IB981

Intel® 4th Gen. Core™ i7/i5/i3/ Pentium® / Celeron® Full-Size CPU Card

User's Manual

Version 1.0
(Sep. 2017)

Compliance

CE

In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.

FC

This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE

This product is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Important Safety Information

Carefully read the precautions before using the board.

Environmental conditions:

- Use this product in environments with ambient temperatures between 0˚C and 60˚C.
- Do not leave this product in an environment where the storage temperature may be below -20° C or above 80° C. To prevent from damages, the product must be used in a controlled environment.

Care for your IBASE products:

- Before cleaning the PCB, unplug all cables and remove the battery.
- Clean the PCB with a circuit board cleaner or degreaser, or use cotton swabs and alcohol.
- Vacuum the dust with a computer vacuum cleaner to prevent the fan from being clogged.

WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do not place heavy objects on the top of this product.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the board on an anti-static kit or mat.
- Hold the edges of board when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the board.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.

CAUTION

Danger of explosion if the internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions or recycle them at a local recycling facility or battery collection point.

Warranty Policy

- **IBASE standard products:**

  24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

  12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

* PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.
   - Product model name
   - Product serial number
   - Detailed description of the problem
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, please log in to the RMA system of the website or and contact your distributor or sales representative for assistance.

Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Block Diagram
- Specifications
- Board Overview
- Board Dimensions

1.1 Introduction

The IB981 PICMG1.0 SHB Express CPU Card is based on the platform of Intel® 4th Gen. Core™ i7/i5/i3 family, Pentium® or Celeron® processor and features an integrated graphics core that work with VGA, DVI-D and LVDS display outputs. It is able to be operated at the ambient operating temperature ranging from 0 °C to 60 °C and even from -20 °C to 80 °C for storage.

Photo of IB981AF

1.2 Features

- Intel® 4th Gen. Core™ i7/i5/i3 / Pentium® / Celeron® Processor, up to 4.4 GHz
- 2 x DDR3/L- 1600 DIMM, Max. 16 GB, ECC compatible
- Intel® Processor integrated graphics, supports DVI-D, VGA
- 24-bit dual channel LVDS, 2 x Intel® PCI-E Gigabit LAN, 4 x USB 3.0, 4 x USB 2.0, 4 x COM,
- 1 x Mini PCI-E slot with mSATA, USB 2.0 and PCIe (x1)
- Watchdog timer, Digital I/O, iSmart, TPM 2.0, iAMT 9.0

1.3 Packing List

Your IB981 package should include the items listed below. If any of the items below is missing, contact the distributor or dealer from whom you purchased the product.

- IB981 PICMG1.0 SHB x 1
- Cable Kit (IB73-1) x 1
  Including
  COM Port Cable (PK1-20BK)
  P/S2 KB & MS Cable (PS2NK)
  SATA Cable (SATA-3F)
  USB (USB2K-9)

1.4 Optional Accessories

IBASE provides optional accessories as follows. Please contact us or your dealer if you need any.

- Audio Cable (AUDIO-18K)
- DVI-D Cable (DVIK-3)
- USB 3.0 Cable (USB-3K)
- Printer Cable with Bracket (PK3K)

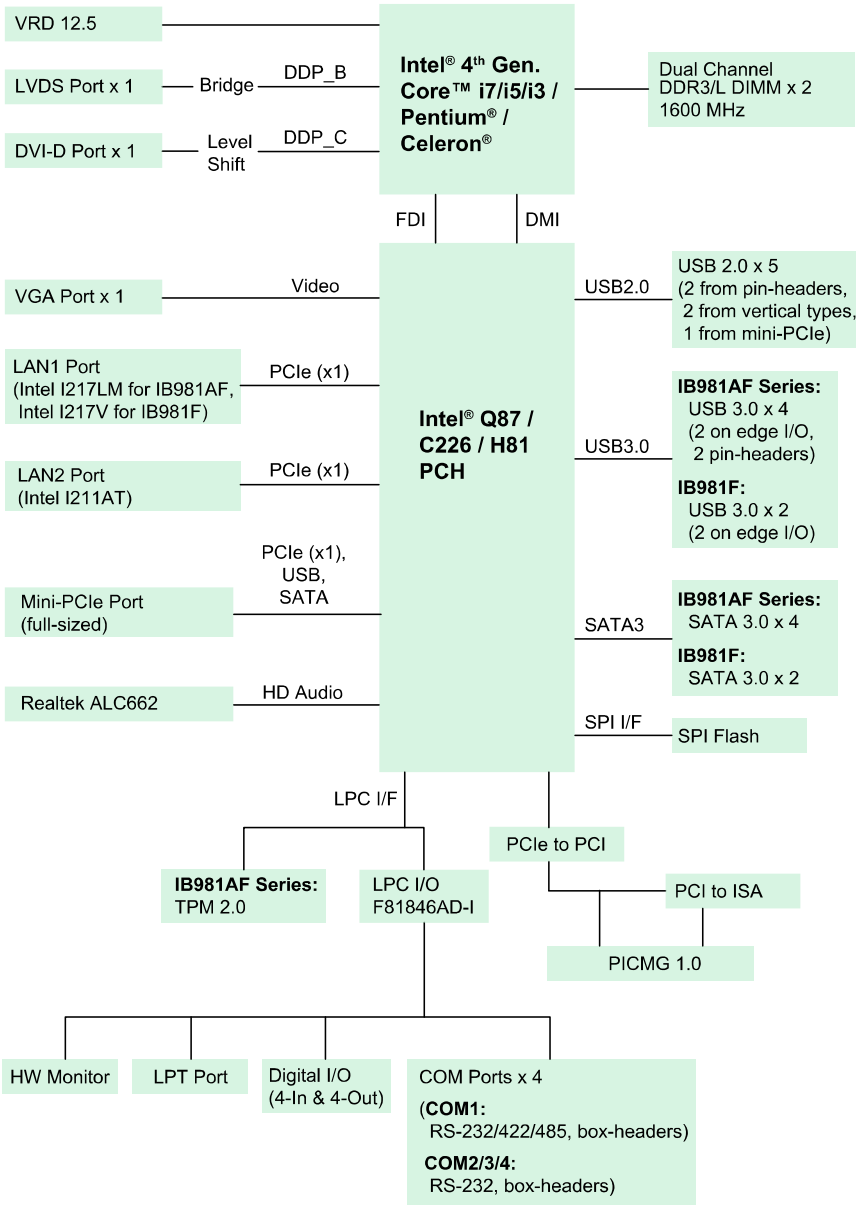
1.5 Specifications

Product Name	IB981AF-C226	IB981AF	IB981F
Form Factor	PICMG 1.0 SHB Express full-size CPU card		
System			
Operating System	• Windows 10 (64-bit) • Windows 7 Pro (32-bit / 64-bit) • Linux Ubuntu (64-bit)		
CPU Type	Intel® 4th Gen. Core™ i7/i5/i3, Pentium®, Celeron® processor		
CPU Speed	Up to 4.0 GHz		
CPU Socket	LGA1150		
Chipset	C226	Q87	H81
Memory	2 x DDR3/L-1600 DIMM, expandable up to 16 GB (ECC compatible)		
Graphics	Integrated		
Network	• Intel® I217LM • Intel® I211AT		• Intel® I217V • Intel® I211AT
Super I/O	Fintek F81846AD-I		
Audio	Intel® PCH-H built-in HD audio controller Realtek ALC662 with 5.1 channel		
Power Requirement	+5V, +3.3V, +12V, -12V & 5VSB		
Security	TPM 2.0	TPM 2.0	N/A
RAID	0, 1, 5, 10	0, 1, 5, 10	N/A
iAMT	9.0		N/A
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec / min)		
BIOS	AMI BIOS		
H/W Monitor	Yes		
Dimensions	338 x 122 mm (13.31” x 4.8”)		
RoHS	Yes		
Certification	CE, FCC Class B, LVD		

Product Name	IB981AF-C226	IB981AF	IB981F
I/O Ports			
Display	• 1 x VGA • 1 x DVI-D (header on board) • 1 x 24-bit dual channel LVDS		
LAN	2 x RJ45 GbE LAN		
USB	**4 x USB 3.0:** • 2 ports via I/O coastline connectors • 2 ports via on-board headers **5 x USB 2.0:** • 2 ports via on-board vertical USB connectors • 2 ports via on-board headers • 1 port via mini-PCIe		**2 x USB 3.0:** via I/O coastline connectors **5 x USB 2.0:** • 2 ports via on-board vertical USB connectors • 2 ports via on-board headers • 1 port via mini-PCIe
Serial	**4 x COM ports:** • COM1: RS-232 /422 / 485, jumper-less selection and configurable under BIOS • COM2~ COM4: RS-232 only		
SATA	5 x SATA 3.0 (1 for mSATA)		• 2 x SATA 3.0 • 1 x SATA 2.0 (for mSATA)
Digital I/O	4-In & 4-Out		
Expansion Slots	1 x Mini-PCIe with mSATA, USB 2.0 and PCIe (x1)		
Environment			
Temperature	• Operating: 0 ~ 60 °C (32 ~ 140 °F) • Storage: -20 ~ 80 °C (-4 ~ 176 °F)		
Relative Humidity	0 ~ 90 %, non-condensing at 60°C		

All specifications are subject to change without prior notice.

1.6 Block Diagram



1.7 Overview

Top View

Photo of IB981AF Series

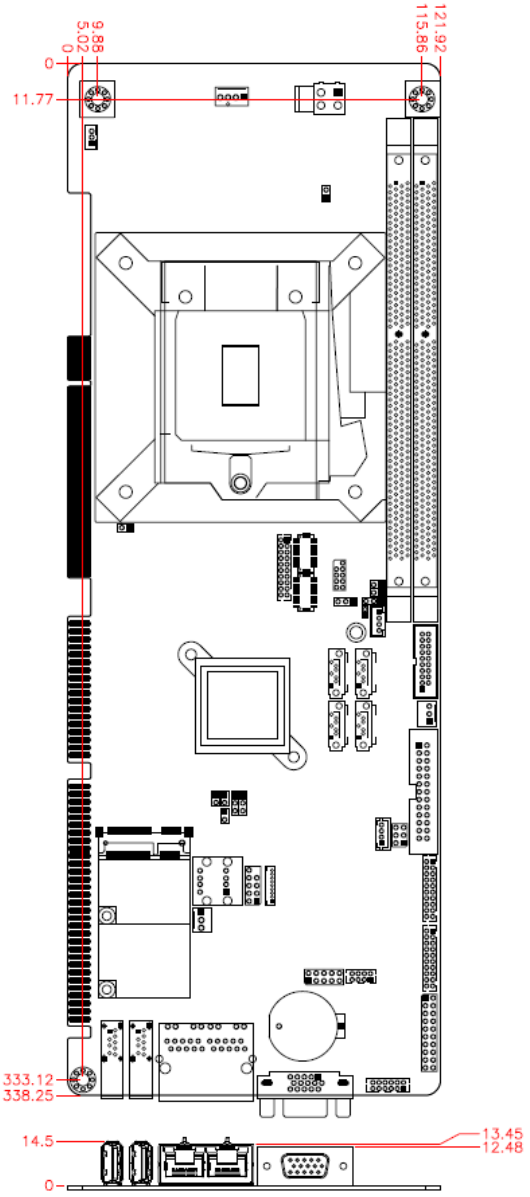
I/O View

Oblique View

Photo of IB981AF Series

* The photos above are for reference only. Some minor components may differ.

1.8 Dimensions



Board diagram of IB981A

Chapter 2
Hardware Configuration

This section provides information on jumper settings and connectors on the IB981 in order to set up a workable system. On top of that, you will also need to install crucial pieces such as the CPU and the memory before using the product. The topics covered are:

- Essential installations before you begin:
  CPU and the memory
- Jumper and connector locations
- Jumper settings and information of connectors

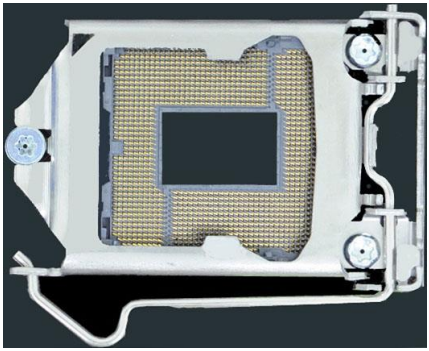
2.1 Essential Installations Before You Begin

Follow the instructions below to install the CPU and the memory.

2.1.1 Installing the CPU

Follow the instructions below to install the CPU.

1. Unlock the socket by pressing the lever sideways, then lift up the lever and the metal lid.
2. Position the CPU above the socket such that the CPU corner aligns with the gold triangle matching the socket corner with a small triangle.
3. Carefully insert the CPU into the socket and push down the lever to secure the CPU.

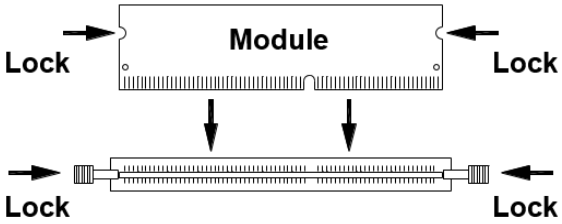


Then you can install the CPU cooler and fan.

Note: Ensure that the CPU cooler and the CPU top surface are in total contact to avoid CPU overheating problem that would cause your system to hang or be unstable.

2.1.2 Installing the Memory

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



1. Hold the module so that the key of the module aligned with that on the memory slot.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

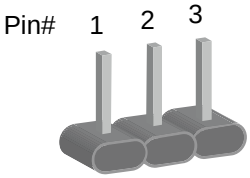
To remove the module, press the clips outwards with both hands

2.2 Setting the Jumpers

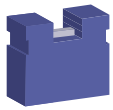
Set up and configure your IB981 by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.

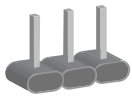
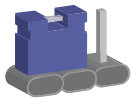
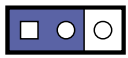
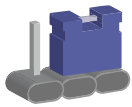
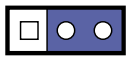


A 3-pin jumper



A jumper cap

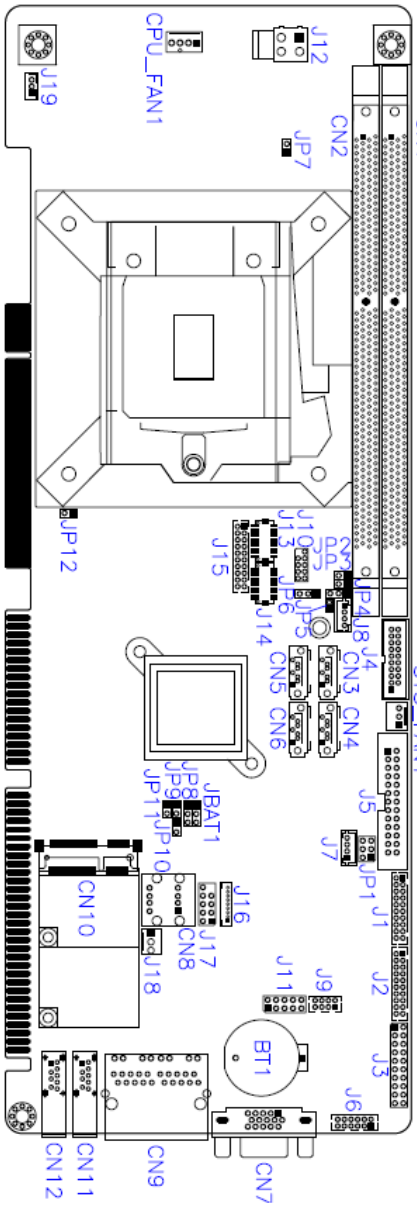
Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

2.3 Jumper & Connector Locations on IB981

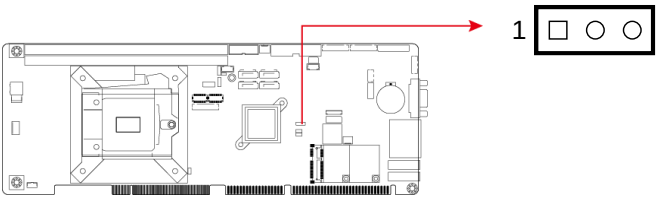


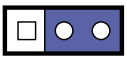
Board diagram of IB981AF

2.4 Jumpers Quick Reference

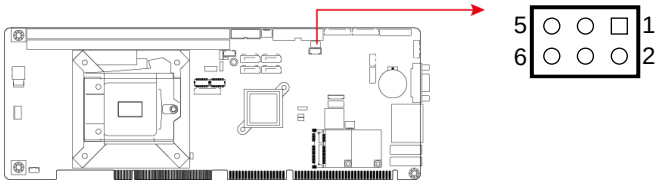
Function	Jumper Name	Page
Clearing CMOS Data	JBAT1	14
COM1 RS-232 Power Setting	JP1	15
Backlight Power Mode Selection	JP4	15
Backlight Control Setting	JP5	16
LVDS Panel Power Selection	JP6	16
Factory Use Only	JP7, JP9, JP11	- -

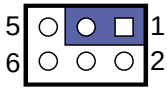
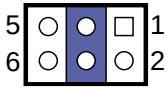
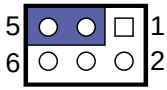
2.4.1 Clear CMOS Content (JBAT1)



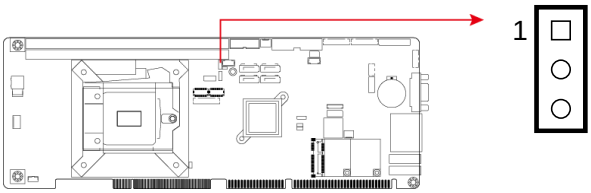
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	

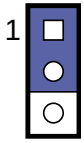
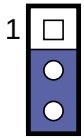
2.4.2 COM1 RS232 Power Setting (JP1)



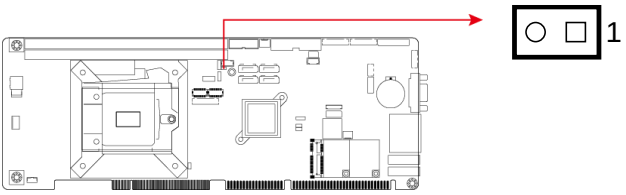
Function	Pin closed	Illustration
+12V	1-3	
RI (default)	3-4	
+5V	3-5	

2.4.3 Backlight Power Mode Selection (JP4)



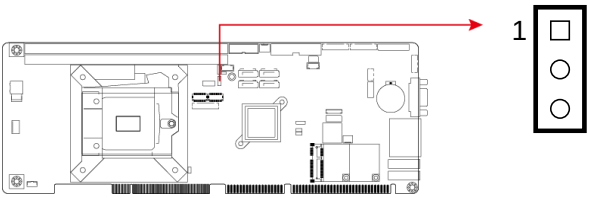
Function	Pin closed	Illustration
DC Mode (default)	1-2	
PWM Mode	2-3	

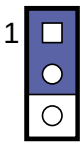
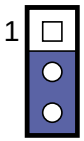
2.4.4 Backlight Control Setting (JP5)



Function	Pin closed	Illustration
3.3V (default)	Open	
5V	Close	

2.4.5 LVDS Panel Power Selection (JP6)

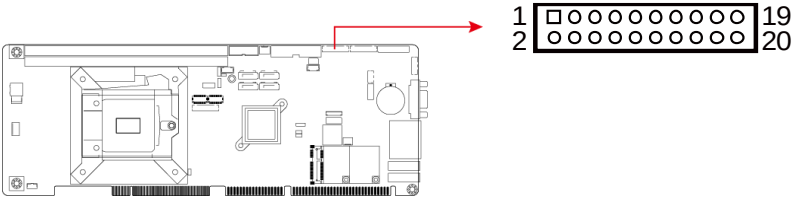


Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

2.5 Connectors Quick Reference

Function	Connector Name	Page
COM1 & COM2 Serial Port	J1	18
COM3 & COM4 Serial Port	J2	19
USB 3.0 / USB 2.0 Connector	J4	20
USB 2.0 Ports	J17 (pin-header), CN8 (vertial)	21
LCD Backlight Connector	J8	21
Front Panel Setting Connector	J3	22
External Audio Connector	J6	23
ATX 12V Power Connector	J12	24
Digital I/O 4 In/4 Out	J11	24
PS/2 KB & MS Connector	J9	25
Parallel Port	J5	26
DVI-D Port	J15	27
CPU Fan Power Connector	CPU_FAN1	28
System Fan Power Connector	SYS_FAN1	28
LVDS Connector	J13, J14	29
Wake-on_LAN Connector	J19	30
ATX 5V Power Connector	J18	30
DDR3 DIMM Socket	CN1, CN2	- -
VGA Port	CN7	- -
GbE LAN Ports	CN9	- -
Mini-PCIe Slot (with mSATA)	CN10 (related to CN5)	- -
USB 3.0 Port	CN11,CN12	- -
SATA 3.0 Connector	CN3, CN4, CN5, CN6	- -
Factory Use Only	J7, J10, J16,	- -

2.5.1 COM1 & COM2 Serial Port (J1)

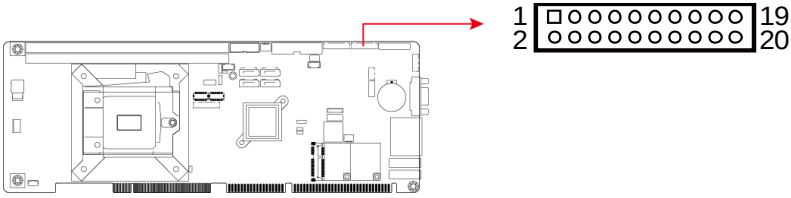


COM1 (pin1 ~ pin10) supports RS-232/422/485.
COM2 (pin11 ~ pin20) supports RS-232 only.

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

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

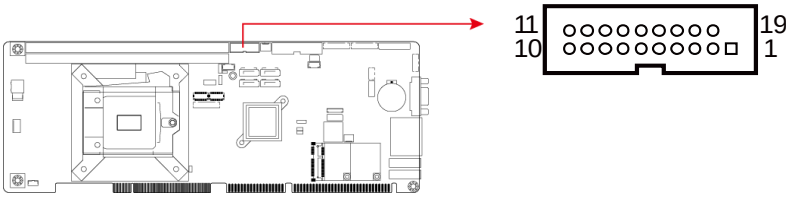
2.5.2 COM3 & COM4 Serial Port (J2)



COM3 (pin1 ~ pin10) and **COM4** (pin11 ~ pin20) support RS-232 only.

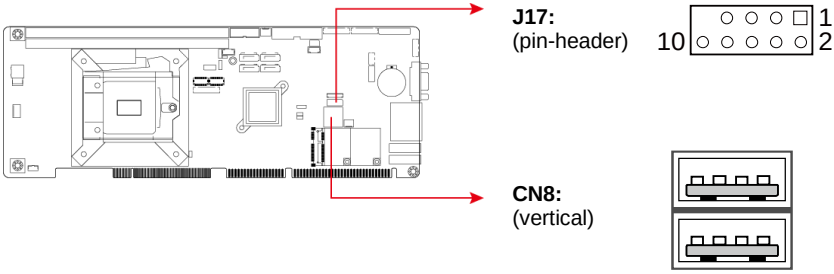
Pin	Assignment	Pin	Assignment
1	DCD3	2	DSR3
3	RXD3	4	RTS3
5	TXD3	6	CTS3
7	DTR3	8	RI3
9	Ground	10	NC
11	DCD4	12	DSR4
13	RXD4	14	RTS4
15	TXD4	16	CTS4
17	DTR4	18	RI4
19	Ground	20	NC

2.5.3 USB 3.0 / USB 2.0 Connector (J4)



Pin	Assignment	Pin	Assignment
1	VCC (900mA)	11	P2_U2_D+
2	P1_SSRX-	12	P2_U2_D-
3	P1_SSRX+	13	Ground
4	Ground	14	P2_SSTX+
5	P1_SSTX-	15	P2_SSTX-
6	P1_SSTX+	16	Ground
7	Ground	17	P2_SSRX+
8	P1_U2_D-	18	P2_SSRX-
9	P1_U2_D+	19	VCC (900mA)
10	NC		

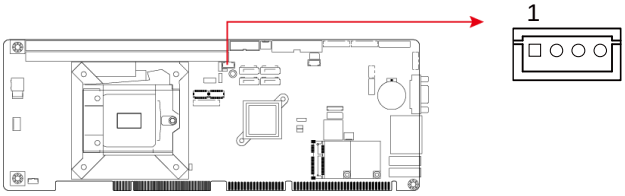
2.5.4 USB2.0 Ports (J17, CN8)



J17:

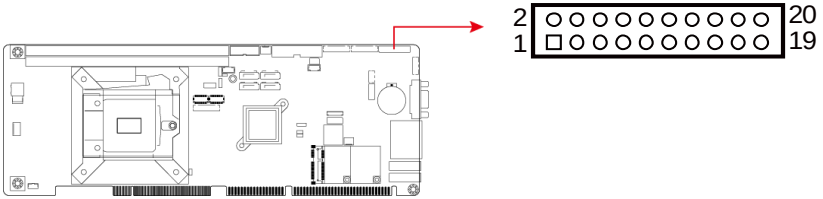
Pin	Assignment	Pin	Assignment
1	VCC (500mA)	2	VCC (500mA)
3	D0-	4	D1-
5	D0+	6	D1+
7	Ground	8	Ground
9	N/A	10	NC

2.5.5 LCD Backlight Connector (J8)



Pin	Assignment	Pin	Assignment
1	Backlight Power +12V (2A)	3	Backlight Control
2	Backlight Enable	4	Ground

2.5.6 Front Panel Setting Connector (J3)



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

J3 is utilized for system indicators to provide light indication of the computer activities and switches to change the computer status. It provides interfaces for the following functions.

- **Speaker (Pins 2 ~ 8)**

  This connector connects to the system speaker on control panel.

- **Power LED (Pins 1 ~ 5)**

  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

- **ATX Power ON Switch (Pins 13 and 14)**

  The 2 pins make an “ATX Power Supply On/Off Switch” for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.

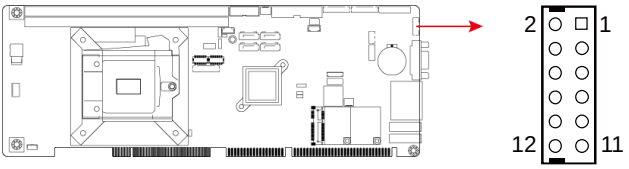
- **Reset Switch (Pins 17 and 18)**

  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

- **Hard Disk Drive LED Connector (Pins 19 and 20)**

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

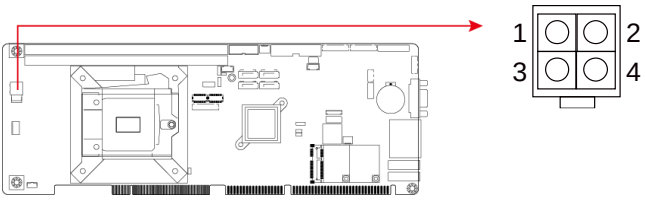
2.5.7 External Audio Connector (J6)



J6 is a 12-pin header that is used to connect to the optional audio cable.

Pin	Assignment	Pin	Assignment
1	Line out_L	2	Line out_R
3	JD_FRONT	4	Ground
5	LINE IN_L	6	Line in_R
7	JD_LINE IN	8	Ground
9	MIC-L	10	MIC-R
11	JD_MIC1	12	Ground

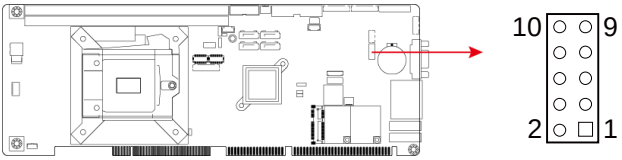
2.5.8 ATX 12V Power Connector (J12)



J12 connector supplies the CPU operating voltage.

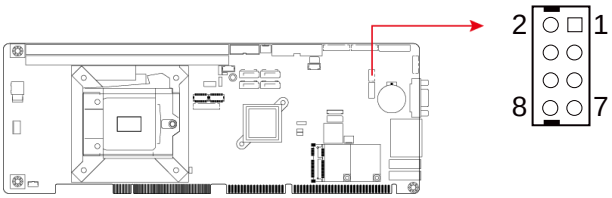
Pin	Assignment	Pin	Assignment
1	Ground	2	Ground
3	+12V-IN	4	+12V-IN

2.5.9 Digital I/O 4 In/4 Out (J11)



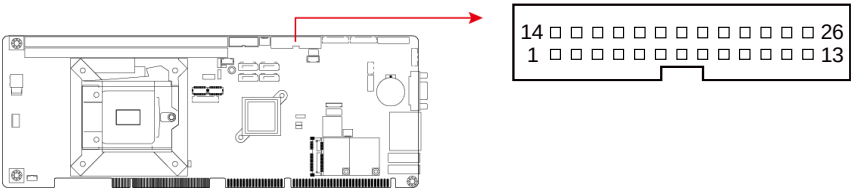
Pin	Assignment	Pin	Assignment
1	Ground	2	VCC (500mA)
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.10 PS/2 KB & MS Connector (J9)



Pin	Assignment	Pin	Assignment
1	VCC (300mA)	2	VCC (300mA)
3	MS_DATA	4	KB_DATA
5	MS_CLK	6	KB_CLK
7	Ground	8	Ground

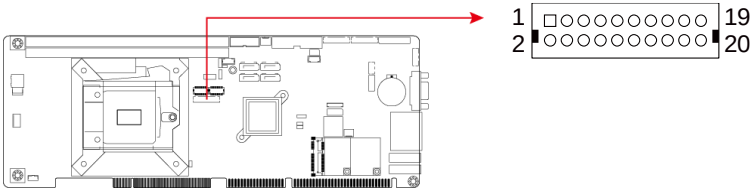
2.5.11 Parallel Port (J5)



J5 is a 26-pin header used to connect to the optional printer port cable.

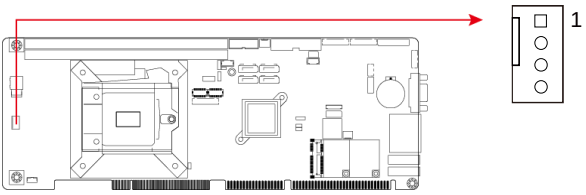
Pin	Assignment	Pin	Assignment
1	Line printer strobe	14	Auto Feed
2	PD0, parallel data 0	15	Error
3	PD1, parallel data 1	16	Initialize
4	PD2, parallel data 2	17	Select
5	PD3, parallel data 3	18	Ground
6	PD4, parallel data 4	19	Ground
7	PD5, parallel data 5	20	Ground
8	PD6, parallel data 6	21	Ground
9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

2.5.12 DVI-D Port (J15)



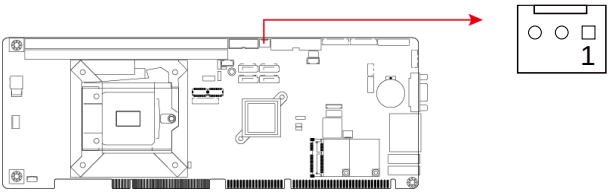
Pin	Assignment	Pin	Assignment
1	TDC1_B	2	TDC1#_B
3	Ground	4	Ground
5	TLC_B	6	TLC#_B
7	Ground	8	5V
9	HPDET_B	10	N.C.
11	TDC2_B	12	TDC2#_B
13	Ground	14	Ground
15	TDC0_B	16	TDC0#_B
17	N.C.	18	N.C.
19	SD_DDC_B	20	SC_DDC_B

2.5.13 CPU Fan Power Connector (CPU_FAN1)



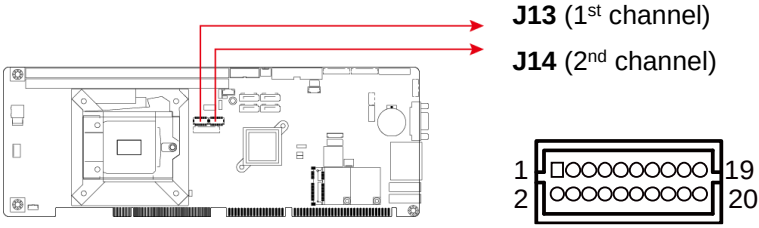
Pin	Assignment	Pin	Assignment
1	Ground	3	Rotation detection
2	+12V (1A)	4	Control

2.5.14 System Fan Power Connector (SYS_FAN1)



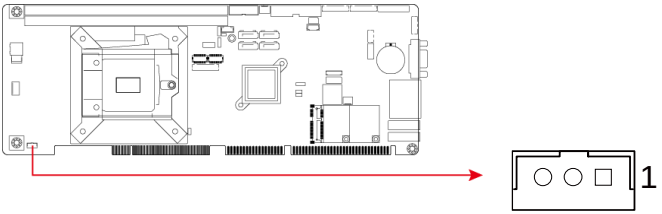
Pin	Assignment	Pin	Assignment
1	Ground	3	Rotation detection
2	+12V (1A)		

2.5.15 LVDS Connector (J13, J14)



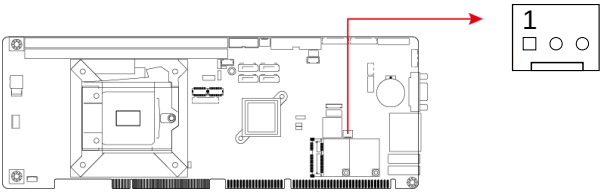
Pin	Assignment	Pin	Assignment
1	LD0+	2	LD0-
3	Ground	4	Ground
5	LD1+	6	LD1-
7	Ground	8	Ground
9	LD2+	10	LD2-
11	Ground	12	Ground
13	CLK+	14	CLK-
15	Ground	16	Ground
17	LD3+	18	LD3-
19	LCD_PWR (1A)	20	LCD_PWR (1A)

2.5.16 Wake-on_LAN Connector (J19)



Pin	Assignment	Pin	Assignment
1	+5VSB	3	-PME
2	Ground		

2.5.17 ATX 5V Power Connector (J18)



Connect the J18 connector to the ATX power connector of your backplane.

Pin	Assignment	Pin	Assignment
1	Ground	3	+5VSB-IN
2	PS_On		

Chapter 3
Drivers Installation

This chapter introduces installation of the following drivers:

- Intel® Chipset Software Installation Utility
- Graphics Driver
- HD Audio Driver
- LAN Driver
- Intel® Management Engine Interface
- Intel® USB 3.0 Driver

3.1 Introduction

This section describes the installation procedures for software and drivers. The contents of this section include the following:

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

3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for Intel chipset components. Follow the instructions below to complete the installation.

1. Go to the download page of the product. Copy the compressed drivers file to your computer. Double click the file to decompress it. Run “CDGuide” to go to the main drivers page as shown. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

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

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

4. Click **Yes** to accept the software license agreement and proceed with the installation process.

5. On the *Readme File Information* screen, click **Install** for installation.

6. The driver has been completely installed. Click **Finish** and restart the computer for changes to take effect.

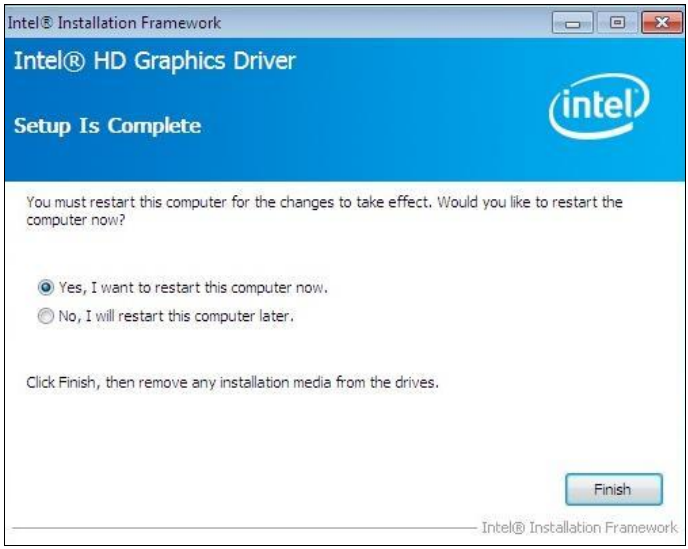
3.3 Graphics Driver Installation

1. Click **Intel** and then **Intel(R) 8 Series 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 *Windows Security* screen shown below, click **Install** to continue.

6. The driver has been completely installed. Click **Finish** and restart the computer for changes to take effect.



3.4 HD Audio Driver Installation

1. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

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

3. On the *Welcome* screen of the InstallShield Wizard, click **Yes** for proceed.

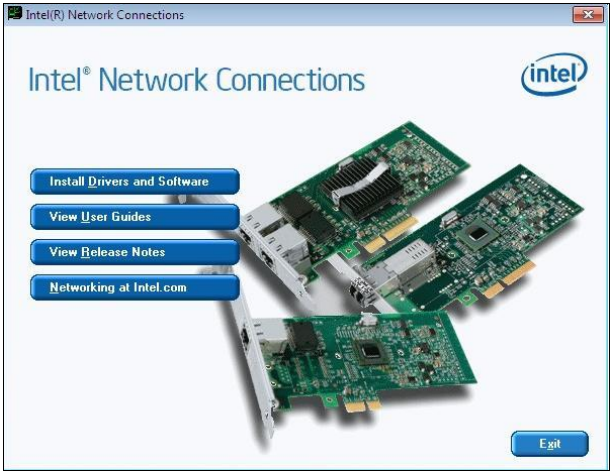
4. The installation is complete. Click **Finish** and restart the computer for changes to take effect.

3.5 LAN Driver Installation

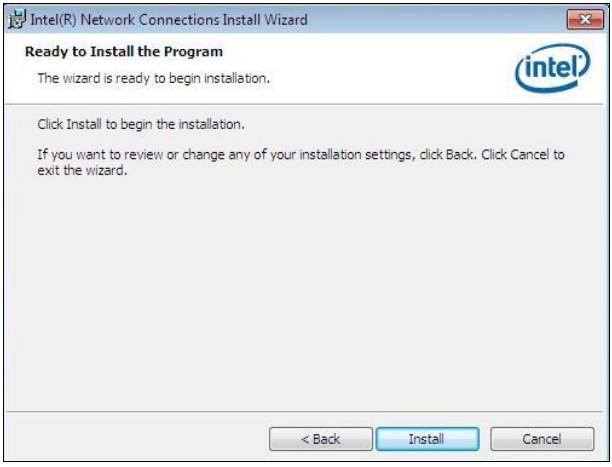
1. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

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

3. On the screen of *Intel® Network Connections*, click **Install Drivers and Software**.



4. When the *Welcome* screen appears, click **Next**.
5. Click **Next** to to agree with the license agreement.
6. On the *Setup Options* screen, click the checkbox to select the desired driver(s) for installation. Then click **Next** to continue.
7. The wizard is ready for installation. Click **Install**.



8. As the installation is complete, click **Finish** and restart the computer for changes to take effect.

3.6 Intel® Management Engine Interface

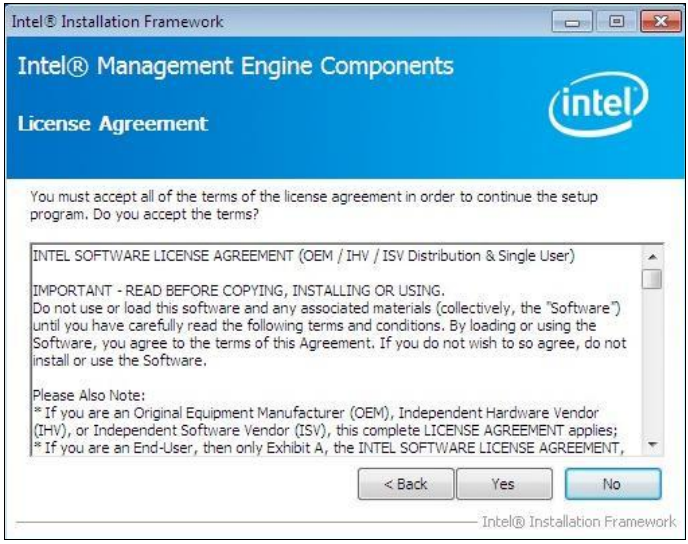
Before installation, please pay attention to the warning message below.

1. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

2. Click **Intel(R) ME 9.0 Drivers**.

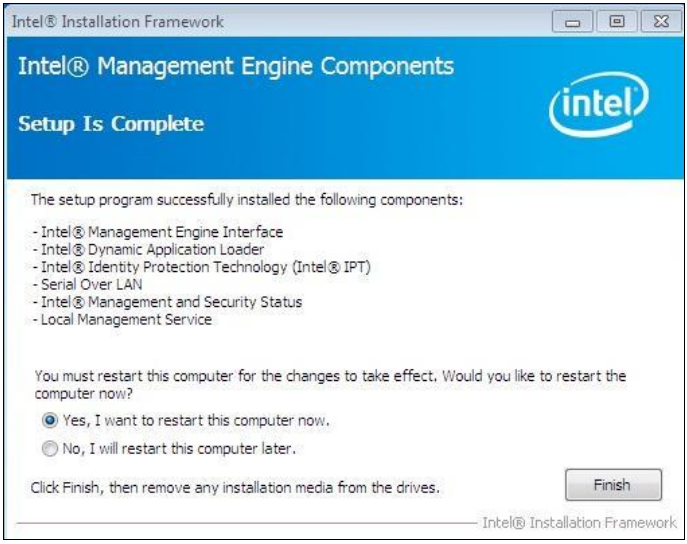
3. When the *Welcome* screen to the InstallShield Wizard for Intel® Management Engine Components appears, click **Next**.

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



5. When the *Setup Progress* screen appears, click **Next**.

6. As the driver has been sccessfully installed, click **Finish** and restart the computer for changes to take effect.



3.7 Intel® USB 3.0 Driver

1. Click **Intel** and then **Intel(R) 8 Series Chipset Drivers**.

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

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

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

5. On the *Readme File Information* screen, click **Next** for installation.

6. The driver has been successfully installed. Click **Finish** and restart the computer for changes to take effect.

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Chapter 4
BIOS Setup

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

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Book Settings
- Save & Exit

4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

4.2 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. Press the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the ”Reset” button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys.

You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

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

In general, 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.

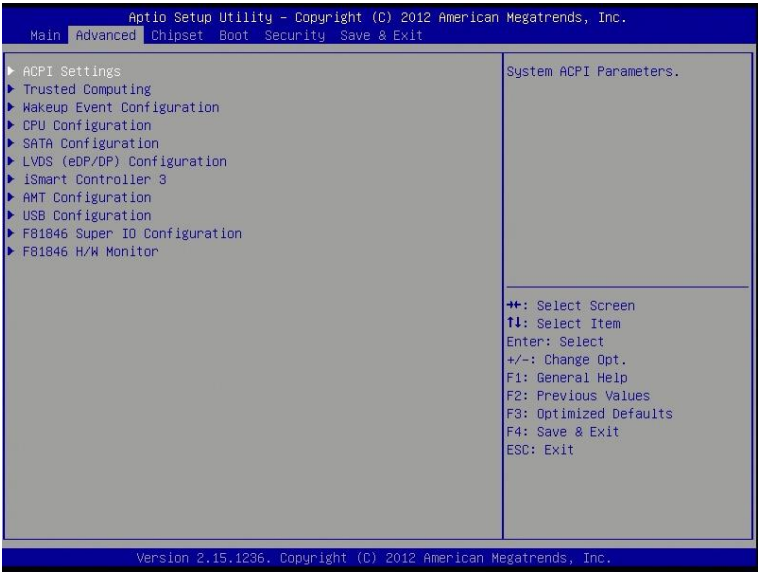
When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: It is strongly recommended that you avoid making any changes to the chipset defaults.

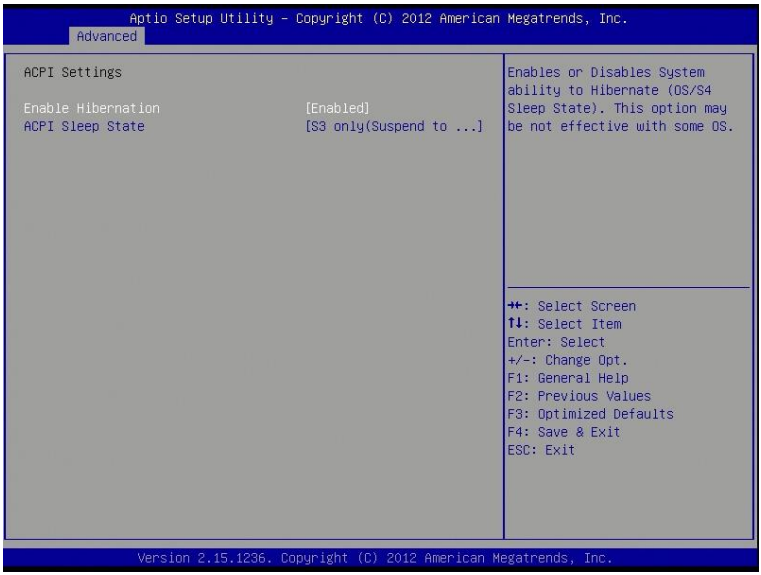
These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

4.3 Advanced Settings

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

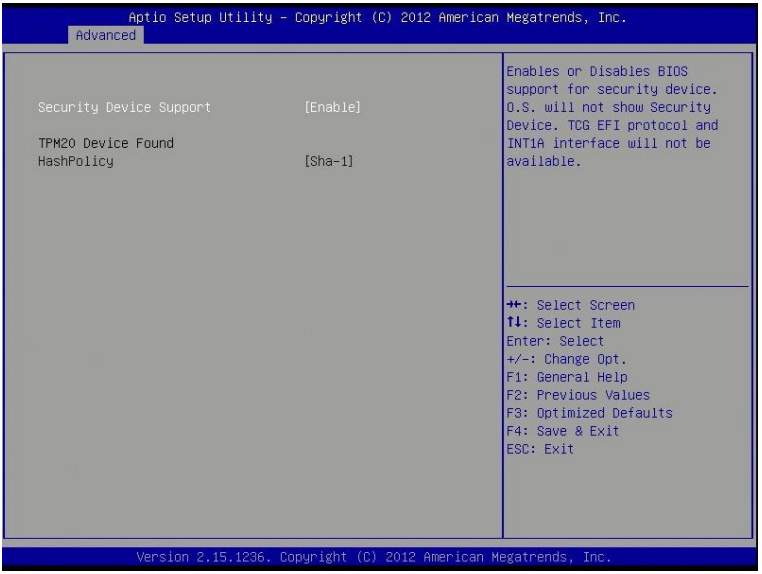


4.3.1 ACPI Settings



BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state where the system will enter when the Suspend button is pressed.

4.3.2 Trusted Computing

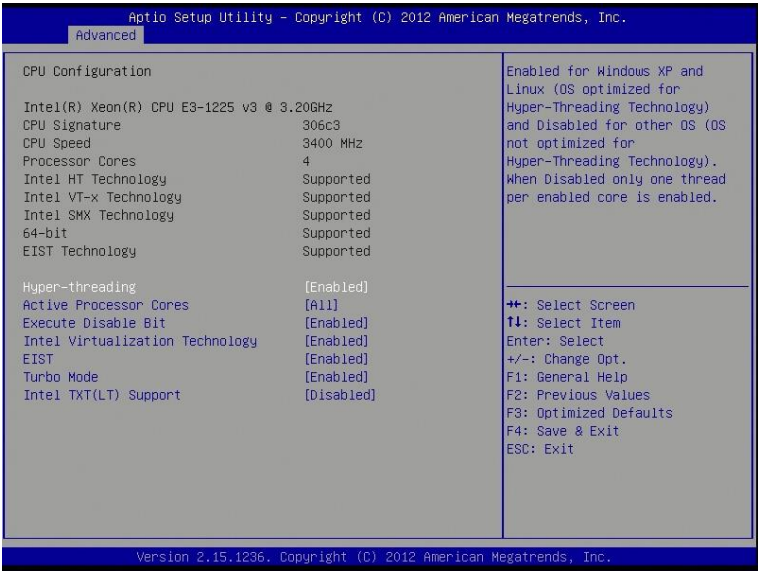


BIOS Setting	Description
Security Device Support	Enables / Disables TPM support. O.S. will not show TPM. Reset of platform is required. **Note:** This feature is not supported on IB981F.

4.3.3 Wakeup Event Configuration

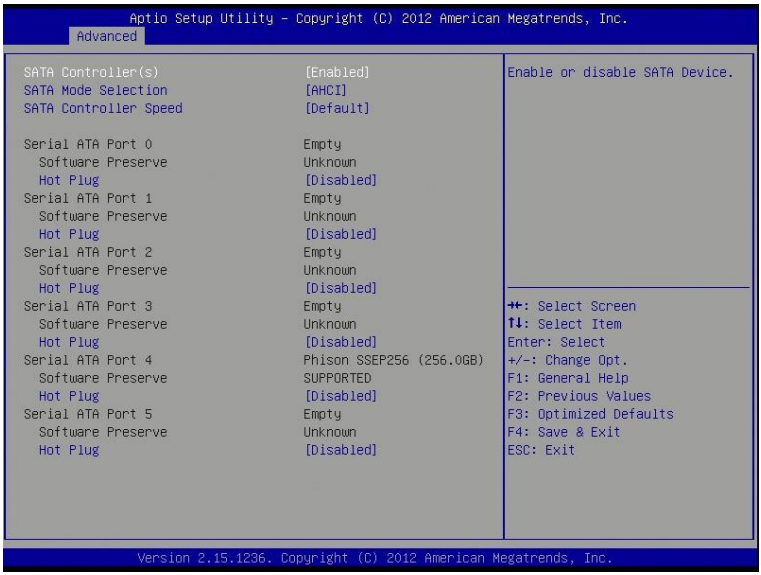
BIOS Setting	Description
Wake up by PCI PME#	Wakes up the device by PCI PME#.
Wake up by PCIE WAKE#	Wakes up the device by PCIE WAKE#.

4.3.4 CPU Configuration



BIOS Setting	Description
Hyper-Threading	Enabled for Windows XP and Linux (OS optimized for Hhyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
Active Processor Cores	Number of cores to enable in each processor package. Options: All, 1, 2, 3
Execute Disable Bit	Enables / Disables the Execute Disable Bit.
Intel Virtualization Technology	Enables / Disables a VMM to utilize the additional hardware capabilities provided by Vanderpool Technology.
EIST	Enables / Disables EIST.
Turbo Mode	Enables / Disables the Turbo Mode.
Intel TXT(LT) Support	Enables / Disables Intel TXT (LT) function.

4.3.5 SATA Configuration

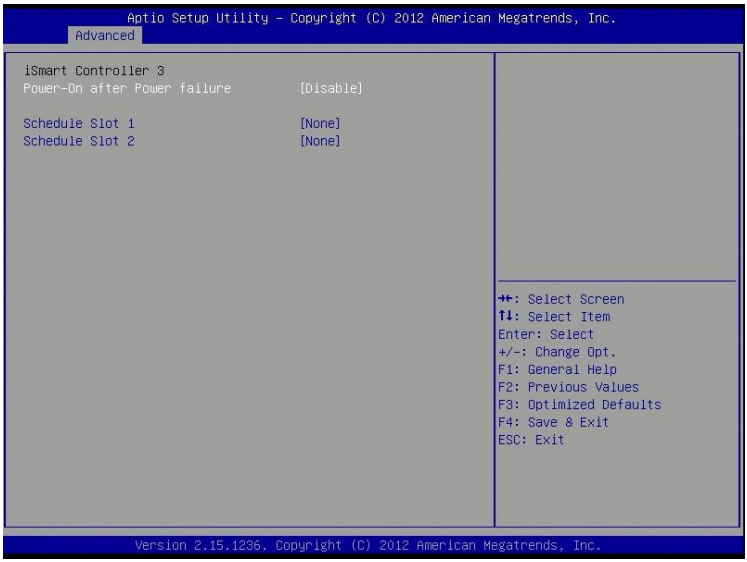


BIOS Setting	Description
SATA Controller(s)	Enables / Disables SATA devices.
SATA Mode Selection	Determines how the SATA controller(s) operate. • AHCI Mode • RAID Mode
Hot Plug	Designates this port as Hot Pluggable.

4.3.6 LVDS Configuration

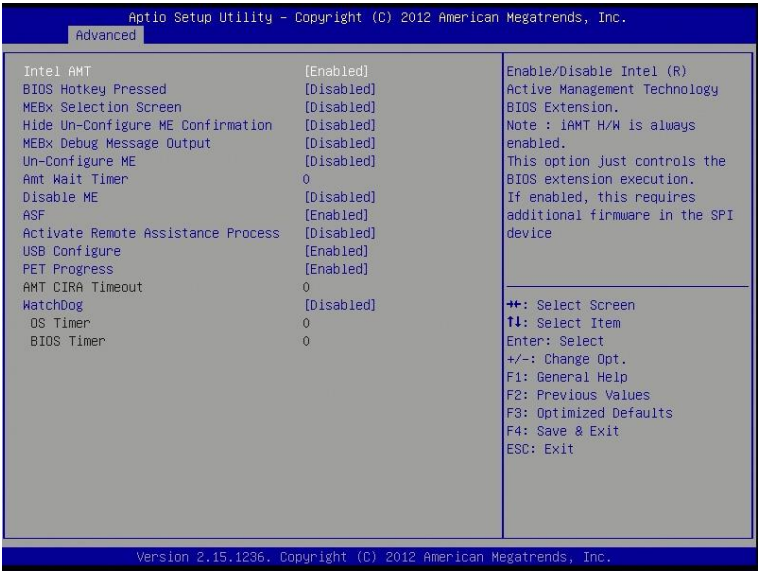
BIOS Setting	Description
LVDS (eDP/DP) Controller	Enables / Disables LVDS (eDP/DP) device.

4.3.7 iSmart Configuration



BIOS Setting	Description
Power-On after Power failure	Enables / Disables the system to be turned on automatically after a power failure.
Power Resume Delay	Enables / Disables to delay the time for system to turn on.
Temperature Guardian	Generate the reset signal when system hands up on POST.
Schedule Slot 1 / 2	Sets up the hour / minute / day for the power-on schedule for the system. Options: None, Power On, Power On / Off **Important:** If you would like to set up a schedule between adjacent days, configure two schedule slots. For example, if setting up a schedule from Wednesday 5 p.m. to Thursday 2 a.m., configure two schedule slots. But if setting up a schedule from 3 p.m to 5 p.m. on Wednesday, configure only a schedule slot.

4.3.8 AMT Configuration



BIOS Setting	Description
Intel AMT	Enables / Disables AMT configuration. **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.
Hide Unconfigure ME	Hides Unconfigures ME without password operation.
Unconfigure ME	Unconfigures AMT/ME without password operation.
Amt Wait Timer	Sets timer to wait before sending ASF_GET_BOOT_OPTIONS.
Activate Remote Assistance Process	Triggers CIRA boot.
PET Progress	Enables / Disables PET events progress to receive PET events.
WatchDog	Enables / Disables Watchdog Timer.

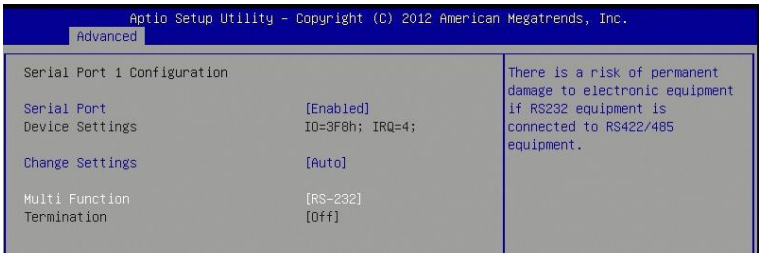
4.3.9 USB Configuration

BIOS Setting	Description
Legacy USB Support	Enables Legacy USB support. “Auto” disables legacy support if there is no USB device connected. “Disable” 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.
EHCI Hand-off	Enabled / Disabled. This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
USB Transfer time-out	The time-out value for Control, Bulk, and Interrupt transfers.

BIOS Setting	Description
Device reset time-out	Seconds of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The 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. But for a Hub port, the delay is taken from Hub descriptor.

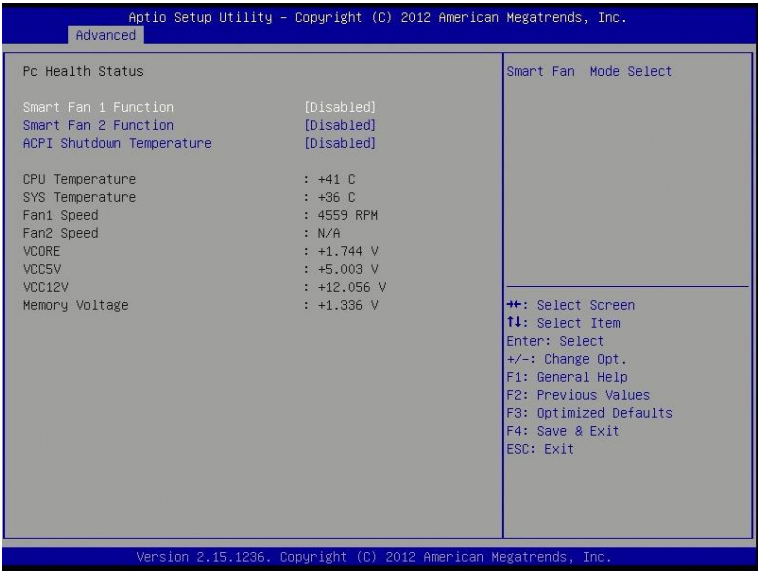
4.3.10 F81846 Super IO Configuration

BIOS Setting	Description
Serial Port Configuration	Sets parameters of Serial Ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.



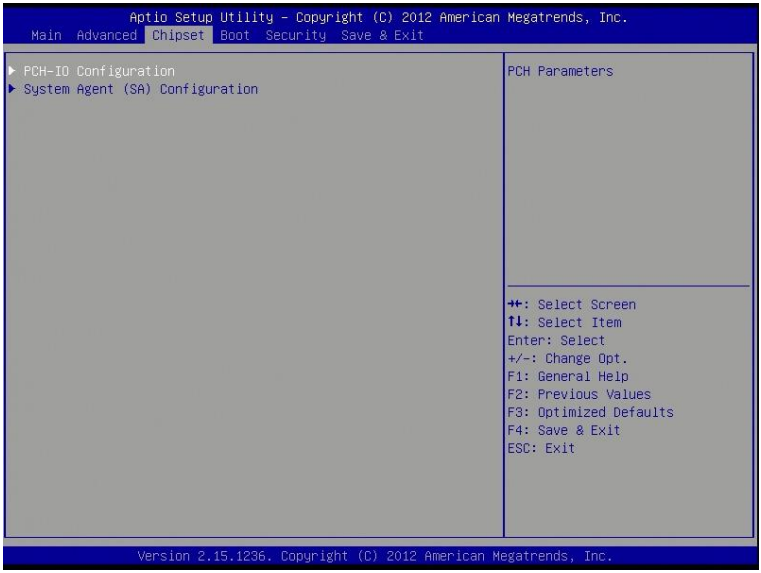
BIOS Setting	Description
Multi Function	There is a risk of permanent damage to electronic equipment if RS-232 equipment is connected to RS-422/485 equipment. Opotions: RS-232, RS-422, RS-485

4.3.11 Hardware Monitor



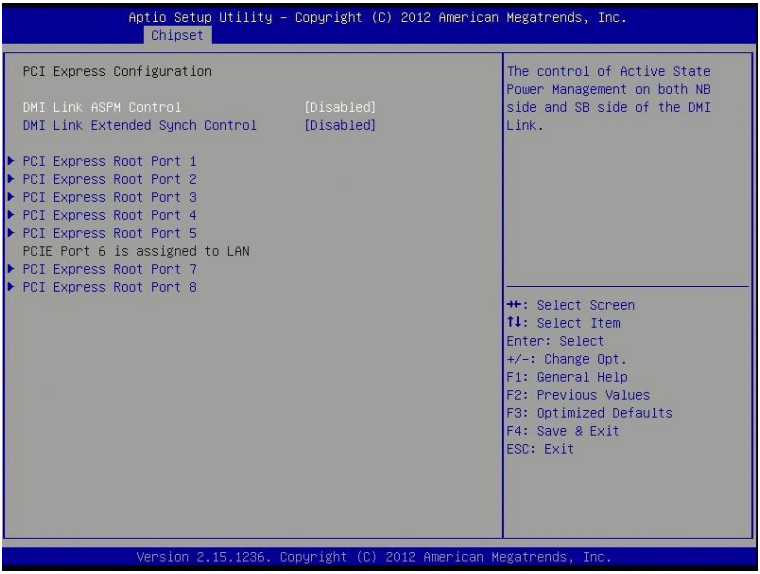
BIOS Setting	Description
Smart Fan 1 / 2 Function	Enables / Disables the smart fan feature. Options: Disabled (default) / 50 °C / 60 °C / 70 °C / 80 °C / 90 °C
Temperatures/Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4 Chipset Settings



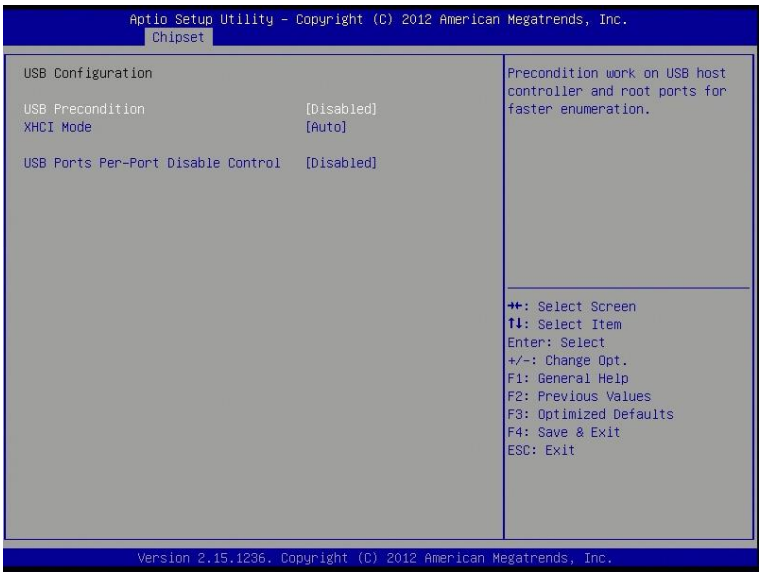
BIOS Setting	Description
PCH-IO Configuration	PCH parameters
System Agent (SA) Configuration	System Agent (SA) parameters

4.4.1 PCI Express Configuration



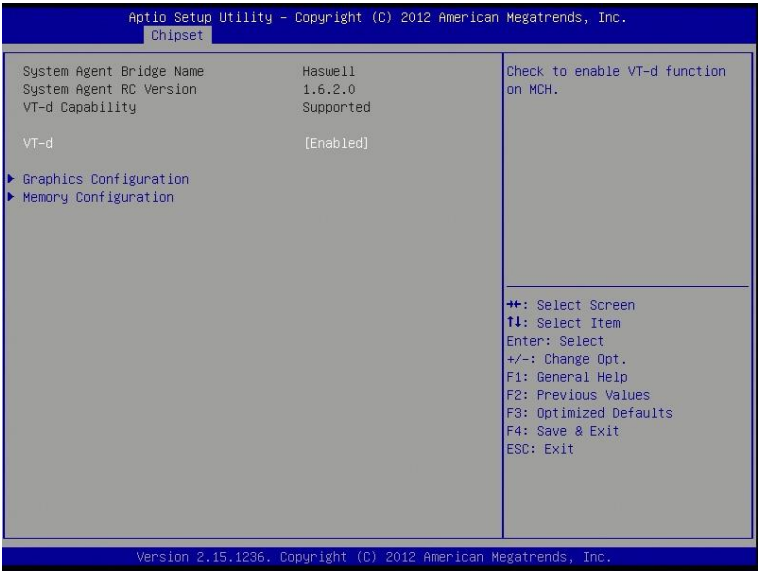
BIOS Setting	Description
PCI Express Configuration	PCI Express Configuration settings.

4.4.1.1. USB Configuration



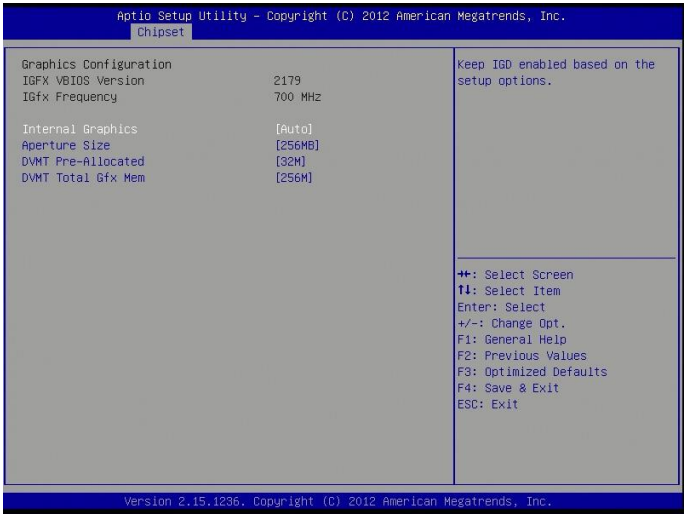
BIOS Setting	Description
USB Configuration	Precondition work on USB host controller and root ports for faster enumeration.

4.4.2 System Agent (SA) Configuration



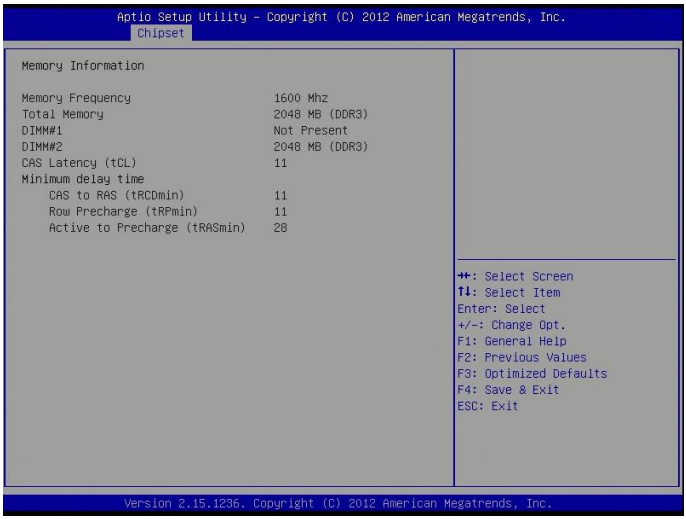
BIOS Setting	Description
VT-d	Checks if VT-d function on MCH is supported.

4.4.2.1. Graphics Configuration

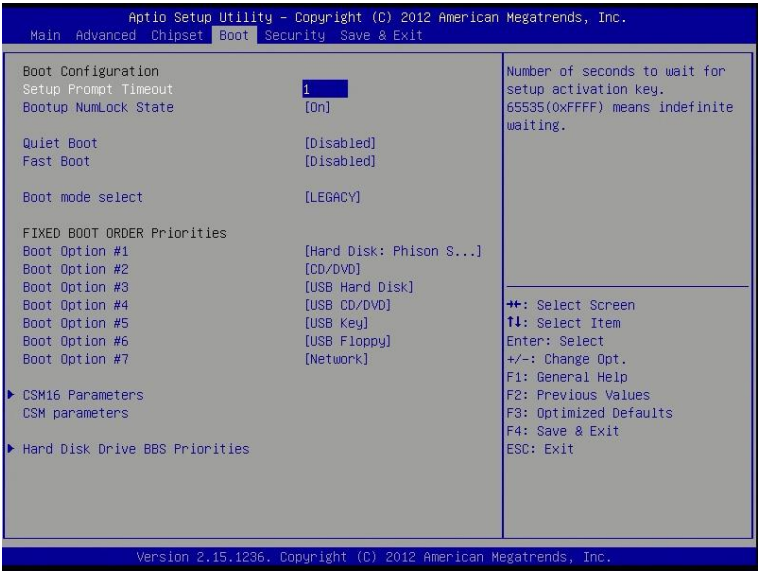


BIOS Setting	Description
Internal Graphics	Keeps IGD enabled based on the setup options.

4.4.2.2. Memory Configuration

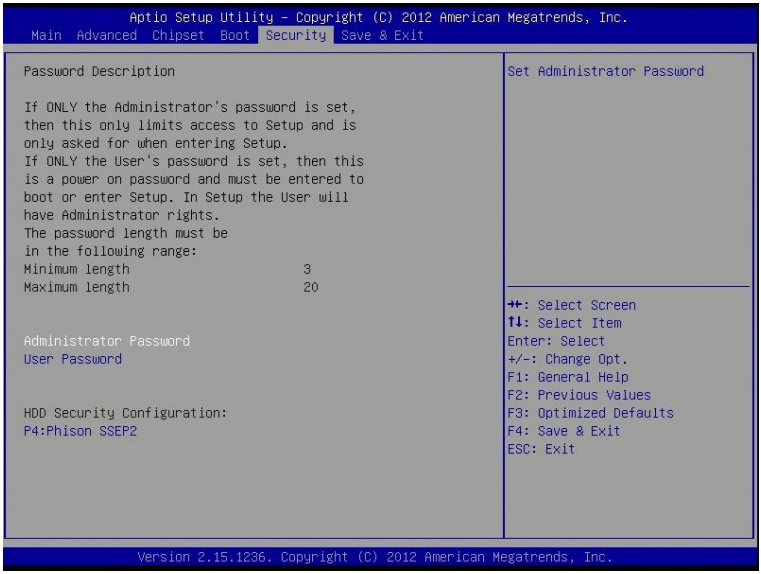


4.5 Boot Settings



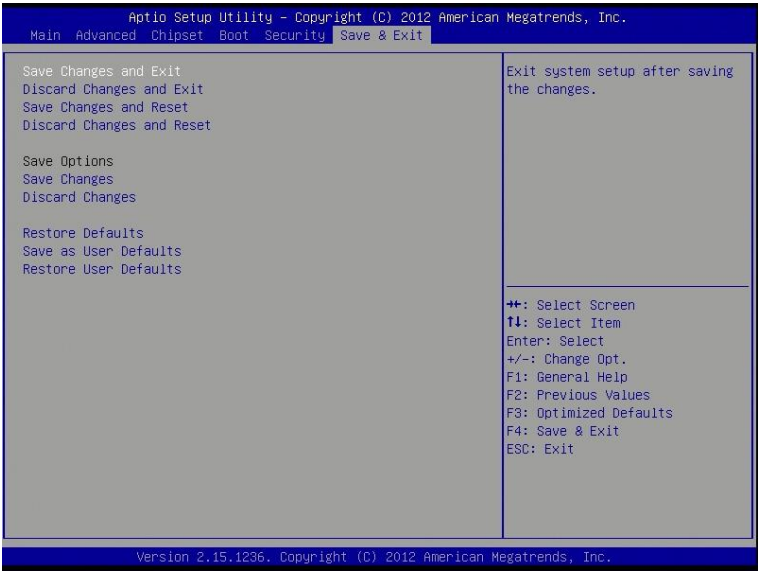
BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Fast Boot	Enables / Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

4.6 Security Settings



BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.

4.7 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.

BIOS Setting	Description
Save as User Defaults	Saves the changes done so far as User Defaults.
Restore User Defaults	Restores the user defaults to all the setup options.

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Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

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
0x0000FFFF-0x0000FFFF	Motherboard Resource
0x0000FFFF-0x0000FFFF	Motherboard Resource
0x0000FFFF-0x0000FFFF	Motherboard Resource
0x0000F0E0-0x0000F0E7	Standard SATA AHCI Controller
0x0000F0D0-0x0000F0D3	Standard SATA AHCI Controller
0x0000F0C0-0x0000F0C7	Standard SATA AHCI Controller
0x0000F0B0-0x0000F0B3	Standard SATA AHCI Controller
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM5)
0x0000F080-0x0000F09F	Standard SATA AHCI Controller
0x0000F060-0x0000F07F	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
0x0000F000-0x0000F03F	Intel(R) HD Graphics P4600/P4700
0x0000E000-0x0000EFFF	Intel(R) 8 Series/C220 Series PCI Express Root Port #3 - 8C14
0x00001F00-0x00001FFE	Motherboard Resource
0x00001E00-0x00001EFE	Motherboard Resource
0x00001D00-0x00001DFE	Motherboard Resource
0x00001C00-0x00001CFE	Motherboard Resource
0x00001854-0x00001857	Motherboard Resource
0x00001800-0x000018FE	Motherboard Resource
0x0000164E-0x0000164F	Motherboard Resource
0x00000D00-0x0000FFFF	PCI Express Root Complex

Address	Device Description
0x00000680-0x0000069F	Motherboard Resource
0x000004D0-0x000004D1	Programmable Interrupt Controller
0x000004D0-0x000004D1	Motherboard Resource
0x000003F8-0x000003FF	Communications Port (COM1)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000003C0-0x000003DF	Intel(R) HD Graphics P4600/P4700
0x000003B0-0x000003BB	Intel(R) HD Graphics P4600/P4700
0x00000378-0x0000037F	Printer Port (LPT1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002A0-0x000002AF	Motherboard Resource
0x00000290-0x0000029F	Motherboard Resource
0x00000280-0x0000028F	Motherboard Resource
0x000000F0-0x000000F0	Numeric data processor
0x000000E0-0x000000EF	Motherboard Resource
0x000000C0-0x000000DF	Memory Controller
0x000000BC-0x000000BD	Programmable Interrupt Controller
0x000000B8-0x000000B9	Programmable Interrupt Controller
0x000000B4-0x000000B5	Programmable Interrupt Controller
0x000000B2-0x000000B3	Motherboard Resource
0x000000B0-0x000000B1	Programmable Interrupt Controller
0x000000AC-0x000000AD	Programmable Interrupt Controller
0x000000A8-0x000000A9	Programmable Interrupt Controller
0x000000A4-0x000000A5	Programmable Interrupt Controller
0x000000A2-0x000000BF	Motherboard Resource
0x000000A0-0x000000A1	Programmable Interrupt Controller

Address	Device Description
0x00000093-0x0000009F	Memory Controller
0x00000092-0x00000092	Motherboard Resource
0x00000090-0x0000009F	Motherboard Resource
0x0000008C-0x0000008E	Motherboard Resource
0x00000088-0x00000088	Motherboard Resource
0x00000084-0x00000086	Motherboard Resource
0x00000081-0x00000091	Memory Controller
0x00000080-0x00000080	Motherboard Resource
0x00000080-0x00000080	Motherboard Resource
0x00000072-0x0000007F	Motherboard Resource
0x00000070-0x00000070	Motherboard Resource
0x00000070-0x00000070	System CMOS/real time clock
0x00000067-0x00000067	Motherboard Resource
0x00000065-0x00000065	Motherboard Resource
0x00000065-0x00000065	Motherboard Resource
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000063-0x00000063	Motherboard Resource
0x00000062-0x00000063	Motherboard Resource
0x00000061-0x00000061	Motherboard Resource
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000050-0x00000053	System timer
0x0000004E-0x0000004F	Motherboard Resource
0x00000044-0x0000005F	Motherboard Resource
0x00000040-0x00000043	System timer
0x0000003C-0x0000003D	Programmable Interrupt Controller
0x00000038-0x00000039	Programmable Interrupt Controller

Address	Device Description
0x00000034-0x00000035	Programmable Interrupt Controller
0x00000030-0x00000031	Programmable Interrupt Controller
0x0000002E-0x0000002F	Motherboard Resource
0x0000002C-0x0000002D	Programmable Interrupt Controller
0x00000028-0x00000029	Programmable Interrupt Controller
0x00000024-0x00000025	Programmable Interrupt Controller
0x00000022-0x0000003F	Motherboard Resource
0x00000020-0x00000021	Programmable Interrupt Controller
0x00000010-0x0000001F	Motherboard Resource
0x00000000-0x0000001F	Memory Controller
0x00000000-0x0000001F	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
IRQ 1	Standard PS/2 Keyboard
IRQ 4294967293	Intel(R) 8 Series/C220 Series PCI Express Root Port #1 - 8C10
IRQ 4294967292	Intel(R) 8 Series/C220 Series PCI Express Root Port #3 - 8C14
IRQ 4294967287	Intel(R) Management Engine Interface
IRQ 22	High Definition Audio Controller
IRQ 10	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
IRQ 23	Intel(R) 8 Series/C220 Series USB EHCI #1 - 8C26
IRQ 16	Intel(R) 8 Series/C220 Series USB EHCI #2 - 8C2D
IRQ 13	Numeric data controller
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 11	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 4294967288	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 12	Microsoft PS/2 Mouse
IRQ 0	System timer
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System

Level	Function
IRQ 4294967286	Intel(R) Ethernet Connection I217-LM
IRQ 19	Intel(R) Active Management Technology - SOL (COM5)
IRQ 4294967294	Intel(R) Xeon(R) processor E3 - 1200 v3/4th Gen Core processor PCI Express x16 Controller - 0C01
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection
IRQ 4294967283	Intel(R) I211 Gigabit Network Connection
IRQ 4294967282	Intel(R) I211 Gigabit Network Connection
IRQ 4294967281	Intel(R) I211 Gigabit Network Connection
IRQ 4294967280	Intel(R) I211 Gigabit Network Connection
IRQ 4294967290	Standard SATA AHCI Controller
IRQ 4294967283	Intel(R) I211 Gigabit Network Connection
IRQ 4294967282	Intel(R) I211 Gigabit Network Connection
IRQ 4294967281	Intel(R) I211 Gigabit Network Connection
IRQ 4294967280	Intel(R) I211 Gigabit Network Connection
IRQ 4294967290	Standard SATA AHCI Controller
IRQ 4294967291	PCI Express Root Port
IRQ 4294967289	Intel(R) HD Graphics P4600/P4700
IRQ 8	System CMOS/real time clock

C. Watchdog Timer Configuration

The Watchdog Timer (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, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81866.H"
//---------------------------------------------------------------------------
int main (int argc, char *argv());
void EnableWDT(int);
void DisableWDT(void);
//---------------------------------------------------------------------------
int main (int argc, char *argv())
{
        unsigned char bBuf;
        unsigned char bTime;
        char **endptr;

        char SIO;

        printf("Fintek 81866 watch dog program\n");

        SIO = Init_F81866();
        if (SIO == 0)
        {
                printf("Can not detect Fintek 81866, program abort.\n");
                return(1);
        }//if (SIO == 0)

        if (argc != 2)
        {
                printf(" Parameter incorrect!!\n");
                return (1);
        }

        bTime = strtol (argv(1), endptr, 10);
        printf("System will reset after %d seconds\n", bTime);

        if (bTime)
        {       EnableWDT(bTime);       }
        else
        {       DisableWDT();}
```

```
		return 0;
}
//---------------------------------------------------------------------------
void EnableWDT(int interval)
{
		unsigned char bBuf;

		bBuf = Get_F81866_Reg(0x2B);
		bBuf &= (~0x20);
		Set_F81866_Reg(0x2B, bBuf);		//Enable WDTO

		Set_F81866_LD(0x07);
		//switch to logic device 7
		Set_F81866_Reg(0x30, 0x01);		//enable timer

		bBuf = Get_F81866_Reg(0xF5);
		bBuf &= (~0x0F);
		bBuf |= 0x52;
		Set_F81866_Reg(0xF5, bBuf);		//count mode is second

		Set_F81866_Reg(0xF6, interval);		//set timer

		bBuf = Get_F81866_Reg(0xFA);
		bBuf |= 0x01;
		Set_F81866_Reg(0xFA, bBuf);		//enable WDTO output

		bBuf = Get_F81866_Reg(0xF5);
		bBuf |= 0x20;
		Set_F81866_Reg(0xF5, bBuf);		//start counting
}
//---------------------------------------------------------------------------
void DisableWDT(void)
{
		unsigned char bBuf;

		Set_F81866_LD(0x07);
		//switch to logic device 7

		bBuf = Get_F81866_Reg(0xFA);
		bBuf &= ~0x01;
		Set_F81866_Reg(0xFA, bBuf);
		//disable WDTO output

		bBuf = Get_F81866_Reg(0xF5);
		bBuf &= ~0x20;
		bBuf |= 0x40;
		Set_F81866_Reg(0xF5, bBuf);
		//disable WDT
}
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include "F81866.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int F81866_BASE;
void Unlock_F81866 (void);
void Lock_F81866 (void);
```

```
//---------------------------------------------------------------------------
unsigned int Init_F81866(void)
{
	unsigned int result;
	unsigned char ucDid;

	F81866_BASE = 0x4E;
	result = F81866_BASE;

	ucDid = Get_F81866_Reg(0x20);
	if (ucDid == 0x07)
	//Fintek 81866
	{	goto Init_Finish;	}

	F81866_BASE = 0x2E;
	result = F81866_BASE;

	ucDid = Get_F81866_Reg(0x20);
	if (ucDid == 0x07)
	//Fintek 81866
	{	goto Init_Finish;	}

	F81866_BASE = 0x00;
	result = F81866_BASE;

Init_Finish:
	return (result);
}
//---------------------------------------------------------------------------
void Unlock_F81866 (void)
{
	outportb(F81866_INDEX_PORT, F81866_UNLOCK);
	outportb(F81866_INDEX_PORT, F81866_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81866 (void)
{
	outportb(F81866_INDEX_PORT, F81866_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81866_LD( unsigned char LD)
{
	Unlock_F81866();
	outportb(F81866_INDEX_PORT, F81866_REG_LD);
	outportb(F81866_DATA_PORT, LD);
	Lock_F81866();
}
//---------------------------------------------------------------------------
void Set_F81866_Reg( unsigned char REG, unsigned char DATA)
{
	Unlock_F81866();
	outportb(F81866_INDEX_PORT, REG);
	outportb(F81866_DATA_PORT, DATA);
	Lock_F81866();
}
//---------------------------------------------------------------------------
unsigned char Get_F81866_Reg(unsigned char REG)
{
	unsigned char Result;
	Unlock_F81866();
	outportb(F81866_INDEX_PORT, REG);
	Result = inportb(F81866_DATA_PORT);
	Lock_F81866();
	return Result;
}
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
```

```
//---------------------------------------------------------------------------
#ifndef __F81866_H
#define __F81866_H                                          1
//---------------------------------------------------------------------------
#define         F81866_INDEX_PORT                   (F81866_BASE)
#define         F81866_DATA_PORT                    (F81866_BASE+1)
//---------------------------------------------------------------------------
#define         F81866_REG_LD                       0x07
//---------------------------------------------------------------------------
#define F81866_UNLOCK                               0x87
#define         F81866_LOCK                                 0xAA
//---------------------------------------------------------------------------
unsigned int Init_F81866(void);
void Set_F81866_LD( unsigned char);
void Set_F81866_Reg( unsigned char, unsigned char);
unsigned char Get_F81866_Reg( unsigned char);
//---------------------------------------------------------------------------
#endif          //__F81866_H
```

D. On-Board Connector Types

Function	Connector Name	Type
COM1 & COM2 Serial Port	J1	HRS_DF11-20DP-2DSA(08)
COM3 & COM4 Serial Port	J2	HRS_DF11-20DP-2DSA(08)
USB 3.0 / USB 2.0 Connector	J4	PINREX_52X-40-20GU52
LCD Backlight Connector	J8	E-CALL_0110-161-040
External Audio Connector	J6	HK_DF11-12S-PA66H
ATX 12V Power Connector	J12	Win_WPO-04D4TN431UW
PS/2 KB & MS Connector	J9	HK_DF11-8S-PA66H
Parallel Port	J5	Win_F-WBOX-26RN
DVI-D Port	J15	HK_DF11-20S-PA66H
LVDS Connector	J13, J14	HIROSE_DF20G-20DP-1V(56)