

User Manual

ECU-479 Series

IEC-61850 Power Substation 2U Rackmount Server with 13th Generation Intel® Processor



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Support

For more information on this and other Advantech products, please visit our website at

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For technical support services, please visit our support website at http://www.advantech.com/en/support/

This manual is for the ECU-479 Series.

Part No. 2001047900 Printed in China Edition 1 January 2024

Product Warranty (2 years)

Advantech warrants the original purchaser that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement mate-rials, service time, and freight. Please consult your dealer for more details.

If you believe your product to be defective, follow the steps outlined below.

- 1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware, and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
- 2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
- 3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
- 4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
- 5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

Test conditions for passing also include the equipment being operated within an industrial enclosure. In order to protect the product from damage caused by electrostatic discharge (ESD) and EMI leakage, we strongly recommend the use of CEcompliant industrial enclosure products.

FCC Class A

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 this event, users are required to correct the interference at their own expense.

Technical Support and Assistance

- 1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
- 2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
 - 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

Safety Precautions - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards while the PC is powered on.
- Disconnect the power before making any configuration changes. A sudden rush of electricity after connecting a jumper or installing a card may damage sensitive electronic components.

Safety Instructions

- 1. Read these safety instructions carefully.
- 2. Retain this user manual for future reference.
- 3. Disconnect this equipment from any A/C outlets before cleaning. Use a damp cloth for cleaning. Do not use liquid or spray detergents.
- 4. For pluggable equipment, the power outlet socket should be located near the equipment and easily accessible.
- 5. Protect the equipment from humidity.
- 6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
- 7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
- 8. This product is intended to be supplied by AC mains or Listed rated DC 100-240V, 3.0A minimum, Tma 50 degree C minimum, power source, if need further assistance, please contact Advantech for further information.
- 9. Position the power cord away from high-traffic areas. 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 avoid damage from transient overvoltage.
- 12. Never pour liquid into an opening. This may cause fire or electrical shock.
- Never open the equipment. The computer will be installed and maintained by skilled person, please contact Advantech for further assistance. Note
 - No modification of this equipment is allowed.
 - If there is any other problem, please consult or return the device to your distributor. Do not try to repair a defective device.
- 14. If one of the following occurs, have the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated the equipment.
 - The equipment has been exposed to moisture.
 - The equipment is malfunctioning or does not operate according to the user manual.
 - The equipment has been dropped and damaged.
 - The equipment shows obvious signs of breakage.
- 15. Do not leave the equipment in an environment with a storage temperature of below -25° C (-13° F) or above 70° C (158° F) as this may damage the components. The equipment should be kept in a controlled environment.
- 16. CAUTION: Batteries are at risk of exploding if incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
- 17. Due to the sensitive nature of the equipment, it must be stored in a restricted access location, only accessible by qualified engineers.
- 18. When installing this equipment, ensure that the earth cable is securely attached using a 3.5 mm screw.
- 19. The sound pressure level at the operator's position according to IEC 704-1:1982 should be no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Consignes de Sécurité

- 1. Lisez attentivement ces consignes de sécurité.
- 2. Conservez ce manuel d'utilisation pour référence ultérieure.
- Débranchez cet équipement de toute prise A/C avant de le nettoyer. Utilisez un chiffon humide chiffon pour le nettoyage. N'utilisez pas de détergents liquides ou en aérosol.
- 4. Pour les équipements enfichables, la prise de courant doit être située près du matériel et facilement accessible.
- 5. Protégez l'équipement de l'humidité.
- 6. Placez l'équipement sur une surface fiable pendant l'installation. Abandonner ou laisser la chute de l'équipement peut causer des dommages.
- 7. Les ouvertures du boîtier sont destinées à la convection d'air. Protéger le matériel de la surchauffe. NE PAS COUVRIR LES OUVERTURES.
- Ce produit est destiné à être alimenté par le secteur CA ou une source d'alimentation nominale CC 100-240 V, 3,0 A minimum, Tma 50 degrés C minimum, si besoin d'aide supplémentaire, veuillez contacter Advantech pour plus d'informations.
- 9. Éloignez le cordon d'alimentation des zones à fort trafic. Ne placez rien dessus le cordon d'alimentation.
- 10. Toutes les mises en garde et tous les avertissements sur l'équipement doivent être notés.
- 11. Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter les dommages causés par les surtensions transitoires.
- 12. Ne versez jamais de liquide dans une ouverture. Cela peut provoquer un incendie ou un choc électrique.
- 13. N'ouvrez jamais l'équipement.
- L'ordinateur sera installé et entretenu par une personne qualifiée, veuillez contacter Advantech pour plus d'assistance. Note
 - Aucune modification de cet équipement n'est autorisée.
 - En cas d'autre problème, veuillez consulter ou retourner l'appareil à votre distributeur. N'essayez pas de réparer un appareil défectueux.
- 15. Si l'un des événements suivants se produit, faites vérifier l'équipement par un personnel:
 - Le cordon d'alimentation ou la fiche est endommagé.
 - Du liquide a pénétré dans l'équipement.
 - L'équipement a été exposé à l'humidité.
 - L'équipement fonctionne mal ou ne fonctionne pas selon l'utilisateur manuel.
 - L'équipement est tombé et a été endommagé.
 - L'équipement montre des signes évidents de bris.
- 16. Ne laissez pas l'équipement dans un environnement dont la température de stockage est inférieure à -25° C (-13° F) ou supérieure à 70° C (158° F) car cela pourrait endommager les composants. L'équipement doit être conservé dans un environnement contrôlé.
- 17. ATTENTION: Les piles risquent d'exploser si elles ne sont pas remplacées correctement. Remplacez uniquement par le même type ou un type équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant. En raison de la nature sensible de l'équipement, il doit être stocké dans un emplacement d'accès, accessible uniquement par des ingénieurs qualifiés.

- 18. Lors de l'installation de cet équipement, assurez-vous que le câble de terre est solidement à l'aide d'une vis de 3,5 mm.
- 19. La pression sonore niveau au poste de l'opérateur selon CEI 704-1:1982 ne doit pas être plus supérieur à 70 dB(A).

AVIS DE NON-RESPONSABILITÉ: cet ensemble d'instructions est fourni conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce document.

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Overview

- This chapter provides an overview of the ECU-479 Series specifica-tions.
- Sections include:
- Introduction
- Hardware Specifications
- Safety Precautions
- Function Block Diagram
- Chassis Dimensions
- Packing List

1.1 Introduction

Upgrades of smart grid technologies are in demand in this new era motivated by the requirement for rugged computing platforms with faster processors and increased reliable storage capacity in modern substation automation systems. To fulfill the performance requirements of modern distributed software applications which require fast processing, Advantech offers the ECU-479, targeted at advanced server-level data concentrators and protocol converters in scenarios like substation automation, energy management, secondary communication and control, etc.

In years past, substations were managed under the well-established SCADA OT system. Now, in this next phase of virtualization, more centralized computing is a better fit for the requirement of higher energy efficiency. There is also a demand for immediate and flexible optimization based on the cloud-as-a-service business model.

ECU-479 is certified with IEC 61850-3, the standard for electrical substation automation design, which ensures high reliability and stability. The standard is suitable for any global power & energy automation market and defines communication between all intelligent electronic devices (IED) and other related equipment from the process level (data acquisition, sensors, and actuators), providing high performance and reliable functionality to meet the needs of the most critical computing applications. It also supports remote monitoring and diagnosis and remote device connectivity to enhance maintenance efficiency.

Isolation & High-Speed Communication Interface

- A comprehensive communication interface is used for smart substation communication servers and IED analyzers to easily implement data gateway & protocol conversion. There is support for a variety of protocols (IEC-60870-104, DNP3.0, etc.).
- Network interfaces are required to respond to real-time data and collect highdensity network packets and accurately facilitate data analysis.
- Versatile communication interface: the IED analyzer easily fulfills the data gateway & protocol conversion requirement.

Easy to Diagnose and Maintain in an Efficient Manner

- Remote diagnosis can be done and the system can be managed to provide high system maintenance efficiency.
- The rear I/O connections and LEDs on the front panel are for various ports and modes, simplifying the monitoring of operation status.

Fast and Easy Customization

- The structured and functional internal design of the module allows for easy customization and fast assembly to suit different kinds of applications for the CTOS manufacturing process.
- Customer-focused service provides fast response for customization requests based on this product's main hardware structure.

1.2 Hardware Specifications

1.2.1 General

- Certifications: CE, FCC Class A, IEC61850-3, IEEE 1613, CB/UL
- Dimensions (W x D x H): 483 x 478 x 88 mm
- Enclosure: SECC & aluminum
- Mounting: 2U 19" rackmount
- Power Requirements:
 - Power 1: 100 ~ 240 V AC (50 ~ 60 Hz) / V DC
 - Power 2: 100 ~ 240 V AC (50 ~ 60 Hz) / V DC
- Power Consumption: Max.150W
- Weight: 13 kg
- **OS Support:** Windows 10, 11, Windows Server 2022, Ubuntu 22.04

Table 1.1: Power Consumption (Watts)					
System Configuration	Idle Mode	Max. Condition			
ECU-479 Base System					
16 Cores CPU, limited to 25 W					
64 GB RAM	20	61			
4 x 2.5" SSD (64/120/128/240GB)	59	81			
2 x M.2 NVMe to PCIe adapters					
2 x PCIe 10Gbps LAN cards					

1.2.2 System Hardware

- **CPU:** 13th/12th Generation Intel® Core[™] i socket CPU (LGA1700)
- Memory: DDR4 SODIMM-ECC/non-ECC 3200 MHz (4 GB, 8 GB, 16 GB, 32 GB) x 2 slots, up to 64 GB
- Indicators: LEDs for Power. SSD, programmable LED, LAN (LINK, ACT), expansion cards
- Storage: Swappable 4 x 2.5" SATA SSD (RAID 0, RAID 1, RAID 5, RAID 10) 1 x M.2 SATA/NVMe
- Display: 4 x DP++ 1.2 up to 4K @ 60Hz

1.2.3 I/O Interface

- **Ethernet:** 4 x Gigabit RJ-45 ports
- **USB Ports:** 5 x USB 3.2 Gen1 (2 front, 3 rear), 1 x internal USB 2.0
- Serial Ports: 2 x DB-9 RS-232/422/485, 2,500 VDC isolation, 50~115,200 bps

1.2.4 Environment

- **Humidity:** 95% @ 40°C (non-condensing)
- Operating Temperature: -25 ~ 70°C(-13 ~ 158°F), IEC 60068-2-2 with 100% CPU and I/O loading, 24 hrs
- **Operating Humidity:** 5 ~ 95% RH (non-condensing)
- Storage Humidity: 5 ~ 95% RH (non-condensing)
- Shock Protection: IEC 60068-2-27 SSD: 20 G, 11 ms
- Vibration Protection: IEC 60068-2-64 m-SATA: 2 G @ 5 ~ 500 Hz

1.3 Function Block Diagram



Figure 1.1 ECU-479 Series Product Function Block

Safety Precautions 1.4

The following messages inform how to make each connection. In most cases, you will simply need to connect a standard cable.

Warning! Always disconnect the power cord from your chassis whenever you are



working on it. Do not connect it while the power is on. A sudden rush of power can damage sensitive electronic components. Only experienced electronics personnel should open the chassis.



Caution! Always ground yourself to remove any static electric charge before touching the ECU-479 series. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.



If DC voltage is supplied by an external circuit, please put a protection device in the power supply input port.



Caution, Shock, Hazard Attention, Choc, Danger



Disconnect all power sources Débranchez toutes les sources d'alimentation

1.5 Chassis Dimensions



Figure 1.2 ECU-479 Chassis Dimensions

1.6 Packing List

The package of the ECU-479 Series contains the following items:

- The main ECU-479 unit
- Accessory box (screws, terminal block, thermal pads)
- 1 x warranty card
- 1 x ROHS LIST



Hardware Specifications

Sections include:

- Overview
- Front Elements (LED, FAN, SATA Slots)
- Power Input
- Ethernet Interface (On-Board)
- Display Interface
- USB
- **Expansion Functions**
- Storage (SATA, M.2)
- Processors
- Memory
- TPM
- Platform Features Description
- Available Accessories

2.1 Overview

2.1.1 ECU-479 LED and Interface



Figure 2.1 ECU-479 Front Panel



Figure 2.2 ECU-479 Rear Panel

2.2 Front Elements

2.2.1 LED Indicators

The LEDs on the front panel can be divided into 4 groups.

2.2.1.1 System Status Indicators



Table 2.1: Definition of System Status Indicators				
LED Status Description				
	Green	System power 1 or 2 is on		
	Off	System power 1 and 2 is off		
SATA	Green	Data is transmitting		
	Off	No data is transmitting		

2.2.1.2 LAN Status Indicators

LINK	1	2	3	ष्
ACT	1	2	3	ą
	— L	.AN		

Table 2.2: Definition of System Status Indicators						
Item LED Status Description						
1		Green	1 Gbps network link			
	$(Port 1 \sim 4)$	Orange	100 Mbps network link			
		Off	10 Mbps network link or invalid network link			
2	LAN/ACT	Green	Ethernet date being received/transmitted			
	(Port 1 ~ 4)	Off	Invalid network link			

2.2.1.3 Programmable LED

0	2	4	6
1	3	5	7
	— P	և —	

The ECU-479 Series products provide 4 programmable LED indicators which are convenient for users to control the programmable LED state using API programming. They can be used to indicate and edit the machine's operating status. Below is a detailed explanation of how to use API programming with this product.

Table 2.3: Programmable LED Status Indicators				
LED	Description			
PL 0	COM1 RX			
PL 1	COM1 TX			
PL 2	COM2 RX			
PL 3	COM2 TX			
PL 4 ~ 7	GPIO 0~3. Customers can, according to their needs, define the programmable LED state.			

There are 4 LEDs (LED4 ~ LED7) which can control and monitor the status (On/Off). The Advantech programmable LED driver provides examples of how to use the ECU-479's programmable LEDs and offers references for users to develop their own applications. You can modify these sample applications to meet your requirements.

To utilize the programmable LEDs PL 4~7 (GPIO 0~3), please download SUSI for ECU-479 (software API) from Advantech's product page.

2.2.1.4 Slot LED

The Slot LED is different according to the corresponding expansion card. Here, we take the LED definition of UNOP-1514RE/PE as an example to show how it is defined. Other LEDs are defined according to the description of the relevant expansion card and manual.

The below table shows the LED number definitions for UNOP-1514RE/PE:

2 4 6 8 10 12 14 18	ๆ	33	5	7	Ø	11	13	15
Él-4 LED	2	4	60	ලි ලැදුණ	10	,12 `	14	18

Table 2.4: Ex. UNOP-1524PE/RE LED Status Indicators						
LED No.	LAN Status	LED Status	Description			
4		White (blinking)	Data being received/transmitted			
1	LAN TACIVE	Off	No data being received/transmitted			
2		White	10 Mbps / 100 Mbps / 1 Gbps network link			
2	LANTLINK	Off	Invalid network link			
2		White (blinking)	Data being received/transmitted			
3	LAN 2 ACTIVE	Off	No data being received/transmitted			
4	LAN 2 Link	White	10 Mbps / 100 Mbps / 1 Gbps network link			
		Off	Invalid network link			
5	LAN 3 Active	White (blinking)	Data being received/transmitted			
		Off	No data being received			
6	LAN 2 Link	White	10 Mbps / 100 Mbps / 1 Gbps network link			
0	LAN 3 LINK	Off	Invalid network link			
7	LAN 4 Active	White (blinking)	Data being received/transmitted			
		Off	No data being received/transmitted			
0		White	10 Mbps / 100 Mbps / 1 Gbps network link			
0	LAN 4 LINK	Off	Invalid network link			
9 - 16	N/A	-	-			

Chapter 2 Hardware Specifications

2.2.2 Disk Bay

ECU-479 supports four swappable 2.5" SSDs at the front. Follow these steps below to install an SSD:

1. Remove the baffle on the right of the front panel, and pull out the disk tray.



Figure 2.3 Removing the SATA Baffle

2. Attach the SATA disk to the tray and push it back into the disk bay. Then attach the baffle in front of the SATA bay.



Figure 2.4 Fixing the SATA Disk onto the Disk Tray

2.3 Jumpers and Connectors

The tables below list the function of each of the jumpers and connectors. Later sections in this chapter give instructions on setting jumpers that are used to configure your system for your application.

Table 2.5: Jumpers					
Label	Function				
JCMOS1	CMOS clearness				
JWDT1	Watchdog timer reset				
JOBS1	Hardware monitor alarm				
JME1	Intel® ME update				
PSON1	AT/ATX mode selection				
JUSB_1, JUSB_2	USB power source switch between +5V and +5V_DUAL				
SMB1, SMB2	PCIe SMBus connection setting for PCIE2~PCIE4 slots				
SMB3, SMB4	PCIe SMBus connection setting for PCIE1 slot				

Table 2.6: Connectors	
Label	Function
COM1,2	Serial port: RS-232/422/485 (9-pin header)
DP1~4	DP connector
USB1~3,4,5	USB 3.2 Gen 1 port
USB6	USB 2.0 port
LAN1	GbE LAN (Intel I210IT)
LAN2~4	GbE LAN (Intel I226IT)
SATA4~7	Serial ATA 3.0 port
SATAPWR4~7	2.5" SATA SSD power connector
PCIE1	PCIe x16 slot (x16 Gen4 link)
PCIE2~4	PCIe x4 slot (x4 Gen3 link)
NVME1	M.2 2280 M-Key socket (SATA 3.0 or PCIe x4 Gen3 link)
DIMMA1, DIMMB1	Channel A,B DIMM1
SPI_TPM1	Serial peripheral interface (SPI) connector
JFP3	Power LED Suspend: fast flash (ATX/AT) System on: on (ATX/AT) System off: off (ATX/AT)
JFP2	External speaker / HDD LED connector / SMBus connector
JFP1	Power switch / reset connector

2.4 Board Layout: Jumper and Connector Locations



Figure 2.5 Jumper and Connector Locations

2.5 **Power Input**

The ECU-479 Series products support redundant power input for both A/C and D/C.

Table 2.7: Power Input						
ltem	AC/DC	Voltage Range	Power Rating	Installation		
	A/C	100-240 V _{AC}	3 A 50-60 Hz	Torminal Block		
	D/C	100-240 V _{DC}	3 A			

Use a circuit breaker that is rated at 20 amps

Connect protective earthing first, with at least 14 AWG G/Y color PE conductor, diameter 4.0mm min., screw type PE terminal, and a spring/star washer to provide satisfactory locking.



Figure 2.6 Power Panel

2.6 Ethernet Interface

The ECU-479 Series products are equipped with Intel® 4 x Giga LAN. LAN1 port is shared with the iBMC function. The LAN2 port is shared with the IAMT function.

2.6.1 MAC Address

You can identify MAC addresses according to the labels placed on Ethernet connectors as shown below:



2.7 Display Interface

The ECU-479 is configured with quad DP++ connectors



Figure 2.7 Display Position

During the first time getting started with a bare sever, the operating system needs to be installed. "UEFI" is the default mode on the bare machine.

2.8 USB Ports

2.8.1 USB Ports Positions

The ECU-479 is equipped with 3 x USB 3.2 Gen1 connectors on the rear panel and 2 x USB 3.2 Gen1 connectors on the front panel, with transmission rates of up to 5 Gbps via USB 3.2 Gen1 and eFuse protection being supported.



Figure 2.8 Rear USB Port Positions



Figure 2.9 Front USB Port Positions

2.8.2 Installing a USB Dongle

The ECU-479 provides an internal USB 2.0 port for the USB dongle. Follow these steps to install the USB dongle:

- 1. Remove proprietary PCI/PCIe cards if any.
- 2. Remove the screws shown in Figure 2.10 to open the chassis.



Figure 2.10 Open the Chassis

3. Remove the USB fastening bracket and plug in the USB dongle to the upper port of USB6 (USB2A1). Note that the lower port is a dummy port. A USB dongle is not included in the package.



Figure 2.11 Location of USB6 Internal USB Port (USB2A1)
Install the USB fastening bracket. Cover and resume operating theECU-479.

2.9 Expansion Slots

2.9.1 Expansion PCI/PCIe Slot

2.9.1.1 Expansion PCI/PCIe Slot Illustration

The ECU-479 supports one standard domain I/O expansion. Customers can choose different proprietary PCI/PCIe cards from Table 2.7.1.2 according to their needs.

Through the interface card, the ECU-479 Series can also use standard PCI cards, PCIe cards, mini-PCI cards, as well as PCI-104 cards.

The maximum power support for proprietary PCI/PCIe slot is:

5 V @ 2 A 3.3 V @ 1.5 A 12 V @ 0.25 A

2.9.1.2 Proprietary PCI/PCIe Card List

Below is the list of proprietary cards compatible with ECU-479:

Table 2.8: Proprietary PCI/PCIe Card List					
ECU Standard P/N	Description				
ECU-P1618D-AE	8-port RS-232/422/485 serial port card				
ECU-P1628D-AE	8-port isolated RS-232/422/485 serial port card				
ECU-P1524PE-GAE	2-port SFP Gigabit Ethernet card with HSR/PRP				
ECU-P1761A-AE	4-ch digital input 4-ch relay output card with IRIG-B				
UNOP-1624D-AE	4-port Iso.RS-232/422/485 & IRIG-B card				
UNOP-1000I-BE	PCI & Mini-PCI expansion card				
UNOP-1000J-BE	PCI-104 & Mini-PCIe expansion card				
UNOP-1000K-AE	PCIe expansion card				
ECU-P1528RE-AE	8-port RJ-45 LAN Gigabit card				
ECU-P1528PE-AE	8-port SFP LAN Gigabit card				

2.9.1.3 Installing a Proprietary PCI/PCIe Card

1. Remove the screws as shown below to open the expansion back plate.



Figure 2.12 Open the ECU-P cover

2. Insert the ECU-P expansion card through the DIN rails and tighten the screws on the card.



Figure 2.13 Insert the expansion card

2.9.2 PCIe Expansion Cards

2.9.2.1 PCIe Expansion Card Illustration

ECU-479 supports 4 low-profile PCIe cards. The size limitation is shown below:



Figure 2.14 PCIe Card Dimension Limitation





2.9.2.2 PCIe Expansion Card list

The tested PCIe expansion list is as follows:

Part Number	Description			
PCIE-1130PS-00A1E	Quad port copper Gigabit Ethernet PCI Express server adapter with Intel [®] I350 (Advantech form factor)			
PCIE-2130NP-00A1E	Quad port fiber Gigabit Ethernet PCI Express server adapter with Intel [®] I350			
PCIE-2230NP-00A1E	Quad port fiber 10GbE Ethernet PCI Express server adapter with Intel [®] XL710-BM1			
PCIE-2220NP-00A1E	Dual port fiber 10GbE Ethernet PCI Express server adapter with Intel [®] 82599ES			

2.9.2.3 Installing PCIe Cards

- 1. Remove the screws shown in Figure 2.10 to open the chassis.
- 2. Remove front PCIe bracket from the top holder, then install your PCIe cards.



Figure 2.16 Installing PCIe cards

3. Reinstall the PCIe top holder. Cover and resume ECU-479.

2.10 Storage (SATA, M.2)

2.10.1 SATA Disks

The ECU-479 provides 4 slots for 2.5" SATA drives that support RAID 0, 1, 5, and 10.

Note! SATA ports name in BIOS:





2.10.2 M.2 Storage

The M.2 2280 connector supports both SATA and PCIe SSD devices for higher read/ write speeds.



Figure 2.17 M.2 Connector Position on the Main Board

2.11 Processors

2.11.1 Compatible with 13th/12th Gen Intel® Core™ CPU

The ECU-479 is equipped with one CPU socket to support 13th/12th Gen Intel® Core™ Series processors with up to 16 cores.

Table 2.9: Validated 13th/12th Gen Intel® Core™							
Test Item	Description						
CPU Family	S-Spec	Base Fre- quency	Core Step- ping	Power	Number of Processor Cores	Shared Last Level Cache	Package Type
i7-13700TE	SRMG4	4.8 GHz	B0	35 W	16	30 MB	FCLGA1700
i5-13500TE	SRMFZ	4.5 GHz	C0	35 W	14	24 MB	FCLGA1700
i3-13100TE	SRMFT	4.1 GHz	H0	35 W	4	12 MB	FCLGA1700
i7-12700TE	SRL6E	4.6 GHz	C0	35 W	12	25 MB	FCLGA1700
i5-12500TE	SRL6V	4.3 GHz	H0	35 W	6	18 MB	FCLGA1700
i3-12100TE	SRL6T	4.0 GHz	H0	35 W	4	12 MB	FCLGA1700
i7-13700E	SRMG3	4.8 GHz	B0	65 W	16	30 MB	FCLGA1700
i5-13500E	SRMFW	4.5 GHz	C0	65 W	14	24 MB	FCLGA1700
i3-13100E	SRMFR	4.2 GHz	H0	60 W	4	12 MB	FCLGA1700
i7-12700E	SRL6D	5.1 GHz	C0	65 W	12	25 MB	FCLGA1700
i5-12500E	SRL6W	4.6 GHz	H0	65 W	6	18 MB	FCLGA1700
i3-12100E	SRL6U	4.4 GHz	H0	60 W	4	12 MB	FCLGA1700

2.12 Memory

ECU-479 has 2 x 260-pin memory slots for DDR4 3200/2933/2666 mHz ECC/non-ECC memory modules with a maximum total capacity of 64 GB (maximum 32 GB for each SODIMM).

2.12.1 Validated Memory

Advantech has tested a list of RAM for your reference, all of which are verified as compatible with the ECU-479..

Table 2.10: Validated Memory							
Brand	Size	Speed (MHz)	Туре	ECC	Vendor PN		
Advantech	32 GB	3200	DDR4	Y	SQR-SD4I32G3K2SEAB		
Advantech	16 GB	3200	DDR4	Y	SQR-SD4I16G3K2SECB		
Advantech	8 GB	3200	DDR4	Y	SQR-SD4I8G3K2SEBCB		
Advantech	32 GB	3200	DDR4	Y	AQD-SD4U32E32-SBW		
Advantech	16 GB	3200	DDR4	Y	AQD-SD4U16E32-SEW		
Advantech	8 GB	3200	DDR4	Y	AQD-SD4U8GE32-SEW		
Advantech	32 GB	3200	DDR4	N	SQR-SD4I32G3K2SNAB		
Advantech	16 GB	3200	DDR4	N	SQR-SD4I16G3K2SNCB		
Advantech	8 GB	3200	DDR4	N	SQR-SD418G3K2SNBCB		
Advantech	32 GB	3200	DDR4	N	AQD-SD4U32N32-SBW1		
Advantech	16 GB	3200	DDR4	Ν	AQD-SD4U16N32-SEW1		
Advantech	8 GB	3200	DDR4	N	AQD-SD4U8GN32-SEW1		

2.13 **TPM**

The ECU-479 supports Trusted Platform Module (TPM 2.0) technology. TPM is designed to provide hardware-based security-related functions. TPM is a microchip designed to provide basic security-related functions primarily involving encryption keys. TPM is usually installed on the motherboard of a computer, and communicates with the rest of the system using a hardware bus.

The Trusted Platform Module (TPM) is the root-of-trust in a given platform (such as on desktop computers). If built into a computer that runs an operating system that is aware of this chip, it can check the system integrity and authenticate third-party users who would like to access the security features while remaining under complete control of its primary user.

2.14 Installing CPU, Memory and M.2 Storage

- 1. Remove the screws shown in Figure 2.10 to open the chassis.
- 2. Remove the 12 screws shown in Figure 2.15. Note that the 4 spring screws in the red boxes cannot be taken out after loosening.



Figure 2.18 Heatsink screws Positions



3. Carefully lift the heatsink, then flip it over.

Figure 2.19 Heatsink-Bottom Side
- Chapter 2 Hardware Specifications
- 4. Paste the thermal pads according to your configuration on the heatsink with care. When you install an M.2 storage device, paste thermal pad E on the heatsink and pad G on the motherboard under the M.2 storage.

Table 2.11: Thermal Pad List			
Position	Dimensions (L x W x H)	Outward appearance	
A	59 x 7 x 1 mm	Grey	
В	59 x 16 x 1 mm	Blue	
С	59 x 24.3 x 1 mm	Blue	
D	45 x 30 x 0.21 mm	Green	
E	59 x 16 x 1 mm	Grey	
F	27.8 x 27.8 x 1 mm	Blue	
G	60 x 16 x 6 mm	Black	

5. Install the CPU, memory, and M.2 storage according to your configuration.



Figure 2.20 CPU, memory, and M.2 storage positions

6. Carefully reinstall the heatsink. Tighten the screws in the order shown in Figure 2.18, torque = 5.5 kgf.





- 7. Cover and resume ECU-479.
 - **Note!** The computer should be installed by a skilled person.



Thermal pads cannot be re-used. Please contact Advantech or your distributor before modifying the configuration.

2.15 Platform Feature Description

2.15.1 **BIOS**

With the AMI BIOS setup program, you can modify BIOS settings and control the special features of your computer. The setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the ECU-479 setup screens.

Main Advanced Chipset Secu	Aptio Setup – AMI rity Boot Save & Exit MEBx	
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level Setup Item Hidden	American Megatrends 5.0.2.5 0.10 x64 UEFI 2.8; PI 1.7 E479000WF60X002 09/23/2022 10:18:48 Administrator [Enabled]	Hidden Setup item.
Serial Number UUID	Default string 0002000300040005 0006000700080009	
System Date System Time Power Type	[Thu 04/27/2023] [20:50:13] ATX	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Ven	sion 2.22.1284 Copyright (C) 202	22 AMI

Figure 2.22 BIOS Interface

The ECU-479's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS so that it retains the setup information when the power is turned off.

Note!		

The BIOS setup screens shown in this manual are for reference only. They may not match exactly what you see on your display.

The main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the legend. Above the legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

2.15.2 Watchdog

2.15.2.1 Watchdog Timer Overview

The watchdog timer is built into the Super I/O controller, NCT6126D (B). It provides the following functions for user programming and can be enabled and disabled by the user's program timer, which can be set from 1 to 255 seconds. It generates an interrupt or reset signal if the software fails to reset the timer before time-out.

To get the driver and test case for Windows and Linux operating systems, you can visit the official Advantech website on the ECU-479 product page to download the driver with the test sample.

2.15.3 iBMC

The ECU-479 is equipped with the Nuvoton M487SIDAE and supports iBMC 1.2 (Intelligent board management controller) via a LAN port.

LAN1 can operate with the iBMC function that allows for remote control management. High reliability and outstanding performance make ECU-479 the ideal platform for industrial server/networking applications.



BIOS Operation

3.1 Introduction

With the AMI BIOS setup utility, you can modify BIOS settings and control the specific features of your computer. The setup utility uses a number of menus for making changes and turning specific features on or off. This chapter describes the basic navigation of the ECU-479 setup screens.

Main Advanced Chipset	Aptio Setup – AMI Security Boot Save & Exit MEBx		
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level	American Megatrends 5.0.2.7 0.07 x64 UEFI 2.8; PI 1.7 E479000WF60X204 07/25/2023 13:44:49 Administrator	Set the Date. Use Tab to switch between Date elements. Default Ranges: Year: 1998–9999 Months: 1–12 Days: Dependent on month Range of Years may vary.	
Serial Number UUID	Default string 0002000300040005 0006000700080009		
System Date System Time Power Type	[Mon 08/21/2023] [05:43:25] ATX	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>	
Version 2.22.1288 Copyright (C) 2023 AMI			

Figure 3.1 Main Setup Screen

AMI's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This information is stored in a flash ROM so it retains the setup information when the power is turned off.

3.2 Entering BIOS Setup

Press during bootup to enter the AMI BIOS setup utility. The Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

3.2.1 Main Menu

When users first enter the BIOS Setup Utility, they enter the Main setup screen. Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options described in this section. The Main BIOS Setup screen is shown below.

Main Advanced Chipset Security	Aptio Setup – AMI Boot Save & Exit MEBx	
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level	American Megatrends 5.0.2.7 0.07 x64 UEFI 2.8; PI 1.7 E479000WF60X204 07/25/2023 13:44:49 Administrator	Set the Date. Use Tab to switch between Date elements. Default Ranges: Year: 1998–9999 Months: 1–12 Days: Dependent on month Range of Years may vary.
Serial Number UUID	Default string 0002000300040005 0006000700080009	
System Date System Time Power Type	[Mon 08/21/2023] [05:43:25] ATX	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.22.1288 Copyright (C) 2023 AMI		

Figure 3.2 Main Setup Screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend.

The key legend above is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ECU-479 setup screen to enter the Advanced BIOS setup screen. You can select any of the items in the left frame of the screen, such as CPU configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

Aptio Setup – AMI Main <mark>Advanced </mark> Chipset Security Boot Save & Exit MEBx		
 Platform Misc Configuration CPU Configuration Power & Performance PCH-FW Configuration Trusted Computing ACPI Settings SMART Settings NCT6126D Super IO Configuration Hardware Monitor SS RTC Wake Settings IBMC Configuration Serial Port Console Redirection Intel TXT Information PCI Subsystem Settings USB Configuration Network Stack Configuration CSM Configuration Driver Health 	System ACPI Parameters. ++: Select Screen +: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.22.1288 Copyright (C) 2023 AMI		

Figure 3.3 Advanced BIOS Features Setup Screen

Chapter 3 BIOS Operation

3.2.2.1 Platform Misc Configuration

Advanced	Aptio Setup – AMI	
Platform Misc Configuration		Bit - PCIe Native * control
Native PCIE Enable	[Disabled]	<pre>0 - ~ Hot Plug 1 - SHPC Native Hot Plug control 2 - ~ Power Management Events 3 - PCIe Advanced Error Reporting control 4 - PCIe Capability Structure control 5 - Latency Tolerance Reporting control ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	n 2.22.1288 Copyright (C) 2023	3 AMI

Figure 3.4 Platform Misc Configuration

Native PCIE Enable

"Enable or Disable" PCI Express native support.

3.2.2.2 CPU Configuration

	Aptio Setup – AMI	
Advanced		
CPU Configuration		Displays the P-core Information
▶ Performance-core Information		
ID Brand String VMX SMX/TXT Handware Prefetcher Adjacent Cache Line Prefetch Intel (VMX) Virtualization Technology Active Performance-cores Active Efficient-cores Hyper-Threading AES	0x90675 12th Gen Intel(R) Core(TM) i3-12100TE Supported Not Supported [Enabled] [Enabled] [A11] [A11] [A11] [Enabled] [Enabled] [Enabled]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Versi	on 2.22.1288 Copyright (C) 2	2023 AMI

Figure 3.5 CPU Configuration



Figure 3.6 Performance-Core Information

Performance-Core Information

Performance-core (P-core) information of current CPU used is displayed here.

Hardware Prefetcher

Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it to improve the load-to-use latency. You may choose to "Enable" or "Disable" it.

Adjacent Cache Line Prefetch

The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When it is enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. You may choose to "Enable" or "Disable" it.

Intel® Virtualization Technology

This feature is used to "Enable" or "Disable" Intel® Virtualization Technology (IVT) extension. It allows multiple operating systems to run simultaneously on the same system by creating virtual machines, each running its own x86 operating system.

Active Processor Core

Use this item to select the number of processor cores you want to activate when you are using a multi-core processor.

Hyper-Threading

"Enable" or "Disable" Intel® Hyper Threading technology.

AES

"Enable" or "Disable" CPA advanced encryption standard instruction

Chapter 3 BIOS Operation

3.2.2.3 Power & Performance



Figure 3.7 Power & Performance



Figure 3.8 CPU - Power Management Control

Boot Performance Select the performance state that the BIOS will set before OS handoff.

Intel® Speedstep™ Allows more than two frequency ranges to be supported.

Turbo Mode

"Enable" or "Disable" processor turbo mode.

C States

Intel® C states setting for power saving. Suggest enable for ErP.

3.2.2.4 PCH-FW Configuration

Advanced	Aptio Setup – AMI	
ME Firmware Version ME Firmware Mode ME Firmware SKU ▶ AMT Configuration	16.1.25.2101 Normal Mode Corporate SKU	Configure Intel(R) Active Management Technology Parameters
 Firmware Update Configuration PTT Configuration 		
		<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2	22 1288 Conumight (C) 2023	AMT

Figure 3.9 PCH-FW Configuration

Boot Performance PCH-FW Version PCH-FW page shows Intel® ME FW information.

AMT Configuration

Advanced	Aptio Setup – AMI	
USB Provisioning of AMT ASF Configuration Secure Erase Configuration	[Disabled]	Enable/Disable of AMT USB Provisioning.
		<pre> ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2	.22.1288 Copyright (C) 2023	AMI

Figure 3.10 AMT Configuration

ASF Configuration

Advanced	Aptio Setup – AMI	
PET Progress WatchDog OS Timer BIOS Timer ASF Sensors Table	[Enabled] [Disabled] 0 0 [Disabled]	Enable/Disable PET Events Progress to receive PET Events.
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Ve	ersion 2.22.1288 Copyright (C)	2023 AMI

Figure 3.11 ASF Configuration

- PET Progress

"Enable" or "Disable" PET events Progress to receive PET events.ASF Configuration WatchDog

"Enable" or "Disable" Watchdog Timer.

ASF Sensors Table
 "Enable" or "Disable" to add ASF Sensor Table into ASF ACPI Table.

Secure Erase Configuration

Advanced	Aptio Setup – AMI	
Secure Erase mode Force Secure Erase	[Simulated] [Disabled]	Change Secure Erase module behavior: Simulated: Performs SE flow without erasing SSD Real: Erase SSD. *** If SATA device is used, OEM could use SECURE_ERASE_HOOK_PROTOCOL to remove SATA power to skip G3 cycle. ***
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	Version 2.22.1288 Copyright (C)	2023 AMI

Figure 3.12 Secure Erase Configuration

- Secure Erase mode
 Change secure erase module behavior as "Simulated" or "Real".
- Forced Secure Erase
 "Enable" or "Disable" forced secure erase on next boot.

Firmware Update Configuration

Advanced	Aptio Setup – AMI	
Me FW Image Re-Flash	[Disabled]	Enable/Disable Me FW Image Re-Flash function.
		<pre> ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2	2.22.1288 Copyright (C) 2023	AMI

Figure 3.13 Firmware Update Configuration

ME FW Image Re-flash
 "Enable or Disable" ME firmware image re-flash function.

Advanced	Aptio Setup – AMI	
PTT Capability ∕ State	1 / 1	Selects TPM device: PTT or
TPM Device Selection	[PTT]	SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning ! PTT/dTPM will be disabled and all data saved on it will be lost.
		++: Select Screen
		↑↓: Select Item Enter: Select
		+/-: Change Opt.
		F1: General Help F2: Previous Values
		F3: Optimized Defaults
		ESC: Exit
	Version 2.22.1288 Copyright	(C) 2023 AMI

PTT Configuration

Figure 3.14 PTT Configuration

- TPM Device Selection

Select TPM device "dTPM" or "PTT". dTPM is selected for discrete TPM, dTPM module. PTT (Intel Platform Trust Technology) is a firmware TPM.

3.2.2.5 Trusted Computing

Advanced	Aptio Setup – AMI	
TPM 2.0 Device Found Firmware Version: Vendor: Security Device Support	600.18 INTC [Enable]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be
Active PCR banks Available PCR banks	SHA256 SHA256,SHA384,SM3	available.
SHA256 PCR Bank SHA384 PCR Bank SM3_256 PCR Bank	[Enabled] [Disabled] [Disabled]	
Pending operation Platform Hierarchy Storage Hierarchy Endorsement Hierarchy Physical Presence Spec Version TPM 2.0 InterfaceType Device Select	[None] [Enabled] [Enabled] [Enabled] [1.3] [CRB] [Auto]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1288 Copyright (C) 202	3 AMI

Figure 3.15 TPM Settings

Security Device Support

"Enable" or "Disable" TPM Support. You can purchase an Advantech-designed dTPM 2.0 module to enable the TPM function. P/N: PCA-TPMSPI-00A1.

3.2.2.6 ACPI Settings



Figure 3.16 ACPI Settings

Enable ACPI Auto Configuration

"Enable" or "Disable" ACPI auto configuration.

Enable Hibernation

"Enable" or "Disable" Hibernation (OS/S4 Sleep State). This option may not be applied in some OS.

ACPI Sleep State

"Suspend Disabled" or "S3 (Suspend to RAM)" ACPI Sleep State.

Deep Sleep

Select "Disabled" or "Enable (S4+S5)" or "Enable (S5 only)" sleep mode. Enable this function to cut off the power of peripherals in sleep state. Please enable this function to comply with EU ErP (Energy-related Product) regulations if required. If "Enable (S5 only)" is chosen, only the power button can turn on the system (fast startup must be disabled under OS)

3.2.2.7 SMART Settings



Figure 3.17 SMART Settings

SMART Self Test

"Enable" or "Disable" SMART self test on all HDDs during POST.

3.2.2.8 NCT6126D Super IO Configuration





Chapter 3 BIOS Operation

Serial Port 1,2 Configuration



Figure 3.19 Serial Port 1 Configuration

- Serial Port "Enable" or "Disable" serial port.
- Change Settings Select an optimal setting for serial port 3.
- Device Mode Default for device mode is "RS-232".

3.2.2.9 Hardware Monitor

Advanced	Aptio Setup — AMI	
Pc Health Status		Smart Fan function setting
System temperature CPU temperature CPUFAN1 Speed SYSFAN1 Speed SYSFAN2 Speed SYSFAN3 Speed VCORE +12V +5V +5VSB +3.3V VBAT > Smart Fan Function Case Open Warning CPU Warning Temperature ACPI Shutdown Temperature	: +33 °C : +31 °C : N/A : N/A : N/A : N/A : +0.808 V : +11.880 V : +5.152 V : +5.024 V : +3.376 V : +2.928 V [Disabled] [Disabled] [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
V	ersion 2.22.1288 Copyright (C) 202	23 AMI

Figure 3.20 Hardware Monitor

Case Open Warning

"Enable" or "Disable" the chassis Intrusion monitoring function. When it is enabled and the case is opened, the speaker beeps.

CPU Warning Temperature

Use this item to set the CPU warning temperature. When the system reaches the warning temperature, the speaker will beep.

ACPI Shutdown Temperature

Use this item to set the ACPI shutdown temperature. When the system reaches the shutdown temperature limit, it will be automatically shut down by the ACPI OS to protect the system from overheating damage.

3.2.2.10 S5 RTC Wake Settings

Advanced	Aptio Setup — AMI	
Wake system from S5	[Disabled]	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime , System will wake on the current time + Increase minute(s) ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1288 Copyright (C) 2023	3 AMI

Figure 3.21 S5 RTC Wake Settings

Wake System with Fixed Time

"Enable" or "Disable" System wake on alarm event. The system will wake on the hr:min:sec as specified.

3.2.2.11 iBMC Configuration

Advanced	Aptio Setup — AMI	
iBMC Out-of-Band Managemen	t	iBMC function control
iBMC Vendor ID iBMC Device ID iBMC Version iBMC BIOS Capability iBMC Apacer Coresnapshot BIOS POST STEP Recovery mode	13FE 4000 1401 00000007 [Enabled] Not Found [Enabled] [Enabled]	
Change bootorder	[Enabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	Version 2.22.1288 Copyright (C)	2023 AMI



■ iBMC

"Enable" or "Disable" iBMC controller's hardware communication. The default setting is "Enabled". iBMC controller/function can be disabled if the item is selected as "Disabled".

- BIOS POST STEP "Enable" or "Disable" BIOS POST STEP.
- Recovery mode
 "Enable" or "Disable" recovery mode.
- Change bootorder
 "Enable" or "Disable" change bootorder.

3.2.2.12 Serial Port Console Redirection

Advanced	Aptio Setup – AMI	
COM1 Console Redirection ▶ Console Redirection Settings	[Disabled]	Console Redirection Enable or Disable.
COM1(Pci Bus0,Dev0,Func0) (Disabled) Console Redirection	Port Is Disabled	
Legacy Console Redirection ▶ Legacy Console Redirection Settings		
Serial Port for Out-of-Band Managemer Windows Emergency Management Service:	nt∕ s (EMS)	
Console Redirection EMS ▶ Console Redirection Settings	[Disabled]	<pre>++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.	.22.1288 Copyright (C) 2023	AMI

Figure 3.23 Serial Port Console Redirection

Advanced	Aptio Setup – AMI	
Legacy Console Redirection Settings		Select a COM port to display redirection of Legacy OS and
Redirection COM Port Resolution Redirect After POST	(COMI) [80x24] [Always Enable]	Legacy OPROM Messages
		<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2	.22.1288 Copyright (C) 2023	AMI



- COM1
 - Console Redirection Settings

Console redirection "Enable" or "Disable".

Legacy Console Redirection

- Legacy Console Redirection Settings

Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

- Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)
 - Console Redirection Settings
 Console redirection "Enable" or "Disable".

3.2.2.13 Intel® TXT Information

Advanced	Aptio Setup — AMI	
Intel TXT Information		
Chipset BiosAcm Chipset Txt Cpu Txt Error Code Class Code Major Code Minor Code	Production Fused Debug Fused Not Supported None None None None None	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Versio	n 2.22.1288 Copyright (C) 2023) AMI

Figure 3.25 Intel® TXT Information

Chapter 3 BIOS Operation

3.2.2.14 USB Configuration

Advanced	Aptio Setup – AMI	
USB Configuration		Enables Legacy USB support.
USB Module Version	31	support if no USB devices are connected. DISABLE option will
USB Controllers: 1 XHCI		Keep USB devices available only for EFI applications.
USB Devices: 1 Drive, 1 Keyboard		
Legacy USB Support	[Enabled]	
USB Mass Storage Driver Support	[Enabled]	
USB hardware delays and time–outs:		↔: Select Screen
USB transfer time—out	[20 sec]	†↓: Select Item
Device reset time-out	[20 sec]	Enter: Select
Device power-up delay	[Auto]	+/-: Change Opt.
		F1: General Help
Mass Storage Devices:	50 J J	F2: Previous Values
USB	[AUTO]	F3: Uptimized Defaults
		F4: 58VE & EXIL
		LOU. LAIT
Version 2	2 22 1288 Conuright (C) 2023	АМТ.
VEI STOIL 2		11112

Figure 3.26 USB Information

Legacy USB Support

This supports USB device under legacy OS such as DOS. When choosing "Auto" the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode when a USB device is plugged in and disable USB legacy mode when no USB device is plugged in.

XHCI Hand-Off

This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver.

USB Mass Storage Driver Support

"Enable" or 'Disable" USB mass storage driver support.

- USB Transfer Time-Out
 Allows you to select the USB transfer time-out value. [1,5,10,20 sec]
- Device Reset Time-Out Allows you to select the USB device reset time-out value. [10,20,30,40 sec]
- Device Power-Up Delay

Maximum time the device will take before it properly reports itself to the host controller. "Auto" uses default value: for a root port it is 100 ms, for a hub port the delay is take from hub descriptor.

3.2.2.15 Network Stack Configuration



Figure 3.27 Network Stack Configuration

Network Stack

"Enable" or "Disable" UEFI Network Stack.

3.2.2.16 CSM Configuration



Figure 3.28 CSM Configuration

Advanced	Aptio Setup – AMI	
Compatibility Support Module C	onfiguration	Enable/Disable CSM Support.
CSM Support	[Enabled]	
CSM16 Module Version	N/A, reset required	
GateA20 Active INT19 Trap Response	[Upon Request] [Immediate]	
Boot option filter	[UEFI only]	
Option ROM execution		
Network Storage Video Other PCI devices	[Do not launch] [UEFI] [UEFI] [UEFI]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Ver	sion 2.22.1288 Copyright (C) 2	023 AMI

Figure 3.29 CSM Configuration (CSM Support "Enabled")

Compatibility Support Module Configuration

- CSM Support

"Enable" or "Disable" CSM Support. The default setting is "Disabled". If your graphics card does not support UEFI mode, make sure to select "Enabled" to allow non-UEFI boot mode before installing the graphics card to turn on the computer.

3.2.2.17 NVMe Configuration



Figure 3.30 NVMe Configuration

NVMe Configuration

Supports NVMe M.2 storage devices.

3.2.2.18 Driver Health



Figure 3.31 Driver Health

3.2.3 Chipset

Aptio Setup – AMI Main Advanced <mark>Chipset</mark> Security Boot Save & Exit MEBx	
▶ System Agent (SA) Configuration ▶ PCH-IO Configuration	System Agent (SA) Parameters
	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.22.1288 Copyright (C) 2023	AMI

Figure 3.32 Chipset

This page provides information on the ECU-479 chipset.

3.2.3.1 System Agent (SA) Configuration



Figure 3.33 System Agent (SA) Configuration

VT-d

"Enable" or "Disable" VT-d function.

Above 4GB MMIO BIOS Assignment

"Enable" or "Disable" above 4GB memory-mapped IO BIOS assignment.

3.2.3.2 Memory Configuration

Chipset	Aptio Setup — AMI	
Chipset Memory Configuration Memory RC Version Memory Frequency tCL-tRCD-tRP-tRAS DIMMA1 Size Number of Ranks Manufacturer DIMMB1 Size Number of Ranks Manufacturer Maximum Memory Frequency Max TOLUD	0.0.4.112 2667 MHz 19-19-19-43 Populated & Enabled 16384 MB (DDR4) 2 Advantech Co Ltd Populated & Enabled 16384 MB (DDR4) 2 Advantech Co Ltd [Auto] [Dynamic]	Maximum Memory Frequency Selections in Mhz.
	Version 2.22.1288 Copyright (C) 202	23 AMI

Figure 3.34 Memory Configuration

Maximum Memory Frequency

Maximum memory frequency selections in MHz.

Max TOLUD

Maximum value of TOLUD.

3.2.3.3 Graphics Configuration

Chipset	Aptio Setup – AMI	
Graphics Configuration		Select which of IGFX/PEG/PCI Graphics device should be
Primary Display Internal Graphics	[Auto] [Auto]	
		<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt.</pre>
		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1288 Copyright (C) 2023	AMI

Figure 3.35 Graphics Configuration

Primary Display

Set primary display to "Auto", "IGFX", "PEG", "PCI", or "SG".

Internal Graphics

Set internal graphics to "Auto", "Disable" or "Enable". "Auto" will disable internal graphics when a GPU card is installed. If GPU and internal graphics outputs are required at the same time, set this item to "Enable".

3.2.3.4 VMD Setup Menu



Figure 3.36 VMD Setup Menu

Enable VMD controller

"Enable" or "Disable" VMD controller. Enable VMD controller to active "Intel Rapid Storage Technology" option and setup RAID.

Chapter 3 BIOS Operation

3.2.3.5 PCI Express Configuration

Aptio Setup – AMI <mark>Chipset</mark>	
PCI Express Configuration	PCI Express Root Port Settings.
▶ PCI Express Root Port (PCIe1)	
	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.22.1288 Convright (C) 2023	AMT



Chipset	Aptio Setup – AMI	
PCI Express Root Port (PCIe1) PCIe Speed	[Enabled] [Auto]	Control the PCI Express Root Port.
Version 2.	22.1288 Copyright (C) 2023	AMI

Figure 3.38 PCI Express Root Port (PCIe1)

For PCIE1 x16 Gen4 slot.

- PCI Express Root Port (PCIe 1)
 - PCI Express Root Port (PCIe 1)
 "Enable" or "Disable" PCI Express root port.

PCIe Speed

Select "Auto, Gen1, Gen2, Gen 3, Gen 4" for PCle speed.

3.2.3.6 PCH-IO Configuration

Chipset	Aptio Setup — AMI	
PCH-IO Configuration ► PCI Express Configuration ► SATA Configuration ► USB Configuration ► Security Configuration ► HD Audio Configuration		PCI Express Configuration settings
LANI Controller LAN1 Option-ROM LAN2 Controller LAN2 Option-ROM LAN3 Controller LAN3 Option-ROM LAN4 Controller LAN4 Option-ROM PCIE Wake Restore AC Power Loss PCIE Device Initial Delay	[Enabled] [Disabled] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [S5 State] 0	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	Version 2.22.1288 Copyright (C) 2023	AMI

Figure 3.39 PCH-IO Configuration

LAN1~4 Controller

"Enable or Disable" LAN1~4 controller.

LAN1~4 Option-ROM

"Enable or Disable" LAN1~4 boot option for legacy network devices.

PCIE Wake

"Enable or Disable" PCIE to wake the system from S5. When this item is selected as "Disabled", Wake on LAN2 function is also disabled.

Restore AC Power Loss

Select behavior when recovering from AC power loss: "S0 State" (power on), "S5 State" (power off), or "Last State".

PCIE Device Initial Delay

Users can set seconds to delay PCIE device initial time.

Chapter 3 BIOS Operation

3.2.3.7 PCI Express Configuration

Chipset	Aptio Setup — AMI	
PCI Express Configuration	1	PCI Express Root Port Settings.
 PCI Express Root Port 1 PCI Express Root Port 2 PCI Express Root Port 3 PCI Express Root Port 4 PCI Express Root Port 5 PCI Express Root Port 6 PCI Express Root Port 7 PCI Express Root Port 8 PCI Express Root Port 9 PCI Express Root Port 10 PCI Express Root Port 11 PCI Express Root Port 12 PCI Express Root Port 13 PCI Express Root Port 14 PCI Express Root Port 15 PCI Express Root Port 15 PCI Express Root Port 16 PCI Express Root Port 17 PCI Express Root Port 18 PCI Express Root Port 18 PCI Express Root Port 18 PCI Express Root Port 19 	Shadowed by x2/x4 port Shadowed by x2/x4 port	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	Version 2.22.1288 Copyright (C) 2023	3 AMI

Figure 3.40 PCI Express Configuration

Chipset	Aptio Setup – AMI	
PCI Express Root Port 1 PCIe Speed Detect Non-Compliance Device	[Enabled] [Auto] [Disabled]	Control the PCI Express Root Port. +: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version	2.22.1288 Copyright (C) 2023	AMI

Figure 3.41 Express Root Port

For PCIE2~4 x4 Gen3 slots.

PCIE2: Root Port 9~12; PCIE3: Root Port 5~8; PCIE4: Root Port 1~4

PCI Express Root Port 1

"Enable" or "Disable" PCI Express Root Port.

PCIe Speed

Select "Auto, Gen1, Gen2, Gen 3" for PCIe speed.

Detect Non-compliance Device

If enabled, it will take more time during POST.

3.2.3.8 SATA and RST Configuration

Chipset	Aptio Setup — AMI	
SATA Configuration		▲ Enable/Disable SATA Device.
SATA Controller(s) SATA Mode Selection SATA Controller Speed Serial ATA Port O(NVME1) Software Preserve Port 0 Hot Plug Configured as eSATA Spin Up Device SATA Device Type Serial ATA Port 4 Software Preserve Port 4 Hot Plug Configured as eSATA Spin Up Device SATA Device Type Serial ATA Port 5 Software Preserve Port 5 Hot Plug Configured as eSATA	[Enabled] [AHC1] [Auto] Empty Unknown [Enabled] [Disabled] [Hard Disk Drive] Empty Unknown [Enabled] [Disabled] Hot Plug supported [Disabled] [Hard Disk Drive] Empty Unknown [Enabled] [Disabled] [Disabled] [Disabled] [Disabled] [Disabled] Hot Plug supported	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Figure 3.42 SATA and RST Configuration

SATA Controller(s)

"Enable or Disable" SATA controller.

SATA Mode Selection

This is fixed as 'AHCI'.

- SATA Controller Speed
 Select "Auto, Gen2, Gen3" of SATA controller speed.
- Port 4~7

"Enable" or "Disable" SATA port 4~7.

Hot Plug

"Enable" or "Disable" SATA Hot-Plug.

Spin Up Device

"Enable" or "Disable" spin up device.

SATA Device Type

To identify the SATA that is connected to a "Solid State Drive" or "Hard Disk Drive".
Chapter 3 BIOS Operation

3.2.3.9 Security Configuration

Aptio Setup - AMI Chipset						
Security Configuration	7 - 1 - 12	Enable will lock bytes 38h–3Fh in the lower/upper 128-byte				
RIC Memory Lock BIOS Lock Force unlock on all GPIO pads	[Enabled] [Enabled] [Disabled]	DANK OT KIU KAM				
		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>				
Version	2.22.1288 Copyright (C) 2023	AMI				

Figure 3.43 Security Configuration

RTC Memory Lock

Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.

BIOS Lock

"Enable" or "Disable" the PCH BIOS Lock Enable feature. Needs to be enabled to ensure SMM protection of flash.

Force unlock on all GPIO pads

If Enabled, BIOS will force all GPIO pads into an unlocked state.

3.2.3.10 HD Audio Configuration



Figure 3.44 HD Audio Configuration

HD Audio

Control detection of the HD-Audio device. Disable = HDA will be unconditionally disabled. Enable = HDA will be unconditionally enabled.

3.2.4 Security

Aptio Setup – AMI Main Advanced Chipset <mark>Security</mark> Boot Save & Exit MEBx						
Password Description		Set Administrator Password				
If ONLY the Administrator's then this only limits acces only asked for when enterin If ONLY the User's password is a power on password and boot or enter Setup. In Set have Administrator rights. The password length must be in the following range:	password is set, s to Setup and is g Setup. is set, then this must be entered to up the User will					
Minimum length Maximum length	3 20	↔: Select Screen				
Administrator Password User Password		<pre>↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit</pre>				
HDD Security Configuration: P7:SQF-S25M4-64G-SBE		ESC: Exit				
▶ Secure Boot		Image: Second secon				
	Version 2.22.1288 Copyright ((C) 2023 AMI				

Figure 3.45 Security

Select security setup from the ECU-479 BIOS setup menu. All security setup options, such as password protection and secure boot, are displayed in this section.

Security Boot

Security Boot feature setup.

Note!					

If only one user password is set, the user will have administrator rights. Setting an administrator password is strongly recommended if you have security concerns.

3.2.5 Boot



Figure 3.46 Boot

Setup Prompt Timeout

Directly key in the number, or use the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.

Bootup NumLock State

Default state for the NumLock key during power on.

Quiet Boot

"Enable or Disable" Quiet Boot option. When enabled, the BIOS logo will show in place of POST screen.

Boot Option Priorities

Set the boot order.

Chapter 3 BIOS Operation

3.2.6 Save & Exit

Aptio Setup – AMI Main Advanced Chipset Security Boot Save & Exit MEBx	
Save Options Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes Discard Changes Default Options Restore Defaults Save as User Defaults Restore User Defaults Boot Override UEFI: Built-in EFI Shell Windows Boot Manager (P7: SQF-S25M4-64G-SBE) UEFI: USB, Partition 1 (USB)	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.22.1288 Copyright (C) 2023	AMI

Figure 3.47 Save & Exit

Save Changes and Exit Exit system setup after saving the changes. **Discard Changes and Exit** Exit system setup without saving any changes. **Save Changes and Reset** Reset the system after saving changes. **Discard Changes and Reset** Reset system setup without saving any changes. **Save Changes** Save changes done so far to any of the setup options. **Discard Changes** Discard changes done so far to any of the setup options. **Restore Defaults** Restore/Load default values for all the setup options. Save as User Defaults Save the changes done so far as user defaults. **Restore User Defaults** Restore the user defaults to all the setup options.



I/O Pin Assignments

A.1 LAN1~LAN4



Table A.1	: LAN Port (LAN1~LAN4)		
Pin	Signal	Pin	Signal
1	DA+	5	DC+
2	DA-	6	DC-
3	DB+	7	DD+
4	DB-	8	DD-

A.2 USB1~USB5



Table A.2: USB 3.2 Port (USB1~USB5)						
Pin	Signal	Pin	Signal			
1	+5V	6	STDA_SSRX+			
2	D-	7	Shield GND_DRAIN			
3	D+	8	STDA_SSTX-			
4	GND	9	STDA_SSTX+			
5	STDA_SSRX-					

A.3 DisplayPort Connector



Table A.3: DisplayPort Connector (DP1~4)							
Pin	Signal	Pin	Signal				
1	TMDS D2+	11	GND				
2	GND	12	TMDS CLK-				
3	TMDS D2-	13	N/C				
4	TMDS D1+	14	N/C				
5	GND	15	SCL				
6	TMDS D1-	16	SDA				
7	TMDS D0+	17	GND				
8	GND	18	VCC (+5 V)				
9	TMDS D0-	19	Hot plug detect				
10	TMDS CLK+						

A.4 COM1,2



Table A.4: RS-232 DB-9 Connector (COM1,2)						
Pin	RS-232	RS-485/422 Full Duplex	RS-485 Half Duplex			
1	DCD	TX-	Data-			
2	RXD	TX+	Data+			
3	TXD	RX+				
4	DTR	RX-				
5	GND	GND	GND			
6	DSR					
7	RTS					
8	CTS					
9	RI					

A.5 SPI_TPM1

1	C2							5	
-		٠	٠	٠	٠	٠	٠	I	
	H		۰	۰		۰	٠	Ħ	
2								-	12

Table A.5: Serial Peripheral Interface(SPI) Connector (SPI_TPM1)					
Pin	Signal	Pin	Signal		
1	CS#	7	MISO		
2	PRSNT#	8	N.C.		
3	CLK	9	IRQ#		
4	GND	10	GND		
5	MOSI	11	RESET#		
6	GND	12	+3.3 V POWER		

A.6 JFP1~JFP3

JFP1	3	6	9	12		PWRSW	RESET	
&	2	5	8	11		HDDLED	SNMP SM_BUS	
JFP2 🕨	1	4	7	10		SPEAKER		
JFP3	1	2	3	4	5	PWRLED	& N/C	

A.6.1 Power LED (JFP3)



Table A.6: Power LED (JFP3)					
Pin	Function				
1	POWER_LED+				
2	N/C				
3	GND				
4	N/C				
5	N/C				

A.6.2 External Speaker Connector (JFP2)



Table A.7: External Speaker Connector (JFP2)		
Pin	Function	
1	EXTENAL_SPK_P1	
4	EXTENAL_SPK_2	
7	INTENAL_SPK_P3	
10	INTENAL_SPK_P4	

A.6.3 HDD LED Connector (JFP2)

25

Table A.8: HDD LED Connector (JFP2)		
Pin	Signal	
2	HDD_LED+	
5	HDD_LED-	

A.6.4 SMBus Connector (JFP2)

Table A.9: SMBus Connector (JFP2)		
Pin	Signal	
8	SMB_SNMP_SDAT	
11	SMB_SNMP_SCLK	

A.6.5 ATX Soft Power Switch (JFP1)

Table A.10: ATX Soft Power Switch (JFP1)		
Pin	Signal	
3	PANSWIN#	
6	GND	

A.6.6 Reset Connector (JFP1)

9 12

Table A.11: Reset Connector (JFP1)		
Pin	Signal	
9	SYSTEM RESET#	
12	GND	

A.7 CMOS clear (JCMOS1) and Intel® ME update (JME1)

The ECU-479 motherboard contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set JCMOS1 to pins 2-3 closed for just a few seconds, and then move the jumper back to pins 1-2 closed. This procedure will reset the CMOS to its default setting.



A.8 Watchdog timer output and OBS alarm (JWDT1+JOBS1)

The ECU-479 contains a watchdog timer that will reset the CPU. This feature means the ECU-479 will recover from a software failure or an EMI problem. The JWDT1 jumper settings control the outcome of what the computer will do in the event the watchdog timer is tripped.

The 2-pin OBS alarm header (JOBS1) enables/disables hardware monitor alarm functions.

Table A.13: WD timer output & OBS alarm (JWDT1+JOBS1)		
Function	Jumper Setting	
Watchdog timer disable (2-4) OBS beep (8-10)	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2-4, 8-10 closed
*Watchdog timer reset (4-6) OBS beep (8-10)	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	4-6, 8-10 closed

A.9 ATX/AT mode selection (PSON1)

Table A.14: ATX/AT mode selection (PSON1)		
Function	Jumper Setting	
AT mode	1 2 3 0 0 0 1-2 closed	
* ATX mode	1 2 3 2-3 closed	
* default setting		

A.10 USB power source switch between +5V and +5V_DUAL for onboard USB ports (JUSB_1, JUSB_2)

The ECU-479 allows users to set USB power between +5 V_DUAL and +5 V. When the jumper is set as +5 V, the USB ports doesn't support wake up from S3 via keyboard or mouse.

JUSB_1 controls rear USB1~3, JUSB_2 controls USB4,5 (front), 6 (internal).

Table A.15: USB power source switch for USB ports		
Function	Jumper Setting	
USB +5 V_DUAL power	1 2 3 0 0 0 1-2 closed	
USB +5 V power	1 2 3	
Default setting: JUSB_1 1-2 closed, JUSB_2 2-3 closed.		

A.11 PCIe SMBus connection setting of clock (SMB1, SMB3) and data (SMB2, SMB4) for PCIE1 ~ PCIE4 slots

Some PCIe add-on cards or devices may have SMBus address conflicts with DIMMB2 slot at slave address of 0xA6. In the case, users may disable the SMBus connection of clock (SMB1, SMB3) and data (SMB2, SMB4), while VPD (Vital Product Data) will not be accessed. The default setting is enabled. Please note that both SMB1 and SMB2 jumpers should be switched to the same setting, either pins 1-2 closed or pins 2-3 closed.

SMB1, SMB2 control PCIE2~PCIE4 slots; SMB3, SMB4 control PCIE1 slot.

Table A.16: PCIe SMBus connection	on setting of clock and data
Function	Jumper Setting
*Enable PCIe SMBus connection	1 2 3 0 0 0 1-2 closed
Disable PCIe SMBus connection	1 2 3 2-3 closed
* default setting	



Programming the Watchdog Timer

The ECU-479's watchdog timer can be used to monitor system software operations and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

B.1 Watchdog timer overview

The watchdog timer is built into the super I/O controller NCT6126D. It provides the following functions for user programming:

- Can be enabled and disabled via the user's program.
- The timer can be set from 1 to 255 seconds/minutes.
- Generates an interrupt or reset signal if the software fails to reset the timer before time-out.

B.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. You must first write an address value into address port 2E (hex), and then write/read data to/from the assigned register through data port 2F (hex).



Table B.1: Watchdog timer registers		
Address of register (2E)	Read/ Write	Value (2F) & description.
87 (hex)	-	Write this address to I/O address port 2E (hex) twice to unlock the NCT6126D.
07 (hex)	write	Write 08 (hex) to select register of watchdog timer.
30 (hex)	write	Write 01 (hex) to enable the function of the watchdog timer. Enabled is set as default.
F0 (hex)	write	Set seconds or minutes as units for the timer. Write 0 to bit 3: set seconds as counting unit. [default]. Write 1 to bit 3: set minutes as counting unit.
F1 (hex)	write	0: stop timer [default] 01 ~ FF (hex): The amount of the count, in seconds or minutes, depends on the value set in register F0 (hex). This number decides how long the watchdog timer waits for strobe before generating an interrupt or reset signal. Writing a new value to this register can reset the timer to count with the new value.
F2 (hex)	read/ write	Bit 6: Write 1 to enable keyboard to reset the timer, 0 to dis- able.[default] Bit 5: Write 1 to generate a timeout signal immediately and auto- matically return to 0. [default=0] Bit 4: Read status of watchdog timer, 1 means timer is "timeout".
AA (hex)	-	Write this address to I/O port 2E (hex) to lock NCT6126D.



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