Intel® Core™ i9/i7/i5/i3 Processor (14th) Expandable AI Computing System With Discrete Graphics



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Order Information

	Ethernet					System	
Model	2.5G LAN	1G LAN	PCIe x16	SATA III	USB	СОМ	Fan
MIG-3000	1	1	1	2	4	2	Y

Optional Accessories

Part Number	Description
DDR5 32G	Certified DDR5 32GB 4800MHz RAM
DDR5 16G	Certified DDR5 16GB 4800MHz RAM
DDR5 8G	Certified DDR5 8GB 4800MHz RAM
PWS-480W-WT	480W, 24V, 90V AC to 305V AC Power Supply, Wide-Temp, IP65
PWS-600W	600W, 24V, 90V AC to 305V AC Power Supply
PWS-600W-WT	600W, 28.8V, 90V to 305V AC Power Supply, Wide Temperature -40°C to +70°C
M.2 Storage Module	M.2 Key M Storage Module
WiFi & Bluetooth	WiFi & Bluetooth Module with Antenna

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GENERAL INTRODUCTION

1.1 Overview

The Vecow MIG-3000 is a high-performance, expandable AI computing system powered by Intel[®] Core[™] i9/i7/i5/i3 processors (14th Gen) and Intel[®] H610E chipset. Designed for compute-intensive applications, it supports discrete GPU integration and delivers scalable performance for demanding AI workloads.

The system is equipped with up to 64GB of high-speed DDR5 memory and integrates Intel[®] UHD Graphics 770/730 driven by Intel[®] Xe Architecture, supporting 1 HDMI 4K display and advanced 3D graphics capabilities. With its robust PCIe 4.0 x16 slot supporting up to 900W of power, the MIG-3000 is built to accommodate 2-slot graphics card for next-generation AI acceleration.

Engineered for versatility and connectivity, the MIG-3000 supports 1 2.5G LAN, 1 GigE LAN, 4USB ports, and 2 COM ports—enabling seamless integration across diverse environments. Its wide-range 9V to 55V DC power input and 0°C to 60°C operating temperature ensure industrial-grade reliability in harsh conditions, making it ideal for applications such as autonomous vehicles, medical imaging, smart manufacturing, deep learning, gaming, traffic vision, and a broad range of AloT and Industry 4.0 deployments.

1.2 Features

- Intel[®] Core[™] i9/i7/i5/i3 Processors (12/13/14th Gen, Raptor/Alder Lake) running with Intel[®] H610E Chipset supports max 65W TDP CPU
- 2 DDR5 4800MHz Memory supports up to 64GB
- 1 M.2 2242/2280 NVMe slot and 2 SATA III ports for storage
- Expansion: 1 M.2 2230 Key E, 1 PCIe x16 expansion supports up to 900W power budget for independent 2-slot graphics card
- DC 9V to 55V wide range power input
- Operating Temperature from 0°C to 60°C

1.3 Specifications of MIG-3000

System						
Processor	 24-core Intel[®] Core[™] i9/i7/i5/i3 Processor (14th gen, Raptor Lake-S Refresh) 24-core 13th Gen Intel[®] Core[™] i9/i7/i5/i3 Processor (Raptor Lake-S) 16-core 12th Gen Intel[®] Core[™] i9/i7/i5/i3 Processor (Alder Lake-S) 					
Chipset	Intel [®] H610E					
BIOS	AMI					
SIO	NCT6126D					
Memory	2 DDR5 4800MHz SO-DIMM, up to 64GB					
I/O Interface						
Serial	2 COM RS-232/422/485					
USB	 2 USB 3.2 Type-A 2 USB 2.0 Type-A 					
LED	HDD, Power					
Expansion						
PCle	1 PCle 4.0 x16					
M.2	1 M.2 Key E Socket (2230, PCIe x1/USB2)					
Graphics						
Graphics Processor	 Intel[®] UHD Graphics 770/730 driven by Intel[®] Xe Architecture Independent Graphics : By request 					
Interface	 1 DP 1.2a: Up to 3840 x 2160 @60Hz 1 HDMI 1.4: Up to 3840 x 2160 @30Hz 					
Storage						
SATA	2 SATA III (6Gbps)					
M.2	1 M.2 Key M Socket (2242/2280, PCIe x4/SATA)					
Audio						
Audio Codec	Realtek [®] ALC897, 7.1 Channel HD Audio					
Audio Interface	1 Mic-in, 1 Line-out					
Ethernet	Ethernet					
LAN 1	Intel [®] I219V GigE LAN					
LAN 2	Intel [®] I225LM 2.5GigE LAN					

Power					
Power Input	DC 9V to 55V				
Power Interface	2-pin Terminal Block : V+, V-				
Others					
ТРМ	Infineon SLB9670 supports TPM 2.0, SPI Interface				
Watchdog Timer	Reset : 5 to 255 sec./min. per step				
Smart Mgmt	Wake on LAN supported (LAN1 only)				
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.				
Mechanical					
Dimension (W x D x H)	243.5mm x 271.3mm x 390mm (9.58" x 10.68" x 15.35")				
Weight	5.3 kg (11.45 lb)				
Mounting	Wallmount by mounting bracket				
Environment					
Operating Temperature	-0°C to 60°C (32°F to 147°F)				
Storage Temperature	-20°C to 80°C (-4°F to 185°F)				
Humidity	5% to 90% humidity, non-condensing				
Relative Humidity	95% at 60°C				
Shock	 IEC 61373 : 2010 Railway Applications : Rolling Stock Equipment, Shock and Vibration Tests 				
EMC	CE, FCC, EN50155, EN50121-3-2				

1.4 Supported CPU List

Series	CPU	Cores	GHz	TDP (W)
	i9-14900	24	5.8	
	i7-14700	20	5.4	
	i5-14500	14	5	
	i3-14100	4	4.7	
	i9-13900E	24	5.2	
	i7-13700E	16	5.1	65
	i5-13500E	14	4.6	60
	i3-13100E	4	4.4	
	i9-12900E	16	5	
	i7-12700E	12	4.8	
	i5-12500E	6	4.5	
Intel [®] Core™	i3-12100E	4	4.2	
	i9-14900T	24	5.5	
	i7-14700T	20	5.2	
	i5-14500T	14	4.8	
	i3-14100T	4	4.4	
	i9-13900TE	24	5	
	i7-13700TE	16	4.8	35
	i5-13500TE	14	4.5	
	i3-13100TE	4	4.1	
	i9-12900TE	16	4.8	
	i7-12700TE	12	4.7	
	i5-12500TE	6	4.3	
	i3-12100TE	4	4	



1.5 Mechanical Dimension



Unit : mm (inch)







GETTING TO KNOW YOUR MIG-3000

2.1 Packing List

Item	Description						
1	MIG-3000						
Item	Description	Outlook	Usage	P/N	Qty		
1	PHILLPIS M4x16L with washer, Ni	S.	Mount	53-24D6416-30B	4		
2	M3x4 Screw	€®	HDD	53-M006350-010	8		
3	Phillips F-Head M3*5 Z.B+Ny	*	Wall mount	53-M004950-310	6		
4	M3x4L, Ni	@	M.2 Slot	53-2426204-80B	1		
5	Terminal block 2-pin (10.16mm)		Switch	51-2701R02- R1Q	1		
6	MIG-3000 BP to GPU Cable		Cable	61-1400011-010	1		
7	Wall-mounting bracket		Mount	62-03P0692-B00	2		
8	27.8mm Foot pad		FOOT PAD	53-4029942-303	4		

2.2 Front Panel I/O Functions

In Vecow MIG-3000 series family, all I/O connectors are located on front panel. Most of the general connections to computer device, such as USB, LAN Jack, Audio, COM, HDMI, DC-IN and any additional Graphic Card, are placed on the front panel.



2.2.1 Reset Tact Switch



It is a hardware reset switch. Use this switch to reset the system without power off the system. Press the Reset Switch for a few seconds, then reset will be enabled.

2.2.2 Power Button



The Power Button is a non-latched switch with single color LED indication. It indicates power status S0.

To power on the system, press the power button and then the Green LED is lightened.

To power off the system, you can either command shutdown by OS operation, or just simply press the power button.

If system error, you can just press the power button for 4 seconds to shut down the machine directly.

Please do note that a 4-second interval between each 2 power-on/ power-off operation is necessary in normal working status. (For example, once turning off the system, you have to wait for 4 seconds to initiate another power-on operation).

2.2.3 PWR & HDD LED Indicator



HDD LED/Green : A Hard Disk LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

Power LED/Green : If the LED is solid green, it indicates that he system is powered on.

LED Color	Indication	System Status
Green	HDD	On/Off : Storage status, function or not.Twinkling : Data transferring.
Green	Power	System power status (on/off)

2.2.4 HDMI Port



The HDMI port supports HDCP 1.4 and Dolby TrueHD and DTS HD Master Audio formats. It also supports up to 192KHz/16bit 8-channel LPCM audio output. You can use this port to connect your HDMI-supported monitor. The maximum supported resolution is 3840 x 2160 @30Hz, but the actual resolutions supported are dependent on the monitor being used.

2.2.5 DisplayPort



Onboard Display Port supports auxiliary channel dual mode, and the connection supports up to 3840 x 2160 resolution at 60 Hz.

2.2.6 USB 3.2



There are 2 USB 3.2 Gen2 Type A connections available supporting up to 10GB per second data rate in the front side of MIG-3000 series . It also compliant with the requirements of Super Speed (SS), high speed (HS), full speed (FS) and low speed (LS).

2.2.7 USB 2.0



There are 2 USB 2.0 ports available supporting up to 480Mbps per second data rate in the front side of MIG-3000. They are also compliant with the requirements of high speed (HS), full speed (FS) and low speed (LS).

2.2.8 Ethernet Port



There are two 8-pin RJ-45 jacks supporting 10/100/1000/2500 Mbps Ethernet connections on the front side of MIG-3000. LAN 1 is powered by Intel[®] I219V Ethernet engine, and LAN 2 is powered by Intel I225LM Ethernet engine.

LAN Chip	Function	Connector
I219V_LAN1	RJ-45(10/100/1000)	LAN1
I225LM_LAN2	RJ-45(10/100/1000/2500)	LAN2

LED	Location	LED Color	10 Mbps	100 Mbps	1000 Mbps	2500 Mbps
	Left	Green/ Orange	Off	Solid Green	Solid Orange	х
CN_LAN1	Right	Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow	х
CN_LAN2	Left	Green/ Orange	Off	Off	Solid Green	Solid Orange
	Right	Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow

2.2.9 Audio Connector



There are 2 audio connectors, Mic-in and Line-out, in the front side of MIG-3000. Onboard Realtek ALC897 audio codec supports 7.1 channel HD audio and fully complies with Intel[®] High Definition Audio (Azalia) specifications.

To utilize the audio function in Windows platform, you need to install corresponding drivers for both Intel Sunrise Point chipset and Realtek ALC897 codec.

2.2.10 Serial Port



Serial port can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. The default definition is RS-232, but if you want to change to RS-422 or RS-485, you can find the settings in BIOS.

BIOS Setting	Function	
COM 1,2	RS-232	
	RS-422 (5-wire)	
	RS-485 (3-wire)	



The pin assignments are listed in the following table :

Serial Port	Pin No.	RS-232	RS-422 (5-wire)	RS-485 (3-wire)
	1	DCD	TXD-	DATA-
	2	RXD	TXD+	DATA+
	3	TXD	RXD+	
	4	DTR	RXD-	
1,2	5	GND	GND	GND
	6	DSR		
	7	RTS		
	8	CTS		
	9	RI		

2.2.11 DC-in



This system supports 9V to 55V DC power input by terminal block in the front side. In normal power operation, power LED lightens in solid green.

2.3 Main Board Expansion Connectors

2.3.1 Inside View of MIG-3000 Main Board with Connector Location



2.3.2 F_PANEL: Front Panel Header



This pin header can be used as a backup for following functions, hard drive LED indicator, reset button, power LED indicator, and power-on/off button. The pin assignments of F_PANEL are listed in the following table:

	Pin No.	Pin No.	Description
	HDD LED	1	HDD LED+
9		3	HDD LED#
	RESET BUTTON	5	Ground
		7	RST_BTN#
	POWER LED	2	Power LED+
1		4	Power LED#
	POWER BUTTON	6	PANSWIN#
	FOWER BUITON	8	Ground

2.3.3 SATA1,SATA2:SATA III Connector



There are 2 onboard high performance Serial ATA III (SATA III) on MIG-3000. It supports higher storage capacity with less cabling effort and smaller required space. The pin assignments of SATA1 and SATA2 are listed in the following table :

Pin No.	Description	Pin No.	Description
1	GND	2	TXP
3	TXN	4	GND
5	RXN	6	RXP
7	GND		

2.3.4 HDD_PWR : SATA Power Connector



The MIG-3000 also equip with a SATA power connector. The one port supports 5V (Up to 3A) and 12V (Up to 3A) current to the hard drive or SSD. The pin assignments of HDD_PWR is listed in the following table:

1	Pin No.	Description
	1	GND
	3	GND
	2	GND
4	4	+5V

2.3.5 CPU_FAN/SYS_FAN: Fan Header

Fan power connector supports for additional thermal requirements. The pin assignments of CPU_FAN/SYS_FAN are listed in the following table.



	Pin No.	Description	Pin No.	Description
	1	GND	2	+12V (2A max)
1 4	3	Fan speed sensor	4	Fan PWM

2.3.6 JCOM1, JCOM2, JCOM3 : Serial Port cable Connector



	Pin No.	Description	Pin No.	Description
1	1	DCD#	2	RX
	3	TX	4	DTR#
	5	GND	6	DSR#
9	7	RTS#	8	CTS#
	9	RI3xPOWERxJMP		

2.4 Main Board Jumper Settings

2.4.1 Board Top View of MIG-3000 Main Board with Jumper and DIP Switch

The figure below is the top view of the system main board. It shows the location of the jumpers and the switches.



You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper, you connect the pins with the clip. To "open" a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



2.4.2 JCOMPWR1~3: COM Port RI pin Select



	Pin No.	COM Port	Description
	(1-2)		12V
1 5	(3-4) Default	COM1~3	RI
	(5-6)		5V

2.4.3 JCMOS1 : CMOS



	Setting	Function
	1 - 2	*Normal (Default)
<u> </u>	2 - 3	Clear CMOS

2.4.4 AT/ATX Power Mode Select (JPSON1)

This jumper allows you to select ATX power mode



1 3	Setting	Function
	1 - 2	AT mode
	2 - 3	ATX mode(default)



SYSTEM SETUP

3.1 How to Open Your MIG-3000

Step 1 Remove Top Cover ten M3x5L screws.



Step 2 Fisish.



3.2 Installing CPU

Step 1 remove cpu sink.



Step 2 Open the top cover.





Step 3 Make sure the notches on the CPU match the socket.

Step 4 Close the top cover.



3.3 Installing DDR5 SO-DIMM Modules

Step 1 Check the position of the DDR5 module.



Step 2 Install the DDR module and make sure it is properly locked into the memory slot.



3.4 Installing M.2

Step 1 Check the position of the M.2 slot.



Step 2 Fasten one M3 screw.



3.5 Installing Antenna Cable

Step 1 Check the antenna installation position.



Step 2 Installing Antenna Cable.


3.6 PCI Card

System designs will support 111.15 mm standard height, 312 mm maximum length (without the I/O bracket & power cable) expansion cards.

(*Based on the position of power connectors and the card sink/case design, not all expansion card within the maximum dimension can fit in to the system. Please consult the Vecow support team for confirmation.)

Step 1 Check the PCIe slot position.



Step 2 Install the PCIe card and secure it with two screw.



3.7 Installing SSD/HDD

Step 1 Please check the position of the SSD tray and remove the screw marked with two red circle.



Step 2 Install the SSD and tighten the four screws in the direction indicated.



3.8 Mount Your MIG-3000

Step 1 Ensure the screw holes on the right and left side of upper case match the ones on MIG-3000 wall mount bracket.



Step 2 Fasten Six M3 screws then finish.





3.9 Installing Hold-down Kit

Step 1 Check the hold-down kit.



Step 2 Hold two brackets to the graphics card.



Step 3 Fasten four M3 screws.





BIOS SETUP

4.1 BIOS Setting

Main Advanced Chipset Se	Aptio Setup – AMI curity Boot Save & Exit	
BIOS Information BIOS Vendor Core Version Compliancy Project Version	American Megatrends 5.25 0.08 x64 UEFI 2.8; PI 1.7 MX610HD #71851 BIOS V0.21	Set the Time. Use Tab to switch between Time elements.
Build Date and Time Access Level	00.21 06/16/2022 16:41:05 Administrator	
Memory Information		
Total Memory	32768 MB	
Memory Frequency	4800 MHz	
Power Type	[ATX Mode]	++: Select Screen ↑↓: Select Item
System Date	[Wed 07/20/2022]	Enter: Select
System Time	[10:28:46]	+/−: Change Opt. F1: General Help

Figure 4-1 : Entering BIOS Setup

BIOS provides an interface for users to check and change system configuration. The BIOS setup program is accessed by pressing the key when POST display output is shown

4.2 Main Menu

Main Advanced Chipset Sec	Aptio Setup – AMI urity Boot Save & Exit	
BIOS Information		Set the Time. Use Tab to
BIOS Vendor	American Megatrends	switch between Time elements.
Core Version	5.25 0.08 x64	
Compliancy	UEFI 2.8; PI 1.7	
Project Version	MX610HD #71851 BIOS V0.21	
Build Date and Time	06/16/2022 16:41:05	
Access Level	Administrator	
Memory Information		
Total Memory	32768 MB	
Memory Frequency	4800 MHz	
Power Type	[ATX Mode]	↔+: Select Screen
		↑↓: Select Item
System Date	[Wed 07/20/2022]	Enter: Select
System Time	[10:28:46]	+/-: Change Opt. F1: General Help

Figure 4-2 : BIOS Main Menu

This section allows you to record some basic hardware configurations in your computer and set the system clock.

System Date

Use the system date option to set the system date. Manually enter the day, month and year.

System Time

Use the system time option to set the system time. Manually enter the hours, minutes and seconds.

4.3 Advanced Function

Aptio Setup – AMI Main Advanced Chipset Security Boot Save & Exit		
 CPU Configuration Power & Performance PCH-FW Configuration Trusted Computing ACPI Settings NCT6126D Super IO Configuration Hardware Monitor S5 RTC Wake Settings Serial Port Console Redirection USB Configuration Network Stack Configuration NVMe Configuration 	CPU Configuration Parameters	
	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults</pre>	

Figure 4-3 : BIOS Advanced Function

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen.

You can select any of the items in the left frame of the screen, such as CPU configuration, ACPI settings, and Super IO configuration.

4.3.1 CPU Configuration

Advanced	Aptio Setup – AMI	
CPU Configuration		Displays the P-core Information
▶ Performance–core Information		
ID Brand String Microcode Revision VMX SMX/TXT TXT Crash Code TXT SPAD Boot Guard Status	0xB06F2 13th Gen Intel(R) Core(TM) i5-13500E 32 Supported Supported 0x00000000 0x000000000000000000000000	
Boot Guard ACM Policy Status Boot Guard ACM Information	0x000000000000000000 0x0000001000000000	↔+: Select Screen ↑↓: Select Item Enter: Select
Intel (VMX) Virtualization Technology Active Performance-cores Active Efficient-cores Hyper-Threading	[Enabled] [All] [All] [Enabled]	+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
		ESC: Exit

Figure 4-3-1 : CPU Configuration

Intel (VMX) Virtualization Technology

When enabled, a VMM can utilize the additional hardware compatibilities provided by Vandorpool Technology

Active Performance – cores

Number of P-core to enable in each processor package

Active Efficient – cores

Number of E-core to enable in each processor package

Hyper-Threading

Enable or Disable Hyper-Threading Technology

4.3.2 Power & Performance

Aptio Setup – AMI Advanced	
Power & Performance	CPU – Power Management Control
▶ CPU – Power Management Control	Options

Figure 4-3-2 : Power & Performance

4.3.2.1 CPU - Power Management Control

Advanced	Aptio Setup – AMJ	[
CPU – Power Management Control	L	Allows more than two frequency ranges to be supported.
Intel(R) SpeedStep(tm)	[Enabled]	
Turbo Mode	[Enabled]	
C states	[Enabled]	
Enhanced C-states	[Enabled]	
Package C State Limit	[03]	

Figure 4-3-2-1 : CPU - Power Management Control

Intel[®] Speedstep[™] [Enabled]

Allows more than two frequency ranges to be supported

Turbo Mode

Enable / Disable processor Turbo Mode

C states

Enable / Disable CPU power management. Allows CPU to go to C states when it's not 100% utilized

Enhance C states

When enabled, CPU will switch to minimum speed when all cores enter C-State

Package C state limit

Maximum Package C State Limit Setting

4.3.3 PCH-FW Configuration

Advanced	Aptio Setup – AMI	
ME Firmware Version ME Firmware Mode ME Firmware SKU ME Firmware Status 1 ME Firmware Status 2 ME Firmware Status 3 ME Firmware Status 4 ME Firmware Status 5 ME Firmware Status 6 ME State ME Unlock Control	16.0.15.1620 Normal Mode Consumer SKU 0×90000255 0×39850106 0×00000020 0×00004000 0×00000000 0×00000000 0×00000000	When Disabled ME will be put into ME Temporarily Disabled Mode.

Figure 4-3-3 : PCH-FW Configuration

ME State

When Disabled ME will be put into ME Temporarily Disabled Mode

ME Unlock Control

When Set unlock, system will shutdown for active function

4.3.4 Trusted Computing

Advanced	Aptio Setup – AMJ	
TPM Device Selection	[dTPM]	Enables or Disables BIOS support for security device.
TPM 2.0 Device Found		O.S. will not show Security
Firmware Version:	7.85	Device. TCG EFI protocol and
Vendor:	IFX	INT1A interface will not be available.
Security Device Support	[Enable]	
Active PCR banks	SHA256	
Available PCR banks	SHA256	
SHA256 PCR Bank	[Enabled]	
Pending operation	[None]	
		++: Select Screen
		↑↓: Select Item

Figure 4-3-4 : Trusted Computing

TPM Device Selection

Selects TPM device: PTT or discrete TPM

Security Device support

Enables or Disables BIOS support security device

4.3.5 ACPI Settings

Advanced	Aptio Setup – AMI	
ACPI Settings		Enables or Disables System ability to Hibernate (OS/S4
Enable Hibernation	[Enabled]	Sleep State). This option may
ACPI Sleep State	[S3 (Suspend to RAM)]	not be effective with some operating systems.
PCIE# Wake from S5	[Disabled]	
Wake on Ring	[Disabled]	

Figure 4-3-5 : ACPI Settings

Enable Hibernation

Enables or Disables System ability to Hibernate.

ACPI Sleep State

Select the highest ACPI sleep state the system will enter the SUSPEND button is pressed.

PCIE# Wake from S5

Enable or disable PCIE wake the system from S5.

Wake on Ring

Enable / Disable wake on ring function under ACPI S3/S4/S5.

4.3.6 NCT6126D Super IO configuration

Advanced	Aptio Setup — AMI	
NCT6126D Super IO Configuration		Set Parameters of Serial Port 1
Super IO Chip > Serial Port 1 Configuration > Serial Port 2 Configuration > Serial Port 3 Configuration	NCT6126D	
WatchDog Count Mode WatchDog TimeOut Value Chassis Opened Warning	[Second] O [Disabled]	

Figure 4-3-6 : NCT6126D Super IO Configuration

WatchDog Count Mode

WatchDog count mode Selection

WatchDog TimeOut Value

Fill Watchdog TimeOut Value, 0 means disabled

Chassis Opened Warning

Select whether to enable Chassis Intrusion Detection. Chassis Intrusion Detection is a utility that can tell whether someone has opened the case.

4.3.6.1 Serial Port X Configuration



Figure 4-3-6 : Serial Port X Configuration

Serial Port

Enable or Disable Serial Port (COM)

Change Settings

Select an optimal settings for super IO Device

COM Mode Select

Configure the COM port Mode

4.3.7 Hardware Monitor

Advanced	Aptio Setup – AMI	
PC Health Status ▶ Smart Fan		Smart Fan function page
CPU Temperature (PECI) CHA Temperature CPU_FAN1 Speed CHA_FAN1 Speed VCORE +5VSB +5V +12V 3VSB 3VCC VBAT AVSB	: +44 C : +36 C : N/A : N/A : +0.704 V : +5.084 V : +5.056 V : +12.000 V : +3.328 V : +3.312 V : +3.040 V : +3.328 V	++: Select Screen 11: Select Item Enter: Select +/-: Change Dot.

Figure 4-3-7 : Hardware Monitor

Display Hardware monitor information such as thermal, fan speed, and system voltage status monitoring.

4.3.7.1 Smart FAN



Figure 4-3-7-1 : Smart FAN

Smart FAN Function

Smart fan function Enable / Disable

4.3.7.2 Smart FAN mode Configuration

Aptio Setup — AMI Advanced		41
Smart Fan Mode Configuration		CPU Smart Fan Target Temperature
CPU_FAN1 Smart Fan Target CPU_FAN1 MIN.FAN Speed(%)	[55 C] [12.5%]	
CHA_FAN1 Smart Fan Target CHA_FAN1 MIN.FAN Speed(%)	[55 C] [12.5%]	

Figure 4-3-7-2 : Smart FAN mode Configuration

CPU_FAN1/CHA_FAN1 Smart FAN Target Smart Fan Target Temperature

CPU_FAN1/CHA_FAN1 MIN.FAN Speed (%)

Smart Fan minimum settings

4.3.8 S5 RTC Wake Settings

Advanced	Aptio Setup – AMI	
Wake system from S5		Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec.

Figure 4-3-8 : S5 RTC Wake Settings

Wake system from S5

Enable or disable System wake on alarm event.

4.3.9 Serial Port Console Redirection

Advanced	Aptio Setup – AMI	
COM1 Console Redirection ▶ Console Redirection Settings	[Disabled]	Console Redirection Enable or Disable.



Console Redirection

Console Redirection Enable or Disable.

4.3.9.1 Console Redirection settings

COM1		Emulation: ANSI: Extended
Console Redirection Settings		ASCII char set. VT100: ASCII char set. VT100Plus: Extends
Terminal Type	[ANSI]	VT100 to support color,
Bits per second	[115200]	function keys, etc. VT-UTF8:
Data Bits	[8]	Uses UTF8 encoding to map
Parity	[None]	Unicode chars onto 1 or more
Stop Bits	[1]	bytes.
Flow Control	[None]	
VT-UTF8 Combo Key Support	[Enabled]	
Recorder Mode	[Disabled]	
Resolution 100x31	[Disabled]	
Putty KeyPad	[VT100]	
		++: Select Screen
		↑↓: Select Item

Figure 4-3-9-1 : Console Redirection settings

Terminal Type

Select Terminal Type

Bits per second

Select serial port transmission speed

Data Bits

Select Data Bits

Parity

A parity bit can be sent with the data bits to detect some transmission errors

Stop Bits

Stop bits indicate the end of a serial data package

Flow Control

Flow control can prevent data loss from buffer overflow.

VT-UTF8 Combo Key Support

Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals

Recorder Mode

With this mode enabled only text will be sent.

Resolution 100x31

Enables or disables extended terminal resolution

Putty Keypad

Selects FunctionKey and KeyPad on Putty

4.3.10 USB Configuration

Advanced	Aptio Setup – AMI	
USB Configuration		Enable/Disable USB Mass
USB Module Version	28	Storage Driver Support.
USB Controllers: 1 XHCI		
USB Devices: 1 Drive, 1 Keyboard, 2 Hubs		
USB Mass Storage Driver Support	[Enabled] Mass Storage Driver Support -	
Mass Storage Devices: Disable KingstonDataTraveler 3.0PM Enabled		lect Screen
		lect Item Enter: Select +/-: Change Opt.

Figure 4-3-10 : USB Configuration

USB Mass Storage Driver Support Enable / Disable USB Mass Storage Driver Support

4.3.11 Network Stack Configuration



Figure 4-3-11 : Network Stack Configuration

Network Stack

Enabled/Disabled UEFI Network Stack

IPv4 PXE Support

Enable / Disable IPv4 PXE boot support

IPv6 PXE Support

Enable / Disable IPv6 PXE boot support

PXE boot wait time

Wait time in seconds to press ESC key to abort the PXE boot.

Media detect count

Number of times the presence of media will be checked

4.3.12 NVMe Configuration

Advanced	Aptio Setup – AMI	
NVMe Configuration		
No NVME Device Found		

Figure 4-3-12 : NVMe Configuration

Display NVMe controller and Drive information.

4.4 Chipset



Figure 4-4 : Chipset

Select Chipset tab to enter chipset BIOS setup options, such as System Agent (SA) Configuration and PCH-IO Configuration.

4.4.1 System Agent (SA) Configuration

Chipset	Aptio Setup – AMI	
System Agent (SA) Configuration		Memory Configuration Parameters
VT-d	Supported	
 Memory Configuration Graphics Configuration PCI Express Configuration 		
VT-d	[Enabled]	

Figure 4-3-14 : System Agent (SA) Configuration



4.4.1.1 Memory Configuration

Chipset	Aptio Setup – AMI	
Memory Configuration Memory RC Version Memory Frequency tCL-tRCD-tRP-tRAS Total Memory DIMM_A1 Size Number of Ranks Manufacturer DIMM B1	0.0.3.58 4800 MHz 40-39-39-77 Max TOLUD Dynamic 1 GB 1.25 GB 1.5 GB 1.5 GB 1.75 GB 2 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller
Size Number of Ranks Manufacturer Max TOLUD	2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB 3.5 GB	<pre>++: Select Screen ++: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Figure 4-4-1-1 : Memory Configuration

Displays memory information.

Max TOLUD

Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

4.4.1.2 Graphics Configuration

Chipset	Aptio Setup – A	MI
Graphics Configuration		Select which of IGFX/PEG/PCIE Graphics device should be
Primary Display	[Auto]	Primary Display Or select HG
Internal Graphics	[Auto]	for Hybrid Gfx.
DVMT Pre-Allocated	[60M]	
DVMT Total Gfx Mem	[256M]	
▶ LCD Control		

Figure 4-4-1-2 : Graphics Configuration

Primary Display

Select which of IGFX/PEG/PCIE Graphic device should be Primary Display or select HG for Hybrid Gfx.

Internal Graphics

Keep IGFX enabled based on the setup options

DVMT Pre-allocated

Select DVMT 5.0 Pre-allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

DVMT Total Gfx Mem

Select DVMT 5.0 Total Graphics Memory size used by the Internal Graphics Device.

LCD Control

Enable / Disable LCD. LCD is LVDS or eDP panel

4.4.1.3 PCI Express Configuration

Chipset	Aptio Setup – AMI	
PCI Express Root Port 2 ASPM PCIe Speed	[Enabled] [Disabled] [Auto]	Control the PCI Express Root Port.

Chipset	Aptio Setup – AMI	
PCI Express Configuration		PCI Express Root Port Settings.
▶ PCI Express Root Port 2(x16 PEG Slot		
Detect Non-Compliance Device	[Disabled]	

Figure 4-4-1-3 : PCI Express Configuration

Detect Non-compliance Device

Detect Non-compliance PCI Express Device in PEG

PCI Express Root Port 2

Control the PCI Express Root Port

ASPM

Set the ASPM level

PCIe Speed

Configure PCIe Speed

4.4.2 PCH-IO Configuration

Chipset	Aptio Setup – AMI	
PCH−IO Configuration ▶ PCI Express Configuration ▶ SATA Configuration		PCI Express Configuration settings
USB Configuration		
 HD Audio Configuration SerialIa Configuration 		
SerialIo Configuration		
LAN1 Controller LAN1 PXE OpROM Wake on LAN Enable LAN2 Controller LAN2 PXE OpROM	[Enabled] [Disabled] [Disabled] [Enabled] [Disabled]	
Restore AC Power Loss	[Power Off]	++: Select Screen
Flash Protection Range Registers	[Disabled]	↑↓: Select Item
(FPRR)		Enter: Select +/-: Change Opt.
GPIO Group Control	[Disabled]	F1: General Help F2: Previous Values
Amplifier GAIN(db)	[15.3db]	F3: Optimized Defaults F4: Save & Exit ESC: Exit

Figure 4-4-2 : PCH-IO Configuration

Lan Controller

Enable / Disable onboard LAN

Lan PXE OpROM

Enable or disable boot option for LAN controller

Wake on LAN Enabled

Enable / Disable integrated LAN to wake the system

Restore AC Power Loss

Specify what state to go to when power is re-applied after a power failure (G3 state)

Flash Protection Range Registers(FPRR) Enable Flash Protection Range Registers

GPIO Group Control Configure the digital GPIO pins

Amplifier GAIN(db)

Select Amplifier GAIN value

4.4.2.1 PCI Express Configuration

Aptio Setup – AM Chipset	I
PCI Express Configuration	PCI Express Root Port Settings.
 PCI Express Root Port 1(x1 Key E) PCI Express Root Port 3(LAN2) PCI Express Root Port 5(x4 Key M) PCI Express Root Port 15(LAN1) 	

Chipset	Aptio Setup – AMI	
PCI Express Root Port 1 ASPM 1 PCIe Speed Detect Non-Compliance Device	[Enabled] [Disabled] [Auto] [Disabled]	Control the PCI Express Root Port.

Figure 4-4-2-1 : PCI Express Configuration

PCI Express Root Port

Control the PCI Express Root Port

ASPM Set the ASPM Level

PCIe Speed Configure PCI Speed

Detect Non-Compliance Device

Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

4.4.2.2 SATA Configuration

Chipset	Aptio Setup – AMI	
SATA Configuration		Enable/Disable SATA Device.
SATA Controller(s) SATA Mode Selection	[Enabled] [AHCI]	
Serial ATA Port 1 Software Preserve Port 1	Empty Unknown [Enabled]	
Serial ATA Port 2 Software Preserve Port 2	Empty Unknown [Enabled]	
M.2 KeyM Software Preserve M2 Port	Empty Unknown [Enabled]	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt.</pre>

Figure 4-4-2-2 : SATA Configuration

SATA Controller(s)

Enable / Disable SATA Device

SATA Mode Selection

Determines how SATA controller(s) operate

Port X

Enable or Disable SATA Port

4.4.2.3 USB Configuration

Chipset	Aptio Setup – AMI	
USB Configuration		Enable/Disable USB Standby Power.
USB12 Standby Power USB34 Standby Power	[Enabled] [Enabled]	
USB56 Standby Power USB78 Standby Power	[Enabled] [Enabled]	

Figure 4-4-2-3 : USB Configuration

USB Standby Power

Enable / Disable USB Standby Power

4.4.2.4 HD Audio Configuration

Chipset	Aptio Setup – AMI	
HD Audio Subsystem Configuration HD Audio	Settings [Enabled]	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be
	HD Audio Disabled Enabled	unconditionally enabled. →+: Select Screen ↑↓: Select Item Enter: Select

Figure 4-4-2-4 : HD Audio Configuration

HD Audio

Control Detection of the HD-Audio device

4.4.2.5 Serial IO Configuration

Chipset	Aptio Setup – AMI	
SerialIo Configuration I2CO Controller ▶ Serial IO I2CO Settings	[Enabled]	Enables/Disables SerialIo Controller If given device is Function O PSF disabling is skipped. PSF default will remain and device PCI CFG Space will still be

Figure 4-4-2-5 : Serial IO Configuration

I2C0 Controller

Enables/Disables Seriallo Controller

4.5 Security

Aptio Setup – AMI Main Advanced Chipset <mark>Security</mark> Boot Save & Exit					
Password Description		Set Administrator Password			
If ONLY the Administrator's then this only limits acces only asked for when enterin If ONLY the User's password is a power on password and boot or enter Setup. In Se have Administrator rights. The password length must be in the following range:	ss to Setup and is ng Setup. d is set, then this must be entered to cup the User will				
Minimum length Maximum length	20	↔: Select Screen			
Havinam Tongen	20	14: Select Item			
Administrator Password		Enter: Select			
User Password		+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit			
▶ Secure Boot					

Figure 4-5 : Security

Administrator Password

Set Administrator Password

User Password

Set User Password

4.5.1 Secure Boot

	Aptio Setup – AMI Security	
System Mode	Setup	Secure Boot mode options: Standard or Custom.
Secure Boot	[Enabled] Not Active	In Custom mode, Secure Boot Policy variables can be configured by a physically
Secure Boot Mode ▶ Restore Factory Keys ▶ Reset To Setup Mode	[Standard]	present user without full authentication
▶ Key Management		

Figure 4-5-1 : Secure Boot

Secure Boot

Secure Boot feature is Active if Secure Boot is 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 variable authentication

4.6 Boot

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit	
Boot Configuration Setup Prompt Timeout Bootup NumLock State Quiet Boot	<mark>1</mark> [On] [Disabled]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Boot mode select	[UEFI]	
FIXED BOOT ORDER Priorities Boot Option #1	[USB Key:UEFI: KingstonDataTraveler	
Boot Option #2 Boot Option #3 Boot Option #4 Boot Option #5 Boot Option #6 Boot Option #7 Boot Option #8	3.0PMAP, Partition 1] [CD/DVD] [USB CD/DVD] [USB Floppy] [NVME] [Hard Disk] [Network] [UEFI AP:UEFI: Built-in EFI Shell]	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults</pre>
 UEFI USB Key Drive BBS Priorities UEFI Application Boot Priorities 		F4: Save & Exit ESC: Exit

Figure 4-6 : Boot

Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFF) means indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state

Quick Boot

Enable or disables Quick Boot option

4.7 Save & Exit

Aptio Setup – AMI Main Advanced Chipset Security Boot Save & Exit	
Save Options Save Changes and Exit Discard Changes and Exit Save Changes and Reset	Exit system setup after saving the changes.
Default Options Restore Defaults	
Boot Override UEFI: KingstonDataTraveler 3.00000, Partition 1 (KingstonDataTraveler 3.00000) UEFI: Built–in EFI Shell Launch EFI Shell from filesystem device	
	↔: Select Screen

Figure 4-7 : Save & Exit

Save Changes and Exit

Exit system setup after saving the changes.

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset the system after saving the changes.

Restore Defaults

Restore/Load Default values for all the setup options.



APPENDIX A : Power Consumption

Testing Board	MIG-3000			
RAM	32GB * 2			
USB-1	USB Micsoft Wired Keyboard 600			
USB-2	USB Mouse ASUS TUF GAMING MINI WL MOUSE MIKU			
SATA 0	Innodisk M.2(P42) 3TE6 512GB			
LAN1 (i219)	1.0 Gbps			
LAN2 (i225)	2.5 Gbps			
Graphics output	HDMI			
Power plan	Balance(Windows11 Power plan)			
Power Source	Chroma 62006P-100-25			
Test Program -1	BurnInTest V10.2			
Test Program -2	FurMark V2.4.0.0			

A.1 Intel[®] Core[™] i7-13700E (30M Cache, up to 5.10 GHz)

				Power on and boot to Win11 64bit			
CPU	Power Input	Standby Mode		Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
	9V	0.41A	03.70W	02.731A	24.579W	02.89A	26.01W
Core™	12V	0.326A	03.91W	02.135A	25.62W	02.23A	26.76W
i7-13700E	24V	0.178A	04.27W	01.13A	27.12W	01.444A	27.46W
	55V	0.072A	04.35W	0.509A	27.99W	0.527A	28.99W

Power on and boot to Win 11 64-bit

CPU		Power on and boot to Win11 64bit					
	Power Input	Run 100% CPU usage with 2D		Run 100% CPU usage with 3D			
		Max Current	Max Consumption	Max Current	Max Consumption		
	9V	14.953A	134.58W	15.781A	142.03W		
Core™	12V	11.244A	134.94W	11.856A	142.28W		
i7-13700E	24V	05.814A	139.54W	05.975A	143.44W		
	55V	02.671A	146.91W	02.78A	152.94W		



APPENDIX B : Supported Memory & Storage List

B.1 Supported Memory List

Testing Board	MIG-3000
Memory Test	MemTest86 V11.0
BurnInTest	BurnInTest Pro V10.2(build 1006)

Tset Item

Channel	Memory Test	OS internal info	Hibernate	Sleep	Reboot
SODIMM_1 SODIMM_2	PASS	PASS	PASS	PASS	PASS

B.2 Supported Non-ECC Memory List

Brand	Info	Test Temp.(Celsius)
Transcend 8G DDR5-5600 SO-DIMM	TS1GSA64V6G	25°C
Samsung 16G DDR5-5600 SO-DIMM	M425R2GA3P80-CWM0D	25°C
Innodisk 32G DDR5-5600 SO-DIMM	M5S0-BGG2OCZQ-H03	25°C

B.3 Supported ECC Memory List

Brand	Info	Test Temp.(Celsius)
Innodisk 16G DDR5-5600 ECC SO-DIMM	M5D0-AGS2PCZQ-H03	25°C
Transcend 16G DDR5-4800 EC4 SO-DIMM	TS2GSA72V8E	25°C
Innodisk 32G DDR5-4800 ECC SO-DIMM	M5D0-AGS2PCVP-H03	25°C
Innodisk 32G DDR5-4800 ECC SO-DIMM	M5D0-BGS2Q5VP-H03	25°C
TEAMGROUP 48G DDR5-5600 ECC SO-DIMM	TE48GFSEV2TH-V	25°C

B.4 Supported Storage Device List

Туре	Brand	Model	Capacity
SATA SSD	Innodisk	DES25-C12DK1KCCQL-H03 2.5" SATA 512GB	512GB
	Transcend	TS512GSSD460K 2.5" SATA 512GB	512GB
M.2 SSD SATA	SMART	FDM28256GTCYC282 256GB	256GB
	Innodisk	3TE7 M.2 (S80) DEM28-C12DK1KCAQL-H03 M.2-BM	512GB
M.2 PCle SSD	Innodisk	4TG2-P DGM28-C12DP1KCAEF-H03 G4X4	512GB
		3TE6 DEM28-C12DD1KCCQF-H03 G3X2	512GB
	Transcend	TS512GMTE720T G4X4	512GB
		TS512GMTE460T G3X2	512GB

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