

Alderamin MK3

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1 Copyright

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Applications described in this manual are for illustration purposes only. We make no representation or guarantee that such applications will be suitable for the specified use without further testing or modification.

2 Regulatory Compliances

2.1 CE and UKCA Notice

This device complies with the requirements of the CE directive and UKCA regulations.

Low Voltage Directive 2014/35/EU + Electrical Equipment Safety Regulations 2016 (SI 2016 No 1101)

- EN 62368-1:2014+AC:2015

EMC Directive 2014/30/EU + Electromagnetic Compatibility Regulations 2016

- EN 50155:2017
- EN 50121-1:2017
- EN 50121-3-2:2016
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- EN 61000-4-2:2009
- EN 61000-4-3:2006 +A1:2008 +A2:2010
- EN 61000-4-4:2012
- EN 61000-4-5:2014 +A1:2017
- EN 61000-4-6:2014 +AC:2015

RoHS 2 Directive 2011/65/EU & 2015/863/EU + RoHS 2 Directive 2020 No. 1647

- Exemption(s) used:
- 6c,7a,7c-I



2.2 Railway Application and Environmental Testing

In accordance with the council directive 2008/57/EC

Railway Applications

- EN 50155:2017
- IEC 61373:2016
- EN 50121-3-2:2016

Environmental Testing

- IEC 60068-2-1:2007
- IEC 60068-2-2:2007
- IEC 60068-2-30:2005

Fire Hazard Testing

- EN60695-2-11:2014

3 Safety Instructions

Please read these instructions carefully and retain them for future reference.

1. Disconnect this equipment from the power outlet before cleaning. Do not use liquid or sprayed detergent for cleaning. Use a moist cloth or sheet.
2. Keep this equipment away from humidity.
3. Ensure the power cord is positioned to prevent tripping hazards and do not place anything on top of it.
4. Pay attention to all cautions and warnings on the equipment.
5. If the equipment is not used for an extended period, disconnect it from the main power to avoid damage from transient over-voltage.
6. **Prolonged usage with less than 12V may damage the PSU or destroy the mainboard.**
7. Never pour any liquid into openings as this could cause fire or electrical shock.
8. Have the equipment checked by service personnel if:
 - The power cord or plug is damaged.
 - Liquid has penetrated the equipment.
 - The equipment has been exposed to moisture in a condensation environment.
 - The equipment does not function properly, or you cannot get it to work by following the user manual.
 - The equipment has been dropped and damaged.
9. Do not leave this equipment in an unconditioned environment, with storage temperatures below -20 degrees or above 60 degrees Celsius for extended periods, as this may damage the equipment.
10. Unplug the power cord when performing any service or adding optional kits.
11. Lithium Battery Caution:
 - Risk of explosion if the battery is replaced incorrectly. Replace only with the original or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
 - Do not remove the cover, and ensure no user-serviceable components are inside. Take the unit to a service center for service and repair.

⚠ Warning!

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

⚠ Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

4 Product Specifications

4.1 Features

The Alderamin MK3 Embedded System delivers high performance and versatility with the following key features:

- **Powerful Processing:** Supports 8th & 9th Generation Intel® Xeon-E, Core™ i7 / i5 / i3 processors.
- **Triple Display Support:** Connect via HDMI, DisplayPort, and DVI-I for enhanced multi-screen capabilities.
- **Fan-less & Expandable Design:** Ensures silent operation and modular flexibility.
- **Versatile Connectivity:** Expand via COM, DIO, LAN, and PoE modules for diverse applications.
- **Vehicle-Ready Power Ignition:** Supports Xpansion Module for in-vehicle applications.
- **Wide Power Range:** Operates on a 9-48V power supply for industrial adaptability.
- **Extreme Temperature Tolerance:**
 - -40°C to 70°C with a 35W CPU
 - -40°C to 50°C with a 51-65W CPU
 - -40°C to 40°C with a 71-80W CPU

4.2 Alderamin MK3 & Alderamin MK3-D CPU Options

Processor Name	Cores	Threads	TDP
Intel® Xeon® E Series			
Intel® Xeon® E-2176G – 12M Cache, up to 4.70 GHz	6	12	80W
Intel® Xeon® E-2124G – 8M Cache, up to 4.50 GHz	4	4	71W
Intel® 9th Gen Coffee Lake Refresh			
Intel® Core™ i7-9700TE – 12M Cache, up to 3.80 GHz	8	8	35W
Intel® Core™ i5-9500E – 9M Cache, up to 4.20 GHz	6	6	65W
Intel® Core™ i5-9500TE – 9M Cache, up to 3.60 GHz	6	6	35W
Intel® Core™ i3-9100E – 6M Cache, up to 3.70 GHz	4	4	65W
Intel® Core™ i3-9100TE – 6M Cache, up to 3.20 GHz	4	4	35W

4.3 Technical Details

Feature	Specification	Details
Processor	CPU	8th Gen Intel® Coffee Lake Xeon-E / Core-i LGA1151 Socket Processor, TDP Max. 80W
Memory	System Memory	DDR4 2666MHz, 2 x 260-pin SO-DIMM, Max. 64GB (Xeon: ECC; Core-i: Non-ECC)
Storage	Slots	3 x 2.5" HDD/SSD (1 w/ Removable HDD Bay; 2 w/ Internal HDD Bracket) 2 x mSATA
Security	I/O Chipset	Nuvoton NCT6116D
	TPM	Nuvoton NPCT750AAAYX
I/O Ports	Front I/O	2 x USB 3.0 1 x HDMI 1.4 2 x SIM Card Slot w/ Cover 1 x 2.5" SATAIII HDD / SSD Bay
	Rear I/O	4 x USB 3.1 Gen 2, 2 x USB 2.0, 2 x RJ-45 1 x DisplayPort 1.2, 1 x DVI-I, 1 x PS/2 2 x RS232 / 422 / 485 (Support Power 5V / 12V) 1 x Mic-in, 1 x Line-out 1 x 2-pin Terminal Block Remote Power On/Off 1 x 2-pin Terminal Block Remote Power Reset 1 x 4-pin Terminal Block External Fan Connector 1 x 3-pin Terminal Block Power Input 4 x SMA Antenna (Optional for WiFi/LTE function)
Connectivity	Ethernet	Intel® I219-LM Giga LAN + I210-IT Giga LAN
	Audio	Realtek® ALC662
Expansion	PCIe	a. PCIe 3.0 x16 (Alderamin MK3) b. PCIe 3.0 x16 + PCIe 3.0 x1 (Alderamin MK3-D Default) c. PCIe 3.0 x8 + PCIe 3.0 x8 (Alderamin MK3-D Option)
	Storage	M.2 2242 / 2260 / 2280 M key (PCIe X4 / SATA)
	Wireless	M.2 2230 E key (PCIe / USB)
	SIM Slot	2 x Mini PCIe Full / Half size (USB / PCIe / SATA), w/ SIM Card Holder
Additional	Indicators	Power LED, HDD LED, DIO LED, LAN1 & 2 ACT / SPEED
	Watchdog Timer	Watchdog 1~255 Steps by Software Program
Environmental	Operating Temperature	Fanless Design (Alderamin MK3 & MK3-D): a. 35W TDP: -40°C to 70°C b. 51~65W TDP: -40°C to 50°C c. 71~80W TDP: -40°C to 40°C (with 0.7m/s Air Flow and Wide Temperature Memory/Storage) Fan Design for max. 120W GFX Card (Alderamin MK3-D): a. 35W TDP: -20°C to 50°C b. 51~65W TDP: -20°C to 45°C c. 71~80W TDP: -20°C to 40°C (with 0.7m/s Air Flow and Wide Temperature Memory/Storage) Fan Design for max. 120W GFX Card + External Fan (Alderamin MK3-D): a. 35W TDP: -20°C to 55°C b. 51~65W TDP: -20°C to 50°C c. 71~80W TDP: -20°C to 45°C (with 0.7m/s Air Flow and Wide Temperature Memory/Storage) Fan Design for Nvidia 70W T4 and 75W P4 Card (Alderamin

4.4 ☒ Important Notes

Restricted Access Location (RAL) A Restricted Access Location is an area with extreme temperatures where only authorized personnel can enter for specific purposes.

1. Access is limited to trained personnel aware of location restrictions and necessary precautions.
2. Entry requires security measures such as tools, lock-and-key, or controlled access by the responsible authority.

Power Consumption Considerations Ensure power consumption is within the power supply's specifications.

- Recommended AC Adapters:
 - AC/DC 24V/12.5A, 300W (3PIN Terminal Block Power Adaptor)
 - AC/DC 24V/9.16A, 220W (3PIN Terminal Block Power Adaptor)

Ambient Temperature Precaution

- The maximum safe operating temperature is **40°C** if the external AC adapter model **EA12501J** or **EA13001N** is placed in the same high-temperature area as the embedded system.

PXE Application Requirement

- Before OS installation via PXE server, pre-install the **i219-LM driver** in the OS image.

Lithium Battery Safety Warning

- **Caution:** This system contains a **Lithium battery**.
- Do **NOT** puncture, mutilate, or dispose of it in fire.
- Risk of **explosion** if replaced incorrectly—use only manufacturer-recommended replacements.
- Dispose of batteries as per manufacturer instructions and local regulations.

System Shutdown Risks The following configurations may cause unexpected shutdowns:

- **12 x LANs** or **10 x PoE LANs** with certain **NVMe SSD models** (Check compatibility with sales support).
- **12 x LANs** or **10 x PoE LANs** with **mPCIe** or **M.2 Wi-Fi Cards** (Excludes CNVi Wi-Fi Cards; check compatibility with sales support).

BIOS Flashing Precautions

- Read BIOS release notes before re-flashing BIOS.
- If BIOS resets to default settings post-flash, verify configuration before booting.
- **Incorrect RAID settings** may cause system boot failure.

PCIe GFX Card Installation Considerations

- With a **PCIe GFX card** installed in **Alderamin MK3-D**, BIOS setup will only support display output via the **external graphics card**.

Storage Limitations for Dual-Layer PCIe GFX Cards

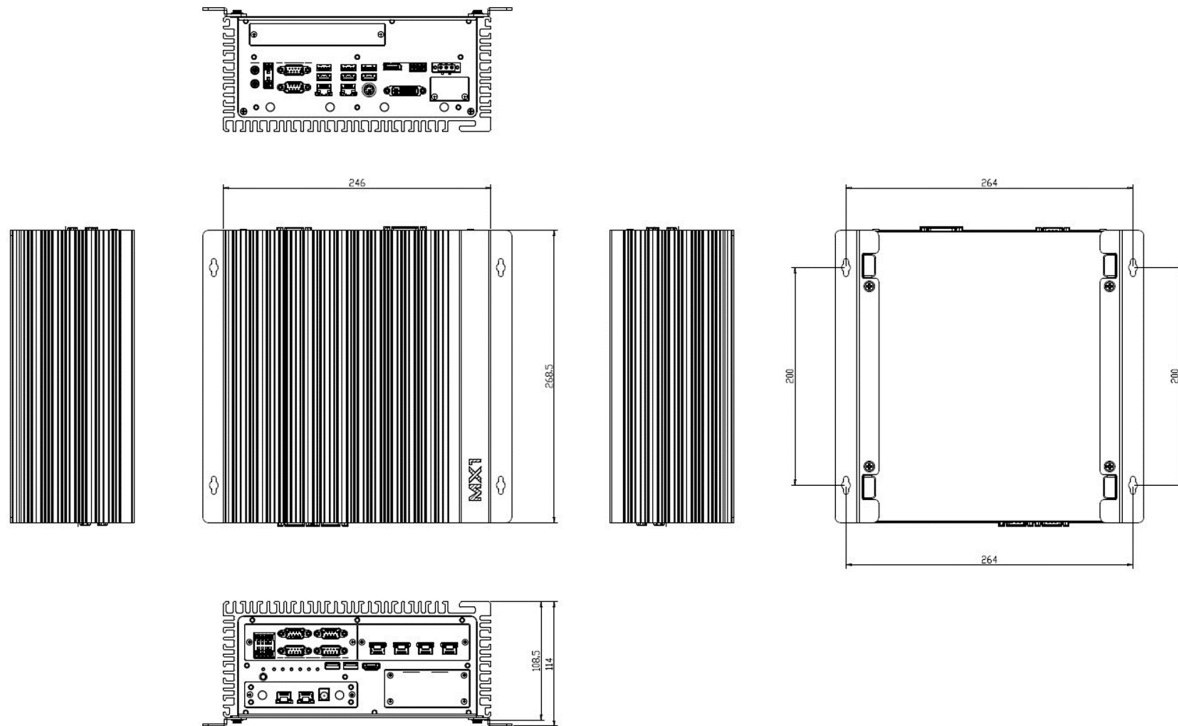
- Installing a **dual-layer PCIe GFX card** allows only **one** internal HDD/SSD (excluding removable HDD/SSD) instead of **two** due to mechanical constraints.
- **SATA cable connector** must be inserted into the **SATA port next to the 2 × 40x40x20mm internal system fan**.
- **Cable clip removal may be required** for clearance with the graphics card.

Storage Limitations for NVIDIA T4/P4 AI Card

- Installing an **NVIDIA T4 or P4 AI card** with **2 × 40x40x28mm internal fans** and a **fan duct** allows only **one** internal HDD/SSD (excluding removable HDD/SSD) instead of **two** to prevent interference.
- **SATA cable connector** must be inserted into the **internal SATA connector**.

4.5 Alderamin MK3

- **Mechanical Dimensions:** 268 mm x 246 mm x 108 mm
- **PCI Express x16 Slot Maximum Card Dimensions:**
 - 111.15 x 200 x 18.7 mm (with mPCIe PoE Module)
 - 111.15 x 230 x 18.7 mm (without mPCIe PoE Module)



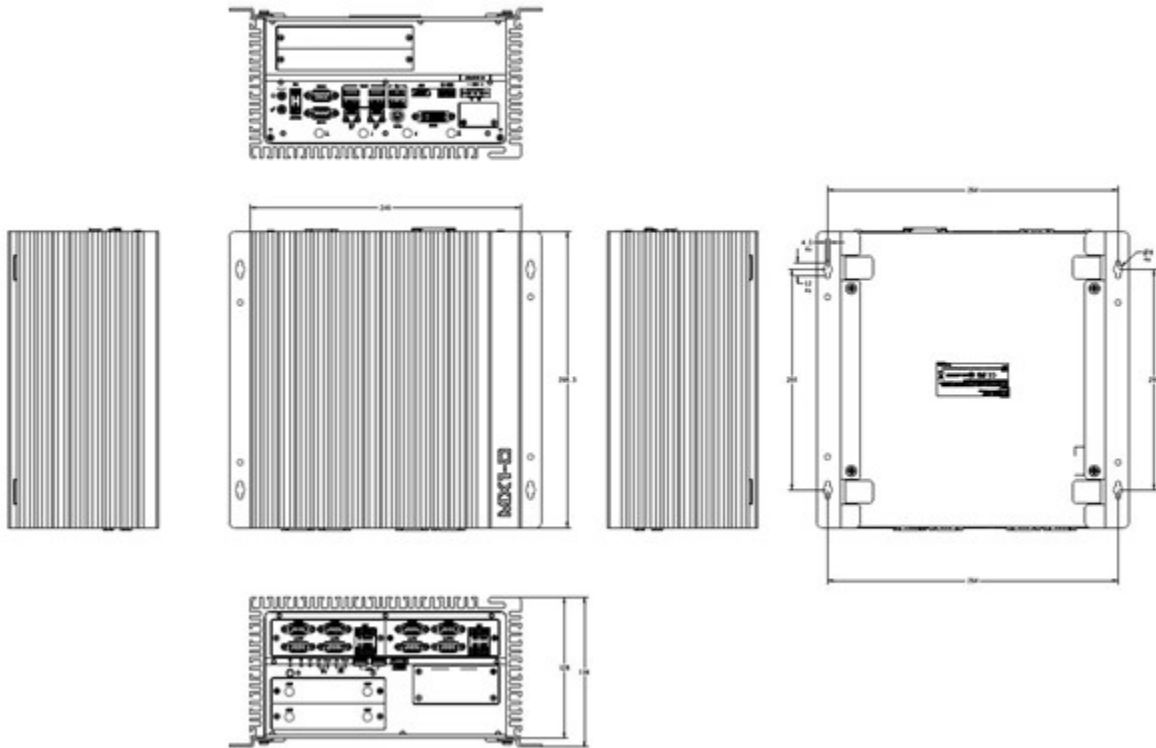
4.6 Alderamin MK3-D

- **Mechanical Dimensions:** 268 mm x 246 mm x 128 mm
- **PCI Express x16 Slot Maximum Card Dimensions:**
 - 145 x 221 x 43 mm (without mPCIe PoE Module)
- **PCI Express Slot Configurations:**
 - PCI Express X16 + X1 Dual Slot (Default)
 - PCI Express X8 + X8 Dual Slot (Optional)

4.6.1 AI & Graphics Card Support List:

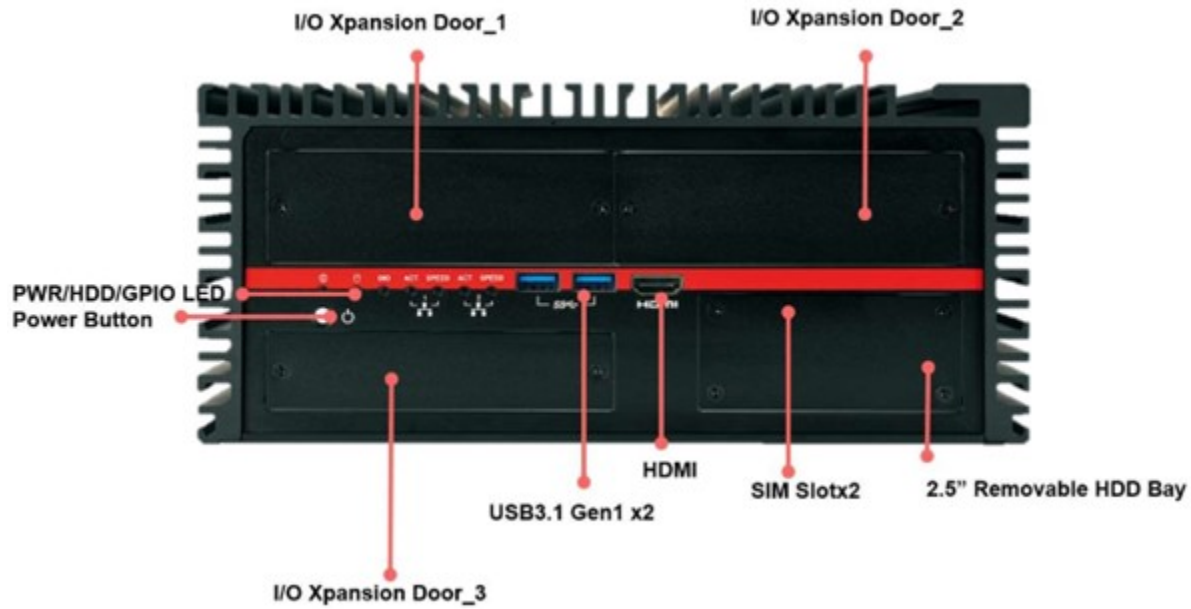
- NVIDIA Quadro P400 (30W)
- NVIDIA Quadro P620 (40W)
- NVIDIA Quadro P2000 (75W)
- NVIDIA Tesla T4 / P4 (75W)
- Aetina GTX1050 N1050-J9FX (2GB, 75W)
- Leadtek WinFast GTX1650 (4GB, 75W)

- Leadtek WinFast GTX1660 HURRICANE (6GB, 120W) *Requires secondary 12V, 180W AC Adapter*
- Leadtek WinFast GTX1660 Ti HURRICANE (6GB, 120W) *Requires secondary 12V, 180W AC Adapter*



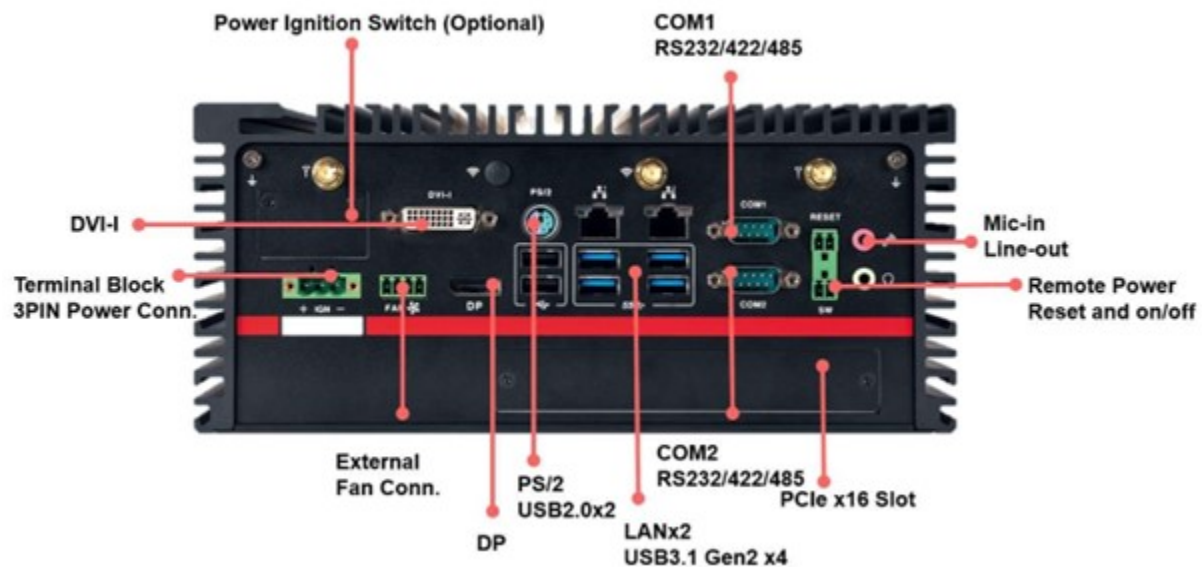
5 Interfaces and Connections

5.1 Front I/O

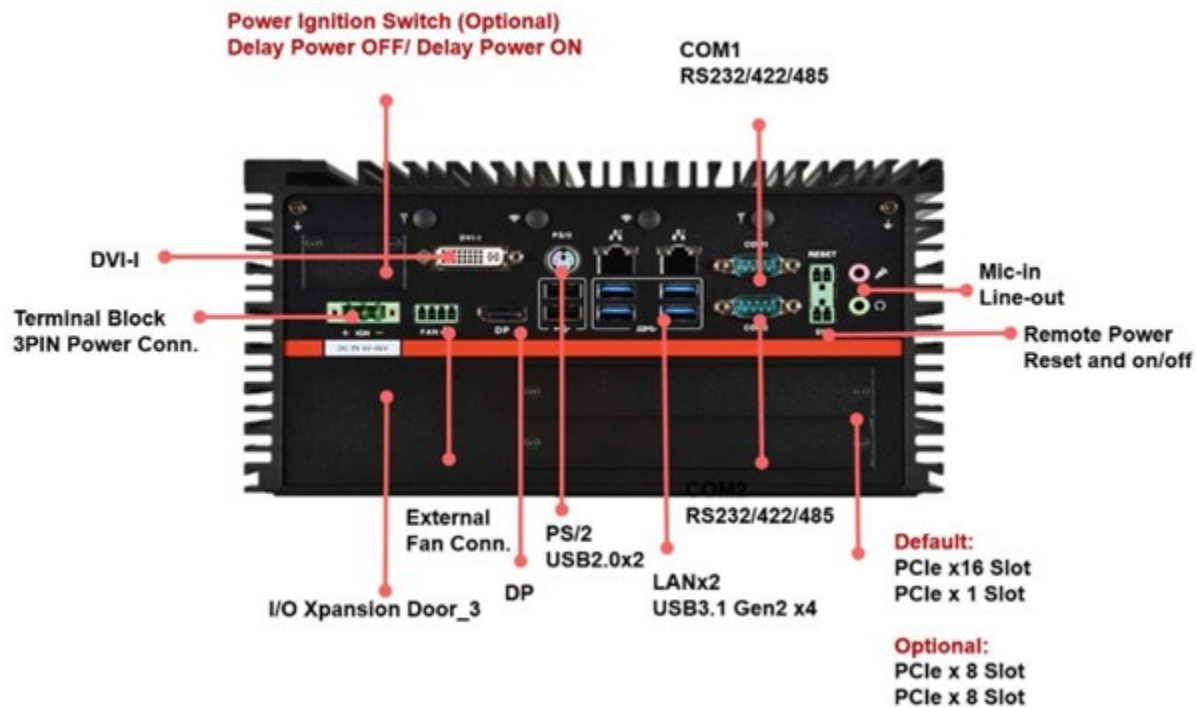


5.2 Rear I/O

5.2.1 Alderamin MK3



5.2.2 Alderamin-MK3D



Note: The recommended dimensions for a USB cable connector or device for USB 2.0 ports are **9mm height x 19mm width** when all other I/O ports are occupied. However, compatibility also depends on the dimensions of the DisplayPort connector and other devices to avoid interference.

5.3 Expansion Module (Optional) Configuration Table



Expansion	Function	1	2	3	4
COM/DIO	4x COM, 8x DIO	X	X		
PoE RJ45	4x Gigabit PoE RJ45	X	X		
PoE M12	4x Gigabit PoE M12	X	X		
IGN	Ignition Control				X
DualLAN	2x Gigabit LAN RJ45	X	X	X	

5.4 Recommended PoE Configuration and Environmental Spec Matrix

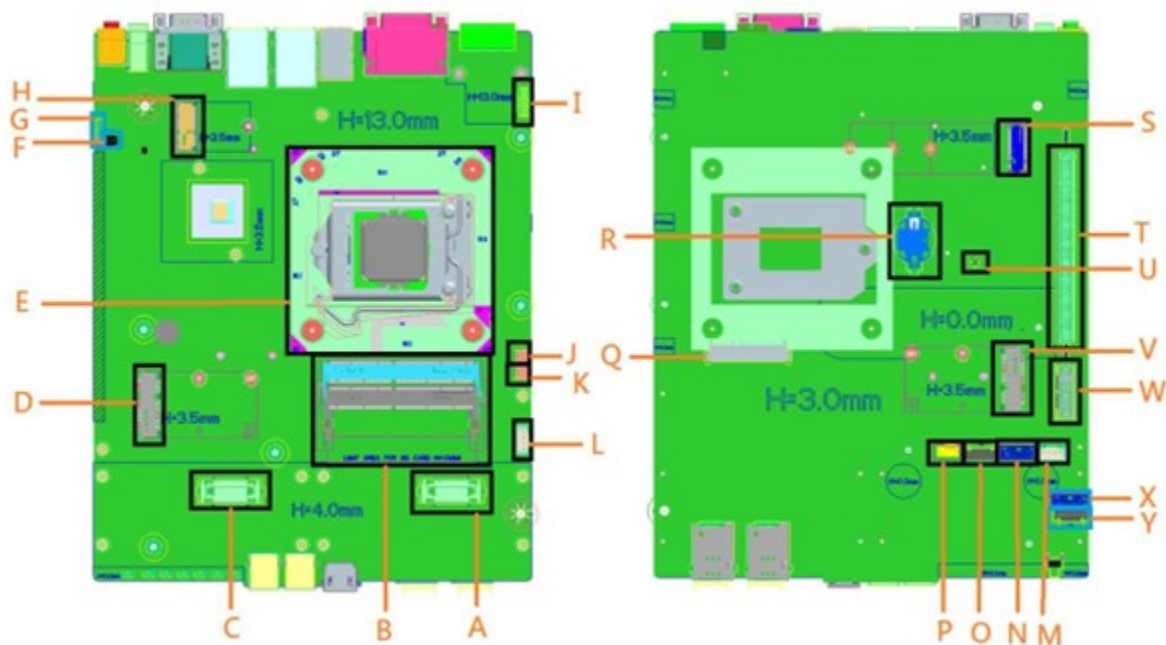
CPU TDP	PoE Configuration	Max. Ambient (°C)	CPU Utility	Memory Loading	HDD/SSD Loading	PoE Power %
71W~80W	None	40	70%	40%	10%	-
71W~80W	x2 PoE ports (Max. 30W)	35	70%	40%	10%	70%
71W~80W	x4 PoE ports (Max. 50W)	30	70%	40%	10%	70%
51W~65W	None	50	70%	40%	10%	-
51W~65W	x2 PoE ports (Max. 30W)	45	70%	40%	10%	70%
51W~65W	x4 PoE ports (Max. 50W)	40	70%	40%	10%	70%
51W~65W	x6 PoE ports (Max. 80W)	35	50%	40%	10%	70%
51W~65W	x8 PoE ports (Max. 100W)	30	50%	40%	10%	70%
35W	None	70	100%	40%	10%	-
35W	x2 PoE ports (Max. 30W)	65	100%	40%	10%	70%
35W	x4 PoE ports (Max. 50W)	60	100%	40%	10%	70%
35W	x6 PoE ports (Max. 80W)	55	100%	40%	10%	70%
35W	x8 PoE ports (Max. 100W)	50	100%	40%	10%	70%
35W	x10 PoE ports (Max. 130W)	45	100%	40%	10%	70%

6 DIP Switch Settings and Pin Definitions

This chapter provides guidance on setting up the DIP switch and using the internal I/Os of the Alderamin MK3 Embedded System hardware.

6.1 Jumper and Internal Connector Placement

6.1.1 Overall Layout



Label	Component
A	1st Board-to-Board Connector
B	DIMM Sockets
C	2nd Board-to-Board Connector
D	Mini PCIe Slot 2
E	CPU Socket
F	DIP Switch for Power COM
G	AT/ATX Mode Switch
H	M.2 Key E Connector
I	Board-to-Board Connector for Power Ignition
J	5V Power Header
K	5V Power Header
L	12V Power Header for PoE Module of Mini PCIe
M	12V Power Header for PoE Module of Mini PCIe
N	2nd SATA Signal Header
O	2nd SATA Power Header
P	FAN Header
Q	1st SATA Connector
R	Coin Battery Connector
S	M.2 Key M
T	PCIe X16
U	Clear CMOS Switch
V	Mini PCIe Slot 1
W	PCIe X1
X	3rd SATA Signal Header
Y	3rd SATA Power Header

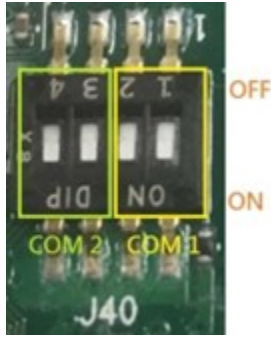
6.2 DIP Switch Settings

6.2.1 AT/ATX Mode Selection (Location #G)



Pin Position	Mode
UP	ATX Mode
DOWN	AT Mode

6.2.2 Power COM DIP Switch (Location #F)



Switch Setting	Mode	1	2
COM 1	RI	ON	ON
	5V	ON	OFF
	12V	OFF	ON
COM 2	RI	ON	ON
	5V	ON	OFF
	12V	OFF	ON

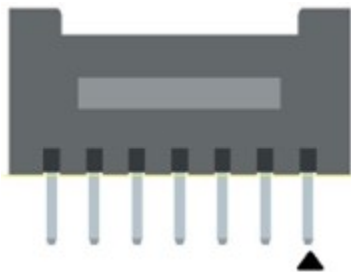
6.3 Internal Connector Pin Definitions

6.3.1 1st SATA Connector (Location #Q)



Pin	Signal Name
P1-P3	VCC3
P4-P6	GND
P7-P9	VCC
P10	GND
P11	RES
P12	GND
P13-P15	+12V
S1	GND
S2	SATAHDR_TXP0_C
S3	SATAHDR_TXN0_C
S4	GND
S5	SATAHDR_RXN0_C
S6	SATAHDR_RXP0_C
S7	GND

6.3.2 SATA Power Headers (Location #O/#Y - 2nd & 3rd SATA Power Headers)



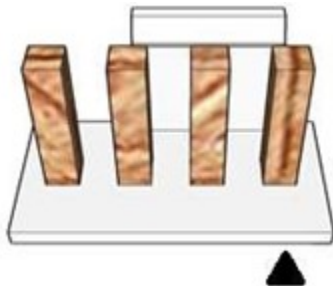
Pin	Signal Name
1	VCC3
2	GND
3-4	VCC
5	GND
6-7	+12V

6.3.3 SATA Signal Headers (Location #N/#X - 2nd & 3rd SATA Signal Headers)



Pin	Signal Name	Description
1	GND	Ground
2	SATAHDR_TXP_C	SATA Data Transmit (Positive)
3	SATAHDR_TXN_C	SATA Data Transmit (Negative)
4	GND	Ground
5	SATAHDR_RXN_C	SATA Data Receive (Negative)
6	SATAHDR_RXP_C	SATA Data Receive (Positive)
7	GND	Ground

6.3.4 Fan Header (Location #P)



Pin	Signal
1	Ground
2	+12V
3	CPU_FAN_TACH
4	CPU_FAN_CTRL

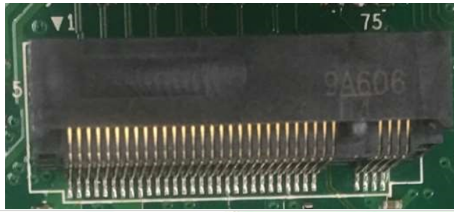
6.3.5 M.2 Connectors

M.2 Key E Slot (Location #H)



	Standard M.2 Key E	LcP Signals	LcP Signals	Standard M.2 Key E	
74	+V3P3A		GND		75
72	+V3P3A	WT_CLKP	REFCLKN1		73
70	PEWake1# (IO)(0/3.3V)	WT_CLKN	REFCLKP1		71
68	CLKREQ1# (IO)(0/3.3V)		GND		69
66	PERST1# (O)(0/3.3V)	WT_DOP	PERn1		67
64	RESERVED	WT_DON	PERp1		65
62	ALERT# (I)(0/1.8V)		GND		63
60	I2C_CLK (O)(0/1.8V)	WT_D1P	PETn1		61
58	I2C_DATA (IO)(0/1.8V)	WT_D1N	PETp1		59
56	W_DISABLE1# (O)(0/3.3V)		GND		57
54	W_DISABLE2# (O)(0/3.3V)		PEWake0# (IO)(0/3.3V)		55
52	PERST0# (O)(0/3.3V)		CLKREQ0# (IO)(0/3.3V)		53
50	SUSCLK(32kHz) (O)(0/3.3V)		GND		51
48	COEX_TXD (O)(0/1.8V)		REFCLKN0		49
46	COEX_RXD (O)(0/1.8V)		REFCLKP0		47
44	COEX3 (IO)(0/1.8V)		GND		45
42	CLink CLK		PERn0		43
40	CLink DATA		PERp0		41
38	CLink RESET (O)(0/3.3V)		GND		39
36	LPSS UART RTS (O)(0/1.8V) / BRI_DT (MUX'd in PCH/SoC)		PETn0		37
34	LPSS UART CTS (I)(0/1.8V) / RGI_RSP (MUX'd in PCH/SoC)		PETp0		35
32	LPSS UART Tx (O)(0/1.8V) / RGI_DT (MUX'd in PCH/SoC)		GND		33
E	Connector Key		Connector Key		E
	Connector Key		Connector Key		
	Connector Key		Connector Key		
	Connector Key		Connector Key		
22	LPSS UART Rx (I)(0/1.8V) / BRI_RSP (MUX'd in PCH/SoC)	WGR_CLKP	SDIO Reset#(O)(0/1.8V)		23
20	UART Wake# (I)(0/3.3V)	WGR_CLKN	SDIO Wake#(I)(0/1.8V)		21
18	GND	GND	SDIO DAT3(I)(0/1.8V)		19
16	LED2# (I)(OD)	WGR_DOP	SDIO DAT2(I)(0/1.8V)		17
14	PCM_OUT (O)(0/1.8V) / CLKREQ0 (MUX'd in PCH/SoC)	WGR_DON	SDIO DAT1(I)(0/1.8V)		15
12	PCM_IN (I)(0/1.8V)	GND	SDIO DAT0(I)(0/1.8V)		13
10	PCM_SYNC (OI)(0/1.8V) / RF_RESET_B (MUX'd in PCH/SoC)	WGR_D1P	SDIO CMD(I)(0/1.8V)		11
8	PCM_CLK (OI)(0/1.8V)	WGR_D1N	SDIO CLK(O)(0/1.8V)		9
6	LED1# (I)(OD)		GND		7
4	+V3P3A		USB_D-		5
2	+V3P3A		USB_D+		3
			GND		1

M.2 Key M Slot (Location #S)



74	3.3Vaux	GND	75
72	3.3Vaux	GND	73
70	3.3Vaux	GND	71
68	SUSCLK(32kHz) (O)(0/3.3V)	PEDET (OC-PCIe/GND-SATA)	69
	Key	N/C	67
	Key	Key	
	Key	Key	
	Key	Key	
	Key	Key	
58	N/C	GND	57
56	N/C	REFCLKP	55
54	PEWake# (IO)(0/3.3V) or N/C	REFCLKN	53
52	CLKREQ# (IO)(0/3.3V) or N/C	GND	51
50	PERST# (O)(0/3.3V) or N/C	PERp0/SATA-A+	49
48	N/C	PERn0/SATA-A-	47
46	N/C	GND	45
44	N/C	PETp0/SATA-B-	43
42	N/C	PETn0/SATA-B+	41
40	N/C	GND	39
38	DEVS LP (O)(0/3.3V)	PERp1	37
36	N/C	PERn1	35
34	N/C	GND	33
32	N/C	PETp1	31
30	N/C	PETn1	29
28	N/C	GND	27
26	N/C	N/C	25
24	N/C	N/C	23
22	N/C	GND	21
20	N/C	N/C	19
18	3.3Vaux	N/C	17
16	3.3Vaux	GND	15
14	3.3Vaux	N/C	13
12	3.3Vaux	N/C	11
10	DAS/DSS# (I)(OD)	GND	9
8	N/C	N/C	7
6	N/C	N/C	5
4	3.3Vaux	GND	3
2	3.3Vaux	GND	1

6.3.6 12V Power Headers for PoE Xpansion (Location #L/#M)



Pin	Signal
1	Ground
2-3	+12V
4	GND

6.3.7 5V Power Headers (Location #J/#K)



Pin	Signal
1	+5V
2	Ground

6.4 External Connector Pin Definitions

6.4.1 3-Pin Terminal Block for DC Input



Pin	Signal
1	DC IN +9~48VIN
2	Ignition (IGN)
3	GND

6.4.2 4-Pin Terminal Block for PWM Fan



Pin	Signal
1	Ground
2	+12V
3	System_FAN_TACH
4	SYSTEM_FAN_CTRL

6.4.3 2-Pin Terminal Block for Remote Power ON/OFF and Reset



Pin	Signal
1	Ground
2	EXT Reset
3	Ground
4	EXT_PWRBT_ON/OFF

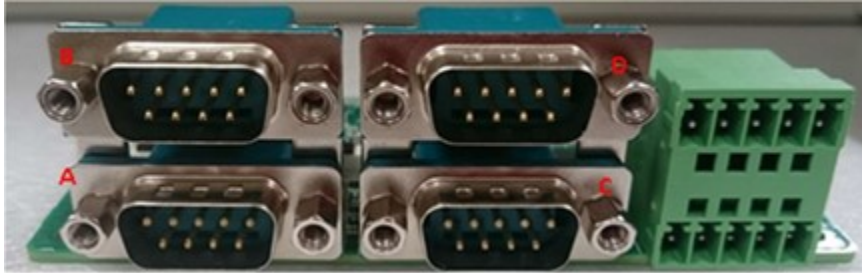
6.5 Expansion Modules

6.5.1 COM/DIO Expansion Module

This module consists of Serial COM and Digital IO functions.

COM Port Settings

Location: Supports 4 COM ports (Configurable as RS232/RS485/RS422).

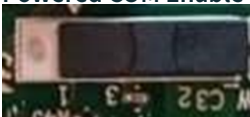


DIP Switch Functions

- COM ID Selection Switch



- Powered COM Enable Switch



Set to the right(default)
Normal COM port (Pin9 = signal)



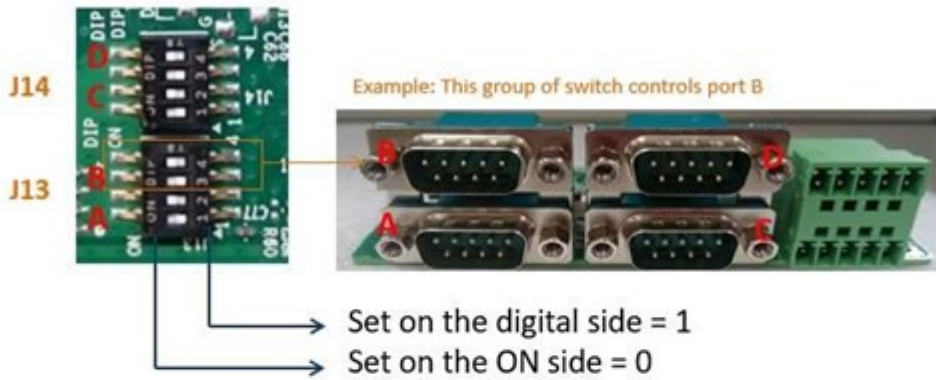
Set to the left
Powered COM port (Pin9 = VDD)

- Powered COM Power Source Selection Switch



Set A-B; VDD = 12V (Default)
Set B-C; VDD = 5V

- COM Mode Setting Switch

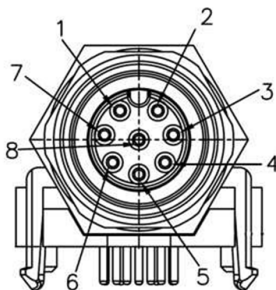


Switch	Bit	COM Port	Test Mode	RS485	RS232 (Default)	RS422
J14	4	Port D	0	1	0	1
	3		0	0	1	1
	2	Port C	0	1	0	1
	1		0	0	1	1

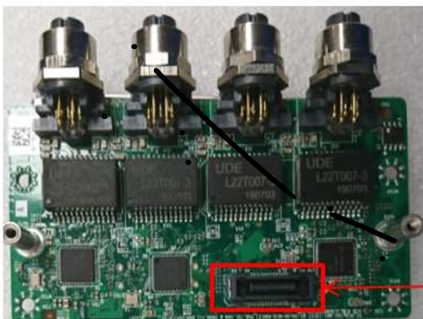
Switch	Bit	COM Port	Test Mode	RS485	RS232 (Default)	RS422
J13	4	Port B	0	1	0	1
	3		0	0	1	1
	2	Port A	0	1	0	1
	1		0	0	1	1

6.5.2 LAN Expansion Module

Supports four M12 type interfaces for Giga LAN connectivity.



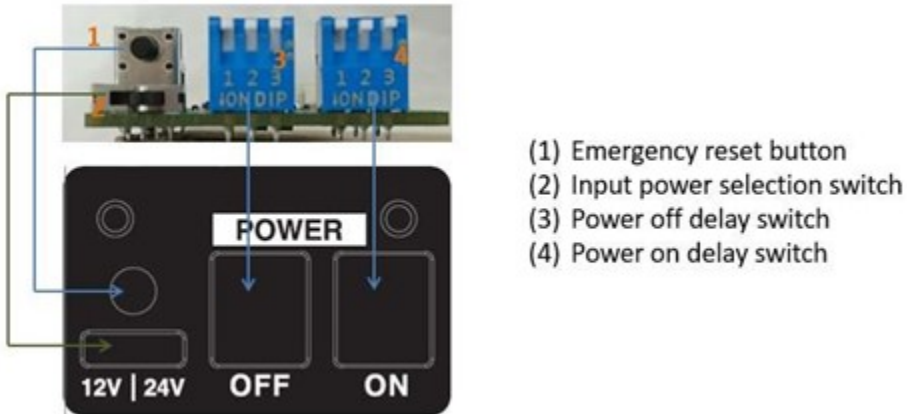
PIN	Signal	POE typeA
1	LAN_MDI1+	DC+
2	LAN_MDI1-	DC+
3	LAN_MD20+	DC-
4	LAN_MDI2-	
5	LAN_MDI3+	
6	LAN_MDI3-	DC-
7	LAN_MDI4+	
8	LAN_MDI4-	



Use for connecting to MS-01PON-S10

6.5.3 Ignition Expansion Module

Detects vehicle ignition status and controls power delay settings.



Delay Power On/Off Setting Switch



set on up side = 0



set on down side = 1

Power Off Delay Time Table

1 2 3 |

0 0 0	0 second
0 0 1	1 minute
0 1 0	3 minutes
0 1 1	5 minutes
1 0 0	10 minutes
1 0 1	30 minutes
1 1 0	1 hour
1 1 1	2 hours

Power On Delay Time Table

1 2 3 |

0 0 0	0 second
0 0 1	3 seconds
0 1 0	4 seconds
0 1 1	10 seconds
1 0 0	15 seconds
1 0 1	20 seconds
1 1 0	25 second
1 1 1	30 seconds

7 Radio Modules (only relevant with optional LTE/WiFi Modules)

The Alderamin Mk3 may contain the following RF Modules:

- Telit Cinterion LEPCIC4EU08T080700

7.1 Radio Frequencies Telit

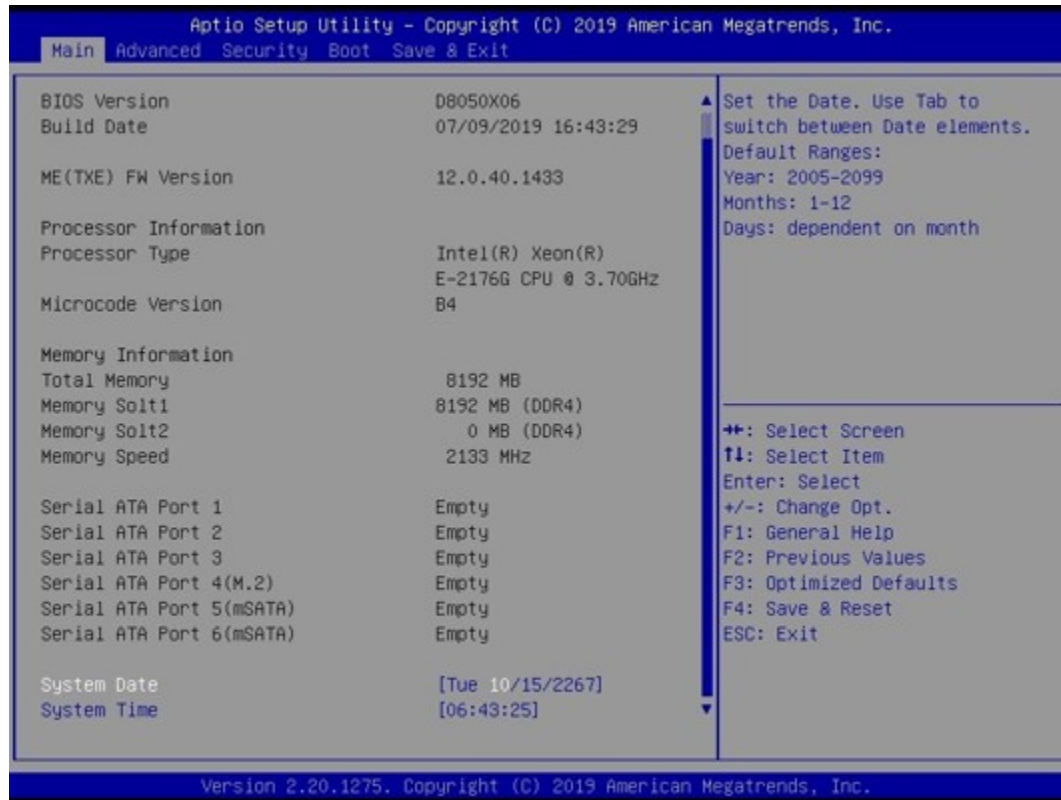
Band	Frequency Range Down	Frequency Range Up	Max Transmission Power
Band 1	2110 MHz - 2170 MHz	1920 MHz - 1980 MHz	199 mW
Band 3	1805 MHz - 1880 MHz	1710 MHz - 1785 MHz	199 mW
Band 7	2620 MHz - 2690 MHz	2500 MHz - 2570 MHz	199 mW
Band 8	925 MHz - 960 MHz	880 MHz - 915 MHz	199 mW
Band 20	791 MHz - 821 MHz	832 MHz - 862 MHz	199 mW
Band 28A	758 MHz - 803 MHz	703 MHz - 748 MHz	199 mW

7.1.1 Notes

- **Down:** Refers to the downlink frequency range.
- **Up:** Refers to the uplink frequency range.
- **Max Transmission Power:** Maximum power at which the device transmits.

8 BIOS

8.1 Main Page



8.1.1 System Information

The **Main Page** displays essential system information, including BIOS version, build date, and hardware details. None of these fields are user-configurable.

- **BIOS Vendor:** AMI Megatrends
- **BIOS Version:** Displays the current BIOS version.
- **Build Date:** Shows the BIOS build date.
- **ME (TXE) Firmware Version:** Displays the Management Engine firmware version.
- **Processor Information:** Provides details about the installed CPU.
- **Total Memory:** Displays the installed RAM size.
- **Memory Frequency:** Shows the memory clock speed.
- **SATA Devices:** Lists installed storage devices connected via SATA, M.2, or mSATA.

8.1.2 System Date & Time Settings

The **System Date & Time** settings allow you to configure the system's real-time clock.

- **System Date:** Set using the format [Www mm/dd/yyyy] where:
 - Www: Day of the week (Mon-Sun)
 - mm: Month (1-12)
 - dd: Day (1-31)
 - yyyy: Year (1998-9999)
- **System Time:** Set using the format [hh/mm/ss], where:
 - hh: Hours (0-23)
 - mm: Minutes (0-59)
 - ss: Seconds (0-59)

Use the **Tab** key to switch between date and time fields.

8.2 Advanced Page

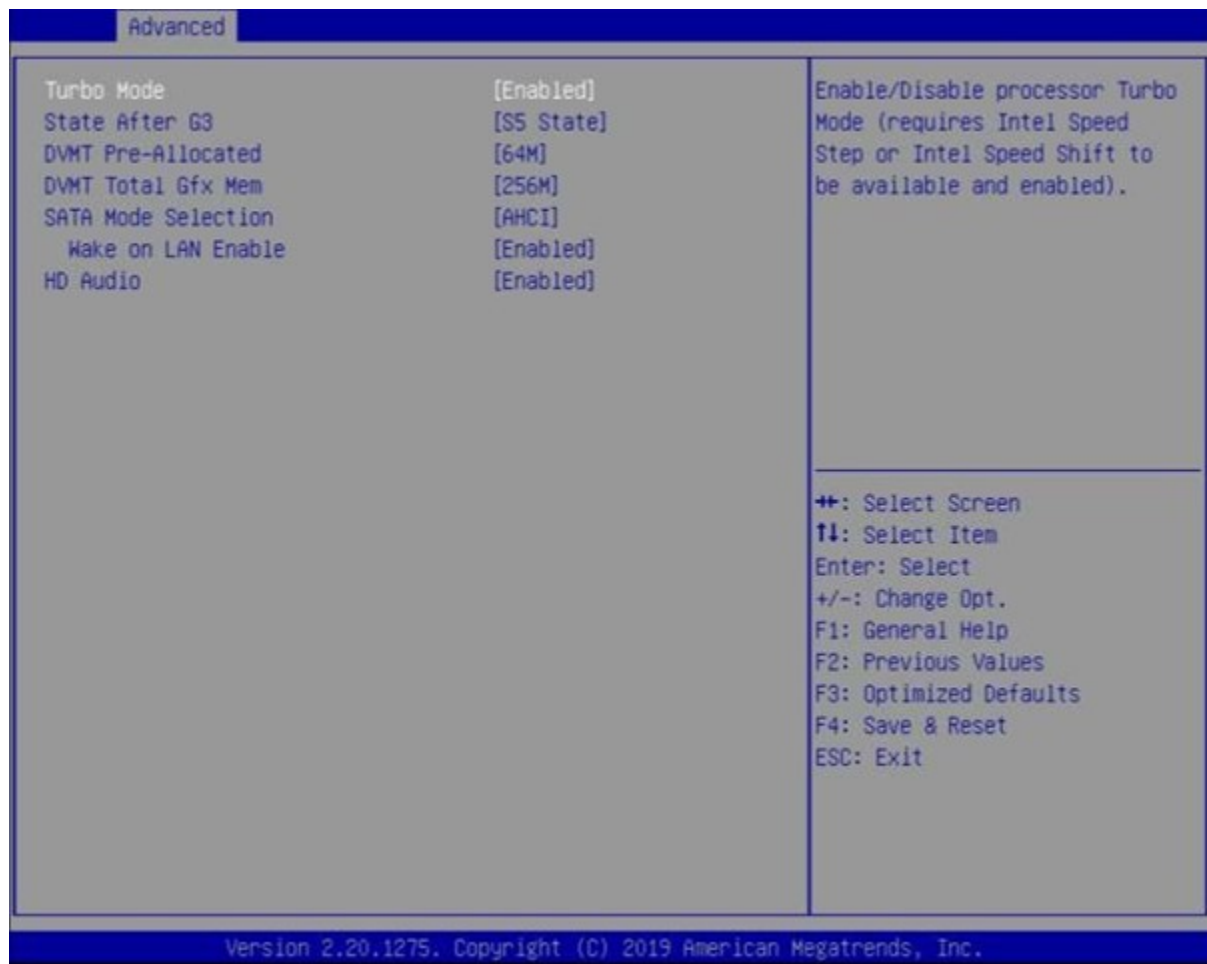


The **Advanced Page** contains various configuration options that allow users to fine-tune system behavior.

8.2.1 Advanced Configuration Options

- **Onboard Devices:** Configure integrated device settings.
- **CPU Configuration:** View and adjust processor settings.
- **Trusted Computing:** Manage TPM and security features.
- **WatchDog:** Enable or disable the WatchDog timer.
- **Super IO Configuration:** Configure settings for system I/O controllers.
- **NCT6116D HW Monitor:** Monitor system temperature, voltage, and fan speeds.
- **S5 RTC Wake Setting:** Enable system wake-up from S5 using an RTC alarm.
- **Network Stack Configuration:** Enable or disable UEFI network boot.
- **NVMe Configuration:** Configure settings for NVMe storage devices.

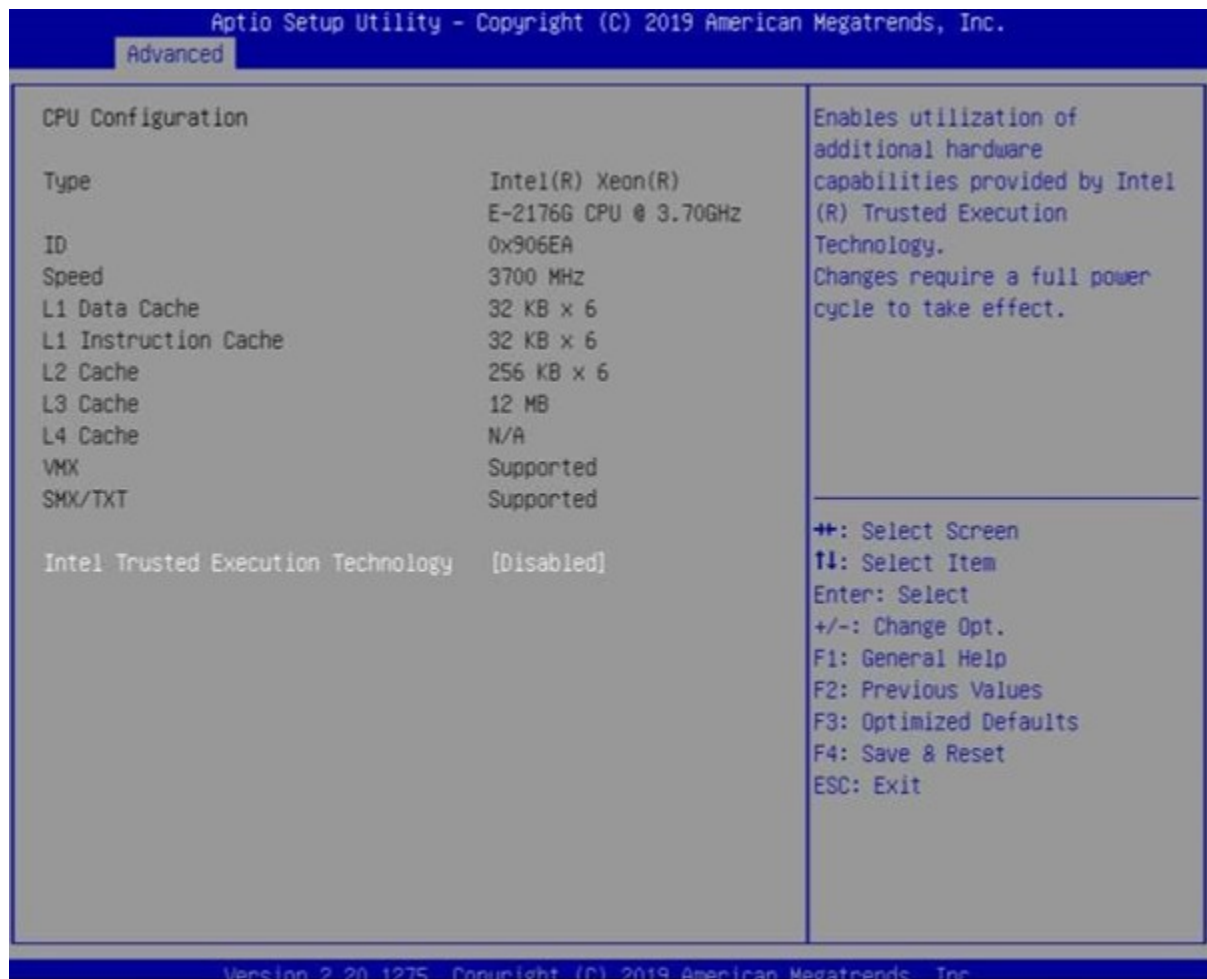
8.2.2 Onboard Devices Configuration



- **Turbo Mode:** Enable or disable the processor's Turbo Boost feature. Requires Intel Speed Step or Intel Speed Shift.
- **State After G3:** Determines system behavior after power loss (options include S0 and S5 states).
- **DVMT Pre-Allocated:** Set the amount of pre-allocated graphics memory for internal graphics.
- **DVMT Total Graphics Memory:** Choose the total memory allocation for integrated graphics.

- **SATA Mode Selection:** Defines how the SATA controller operates (AHCI or Intel RST Premium).
- **Wake on LAN:** Enable or disable system wake-up on network activity.
- **HD Audio:** Enable or disable high-definition audio detection.

8.3 CPU Configuration



This section displays processor details and allows certain configurations:

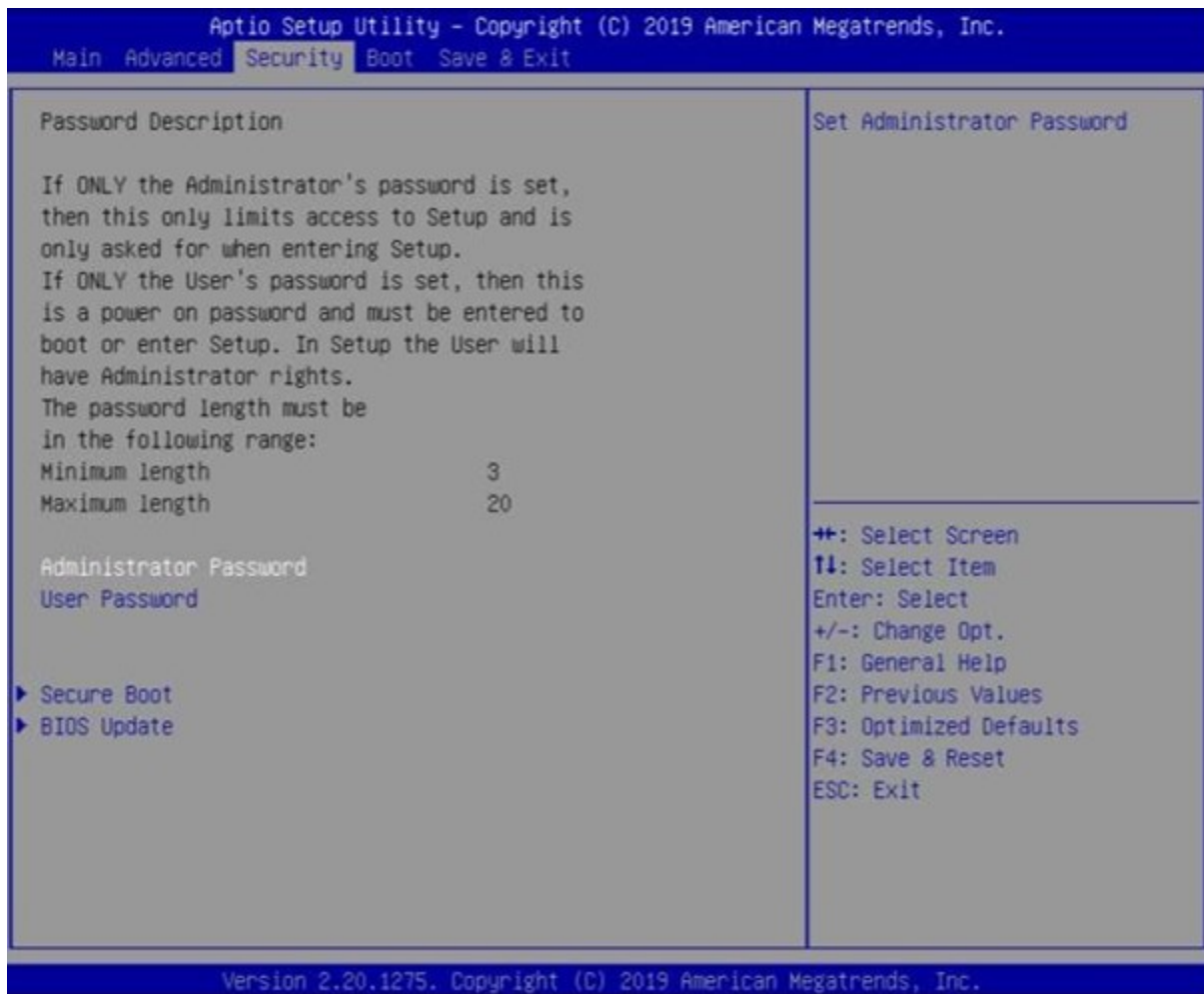
- **Processor Type:** Displays the installed CPU model.
- **Processor ID:** Shows the CPU identification number.
- **Clock Speed:** Indicates the processor's base frequency.
- **Cache Levels:** Displays information about L1, L2, and L3 caches.
- **VMX Support:** Indicates whether Virtual Machine Extensions (VMX) are supported.
- **Intel Trusted Execution Technology:** Allows enabling or disabling of Intel's security extensions.

8.4 Trusted Computing



- **TPM 2.0 Device:** Displays the presence of a TPM security module.
- **Firmware Version:** Shows the TPM firmware version.
- **Vendor Information:** Displays the TPM manufacturer.
- **Security Device Support:** Enable or disable TPM functionality within the BIOS.

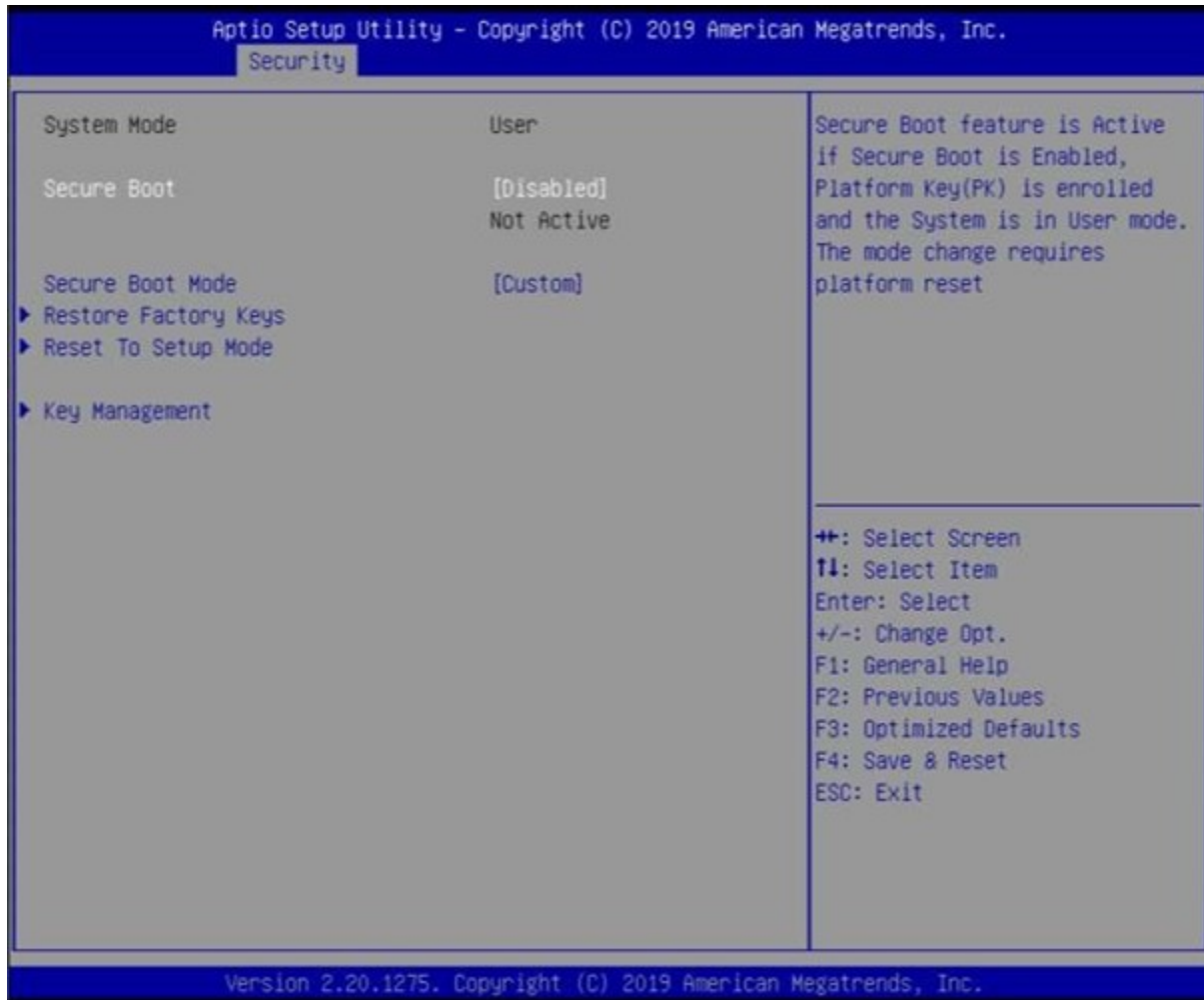
8.5 Security Page



The **Security Page** allows configuration of password protection and security features:

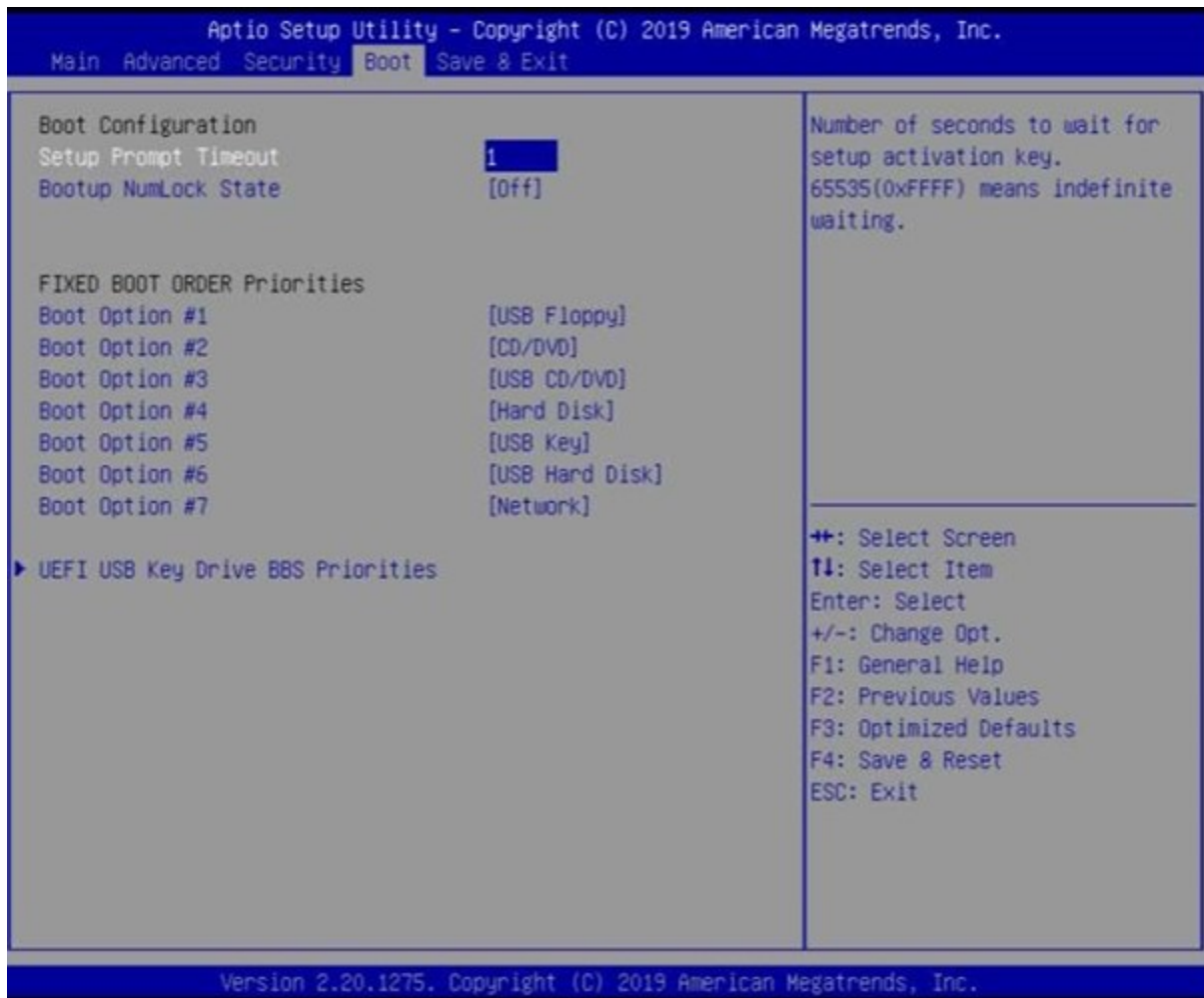
- **Administrator Password:** Set or modify the administrator password.
- **User Password:** Set or modify the user password.
- **Secure Boot:** Enable or disable Secure Boot to enforce signed OS loaders.

8.5.1 Secure Boot Configuration



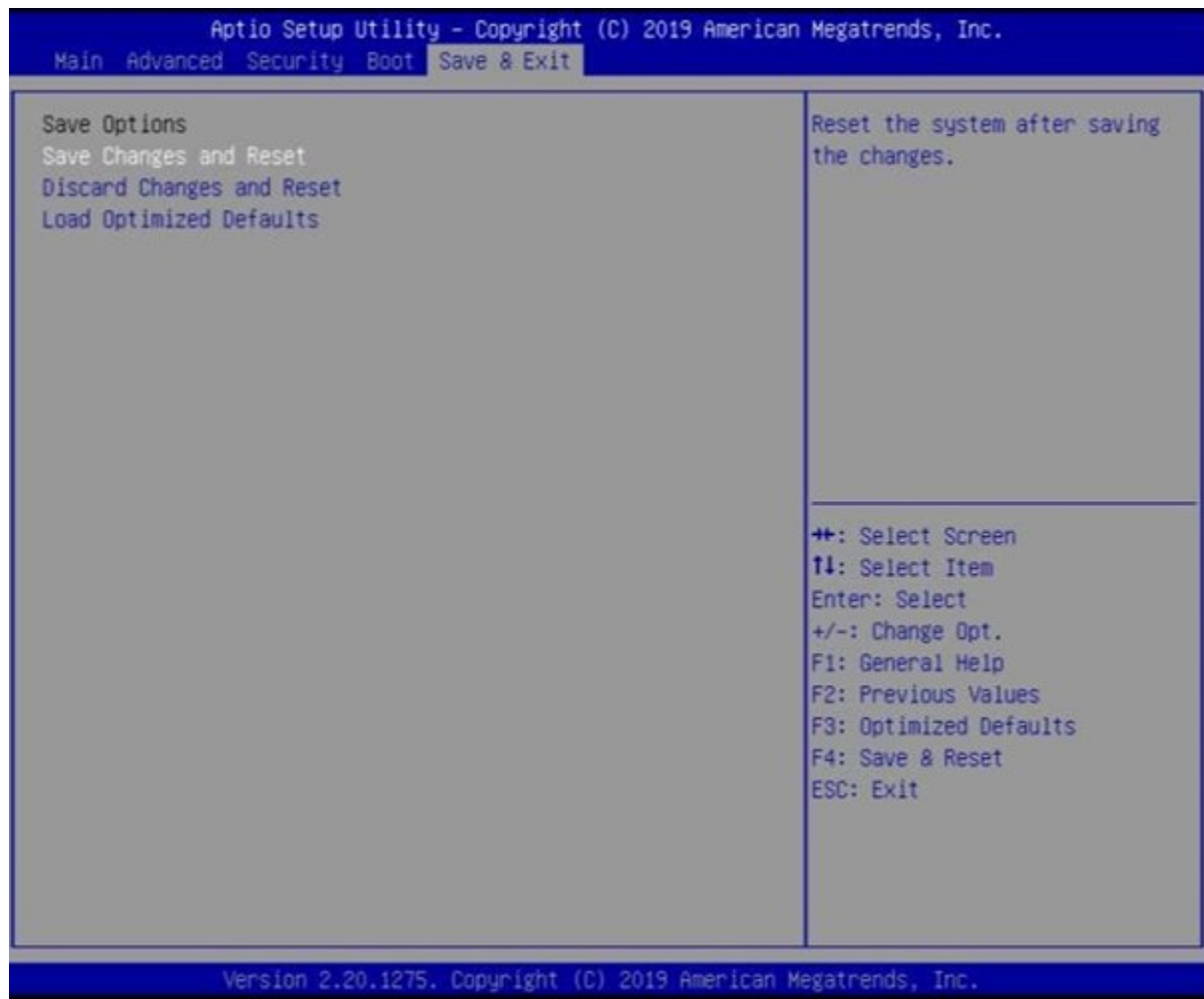
- **Secure Boot Mode:** Choose between Standard and Custom configurations.
- **Restore Factory Keys:** Reset Secure Boot keys to default factory settings.

8.6 Boot Page



- **Setup Prompt Timeout:** Set the time (in seconds) for the BIOS prompt to appear before boot.
- **Boot Order Configuration:** Define the sequence of boot devices.

8.7 Save & Exit



- **Save Changes and Reset:** Apply changes and restart the system.
- **Discard Changes and Reset:** Restart without saving any modifications.
- **Load Optimized Defaults:** Restore factory default settings for all BIOS configurations.

9 System Setup

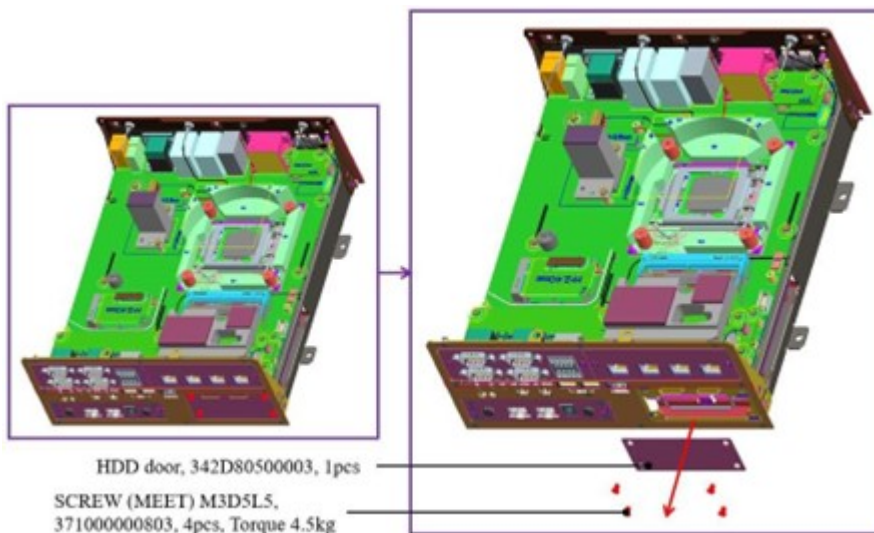
This chapter provides guidance on setting up the **Alderamin MK3 Embedded System** hardware.

⚠ **Warning:** The edges of the ALDERAMIN MK3 aluminum extrusion fins are sharp. Handle the unit carefully during installation, movement, and operation.

9.1 2.5" SATA HDD/SSD Installation

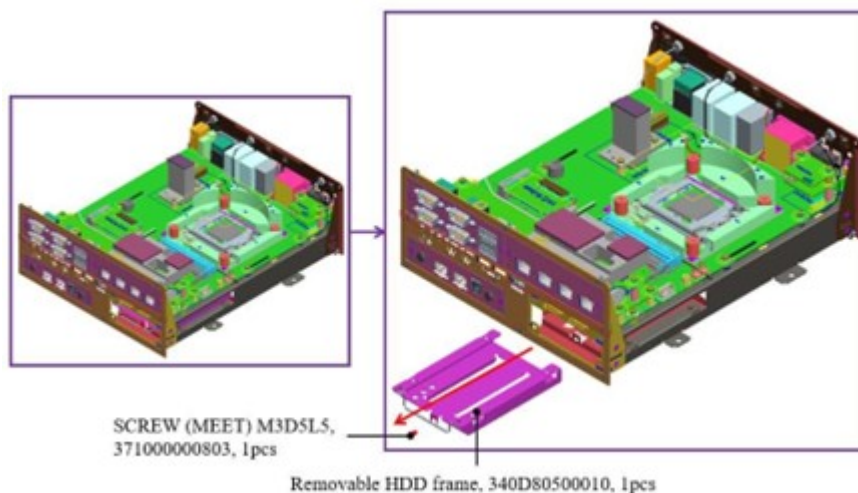
Follow these steps to install a SATA HDD:

- Remove the door from the front bezel.



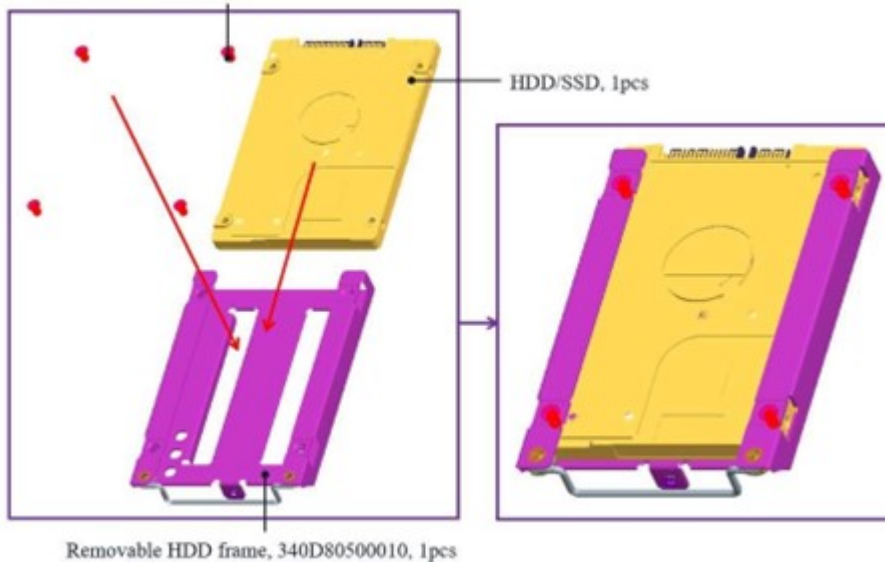
Note: Loosen the four screws from the expansion door, then gently lift the cover with your fingernail to carefully remove it.

- Pull the HDD tray out from the main chassis.

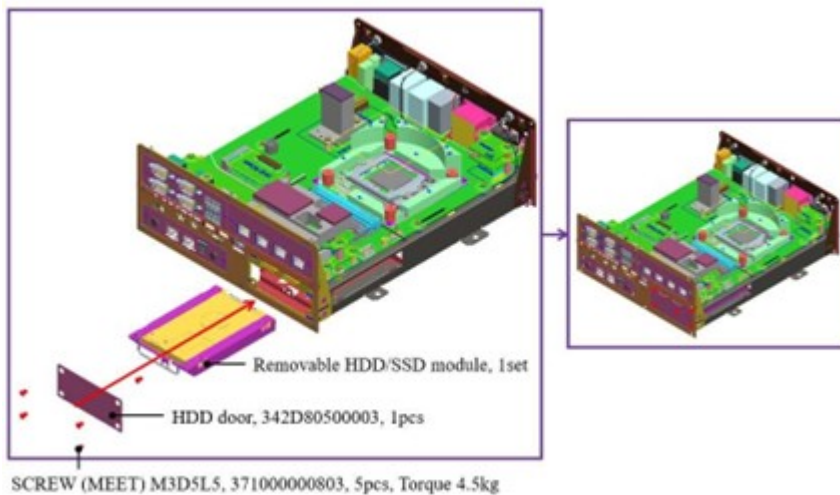


- Secure the HDD/SSD to the bracket using screws.

SCREW (MEET) M3D5L5, 371000000803, 4pcs, Torque 4.5kg
(Screw pack 452D80500003)



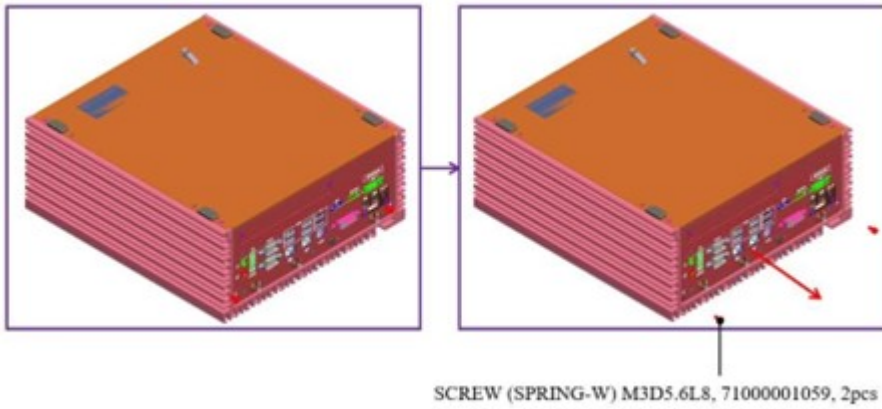
- Insert the HDD/SSD tray back into the main chassis and fasten the screws on the door.



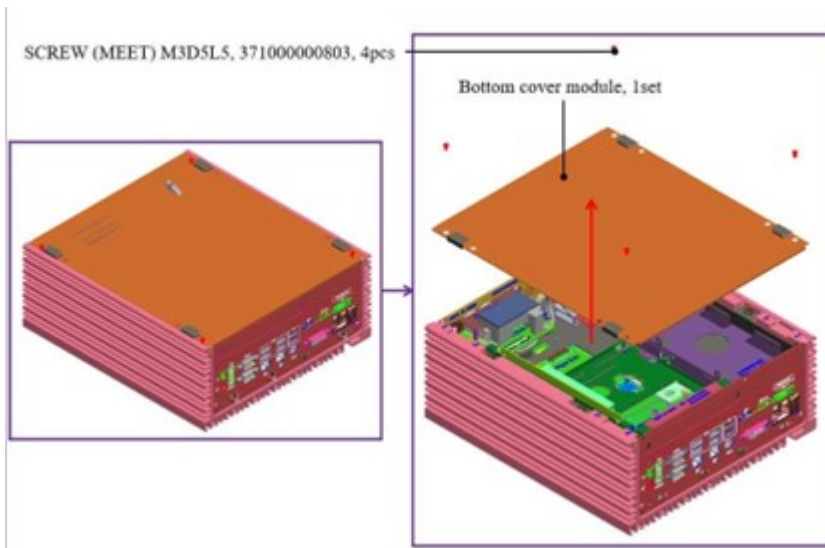
Note: Keep the unit horizontal to facilitate smooth reinsertion of the HDD tray.

9.2 2nd and 3rd 2.5" SATA HDD/SSD Installation

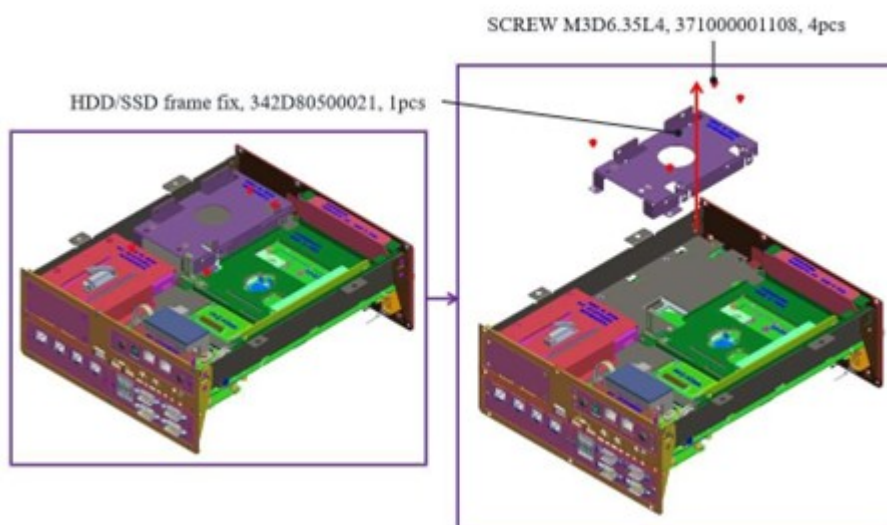
- Remove the GND screws from the rear bezel.



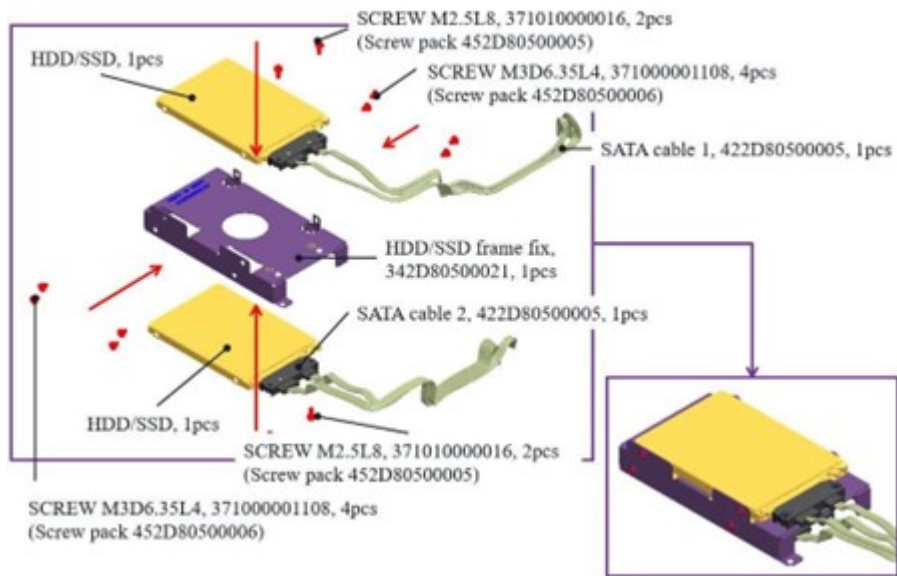
- Remove the **bottom cover**.



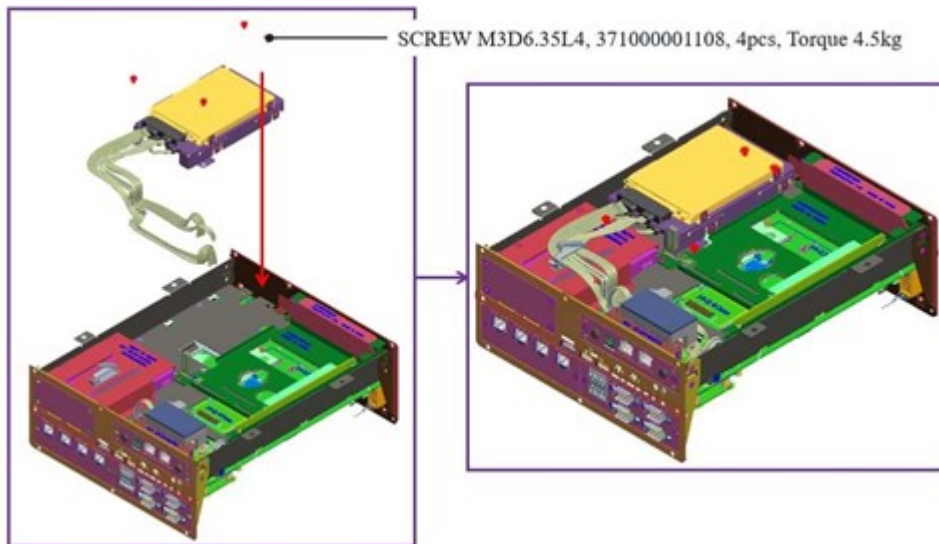
- Loosen the four **HDD bracket screws** and pull the bracket out of the unit.



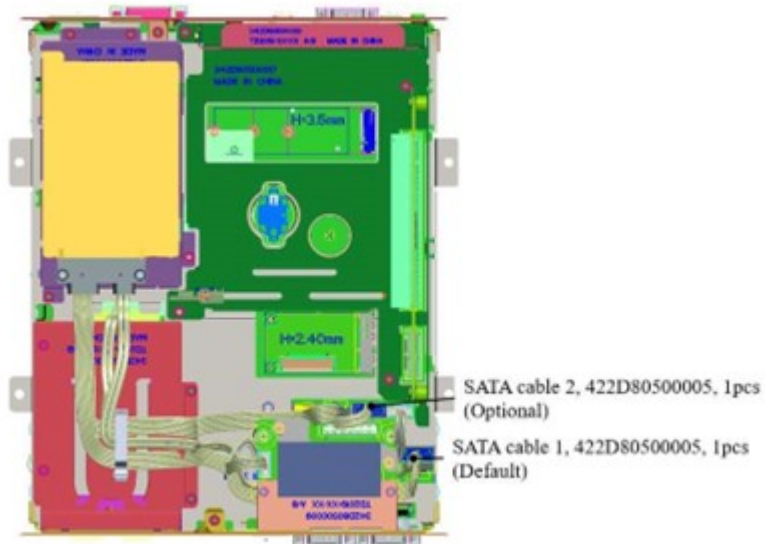
- Secure the **2nd and 3rd HDD/SSD** to the bracket as illustrated in the concept drawing.



- Fasten the **four bracket screws** to the main unit.

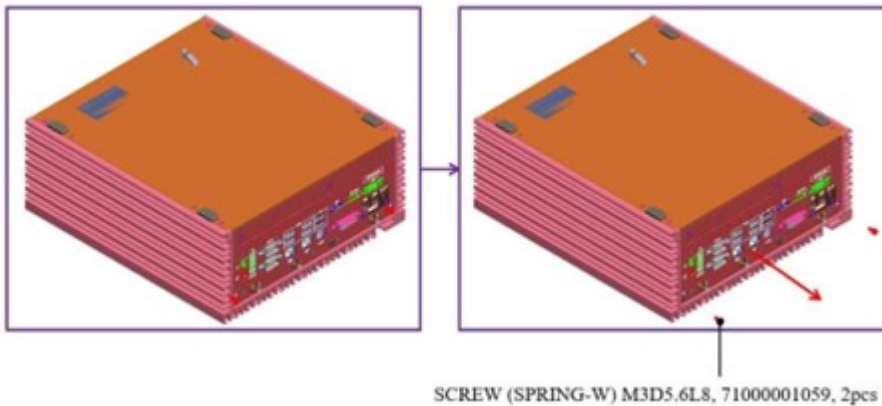


- Follow the guide for proper **SATA cable routing**.

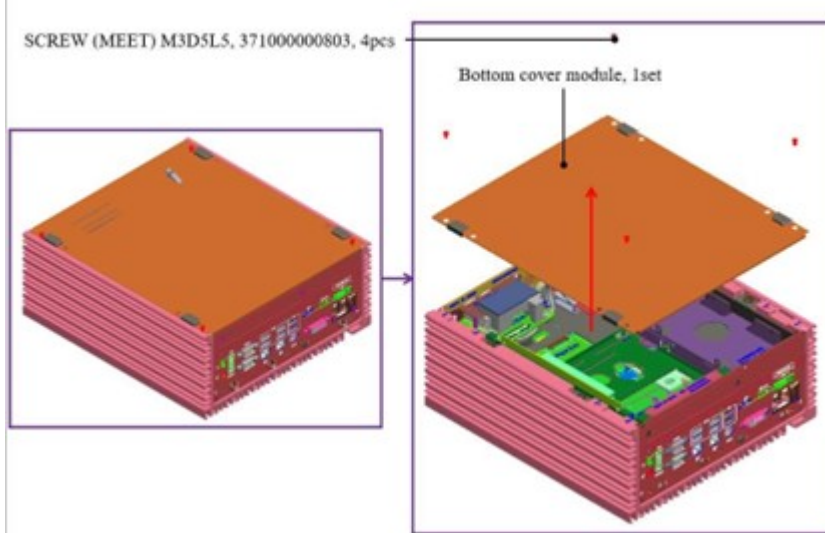


9.3 CPU, CPU Heatsink, and DRAM Installation

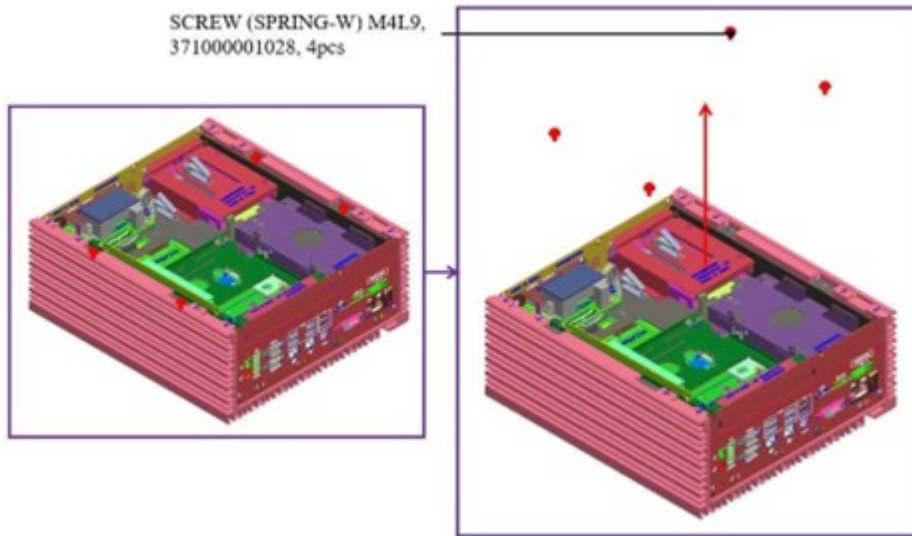
- Remove the **GND screws** from the rear bezel.



- Remove the **bottom cover**.

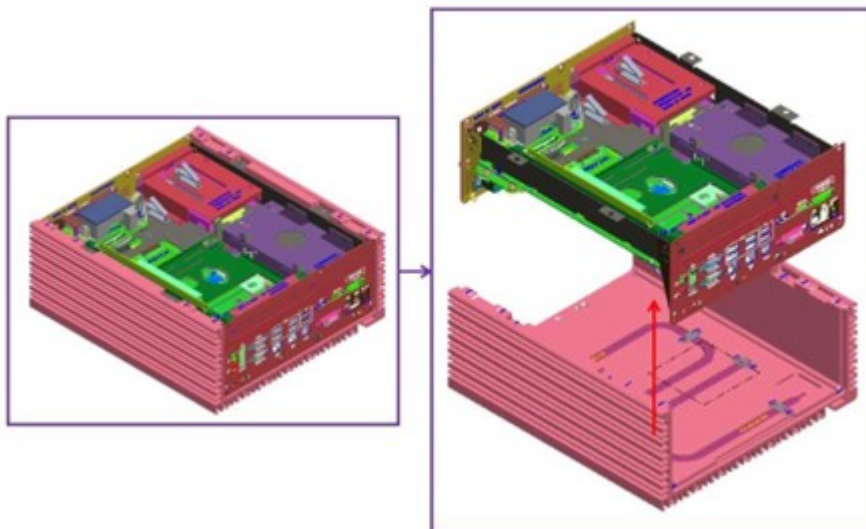


- Loosen the **four M4 screws** from the main chassis.

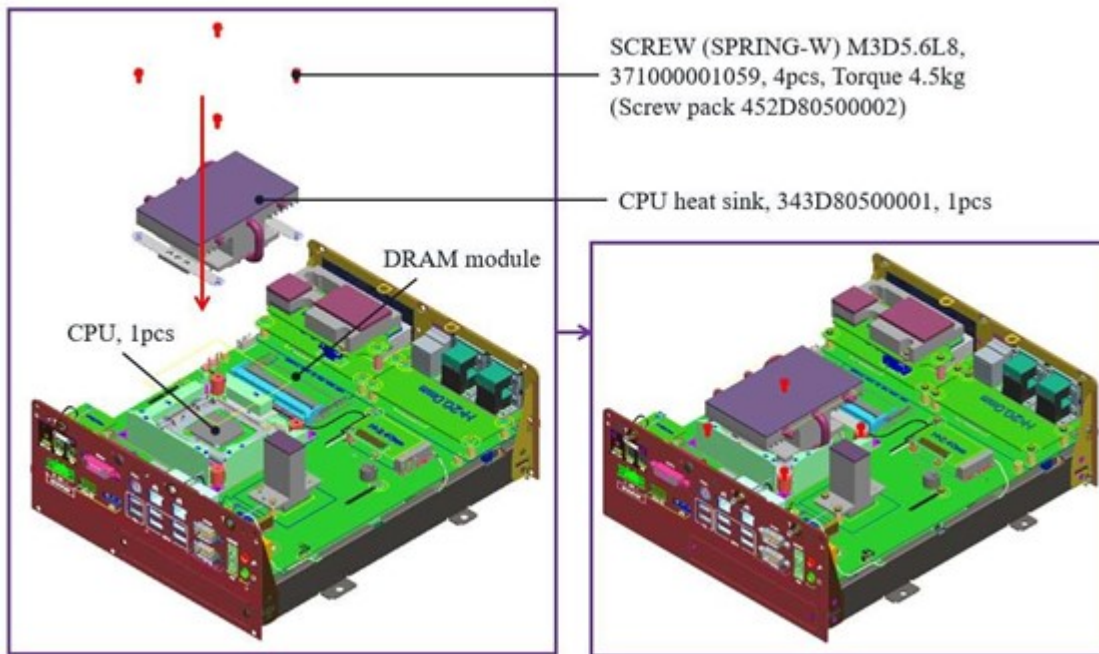


- Ensure the **two GND screws** are loosened, then carefully pull the **main chassis** from the aluminum extrusion.
 - The aluminum extrusion has **chipset thermal pads (L6)** and **two guide pins**, so some force may be required.

Warning: The aluminum and metal edges are sharp—handle with extreme caution when pulling the main chassis out.



- Take the **CPU passive cooler** from the accessories and install the **CPU, CPU heatsink, and DRAM modules** as shown.



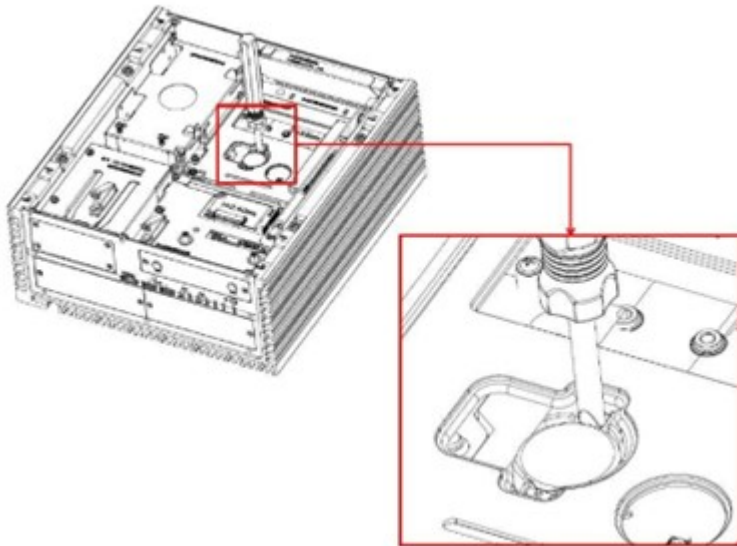
9.4 RTC Battery Maintenance

9.4.1 Preparation for Disassembly

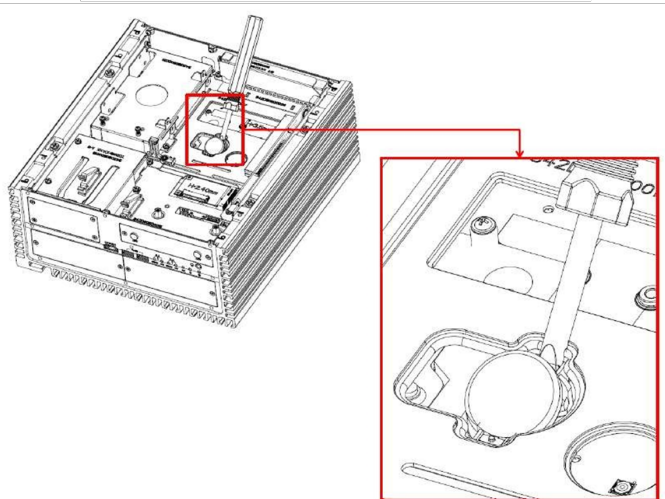
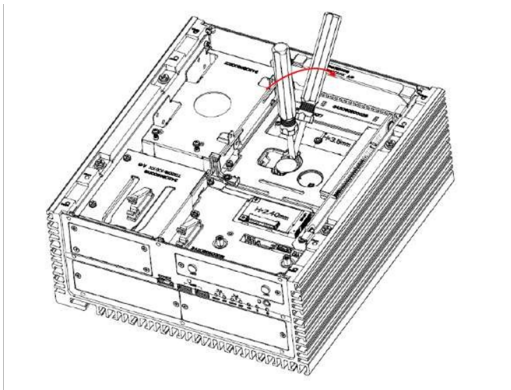


Flathead Screwdriver (Required for battery removal due to high vibration resistance design)

- Insert the **flathead screwdriver** into the gap on one side of the **RTC battery** vertically.

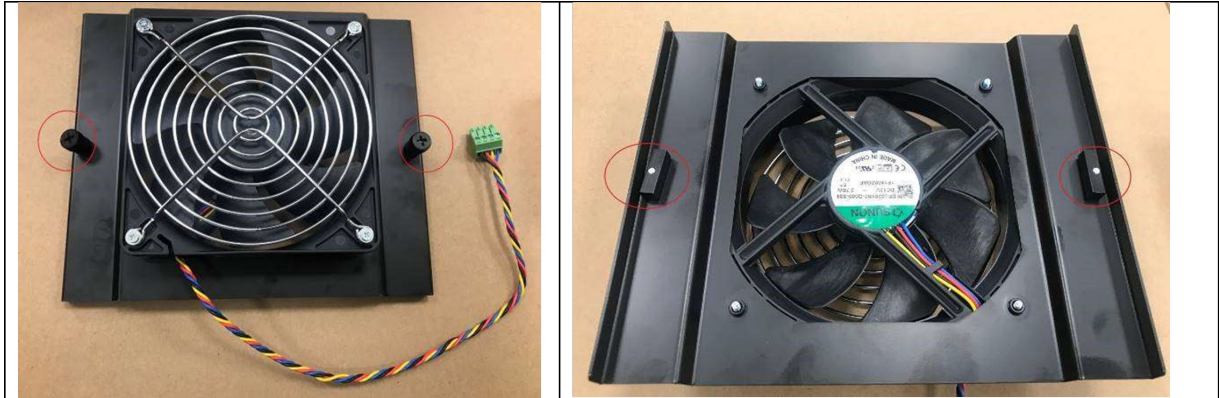


- Rotate the screwdriver about **45 degrees** to loosen and remove the coin battery.



9.5 External Fan (Optional) Installation Guide

- Twist the thumbscrews counterclockwise on the external fan.



- Align the edge of the external fan bracket with the green arrows and align the metal latch with the red arrow direction.
 - Insert the fan into the center of the housing.



- Tighten the thumbscrews to secure the external fan and connect the 4-pin cable to the PWM fan connector on the rear I/O.



Note: Do not operate the system when it is powered on. Improper installation of the external system fan while the system is running may cause injury.

10 CE Declaration of Conformity

Declaration of conformity

Holder:

Welotec GmbH
Zum Hagenbach 7
48366 Laer
GERMANY

declares that the product:

Product:

Industrial PC – Alderamin MK3

Identification:

WIPC07003091-XXX (with X = 0 to 9)

Complies with:

- **Low Voltage Directive 2014/35/EU**
 - o EN 62368-1 :2014 +AC:2015
- **EMC Directive 2014/30/EU**
 - o EN 50155:2017
 - o EN 50121-1:2017
 - o EN 50121-3-2:2014
 - o EN 61000-3-2:2016
 - o EN 61000-3-3:2013
 - o EN 61000-4-2:2009
 - o EN 61000-4-3:2006 +A1:2008 +A2:2010
 - o EN 61000-4-4:2012
 - o EN 61000-4-5:2014 +A1:2017
 - o EN 61000-4-6:2014 +AC:2015
- **RoHS 2 Directive 2011/65/EU & 2015/863/EU**
 - o Exemption(s) used:
 - o 6c, 7a, 7c-I



The corresponding markings appear under the appliance.

Welotec GmbH
Zum Hagenbach 7
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Fon: +49 (0) 25 54 91 30-00
E-mail: info@welotec.com

January 11, 2021
Date

Signature
(Jos Zenner, CTO)

www.welotec.com | info@welotec.com

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Fax: +49 (0) 25 54 91 30-10

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Ust-IdNr. DE121631449
Steuer-Nr. 311/5830/2243
D-U-N-S: 34-448-1044

Geschäftsführer:
Dr. Reinhard Lüllf
Jos Zenner
Daniel Maurice

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