# CMI221-991 Mini-ITX Systems

# **User's Manual**

Version 1.0 (November 2019)



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## Compliance

## CE

This product has passed CE tests (pre-scan) for environmental specifications and limits. This product is in accordance with the directives of the Union European (EU). If users modify and/or install other devices in this equipment, the CE conformity declaration may no longer apply.

## FC

This product has been tested and found to comply with the limits for a Class B (prescan) 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 device.

#### **Environmental conditions:**

- Lay the device horizontally on a stable and solid surface in case the device may fall, causing serious damage.
- Leave plenty of space around the device and do not block the openings for ventilation.
- Slots and openings on the chassis are for ventilation. Do not block or cover them. Make sure you leave plenty of space around the device for ventilation.
- Use this product in environments with ambient temperatures between 0°C and 45°C.
- Do not leave this device in an environment where the storage temperature may go below -20°C or above 80°C. This could damage the device. The device must be used in a controlled environment.

#### Care for your IBASE products:

- Before cleaning the device, turn it off and unplug all cables such as power in case a small amount of electrical current may still flow.
- Use neutral cleaning agents or diluted alcohol to clean the device chassis with a cloth. Then wipe the chassis with a dry cloth.
- Vacuum the dust with a computer vacuum cleaner to prevent the air vent or slots from being clogged.



#### Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on your device.
- Do not place heavy objects on the top of the device.
- Operate this device from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your distributor or local power company.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure that the total ampere rating of the product plugged into the extension cord does not exceed its limits.

#### **Avoid Disassembly**

You are not suggested to disassemble, repair or make any modification to the device. Disassembly, modification, or any attempt at repair could generate hazards and cause damage to the device, even bodily injury or property damage, and will void any warranty.



Danger of explosion if 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.

## **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.

#### • 3<sup>rd</sup>-party parts:

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

PRODUCTS, HOWEVER, THAT FAILS 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 <u>www.ibase.com.tw</u> 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)
- If repair service is required, you can download the RMA form at <u>http://www.ibase.com.tw/english/Supports/RMAService/</u>. Fill out the form and contact your distributor or sales representative.

# **Table of Contents**

Chapter 1	General Information	1
1.1	Introduction	2
1.2	Features	3
1.3	Specifications - CMI221-991	3
1.4	System View	5
1.5	Dimensions	7
Chapter 2	Hardware Installation	9
2.1	Essential Installations	.10
2.2	WiFi / 3G / 4G Antenna Installation	.11
2.3	PCIe (x16) Expansion Card Installation	.12
2.4	Fan Replacement	.12
2.5	Mounting Brackets Installation	.13
Chapter 3	Driver Installation	15
3.1	Introduction	.16
3.2	Intel® Chipset Software Installation Utility	.16
3.3	HD Graphics Driver Installation	.18
3.4	HD Audio Driver Installation	.21
3.5	LAN Driver Installation	.23
3.6	Intel® Management Engine Drivers Installation	.26
3.7	Intel® USB 3.0 Drivers	.28
Chapter 4	BIOS Setup	31
Appendix		56
Α.	I/O Port Address Map	.57
В.	Interrupt Request Lines (IRQ)	.59
C.	Watchdog Timer Configuration	.60

# **Chapter 1 General Information**

The information provided in this chapter includes:

- Features
- Specifications
- Overview
- Dimensions



### **1.1 Introduction**

The CMI221 Mini-ITX System uses the MI991AF motherboard to support Intel® 6th Gen. i7/i5/i3 CPUs and up to 32GB of DDR4 2400 SO-DIMM system memory. The *CMI221-991-6COM* series supports *six COM* ports, and the CMI221-991M has *four COM* ports. The models available are:

- CMI221-991-6COM-i7 (with IBD182V) with Intel® Core™ i7-6700TE
- CMI221-991-6COM-i5 (with IBD182V) with Intel® Core™ i5-6500TE
- CMI221-991M [Barebone]





Rear view of CMI221-991-6COM (with 6 COM ports)

### 1.2 Features

- Mini-ITX system with MI991AF Mini-ITX motherboard
- Supports Intel® 6th Gen. Core™ i7/i5/i3/Pentium DT processor
- 2 x DDR4-2400 SO-DIMM, upgradable to 32 GB
- DVI-D, HDMI, DisplayPort graphics interface
- 2x USB 2.0 & 6x USB 3.0 ports
- Dual GbE LAN,
- 2.5" HDD and/or mSATA storage
- 1x PCIe (x16) expansion slot
- 100V~240V AC power input

### 1.3 Specifications – CMI221-991

Product Name	CMI221-991-6COM Series	CMI221-991M		
	Sys	tem		
Motherboard	MI99	01AF		
CPU	Intel® 6th Gen. Core™ i7/i • Intel® Core™ i7-6700TE • Intel® Core™ i5-6500TE	Intel® 6th Gen. Core <sup>™</sup> i7/i5/i3/Pentium DT processor Intel® Core <sup>™</sup> i7-6700TE (2.4GHz ~ 3.4GHz) @35W Intel® Core <sup>™</sup> i5-6500TE (2.3GHz ~ 3.3GHz) @35W		
Chipset	Intel <sup>®</sup>	Q170		
Memory	2 x DDR4-2400 SO-DIM	M, upgradable to 32 GB		
Graphics	Core <sup>™</sup> DT processor ir	ntegrated HD Graphics,		
Storage	<ul> <li>1x 2.5" SATA 1TB 5400RPM</li> <li>2.5" SATA SSD (Reserved), reserved cable kit for 2nd storage</li> </ul>			
Power Supply	Industrial ATX power 250W AC-In 100V ~ 240V Input frequency 47Hz ~ 63Hz			
BIOS	AMI BIOS			
Watchdog	Watchdog Timer 256 segments, 0, 1, 2255 sec/min			
Chassis	Black, Matte black paint over galvanized sheet steel			
Mounting	Desktop or wall mount			
Dimensions	300mm(W) x 250mm(D) x 72mm(H)			
Net Weight	TBD			
Certification	CE **following EN5503	2**; FCC Class A / LVD		
<ul> <li>• Windows 10 (64-bit) / 8.1 (64-bit) / 7 Pro (32-bit / 6</li> <li>• Windows Embedded 8.1 (64-bit)</li> <li>• Linux Fedora (64-bit) / Ubuntu (64-bit)</li> </ul>				

Product Name	CMI221-991-6COM Series	CMI221-991M		
I/O Ports				
	<ul> <li>6x DB9 for COM#1~6 (COM1 RS232/422/485, COM2~6 RS232)</li> </ul>	<ul> <li>4 x DB9 for COM#1~4 (COM1 RS232/422/485, COM2~4 RS232)</li> </ul>		
Boor Donal	6x USB 3.0 ports     2x RJ-45 GbE Connector			
Rear Panel	<ul> <li>AC pov</li> </ul>	ver socket		
	1x Antenna hole reserved			
	<ul> <li>1x DVI-D, 1x HDMI, 1 x DisplayPort</li> </ul>			
	<ul> <li>1x Audio port for [Line-in / Line-out / Mic]</li> </ul>			
	<ul> <li>1 x GPIO Port (4-In &amp; 4-Out)</li> </ul>			
Front Panel	2 x USB2.0 ports			
Expansion	1 x PCIe (x16) slot			
Expansion	Option: IP119 riser card			
	Environment			
Tomporaturo	• <b>Operating:</b> 0 ~ 45 °C (32 ~ 113 °F)			
remperature	<ul> <li>Storage: -20~ 80 °C (-4 ~ 176 °F)</li> </ul>			
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)			
Vibration	Operating: 0.25	Grms / 5 ~ 500 Hz		
Protection	<ul> <li>Non-operating: 1 Grms / 5 ~ 500Hz</li> </ul>			

All specifications are subject to change without prior notice.

For detailed MB specifications, refer to the respective user manuals on our website.



## 1.4 System View

### **Top View**



#### **Front View**



**Rear View** 



No.	Name	No.	Name
1	COM Ports (COM1 ~ COM6)	6	DisplayPort
2	Expansion Slot	7	GbE LAN Ports
3	DVI-D Port	8	Audio Jacks (From top to bottom: Line-In, Line-Out, Mic)
4	HDMI Port	9	GPIO Connector
5	USB 3.0 Ports	10	Power In (110V~220V)

#### Remarks:

1. CMI221-991-6COM supports COM#1~6 (COM1 RS232/422/485, COM2~6 RS232)

2. CMI221-991M supports COM#1~4 (COM1 RS232/422/485, COM2~4 RS232)



### 1.5 Dimensions

Unit: mm



Rear view of CMI221-991-6COM (with 6 COM ports)



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# **Chapter 2 Hardware Installation**

The information provided in this chapter includes:

- Essential installations
  - HDD Installation
  - Memory Installation
  - WiFi / 3G / 4G Antenna Installation
  - PCIe (x16) Expansion Card Installation
  - Fan Replacement
  - Mounting Brackets Installation



### 2.1 Essential Installations

Release the four screws shown below to remove the cover for all installations except for that of the HDD. After installation, secure the device cover.



#### 2.1.1 HDD Installation

1. Loosen the single screw to release the HDD tray. Loosen the 4 screws holding the HDD. Install the HDD by fixing it with the screws that have been removed and connect the related cables. Close and secure the tray.



#### 2.1.2 Memory Installation

- 1. Remove the system cover, locate the memory slot and align the key of the memory module with that on the memory slot.
- 2. Insert the module slantwise and gently push the module straight down 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 WiFi / 3G / 4G Antenna Installation

Thread the WiFi / 3G / 4G antenna extension cable through an antenna hole of the front I/O cover and fasten the antenna as shown below. Then apply adhesive to the edge of the hex nut behind the front I/O cover to prevent the extension cable from falling if the cable becomes loose. After installation, secure the device cover.

 Thread and fasten the hex nut and the washer. Then install the antenna.
 Apply adhesive around here.





Info: The diameter of the nut is around 6.35 mm (0.25"-36UNC).

### 2.3 PCIe (x16) Expansion Card Installation

Release the screw holding the expansion slot bracket after removing the system chassis cover. Then install the expansion card and fix it with the screw that we removed earlier. Secure the system cover.



### 2.4 Fan Replacement

Remove the system cover and release the 4 fan screws. Replace the fan and tighten it with the screws that were removed. Replace the system cover.



## 2.5 Mounting Brackets Installation

### Wall Mount Installation:

Attach the wall mounting brackets to your CMI221 System, and secure them with the supplied screws as shown below.



Prepare at least four screws (M3, 6 mm) to mount the device on wall .



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# **Chapter 3 Driver Installation**

The information provided in this chapter includes:

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





#### **3.1 Introduction**

This section describes the installation procedures for software and drivers.

### 3.2 Intel® Chipset Software Installation Utility

The Intel<sup>®</sup> 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.

 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) Skylake Chipset Drivers*.



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



**Note:** After installing your operating system, you must install the Intel<sup>®</sup> Chipset Software Installation Utility first before proceeding with the drivers installation.

- 3. When the *Welcome* screen to the *Intel*® *Chipset Device Software* appears, click *Next* to continue.
- 4. On the next screen, click **Yes** to accept the software license agreement.
- 5. On the *Readme File Information* screen, click *Install* to continue.

Intel(R) Chipset Device Sof Readme File Information	tware	(	intel
<pre>* Product: Intel(R) Chipset * Version: 10.1.1 * Target PCH/Chipset: Clien * Date: 2015-06-03 NOTE:</pre>	Device Soft t Platforms	ware	*******
For the list of to the Release N * CONTENTS OF THIS DOCUMENT This document contains the f	supported ch otes otes otes otes otes otes otes otes	ipsets, plea	se refer
<ol> <li>Overview</li> <li>System Requirements</li> <li>Contents of the Distribu 3A. Public and NDA Confi</li> </ol>	tion Package gurations	h 0-t	>
	Back	Install	Cancel

6. After the utility has been installed, click *Finish* to restart the computer and for changes to take effect.+

### 3.3 HD Graphics Driver Installation

1. Click Intel and then Intel(R) Skylake Chipset Drivers.



2. Click Intel(R) HD Graphics Driver.

<b>Inside T</b>	<b>his CD</b> Version : I-6_Gen-1.0 @6
Intel	Intel(R) Chipset Software Installation Utility Intel(R) HD Graphics Driver Realtek High Definition Audio Driver Intel(R) PRO LAN Network Drivers Intel(R) ME 11.x Drivers Intel(R) USB 3.0 Drivers
8	Intel(R) HD Graphics Driver



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

Intel® Installation Framework 🚽 🗖 🗙				
Intel® Graphics Driver				
Welcome to the Setup Program				
This setup program will install the following components: - Intel® Graphics Driver - Intel® Display Audio Driver				
It is strongly recommended that you exit all programs before continuing. Click Next to continue.				
Automatically run WinSAT and enable the Windows Aero desktop theme (if supported).				
< <u>B</u> ack <u>Next</u> > <u>Cancel</u>				

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

Intel® Installation Framework 🛛 🗖	×
Intel <sup>®</sup> Graphics Driver	D
License Agreement	
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?	
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)	^
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING. Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.	2
Please Also Note: * If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies; * If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT,	~
< Back Yes No	
Intel® Installation Fra	mework

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



6. When installation has been completed, click *Finish* to restart the computer and for changes to take effect.



3

#### 3.4 HD Audio Driver Installation

1. Click Intel and then Intel(R) Skylake Chipset Drivers.

<b>Inside T</b>	Version : I-6_Gen-1.0 @6
intel LAN Card	Intel(R) Skylake Chipset Drivers Intel(R) Skylake-U Chipset Drivers
	Support Intel(R) Skylake Chipset Drivers

2. Click Realtek High Definition Audio Driver.



3. On the *Welcome to the InstallShield Wizard* screen, click *Next* to proceed and complete the installation process.



4. After the *InstallShield Wizard* has completed the driver installation, restart the computer for changes to take effect.

Realtek High Definition Audio Driver Setup (3.65) R2.71				
	InstallShield Wizard Complete			
	The InstallShield Wizard has successfully installed Realtek High Definition Audio Driver. Before you can use the program, you must restart your computer.			
	Yes, I want to restart my computer now.     No, I will restart my computer later.			
	Hemove any disks from their drives, and then click Finish to complete setup.			
InstallShield	< Back Finish Cancel			

3

#### 3.5 LAN Driver Installation

1. Click Intel and then Intel(R) Skylake Chipset Drivers.



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



#### 3. Click Install Drivers and Software.



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

退	Intel(R) Network Connections Install Wizard	×
Welcom Networ	e to the install wizard for Intel(R) k Connections	(intel)
	The install wizard will allow you to modify or remove Intel(R) Network Connections. To continue, dick Next.	
	< Back Next >	Cancel

3

- 5. On the next screen, click *Next* to to agree with the license agreement.
- 6. Click the checkbox for Drivers in the Setup Options screen and click *Next* to continue.

Intel(R) Networ	k Connections Install Wizard	×
Setup Options Select the program features you wan	t installed.	(intel)
Install: Drivers Intel(R) PROSet for Windows* De Advanced Network Services Windows* PowerShell Module Intel(R) Network Connections SN	evice Manager : MP Agent	
Feature Description	< <u>B</u> ack <u>N</u> ext >	Cancel

7. Click *Install* to begin the installation.

退	Intel(R) Network	Connections	s Install Wizard	×
Ready to I	I <b>nstall the Program</b> d is ready to begin installatio	n.		(intel)
Click Insta	all to begin the installation.			-
If you wa exit the w	nt to review or change any o iizard.	of your installation	settings, dick Back. Cli	ck Cancel to
		< <u>B</u> ack	Install	Cancel

8. When InstallShield Wizard has completed the installation, click *Finish*.

### 3.6 Intel® Management Engine Drivers Installation

1. Click Intel and then Intel(R) Skylake Chipset Drivers.

Inside This CD Version : I-6_Gen-1.0 @6		
Intel LAN Card	Intel(R) Skylake Chipset Drivers Intel(R) Skylake-U Chipset Drivers	
8	Support Intel(R) Skylake Chipset Drivers	

2. When the *Welcome* screen to the *Intel*® *Management Engine Components* setup appears, click *Next* to continue.

Setup		×
Intel® Management Engine Components Welcome	(intel)	
You are about to install the following product: Intel® Management Engine Components It is strongly recommended that you exit all programs before Click Next to continue, or click Cancel to exit the setup programs	e continuing. am.	
Intel Corporation	< Back Next > Cance	el



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

Setup			×
Intel® Management Engine Component License Agreement	S	(inte	D
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User) IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING. Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.			are") e lo not
Please Also Note: * If you are an Original Equipment Manufacturer (OEI (IHV), or Independent Software Vendor (ISV), this co * If you are an End-User, then only Exhibit A, the IN applies. For OEMs, IHVs, and ISVs:	M), Independent Ha mplete LICENSE AG TEL SOFTWARE LICI	rdware Vendo REEMENT app ENSE AGREEM	or olies; IENT,
LICENSE. This Software is licensed for use only in con Use of the Software in conjunction with non-Intel con	junction with Intel c aponent products is	omponent pro not licensed	oducts. V
Intel Corporation	< <u>B</u> ack	Next >	<u>C</u> ancel

4. Follow the instructions accordingly. When the Setup Progress screen appears, click *Next*. Click *Finish* when the components have been successfully installed.

### 3.7 Intel® USB 3.0 Drivers Installation

1. Click Intel and then Intel(R) Skylake Chipset Drivers.



2. Click Intel(R) USB 3.0 Drivers.





3. When the *Welcome* screen to the *Intel*® USB 3.0 Host Controller Adaptation Driver setup appears, click Next.



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



- 5. On the *Readme File Information* screen, click *Next* to continue and follow the instructions accordingly.
- 6. When the driver has been successfully installed, click *Finish* to restart the computer and for changes to take effect.

Setup	×
Intel® USB 3.0 Host Controller Adaptation Dri Completion	ver (intel)
You have successfully installed the following product:	
Intel® USB 3.0 Host Controller Adaptation Driver	
You must restart this computer for the changes to take effect computer now?	t. Would you like to restart the
• Yes, I want to restart this computer now.	
○ No., I will restart this computer later.	
Click here to open log file location.	
Intel Corporation	< Back Next > Finish

# 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
- Boot Settings
- Save & Exit



### 4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel<sup>®</sup> 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.

#### 4.1 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.



### 4.2 Main Settings

Aptio Setup Utility - Main Advanced Chipset Security	Copyright (C) 2019 American Boot Save & Exit	Megatrends, Inc.
Total Memory Memory Frequency	8192 MB 2133 MHz	Set the Date. Use Tab to switch between Date elements.
System Date System Time	[Thu 01/01/2009] [00:06:13]	
		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2,18,1263, C	opyright (C) 2019 American M	egatrends. Inc.

<b>BIOS Setting</b>	Description
System Date	Sets the date. Use the <tab> key to switch between the date elements.</tab>
System Time	Set the time. Use the <tab> key to switch between the time elements.</tab>

### 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.

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced Chipset Security Boot Save & Exit	Megatrends, Inc.
<pre>&gt; CPU Configuration Power &amp; Performance PCH-FW Configuration Trusted Computing ACPI Settings iSmart Controller F81846 Super IO Configuration Hardware Monitor CSM Configuration &gt; USB Configuration</pre>	<pre>CPU Configuration Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>

BIOS Setting	Description
CPU Configuration	Displays CPU configuration parameters.
Power & Performance	Shows power and performance options.
PCH-FW Configuration	Configures management engine technology parameters.
Trusted Computing	Trusted computing settings.
ACPI Settings	Displays system ACPI parameters.
iSmart Controller	Sets up system power on settomgs.
Fintek Super IO Configuration	Displays super IO chip parameters.
Hardware Monitor	Shows hardware monitoring status.
CSM Configuration	Enables / Disables option ROM execution settings, etc.
USB Configuration	Displays USB configuration parameters.

### 4.3.1 CPU Configuration

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc. Advanced			
CPU Configuration Type ID Speed	Intel(R) Core(TM) 15-6500 CPU @ 3.20GHz 0x506E3 3200 MHz Supported	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.	
SMX/TXT SMX/TXT Intel (VMX) Virtualization Technology Active Processor Cores	Supported [Enabled] [A11]		
AES Intel Trusted Execution Technology	[Enabled] [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>	

<b>BIOS Setting</b>	Description
Intel(VMX) Virtualization Technology	Enables / Disables a VMM to utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	Number of cores to enable in each processor package. Options: All, 1, 2, 3
AES	Enables / Disables AES (Advanced Encription Standard).
Intel Trusted Execution Technology	Enables / Disables utilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology. Changes require a full power cycle to take effect.

### 4.3.2 Power & Performance

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced Chipset Security Boot Save & Exit	Megatrends, Inc.
CPU Configuration Power & Performance PCH-FW Configuration Trusted Computing ACPI Settings iSmart Controller F 681846 Super ID Configuration Hardware Monitor CSM Configuration USB Configuration	Power & Performance Options ++: Select Screen t1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.18.1263. Copyright (C) 2019 American Me	egatrends, Inc.

BIOS Setting	Description
CPU – Power Management Control	CPU – Power Management Control Options
Intel® SpeedStep(tm)	Allows more than two frequency ranges to be supported
Intel® Speed Shift Technology	Enables / Disables Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enables / Disables processor Turbo Mode (requires EMMTTM enabled too). <b>Auto</b> means enabled, unless max. turbo ration is bigger than 16-SKL AO W/A.



### 4.3.3 PCH-FW Configuration

Aptio Setup Utility Advanced	– Copyright (C) 2019 America	n Megatrends, Inc.
ME Firmware Version ME Firmware Mode ME Firmware SKU ME File System Integrity Value ME Firmware Status 1 ME Firmware Status 2 AMT BIOS Features	11.8.55.3510 Normal Mode Corporate SKU 2 0×90000245 0×8010830E [Enabled]	<pre>When disabled AMT BIDS Features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability Features in FW.  ++: Select Screen t4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.18.1263.	Copyright (C) 2019 American	Megatrends, Inc.

BIOS Setting	Description
AMT BIOS Features	When disabled AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability features in FM.



### 4.3.4 Trusted Computing

Aptio Setup Utili Advanced	ty – Copyright (C) 2019 A	merican Megatrends, Inc.
Configuration Security Device Support TPM State Pending operation Device Select	(Enable) (Enabled) [None] (Auto]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Current Status Information TPM Enabled Status: TPM Active Status: TPM Owner Status:	Enable Activated Unowned	
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.18.126	3. Copyright (C) 2019 Ame	rican Megatrends. Inc.

<b>BIOS Setting</b>	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INTIA interface will not be available.
TPM State	Enables/Disables Security Device. NOTE: Your computer will reboot during restart in order to change State of the Device.
Pending operation	Schedule an operation for the security device. NOTE: Your computer will reboot during restart in order to change state of security device.
Device Select	<b>TPM 1.2</b> will restrict support to TPM 1.2 devices. <b>TPM 2.0</b> will restrict support of TPM 2.0 devices. <b>Auto</b> will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.



#### 4.3.5 ACPI Settings



<b>BIOS Setting</b>	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. Options: Suspend Disabled, S3 (Suspend to RAM)



### 4.3.6 iSmart Controller

Aptio Setup Utility - Advanced	Copyright (C	) 2019 American	Megatrends, Inc.
Aptio Setup Utility - Advanced iSmart Controller Power-On after Power failure Temperature Guardian Schedule Slot 1 Schedule Slot 2	Copyright (C [Disable] [Disable] [None] [None]	) 2019 American	<pre>Megatrends, Inc.  ++: Select Screen t1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Varation 0.40.4262		2010 American M	

<b>BIOS Setting</b>	Description	
Power-On after Power failure	Options: Disable, Enable	
Temperature Guardian	Options: Disable, Enable	
Schedule Slots	Sets up the hour / minute system power on. Options:	
	None	
	Power On	
	Power On / Off	



## 4.3.7 F81846 Super IO Configuration

Aptio Setup Uti Advanced	lity – Copyright (C) 2019 Amer.	ican Megatrends, Inc.
F81846 Super IO Configuration	1	[Enable]Provide the Standby
Super IO Chip	F81846	[Disable]Shutdown the standby
Standby Power on S5(Eup)		
<ul> <li>Serial Port 1 Configuration</li> <li>Serial Port 2 Configuration</li> <li>Serial Port 3 Configuration</li> <li>Serial Port 4 Configuration</li> </ul>		
	Standby Power on S5(Eup) All Enable Enable Ethernet for WOL All Disable	: Select Screen
		: Select Item ter: Select
		+/-: Change Opt.
		F1: General Help
		F3: Optimized Defaults
		F4: Save & Exit FSC: Exit
Version 2.18.1	263. Copyright (C) 2019 America	an Megatrends, Inc.

<b>BIOS Setting</b>	Description
Standby Power on S5 (ErP)	Enable - provide the standby power for device. Disable - shutdown the standby power. Options: All Enable, Enable Ethernet for WOL, All Disable.
Serial Port Configuration	Sets parameters of Serial Ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.



## 4.3.7.1 Serial Port 1 Configuration

Aptio Setup Utility Advanced	– Copyright (C) 2019 America	an Megatrends, Inc.
F81846 Super IO Configuration		Set Parameters of Serial Port
Super IO Chip	F81846	I (COMP)
Standby Power on S5(Eup)	[All Enable]	
<ul> <li>Serial Port 1 Configuration</li> <li>Serial Port 2 Configuration</li> <li>Serial Port 3 Configuration</li> <li>Serial Port 4 Configuration</li> </ul>		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.18.1263.	Copyright (C) 2019 American	Megatrends, Inc.

<b>BIOS Setting</b>	Description	
Serial Port	Enables / Disables the serial port.	
Change Settings	Selects an optimal settings for Super I/O device. Options:	
	• Auto	
	• IO = 3F8h; IRQ = 4	
	• IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
F81846 Serial Port1 Mode Select	F81846 serial port1 loop back//RS-232 / 422 / 485. Options:	
	• RS232	
	• RS485	
	• RS422	



#### 4.3.7.2 Serial Port 2 Configuration



<b>BIOS Setting</b>	Description	
Serial Port	Enables / Disables the serial port.	
Change Settings	Selects an optimal settings for Super I/O device. Options:	
	• Auto	
	• IO = 2F8h; IRQ = 3	
	• IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	



## 4.3.7.3 Serial Port 3 Configuration

Aptio Setup Utility - Advanced	- Copyright (C) 2019 Americar	n Megatrends, Inc.
Serial Port 3 Configuration		Enable or Disable Serial Port
Serial Port Device Settings	[Enabled] IO=3E8h; IRQ=5;	
Change Settings	[Auto]	
	Serial Port Disabled Enabled	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.18.1263. (	Copyright (C) 2019American M	Megatrends, Inc.

<b>BIOS Setting</b>	Description	
Serial Port	Enables / Disables the serial port.	
Change Settings	Selects an optimal settings for Super I/O device. Options:	
	• Auto	
	• IO = 3E8h; IRQ = 7	
	• IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2F0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2E0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	







<b>BIOS Setting</b>	Description	
Serial Port	Enables / Disables the serial port.	
Change Settings	Selects an optimal settings for Super I/O device. Options:	
	Auto	
	• IO = 2E8h; IRQ = 7	
	• IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2F0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	
	• IO = 2E0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12	

### 4.3.8 Hardware Monitor

Aptio Setup Uti Advanced	lity – Copyright (C) 2019 Am	merican Megatrends, Inc.
Pc Health Status DPU smart fan control System smart fan control CPU temperature System temperature CPU Fan Speed SYS Fan Speed VCORE +5V +12V Memory Voltage +3.3V CPU Shutdown Temperature	[Disabled] [Disabled] : +29 C : +29 C : 4021 RPM : 0 RPM : +1.120 V : +5.045 V : +12.232 V : +1.192 V : +3.360 V [Disabled]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.18.1	263. Copyright (C) 2019 Amer	ican Megatrends, Inc.

<b>BIOS Setting</b>	Description
CPU Smart Fan Control	Enables / Disables the CPU smart fan feature. Options: Disabled / 50°C / 60°C / 70°C / 80°C
System Smart Fan Control	Enables / Disables the system smart fan feature. Options: Disabled / 50°C / 60°C / 70°C / 80°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.
CPU Shutdown Temperature	Options: Disabled / 70°C / 75°C / 80°C / 85°C / 90°C / 95°C



### 4.3.9 CSM Configuration

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced Chipset Security Boot Save & Exit	Megatrends, Inc.
<ul> <li>CPU Configuration</li> <li>Power &amp; Performance</li> <li>PCH-FW Configuration</li> <li>Trusted Computing</li> <li>ACPI Settings</li> <li>iSmart Controller</li> <li>F81846 Super IO Configuration</li> <li>Hardware Monitor</li> <li>CSM Configuration</li> <li>USB Configuration</li> </ul>	CPU Configuration Parameters

Option ROM execution		
		Controls the execution of UEFI
Network [Do	not launch]	and Legacy The option
		++: Select Screen
		Enter: Select
		F1: General Help F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit
		ESC: Exit

<b>BIOS Setting</b>	Description
Network	Controls the execution of UEFI and Legacy PXE OpROM.
	Options: Do not launch / Legacy



## 4.3.10 USB Configuration

Aptio Setup Util Advanced	ity – Copyright (C) 20	)19 American Megatrends, Inc.
USB Configuration		Enables Legacy USB support. AUTO option disables legacy
USB Module Version	17	support if no USB devices are connected. DISABLE option will
USB Controllers: 1 XHCI		keep USB devices available only for EFI applications.
USB Devices:		
1 Drive, 1 Keyboard, 1 ⊧	louse	
Legacy USB Support	[Enabled]	
XHCI Hand-off	Legacy USB Sup	pont —
USB Mass Storage Driver Suppor	t Enabled	
Port 60/64 Emulation	Disabled	
	Auto	→+: Select Screen
USB hardware delays and time-o	out	t↓: Select Item
USB transfer time-out		Enter: Select
Device reset time-out	[20 sec]	+/-: Change Opt.
Device power-up delay	[Auto]	F1: General Help
		F2: Previous Values
Mass Storage Devices:		F3: Optimized Defaults
USB DISK 3.0 PMAP	[Auto]	F4: Save & Exit
		ESC: Exit

<b>BIOS Setting</b>	Description
Legacy USB Support	<b>Auto</b> disables legacy support if there is no USB device connected. <b>Disable</b> keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand- off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
Port 60/64 Emulation	Enables / Disables I/O port 60h/64h emulation. This should be enabled for the complete USB KB legacy support for non-USB aware OSes.
USB Transfer time- out	The time-out value for control, bulk, and Interrupt transfers. Options: 1 sec / 5 sec / 10 sec / 20 sec
Device reset time- out	Seconds of delaying execution of start unit command to USB mass storage device. Options: 10 sec / 20 sec / 30 sec / 40 sec
Device power-up delay	Maximum time the device will take before it roperly reports itself to the Host Controllwer. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.
Mass Storage Devices	Mass storage device emulation type. <b>Auto</b> enumerates devices according to their media format. Optical drives are emulated as <b>CROM</b> , deives with no medial will be emulated according to a drive type



### 4.4 Chipset Settings

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced <mark>Chipset</mark> Security Boot Save & Exit	Megatrends, Inc.
▶ System Agent (SA) Configuration ▶ PCH-IO Configuration	<pre>System Agent (SA) Parameters ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.18.1263. Copyright (C) 2019 American Me	egatrends, Inc.

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

### 4.4.1 System Agent (SA) Configuration

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc. Chipset		
System Agent (SA) Configuration	ı	Graphics Configuration
SA PCIE Code Version VT-d	1.5.0.0 Supported	
▶ Graphics Configuration VT-d	[Enabled]	
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.18.126	63. Copyright (C) 2019 An	merican Megatrends, Inc.

## 4.4.1.1 Graphics Configuration

Aptio Setup Utility - Chipset	Copyright (C) 2017 American	Megatrends, Inc.
Graphics Configuration Graphics Turbo IMON Current Skip Scaning of External Gfx Card Primary Display Select PCIE Card ► External Gfx Card Primary Display Co Internal Graphics GTT Size Aperture Size DVMT Pre-Allocated DVMT Pre-Allocated	<b>31</b> (Disabled) (Auto) nfiguration (Auto) (BMB) (256MB) (32M) (9254)	Graphics turbo IMON current values supported (14–31)
	ICODMJ	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
Version 2.18.1263. Co	pyright (C) 2017American M	egatrends, Inc.

BIOS Setting	Description	
Skip Scanning of External Gfx Card	If enabled, it will not scan for external Gfx Card on PEG and PCH PCIE ports.	
Primary Display	Selects which of IGFX/PEG/PCI graphics device should be primary display, or selects SG for switchable Gfx. Options: Auto /IGFX /PEG /PCI /SG	
External Gfx Card	Configures the external Gfx card primary display.	
Primary Display Configuration	<ul> <li>Primary PEG: Selects the primary PEG (options: Auto / PEG11 / PEG12).</li> </ul>	
	<ul> <li>Primary PCIE: Selects the primary PCIe (options: Auto / PCIE1 ~ PCIE18)</li> </ul>	
Internal Graphics	Keep IGFX enabled based on the setup options. Options: Auto / Disabled / Enabled	
GTT Size	Sets the GTT size as 2MB, 4MB, or 8MB.	
Aperture Size	Sets the aperture size as 128 MB / 256 MB / 512 MB / 1024 MB / 2048 MB.	
	Note: Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, disable CSM support.	
DVMT Pre- Allocated	Sets DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics devce. Options: 0M /32M /64M /4M /8M /12M /16M /20M /24M /28M /32M/F7 /36M /40M /44M /48M /52M /56M /60M	



Selects DVMT 5.0 total graphic memory size used by he internal graphcis device. Options: 256M/128M/MAX
S

### 4.4.2 PCH-IO Configuration

Aptio Se Chips	tup Utility – Copyright (C) 2019 American et	Megatrends, Inc.
PCH-IO Configuration ▶ SATA And RST Configura PCH LAN Controller Wake on LAN Enable	tion [Enabled] [Enabled]	SATA Device Options Settings
<b>BIOS Setting</b>	Description	
SATA and RST Configuration	Configures SATA devices.	
PCH LAN Controller	Enables / Disables the onboard NIC.	
Wake on LAN Enable	Enables / Disables the integrated LAN to wake up the system.	

#### 4.4.2.1 SATA and RST Configuration:



<b>BIOS Setting</b>	Description
SATA Controller(s)	Enables / Disables the SATA device.
SATA Mode Selection	Determines how SATA controller(s) operate. Options: AHCI / Intel RST Premium
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.

### 4.5 Security Settings

Aptio Setup Utility Main Advanced Chipset Security	– Copyright (C) 2019 American Boot Save & Exit	Megatrends, Inc.
Password Description If ONLY the Administrator's password then this only limits access to Se only asked for when entering Setup If ONLY the User's password is set is a power on password and must be boot or enter Setup. In Setup the have Administrator rights. The password length must be in the following range: Minimum length Maximum length Administrator Password User Password	ard is set, etup and is  , then this entered to User will 3 20	Set Administrator Password ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Vancian 2 19 1962	Conunight (C) 2019 Amonican M	agatpande. Inc.

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



### 4.6 Boot Settings

	Aptio Setup Utility Main Advanced Chipset Securit	– Copyright (C) 2019 America y Boot Save & Exit	n Megatrends, Inc.
	Boot Configuration Setup Prompt Timeout Bootup NumLock State Quiet Boot Fast Boot Boot mode select	1 [Off] [Disabled] [Disabled] [LEGACY]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
	FIXED BOOT ORDER Priorities Boot Option #1 Boot Option #2 Boot Option #3	[Hard Disk] [CD/DVD] [USB Hard Disk]	
	Boot Option #4 Boot Option #5 Boot Option #6	[USB CD/DVD] [USB Key: USB DISK 3.0 PMAP] [USB Floppy]	++: Select Screen fl: Select Item Enter: Select
•	Boot Uption #7 Boot Option #8 USB Key Drive BBS Priorities	[USB Lan] [Network]	+/-: Change Upt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit FSS: Exit
	Version 2 18 1263	Conuciant (C) 2019 American	Megatrends Tor

<b>BIOS Setting</b>	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.
Boot mode select	Options: LEGACY, UEFI
FIXED BOOT ORDER Priorities	Sets the system boot order.
USB Key Drive BBS Priorities	Specifies the Boot Device Priority sequence from available USB Key Drives

### 4.7 Save & Exit Settings

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced Chipset Security Boot <mark>Save &amp; Exit</mark>	Megatrends, Inc.
Save Options Save Changes and Exit Discard Changes and Reset Discard Changes and Reset Save Changes Discard Changes Default Options Restore Defaults Save as User Defaults Restore User Defaults	Exit system setup after saving the changes. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2 19 1263 Conunight (C) 2019 American M	agatpande The

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.
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.

# **Appendix**

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

- I/O Port Address Map
- Interrupt Request Lines (IRQ)
- 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
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x0000061-0x0000061	Motherboard resources
0x0000063-0x0000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x0000067-0x0000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x0000080-0x0000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x0000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x0000030-0x0000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x0000038-0x0000039	Programmable interrupt controller
0x000003C-0x000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller

Address	Device Description
0x000000A8-0x000000A9	Programmable interrupt controller
0x00000AC-0x00000AD	Programmable interrupt controller
0x00000B0-0x00000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000800-0x0000087F	Motherboard resources
0x0000E000-0x0000EFFF	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115
0x000000F0-0x000000F0	Numeric data processor
0x0000F090-0x0000F097	Standard SATA AHCI Controller
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F060-0x0000F07F	Standard SATA AHCI Controller
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x00001854-0x00001857	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM5)
0x0000F000-0x0000F03F	Intel(R) HD Graphics 630
0x000003B0-0x000003BB	Intel(R) HD Graphics 630
0x000003C0-0x000003DF	Intel(R) HD Graphics 630
0x0000FF00-0x0000FFFE	Motherboard resources
0x0000F040-0x0000F05F	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
0x0000060-0x0000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard

### 4.8

## 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 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 8	System CMOS/real time clock
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131
IRQ 12	Microsoft PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 14	Motherboard resources
IRQ 16	High Definition Audio Controller
IRQ 19	Intel(R) Active Management Technology - SOL (COM5)
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967283	Intel(R) Management Engine Interface
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection
IRQ 4294967288	Intel(R) I211 Gigabit Network Connection
IRQ 4294967289	Intel(R) I211 Gigabit Network Connection
IRQ 4294967290	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967291	Intel(R) HD Graphics 630
IRQ 4294967292	Intel(R) Ethernet Connection (2) I219-LM
IRQ 4294967293	Standard SATA AHCI Controller
IRQ 4294967294	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115

### 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 the 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.
\parallel
//-----
#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 &= (\sim 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 &= (\sim 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 &= \sim 0x01;
    Set_F81866_Reg(0xFA, bBuf);
                                       //disable WDTO output
    bBuf = Get_F81866_Reg(0xF5);
    bBuf &= \sim 0x20;
    bBuf = 0x40;
    Set_F81866_Reg(0xF5, bBuf); //disable WDT
}
//-----
```

```
//-----
//
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// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
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// 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);
                                 //Fintek 81866
   if (ucDid == 0x07)
       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;
}
,
//-----
//-----
\parallel
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// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
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// 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
```