

EPI-ARLS

Intel® Core™ Ultra Processors, EPIC Board with Intel®
Q870/H810 Chipsets

User's Manual

1st Ed – 18 August 2025

Copyright Notice

Copyright © 2025 Avalue Technology Inc., ALL RIGHTS RESERVED.

Part No: E2047396800R

Document Amendment History

Revision	Date	By	Comment
1 st	August 2025	Avalue	Initial Release

Declaration of Conformity



This device complies with part 15 fcc rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class "a" digital device, pursuant 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 statement

The product(s) described in this manual complies with all application 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.

Notice

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

Copyright Notice

© 2025 by Avalue Technology Inc. All rights are reserved. No parts of this manual may be copied, modified, or reproduced in any form or by any means for commercial use without the prior written permission of Avalue Technology Inc. All information and specification provided in this manual are for reference only and remain subject to change without prior notice.

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows is registered trademark of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

Disclaimer

This manual is intended to be used as a practical and informative guide only and is subject to change without notice. It does not represent a commitment on the part of Avalue. This

EPI-ARLS User's Manual

product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

A Message to the Customer

Avalue Customer Services

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support and Assistance

1. Visit the Avalue website at <https://www.avalue.com/> where you can find the latest information about the product.
2. Contact your distributor or our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

To receive the latest version of the user's manual; please visit our Web site at:

www.avalue.com

Product Warranty (Returns & Warranties policy)

1. Purpose

Avalue establishes the following maintenance specifications and operation procedures for providing the best quality of service and shortened repair time to our customers.

2. Warranty

2.1 Warranty Period

Avalue endeavors to offer customers the most comprehensive post-sales services and protection; besides offering a 2-year warranty for standard Avalue products, an extended warranty service can also be provided based on additional request from the customer. Within the warranty period, customers are entitled to receive comprehensive and prompt repair and warranty.

Standard products manufactured by Avalue are offered a 2-year warranty, from the date of delivery from Avalue. For ODM/OEM products manufactured by Avalue or PCBA with conformal coating, will follow up the define warranty of the agreement, otherwise will be offered 1-year warranty for ODM/OEM products but non-warranty for PCBA with conformal coating. For outsourcing parts kit by Avalue (ex: Motherboard, LCD touch panel, CPU, RAM, HDD) are offered a 6-month warranty, and Mobile/Tablet PC battery are offered a warranty of the half year, from the date of delivery by Avalue. Products before the mass production stage, i.e. engineering samples are not applied in this warranty or service policy. For extended warranty and cross-territory services, product defects resulting from design, production process or material are covered by the pre-set warranty period after the date of delivery from Avalue. For non-Avalue products, the product warranty and repair time shall be based on the service standards provided by the original manufacturer; in principle Avalue will provide these products a warranty service for no more than one year.

2.2 Maintenance services within the warranty period

In the case of Avalue product DOA (Defect-on-Arrival) when the customer finds any defect within 1 month after the delivery, Avalue will replace it with a new product in a soonest way. Except for custom products, once the customer is approved of a Cross-Shipment Agreement, which allows for delivery a new product to the customer before receiving the defective one, Avalue will immediately proceed with new product replacement for the said DOA case. On validation of the confirmed defect, Avalue is entitled to reserve the right whether to provide a new product for replacement. For the returned defective new product, it is necessary to verify that there shall be no bruise, alteration, scratch or marking to the appearance, and that none of the delivered accessories missing; otherwise, the customer will be requested to pay a processing fee. On the other hand, if the new product defect is resulting from incorrect configuration or erroneous use by the user instead of any problem of the hardware itself, the customer will also be requested to pay for relevant handling fees.

EPI-ARLS User's Manual

As for other conditions, Avalue will handle defects by way of repair. The customer will be requested to send the defective product to an Avalue authorized service center, and Avalue will return the repaired product back to the customer as soon as possible.

2.3 Ruling of an out-of-warranty defect

The following situations are not included in the warranty:

- The warranty period has expired.
- Product has been altered or its label of the serial number has been torn off.
- Product functionality issues resulting from improper use by the user, unauthorized dismantle or alteration, unfit operation environment, improper maintenance, accident or other causes. Avalue reserves the right for the ruling of the aforementioned situations.
- Product damage resulting from lightning, flood, earthquake or other calamities.
- The warranty rules of non-Avalue products and accessories shall be in accordance with standards set up by the original manufacturer. These products and accessories include RAM, HDD, FDD, CD-ROM, CPU, FAN, etc.
- Product upgrade request or test request submitted by the customer after expiration of the warranty.
- PCBA with conformal coating.
- Avalue semi-product and outsourced products without Avalue serial number.
- Products before the mass production stage, i.e. engineering samples.

3. Procedure for sending for repair

3.1 Attain a RMA number

A customer's rejected product returned for repair shall have a RMA (Return Merchandise Authorization) number. Without a RMA number, Avalue will not provide any repair service for the rejected product, and the product will be returned to the customer at customer's cost. Avalue will not issue any notice for the return of the product.

Each returned product for repair shall have a RMA number, which is simply the authorization of the return for repair; it is not a guarantee that the returned goods can be repaired or replaced. For applying for a RMA number, the customer may enter the eRMA webpage of Avalue <https://www.avalue.com/en/member> and log-in with an account number and a password authorized by Avalue. The system will then automatically issue a RMA number.

When applying for the RMA number, it is essential to fill in basic information of the customer and the product, together with detailed description of the problem encountered. If possible, avoid using ambiguous words such as "does not work" or "problematic". Without a substantial description of the problem, it is hard to start the repair and will cause prolonged repair time. Lacking detailed statement of fault steps also makes the problem hard to be identified, sometimes resulting in second-time repairs.

In case the customer can't define the cause of problem, please contact Avalue application engineers. Sometimes when the problem can be resolved even before the customer sends back the product.

On the other hand, if the customer only returns the key parts to Avalue for repair, it is necessary that the serial number of the entire unit is given in the "Problem Description" field, so that warranty period can be ruled accordingly; or Avalue will handle the case as an Out-of- warranty case.

3.2 Return of faulty product for repair

It is recommended that the customer not to return the accessories (manual, connection cables, etc.) with the products for repair, devices such as CPU, DRAM, CF memory card, etc., shall also be removed from the faulty goods before return for repair. If these devices are relevant to described repair problems and necessary to be returned with the goods; please clearly indicate the items included in the eRMA application form. Avalue shall not be responsible for any item that is not itemized. Moreover, make sure the problem(s) are detailed in the "Problem Description" field.

In the list of delivery, the customer may fill-in a value which is lower than the actual value, to prevent customs levying a higher tax over the excessive value of the return goods. The customer shall be held responsible for extra fees caused by this. We strongly recommend that "Invoice for customs purpose only with no commercial value" be indicated on the delivery note. Also for the purpose of expedited handling, please printout the RMA number and put it in the carton, also indicate the number outside of the carton, with the recipient addressing to Avalue RMA Department.

When returning the defective product, please use an anti-static bag or ESD material to pack it properly. In case of improper packing resulting in damages in the transportation process, Avalue reserves the right to reject the un-repaired faulty good at the customer's costs. Furthermore, it is suggested that the faulty goods shall be sent via a door-to-door courier service. The customer shall be held responsible for any customs clearance fee or extra expenses if Air-Cargo is used for the delivery.

In case of a DOA situation of a new product, Avalue will be responsible for the product and the freight. If the faulty goods are within the warranty period, the sender will take responsibility for the freight. For an out-of-warranty case, the customer shall be responsible for the freight of both trips.

3.3 Maintenance Charge

Avalue will charge a moderate repair fee for the following conditions:

- The warranty period has expired.
- Product has been altered or its label of the serial number has been torn off.
- Product functionality issues resulting from improper use by the user, unauthorized dismantle or alteration, unfit operation environment, improper maintenance, accident

EPI-ARLS User's Manual

or other causes. Avalue reserves the right for the ruling of the aforementioned situations.

- Product damage resulting from lightning, flood, earthquake or other calamities.
- The warranty rules for non-Avalue products and accessories shall be in accordance with standards set up by the original supplier. These products and accessories include RAM, HDD, FDD, CD-ROM, CPU, FAN, etc.
- Product upgrade request or test request submitted by the customer after expiry of the warranty.
- PCBA with conformal coating.
- Avalue semi-product and outsourced products without Avalue serial number
- Products before the mass production stage, i.e. engineering samples.
- In case the products received are examined as NPF (No Problem Found) within the warranty period, the customer shall be responsible for the freight of both trips.
- Please contact your local distributor to examine in advance to prevent unnecessary freight cost.

For system failure of out-of-warranty products, Avalue will provide a quotation prior to repair service. When the customer applies for the cost, please refer to the Quotation number. In case the customer does not return the DOA product that has already been replaced by a new one, or the customer does not sign back the quotation of the out-of-warranty maintenance, Avalue reserves the right of whether or not to provide the repair service. In case the customer does not reply in 3 months, Avalue shall directly scrap or return the product back to customer at customer's cost without further notice to the customer.

3.4 Maintenance service of phased-out products

For servicing phased-out products, Avalue provides an extended period, starting the date of phase-out, as a guaranteed maintenance period of such products, for continuance of the maintenance service to meet customer's requirements. In case of unexpected factors causing Avalue to be unable to repair/replace a warranted but phased-out product, Avalue will, depending on the availability, upgrade the product (free of charge with continued warranty period as of the original product), or, give partial refund (based on the length of the remaining warranty period) to solve this kind of problem.

3.5 Maintenance Report

On completion of repair of a defective product, a Maintenance Report indicating the maintenance result and part(s) replaced (if any) will be sent to the customer together with the product. If the customer demands an additional maintenance analysis report, a service fee of various level will be charged depending on the warranty status. In case the analysis result shows that the defect attributes to Avalue's faulty design or process, the analysis fee will be exempted.

4. Service Products

Avalue provides service products to manage with different customer needs. Should you have any need, please consult to Avalue Sales Department.

Defect Analysis Report (DAR)

Avalue provides DAR (Defect Analysis Report) services aiming to elevating customer satisfaction. A DAR includes defect cause identification/verification/suggestion and improvement precautions, with instructions on correct usage for the avoidance of any reoccurrence.

Upgrade Service

Avalue is capable to provide system upgrade service for customization requirements. This upgrade service is applicable for main parts, such as CPU, memory, HDD, SSD, storage devices; also replacements motherboards of systems. Please contact Avalue sales for details to evaluate the possibility of system upgrade service and obtain information of lead time and price.

Safety Instructions

Safety Precautions

Before installing and using this device, please note the following precautions.

1. Read these safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Disconnected this equipment from any AC outlet before cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Use a power cord that has been approved for using with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to

EPI-ARLS User's Manual

avoid damage by transient overvoltage.

12. Never pour any liquid into an opening. This may cause fire or electrical shock.

13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel. If one of the following situations arises, get the equipment checked by service personnel:

- The power cord or plug is damaged.
- Liquid has penetrated into the equipment.
- The equipment has been exposed to moisture.
- The equipment does not work well, or you cannot get it work according to the user's manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.

14. CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

15. Equipment intended only for use in a RESTRICTED ACCESS AREA.

Explanation of Graphical Symbols

	Warning	A WARNING statement provides important information about a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Caution	A CAUTION statement provides important information about a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the user or patient or in damage to the equipment or other property.
	Note	A NOTE provides additional information intended to avoid inconveniences during operation.
		Direct current.
		Alternating current
		Stand-by, Power on
		FCC Certification
		CE Certification
		Follow the national requirements for disposal of equipment.
		Stacking layer limit
		This side up

EPI-ARLS User's Manual

		Fragile Packaging
		Beware of water damage, moisture-proof
		Carton recyclable
		Handle with care
		Follow operating instructions of consult instructions for use.
		WARNING • INGESTION HAZARD: This product contains a button cell or coin battery. • DEATH or serious injury can occur if ingested. • A swallowed button cell or coin battery can cause Internal Chemical Burns in as little as 2 hours. • KEEP new and used batteries OUT OF REACH of CHILDREN. • Seek immediate medical attention if a battery is suspected to be swallowed or inserted inside any part of the body.

Disposing of your old product

WARNING:

There is danger of explosion if the battery is mishandled or incorrectly replaced. Replace only with the same type of battery. Do not disassemble it or attempt to recharge it outside the system. Do not crush, puncture, dispose of in fire, short the external contacts, or expose to water or other liquids. Dispose of the battery in accordance with local regulations and instructions from your service provider.

CAUTION:

- Lithium Battery Caution: Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type. Dispose batteries according to manufacturer's instructions.
- Disposal of a BATTERY into fire or a hot oven, or mechanically crushing or cutting of a BATTERY, that can result in an EXPLOSION
- Leaving a BATTERY in an extremely high temperature surrounding environment that can result in an EXPLOSION or the leakage of flammable liquid or gas.
- A BATTERY subjected to extremely low air pressure that may result in an EXPLOSION or the leakage of flammable liquid or gas.

Mise en garde!

AVERTISSEMENT : Il existe un risque d'explosion si la batterie est mal manipulée ou remplacée de manière incorrecte. Remplacez uniquement par le même type de batterie. Ne le démontez pas et ne tentez pas de le recharger en dehors du système. Ne pas écraser, percer, jeter au feu, court-circuiter les contacts externes ou exposer à l'eau ou à d'autres liquides. Jetez la batterie conformément aux réglementations locales et aux instructions de votre fournisseur de services.

MISE EN GARDE:

- Pile au lithium Attention : Danger d'explosion si la pile n'est pas remplacée correctement. Remplacer uniquement par un type identique ou équivalent. Jetez les piles conformément aux instructions du fabricant.
- L'élimination d'une BATTERIE dans le feu ou dans un four chaud, ou l'écrasement ou le découpage mécanique d'une BATTERIE, pouvant entraîner une EXPLOSION
- Laisser une BATTERIE dans un environnement à température extrêmement élevée pouvant entraîner une EXPLOSION ou une fuite de liquide ou de gaz inflammable.
- UNE BATTERIE soumise à une pression d'air extrêmement basse pouvant entraîner une EXPLOSION ou une fuite de liquide ou de gaz inflammable.

Content

1. Getting Started	17
1.1 Safety Precautions	17
1.2 Packing List	17
1.3 Manual Objectives	18
1.4 System Specifications	19
1.5 Architecture Overview—Block Diagram	23
2. Hardware Configuration	24
2.1 Product Overview	25
2.2 Jumper and Connector List	26
2.3 Setting Jumpers & Connectors	28
2.3.1 AT/ATX mode/ Clear CMOS selector (SW1)	28
2.3.1.1 Signal Description –AT/ATX mode selection	28
2.3.2 SPI connector (JSPI1)	29
2.3.3 ESPI connector (JESPI1)	29
2.3.4 eDP/LVDS connector (JLVDS1)	30
2.3.5 Serial port 1 connector (JCOM1)	31
2.3.6 Serial port 2 connector (JCOM2)	31
2.3.7 Serial port 3 connector (JCOM3)	32
2.3.8 Serial port 4 connector (JCOM4)	32
2.3.9 General purpose I/O connector (JDIO1)	33
2.3.10 CPU fan connector (JCPU_FAN1)	33
2.3.11 USB2.0 connector (JUSB1)	34
2.3.12 USB2.0 connector (JUSB2)	34
2.3.13 LCD inverter backlight connector (JBKL1)	35
2.3.14 Battery connector (JBAT1)	35
2.3.15 Front Panel connector (JFP1)	36
2.3.16 PC connector (JPC1)	36
2.3.17 Audio connector (JAUDIO1)	37
2.3.17.1 Signal Description – Audio connector (JAUDIO1)	37
2.3.18 EC connector (JEC1)	37
3. Drivers Installation	38
3.1 Install Chipset Driver	39
3.2 Install VGA Driver	40
3.3 Install ME Driver	41
3.4 Install Audio Driver	42
3.5 Install Serial IO Driver	43
3.6 Install Ethernet Driver	44

3.7	Install GNA Driver	45
3.8	Install NPU Driver.....	46
4	BIOS Setup	47
4.1	Introduction	48
4.2	Starting Setup	48
4.3	Using Setup	49
4.4	Getting Help	50
4.5	In Case of Problems.....	50
4.6	BIOS setup.....	51
4.6.1	Main Menu.....	51
4.6.1.1	System Language.....	51
4.6.1.2	System Date	52
4.6.1.3	System Time.....	52
4.6.2	Advanced Menu	52
4.6.2.1	CPU Configuration.....	53
4.6.2.1.1	Efficient-core Information.....	54
4.6.2.2	Power & Performance	54
4.6.2.2.1	CPU – Power Management Control	55
4.6.2.3	PCH-FW Configuration	56
4.6.2.3.1	Firmware Update Configuration.....	57
4.6.2.4	Trusted Computing	57
4.6.2.5	APCI Settings	58
4.6.2.6	IT5782 Super IO Configuration.....	59
4.6.2.6.1	Serial Port 1 Configuration	59
4.6.2.6.2	Serial Port 2 Configuration	60
4.6.2.6.3	Serial Port 3 Configuration	61
4.6.2.6.4	Serial Port 4 Configuration	61
4.6.2.7	EC 5782 HW Monitor.....	62
4.6.2.8	S5 RTC Wake Settings.....	63
4.6.2.9	Serial Port Console Redirection	64
4.6.2.10	USB Configuration	64
4.6.2.11	Network Stack Configuration	65
4.6.2.12	NVMe Configuration	66
4.6.3	Chipset.....	66
4.6.3.1	System Agent (SA) Configuration.....	67
4.6.3.1.1	Memory Configuration	67
4.6.3.1.2	Graphics Configuration	68
4.6.3.1.3	VT-d setup menu	68
4.6.3.2	PCH-IO Configuration.....	69
4.6.3.2.1	PCI Express Configuration	69

EPI-ARLS User's Manual

4.6.3.2.2	SATA Configuration	78
4.6.3.2.3	HD Audio Configuration	79
4.6.3.3	Board & Panel Configuration	79
4.6.4	Security	81
4.6.4.1	Secure Boot	82
4.6.4.1.1	Expert Key Management	83
4.6.5	Boot	84
4.6.6	Save and Exit	84
4.6.6.1	Save Changes and Reset	85
4.6.6.2	Discard Changes and Reset	85
4.6.6.3	Restore Defaults	85
4.6.6.4	Launch EFI Shell from filesystem device	85
4.6.7	MEBx	86
5.	Mechanical Drawing	87

1. Getting Started

1.1 Safety Precautions

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.

1.2 Packing List

Before installation, please ensure all the items listed in the following table are included in the package.

Item	Description	Q'ty
1	EPIC Board EPI-ARLS	1
2	Flat Cable 9P(M)-PHD (10P/2.0mm)	1
3	CPU Cooler	1
4	M.2 screws	
5	Graphene sheet	1



If any of the above items is damaged or missing, contact your retailer.

1.3 Manual Objectives

This manual describes in details Avalue Technology EPI-ARLS Single Board.

We have tried to include as much information as possible, but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up EPI-ARLS or change the standard configurations. Whilst all the necessary information is available in this manual, we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.4 System Specifications

System	
CPU	Intel® Arrow Lake-S (Codename: ARL-S) Processor, supports LGA 1851 CPU Up to 35W Max CPU Socket and PCH on top side.
BIOS	AMI uEFI BIOS, 256Mbit SPI Flash ROM
System Chipset	Intel® Q870/H810 chipsets
I/O Chip	EC ITE IT5782VG
System Memory	1 x 262pin SO-DIMM Up to 48GB Dual Channel DDR5 5600/6400MHz (6400Mhz for Ultra 7, Ultra 9 CPU)
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step
H/W Status Monitor	CPU temperature monitoring Voltages monitoring CPU fan speed control
TPM	On board TPM 2.0 IC NuvoTon NPCT760AABYX co-lay Infineon SLB9672VU2.0/ SLB9672XU2.0 TBC
iAMT	Yes, for Q870 + LAN I226LM only.
Expansion Slot	
M.2	1 x M.2 (2230) E-Key, support Wi-Fi module, support PCIe x2 Gen4, USB 2.0 support WiFi module 1 x M.2 (2280) M-Key, support PCI-e x4 Gen4 NVMe or SATA device 1 x M.2 (2242) M-Key, support PCI-e x4 Gen4 NVMe or SATA device (for Q870 only)
Storage	
M.2	1 x M.2 (2280) M-Key, support PCI-e x4 Gen4 NVMe or SATA device 1 x M.2 (2242) M-Key, support PCI-e x4 Gen4 NVMe or SATA device (for Q870 only)
Edge I/O	
LAN	3 x RJ45
USB	4 x USB 3.2 Gen2 +5VSB/0.9A (2 x USB 3.2 Gen 2, 2 x USB 3.2 Gen 1 at I/O for H810)
DP	1 x DP 2.0
HDMI	1 x HDMI 2.0
DC Input	1 x Mini Din 4-pin DC in Jack Co-lay Phoenix connector (E16L1513400H) *Note: For system product, please use certified CE & FCC power adapter/power supply.
Onboard I/O	
COM	JCOM1~2: 2 x 5 pin, pitch 2.00mm header, support RS-232/422/485 by BIOS setting.

EPI-ARLS User's Manual

	JCOM3~4: 2 x 5 pin, pitch 2.00mm header, support RS-232.
USB	JUSB1~2: 2 x 2 x 5 pin, pitch 2.00mm header for 4 x USB 2.0, +5VSB/0.5A
GPIO	JDIO1: 2 x 10 Pin header, pitch 2.00/1.27mm for 16 bit GPIO, 5V SMBUS, +5V GND, specify pull high, pull low voltage
CPU/System FAN	JCPU_FAN1: 1 x 4 pin, pitch 2.54mm wafer for CPU fan connector with smart fan function supported.
Front Panel	JFP1: 2 x 5 pin, pitch 2.00mm wafer for Front panel. HDD LED, Power LED, Reset button, Power button
RTC Battery	1 x 2 Pin Pitch 1.25mm Vertical type battery connector (SMD Type)(BAT1) Battery 3V/220mAh 170mm CR2032/2450 Lithium Coin Cell (BAT1_1) *Based on Battery Capacity / Current Consumption = > 4 years
AT/ATX Selector	1 x 3 pin, pitch 2.00mm pin header for AT/ATX jumper, default AT. (JAT1)
Clear CMOS	1 x 3 pin, pitch 2.00mm pin header for Clear COMS jumper.
LVDS	JLVDS1: 2 x 20 pin, pitch 1.25mm connector for LVDS or eDP (2 Lanes)
LCD Backlight Brightness	1 x 5 pin, pitch 2.00mm Wafer connector for LCD inverter backlight connector (5V/12V) (JBKL1) (+5V/+12V, 1A)
BIOS SPI	JSPI1: 2 x 4 pin, pitch 2.00mm pin header
eSPI	JESPI1: 2 x 6 pin wafer, pitch 1.00mm
EC Debug	JEC1: 1 x 3 pin header, pitch 2.00mm
Audio	JAUDIO1: 2 x 6 pin header, pitch 2.00mm (For Line in, Line out, Mic in)
Display	
Graphic Chipset	Intel® Xe LPG graphics architecture CPU integrated
Spec. & Resolution	1 x DP 2.0: Max: 7680 x 4320@60 Hz 1 x HDMI 2.0 : 4096 x 2304@60 Hz 1 x LVDS: 1920 x 1080 Dual channel 18/24-bits LVDS (Chrontel CH7513A-BF eDP to LVDS) or 1 x eDP: 1920 x 1080@60Hz (2 Lanes), default LVDS
Multiple Display	Triple display
Audio	
Audio Codec	RealTek ALC888S-VD2-GR
Ethernet	
LAN Chipset	LAN1: Intel® I226LM 2.5 Gigabit Ethernet Controller LAN2: Intel® I226V 2.5 Gigabit Ethernet Controller LAN3: Intel® I226V 2.5 Gigabit Ethernet Controller (for Q870 only)
LAN Spec.	100/1000/2500 Base-Tx GbE compatible Gigabit Ethernet

LED Indicator	Max. 1G LAN Port			
	ACT/LINK		SPEED	
	LED	Definition	LED	Definition
	Light Off	No Link	Solid Orange	1G
	Solid Yellow	Connection	Solid Green	100M
	Yellow Flashing	Activity	Light Off	10M
	Max. 2.5G LAN Port			
	ACT/LINK		SPEED	
		Definition	LED	Definition
	Light Off	No Link	Solid Orange	2.5G
	Solid Yellow	Connection	Solid Green	1G/100M
	Yellow Flashing	Activity	Light Off	10M
Mechanical & Environmental Specification				
Power Requirement	DC IN +12V *Note: For system product, please use certified CE & FCC power adapter/power supply.			
ACPI	Single power ATX Support S0, S3, S4, S5			
Power Mode	HW: AT (AT / ATX mode Switchable Through Jumper)			
Operating Temp.	0~60°C (32~140°F) with 0.5m/s air flow			
Storage Temp.	-40~ +75°C			
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing			
Size (L x W) (Please consult product engineers for the production feasibility if the size is larger than 410x360mm or smaller than 80x70mm)	4.5" x 6.5" (115mm x 165mm)			
Weight	0.3kg			
Vibration Test	<u>Package Vibration Test</u> Reference IEC60068-2-64 Testing procedures Test Fh: Vibration broadband random Test 1. PSD: 0.026G ² /Hz, 2.16 Grms 2. Non-operation mode 3. Test Frequency: 5-500Hz			

EPI-ARLS User's Manual

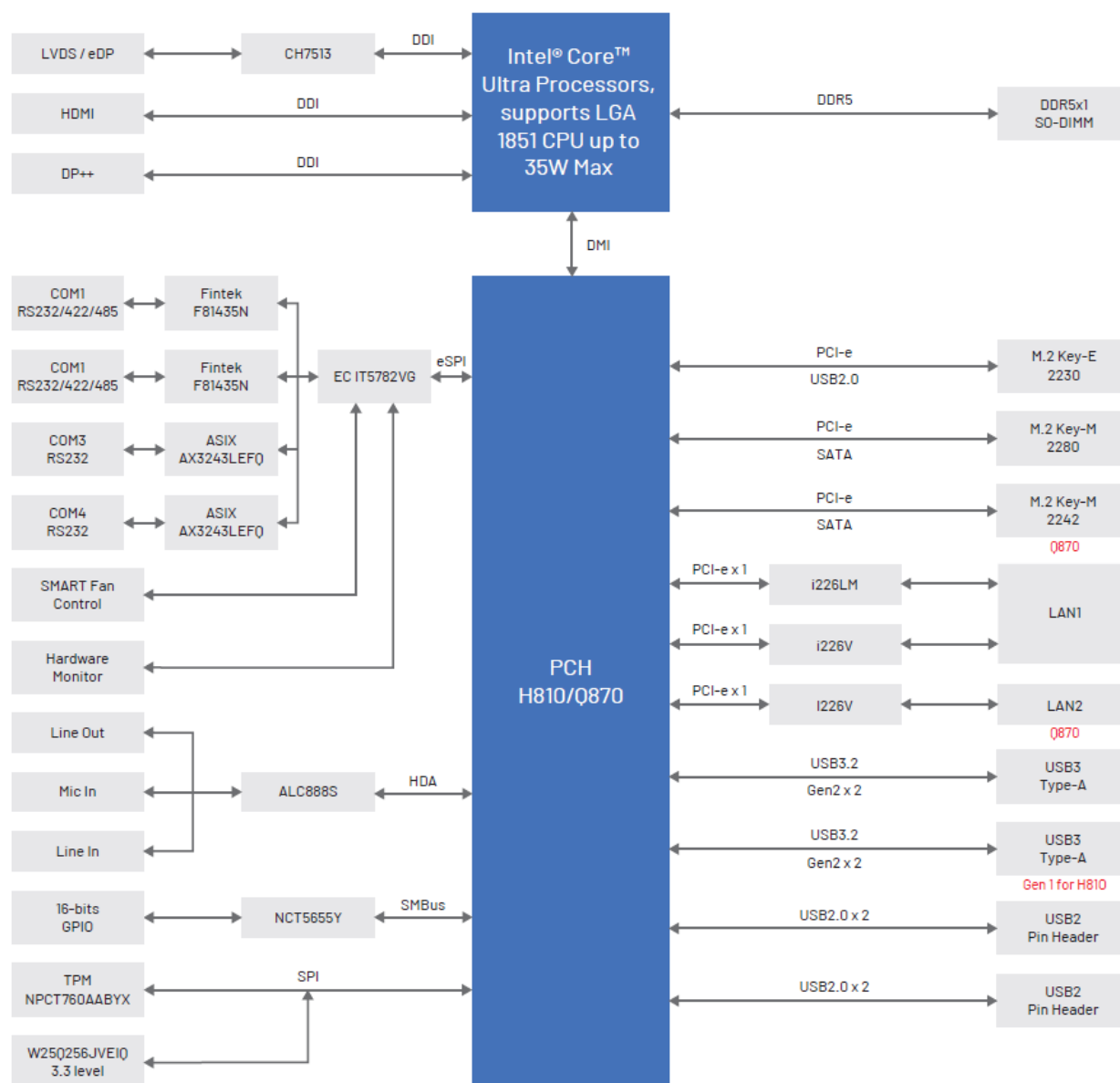
	4. Test Axis: X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh <u>Random Vibration Operation</u> Reference IEC60068-2-64 Testing procedures Test Fh : Vibration broadband random Test 1. PSD: 0.00454G²/Hz, 1.5 Grms 2. Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh <u>Random Vibration Non Operation</u> Reference IEC60068-2-64 Testing procedures Test Fh : Vibration broadband random Test 1. PSD: 0.01818G²/Hz, 3.0 Grms 2. Non Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh
Drop Test	<u>Packing Drop</u> <u>Reference ISTA 2A, Method : IEC-60068-2-32 Test: Ed</u> <u>Drop Test</u> <u>1 One corner , three edges, six faces</u> <u>2 ISTA 2A, IEC-60068-2-32 Test:Ed</u>
OS Information	Windows 11 64bit, Linux



Note: Specifications are subject to change without notice.

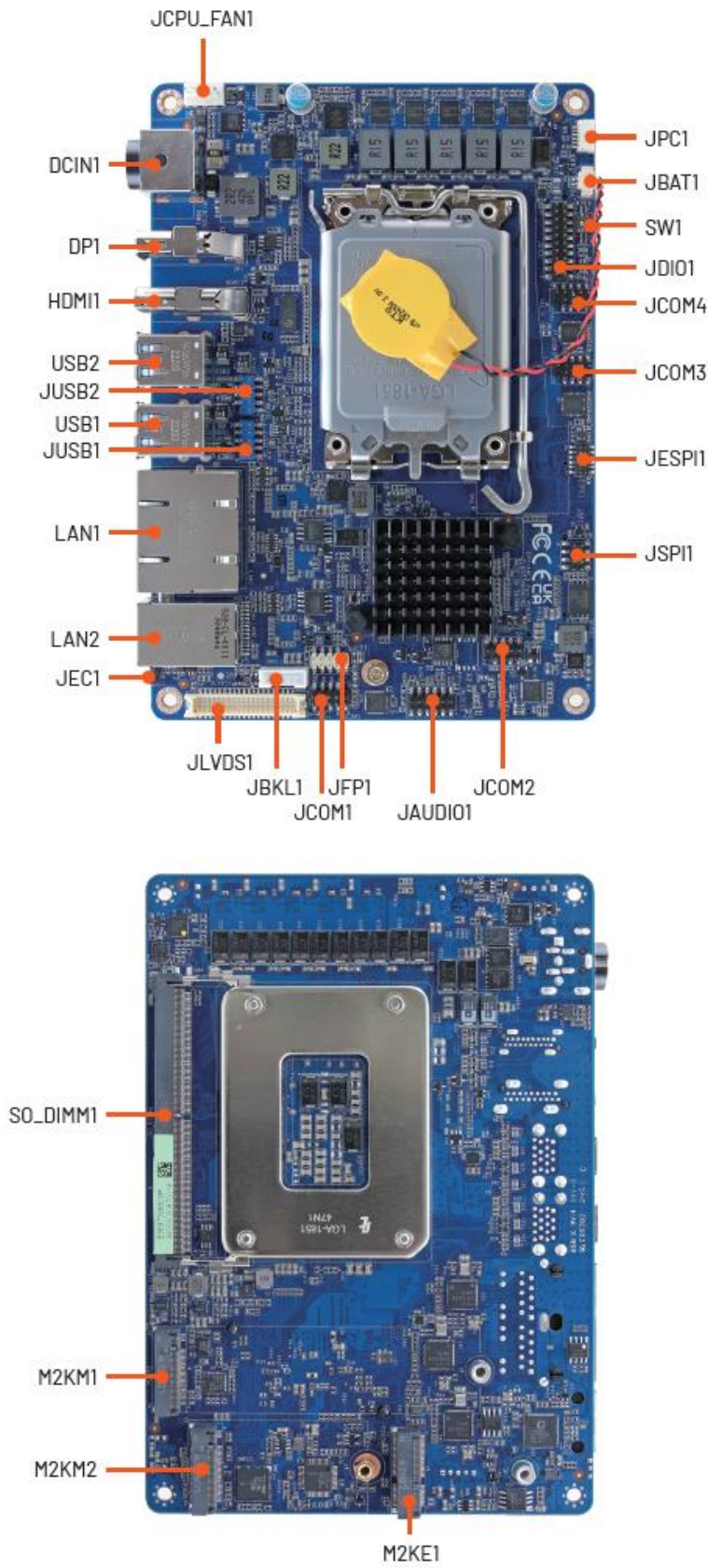
1.5 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EPI-ARLS.



2. Hardware Configuration

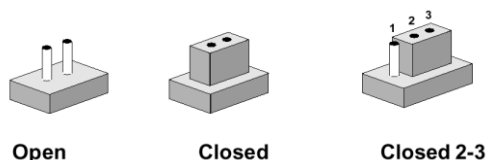
2.1 Product Overview



2.2 Jumper and Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest 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.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

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.

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

Jumpers

Label	Function	Note
SW1	AT/ATX mode/ Clear CMOS selector	

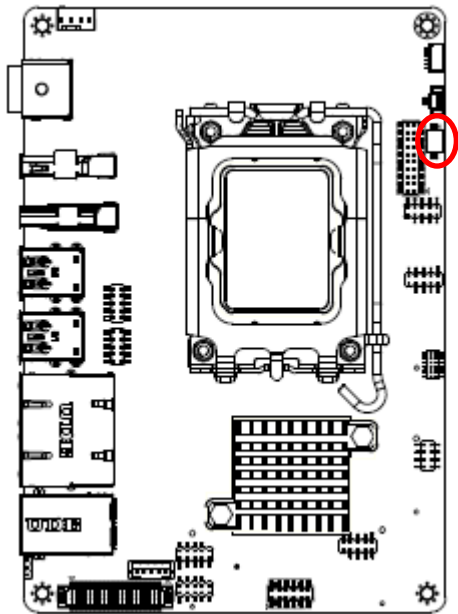
Connectors

Label	Function	Note
JBKL1	LCD inverter backlight connector	5 x 1 wafer, pitch 2.00mm Matching Connector: JST PHR-5
JCPU_FAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
JCOM1/2/3/4	Serial port 1/2/3/4 connector	5 x 2 header, pitch 2.00mm
JDIO1	General purpose I/O connector	10 x 2 header, pitch 2.00mm
DCIN1	Power connector	
LAN1	2 x RJ-45 Ethernet	
LAN2	RJ-45 Ethernet	

DP1	DP connector	
HDMI1	HDMI connector	
JFP1	Front Panel connector	5 x 2 header, pitch 2.00mm
USB1	2 x USB3.2 Gen2 connector	
USB2	2 x USB3.2 Gen2 connector (2 x USB 3.2 Gen 1 connector for H810)	
JUSB1	USB2.0 connector	5 x 2 header, pitch 2.00mm
JUSB2	USB2.0 connector	5 x 2 header, pitch 2.00mm
JEC1	EC connector	3 x 1 header, pitch 2.00mm
JSPI1	SPI connector	4 x 2 header, pitch 2.00mm
JESPI1	ESPI connector	6 x 2 header, pitch 1.27mm
JPC1	PC connector	6 x 1 wafer, pitch 1.00mm
JLVDS1	eDP/LVDS connector	DIN 40-pin wafer, pitch 1.25mm Matching Connector: Hirose DF13-40DS-1.25C
JBAT1	Battery connector	2 x 1 wafer, pitch 1.25mm
JAUDIO1	Audio connector	6 x 2 header, pitch 2.00mm
SO_DIMM1	DDR5 SODIMM socket	
M2KE1	M.2 KEY-E 2230 connector	
M2KM1	M.2 KEY-M 2280 connector	
M2KM2	M.2 KEY-M 2242 connector	

2.3 Setting Jumpers & Connectors

2.3.1 AT/ATX mode/ Clear CMOS selector (SW1)

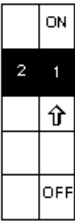


*Default

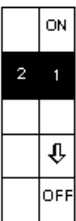
AT/ATX mode



AT mode*/
Clear CMOS*



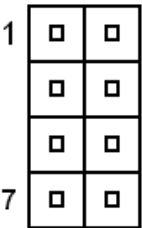
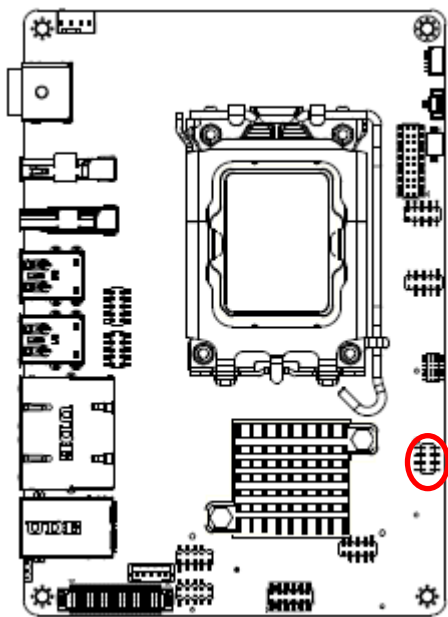
ATX mode/
Normally



2.3.1.1 Signal Description –AT/ATX mode selection

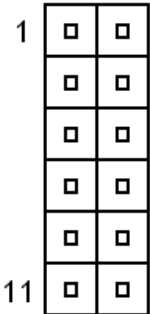
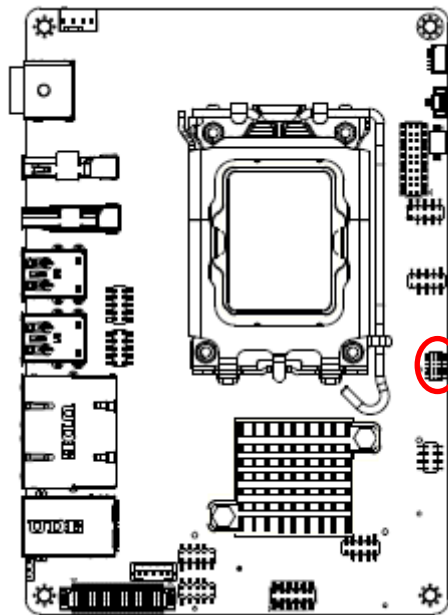
AT/ATX mode/ Clear CMOS	Description
AT mode*/ Clear CMOS* 	Auto-power on, no need to press Power button to enable power on/off
ATX mode/ Normally 	Press the power button to enable power on/off

2.3.2 SPI connector (JSPI1)



Signal	PIN	PIN	Signal
+3.3VSB	1	2	GND
SPI_CS0#	3	4	SPI_CLK_BIOS
SPI_MISO_BIOS	5	6	SPI_MOSI_BIOS
SPI_HOLD#	7	8	SPI_WP#

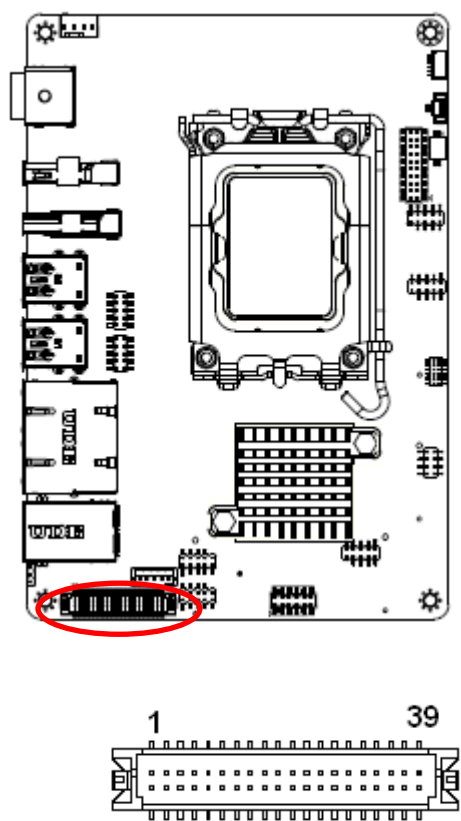
2.3.3 ESPI connector (JESPI1)



Signal	PIN	PIN	Signal
ESPI_IO0_CN	1	2	+3.3VSB
ESPI_IO1_CN	3	4	PLT_RST_BUF#
ESPI_IO2_CN	5	6	ESPI_CS#0
ESPI_IO3_CN	7	8	ESPI_CLK_CN
NC	9	10	GND
ESPI_RST#	11	12	ESPI_ALERT#0

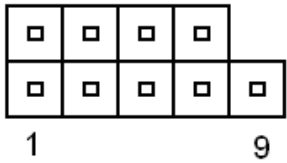
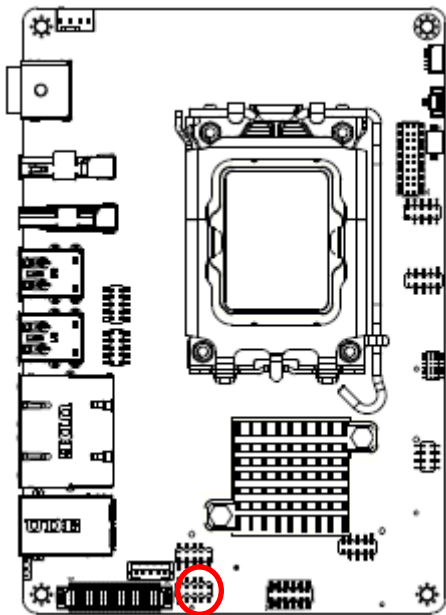
EPI-ARLS User’s Manual

2.3.4 eDP/LVDS connector (JLVDS1)



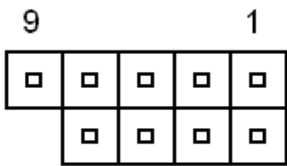
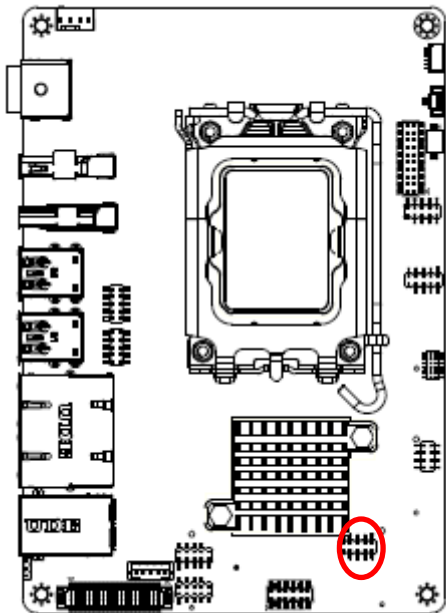
Signal	PIN	PIN	Signal
+3.3V	1	2	+5V
+3.3V	3	4	+5V
+3.3V	5	6	+5V
GND	7	8	GND
eDP_TX1+/ LVDS_A_DATA1+	9	10	eDP_HPD/ LVDS_A_DATA0+
eDP_TX1-/ LVDS_A_DATA1-	11	12	LVDS_A_DATA0-
GND	13	14	GND
LVDS_A_DATA3+	15	16	eDP_TX0+/ LVDS_A_DATA2+
LVDS_A_DATA3-	17	18	eDP_TX0-/ LVDS_A_DATA2-
GND	19	20	GND
LVDS_B_DATA1+	21	22	LVDS_B_DATA0+
LVDS_B_DATA1-	23	24	LVDS_B_DATA0-
GND	25	26	GND
LVDS_B_DATA3+	27	28	LVDS_B_DATA2+
LVDS_B_DATA3-	29	30	LVDS_B_DATA2-
GND	31	32	GND
LVDS_B_CLK+	33	34	eDP_AUX+/ LVDS_A_CLK+
LVDS_B_CLK-	35	36	eDP_AUX-/ LVDS_A_CLK-
GND	37	38	GND
+12V	39	40	+12V

2.3.5 Serial port 1 connector (JCOM1)



Signal	PIN	PIN	Signal
COM_DCD#_TXN_1	1	2	COM_RXD_TXP_1
COM_TXD_RXP_1	3	4	COM_DTR#_RXN_1
GND	5	6	COM_DSR#_1
COM_RTS#_1	7	8	COM_CTS#_1
COM_RI#_1	9		

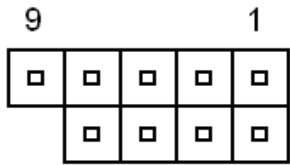
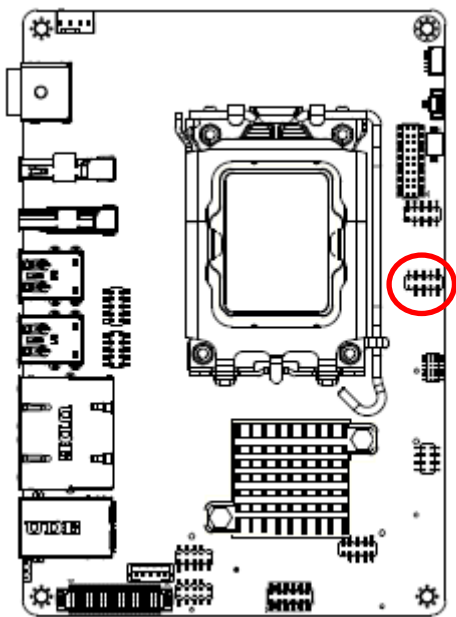
2.3.6 Serial port 2 connector (JCOM2)



Signal	PIN	PIN	Signal
COM_DCD#_TXN_2	1	2	COM_RXD_TXP_2
COM_TXD_RXP_2	3	4	COM_DTR#_RXN_2
GND	5	6	COM_DSR#_2
COM_RTS#_2	7	8	COM_CTS#_2
COM_RI#_2	9		

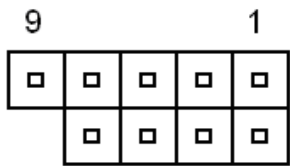
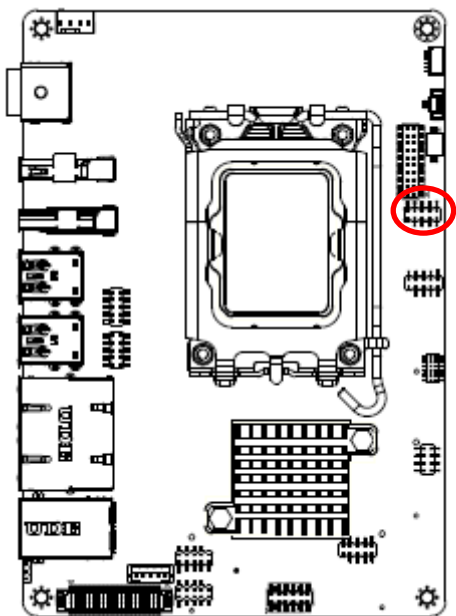
EPI-ARLS User’s Manual

2.3.7 Serial port 3 connector (JCOM3)



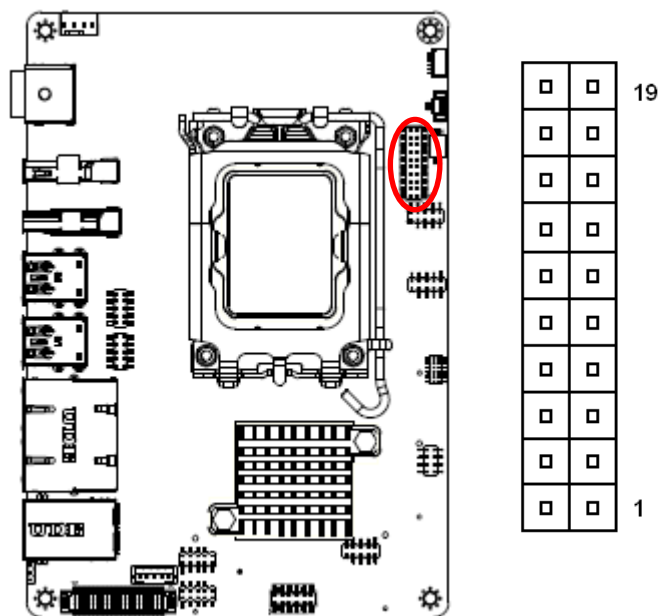
Signal	PIN	PIN	Signal
COM_DCD#_3	1	2	COM_RXD_3
COM_TXD_3	3	4	COM_DTR#_3
GND	5	6	COM_DSR#_3
COM_RTS#_3	7	8	COM_CTS#_3
COM_RI#_3	9		

2.3.8 Serial port 4 connector (JCOM4)



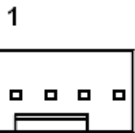
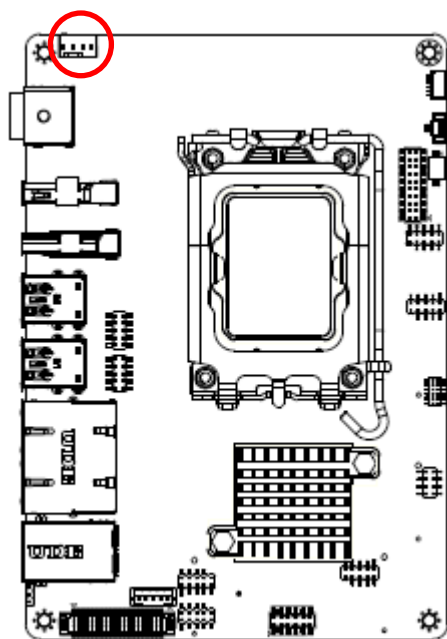
Signal	PIN	PIN	Signal
COM_DCD#_4	1	2	COM_RXD_4
COM_TXD_4	3	4	COM_DTR#_4
GND	5	6	COM_DSR#_4
COM_RTS#_4	7	8	COM_CTS#_4
COM_RI#_4	9		

2.3.9 General purpose I/O connector (JDIO1)



Signal	PIN	PIN	Signal
+5V	20	19	GND
SMB_SDA_5655	18	17	SMB_SCL_5655
DO7	16	15	DI7
DO6	14	13	DI6
DO5	12	11	DI5
DO4	10	9	DI4
DO3	8	7	DI3
DO2	6	5	DI2
DO1	4	3	DI1
DO0	2	1	DI0

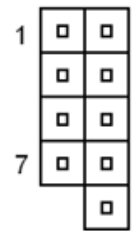
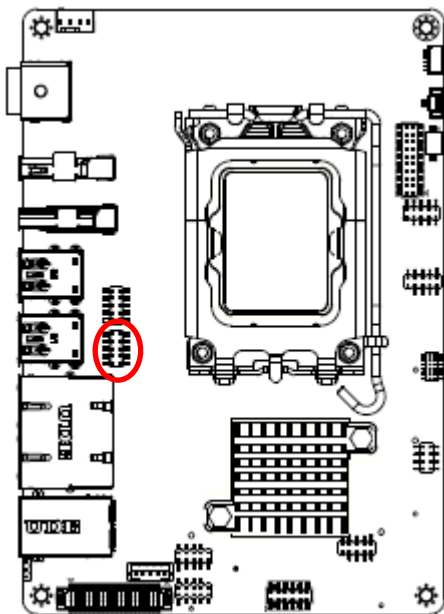
2.3.10 CPU fan connector (JCPU_FAN1)



Signal	PIN
GND	1
GND	2
CPUFANIN	3
FAN_PWM0	4

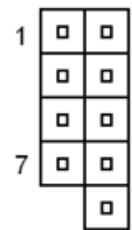
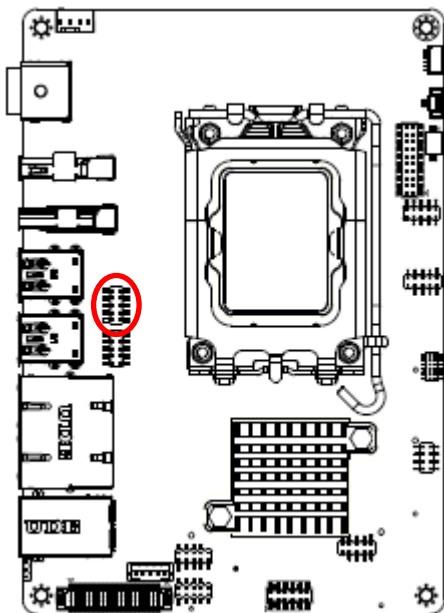
EPI-ARLS User’s Manual

2.3.11 USB2.0 connector (JUSB1)



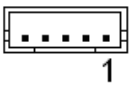
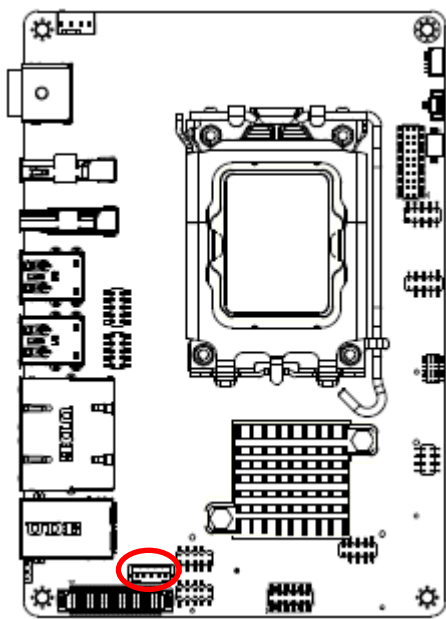
Signal	PIN	PIN	Signal
+5VSB	1	2	+5VSB
USB_N4	3	4	USB_N5
USB_P4	5	6	USB_P5
GND	7	8	GND
		10	GND

2.3.12 USB2.0 connector (JUSB2)



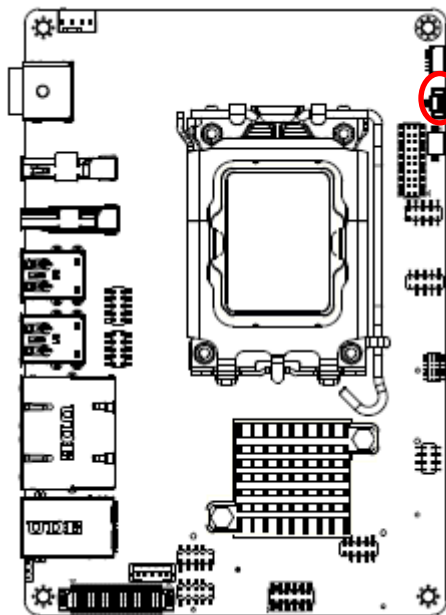
Signal	PIN	PIN	Signal
+5VSB	1	2	+5VSB
USB_N7	3	4	USB_N8
USB_P7	5	6	USB_P8
GND	7	8	GND
		10	GND

2.3.13 LCD inverter backlight connector (JBKL1)



Signal	PIN
+12V	1
GND	2
BKLEN	3
VBRIGHT	4
+5V	5

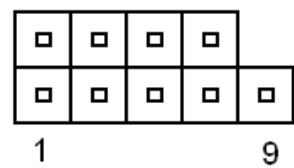
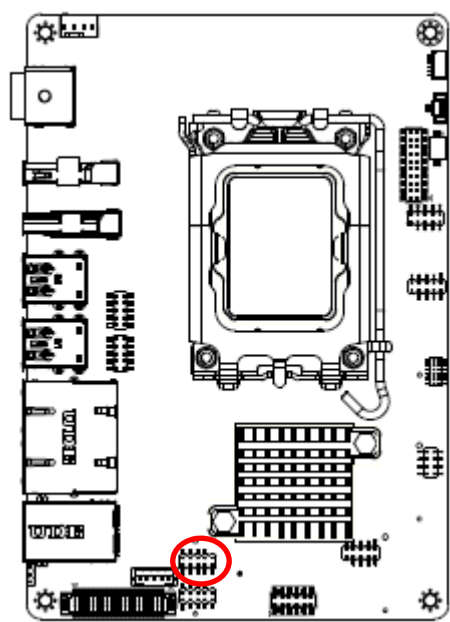
2.3.14 Battery connector (JBAT1)



Signal	PIN
GND	2
+RTCBAT	1

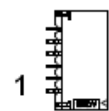
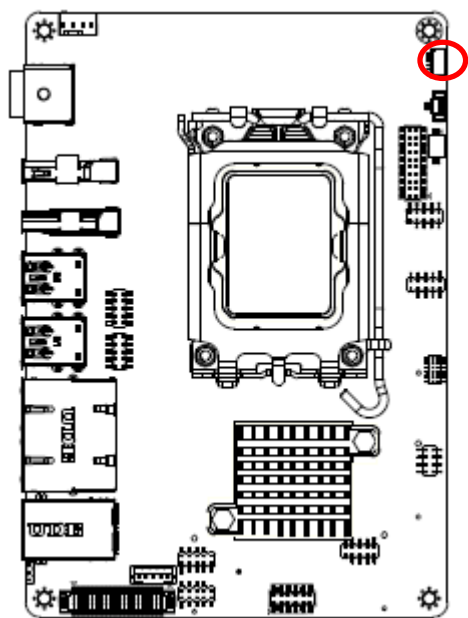
EPI-ARLS User’s Manual

2.3.15 Front Panel connector (JFP1)



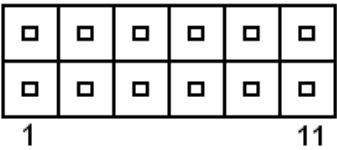
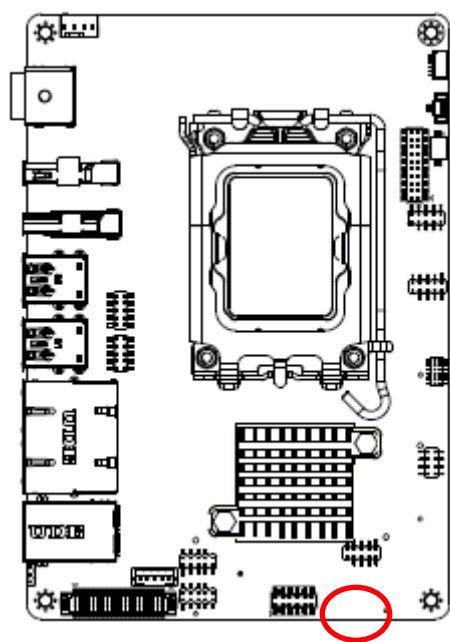
Signal	PIN	PIN	Signal
HDD_LED+	1	2	PWR_LED+
HDD_LED-	3	4	PWR_LED-
RSTBTN#_R	5	6	PWRBTN_IN#_R
GND	7	8	GND
NC	9		

2.3.16 PC connector (JPC1)



Signal	PIN
+3.3VSB	6
NC	5
VCCCORE_PMSCL	4
GND	3
VCCCORE_PMSDA	2
VCCCORE_nPMALERT	1

2.3.17 Audio connector (JAUDIO1)

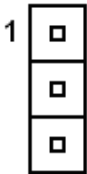
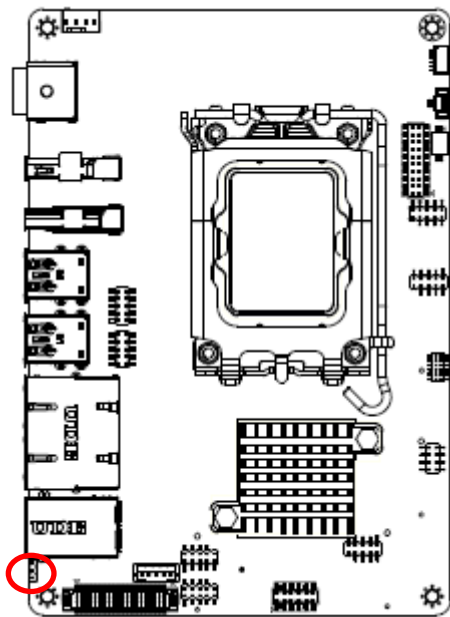


Signal	PIN	PIN	Signal
FRONT-R-OUT	1	2	FRONT-L-OUT
HD_AGND	3	4	HD_AGND
LINE1-R-IN	5	6	LINE1-L-IN
MIC1-R-IN	7	8	MIC1-L-IN
FRONT-JD	9	10	LINE1-JD
MIC1-JD	11	12	HD_AGND

2.3.17.1 Signal Description – Audio connector (JAUDIO1)

Signal	Signal Description
LINE1-JD	AUDIO IN (LINE_RIN/LIN)sense pin
FRONT-JD	AUDIO Out(ROUT/LOUT) sense pin
MIC1-JD	MIC IN (MIC_RIN/LIN) sense pin

2.3.18 EC connector (JEC1)



Signal	PIN
EC_SMCLK_DEBUG1	1
EC_SMDAT_DEBUG1	2
GND	3

3. Drivers Installation

All the drivers are available on Avalue Downloads Area (<https://www.avalue.com/en/support/download>). Type the model name and press Enter to find all the relevant software, utilities, and documentation.

Chipset 1Audio 1Graphics 1LAN 1Other 1

Chipset

Total 1 Files

No.	Release Date	Title	Description	Download
01	2023-09-20	Intel Chipset Driver for Win10 x64	Windows 10 64bit	

Audio

Total 1 Files

No.	Release Date	Title	Description	Download
01	2023-09-20	Realtek Audio Driver for Win10 x64	Windows 10 64bit	

(For reference only)



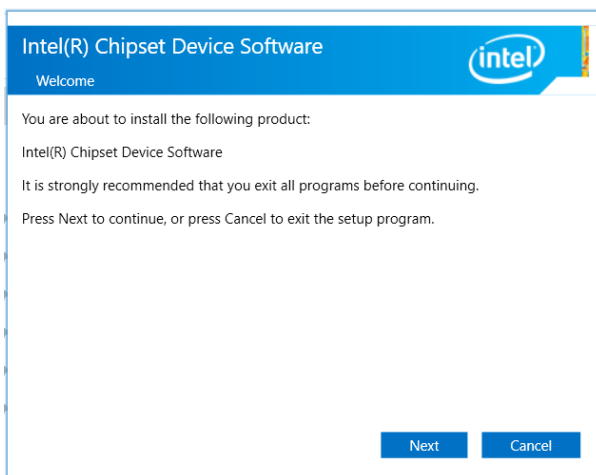
Note: Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

3.1 Install Chipset Driver

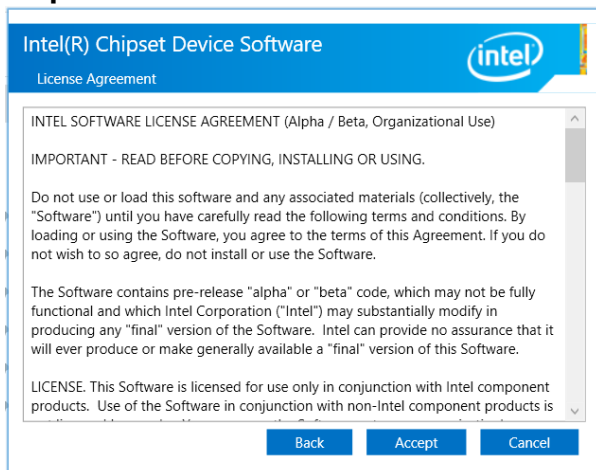
All drivers can be found on the Avalue Official Website:
www.avalue.com.



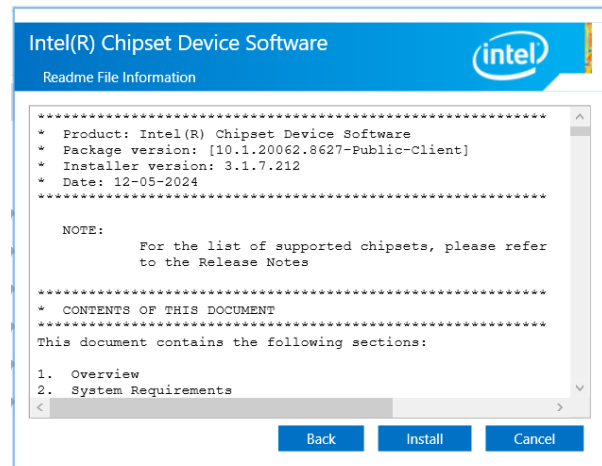
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system. If the warning message appears while the installation process, click Continue to go on.



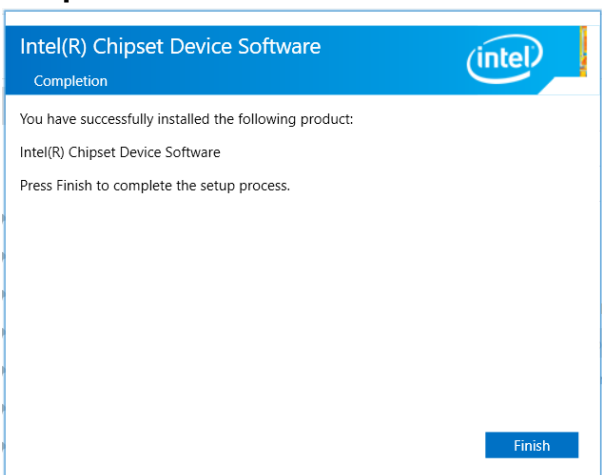
Step1. Click Next.



Step 2. Click Accept.



Step 3. Click Install.



Step 4. Click Finish to complete setup.

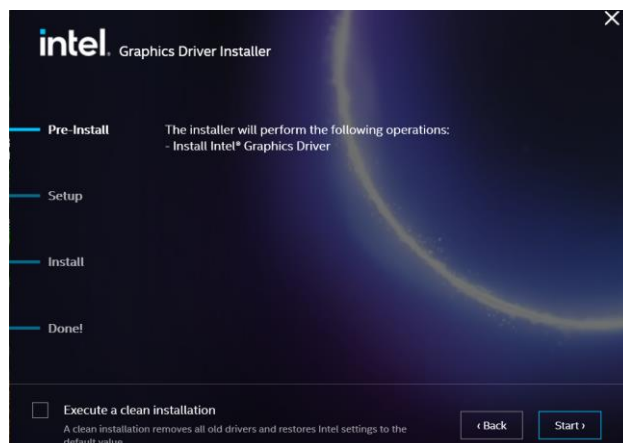
3.2 Install VGA Driver

All drivers can be found on the Avalue Official Website:

www.avalue.com.



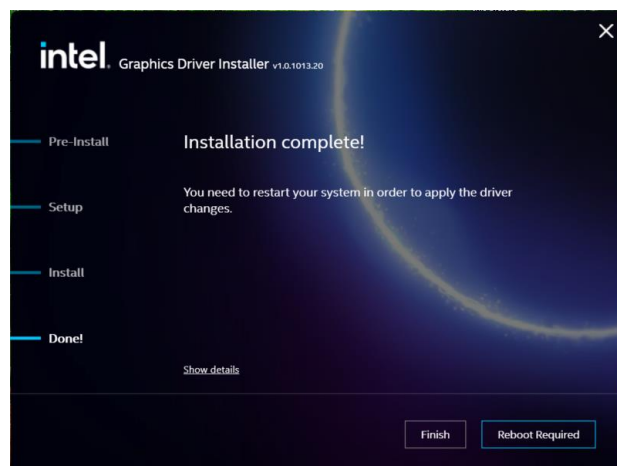
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



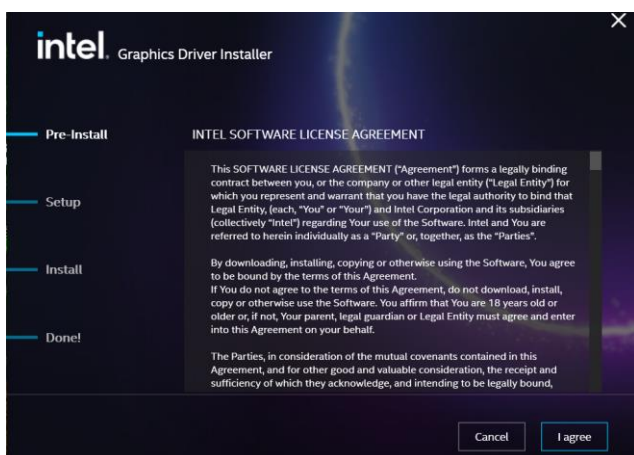
Step 3. Click **Start**.



Step 1. Click **Begin installation**.



Step 4. Click **Finish** to complete setup.



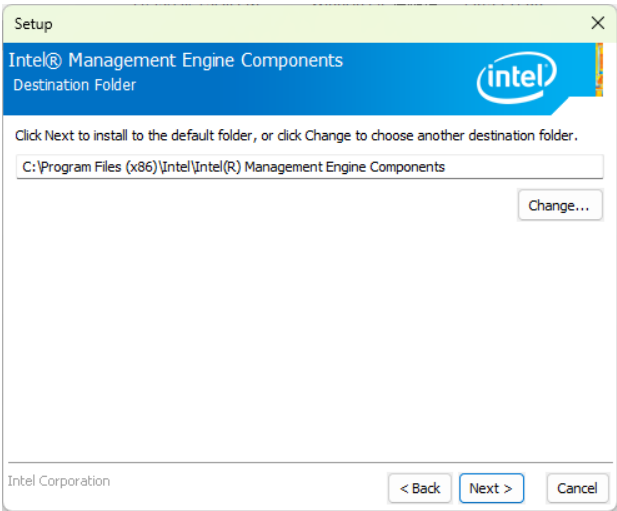
Step 2. Click **I agree**.

3.3 Install ME Driver

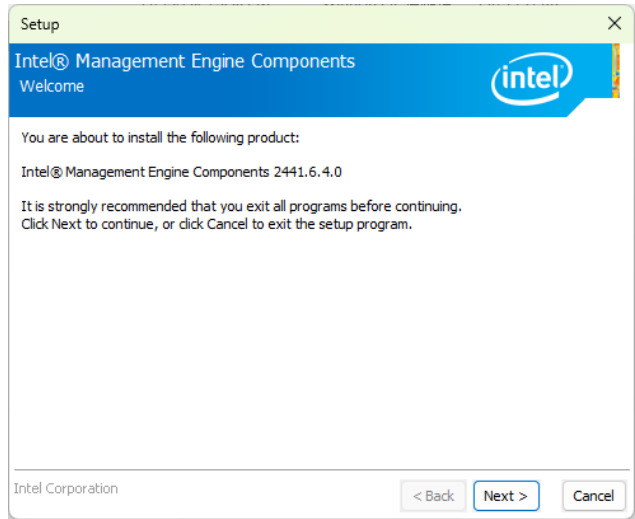
All drivers can be found on the Avalue Official Website:
www.avalue.com.



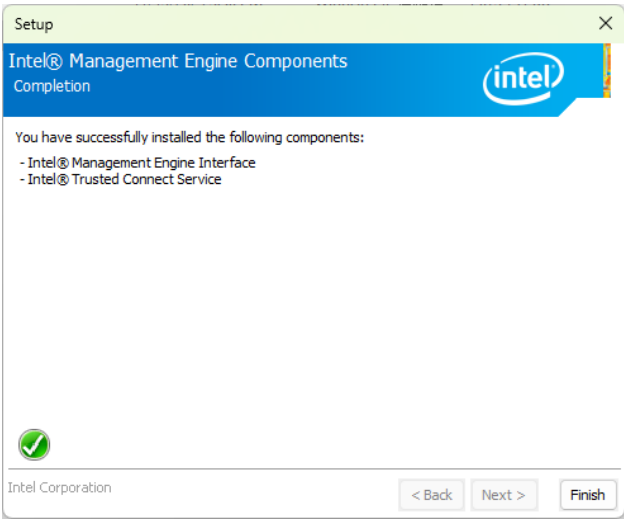
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



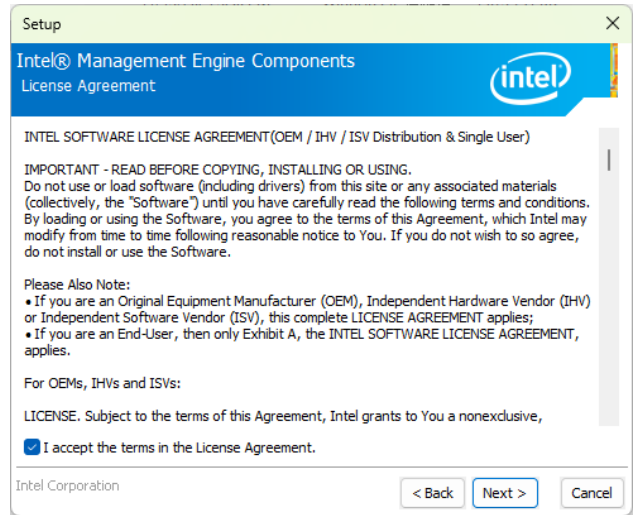
Step 3. Click Next.



Step 1. Click Next to continue installation.



Step 4. Click Finish to complete setup.



Step 2. Click Next.

EPI-ARLS User's Manual

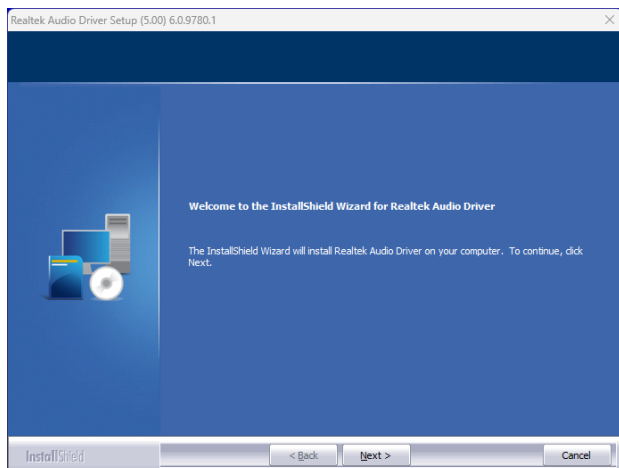
3.4 Install Audio Driver

All drivers can be found on the Avalue Official Website:

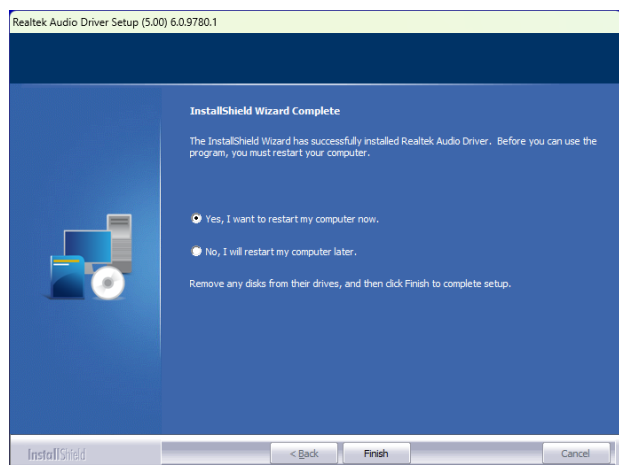
www.avalue.com.



Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



Step 1. Click Next.



Step 2. Click Finish to complete setup.

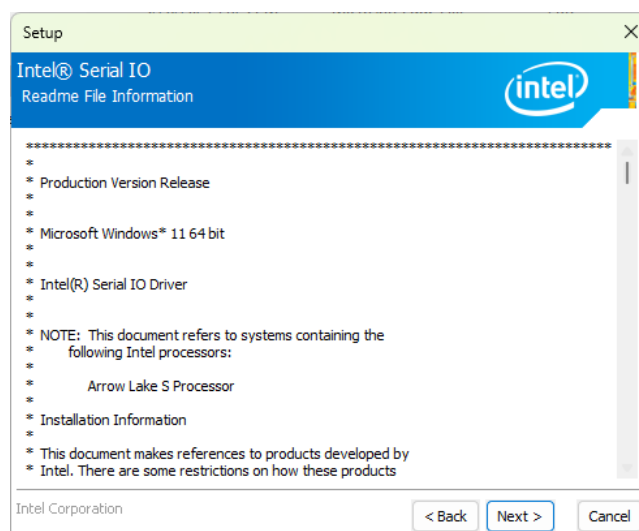
3.5 Install Serial IO Driver

All drivers can be found on the Avalue Official Website:

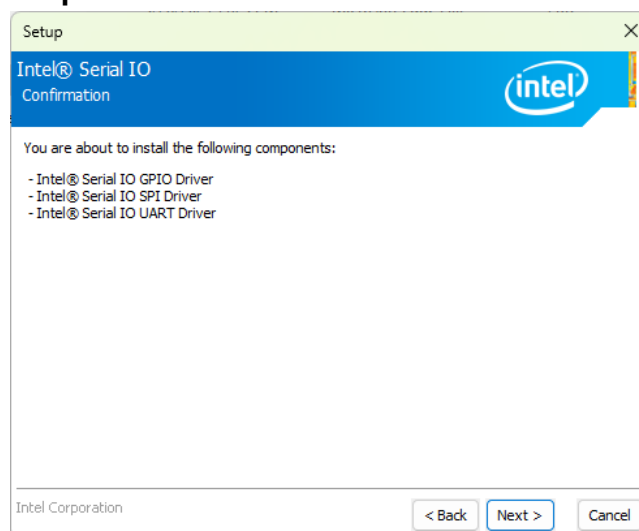
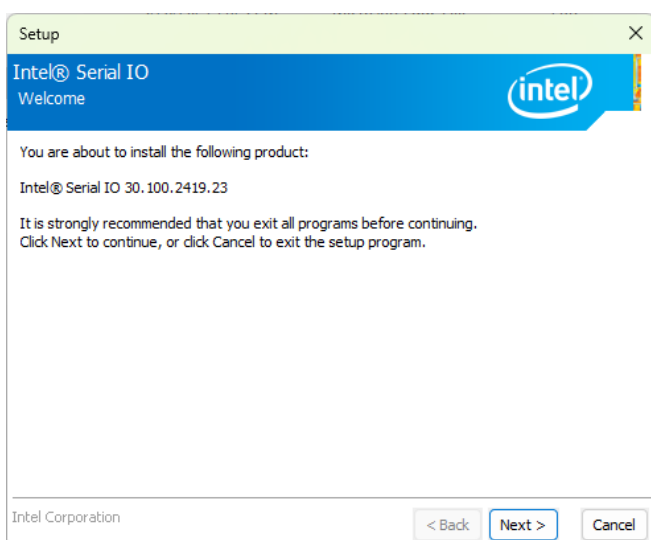
www.avalue.com.



Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.

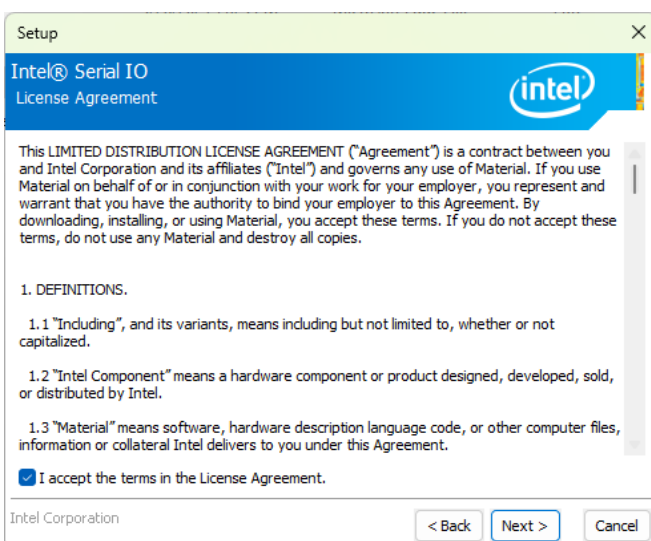


Step 3. Click Next.

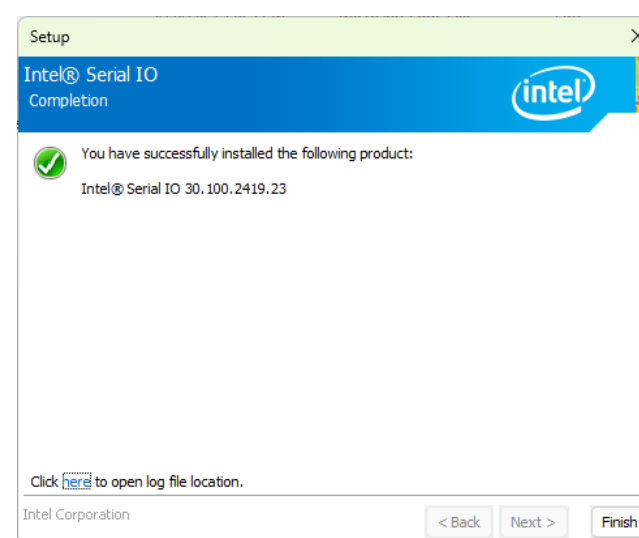


Step 4. Click Next.

Step 1. Click Next to continue installation.



Step 2. Click Next.



Step 5. Click Finish to complete setup.

EPI-ARLS User's Manual

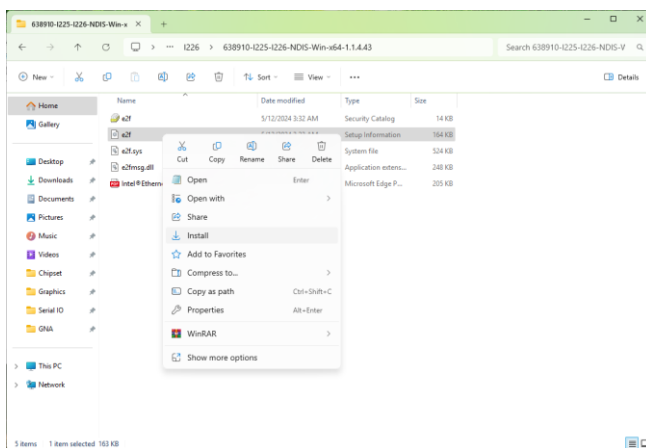
3.6 Install Ethernet Driver

All drivers can be found on the Avalue Official Website:

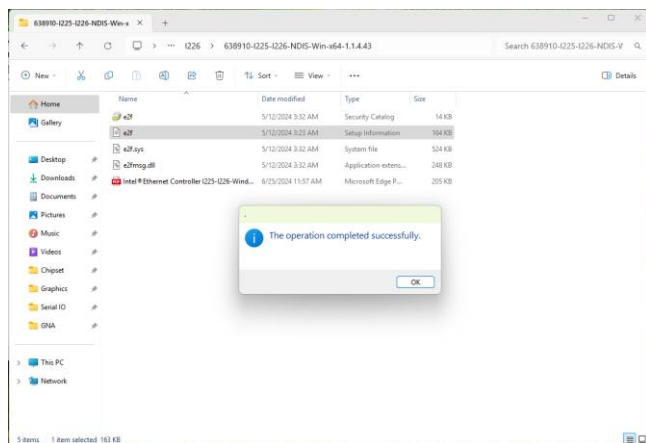
www.avalue.com.



Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



Step 1. Click Install.



Step 2. Setup completed.

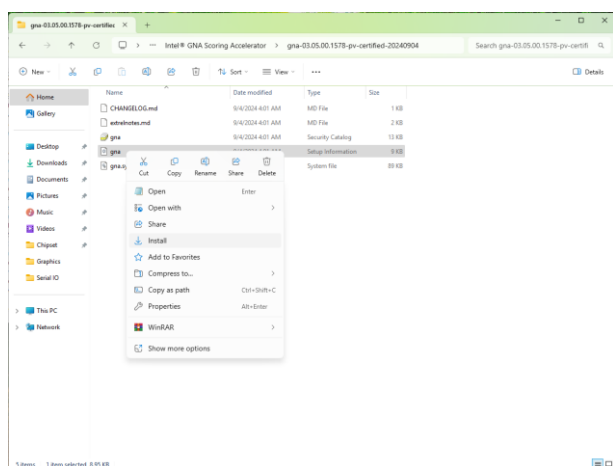
3.7 Install GNA Driver

All drivers can be found on the Avalue Official Website:

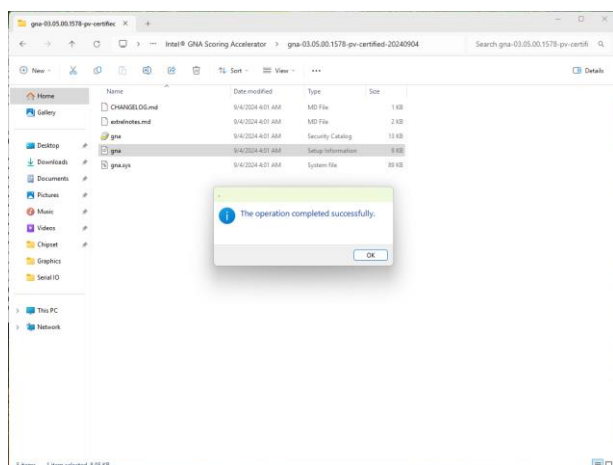
www.avalue.com.



Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



Step 1. Click Install.



Step 2. Setup completed.

EPI-ARLS User's Manual

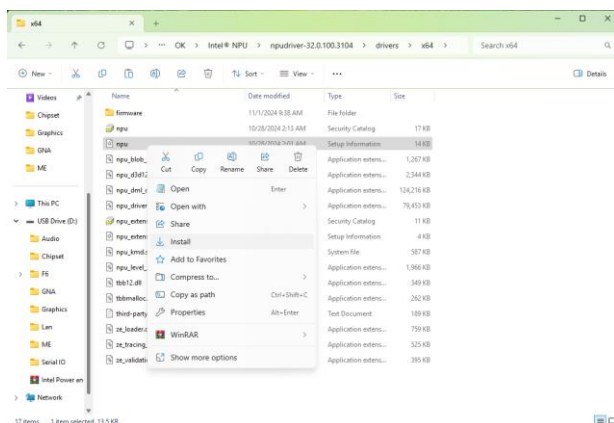
3.8 Install NPU Driver

All drivers can be found on the Avalue Official Website:

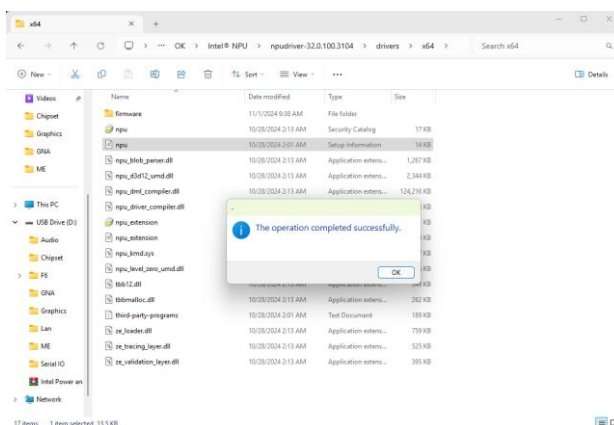
www.avalue.com.



Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



Step 1. Click Install.



Step 2. Setup completed.

4.BIOS Setup

4.1 Introduction

The BIOS setup program allows users to modify the basic system configuration. In this following chapter will describe how to access the BIOS setup program and the configuration options that may be changed.

4.2 Starting Setup

AMI BIOS™ is immediately activated when you first power on the computer. The BIOS reads the system information contained in the NVRAM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

By pressing <ESC> or immediately after switching the system on, or

By pressing the <ESC> or key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <ESC> or to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

4.3 Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Button	Description
↑	Move to previous item
↓	Move to next item
←	Move to the item in the left hand
→	Move to the item in the right hand
Esc key	Main Menu -- Quit and not save changes into NVRAM Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Previous Values
F3 key	Optimized defaults
F4 key	Save & Exit Setup

- **Navigating Through The Menu Bar**

Use the left and right arrow keys to choose the menu you want to be in.



Note: Some of the navigation keys differ from one screen to another.

- **To Display a Sub Menu**

Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>. A “➤” pointer marks all sub menus.

4.4 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the <Enter> key again.

4.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AMI BIOS supports an override to the NVRAM settings which resets your system to its defaults.

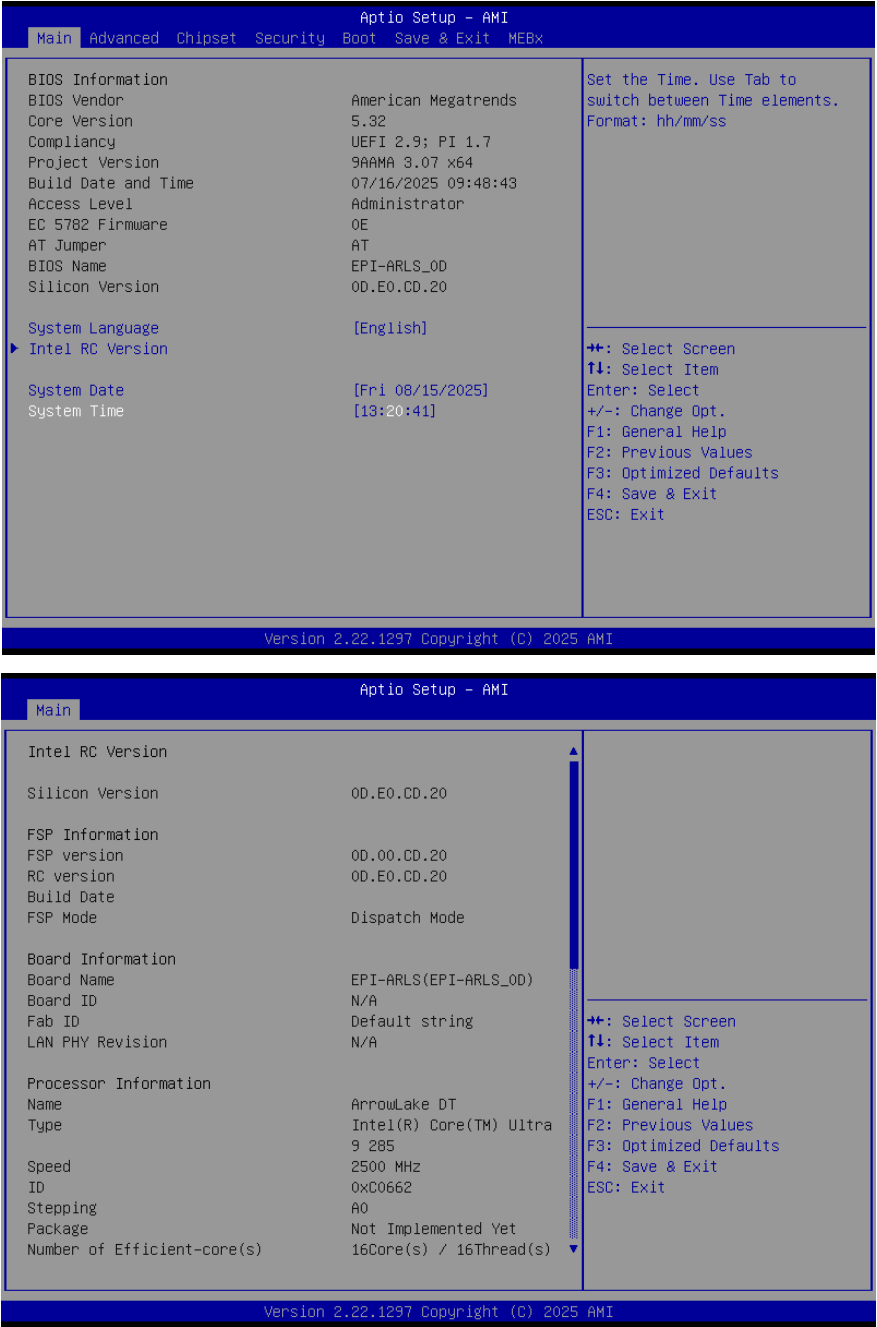
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

4.6 BIOS setup

Once you enter the Aptio Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

4.6.1 Main Menu

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



4.6.1.1 System Language

This option allows choosing the system default language.

4.6.1.2 System Date

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

4.6.1.3 System Time

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

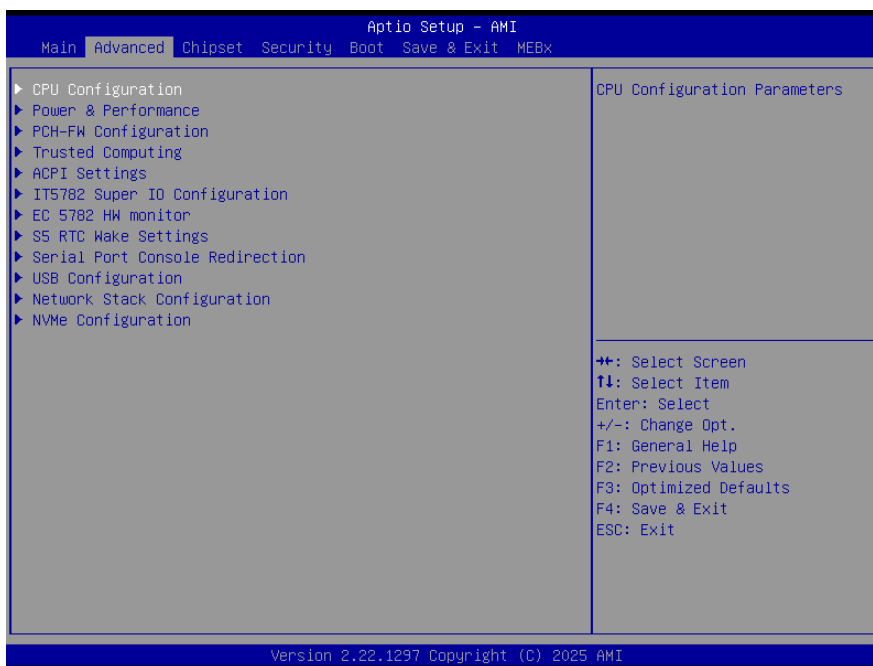


Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.

Visit the Avalue website (www.avalue.com) to download the latest product and BIOS information.

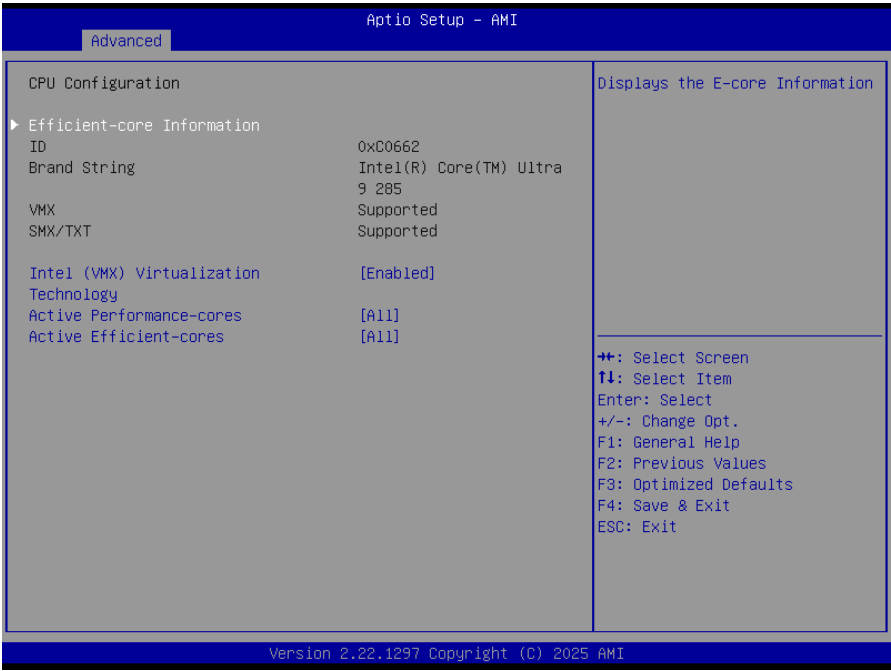
4.6.2 Advanced Menu

This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.



4.6.2.1 CPU Configuration

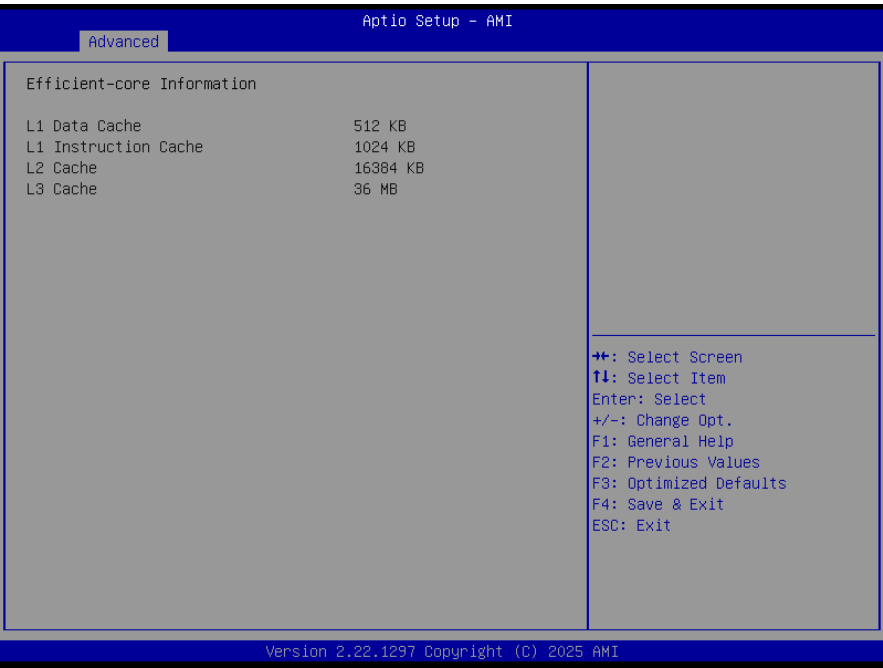
Use the CPU configuration menu to view detailed CPU specification and configure the CPU.



Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled Enabled [Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Performance-cores	All[Default] 7 6 5 4 3 2 1	Number of P-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.
Active Efficient-cores	All[Default] /31/30/29/28/27/26/25/24/23/22/21/20/19/18/17/16/15/14/13/12/11/10/9/8/7/6/5/4/3/2/1	Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.

EPI-ARLS User’s Manual

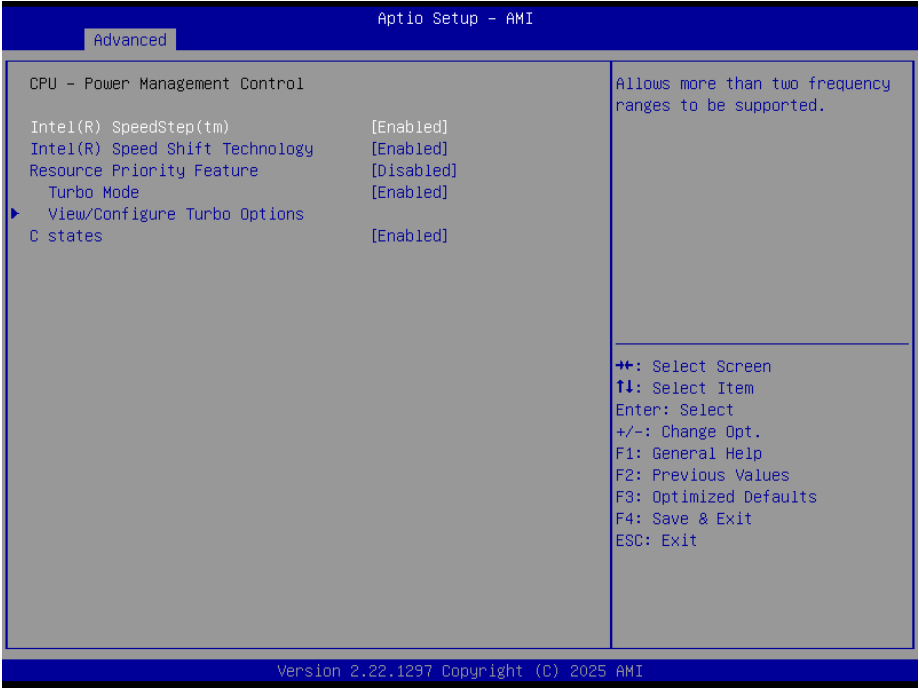
4.6.2.1.1 Efficient-core Information



4.6.2.2 Power & Performance



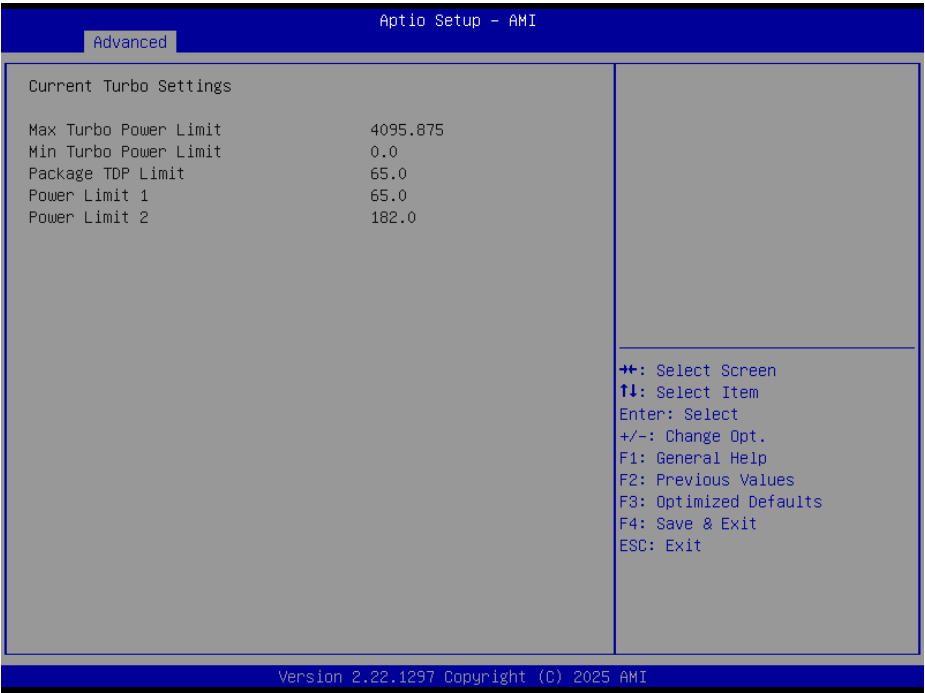
4.6.2.2.1 CPU – Power Management Control



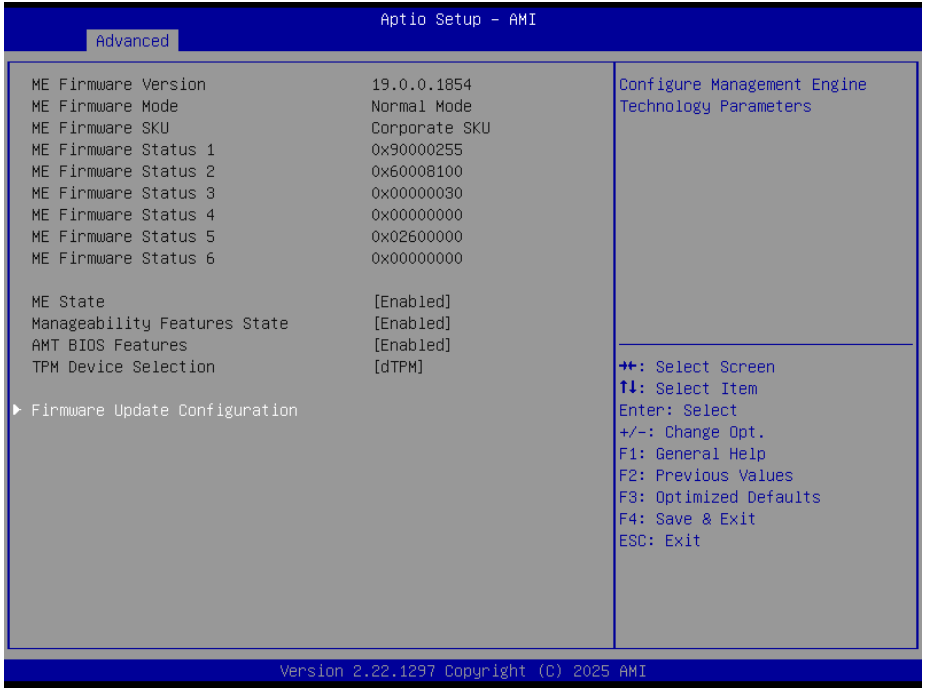
Item	Option	Description
Intel® SpeedStep™	Enabled[Default], Disabled	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Enabled[Default], Disabled	Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Resource Priority Feature	Disabled[Default] Enabled	Enable/Disable Resource Priority Feature support.
Turbo Mode	Enabled[Default], Disabled	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
C States	Enabled[Default] Disabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

EPI-ARLS User’s Manual

4.6.2.3.1.1 View/Configure Turbo Options



4.6.2.3 PCH-FW Configuration

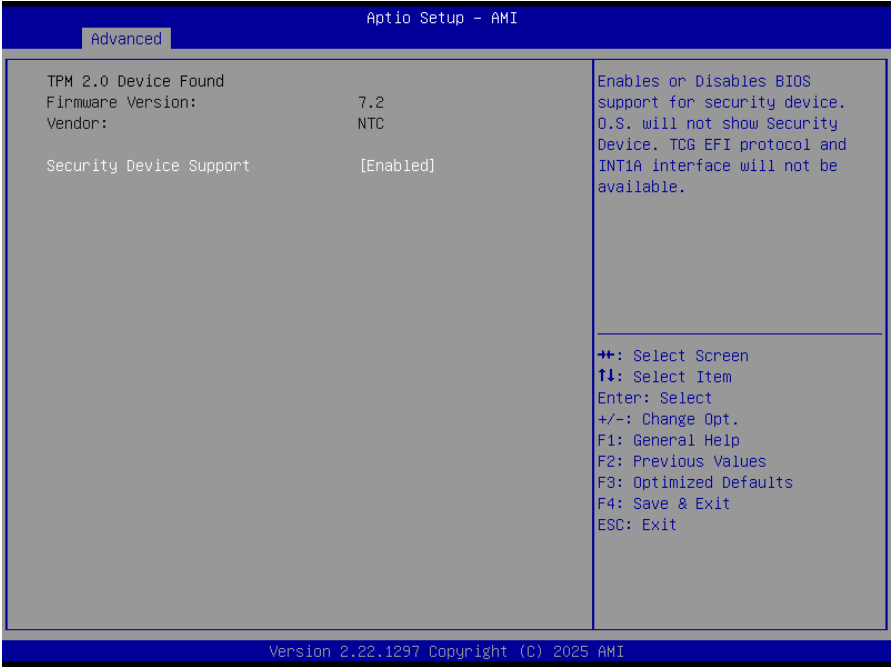


4.6.2.3.1 Firmware Update Configuration



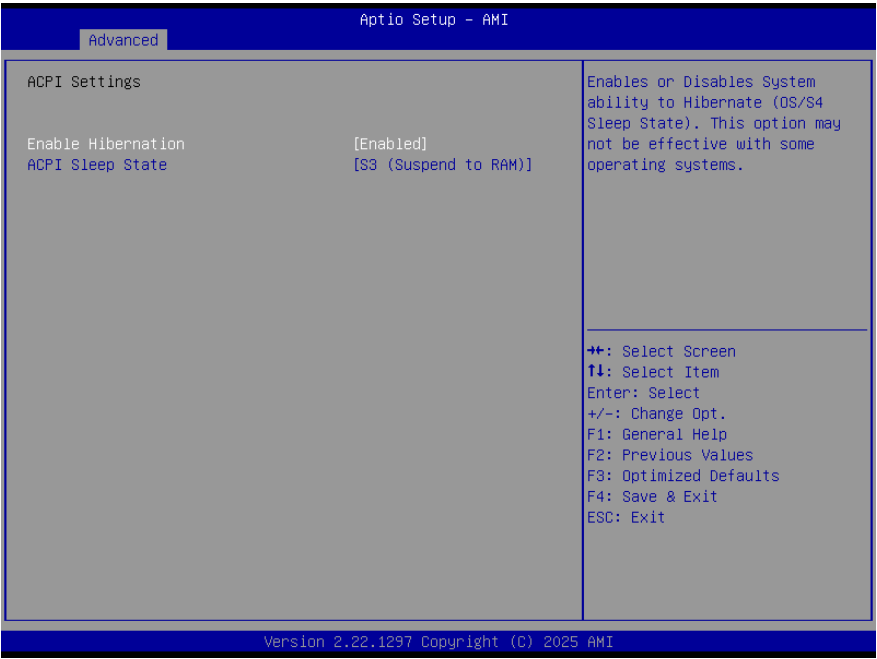
Item	Option	Description
ME FW Image Re-Flash	Disabled[Default], Enabled	Enable/Disable Me FW Image Re-Flash function.

4.6.2.4 Trusted Computing



Item	Options	Description
Security Device Support	Disable, Enable[Default]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

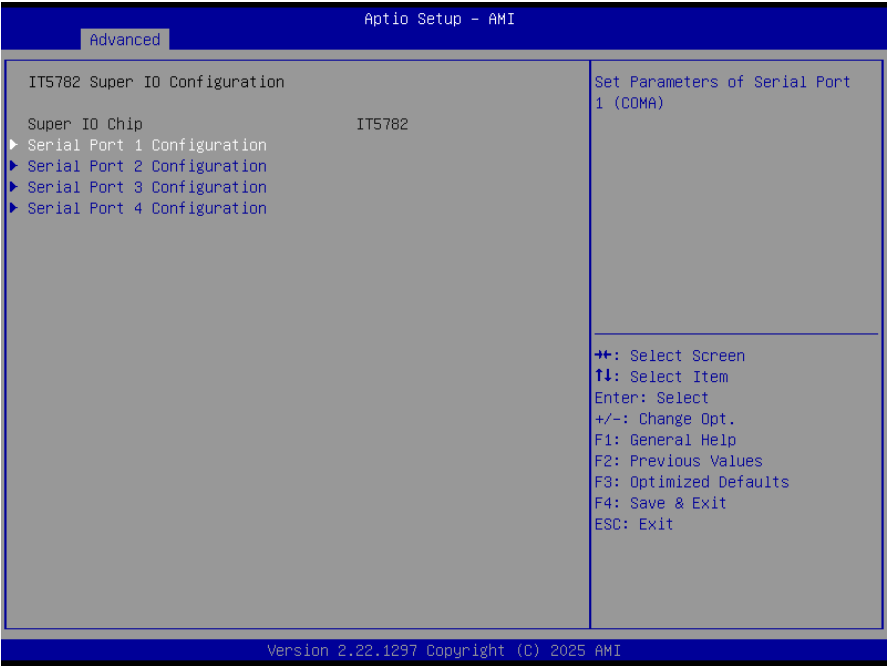
4.6.2.5 APCI Settings



Item	Options	Description
Enable Hibernation	Disabled Enabled [Default] ,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM) [Default]	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

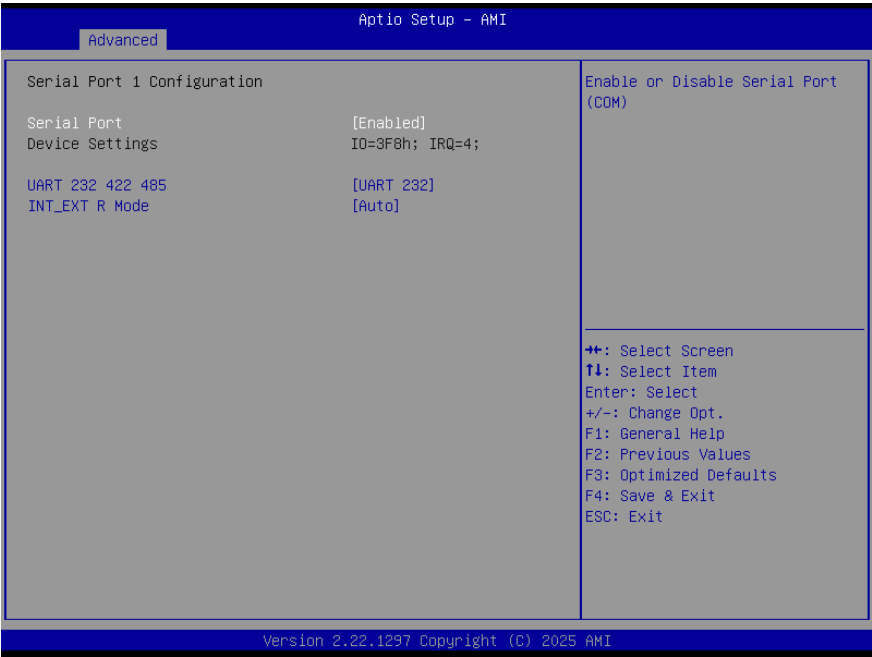
4.6.2.6 IT5782 Super IO Configuration

You can use this item to set up or change the IT5782 Super IO configuration for serial ports. Please refer to 4.6.2.6.1 ~ 4.6.2.6.4 for more information.



Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).

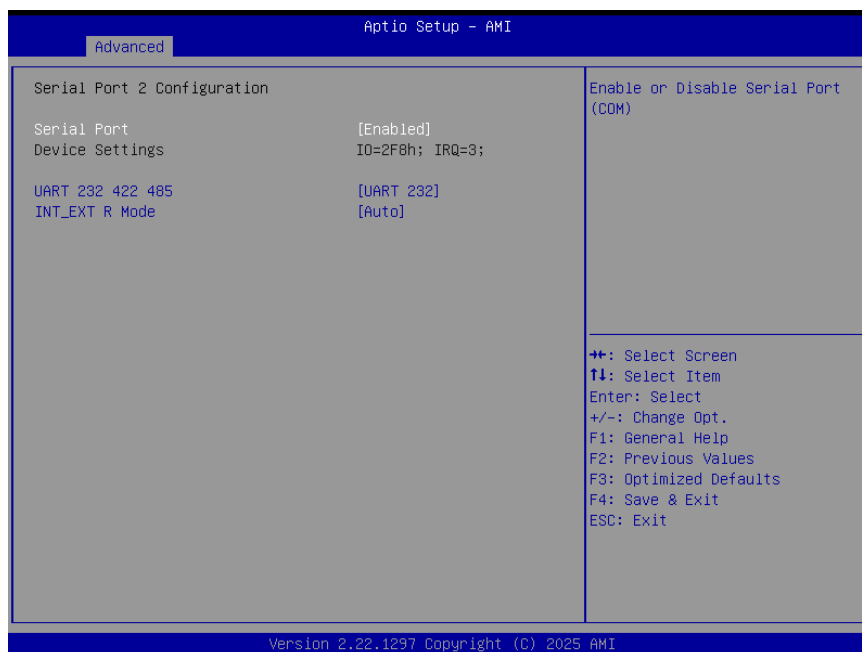
4.6.2.6.1 Serial Port 1 Configuration



EPI-ARLS User's Manual

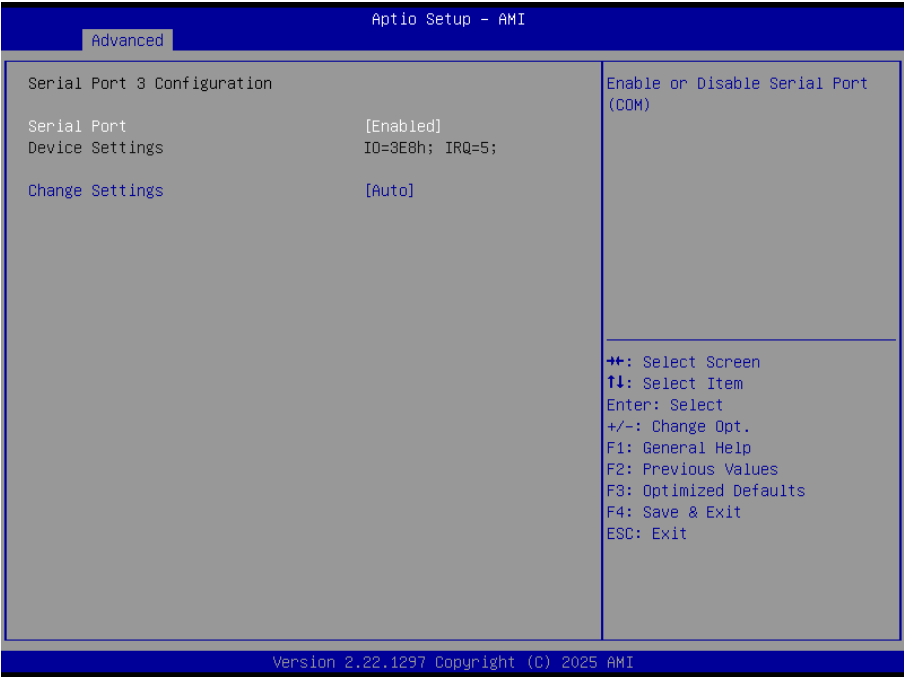
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232[Default] UART 422 UART 485	Change the Serial Port as RS232/422/485.
INT_EXT R Mode	AUTO[Default] INT + EXT R INT R EXT R Non INT + EXT R	Change the INT_EXT as Auto/INT/EXT

4.6.2.6.2 Serial Port 2 Configuration



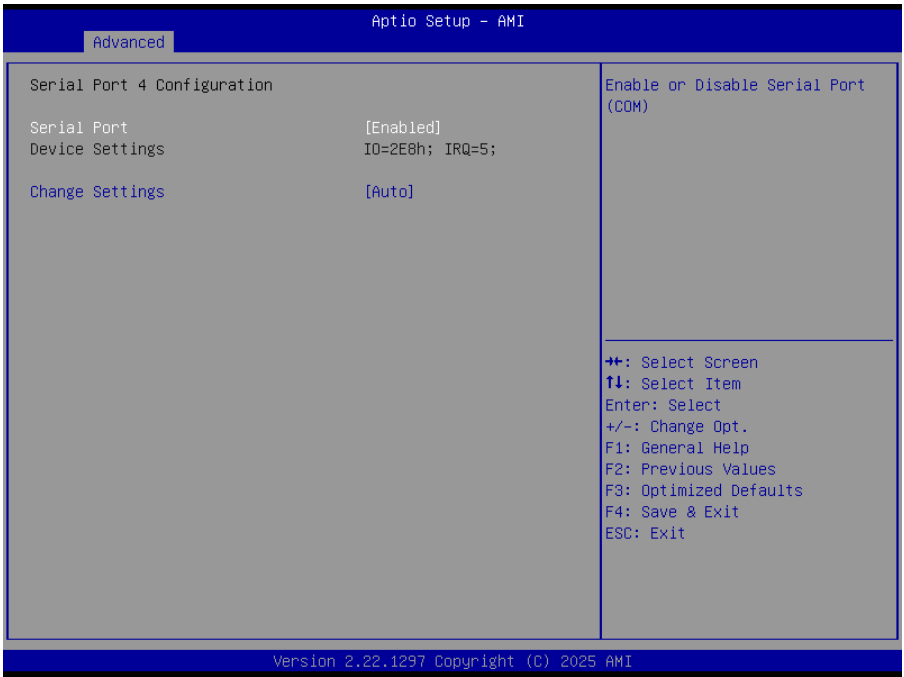
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232[Default] UART 422 UART 485	Change the Serial Port as RS232/422/485.
INT_EXT R Mode	AUTO[Default] INT + EXT R INT R EXT R Non INT + EXT R	Change the INT_EXT as Auto/INT/EXT

4.6.2.6.3 Serial Port 3 Configuration



Item	Option	Description
Serial Port	Enabled [Default] , Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto [Default] IO=3E8h; IRQ=7, IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal settings for Super IO Device.

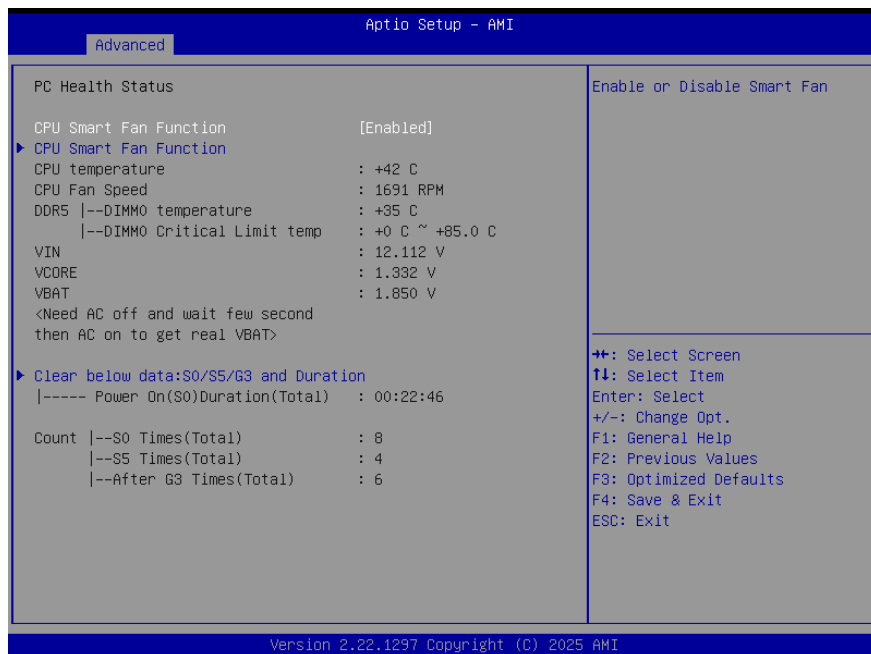
4.6.2.6.4 Serial Port 4 Configuration

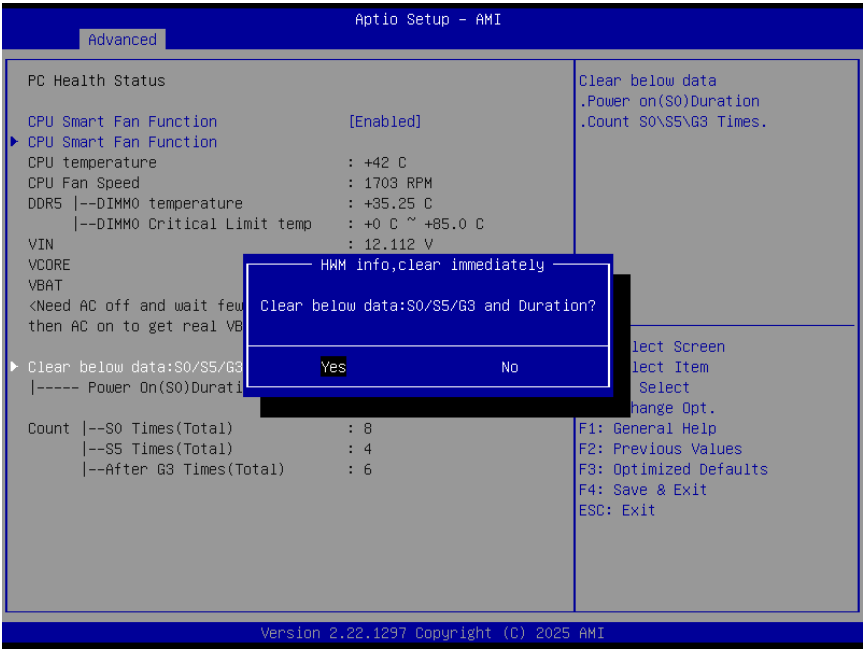


EPI-ARLS User's Manual

Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default] IO=2E8h; IRQ=7, IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal settings for Super IO Device.

4.6.2.7 EC 5782 HW Monitor





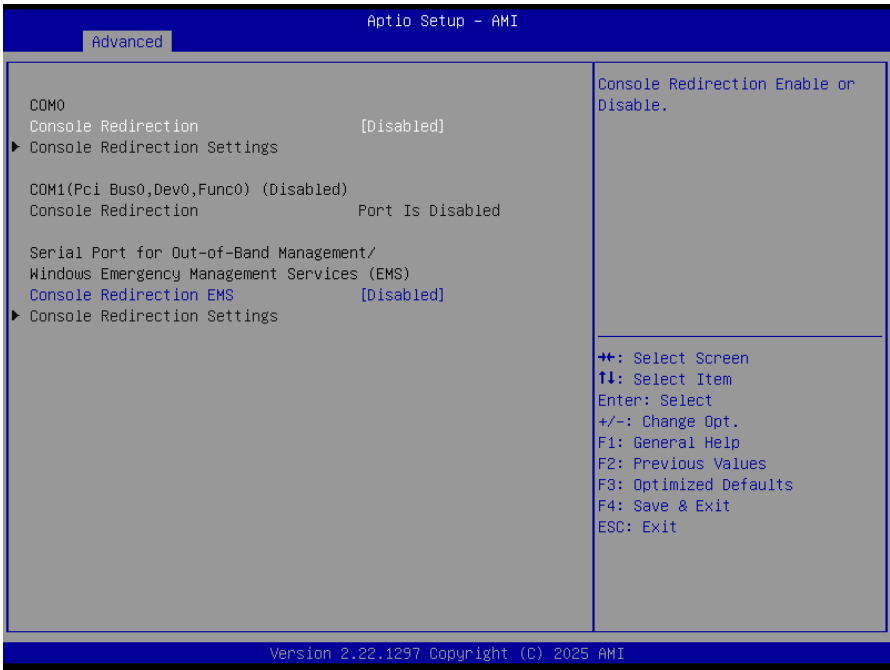
Item	Options	Description
CPU Smart Fan Function	Enabled[Default] Disabled	Enables or Disables Smart Fan.
Clear below data: S0/S5/G3 and Duration		Clear below data. Power on(S0) Duration. Count S0/S5/G3 Times.

4.6.2.8 S5 RTC Wake Settings



Item	Options	Description
Wake system from S5	Disabled[Default], Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

4.6.2.9 Serial Port Console Redirection



Item	Options	Description
Console Redirection	Disabled[Default], Enabled	Console Redirection Enable or Disable.
Console Redirection EMS	Disabled[Default], Enabled	Console Redirection Enable or Disable.

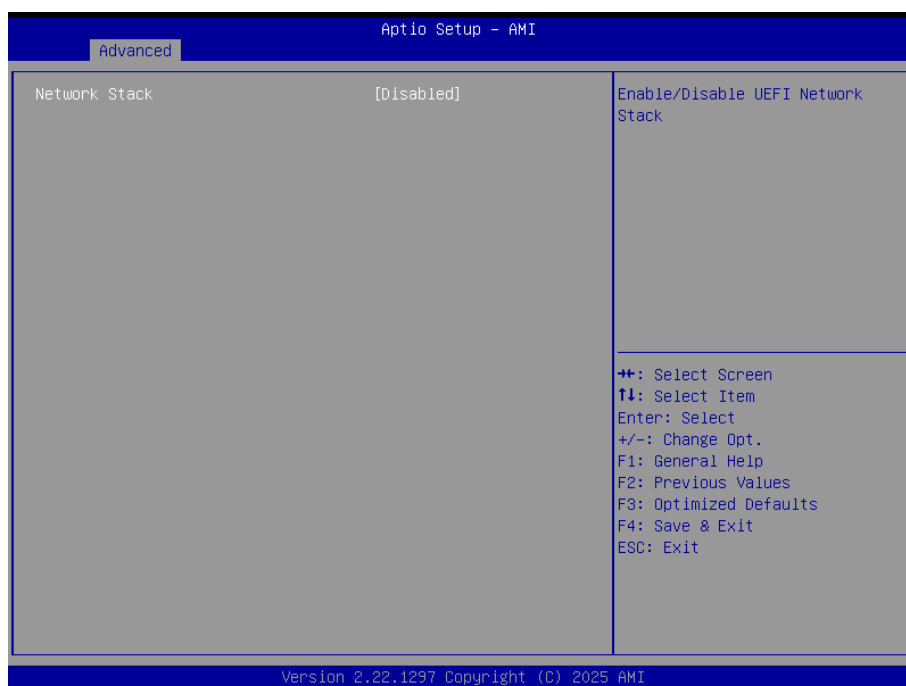
4.6.2.10 USB Configuration

The USB Configuration menu helps read USB information and configures USB settings.



Item	Options	Description
XHCI Hand-off	Enabled [Default] Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled Enabled [Default]	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec [Default]	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec [Default] 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto [Default] Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

4.6.2.11 Network Stack Configuration



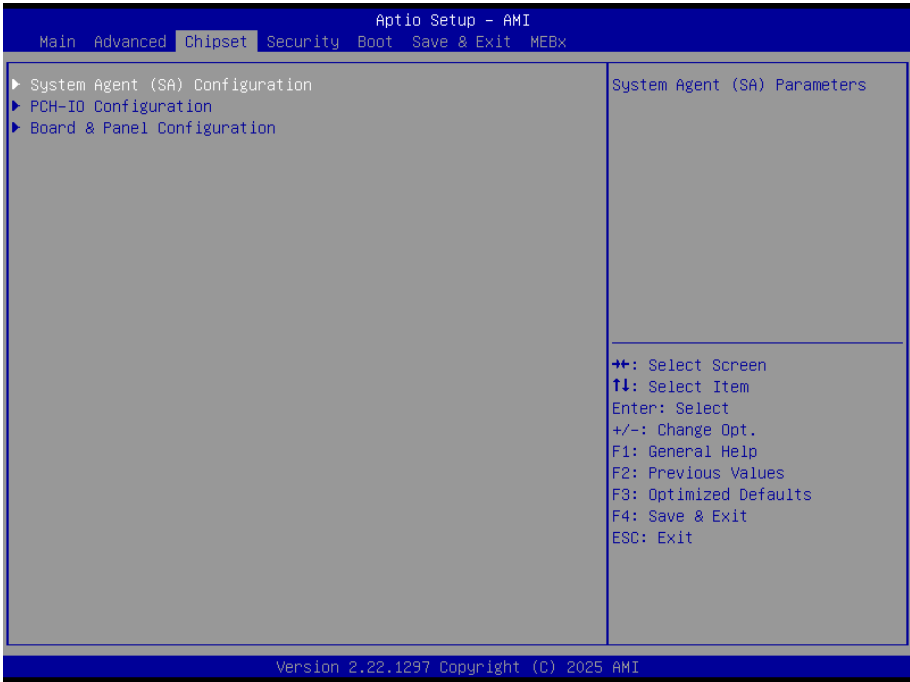
Item	Options	Description
Network Stack	Enabled Disabled [Default]	Enable/Disable UEFI Network Stack.

EPI-ARLS User's Manual

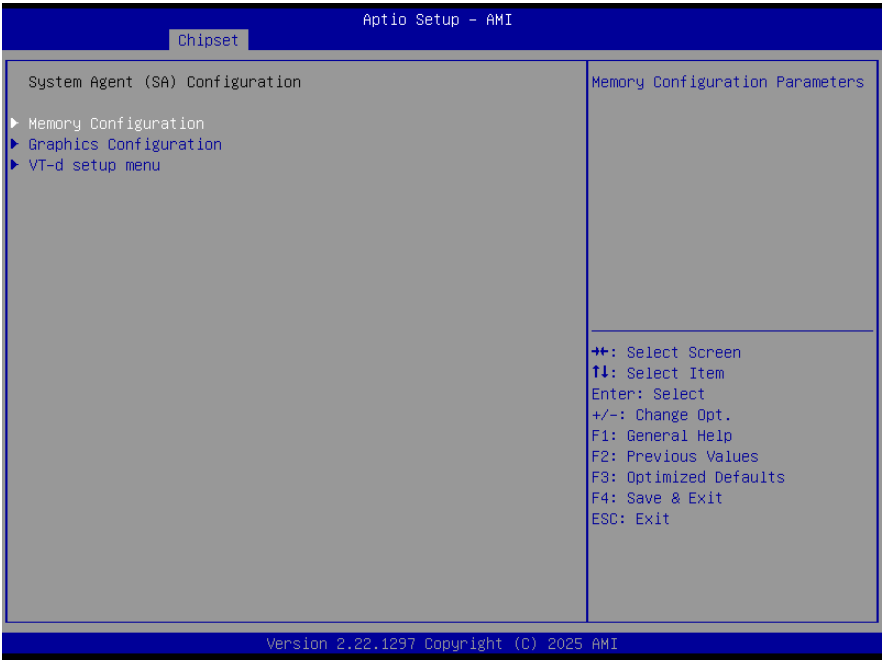
4.6.2.12 NVMe Configuration



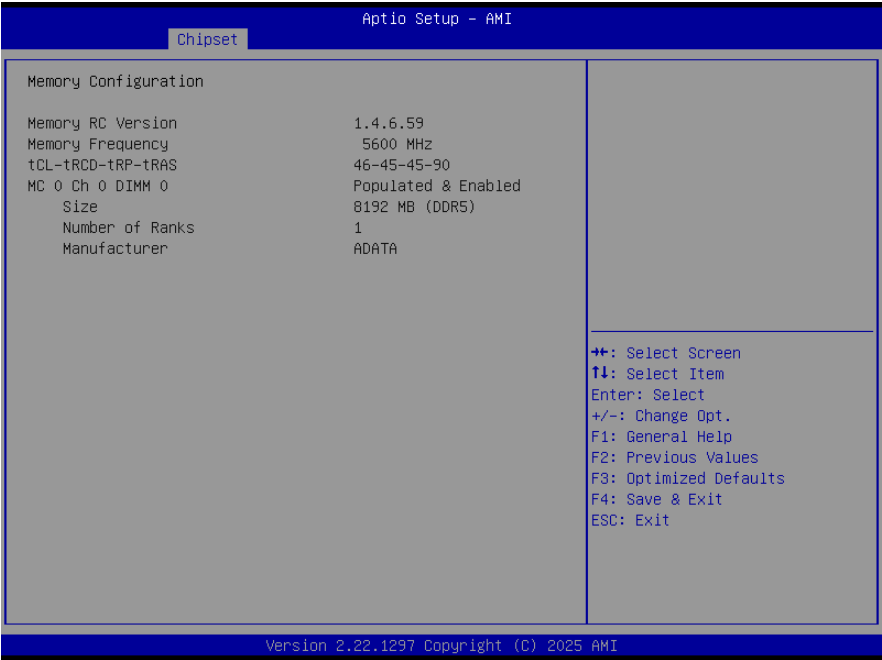
4.6.3 Chipset



4.6.3.1 System Agent (SA) Configuration

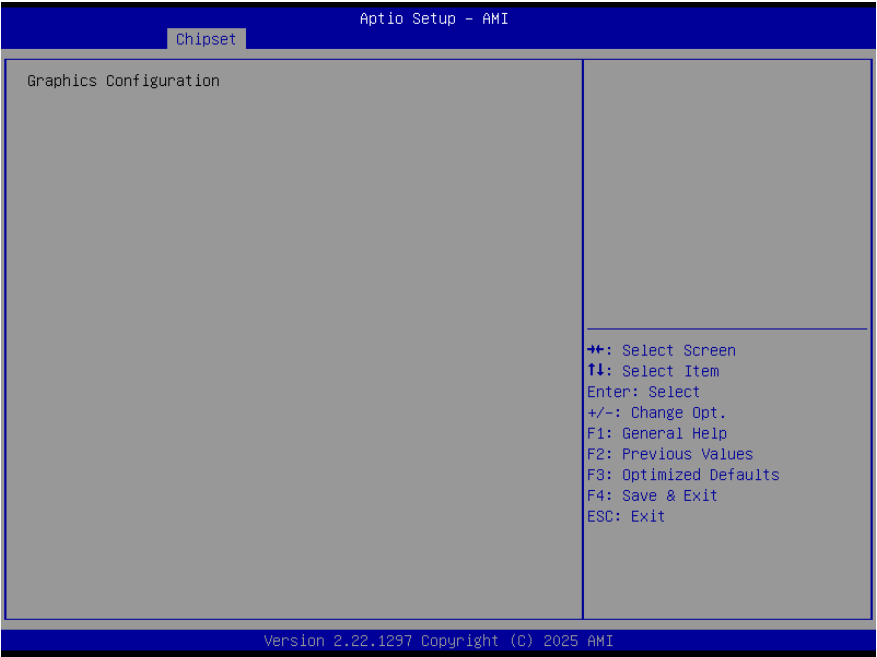


4.6.3.1.1 Memory Configuration

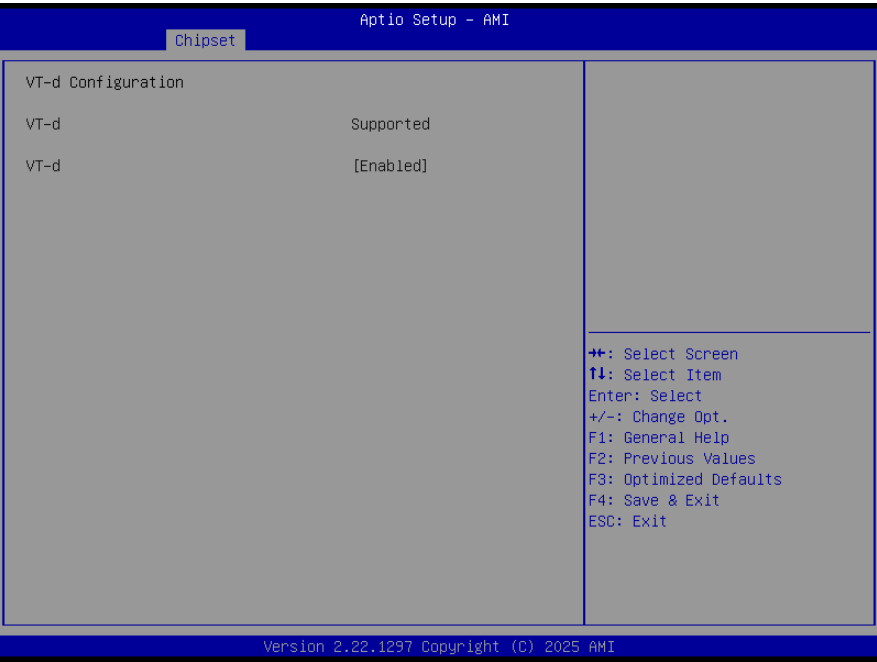


EPI-ARLS User’s Manual

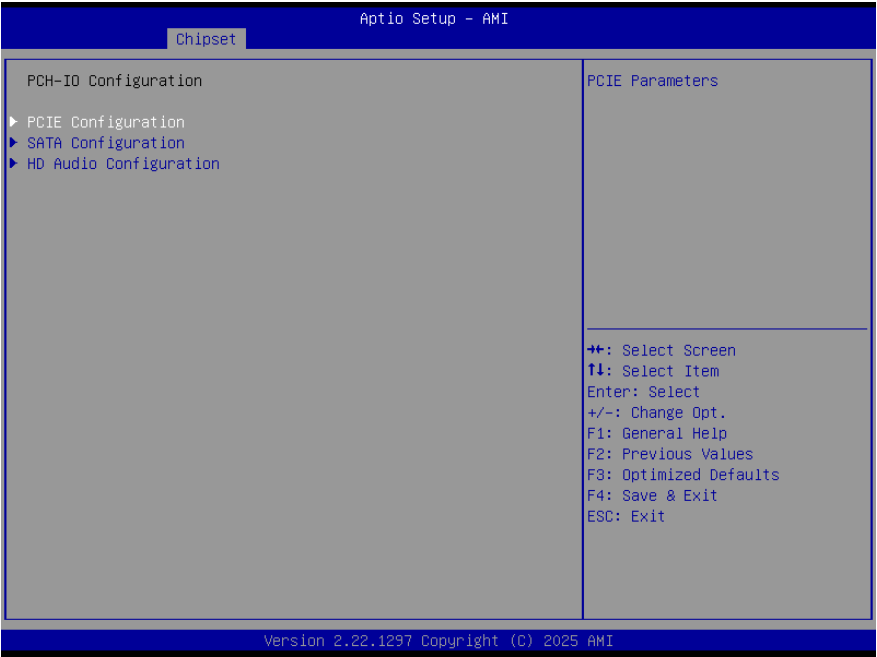
4.6.3.1.2 Graphics Configuration



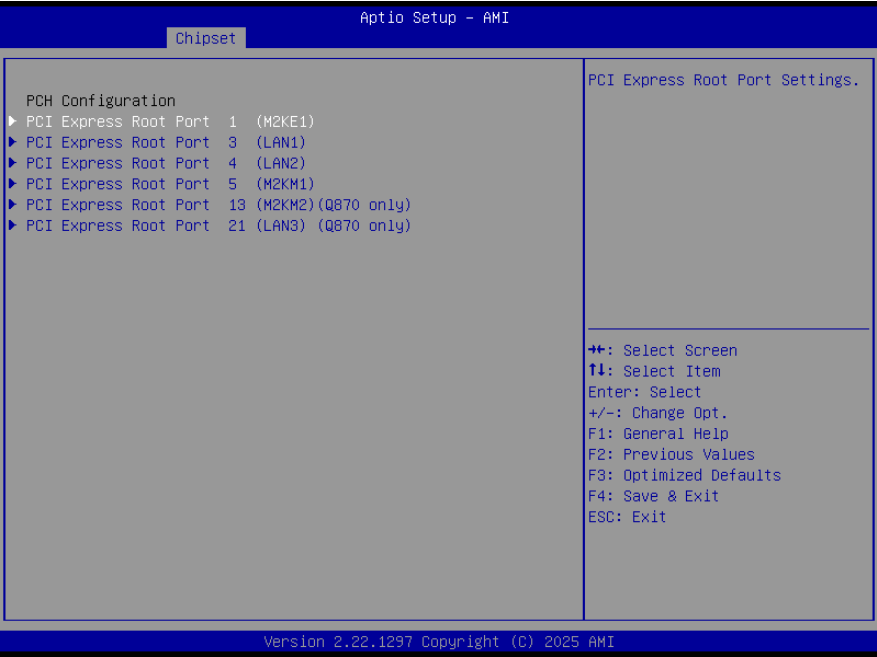
4.6.3.1.3 VT-d setup menu



4.6.3.2 PCH-IO Configuration



4.6.3.2.1 PCI Express Configuration



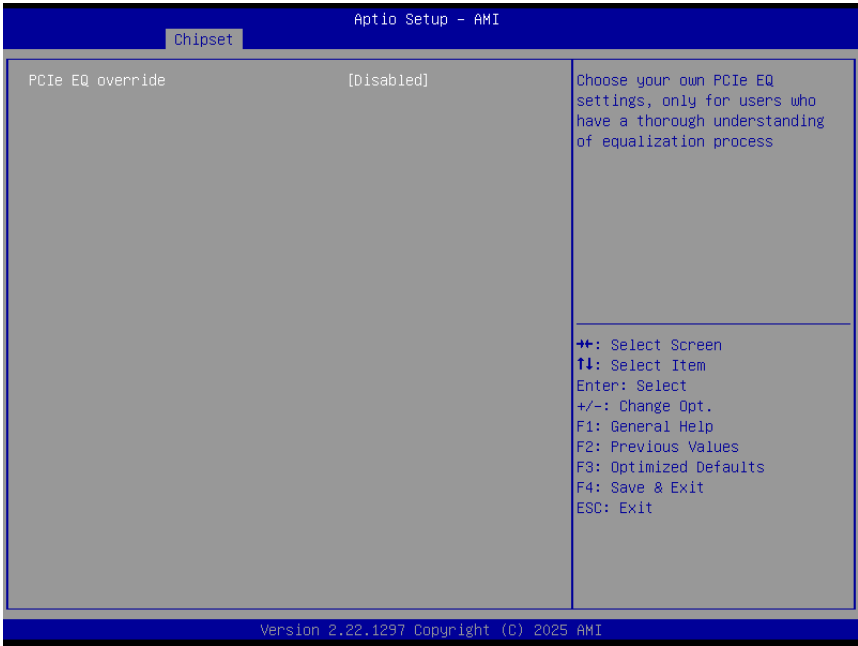
EPI-ARLS User’s Manual

4.6.3.2.1.1 PCI Express Root Port 1(M2KE1)



Item	Option	Description
PCI Express Root Port 1(M2KE1)	Enabled[Default], Disabled	Control the PCI Express Root Port.
ASPM	Disabled[Default], L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto[Default], Gen1, Gen2, Gen3	Configure PCIe Speed.

4.6.3.2.1.1 PCIe EQ settings



Item	Option	Description
PCIe EQ override	Disabled [Default] , Enabled	Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process.

4.6.3.2.1.2 PCI Express Root Port 3(LAN1)



Item	Option	Description
PCI Express Root Port 3(LAN1)	Enabled [Default] , Disabled	Control the PCI Express Root Port.

EPI-ARLS User’s Manual

ASPM	Disabled [Default] , L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto [Default] Gen1 Gen2 Gen3	Configure PCIe Speed.

4.6.3.2.1.2.1 PCIe EQ settings



Item	Option	Description
PCIe EQ override	Disabled [Default] , Enabled	Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process.

4.6.3.2.1.3 PCI Express Root Port 4(LAN2)



Item	Option	Description
PCI Express Root Port 4(LAN2)	Enabled[Default], Disabled	Control the PCI Express Root Port.
ASPM	Disabled[Default], L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto[Default], Gen1, Gen2, Gen3	Configure PCIe Speed.

4.6.3.2.1.3.1 PCIe EQ settings



EPI-ARLS User’s Manual

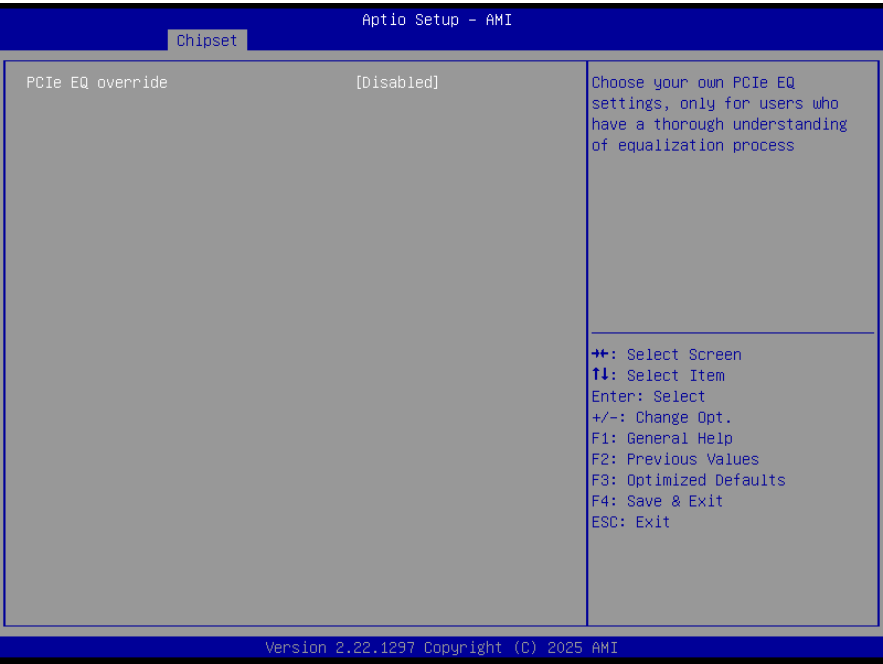
Item	Option	Description
PCIe EQ override	Disabled [Default] , Enabled	Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process.

4.6.3.2.1.4 PCI Express Root Port 5(M2KM1)



Item	Option	Description
PCI Express Root Port 5(M2KM1)	Enabled [Default] , Disabled	Control the PCI Express Root Port.
ASPM	Disabled [Default] , L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto [Default] Gen1 Gen2 Gen3	Configure PCIe Speed.

4.6.3.2.1.4.1 PCIe EQ settings



Item	Option	Description
PCIe EQ override	Disabled [Default] , Enabled	Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process.

4.6.3.2.1.5 PCI Express Root Port 13(M2KM2) (Q870 only)

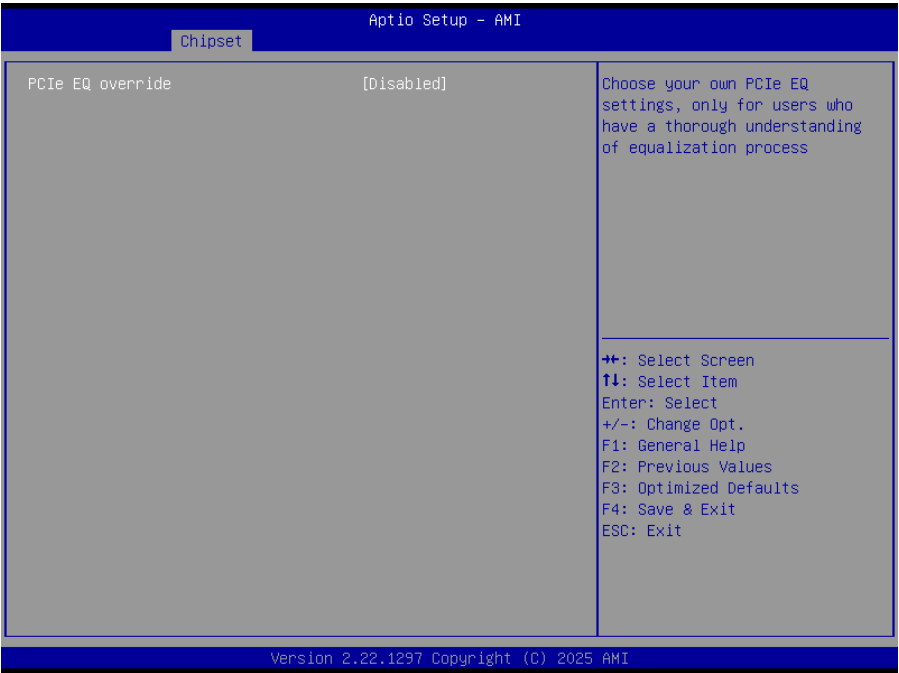


Item	Option	Description
PCI Express Root Port 13(M2KM2) (Q870 only)	Enabled [Default] , Disabled	Control the PCI Express Root Port.

EPI-ARLS User’s Manual

ASPM	Disabled [Default] , L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto [Default] Gen1 Gen2 Gen3	Configure PCIe Speed.

4.6.3.2.1.5.1 PCIe EQ settings



Item	Option	Description
PCIe EQ override	Disabled [Default] , Enabled	Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process.

4.6.3.2.1.6 PCI Express Root Port 21(LAN3) (Q870 only)



Item	Option	Description
PCI Express Root Port 21(LAN3) (Q870 only)	Enabled [Default] , Disabled	Control the PCI Express Root Port.
ASPM	Disabled [Default] , L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
PCIe Speed	Auto [Default] Gen1 Gen2 Gen3	Configure PCIe Speed.

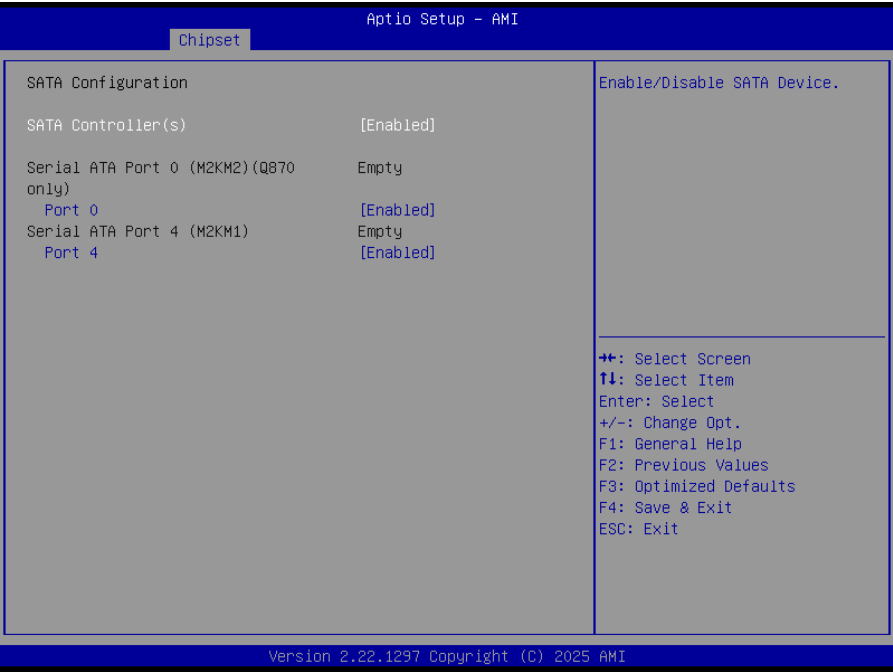
EPI-ARLS User’s Manual

4.6.3.2.1.6.1 PCIe EQ settings



Item	Option	Description
PCIe EQ override	Disabled [Default] , Enabled	Choose your own PCIe EQ settings, only for users who have a thorough understanding of equalization process.

4.6.3.2.2 SATA Configuration



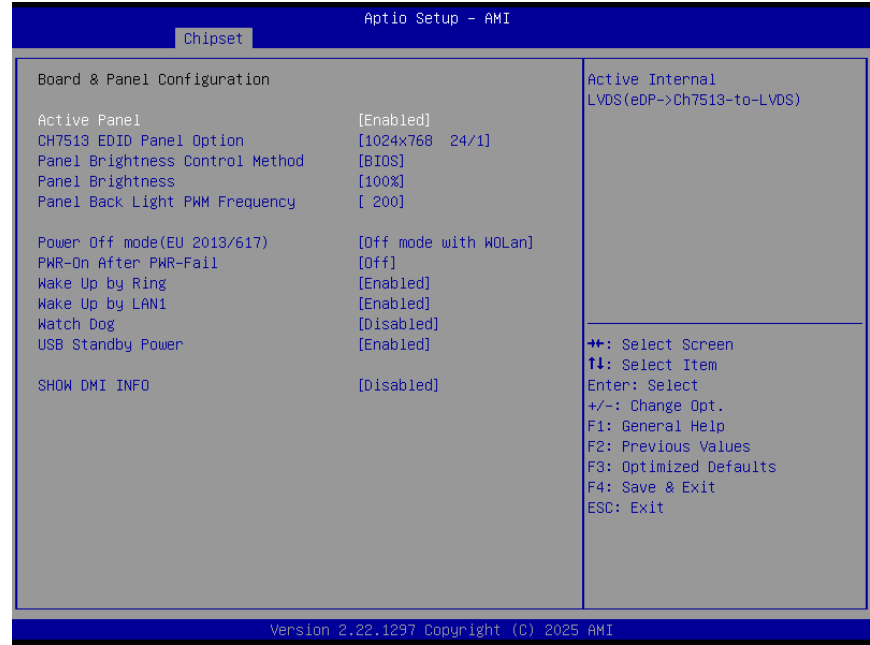
Item	Options	Description
SATA Controller(s)	Enabled [Default] Disabled,	Enable/Disable SATA Device.
Port 0/4	Enabled [Default] Disabled	Enable or Disable SATA Port.

4.6.3.2.3 HD Audio Configuration



Item	Option	Description
HD Audio	Disabled Enabled[Default]	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

4.6.3.3 Board & Panel Configuration



Item	Option	Description
Active Panel	Disabled Enabled[Default]	Active Internal LVDS(eDP->Ch7513-to-LVDS).
CH7513 EDID Panel Option	1024x768 24/1[Default]	Port1-EDP to LVDS(Chrotel 7513)

EPI-ARLS User's Manual

	800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 1920x1080 18/2 1280x1024 24/2 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2 7513-eDP	Panel EDID Option.
Panel Brightness Control Method	BIOS[Default] OS Driver	Panel Brightness Control Method. 1.BIOS 2.OS Driver.
Panel Brightness	00% 25% 50% 75% 100%[Default]	Select Panel back light PWM duty.
Panel Back Light PWM Frequency	200[Default] 1k 10k 20k	Select Panel back light PWM Frequency.
Power Off mode(EU 2013/617)	Traditional_S5 Off mode w/o WOL(ErP) Off mode with WOLan[Default]	Power Off mode(EU 2013/617). Off mode with WOLan : Wakeup from Lan1/PWR button. Off mode w/o WOL(ErP) : Wakeup from PWR button. *When the default setting is off mode with WOLane1, the system cannot be woken up via USB port after entering S4 from OS. Wake up is only possible through LAN1 port. If wake up via USB port is required, please change the setting to Traditional_S5.
PWR-On After PWR-Fail	Off[Default] On Last state	AC loss resume.
Wake Up by Ring	Disabled Enabled[Default]	Wake Up by Ring from S3/S4/S5.
Wake Up by LAN1	Disabled Enabled[Default]	Wake Up by LAN1 from S3/S4/S5.
Watch Dog	Disabled[Default] 30 sec 40 sec 50 sec 1 min	Select WatchDog.

	2 min 10 min 30 min	
USB Standby Power	Disabled Enabled[Default]	Enable/Disabled USB Standby Power during S3/S4/S5.
SHOW DMI INFO	Disabled[Default] Enabled	SHOW DMI INFO.

4.6.4 Security



- Administrator Password

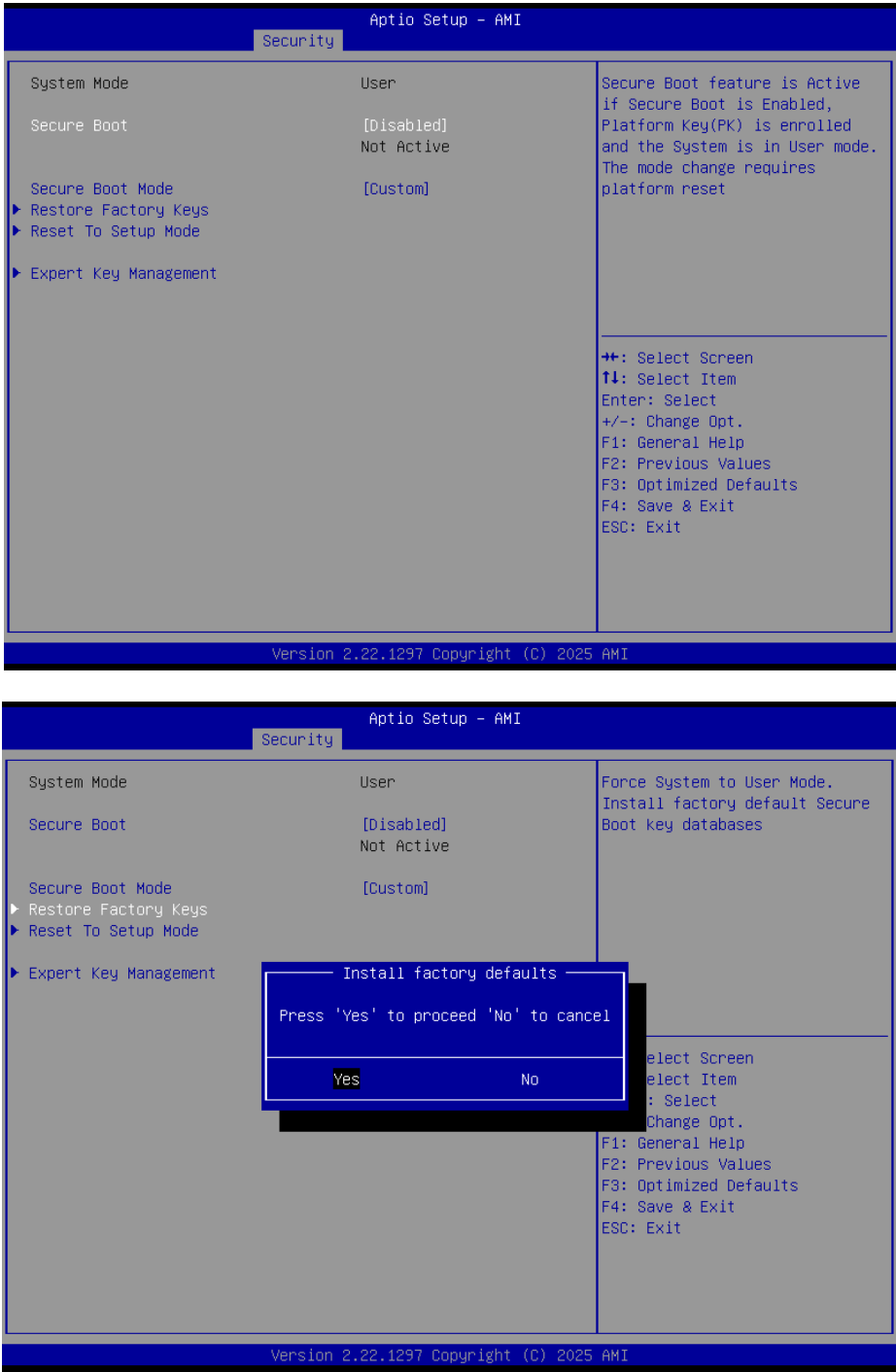
Set setup Administrator Password

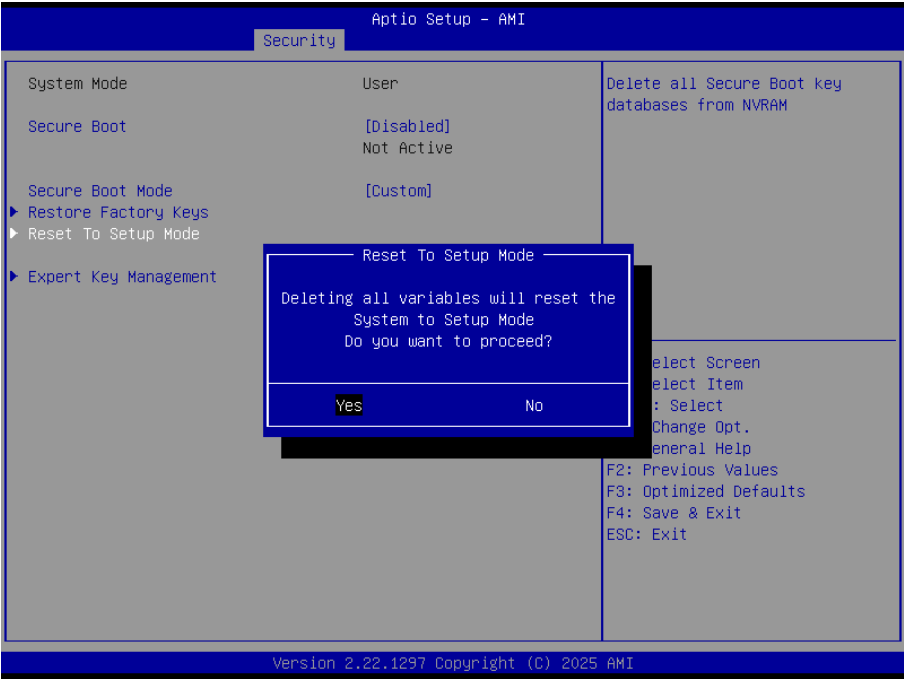
- User Password

Set User Password

EPI-ARLS User’s Manual

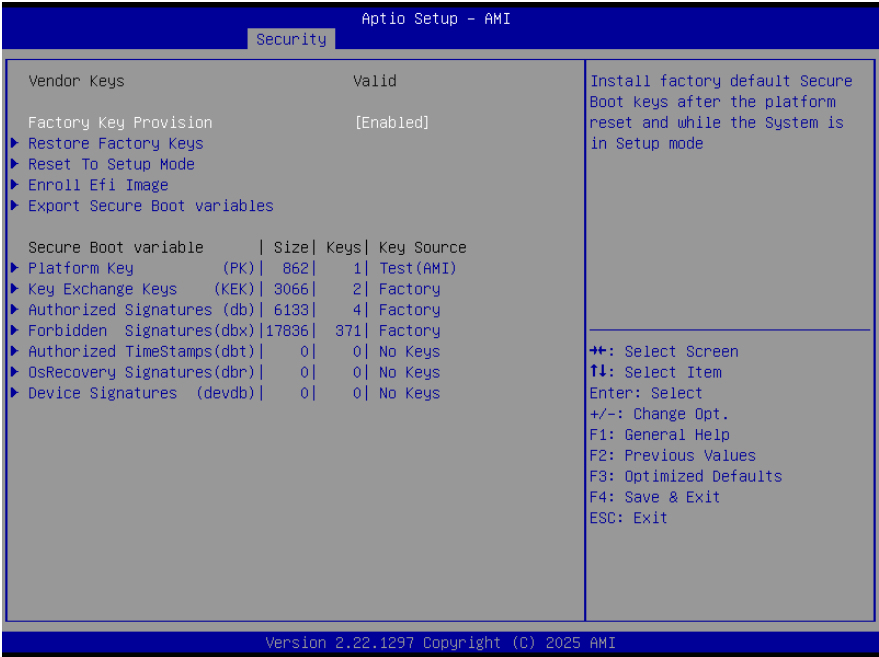
4.6.4.1 Secure Boot





Item	Option	Description
Secure Boot	Disabled Enabled[Default]	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard Custom[Default]	Secure Boot mode options : Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

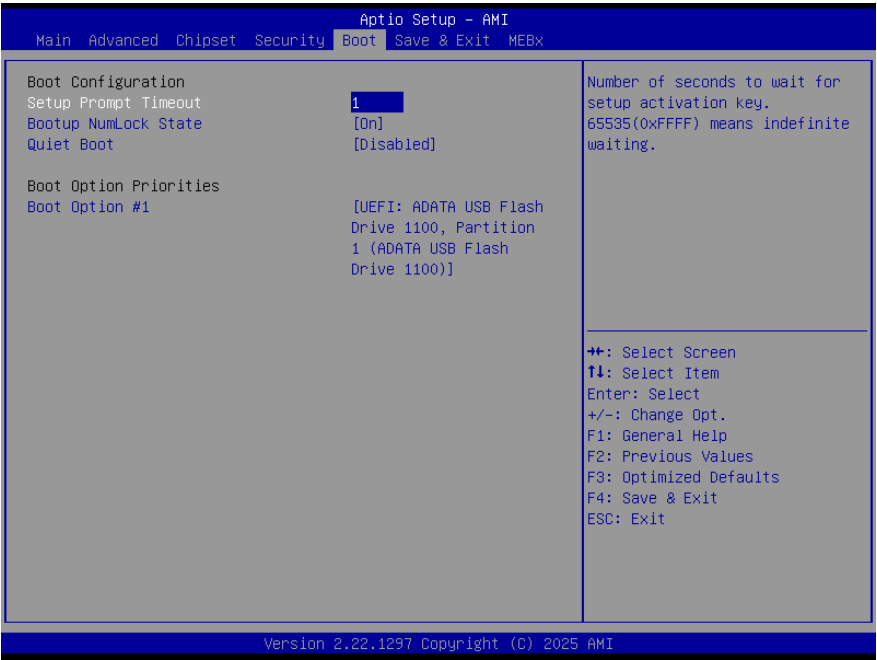
4.6.4.1.1 Expert Key Management



Item	Option	Description
Factory Key Provision	Disabled Enabled[Default]	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

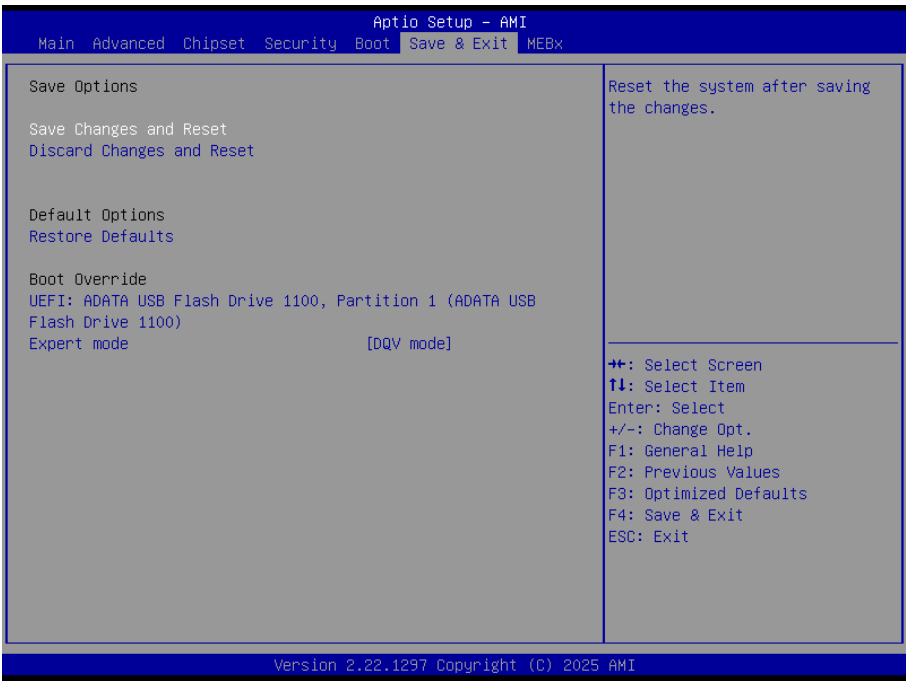
EPI-ARLS User’s Manual

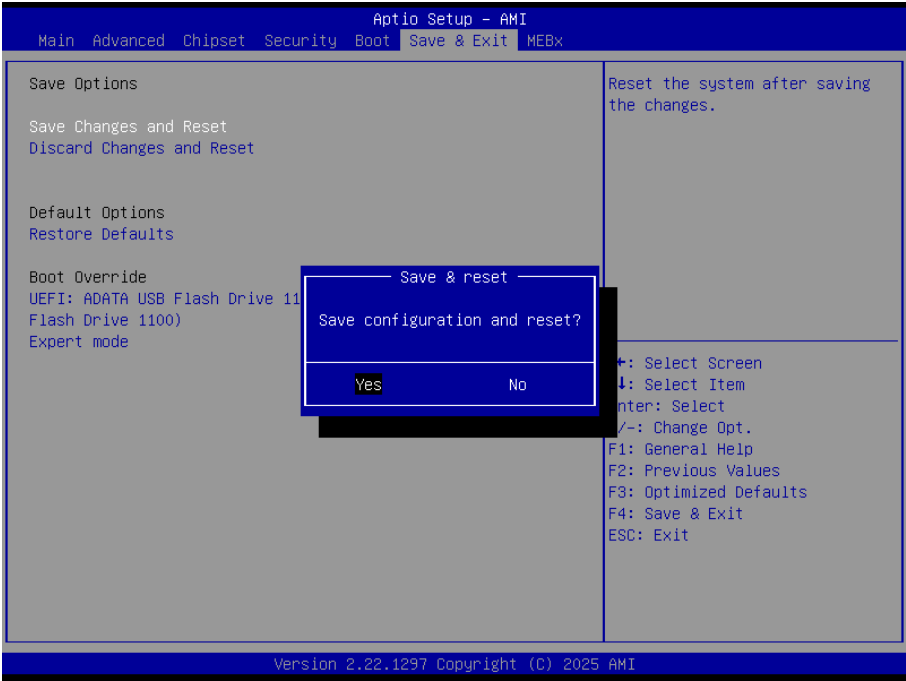
4.6.5 Boot



Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On[Default] Off	Select the keyboard NumLock state
Quiet Boot	Disabled[Default] Enabled	Enables or disables Quiet Boot option
Boot Option #1	Set the system boot order.	

4.6.6 Save and Exit





4.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

4.6.6.2 Discard Changes and Reset

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The setup program then exits and reboots the controller.

4.6.6.3 Restore Defaults

This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting.

4.6.6.4 Launch EFI Shell from filesystem device

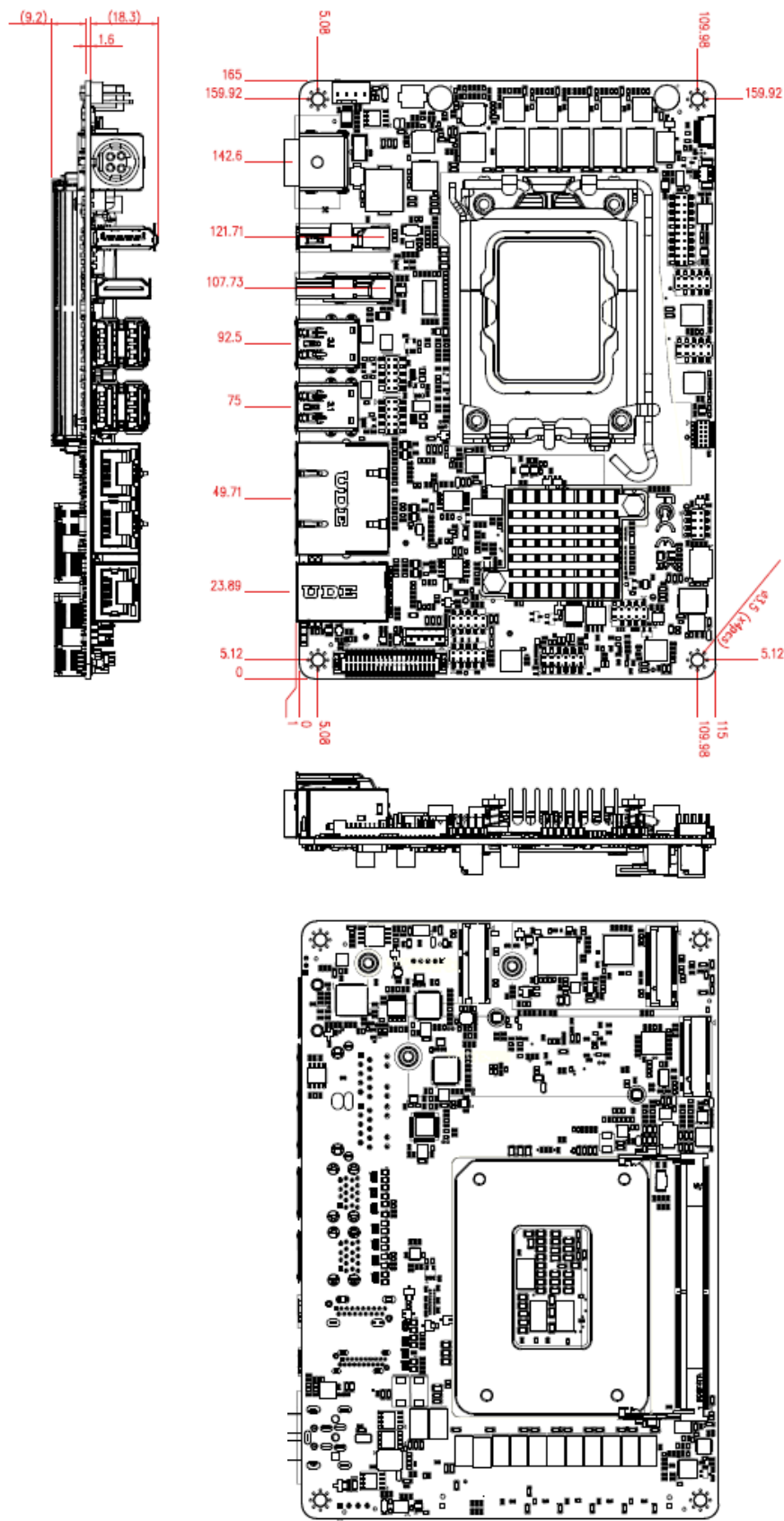
Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

EPI-ARLS User’s Manual

4.6.7 MEBx



5. Mechanical Drawing



Unit: mm

Thermal Solutions:

EPI-ARLS standard package include cooler, please follow below for assembly.

