# **IB995**

# Intel<sup>®</sup> 8th or 9th Gen. Xeon. Core™ i7/i5/i3 Full-Size CPU Card

# User's Manual

Version 1.1a (Sep. 2021)

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# 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 A 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 (-4° F) or above 80° C (176° F). To prevent from damages, the product must be used in a controlled environment.



#### 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 PCB on an anti-static kit or mat.
- Hold the edges of PCB when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the PCB.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.



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.

#### • 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, 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 <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 Gene	eral Information	1
1.1	Introduo	ction	2
1.2	Feature	95	2
1.3	Packing	g List	3
1.4	Optiona	Il Accessories	3
1.5	Specific	cations	4
1.6	Block D	viagram	6
1.7	Board F	Pictures	7
1.8	Dimens	ions	8
Chapter	2 I	Hardware Configuration	9
2.1	Essenti	al Installations Before You Begin	. 10
2.2	Setting	the Jumpers	. 12
2.3	Jumper	& Connector Locations on IB995	. 13
2.4	Jumper	s Quick Reference	. 14
	2.4.1	ATX / AT Power Mode Selection (JP1)	. 14
	2.4.2	PCIe (x16) Bifurcation Selection (JP2 & JP3)	. 15
	2.4.3	LVDS Power Brightness Selection (JP4)	. 16
	2.4.4	LVDS Panel Power Selection (JP6)	. 16
	2.4.5	Clear ME Register (JP8)	. 17
	2.4.6	Clear CMOS Data (JP9)	. 17
2.5	Connec	tors Quick Reference	. 18
	2.5.1	COM1 RS-232/422/485 & COM2 RS-232 Serial Port (J25)	. 19
	2.5.2	COM2~COM4 RS-232 Ports (J26, J5, J6)	. 20
	2.5.3	Digital I/O Connector (J2)	. 21
	2.5.4	LCD Backlight Connector (J10)	. 21
	2.5.5	ATX Power Connector (J7)	. 22
	2.5.6	USB3.0/2.0 Connector (J8, J9)	. 23
	2.5.7	Dual USB 2.0 Connector (J16)	. 24
	2.5.8	Front Panel Audio Connector (J18)	. 24
	2.5.9	Front Panel Settings Connector (J3)	. 25
	2.5.10	LVDS Connector (J11, J12)	. 26
	2.5.11	Fan Power Connector (CPU_FAN1)	. 27
	2.5.12	DVI-D Connector (J20)	. 28
	2.5.13	Parallel Port (J24)	. 29

Chapter 3	Drivers Installation	.31
3.1	Introduction	32
3.2	Intel® Chipset Software Installation Utility	33
3.3	VGA Driver Installation	35
3.4	HD Audio Driver Installation	38
3.5	LAN Driver Installation	39
3.6	Intel® Management Engine Interface	42
Chapter 4	BIOS Setup	.45
4.1	Introduction	46
4.2	BIOS Setup	46
4.3	Main Settings	48
4.4	Advanced Settings	49
4.5	Chipset Settings	62
4.6	Security Settings	65
4.7	Boot Settings	69
4.8	Save & Exit Settings	70
Appendix		.71
A.	I/O Port Address Map	72
В.	Interrupt Request Lines (IRQ)	73
C.	Watchdog Timer Configuration	74

# Chapter 1 General Information

The information provided in this chapter includes:

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



## 1.1 Introduction

The IB995AF PICMG1.3 SHB Express CPU Card is based on the latest 8th or 9th Gen. Intel® Xeon® E / Core<sup>TM</sup> / Pentium® / Celeron® processor with speeds of up to 4.7GHz and features an integrated graphics core that work with LVDS, DVI-I and DVI-D display outputs.

IB995 utilizes the dramatic increase in performance provided by Intel's latest cutting-edge technology. Measuring 338mm x122mm, IB995 offers fast 6Gbps SATA support (up to 8 ports), USB3.1 (5 ports) and interfaces for two Gigabit LAN.



Photo of IB995

#### 1.2 Features

- 2 x DDR4-2400/2666 UDIMM, expandable up to 32GB, ECC supported per CPU SKUS.
- Dual Gigabit LAN
- 1 x DVI-I , 1 x DVI-D, 1 x 24-bit dual channel LVDS
- 5 x USB 3.1, 8 x SATA III, 4 x serial ports
- PCIe (x16), M.2 M2280 (for IB995AF series only) and M.2 E2230 expansion slots
- Configurable watchdog timer, digital I/O, TPM

## 1.3 Packing List

Your IB995 package should include the items listed below. If any of the items is missing, please contact the distributor or dealer from whom you have purchased the product.

- IB995AF PICMG1.3 SHB x 1
- I/O shield
- SATA cable (SATA-5)
- COM port cable (PK1-150)
- Disk (including chipset drivers)
- This user's manual

## 1.4 Optional Accessories

- Audio cable (Audio-18)
- DVI-D cable (DVIK-3)
- USB cable (USB-29)
- USB3.0 cable (USB-3K)
- Printer port cable (PK3K)

# 1.5 Specifications

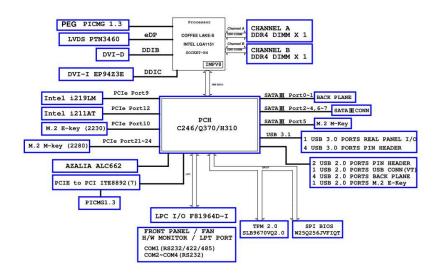
Product Name	IB995AF Series	IB995EF	
Form Factor	PICMG 1.3 SHB Express full	size CPU card	
	System		
Operating	Microsoft Windows 10 (64-	bit)	
System	Linux Ubuntu (64-bit)		
CPU & Chipset	9 <sup>th</sup> / 8 <sup>th</sup> Gen. Intel <sup>®</sup> Xeon <sup>®</sup> E / Celeron <sup>®</sup> , up to 4.7 GHz	′ Core™ / Pentium <sup>®</sup> /	
Memory	2 x DDR4 UDIMM 2666 / 240	00 MHz, up to 32 GB	
Wentory	* ECC will be supported by ic	dentified CPU SKUs.	
Storage	M.2 M2280 slot (NVMe supported)	N/A	
Graphics	Intel <sup>®</sup> UHD Graphics P630		
	1 <sup>st</sup> LAN: Intel <sup>®</sup> I219LM GbE	1 <sup>st</sup> LAN: Intel <sup>®</sup> I219V GbE	
LAN	2 <sup>nd</sup> LAN: Intel <sup>®</sup> I210AT / I211AT GbE	2 <sup>nd</sup> LAN: Intel <sup>®</sup> I211AT GbE	
Security	TPM 2.0		
Super I/O	Fintek F81964D-I		
Digital I/O	4-In / 4-Out		
Audio Codec	Built HD audio with Realtek ALC662		
Watchdog Timer	Yes (256 segments, 0, 1, 2255 sec / min)		
BIOS	AMI BIOS		
iSmart	N/A		
RAID	RAID 0/1/5	N/A	
iAMT	11.6 (with E-Xeon <sup>®</sup> / Core i7/ i5 DT CPU SKUs) N/A		
ТРМ	2.0		
Dimensions	338mm x 126mm		
RoHS	Yes		
Certification	CE, FCC		



Model	I	B995AF Series	IB995EF	
	I	I/O Ports		
Display	• 1 x D • 1 x 2	<ul> <li>1 x DVI-D (1920 x 1080 at 60 Hz)</li> <li>1 x DVI-I (1920 x 1080 at 60 Hz)</li> <li>1 x 24-bit dual channel LVDS (1920 x 1080 at 60 Hz)</li> </ul>		
LAN	- ^ · · ·	J45 GbE LAN .2 (E-kev@2230). Supp	ort CNVi	
USB	<ul> <li>1 x M.2 (E-key@2230), Support CNVi</li> <li>1 x USB 3.1 (I/O coastline connectors)</li> <li>4 x USB 3.1 (via two onboard pin-header)</li> <li>1 x USB 2.0 ports (via M.2 E2230)</li> <li>1 x USB 2.0 (Vertical type A)</li> <li>2 x USB 2.0 (via an onboard pin-header)</li> <li>4 x USB 2.0 to Backplane</li> <li>1 x USB 2.0 to Backplane</li> </ul>			
Serial	<ul> <li>4 x COM ports:</li> <li>COM1: RS-232/422/485 (Support Ring-in with power at 500mA, selectable for 5V or 12V)</li> <li>COM2 ~ COM4: RS-232 only (via onboard box-headers)</li> </ul>		<ul> <li>4 x COM ports:</li> <li>COM1: RS-232/422/485 (Support Ring-in with power at 500mA, selectable for 5V or 12V)</li> <li>COM2 ~ COM4: RS-232 only (via onboard box-headers))</li> </ul>	
SATA	<ul> <li>IB995AF-C246 support 8 ports, 5 x SATAIII (3.0) 6Gbps</li> <li>IB995AF(Q370) support 6 ports, 3 x SATAIII (3.0) 6Gbps</li> <li>IB995EF(H310); support 4 ports, 2 x SATAIII (3.0) 6Gbps</li> </ul>			
Digital IO	4-In & 4-Out			
Expansion Slots	<ul> <li>1 x PCle (x16)</li> <li>1 x M.2 M2280</li> <li>1 x M.2 E2230</li> </ul>		<ul><li>1 x PCle (x16)</li><li>1 x M.2 E2230</li></ul>	
Environment				
Tomporatur	0	• Operating: 0 ~ 60 °	C (32 ~ 140 °F)	
Temperature	6	• Storage: -20 ~ 80 °C (-4 ~ 176 °F)		
Relative Hu	midity	0 ~ 90 %, non-conden	sing at 60 °C	

All specifications are subject to change without prior notice.

## 1.6 Block Diagram



### 1.7 Board Pictures

#### **Top View**



#### **Bottom View**

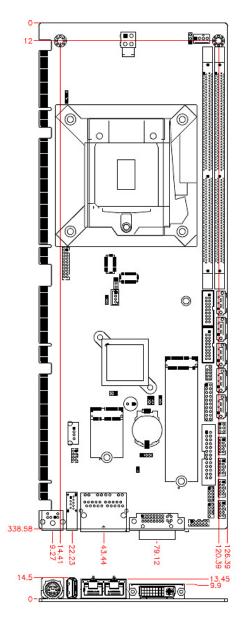


#### I/O View



\* The photos above are for reference only.

## 1.8 Dimensions



# Chapter 2 Hardware Configuration

This section provides information on jumper settings and connectors on the IB995 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
- Jumper and connector locations
- Jumper settings and information of connectors



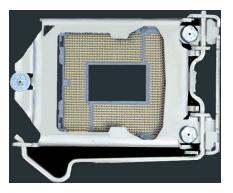
## 2.1 Essential Installations Before You Begin

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

#### 2.1.1 Installing the CPU

The IB995 board supports an LGA1151 Socket (shown below) for Intel<sup>®</sup> Xeon<sup>®</sup> E3 v5 family or Intel<sup>®</sup> 6<sup>th</sup> Gen. Core<sup>TM</sup> i7 / i5 / i3 DT processor processors. 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.

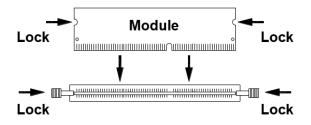


Then you can install the CPU cooler and fan.

**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

The IB995 board supports two DDR4 memory socket for a maximum total memory of 32GB in DDR4 UDIMM memory type. 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.

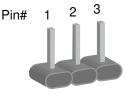
To remove the module, press the clips outwards with both hands

## 2.2 Setting the Jumpers

Set up and configure your IB995 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

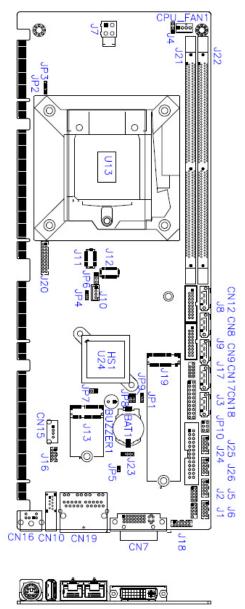
Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Illustration
Open		$\Box \circ \circ \\ 1 2 3$
1-2		<b>1</b> 2 3
2-3		1 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 IB995

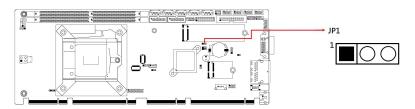


Board diagram of IB995AF (for Q170)

## 2.4 Jumpers Quick Reference

Function	Jumper	Page
ATX/AT Power Mode Selection	JP1	14
PCIe Bifurcation Selection	JP2, JP3	15
LVDS Panel Brightness Selection	JP4	16
LVDS Panel Power Selection	JP6	16
Clear ME Register	JP8	17
Clear CMOS Data	JP9	17

#### 2.4.1 ATX / AT Power Mode Selection (JP1)



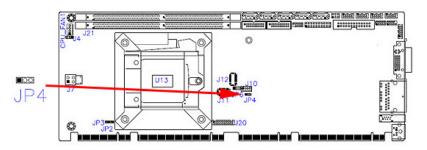
Function	Pin closed	Illustration
ATX Mode (default)	1-2	○ ● 1 ■
AT Mode	2-3	• • 1



#### 2.4.2 PCle (x16) Bifurcation Selection (JP2 & JP3)

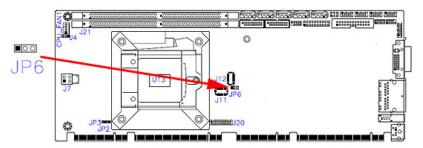
JP3 JP2			
Function	Pin closed	Illustration	
1 x PCle (x16)	JP3: Open	0 🗆 1	
(default)	JP2: Open	0 🗆 1	-
	JP3: Open	0 🗆 1	-
2 x PCle (x8)	JP2: Close	• 🗖 1	-
1 x PCle (x8)	JP3: Close	• 🗖 1	-
2 x PCIe (x4)	JP2: Close	0 🗆 1	-

### 2.4.3 LVDS Power Brightness Selection (JP4)



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

### 2.4.4 LVDS Panel Power Selection (JP6)



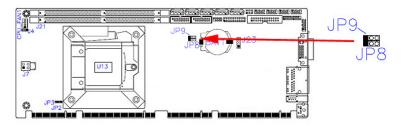
Function	Pin closed	Illustration
3.3V (default)	1-2	□ ● 1 ■
5V	2-3	• • 1 🗖

## 2.4.5 Clear ME Register (JP8)

0
- 88
JP8

Function	Pin closed	Illustration
Normal (default)	1-2	1 • •
Clear ME	2-3	1 🗆 •

## 2.4.6 Clear CMOS Data (JP9)

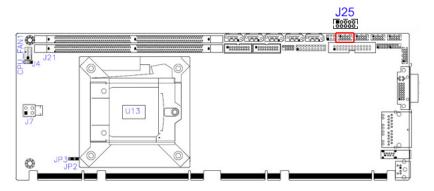


Function	Pin closed	Illustration
Normal (default)	1-2	1
Clear CMOS	2-3	1

#### 2.5 Connectors Quick Reference

Function	Connector Name	Page
COM1 RS-232/422/485 Ports	J25	19
COM2~COM4 RS-232 Ports	J26 (COM2), J5 (COM3), J6 (COM4)	20
Digital I/O Connector	J2	21
LCD Backlight Connector	J10	21
ATX 12V Power Connector	J7	22
Dual USB 3.0 Pin-Header	J8,J9	23
Dual USB 2.0 Pin-Header	J16	24
Front Panel Audio Connector	J18	25
Front Panel Settings Connector	J3	25
LVDS Connector	J11, J12	26
Fan Power Connector	CPU_FAN1	27
DVI-D Connector	J20	28
Parallel Port	J24	29

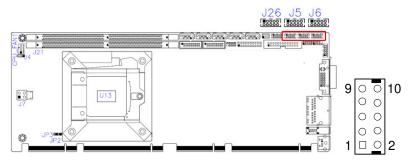
2.5.1 COM1 RS-232/422/485 & COM2 RS-232 Serial Port (J25)



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

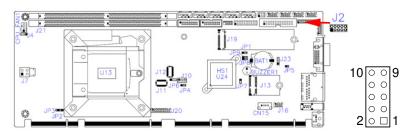
Pin	Signal Name			
FIII	RS-232	RS-422	RS-485	
1	DCD	TX-	DATA-	
2	RX	TX+	DATA+	
3	ТΧ	RX+	NC	
4	DTR	RX-	NC	
5	Ground	Ground	Ground	
6	DSR	NC	NC	
7	RTS	NC	NC	
8	CTS	NC	NC	
9	RI	NC	NC	

#### 2.5.2 COM2~COM4 RS-232 Ports (J26, J5, J6)



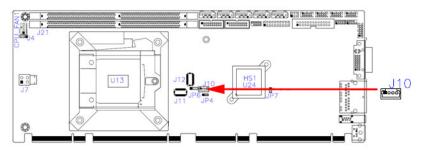
Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	2	RXD, Receive data
3	TXD, Transmit data	4	DTR, Data terminal ready
5	Ground	6	DSR, Data set ready
7	RTS, Request to send	8	CTS, Clear to send
9	RI, Ring indicator	10	Кеу

## 2.5.3 Digital I/O Connector (J2)



Pin	Signal Name	Pin	Signal Name
1	Ground	2	+5V
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	INO

#### 2.5.4 LCD Backlight Connector (J10)



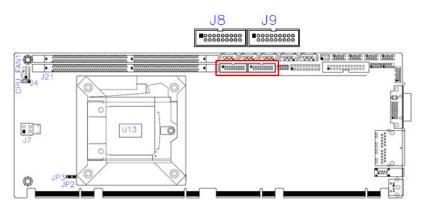
Pin	Signal Name	Pin	Signal Name
1	+12V	3	Brightness Control
2	Backlight Enable	4	Ground

#### 2.5.5 ATX Power Connector (J7)

ndo New J4		별, 
الرام ما		
J7		
5%	JP3 -	

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

2.5.6 USB3.0/2.0 Connector (J8, J9)



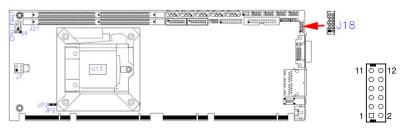
11 00000000 19 10 000000000 1

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

### 2.5.7 Dual USB 2.0 Connector (J16)

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

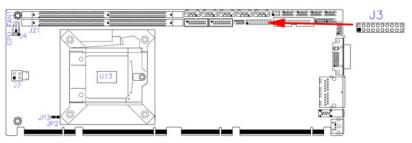
### 2.5.8 Front Panel Audio Connector (J18)

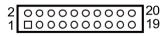


Pin	Signal Name	Pin	Signal Name
1	HPOUT_L	2	HPOUT_R
3	HPOUT_JD	4	Ground
5	LINE_L	6	LINE_R
7	LINE_JD	8	Ground
9	MIC IN_L	10	MIC IN_R
11	MIC IN_JD	12	Ground



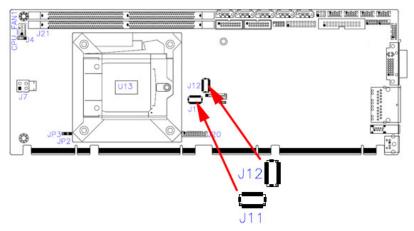
### 2.5.9 Front Panel Settings Connector (J3)





Pin	Signal Name	Pin	Signal Name
1	VCC5	2	Speak Out
3	NC	4	NC
5	Ground	6	Ground
7	NC	8	VCC5
9	Ground	10	NC
11	Ground	12	NC
13	Power BTN-	14	Power BTN+
15	System LED+	16	System LED-
17	Reset BTN-	18	Reset BTN+
19	HDD LED+	20	HDD LED-

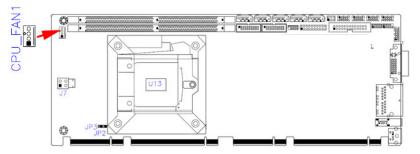
### 2.5.10 LVDS Connector (J11, J12)



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

Remarks: J11 is 1st LVDS; J12 is 2nd LVDS.

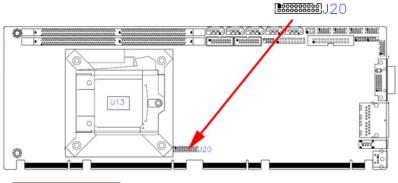
#### 2.5.11 Fan Power Connector (CPU\_FAN1)



Pin	Signal Name	Pin	Signal Name
1	Ground	3	Rotation detection
2	+12V	4	Control

Remarks: (PWM Mode Only)

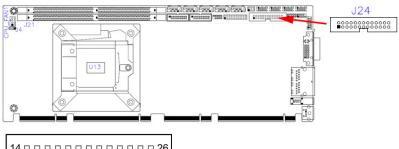
#### 2.5.12 DVI-D Connector (J20)



#### 1 □000000000 19 2 000000000 20

Pin	Signal Name	Pin	Signal Name
1	TMDS_DATA1_P	2	TMDS_DATA1_N
3	Ground	4	Ground
5	TMDS_CLK_P	6	TMDS_CLK_N
7	Ground	8	Ground
9	Hot Plug Detect	10	NC
11	TMDS_DATA2_P	12	TMDS_DATA2_N
13	Ground	14	Ground
15	TMDS_DATA0_P	16	TMDS_DATA0_N
17	NC	18	NC
19	TMDS_SDA	20	TMDS_SCL

#### 2.5.13 Parallel Port (J24)



Pin	Signal Name Pin Signal Nam		Signal Name
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-Printer / Select-In
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



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# **Chapter 3 Drivers Installation**

This chapter introduces installation of the following drivers:

- Intel<sup>®</sup> Chipset Software Installation Utility
- VGA Driver
- HD Audio Driver
- LAN Driver
- Intel<sup>®</sup> Management Engine Interface
- Intel<sup>®</sup> USB 3.0 Driver



### 3.1 Introduction

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find anything missing, please contact the distributor where you made the purchase. 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<sup>®</sup> 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.

1. Insert the disk enclosed in the package with the board. Click Intel and then Intel(R) Coffeelake Chipset Drivers.



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



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

Readme File Informa	tion	
*************	***********************************	***********
Product: Inte	l(R) Chipset Device Software	
Target PCH/Ch		
10.1.19.1:		3000 product far
10.1.17.1:		
10.1.16.3:	Intel(R) 300 Series Chipset Fa	
:	Intel(R) C240 Series Chipset	
10.1.15.2:	mobile 8th Gen Intel(R) Core(	TM) processor fa
10.1.14.3:	8th Gen Intel(R) Core(TM)	
10.1.13.2:	Intel(R) Celeron(R)/Pentium(R)	
10.1.11.1.	Intel(R) 200 series chipset f	
10.1.10.2:	Intel(R) Xeon(R) processor E3	
10.1.9.1:	7th Generation Intel(R) Core( Intel(R) C620 series chipset	im) processor ia
10.1.8.3:	Intel(R) Xeon(R) processor P 1	Family
10.1.7.2:	Intel(R) Xeon(R) processor E3	
	Intel(R) Xeon(R) processor E3	
:	6th Generation Intel(R) Core(	
10.1.6.1:	Intel(R) 100 Series chipset	
	Intel(R) C230 series chipset	family
40454.	746 ciliantin Tatal(n) card	mi)
		>

6. When installation is complete, click **Restart Now** to restart the computer and for changes to take effect.



3

#### 3.3 VGA Driver Installation

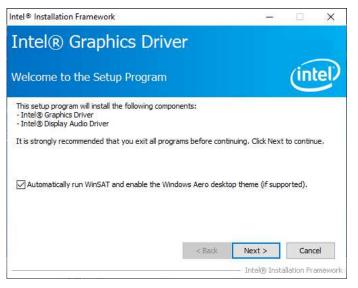
1. Insert the disk enclosed in the package with the board. Click **Intel** and then **Intel(R) Coffeelake Chipset Drivers**.



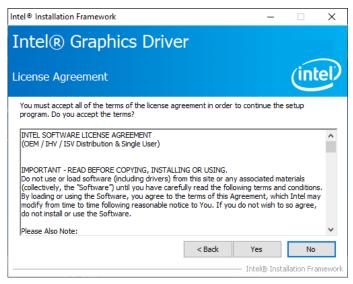
2. Click Intel(R) HD Graphics Driver.

<b>Inside T</b>	his CD Version : I-8_Gen-1.2 @1
Intel LAN Card Tools	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 12.x Drivers
8	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 *Readme File Information* screen, click **Next** to continue.

	-	
er		
		intel
tem requirements and in	stallation info	ormation.
		^
/RS5)		
family (Codename Kaby	Lake)	~
	/RS5)	tem requirements and installation info

#### 6. While Setup is in progress, click **Next** to continue.

ntel® Installation Framework	
Intel® Graphics Drive	er
Setup Progress	(intel
Please wait while the following setup operations a	re performed:
Deleting File: C: \ProgramData\Wicrosoft\Window Deleting File: C: \Jsers\Public\Desktop\Intel(R) HI Deleting File: C: \Jsers\Public\Desktop\Intel(R) G Deleting File: C: \ProgramData\Wicrosoft\Window Deleting File: C: \ProgramData\Wicrosoft\Window Deleting File: C: \Jsers\Public\Desktop\Intel\Intel Deleting File: C: \Jsers\Public\Desktop\Intel\Intel Deleting Registry Key: HKLM\SOFTWARE\Intel\G Deleting Registry Key: HKLM\SOFTWARE\Intel\G Click Next to continue.	D Graphics Control Panel.Ink raphics and Media Control Panel.Ink S\Start Menu\Programs\Intel\Intel(R) Iris(R) ( s\Start Menu\Programs\Intel(R) Iris(R) Graph (s(R) Graphics Control Panel.Ink (R) Iris(R) Graphics Control Panel.Ink FX\Internal\QudioFix
	Next >
	Intel® Installation Framewor

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

#### 3.4 HD Audio Driver Installation

1. Insert the disk enclosed in the package with the board. Click Intel and then Intel(R) Coffeelake Chipset Drivers.



2. Click Realtek High Definition Audio Driver.

<b>Inside T</b>	his CD Version : I-8_Gen-1.2 @1
Intel LAN Card Tools	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 12.x Drivers
×	Realtek High Definition Audio Driver

- 3. On the *Welcome* screen of the InstallShield Wizard, click **Next** to start the installation.
- 4. When installation is complete, click **Finish** to restart the computer and for changes to take effect.



3

#### 3.5 LAN Driver Installation

1. Insert the disk enclosed in the package with the board. Click Intel and then Intel(R) Coffeelake Chipset Drivers.



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



3. Click **Next** to accept the terms in the license agreement.

提 Intel(R) Network Connections Install Wizard			×
License Agreement Please read the following license agreement carefully.			(intel)
Please read the following license agreen	nent carefully.		
INTEL SOFTWAR	RE LICENSE AGR	EEMENT	^
IMPORTANT - READ BEFOR	E COPYING, IN S	TALLING OR USIN	G.
Do not copy, install, or use this software and any associated materials (collectively, the "Software") provided under this license agreement ("Agreement") until you have carefully read the following terms and conditions. By copying, installing, or otherwise using the Software, you agree to be bound by			
the terms of this Agreement. If you do not agree to the terms of this Agreement, do not copy, install, or use the Software.			
LICENSES:			~
I accept the terms in the license agreement     Print			Print
○ I do not accept the terms in the license a	agreement		
	< Back	Next >	Cancel

#### 4. Click **Next** after checking the device drivers in the Setup options.

Intel(R) Network Connections Install Wiz	ard		×
Setup Options Select the program features you want i	nstalled.		(intel)
Install:			
Device drivers	ices		
	< Back	Next >	Cancel
	< Back	ivext >	Cancel



#### 5. Click **Install** to continue.

🖟 Intel(R) Network Connections Install	Wizard		×
Ready to Install the Program			(intal)
The wizard is ready to begin installation			linter
Click Install to begin the installation.			
If you want to review or change any of exit the wizard.	your installation s	ettings, dick Back. (	Click Cancel to
	< Back	Install	Cancel

#### 6. When Install wizard is completed, click **Finish**.

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

# 3.6 Intel<sup>®</sup> Management Engine Interface

1. Insert the disk enclosed in the package with the board. Click Intel and then Intel(R) Coffeelake Chipset Drivers.

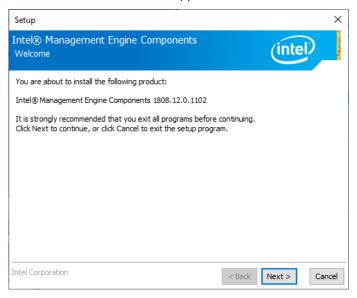
<b>Inside T</b>	his CD
Intel LAN Card K Tools	Intel(R) Coffeelake Chipset Drivers

2. Click Intel(R) ME 12.x Drivers.

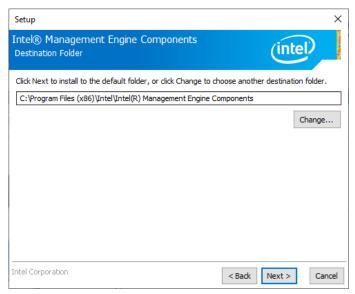
side T	his CD
Intel LAN Card Tools	Intel(R) Chipset Software Installation Utility Intel(R) HD Graphics Driver Realtek High Definition Audio Driver Intel(R) PRO LAN Network Drivers Intel(R) ME 12.x Drivers
8	Intel(R) ME 12.x Drivers



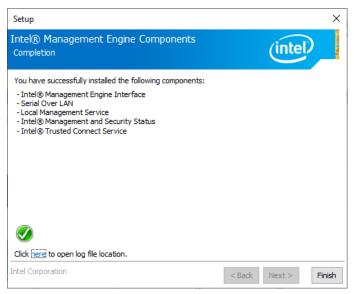
3. When the Welcome screen appears, click Next.



4. Then next window shows the destination folder where to install the files. Click **Next**.



5. After the Intel® Management Engine Components have been installed, click **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
- Book 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.

## 4.2 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 Main Settings

Aptio Setup Utility Main Advanced Chipset Security	– Copyright (C) 2019 America , Boot Save & Exit	n Megatrends, Inc.
BIOS Information		Set the Date. Use Tab to switch between Date elements.
BIOS Version	IB995AF-C246-K1A-190719	Default Ranges: Year: 2005-2099
Total Memory Memory Frequency	16384 MB 2133 MHz	Months: 1–12 Days: dependent on month
System Date System Time	[Thu 07/18/2019] [22:43:25]	
		↔: Select Screen ↑↓: Select Item
		Enter: Select +/-: Change Opt.
		F1: General Help F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit
		ESC: Exit
Version 2.20.1271.	Copyright (C) 2019 American (	Megatrends, Inc.

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

## 4.4 Advanced Settings

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





#### 4.4.1 Connectivity Configuration

CNVi present	No	This option configures
CNVi Configuration		Connectivity.
		[Auto Detection] means that if
MfUart1 type	[ISH Uart0]	Discrete solution is discovered it will be enabled
CoExistence Manager	[Disabled]	by default. Otherwise Integrated solution (CNVi)
WWAN Enable	[Disabled]	will be enabled; [Disable Integrated] disables
Discrete Bluetooth Module	[Disabled]	Integrated Solution. NOTE: When CNVi is present.
Advanced settings	[Disabled]	
		→+: Select Screen
		<b>1↓:</b> Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit
		ESC: Exit
		ESC: EXIL

<b>BIOS Setting</b>	Description
	This option configures Connectivity
CNVi Mode	[Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; [Disable Integrated] disables integrated solution.
	This option configures Connectivity
CNVi Mode	[Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise integrated solution (CNVi) will be enabled; [Disable Integrated] disables integrated solution.
MfUart1 type	This is a test option which allows configuration of UART type for WiFi side band communication. Options are ISH Uart0, SerialIO Uart2, Uart over external pads, Not connected.
CoExistence Manager	CoEx Manager mitigates radio coexistence issues between Intel WWAN (modem) and Intel WLAN (WiFi/BT). This should be enabled only if both WWAN and WLAN solutions are based on Intel components.
WWAN Enable	Enables/Disables M.2 WWAN module. WWAN can only be enabled for re-work board.
Discrete Bluetooth Module	Seriallo UART0 needs to be enabled to select BT Module
Advanced settings	Configure ACPI objects for wireless devices

### 4.4.2 CPU Configuration

CPU Configuration		When enabled, a VMM can utilize the additional
Type ID Speed VHX SMX/TXT Intel (VHX) Virtualization Technol Active Processor Cores Hyper-Threading Intel Trusted Execution Technology	Intel(R) Core(TM) i7 0x906EA 3200 HHz Supported Supported [Enabled] [Enabled] [Enabled] [Disabled]	
		<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>

BIOS Setting	Description
Intel (VMX) Virtualization Techno1	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
Active Processor Cores	Number of cores to enable in each processor package. Options are All, 1, 2, 3, 4, 5
Hyper-Threading	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
Intel Trusted Execution Technology	Enables utilization of additional hardware capabilities provided by Intel® Trusted Execution Technology. Changes require a full power cycle to take effect.



#### 4.4.3 PCH-FW Configuration

Aptio Setup Advanced	Utility – Copyright (C) 2019 Amer	rican Megatrends, Inc.
ME Firmware Version ME Firmware Mode ME Firmware SKU	12.0.20.1301 Normal Mode Corporate SKU	When Disabled ME will be put into ME Temporarily Disabled Mode.
ME State AMT BIOS Features	(Enabled) (Enabled)	
		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.2	0.1271. Copyright (C) 2019 Americ	can Megatrends, Inc.

BIOS Setting	Description
ME State	When disabled, ME will be put into ME Temporarily Disabled Mode
AMT BIOS Features	When disabled, AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup.

#### 4.4.4 Trusted Computing

TPM20 Device Found Firmware Version: Vendor:	7.62 IFX	Enables or Disables BIOS support for security device. O.S. will not show Security
Security Device Support Pending operation	[Enable] [None]	Device. TGG EFI protocol and INTIA interface will not be available.
		++: Select Screen 14: Select Item Enter: Select + Change Ont. F1: Generol Help F2: Previous Values F3: Optimized Defaults
		F4: Save & Exit ESC: Exit

BIOS Setting	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.
Pending Operation	Schedule an operation for the Security Device. NOTE: Your computer will reboot during restart in order to chnge State of Security Device.



#### 4.4.5 ACPI Settings

Aptio Setup U Advanced	tility – Copyright (C) 2019 Americ	an Megatrends, Inc.
ACPI Settings Enable Hibernation ACPI Sleep State	[Enabled] [S3 (Suspend to RAM)]	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
	Enable Hibernation	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.20	.1271. Copyright (C) 2019 American	Megatrends, Inc.

BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not be effective with some operating systems.
ACPI Sleep State	Selects the highest ACPI sleep state the system will enter when the suspend button is pressed.
	Options: Suspend Disabled, S3 (Suspend to RAM)



### 4.4.6 LVDS (eDP/DP) Configuration



BIOS Setting	Description	
LVDS (eDP/DP) Support	LVDS (eDP/DP) ON/OFF	
Panel Color Depth	Options: 18 BIT, 24bit(VESA), 24bit(JEIDA)	
LVDS Channel Type	Options: Single, Dual	
Panel Type	Options: 800x480, 800x600, 1024x768, 1280x768, 1280x800, 1280x960, 1280x1024, 1366x768, 1440x900, 1600x900, 1600x1200, 1680x1050, 1920x1080, 1920x1200	
LVDS Brighntess Level Control	Options: Level-1, Level-2, Level-3, Level -4, Level-5, Level-6, Level-7, Level-8	



#### 4.4.7 F81964 Super IO Configuration

Aptio Setup Util Advanced	ity – Copyright (C) 2019 Americ	an Megatrends, Inc.
F81964 Super IO Configuration		Set Parameters of Serial Port 1 (COMA)
Super IO Chip > Serial Port 1 Configuration > Serial Port 2 Configuration > Serial Port 3 Configuration > Serial Port 4 Configuration > Parallel Port Configuration	F81964	
Power Failure	[Always off]	
Advanced Serial Port 1 Configuration		Select an optimal settings for Super IO Device
Serial Port 1 Configuration	[Enabled]	
Device Settings	IO=3F8h; IRQ=4;	
Change Settings Device Mode	[Auto] [RS232]	
	Change Settings Hauto ID=3F8h: IRQ=3,4,5,6,7,9,10,11, ID=2F8h: IRQ=3,4,5,6,7,9,10,11, ID=2E8h: IRQ=3,4,5,6,7,9,10,11, ID=2E8h: IRQ=3,4,5,6,7,9,10,11,	12; 12; Select Screen

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.	
Parallel Port Configuration	Set parameters of parallel port (LPT/LPTE)	
Power Failure	Options: Always on, Always off	



#### 4.4.8 F81964 Hardware Monitor

Pc Health Status       CPU shutdown Temperature       [Disabled]         CPU Smart Fan Control       [Disabled]         CPU temperature       : +28 °C         System temperature       : 433 °C         CPU Temperature       : 4043 RPM         VCOre       : 4043 RPM         VCCSV       : 5087 V         VCC12V       : +12.232 V         Memory       : +1.192 V         ++: Select Screen         TL: Select Item         Enter: Select         */-: Change Opt.         F2: Previous Values         F3: Optimized Defaults         F4: Save & Exit         ESC: Exit	Aptio Setup Util. Advanced	ity – Copyright (C) 2019 A	american Megatrends, Inc.
CPU Smart Fan Control     [Disabled]       CPU temperature     : +28 °C       System temperature     : +33 °C       CPU Fan Speed     : 4043 RPM       VCOre     : +1.016 V       VCCSV     : +5.087 V       VCCI2V     : +1.192 V       #+: Select Screen       11: Select Item       Enter: Select Item       Enter: Select Item       File General Help       F2: Previous Values       F3: Optimized Defaults       F4: Save & Exit	Pc Health Status		
CPU         temperature         : +28 °C           System temperature         : +33 °C           CPU Fan Speed         : 4043 RPM           VCore         : +1.016 V           VCCD2V         : +5.087 V           VCC12V         : +1.192 V           Memory         : +1.192 V           ++: Select Screen           1L: Select Item           Enter: Select Item           Enter: Select Item           F1: General Help           F2: Previous Values           F3: Optimized Defaults           F4: Save & Exit			
System temperature : +33 °C CPU Fan Speed : 4043 RPM VCore : +1.016 V VCC5V : +5.087 V VCC12V : +12.232 V Memory : +1.192 V ++: Select Screen 11: Select Item Enter: Select Item Enter: Select Item Fi: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	CPU Smart Fan Control	[Disabled]	
	System temperature CPU Fan Speed VCore VCCSV VCC12V	: +33 °C : 4043 RPM : +1.016 V : +5.087 V : +12.232 V	11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

BIOS Setting	Description
CPU Shutdown Temperature	Options: Disabled / 70 °C / 75 °C / 80 °C / 85 °C / 90 °C / 95 °C
CPU Smart Fan Control	Enables / Disables the CPU 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.



#### 4.4.9 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-c	off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass S Driver Suppo		
USB Transfe time-out	r The time-out value for Control, Bulk, and Interrupt transfers.	
Device reset time-out	USB mass storage device start unit command time-out. Options: 10/20/30/40 sec	
Device power-up delay	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor	
USB Disk 3.0 PMAP	Mass storage device emulation type. 'Auto' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type	



#### 4.4.10 Network Stack Configuration

Aptio Setup Utilii	ty – Copyright (C) 2019 America	an Megatrends, Inc.
Network Stack	[Disabled]	Enable/Disable UEFI Network Stack
BIOS Setting	Description	
Network Stack		EFI Network Stack
Aptio Setup Utili1 Advanced	y – Copyright (C) 2019 America	
Network Stack IDV4 HTP Support IDV4 HTP Support IDV6 HTP Support IDV6 HTP Support IPSEC Certificate PXE boot wait time Media detect count	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Enabled] 0 1	Enable/Disable UEFI Network Stack
BIOS Setting	Description	
lpv4 PXE Support		v4 PXE boot support. If E boot support will not be
Ipv4 HTTP Support	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available	
lpv4 PXE Support	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available	
Ipv6 HTTP Support	Enable/Disable IPv6 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available	
Ipv6 PXE Support	Enable/Disable IPv6 PXE boot support. If disabled, IPv4 PXE boot support will not be available	
IPSEC Certificate	Support to Eable/Disable IPSEC certificate for Ikey.	
PXE boot wait time	Wait time in seconds to press ESC key to aboart the PXE boot. Use either +/1 or numeric keys to set the value	
Media detect count	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value	



# 4.4.11 CSM Configuration

Aptio Setup Uti: Advanced	lity – Copyright (C) 2019 Amer	rican Megatrends, Inc.
Compatibility Support Module (	Configuration	Enable/Disable CSM Support.
CSM Support		
CSM16 Module Version	07.82	
GateA20 Active INT19 Trap Response HDD Connection Order Boot option filter Option ROM execution Network	[Upon Request] [Adjust] [Adjust] CSM Support Disabled Enabled	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F4: Soure & Exit ESC: Exit
Version 2.20.12	271. Copyright (C) 2019 Americ	can Megatrends, Inc.

BIOS Setting	Description	
CSM Support	Enables / Disables CSM support.	
GateA20 Active	UPON REQUEST – GA20 can be disable using BIOS services. ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.	
INT19 Trap Response	BIOS reaction on INT19 trapping by option ROM: IMMEDIATE - execute the trap right away; POSTPONED – execute the trap during legacy boot.	
HDD Connection Order	Some OS require HDD handles to be adjusted, i.e. OS is installed on drive 80h.	
Boot option filter	This option controls Legacy/UEFI ROMs priority Options: UEFI and Legacy / Legacy only / UEFI only	
Network	Controls the execution of UEFI and Legacy PXE OpROM.	
	Options: Do not launch / Legacy	



#### 4.4.12 NVMe Configuration

This sets the NVMe Device Options.





## 4.5 Chipset Settings



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



#### 4.5.1 System Agent (SA) Configuration



## 4.5.1.1 Graphics Configuration and VT-d Capability

Aptio Setup Uti Chipset	lity – Copyright (C) 2019	) American Megatrends, Inc.
Graphics Configuration Primary Display Select PCIE Card Internal Graphics GTT Size Aperture Size	(Auto) (Auto) (Auto) (BMB) (256MB) Primary Display Auto	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
	IGFX PEG PCI SG	++: Select Screen 11: Select Item Enter: Select

BIOS Setting	Description
Primary Display	Selects which of IGFX/PEG/PCI graphics device should be primary display, or selects SG for switchable Gfx.
Select PCIE Card	Select the card used on the platform. Auto: Skip GPIO basd Power Enable to dGPU Elk Creek 4: DGPU Power Enable =ActiveLow PEG Eval: DGPU Power Enable = ActiveHigh
Internal Graphics	Keeps IGFX enabled based on the setup options.
GTT Size	Select the GTT Size Options: 2MB / 4MB / 8MB
Aperture Size	Select the Aperture Size Note: Above 4MB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support. Options: 128MB / 256MB / 512MB / 1024MB / 2048MB



#### 4.5.2 PCH-IO Configuration

Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc. Chipset		
PCH-IO Configuration		SATA Device Options Settings
PCH LAN Controller Wake on LAN Enable	[Enabled] [Enabled]	

BIOS Setting	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.	

SATA And RST Configuration		Determines how SATA controller(s) operate.
SATA Controller(s)	[Enabled]	controller(s) operate.
Serial ATA Port O	Empty	
Software Preserve	Unknown	
Hot Plug	[Disabled]	
Serial ATA Port 1	Empty	
Software Preserve	Unknown	
Hot Plug	[Disabled]	
Serial ATA Port 2	Empty	
Software Preserve	Unknown	
Hot Plug	[Disabled]	++: Select Screen
Serial ATA Port 3	Empty	↑↓: Select Item
Software Preserve	Unknown	Enter: Select
Hot Plug	[Disabled]	+/-: Change Opt.
Serial ATA Port 4	Empty	F1: General Help
Software Preserve	Unknown	F2: Previous Values
Hot Plug	[Disabled]	F3: Optimized Defaults
Serial ATA Port 5	Empty	F4: Save & Exit
Software Preserve	Unknown	ESC: Exit
Hot Plug	[Disabled]	
Serial ATA Port 6	Empty	
Software Preserve	Unknown	

# 4.6 Security Settings

Aptio Setup Uti Main Advanced Chipset Sec	l <mark>ity – Copyright (C) 2016 Amer</mark> . <mark>writy Boot Save &amp; Exit</mark>	ican Megatrends, Inc.	
Password Description		Set Administrator Password	
then this only limits access	If ONLY the Administrator's password is set, then this only limits access to Setup and is		
only asked for when entering : If ONLY the User's password i:			
is a power on password and mu boot or enter Setup. In Setup			
have Administrator rights.			
The password length must be in the following range:			
Minimum length Maximum length	3		
Administrator Password		++: Select Screen	
User Password		Enter: Select	
		+/-: Change Opt. F1: General Help	
		F2: Previous Values F3: Optimized Defaults	
		F4: Save & Exit	
		ESC: Exit	
Version 2.18.1	256. Copyright (C) 2016 America	an Megatrends, Inc.	

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



#### 4.6.1 Secure Boot Configuration

Aptio	Setup Utility – Copyright (C) 2019 Security	American Megatrends, Inc.
System Mode	User	Secure Boot feature is Active if Secure Boot is Enabled.
Secure Boot	[Disabled] Not Active	Platform Key(PK) is enrolled and the System is in User mode.
Secure Boot Mode ▶ Restore Factory Keys ▶ Reset To Setup Mode	[Custom]	The mode change requires platform reset
▶ Key Management	Secure Boot – 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
Versi	on 2.20.1271. Copyright (C) 2019 A	merican Megatrends, Inc.

BIOS Setting	Description
Secure Boot	Secure Boot feature is active if Secure Boot enabled. Platform Key(PK) is enrolled and the system is in user mode. The mode change requires platform reset.
Secure Boot Mode	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
Restore Factory Keys	Force System to User Mode. Install factory default Secure Boot key databases.
Reset To Setup Mode	Delete all Secure Boot key databases from NVRAM
Key Management	Enables expert users to modify Secure Boot Policy variables without full authentication

#### 4.6.1.1 Key Management

Vendor Keys     Valid       Factory Key Provision     [Enabled]       Reset To Setup Mode     Export Secure Boot variables       Enroll Efi Image     Device Guard Ready       Remove 'UEFI CA' from DB     Remove 'UEFI CA' from DB       Restore DB defaults     Factory Key Provision       Secure Boot variable   Size  Key Exchange Keys     1560       + Ret Exchange Keys     1550       + Authorized Signatures     1400	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode
<pre>&gt; Restore Factory Keys &gt; Resort Secure Boot variables &gt; Ernoil Efi Image Device Guard Ready &gt; Remove 'UEFI CA' from DB &gt; Restore DB defaults Secure Boot variable   Size  Ke Platform Key(PK)   662  1 </pre>	reset and while the System is
Secure Boot variable   Size  Ke ▶ Platform Key(PK)   862  ▶ Key Exchange Keys   1560  1	
▶ Forbidden Signatures  3724  771  Factory ▶ Authorized TimeStamps  0  0  No Keys ▶ OsRecovery Signatures  0  0  No Keys	+: Select Screen I: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

BIOS Setting	Description
Factory Key Provision	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.
Restore Factory Keys	Force System to User Mode. Install factory default Secure Boot key databases.
Reset To Setup Mode	Delete all Secure Boot key databases from NVRAM
Export Secure Boot variables	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device
Enroll Efi Image	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database(db)
Remove 'UEFI CA' from DB	Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db)
Restore DB defaults	Restore DB defaults to factory defaults





Secure Boot variable Platform Key(PK) Key Exchange Keys Authorized Signatures Forbidden Signatures Authorized TimeStamps OsRecovery Signatures	Enroll Factory Defaults or load certificates from a file: 1. Public Key Certificate: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2. Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Factory, External, Mixed
--	--

# 4.7 Boot Settings

Boot Configuration Setup Prompt Timeout	1	Number of seconds to wait for setup activation key.
Bootup NumLock State Quiet Boot	[On] [Disabled]	65535(0×FFFF) means indefinite waiting.
Boot mode select	[UEFI]	
FIXED BOOT ORDER Priorities		
Boot Option #1	[Hard Disk:Windows]	
Boot Option #2	[CD/DVD]	
Boot Option #3	[USB Hard Disk]	
Boot Option #4	[USB CD/DVD]	
Boot Option #5	[USB Key]	
Boot Option #6	[USB Floppy]	<pre>++: Select Screen  f4: Select Item</pre>
Boot Option #7 Boot Option #8	[USB Lan] [Network]	Enter: Select
BOOL OPLION #8	[Network]	+/-: Change Opt.
▶ UEFI Hard Disk Drive BBS Priorities		F1: General Help
OLI I Hard DISK DI IVE DDS II IOI I	(165	F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit

BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key.
Timeout	65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Boot mode select	Select boot mode LEGACY/UEFI
FIXED BOOT ORDER Priorities	Sets the system boot order.
UEFI Hardk Disk Drive BBS Priorities	Specifies the Boot Device Priority UEFI Hard Disk Drives

## **iBASE**

## 4.8 Save & Exit Settings

Aptio Setup U Main Advanced Chipset S		American	Megatrends, Inc.
Save Options Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Changes Discard Changes Default Options			Exit system setup after saving the changes.
Restore Defaults Save as User Defaults Restore User Defaults			++: 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	t (C) 2016 An	merican Me	egatrends, Inc.

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.



# **iBASE**

#### A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0000h-0CF7h	PCI Express Root Complex
0040h-0043h	System timer
0050h-0053h	System timer
0070h-0070h	System CMOS/real time clock
00F0h-00F0h	Numeric data processor
02E8h-02EFh	Communications Port (COM4)
02F8h-02FFh	Communications Port (COM2)
03B0h-03BBh	Intel(R) HD Graphics 530
03C0h-03DFh	Intel(R) HD Graphics 530
03E8h-03EFh	Communications Port (COM3)
03F8h-03FFh	Communications Port (COM1)
0D00h-FFFFh	PCI Express Root Complex
E000h-0E01h	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115
F000h-F03Fh	Intel(R) HD Graphics 530
F040h-F05Fh	Intel(R) 100 Series/C230 Series Chipset SMBus - A123
F060h-F07Fh	Standard SATA AHCI Controller
F080h-F083h	Standard SATA AHCI Controller
F090h-F097h	Standard SATA AHCI Controller
F0A0h-F0A7h	Intel(R) Active Management Technology - SOL (COM5)

# B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System Timer
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Serial Port #3
IRQ7	Serial Port #4
IRQ8	Real Time Clock
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family Integrated Sensor Hub - A135
IRQ 11	Intel(R) 100 Series/C230 Series Chipset SMBus - A123
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Thermal subsystem - A131
IRQ 13	Numeric data processor
IRQ 16	High Definition Audio Controller
IRQ 16	Standard SATA AHCI Controller
IRQ 19	Intel(R) Active Management Technology - SOL (COM5)

# **iBASE**

#### 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:

```
11-
//
// 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.
11
//---
                     _____
#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 &= (\sim 0 \times 0F);
            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 &= ~0x20;
            bBuf |= 0x40;
            Set_F81866_Reg(0xF5, bBuf);
            //disable WDT
}
,
//--
        _____
11
// 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.
11
//---
#include "F81866.H"
#include <dos.h>
//----
unsigned int F81866 BASE;
void Unlock F81866 (void);
void Lock_F81866 (void);
```

#### ibase

```
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():
11-
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:
11-
//
// 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.
//
```

}

}

{

}

#### Appendix

//		1	
#define #define	F81866_INDEX_PORT F81866_DATA_PORT	(F81866_BASE) (F81866_BASE+1)	
#define	F81866_REG_LD	0x07	
#define F81866_UNLOCK #define F81866_LOCK //		0x87 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); //			
#ondif	// E01066 L		

#endif //\_\_F81866\_H