

IB915F

**Intel® Skylake U
3.5" Disk Size SBC**

USER'S MANUAL

Version 1.2

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Introduction

Product Description

The IB915F is a 3.5-inch single board computer based on the Intel® Skylake U MCP processors.

The IB915F platform is well suited for low-power and high-performance designs in a broad range of markets including Industrial Control & Automation, Digital Signage, Thin Client, Electronic Gaming Machines, and SMB storage appliances.

IB915F Features:

- Supports Intel® 6th generation mobile Core™ i MCP processors
- Two DDR3L SO-DIMM, 1600 MHz, Max. 16GB memory
- Integrated graphics for DisplayPort, LVDS, eDP displays
- 2 x SATA III connector
- 4x COM port connector
- 1 x Mini-PCIe(x1) slot (*w/ USB/mSATA support*)
- 2x GbE (RJ-45) connector
- 1x 9V to 24V DC-IN power connector

Checklist

Your IB915F package should include the items listed below.

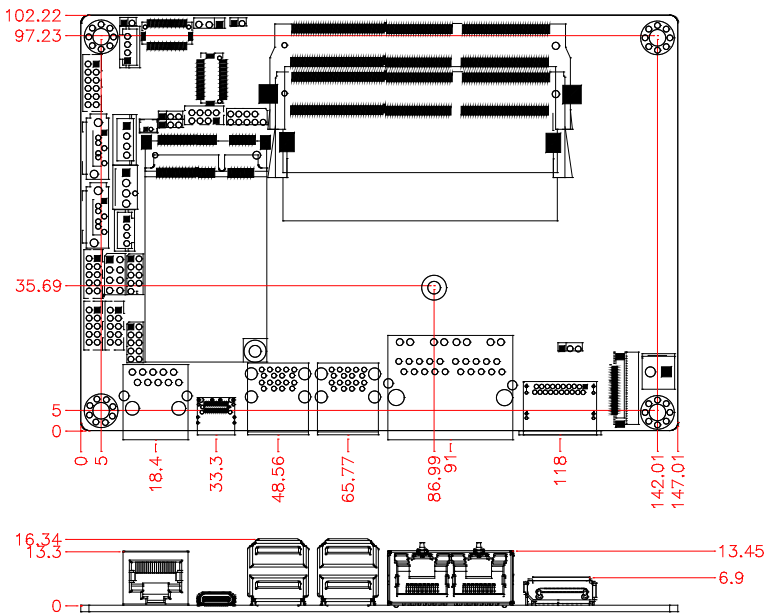
- The IB915F SBC
- This User's Manual
- 1 DVD containing chipset drivers and flash memory utility
- Optional cable kit IB75 (containing DC in power cable/PW87, COM port cable / PK1H, SATA & HDD power cable/SATA-26 and USB 2.0 cable/USB-29)
- Other options: Audio-18 audio cable, HSIB915-BGA-B heatsink , HSIB915-BGA-1 heat spreader

IB915F Specifications

Product Name	IB915AF-6600 (Supports iAMT) IB915AF-6300 (Supports iAMT) IB915F-6100 IB915F-3955 (MOQ) **IB915 will be model name printed on PCB surface**
Form Factor	3.5"
CPU Type	- Intel® 6 th generation mobile Core™ i MCP processors (14nm monolithic) - TDP = 15W (DC) , 42mm x 24mm x 1.16mm, FCBGA1356 @ solder side
CPU Speed	Intel® Core™ i7-6600U processor (2.6GHz/3.4GHz) [IB915AF-6600] Intel® Core™ i5-6300U processor (2.4GHz/3GHz) [IB915AF-6300] Intel® Core™ i3-6100U processor (2.3GHz) [IB915F-6100](Non-AMT) Intel® Celeron® 3955U processor (2GHz) [IB915F-3955](Non-AMT)
Cache	Up to 4MB
Chipset	Integratd in Intel® 6 th Generation Core™ U-series processor
BIOS	AMI BIOS
Memory	Intel® 6 th Gen. Core™ U-series processor integrated memory controller - DDR3L(1.35V) @1600 MHz, SO-DIMM x 2 , Max.=16GB , Non-ECC
Display	Intel® 6 th Gen. Core™ U-series processor integrated Gfx, supports 3 independent displays, - eDP x 1 (Thru eDP) - DP++ x 1 (Thru DDI#1) - LVDS(Thru DDI#2, via NXP PTN3460BS/F6)
LAN	1. Intel® I219LM GbE PHY (IB915AF-6600 & IB915AF-6300) Intel® I219V GbE PHY (IB915F-6100 & IB915F-3955) ** Thru PCIe port # 9** 2. Intel® I211AT as 2 nd GbE ** Thru PCIe port # 10**
USB	- Intel® 6 th Gen. Core™ U-series processor integrated USB 2.0 host controller ,2 ports onboard pin header + 1 port thru MiniPCIe - Intel® 6 th Gen. Core™ U-series processor integrated USB 3.0 host controller 4 x USB 3.0 in the rear panel ** Thru USB3 port# 1~port# 4 ** - USB 3.1 type C connector thru ASM1142 PCIe to USB 3.1 host controller ** Thru PCIe port# 1 **
Serial Ports ATA	Intel® 6 th Gen. Core™ U-series processor built-in SATA III controller - 2 x SATA 3.0 (6Gbps) onboard **Thru SATA port# 0 & port# 2 ** - 1 x mSATA via MiniPCIe full-sized slot **Thru SATA port# 1/Pcie port # 11**
Audio	Intel® 6 th Gen. Core™ U-series processor built-in HD audio controller Realtek ALC662-GR Codec

LPC I/O	Fintek F81846AD-I (128-pin LQFP [14mm x 14 mm]) ▪ COM #1 (RS232/422/485) @ edge I/O With Fintek F81439N transceiver x 1 for jumper-less selection ▪ COM #2~COM #4 (RS232 only) [Hardware Monitor] 2 x Thermal inputs 2 x Voltage monitoring
Digital IO	4 in & 4 out
iAMT(11.0)	For IB915AF-6600 & IB915AF-6300
Expansion Slots	1 x mPCIe(x1) w/ USB 2.0 signal, support mSATA [Full-sized] ** Thru PCIe port # 4**
Edge Connector	DP connector x 1 [C12ZZDPP23VD11000P] RJ45 x2 for LAN#1 & #2 (Horizontal Combo type) USB 3.0 stack connector x 2 for USB1/2 & USB3/4 [Blue color] RJ50 x 1 for COM #1 USB 3.1 type C connector x 1
On Board Header/ Connector	DF20-20 socket connector x 2 for 24-bit dual channel LVDS 4 pins box header x 1 for backlight/brightness control eDP 30-pin connector x 1 2 ports x SATA III [Blue color] 2x4 pins header x 1 for 2 x USB 2.0 ports[DF11 x 1] DF-11 2x6 pins box header x1 for front audio DF-11 2x5 pins box header x 3 for COM2 ~ COM4 2x5 pins headers x 1 for LPC (Debug purpose only) 4 pins power connector x 1 for SATA HDD 2 pins power connector x 1 for DC-in
Watchdog Timer	Yes (256 segments, 0, 1, 2...255 sec/min)
Power Input	+9V ~ +24V DC-in
RoHS	Yes
Board Size	102mm x 147mm
OS support	- Windows 8.1 / Industrial; Windows 10 - Linux - Fedora - Ubuntu
Others	1. Support RAID function 2. iSMART 3.2 3. RTC battery via cable
Optional Cable Kit (IB75)	PW87 x 1 PK1H x 1 SATA-26 x 1 USB29 x 1
Optional items	1. Heatsink 2. Heat Spreader 3. Audio-18 cable (C501AUD1812302000P)

Board Dimensions



Installations

This section provides information on how to use the jumpers and connectors on the IB915F in order to set up a workable system. The topics covered are:

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Setting the Jumpers 8

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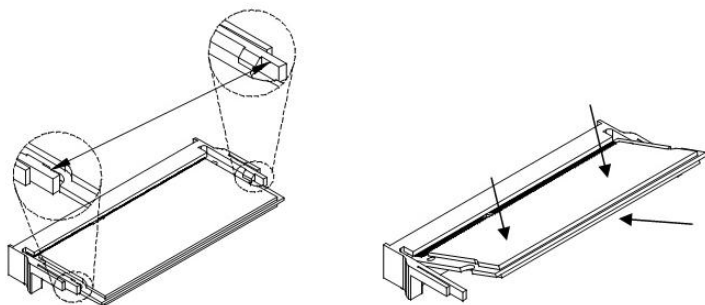
Installing the Memory

The IB915F board supports two DDR3L memory sockets for a maximum total memory of 16GB DDR3L memory type.

Installing and Removing Memory Modules

To install the DDR3L modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR3L module so that the key of the DDR3L module aligned with that on the memory slot.
2. Gently push the DDR3L module in an upright position until the clips of the slot close to hold the DDR3L module in place when the DDR3L module touches the bottom of the slot.
3. To remove the DDR3L module, press the clips with both hands.

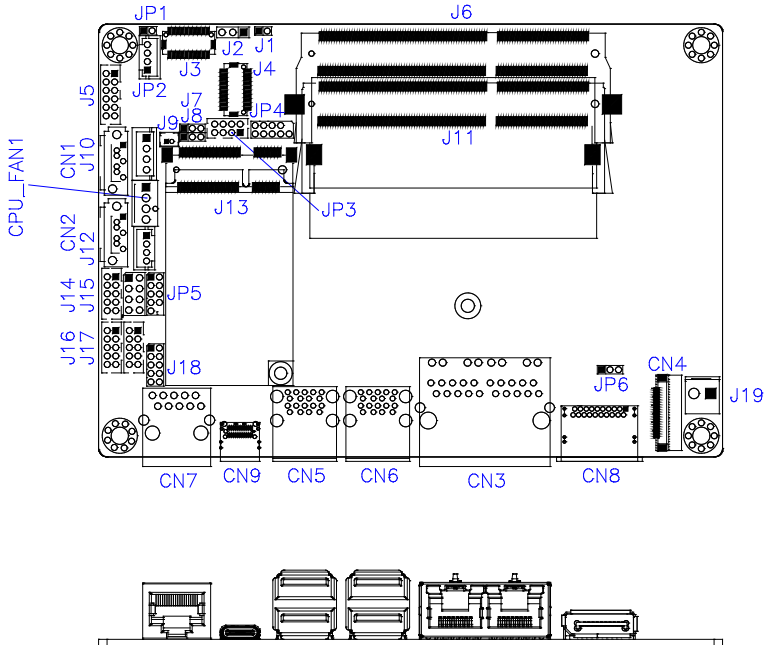


Setting the Jumpers

Jumpers are used on IB915F 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 IB915F and their respective functions.

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JP2: LCD Backlight Connector	10
JP3: USB 2.0 Pin Header	11
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J7: Clear ME	12
J8: Clear CMOS Contents.....	12

Jumper Locations on IB915F

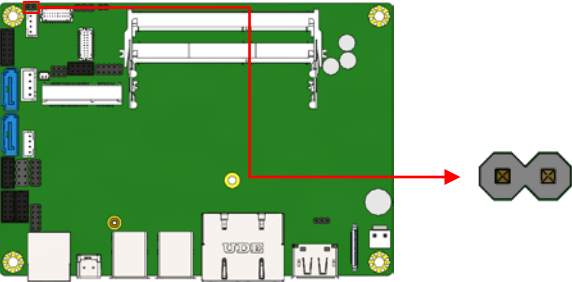


Jumpers on IB915F

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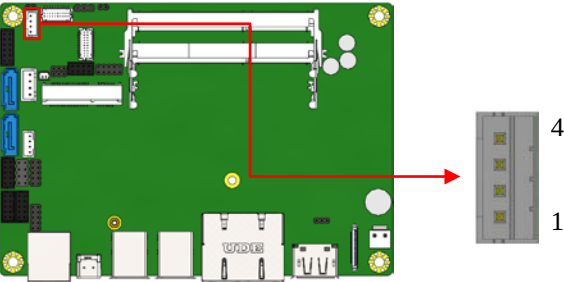
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JP4: SPI Flash Connector (Factory use only).....	11
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JP1: LVDS Panel Brightness Control Selection

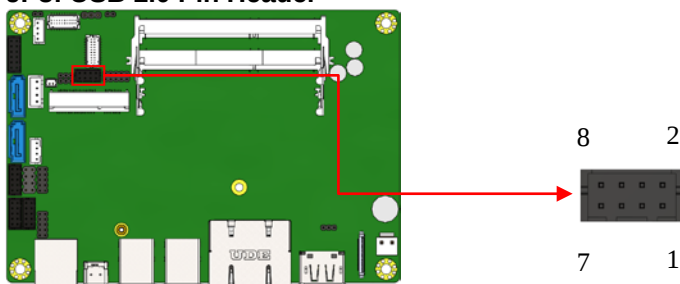


JP1	Brightness Control (PWM mode)
Open	3.3V
Close	5V(Default)

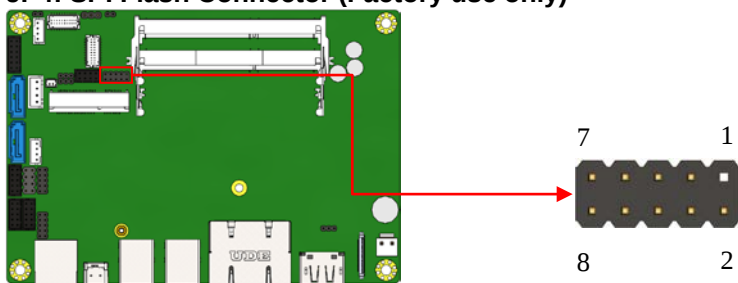
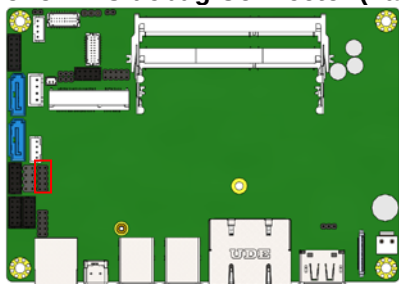
JP2: LCD Backlight Connector



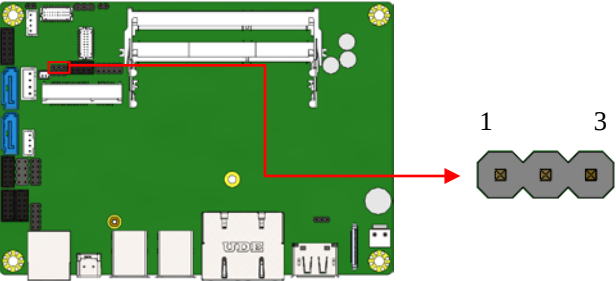
Pin #	Signal Name
1	+12V
2	Backlight Enable
3	Brightness Control
4	Ground

JP3: USB 2.0 Pin Header


Signal Name	Pin #	Pin #	Signal Name
Vcc	1	2	Ground
D0-	3	4	D1+
D0+	5	6	D1-
Ground	7	8	Vcc

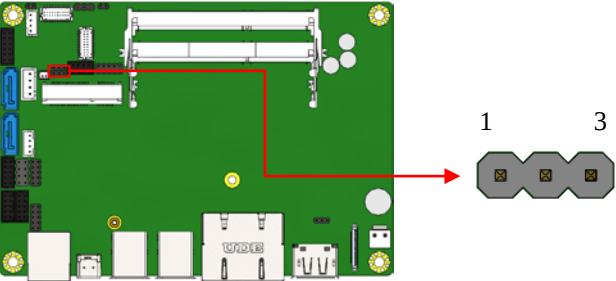
JP4: SPI Flash Connector (Factory use only)

JP5: LPC debug Connector (Factory use only)


J7: Clear ME



J7	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear ME

J8: Clear CMOS Contents

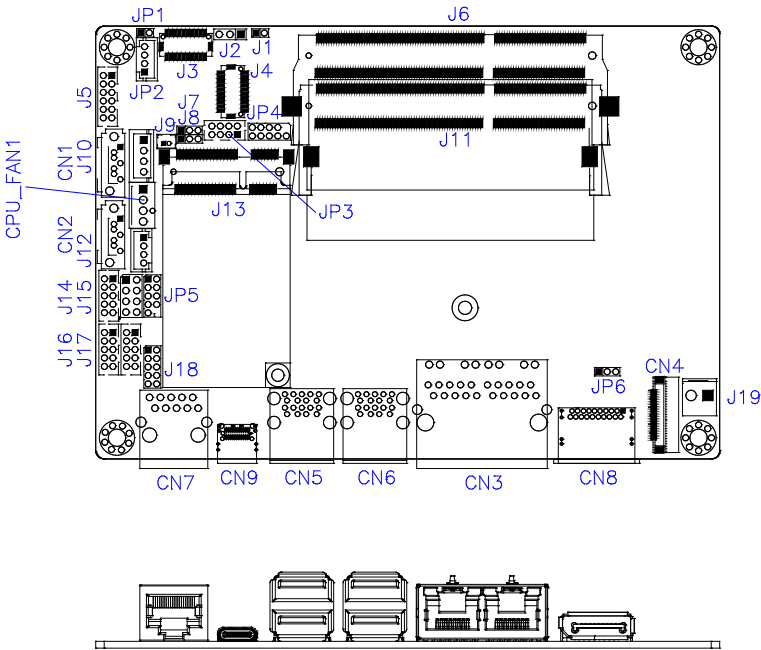


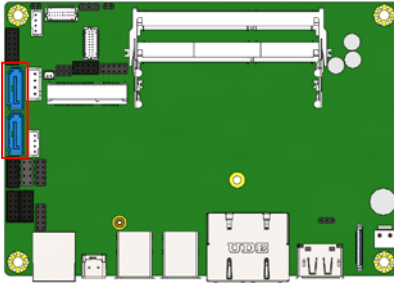
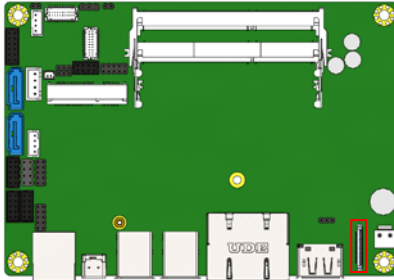
J8	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

Connectors on IB915F

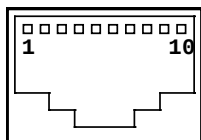
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Connector Locations on IB915F



CN1 / CN2: SATA3 Connector

CN3: Gigabit LAN (I219) / Gigabit LAN (I211AT)
CN4: eDP Connector (30 Pin) (I-PEX_20374-030E-31)


Signal Name	Pin #	Pin #	Signal Name
BL_Power	2	1	NC
BL_Power	4	3	BL_Power
NC	6	5	BL_Power
BRIGHTNESS	8	7	NC
GND	10	9	Bklt_en
GND	12	11	GND
HPD	14	13	GND
GND	16	15	GND
Panel_VDD	18	17	NC
GND	20	19	Panel_VDD
AUX_P	22	21	AUX_N
TX0_P	24	23	GND
GND	26	25	TX0_N
TX1_N	28	27	TX1_P
NC	30	29	GND

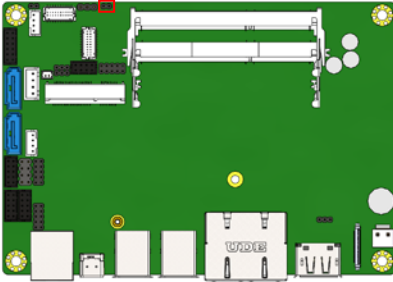
CN5 / CN6: USB3.0 Connector**CN7: COM1 RJ50 Connector****RJ-50_10P10C**

Pin #	Signal Name
1	DSR
2	GND
3	GND
4	TXD
5	RXD
6	DCD
7	DTR
8	CTS
9	RTS
10	RI

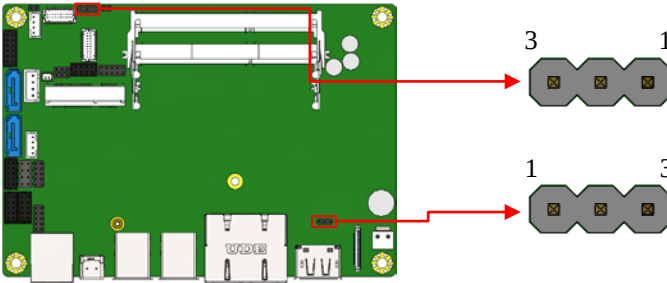
Pin #	Signal Name		
	RS-232	RS-422	RS-485
1	DSR	-	-
2, 3	Ground	Ground	Ground
4	TX	RX+	-
5	RX	TX+	DATA+
6	DCD	TX-	DATA-
7	DTR	RX-	-
8	CTS	-	-
9	RTS	-	-
10	RI	-	-

CN8: DisplayPort Connector**CN9: USB Type C Connector**

J1: Flash Descriptor Security Override (Factory use only)



J2/JP6: LVDS Panel Power Selection

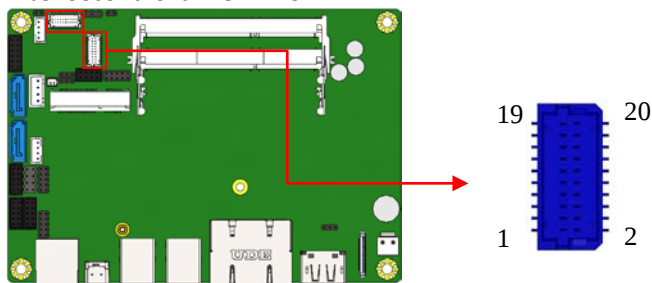


J2/JP6	Setting	Panel Voltage
	Pin 1-2 Short/Closed	3.3V (default)
	Pin 2-3 Short/Closed	5V

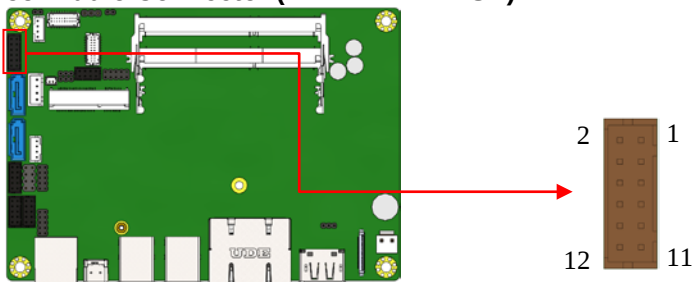
J3, J4: LVDS Connectors (Hirose DF20G-20DP-1V)

J4: First Channel LVDS

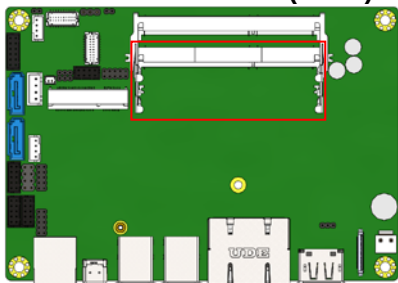
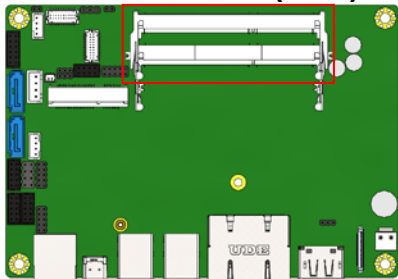
J3: Second Channel LVDS



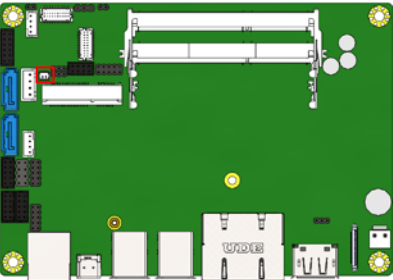
Signal Name	Pin #	Pin #	Signal Name
TX0N	2	1	TX0P
Ground	4	3	Ground
TX1N	6	5	TX1P
Ground	8	7	Ground
TX2N	10	9	TX2P
Ground	12	11	Ground
CLKN	14	13	CLKP
Ground	16	15	Ground
TX3N	18	17	TX3P
Power	20	19	Power

J5: Audio Connector (DF11-12DP-2DSA)


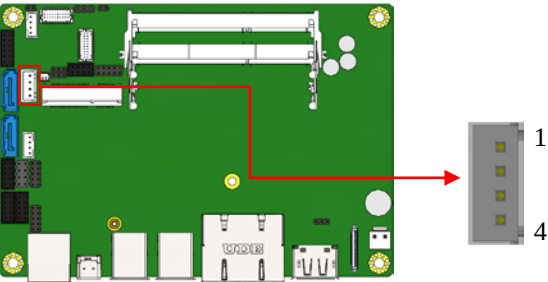
Signal Name	Pin #	Pin #	Signal Name
LINEOUT_R	2	1	LINEOUT_L
Ground	4	3	JD_FRONT
LINEIN_R	6	5	LINEIN_L
Ground	8	7	JD_LINEIN
MIC-R	10	9	MIC_L
Ground	12	11	JD_MIC1

J11: DDR3L SO-DIMM (CH-A) Socket

J6: DDR3L SO-DIMM (CH-B) Socket


J9: Battery Connector

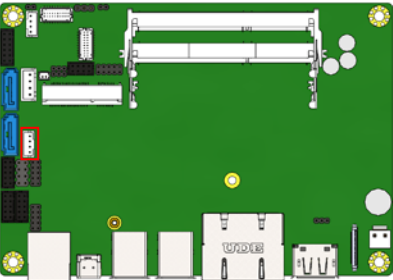


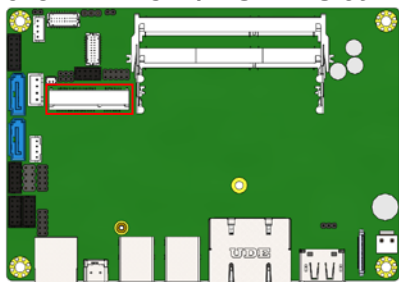
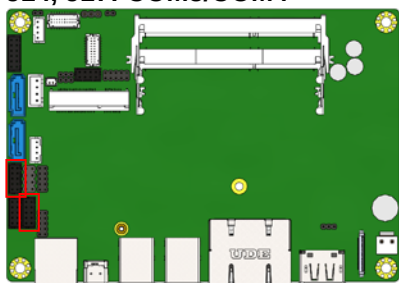
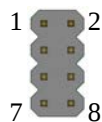
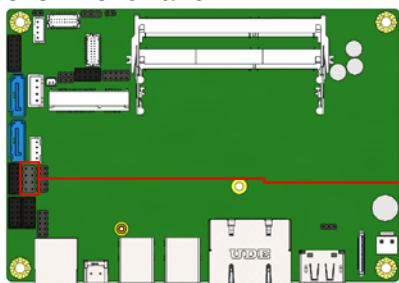
J10: SATA HDD Power Connectors



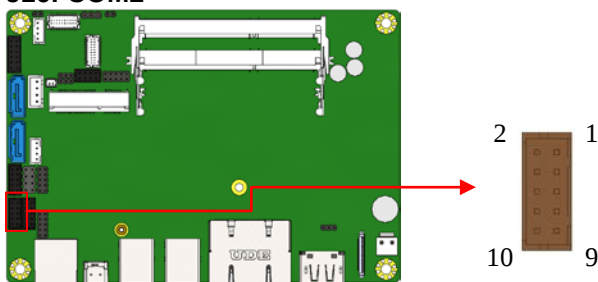
Pin #	Signal Name
1	+5V
2	Ground
3	Ground
4	+12V

J12: MCU JTAG

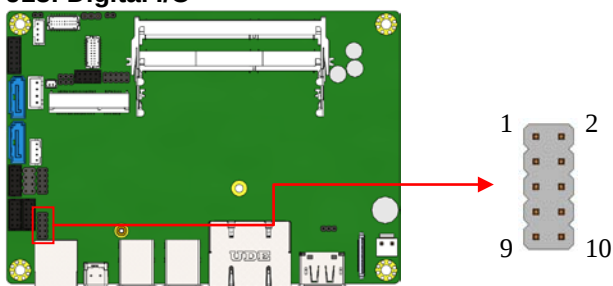


J13: Mini PCIE / mSATA Slot

J14, J17: COM3/COM4

J15: Front Panel


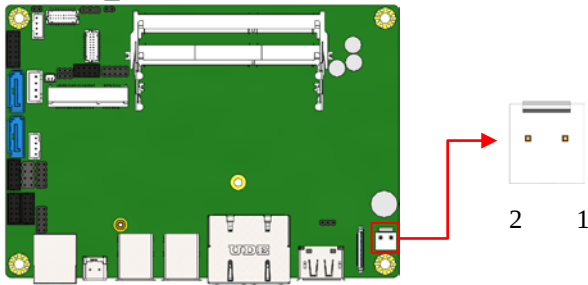
Signal Name	Pin #	Pin #	Signal Name
GND	1	2	PWR_BTN
3.3V	3	4	HDD Active
GND	5	6	Reset
+5V	7	8	GND

J16: COM2

Signal Name	Pin #	Pin #	Signal Name
DCD, Data carrier detect	1	2	RXD, Receive data
TXD, Transmit data	3	4	DTR, Data terminal ready
GND, ground	5	6	DSR, Data set ready
RTS, Request to send	7	8	CTS, Clear to send
RI, Ring indicator	9	10	Not Used

J18: 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

J19: DC_IN Connector

Pin #	Signal Name
1	+9V ~ +24V
2	GND

BIOS Setup

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

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BIOS Introduction

The BIOS (Basic Input/Output System) installed in your computer system's ROM provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and 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 or <ESC> 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.

Main Settings

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
Access Level			Administrator		Choose the system default language
Total memory			4096 MB		
Memory Frequency			1600 Mhz		→ ←Select Screen
System Language			[Englisg]		↑ ↓ Select Item
System Date			[Tue 10/29/2013]		Enter: Select
System Time			[15:27:20]		+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save
					ESC: Exit

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 – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
	▶ ACPI Settings ▶ LVDS (eDP/DP) Configuration ▶ ISmart Controller ▶ AMT Configuration ▶ Fintek Super IO Configuration ▶ Hardware Monitor ▶ CPU Configuration ▶ SATA Configuration ▶ Acoustic Management Configuration ▶ Network Stack Configuration ▶ CSM Configuration ▶ USB Configuration				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit

ACPI Settings

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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 ACPI Auto Configuration			[Disabled]		
Enable Hibernation			[Enabled]		
ACPI Sleep State			[S3 (Suspend to R...)]		
Lock Legacy Resources			[Disabled]		
S3 Video Report			[Disabled]		
ACPI Low Power S0 Idle			[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 Report

Enabled or Disabled S3 Video Report.

ACPI Low Power S0 Idle

Enabled or Disabled ACPI Low Power S0 Idle Support.

LVDS (eDP/DP) Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
LVDS (eDP/DP) Configuration					→ ← Select Screen
LVDS (eDP/DP) Support					↑ ↓ Select Item
Panel Color Depth					Enter: Select
LVDS Channel Type					+ - Change Field
Panel Type					F1: General Help
Brightness Control					F2: Previous Values
Signal Type					F3: Optimized Default
Brightness Percent					F4: Save & Exit
PWM Clock					ESC: Exit

Panel Color Depth

Select the LFP Panel Color Depth: 18 Bit, 24 Bit.

LVDS Channel Type

Select LVDS Channel Type

Panel Type

Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item: 800x600 LVDS ~ 1920x1080 LVDS.

LVDS Brightness Control

Enable or Disable LVDS Brightness

ISmart Controller

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
ISmart Controller					→ ← Select Screen
Power-On after Power failure			[Disable]	↑ ↓ Select Item	
Temperature Guardian			[Disable]	Enter: Select	
Schedule Slot 1			[None]	+- Change Field	
Schedule Slot 2			[None]	F1: General Help	
					F2: Previous Values
					F3: Optimized Default
					F4: Save
					ESC: Exit

Power-On after Power failure

Enable or Disable.

Temperature Guardian

Enable or Disable.

Schedule Slot 1 / 2

Setup the hour/minute for system power on.

AMT Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

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

AMT Configuration

This configuration is supported only with IB915AF(with iAMT function).

Options are Enabled and Disabled.

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

Amt Wait Timer

Set timer to wait before sending ASF_GET_BOOT_OPTIONS.

Activate Remote Assistance Process

Trigger CIRA boot.

PET Progress

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

Watchdog Timer

Enable/Disable Watchdog Timer.

Fintek Super IO Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
Fintek Super IO Configuration				→ ←Select Screen	
Super IO Chip				↑ ↓ Select Item	
F81846 Serial				Enter: Select	
▶ Serial Port 1 Configuration				+ - Change Field	
▶ Serial Port 2 Configuration				F1: General Help	
▶ Serial Port 3 Configuration				F2: Previous Values	
▶ Serial Port 4 Configuration				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.

Hardware Monitor

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
PC Health Status				→ ←Select Screen	
CPU temperature				↑ ↓ Select Item	
: +46 C				Enter: Select	
System temperature				+ - Change Field	
: +46 C				F1: General Help	
VCore				F2: Previous Values	
: +0.888 V				F3: Optimized Default	
VBAT				F4: Save	
: +3.248 C				ESC: Exit	
CPU Shutdown Temperature				[Disabled]	

CPU Shutdown Temperature

The default setting is Disabled.

Temperatures/Voltages

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

[

CPU Configuration

This section shows the CPU configuration parameters.

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit
CPU Configuration					→ ←Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
Intel(R) CPU Core(TM)i3-6100U CPU @ 2.30GHz					
CPU Signature 406E3					
Microcode Patch 33					
Processor cores 2					
Max CPU Speed 2200 MHz					
Min CPU Speed 500 MHz					
CPU Speed 3100 MHz					
Processor Cores 2					
Hyper Threading Technology Supported					
Intel VT-x Technology Supported					
Intel SMX Technology Not Supported					
64-bit Supported					
EIST Technology Supported					
CPU C3 State Supported					
CPU C6 State Supported					
CPU C7 State Supported					
Intel (R) SpeedStep(tm)- [Enabled]					
Turbo Mode [Enabled]					
Package power Limit MSR Lock [Disabled]					
1-Core Ratio Limit Override 0					
2-Core Ratio Limit Override 0					
Configurable TDP Boot Mode [Nominal]					
Configurable TDP Lock [Disabled]					
CTDP BIOS control [Disabled]					
PRMRR Size [AUTO]					

Intel (R) SpeedStep(tm)

Allows more than two frequency ranges to be supported.

Turbo Mode

Enable or Disable Turbo Mode.

Package power Limit MSR Lock

Enable/disable locking of Package Power Limit settings. When enabled, PACKAGE_POWER_LIMIT MSR will be locked and a rest will be required to unlock the register.

Configurable TDP Boot Mode

Configurable TDP Boot Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero.

Configurable TDP Lock

Configurable TDP Lock sets the Lock bits on

TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL.

Note: When CTD Lock is enabled Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot Index will be forced to 0.

CTDP BIOS control

Enables CTD control via runtime ACPI BIOS methods.

This "BIOS only" feature does not require EC or driver support.

SATA Configuration

SATA Devices Configuration.

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
SATA Controller(s)			[Enabled]		
SATA Mode Selection			[AHCI]		
► Software Feature Mask Configuration					
Aggressive LPM Support			[Enabled]		
Serial ATA Port 0			[Empty]		
Software Preserve			[Unknown]		
Port 0			[Enabled]		
Hot Plug			[Disabled]		
Serial ATA Port1			[Empty]		
Software Preserve			[Unknown]		
Port 1			[Enabled]		
Hot Plug			[Disabled]		
Serial ATA Port2			[Empty]		
Software Preserve			[Unknown]		
Port 2			[Enabled]		
Hot Plug			[Disabled]		
Serial ATA Port3			[Empty]		
Software Preserve			[Unknown]		
Port 3			[Enabled]		
Hot Plug			[Disabled]		
				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit	

SATA Controller(s)

Enable / Disable Serial ATA Controller.

SATA Mode Selection

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

Software Feature Mask Configuration

RAID OROM/RST driver will refer to the SWFM configuration to enable or disable the storage features.

Aggressive LPM Support

Enable PCH to aggressively enter link power state.

Acoustic Management Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
Acoustic Management Configuration HDD not found				→ ←Select Screen ↑↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit	

Acoustic Management Configuration

Option to Enable or Disable Automatic Acoustic Management

Network Stack Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

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

Network Stack Configuration

Network Stack Settings.

CSM Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
Compatibility Support Module Configuration					
CSM Support			Enabled	→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit	
CSM16 Module Version			07.78		
GateA20 Active			[Upon Request]		
Option ROM Messages			[Force BIOS]		
INT19 Trap Response			[Immediate]		
Boot option filter			[UEFI and Legacy]		
Option ROM execution					
Network			[Do not launch]		
Storage			[Legacy]		
Video			[Legacy]		
Other PCI device			[Legacy]		

CSM Support

Enable/Disable CSM Support.

Boot option filter

This option controls what devices system can boot to.

Network

Controls the execution of UEFI and Legacy PXE OpROM.

Storage

Controls the execution of UEFI and Legacy Storage OpROM.

Video

Controls the execution of UEFI and Legacy Video OpROM.

Other PCI device

Determines OpROM execution policy for devices other than Network, Storage, or Video.

USB Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
USB Configuration				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit	
USB Module Version		12			
USB Controllers:					
1 XHCI					
USB Devices:					
1 Keyboard, 1Mouse					
Legacy USB Support		[Enabled]			
XHCI Hand-off		[Disabled]			
USB MASS Storage Driver Support		[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]			

Legacy USB Support

Enables Legacy USB support.

AUTO option disables legacy support if no USB devices are connected.

DISABLE option keeps USB devices available only for EFI applications.

XHCI Hand-off

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

USB Mass Storage Driver Support

Enable/Disable USB Mass Storage Driver Support.

Port 60/64 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.

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 – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
▶ System Agent (SA) Configuration ▶ PCH-IO Configuration					

System Agent (SA) Configuration

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
System Agent Bridge Name System Agent RC Version VT-d Capability VT-d eDRAM Mode ▶ Graphics Configuration			Skylake 1.6.0.0 Supported [Enabled] [eDRAM HW Mode]	→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit	

VT-d

VT-d capability.

eDRAM Mode

SW Mode eDRAM on or eDRAM off.

PCH-IO Configuration

This section allows you to configure the North Bridge Chipset.

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
		Intel PCH RC Version	1.6.0.0		
		Intel PCH SKU Name	PCH-LP Mobile (U) Pre...		
		Intel PCH Rev ID	21/C1		
		PCH LAN Controller	[Enabled]		→ ← Select Screen
		LAN PHY Drives LAN_WAKE#	[Disabled]		↑ ↓ Select Item
		Sensor Hub Type	[None]		Enter: Select
		LAN Wake From DeepSx	[Enabled]		+ - Change Field
		Wake on LAN	[Enabled]		F1: General Help
		SLP_LAN# Low on DC Power	[Enabled]		F2: Previous Values
					F3: Optimized Default
					F4: Save
					ESC: Exit

PCH LAN Controller

Enable or disable onboard NIC.

LAN PHY Drives LAN_WAKE#

Enables/Disables LAN Phy driving LAN_WAKE# else platform drives LAN_WAKE#.

Sensor Hub Type

Choose the sensor Hub Type, 'None' will Suppress 'I2C Sensor Hub' Setup option, 'I2C' Will Suppress 'ALS' Setup option and 'USB' will Suppress Both I2C and ALS.

LAN Wake From DeepSx

Wake from DeepSx by the assertion of LAN_WAKE# pin.

Wake on LAN

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

SLP_LAN# Low on DC Power

Enable/Disable SLP_LAN# Low on DC Power

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 – Copyright © 2016 American Megatrends, Inc.

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.

Boot Settings

This section allows you to configure the boot settings.

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
Boot Configuration					
Setup Prompt Timeout		1			
Bootup NumLock State		[On]			
Quiet Boot		[Disabled]			
Fast Boot		[Disabled]			
Boot mode select		[LEGACY]			
FIXED BOOT ORDER Priorities					
Boot Option #1		[Hard Disk]			→ ← Select Screen
Boot Option #2		[CD / DVD]			↑ ↓ Select Item
Boot Option #3		[USB Hard Disk]			Enter: Select
Boot Option #4		[USB CD / DVD]			+ - Change Field
Boot Option #5		[USB Key]			F1: General Help
Boot Option #6		[USB Floppy]			F2: Previous Values
Boot Option #7		[USB LAN]			F3: Optimized Default
Boot Option #8		[Network]			F4: Save
					ESC: Exit

Setup Prompt Timeout

Number of seconds to wait for setup activation key.

65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

Enables/Disables Quiet Boot option.

Fast Boot

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

Boot mode select

Select boot mode LEGACY/UEFI

FIXED BOOT ORDER Priorities

Sets the system boot order.

Save & Exit Settings

Aptio Setup Utility – Copyright © 2016 American Megatrends, Inc.

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

Save Changes and Exit

Exit system setup after saving the changes.

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

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

Discard Changes

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

Restore Defaults

Restore/Load Defaults values for all the setup options.

Save as User Defaults

Save the changes done so far as User Defaults.

Restore User Defaults

Restore the User Defaults to all the setup options.

Drivers Installation

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

Intel Chipset Software Installation Utility	45
VGA Drivers Installation.....	47
Realtek HD Audio Driver Installation	50
LAN Drivers Installation	52
Intel® Management Engine Interface.....	55
Intel® USB 3.0 Drivers	57
ASMedia USB 3.1 Drivers.....	60

IMPORTANT NOTE:

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

Intel Chipset Software Installation Utility

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

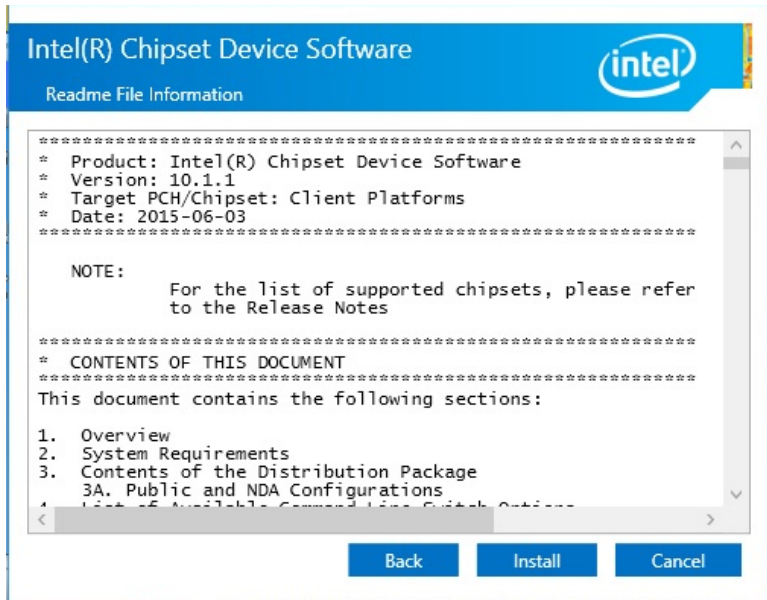
1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.



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



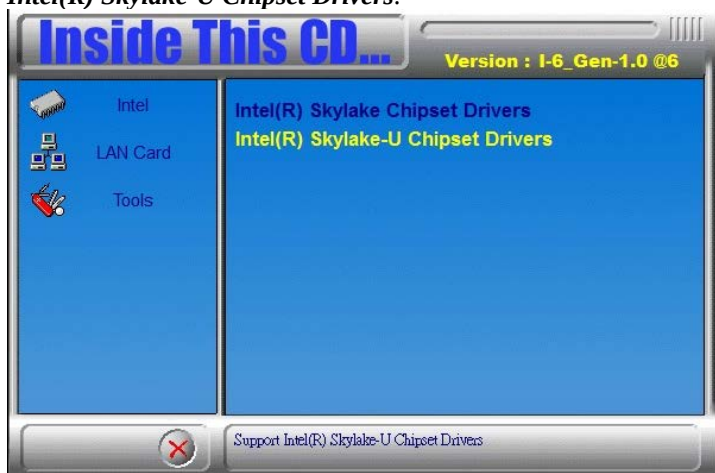
3. When the Welcome screen to the Intel® Chipset Device Software appears, click **Next** to continue.
4. Click **Yes** to accept the software license agreement and proceed with the installation process.
5. On the Readme File Information screen, click **Install** to continue the installation.



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

VGA Drivers Installation

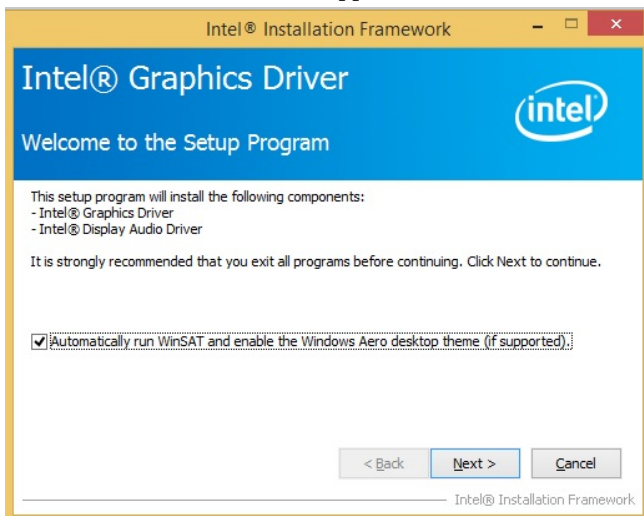
1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.



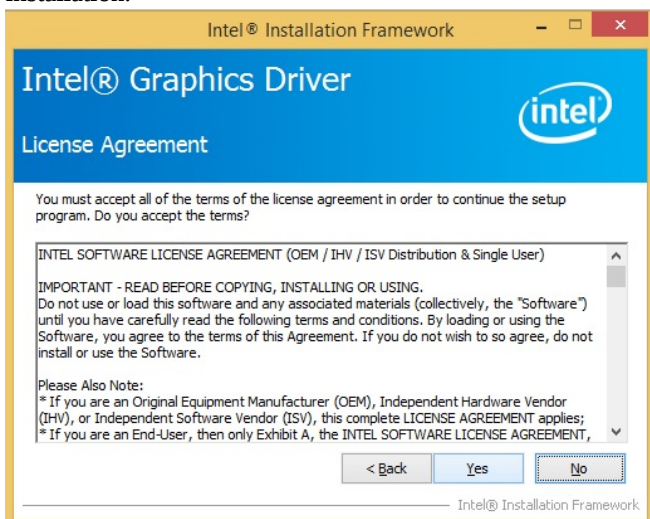
2. Click **Intel(R) HD Graphics Driver**.



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



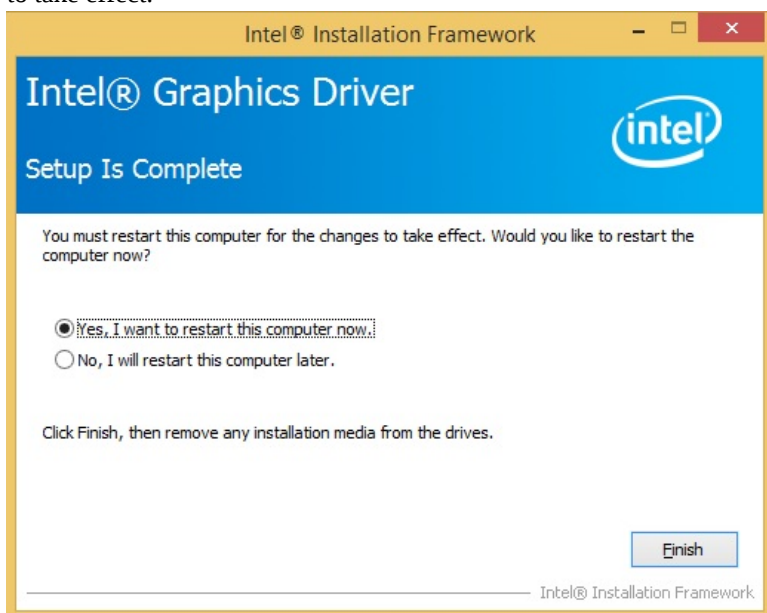
4. Click **Yes** to agree with the license agreement and continue the installation.



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

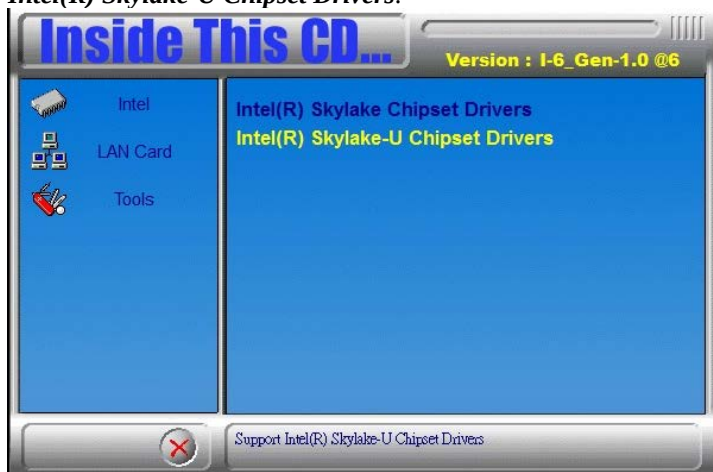


6. Setup complete. Click **Finish** to restart the computer and for changes to take effect.

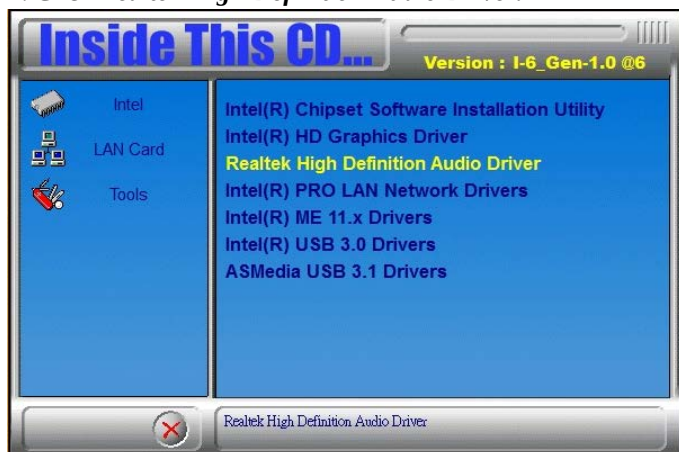


Realtek HD Audio Driver Installation

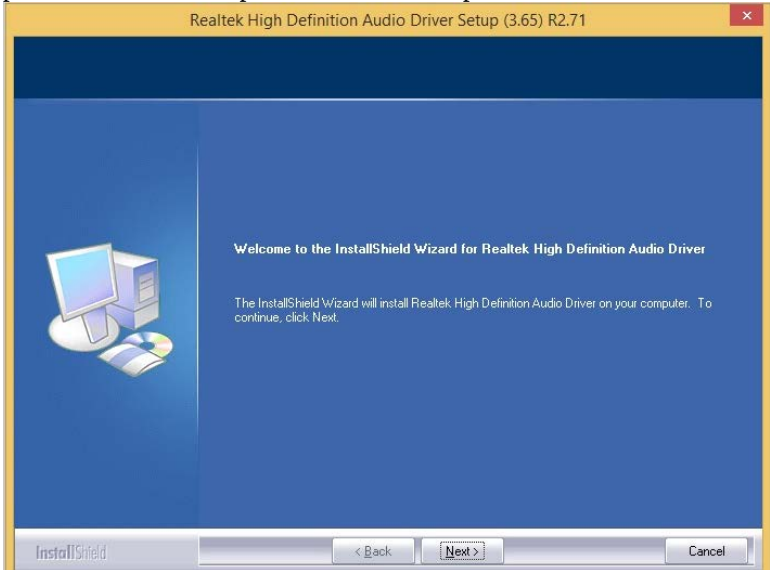
1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.



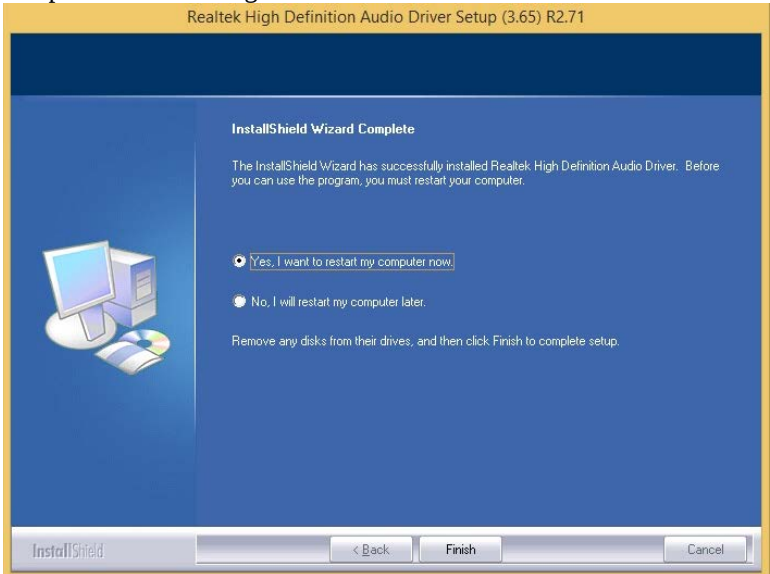
2. Click **Realtek High Definition Audio Driver**.



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

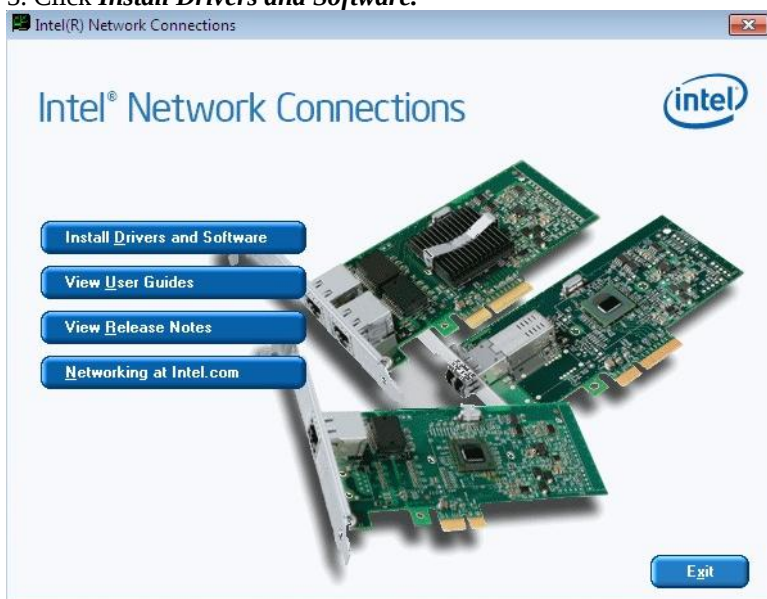
1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.



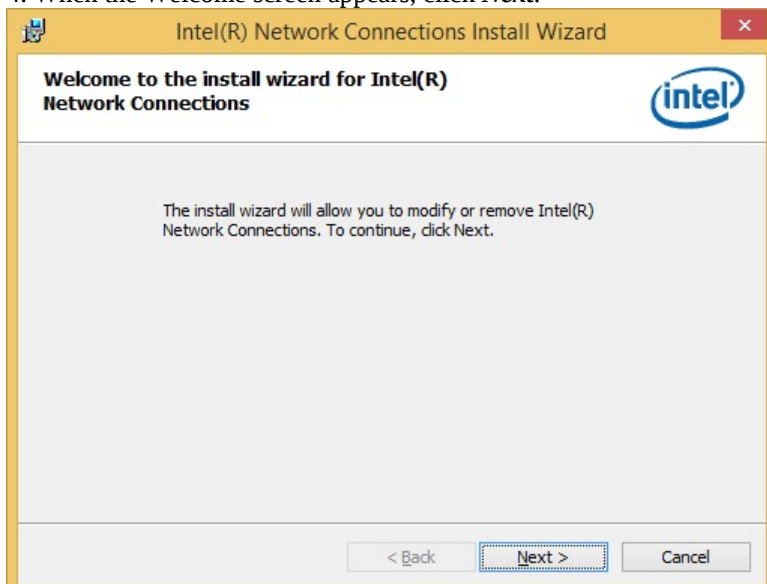
2. Click **Intel(R) PRO LAN Network Driver**.



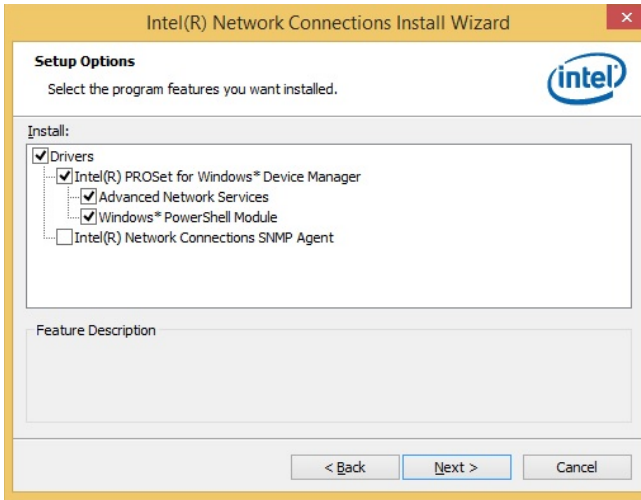
3. Click **Install Drivers and Software**.



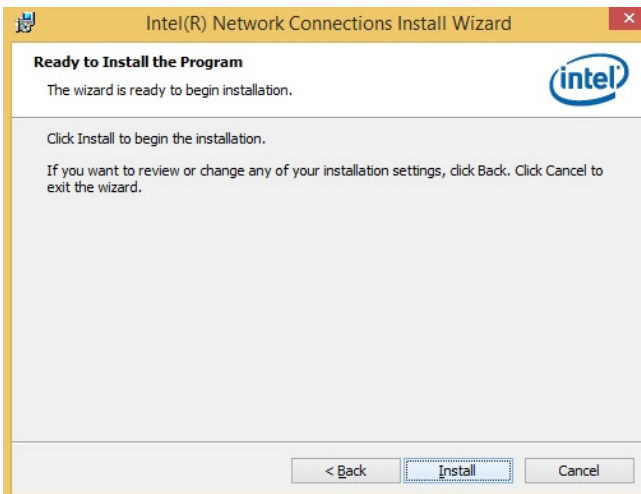
4. When the Welcome screen appears, click **Next**.



5. Click **Next** to 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

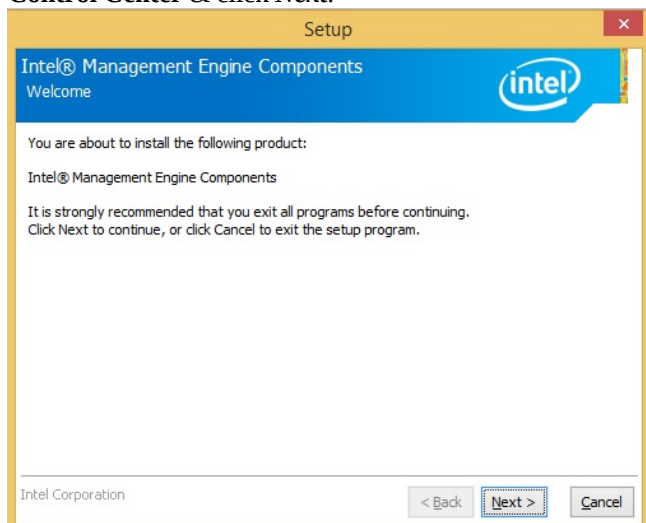
1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.



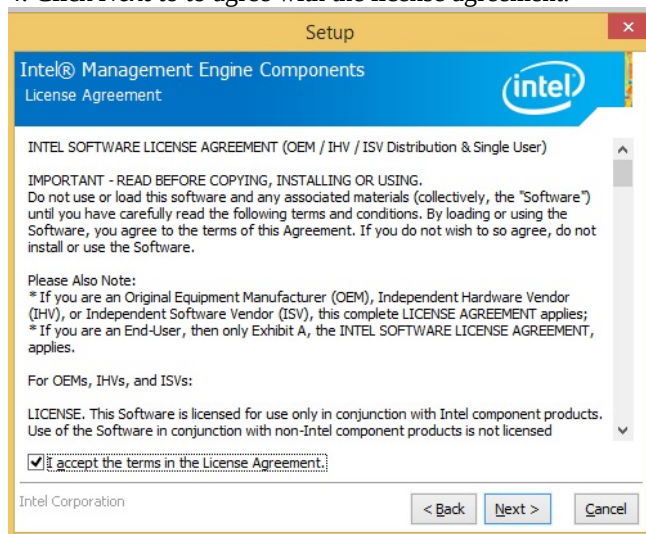
2. Click **Intel (R) ME 11.x Drivers**.



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



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



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

Intel® USB 3.0 Drivers

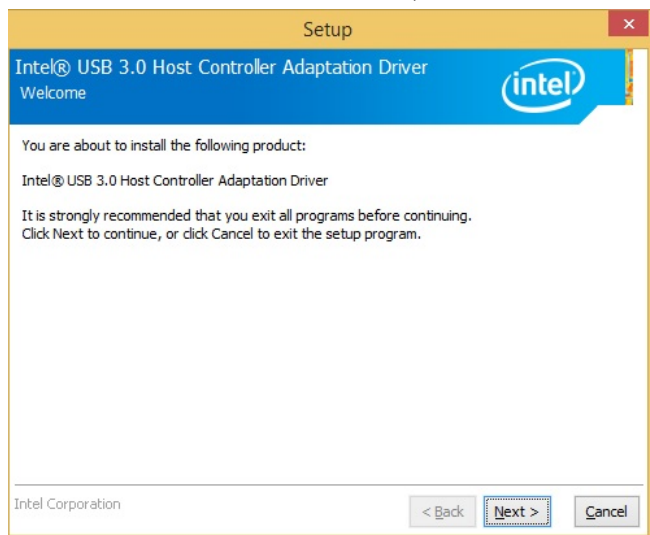
1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.



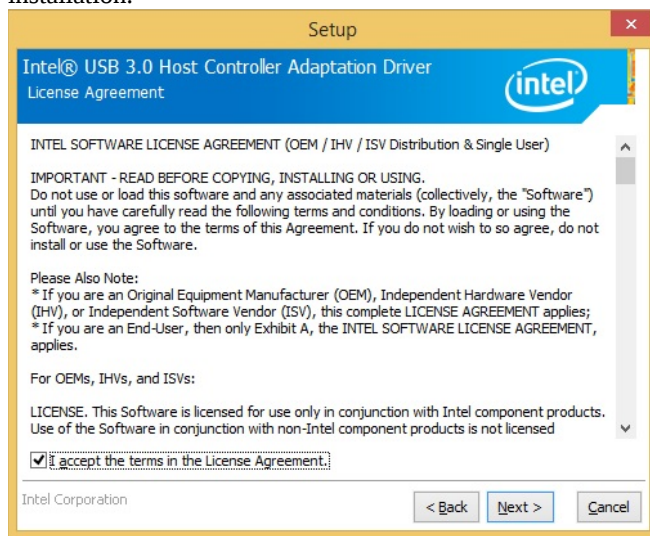
2. Click **Intel(R) USB 3.0 Drivers**.



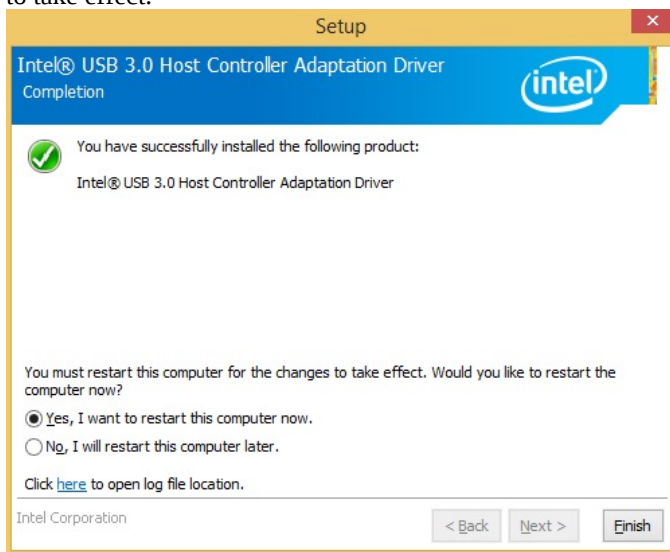
3. When the Welcome screen to the InstallShield Wizard for Intel® USB 3.0 eXtensible Host Controller Driver, click **Next**.



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

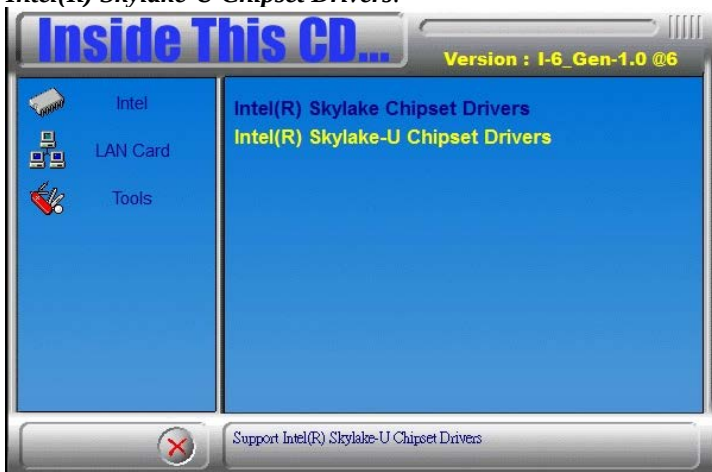


5. On the Readme File Information screen, click **Next** to continue the installation of the Intel® USB 3.0 eXtensible Host Controller Driver.
6. Setup complete. Click **Finish** to restart the computer and for changes to take effect.



ASMedia USB 3.1 Drivers

1. Insert the DVD that comes with the board. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.



2. Click **ASMedia USB 3.1 Drivers**.



3. When the Welcome screen to the InstallShield Wizard for Asmedia USB Host Controller Driver, click **Next**.



4. Setup complete. Click **Finish**



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
0000h-0CF7h	PCI Express Root Complex
0040h-0043h	System timer
0070h-0070h	System CMOS/real time clock
02E8h-02EFh	Fintek Communications Port (COM4)
02F8h-02FFh	Fintek Communications Port (COM2)
03E8h-03EFh	Fintek Communications Port (COM3)
03F8h-03FFh	Fintek Communications Port (COM1)
03B0h-03BBh	Intel(R) HD Graphics 520
03C0h-03DFh	Intel(R) HD Graphics 520
0D00h-FFFFh	PCI Express Root Complex

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
IRQ1	Keyboard
IRQ3	Fintek Communications Port(COM2)
IRQ4	Fintek Communications Port(COM1)
IRQ7	Fintek Communications Port(COM3)
IRQ7	Fintek Communications Port(COM4)
IRQ11	Intel® Ethernet Connection I219-V
IRQ14	MotherBoard resources

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
}
//-----
```

```

//-----
//
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//
//-----
#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;
}
//-----

//-----
//
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//
//-----
#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

```