



Eagle Eye-AIHD Series Fanless Box Computer

This manual covers the following SKU's

AIHD ❖ AIHDP

User Manual

Version 1.1

Preface

Revision History

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0.1	2018/10/19	Max	Initial Draft
0.2	2019/06/27	Max	Add Chapter 4
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Declaration of Conformity

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, according to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

Warnings, Cautions, and Notes

Warning!



Warnings indicate conditions, which if not observed, can cause personal injury!

Caution!



Cautions are included to help you avoid damaging hardware or losing data

Note:

Notes provide additional information



Safety Instructions

Please read the following safety instructions carefully.

It is advised that you keep this manual for future references.

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered on, as a sudden rush of energy may damage sensitive electronic components.
6. If the device is not used for an extended period, disconnect the device from the power supply to avoid being damaged by transient over-voltage.
7. Always unplug this device from any electrical outlet before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from any humidity.
11. Place the device on a solid surface during installation to prevent falls.
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. System enclosure may get hot during operation, use caution when handling.
14. Do not touch the heat sink or heat spreader when the system is running.
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to a static electrical charge, be sure to ground yourself to prevent static charge(s) when installing the internal components. Use a grounding wrist strap and contain all electronic components in static shielded containers.
17. If any of the following situations arises, please contact our service personnel:
 - I. Damaged power cord or plug.
 - II. Liquid intrusion to the device.
 - III. Exposure to moisture.
 - IV. The device is not working as expected or in a manner as described in this manual.
 - V. The device is dropped or damaged.
 - VI. Any visible signs of damage displayed on the device.
18. **Do Not store this device in an uncontrolled environment where the ambient temperatures are BELOW -40°C (-40°F) or ABOVE 85°C (185°F) to prevent damage.**

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Chapter 1

General Introduction

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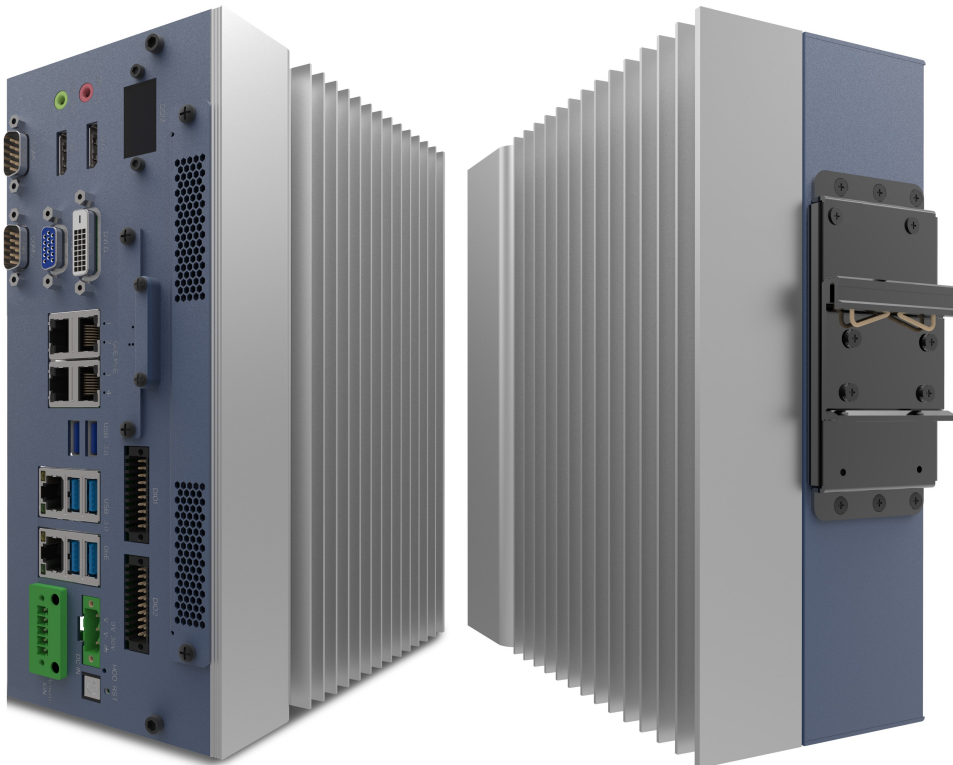
- Overview
- Common Specification
- Comparison Table
- Supported CPU List
- Supported Memory List
- Packing List
- Ordering Information

1.1 Overview

The Eagle Eyes-AIH Fanless Box Computer is a high-performance, all-in-one integrated expandable Embedded Workstation System.

- LGA1151 Socket supports Quad Core 7th/6th Generation Intel® Xeon®/Core™ i7/i5/i3 processor (Kaby Lake-S / Skylake-S) running with workstation-grade Intel® C236 chipset.
- Dual channel DDR4 2133/2400MHz up to 64GB non-ECC or ECC memory
- Advanced Intel® HD Graphics 630/530 supporting DirectX 12, OpenGL 4.5, and OpenCL 2.0 API
- Onboard there are one VGA, one DVI-D, and two DisplayPorts (DP) video interfaces, that support Ultra HD 4K resolution

The Eagle Eye-AIH system offers leading CPU performance, power efficiency, and graphics performance with PCIe 3.0 (8GB), Multiple SATA III (6Gbps), USB 3.0 (5Gbps), PoE (1Gbps), GbE LAN, and multiple wireless connections to make transferring high-speed data as seamless as possible. Thus, delivering outstanding system performance, power productivity, and flexible manageability for performance-driven embedded computing applications such as Machine Vision, Rolling Stock, Intelligent Surveillance, Smart Manufacturing, ITS, Intelligent Automation, Vehicle Computing, and many Industry 4.0 performance-driven real-time embedded computing applications.



AIHD / AIHDP

1.2 Common Specifications

Model Name	AIHD	AIHDP
Mechanical		
Dimensions	102(W) mm x 206(D) mm x 243(H) mm (4.01" x 8.11" x 9.57")	
Weight	4.5kg	
Mounting	DIN Rail Clip Optional: Wall Mount bracket	
Construction	Aluminum and metal chassis with fanless design	
Battery	Easily replaceable RTC battery	
System		
Intel® Platform	Skylake S (SKL-S) / Kaby Lake S (KBL-S)	
CPU	6 th / 7 th Gen Intel® Xeon® E3/Core™ S LGA1151 Socket type CPU (supports TDP up to 35W)	
Chipset	Intel® C236 Chipset Xeon®: HD Graphics P530 (Skylake)/P630 (Kaby Lake)	
Graphics	Xeon®: HD Graphics P530 (Skylake)/P630 (Kaby Lake) Core™ i Series: HD Graphics 530 (Skylake)/630 (Kaby Lake) Pentium®/Celeron®: HD Graphics 510 (Skylake)/610 (Kaby Lake)	
Memory	2x DDR4 SO-DIMM Max. 64GB (Skylake: DDR4 2133; Kaby Lake: DDR4 2400)	
BIOS	AMI 128Mbit SPI BIOS	
AMT	iAMT 11.0 (Intel® i219)	
Watchdog Timer	Runtime: 10 – 65535 seconds Powerup: 120 – 65535 seconds	
TPM (optional)	TPM 2.0 (SLB9665) for data security	
OS	Windows / Linux	
eKit Features		
AI Controller (AIC)	AI for system monitoring and predictive analysis	
Dynamic Display Module (DDM)	0.96-inch LCM work with AIC to display system status	
API Library	DDMI & DMCI	
Power		
DC Input	9 - 36V	
Surge Protection	200V/1ms	
Input Power Protection	Reverse-Voltage, Over-Voltage, Under-Voltage, and Over-Current	
Remote Control	Yes	
Ignition Control	Yes	
Power Mode	AT/ATX (BIOS setting)	
External IO		
Display Ports / Resolution	2x DP/4096x2304@60Hz 1x DVI-D/1920x1200@60Hz 1x VGA/1920x1200@60Hz	
Video Ports Combinations	2x DP + 1x DVI-D 2x DP + 1x VGA 1x DP + 1x DVI-D + 1x VGA	
GbE	6x RJ45 (i219 +5x i210)	2x RJ45 (i219 +1x i210)
GbE/PoE	N/A	4x RJ45 (4x i210)
USB	6x USB 3.0 ports via native XHCI controller (0.9A each port)	

Model Name	AIHD	AIHDP
COM	1x RS-232/422/485 (auto flow control) 1x RS-232 port	
DIO	32-bit Programmable 16-bit Programmable+ 8-bit isolated DI + 8-bit isolated DO (optional) 16-bit isolated DI + 16-bit isolated DO (optional)	
Audio	ALC892 HD Audio Codec, Mic-in, Line out	
SIM Push-Push/USIM Sockets?	3x SIM Push-Push Sockets – SIM supports 2G / USIM supports 3 & 4G	
Storage		
mSATA	3x Full-Length mSATA (muxed with Mini PCIe)	
2.5" SATA Drive Bay	3x internal	
RAID Mode	RAID 0/1/5	
Expansion Slot		
Mini PCIe	3x Full-Length Mini PCIe (muxed with mSATA, auto-detection)	
Other		
USB 2.0 Dongle (optional)	1x Internal USB 2.0 dongle for security key	
Antenna	4x antenna openings	
LED	Power status, SSD status, and I/O status	
Environment		
Operating Temperature	Standard: -20°C to 50°C (-4°F-122°F), supporting CPU TDP up to 35W Extended temperature -25°C to 70°C (-13°F-158°F)	
Storage Temperature	-40°C - 85°C (-40°F - 185°F)	
Relative Humidity	95% @ 40°C (104°F), non-condensing	
Vibration During Operation	5Grms with SSD; 5 Grms with HDD (IEC60068-2-64: Random 5-500Hz)	
Shock During Operation	50Grms with SSD; 50Grms with HDD (IEC60068-2-27: Half Sine, 11ms duration)	
Certification		
EMC	CE/FCC Class A	
Safety Certifications	CB	

1.3 Comparison Table

Model Name	Ethernet		Digital I/O	
	GbE	GbE/ PoE	16-bit GPIO	Isolated 8-bit DI & 8-bit DO
AIHD	6x RJ45	N/A	Yes	N/A
AIHD-i	2x RJ45	N/A	N/A	Yes
AIHDP	2x RJ45	4x RJ45	Yes	N/A
IHDP-i	2x RJ45	N/A	N/A	Yes

1.4 Supported CPUs

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series embedded PCs support the 7th/6th Generation Intel® Xeon®-E3, Core™-S i7/i5/i3, Pentium® and Celeron® LGA1151 socket desktop processor (Platform: Kaby Lake-S / Skylake-S). You may select from the processors listed below according to your cost and performance requirements.

Intel® 6th Gen Skylake

Xeon® E3-1268L v5 Processor (4 cores/8 threads, 2.4 GHz/3.4 GHz, 8MB cache, 35W TDP)

Core™ i7-6700TE Processor (4 cores/8 threads, 2.4 GHz/3.4 GHz, 8MB cache, 35W TDP)

Core™ i5-6500TE Processor (4 cores/4 threads, 2.3 GHz/3.3 GHz, 6MB cache, 35W TDP)

Core™ i3-6100TE Processor (2 cores/4 threads, 2.7 GHz, 4MB cache, 35W TDP)

Pentium® G4400TE Processor (2 cores/2 threads, 2.4 GHz, 3MB cache, 35W TDP)

Celeron® G3900TE Processor (2 cores/2 threads, 2.3 GHz, 2MB cache, 35W TDP)

Intel® 7th Gen Kaby Lake

Core™ i7-7700T Processor (4 cores/8 threads, 2.9 GHz/3.8 GHz, 8MB cache, 35W TDP)

Core™ i5-7500T Processor (4 cores/4 threads, 2.7 GHz/3.3 GHz, 6MB cache, 35W TDP)

Core™ i3-7101TE Processor (2 cores/4 threads, 3.4 GHz, 3MB cache, 35W TDP)

1.5 Supported Memory List

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series embedded PCs support two channels of DDR4 memory with a maximum of two DIMMs per channel. DDR technologies, number of DIMMs per channel, number of ranks per channel are SKU dependent.

ECC/Non-ECC UDIMM and SODIMM DDR4 support based on SKU.

CPU Name	Memory Types	Max Memory Size	ECC Memory Supported
E3-1268LV5	DDR4 SO-DIMM	64 GB	Yes
i7-6700TE	DDR4 SO-DIMM	64 GB	No
i5-6500TE	DDR4 SO-DIMM	64 GB	No
i3-6100TE	DDR4 SO-DIMM	64 GB	Yes
G4400TE	DDR4 SO-DIMM	64 GB	Yes
G3900TE	DDR4 SO-DIMM	64 GB	Yes
i7-7700T	DDR4 SO-DIMM	64 GB	No
i5-7500T	DDR4 SO-DIMM	64 GB	No
i3-7101TE	DDR4 SO-DIMM	64 GB	Yes

DDR4 Memory Bandwidth and Data Transfer Rate

Standard	Clock Rates	Data Transfer Rate	Bandwidth
DDR4-1866 (PC4-1866)	933 MHz	1866 MT/s	29.1 GB/s
DDR4-2133 (PC4-1866)	1066 MHz	2133 MT/s	33.3 GB/s
DDR4-2400 (PC4-2400)	1200 MHz	2400 MT/s	37.5 GB/s
DDR4-2666 (PC4-2666)	1333 MHz	2666 MT/s	41.6 GB/s

1.6 Packing List

Item	Description	Qty
1	Eagle Eyes-AIHD / AIHDP series Embedded Box PC	1

1.7 Ordering Information**Optional Module**

Model Name	Description	Article Number (A/N)
iDIO-8I8O	8-bit isolated DI & 8-bit isolated DO module	9206-9002

Optional Accessories

Model Name	Description	Article Number (A/N)
CBL-S01	SATA (Data + Power) cable, 230mm	9992-0301
TBP5-S03	3-Pin, pitch 5.08mm Female Terminal Block Plug for DC input x1	9993-0105
TBP3-S05	5-Pin, pitch 3.81mm Female Terminal Block Plug for Remote Connector x1	9993-0303
TBP3-D20	2x10-Pin, pitch 3.5mm Female Terminal Block Plug for DIO Connector x1	9993-0620
UTA-89	DIN Rail Clip (S size)	9995-0101
UTA-159	DIN Rail Clip (M size)	9995-0201

Model Name	Description	Article Number (A/N)
E3-1268Lv5	6 th Skylake Intel® Xeon® E3-1268L v5 Processor (4 cores/8 threads, 2.4 GHz/3.4 GHz, 8MB cache, 35W TDP)	9860-1268
i7-6700TE	6 th Skylake Intel® Core™ i7-6700TE Processor (4 cores/8 threads, 2.4 GHz/3.4 GHz, 8MB cache, 35W TDP)	9867-6700TE
i5-6500TE	6 th Skylake Intel® Core™ i5-6500TE Processor (4 cores/4 threads, 2.3 GHz/3.3 GHz, 6MB cache, 35W TDP)	9865-6500TE
i3-6100TE	6 th Skylake Intel® Core™ i3-6100TE Processor (2 cores/4 threads, 2.7 GHz, 4MB cache, 35W TDP)	9863-6100TE
G4400TE	6 th Skylake Intel® Pentium® G4400TE Processor (2 cores/2 threads, 2.4 GHz, 3MB cache, 35W TDP)	9862-4400TE

Model Name	Description	Article Number (A/N)
G3900TE	6 th Skylake Intel® Celeron® G3900TE Processor (2 cores/2 threads, 2.3 GHz, 2MB cache, 35W TDP)	9861-3900TE
i7-7700T	7 th Kaby Lake Intel® Core™ i7-7700T Processor (4 cores/8 threads, 2.9 GHz/3.8 GHz, 8MB cache, 35W TDP)	9877-7700T
i5-7500T	7 th Kaby Lake Intel® Core™ i5-7500T Processor (4 cores/4 threads, 2.7 GHz/3.3 GHz, 6MB cache, 35W TDP)	9875-7500T
i3-7101TE	7 th Kaby Lake Intel® Core™ i3-7101TE Processor (2 cores/4 threads, 3.4 GHz, 3MB cache, 35W TDP)	9873-7101TE

Memory - Standard Temperature Grade (0°C - +60°C)

Model Name	Description – Memory Options	Article Number (A/N)
DDR4-2133-4G	SO-DIMM DDR4-2133, 4GB	9913-3004
DDR4-2133-8G	SO-DIMM DDR4-2133, 8GB	9913-3008
DDR4-2133-16G	SO-DIMM DDR4-2133, 16GB	9913-3016
DDR4-2133-32G	SO-DIMM DDR4-2133, 32GB	9913-3032
DDR4-2133-64G	SO-DIMM DDR4-2133, 64GB	9913-3064
DDR4-2400-2G	SO-DIMM DDR4-2400, 2GB	9913-4002
DDR4-2400-4G	SO-DIMM DDR4-2400, 4GB	9913-4004
DDR4-2400-8G	SO-DIMM DDR4-2400, 8GB	9913-4008
DDR4-2400-16G	SO-DIMM DDR4-2400, 16GB	9913-4016
DDR4-2400-32G	SO-DIMM DDR4-2400, 32GB	9913-4032
DDR4-2400-64G	SO-DIMM DDR4-2400, 64GB	9913-4064
DDR4-2666-4G	SO-DIMM DDR4-2666, 4GB	9913-5004
DDR4-2666-8G	SO-DIMM DDR4-2666, 8GB	9913-5008
DDR4-2666-16G	SO-DIMM DDR4-2666, 16GB	9913-5016
DDR4-2666-32G	SO-DIMM DDR4-2666, 32GB	9913-5032
DDR4-2666-64G	SO-DIMM DDR4-2666, 64GB	9913-5064

Memory - Industrial Temperature Grade (-40°C - +85°C)

Model Name	Description – Memory Options	Article Number (A/N)
DDR4-2133-4G(i)	SO-DIMM DDR4-2133, 4GB, Industrial	9923-3004
DDR4-2133-8G(i)	SO-DIMM DDR4-2133, 8GB, Industrial	9923-3008
DDR4-2133-16G(i)	SO-DIMM DDR4-2133, 16GB, Industrial	9923-3016
DDR4-2133-32G(i)	SO-DIMM DDR4-2133, 32GB, Industrial	9923-3032
DDR4-2133-64G(i)	SO-DIMM DDR4-2133, 64GB, Industrial	9923-3064
DDR4-2400-4G(i)	SO-DIMM DDR4-2400, 4GB, Industrial	9923-4004
DDR4-2400-8G(i)	SO-DIMM DDR4-2400, 8GB, Industrial	9923-4008

DDR4-2400-16G(i)	SO-DIMM DDR4-2400, 16GB, Industrial	9923-4016
DDR4-2400-32G(i)	SO-DIMM DDR4-2400, 32GB, Industrial	9923-4032
DDR4-2400-64G(i)	SO-DIMM DDR4-2400, 64GB, Industrial	9923-4064
DDR4-2666-4G(i)	SO-DIMM DDR4-2666, 4GB, Industrial	9923-5004
DDR4-2666-8G(i)	SO-DIMM DDR4-2666, 8GB, Industrial	9923-5008
DDR4-2666-16G(i)	SO-DIMM DDR4-2666, 16GB, Industrial	9923-5016
DDR4-2666-32G(i)	SO-DIMM DDR4-2666, 32GB, Industrial	9923-5032
DDR4-2666-64G(i)	SO-DIMM DDR4-2666, 64GB, Industrial	9923-5064

Storage - mSATA Standard Temperature Grade (0°C - ++60°C)

Model Name	Description – Storage Options	Article Number (A/N)
mSATA-8G	mSATA, 8GB	9933-1008
mSATA-16G	mSATA, 16GB	9933-1016
mSATA-32G	mSATA, 32GB	9933-1032
mSATA-64G	mSATA, 64GB	9933-1064
mSATA-128G	mSATA, 128GB	9933-1128
mSATA-256G	mSATA, 256GB	9933-1256
mSATA-512G	mSATA, 512GB	9933-1512
mSATA-1T	mSATA, 1TB	9933-5001

Storage - mSATA Industrial Temperature Grade (-40°C - +85°C)

Model Name	Description – Storage Options	Article Number (A/N)
mSATA(i)-8G	mSATA, 8GB, Industrial	9943-1008
mSATA(i)-16G	mSATA, 16GB, Industrial	9943-1016
mSATA(i)-32G	mSATA, 32GB, Industrial	9943-1032
mSATA(i)-64G	mSATA, 64GB, Industrial	9943-1064
mSATA(i)-128G	mSATA, 128GB, Industrial	9943-1128
mSATA(i)-256G	mSATA, 256GB, Industrial	9943-1256
mSATA(i)-512G	mSATA, 512GB, Industrial	9943-1512
mSATA(i)-1T	mSATA, 1TB, Industrial	9943-5001

2.5-inch SSD: Standard Temperature Grade (0°C - +60°C)

Model Name	Description – Storage Options	Article Number (A/N)
2.5" SSD-32G	2.5" SSD, 32GB	9934-1032
2.5" SSD-64G	2.5" SSD, 64GB	9934-1064
2.5" SSD-128G	2.5" SSD, 128GB	9934-1128
2.5" SSD-256G	2.5" SSD, 256GB	9934-1256
2.5" SSD-512G	2.5" SSD, 512GB	9934-1512
2.5" SSD-1T	2.5" SSD, 1TB	9934-5001
2.5" SSD-2T	2.5" SSD, 2TB	9934-5002

2.5-inch SSD - Industrial Temperature Grade (-40°C - +85°C)

Model Name	Description – Storage Options	Article Number (A/N)
2.5" SSD(i)-32G	2.5" SSD, 32GB, Industrial	9944-1032
2.5" SSD(i)-64G	2.5" SSD, 64GB, Industrial	9944-1064
2.5" SSD(i)-128G	2.5" SSD, 128GB, Industrial	9944-1128
2.5" SSD(i)-256G	2.5" SSD, 256GB, Industrial	9944-1256
2.5" SSD(i)-512G	2.5" SSD, 512GB, Industrial	9944-1512
2.5" SSD(i)-1T	2.5" SSD, 1TB, Industrial	9944-5001
2.5" SSD(i)-2T	2.5" SSD, 2TB, Industrial	9944-5002

2.5-inch HDD - Standard Temperature Grade (0°C - 60°C)

Model Name	Description – Storage Options	Article Number (A/N)
2.5" HDD-500G	2.5" HDD, 500GB	9935-1500
2.5" HDD-1T	2.5" HDD, 1TB	9935-5001
2.5" HDD-2T	2.5" HDD, 2TB	9935-5002
2.5" HDD-4T	2.5" HDD, 4TB	9935-5004
2.5" HDD-5T	2.5" HDD, 5TB	9935-5005

AC-DC Power Adapter - Options

Model Name	Description	Article Number (A/N)
ADT-24V60-T3A	24V/60W AC-DC power adapter with pitch 5.08 mm 3-pin terminal block plug	9952-1822
ADT-24V90-T3A	24V/90W AC-DC power adapter with pitch 5.08 mm 3-pin terminal block plug	9952-1823
ADT-24V120-T3A	24V/120W AC-DC power adapter with pitch 5.08 mm 3-pin terminal block plug	9952-1824
ADT-24V160-T3A	24V/160W AC-DC power adapter with pitch 5.08 mm 3-pin terminal block plug	9952-1825
ADT-24V220-T3A	24V/220W AC-DC power adapter with pitch 5.08 mm 3-pin terminal block plug	9952-1826
ADT-24V280-T3A	24V/280W AC-DC power adapter with pitch 5.08 mm 3-pin terminal block plug	9952-1827

AC Power Cord - Options

Model Name	Description	Article Number (A/N)
PCBL-B12	YP12-YC12: category B type plug, H05VV-F 3G 0.75 mm, 1.8m, 250V, 10A, TW/JP/US/CA/TH/PH/Central America	9959-1111
PCBL-D03	YP03-YC12: category D type plug, H05VV-F 3G 0.7 mm, 1.8m, 250V, 10A, CN	9959-1211
PCBL-D35	YP35-YC12: category D type plug, H05VV-F 3G 0.75 mm, 1.8m, 250V, 10A, AU/NZ	9959-1311
PCBL-G22	YP22-YC12: category G type plug, H05VV-F 3G 0.75 mm, 1.8m, 250V, 10A, DE	9959-1411
PCBL-I61	"YP61-YC12: category I type plug, H05VV-F 3G 0.75 mm, 1.8m, 250V, 10A, UK/HK/MO/SG/MY"	9959-1511

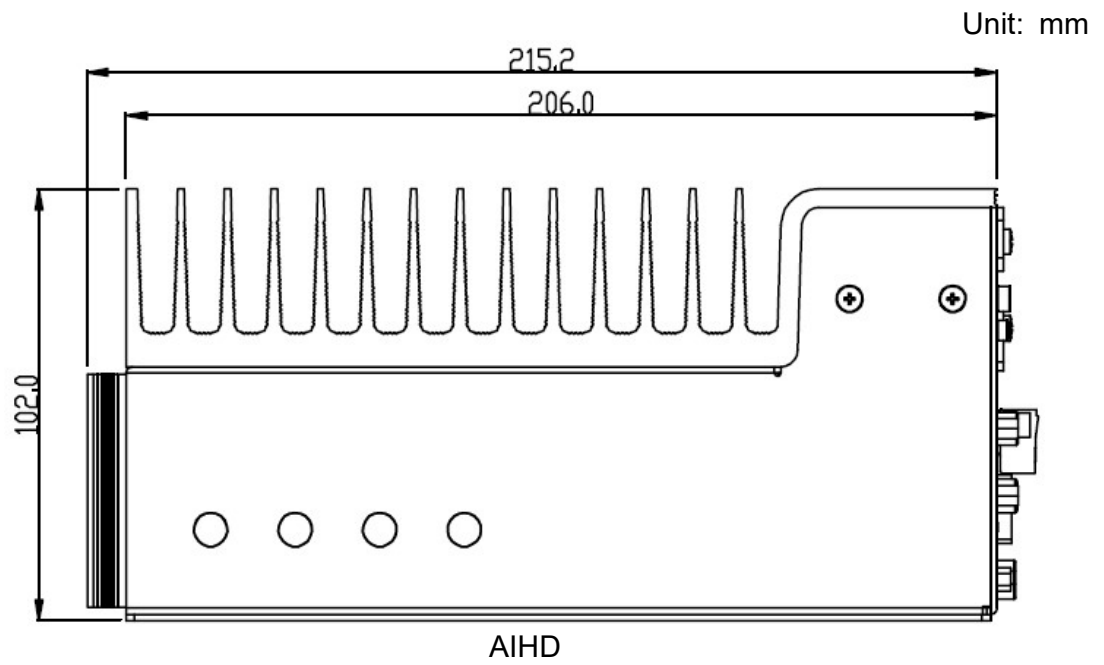
Chapter 2

Mechanical Dimensions

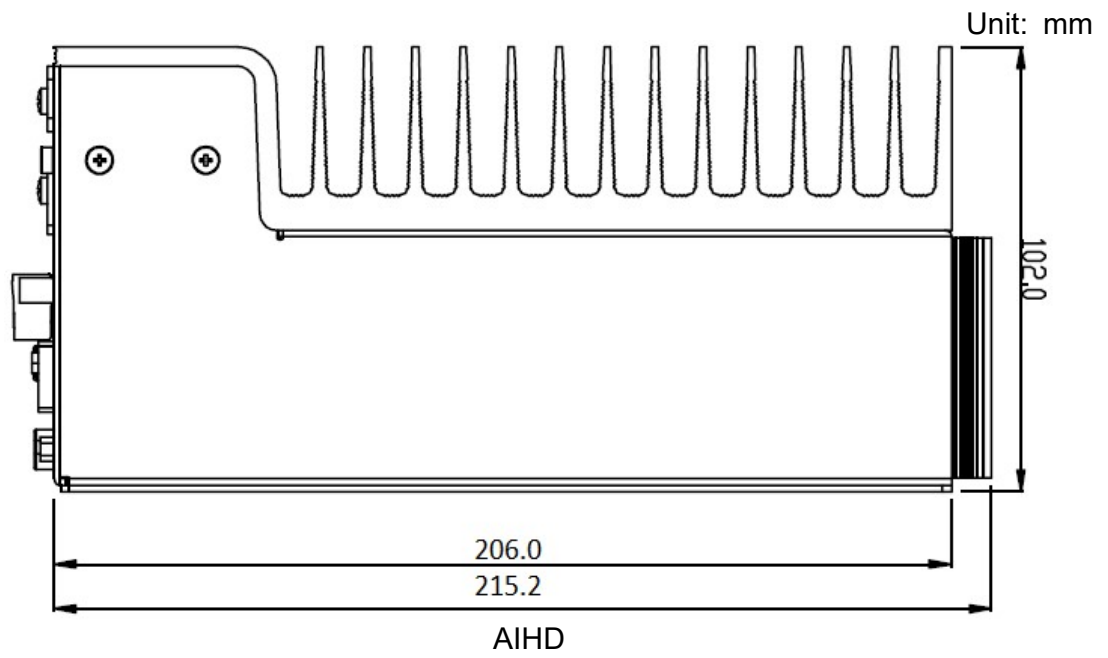
This chapter includes:

- Top View
- Front View
- Rear View
- Left-Side View
- Right-Side View
- Bottom View

2.1 Top View

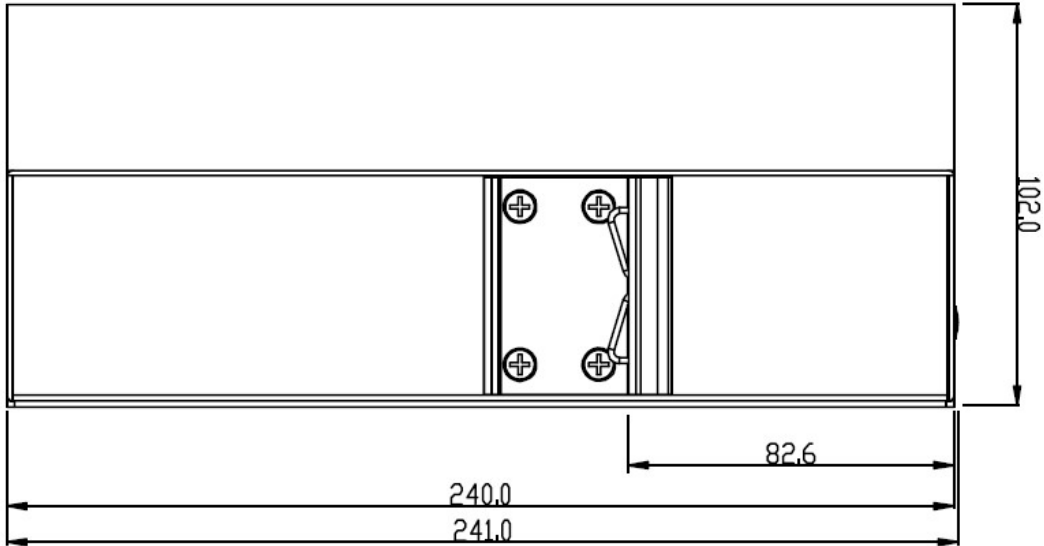


2.2 Bottom View



2.3 Rear View

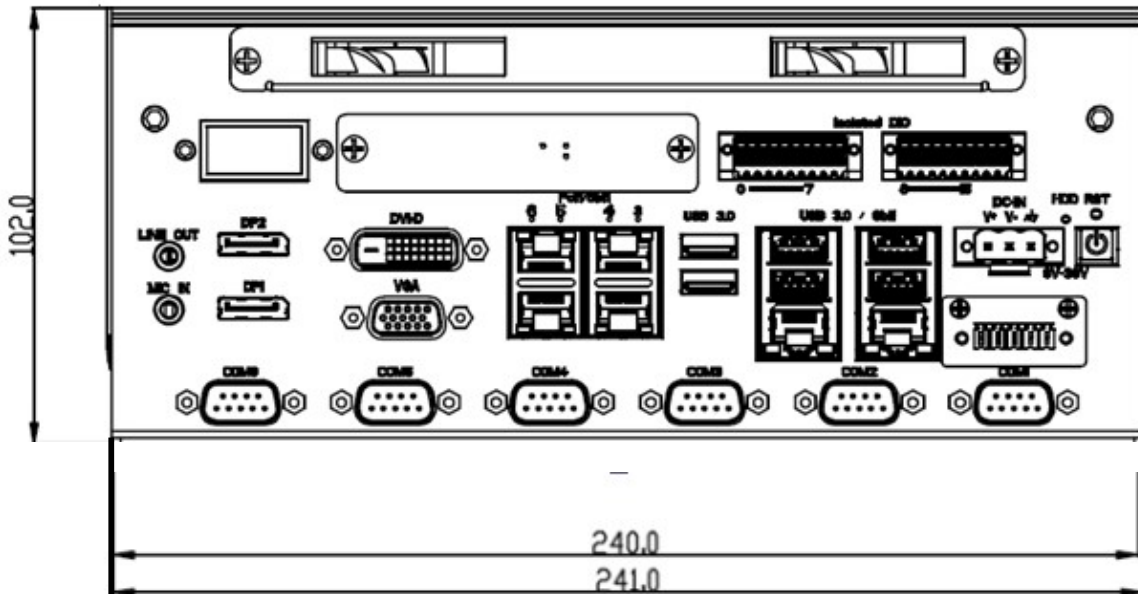
Unit: mm



AIHD

2.4 Front View

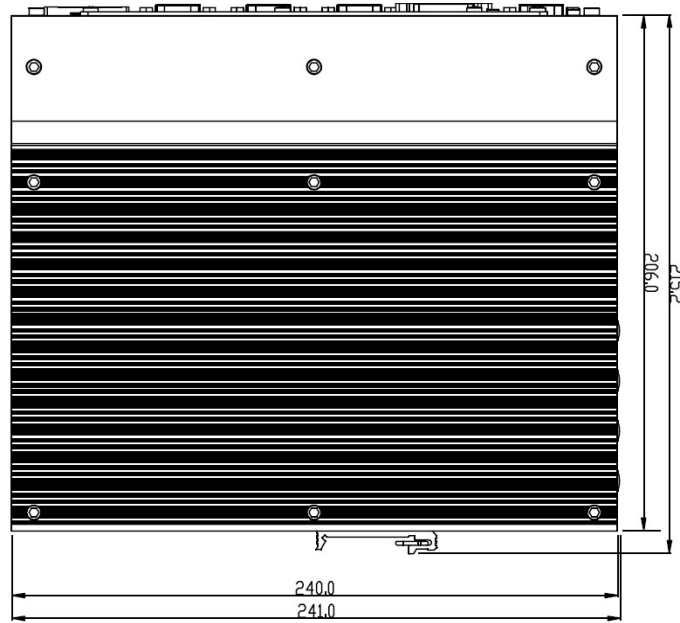
Unit: mm



AIHD

2.5 Right-Side View

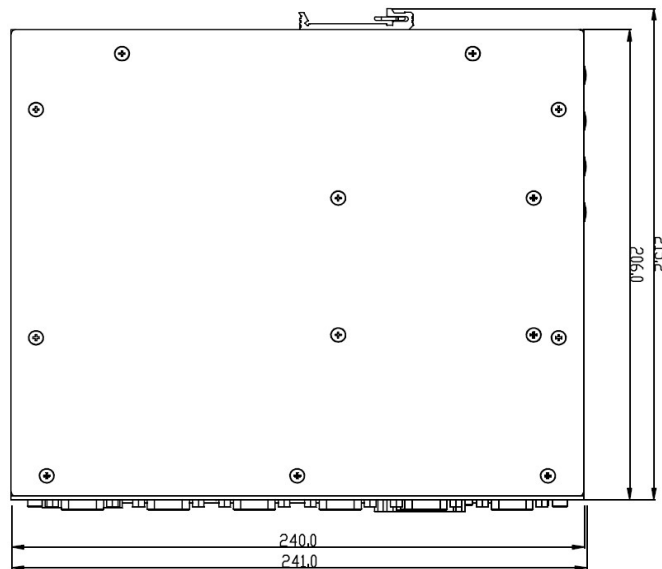
Unit: mm



AIHD

2.6 Left-Side View

Unit: mm



AIHD

Chapter 3

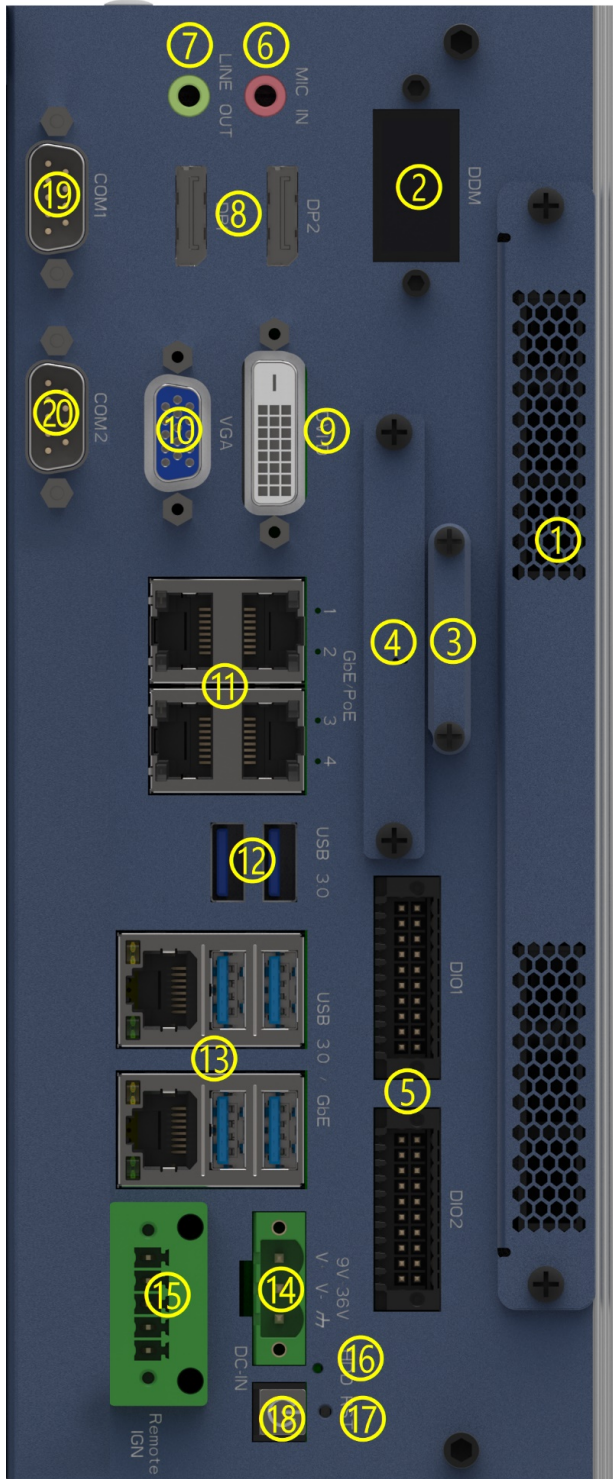
Hardware Function Description

This chapter includes:

- I/O Layout
- External I/O
- Internal I/O
- SSD/HDD Drive Bay
- IOM
- Card Expansion

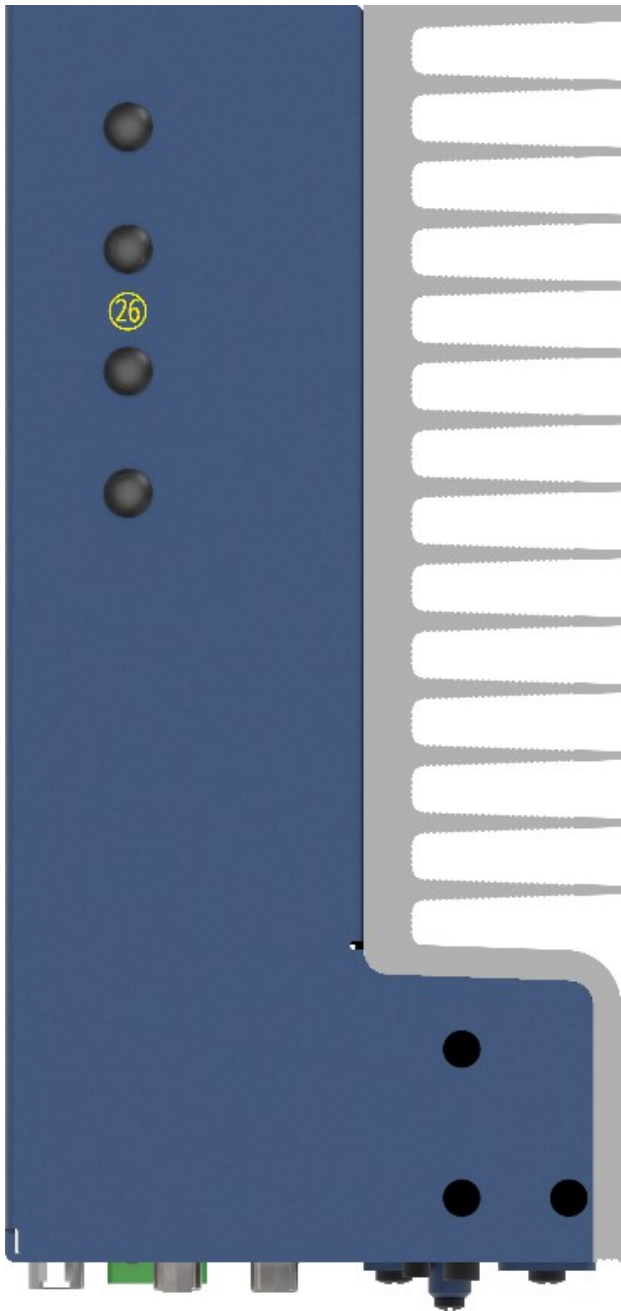
3.1 I/O Layout

Front I/O



- ① System FAN (2 fans)
- ② DDM (Dynamic Display Module)
- ③ RTC Battery
- ④ SIM sockets (3 sockets)
- ⑤ GPIO or Isolated DI & DO (2 connectors)
- ⑥ Mic-In
- ⑦ Line-Out
- ⑧ DisplayPort (2 ports)
- ⑨ DVI-D port
- ⑩ VGA port
- ⑪ Dual stack GbE (2 connectors Four ports)
- ⑫ Dual Stack USB 3.0 connector
- ⑬ GbE with 2x USB 3.0 Stack (2 connectors)
- ⑭ DC-in terminal block
- ⑮ Remote & Ignition control terminal block
- ⑯ SSD LED
- ⑰ Reset Button
- ⑱ Power Button with Power LED
- ⑲ RS232/422/485
- ⑳ RS232

Top-side IO

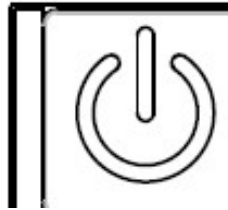


②⑥ Antenna Hole: 4 holes

External I/O

3.2.1 Power Button with Power LED

The Power Button is a non-latched switch with a dual-color LED indicator. It indicates power status: S0, S3, and S5.



LED Color	Power Status	System Status
Solid Blue	S0	System working
Solid Orange	S3, S5	Suspend to RAM, System off with standby power

More detailed LED indications are listed as follows:

Power Mode	Power On	Power Off	Suspend to RAM, Hibernate
ATX Mode	Solid Blue	Solid Orange	Solid Orange
AT Mode	Solid Blue	-	-
Ignition Mode	Solid Blue	-	-

Note:



ATX Mode

Press the power button to power on the system and the LED will turn blue (active). When the system is powered off the LED will turn orange (inactive).

AT Mode

Plug in the DC power supply and the system will automatically power on and the LED will be blue. When system is powered off the LED will turn off.

Ignition Mode

Use the external ignition switch to power on the unit, when LED turns blue plug in the DC power.

When using the external ignition switch to power off the unit the LED will turn off and the power button will not function at ignition.

In case of system error, you can press the power button for 4 seconds to do a hard reset of the unit

3.2.2 Reset Button

The hardware Reset Button is used to reset the system without powering off the system. Press the Reset Button for a few seconds to reset the system.



3.2.3 SSD/HDD LED

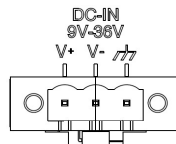
If the LED is on, it indicates that the system's storage is functional. If the **LED is off**, that indicates that the system's **storage is not functional**. If the LED is flashing, that indicates data access activity.



SSD/HDD LED	LED Status
Storage Active	Flash Green

3.2.4 System DC Input (3-Pin Euro Type Terminal Block)

The Eagle Eyes AIHD / AIHD-P4E / AIHD-GP4E series allows a wide range of DC power input from 9V to 36V DC. It offers a 3-pin, pitch 5.08mm Euro Type pluggable terminal block. The 3-pin power connector is used to connect the power plug of an AC/DC adapter. It's convenient for indoor usage where AC power is usually available. Since there is no specific rule of pin definition for this type of connector, please always confirm the polarity of the power source before plugging it into the Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series if you're not using the power adapter provided by EFCO.



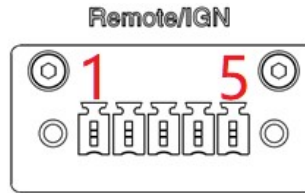
Pin	Name	Description
1	DC V+	DC INPUT +
2	DC V-	DC INPUT -
3	Ground	Earth Ground or Chassis Ground

Caution!



1. **Make sure the polarity of the power plug is correct before plugging it into the system.**
2. Please make sure the voltage of the DC power supply is correct before you connect it to the Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series system. Supplying a voltage over 36V will damage the system.

3.2.5 Power Remote & Ignition Control (5-Pin Euro Type Terminal Block)

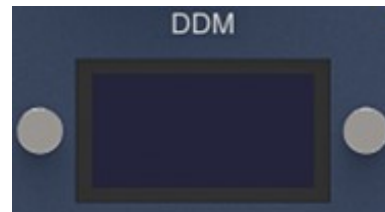


Pin	Name	Description
1	IGN-	Ignition control Signal-
2	IGN PWR+	Ignition Power V+
3	Remote +	Remote control +
4	Remote GND	Remote control Ground
5	PLED+	Power LED+

3.2.6 Dynamic Display Module (DDM)

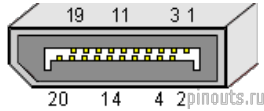
The Dynamic Display Module (DDM) is a 0.96" LCM module. It can display the following information:

- Customer's Information
- Logo
- Part Number
- CPU Temperature
- Power Consumption
- RTC Battery Voltage
- DC in Voltage
- Warning Message
- PoE Status
- POST Code
- Hardware Health Status
- Customized Information



3.2.7 DisplayPort Connectors

The Eagle-Eyes AIHD / AIHD-P4E / AIHD-GP4E series provides two high-resolution DisplayPort (DP) outputs on the I/O panel. It supports video resolutions up to 4096x2304@60Hz.



Pin	Name	Description
1	ML Lane 0 (p)	Lane 0 (positive)
2	GND	Ground
3	ML Lane 0 (n)	Lane 0 (negative)
4	ML Lane 1 (p)	Lane 1 (positive)
5	GND	Ground
6	ML Lane 1 (n)	Lane 1 (negative)
7	ML Lane 2 (p)	Lane 2 (positive)
8	GND	Ground
9	ML Lane 2 (n)	Lane 2 (negative)
10	ML Lane 3 (p)	Lane 3 (positive)
11	GND	Ground
12	ML Lane 3 (n)	Lane 3 (negative)
13	CONFIG1	Connected to Ground. Pins 13 and 14 may either be directly connected to ground or connected to ground through a pulldown device.
14	CONFIG2	connected to Ground
15	AUX CH (p)	Auxiliary Channel (positive)
16	GND	Ground
17	AUX CH (n)	Auxiliary Channel (negative)
18	Hot Plug	Hot Plug Detect
19	Return	Return for Power
20	DP PWR	Power for the connector (3.3 V 500 mA)

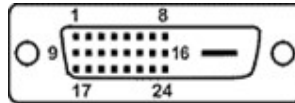
The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series supports multi-Stream Transport (MST) see the following MST Display Resolutions Table:

Multi-Stream Transport Display	Max. Resolution
One Display	4096x2304@60Hz
Two Displays concurrently	2880x1800@60Hz
Three Displays concurrently	2304x1440@60Hz

To achieve optimal DP output resolution in Windows, you will need to install the corresponding graphics driver.

3.2.8 DVI-D Connector

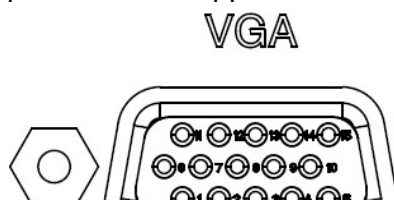
The DVI-D connector on the rear panel supports DVI-D display. This connector can send out a DVI signal. The DVI-D output supports up to 1920 x 1200 resolution. The resolution is automatically selected according to the connected display. You will need a DVI-D cable when connecting to a display device.



Pin	Signal
1	T.M.D.S DATA 2-
2	T.M.D.S DATA 2+
3	T.M.D.S DATA 2/4 SHIELD
4	T.M.D.S DATA 4-
5	T.M.D.S DATA 4+
6	DDC CLOCK
7	DDC DATA
8	ANALOG VERT. SYNC
9	T.M.D.S DATA 1-
10	T.M.D.S DATA 1+
11	T.M.D.S DATA 1/3 SHIELD
12	T.M.D.S DATA 3-
13	T.M.D.S DATA 3+
14	+5V POWER
15	GND
16	HOT PLUG DETECT
17	T.M.D.S DATA 0-
18	T.M.D.S DATA 0+
19	T.M.D.S DATA 0/5 SHIELD
20	T.M.D.S DATA 5-
21	T.M.D.S DATA 5+
22	T.M.D.S CLOCK SHIELD
23	T.M.D.S CLOCK+
24	T.M.D.S CLOCK-

3.2.9 VGA Connector

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series provides a high-resolution VGA video port on the front panel, which supports video resolutions up to 1920x1080.



Pin	Name	Description
1	RED	Red Video (75-ohm, 0.7 V p-p)
2	GREEN	Green Video (75-ohm, 0.7 V p-p)
3	BLUE	Blue Video (75-ohm, 0.7 V p-p)
4	RES/NC	Reserved
5	GND	Ground
6	RGND	Red Ground
7	GGND	Green Ground
8	BGND	Blue Ground
9	DDC +5V	+5 VDC
10	SGND	Sync Ground
11	ID0	Monitor ID Bit 0 (optional)
12	SDA	DDC Serial Data Line
13	HSYNC or CSYNC	Horizontal Sync (or Composite Sync)
14	VSYNC	Vertical Sync
15	SCL	DDC Data Clock Line

3.2.10 Gigabit Ethernet Port

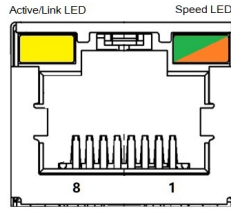
The GbE ports are located on the front panel.

Gigabit Ethernet **Ports 1 - 2** are powered by the Intel® i219 and i210 Ethernet controller, supporting 10/100/1000 Mbps, PXE, Wake on LAN, and iAMT11, with an RJ45 connector and LED indicators.

The GbE ports are located on the front panel, and each port supports IEEE 802.3at (PoE+) Power over Ethernet connection delivering up to 30W/54V per port and 1000 BASE-T GigE data signals over a standard Ethernet Cat 5/Cat 6 cable.

PoE Ethernet **Ports 3 - 6** are powered by the Intel® i210 Ethernet controller, supporting 10/100/1000 Mbps, PXE, Wake on LAN, and IEEE-1588 header, with an RJ45 connector with LED indicators or an M12 A-code connector depending on the model.

RJ45 Connector



Pin No	10 / 100 Mbps	1000 Mbps	Description	PoE (Optional)
1	TX+	BI DA+	Bi-directional pair A +	PoE+
2	TX-	BI DA-	Bi-directional pair A -	PoE+
3	RX+	BI DB+	Bi-directional pair B +	PoE-
4	N/A	BI DC+	Bi-directional pair C +	N/A
5	N/A	BI DC-	Bi-directional pair C -	N/A
6	RX-	BI DB-	Bi-directional pair B -	PoE-
7	N/A	BI DD+	Bi-directional pair D +	N/A
8	N/A	BI DD-	Bi-directional pair D -	N/A

Ethernet Active/Link LEDs

Active/Link LED (left)	Status
Off	Disconnected
Solid Yellow	Connected, no data transmission
Flashing Yellow	Connected, data transmitting/receiving

Ethernet Speed LED

Right Top Link LED	Status
Off	10 Mbps Link
Solid Green	100 Mbps Link
Solid Orange	1000 Mbps Like

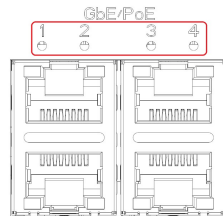
M12 A-code Connector



Pin No	10 / 100 Mbps	1000 Mbps	Description	PoE (optional)
1	N/A	BI DC+	Bi-directional pair C +	N/A
2	N/A	BI DD+	Bi-directional pair D +	N/A
3	N/A	BI DD-	Bi-directional pair D -	N/A
4	TX-	BI DA-	Bi-directional pair A -	PoE+
5	RX+	BI DB+	Bi-directional pair B +	PoE-
6	TX+	BI DA+	Bi-directional pair A +	PoE+
7	N/A	BI DC-	Bi-directional pair C -	N/A
8	RX-	BI DB-	Bi-directional pair B -	PoE-

3.2.11 PoE LEDs

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series offers 4 LED's to indicate the PoE status. The LED will light up when the PoE port links to the PoE PD of each device.



Note:

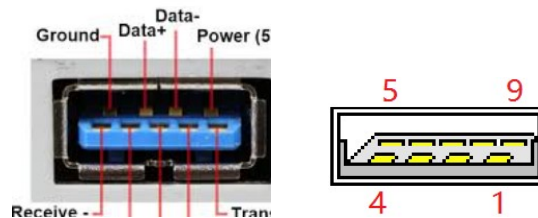


The photo is only for Eagle Eyes- AIHD / AIHD-P4E / AIHD-GP4E series

3.2.12 USB 3.0 Connectors

There are four USB 3.0 Type A connectors with signals directly connected to the Intel® XHCI controller, each port supporting up to 5GB/s and 5V/0.9A power. They are compliant with Super Speed, High Speed, Full Speed, and Low Speed USB signaling rates. Each port can be powered on/off by the BIOS or an EFCO Application Program.

USB 3.0 Connector

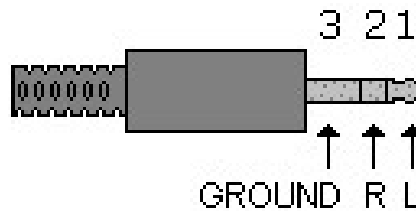


Pin	Name	Description
1	VBus	+5V Power
2	USB D-	USB 2.0 data
3	USB D+	
4	GND	Ground for power return
5	StdA SSRX-	SuperSpeed receiver
6	StdA SSRX+	SuperSpeed receiver
7	GND DRAIN	Ground for signal return
8	StdA SSTX-	SuperSpeed transmitter
9	StdA SSTX+	SuperSpeed transmitter

3.2.13 Audio Line-out and Mic-in Audio Jacks

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series provides audio function using Intel® High Definition Audio and Realtek ALC892 codec. There are two 3.5mm audio jacks on the front panel. One is Line-out (Left/Right stereo), another is Mic-in (Mono) signals. To utilize the audio function in Windows, you need to install the corresponding drivers.

Line-out and Mic-in Plug connector



Pin Number	Pin Name	Description
1	Line-out L/Mic-in L	Left Audio signal
2	Line-out R/Mic-in R	Right Audio signal
3	GND	Audio Ground

3.2.14 GPIO/Isolated DIO

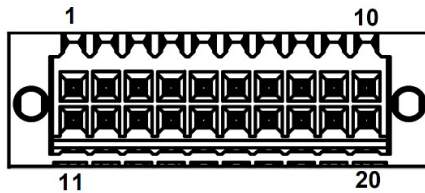
The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series offers 16-bit digital programmable general-purpose input and output (GPIO). Isolated 8-bit DI & 8-bit DO is optional. The GPIO support 3.3V or 5V signal and are configurable by the BIOS or an EFCO Application Program.

DI/DO Safety-Related Certifications

DI	DO
2500-V PART NUMBER PACKAGE BODY SIZE (NOM) RMS Isolation for 1 minute per UL 1577	2500-V PART NUMBER PACKAGE BODY SIZE (NOM) RMS Isolation for 1 minute per UL 1577
Approved by VDE, DIN EN60747-5-2() (as an option), file No. 40009162 (as model No. PC3H4)	4242-V ISO7131CC PK Isolation per DIN V VDE V 0884-10 (VDE V 0884-10):2006-12, 566 V ISO7140CC PK Working Voltage
UL flammability grade (94V-0)	CSA Component Acceptance Notice 5A, IEC ISO7141CC 60950-1 and IEC 61010-1 End Equipment ISO7141FCC Standards
CQC Certification per GB 4943.1-2011 (Vendor Certification)	

DI/DO Operation Characteristics

Parameter	DI	DO
Operation Voltage	5 - 48V DC	Source Mode: 5 - 48V DC Sink Mode: 5 - 40V DC
Input/Output Current Limit	25 uS	100mA
Turn On Delay Time (Max.)	25 uS	Source Mode: 15 uS Sink Mode: 60uS
Turn Off Delay Time (Max.)	25 uS	Source Mode: 15 uS Sink Mode: 60uS

GPIO/Isolated DIO Terminal Block**Programmable DIO**

Pin	Description	Pin No.	Description
1	GPIO10 (Default GPI bit0)	11	GPIO0 (Default GPO bit0)
2	GPIO11 (Default GPI bit1)	12	GPIO1 (Default GPO bit1)
3	GPIO12 (Default GPI bit2)	13	GPIO2 (Default GPO bit2)
4	GPIO13 (Default GPI bit3)	14	GPIO3 (Default GPO bit3)
5	GPIO14 (Default GPI bit4)	15	GPIO4 (Default GPO bit4)
6	GPIO15 (Default GPI bit5)	16	GPIO5 (Default GPO bit5)
7	GPIO16 (Default GPI bit6)	17	GPIO6 (Default GPO bit6)
8	GPIO17 (Default GPI bit7)	18	GPIO7 (Default GPO bit7)
9	Digital Input COM	19	GND
10	GND	20	VCC

Isolated DIO

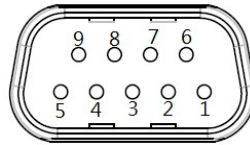
Pin	Description	Pin No.	Description
1	Isolated DI bit0	11	Isolated DO bit0
2	Isolated DI bit1	12	Isolated DO bit1
3	Isolated DI bit2	13	Isolated DO bit2
4	Isolated DI bit3	14	Isolated DO bit3
5	Isolated DI bit4	15	Isolated DO bit4
6	Isolated DI bit5	16	Isolated DO bit5
7	Isolated DI bit6	17	Isolated DO bit6
8	Isolated DI bit7	18	Isolated DO bit7
9	Digital Input COM	19	Isolated GND
10	Isolated GND	20	Isolated VCC

3.2.15 UART Ports

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series provides two RS-232/422/485 ports and four RS232 ports for communicating with external devices. COM1 - COM6 are located on the I/O panel via 9-pin D-Sub male connectors. COM1 and COM2 can be configured for full RS232, RS422, or RS485 with auto flow control communication. Mode selection is by BIOS or eKit tools. The default definition is RS232.

Each of the serial ports individually contains a programmable baud rate generator, which can divide the input clock by a number ranging from 1 to 65535. The data rate of each serial port can be programmed from 115.2K baud (COM1 baud rate up to 912.6Kbit/s) and down to 50 baud. The character options are programmable for one start bit; 1, 1.5 or 2 stop bits; even, odd, stick or no parity; and privileged interrupts. Each port supports 128 bytes RX FIFO depths and 16 bytes TX FIFO depths.

All transmitter outputs and receiver inputs feature robust electrostatic discharge (ESD) protection to $\pm 15\text{kV}$ Human Body Model (HBM) and $\pm 8\text{kV}$ IEC- 61000-4-2 Contact. Each receiver output has full fail-safe protection to avoid system lockup, oscillation, or indeterminate states by defaulting to logic-high output level when the inputs are open, shorted, or terminated, but undriven.



The following table describes the pin definition of UART ports.

COM1, COM2

UART Mode		RS-232	RS-422 (5-wire)	RS-422 (9-wire)	RS-485 (3-wire)
D-Sub 9 Male COM1, COM2	Pin 1	DCD#	TxD-	TxD-	Data-
	Pin 2	RxD	TxD+	TxD+	Data+
	Pin 3	TxD	RxD+	RxD+	N/A
	Pin 4	DTR#	RxD-	RxD-	N/A
	Pin 5	GND	GND	GND	GND
	Pin 6	DSR	N/A	RTS-	N/A
	Pin 7	RTS#	N/A	RTS+	N/A
	Pin 8	CTS#	N/A	CTS+	N/A
	Pin 9	RI#/+12V/+5V	N/A	CTS-	N/A

COM3, COM4

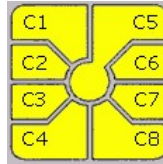
UART Mode		RS-232	Description
D-Sub 9 Male COM3, COM4	Pin 1	DCD#	Data Carrier Detect
	Pin 2	RxD	Receive Data
	Pin 3	TxD	Transmit Data
	Pin 4	DTR#	Data Terminal Ready
	Pin 5	GND	System Ground
	Pin 6	DSR	Data Set Ready
	Pin 7	RTS#	Request to Send
	Pin 8	CTS#	Clear to Send
	Pin 9	RI#/+12V/+5V	Ring Indicator/+12V/+5V

COM5, COM6

UART mode		RS-232	Description
D-Sub 9 Male COM3, COM4	Pin 1	DCD#	Data Carrier Detect
	Pin 2	RxD	Receive Data
	Pin 3	TxD	Transmit Data
	Pin 4	DTR#	Data Terminal Ready
	Pin 5	GND	System Ground
	Pin 6	DSR	Data Set Ready
	Pin 7	RTS#	Request to Send
	Pin 8	CTS#	Clear to Send
	Pin 9	RI#	Ring Indicator

3.2.16 USIM Socket

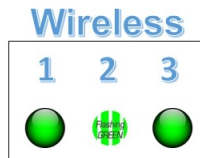
The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series provides three USIM sockets for wireless applications when 3G/4G wireless modules are installed in the full-length Mini PCIe slots.



Pin	Name	Description
C1	VCC	+5 V DC power supply input (optional use by the card)
C2	RESET	Reset signal used to reset the card's communications. Either used itself (reset signal supplied from the interface device) or in combination with an internal reset control circuit (optional use by the card). If internal reset is implemented, the voltage supply on VCC is mandatory
C3	CLOCK	Provides the card with a clock signal, from which data communications timing is derived
C4	RESERVED	AUX1, optionally used for USB interfaces and other uses.
C5	GND	Ground (reference voltage)
C6	VPP	Programming voltage input (optional). This contact may be used to supply the voltage required to program or to erase the internal non-volatile memory. ISO/IEC 7816-3:1997 designated this as a programming voltage: an input for a higher voltage to program persistent memory (e.g., EEPROM). ISO/IEC 7816-3:2006 designates it SPU, for either standard or proprietary use, as input and/or output.
C7	I/O	Input or Output for serial data (half-duplex) to the integrated circuit inside the card.
C8	RESERVED	AUX2, optionally used for USB interfaces and other uses.

3.2.17 Wireless module LED for Mini PCIe

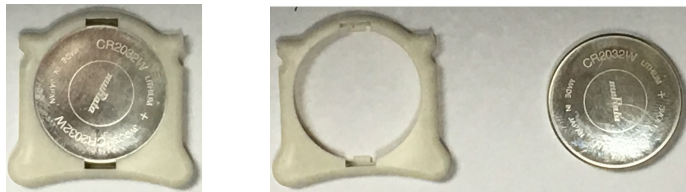
The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series supports 3 Mini PCIe slots with 3 USIM socket. It can support any WWAN / WLAN / WPAN Mini PCIe wireless module, such as Wi-Fi, Bluetooth, 3G/4G/LTE, etc. When a Mini PCIe wireless module is installed and activated, the corresponding LED will light as described below.



Mini Card LED	LED Status
WWAN Linked	Solid Green
WWAN Active	Flash Green
WLAN Linked	Solid Green
WLAN Active	Flash Green
WPAN Linked	Solid Green
WPAN Active	Flash Green

3.2.18 RTC CMOS Battery

The Eagle Eyes AIHD / AIHD-P4E / AIHD-GP4E series supports an easily swappable RTC CMOS battery.



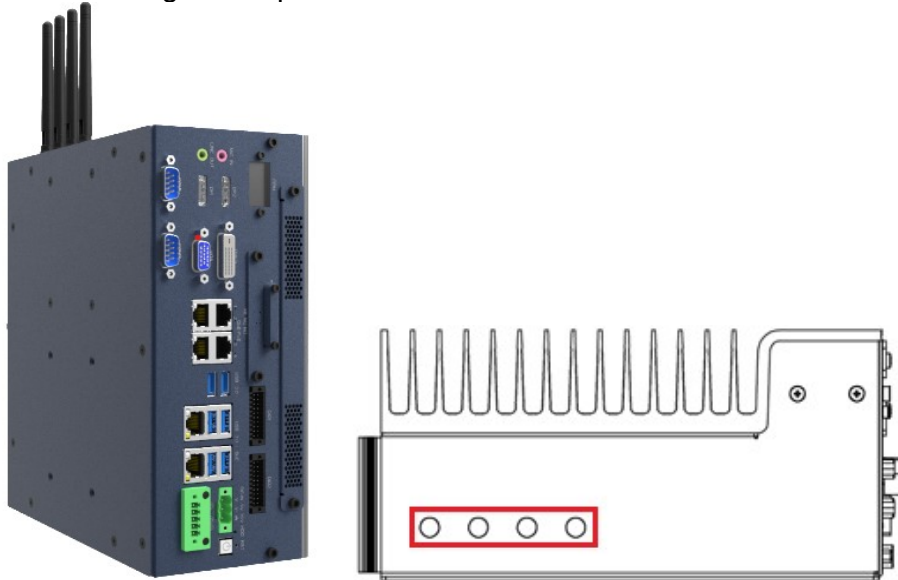
Caution!



Risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to your local guidelines.

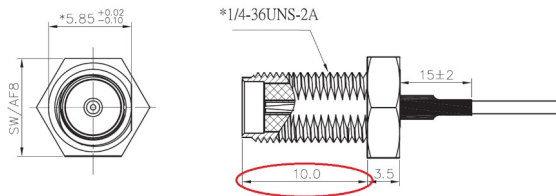
3.2.19 Antenna Holes

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series system provides four antenna holes on its right-side panel.

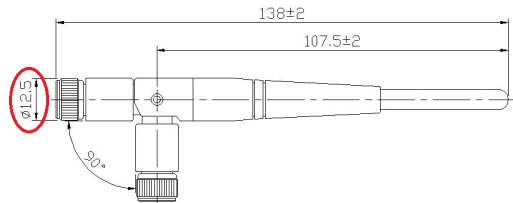


1. Proposed SMA connector SPEC:
SMA screw length "*minimum 10mm.*"

Caution!



2. Proposed Antenna connector SPEC:
Antenna screw size "*maximum 15mm.*"

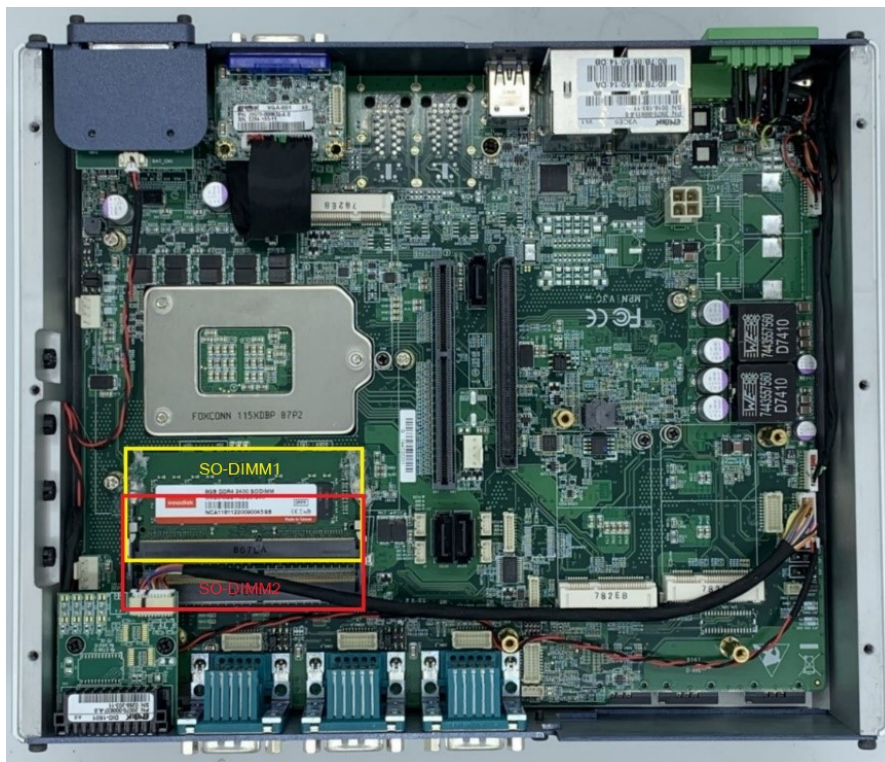


3.3 Internal I/O Functions

In addition to I/O connectors on the front/rear panel, the Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series provides other useful features via its on-board connectors, such as mSATA socket, Mini PCIe slots. This section describes these internal I/O functions.

3.3.1 DDR4 SO-DIMM Socket

Dual Channel DDR4 SO-DIMM slot supports DDR4 2133 (Skylake) or DDR4 2400 (Kaby Lake), up to 64GB (ECC/Non-ECC) memory.



Note:



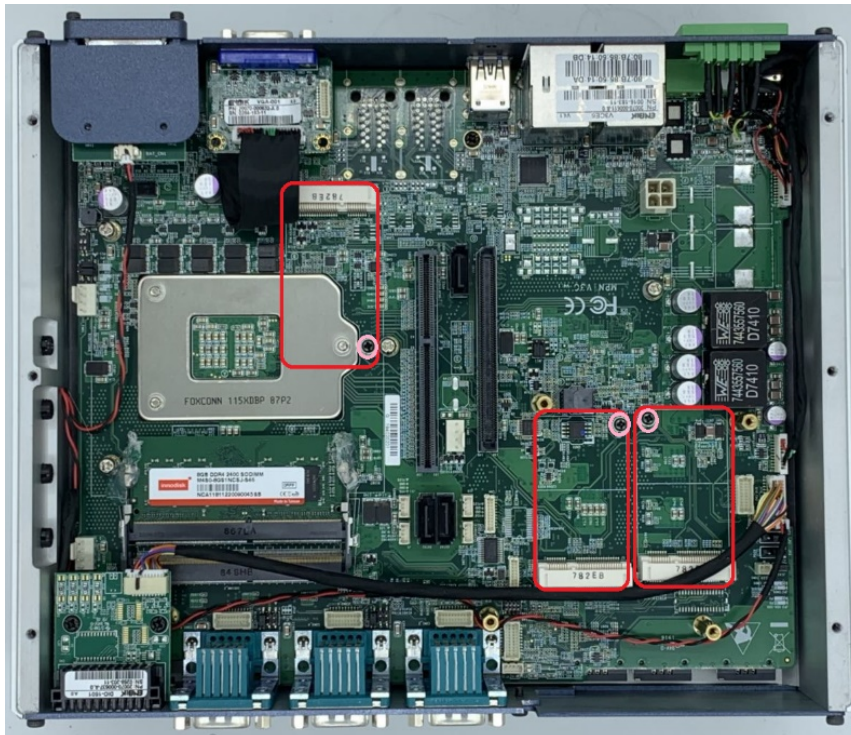
The Memory module is installed on the SO-DIMM1 Socket first.

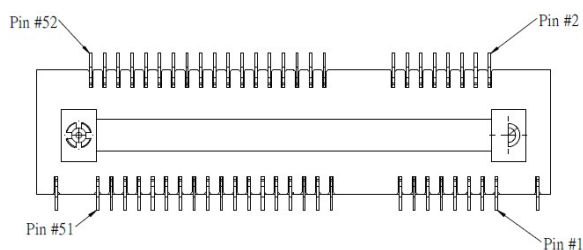
3.3.2 Mini PCIe Slot / mSATA Socket

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series system provides three on-board full-length Mini PCIe slots with a USIM socket. By installing a Mini PCIe module, your system can have expanded features such as Wi-Fi, 3G, 4G, GPS, Bluetooth, etc.

Each full-length Mini PCIe Slot supports Mini PCIe / mSATA mode selected by BIOS setup. Each USIM card slot supports +3.3V Power On/Off control by EFCO Application Program, and one Card Detection LED (WWAN, WLAN & WPAN) on the front panel. These slots allow your system to connect to the internet through the available telecom operator's GPRS/3G/4G network.

For Wi-Fi/3G/4G communications, the AIHD / AIHD-P4E / AIHD-GP4E series provides multiple SMA antenna apertures on the right panel for multi-antenna configuration.





Top Side		Bottom Side	
1	PCIe Wake#	2	3.3V
3	Reserved	4	GND
5	Reserved	6	1.5V
7	PCIe CLKREQ#	8	UIM PWR
9	GND	10	UIM DATA
11	PCIe REFCLK-	12	UIM CLK
13	PCIe REFCLK+	14	UIM RESET
15	GND	16	UIM VPP
17	Reserved (UIM C8)	18	GND
19	Reserved (UIM C4)	20	Reserved
21	GND	22	PCIe RST#
23	PCIe PERn0/SATA-Tx+	24	+3.3V SB
25	PCIe PERp0/SATA-TX-	26	GND
27	GND	28	+1.5V
29	GND	30	SMB CLK
31	PCIe PETn0/SATA-RX-	32	SMB DATA
33	PCIe PETp0/SATA-RX+	34	GND
35	GND	36	USB D-
37	GND	38	USB D+
39	+3.3V	40	GND
41	+3.3V	42	LED WWAN#
43	GND	44	LED WLAN#
45	Reserved	46	LED WPAN#
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	Reserved	52	+3.3V

3.3.3 Internal USB 2.0 Port for a USB 2.0 Dongle

The AIHD / AIHD-P4E / AIHD-GP4E series provides one internal USB 2.0 Type A connector. The internal USB port is designed to allow users to attach a protection dongle inside the chassis.



Pin	Name	Description
1	VCC	+5 V DC
2	D-	Data -
3	D+	Data +
4	GND	Ground

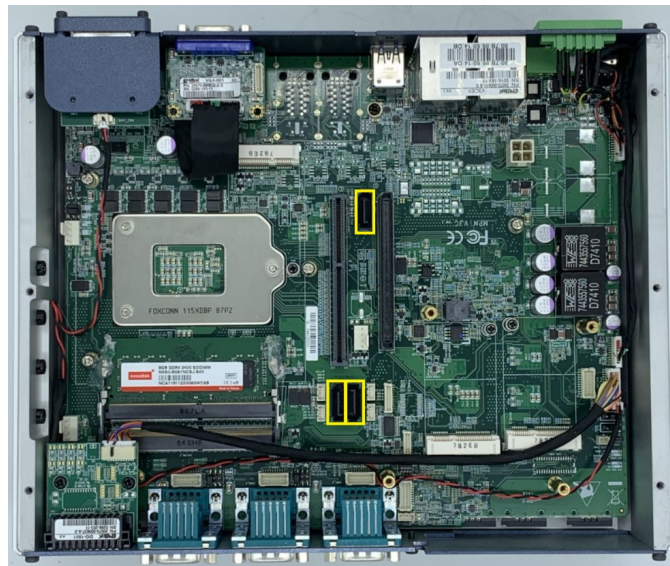
3.4 SATA and SATA Power Connector

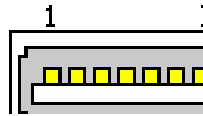
AIHD / AIHD-P4E / AIHD-GP4E series provides three SATA ports for internal 2.5" SSD/HDD Drive Bay.

3.4.1 Internal SATA and SATA power connectors

The AIHD / AIHD-P4E / AIHD-GP4E series provides three internal SATA connectors and 4 SATA power connectors.

SATA Connector

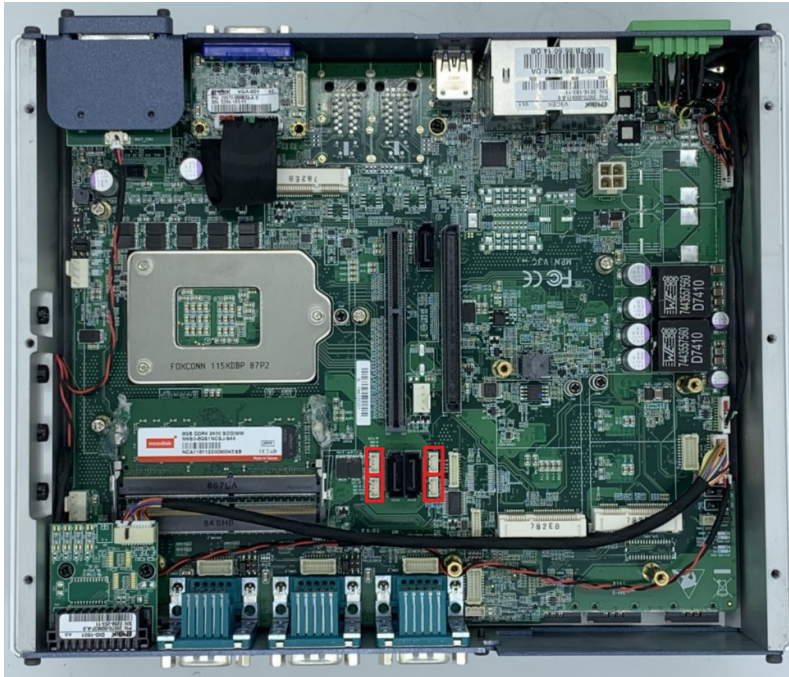




SATA Data Pinout

Pin	Name	Function
1	GND	Ground
2	A+	Transmit+
3	A-	Transmit-
4	GND	Ground
5	B-	Receive-
6	B+	Receive+
7	GND	Ground

SATA Power Connector



SATA Power Pinout

Pin	Name	Function
1	12VS	DC 12V
2	GND	Ground
3	GND	Ground-
4	5VS	DC 5V

Chapter 4

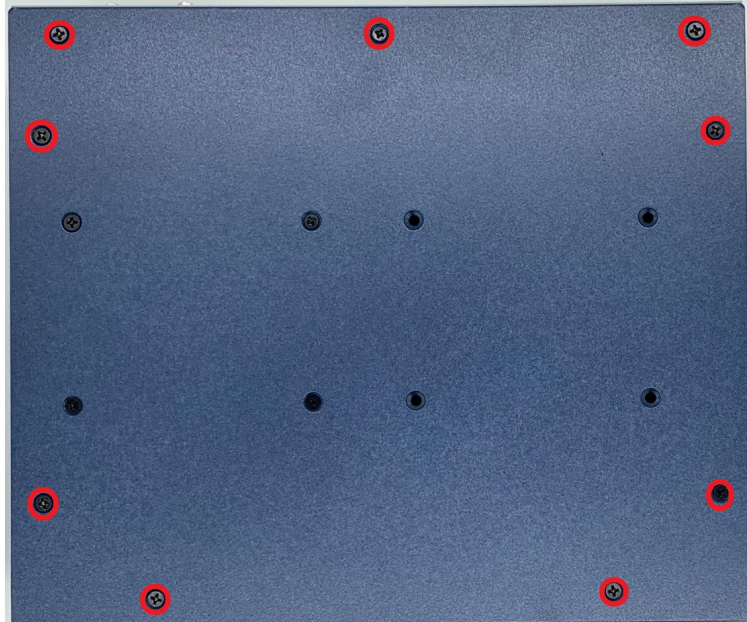
Hardware Installation

This chapter including:

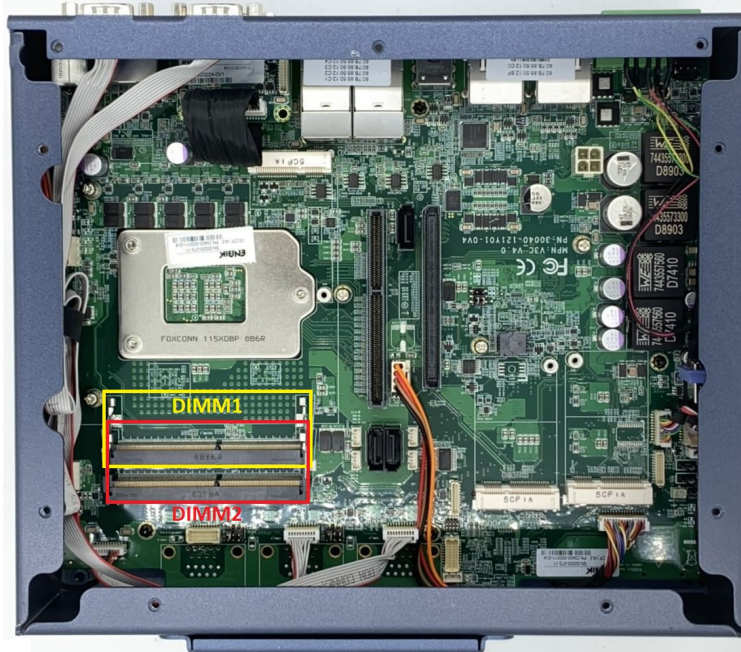
- LGA1151 CPU Installation and Replacement
- SO-DIMM Memory Installation
- Mini PCIe/ mSATA Module Installation
- 2.5" SATA SSD / HDD Installation
- IOM Installation
- Mounting Bracket Installation

4.1 SO-DIMM Memory Installation

1. Remove 9 M3*6mm crews from the bottom cover.



2. Install or replace your memory.

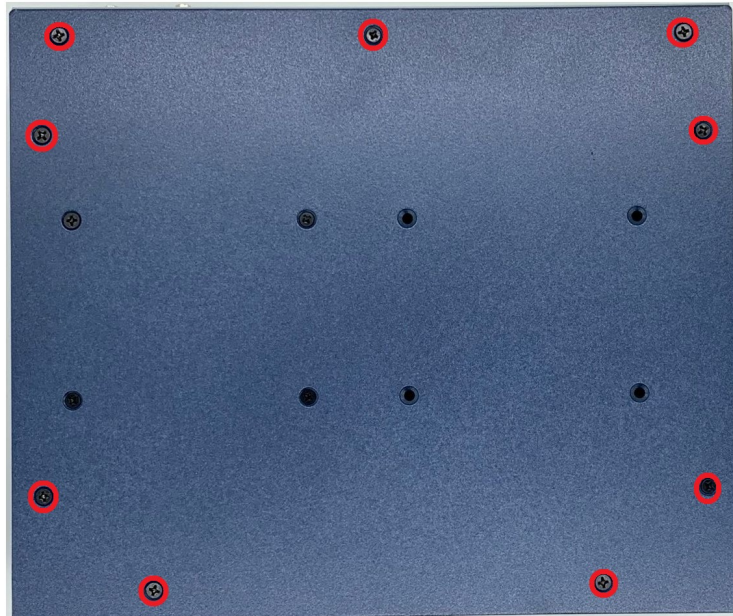


Note:



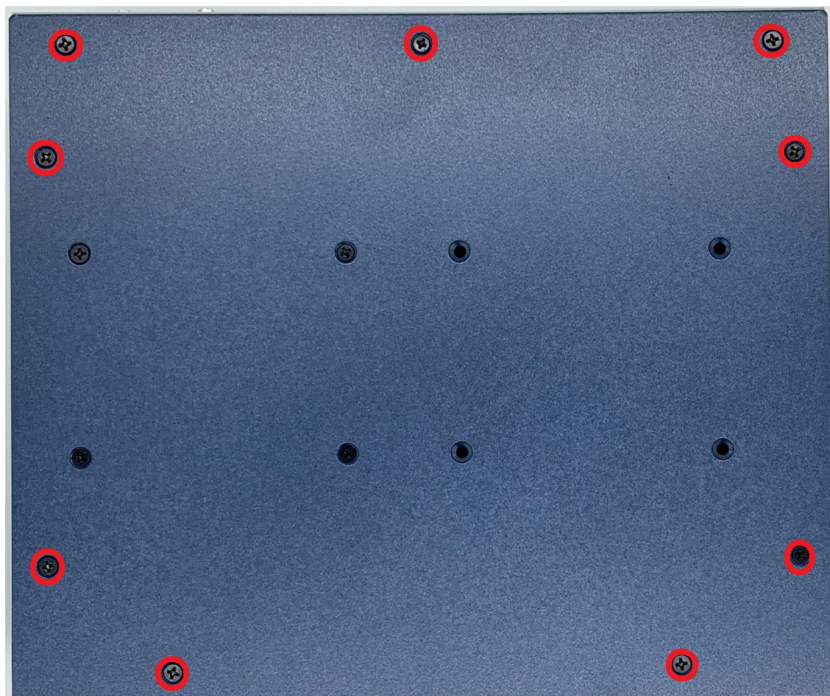
If only one memory, please install DIMM1 first.

3. Replace 9 M3*6mm screws on the bottom cover.

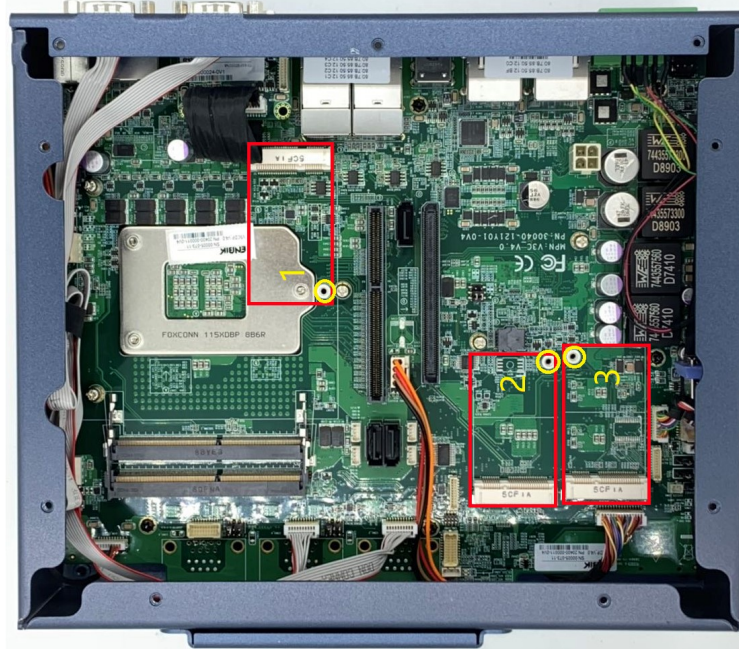


4.3 Mini PCIe / mSATA module installation

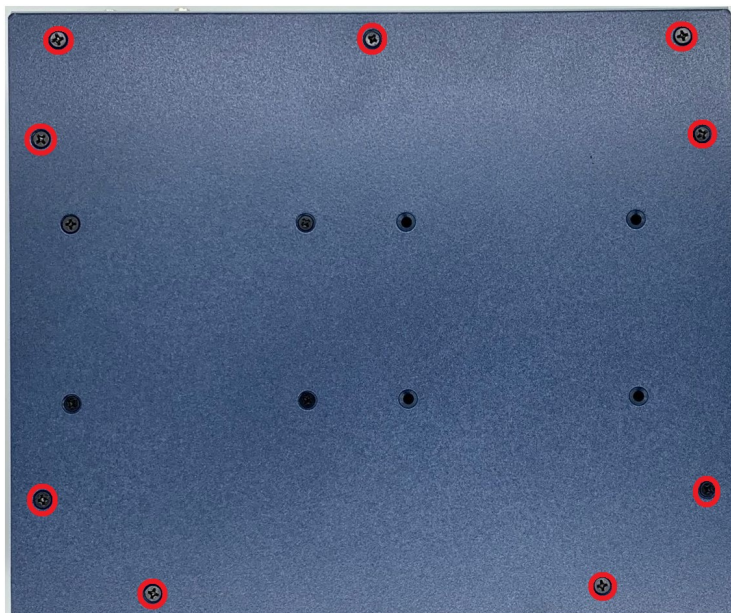
1. Remove 9 M3*6mm screws from the bottom cover.



2. Install or replace the Mini PCIe / mSATA device in those three slots.

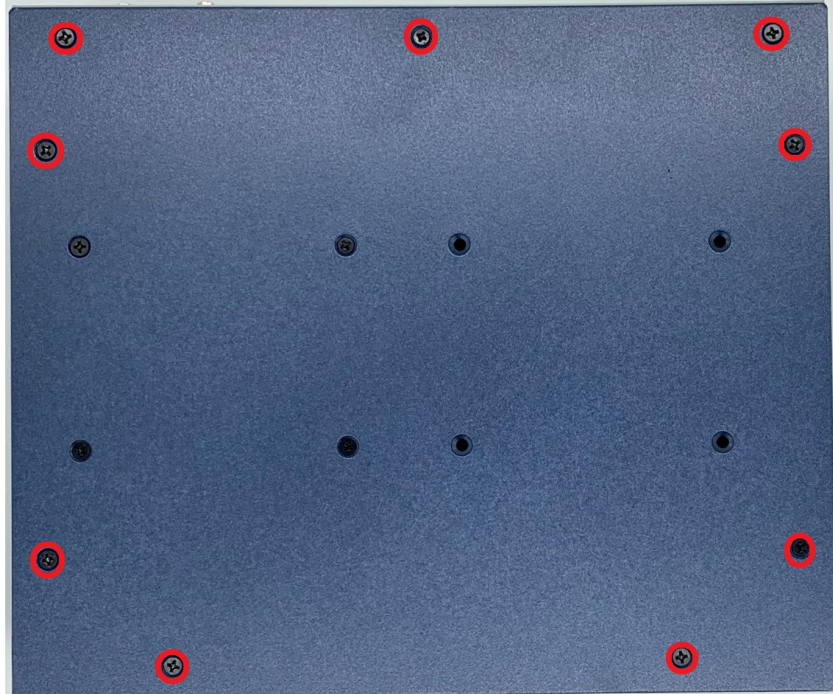


3. Replace 9 M3*6mm screws on the bottom cover.

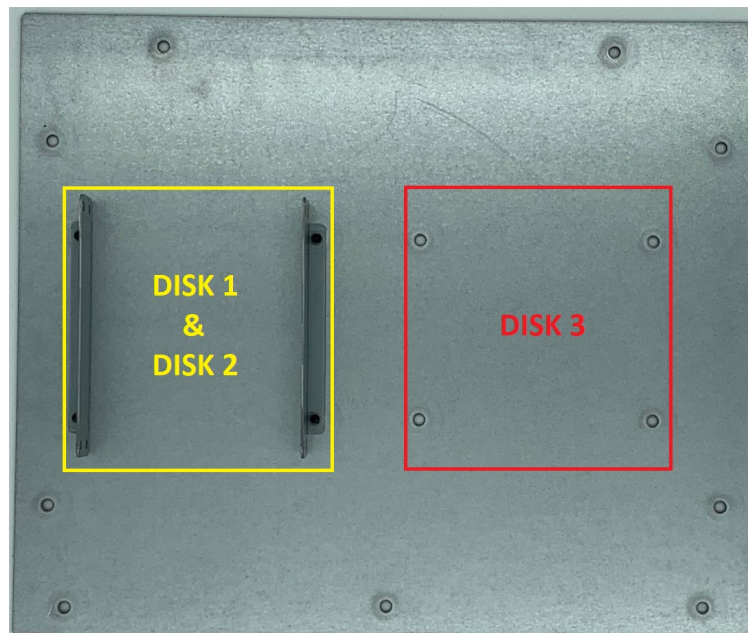


4.4 2.5" SATA SSD / HDD installation

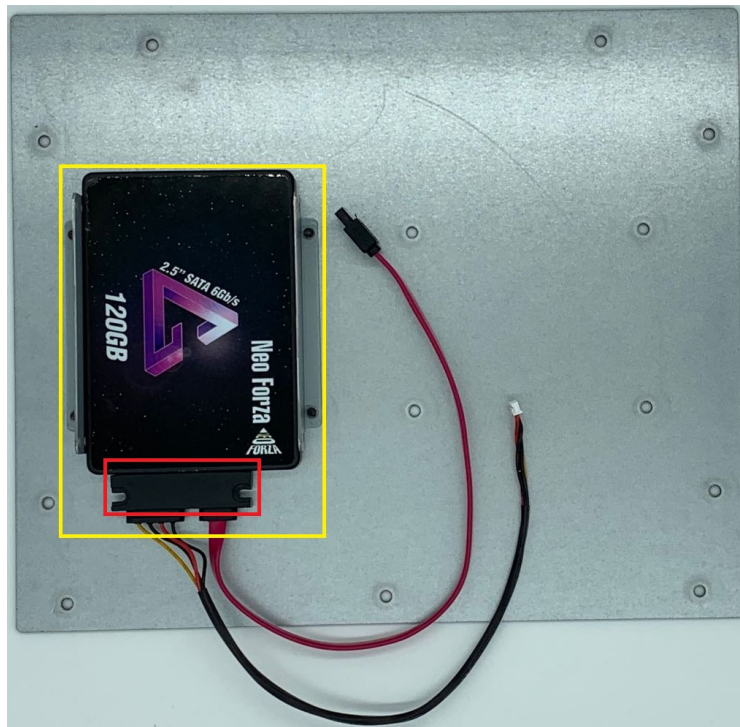
1. Remove 9 M3*6mm crews from the bottom cover.



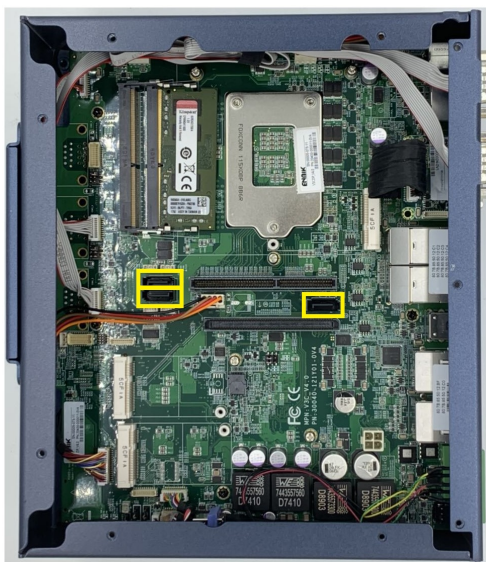
2. Install 2.5" storage in Disk1, Disk2, or Disk3 areas of the bottom cover inside.



3. Connect SATA & SATA power cable to your 2.5" storage, then attach the storage device to the bottom cover by 4 M3*4 screws.



4. Reconnect SATA & SATA power cables, then close the bottom cover.

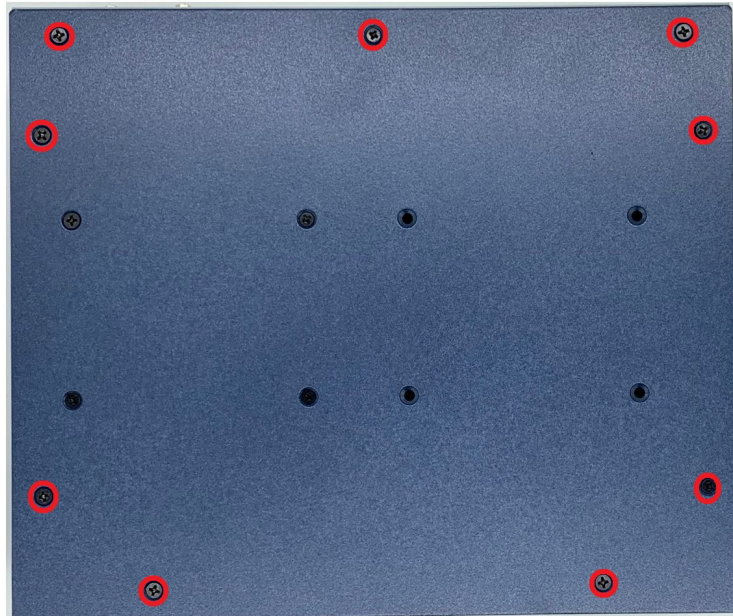


SATA connector



SATA power connector

5. Replace 9 M3*6mm screws on the bottom cover.



Chapter 5

Function Settings

This section includes:

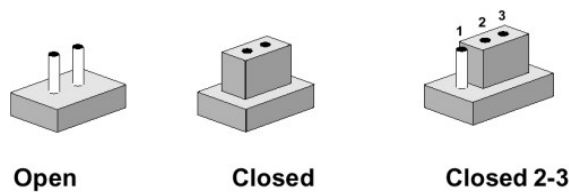
- Jumper and DIP Switch
- Clear CMOS
- Serial Port (UART)
RI/+12V/+5V Settings
- PEG (PCIe x16)
Bifurcation
- PEG (PCIe x 16) Lane
Reversal

5.1 Jumper and DIP switch

5.5.1 Jumper

You can configure your board to match the needs of your application by setting jumpers. A jumper is the most straightforward kind of electric switch.

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 two pins.



The jumper settings are schematically depicted in this manual as follows:



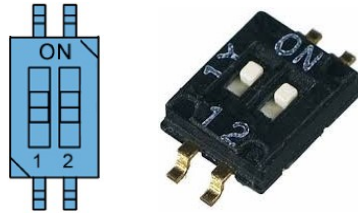
A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

5.5.2 DIP Switch

A DIP switch is a manual electric switch that is boxed with others in a group or a standard dual-in-line unit (DIP). The term may refer to each switch or the unit as a whole. This type of switch is designed to be used on a printed circuit board along with other electronic components. It is commonly used to customize the behavior of an electronic device for specific situations.

DIP switches are an alternative to jumper blocks. Their main advantages are that they are quicker to change, and there are no parts to lose.

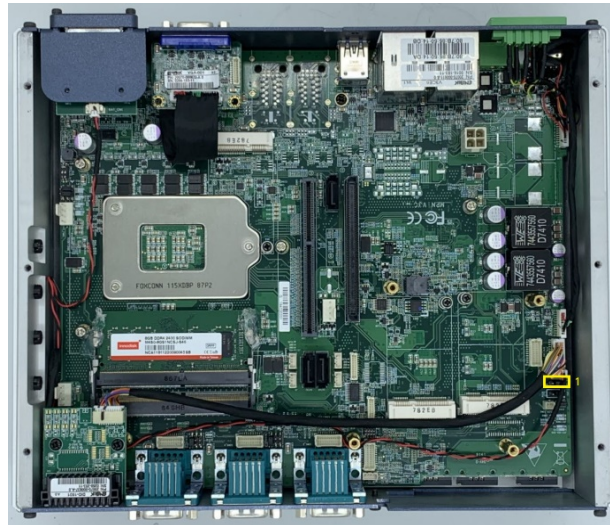


The following tables list the function of each of the board's jumpers and DIP switches.

Label	Function	Note
JP2	Clear CMOS	3 x 1 header, pitch 2.00 mm
JP9	Serial Port (COM3) RI/+12V/+5V Setting	3 x 2 header, pitch 2.00 mm
JP10	Serial Port (COM3) RI/+12V/+5V Setting	3 x 2 header, pitch 2.00 mm
JP1	PEG (PCIe x16) Bifurcation Setting	3 x 2 header, pitch 2.00 mm
SW2	PEG (PCIe x16) Lane Reversal Setting	2 SPST DIP switch

5.6 Clear CMOS (JP2)

You can use Switch SW1 to clear CMOS and Intel® Management Engine settings.



Closed Pin	Function	Note
1-2	Normal	Default
2-3	Clear CMOS	

Appendix

This section includes:

- APPENDIX A – Active Video Combinations
- APPENDIX B – DisplayPort Multi-Stream Transport (MST) Capabilities
- APPENDIX C – How to use GPIO

Appendix A: Active Video Display Combinations

The Eagle Eye-AIHD / AIHD-P4E / AIHD-GP4E series support four display connectors – two DP, one DVI-D, and one VGA. The processor supports three streaming independent and simultaneous display combinations of DisplayPort / DVI-D / VGA monitors. In the case where four monitors are plugged in, the software policy will determine which three will be used. Below is the combination list:

Active Display1	Active Display2	Active Display3
DP	DP	DVI
DP	DP	VGA
DP	DVI	VGA

A.1 Multiple Display Modes

The following multiple display modes are supported with the appropriate driver software:

- Single Display mode has one port activated to drive a single display device.
- Intel® Display Clone mode has up to three ports activated to drive the same video content with color depth setting but potentially different refresh rate and resolution settings to all the active display devices connected.
- The extended Desktop mode has up to three ports activated to drive the content with potentially different color depth, refresh rate, and resolution settings on each of the active display devices connected.

The following table shows examples of valid three display configurations through the processor.

Standard	Maximum Resolution
DP	4096x2304 @ 60Hz, 24bpp
DVI-D	1920x1200 @ 60Hz, 24bpp
VGA	1920x1200 @ 60Hz, 24bpp

Note:



1. Supports up to four displays, but only three can be active at the same time.
2. In the case of connecting more than one active display port, the processor frequency may be lower than the base frequency at a thermally limited scenario.
3. Only two displays can be active at the same time under DOS mode.

A.2 Display combination Table

Attached Display Monitor	Active Display on BIOS SETUP	Active Display on Windows	Active Display on DOS
DP1+DP2	DP1 + DP2	DP1+DP2	DP1
DP1+DVI-D	DP1 + DVI-D	DP1+DVI-D	DP1
DP1+VGA	DP1 + VGA	DP1+VGA	DP1
DP1+DP2+DVI-D	DP1 + DVI-D	DP1+DP2+DVI-D	DP1
DP1+DP2+VGA	DP1 + VGA	DP1+DP2+VGA	DP1
DP1+DVI-D+VGA	DP1 + VGA	DP1+DVI-D+VGA	DP1
DP1+DP2+DVI-D+VGA	DP1 + VGA	DP1+DP2+VGA	DP1
DP2+DVI-D	DP2 + DVI-D	DP2+DVI-D	DP2
DP2+VGA	DP2 + VGA	DP2+VGA	DP2
DP2+DVI-D+VGA	DP2 + VGA	DP2+DVI-D+VGA	DP2
DVI-D+VGA	DVI-D + VGA	DVI-D+VGA	DVI-D

Appendix B: DisplayPort Multi-Stream Transport (MST) Capabilities

The Eagle Eyes-AIHD / AIHD-P4E / AIHD-GP4E series DisplayPorts (DP1, DP2) support Multi-Stream Transport (MST), enabling multiple monitors to be used via a single DisplayPort connector.



MST	Max. Resolution	Pixel Clock	One Display Bandwidth [Gbps]	Total Bandwidth for all display [Gbps]
1 display	3840x2160 @60Hz	533.25	16	16
	4096x2304 @60Hz	605.0	18.5	18.15
2 concurrent	2880x1800 @60Hz	337.75	10.13	20.26

Note:



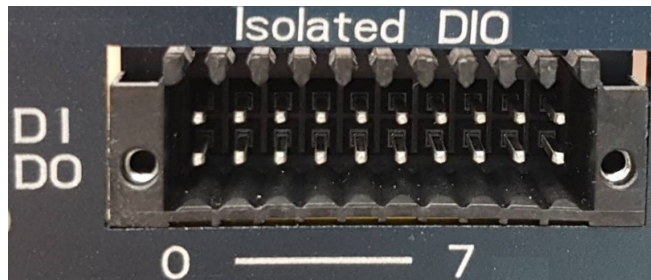
- Multi-Stream Transport (MST) enables multiple monitors via a single DisplayPort connector.
- Total bandwidth for all displays must be lower than the Max theoretical bandwidth of $5.4 \times 4 = 21.6$ [Gbps].
- Additional cooling is required.

Appendix C: How to use GPIO

Functional Description

GPIO signals are accessed via a 2.54mm 2x10-pin terminal block, including isolated DI 8 bit, DO 8-bit, DI Com, Power, and GND.

DI/DO supports NPN (Sink) and PNPO (Source) mode.



DI mode is selected by an external H/W connection. DO mode is selected by a BIOS setting or via an Application Program.

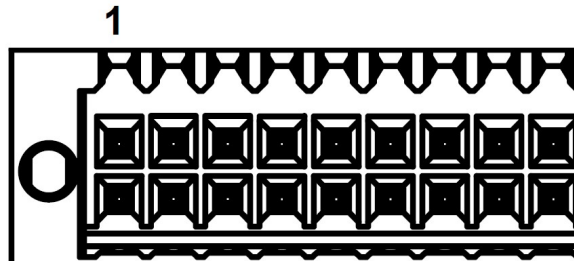
DI/DO Safety-Related Certifications

DI	DO
2500-V PART NUMBER PACKAGE BODY SIZE (NOM) RMS Isolation for 1 minute per UL 1577	2500-V PART NUMBER PACKAGE BODY SIZE (NOM) RMS Isolation for 1 minute per UL 1577
Approved by VDE, DIN EN60747-5-2() (as an option), file No. 40009162 (as model No. PC3H4)	4242-V ISO7131CC PK Isolation per DIN V VDE V 0884-10 (VDE V 0884-10):2006-12, 566 V ISO7140CC PK Working Voltage
UL flammability grade (94V-0)	CSA Component Acceptance Notice 5A, IEC ISO7141CC 60950-1 and IEC 61010-1 End Equipment ISO7141FCC Standards
CQC Certification per GB 4943.1-2011 (Vendor Certifications)	

DI/DO Operation Characteristics

Parameter	DI	DO
Operation Voltage	5 - 48V DC	Source Mode: 5 - 48V DC Sink Mode: 5 - 40V DC
Input/Output Current Limit	25 uS	100mA
Turn On Delay Time (Max.)	25 uS	Source Mode: 15 uS Sink Mode: 60uS
Turn Off Delay Time (Max.)	25 uS	Source Mode: 15 uS Sink Mode: 60uS

Pin Definition

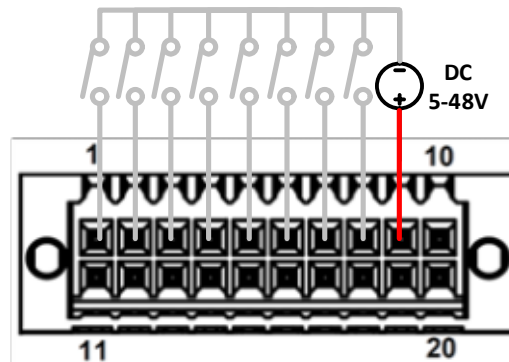


Pin	Description	Pin	Description
1	Isolated DI bit0	11	Isolated DO bit0
2	Isolated DI bit1	12	Isolated DO bit1
3	Isolated DI bit2	13	Isolated DO bit2
4	Isolated DI bit3	14	Isolated DO bit3
5	Isolated DI bit4	15	Isolated DO bit4
6	Isolated DI bit5	16	Isolated DO bit5
7	Isolated DI bit6	17	Isolated DO bit6
8	Isolated DI bit7	18	Isolated DO bit7
9	Digital Input COM	19	Isolated GND
10	Isolated GND	20	Isolated VCC

Isolation Digital Input Connection Method

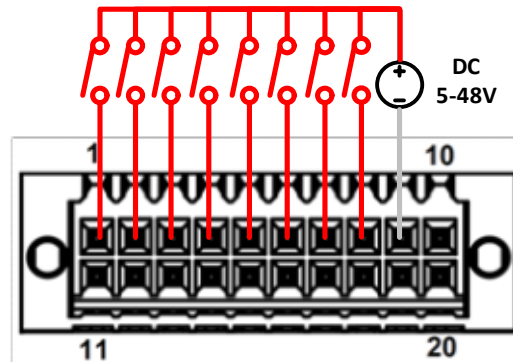
Digital Input Sink Mode Connection Method

Pin 9 digital input COM pin connection to V+. Input pin (Pins 1-8) control by V-.



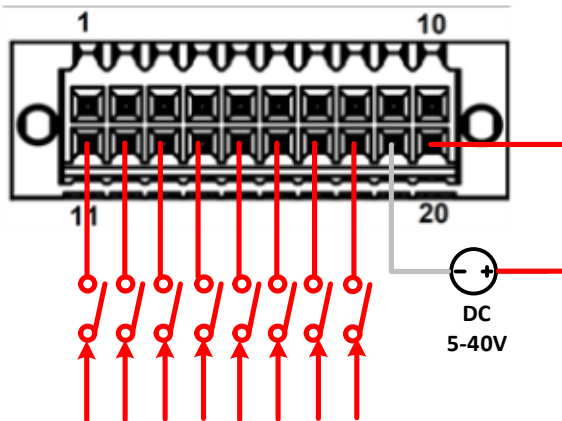
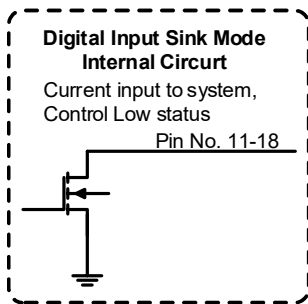
Digital Input Source Mode Connection Method

Pin 9 digital input COM pin connection to V-. Input pin (Pins 1-8) control by V+.



Isolation Digital Output Connection Method

Digital Output Sink Mode Connection Method



Digital Output Source Mode Connection Method

