TRANSDUCTION

USER'S MANUAL

Version 1.0
08/22/13

TR-981 INDUSTRIAL FULL-SIZE PICMG 1.0 SBC WITH INTEL CORE i7 / i5 / XEON PROCESSOR FOR INTEL PROCESSOR SOCKET LGA1155

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Introduction

This manual is designed to give you information on the TR-981 Industrial Main Board.
The topics covered in this manual are as follows:

- ✓ **Features**
- ✓ **Specification**
- ✓ **Jumper setting and Connectors**
- ✓ **BIOS Setup**
- ✓ **Drivers Installation**
- ✓ **Appendix**

Chapter 1 Features & Specifications

FEATURES 3
SPECIFICATIONS 4

❖*Features*

- Support 3'rd and 2'nd Generation Intel Core™ i7,i5, i3, Pentium®, Celeron® and Xeon® E3 series Processor in LAG1155 Package.

- Two DIMMs support up to DDR3-1600 16GB memory in dual channels.

- Two SATAIII 6Gb/s ports and four SATAII 3Gb/s ports support RAID0, RAID1, RAID5, RAID10, AHCI and IDE modes.

- Two Mini-PCIE sockets, one can be configured to support mSATA.

- Dual Intel GbE LANs support Intel AMT 8.0, remote boot, wake up on LAN and teaming.

- Multiple I/O functions: USB3.0 port x 4, USB2.0 port x 6, LPT x1, FLOPPY x 1, DIO x 8bits, COM port x 4 while COM1 support RS232/422/485, auto flow control and multi drop(9-bits).

- TPM built-in to support security functions.

- Multiple display technologies: CRT, Dual channel 24-bits LVDS LCD display, DVI, HDMI and Displayport. Supports up to three independent display with Ivy bridge Processors.

- PICMG 1.0 standard form factor support both PCI and ISA interface.

❖Specifications

Processor Support

- Support Intel® LGA1155, 3rd and 2'nd generation Intel® Core™ i processors:

Intel® Xeon® E3-1225v2 (4C/8M Cache/3.2 GHz/Max. TDP 77W)
Intel® Xeon® E3-1275 (4C/8M Cache/3.4 GHz/Max. TDP 95W)
Intel® Xeon® E3-1225 (4C/6M Cache/3.1 GHz/Max. TDP 95W)
Intel® Core® i7-3770 (4C/8M Cache/3.4 GHz/Max. TDP 77W)
Intel® Core® i5-3550s (4C/6M Cache/3.0 GHz/Max. TDP 65W)
Intel® Core® i3-3220 (2C/3M Cache/3.3 GHz/Max. TDP 55W)
Intel® Core® i7-2600 (4C/8M Cache/3.4 GHz/Max. TDP 95W)
Intel® Core® i5-2400 (4C/6M Cache/3.1 GHz/Max. TDP 95W)
Intel® Core® i3-2120 (2C/3M Cache/3.3 GHz/Max. TDP 65W)
Intel® Pentium® G2120 (2C/3M Cache/3.1 GHz/Max. TDP 55W)
Intel® Celeron® G850 (2C/3M Cache/2.9 GHz/Max. TDP 65W)
Intel® Celeron® G540 (2C/3M Cache/2.5 GHz/Max. TDP 65W)

Major Chipset

- Intel® Q77 PCH chipset.

System Memory

- Dual DDR3 DIMM slots support DDR3-1333/1600 Non-ECC system memory up to 16GB.
- Dual channel mode operation supported.

Display

- Intel® HD graphics with DX11 supports up to three independent displays.
- VGA is 15-Pins D-Sub Female connector on I/O bracket for CRT/LCD Monitors.
- LVDSLCD is DF13-40DP-1.25mm connector supports up to Dual channel 24-bits LVDS panels.
- DVI_HDMI is DF13-20DP-1.25mm connector supports DVI or HDMI display devices.
- DP is DF13-20DP-1.25mm connector supports Displayport display devices.
- Support up to triple independent display when use Ivy bridge CPU.

Super I/O

- COM1,COM2,COM3,COM4 is 2x5/2.54mm box header for serial ports connections. COM1 can be

configured as RS232, 422 or 485 by jumpers.

- When COM1 is configured as RS485, the auto flow control and multi drop(9-bits) function can be enabled by BIOS setup.
- FLOPPY is 2x17/2.54mm box header supports floppy drives.
- LPT is 2x13/2.54mm box header supports parallel port in SPP/ECP/EPP mode.
- PS2KB_MS is Mini-DIN connector on I/O bracket to support PS2 Keyboard and mouse. AT-KB1 is 1x5/2.54mm pin-header for internal connection. Keyboard hot-key wakeup and mouse click wakeup functions are supported.
- DIO1 is 2x5/2mm pin-header supports 8-bits digital I/O ports. Each bit can be indivisibly configured as input or output.
- Integrated hardware monitor to monitor voltages, temperatures and fans speed. The reading can be checked on BIOS setup Hardware monitoring page.
- CPU Warning Temperature and CPU shutdown temperature function supported.
- CPU and system FAN speed can be adjusted by BIOS. Or set up to be automatically controlled by CPU and system temperature.

USB Interface

- USB1, USB2, USB3 are 2x5/2.54mm pin-header for internal USB2.0 devices connection.
- USB3_PORT1, USB3_PORT2 are 2x10/2mm pin-header for USB3.0 devices.
- All USB ports can be individually disabled or enabled by BIOS setup.
- Support Legacy USB devices and Boot from USB devices.
- All USB ports support USB type keyboard and mouse. Keyboard hot-key wakeup and mouse click wakeup functions are supported.

SATA

- SATA1, SATA2 support SATAIII 6Gbps speed with blue color connectors.
- SATA3, SATA4, SATA5 support SATAII 3Gbps speed

with black color connectors.
- Support RAID0, 1, 5, 10, AHCI and Intel® Rapid Storage Technology.
- Mini-PCIE2 optionally supports mSATA modules.

Ethernet
- LAN1 is Intel 82579LM PHY with iAMT 8.1 supported.
- LAN2 is Intel 82583V Ethernet controller. All ports support 10/100/1000 Mbps speed.
- Support Wake-on-LAN and can be disabled or enabled by BIOS.
- Remote Boot Agent is supported with PXE protocol.
- Each LAN port can be individually enabled and disabled from BIOS.
- LAN1_LED and LAN2_LED are 1x4/2.54mm pin-header for LAN port status indicators.

Audio
- Realtek ALC888 High-Definition Audio chip on-board.
- AUDIO1 is 2x5/2.54mm pin-header supports Audio Line-out. Line-In and Microphone.
- CD_IN connector is used to get audio input from DVD player.
- SPDIF is 2x3/2.54mm pin-header to support SPDIF digital audio.

PCI , Mini-PCIE and ISA Interfaces
- PCI interface is compliant to PICMG 1.0 specifications.
- ISA bus support I/O addressing, D-Segment memory addressing, IRQ and etc. However, Bus Master cycle is not supported due to the limitation of the Intel architecture.
- Two Mini-PCIE sockets support full and half size Mini PCI-Express modules. Mini-PCIE2 optionally support either mSATA or mini-PCIE modules, selectable by JP3 jumper.

TPM module
- Infineon - SLB9635TT12 TPM 1.2 chip on-board.
- TPM functions can be enabled and activated or disabled by BIOS.

Watchdog Timer

- The Watch-Dog timer can be disabled or enabled through BIOS setup.
- The timeout interval 1~255 seconds can be programmed through I/O address 845h/846h. The timeout event will generate the RESET.

CMOS
- On-board RTC with 242 bytes of Battery-back CMOS RAM.
- JP2 is 3-pins Jumper to clear CMOS data.

BIOS
- Insyde EFI BIOS via SPI ROM.
- BIOS utility available for field update.

Power Connector
- Support both AT mode and ATX mode operation. Selectable by AT_MODE jumper.
- One Standard 4-pins power connector for 5V and +12V power input. It is mandatory to connect this connector to system power supply to have stable operation.
- One ATX-12V 4-pins connector for CPU power input. This connector mush be connected to power supply to make CPU start to work.

Cooling
- One CPU cooling fan connector nearby CPU socket.
- One System cooling fan connectors on board for Chassis or PSU cooling.
- Supports Auto fan speed control based on CPU and board temperatures. Fan speed can be adjusted by BIOS setup.

Others
- One Buzzer (9mm) on-board for beep message.

Operating Temperature
- 0~60°C Operation Range.
- -20°C to 70°C storage.
- Relative Humility: 5~95%, non-condensing.

Dimensions
- 13.3" (L) x 4.8" (W); or 338mm (L) x 124mm (W).
- PICMG 1.0 standard form factor.

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Chapter 2 Jumper setting & Connectors

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2.1 Jumpers on the TR-981

The jumpers on the TR-981 allow you to configure your Main Board according to the needs of your applications. If you have doubts about the best jumper configuration for your needs, contact your dealer or sales representative. The following table lists the jumpers on TR-981 and their respective functions.

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JP1: TPM Physical Present Pin selection..... 12
JP2: Clear CMOS RAM Data 12
JP3: MINI_PCIE2 slot selection 12
AT_MODE1: Power Supply Mode Selection 13
PNLPWR1: LCD PANEL Power Selection..... 13
BKLPWR1: LCD Backlight Power Selection..... 13
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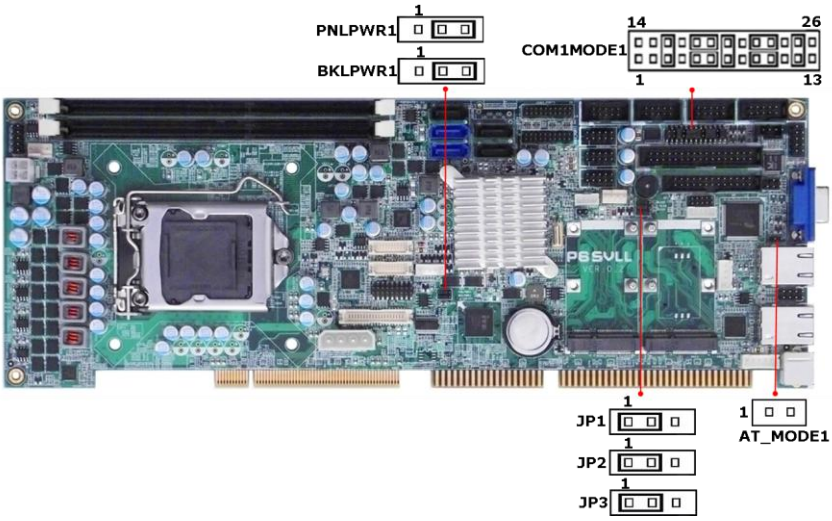
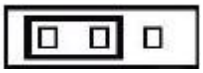
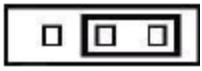
Jumper Locations on the TR-981



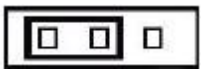
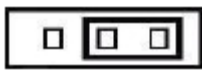
JP1: TPM Physical Present Selection

The standard position of the jumper should connect the pin to GND. If the pin is connected to 3VSB, some special commands are enabled.

ENABLE PP	DISABLE PP (Default)
	

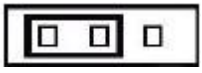
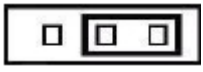
JP2: Clear CMOS RAM Data

This 3-pin Jumper allows the user to disconnect the built-in 3V battery power to clear the information stored in the CMOS RAM. To clear the CMOS data:
(1) Turn off the system power.
(2) Remove jumper cap from pin1&2.
(3) Short the pin2 and pin3 for three seconds.
(4) Put Jumper cap back to pin1 & 2.
(5) Turn on your computer.
(6) Press <Esc> during boot up and enter BIOS setup to enter your preferences.

Normal Operation (Default)	Clear CMOS Content
	

JP3: MINI_PCIE2 slot selection

JP3 can be used to select MINI_PCIE2 socket as mSATA or Mini PCIE. The default setting is mSATA.

mSATA(Default)	Mini PCIE
	

AT_MODE1: Power Supply Mode Selection

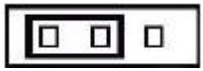
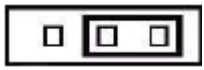
AT_MODE1 can be used to select power supply mode: ATX or AT mode. The default setting is AT mode.

AT Mode (Default)	ATX Mode
	
1 2	1 2

Caution!
When set up as ATX mode, ATX_PWR1 connector must be wired to backplane to get standby power and PSU control signals.

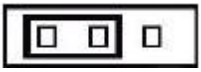
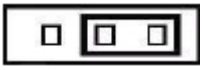
PNLPWR1: LCD PANEL Power Selection

PNLPWR1 can be used to select the LCD panel supple power: +3.3V or +5V.The default setting is on +3.3V. User needs to check the LCD panel spec and adjust this jumper to make panel work on specified power rail.
This jumper serves LCD LVDS connector.

+5V	+3.3V (Default)
	
1 2 3	1 2 3

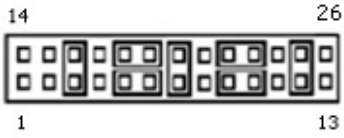
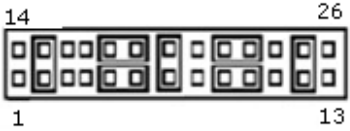
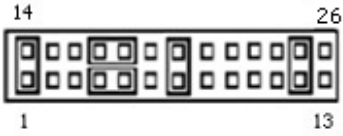
BKLPWR1: LCD Backlight Power Selection

BKLPWR can be used to select the Panel backlight supple power: +12V or +5V.The default setting is on +12V.User need to check the LCD panel spec and adjust this jumper to make panel work on specified power rail.
This jumper serves LCD LVDS connector.

+12V (Default)	+5V
	

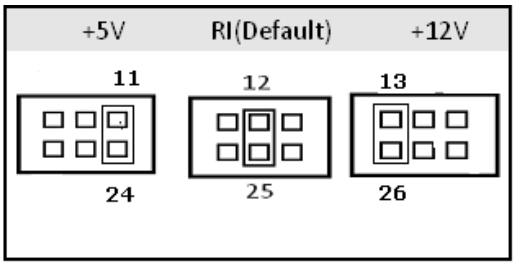
COM1MODE1: RS232/RS422/RS485

COM1 support multi-protocols include RS232, RS422 and RS485, while COM2~COM4 support diffused RS232 protocol. The protocols of COM1 can be set up through jumpers. The pin-out for each mode is illustrated on next chapter.

COM1MODE1	I/F TYPE
	RS-232 (Default)
	RS-422
	RS-485

COM1 Pin9 Power Selection

Pin9 of COM1 can be configured to supply power to devices attached to COM1. The options are +5V, ring-in or +12V.



2.2 Connectors on the TR-981

The connector on the TR-981 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers and etc. The following table lists the connectors on TR-981 and their respective page number.

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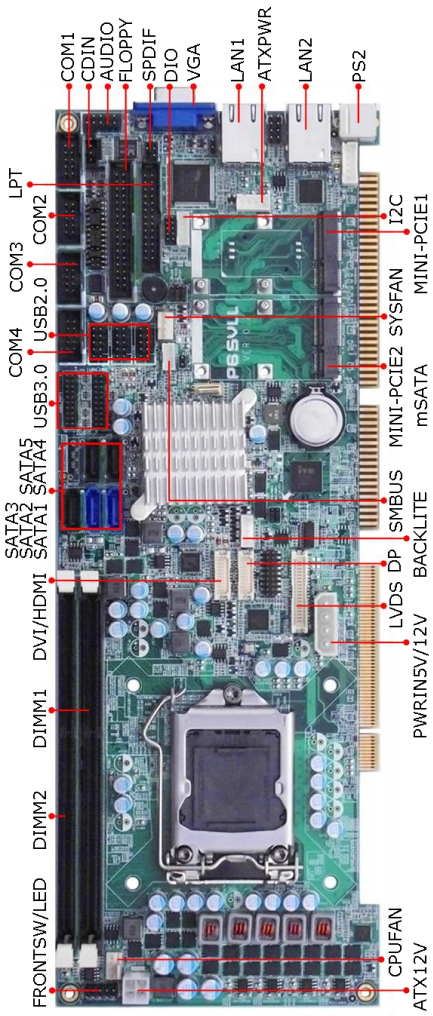
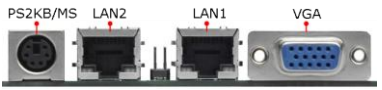
AT_KB Connector 21
PRINTER Connector 22
COM1 connector 22
COM2~COM4 Connector 23
FLOPPY Connector AUDIO Connector 24
DIO Connector CD_IN Connector 24
SYS_FAN Connector 24
CPU_FAN Connector 25
SATA1~SATA6 Connector 25
USB1,USB2,USB3 Connector 26
USB3_PORT1,USB3_PORT2 Connector 26
VGA Connector 27
LVDSLCD Connector 28
BACKLITE Connector 28
DVI_HDMI Connector 29
DP Connector 29
LAN1, LAN2 Connector 30
LAN RJ45 LED 30
LAN1_LED,LAN2_LED Connector 31
AUDIO Connector 31
CD_IN Connector 31
SPDIF Connector 32
ATX12V Connector 32
ATX_PWR Connector 33
SMBUS Connector 33

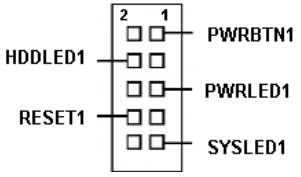
Connector Locations on the TR-981





FRONT_PANEL:
PWRBTN (ATX Power ON/OFF Button)

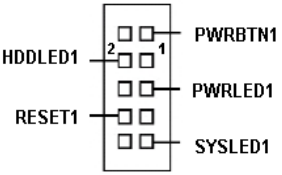
This 2-pin connector acts as the "Power Supply On/Off Switch". When pressed, the switch will force the Main board to power on. When pressed again, it will force the main board to power off. Orientation is not required when making a connection to this header.



Pin	Signal Name
1	5VSB
2	PWRBTSW

HDDLED (Hard Disk LED)

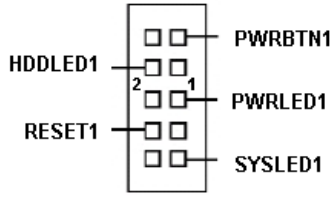
This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.



Pin	Signal Name
1	VCC
2	HDDLED-

PWRLED (Power-On LED)

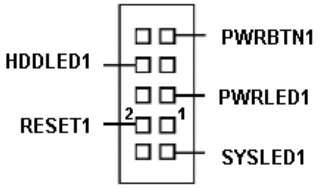
This connector allows users to connect to front panel power indicator LED.



Pin	Signal Name
1	PWRLED
2	GND

RESET (System RESET Button)

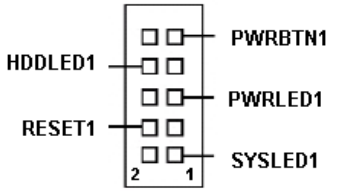
The reset switch allows the user to reset the system with out turning the main power switch off and then on. Orientation is not required when making a connection to this header.



Pin	Signal Name
1	SYS_RST
2	GND

SYSLED (System Status LED)

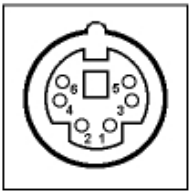
This connector allows users to connect to front panel system status indicator. Normally it will alarm users the system is over-heated when BIOS setup enabled the temperature warning function.



Pin	Signal Name
1	VCC
2	SYSLED-

PS/2 Keyboard & Mouse Connector

The following table describes the pin assignment of PS/2 Keyboard and Mouse connector, which is mounted on bracket. To attach PS/2 Keyboard and mouse, users need to connect trough a PS/2 1-to-2 Y-cable and plug into this Mini-Din connector.



Pin	Signal Name
1	Keyboard data
2	Mouse data
3	GND
4	5V
5	Keyboard clock
6	Mouse clock

AT_KB Connector

This connector provides internal connection to backplane for AT type PS2 Keyboard connector.

Pin	Signal Name
1	KB CLK
2	KB DATA
3	PWR OK
4	GND
5	KB VCC

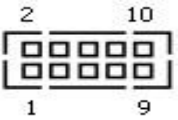
PRINTER Connector

The LPT parallel port is a 26-pin header connector. It can be configured as EPP, ECP or SPP mode.

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

COM1 connector

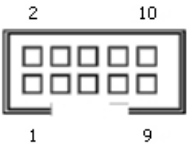
The following table shows its pin assignments.



Pin	RS232 Mode Signal Name	RS422/RS485 Mode Signal Name
1	DCD, Data carrier detect	TX- (422/485)
2	RXD, Receive data	TX+ (422/485)
3	TXD, Transmit data	RX+ (422)
4	DTR, Data terminal ready	RX- (422)
5	GND, ground	GND
6	DSR, Data set ready	N.C.
7	RTS, Request to send	N.C.
8	CTS, Clear to send	N.C.
9	+5V,Ring-IN or +12V	N.C.
10	N.C.	N.C.

COM2,COM3,COM4 connector

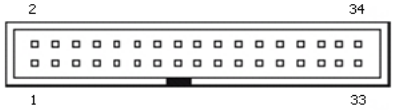
The following table shows its pin assignments.



Pin	Signal Name
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring in
10	NC

FLOPPY Connector

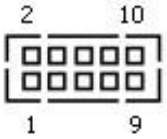
Floppy connector is a 34-pin header and will support up to 2.88MB floppy drives.



Signal Name	Pin	Pin	Signal Name
Ground	1	2	RM/LC
Ground	3	4	No connect
Ground	5	6	No connect
Ground	7	8	Index
Ground	9	10	Motor enable 0
Ground	11	12	Drive select 1
Ground	13	14	Drive select 0
Ground	15	16	Motor enable 1
Ground	17	18	Direction
Ground	19	20	Step
Ground	21	22	Write data
Ground	23	24	Write gate
Ground	25	26	Track 00
Ground	27	28	Write protect
Ground	29	30	Read data
Ground	31	32	Side 1 select
Ground	33	34	Diskette change

DIO Connector

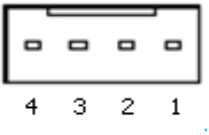
DIO ports support 8 bits digital I/O. Each bit can be configured as Input or output individually. All bits are 5V tolerant.



Signal Name	Pin	Pin	Signal Name
GND	1	2	+5V
DIO_0	3	4	DIO_4
DIO_1	5	6	DIO_5
DIO_2	7	8	DIO_6
DIO_3	9	10	DIO_7

SYS_FAN Connector

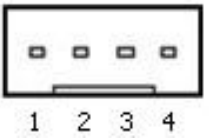
This is a 4-pin header for the system fan.



Pin	Signal Name
1	GND
2	+12V
3	SYSFAN SENSE
4	SYSFAN CONTROL

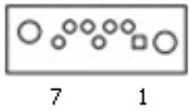
CPU_FAN Connector

This is a 4-pin header for the CPU fan.



Pin	Signal Name
1	GND
2	+12V
3	CPUFAN SENSE
4	CPUFAN CONTROL

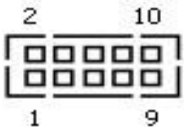
SATA1~SATA6 Connector



Pin	Signal Name
1	GND
2	SATA TX+
3	SATA TX-
4	GND
5	SATA RX-
6	SATA RX+
7	GND

USB1, USB2, USB3 Connector

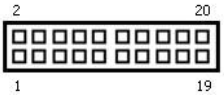
The following table shows the pin outs of the USB1~3 connectors. All of them are USB2.0 speed.



Signal Name	Pin	Pin	Signal Name
N.C.	1	2	VCC
GND	3	4	USB2-
USB1+	5	6	USB2+
USB1-	7	8	GND
VCC	9	10	N.C.

USB3_PORT1, USB3_PORT2 Connector

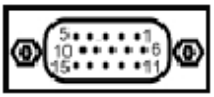
These connectors provide internal connection for USB3.0 devices. All of them can run up to USB3.0 speed. The following table shows the pin outs of the USB3 connectors.



Signal Name	Pin	Pin	Signal Name
NC	1	2	VCC
VCC	3	4	SSR2-
SSR1-	5	6	SSR2+
SSR1+	7	8	GND
GND	9	10	SST2-
SST1-	11	12	SST2+
SST1+	13	14	GND
GND	15	16	D2-
D1-	17	18	D2+
D1+	19	20	GND

VGA Connector

The pin-definition of VGA connector is as follows:



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

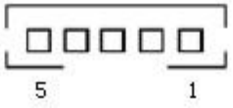
LVDSLCD1 Connector

The LCD panel must be connected to this LVDS header, using the below described pin-out:

Signal Name	Pin	Pin	Signal Name
+12V/5V(BKLPWR)	1	2	+12V/5V(BKLPWR)
GND	3	4	GND
5V/3.3V(PNLPWR)	5	6	5V/3.3V(PNLPWR)
GND	7	8	GND
BRIGHTNES	9	10	BCKLITE_ON
GND	11	12	GND
CHA_TX0+	13	14	CHB_TX0+
CHA_TX0-	15	16	CHB_TX0-
GND	17	18	GND
CHA_TX1+	19	20	CHB_TX1+
CHA_TX1-	21	22	CHB_TX1-
GND	23	24	GND
CHA_TX2+	25	26	CHB_TX2+
CHA_TX2-	27	28	CHB_TX2-
GND	29	30	GND
CHA_TXC+	31	32	CHB_TXC+
CHA_TXC-	33	34	CHB_TXC-
GND	35	36	GND
CHA_TX3+	37	38	CHB_TX3+
CHA_TX3-	39	40	CHB_TX3-

BACKLITE Connector

The LCD backlight must be connected to this header, using the below described pin-out:



Pin	Signal Name
1	Power
2	GND
3	Brightness
4	ON/OFF
5	GND

DVI_HDMI Connector

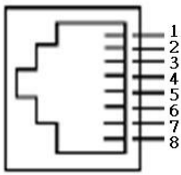
Signal Name	Pin	Pin	Signal Name
CLK+	1	2	TX1+
CLK-	3	4	TX1-
GND	5	6	GND
TX0+	7	8	TX2+
TX0-	9	10	TX2-
GND	11	12	GND
NC	13	14	NC
SCL	15	16	SDA
HPD	17	18	GND
VCC5	19	20	VCC5

DP Connector

Signal Name	Pin	Pin	Signal Name
TX0+	1	2	GND
TX0-	3	4	TX1+
GND	5	6	TX1-
TX2+	7	8	GND
TX2-	9	10	TX3+
GND	11	12	TX3-
PIN13	13	14	GND
AUX+	15	16	GND
AUX-	17	18	HPD
VCC3	19	20	VCC3

LAN1, LAN2 Connector

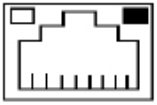
This connector is with the 10/100/1000Mbps Ethernet capability.
The figure below shows the pin out assignments of this c onnector and its corresponding input jack.



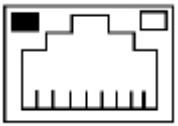
Pin	Signal Name
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI1-
5	MDI2+
6	MDI2-
7	MDI3+
8	MDI3-

LAN1/LAN2 RJ45 LED

The LAN_LEDs on top of RJ45 are to display the current network connection status. The green color LED on the right-hand side shows the link status and TX/RX activity. The Orange/Green Dual color LED on the left-hand side indicates the operation mode, i.e. 100Base-T.



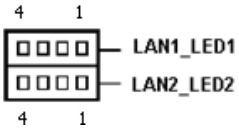
LNK/AC_	STATUS
GREEN	Link
OFF	Disconnected
FLASH	Packets TX/RX



SPEED	MODE
ORANGE	1000 Mbps
GREEN	100 Mbps
OFF	10 Mbps

LAN1_LED, LAN2_LED1 Connector

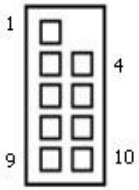
LAN1_LED is used to display LAN1 port status on front panel. LAN2_LED is used to display LAN2 port status on front panel.



LAN1_LED	
Pin	**Signal Name**
1	ACTLED
2	VCC
3	LINK1000
4	LINK100

LAN2_LED	
Pin	**Signal Name**
1	ACTLED
2	VCC
3	LINK1000
4	LINK100

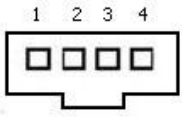
AUDIO Connector



Pin	Signal Name
1	JD0
2	KEY
3	MIC1 IN-L
4	MIC1 IN-R
5	AGND
6	AGND
7	LINE OUT-L
8	LINE IN-L
9	LINE OUT-R
10	LINE IN-R

CD_IN Connector

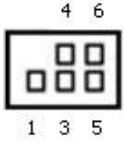
CD_IN connector is designed for wiring the DVD audio signals to the on-board Audio CODEC.



Pin	Signal Name
1	CD Left
2	GND
3	AGND
4	CD Right

SPDIF Connector

SPDIF connector is for S/PDIF audio module.



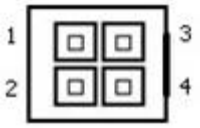
Signal Nam	Pin	Pin	Signal Name
VCC	1	2	NC
SPDIF OUT	3	4	SPDIF IN
GND	5	6	GND

ATX12V1 Connector

The ATX12V1 power connector mainly supplies power to the CPU.

Caution!

If the ATX12V1 power connector is not connected, the system will not start.



Pin	Signal Name
1	GND
2	GND
3	+12V
4	+12V

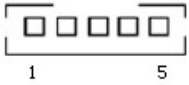
ATX_PWR Connector

This is a four-pin connector to supports the ATX power a nd corresponding back-plane. When your back-plane is configured to perform ATX power supply Soft-on/off function, you have to wire the control signals and standby power on this connector to your back-plane by a corresponding cable.

Pin	Signal Name
1	PWR OK
2	5VSB
3	PS_ON-
4	GND

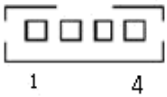
When using ATX power supply soft-on/off function, please make sure remove AT_MODE jumper.
The setting is illustrated as below:

MI2CBUS Connector



Pin	Signal Name
1	VCC
2	VCC3
3	Data
4	Clock
15	GND

SMBUS Connector



Pin #	Signal Name
1	VCC3
2	DATA
3	Clock
4	GND

Chapter 3 BIOS Setup

This chapter describes the different settings available in the Award BIOS that comes with the TR-981 CPU card. The topics covered in this chapter are as follows:

3.1 MAIN MENU 37
3.2 ADVANCED MENU 69
3.3 HARDWARE MONITOR 72
3.4 SECURITY MENU 73
3.5 POWER MENU 76
3.6 BOOT MENU 77
3.7 EXIT MENU 80

BIOS Introduction

This document explains the BIOS Setup Menu, which displays system configuration settings and allows the changing of these settings to configure the system. This special information is then stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

Starting Setup

The following pages are meant to give you a better insight into the options you have to setup your system. Many options depend on the choice of type of memory, memory speed, peripherals and the programs that you will be running. The effective of these settings are related to system performance that can destabilize operation. We urge you to proceed with caution.

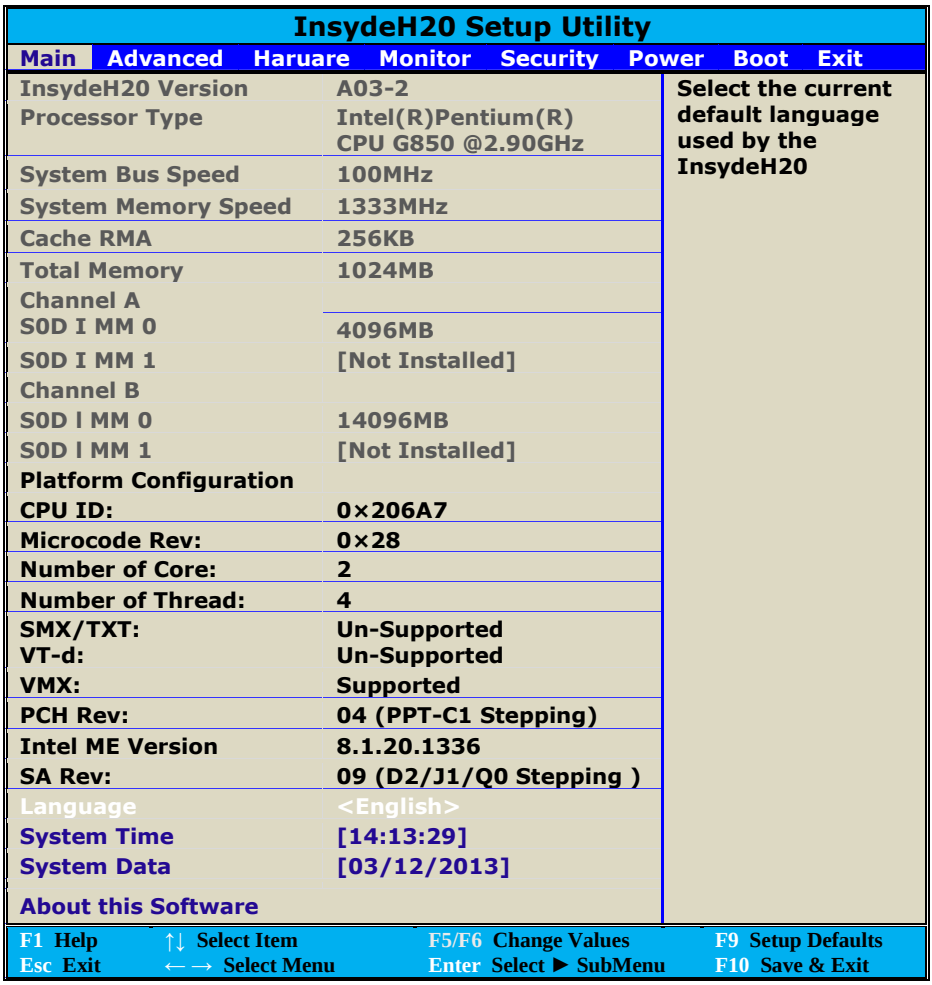
The BIOS Setup Utility can be utilized to view and change BIOS settings for the motherboard. To enter the BIOS Setup Utility, press <Esc> key on the keyboard during the Power-On Self-Test (POST) routine. And you can select 'SCU' to enter BIOS Setup Utility page. If you wish to enter the Setup Utility after POST, you will need to restart the system and try again.

The BIOS Setup Menu is shown as below. This screen appears when you press the <Esc> key and select 'SCU' during POST. BIOS setup menu provided an UI interface to user to set the configuration of the system. The selection in front page included:

- Continue
- Boot Manager
- Device Management
- Boot From File
- Secure Boot Option
- SCU
- MEBx

3.1 Main Menu

The "Main menu" section of the InsydeH2O BIOS provides a quick overview of basic system information and the ability to change the BIOS display language and system time.



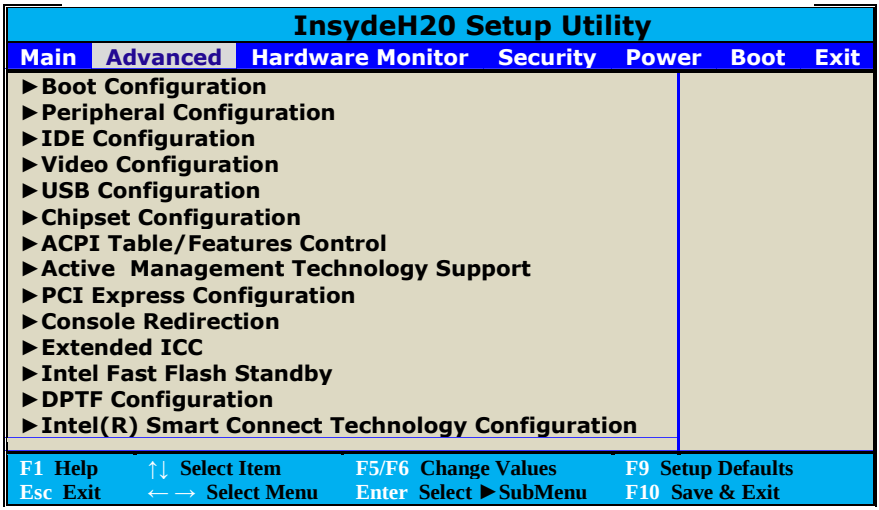
(Figure 1. Main Menu)

BIOS Setting	Options	Description
InsydeH2O version	No options	Display the software version of the installed Insyde BIOS.
Processor Type	No options	Display the make, model and speed of the installed CPU.
System Memory Speed	No options	Display the auto-detected speed of the System Memory.
Cache RAM	No options	Display the current amount of Cache RAM in the system.
Total Memory	No options	Display the total amount of detected system memory installed in the system.
Channel A	No options	Display the information of system memory that is installed in channel A.
SODIMM 0 SODIMM 1	No options	Display the amount of detected system memory installed in channel A.
Channel B	No options	Display the information of system memory that is installed in channel B.
SODIMM 0 SODIMM 1	No options	Display the amount of detected system memory installed in channel B.
Platform Configuration	No options	Display the information of CPUID, Microcode Revision, Number of Core, Number of Thread, support of SMX/TXT, support of VT-d, support of VMX, PCH Revision, VBIOS Version, Intel ME Version, and SA Revision.
Language	English French 日本 語中文	Select the language the InsydeH2O BIOS will display in the Setup Utility.
System Time	Adjust time	Allow user to change the time recognized by the system.

BIOS Setting	Options	Description
System Date	Adjust date	Allow user to change the date recognized by the system.

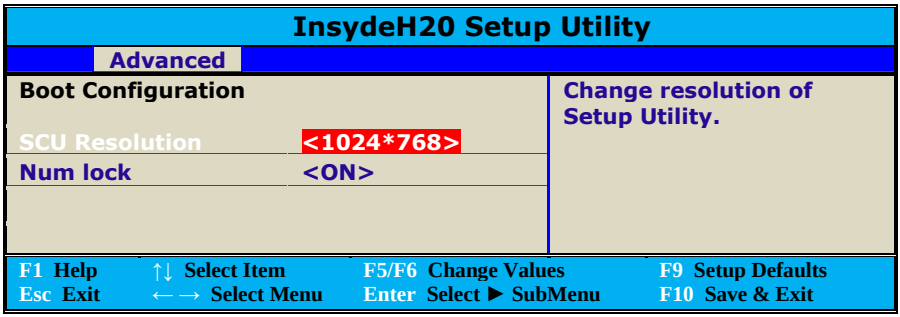
3.2 Advanced Menu

The "Advanced" section of the InsydeH2O BIOS allows users to configure advanced system settings.



(Figure 2. Advanced Menu)

➢ Boot Configuration



(Figure 3. Boot Configuration Menu)

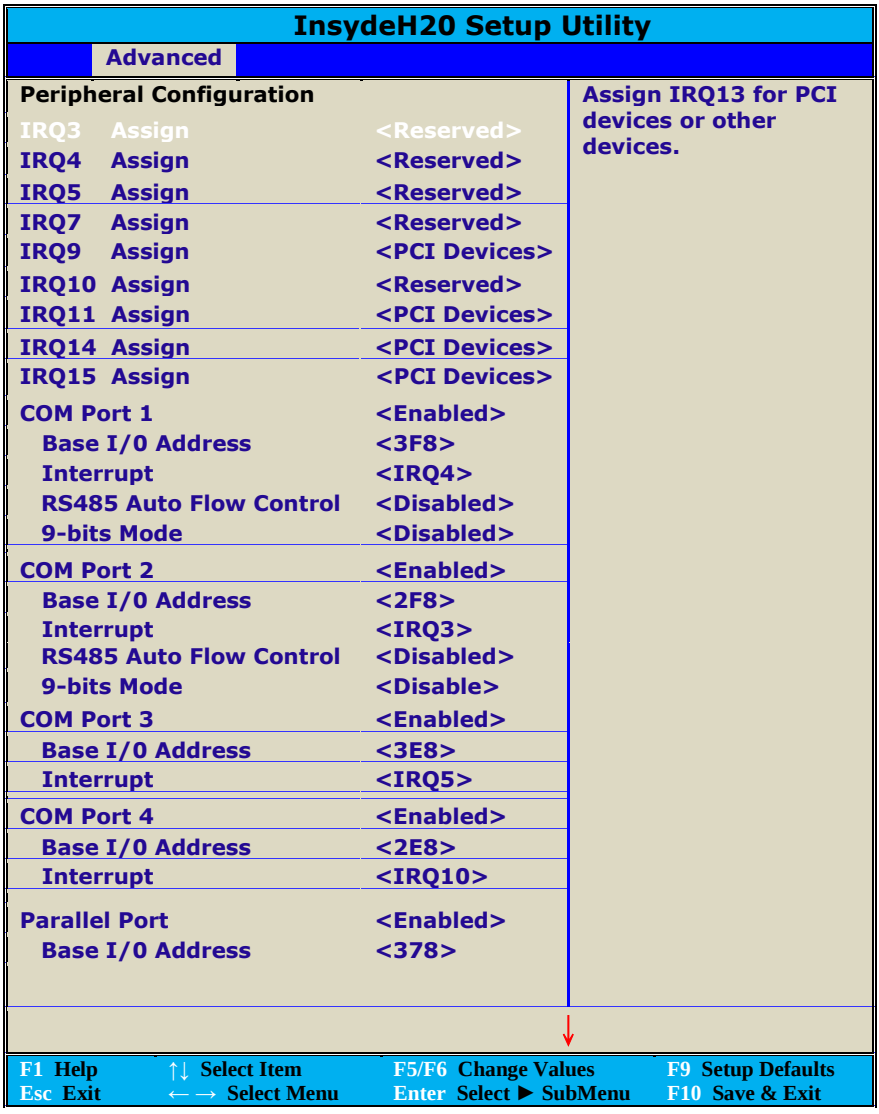
SCU Resolution

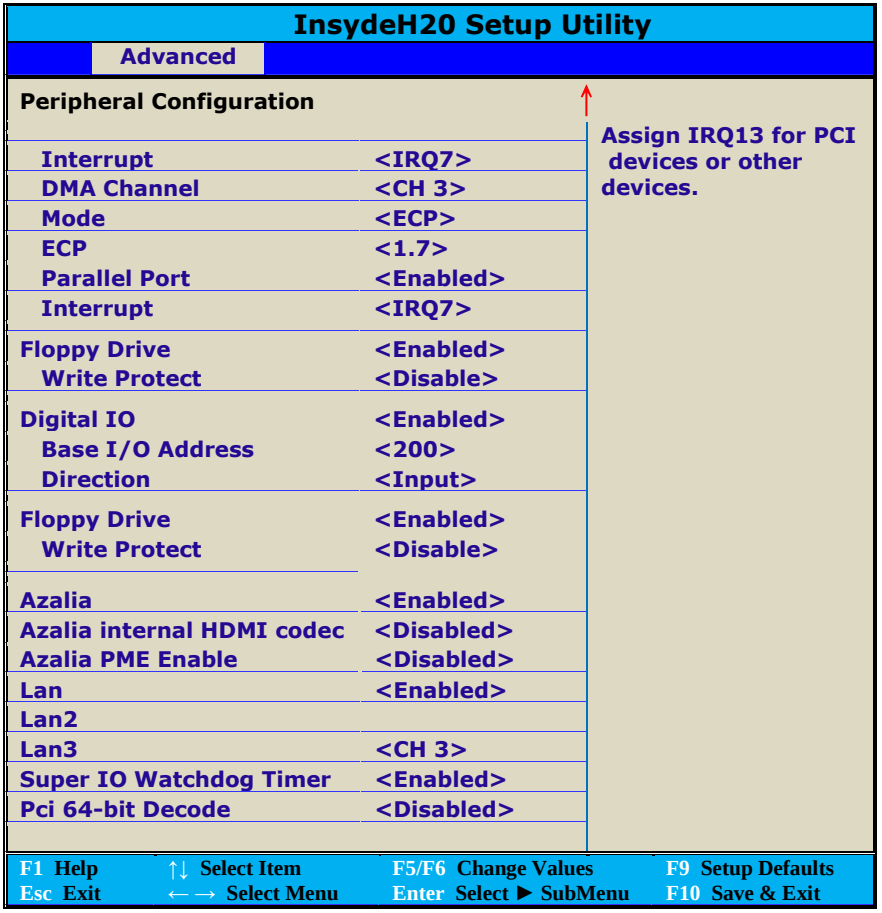
Change resolution of Setup Utility.
The choice: 640*480, 800*600, 1024*768**(default)**

Num lock

Select Power-on status for Num lock.
The choice: Off, On(default)

➢ Peripheral Configuration


InsydeH20 Setup Utility
Advanced
Peripheral Configuration
IRQ3 Assign <Reserved>
IRQ4 Assign <Reserved>
IRQ5 Assign <Reserved>
IRQ7 Assign <Reserved>
IRQ9 Assign <PCI Devices>
IRQ10 Assign <Reserved>
IRQ11 Assign <PCI Devices>
IRQ14 Assign <PCI Devices>
IRQ15 Assign <PCI Devices>
COM Port 1 <Enabled>
Base I/O Address <3F8>
Interrupt <IRQ4>
RS485 Auto Flow Control <Disabled>
9-bits Mode <Disabled>
COM Port 2 <Enabled>
Base I/O Address <2F8>
Interrupt <IRQ3>
RS485 Auto Flow Control <Disabled>
9-bits Mode <Disable>
COM Port 3 <Enabled>
Base I/O Address <3E8>
Interrupt <IRQ5>
COM Port 4 <Enabled>
Base I/O Address <2E8>
Interrupt <IRQ10>
Parallel Port <Enabled>
Base I/O Address <378>
Assign IRQ13 for PCI devices or other devices.
F1 Help ↑↓ Select Item F5/F6 Change Values F9 Setup Defaults
Esc Exit ← → Select Menu Enter Select ▶ SubMenu F10 Save & Exit



(Figure 4. Peripheral Configuration Menu)

BIOS Setting	Options	Description
IRQ3 Assign	PCI Devices Reserved	Assign IRQ13 for PCI devices or other devices.
IRQ4 Assign	PCI Devices Reserved	Assign IRQ4 for PCI devices or other devices.
IRQ5 Assign	PCI Devices Reserved	Assign IRQ5 for PCI devices or other devices.
IRQ7 Assign	PCI Devices	Assign IRQ7 for PCI devices or other devices.

BIOS Setting	Options	Description
	Reserved	
IRQ9 Assign	PCI Devices Reserved	Assign IRQ9 for PCI devices or other devices.
IRQ10 Assign	PCI Devices Reserved	Assign IRQ10 for PCI devices or other devices.
IRQ11 Assign	PCI Devices Reserved	Assign IRQ11 for PCI devices or other devices.
IRQ14 Assign	PCI Devices Reserved	Assign IRQ14 for PCI devices or other devices.
IRQ15 Assign	PCI Devices Reserved	Assign IRQ15 for PCI devices or other devices.
COM Port 1	Disabled Enabled	Enable/Disable COM port 1.
Base I/0 Address	2E8 2F8 3E8 3F8	Set I0 base address for this device.
Interrupt	IRQ3 IRQ4	Set interrupt for this device.
RS485 Auto Flow Control	Enabled Disabled	Enable/Disable RS485 auto flow control.
9-bits Mode	Enabled Disabled	Enable/Disable 9-bits mode.
COM Port 2	Disabled Enabled	Enable/Disable COM port 2.
Base I/0 Address	2E8 2F8 3E8 3F8	Set I0 base address for this device.
Interrupt	IRQ3 IRQ4	Set interrupt for this device.
RS485 Auto Flow Control	Enabled Disabled	Enable/Disable RS485 auto flow control.
9-bits Mode	Enabled Disabled	Enable/Disable 9-bits mode.

BIOS Setting	Options	Description
COM Port 3	Disabled Enabled	Enable/Disable COM port 3.
Base I/0 Address	2E8 2F8 3E8 3F8	Set I0 base address for this device.
Interrupt	IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ10 IRQ11	Set interrupt for this device.
COM Port 4	Disabled Enabled	Enable/Disable COM port 4.
Base I/0 Address	2E8 2F8 3E8 3F8	Set I0 base address for this device
Interrupt	IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ10 IRQ11	Set interrupt for this device.
Parallel Port	Disabled Enabled	Enable/Disable Parallel Port
Base I/0 Address	378 278 3BC	Set I0 base address for this device
Interrupt	IRQ5 IRQ7	Set interrupt for this device.
DMA Channel	CH 1 CH 3	Set DMA channel for this device.
Mode	SPP EPP ECP EPP+ECP Printer	Set parallel port mode.

BIOS Setting	Options	Description
Floppy Drive	Disabled Enabled	Enable/Disable FDD controller.
Write Protect	Disabled Enabled	Enable/Disable Write Protect function.
Digital IO	Disabled Enabled	Enable/Disable digital input/output function.
Base I/O Address	200 220 300 330	Set IO address for this device.
Direction	Input Output 4×Input, 4×Output	Set digital IO pin direction.
Azalia	Disabled Enabled Auto	[Auto] Auto detect the Azalia codec. [Disabled] Disable the Azalia controller can be selectable.
Azalia internal HDMI codec	Disabled Enabled	Enable/Disable internal HDMI codec for Azalia.
Azalia PME Enable	Disabled Enabled	Enable/Disable PME Enable for Azalia.
Lan	Disabled Enabled	ENABLE: Enable the LAN controller. DISABLE: Disable the LAN controller can be selectable.
Lan2	Disabled Enabled	Enable/Disable LAN 2.
Lan3	Disabled Enabled	Enable/Disable LAN 3.
Super IO Watchdog Timer	Disabled Enabled	Enable/Disable SIO Watchdog Timer. If watchdog timer counts down to 0,it will reset platform.
Pci 64-bit Decode	Disabled Enabled	Allow system to support 64-bit BAR for PCI devices.

➢ IDE Configuration

Select the IDE Configuration and hard disk rive type installed in your system.

InsydeH20 Setup Utility		
Advanced		
IDE Configuration		**DISABLED: Disables SATA controller. ENABLED: Enables SATA controller.**
IDE Controller	<Enabled>	
HDC Configure As	<AHCL>	
►Software Feature Mask Configuration		
Aggressive LPM Support	<Enabled>	
SATA Port 0	<Enabled>	
SATA Port HotPlug	<Disabled>	
Spin-Up Device	<Disabled>	
SATA Device Type	<Hard Disk Drive>	
Port Multiplier	<Disabled>	
SATA Port 1	<Enabled>	
SATA Port HotPlug	<Disabled>	
Spin-Up Device	<Disabled>	
SATA Device Type	<Hard Disk Drive>	
Port Multiplier	<Disabled>	
SATA Port 2	<Enabled>	
SATA Port HotPlug	<Disabled>	
Spin-Up Device	<Disabled>	
SATA Device Type	<Hard Disk Drive>	
Port Multiplier	<Disabled>	
SATA Port 3	<Enabled>	
SATA Port HotPlug	<Enabled>	
Spin-Up Device	<Disabled>	
SATA Device Type	<Hard Disk Drive>	
Port Multiplier	<Disabled>	
SATA Port 4	<Enabled>	
SATA Port HotPlug	<Enabled>	
Spin-Up Device	<Disabled>	
SATA Device Type	<Hard Disk Drive>	
Port Multiplier	<Disabled>	
SATA Port 5	<Enabled>	
SATA Port HotPlug	<Disabled>	
Spin-Up Device	<Disabled>	
SATA Device Type	<Hard Disk Drive>	
Port Multiplier	<Disabled>	

F1 Help	↑↓ Select Item	F5/F6 Change Values	F9 Setup Defaults
Esc Exit	←→ Select Menu	Enter Select ► SubMenu	F10 Save & Exit

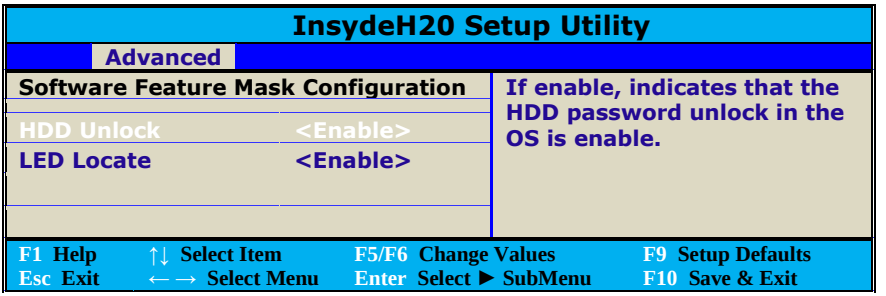
BIOS Setting	Options	Description
IDE Controller	Disabled Enabled	DISABLED: Disables SATA controller. ENABLED: Enables SATA controller.
HDC Configure As	IDE AHCI RAID	Set Harddisk controller Configure Type.
Aggressive LPM Support	Disabled Enabled	Enable / Disable Support Aggressive Link Power Management (SALP).
SATA Port 0	Disabled Enabled	Enable/Disable SATA Port 0.
SATA Port HotPlug	Disabled Enabled	Enable/Disable SATA Port 0 HotPlug.
Spin-Up Device	Disabled Enabled	Enable / Disable support of Staggered Spin-Up (SSS) in AHCI Host Capability Register Bit 27.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify Solid State Drive or Hard Disk Drive.
Port Multiplier	Disabled Enabled	Enable / Disable support of Port Multiplier (PMS) in AHCI Host Capability Register Bit 17.
SATA Port 1	Disabled Enabled	Enable/Disable SATA Port 1.
SATA Port HotPlug	Disabled Enabled	Enable/Disable SATA Port 1 HotPlug.
Spin-Up Device	Disabled Enabled	Enable / Disable support of Staggered Spin-Up (SSS) in AHCI Host Capability Register Bit 27.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify Solid State Drive or Hard Disk

BIOS Setting	Options	Description
		Drive.
Port Multiplier	Disabled Enabled	Enable / Disable support of Port Multiplier (PMS) in AHCI Host Capability Register Bit 17.
SATA Port 2	Disabled Enabled	Enable/Disable SATA Port 2.
SATA Port HotPlug	Disabled Enabled	Enable/Disable SATA Port 2HotPlug.
Spin-Up Device	Disabled Enabled	Enable / Disable support of Staggered Spin-Up (SSS) in AHCI Host Capability Register Bit 27.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify Solid State Drive or Hard Disk Drive.
Port Multiplier	Disabled Enabled	Enable / Disable support of Port Multiplier (PMS) in AHCI Host Capability Register Bit 17.
SATA Port 3	Disabled Enabled	Enable/Disable SATA Port 3.
SATA Port HotPlug	Disabled Enabled	Enable/Disable SATA Port 3 HotPlug.
Spin-Up Device	Disabled Enabled	Enable / Disable support of Staggered Spin-Up (SSS) in AHCI Host Capability Register Bit 27.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify Solid State Drive or Hard Disk Drive.
Port Multiplier	Disabled Enabled	Enable / Disable support of Port Multiplier (PMS) in AHCI Host Capability Register Bit 17.

BIOS Setting	Options	Description
SATA Port 4	Disabled Enabled	Enable/Disable SATA Port 4.
SATA Port HotPlug	Disabled Enabled	Enable/Disable SATA Port 4 HotPlug.
Spin-Up Device	Disabled Enabled	Enable / Disable support of Staggered Spin-Up (SSS) in AHCI Host Capability Register Bit 27.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify Solid State Drive or Hard Disk Drive.
Port Multiplier	Disabled Enabled	Enable / Disable support of Port Multiplier (PMS) in AHCI Host Capability Register Bit 17.
SATA Port 5	Disabled Enabled	Enable/Disable SATA Port 5.
SATA Port HotPlug	Disabled Enabled	Enable/Disable SATA Port 5 HotPlug.
Spin-Up Device	Disabled Enabled	Enable / Disable support of Staggered Spin-Up (SSS) in AHCI Host Capability Register Bit 27.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify Solid State Drive or Hard Disk Drive.
Port Multiplier	Disabled Enabled	Enable / Disable support of Port Multiplier (PMS) in AHCI Host Capability Register Bit 17.

➢ Software Feature Mask Configuration

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



(Figure 6. Software Feature Mask Configuration Menu)

HDD Unlock

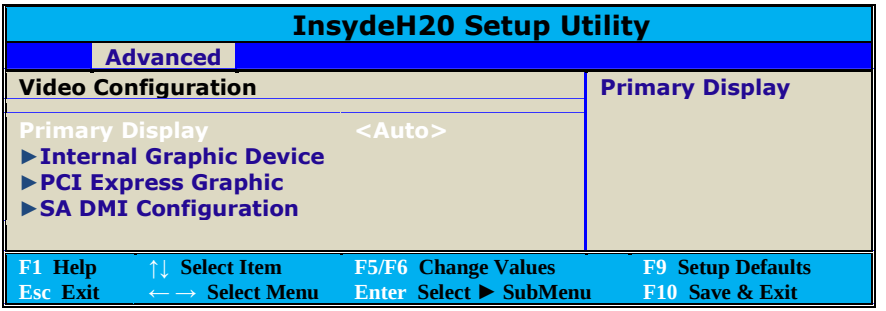
If enable, indicates that the HDD password unlock in the OS is enable.
The choice: Enable **(default)**, Disable

LED Locate

If enable, indicates that the LED/SGPIO hardware is attached and ping to locate feature is enable on the OS.
The choice: Enable **(default)**, Disable

➢ Video Configuration

Configures video settings.

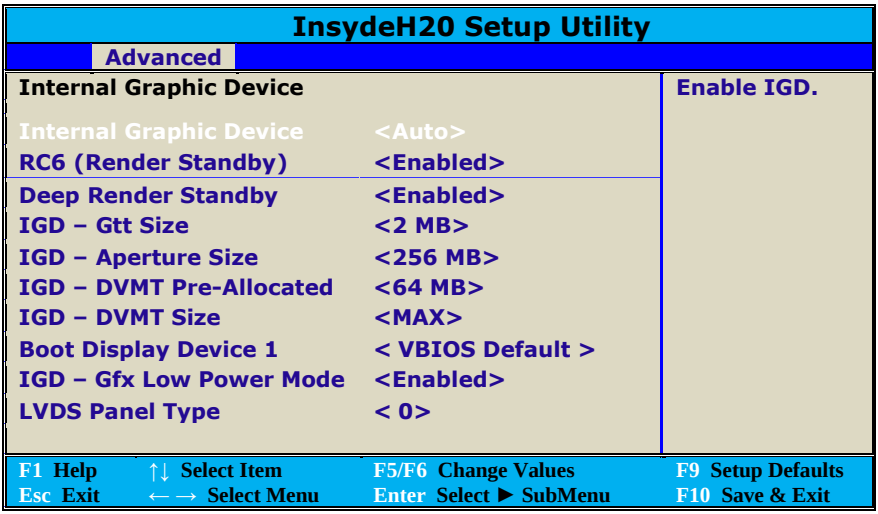


(Figure 7. Video Configuration Menu)

Primary Display

Indicate the setting of Primary Display.
The choice: Auto **(default)**, IGFX , PEG, PCI

➢ Internal Graphic Device



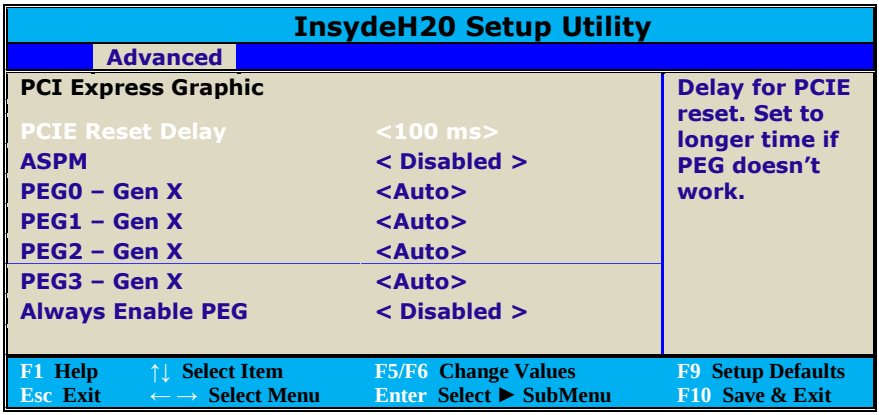
(Figure 8. Internal Graphic Device Menu)

BIOS Setting	Options	Description
Internal Graphic Device	Auto Enabled Disabled	Enable IGD.
RC6 (Render Standby)	Disabled Enabled	Graphic Render C-State (RC6) is a technique designed to optimize the average power to the graphics render engine during times of idleness of the render engine.
Deep Render Standby	Disabled Enabled	Configure Deep Render Standby.
IGD – Gtt Size	1 MB 2 MB	Select the Gtt size.

BIOS Setting	Options	Description
IGD – Aperture Size	128 MB 256 MB 512 MB	Select the Aperture size.
IGD – DVMT Pre-Allocated	0 MB 32 MB 64 MB 96 MB 128 MB 160 MB 192 MB 224 MB 256 MB 288 MB 320 MB 352 MB 384MB 416 MB 448 MB 480 MB 512MB 1024MB	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
IGD – DVMT Size	128 MB 256 MB MAX	Select the size of DVMT 5.0 that the Internal Graphics Device will use.
Boot Display Device 1	VBIOS Default CRT EFP LFP EFP3 EFP2 LFP2	Select the Video Device that will be activated during POST.
IGD – Gfx Low Power Mode	Disabled Enabled	This option is applicable for SFF Only.
LVDS Panel Type	0 1 2 3 4 5 6	Select onboard panel number.

BIOS Setting	Options	Description
	7 8 9 10 11 12 13 14 15	

➢ PCI Express Graphic

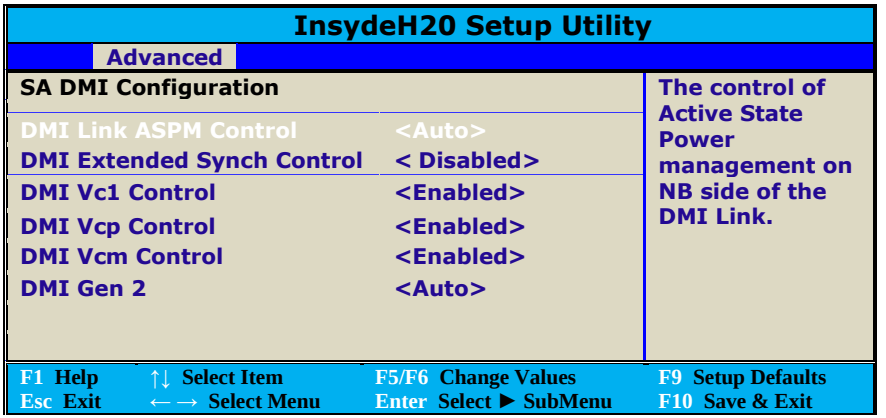


(Figure 9. PCI Express Graphic Menu)

BIOS Setting	Options	Description
PCIE Reset Delay	Disabled 50 ms 100 ms 200 ms 300 ms	Delay for PCIE reset. Set to longer time if PEG doesn't work.
ASPM	Disabled L0s L1 L0sL1 Auto	Control ASPM support for the PEG Device.
PEG0 – Gen X	Auto Gen1 Gen2 Gen3	Configure PEG0 B0:D1:F0 Gen1-Gen2.

BIOS Setting	Options	Description
PEG1 – Gen X	Auto Gen1 Gen2 Gen3	Configure PEG0 B0:D1:F1 Gen1-Gen2.
PEG2 – Gen X	Auto Gen1 Gen2 Gen3	Configure PEG0 B0:D1:F2 Gen1-Gen2.
PEG3 – Gen X	Auto Gen1 Gen2 Gen3	Configure PEG0 B0:D6:F0 Gen1-Gen2
Always Enable PEG	Enabled Disabled	To enable the PEG.

➢ SA DMI Configuration

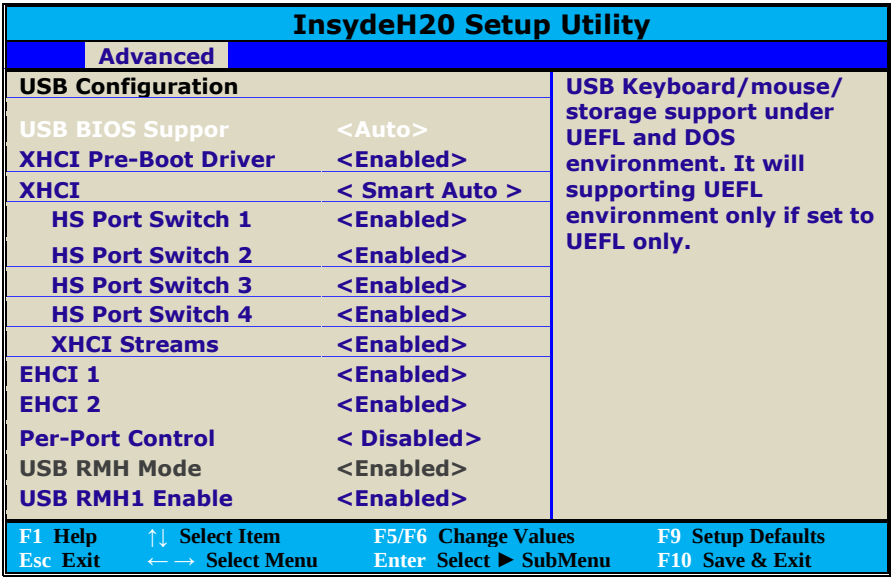


(Figure 10. SA DMI Configuration Menu)

BIOS Setting	Options	Description
DMI Link ASPM Control	Disabled L0s L1 L0sL1 Auto	The control of Active State Power management on NB side of the DMI Link.
DMI Extended Synch Control	Disabled Enabled	Enable / Disable DMI Extended

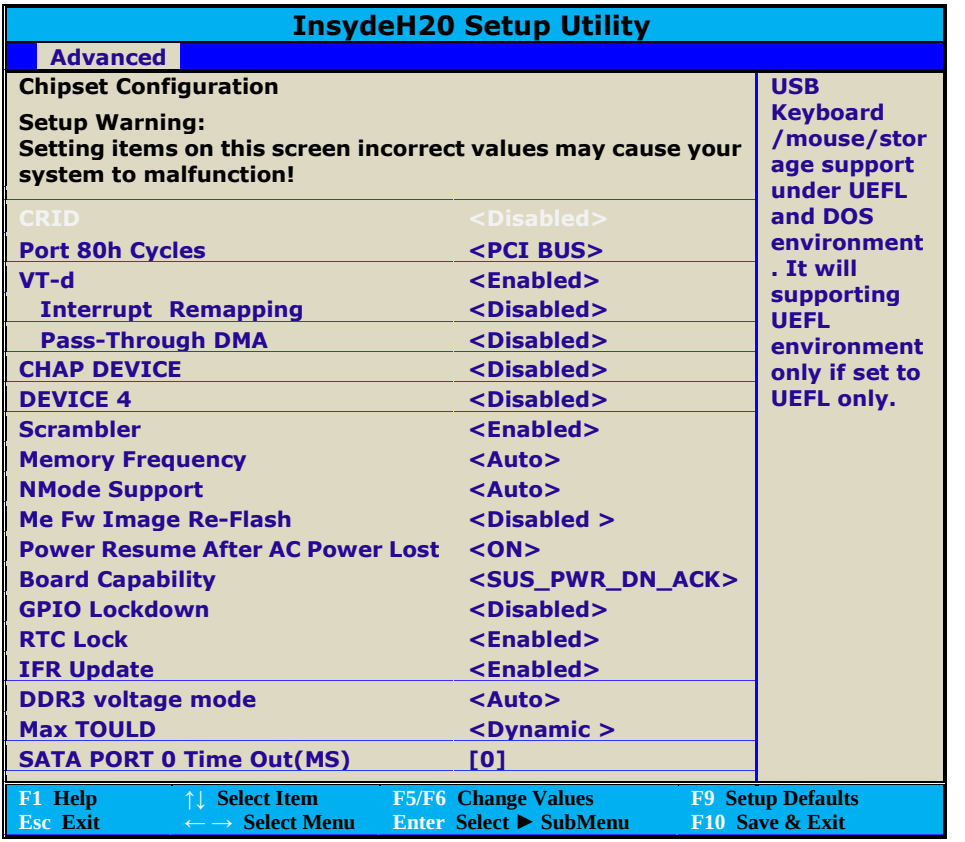
		Synchronization.
DMI Vc1 Control	Disabled Enabled	Enable / Disable DMI Vc1 .
DMI Vcp Control	Disabled Enabled	Enable / Disable DMI Vcp .
DMI Vcm Control	Disabled Enabled	Enable / Disable DMI Vcm .
DMI Gen 2	Disabled Enabled Auto	Enable / Disable DMI Vc1 .

➢ USB Configuration



(Figure 11. USB Configuration Menu)

BIOS Setting	Options	Description
USB BIOS Support	Disabled Enabled UEFI Only	USB Keyboard/mouse/storage support under UEFL and DOS environment. It will supporting UEFL environment only if set to UEFL only.
XHCI Pre-Boot Driver	Disabled Enabled	Enable / Disable XHCI Pre-Boot Driver Support.
XHCI	Disabled Enabled Auto Smart Auto	Configure XHCI Mode.
HS Port Switch 1	Disabled Enabled	Allows for HS port switching between XHCI and EHCI. If disable, port is routed to EHCI. If HS port routed to XHCI the corresponding SS port is enable.
HS Port Switch 2	Disabled Enabled	Allows for HS port switching between XHCI and EHCI. If disable, port is routed to EHCI. If HS port routed to XHCI the corresponding SS port is enable.
HS Port Switch 3	Disabled Enabled	Allows for HS port switching between XHCI and EHCI. If disable, port is routed to EHCI. If HS port routed to XHCI the corresponding SS port is enable.
HS Port Switch 4	Disabled Enabled	Allows for HS port switching between XHCI and EHCI. If disable, port is routed to EHCI. If HS port routed to XHCI the corresponding SS port is enable.
XHCI Streams	Disabled Enabled	Enable / Disable XHCI Streams.
EHCI 1	Disabled Enabled	Enable / Disable EHCI 1.
EHCI 2	Disabled Enabled	Enable / Disable EHCI 2.
Per-Port Control	Disabled Enabled	Enable / Disable the Per-Port Disable Control Override.
USB RMH Mode	No options	PCH USB Rate Matching Hubs mode.
USB RMH1 Enable	Disabled Enabled	Disable / Enable USB Rate Matching Hubs 1.



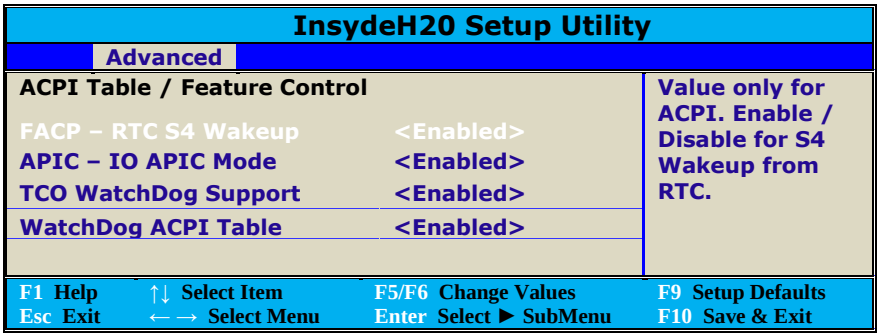
(Figure 12. Chipset Configuration Menu)

BIOS Setting	Options	Description
CRID	Disabled Enabled	Enable / Disable: Compatible Revision ID (CRID) / Stepping Revision ID (SRID).
Port 80h Cycles	LPC BUS PCI BUS	Control where the port 80h cycles are sent.
VT-d	Disabled Enabled	Check to enable VT-d function on MCH.
Interrupt Remapping	Disabled Enabled	Enable / Disable Interrupt Remapping function.
Pass-Through DMA	Disabled Enabled	Enable / Disable Pass-Through DMA.
CHAP DEVICE	Disabled	Enable / Disable CHAP device (Bus

BIOS Setting	Options	Description
	Enabled	0, Dev 7).
DEVICE 4	Disabled Enabled	Enable / Disable Thermal device (Bus 0, Dev 4).
Scrambler	Disabled Enabled	Enable / Disable scrambling.
Memory Frequency	Auto 1067 1333 1600 1867 2133	Memory Frequency Selections in Mhz.
NMode Support	Auto 1N Mode 2N Mode	Nmode Support Option.
Me Fw Image Re-Flash	Disabled Enabled	Enable / Disable Me FW Image Re-Flash function.
Power Resume After AC Power Lost	ON OFF Last State	Specify what state to go to when power is re-applied after a power failure (G3 state).
Board Capability	SUS_PWR_DN_ACK DeepSx	Board Capability : SUS_PWR_DN_ACK -> Send Disable to PCH. DeepSx -> Show DeepSx Policy.
GPIO Lockdown	Disabled Enabled	Enable / Disable GPIO Lockdown feature. GPIO registers will be READ-ONLY, when enable GPIO Lockdown.
RTC Lock	Disabled Enabled	Enable will lock bytes 38h-3fh in the lower/upper 128-byte bank of RTC RAM.
IFR Update	Disabled Enabled	Independent FW Recovery. Note **OEM** This is only for OEM TO opt-out from IFR Update but not the option for end user.
DDR3 voltage mode	DDR3 DDR3L Auto	DDR3 voltage mode setting.
Max TOULD	Dynamic 1 GB	Max value of TOLUD. Dynamic assignment would adjust TOLUD

BIOS Setting	Options	Description
	1.25 GB 1.5 GB 1.75 GB 2 GB GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB	automatically based on largest MMIO length of installed graphic controller.
SATA PORT 0 Time Out(MS)	No options	Add Delay time for SATA PORT 0, Time Out 0: no delay, Time Out >0:MAX delay time equal Time out, the recommend time is:1 to 10 MS.

➢ ACPI Table / Feature Control

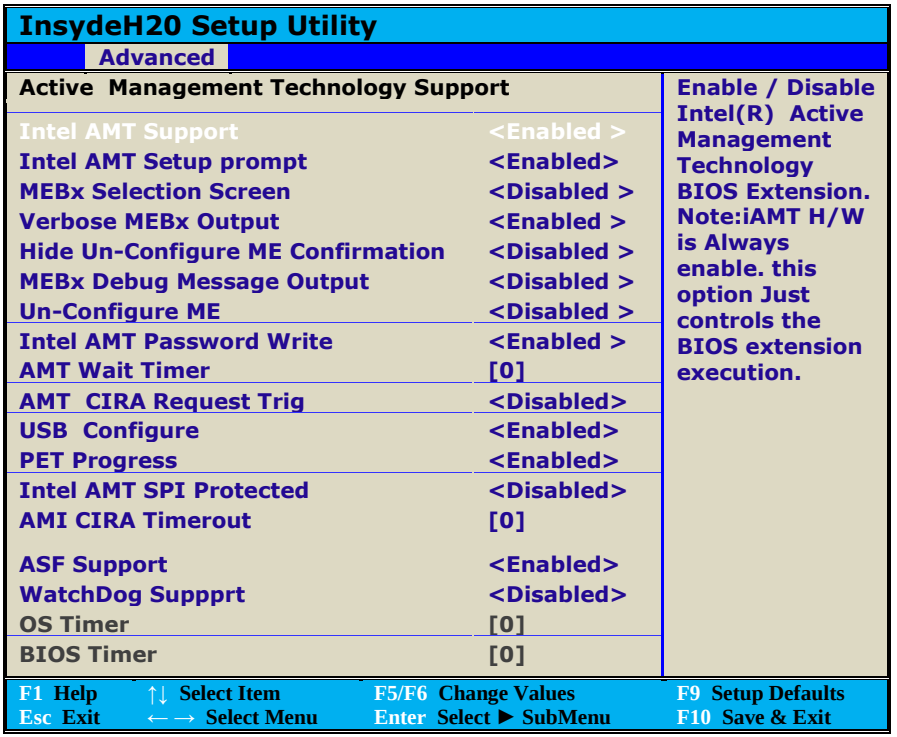


(Figure 13. ACPI Table / Feature Control

BIOS Setting	Options	Description
FACP – RTC S4 Wakeup	Disabled Enabled	Value only for ACPI. Enable / Disable for S4 Wakeup from RTC.
APIC – IO APIC Mode	Disabled Enabled	This item is valid only for WIN2K and WINXP. Also, a fresh install of the OS must occur when APIC Mode is desired. Test the IO APIC by setting item to Enable. The APIC Table will then be pointed

BIOS Setting	Options	Description
		to by he RSDT, the Local APIC will be initialized, and the proper enable bits will be set in ICH4M.
TCO WatchDog Support	Disabled Enabled	Enable / Disable TCO Watchdog Support.
WatchDog ACPI Table	Disabled Enabled	Enable / Disable to support Watchdog ACPI Table(WADT).

➢ Active Management Technology Suppor

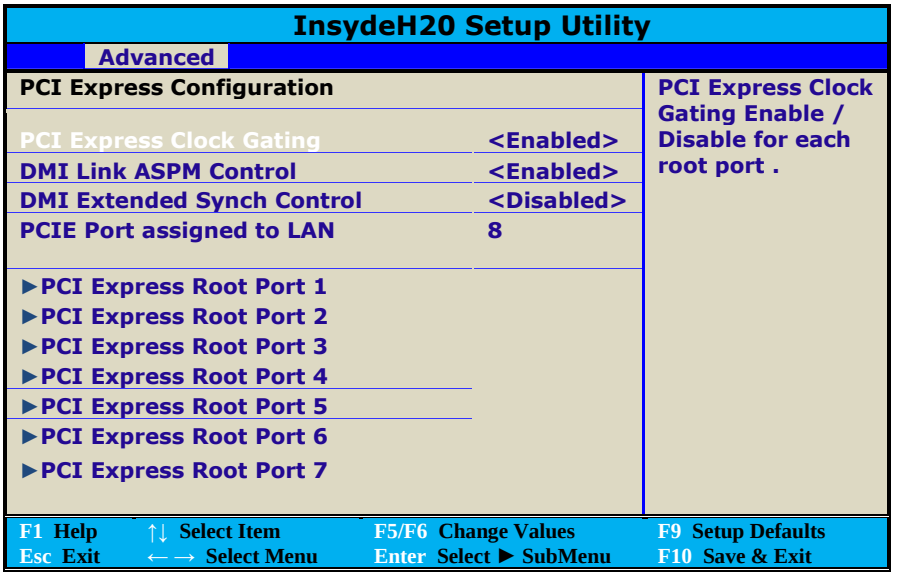


(Figure 14. Active Management Technology Suppor Menu)

BIOS Setting	Options	Description
Intel AMT Support	Disabled Enabled	Enable / Disable Intel(R) Active Management Technology BIOS Extension. Note:iAMT H/W is Always enable. this option Just controls the BIOS extension execution.
Intel AMT Setup prompt	Disabled Enabled	Enable / Disable Intel AMT Setup prompt to wait for hot-key to enter setup.
MEBx Selection Screen	Disabled Enabled	Enable / Disable MEBx Selection Screen.
Verbose MEBx Output	Disabled Enabled	Enable / Disable Verbose MEBx Output.
Hide Un-Configure ME Confirmation	Disabled Enabled	Hide Un-Configure ME without Password confirmation Prompt.
MEBx Debug Message Output	Disabled Enabled	Enable MEBx Debug Message Output.
Un-Configure ME	Disabled Enabled	Un-Configure ME without Password.
Intel AMT Password Write	Disabled Enabled	Enable / Disable Intel AMT Password Write. Password is Writeable when set Enable.
AMT Wait Timer	No options	Set timer to wait before sending ASF_GET_BOOT_OPTIONS.
AMT CLRA Request Trig	Disabled Enabled	Tirgger CIRA boot.
USB Configure	Disabled Enabled	Enable / Disable USB Configure function.
PET Progress	Disabled Enabled	Enable / Disable PET Events Progress to recieve PEI events.
Intel AMT SPI Protected	Disabled Enabled	Enable / Disable Intel AMT SPI write protect.
AMI CIRA Timerout	No options	OEM defined timeout for MPS connection to be established.
ASF Support	Disabled	Enable / Disable ASF Support

BIOS Setting	Options	Description
	Enabled	specification Format.
WatchDog Support	Disabled Enabled	Enable / Disable WatchDog Timer.

➢ PCI Express Configuration



(Figure 15. PCI Express Configuration Menu)

PCI Express Clock Gating

PCI Express Clock Gating Enable / Disable for each root port .
The choice: Disable ,Enable **(default)**

DMI Link ASPM Control

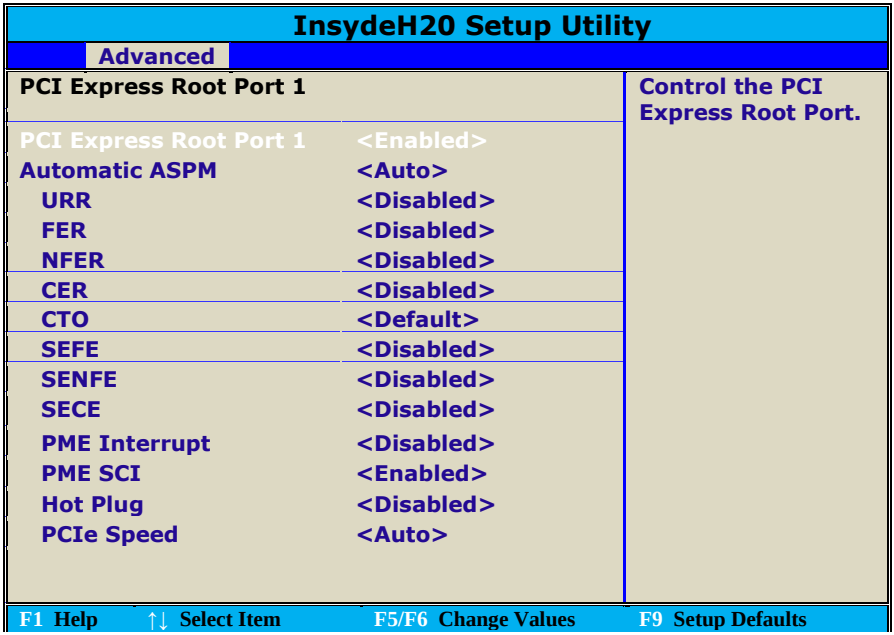
The control of Active State Power Management on SB side of the DMI Link.
The choice: Disable ,Enable (**default**)

DMI Extended Synch Control

Enable / Disable DMI Extended Synch Control.
The choice: Disable (**default**) ,Enable

PCIE Port assigned to LAN

PCI Express Root Port 1~8 Settings.

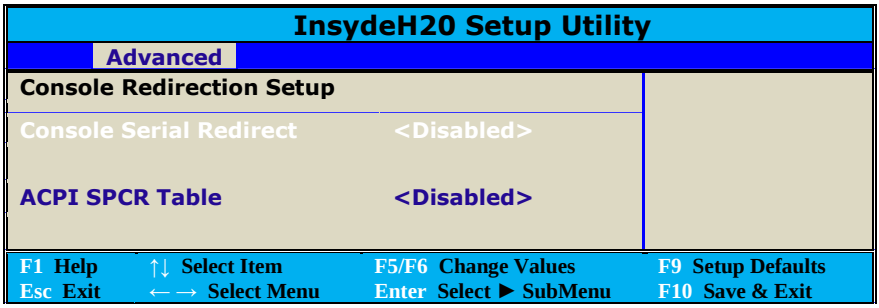


(Figure 16. PCI Express Root Port 1,2,3,4,5,6,7 Menu)

BIOS Setting	Options	Description
PCI Express Root Port 1	Disabled Enabled	Control the PCI Express Root Port.
Automatic ASPM	Disabled L0s L1 L0sL1 Auto	Automatically enable ASPM base on reported capabilities and known issues.
URR	Disabled Enabled	PCI Express Unsupported Request Reporting Enable / Disable.
FER	Disabled Enabled	PCI Express Device Fatal Error Reporting Enable / Disable.
NFER	Disabled Enabled	PCI Express Device Non-Fatal Error Reporting Enable / Disable.
CER	Disabled Enabled	PCI Express Device Correctable Error Reporting Enable/ Disable.
CTO	Default 16-55 ms 65-210 ms 260-900 ms 1-3.5 ms Disable	PCI Express Completion Timer TO Enable / Disable.
SEFE	Disabled Enabled	Root PCI Express System Error on Fatal Error Enable / Disable.
SENFE	Disabled Enabled	Root PCI Express System Error on Non-Fatal Error Enable / Disable.
SECE	Disabled Enabled	Root PCI Express System Error on Correctable Error Enable / Disable.
PME Interrupt	Disabled Enabled	Root PCI Express PME Interrupt Enable / Disable.
PME SCI	Disabled Enabled	PCI Express PME SCI Enable / Disable.
Hot Plug	Disabled Enabled	PCI Express Hot Plug SCI Enable / Disable.

BIOS Setting	Options	Description
PCIe Speed	Auto Gen1 Gen2	Configure PCIe Speed.

➢ Console Redirection



(Figure 17. Console Redirection Menu)

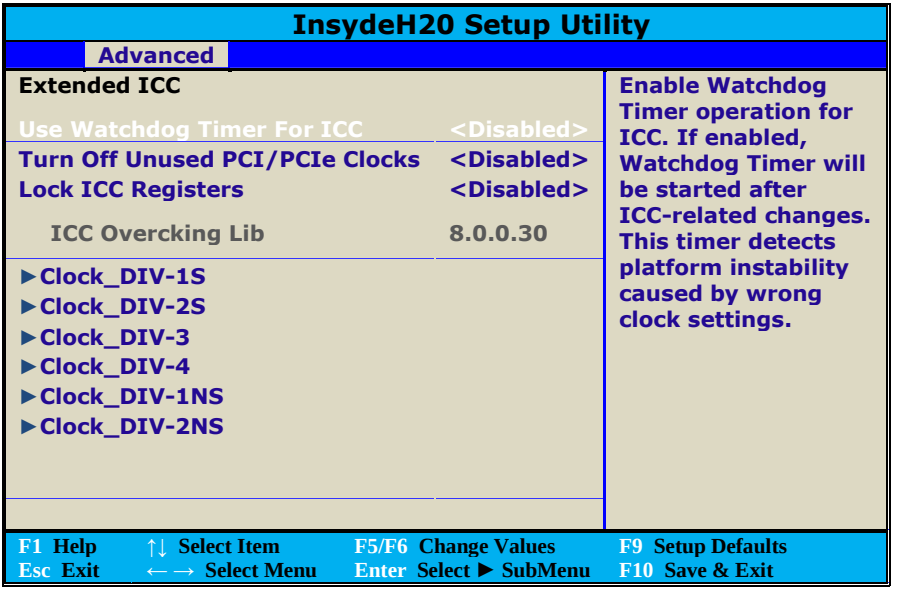
Console Serial Redirect

Disable / Enable Console Redirection Function.
The choice: Disable (**default**) ,Enable

ACPI SPCR Table

Disable / Enable Console Redirection Function. Serial Port Console Redirection Table: Enabled this feature, the SPCR table will be added into ACPI tables.
The choice: Disable (**default**) ,Enable

➢ Extended ICC



(Figure 18. Extended ICC Menu)

Use Watchdog Timer For ICC

Enable Watchdog Timer operation for ICC. If enabled, Watchdog Timer will be started after ICC-related changes. This timer detects platform instability caused by wrong clock settings.
The choice: Disable (**default**) ,Enable

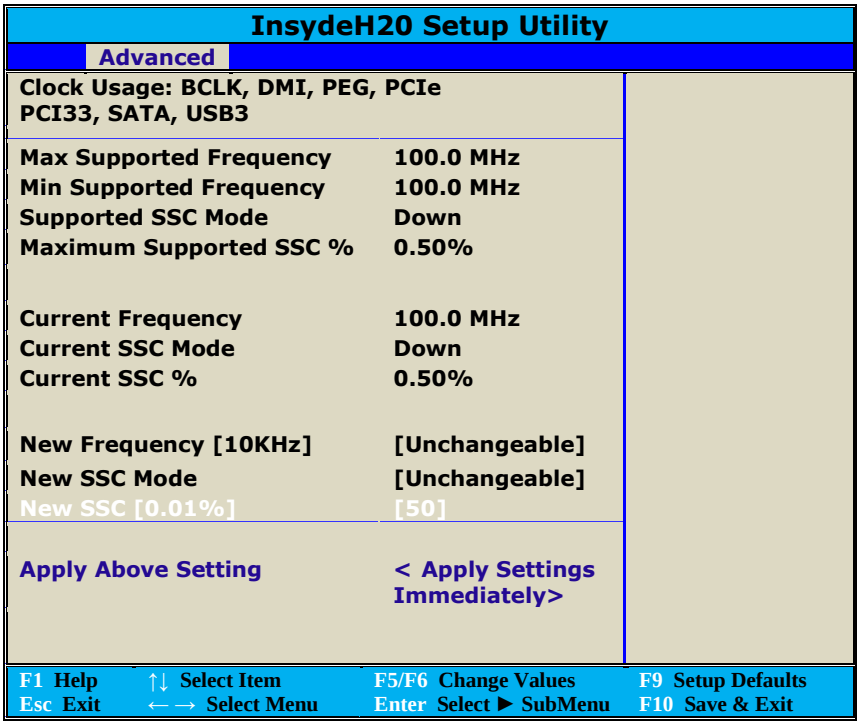
Turn Off Unused PCI/PCIe Clocks

Disable: All clock turned on.
Enable: Clocks for empty PCI/PCIe slots will be turned off to save power. Platform must be powered off for changes to take effect.
The choice: Disable (**default**) ,Enable

Lock ICC Registers

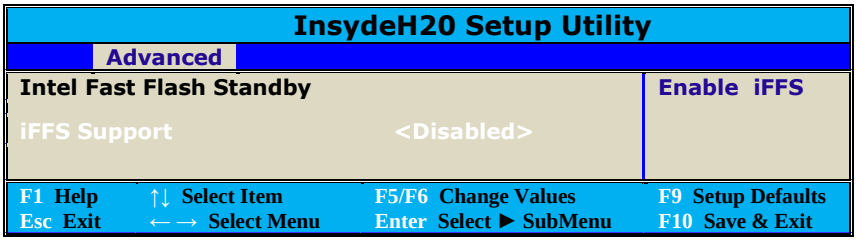
All registers: All ICC registers will be locked.
Static only: Only Static ICC registers will be locked.
The choice: All registers ,Static registers only **(default)**

➢ Clock_DIV-1S ,2S,3,4,1NS,2NS



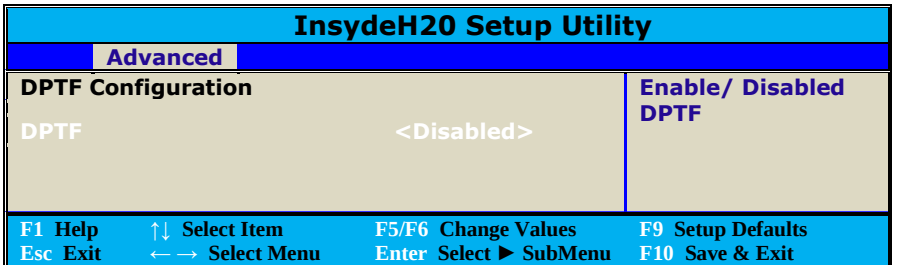
(Figure 19. Clock_DIV-1S ,2S,3,4,1NS,2NS Menu)

➢ Intel Fast Flash Standby



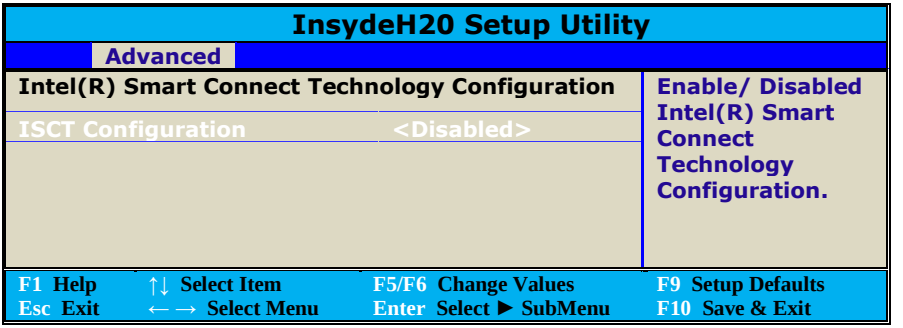
(Figure 20. Intel Fast Flash Standby

➢ DPTF Configuration



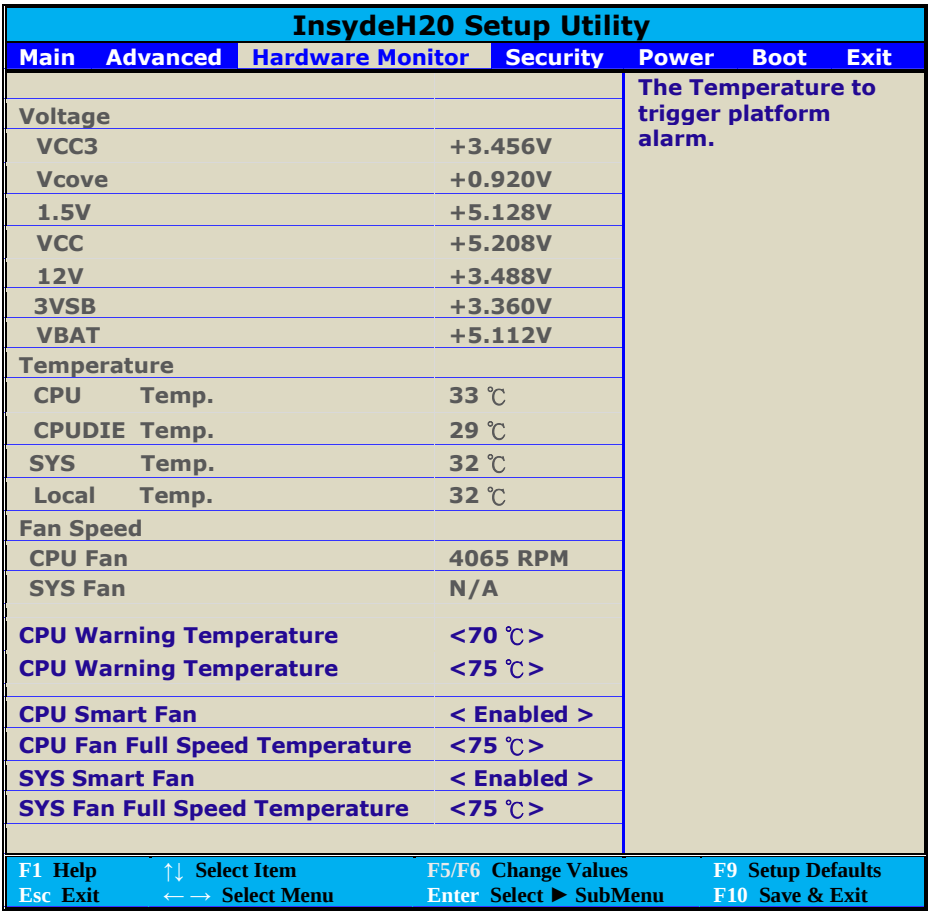
(Figure 21. DPTF Configuration

➢ Intel(R) Smart Connect Technology Configuration



(Figure 22. Intel(R) Smart Connect Technology Configuration Menu)

3.3 Hardware Monitor



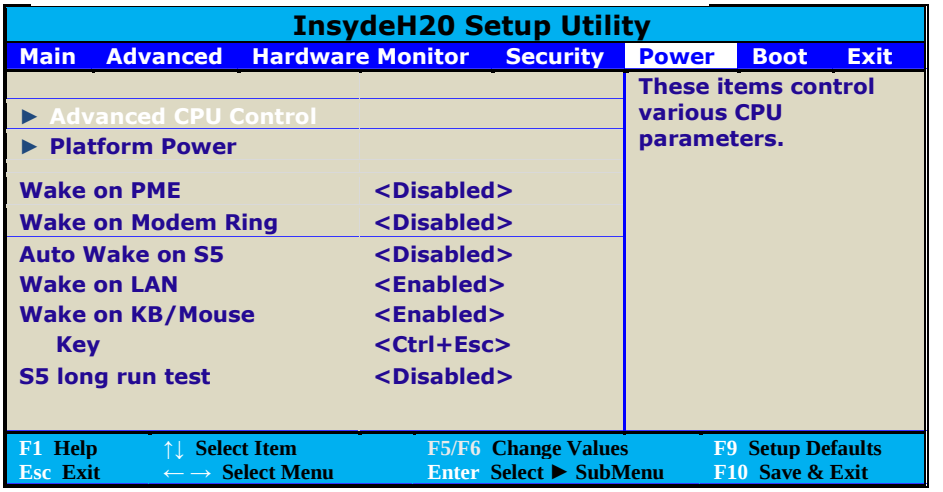
(Figure 23. Hardware Monitor Menu)

BIOS Setting	Options	Description
CPU Warning Temperature	Disabled 40 ℃ 50 ℃ 55 ℃ 60 ℃ 65 ℃ 70 ℃ 75 ℃	The Temperature to trigger platform alarm.
CPU Warning Temperature	Disabled 40 ℃ 60 ℃ 70 ℃ 75 ℃ 80 ℃ 85 ℃	The Temperature to trigger platform shutdown.
CPU Smart Fan	Disabled Enabled	Enable /Disable CPU Smart fan control.
CPU Fan Full Speed Temperature	50 ℃ 55 ℃ 60 ℃ 65 ℃ 70 ℃ 75 ℃ 80 ℃ 85 ℃	Setting Temperature that will trigger CPU FAN run in full speed.
SYS Smart Fan	Disabled Enabled	Enable/ Disable SYS smart fan control.
SYS Fan Full Speed Temperature	50 ℃ 55 ℃ 60 ℃ 65 ℃ 70 ℃ 75 ℃ 80 ℃ 85 ℃	Setting Temperature that will trigger SYS FAN run in full speed.

(Figure 24. Security Menu)

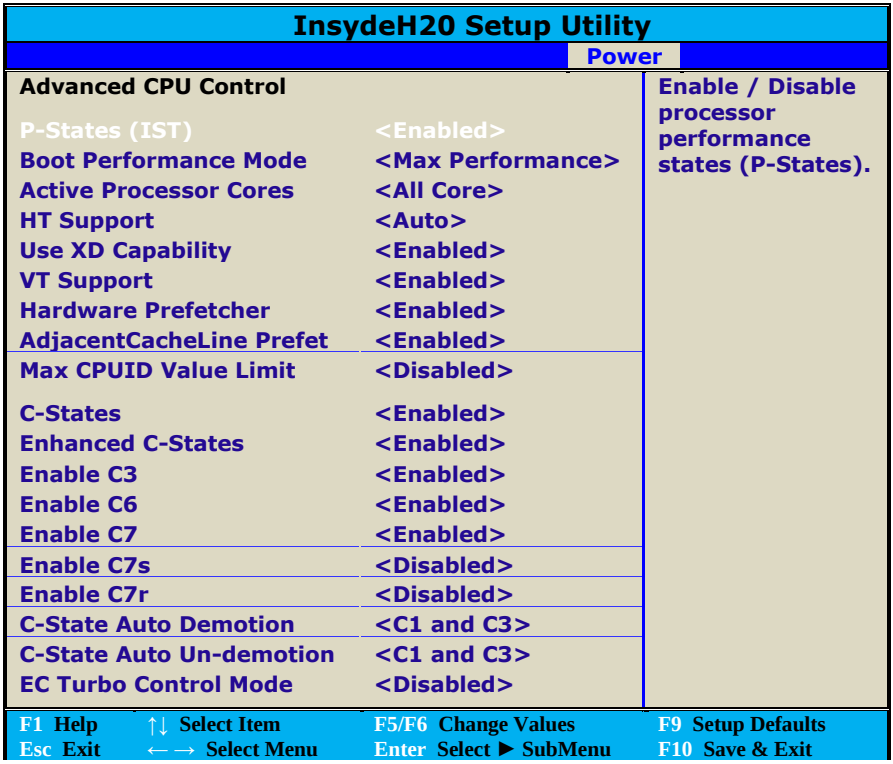
3.5 Power Menu

The Power menu allows users to set or control various prameters on power management, thermal managementand sleeping states.



(Figure 25. Power Menu)

➢ Advanced CPU Control



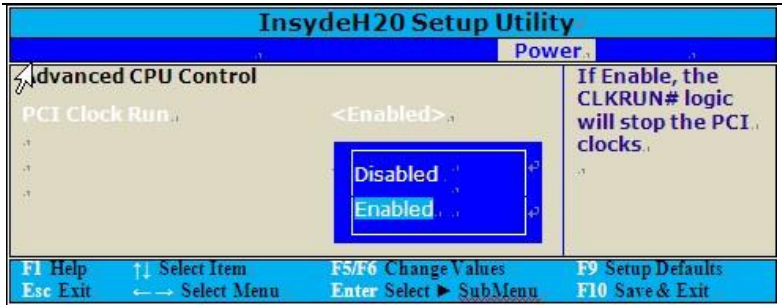
(Figure 26. Advanced CPU Control Menu)

BIOS Setting	Options	Description
P-States (IST)	Disabled Enabled	Enable / Disable processor performance states (P-States).
Boot Performance Mode	Max Battery Max Performance	Select the performance state that BIOS will set before OS handoff.
Active Processor Cores	All Core 1 Core 2 Core 3 Core	Number of Cores to enable in each processor package.

BIOS Setting	Options	Description
HT Support	Auto Disabled	Auto / Disable Hyper-Threading.
Use XD Capability	Disabled Enabled	XD is a CPU feature for prevent malicious buffer overflow attacks (OS support is necessary).
VT Support	Disabled Enabled	Virtualization Technology Enable / Disable.
Hardware Prefetcher	Disabled Enabled	Enable / Disable MLC (Mid Level Cache, L2 Cache) Streamer Prefetcher.
AdjacentCacheLine Prefet	Disabled Enabled	Enable / Disable MLC Spatial Prefetcher. (Adjacent Cache Line Prefetch)
Max CPUID Value Limit	Disabled Enabled	Limit CPUID max value to 3 (If max CPUID value > 3). This setting is useless for Windows OS.
C-States	Disabled Enabled	Enable / Disable processor idle Power saving states (C-States).
Enhanced C-States	Disabled Enabled	Enable / Disable P-State transitions to occur in combination with C-States.
Enable C3	Disabled Enabled	Enable / Disable C3.
Enable C6	Disabled Enabled	Enable / Disable C6.
Enable C7	Disabled Enabled	Enable / Disable C7.
Enable C7s	Disabled	Enable / Disable C7s.

BIOS Setting	Options	Description
	Enabled	If enabled, BIOS will report C7s instead of C7 to OS.
Enable C7r	Disabled Enabled	Enable / Disable C7r.
C-State Auto Demotion	Disabled C1 only C3 only C1 and C3	Enable / Disable C-State Auto Demotion.
C-State Auto Un-demotion	Disabled C1 only C3 only C1 and C3	Enable / Disable C-State Auto Un-demotion.
EC Turbo Control Mode	Disabled Enabled	Enable / Disable EC Turbo Control Mode.

➢ **Platform Power**



(Figure 27. Platform Power Menu)

Wake on PME

Determine the action taken when the system power is off and a PCI Power Management Enable wake up event occurs.

The choice: Disabled, Enabled **(default)**

Wake on Modem Ring

Determine the action taken when the system power is off and a modem connected to the serial port is ringing.

The choice: Disabled **(default)**, Enabled

Auto Wake on S5

Auto wake on S5, By Day of Month or Fixed time of every day.
The choice: Disabled **(default)**, By Every Day, By Day of Month

Wake on LAN

Enable / Disable integrated LAN to wake the system.
The choice: Disabled, Enabled**(default)**

Wake on KB/Mouse

Enable / Disable PS2 keyboard/mouse to wake the system.
The choice: Disabled, Enabled**(default)**

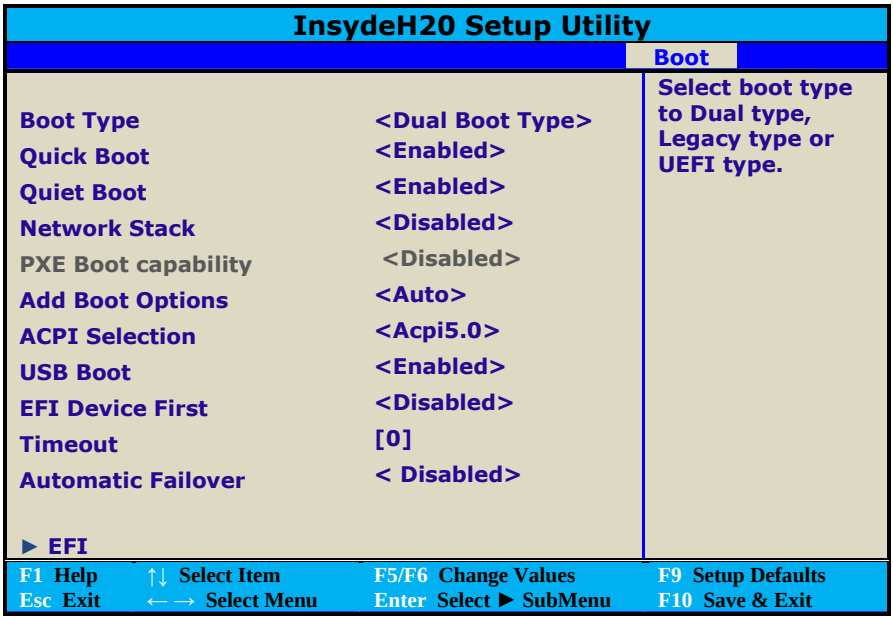
Key

Select key to wake the system.
The choice: Ctrl+Esc**(default)**, Ctrl+F1, Ctrl+Space, Any Key, Windows Wakeup Key , Windows Power Key, Ctrl+Alt+Space, Space

S5 long run test

Enable: force to enable RTC S5 wake up. even if OS disables it. Support ipwrtest to do RTC S5 wakeup.
The choice: Disabled**(default)**, Enabled

3.6 Boot Menu

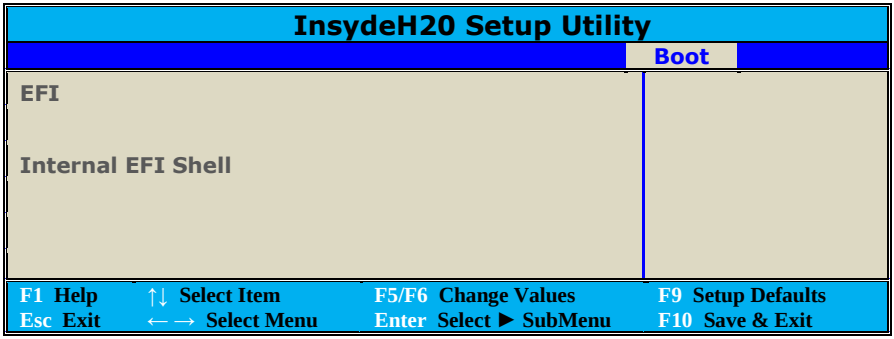


(Figure 28. Power Menu)

BIOS Setting	Options	Description
Boot Type	Dual Boot Type Legacy Boot Type UEFI Boot Type	Select boot type to Dual type, Legacy type or UEFI type.
Quick Boot	Disabled Enabled	Allow InsydeH2O to skip certain tests while booting. This will decrease the time needed to boot the system.
Quiet Boot	Disabled Enabled	Disable or enable booting in Text Mode.
Network Stack	Disabled Enabled	Network Stack Support: Windows 8

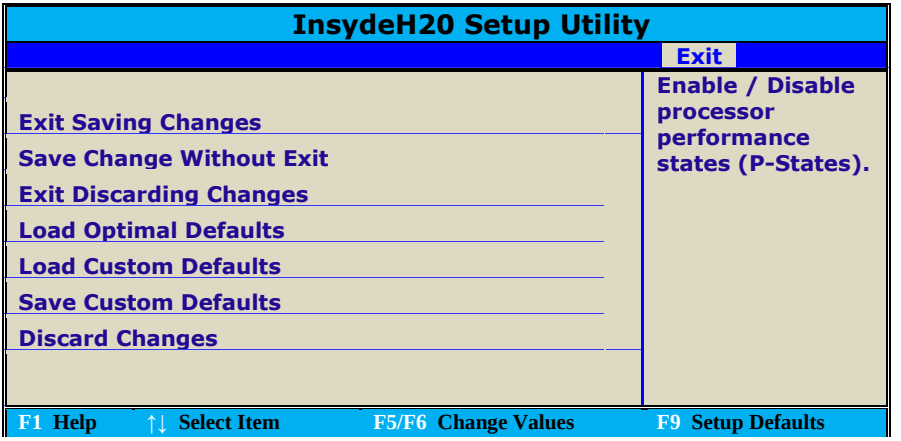
BIOS Setting	Options	Description
		BitLocker Unlock UEFI IPv4/IPv6 PXE Legacy PXE OPROM.
PXE Boot capability	Disabled Enabled	Enable / Disable PXE boot capability
Add Boot Options	First Last Auto	Position in Boot Order for Shell, Network and Removables.
ACPI Selection	Acpi4.0 Acpi5.0	Select booting to Acpi3.0/Acpi1.0B
USB Boot	Disabled Enabled	Enable / Disable booting to USB boot devices
EFI Device First	Disabled Enabled	Determine EFI device first or legacy device first. If enable, it is EFI device first. If disable, it is Legacy device first.
Timeout	No options	The number of seconds that the firmware will wait before booting the original default boot selection.
Automatic Failover	Disabled Enabled	Enable : if boot to default device fail, it will directly try to boot next. Disable: if boot to default device fail, it will pop warning message then go into firmware UI.

➢ EFI



(Figure 29. EFI Menu)

3.7 Exit Menu



(Figure 30. Exit Menu)

BIOS Setting	Options	Description
Exit Saving Changes	Yes No	Exit system setup and save your changes.
Save Change Without Exit	Yes No	Save your changes and without exiting system.
Exit Discarding Changes	Yes No	Exit system setup and without saving your changes.
Load Optimal Defaults	Yes No	Load Optimal Defaults.
Load Custom Defaults	Yes No	Load Custom Defaults.
Save Custom Defaults	Yes No	Save Custom Defaults
Discard Changes	Yes No	Discard Changes

CHPTER 4 Drivers installation

4.1 INTEL CHIPSET DRIVER 83
4.2 MICROSOFT .NET FRAMEWORK 3.5 80
4.3 MICROSOFT UAA BUS DRIVER FOR HIGH DEFINITION AUDIO 88
4.4 INTEL GRAPHICS DRIVERS 90
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4.9 INFINEON TPM DRIVER..... 102
4.10 INTEL ® RAPID STORAGE DRIVER 105
4.11 UPDATING THE BIOS..... 108

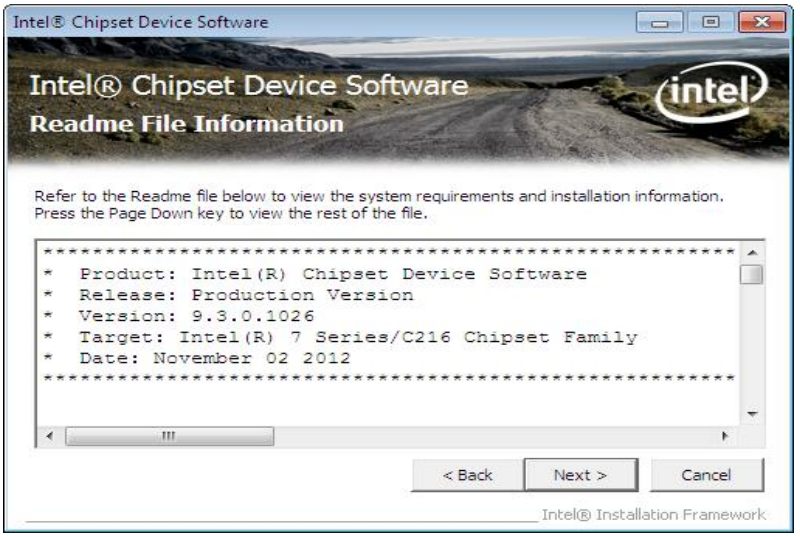
4.1 Intel Chipset Driver

The Intel chipset can be recognized and configured properly in the system.

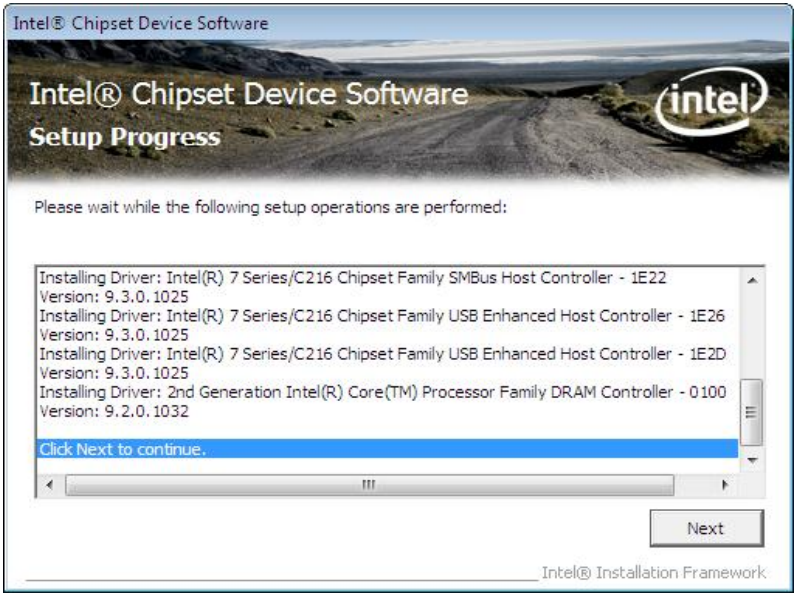
1. Setup is ready to install the driver and click "Next".

2. Read the license agreement and click "Yes".

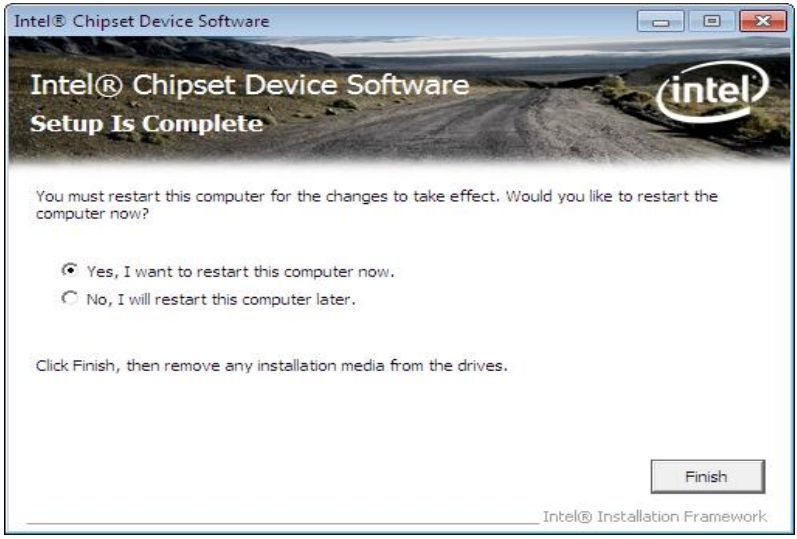
3. Go through the readme file then click “Next”.



4. Setup is installing the driver. Click “Next” to continue.



5. Choose” Yes, I want to restart this computer now”. Click “Finish” to exit setup.

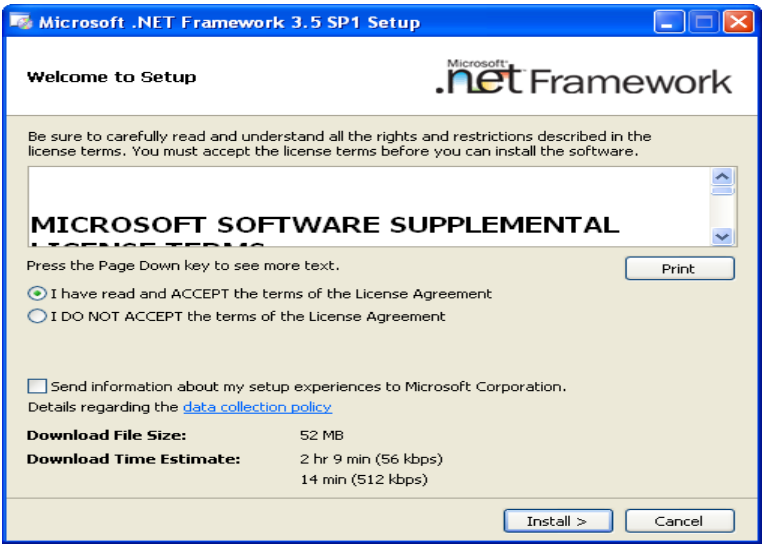


4.2 Microsoft .NET Framework 3.5

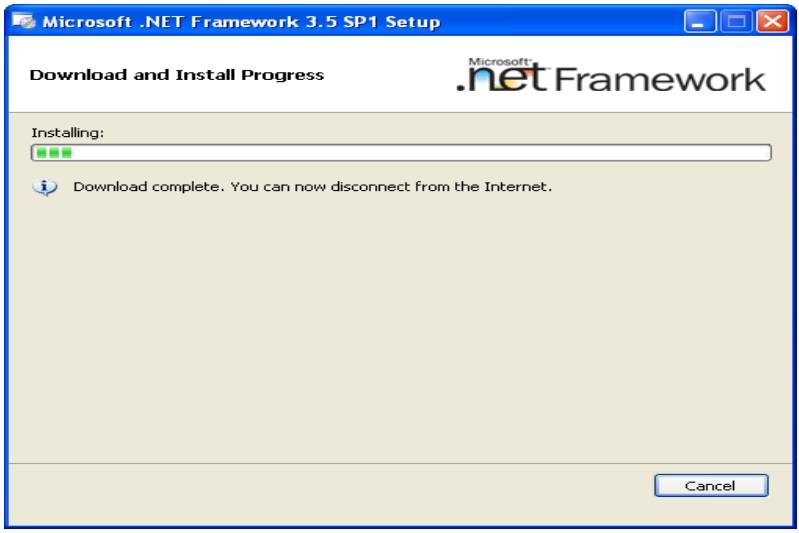
(For Windows XP only)

Note:
Before installing Microsoft .NET Framework 3.5, make sure you have updated your Windows XP operating system to Service Pack 3.

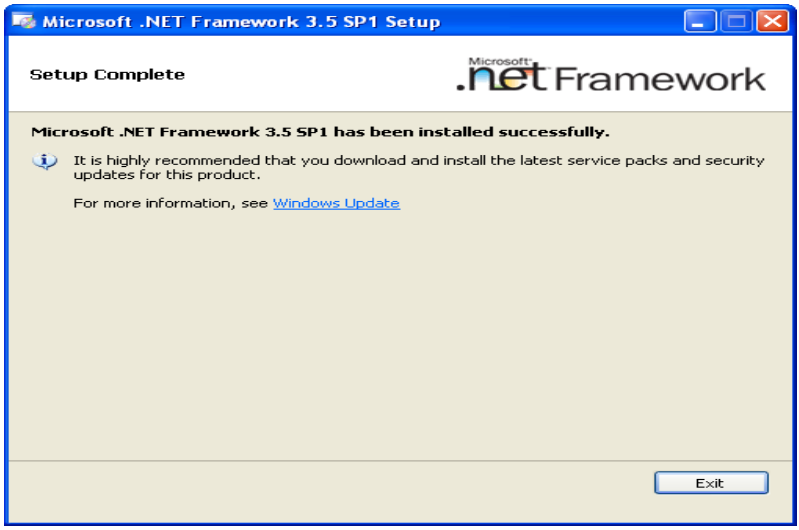
1. Be sure to read the license agreement carefully. Click "I have read and accept the terms of the License Agreement" then click Install.



2. Setup is installing now.



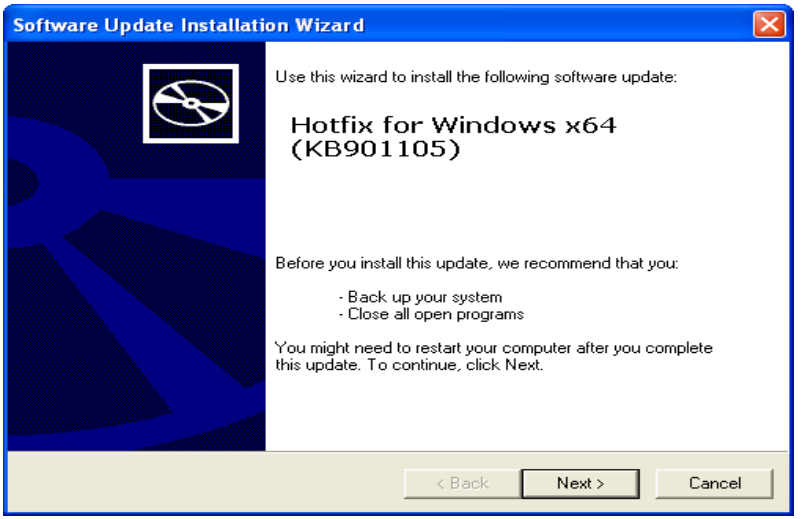
3. Click



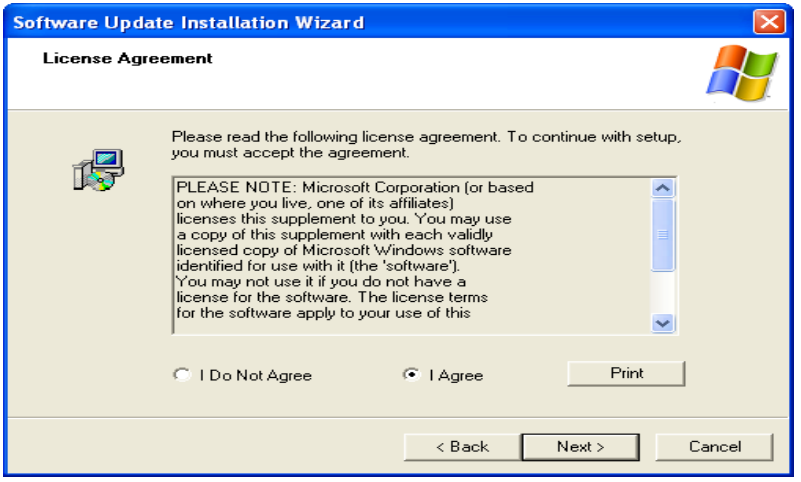
4.3 Microsoft UAA bus driver for high definition audio

(For Windows XP 64bit only)

1. Setup is ready to install and click “Next”.



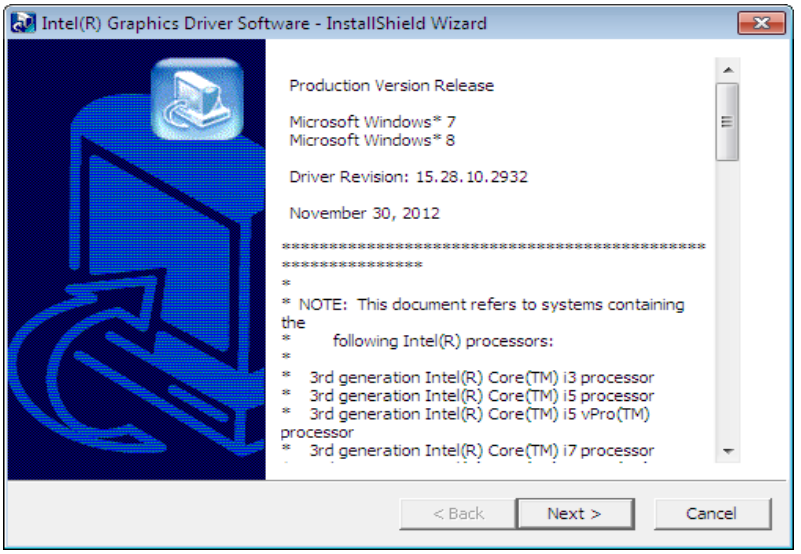
2. Read the license agreement then choose “Yes” and click “Next”.



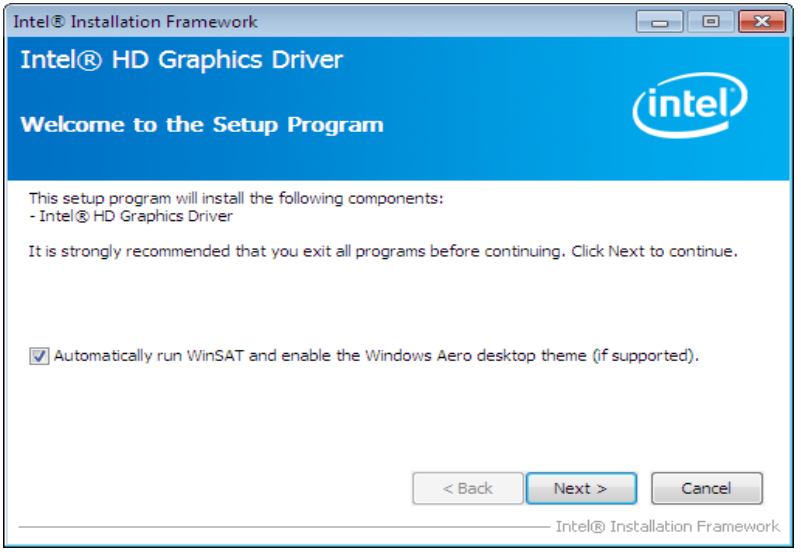
3. Click “Finish” to exit setup.

4.4 Intel Graphics Drivers

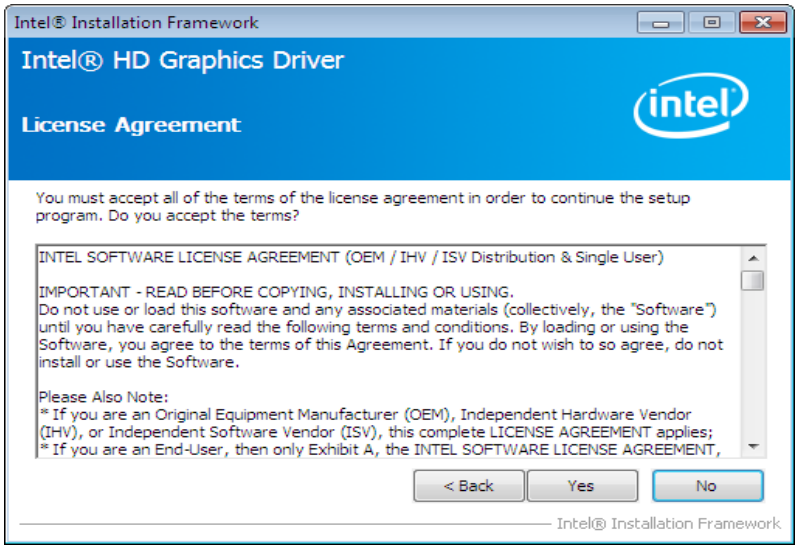
1. Setup is ready to install the driver. Click "Next".



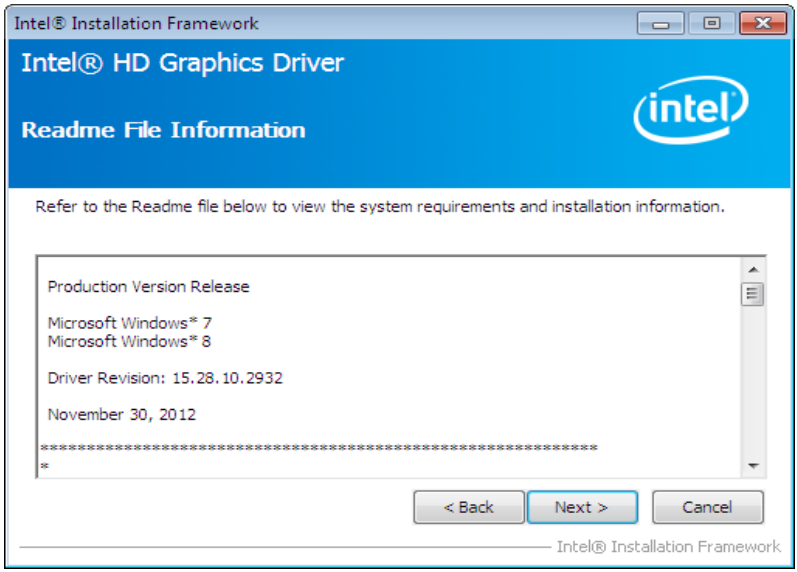
2. Setup is ready to install the driver. Click "Next".



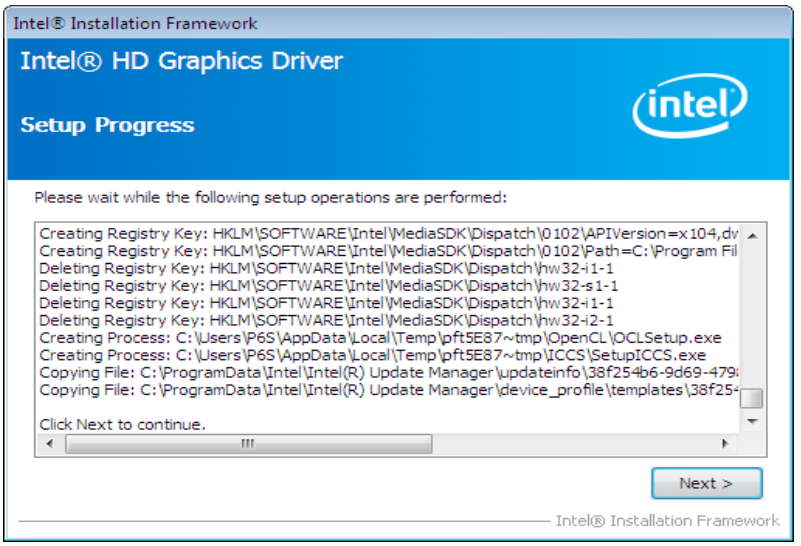
3. Read the license agreement then click "Yes".



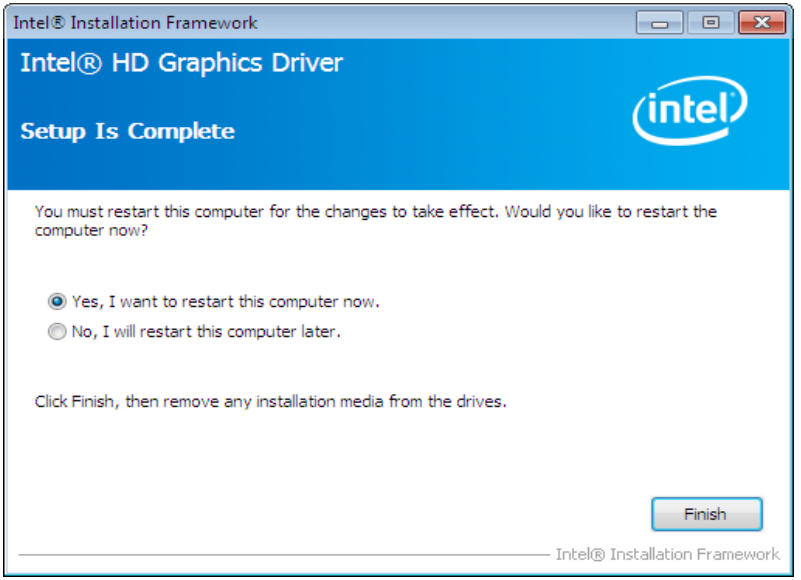
4. Go through the readme file for system requirements and installation information then click "Next".



5. Setup is installing the driver. Click “Next” to continue.

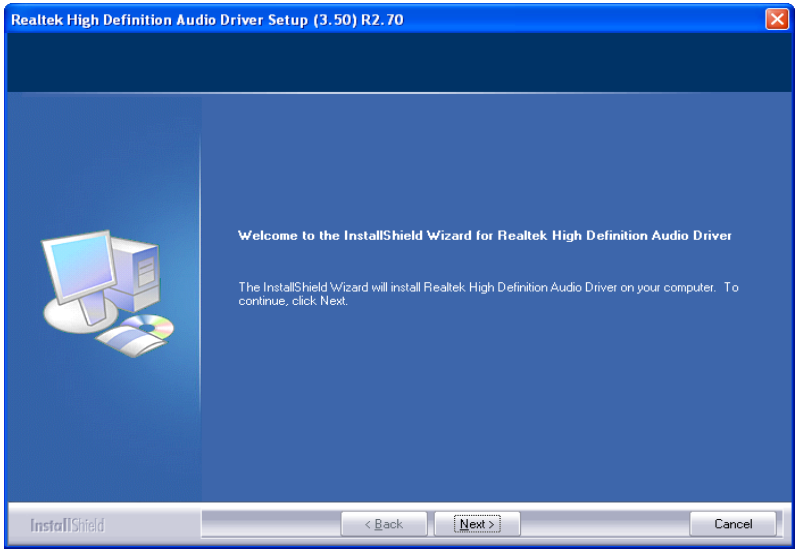


6. Choose” Yes, I want to restart this computer now”. Click “Finish” to exit setup.

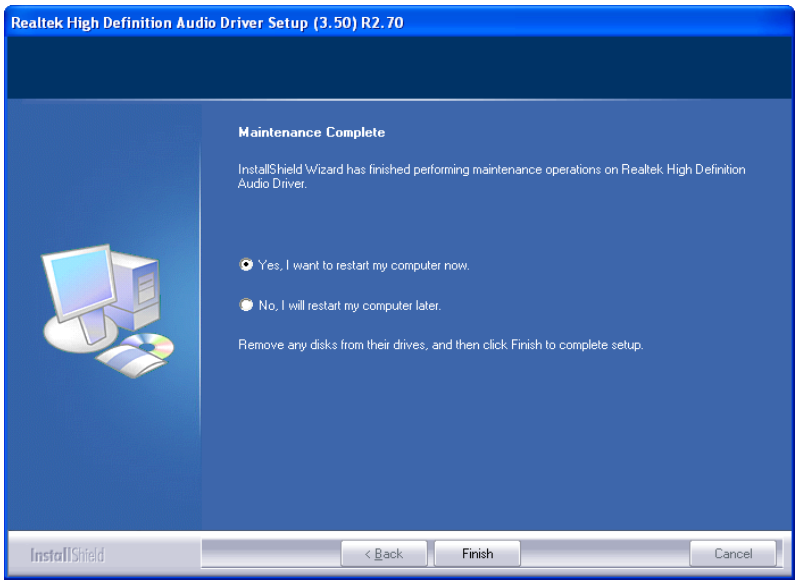


4.5 Audio Drivers

1. Setup is ready to install the driver. Click "Next".

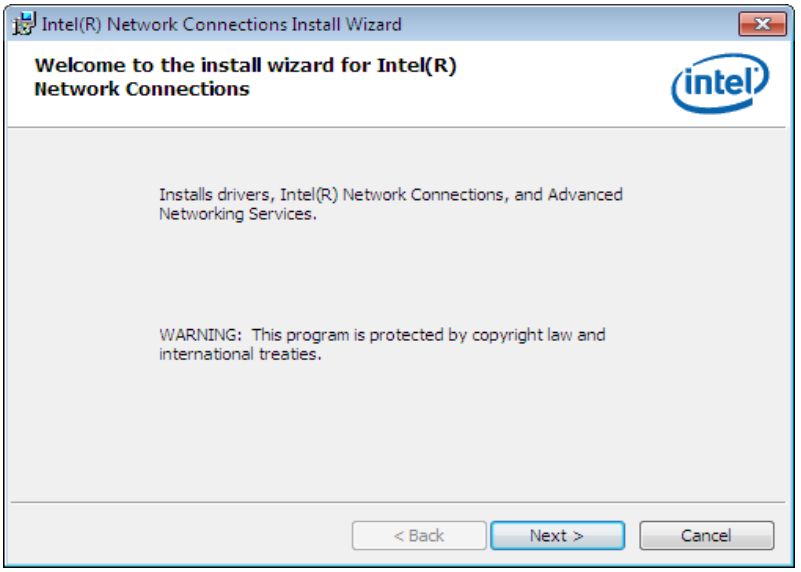


2. Choose" Yes, I want to restart my computer now". Click "Finish" to exit setup.

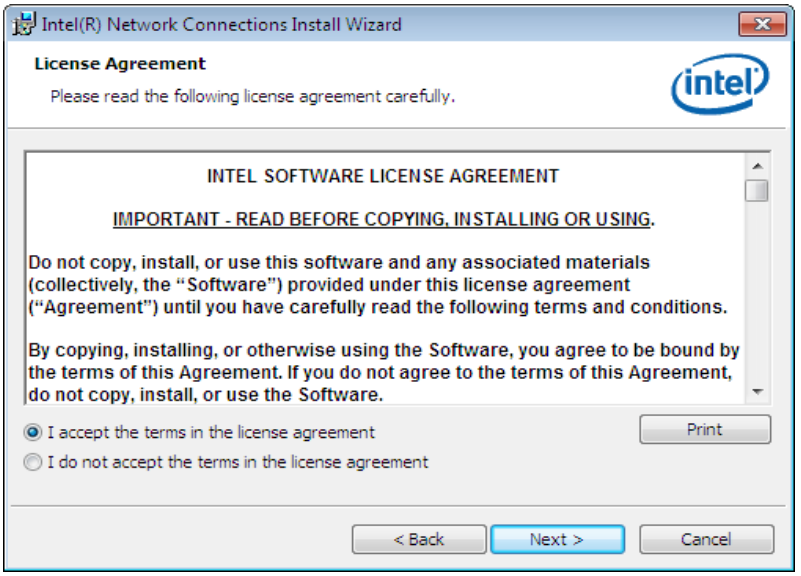


4.6 Intel LAN Drivers

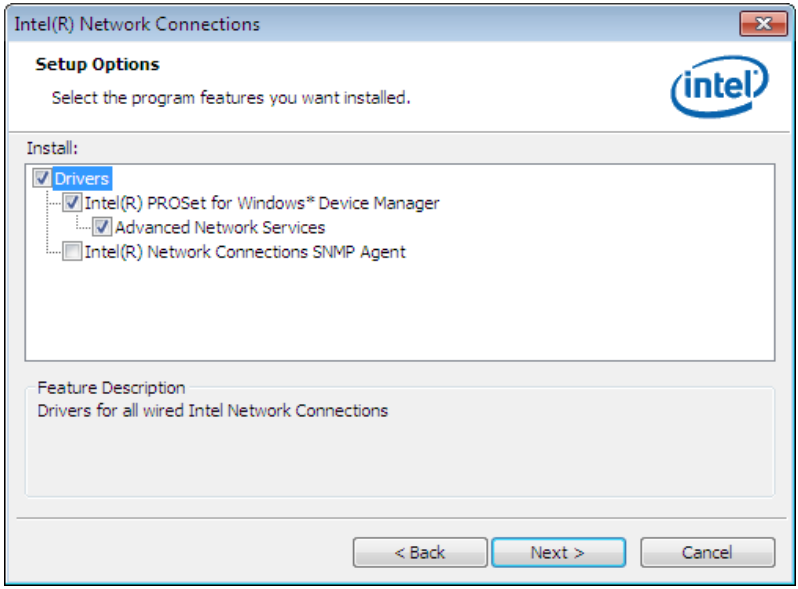
1. Setup is ready to install the driver. Click "Next".



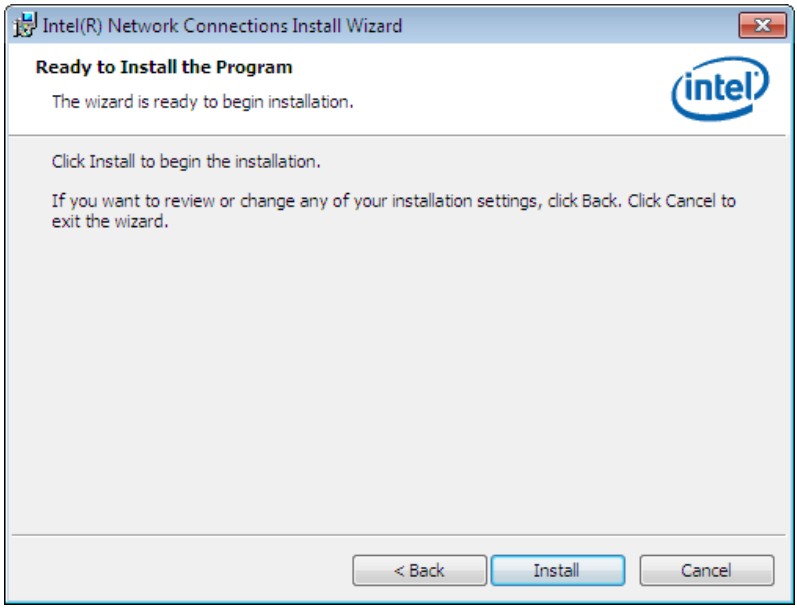
2. Click "I accept the terms in the license agreement" then click "Next".



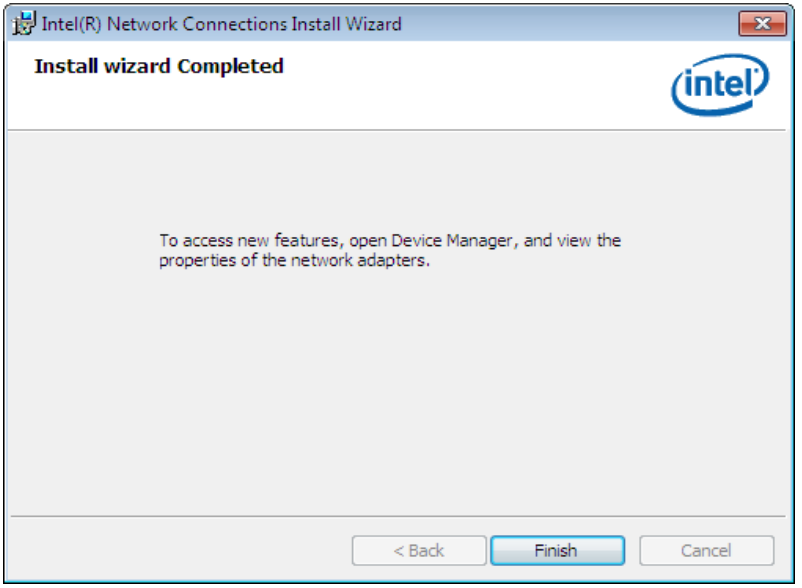
3. Select the program features which you want installed then click "Next".



4. Click "Install" to begin the installation.



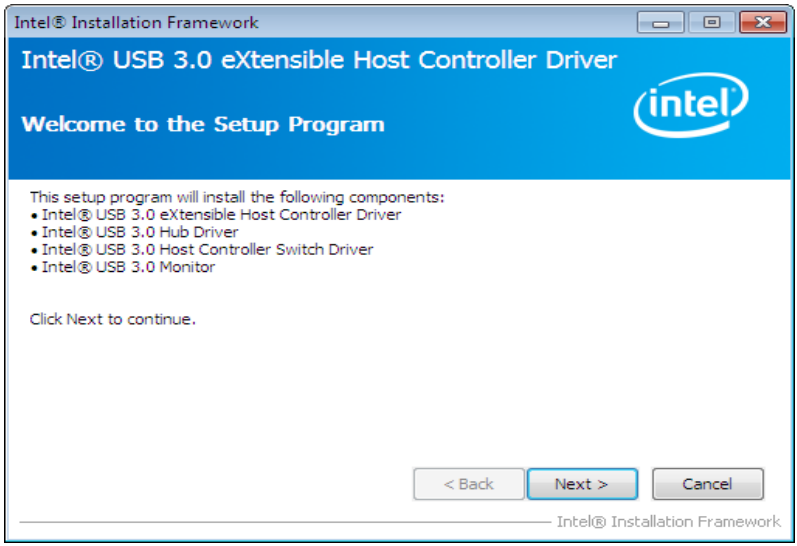
5. Click "Finish" to exit setup.


Intel(R) Network Connections Install Wizard
Install wizard Completed
intel
To access new features, open Device Manager, and view the properties of the network adapters.
< Back
Finish
Cancel

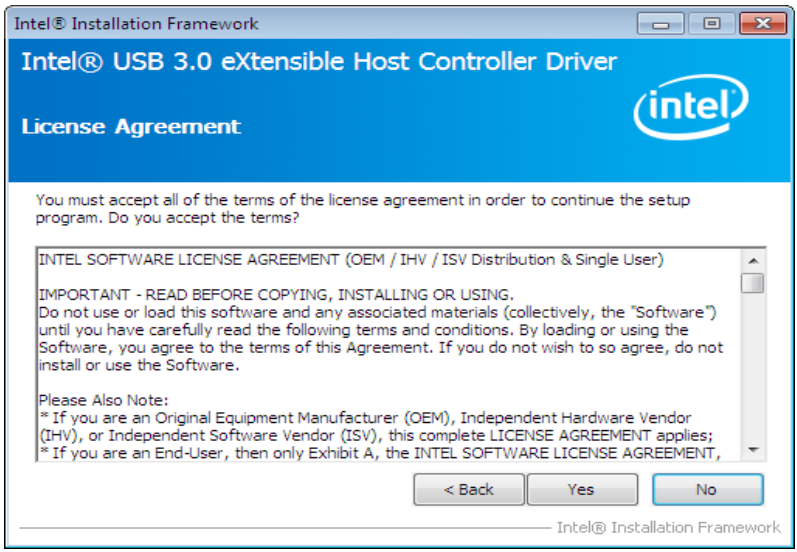
4.7 Intel USB 3.0

(for Windows 7 only)

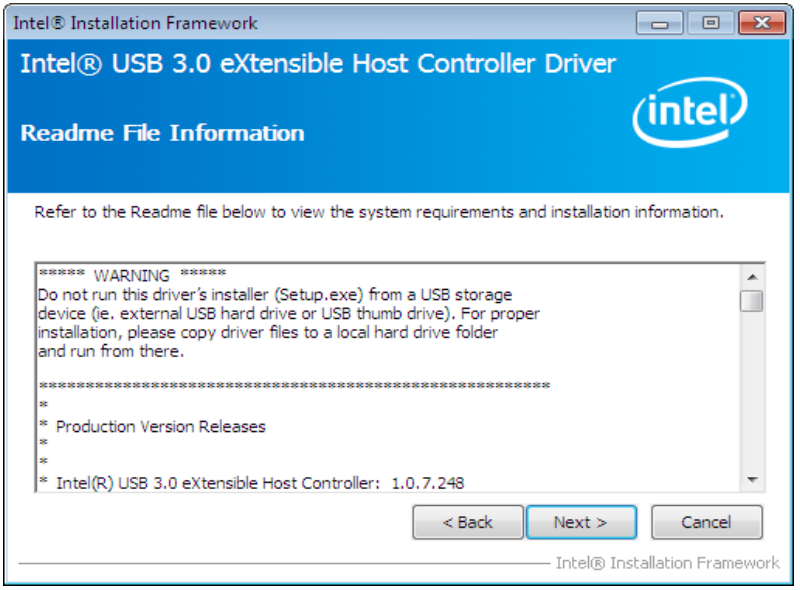
1. Setup is ready to install the driver. Click "Next".



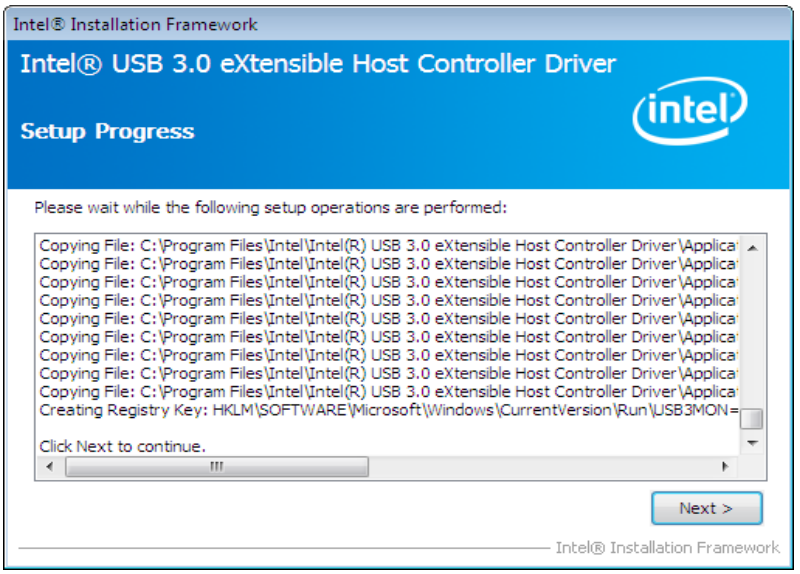
2. Read the license agreement then click "Yes".



3. Go through the readme file for system requirements and installation information then click “Next”.



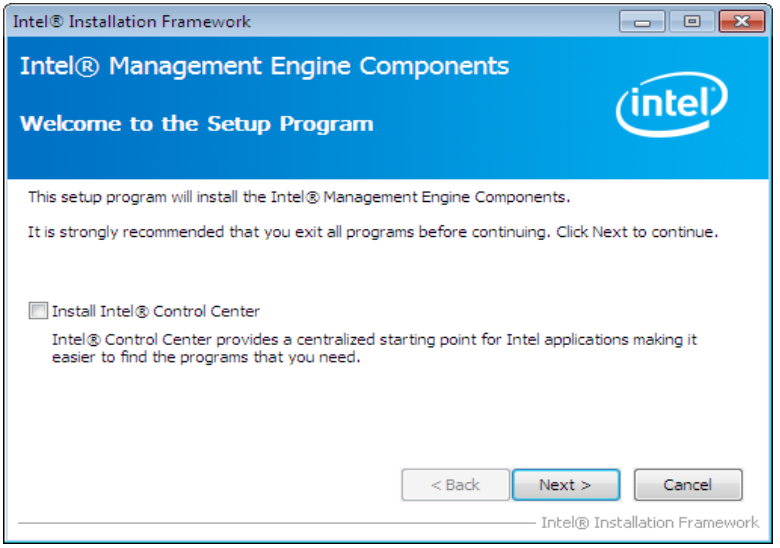
4. Setup is installing the driver. Click “Next” to continue.



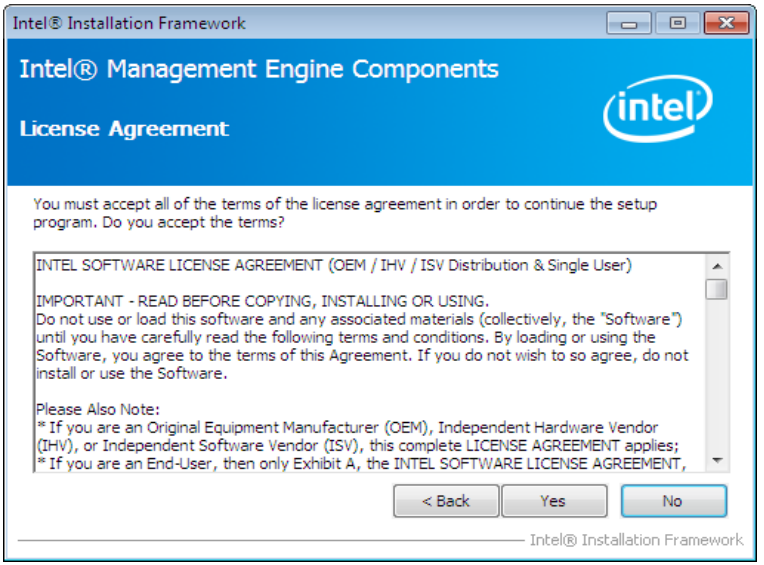
5. Choose” Yes, I want to restart this computer now”. Click “Finish” to exit setup.

4.8 Intel Management Engine Drivers

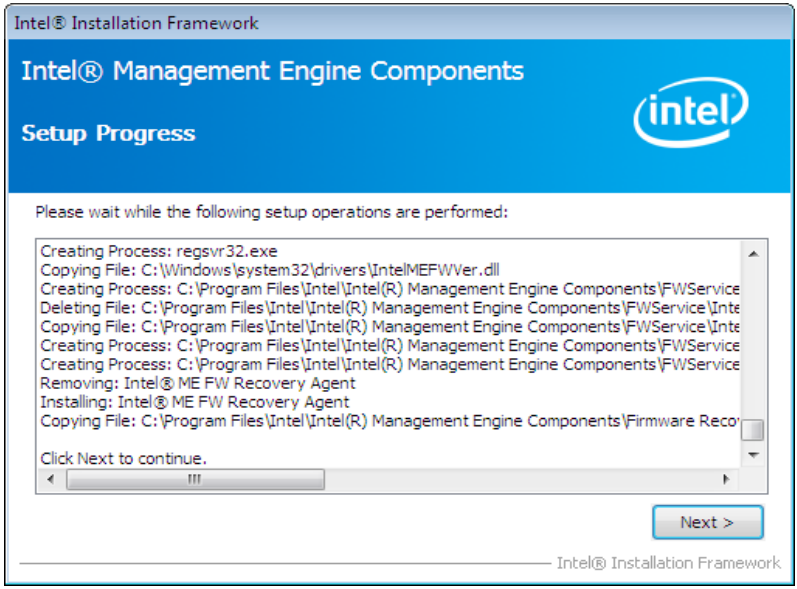
1. Setup is ready to install the driver. Click "Next".



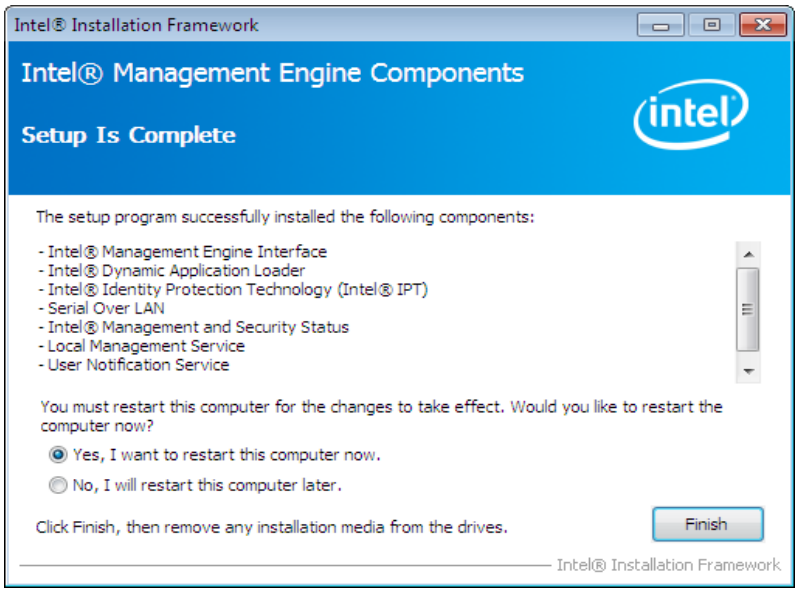
2. Read the license agreement then click "Yes".



3. Setup is installing the driver. Click "Next" to continue.

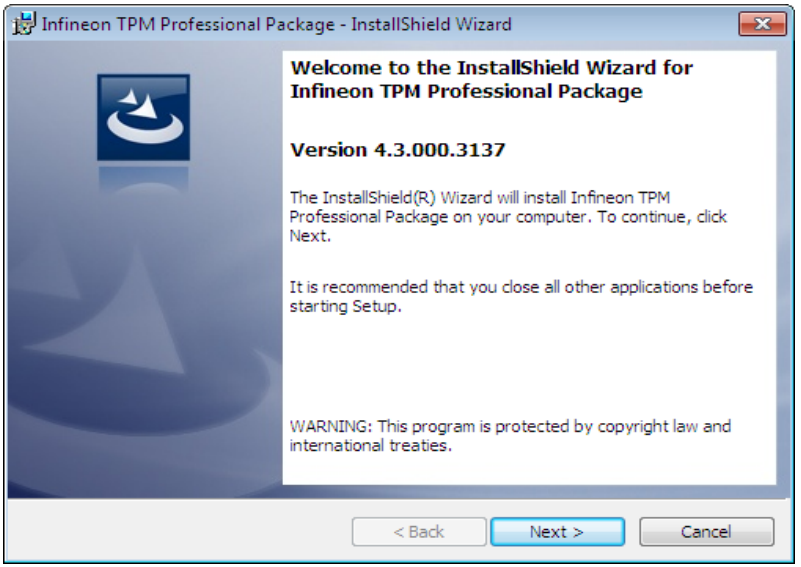


4. Choose" Yes, I want to restart this computer now". Click "Finish" to exit setup.

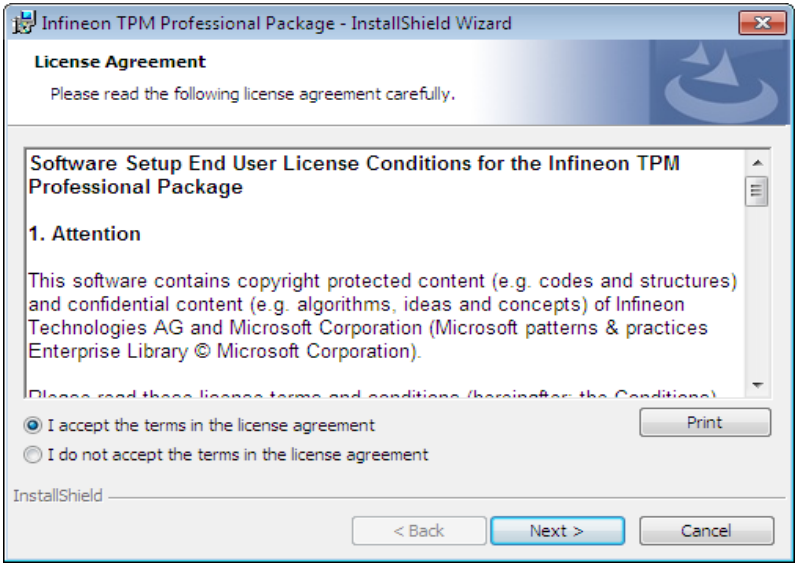


4.9 Infineon TPM Driver

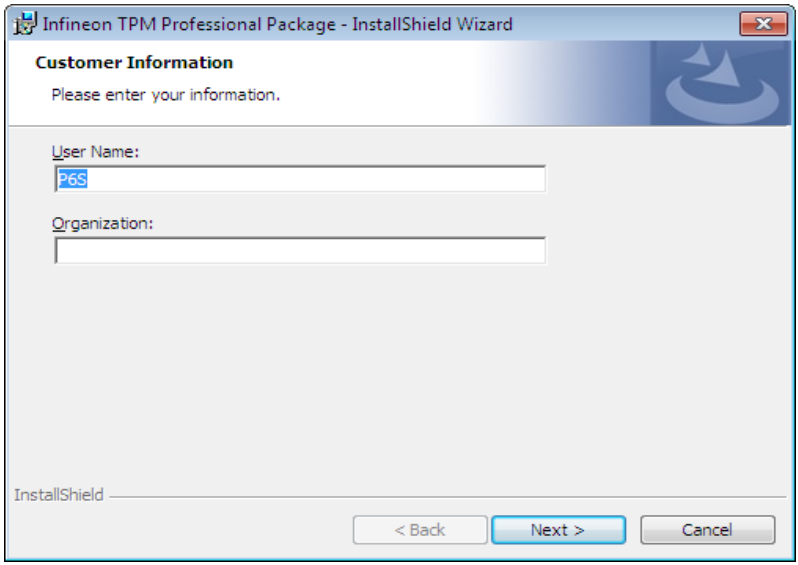
1. The setup is ready to install the driver.Click "Next".



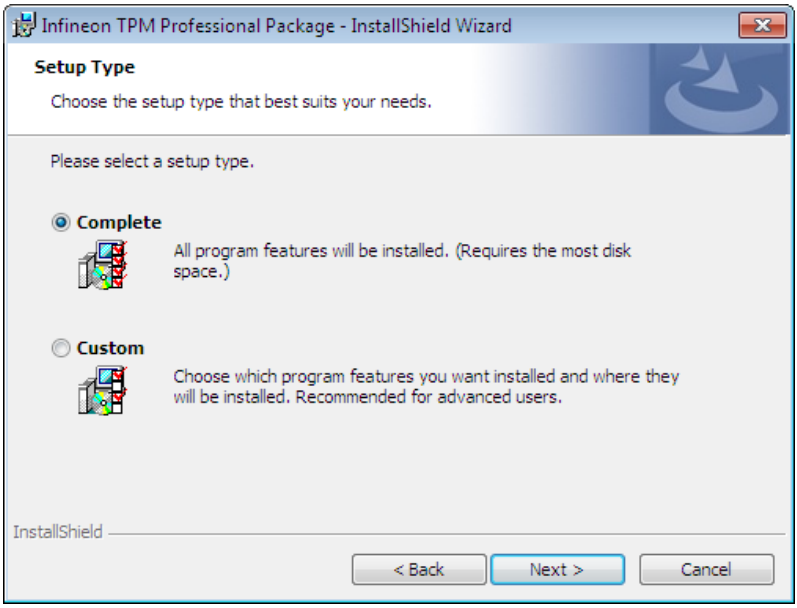
2. Click "I accept the terms in the license agreement" then click "Next".



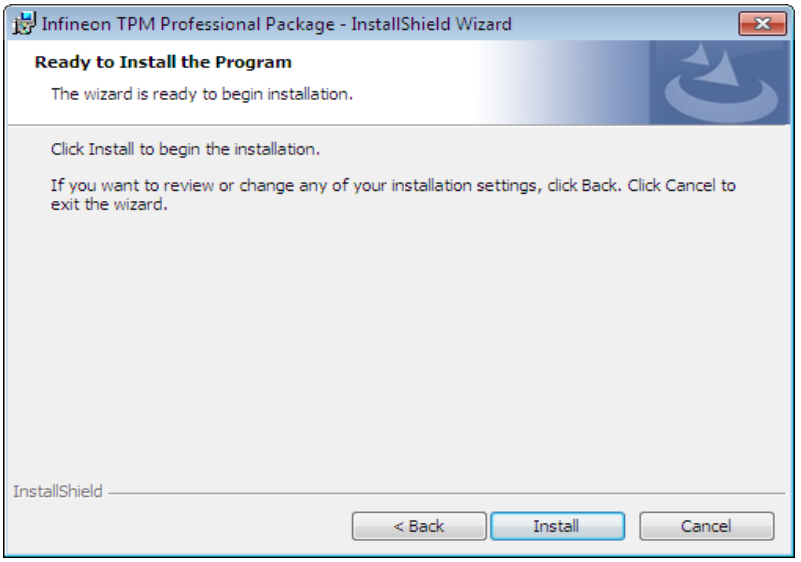
3. Enter the information and then click “Next”.



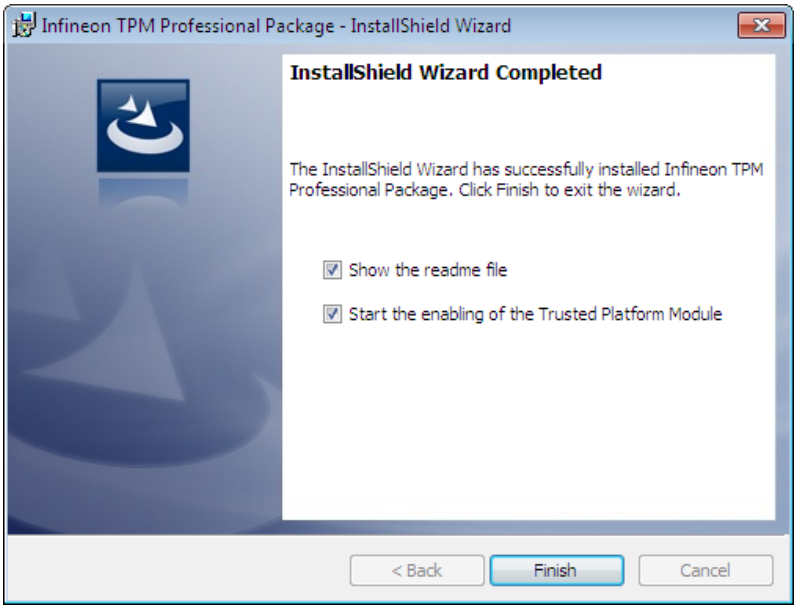
4. Select a setup type and then click “Next”.



5. Ready to install the program. Click "Install".

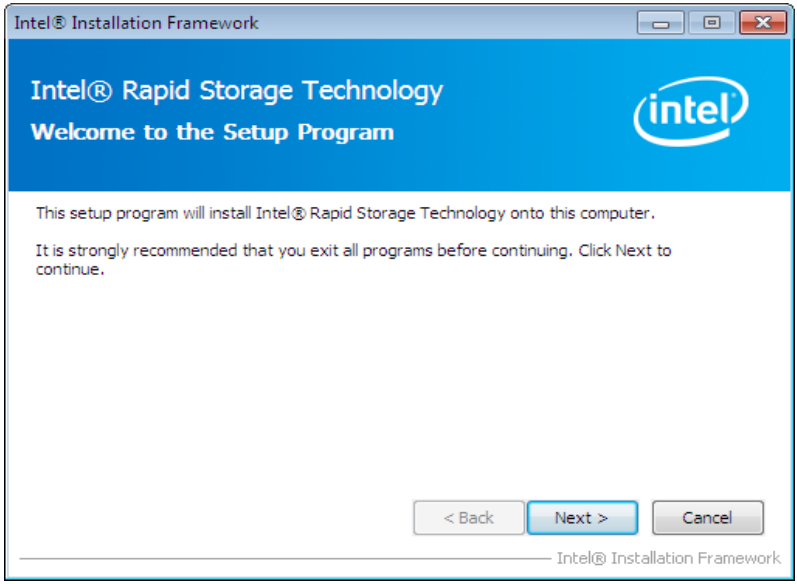


6. Click "Finish" to exit setup.

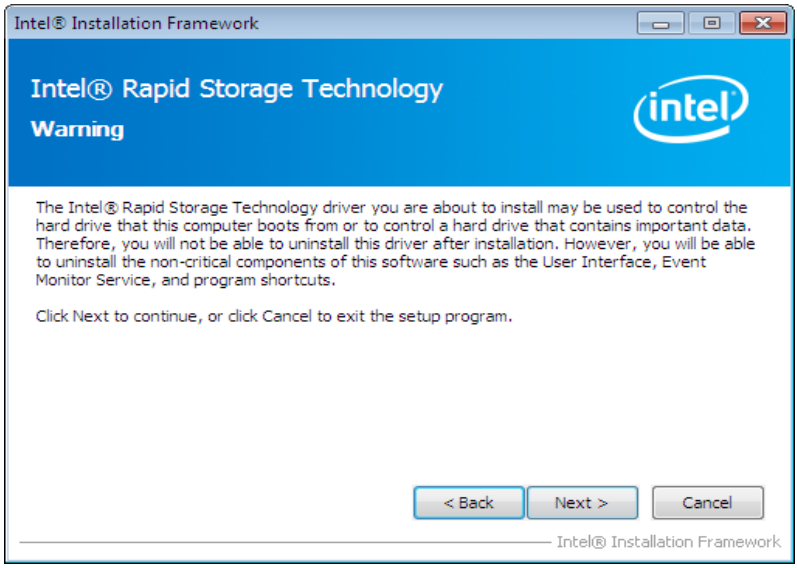


4.10 Intel® Rapid Storage Driver

1. Setup is ready to install the driver. Click "Next".

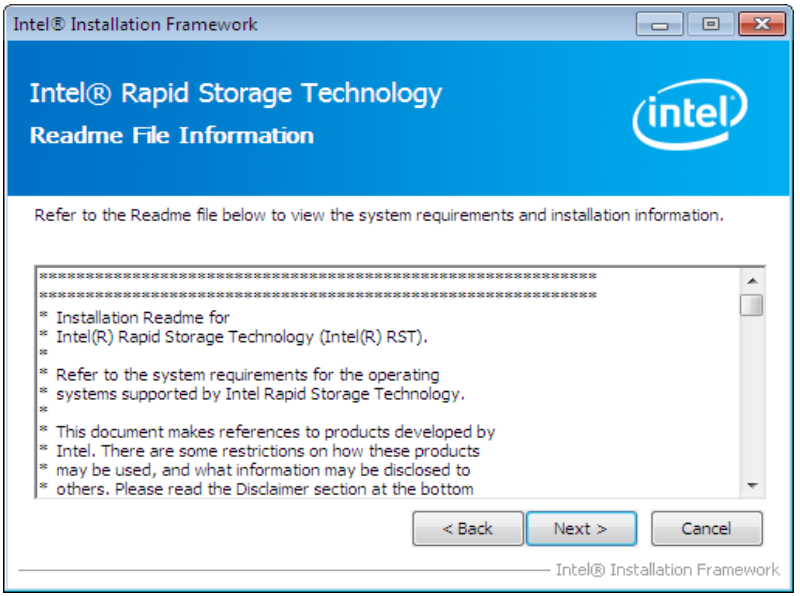


2. Click "Next" to continue.

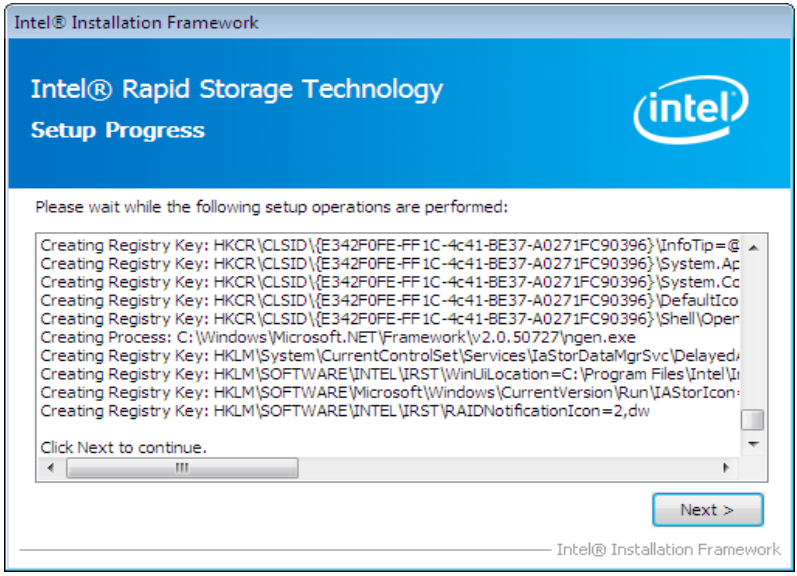


3. Read the license agreement then click “Yes”.

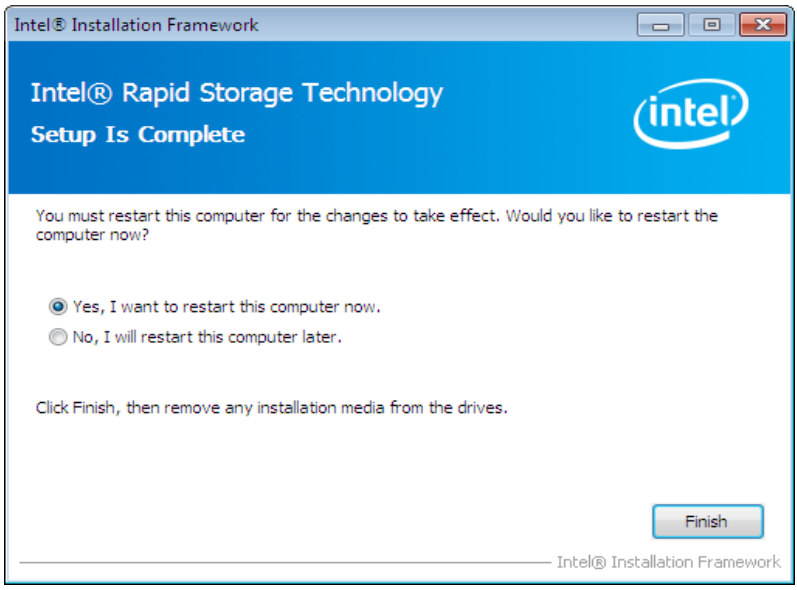
4. Go through the readme file for system requirements and installation information then click “Next”.



5. Setup is installing the driver. Click "Next" to continue.



6. Choose" Yes, I want to restart this computer now". Click "Finish" to exit setup.

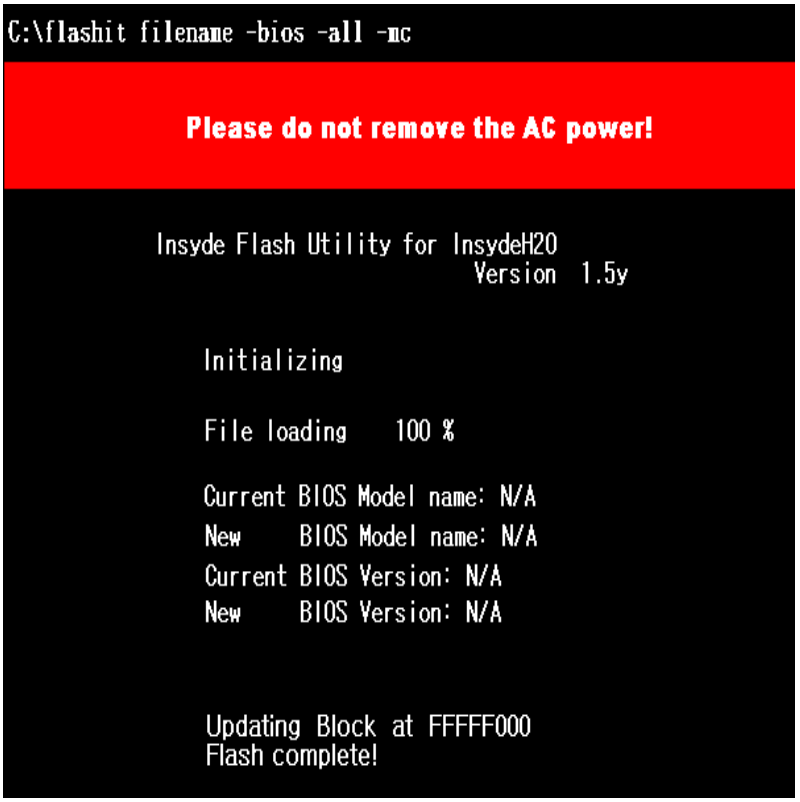


4.11 Updating the BIOS

To update the BIOS, you will need the BIOS file and a flash utility, flashit.exe. Please contact Transduction.

Update 3MB binary (BIOS region only) with flashit.exe

To execute the utility, type:
C:\flashit filename –bios –all -mc
then press <Enter>.



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CHPTER 5 Appendix

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C. POST BEEP..... 111

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. There is a total of 1K port address space available. The following table lists the I/O port addresses used on the Industrial CPU Card.

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
200h – 206h	Digital IO
2E8h - 2FFh	Serial Port #2(COM4)
2F8h - 2FFh	Serial Port #2(COM2)
378h - 3FFh	Parallel Port #1(LPT1)
3B0h - 3DFh	Graphics adapter Controller
3E8h – 3EFh	Serial Port #2(COM3)
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)
845h – 846h	Watch Dog Timer

B. Interrupt Request Lines (IRQ)

There are a total of 15 IRQ lines available on the Industrial CPU Card. Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on the Industrial CPU Card.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Serial Port #3
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Microsoft ACPI-Compliant System
IRQ10	Serial Port #4
IRQ11	Reserved
IRQ12	PS/2 Mouse
IRQ13	Numeric data Processor
IRQ16	Intel HD Graphics
IRQ18	Intel 82574L Network Connection
IRQ20	Intel 82579LM Network Connection
IRQ22	High Definition Audio

C. POST Beep

Currently there are two kinds of beep codes in BIOS.

When display device detected and enabled by system BIOS, BIOS will issue on short beep to indicate the display device is turned on.
The other code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.