ESM-EHLC

PICMG COM.0 R3.0 Type 6 Compact module with on board Intel® Elkhart Lake series Platform

User's Manual

1st Ed -31 May 2022

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(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.

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.

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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 you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x ESM-EHLC COMe Module
- 1 x Desiccant (5g)
- 4 x Screws



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

1.3 Document Amendment History

Revision	Date	Ву	Comment
1 st	May 2022		Initial Release

1.4 Manual Objectives

This manual describes in details ESM-EHLC 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 ESM-EHLC series 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 NVRAM that make booting impossible. If this should happen, clear the NVRAM 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.

ESM-EHLC User's Manual 1.5 System Specifications

System					
CDU	Onboard Intel® Celeron®/ Pentium®/Atom™ SoC BGA Processor (Elkhart Lake				
CPU	Platform 6~12W)				
BIOS	AMI uEFI BIOS, 256 Mbit SPI Flash ROM				
System Chipset	Elkhart lake SoC integrated				
I/O Chip	EC ITE IT5571				
System Memory	Two 260-pin SODIMM DDR4 3200 SDRAM slot up to 32GB				
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec. and 1sec./step				
U/M Status Manitar	Monitoring System Temperature, Voltage and FAN Status with Auto Throttling				
H/W Status Monitor	Control				
трм	TPM 2.0 (Optional, NuvoTon NPCT754AADYX SPI Interface E14S4075401H,				
I PIVI	wide temp version, Co-lay with Infineon solution)				
Storage					
eMMC	eMMC 5.1 up to 128 GB (build option)				
I/O Interface (SOM)					
PCI Express	3 PClex1 Gen3 (8.0 GT/s)				
UART	2 x UART(2-wire)				
USB 2.0	8 x USB 2.0				
USB 3.1	4 x USB 3.2 Gen2x1 (10 Gbps)				
SATA	2 x SATA3.0 (6.0Gb/s)				
LPC/eSPI	1x LPC (via eSPI-to-LPC bridge), or 1x eSPI (Only support 20MHz), build option.				
I2C Bus	1 x I2C				
SMBus	SMBus				
e D	SD Optional (SD signal share with GPIO, default is GPIO, controlled by BIOS and				
50	BOM setting)				
SPI	1 x SPI				
Others	8bit GPIO				
Display					
Graphic Chipset	Intel® Elkhart Lake SoC Processor integrated Gen11 LP graphics				
	HDMI 1.4b/2.0b: 4096x2160 @60Hz				
	DP 1.4: 4096x2160 @60Hz Per Intel design guide, need to add Redriver				
	(Redriver in carrier board to fine tune the signal of DP1.4).				
Spec. & Resolution	eDP 1.3b(Optional): 4096x2160 @60Hz				
	(Only support 4Lanes 2560x1440 & 2Lanes 1920x1080)				
	LVDS(via eDP-to-LVDS): 1920x1080 @60Hz, LVDS via CH7511B				
	VGA(via DP-to-VGA): 1920x1080 @60Hz, VGA via CH7517A (DP to VGA)				

	Maximum of 3 Simultaneous Displays							
	Maximum of 3 Simultaneous Displays							
	1 Displ 1 Internal	ay Only 1 External	2 Dis 1 Internal + 1 External	plays 2 External	3 Dis 1 Internal + 2 External	splays 3 External	F	
	eDP 1.3b ² : 4096x2160 60Hz (Single port) MIPI-DSI: 4096x2160 @ 60Hz (w. compression)	N/A	eDP 1.3b ² : 4096 x 2160 @ 60Hz MIPI-DSI: 4096 x 2160 @ 60Hz	N/A	eDP 1.3b ² : 4096 x 2160 @ 60Hz MIPI-DSI: 4096 x 2160 @ 60Hz	N/A		
Multiple Display	External N/A	DP 1.4 ² : 4096x2160 @ 60hz 4096x2160 @120Hz (w.compression) HDMI 2.0b: 4096 x 2160 @ 60Hz	DP 1.4 ² : 4096 x 2160 @ 60Hz HDMI 2.0b: 4096 x 2160 @ 60Hz	DP 1.4 ² : 4096 x 2160 @ 60Hz HDMI 2.0b: 4096 x 2160 @ 60Hz	DP 1.4 ² : 4096 x 2160 @ 60Hz HDMI 2.0b: 4096 x 2160 @ 60Hz	DP 1.4 ² : 4096 x 2160 60Hz HDMI 2.0b: 4096 x 21 @ 60Hz	160	
	External #2 N/A	N/A	N/A	DP 1.4 ² : 4096 x 2160 @ 60Hz HDMI 2.0b: 4096 x 2160 @ 60Hz	DP 1.4 ² : 4096 x 2160 @ 60Hz HDMI 2.0b: 4096 x 2160 @ 60Hz	DP 1.4 ² : 4096 x 2160 60Hz HDMI 2.0b: 4096 x 21 @ 60Hz	@ 160	
	External #3 N/A	N/A	N/A	N/A	N/A	DP 1.4 ² : 4096 x 2160 60Hz HDMI 2.0b: 4096 x 21 @ 60Hz	@ 160	
	Notes: Depends or	n vary carrier	board.					
Digital Display							1	
Interface (SOM)	HDMI/DP (default)							
Audio								
Audio Codec	Intel® HD Audio in	tegrated in S	оС]	
Ethernet								
	1 x Intel KTI225LM	l for STD-Ter	mp. SKU					
LAN Chipset	1 x Intel KTI225IT for Wide-Temp. SKU							
LAN Space	1 x 10BASE-TE/100BASE-TX/1000BASE-T/2500BASE-T compatible Gigabit,							
LAN Spec.	above 70°C Tc, the recommended speed is 1G.							
Mechanical &								
Environmental								
Power Requirement	+9~ +19V							
	Single power ATX Support S0, S3, S4, S5							
ACFI	ACPI 6.0Compliant							
Power Mode	AT/ATX							
	Operating Standard: 0°C ~ 60°C with 0.2m/s air flow							
Operating Temp.	Conditional extend: -40°C ~ 85°C with 0.5m/s air flow. (Note: Above 70°C Tc, the							
	recommended ethernet speed is 1G.)							
Storage Temp.	-40°C ~ 85°C (-40°F ~ 185°F)							
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing							
Size (L x W)]		
(Please consult product								
engineers for the								
production feasibility if the	95 x 95 mm (3.74" x 3.74")							
size is larger than								
410x360mm or smaller								
than 80x70mm)								
Weight	0.44lbs(0.2kg)							

	Random Vibration Operation 1 Test PSD : 0.00454G²/Hz , 1.5 Grms 2 System
	condition : operation mode 3 Test frequency : 5~500 Hz 4 Test axis : X,Y and Z
	axis 5 Test time : 30 minutes per each axis 6 IEC60068-2-64 Test Fh 6 Storage :
	mSATA
	Random vibration test (Non-operation)
	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
Vibration Test	5 30 min. per each axis
	6 IEC 60068-2-64 Test:Fh
	Package Vibration Test:
	1 Test PSD : 0.026G²/Hz , 2.16 Grms
	2 Test frequency : 5~500 Hz
	3 Test axis : X,Y and Z axis
	4 Test time : 30 minutes per each axis
	5 IEC 60068-2-64 Test Fh
	1 Wave from : Half Sine wave
	2 Acceleration Rate : 10g
	3 Duration Time : 11ms
Shock Test	4 No. of shock : Z axis 300 times
	5 Test Axis : Z axis
	6 operation mode
	7 Reference IEC 60068-2-27 testing procedures Test Eb : Shock Test
	Package drop test
	Reference ISTA 2A, Method : IEC-60068-2-32 Test:Ed Test Ea : Drop Test
Dren Test	1 Test phase : One corner, three edges, six faces
Drop Test	2 Test high : 96.5cm
	3 Package weight : 5Kg
	4 Test drawing
OS Information	Windows* 10 IoT Enterprise (64-bit), Linux
Carrier	Carrier: with EEV-EX16 B1 version
Others	Sample build included BOM1 & 2, BOM3 RD will adjust component and offer for
Others	testing



Note: Specifications are subject to change without notice.

1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of ESM-EHLC.



2. Hardware Configuration

2.1 Product Overview



2.2 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:

0 0		1 2 3 O
Open	Closed	Closed 2-3

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.

Connectors					
Label	Function	Note			
BIOS_SPI1	(Reserved for BIOS programming)	5 x 2 header, pitch 2.00mm			
CN1A	COM Express connector 1				
CN1B	COM Express connector 2				
SODIMM1	260-pin DDR4 SDRAM DIMM socket				
SODIMM2	260-pin DDR4 SDRAM DIMM socket				
SW1	AT/ATX mode selector				

2.3 Setting Jumpers & Connectors

2.3.1 AT/ATX mode selector (SW1)



AT/ATX mode



AT mode





2.3.1.1 Signal Description –AT/ATX mode selection

AT/ATX mode	Description
AT mode on 12	Auto power on, no need to press Power button to enable power on/off
ATX mode	
on III 12	Press the ATX power button to enable power on/off

2.3.2 COM Express Connector 1 (CN1A)





Signal	PIN	PIN	Signal
GND	A110	B110	GND
VCC	A109	B109	VCC
VCC	A108	B108	VCC
VCC	A107	B107	VCC
VCC	A106	B106	VCC
VCC	A105	B105	VCC
VCC	A104	B104	VCC
LID#	A103	B103	SLEEP#
SER1_RX	A102	B102	FAN_TACHIN
SER1_TX	A101	B101	FAN_PWMOUT
GND	A100	B100	GND
SER0_RX	A99	B99	NC
SER0_TX	A98	B98	NC
TYPE10#	A97	B97	SPI_CS#
TPM_PP	A96	B96	VGA_I2C_DAT
SPI_MOSI	A95	B95	VGA_I2C_CK
SPI_CLK	A94	B94	VGA_VSYNC
GPO0	A93	B93	VGA_HSYNC
SPI_MISO	A92	B92	VGA_BLU
+3.3V_SPI	A91	B91	VGA_GRN
GND	A90	B90	GND
PCIE_CLK_REF-	A89	B89	VGA_RED
PCIE_CLK_REF+	A88	B88	BIOS_DIS1#
CB_EDP_HDP	A87	B87	+ATX5VSB
NC	A86	B86	+ATX5VSB
GPI3	A85	B85	+ATX5VSB
LVDS_I2C_DAT/EDP_AUX-	A84	B84	+ATX5VSB
LVDS_I2C_CK/EDP_AUX+	A83	B83	LVDS_BKLT_CTRL/ EDP_BKLT_CTRL
LVDS_A_CK-/EDP_TX3-	A82	B82	LVDS_B_CK-
LVDS_A_CK+/EDP_TX3+	A81	B81	LVDS_B_CK+





Signal	PIN	PIN	Signal
GND	A80	B80	GND
LVDS_A3-	A79	B79	LVDS_BKLT_EN/ EDP_BKLT_EN
LVDS_A3+	A78	B78	LVDS_B3-
LVDS_VDD_EN/EDP_VDD_EN	A77	B77	LVDS_B3+
LVDS_A2-/EDP_TX0-	A76	B76	LVDS_B2-
LVDS_A2+/EDP_TX0+	A75	B75	LVDS_B2+
LVDS_A1-/EDP_TX1-	A74	B74	LVDS_B1-
LVDS_A1+/EDP_TX1+	A73	B73	LVDS_B1+
LVDS_A0-/EDP_TX2-	A72	B72	LVDS_B0-
LVDS_A0+/EDP_TX2+	A71	B71	LVDS_B0+
GND	A70	B70	GND
PCIE_TX0-	A69	B69	PCIE_RX0-
PCIE_TX0+	A68	B68	PCIE_RX0+
GPI2	A67	B67	WAKE1#
GND	A66	B66	WAKE0#
PCIE_TX1-	A65	B65	PCIE_RX1-
PCIE_TX1+	A64	B64	PCIE_RX1+
GPI1	A63	B63	GPO3
PCIE_TX2-	A62	B62	PCIE_RX2-
PCIE_TX2+	A61	B61	PCIE_RX2+
GND	A60	B60	GND
PCIE_TX3-	A59	B59	PCIE_RX3-
PCIE_TX3+	A58	B58	PCIE_RX3+
GND	A57	B57	GPO2
PCIE_TX4-	A56	B56	PCIE_RX4-
PCIE_TX4+	A55	B55	PCIE_RX4+
GPI0	A54	B54	GPO1
NC	A53	B53	NC
NC	A52	B52	NC
GND	A51	B51	GND





Signal	PIN	PIN	Signal
LPC_SERIRQ/ ESPI CS1#	A50	B50	CB_RESET#
GBE0_SDP	A49	B49	SYS_RESET#
RSVD1	A48	B48	NC
+3.3V_RTC	A47	B47	NC
USB0+	A46	B46	USB1+
USB0-	A45	B45	USB1-
USB_2_3_OC#	A44	B44	USB_0_1_OC#
USB2+	A43	B43	USB3+
USB2-	A42	B42	USB3-
GND	A41	B41	GND
USB4+	A40	B40	USB5+
USB4-	A39	B39	USB5-
USB_6_7_OC#	A38	B38	USB_4_5_OC#
USB6+	A37	B37	USB7+
USB6-	A36	B36	USB7-
THRMTRIP#	A35	B35	THRM#
BIOS_DIS0#	A34	B34	I2C_DAT
HDA_SDOUT	A33	B33	I2C_CLK
HDA_BITCLK	A32	B32	SPKR
GND	A31	B31	GND
HDA_RST#	A30	B30	HDA_SDIN0
HDA_SYNC	A29	B29	HDA_SDIN1
(S)ATA_ACT#	A28	B28	NC
BATLOW#	A27	B27	WDT
NC	A26	B26	NC
NC	A25	B25	NC
SUS_S5#	A24	B24	PWR_OK
NC	A23	B23	NC
NC	A22	B22	NC
GND	A21	B21	GND



SATA0_RX- A SATA0_RX+ A PCH_SLP_S4# A SATA0_TX- A	A20 A19 A18 A17	B20 B19 B18	SATA1_RX- SATA1_RX+
SATA0_RX+ A PCH_SLP_S4# A SATA0_TX- A	A19 A18 A17	B19 B18	SATA1_RX+
PCH_SLP_S4# A SATA0_TX- A	A18 A17	B18	
SATA0_TX-	A17		ESPI_RST#
		B17	SATA1_TX-
SATA0_TX+	A16	B16	SATA1_TX+
SUS_S3# A	A15	B15	SMB_ALERT#
GBE0_CTREF A	A14	B14	SMB_SDA_S5
GBE0_MDI0+	A13	B13	SMB_SCL_S5
GBE0_MDI0-	A12	B12	PWRBTN#
GND A	A11	B11	GND
GBE0_MDI1+	A10	B10	LPC_CLK/ ESPI CK
GBE0_MDI1-	A9	B9	LPC_DRQ1#/ ESPI ALERT1#
GBE0_LINK#	A8	B8	LPC_DRQ0#/ ESPI ALERT0#
GBE0_MDI2+	A7	B7	LPC_AD3/ ESPI IO 3
GBE0_MDI2-	A6	B6	LPC_AD2/ ESPI IO 2
GBE0_LINK2500#	A5	B5	LPC_AD1/ ESPI IO 1
GBE0_LINK100_1000#	A4	B4	LPC_AD0/ ESPI IO 0
GBE0_MDI3+	A3	В3	LPC_FRAME#/ ESPI CS0#
GBE0_MDI3-	A2	B2	GBE0_ACT#
GND	A1	B1	GND



2.3.2.1 Signal Description – COM Express Connector 1 (CN1A)

2.3.2.1.1 Audio Signals

Signal	Signal Description
HDA_SYNC	HD Audio Sync
HDA_RST#	HD Audio Reset

2.3.2.1.2 Gigabit Ethernet Signals

Signal	Signal Description			
	Gigabit Ethernet Controller 0: Media Dependent Interface Differential Pairs 0,1,2,3.The MDI can operate in 2500, 1000, 100 and 10 Mbit / sec modes. Some pairs are unused in some modes, per the following:2500B-T/1000B-T100B-T10B-T10B-T			
	MDI[0]+/-	B1_DA+/	TX+/-	TX+/-
	MDI[1]+/	B1_DB+/	RX+/-	RX+/-
	MDI[2]+/	B1_DC+/	Х	Х
	MDI[3]+/	B1_DD+/	Х	Х
GBE0_ACT#	Gigabit Ethernet Controller 0 activity indicator, active low.			
GBE0_LINK#	Gigabit Ethernet Controller 0 link indicator, active low.			
GBE0_LINK100_1000#	Gigabit Ethernet Controller 100 1000 Mbit / sec link indicator, active low.			
GBE0_LINK2500#	Gigabit Ethernet Controller 2500 Mbit / sec link indicator, active low.			

2.3.2.1.3 PCI Express Signals

Signal	Signal Description
PCIE_TX[0:4] +/-	PCI Express Differential Transmit Pair 0-4
PCIE_RX[0:4] +/-	PCI Express Differential Receive Pair 0-4

2.3.2.1.4 Flat Panel LVDS Signals

Signal	Signal Description
LVDS_BKLT_CTRL	Controls panel digital power.
LVDS_I2C_CK	I2C clock output for LVDS display use.
LVDS_I2C_DAT	I2C data line for LVDS display use.
LVDS_VDD_EN	LVDS panel power enables.

2.3.2.1.5 LPC/eSPI Signals

Signal	Signal Description
	LPC frame indicates the start of an LPC cycle
LPC_FRAME#/	ESPI Mode: eSPI Master Chip Select Outputs Driving Chip Select0#. A low
ESPI_CS0#	selects a particular eSPI slave for the transaction. Each of the eSPI slaves is
	connected to a dedicated Chip Selectn# pin
	LPC multiplexed address, command and data bus
LPC_AD[0:3]/	ESPI Mode: eSPI Master Data Input / Outputs These are bi-directional
ESPI_IO_[0:3]	input/output pins used to transfer data between master and slaves.
	Multiplexed with LPC_AD[0:3]
	LPC clock output - 33MHz nominal
	ESPI Mode: eSPI Master Clock Output This pin provides the reference timing for
LOFI_OK	all the serial input and output operations
	LPC serial interrupt
LPC_SERIRQ/	ESPI Mode: eSPI Master Chip Select Outputs Driving Chip Select# A low selects
ESPI_CS1#	a particular eSPI slave for the transaction. Each of the eSPI slaves is connected
	to a dedicated Chip Selectn# pin
	LPC serial DMA request.
ESPI_ALERT0#	ESPI Mode: eSPI pins used by eSPI slave to request service from the eSPI
	master.
	LPC serial DMA request.
ESPI_ALERT1#	ESPI Mode: eSPI pins used by eSPI slave to request service from the eSPI
	master.

2.3.2.1.6 GPIO Signals

Signal	Signal Description	
GPI[0:4]	General purpose input pins.	
GPO[0:4]	General purpose output pins.	

2.3.2.1.7 Power & System Management Signals

Signal	Signal Description
SUS_S3#	Indicates system is in Suspend to RAM state. Active low output.
BATLOW#	Indicates that external battery is low
PWRBTN#	Power button to bring system out of S5 (soft off), active on rising edge.

SMB_SCL_S5	System Management Bus bidirectional clock line.		
SMB_SDA_S5	System Management Bus bidirectional data line.		
SMB_ALERT#	System Management Bus Alert - input can be used to generate an SMI# (System		
	Management Interrupt) or to wake the system.		
ESPI_RST#	ESPI Mode: eSPI Reset Reset the eSPI interface for both master and slaves.		
	eSPI Reset# is typically driven from eSPI master to eSPI slaves		
PWR_OK	Power OK from main power supply		
SYS_RESET#	Reset button input. Active low input.		
WAKE0#	PCI Express wake up signal.		
WAKE1#	General purpose wake up signal.		

2.3.2.1.8 SATA Signals

Signal	Signal Description
SATA[0:1]_TX +/-	Serial ATA Channel 0-1 transmit differential pair.
SATA[0:1]_RX +/-	Serial ATA Channel 0-1 receive differential pair.
ATA_ACT#	ATA (parallel and serial) activity indicator, active low.

2.3.2.1.9 USB Signals

Signal	Signal Description
USB[0:7] +/-	USB differential pairs, channels 0 through 7
USB_0_1_OC#	USB over-current sense, USB channels 0 and 1
USB_2_3_OC#	USB over-current sense, USB channels 2 and 3
USB_4_5_OC#	USB over-current sense, USB channels 4 and 5
USB_6_7_OC#	USB over-current sense, USB channels 6 and 7

2.3.2.1.10 I2C Signals

Signal	Signal Description			
I2C_CLK	General purpose I2C port clock output.			
I2C_DATA	General purpose I2C port data I/O line.			

2.3.2.1.11 USB3.0 Signals

Signal	Signal Description		
USB_SSTX[0:1]+	Additional transmit signal differential pairs for the SuperSpeed USB data path.		
USB_SSTX[0:1]-			
USB_SSRX[0:1]+			
USB_SSRX[0:1]-	Additional receive signal differential pairs for the SuperSpeed USB data path.		

ESM-EHLC User's Manual 2.3.3 COM Express Connector 2 (CN1B)





Signal	PIN	PIN	Signal
GND	C110	D110	GND
VCC	C109	D109	VCC
VCC	C108	D108	VCC
VCC	C107	D107	VCC
VCC	C106	D106	VCC
VCC	C105	D105	VCC
VCC	C104	D104	VCC
GND	C103	D103	GND
NC	C102	D102	NC
NC	C101	D101	NC
GND	C100	D100	GND
NC	C99	D99	NC
NC	C98	D98	NC
NC	C97	D97	NC
GND	C96	D96	GND
NC	C95	D95	NC
NC	C94	D94	NC
GND	C93	D93	GND
NC	C92	D92	NC
NC	C91	D91	NC
GND	C90	D90	GND
NC	C89	D89	NC
NC	C88	D88	NC
GND	C87	D87	GND
NC	C86	D86	NC
NC	C85	D85	NC
GND	C84	D84	GND
NC	C83	D83	NC
NC	C82	D82	NC
NC	C81	D81	NC





Signal	PIN	PIN	Signal
GND	C80	D80	GND
NC	C79	D79	NC
NC	C78	D78	NC
NC	C77	D77	NC
GND	C76	D76	GND
NC	C75	D75	NC
NC	C74	D74	NC
GND	C73	D73	GND
NC	C72	D72	NC
NC	C71	D71	NC
GND	C70	D70	GND
NC	C69	D69	NC
NC	C68	D68	NC
RAPID_SHUTDOWN	C67	D67	GND
NC	C66	D66	NC
NC	C65	D65	NC
NC	C64	D64	NC
NC	C63	D63	NC
NC	C62	D62	NC
NC	C61	D61	NC
GND	C60	D60	GND
NC	C59	D59	NC
NC	C58	D58	NC
TYPE1#	C57	D57	TYPE2#
NC	C56	D56	NC
NC	C55	D55	NC
TYPE0#	C54	D54	NC
NC	C53	D53	NC
NC	C52	D52	NC
GND	C51	D51	GND





Signal	PIN	PIN	Signal
DDI3_PAIR3-	C50	D50	DDI2_PAIR3-
DDI3_PAIR3+	C49	D49	DDI2_PAIR3+
NC	C48	D48	NC
DDI3_PAIR2-	C47	D47	DDI2_PAIR2-
DDI3_PAIR2+	C46	D46	DDI2_PAIR2+
NC	C45	D45	NC
DDI3_HPD	C44	D44	DDI2_HPD
DDI3_PAIR1-	C43	D43	DDI2_PAIR1-
DDI3_PAIR1+	C42	D42	DDI2_PAIR1+
GND	C41	D41	GND
DDI3_PAIR0-	C40	D40	DDI2_PAIR0-
DDI3_PAIR0+	C39	D39	DDI2_PAIR0+
DDI3_DDC_AUX_SEL	C38	D38	NC
DDI3_CTRLDATA_AUX-	C37	D37	DDI1_PAIR3-
DDI3_CTRLCLK_AUX+	C36	D36	DDI1_PAIR3+
NC	C35	D35	NC
DDI2_DDC_AUX_SEL	C34	D34	DDI1_DDC_AUX_SEL
DDI2_CTRLDATA_AUX-	C33	D33	DDI1_PAIR2-
DDI2_CTRLCLK_AUX+	C32	D32	DDI1_PAIR2+
GND	C31	D31	GND
NC	C30	D30	DDI1_PAIR1-
NC	C29	D29	DDI1_PAIR1+
NC	C28	D28	NC
NC	C27	D27	DDI1_PAIR0-
NC	C26	D26	DDI1_PAIR0+
NC			
NC	C25	D25	NC
DDI1_HPD	C25 C24	D25 D24	NC NC
DDI1_HPD NC	C25 C24 C23	D25 D24 D23	NC NC NC
DDI1_HPD NC NC	C25 C24 C23 C22	D25 D24 D23 D22	NC NC NC NC





Signal	PIN	PIN	Signal
NC	C20	D20	NC
NC	C19	D19	NC
LVDS_BLDN	C18	D18	NC
LVDS_BLUP	C17	D17	NC
NC	C16	D16	DDI1_CTRLDATA_AUX-
NC	C15	D15	DDI1_CTRLCLK_AUX+
GND	C14	D14	GND
USB_SSRX3+	C13	D13	USB_SSTX3+
USB_SSRX3-	C12	D12	USB_SSTX3-
GND	C11	D11	GND
USB_SSRX2+	C10	D10	USB_SSTX2+
USB_SSRX2-	C9	D9	USB_SSTX2-
GND	C8	D8	GND
USB_SSRX1+	C7	D7	USB_SSTX1+
USB_SSRX1-	C6	D6	USB_SSTX1-
GND	C5	D5	GND
USB_SSRX0+	C4	D4	USB_SSTX0+
USB_SSRX0-	C3	D3	USB_SSTX0-
GND	C2	D2	GND
GND	C1	D1	GND

ESM-EHLC User's Manual 2.3.3.1 Signal Description – COM Express Connector 2 (CN1B)

2.3.3.1.1 USB3.0 Signals

Signal	Signal Description		
USB_SSTX[0:3]+	Additional transmit signal differential naive for the SuperSpeed LISP date with		
USB_SSTX[0:3]-	Additional transmit signal differential pairs for the SuperSpeed USB data path.		
USB_SSRX[0:3]+			
USB_SSRX[0:3]-	Additional receive signal differential pairs for the SuperSpeed USB data path.		

2.3.3.1.2 DDI Signals

Signal	Signal Description				
DDI[1:3]_PAIR[0:3]+	Digital Display Interface 1 to 3Pair[0:3] differential pairs				
DDI[1:3]_PAIR[0:3]-					
DDI[1:3]_DDC_AUX_SEL	Selects the function of DDI[1:3]_CTRLCLK_AUX+ and DDI[1:3]_CTRLDATA_AUX				
	If this input is floating the AUX pair is used for the DP AUX+/- signals. If pulled-high				
	the AUX pair contains the CRTLCLK and CTRLDATA signals.				
DDI[1:3]_CTRLCLK_AUX+	DP AUX+function if DDI[1:3]_DDC_AUX_SEL is no connect				
	HDMI/DVI 12C CTRLCLK if DDI[1:3]_DDC_AUX_SEL is pulled high				
DDI[1:3]_CTRLDATA_AUX-	DP AUX-function if DDI[1:3]_DDC_AUX_SEL is no connect				
	HDMI/DVI 12C CTRLDATA if DDI[1:3]_DDC_AUX_SEL is pulled high				
DDI[1:3]_HPD	Digital Display Interface Hot-Plug Detect				

2.4 Installing Heatsink / Heat spreader

Standard Temperature



Step1. Using 4 screws (M2.5-16L) to lock the Heatsink/Heat spreader from PCB backside.

Note:

Screw Size/Q'TY - M2.5-16L Ni*4pcs

Wide Temperature



Step1. Using 4 screws (M2.5-12L) to lock the Heat spreader/Cooler from PCB backside.

Note:

Screw Size/Q'TY - M2.5-12L Ni*4pcs

3. BIOS Setup



3.1 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.

3.2 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 <F2> or immediately after switching the system on, or

By pressing the <F2> or key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <F2> 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.

3.3 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
1	Move to previous item
Ļ	Move to next item
<i>←</i>	Move to the item in the left hand
\rightarrow	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 $\langle Enter \rangle$. A " \geq " pointer marks all sub menus.

3.4 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 F1 key again.

3.5 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 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 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.
3.6 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.

3.6.1 Main Menu

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

Main Advanced Chipset Securit	Aptio Setup – AMI y Boot Save & Exit	
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level EC 5571 Firmware BIOS Name System Language ► Intel RC	American Megatrends 5.19 UEFI 2.7; PI 1.6 1AWHS 0.11 x64 05/31/2022 15:15:15 Administrator 09 SEHL017 [English]	Intel RC
System Date System Time	[Fri 01/01/2021] [01:38:27]	<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 2.21.1278 Copyright (C) 2022 AMI		

Main	Aptio Setup – AMI	
FSP Information FSP version RC version Build Date FSP Mode	09.03.09.23 09.03.09.23 API Mode	▲
PSE Information PSE version	NZA	
Board Information Board Name Board ID Fab ID LAN PHY Revision	ESM-EHLC(SEHL017) N/A Default string N/A	++: Select Screen 11: Select Item Enter: Select 4/=: Change Opt
Processor Information Name Type	ElkhartLake ULX Intel Atom(R) x6425E Processor @ 2.00GHz	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Speed ID Stepping Package	2000 MHZ 0×90661 B0 Not Implemented Yet	ESC: Exit
	Version 2.21.1278 Copyright (C) 202	22 AMI

Main	Aptio Setup – AMI	
Number of Processors	4Core(s) / 4Thread(s)	
Microcode Revision	15	
GT Info	GT4 (0×4571)	
eDRAM Size	NZA	
IGFX VBIOS Version	N/A	
IGFX GOP Version	18.0.1034	
Memory RC Version	0.0.4.104	
Total Memory	8192 MB	
Memory Data Rate	2133 MTPS	
PCH Information		
Name	EHL PCH	
PCH SKU	MCC SKU O	↔: Select Screen
Stepping	B1	1↓: Select Item
		Enter: Select
OOB Manageability State	NZA	+/-: Change Opt.
OOB Provision	NZA	F1: General Help
OOB Cloud Type	NZA	F2: Previous Values
OOB Cloud URL	NZA	F3: Optimized Defaults
OOB Cloud Port	NZA	F4: Save & Exit
		ESC: Exit
Package	Not Implemented Yet	
TXT Capability of Platform/PCH	Unsupported	
Production Type	Production	T
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Main	Aptio Setup — AMI	
Name PCH SKU Stepping OOB Manageability State OOB Provision	EHL PCH MCC SKU O B1 N/A N/A	
008 Cloud Type 008 Cloud URL 008 Cloud Port	N/A N/A N/A	
Package TXT Capability of Platform/PCH Production Type Intel(R) Safety Island Boot	Not implemented yet Unsupported Production N/A	++: Select Screen
Memory Type Information EfiACPIReclaimMemory EfiACPIMemoryNVS EfiReservedMemory	00000069 00000088 0000226A	11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values
EfiRuntimeServicesData EfiRuntimeServicesCode ME EW Version	000005D8 00000093 15.40.10.2252	F3: Optimized Defaults F4: Save & Exit ESC: Exit
ME Firmware SKU PMC FW Version	Consumer SKU 154.1.10.1025	T A CARACTERISTIC
Versio	n 2.21.1278 Copyright (C) 2	2022 AMI

3.6.1.1 System Language

This option allows choosing the system default language.

3.6.1.2 System Date

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

3.6.1.3 System Time

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

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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.

3.6.2 Advanced Menu

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

Main Advanced Chipset Security B	Aptio Setup – AMI ot Save & Exit
 CPU Configuration Power & Performance PCH-FW Configuration Trusted Computing ACPI Settings IT5571 Super IO Configuration EC 5571 HW monitor S5 RTC Wake Settings Serial Port Console Redirection USB Configuration Network Stack Configuration NVME Configuration 	CPU Configuration Parameters
► User Password Management	++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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3.6.2.1 CPU Configuration

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



Item	Options	Description
CPU Flex Ratio Override	Disabled [Default] Enabled	Enable/Disable CPU Flex Ratio Programming.
Intel (VMX) Virtualization Technology	Disabled Enabled [Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All [Default] 1 2 3 4 5 6 7 8	Number of cores to enable in each processor package.

3.6.2.2 Power & Performance

Aptio Setup - AMI Advanced		
Power & Performance	CPU - Power Management Control	
 CPU - Power Management Control GT - Power Management Control 		
	<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>	
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3.6.2.2.1 CPU – Power Management Control

Advanced	Aptio Setup — AMI	
CPU - Power Management Control P0 Fused Max Core Ratio P1 Fused Max Core Ratio P2 Fused Max Core Ratio P3 Fused Max Core Ratio Boot performance mode Intel(R) SpeedStep(tm) Intel(R) Speed Shift Technology	N/A N/A N/A [Max Non-Turbo Performance] [Enabled]	Select the performance state that the BIOS will set starting from reset vector.
Turbo Made View/Configure Turbo Options Thermal Monitor	[Enabled] [Enabled]	<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>
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ltem	Option	Description
	Max Battery	Select the performance state that the
Boot performance mode	Max Non-Turbo Performance[Default]	BIOS will set starting from reset
	Turbo Performance	vector.
Intel® SneedSten IM	Enabled[Default],	Allows more than two frequency
intens speedstep	Disabled	ranges to be supported.

Intel® Speed Shift Technology	Enabled [Default] , Disabled	Eanble/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enabled [Default] , Disabled	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
Thermal Monitor	Enabled [Default] , Disabled	Enable/Disable Thermal Monitor.

3.6.2.2.1.1 View/Configure Turbo Options

Advanced	Aptio Setup - AMI	
Current Turbo Settings Max Turbo Power Limit Min Turbo Power Limit Package TDP Limit Power Limit 1 Power Limit 2 1-core Turbo Ratio 2-core Turbo Ratio	4095.875 0.0 12.0 12.0 20.0 30 30	Enable/Disable Energy Efficient P-state feature. When set to 0, will disable access to ENERGY_PERFORMANCE_BIAS MSR and CPUID Function 6 ECX[3] uill read 0 indicating no support for Energy Efficient policy setting. When set to 1
3-core Turbo Ratio 4-core Turbo Ratio Energy Efficient P-state	27 27 [Enabled]	uill enable access to ENERGY_PERFORMANCE_BIAS MSR •
	[Eurored]	T1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit E6D: Exit
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Item	Option	Description
Energy Efficient P-state	Enabled [Default] , Disabled	Enable/Disable Energy Efficient P-state feature. When set to 0, will disable access to ENERGY_PERFORMANCE_BIAS MSR and CPUID Function 6 EXC[3] will read 0 indicating no support for Energy Efficient policy setting. When set to 1 will enable access to ENERGY_PERFORMANCE_BIAS MSR 0B0h.
Energy Efficient Turbo	Enabled [Default] , Disabled	Enable/Disable Energy Efficient Turbo Feature. This feature will opportunistically lower the turbo frequency to increase efficiency. Recommended only to disable in overclocking situations where turbo frequency must remain constant. Otherwise, leave enabled.

3.6.2.2.2 GT – Power Management Control

BT - Power Management Control Check to enable render s support. RC6(Render Standby) [Enabled] Maximum GT frequency [Default Nax Frequency] Disable Turbo GT frequency [Disabled] ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Halp F2: OptImized Defaults F4: Save & Exit F4: Save & Exit	Advanced	Aptio Setup – AMI	
++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	GT – Power Management Control RC6(Render Standby) Maximum GT frequency Disable Turbo GT frequency	[Enabled] [Default Max Frequency] [Disabled]	Dheck to enable render standby support.
ESC: Exit			++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

ltem	Option	Description
PC6/Pondor Standby)	Enabled[Default],	Check to enable render standby
RCO(Render Standby)	Disabled	support.
	Default Max Frequency[Default],/	
	100Mhz/150Mhz/200Mhz/250Mhz/	
Maximum GT frequency	300Mhz/350Mhz/400Mhz/450Mhz/	Auto Updated.
	500Mhz/550Mhz/600Mhz/650Mhz/	
	700Mhz/750Mhz/800Mhz/850Mhz/	
	900Mhz/950Mhz/1000Mhz/1050Mhz/	
	1100Mhz/1150Mhz/1200Mhz	
	Enchlad	Enable: Disables Turbo GT
Disable Turbo GT frequency		frequency. Disabled: GT
		frequency is not limited.

3.6.2.3 PCH-FW Configuration

Advanced	Aptio Setup — AMI	
ME Firmware Version ME Firmware Mode ME Firmware SKU ME Firmware Status 1 ME Firmware Status 2	15.40.10.2252 Normal Mode Consumer SKU 0x90000255 0x89100106	When Disabled NE will be put into ME Temporarily Disabled Mode.
ME State ME Unconfig on RTC Clear	[Enabled] [Enabled]	
 Firmware Update Configuration PTT Configuration 		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Oot. F1: Beneral Help F2: Previous Values F3: Dotimized Defaults F4: Save 8 Ekit ESC: Exit
Versio	n 2.21.1278 Copyright (C) 202	2 AMI

Item	Option	Description
ME State	Disabled	When Disabled ME will be put into ME
ME State	Enabled[Default],	Temporarily Disabled Mode.
ME Uneenfig en BTC Clear	Disabled	When Disabled ME will not be unconfigured on
ME Uncoming on RTC Clear	Enabled[Default],	RTC Clear.

3.6.2.3.1 Firmware Update Configuration

Advanced	Aptio Setup — AMI	
Me FW Inage Re-Flash FW Update	[Disabled] [Enabled]	Enable/Disable Me FW Image Re-Flash function.
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Item	Option	Description	
ME EW/Imago Bo Elach	Disabled[Default],	Enable/Disable Me FW Image Re-Flash function.	
ME FW IIIage Re-Flash	Enabled		
EW Lindata	Disabled	Enchle/Dischle Ma EW/ Undete function	
FW Update	Enabled[Default],		

3.6.2.3.2 PTT Configuration

Advanced	Aptic Setup — AMI	
PTT Capability / State	1 / 1	Selects TPN device: PTT or
TPM Device Selection	[PTT]	SkuMgr dTFM 1.2 - Disables PTT in SkuMgr kenning ! PTT7/dTPM will be disabled and all data saved on it will be lost.
		<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>
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Item	Option	Description
TPM Device Selection	dTPM, PTT [Default]	Selects TPM device: PTT or dTPM. PTT-Enables PTT in SkuMgr dTPM 1.2 – Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.

3.6.2.4 Trusted Computing

Advanced	Aptio Setup – AMI	
TPM 2.0 Device Found Firmware Version: Vendor: Security Device Support Active PCR banks Available POR banks TPM 2.0 InterfaceType	600.15 INTC [Enable] SHA256 SHA-1,SHA256,SHA364,SH3 [CRB]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TOS EFI protocol and INTIA interface will not be available.
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Versio	on 2.21.1278 Copyright (C) 202	2 AMI

ltem	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.

3.6.2.5 APCI Settings

Advanced	Aptio Setup — AMI	
ACPI Settings		Enables on Disables BIOS ACPI
Enable ACPI Auto Configuration		Hutu cum iguracium.
Enable Hibernation ACPI Sleep State	[Enabled] [S3 (Suspend to RAM)]	
		<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	.21.1278 Copyright (C) 2022	AMI

Item	Options	Description
Enable ACPI Auto	Disabled[Default]	Enables or Disables BIOS ACPI Auto
Configuration	Enabled,	Configuration.
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.

3.6.2.6 IT5571 Super IO Configuration

You can use this item to set up or change the IT5571 Super IO configuration for serial ports. Please refer to $3.6.2.6.1 \sim 3.6.2.6.2$ for more information.

Advanced	Aptio Setup – AMI	
IT5571 Super ID Configuration		Set Parameters of Serial Port
Super IO Chip • Serial Port 1 Configuration • Serial Port 2 Configuration	I15571	<pre>++: Select Screen ++: Select Item Enter: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	n 2.21.1278 Copyright (C) 202	2 AMI

Item	Description	
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).	
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).	

3.6.2.6.1 Serial Port 1 Configuration



Item	Option	Description
Serial Port	Enabled [Default] , Disabled	Enable or Disable Serial Port (COM).

3.6.2.6.2 Serial Port 2 Configuration

Advanced	Aptio Setup – AMI	
Serial Port 2 Configuration		Enable on Disable Serial Port
Serial Port Device Settings	(Enabled) IO=2F8h; IRQ=3;	(CUM)
		<pre>++: Select Screen 14: Select Iten Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
	ersion 2.21.1278 Copyright (C)	2022 AMI

Item	Option	Description
Serial Port	Enabled [Default] , Disabled	Enable or Disable Serial Port (COM).

3.6.2.7 HW Monitor

Advanced	Aptio Setup — ANI	
Pc Health Status Smart Fan Function CPU temperature CPU Fan Speed VIN VCORE DDR	[Discbled] : +40 C : N/A : +11.046 V : +1.624 V : +1.173 V	Enable or Disable Smart Fan
		<pre>++: Select Screen 14: Select Item Enter: Select 4/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Versio	n 2.21.1278 Copyright (C) 202	2 AMI

Item	Options	Description
Smart Fan Function	Enabled, Disabled [Default]	Enables or Disables Smart Fan.

Advanced	Aptio Setup – AMI	
Pc Health Status Smart Fan Function ▶ Smart Fan Mode Configuration	[Enabled]	Smart Fan Mode Select
CPU temperature CPU Fan Speed VIN VCORE DDR	: +40 C : N/A : +11.845 V : +1.624 V : +1.173 V	
		<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>
Versio	n 2.21.1278 Copyright (C) 2	2022 ANI

Item	Options	Description
Smart Fan Function	Enabled [Default] Disabled	Enables or Disables Smart Fan.

3.6.2.7.1 Smart Fan Mode Configuration

Advanced	Aptio Setup – AMI	
Smart Fan Mode Configuration		CPU Smart Fan Mode Select
СР∪ Smart Fan Mode Fan РиМ	[Manual Mode] 255	
		+: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Item	Option	Description
	Manual Mode [Default] ,/	
	Mode 01/Mode 02/ Mode 03/ Mode 04/	
CBU Smort Fon Mode	Mode 05/Mode 06/ Mode 07/ Mode 08/	CPU Smart Fan Mode Select.
CPU Smart Fan Mode	Mode 09/Mode 10/ Mode 11/ Mode 12/	
	Mode 13/Mode 14/ Mode 15/ Mode 16/	
	Mode 17/Mode 18/ Mode 19/ Mode 20	
Fan PWM	255	Fan PWM duty.

3.6.2.8 S5 RTC Wake Settings

Advanced	Aptio S∈tup – AMI	
Wake system from S5	[Disabled]	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::nh::sec specified. Select DynamicTime , System will wake on the current time + Increase minute(s)
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ltem	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).

Wake system from S5 IFix Wake up day 0 Wake up day 0 Wake up hour 0 Wake up minute 0	ed Timel En abled) on Fi th	when a disable System wake n alarm event. Select .xedTime, system will wake on ne broughnisser specified.
Wake up second 0	ui +	elect DynamicTime , System 11 wake on the current time Increase minute(s)
	++ 11 En +/ F1 F2 F3 F4 ES	:: Select Screen :: Select Item tter: Select -: Change Opt. :: General Help :: Frevious Values :: Optimized Defaults :: Save & Exit D: Exit

ltem	Options	Description
	Disabled,	Enable or disable System wake on alarm event. Select
Wake system from S5	Fixed Time[Default]	Fixed Time, system will wake on the hr::min::sec
	Dynamic Time	specified. Select Dynamic Time, System will wake on

		the current time + Increase minute(s).
Wake up day of week	Disabled [Default] Monday-Friday Monday-Saturday	Wake up day of week. (Monday-Friday) or (Monday-Saturday).
Wake up day	1-31	Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up.
Wake up hour	0-23	Select 0-23 For example enter 3 for 3am and 15 for 3pm.
Wake up minute	0-59	Select 0-59 For Minute.
Wake up second	0-59	Select 0-59 For Second.

Advanced	Aptio Setup – AMI	
Wake system from S5 Wake up minute increase	[Dynamic Time] l	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 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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ltem	Options	Description
Wake system from S5	Disabled, Fixed Time Dynamic Time [Default]	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).
Wake up minute increase	1-5	1-5.

3.6.2.9 Serial Port Console Redirection

Advanced	Aptio Setup – AMI	
COMO Console Redirection Settings CONSOLE Redirection Settings COM1(Pci Bus0,Dev0,Func0) (Disabled) Console Redirection Serial Port for Out-of-Band Management Windows Emergency Management Services Console Redirection EMS Console Redirection Settings	(Disabled) Port Is Disabled nt/ s (EMS) (Disabled)	Console Redirection Enable or Disable.
		<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>
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Item	Options	Description
Concolo Redirection	Disabled[Default],	Console Redirection Enable or Disable.
Console Redirection	Enabled	
Concolo Podiroction EMS	Disabled[Default],	Canaala Badiraatian Enable ar Diaabla
Console Redirection EMS	Enabled	Console Redirection Enable of Disable.

3.6.2.9.1 COM0

Advanced	Aptio Setup - AMI	
COMO Console Redirection Settings Terminal Type Bits per second Data Bits Parity Stop Bits Flow Control VT-UTF8 Combo Key Support Recorder Mode Resolution 100x31 Putty KeyPad	[ANSI] [115200] [0] [None] [1] [None] [Enabled] [Disabled] [Disabled] [VT100]	Emulation: ANSI: Extended ASDII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. ++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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ltem	Option	Description

Terminal Type	VT100 VT100+ VT-UTF8 ANSI [Default] ,	Emulation: ANSI: Extender ASCII char set. VT100: ASCII char set. VT100+:Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 115200 [Default]	Select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8 [Default]	Data Bits.
Parity	None [Default] Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	1 [Default] 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	None [Default] Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
VT-UTF8 Combo Key	Disabled	Enable VT-UTF8 Combination Key Support
Support	Enabled[Default]	for ANSI/VT100 terminals.
Recorder Mode	Disabled[Default]	With this mode enabled only text will be sent.
	Enabled	This is to capture Terminal data.
Resolution 100x31	Disabled [Default] Enabled	Enables or disables extended terminal resolution.
Putty KeyPad	VT100 [Default] Intel Linux XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

3.6.2.9.2 Console Redirection Settings

Advanced	Aptio Setup – AMI	
Out-Of-Band Mgmt Port Terminal Type EMS Bits per second EMS Flow Control EMS Data Bits EMS Parity EMS Stop Bits EMS	[CDM0] [VT-UTF8] [NONE] 8 None 1	Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
		<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>
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Item	Option	Description
Out-of-Band Mgmt Port	COM0[Default],	Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
Terminal Type	VT100 VT100+ VT-UTF8 [Default] , ANSI	VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100+ and them VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
Bits per second	9600 19200 57600 115200 [Default]	Select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Flow Control	None [Default] Hardware RTS/CTS Software Xon/Xoff	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

3.6.2.10 USB Configuration

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

Advanced	Aptio Setup — AMI	
USB Configuration		Enables Legacy USB support.
USB Module Version	25	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 XHCI Hand-off	[Enabled] [Enabled]	
USB Mass Storage Driver Support	[Enabled]	
USB hardware delays and time-outs:		++: Select Screen
USB transfer time-out	[20 sec]	1↓: Select Item
Device neget time-out	[Auto]	+/-; Change Opt.
		F1: General Help
Mass Storage Devices:		F2: Previous Values
UFD 3.0 Silicon-Power32GPMAP	[Auto]	F3: Optimized Defaults
		ESC: Exit
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Item	Options	Description
Legacy USB Support	Enabled [Default] Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no SUB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
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	Enabled [Default] Disabled	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 form Hub descriptor.
Mass Storage Devices	Auto [Default] Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.2.11 Network Stack Configuration

Advanced	Aptio Setup — ANI	
Network Stack	(Disabled)	Enable/Disable UEFI Network Stack
		<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>
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Item	Options	Description
Network Stack	Enabled Disabled [Default]	Enable/Disable UEFI Network Stack.

Advanced	Aptio Setup – AMI	
Network Stack IPv4 PKE Support IPv4 PKE Support IPv6 PKE Support IPv6 HTTP Support PXE boot wait time Media detect count	[Enabled] [Disabled] [Disabled] [Disabled] [Disabled] 0 1	Enable/Disable UEFI Network Stack ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save 8 Exit ESC: Exit
	Version 2.21.1278 Copyright (C) 2022 AMI

Item	Options	Description
Network Stack	Enabled [Default] Disabled	Enable/Disable UEFI Network Stack.
	Enabled	Enable Ipv4 PXE Boot Support. If disabled IPV4
Ipv4 PXE Support	Disabled[Default]	PXE boot option will not be created.
Invid LITTE Summart	Enabled	Enable Ipv4 HTTP Boot Support. If disabled IPV4
Ipv4 HTTP Support	Disabled[Default]	HTTP boot option will not be created.
	Enabled Disabled [Default]	Enable Ipv6 PXE Boot Support. If disabled IPV6
IDVO PXE Support		PXE boot option will not be created.
	Enabled Disabled [Default]	Enable Ipv6 HTTP Boot Support. If disabled IPV4
		HTTP boot option will not be created.
BYE boot wait time	0	Wait time to press ESC key to abort the PXE
	U	boot.
		Number of times presence of media will be
media defect count	1	checked.

3.6.2.12 NVMe Configuration

Advanced	Aptio Setup — AMI	
NVMe Configuration		
No NVME Device Found		
		++: Select Screen
		I∔: Select Item Enter: Select
		F1: General Help
		F3: Optimized Defaults F4: Save & Evit
		ESC: Exit
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3.6.2.13 User Password Management

Advanced	Aptio Setup — AMI	
Admin Password Status Change Admin Password	Not Installed	Input old admin password if it was set, then you can change the password to a new one. After the change action, you may need input the new password when you enter UI. The new password must be between 8 and 32 chars include lowercase, uppercase alphabetic, number, and symbol. Input an empty **: Select Screen 11: Select Item Enter: Select */-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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3.6.3 Chipset

Aptio Setup – AMI Main Advanced <mark>Chipset</mark> Security Boot Save & Exit	
 System Agent (SA) Configuration PCH-IO Configuration Board & Panel Configuration 	System Agent (SA) Parameters +-: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Helo F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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3.6.3.1 System Agent (SA) Configuration

Chipset	Aptio Setup – AMI	
System Agent (SA) Configura	ation	Memory Configuration Parameters
VT-d	Supported	
 Memory Configuration Graphics Configuration VT-d 	[Enabled]	
		<pre>+*: Select Screen T1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save B Exit ESC: Exit</pre>
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Item	Option	Description
VT-d	Enabled[Default]	VT-d canability
VI-G	Disabled	v r-a capability.

3.6.3.1.1 Memory Configuration

Chipset	Aptio Setup - AMI	
Memory Configuration		Enable/Disable In-Band ECC
Memory RC Version Memory Data Rate Memory Timings (tCL-tRCD-tRP-tRAS)	0.0.4.104 2133 MTPS 15-15-15-35	
Channel O Slot O Size Number of Ranks Manufacturer Channel 1 Slot O In-Band ECC In-Band ECC Operation Mode	Populated & Enabled 8192 MB (Unknown) 2 Micron Not Populated / Disabled [Enabled] [2] [2]	
IN-Bend FCC FWYOM INJECTION	[01530100]	<pre>Here Select Scheen H: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save 8 Exit ESD: Exit</pre>
_Version 2	2.21.1278 Coowright (C) 2022	АНТ

Item	Option	Description
In-Band ECC	Enabled Disabled [Default]	Enable/Disable In-Band ECC.
In-Band ECC Operation Mode	0 1 2 [Default]	0: Functional Mode protects requests based on the address range, 1: Makes all requests non protected and ignore range checks, 2: Makes all requests non protected and ignore range checks.
In-Band ECC Error Injection	Enabled Disabled [Default]	By enabling this Error Injection Enabling feature, the user acknowledges the security risks. Enabling Error Injection allows attackers who have access to the Host Operating System to inject IBECC errors that can cause unintended memory corruption and enable the leak of security data in the BIOS.

ESM-EHLC User's Manual 3.6.3.1.2 Graphics Configuration

Chipset	Aptic Setup — ANI	
Graphics Configuration		Select which of IGFX/PEG/PCI Graphics device should be
Frimary Display Internal Graphics GTT Size Aperture Size	(Auto) (Auto) (048) (256MB)	Prinary Display Un select Hu for Hybrid Gfx.
		Enter: Select +/∹: Change Opt. F1: Generel Help
		F3: Optimized Defaults F4: Save & Exit ESC: Exit
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ltem	Option	Description
Primary Display	Auto [Default] IGFX PEG PCI	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.
Internal Graphics	Auto [Default] Enabled Disabled	Keep IGFX enabled based on the setup options.
GTT Size	2MB 4MB 8MB [Default]	Select the GTT Size.
Aperture Size	128MB 256MB [Default] 215MB 1024MB 2048MB	Select the Aperture Size Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

3.6.3.2 PCH-IO Configuration

Aptio Setup - AMI Chipset	
PCH-IO Configuration PCI Express Configuration SATA Configuration USB Configuration HD Audio Configuration SCS Configuration	PCI Express Configuration settings
	<pre>++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
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3.6.3.2.1 PCI Express Configuration



3.6.3.2.1.1 PCI Express Root Port 1

Chipset	Aptio Setup – AMI	
PCI Express Root Port 1(USB3crCOMePCIeO) ASPM L1 Substates PCIe Speed	[Enabled] [Disabled] [Disabled] [Auto]	Control the PCI Express Root Port. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Item	Option	Description
PCI Express Root Port	Enabled[Default],	Control the DCI Eveneor Boot Bort
1(USB3orCOMePCIe0)	Disabled	Control the PCI Express Root Port.
	Disabled[Default],	
	LOs	Set the ASPM Level: Force L0s – Force all
ASPM	L1	links to L0s State AUTO – BIOS auto
	L0sL1	configure DISABLE – Disables ASPM.
	Auto	
	Disabled[Default]	
L1 Substates	L1.1	PCI Express L1 Substates settings.
	L1.1 & L1.2	
PCIe Speed	Auto[Default]	
	Gen1	Configure PCIe Speed
	Gen2	Configure Fole Speed.
	Gen3	

Chipset	Aptio Setup – AMI	
POI Express Root Port 2(USB3orCOMAPCIe1) ASPM L1 Substates POIe Speed	[Enabled] [Disabled] [Disabled] [Auto]	Control the PCI Express Root Port. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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3.6.3.2.1.2 PCI Express Root Port 2

Item	Option	Description
PCI Express Root Port	Enabled[Default],	Control the BCI Everage Boot Bort
2(USB3orCOMePCIe1)	Disabled	Control the PCI Express Root Port.
	Disabled[Default],	
	LOs	Set the ASPM Level: Force L0s – Force all
ASPM	L1	links to L0s State AUTO – BIOS auto
	L0sL1	configure DISABLE – Disables ASPM.
	Auto	
	Disabled[Default]	
L1 Substates	L1.1	PCI Express L1 Substates settings.
	L1.1 & L1.2	
PCIe Speed	Auto[Default]	
	Gen1	Configure BCle Speed
	Gen2	Configure Pole Speed.
	Gen3	

3.6.3.2.1.3 PCI Express Root Port 5(COMe PCIe0or4)

	Chipset	Aptio Setup – AMI	
PCI Express Root PCIeOor4) ASPM L1 Substates PCIe Speed	Port S(COHs	[Enabled] [Disabled] [Disabled] [Auto]	Control the PCI Express Root Port.
			<pre>++: Select Scheen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Item	Option	Description
PCI Express Root Port 5(COMe	Enabled[Default],	Control the DCI Express Root Port
PCIe0or4)	Disabled	Control the PCI Express Root Port.
	Disabled [Default] ,	
	LOs	Set the ASPM Level: Force L0s – Force all
ASPM	L1	links to L0s State AUTO – BIOS auto
	L0sL1	configure DISABLE – Disables ASPM.
	Auto	
	Disabled[Default]	
L1 Substates	L1.1	PCI Express L1 Substates settings.
	L1.1 & L1.2	
PCIe Speed	Auto[Default]	
	Gen1	Configure PCIe Speed
	Gen2	Configure - Cie Speed.
	Gen3	

•		
Chipset	Aptio Setup – AMI	
PCI Express Root Port 7 ASPM L1 Substates PCIe Speed	[Ensbied] [Disabled] [Disabled] [Auto]	Control the PCI Express Root Port. ++: Select Screen 14: Select Item Enter: Select +/-: Charge Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Ve	rsion 2.21.1278 Conveight (f	1) 2022 ANT

3.6.3.2.1.4 PCI Express Root Port 7

Item	Option	Description
PCI Express Root Port 7	Enabled [Default] , Disabled	Control the PCI Express Root Port.
	Disabled[Default],	
	LOs	Set the ASPM Level: Force L0s – Force all
ASPM	L1	links to L0s State AUTO – BIOS auto
	L0sL1	configure DISABLE – Disables ASPM.
	Auto	
	Disabled[Default]	
L1 Substates	L1.1	PCI Express L1 Substates settings.
	L1.1 & L1.2	
	Auto[Default]	
PCIe Speed	Gen1	Configure BCle Speed
	Gen2	Configure Pole Speed.
	Gen3	

3.6.3.2.1.5 PCIE clocks

Chipset	Aptio Setup – AMI	
ClockO assignment[CDMePCIe] ClkReq for ClockO	(Enabled) [Disabled]	Platform-PDR = clock is assigned to PCIe port or LAN according to board layout. Enabled = keep clock enabledeven if unused. Disabled = Disable clock.
		<pre>+: Select Screen f1: Select Trem Enter: Select +/-: Change Opt. f1: General Helo F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Item	Option	Description
Clock0 assignment[COMePCle]	Platform-POR Enabled [Default] , Disabled	Platform-POR= clock is assigned to PCIe port or LAN according to board layout. Enabled = keep clock enabledeven if unused. Disabled = Disable clock.
ClkReq for Clock0	Platform-POR Disabled [Default] ,	Platform-POR= CLKREQ signal is assigned to CLKSRC according to board layout. Disabled = CLKREQ will not be used.

3.6.3.2.2 SATA And RST Configuration

Chipset	Aptio Setup — AMI	
SATA Configuration		Enable/Disable SATA Device.
SATA Controller(s) SATA Node Selection Aggressive LPM Support Serial ATA Port 0 Software Preserve Port 0 Spin Up Device SATA Device Type SATA Port 0 DevSlp Serial ATA Port 1 Software Preserve Port 1 Spin Up Device SATA Device Type SATA Port 1 DevSlp	[Enabled] [AHCI] [Disabled] Empty Unknoun [Enabled] [Disabled] [Solid State Drive] [Disabled] Empty Unknoun [Enabled] [Disabled] [Solid State Drive] [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>
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Item	Options	Description
SATA Controller(s)	Enabled [Default] Disabled,	Enable/Disable SATA Device.
SATA Mode Selection	AHCI[Default]	Determines how SATA controller(s) operate.
Aggressive LPM Support	Enabled Disabled [Default]	Enable PCH to aggressively enter link power state.
Port 0	Enabled [Default] Disabled	Enable or Disable SATA Port.
Spin Up Device	Enabled Disabled [Default]	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive [Default]	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
SATA Port 0 DevSlp	Enabled Disabled [Default]	Enable/Disable SATA Port 0 DevSlp. For DevSlp to work, both hard drive and SATA port need to support DevSlp function, otherwise an unexpected behaviour might happen. Please check board design before enabling it.
Port 1	Enabled [Default] Disabled	Enable or Disable SATA Port.
Spin Up Device	Enabled Disabled [Default]	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.

SATA Device Type	Hard Disk Drive	Identify the SATA port is connected to Solid
	Solid State Drive[Default]	State Drive or Hard Disk Drive.
SATA Port 1 DevSlp		Enable/Disable SATA Port 0 DevSlp. For
		DevSlp to work, both hard drive and SATA
	Enabled	port need to support DevSlp function,
	Disabled[Default]	otherwise an unexpected behaviour might
		happen. Please check board design before
		enabling it.

3.6.3.2.3 USB Configuration

Chipset	Aptio Setup – AMI	
USB Configuration		Option to enable Compliance
XHCI Compliance Mode USB3 Link Speed Selection	[Disabled] [GEN2]	Compliance Mode. Change to enabled for Compliance Mode
USB Port Disable Override	[Disabled]	testing.
		++: Select Screen
		T↓: Select Item Enter: Select +/-: Change Opt
		F1: General Help F2: Previous Values
		F3: Optimized Defaults F4: Save & Exit
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Item	Option	Description
XHCI Compliance Mode	Disabled [Default] Enabled	Option to enable Compliance Mode. Default is to disable Compliance Mode. Change to enabled for Compliance Mode testing.
USB3 Link Speed Selection	GEN1 GEN2 [Default]	This option is to select USB3 Link Speed GEN1 or GEN2.
USB Port Disable Override	Disabled [Default] Select Per-Pin	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.

Aptio Setup – AMI Chipset		
HD Audio Subsystem Conf	iguration Settings	Control Detection of the HD-Audio device.
HD Audio	[Enabled]	Disabled = HDA will be unconditionelly disabled Enabled = HDA will be unconditionally enabled
		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

3.6.3.2.4

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ltem	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.

3.6.3.2.5 SCS Configuration

Chipset	Aptio Setup – AMI	
eMMC 5.1 Controller SOCard 3.0 Controller	[Disabled] [Disabled]	Enable on Disable SOS eMMC 5.1 Controller
		++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Van	sion 2.21.1278 Copyright (C	C) 2022 AMI

ltem	Option	Description
eMMC 5.1 Controller	Disabled [Default] Enabled	Enable or Disable SCS eMMC5.1 Controller.
SDCard 3.0 Controller	Disabled [Default] Enabled	Enable or Disable SCS SDHC 3.0 Controller.

3.6.3.3 Board & Panel Configuration

Chipset	Aptio Setup — ANI		
Board & Panel Configuration DDIO Selection VBT Select Active LVDS(Ch7511) CH7511 EDIO Panel Option Brightness Control Method LVDS Back Light PWM LVDS Back Light PWM Frequency ErP Function PWR-On After PWR-Fall Watch Dog SHOW DMI INFO	[eDP/LVD8] [VGA1 (DP-tD-VGA)] [eDP,DP++] [Enabled] [1024x768 24/1] [BIDS] [100%] [200] [Disabled] [Dff] [Disabled] [Disabled]	<pre>Select DDIO path to EEV-EX16. EDP1/LVDS1 via eDP on CH7511 (eDP-to-LVDS bridge). DP_HDMI3 via COMe_DDI3. +*: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save 8 Exit ESC: Exit</pre>	
Version 2.21.1278 Copyright (C) 2022 AMI			

ltem	Option	Description
DDI0 Selection	eDP/I \/DS [D efault]	Select DDI0 path to EEV-EX16.
	DP_HDMI3	(eDP-to-LVDS bridge). DP_HDMI3 via
		COMe_DDI3.
DDI2 Selection	VGA1(DP-to-VGA)[Default]	Select DDI2 path to EEV-EX16. VGA1 via
		CH7517 (DP-to-VGA bridge) to
		COMe_VGA. DP_HDMI2 via COMe_DDI2.
VBT Select		eDP, DP++-EDP1 or LVDS1,
	eDP, DP++ [Default]	DP-HDMI1/DP_HDMI2 is DP++ HDMI
	HDMI only	only – DP_HDMI1~3 are HDMI for 4K
	DP++	DP++- DP_HDMI1~3 are DP++ for
		DP/HDMI.
Active LVDS(Ch7511)	Disabled	Active Internal
	Enabled[Default]	LVDS(eDP->Ch7511-to-LVDS).
CH7511 EDID Panel Option	1024x768 24/1[Default]	
	800x600 18/1	
	1024x768 18/1	Port1-EDP to LVDS(Chrotel 7511) Panel
	1366x768 18/1	EDID Option.
	1024x600 18/1	
	1280x800 18/1	
	1920x1200 24/2	
---------------------------	-------------------	--
	640x480 18/1	
	800x480 18/1	
	1920x1080 18/2	
	1280x1024 24/2	
	1440x900 18/2	
	1600x1200 24/2	
	1366x768 24/1	
	1920x1080 24/2	
	1680x1050 24/2	
	BIOS[Default]	LVDS Brightness Control Method. 1.BIOS
Brightness Control Method	OS Driver	2.OS Driver.
	00%	
	25%	
LVDS Back Light PWM	50%	Select LVDS back light PWM duty.
	75%	
	100%[Default]	
	200[Default]	
	300	
	400	
	500	
LVDS Book Light DW/M	700	
	1k	Select LVDS back light PWM Frequency.
Frequency	2k	
	Зk	
	5k	
	10k	
	20k	
FrP Function	Disabled[Default]	FrP Function (Deen S5)
	Enabled	
	Off[Default]	
PWR-On After PWR-Fail	On	AC loss resume.
	Last state	
	Disabled[Default]	
	30 sec	
	40 sec	
Watch Dog	50 sec	Select WatchDog
Haton Dog	1 min	
	2 min	
	10 min	
	30 min	

3.6.4 Security

Password Description		Secure Boot configuration
If ONLY the Administrator's p then this only limits access only asked for when entering If ONLY the User's password i is a power on password and mu boot or enter Setup. In Setup have Administrator rights. The password length must be in the following range:	wassword is set, to Setup and is Setup. .s set, then this .st be entered to o the User will	
Minimum length	3	
Administrator Password User Password		++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. E1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

• Administrator Password

Set setup Administrator Password

• User Password

Set User Password

3.6.5 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 orde	er.

3.6.6 Save and exit



3.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2 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.

3.6.6.3 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.

3.6.6.4 Launch EFI Shell from filesystem device

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

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4. Drivers Installation



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.

ESM-EHLC User's Manual 4.1 Install Chipset Driver



Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



Step 3. Click Install.



Intel(R) Chipset Device Software Completion You have successfully installed the following product: Intel(R) Chipset Device Software Press Finish to complete the setup process. <u>View Log Files</u> Finish

Step1. Click Next.



Step 2. Click Accept.

Step 4. Complete setup.

4.2 Install HID Driver



Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



Intel® Installation Framework

Step 3. Click Next to continue installation.



Step1. Click Next to start installation.



Step 2. Click Yes.

Intel® Installation Framework	- 🗆 X
Intel(R) HID Event Filter Setup Is Complete	(intel)
You must restart this computer for the changes to tak computer now?	ke effect. Would you like to restart the
Yes, I want to restart this computer now. No, I will restart this computer later.	
Click Finish, then remove any installation media from t	the drives.
	Einish Intel® Installation Framework

Step 4. Click Finish to complete setup.



Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.

intel. _{Gr}	aphics Driver Installer	
Pre-Install	The installer will install the following components: - Intel® Graphics Driver - Intel® Graphics Command Center	
Setup		
Install		
Done!		
		Start)





Step 1. Click Begin installation.



Step 2. Click Next.



Step 4. Complete setup.

4.4 Install Audio Driver



Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



Step 1. Click Next to continue setup. Realtek High Definition Audio Driver Setup (4.27) R2.79



Step 2. Click Finish to complete the setup.

Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.	Intel(R) Network Connections Install Wizard License Agreement Please read the following license agreement carefully. SOFTWARE LICENSE AGREEMENT DO NOT DOWNLOAD, INSTALL, ACCESS, COPY, OR USE AN OF THE SOFTWARE UNTIL YOU HAVE READ AND ACCEPTED AND CONDITIONS OF THIS AGREEMENT. BY INSTALLING, C ACCESSING, OR USING THE SOFTWARE, YOU AGREE TO B BOUND BY THE TERMS AND CONDITIONS OF THIS AGREEMENT authorized You to accept, these terms and conditions, do not inst copy, or use the Software and destroy all copies of the Software possession. This SOFTWARE LICENSE AGREEMENT (this "Agreement") is a laction of license agreement I go not accept the terms in the license agreement I do not accept the terms in the license agreement	Y PORTION D THE TERMS OPYING, E LEGALLY IENT. If You do has not all, access, in Your entered into
	Step 3. Click Next to continue s	Cancel
Intel® Network Connections ×	Intel(R) Network Connections Install Wizard Setup Options Setup Options	(intel)

Install:

Feature Description



Step 1. Click Install Drivers and Software.



Step 4. Click Next.

Select the program features you want installed.

Device drivers Intel® PROSet Intel® Advanced Network Services



< Back

Next >

Cancel

Step 5. Click Install.

Step 2. Click Next.

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👹 Intel(R) Network Connections Install Wi	izard	×
Install wizard Completed		(intel)
A shortcut has been created in the St desired. To access new features, Iaun from the Start Menu.	art Menu. You can also create on ch the Intel(R) PROSet Adapter C	e on the desktop, lf Configuration Utility
Additional Options:		
Launch Intel(R) PROSet Adapter C	Configuration Utility	
	< <u>B</u> ack <u>F</u> inish	Cancel

Step 6. Click Finish to complete the setup.

4.6 Install ME Driver



Step 3. Click Next to continue installation.



Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.

Step1. Click Next to start installation.



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Setup			×
ntek® Management Engine Components Completion		(intel	
You have successfully installed the following components:			
- Intel® Management Engine Interface - Intel® Dynamic Application Loader			
•			
v			
Click here to open log file location.			
ntel Corporation	< <u>B</u> ack	Next >	Einish

Step 4. Click Finish to complete setup.

4.7 Install SIO Driver

+	Search automatically for drivers	
	Windows will search your computer for the best available driver and install it on your device.	
→	Browse my computer for drivers	
	Locate and install a driver manually.	



Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.

🛃 Device Manager	-	
File Action View Help		
V 🛃 DESKTOP-EVGUQLK		
> 🤪 Batteries		
> 💻 Computer		
Disk drives		
> 🖏 Display adapters		
> 📓 Firmware		
> Image Human Interface Devices		
> 📷 IDE ATA/ATAPI controllers		
> 🥅 Keyboards		
Mice and other pointing devices		
> 🥅 Monitors		
> 🖵 Network adapters		
✓ ■ ^D Other devices		
Mi Unknown device		
> 📕 Portable Devices		
Ports (COM & LPT)		
> 📇 Print queues		
> Processors		
Security devices		
Software components		
> Software devices		
V Sound, video and game controllers		
> 🍇 Storage controllers		
> 🏣 System devices		
Universal Serial Bus controllers		

Step1. Click **Unknown device** to start installation.



Step 2. Click Update Drivers.

Step 3. Click Search automatically for drivers.

biolise for allers on your computer			
Search for drivers in this location:			
D\EHL\SIO\5.123.1.1023\5.123.1.1023\jaLPSS2_GPIO2	~	Browse	
Include subfolders			
\rightarrow Let me pick from a list of available drivers	on my com	puter	
→ Let me pick from a list of available drivers This list will show available drivers compatible with the category as the device.	on my com device, and all	puter drivers in the same	
→ Let me pick from a list of available drivers This list will show available drivers compatible with the category as the device.	on my com device, and all	puter drivers in the same	





Step 5. Complete setup



1







Unit: mm

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Wide Temperature







