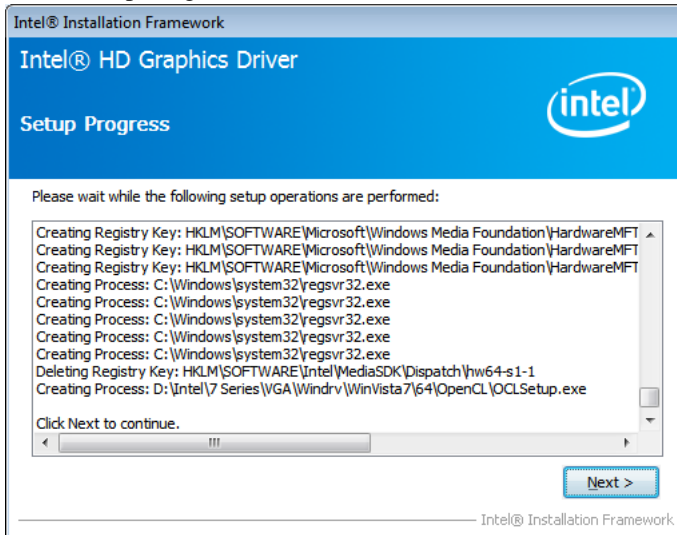3. When the Welcome screen appears, click *Next* to continue.

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

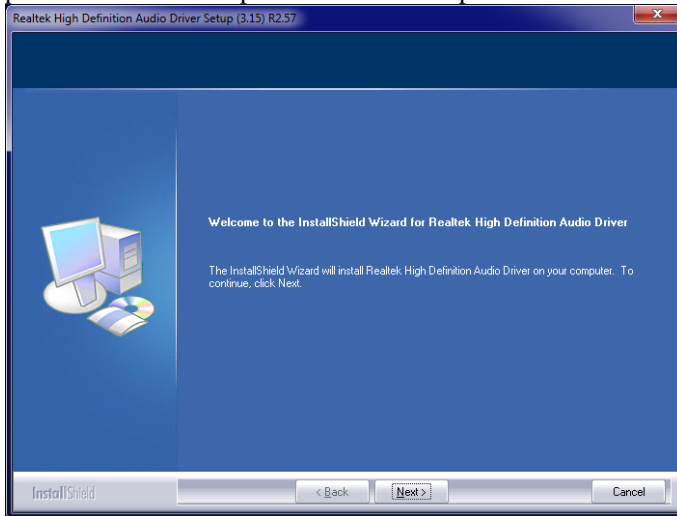Follow the steps below to install the Realtek HD Audio Drivers.

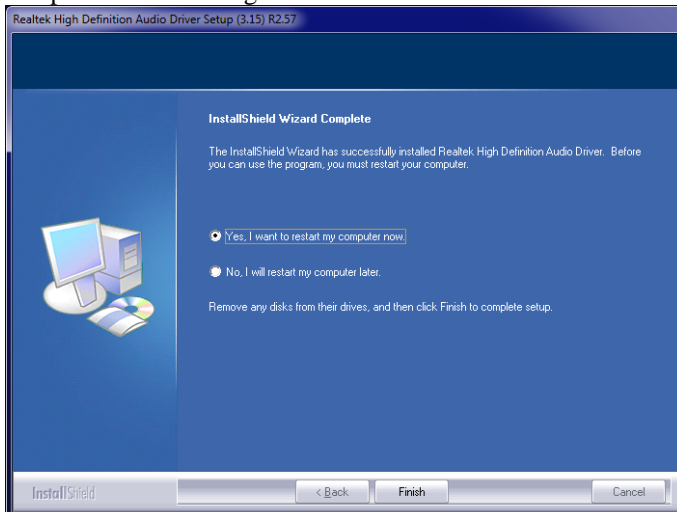1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) Q7 Series Chipset Drivers*.

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.
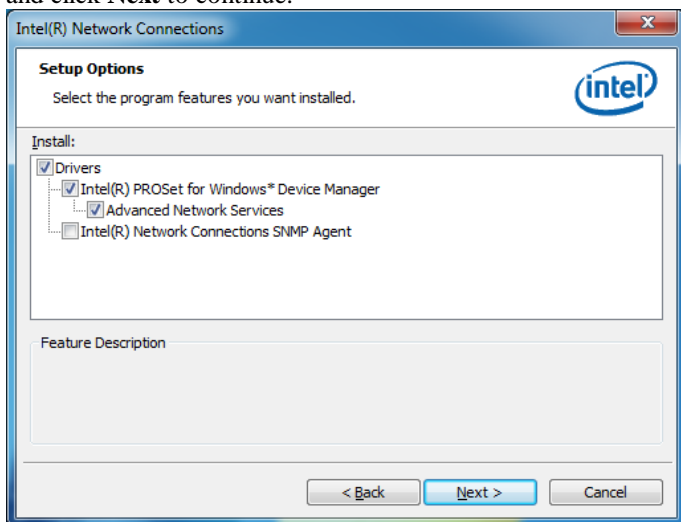
7. The wizard is ready to begin installation. Click *Install* to begin the installation.
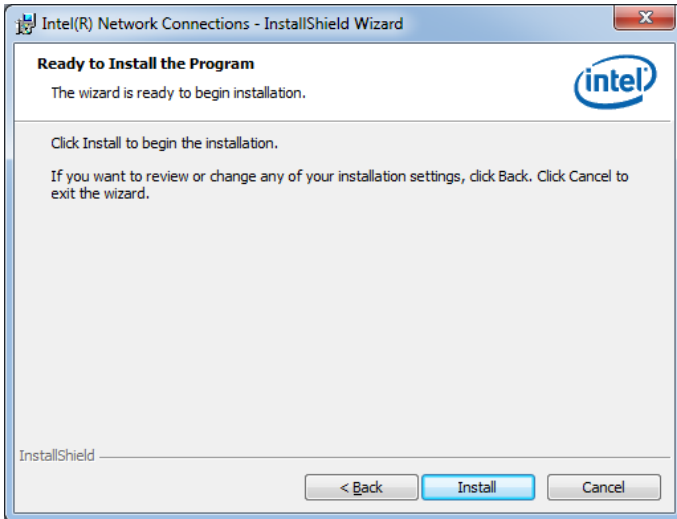
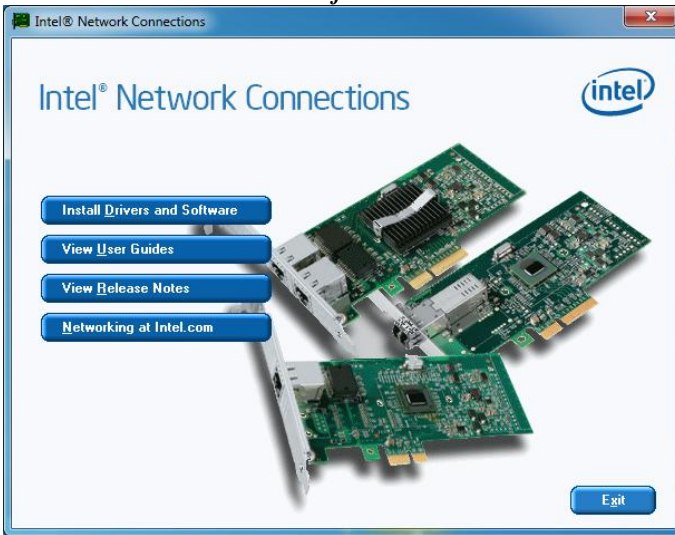8. When InstallShield Wizard is complete, click *Finish*.
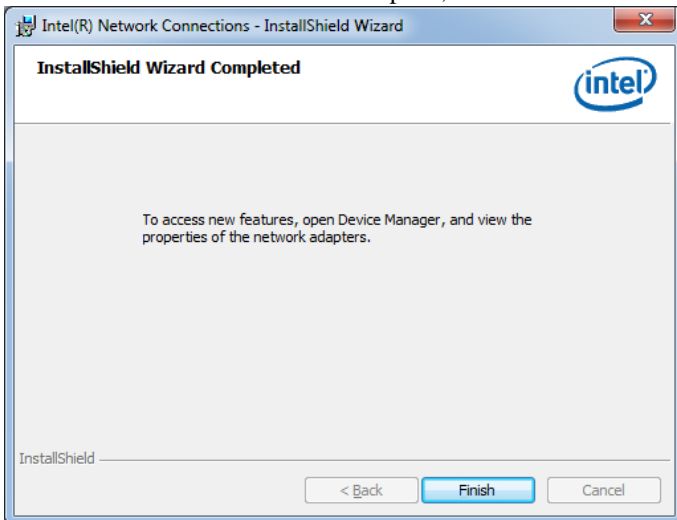
Intel® USB 3.0 Drivers

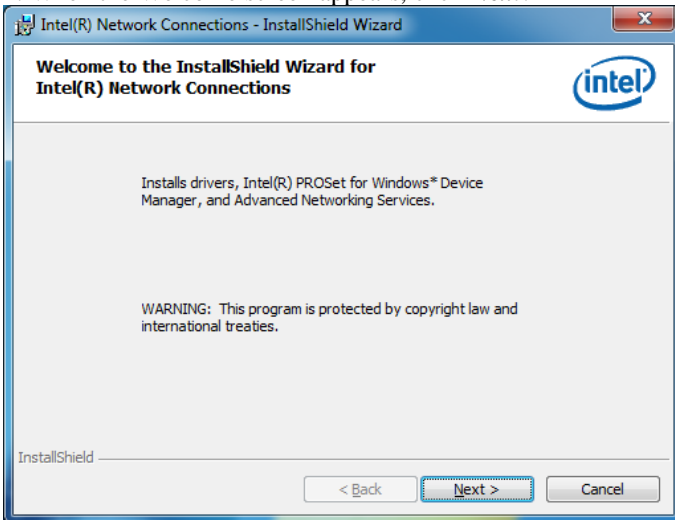1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) Q7 Series Chipset Drivers*.

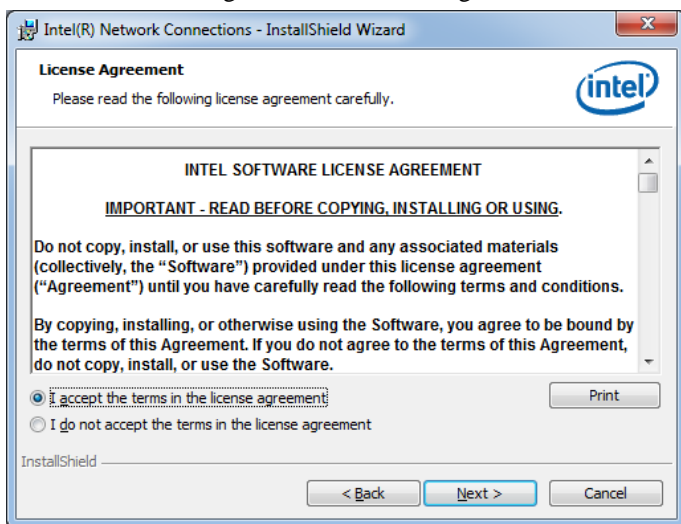2. Click *Intel(R) USB 3.0 Drivers.*

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

4. Click *Yes* to to agree with the license agreement and continue the installation.
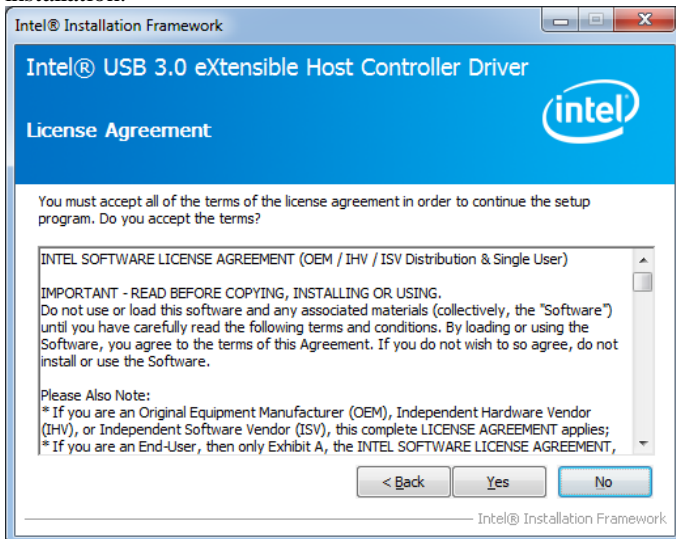
5. On the Readme File Information screen, click **Next** to continue the installation of the Intel® USB 3.0 eXtensible Host Controller Driver.
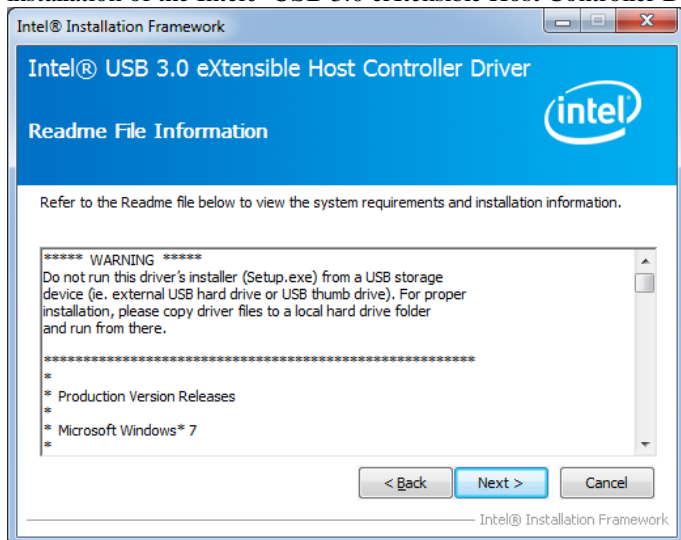
6. Setup complete. Click **Finish** to restart the computer and for changes to take effect.

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
278h - 27Fh	Parallel Port #2(LPT2)
2E8h – 2EFh	Serial Port #4(COM4)
2F8h - 2FFh	Serial Port #2(COM2)
2B0h- 2DFh	Graphics adapter Controller
360h - 36Fh	Network Ports
3B0h - 3BFh	Monochrome & Printer adapter
3C0h - 3CFh	EGA adapter
3D0h - 3DFh	CGA adapter
3E8h – 3EFh	Serial Port #3(COM3)
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
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Reserved
IRQ7	Reserved
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Serial Port #3
IRQ11	Serial Port #4
IRQ12	PS/2 Mouse
IRQ13	80287
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 "F81865.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 81865 watch dog program\n");

        SIO = Init_F81865();
        if (SIO == 0)
        {
                printf("Can not detect Fintek 81865, 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_F81865_Reg(0x2B);
        bBuf &= (~0x20);
        Set_F81865_Reg(0x2B, bBuf);                     //Enable WDTO

        Set_F81865_LD(0x07);                            //switch to logic device 7
        Set_F81865_Reg(0x30, 0x01);                     //enable timer

        bBuf = Get_F81865_Reg(0xF5);
        bBuf &= (~0x0F);
        bBuf |= 0x52;
        Set_F81865_Reg(0xF5, bBuf);                     //count mode is second

        Set_F81865_Reg(0xF6, interval);          //set timer

        bBuf = Get_F81865_Reg(0xFA);
        bBuf |= 0x01;
        Set_F81865_Reg(0xFA, bBuf);                     //enable WDTO output

        bBuf = Get_F81865_Reg(0xF5);
        bBuf |= 0x20;
        Set_F81865_Reg(0xF5, bBuf);                     //start counting
}
//-----------------------------------------------------------------------
void DisableWDT(void)
{
        unsigned char bBuf;

        Set_F81865_LD(0x07);                            //switch to logic device 7

        bBuf = Get_F81865_Reg(0xFA);
        bBuf &= ~0x01;
        Set_F81865_Reg(0xFA, bBuf);                     //disable WDTO output

        bBuf = Get_F81865_Reg(0xF5);
        bBuf &= ~0x20;
        bBuf |= 0x40;
        Set_F81865_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 "F81865.H"
#include <dos.h>
//-------------------------------------------------------------------------
unsigned int F81865_BASE;
void Unlock_F81865 (void);
void Lock_F81865 (void);
//-------------------------------------------------------------------------
unsigned int Init_F81865(void)
{
        unsigned int result;
        unsigned char ucDid;

        F81865_BASE = 0x4E;
        result = F81865_BASE;

        ucDid = Get_F81865_Reg(0x20);
        if (ucDid == 0x07)                              //Fintek 81865
        {       goto Init_Finish;       }

        F81865_BASE = 0x2E;
        result = F81865_BASE;

        ucDid = Get_F81865_Reg(0x20);
        if (ucDid == 0x07)                              //Fintek 81865
        {       goto Init_Finish;       }

        F81865_BASE = 0x00;
        result = F81865_BASE;

Init_Finish:
        return (result);
}
//-------------------------------------------------------------------------
void Unlock_F81865 (void)
{
        outportb(F81865_INDEX_PORT, F81865_UNLOCK);
        outportb(F81865_INDEX_PORT, F81865_UNLOCK);
}
//-------------------------------------------------------------------------
void Lock_F81865 (void)
{
        outportb(F81865_INDEX_PORT, F81865_LOCK);
}
//-------------------------------------------------------------------------
void Set_F81865_LD( unsigned char LD)
{
        Unlock_F81865();
        outportb(F81865_INDEX_PORT, F81865_REG_LD);
        outportb(F81865_DATA_PORT, LD);
        Lock_F81865();
}
//-------------------------------------------------------------------------
void Set_F81865_Reg( unsigned char REG, unsigned char DATA)
{
        Unlock_F81865();
        outportb(F81865_INDEX_PORT, REG);
        outportb(F81865_DATA_PORT, DATA);
        Lock_F81865();
}
//-------------------------------------------------------------------------
unsigned char Get_F81865_Reg(unsigned char REG)
```

```
{
        unsigned char Result;
        Unlock_F81865();
        outportb(F81865_INDEX_PORT, REG);
        Result = inportb(F81865_DATA_PORT);
        Lock_F81865();
        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 __F81865_H
#define __F81865_H                      1
//-----------------------------------------------------------------------------
#define      F81865_INDEX_PORT           (F81865_BASE)
#define      F81865_DATA_PORT            (F81865_BASE+1)
//-----------------------------------------------------------------------------
#define      F81865_REG_LD               0x07
//-----------------------------------------------------------------------------
#define F81865_UNLOCK            0x87
#define      F81865_LOCK                 0xAA
//-----------------------------------------------------------------------------
unsigned int Init_F81865(void);
void Set_F81865_LD( unsigned char);
void Set_F81865_Reg( unsigned char, unsigned char);
unsigned char Get_F81865_Reg( unsigned char);
//-----------------------------------------------------------------------------
#endif //__F81865_H
```