

















Manual

iBase

AGS103T

Ultra-Compact IoT Gateway Edge Computing System with Intel® Atom® x6413E/x6211E Processors



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AGS103T

Advanced Gateway & Ultra-Compact Fanless System

User's Manual

Version 1.0 (September 2021)



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CE

This product has passed CE tests 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 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.
- Make sure you leave plenty of space around the device for ventilation.
- Use this product in environments with ambient temperatures -20°C ~ 70°C.
- Do not leave this device in an environment where the storage temperature may go below -40°C or above 85°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.
- Ensure that you apply correctly the power supply voltage.
- 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.



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.

• 3rd-party parts:

12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, memory, storage device, 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.

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Chapter 1 General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Product View
- Dimensions



1.1 Introduction

The AGS103T embedded computer is an ultra-compact fanless system AGS103T integrating the Intel Atom® x6000E Series processors (code-named Elkhart Lake) that deliver up to 4 cores with 40% increase in CPU performance and improved graphics when compared with previous versions. Based on the economical 10nm technology, the low-power platform is suitable for embedded applications in factory automation, IoT gateway, and automatic control systems.



AGS103T

1.2 Features

- Ultra-Compact, rugged and fanless system with Intel[®] Atom[™] x6413E/x6211E series processor
- Over/Under/Reverse voltage protection
- 9V~36V DC wide-range power input
- Display output through HDMI and DVI-I
- DIN-rail mount & Wall mount compatibility
- GPIO 4-in & 4-out with isolation function
- 3 x Gigabit Ethernet
- 3 x full-size Mini PCI-E sockets, 1x 3042/2242 M.2 B-Key,
- TPM 2.0



1.3 Packing List

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

•	AGS103T / AGS103TS	x 1
•	Wall Mount Kit	x 1
•	Round Head Screw (for Wall Mount Kit)	x 4
•	Thermal Pad	
	19 x 19 x 2 mm	x 1
	28 x 18 x 2 mm	x 1
•	DIN Rail Bracket	x 1

1.4 Optional Accessories

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

- DC-In Power Adapter
- Power Cord
- WiFi Antenna Kit
- 4G/LTE or GPS Antenna Kit

1.5 Specifications

Product Name	AGS103T	AGS103TS	
	System		
Motherboard	SL100		
Carrier Board	IP802		
Operating System	Windows10 (64-bit)Linux Ubuntu		
CPU	Intel [®] Atom™ QC x6413E Intel [®] Atom™ DC x6211E		
CPU Speed	Up to 3.0 GHz		
Memory	1 x DDR4-3200 SO-DIMM, expandable to 16 GB (Non-ECC)		
Storage	• 1 slot for M.2 B3042 SSD	 1 slot for M.2 B3042 SSD 1 slot for 2.5" SSD	
Super I/O	Fintek F81964D-I		
Audio Codec	Realtek ALC888S		
Network	3 x Intel [®] I210IT GbE LAN		
Power Supply	DC-In 9V ~ 36V (3-pin terminal b	block)	
BIOS	AMI BIOS		
Watchdog	Watchdog Timer 256 segments,	0, 1, 2255 sec/min	
ТРМ	2.0		
Chassis	Aluminum & steel, silver		
Mounting	 Desktop mount / Wall mount (wall mount kit included) DIN rail mount 		
Dimensions (W x H x D)	190 x 52 x 110 mm	190 x 68 x 110 mm	
Weight	1.1 kg	1.25 kg	
Certificate	CE / LVD / FCC Class B (pre-scan)		

	I/O Ports	
Left External	• 2 x RS232/422/485 port: COM1 & COM2, select from BIOS	
1/0	1 x Antenna hole for WLAN module	
	1 x Speaker-out / Mic-in connector	
Right External	 1 x Antenna hole for WLAN module 	
1/0	• 2 x Nano SIM card slot	
	[^] The socket signal is from the Mini-PCIe 4G/LTE card.	
Rear External	• 1 x DVI-I	
1/0	• 1 x HDMI	
	• 2 x USB 3.1	
	• $2 \times \text{P} 145 \text{ CbE} 1 \text{ AN port}$	
	• 3 x RJ43 GDE LAN POIL • 4 x LED indicators (WI AN WWAN Heartheat Power/	
	troubleshooting)	
	1 x power button	
	 1 x 3-pin DC-in terminal block type for 9V-36V 	
	2 x Antenna hole for WLAN module	
	 2 x RS-232/422/485 port: COM3 & COM4 	
	1 x Isolated 4-In & 4-Out GPIO connector	
Expansion	 1 x full-size Mini-PCIe socket with USB 2.0 	
slots	 2 x full-size Mini-PCIe socket with USB 2.0 & PCIe 	
	1 x M.2 B3042 socket with USB 2.0 & SATA for WWAN & SSD	
	 1 x 2.5" SSD slot (for AGS103TS only) 	
	Environment	
Tomporaturo	$\mathbf{O}_{\text{parating: } 20^{\circ}\text{C}} = \frac{70^{\circ}\text{C}}{70^{\circ}\text{C}} \left(4^{\circ}\text{E} + \frac{150^{\circ}\text{E}}{10^{\circ}\text{C}} \right)$	
remperature	• Operating: -20° C $\sim 70^{\circ}$ C $(-4^{\circ}$ F $\sim 158^{\circ}$ F)	
	• Storage: -40°C ~ 85°C (-40°F ~ 185°F)	
Relative Humidity	5 ~ 90% at 45°C (non-condensing)	
Vibration	With IEC 60068-2-64	
	Operating: 2 Grms / 5 ~ 500 Hz (Random operation)	
	• Non-operating: 3 Grms / 5 ~ 500Hz (Random operation)	
Shock	With MIL-STD-810G	
	Operating: 30 g / 11 ms duration	
	Non-operating: 40 g / 11 ms duration	

All specifications are subject to change without prior notice.

1.6 Product View – AGS103T

Front View



No.	Name	No.	Name
1	CN1: DVI-I Port	6	DC In
2	CN2: HDMI Port	7	DC In Power Input
3	Gigabit LAN Ports	8	Antenna Holes
4	CN5: USB 3.1 Ports	9	COM3/COM4 Ports
5	CN6: USB 2.0 Ports	10	Digital I/O



Oblique View



Remarks: Two Nano SIM card slots are located on the right side.



Remarks: Aside from the antenna hole, the picture above shows the following:

CN7: 2 in 1 Audio Jack (Line-out/Line-in)

- CN8 : COM1 Connector
- CN10 : COM2 Connector

Bottom View



Remarks: For AGS103TS, the bottom has a compartment for a 2.5" SSD slot.

AGS103TS with Wall Mount Brackets



AGS103TS with DIN Rail Mount (Optional)





1.7 Dimensions –AGS103T

Unit: mm





1.8 Dimensions – AGS103TS

Unit: mm



Chapter 2 Hardware Configuration

The information provided in this chapter includes:

- Installations
- Information and locations of connectors



2.1 Installations

Turn your product upside down and take away the device bottom cover by removing 6 screws as indicated below for the installation or replacement of the memory module, mSATA SSD or WLAN card. After installations, secure the device bottom cover back.



2.1.1 Memory Installation / Replacement

If you need to install or replace a memory module, follow the instructions below for installation after you disassemble the device cover.



- 1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
- 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, and the module will pop-up.

2.1.2 Mini-PCIe & M.2 Cards Installation / Replacement

After removing the bottom cover, follow the instructions below.

1. Locate the mini-PCIe or M.2 slot, align the key of the card to the interface, and insert the card slantwise.





M.2 card:	

2. Push the card down and fix it with the supplied 2 flat head screws for the mini-PCIe card and with one screw for M.2 card.



2.1.3 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.

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

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

2.1.4 Mounting Installation

Requirements

Before mounting the system, ensure that you have enough room for power and signal cable routing, and have good ventilation for the power adaptor. The method of mounting must be able to support the weight of the device plus the weight of the suspending cables to be attached to the system. Use the following methods for mounting your system:

2.1.4.1. Wall-Mounting Installation

1. Turn your product upside down to attach the mounting brackets to your product and secure with the supplied 4 screws.



2. Prepare at least 4 screws (M3) to install the device on wall.



2.1.4.2. DIN Rail Mounting Installation (Optional)

1. Attach the DIN rail mounting bracket to your product, and secure with the supplied 2 screws.



2. Hook the DIN rail mounting bracket over the top of the DIN rail, and then press the lower section of the bracket towards the DIN rail to clip the bracket onto it.

2.1.5 HDD Module Installation



2.1.6 SIM Card Installation

1. The SIM card socket design is push-in/push-out type. To install or remove a SIM card, remove the SIM card cover, as shown in the picture below, by releasing the M3 screw. After insertion/removal of the SIM card, replace the SIM card cover and lock it back into place.

2



2.1.7 Pinout for COM Ports, DC-In Power & Line-Out Jack





COM1 & COM2 RS232/422/485 Ports



COM1 and COM2 ports are jumper-less and configurable in BIOS.

Din	Assignment			
FIN	RS-232	RS-422	RS-485	
1	DCD, Data carrier detect	TX-	DATA-	
2	RXD, Receive data	TX+	DATA+	
3	TXD, Transmit data	RX+	NC	
4	DTR, Data terminal ready	RX-	NC	
5	Ground	Ground	Ground	
6	DSR, Data set ready	NC	NC	
7	RTS, Request to send	NC	NC	
8	CTS, Clear to send	NC	NC	
9	RI, Ring indicator	NC	NC	

2

RS-232 COM3 & COM4 Ports





Din	Assignment			
PIN	RS-232	RS-422	RS-485	
1	DCD, Data carrier detect	TX-	DATA-	
2	RXD, Receive data	TX+	DATA+	
3	TXD, Transmit data	RX+	NC	
4	DTR, Data terminal ready	RX-	NC	
5	Ground	Ground	Ground	
6	DSR, Data set ready	NC	NC	
7	RTS, Request to send	NC	NC	
8	CTS, Clear to send	NC	NC	
9	RI, Ring indicator	NC	NC	

J2 DC-In Power Connector (3-pin terminal block)



PIN	Assignment
1	Power Ground
2	Case Ground
3	9V ~ 36V



Isolated 4-In & 4-Out GPIO Connector (10-pin terminal block)





Pin	Assignment	Pin	Assignment
1	Isolation +5V	6	OUT0
2	IN0	7	OUT1
3	IN1	8	OUT2
4	IN3	9	OUT3
5	IN4	10	Isolation Ground

Line-Out / Line-In Jack



This connector supports Line-in and Line-out. Line-out supports a 2W speaker. Please see diagram below.



2.2 Setting the Jumpers

Set up and configure your device 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 jumper cap

Pin closedOblique viewIllustration in the manualOpenImage: closed state state

Refer to the illustration below to set jumpers.

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 Motherboard Jumper & Connector Locations



SL100 Motherboard

IP802 Carrier Board



2.4 SL100 Motherboard Jumpers and Connectors

2.4.1 SW1: Power Button Switch



2.4.2 RTC RST# (SW2-1) & SRTC RST# (SW2-2)



RTC RST# (SW2-1)		
Function Setting		
Normal	OFF	
Clear CMOS	ON	

SRTC RST# (SW2-2)

Function	Setting
Normal	OFF
Clear ME RTC Register	ON

2

2.4.3 DVI-I Connector (CN1)



2.4.4 HDMI Connector (CN2)



2.4.5 Gigabit LAN RJ45 Connector (CN3)



2.4.6 Gigabit LAN RJ45 Connectors (CN4)

2.4.7 Dual USB 3.1 Connector (CN5)



2.4.8 Dual USB 2.0 Connector (CN6)



2.4.9 Line-Out / Line-In Connector (CN7)



2.4.10 COM1 Connector (CN8)



2.4.11 SATA Connector (CN9)



2.4.12 COM2 Connector (CN10)



2.4.13 AT/ATX Mode (JP1)



Function	Pin closed	Illustration
ATX (default)	1-2	○ • □ 1
AT	2-3	••□1
2.4.14 Reset Button Connector (J1)



2.4.15 J2: DC-In Power Connector (3-pin terminal block)



2.4.16 J3: RTC Battery Connector



2.4.17 J4: SPI Firmware Header



2.4.18 J5: DDR4 Socket



2.4.19 J6: SATA Power Connector



Pin	Assignment
1	5V
2	GND
3	GND
4	Х

2.4.20 J7: Mini PCIe Socket (Supports USB & SIM1)



2.4.21 J8: Mini PCIe Socket (Supports USB, PCIe & SIM2)



2.4.22 J9(SIM1), J12(SIM2): SIM Socket



2.4.23 J10: Power IC JTAG





2.4.24 J11 : Board-to-Board Connector

J11 : Board-to-Board Connector

Pin	Assignment	Pin	Assignment
1	Ground	26	VCC5
2	GPIO_IN0	27	VCC5
3	GPIO_IN1	28	GPIO_OUT0
4	GPIO_IN2	29	GPIO_OUT1
5	GPIO_IN3	30	GPIO_OUT2
6	(COM3) DSR, Data set ready	31	GPIO_OUT3
7	(COM3) RTS, Request to send	32	(COM3) DCD, Data carrier detect
8	(COM3) CTS, Clear to send	33	(COM3) RXD, Receive data
9	(COM3) RI, Ring indicator	34	(COM3) TXD, Transmit data
10	(COM4) DSR, Data set ready	35	(COM3) DTR, Data terminal ready
11	(COM4) RTS, Request to send	36	(COM4) DCD, Data carrier detect
12	(COM4) CTS, Clear to send	37	(COM4) RXD, Receive data
13	(COM4) RI, Ring indicator	38	(COM4) TXD, Transmit data
14	Ground	39	(COM4) DTR, Data terminal ready
15	USB_D+	40	Ground
16	USB_D-	41	PLT_RST#
17	Ground	42	Ground
18	USB_D+	43	PCIE_CLK_DP
19	USB_D-	44	PCIE_CLK_DN
20	Ground	45	Ground
21	VCC3_3	46	PCIE_RXP
22	VCC3_3	47	PCIE_RXN
23	Ground	48	Ground
24	3VDUAL	49	PCIE_TXP
25	3VDUAL	50	PCIE_TXN

2.4.25 J13 : M.2 B-Key Socket (Supports SATA / PCIe /USB)



2.4.26 J14 : Port 80 Header



- 2.4.27 LED1: Power_Fail (Red)
- 2.4.28 LED2: Heartbeat (Blue)
- 2.4.29 LED3: WWAN1 (Green)
- 2.4.30 LED4: WWAN2 (Green)

Chapter 3 Driver Installation

The information provided in this chapter includes:

- Intel[®] Chipset Software Installation Utility
- Graphics Driver Installation
- HD Audio Driver Installation
- Intel[®] Management Engine Drivers Installation
- LAN Driver Installation



3.1 Introduction

This section describes the installation procedures for software drivers. The software drivers are in a disk enclosed with the product package. If you find anything missing, please contact the distributor where you made the purchase.

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

3.2 Intel[®] Chipset Software Installation Utility

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

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Elkhartlake Chipset Drivers** on the right pane.



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

Inside	This CD Version : EM-5.0.1
Intel LAN Card Kools	Intel(R) Chipset Software Installation Utility Intel(R) Elkhartlake Graphics Driver Realtek High Definition Audio Driver Intel(R) ME Drivers
8	Update Windows OS with Plug and Play feature and allow the OS to correctly identify the Intel chipset components and properly

- 3. When the *Welcome* screen to the Intel[®] Chipset Device Software appears, click **Next** to continue.
- 4. Accept the software license agreement and proceed with the installation process.
- 5. On the *Readme File Information* screen, click **Install** for installation.
- 6. After the installation, press Finish to complete the setup process.



3.3 Graphics Driver Installation

- 1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Elkhartlake Chipset Drivers** on the right pane.
- Intel
 Intel
 Intel(R) Chipset Software Installation Utility

 Intel(R) Chipset Software Installation Utility
 Intel(R) Elkhartlake Graphics Driver

 Image: Construction of the imag
- 2. Click Intel(R) Elkhartlake Graphics Driver.

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

Intel® Installation Framework		<u>1994</u> 9		×
Intel® Graphics Drive	٢			
License Agreement			(int	el
You must accept all of the terms of the license agre program. Do you accept the terms?	eement in order	to continue the	e setup	
GRAPHIC DRIVERS SOFTWARE LICENSE AGREEM	ENT (Version Ja	nuary 2020)		^
IMPORTANT NOTICE PLEASE READ AND AGREE COPYING OR USING This Software License Agreement (the "Agreement other legal entity that you represent and warrant (each, "You" or "Your") and Intel Corporation and regarding Your use of the Software defined below otherwise using the Software, You agree to be bo do not agree to the terms of this Agreement, or d to agree to them, do not download, install, copy of	BEFORE DOWN you have the le its subsidiaries . By downloadir und by the term o not have lega or otherwise use	NLOADING, INS egal authority to (collectively, "In ng, installing, co ns of this Agree I authority or re the Software.	TALLING, bind, itel") pying or ment, If Yo equired age	u v
N	< Back	Yes	No	
		— Intel® Inst	allation Fra	mework

4. Click **Yes** to accept the license agreement and click **Next** in The Readme File Information screen. Click **Next** in the Setup Progress screen.



5. Restart the computer when prompted. Click **Finish**, then remove any installation media from the drives.



3.4 HD Audio Driver Installation

1. Insert the disk enclosed in the package with the board. Click Intel on the left pane and then Intel(R) Elkhartlake Chipset Drivers on the right pane.



2. Click Realtek High Definition Audio Driver.

3. On the Welcome screen, click Next to continue.



4. When the InstallShield Wizard has successfully installed the Realtek Audio Driver, restart the computer. Click **Finish** to complete the setup.

3.5 Intel® ME Drivers Installation

1. Insert the disk enclosed in the package with the board. Click Intel on the left pane and then Intel(R) ME Drivers.



2. The welcome screen to the Intel® Management Engine Components appears. Click **Next** to continue.



3

3. Accept the license agreement and click Next.

Setup	×
Intel® Management Engine Components License Agreement	A second
INTEL SOFTWARE LICENSE AGREEMENT(OEM / IHV / ISV Distribution & Single User) IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING. Do not use or load software (including drivers) from this site or 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, which Intel may modify from time to time following reasonable notice to You. If you do not wish to so agree, do not install or use the Software.	^
 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, applies. 	
FOR OEMS, ITVS and ISVS:	22
\Box I accept the terms in the License Agreement.	v
Intel Corporation <back next=""> Can</back>	cel

4. On the Setup's Destination Folder screen, click Next to continue.

Setup			×
Intel® Management Engine Components Destination Folder		(int	el
Click Next to install to the default folder, or click Change to	o choose anoth	ner destinati	on folder.
C:\Program Files (x86)\Intel\Intel(R) Management Engine	Components		
			Change
Intel Corporation	< Back	Next >	Cancel

5. After the Intel® components have been completely installed, click Finish.

3.6 LAN Driver Installation

1. Insert the disk enclosed in the package with the board. Click **LAN Card** on the left pane and then **Intel LAN Controller Drivers** on the right pane.



2. Choose Intel(R) I21x Gigabit Network Drivers.



- 3. In the welcome screen to the install wizard for Intel(R) Network Connections, click **Next**.
- 4. On the next screen, accept the terms in the license agreement and click **Next**.



5. In the Setup Options screen, click Next.

Intel(R) Network Connections Install Wizard			×
Setup Options Select the program features you want instal	led.		(intel)
Install:			
Device drivers Device drivers Intel® PROSet Intel® Advanced Network Services			
Feature Description			
	< Back	Next >	Cancel

6. Click **install** to begin the installation.

뤻 Intel(R) Network Connections Install Wi	zard		×
Ready to Install the Program The wizard is ready to begin installation.			(intel)
Click Install to begin the installation. If you want to review or change any of yo the wizard.	ur installation settir	ngs, click Back. Click (Cancel to exit
	< Back	Install	Cancel

7. Click **Finish** when Install wizard has completed.

뤻 Intel(R) Network Connections Install W	/izard	×
Install wizard Completed		(intel)
To access new features, o properties of the network	pen Device Manager, and view the adapters.	
	< Back Finish	Cancel

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

If you still 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 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

Main Advanced Chipset Se	Aptio Setup - AMI curity Boot Save & Exit	
Total Memory Memory Data Rate	8192 HB 2667 MTPS	Set the Date. Use Tab to switch between Date elements. Default Ranges: Vers: 1292-2020
System Date System Time	[Fr1 08/20/2021] [13:53:00]	Months: 1-12 Days: Dependent on month Range of Years may vary.
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Heln F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	rersion 2.21.1278 Copyright (C)	2021 AHI

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.

Aptio Setup - AMI Main Advanced Chipset Security Boot Save & Exit	
<pre>• CPU Configuration PEH-FH Configuration • Trusted Computing • ACFI Settings • Fintex Super 10 Configuration • Fintex Hardware Monitor • USB Configuration • Network Stack Configuration</pre>	CFU Configuration Parameters +*: Select Screen T4: Select Item Enter: Select +/: Charge Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.21.1278 Copyright (C)	2021 AHI

BIOS Setting	Description
CPU Configuration	Displays CPU configuration parameters.
PCH-FW Configuration	Configure Management Engine Technology Parameters.
Trusted Computing	Configure security device parameters.
ACPI Settings	Displays system ACPI parameters.
Fintek Super IO Configuration	Displays super IO chip parameters.
Fintek Hardware Monitor	Shows super IO monitor hardware status.
USB Configuration	Displays USB configuration parameters.
Network Stack Configuration	Enables / Disables UEFI Network Stack.



4.4.1 CPU Configuration

Aptio Setup - AMI		
CPU Configuration Type ID Speed MMX SHX/TKT Intel (MMX) Virtualization Technol	Intel Atom(R) x6413E 0x90661 1500 MHz Supported Not Supported (Enubled)	When enabled, a VHM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Version	2.21.1278 Copy-lght (C) 202	1964

BIOS Setting	Description	
Intel (VMX) Virtualization Technolgy	When enabled, a VMM can ultilize the additional hardware capabilities provided by Varderpool Technology.	

4.4.2 PCH-FW Configuration

 CPU Configuration PCH-FH Configuration PCH-FH Configuration PCH-FH Configuration PCH-FH Configuration PCH-FH Configuration PCH-FH Configuration Petwork Stack Configuration	Moin Advanced Chipset Securit	Aptio Setup - AKI ty Boot Save & Exit	
Vention 2.21.1278 Coopyright (C) 2021 AHI Aptio Setup - AHI Advanced Aptio Setup - AHI ME Firmware Mode Normal Mode ME Firmware Status 1 Ox30000255 ME Firmware Status 2 Ox3010065 ME State Enabled ME State Enabled	 CPU Configuration FCP-F4 configuration Trusted Computing aCPI Settings Fintek Super ID Configuration Fintek Hardware Monitor USB Configuration Network Stack Configuration 		Configure Hanagement Engine Technology Parameters ++: Select Screen T1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Aptio Setup - AHI Advanced Aptio Setup - AHI Adv	. Weine I	A	
Advanced IS.40.10.2204 ME Firmware Yersion 15.40.10.2204 ME Firmware Mode Normal Mode ME Firmware Stu Consumer SKU Ox30000255 Ox89100106 ME Firmware Status 2 Ox89100106 ME State Enabled ME State Enabled	(Vertica)	A ETELLERA CONSTRACTOR	LOCA HEAL
ME Firmware Version 15.40.10.2204 ME Firmware Mode Normal Mode Description Consumer SKU ME Firmware Status 1 Ox90000255 Ox89100106 Normal Mode ME Statu Dx80100106 ME Statu Enabled	Advanced	Aptio Setup – AMI	1141
++: Select Streen 14: Select Item Enter: Select +/-: Change Opt. F1: General Heip F2: Previous Values F3: Optimized Defaults F4: Save 8 Exit ESC: Exit	ME Firmware Version ME Firmware Mode ME Firmware SkU ME Firmware Status 1 ME Firmware Status 2 ME State	15.40.10.2204 Normal Mode Consumer SKU 0x90000255 0x89100106 IEnabled1	When Disabled ME will be put into ME Temporarily Disabled Mode.
			++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

BIOS Setting	Description	
ME State	When disabled, ME will be put into ME temporarily Disabled Mode.	

4.4.3 Trusted Computing

Advanced	Aptio Setup - AHI	
TPH 2.0 Device Found Firmware Version: Vendor:	7.62 IFX	Enables or Disables BIOS support for security device. 0.5. will not show Security Device. TOS FET protocol and
Security Device Support Active PCR banks Available PCR banks	(Enclin) SHA256 SHA-1,SHA256	INTIA interface will not be available.
SHA-1 PCR Bank SHA256 PCR Bank	(Disabled) [Enobled]	
Pending operation	(None)	
Storage Hierarchy Endorsement Hierarchy TPM 2.0 UEFI Spec Version Physical Presence Spec Version TPM 2.0 InterfaceType Device Belect	(Enabled) (Enabled) (TC6_2) (1.3) (TIS) (Auto)	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values

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.	
SHA-1 PCR Bank	Enables / Disables SHA-1 PCR Bank.	
SHA256 PCR Bank	Enables / Disables SHA256 PCR Bank.	
Pending operation	Schedule an operation for the security device. Note: Your computer will reboot during restart in order to change state of security device.	
Platform Hierarchy	Enables / Disables platform hierarchy.	
Storage Hierarchy	Enables / Disables storage hierarchy.	
Endorsement Hierarchy	Enables / Disables endorsement hierarchy.	
TPM2.0 UEFI Spec Version	 Selects the supported TCG version based o your OS. TCG_1_2: supports Windows 8 /10. TCG_2: supports new TCG2 protocol and event format for Windows 10 or later. 	
Physical Presence Spec Version	Selects to show the PPI Spec Version (1.2 or 1.3) that the OS supports. Note: Some HCK tests might not support 1.3.	
Device Select	 TPM 1.2 will restrict support to TPM 1.2 devices only. TPM 2.0 will restrict support to TPM 2.0 devices only. Auto will support both with the default being set to TPM 2.0 deices if not found, and TPM 1.2 device will be enumerated. 	

4.4.4 ACPI Settings



BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state (Suspend Disabled or S3) where the system will enter when the Suspend button is pressed.



4.4.5 Fintek Super IO Configuration

Advanced	Aptio Setup — AHI	
Fintek Super 10 Confi	iguration	
Super 10 Chip Power Foulture	Fintek F81964 [milmos off]	
 Serial Port 1 Configu Serial Port 2 Configu Serial Port 3 Configu Serial Port 4 Configu 	uration wation wation	
BIOS Setting	Description	

BIOD Octaing	Description
Power Failure	Options: Always on, Always off
Serial Ports Configuration	Sets parameters of serial ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.

Serial Port 1 Configuration



Advanced	Aptio Setup - AHI	
Serial Port 1 Configuratio	n	Select an optimal settings for Super IO Device
Device Settings	IO=3F6h: IRQ=4:	
Change Dettings Device Hode	(0000) (RS232)	
Advanced	Aptio Setup - AHI	
Serial Port 1 Configuratio	n	Change the Serial Port mode.
Serial Port Device Settings	[Enabled] IO=3F8h; IRQ=4:	
Change Settings Device Hode	(Auto) (Ascas)	
	Device Mode R5485 TX Low Active R5485 with Termination TX Low R5422 R5422 with Termination	Active elect Screen elect Item



Serial Port 2 Configuration

Advanced	Aptio Setup - AMI	
Serial Port 2 Configuratio	in.	Enable or Disable Secial Port
Serial Port		(COH)
Device Settings	IO=2F8h1 IRQ=31	
Change Settings Device Hode	(Auto) (R\$232)	
Advanced	Aptio Setup - AMI	
Serial Port 2 Configuratio	n	Select an optimal settings for
Serial Port	(Enabled)	Super IO Device
Device Settings	IO=2F6h; IRQ=3;	
Change Settings Device Hode	(RS232)	
Advanced	Aptio Setup — AMI	
Serial Port 2 Configuratio	'n	Select an optimal settings for
Serial Port	(Enabled)	Super IO Device
Device Settings	IO=2F8h: IRQ=3:	
Device Mode	(8910) (85202)	
	Change Settings	
	IO=2F8h; IRQ=3; IO=2F8h; IRQ=3,4,5,6,7,9,10,1	1149-1
	IO=3F8h; IRQ=3,4,5,6,7,9,10,1 IO=2F8h; IRQ=3,4,5,6,7,9,10,1 IO=3F8h; IRQ=3,4,5,6,7,9,10,1	1/12: 1/12: 0.100 Calert Stream
	IO=2E8h; IRQ=3,4,5,6,7,9,10,1	1,12: Select Item
Advanced	Aptio Setup – AMI	
Serial Port 2 Configuratio	in	Change the Serial Port mode.
Serial Port	(Enabled)	
Device Settings	IO#2F8h: IRQ#3:	
Device Hode	(RS232)	
	Dettil con Modes	
	RS232 RS485 TX Low Active	
	RS485 with Termination TX Low RS422	Active
	RS422 with Termination	elect Item
		Change Opt.
		F2: Previous Values F3: Optimized Defaults
		F4: Save a Exit ESC: Exit
	Version 2.21.1278 Copyright (C)	12021 AM1

Serial Port 3 Configuration

Advanced 10	Aptio Setup - AMI	
Serial Port 3 Configuratio Serial Port Device Settings Change Settings Device Hode	on (Enabled) IO=3E@h; IRQ=5; [Auto] [R5232]	Enable or Disable Serial Port (COM)
Advanced	Aptio Setup - AHI	
Serial Port 3 Configuratio Serial Port Device Settings Change Settings Device Mode	DN [Enabled] IO=3E8h; IRQ=5; [nuto] [R5252] Change Settings Auto IO=3E8h; IRQ=7; IO=3E8h; IRQ=3,4,5,6,7,9,10,1 IO=2E0h; IRQ=3E0h; IRQ=3,4,5,6,7,9,10,1 IO=2E0h; IRQ=3E0h; IRQ=3E	Select an optimal settings for Super IO Device 1,12:

Advanced		
Serial Port 3 Configure	ation	Change the Serial Port mode.
Serial Port Device Settings	lEnabled) IO=3E8h; IRQ=5;	
Change Settings Device Hole	(Auto) (Adapa)	
	RS232 RS485 TX Low Active RS485 with Termination TX Lo RS422 RS422 with Termination	w Active elect Screen elect Item : Select Chappe Dot
		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.21.1270 Conversion 10) 2021 AMT



Serial Port 4 Configuration

Aptio Setup - AMI		
Serial Port 4 Configurati Serial Port Device Settings Change Settings Device Hode	on (Enchled) IO=2EBh; IRQ=10; (Auto) (RS232)	Enable or Disable Serial Port (COM)
Advanced	Aptio Setup – AHI	
Serial Port 4 Configurati Serial Port Device Settings Change Settings Device Mode	on [Enmbled] IO=2E8h; IRQ=10; [Auto] [RS212] Change Settings Auto IO=2E8h; IRQ=7; IO=3E8h; IRQ=3,4,5,6,7,9,10, IO=2E8h; IRQ=3,4,5,6,7,9,10, IO=2E0h; IRQ=3,4,5,6,7,9,10,7,7,7,7,	Select an optimal settings for Super 10 Device 11,12: 11,12: 11,12: 11,12: Select Screen Select Item 11,12: Select Item 11,12: Select Item 12: Select Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save 8 Exit ESC: Exit

Advanced	Aptio Setup - AMI	
Serial Port 4 Configurat	tion	Change the Serial Port mode.
Secial Port Device Settings	[Enabled] IO=2E8h; IRQ=10;	
Change Settings Device Hode	(Auto) (Ascala)	
	Device Mode RS232 RS485 TX Low Active RS485 with Termination TX Low RS422 RS422 with Termination	Active elect Screen slect Item : Select Change Opt. F1: General Help F2: Frevious Values F3: Optimized Defaults F4: Save à Exit ESC: Exit
	Version 2.21.1278 Copyright (C)	2021 AMI



4.4.6 Fintek Hardware Monitor

CPU Configuration PCH-FH Configuration PCH-FH Configuration Protect Computing PCH Settings PCH Settings PCH Settings PCH Settings PCH Settings PCH Settings PCH Setting PCH Seting PCH Setting PCH	Main Advanced Chipset Secu	Aptio Setup - AHI wity Boot Save 8 Exit	
Version 2.21.1270 Copyright (0) 2021 (MI Aptio Setup - AHI Aptio Setup - AHI Pc Health Status C CPU temperature 1 +47 C System temperature 1 +47 C Vcore 1 +1.632 V +5V 1 +5.007 V. Memory Voltage 1 +1.192 V #ti Select Screen 11: Select Item Enter: Select +7: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Several Exit ESC: Exit	 CPU Configuration PCH-FH Configuration Trusted Computing ACPI Settings Fintek Super TO Configuration USB Configuration Network Stack Configuration 		Fintex Monitor hardware status ++: Select Screen TI: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Aptio 2.21.1270 Gopyright (6) 2021 AM1 Aptio Setup - AHI Pc Health Status CPU temporature : +47 C System temporature : +49 C Vcore : +5.007 V Hemory Voltage : +1.192 V Hemory Voltage : +1.192 V +*: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Select Defaults F4: Select Defaults F4: Select Defaults F4: Select Defaults F4: Select Defaults F4: Select Exit			
Advanced Aptio Setup - AH1 Pc Health Status CPU temperature 1 +47 C System temperature 1 +49 C Vcore 1 +1.632 V +5V 1 +5.087 V Hemory Voltage 1 +1.192 V ++1 Select Screen 11: Select Screen 11: Select Item Enter: Select F1: Select Screen 14: Select Screen 14: Select Screen 14: Select Screen 15: Select Screen 14: Select Screen 16: Sector 14: Select Screen 17: Select Screen 14: Select Screen 18: Select Screen 14: Select Screen 19: Sector 14: Select Screen <td>Ver</td> <td>Sion 2.21.1278 Copyright (C) 20</td> <td>121 AMI</td>	Ver	Sion 2.21.1278 Copyright (C) 20	121 AMI
Pc Health Status CPU temperature : +47 C System temperature : +49 C Vcore : +1.632 V +5V : +5.007 V Hemory Voltage : +1.192 V **: Select Screen 11: Select Item Enter: Select Item	Advanced	Aptio Setup - AMI	
CPU temperature : +47 C System temperature : +49 C Vcore : +5.007 V Hemory Voltage : +1.192 V +*: Select Screen Ti: Select Item Enter: Select +/-: Change Opt. fi: General Help f2: Previous Values F3: Optimized Defaults F4: Save 3 Exit ESC: Exit	Pc Health Status		
	CPU temperature System temperature Vcore +5M Hemory Voltage	: +47 C : +49 C : +1.632 V : +5.007 V : +1.192 V	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defmults F4: Save & Exit ESC: Exit

BIOS Setting	Description
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only as monitored by the system and showing the PC health status

4.4.7 USB Configuration

Aptio Setup - AMI		
USB Configuration		Enables Legacy USB support.
USB Module Version	25	support if no USB devices are connected, DISABLE option will
USB Controllers:		Keep USB devices available
USB Devices:		only for cri applications.
1 Drive, I Keyboard, 1 Mouse		
	[Enabled]	
XHCI Hand-off	[Enabled]	
USB Hass Storage Driver Support	(Enabled)	
USB hardware delays and time-outs:		++1 Select Screen
USB transfer time-out	[20 sec]	T4: Select Item
Device reset time-out	[20 sec]	Enter: Select
Device power-up delay	(Auto)	+/-: Change Opt.
And the second sec		F1: General Help
Mass Storage Devices;	(manual)	F21 Previous Values
Beneric Ditra Ha-CORDO	(HUTO)	Ed: Cove & Fult
		ESC: Exit
Vension	2.21.1278 Copyright	(C) 2021 AMI

BIOS Setting	Description
Legacy USB Support	 Enables / Disables 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-pff	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 USB mass storage driver support.
USB Transfer time-out	Sets the time-out value 1, 5, 10 or 20 sec(s) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Sets the seconds (10, 20, 30, 40 secs) of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. Auto uses default value. For a Root port, it is 100 ms. For a Hub port, the delay is taken from Hub descriptor
Generic Ultra MS-COMBO	Mas 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



4.4.8 Network Stack Configuration

Hain Advanced Chipset Securi	Aptio Setup - AHI 1y Boot Bave & Exit	
 CPU Configuration PCH-FH Configuration Trusted Computing ACPI Settings Fintek Super TO Configuration Fintek Hardware Monitor USD Configuration Wetwork Stack Schriguration 		Network Stack Settings ++: Select Screen T4: Select Item Enter: Select +/-: Change Opt. F1: Beneral Help F2: Previous Values F3: Optimized Defaults F4: Save 8 Exit ESC: Exit
Versi	on 2.21.1278 Copyright (C) 200	11 HH1
Advanced	Aptio Setup - AHI	1411
нетшогк Stack		Enable/Disable UEFI Network Stack
	Network Stack Disabled Enabled	++: Select Screen TI: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save B Exit ESC: Exit

BIOS Setting	Description
Network Stack	Enables / Disables UEFI Network Stack.

4.5 Chipset Settings

4.5.1 System Agent (SA) Configuration

MARK NO. TO THE MARK	Aptio Setup - AMI	
Main Advanced Chips	at Security Boot Save & Exit	
 Dustem agent (CA) confi PCH-10 Configuration 	Liguriant Lon	System Agent (SA) Parameters
Chipse	Aptio Setup - AHI	
System Agent (SA) Conf.	Iguration	VT-d capability
VT-d	Supported	
 Graphics Configuration VT-d 	tEnabled	
Chips	Aptio Setup - AHI	
Graphics Configuration Primary Display	inutoi	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG
Internal Graphics GTT Size Aperture Size	(848) (25648)	for Hubrid Gfx.
Chips	Aptio Setup – AHI	
Graphics Configuration Primary Display Internal Graphics GTT Size Adorture dize	LAutoj (Auto) (BHB) (CSCHO)	Select the Aperture Size Note : Above 460 MMID BIDS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.
	Apenture Size - 12848 25648 51248 102448 204648	++1 Select Screen T1: Select Item
BIOS Setting	Description	
Primary display	Select which of IGFX/PE	G/PCI Graphics device should

r mary display	be Primary Display or select HG for Hybrid Gfx
Internal Graphics	Keep IGFX enabled based on the setup options
GTT Size	Options: 2MB, 4MB, 8MB
Aperture Size	Select the Aperture Size. Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support

4.5.2 PCH-IO Configuration

Hain Advanced Chipset Secu	Aptio Setup - AHI wity Boot Save & Exit	
System Agent (SA)≕Configuratio rCH-lo configuration	in.	PCH Parameters
	Aptio Setup - AMI	
Chipset		
PCH-IO Configuration		SATA Device Options Settings
26TA Configuration		
	Antin Catur - AHT	
Chipset	ADTIO SETUD - ANI	
SATA Configuration		Enable or Disable SATA Port
SATA Controller(s)	[Eneb1ed]	
Serial ATA Port O Software Preserve Port O Hot Flug Configured as eSATA Serial ATA Port 1 Software Preserve Port 1 Hot Flug Configured as eSATA	TS646MT54001 (64.0GB) SUPPORTED TEnchied1 IDisabled1 Hot Flug Supported TS128ASTHM16KI (128.0 SUPPORTED [Enabled] [Disabled] Hot Flug Supported	<pre>++: Select Screen T1: Select Item Enter: Select +/-: Change Opt, F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

BIOS Setting	Description	
SATA Controller(s)	Enables / Disables the Serial ATA.	
SATA Mode Selection	Determines how SATA controller(s) operate.	
Serial ATA Port 0~1	Enables / Disables Serial Port 0~1.	
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.	



4.6 Security Settings



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

Aptio Setup - AMI		
SATA Configuration		Enable/Disable SATA Device.
SATA Controlien(t) SATA Mode Selection	(Enablind) (AHCI)	
Serial ATA Port 0 Software Preserve Port 0 Hot Plug Configured as eSATA Serial ATA Port 1 Software Preserve Port 1 Hot Plug Configured as eSATA	TS64GMT54001 (64.0GB) SUPPORTED [Enabled] Hot Flug Supported TS128ASTHM16KI (128.0 SUPPORTED [Enabled] [Disabled] Hot Flug Supported	++: Select Screen 14: Select Item

Aptio Setup - AHI		
Chinset SATA Configuration SATA Controller(s) DATA Hode Selection Serial ATA Port 0 Software Preserve Port 0 Hot Plog Configured as eSATA Serial ATA Port 1 Software Preserve Port 1 Hot Plog Configured as eSATA	[Enabled] [NHCI] TS64GHTS400I (64.06B) SUPPORTED [Enabled] [Disabled] Hot Plug supported TS12BASTHH16K1 (128.0 SUPPORTED [Enabled] [Disabled] Hot Plug supported	Determines how SATA controller(s) operate.
Ver	sion 2.21.1278 Copyright (0) 202	ESC: Exit

Aptio Setup - AHI

SATA Configuration

Chigset

Chigset

SATA Controller(s) SATA Mode Selection

Serial ATA Port 0 Software Preserve Hot Plug Configured as eSATA Serial ATA Port 1 Software Preserve Port 1 Hot Plug Configured as eSATA

[Enabled] (AHCIT)

TS646MTS4001 (64.068) SUPPORTED

(Disabled) Hot Flug supported TS128ASTHM16KI (128.0... SUPPORTED [Enabled] (Disabled) Hot Flug supported

Aptio Setup - AHI

SATA Configuration

SATA Controller(s) SATA Mode Selection

Serial ATA Port 0 Software Preserve Port 0 Configured as eSATA Serial ATA Port 1 Software Preserve Port 1 Hot Plug Configured as eSATA

[Enabled] (AHE I)

TS64GMTS4001 (64.0GB) SUPPORTED [Enabled] HOT Plug supported TS128ASTHM16KI (128.0... SUPPORTED [Enabled] (Disabled) Hot Flug supported

++: Select Screen T4: Select Item

Designates this port as Hot Fluggable.

- ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Enable or Disable SATA Port

rsion 2.21.1278 Copyright (C) 021 AM1








4.7 Boot Settings

Aptio Setup - AMI Main Advanced Chipset Security <mark>Boot</mark> Days a Exit		
Boot Configuration Setup Frompt Timeout Bootup HumLock State Quiet Boot	1 (C++) (Disabled)	Select the keyboard NumLock state
FixED BOOT ORDER Priorities Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #5 Boot Option #5 Boot Option #6 Boot Option #7 Boot Option #8 • UEFI Hard Disk Drive BBS Priorities	Hand Disk:Hindows] (CD/DVD) [USB Hand Disk] (USB CD/DVD) [USB Key] [USB Fioppy] [USB Lan] [Network]	++: Select Screen 14: Select Item Enter: Select 4/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defmults F4: Save & Exit ESC: Exit
Version 4	2.21.1278 Copyright (C) 202	1 AM1

BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Turns on/off the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Fixed Boot Order Priorities	Sets the system boot order.
UEFI Hard Disk Drive BBS Priorities	Specifies the boot device priority sequence from available UEFI hard disk drives.

4.8 Save & Exit Settings

Aptio Setup - AHI Main Advanced Chipset Security Boot Save & Exit	
Save Options Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes Discard Changes Default Options Restore Defaults Save as User Defaults Restore User Defaults Restore User Defaults Boot Override Hindows Boot Hanager (PO: TS64GMTS400I) Launch EF1 Shell from filesystem device	Exit system setup after saving the changes.
Version 2.21.1270 Copyright (C	1 2021 AMT

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

Resource

0x00000000-0x00000CF7 0x0000020-0x00000021 0x00000024-0x00000025 0x0000028-0x00000029 0x000002C-0x0000002D 0x0000002E-0x0000002F 0x00000030-0x00000031 0x00000034-0x00000035 0x0000038-0x00000039 0x000003C-0x000003D 0x00000040-0x00000043 0x0000004E-0x0000004F 0x00000050-0x00000053 0x0000061-0x0000061 0x0000063-0x0000063 0x0000065-0x0000065 0x0000067-0x0000067 0x00000070-0x00000070 0x0000080-0x0000080 0x0000092-0x0000092 0x000000A0-0x000000A1 0x000000A4-0x000000A5 0x000000A8-0x000000A9 0x000000AC-0x000000AD 0x000000B0-0x000000B1 0x00000B2-0x00000B3 0x00000B4-0x00000B5 0x000000B8-0x000000B9 0x00000BC-0x00000BD 0x000002E8-0x000002EF 0x000002F8-0x000002FF 0x000003E8-0x000003EF 0x000003F8-0x000003FF 0x000004D0-0x000004D1 0x00000680-0x0000069F 0x00000A00-0x00000A0F 0x00000A10-0x00000A1F

Device

PCI Express Root Complex Programmable interrupt controller Programmable interrupt controller Programmable interrupt controller Programmable interrupt controller Motherboard resources Programmable interrupt controller Programmable interrupt controller Programmable interrupt controller Programmable interrupt controller System timer Motherboard resources System timer Motherboard resources Programmable interrupt controller Motherboard resources Programmable interrupt controller Programmable interrupt controller Programmable interrupt controller Communications Port (COM4) Communications Port (COM2) Communications Port (COM3) Communications Port (COM1) Programmable interrupt controller Motherboard resources Motherboard resources Motherboard resources

Resource

0x0000063-0x0000063 0x0000065-0x0000065 0x0000067-0x0000067 0x00000070-0x00000070 0x0000080-0x00000080 0x00000092-0x00000092 0x000000A0-0x000000A1 0x000000A4-0x000000A5 0x000000A8-0x000000A9 0x000000AC-0x000000AD 0x000000B0-0x000000B1 0x000000B2-0x000000B3 0x000000B4-0x000000B5 0x000000B8-0x000000B9 0x00000BC-0x00000BD 0x000002E8-0x000002EF 0x000002F8-0x000002FF 0x000003E8-0x000003EE 0x000003F8-0x000003FF 0x000004D0-0x000004D1 0x00000680-0x0000069F 0x00000A00-0x00000A0F 0x00000A10-0x00000A1F 0x00000A20-0x00000A2F 0x00000D00-0x0000FFFF 0x0000164E-0x0000164F 0x00001800-0x000018FE 0x00001854-0x00001857 0x00002000-0x000020FE 0x00003000-0x00003FFF 0x00004000-0x00004FFF 0x00005000-0x00005FFF 0x00006000-0x0000603F 0x00006060-0x0000607F 0x00006080-0x00006083 0x00006090-0x00006097 0x0000EFA0-0x0000EFBF

Device

Motherboard resources Motherboard resources Motherboard resources Motherboard resources Motherboard resources Motherboard resources Programmable interrupt controller Motherboard resources Programmable interrupt controller Programmable interrupt controller Programmable interrupt controller Communications Port (COM4) Communications Port (COM2) Communications Port (COM3) Communications Port (COM1) Programmable interrupt controller Motherboard resources Motherboard resources Motherboard resources Motherboard resources PCI Express Root Complex Motherboard resources Motherboard resources Motherboard resources Motherboard resources Intel(R) PCI Express Root Port #2 - 4B3A Intel(R) PCI Express Root Port #1 - 4B39 Intel(R) PCI Express Root Port #0 - 4B38 Intel(R) UHD Graphics Standard SATA AHCI Controller Standard SATA AHCI Controller Standard SATA AHCI Controller Intel(R) SMBus Controller - 4B23

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 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 10	Communications Port (COM4)
IRQ 16	High Definition Audio Controller
IRQ 55 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967273	Intel(R) Management Engine Interface
IRQ 4294967274~79	Intel I210 Gigabit Network Connection #5
IRQ 4294967280~85	Intel I210 Gigabit Network Connection #6
IRQ 4294967286~91	Intel I210 Gigabit Network Connection #4
IRQ 4294967292	Intel(R) UHD Graphics
IRQ 4294967293	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967294	Standard SATA AHCI Controller

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.
//
//-----
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81964.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_F81964();
    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_F81964_Reg(0x2B);
    bBuf &= (\sim0x20);
    Set_F81964_Reg(0x2B, bBuf);
                                       //Enable WDTO
    Set F81964 LD(0x07);
                                       //switch to logic device 7
    Set_F81964_Reg(0x30, 0x01);
                                       //enable timer
    bBuf = Get_F81964_Reg(0xF5);
    bBuf &= (\sim 0x0F);
    bBuf = 0x52;
    Set_F81964_Reg(0xF5, bBuf);
                                       //count mode is second
    Set_F81964_Reg(0xF6, interval);
                                       //set timer
    bBuf = Get_F81964_Reg(0xFA);
    bBuf = 0x01;
    Set_F81964_Reg(0xFA, bBuf);
                                       //enable WDTO output
    bBuf = Get_F81964_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81964_Reg(0xF5, bBuf);
                                       //start counting
}
//-----
void DisableWDT(void)
{
    unsigned char bBuf;
    Set_F81964_LD(0x07);
                                       //switch to logic device 7
    bBuf = Get F81964 Reg(0xFA);
    bBuf &= \sim 0x01;
    Set_F81964_Reg(0xFA, bBuf);
                                       //disable WDTO output
    bBuf = Get_F81964_Reg(0xF5);
    bBuf &= \sim 0x20;
    bBuf |= 0x40;
    Set F81964 Reg(0xF5, bBuf);
                                       //disable WDT
}
//-----
```

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81964.H"
#include <dos.h>
//-----
unsigned int F81964 BASE; void Unlock F81964 (void); void Lock F81964 (void);
//-----
unsigned int Init_F81964(void)
{
   unsigned int result;
   unsigned char ucDid;
   F81964 BASE = 0x4E;
   result = F81964_BASE;
   ucDid = Get_F81964_Reg(0x20);
   if (ucDid == 0x07)
                                  //Fintek 81866
       goto Init_Finish; }
   {
   F81964 BASE = 0x2E;
   result = F81964_BASE;
   ucDid = Get_F81964_Reg(0x20);
   if (ucDid == 0x07)
                                  //Fintek 81866
   {
       goto Init_Finish; }
   F81964 BASE = 0x00;
   result = F81964 BASE;
Init Finish:
   return (result);
}
//-----
void Unlock_F81964 (void)
{
   outportb(F81964_INDEX_PORT, F81964_UNLOCK);
   outportb(F81964_INDEX_PORT, F81964_UNLOCK);
}
//-----
void Lock_F81964 (void)
{
   outportb(F81964 INDEX PORT, F81964 LOCK);
}
//-----
void Set_F81964_LD( unsigned char LD)
{
   Unlock_F81964();
   outportb(F81964 INDEX PORT, F81964 REG LD);
```

```
outportb(F81964_DATA_PORT, LD); Lock_F81964();
}
//-----
void Set_F81964_Reg( unsigned char REG, unsigned char DATA)
{
   Unlock F81964();
   outportb(F81964_INDEX_PORT, REG);
   outportb(F81964 DATA PORT, DATA);
   Lock_F81964();
}
//-----
unsigned char Get F81964 Reg(unsigned char REG)
{
   unsigned char Result;
   Unlock_F81964();
   outportb(F81964_INDEX_PORT, REG);
   Result = inportb(F81964_DATA_PORT);
   Lock F81964();
   return Result;
}
//-----
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#ifndef F81964_H
#define F81964_H 1
//-----
#define F81964_INDEX_PORT (F81964_BASE)
#define F81964_DATA_PORT (F81964_BASE+1)
//-----
#define F81964_REG_LD 0x07
//-----
#define F81964 UNLOCK 0x87
#define F81964_LOCK 0xAA
//-----
unsigned int Init F81964(void);
void Set_F81964_LD( unsigned char);
void Set F81964 Reg( unsigned char, unsigned char); unsigned char
Get_F81964_Reg( unsigned char);
//-----
#endif // F81964 H
```



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