

User Manual

ASMB-976 Series

Dual LGA 4189 Intel[®] 3rd Gen Xeon[®] Scalable Processor Server Board with 16 DDR4, 4 PCIe x16, 10 SATA3, 9 USB 3.2 gen1, Dual 10GbE, IPMI



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Initial Inspection

Before installing the motherboard, please make sure that the following materials have been shipped:

- 1 x ASMB-976 server board
- 1 x ASMB-976 startup manual
- 2 x Serial ATA HDD data cables
- 1 x I/O port bracket
- 2 x SATA power cable
- 1 x Warranty card
- 2 x Heatsink clip for CPU

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Order Information

Part Number	Chipset	Memory	GbE/10GbE LAN	IPMI	VGA Chip
ASMB-976-00A1	C621A	DDR4 RDIMM	2/-	-	AST 2510
ASMB-976T2-00A1	C621A	DDR4 RDIMM	2/2	Yes	AST 2500

Contents

Chapter	1	Overview	1
	1.1	Introduction	2
	1.2	Features	2
	1.3	Specifications	3
		Table 1.1: Specifications	3
	1.4	Board Layout, Jumpers and Connectors	5
		Figure 1.1 Board Layout	5
		Figure 1.2 Rear I/O of full SKU	5
		Table 1.2: Onboard LAN LED Color Definition	6
		Table 1.3: Onboard LAN LED Color Definition	6
		Table 1.4: Jumpers	7
		Table 1.5: Connectors	7
		Table 1.6: Onboard LED	9
	1.5	Block Diagram	9
		Figure 1.3 Block Diagram	9
	1.6	System Memory	9
	1.7	Memory Installation Procedures	
		Table 1.7: DIMM Configuration with Single CPU	
		Table 1.8: DIMM Configuration with Dual CPU	
		Table 1.9: DCPMM Population Matrix	
	1.8	Processor Installation	12
Chapter	2	Connections	.15
	2.1	Introduction	16
	2.2	USB Ports and LAN Port	
		(USB1~USB10, LAN1~LAN5)	
	2.3	VGA Connector (VGA1)	
	2.4	Serial Ports (COM1~2)	
	2.5	PS2 Keyboard and Mouse Connectors (KBMS1)	
	2.6	CPU Fan Connector (CPUFAN0~1)	
	2.7	System Fan Connector (SYSFAN0~6)	
	2.8	Front Panel Connector (JFP1)	
		2.8.1 Power LED (JFP3)	
		Table 2.1: ATX Power Supply LED Status	
		2.8.2 External Speaker (JFP2 pins 1, 4, 7, 10)	20
		2.8.3 HDD LED Connector (JFP1 Pins 2 & 5)	
		2.8.4 Reset Connector (JFP1 Pins 9 & 12)	
	2.9	Case Open (JCASE1)	
	2.10	SATA SGPIO (SGPIO1)	
	2.11	Front Panel LAN Indicator Connector (LANLED1)	
	2.12	SATA and sSATA (SATA0~7, sSATA0~1)	
	2.13	M.2 Connector (sSATA3 and PCIe gen3 and PCIe gen4)	
	2.14	PCIe Expansion Slots	
	2.15	Auxiliary Power Connector (ATXPWR1/ATX12V1/ATX12V/ATX12V3	
		ATX12V4)	
	2.16	HD Audio Interface Connector (HDAUD1)	
	2.17	LPC Connector (LPC1)	
	2.18	CMOS Clear and ME Update Connector (JCMOS1, JME1)	
	2.19	PMBUS Connector (PMBUS1)	
	2.20	Front Panel SMBUS Connector (SMBUS1)	
	2.21	BMC IC Socket (CN2)	
	2.22	VOLT1 Connector (VOLT1)	
	2.23	GPIO Connector (GPIO1)	29

	2.24 2.25	Intel Virtual RAID (VROC1) NVMe RAID LED Control (PEHP1)	
Chapter	3	AMI BIOS	31
	3.1	Introduction	
	3.2	BIOS Setup	
		3.2.1 Main Menu	
		3.2.2 Advanced BIOS Features Setup	
		3.2.3 Platform Configuration	
		3.2.4 Socket Configuration	
		3.2.5 Server Management 3.2.6 Security	
		3.2.7 Boot	
		3.2.8 Save & Exit	
Chapter	4	Chipset Software Installation Uti	lity 95
	4.1	Before Beginning	
	4.1 4.2	Introduction	
	4.2	4.2.1 Main Menu	
Chapter	5	Graphic Setup	97
	5.1	Introduction	
	5.2	Windows Series Driver Setup	
Chapter	6	LAN Configuration & USB 3.0	99
	6.1	LAN Configuration	100
		6.1.1 Introduction	100
		6.1.2 Features	
		6.1.3 Installation	
		6.1.4 Windows Series Driver Setup (LAN)	
	6.2	USB 3.2 gen1	
		6.2.1 Introduction 6.2.2 Windows Series Driver Setup	
	6.3	SATA & PCIe SSD RAID	
Appendi	хА	Programming the Watchdog Tim	er103
	A.1	Watchdog Timer Overview	104
	A.1 A.2	Programming the Watchdog Timer	
Appendi	хB	I/O Pin Assignments	107
	B.1	USB3.2 gen1 Header(USB3_34, USB3_56, USB3_78)	108
		Table B.1: USB Header	108
	B.2	VGA Connector (VGA1)	
	B.3	Table B.2: VGA Connector RS-232 Interface (COM2)	
	0.3	Table B.3: RS-232 Interface	
	B.4	External Keyboard Connector (KBMS1)	
		Table B.4: External Keyboard Connector	
	B.5	CPU and System Fan Power Connector (CPUFAN0~1,	

	SYSFAN0~SYSFAN6)110 Table B.5: Fan Power Connector
B.6	Power LED (JFP3)
	Table B.6: Power LED 110
B.7	External Speaker Connector (JFP2)
	Table B.7: External Speaker Connector
B.8	Reset Connector (JFP1)
D 0	Table B.8: Reset Connector
B.9	HDD LED Connector (JFP1)
B 4 6	Table B.9: HDD LED Connector
B.10	ATX Soft Power Switch (JFP1)
	Table B.10:ATX Soft Power Switch 111
B.11	Front Panel SMBus Connector (SMBUS1)112
	Table B.11:Front Panel SMBus Connector (SMBUS1)112
B.12	USB/LAN Ports (IPMI_LAN5_USB3_12)112
	Table B.12:USB Port112
	Table B.13:Giga LAN 10/100/1000 Base-T RJ-45 Port 112
B.13	Audio Connector (HDAUD1) 113
	Table B.14:Front Panel Audio Connector
B.14	Alarm Board Connector (VOLT1)113
	Table B.15:Alarm Board Connector
B.15	Case Open Connector (JCASE1) 113
	Table B.16:Case Open Connector 113
B.16	Front Panel LAN LED Connector (LANLED1) 114
	Table B.17:LAN LED Connector
B.17	SATA SGPIO (SGPIO1/SGPIO2) 114
	Table B.18:SATA SGPIO Connector
B.18	LPC Connector (LPC1) 115
	Table B.19:LPC Connector (LPC1)
B.19	Clear CMOS and Update ME Connector (JCMOS1, JME1) 115
	Table B.20: Clear CMOS and Update ME Connector (JCMOS1,
	JME1)115
B.20	PMBUS Connector (PMBUS1)116
	Table B.21:PMBUS Connector (PMBUS1)
B.21	GPIO Connector (GPIO1) 116
	Table B.22:GPIO Connector (GPIO1)116



Overview

1.1 Introduction

The ASMB-976 serverboard is the most advanced Intel Xeon Processor Scalable Family series board for server-grade IPC applications that require high-performance computing power & multi-expansion slots. This serverboard supports Intel Xeon Processor Scalable Family series processor and DDR4 ECC-REG 2400/2666/2933/ 3200 MHz memory up to 2048 GB. ASMB-976 provides four PCIe x16, and seven PCIe x8 slots in PCIe Gen4.0 high speed. In addition, the ASMB-976T2 has dual Gigabit and dual 10GbE Ethernet LAN ports that eliminate network bottlenecks. A fifth RJ-45 LAN connector (LAN5) is dedicated for IPMI function that allows remote control management. One RJ-45 LAN jack (LAN 4) from 10GbE port can also be used as IPMI LAN. High reliability and outstanding performance makes ASMB-976 the ideal platform for industrial server/networking applications.

By using the Intel C621A chipset, the ASMB-976 offers a variety of features such as 9 x USB3.2 gen1 and 1 x USB 2.0 connectivity, 10 x onboard SATA III and 2 x M.2 (SATA/PCIe x4 from PCH + PCIe x4 from CPU0) interface. The 10 x SATA ports support software RAID 0, 1, 10 and 5 (Windows only*), and with the latest Intel RSTe (Rapid Storage Technology Enterprise) it provides a compelling RAID solution for NVMe SSDs via Intel VROC (Virtual RAID on Chip) HW key.

These powerful I/O capabilities ensure even more reliable data storage capabilities and high-speed I/O peripheral connectivity.



- IPMI module will be included in ASMB-976T2 SKU.
 - One USB 2.0 ports (1*Type- A) and nine USB 3.2 gen1 ports (6 2. ports from on-board 20-pin header and 1 port from Type-A).
 - 3. Please refer to the release note of each Linux OS for Intel's C621A chipset SATA RAID function support.

1.2 **Features**

General

- Intel Xeon Processor Scalable Family support: ASMB-976 is equipped with single CPU socket to support Intel Xeon Platinum/Gold/Silver series up to 40core processors.
- High performance I/O capability: 2 x 10GbE (T2 SKU Only) + 2 x GbE LAN, 4 x PCle x16 slot (x16 link) + 7 x PCle x8 slot (x8 link), 10 x SATA and 2 x M.2 connectors, 9 x USB 3.2 gen1 and 1 x USB 2.0 (1 x Type-A).
- Outstanding industrial features: ASMB-976 provides industrial features like long product lifecycle, reliable operation under wide temperature range, watchdog timer, etc.
- IPMI 2.0 support: ASMB-976I/ASMB-976T2 equipped with ASPEED 2500 BMC chip supports IPMI 2.0 (Intelligent Platform Management Interface 2.0) via sharing LAN port.
- KVM over IP: KVM over IP function allows BIOS level remote control of ASMB-976T2 sku system through your own computer.

1.3 Specifications

Table 1.1: Specifications				
Processor				
CPU	 Dual Intel LGA4189 Xeon processor sockets Supports Intel 3rd Gen Xeon Scalable family, up to 40 cores Supports the TDP of processor up to 270W (Please consider extended air thermal solution while using CPU > 205W TDP) 			
System Memory				
Memory Capacity	 Supports DDR4 memory bus Total 16 memory slots provided Supports up to 2 TB memory 1 DIMM slot per channel, 8 channels per processor 			
Memory Type	Supports DDR4 400/2666/2933/3200 MHz RDIMM/LRDIMM modules			
DIMM Sizes	Each memory slot supports 8GB, 16GB, 32GB, 64GB and 128GB (LRDIMM) memory modules			
Memory Voltage	1.2 V			
Error Detection	 Corrects single-bit errors (Using ECC memory) Detects double-bit errors (Using ECC memory) 			
On-Board Devices				
Chipsets	Intel C621A PCH			
Network controllers	 2 x Intel X550 10GbE and 2 x Intel I210 Gigabit Ethernet Controller connected to PCH Above network supports 10 GbE Base-T and 100/1000 Base-T, with RJ-45 output 			
VGA	ASPEED AST2500/2510 controller with 64 MB VGA memory provides basic 2D VGA function.			
EC	ITE IT8528E chip provide motherboard keyboard mouse, RS-232, parallel port and hardware monitor functions			
ВМС	One Realtek 8201F Gigabit PHY connected to AST2500 for BMC remote management (ASMB-976T2 SKU)			
Input/Output	·			
Storage	 Total 10 x SATA ports and 1 x M.2 (SATA/PCIe x4 gen3 compatible from PCH) provide 6 Gb/s and 8 Gb/s, and 1 x M.2 (PCIe x 4 gen4 compatible from CPU) provide 16 Gb/s RAID 0, 1, 5, 10 supports (Windows only. For Linux support please refer to note item 3 of chapter 1.1) 			
LAN	 4 x RJ-45 LAN ports (2 x 10GbE + 2 x 10/100/1000 Base-T LAN) 1 x RJ-45 Dedicated IPMI LAN port (10/100/1000 Base-T) for IPMI only, there is no regular LAN function (ASMB-976T2 SKU) 			
USB	 2 x USB 3.2 gen1 ports at rear window 3 x USB 3.2 gen1 internal header (6 ports) 1 x USB 2.0 internal Type-A port 1 x USB 3.2 gen1 internal Type-A port 			
Graphics	■ 1 x VGA port.			
Serial Port/Header	 1 x RS232 port at rear window, 1 x internal header (2 x 5P pitch: 2.50 mm), both ports are RS-232 (5V) 			
Keyboard/Mouse	PS/2 keyboard and mouse internal header (onboard)			

Table 1.1: Specificati	ons
Power Connector	
CPU Power	4 x 8-pin SSI EPS 12V power connector for CPU & Memory power (12V)
PCIe slot power	2 x 8-pin power connector for PCIe slot 12V input
Expansion Slots	
PCI-express	 4 x PCle x16 slot (Gen4 x16 link) PCIEX16_SLOT3 (from CPU 0) PCIEX16_SLOT5 (from CPU 0) PCIEX16_SLOT7 (from CPU 1) PCIEX16_SLOT9 (from CPU 1) 4 x PCle x8 slot (Gen4 x8 link) PCIEX8_SLOT1 (from CPU0) PCIEX8_SLOT2 (from CPU1) PCIEX8_SLOT4 (from CPU1) PCIEX8_SLOT6 (from CPU0) PCIEx8 SLOT8 (from CPU0) PCIEx8 SLOT10 (from CPU1) PCIEx8 SLOT11 (from CPU1)
System BIOS	
BIOS Type	256 Mb SPI Flash EEPROM with AMI BIOS
PC Health Monitoring	g
Voltage	Monitors for CPU Cores, +3.3V, +5V, +12V, +5V Standby, VBAT
FAN	 Two 4-pin headers for CPU cooler and five 4-pin headers for system fans, and two 8-pin headers for external fans All fans with tachometer status monitoring (except SYSFAN6) Thermal control for all fan connectors
Temperature	Monitoring for CPU (PECI)Monitoring for System (EC)
Other Features (Case Open)	Chassis intrusion detectionChassis intrusion header
Operating Environm	ent/Compliance
RoHS	RoHS Compliant 6/6 Pb Free
Environmental Spec.	 Operating Temperature: 0 to 40° C Non-operating Temperature: -40 to 85° C Operating Relative Humidity: 10% to 90% (non-condensing) Non-operating Relative Humidity: 10% to 95% (non-condensing)

1.4 Board Layout, Jumpers and Connectors

Connectors on the ASMB-976 are linked to external devices such as hard disk drives. In addition, ASMB-976 has a number of jumpers that are used to configure the system for specific applications.

The tables below list the functions of each jumper and connector. Later sections in this chapter give instructions for setting jumpers. Chapter 2 gives instructions for connecting external devices to ASMB-976.

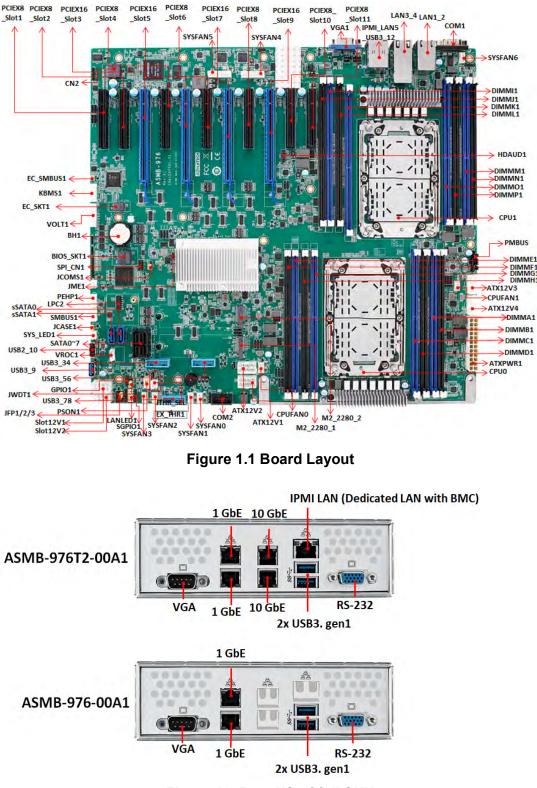


Figure 1.2 Rear I/O of full SKU

Table 1.2: Onboard	Table 1.2: Onboard LAN LED Color Definition						
10/100/100	10/100/1000 Mbps LAN Mbps LAN Link/Activity LED Scheme						
Left Right		LAN1 8	: LAN2 (1G)				
		Left LED	Right LED				
10 Mbps	Link Active	Off Off	Green Blinking green				
100 Mbps	Link Active	Amber Amber	Green Blinking green				
1000 Mbps	Link Active	Green Green	Green Blinking green				
No Link		Off	Off				

Table 1.3: Onboard	Table 1.3: Onboard LAN LED Color Definition						
10/100/1000	10/100/1000 & 10G bps LAN Mbps LAN Link/Activity LED Scheme						
Left Right		LAN3 &	LAN4 (10G)				
		Left LED	Right LED				
100M bps	Link Active	Off Off	Green Blinking green				
1G bps	Link Active	Amber Amber	Green Blinking green				
10G bps	Link Active	Green Green	Green Blinking green				
No Link		Off	Off				

Table 1.4: Jumpers				
Label	Function	Default		
JCMOS1	CMOS Clear	1-2		
JME1	ME update	1-2		
JWDT1	Watch Dog Reset	1-2		
PSON1	AT(1-2) / ATX(2-3)	2-3		
JCASE1	Chassis case open alarm	1-2		
JTHR_SEL	On board(1-2)/external thermistor(2-3)	1-2		

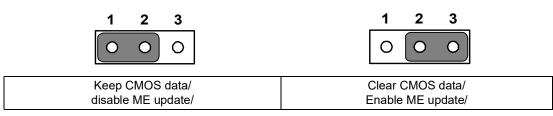


Table 1.5: Connect	ors
Label	Function
ATX12V1/V2	SSI EPS 12V auxiliary power connector (for CPU0) and memory
ATXV3/V4	SSI EPS 12V auxiliary power connector (for CPU1) and memory
ATXPWR1	SSI EPS 24-pin main power connector (for system)
BH2	For optional battery kit
BIOS_SKT1	BIOS SPI ROM
CN2	BMC IC socket for IPMI function (ASMB-976T2 SKU only)
COM2	Serial port: RS-232
CPU0	Intel LGA4189 CPU0 socket
CPU1	Intel LGA4189 CPU1 socket
CPUFAN0	CPU0 fan connector (4-pin)
CPUFAN1	CPU1 fan connector (4-pin)
DIMMA1	Channel A1 DIMMA1 of CPU0
DIMMB1	Channel B1 DIMMB1 of CPU0
DIMMC1	Channel C1 DIMMC1 of CPU0
DIMMD1	Channel D1 DIMMD1 of CPU0
DIMME1	Channel E1 DIMME1 of CPU0
DIMMF1	Channel F1 DIMMF1 of CPU0
DIMMG1	Channel G1 DIMMG1 of CPU0
DIMMH1	Channel H1 DIMMH1 of CPU0
DIMMI1	Channel I1 DIMMI1 of CPU1
DIMMJ1	Channel J1 DIMMJ1 of CPU1
DIMMK1	Channel K1 DIMMK1 of CPU1
DIMML1	Channel L1 DIMML1 of CPU1
DIMMM1	Channel M1 DIMMM1 of CPU1
DIMMN1	Channel N1 DIMMN1 of CPU1
DIMMO1	Channel O1 DIMMO1 of CPU1
DIMMP1	Channel P1 DIMMP1 of CPU1
EC_SMBUS1	For EC debug

Table 1.5: Connecto	ors
EX_THR1	Connector for external thermistor
GPIO1	GPIO function for customize usage
HDAUD1	Audio header
JFP1/JFP2/JFP3	Front panel pin header
KBMS1	For additional keyboard/mouse
LAN1_2, LAN3_4	RJ-45 LAN connector
LANLED1	LAN LED extension connector
LPC1	LPC port for debug & TPM module
SSATA4, SSATA5	SATA port 4/5 for M.2 2242 SATA SSD
PMBUS1	PMBUS connector to communicate with power supply
PEHP1	NVMe RAID LED control
SATA0~SATA7	Serial ATA0~7
SSATA0~SSATA2	sSATA port 0~2
SGPIO1	Supports Serial_Link interface for onboard SATA connections
SLOT1	PCIE x 8 slot of CPU0
SLOT2	PCIE x 8 slot of CPU1
SLOT3	PCIE x 16 slot of CPU0
SLOT4	PCIE x 8 slot of CPU1
SLOT5	PCIE x 16 slot of CPU0
SLOT6	PCIE x 8 slot of CPU0
SLOT7	PCIE x 16 slot of CPU1
SLOT8	PCIE x 8 slot of CPU0
SLOT9	PCIE x 16 slot of CPU1
SLOT10	PCIE x 8 slot of CPU1
SLOT11	PCIE x 8 slot of CPU1
SLOT12V1/V2	For PCIe slot 12V input only
SMBUS1	Front panel SMBus header
SPI_CN1	Connector for BIOS update tool
SPI_SKT1	EC EEPROM
SYSFAN0-SYSFAN7	System FAN connector
SYS_LED1	System LED connector
USB3_34, USB3_56, USB3_78	USB 3.2 gen1 port 3,4,5,6,7,8 (20 pin header)
USB3_9	USB 3.2 gen1 port 9 (Type A)
USB2_10	USB 2.0 port 10 (Type-A)
LAN5_USB3_12	RJ-45 LAN port + USB 3.2 gen1 port x 2 connectors
LAN1~LAN4	RJ-45 LAN port
VOLT1	Voltage display
VROC1	Intel Virtual RAID (VROC) key
VGA1_COM1	VGA and COM connector
COM2	Serial port: RS-232

Chapter 1 Overview

Table 1.6: Onboard LED									
LED	Description LED Definition								
5V_LED1	Power on LED	Off: Power off	On (Green): System is On						
5VSB_LED1	Standby LED	Off: No input AC Power	On (Green): System is ON, in sleep mode, or in soft-off mode						
LED3	BMC heartbeat LED (ASMB-976T2 SKU Only)	Blinking (Green): controller is working r	normally						

1.5 Block Diagram

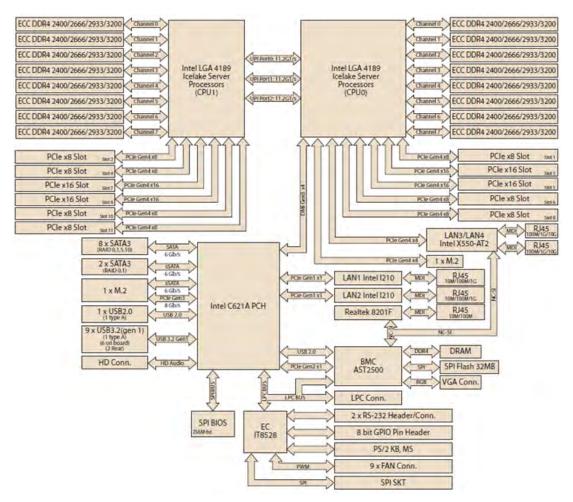


Figure 1.3 Block Diagram

1.6 System Memory

ASMB-976 has sixteen 288-pin memory slots for DDR4 2400/2666/2933/3200 MHz memory modules with maximum capacity of 2 TB (Maximum 128G (LRDIMM) for each DIMM). ASMB-976 supports registered DIMMs memory module.

1.7 Memory Installation Procedures

Memory performance is affected by different DIMM configurations. To reach optimal memory interleaving, be sure to install identical DIMM types with the same size, speed, and number of ranks on those memory slots corresponding to the correct processor.

The following table indicates recommended DIMM configurations with a single and dual processor. Base on the guideline, you may adjust your memory configuration according to your PCIe expansion card configuration.

The 3rd Gen Xeon Scalable (Silver-4xxx, Gold-5xxx/6xxx, Platinum-8xxx) processors support Optane DC persistent memory module (DCPMM).

Table 1.7: DIMM Configuration with Single CPU											
Channel		DIMMA1	DIMMB1	DIMMC1	DIMMD1	DIMME1	DIMMF1	DIMMG1	DIMMH1		
		V									
			V								
				V							
	1				V						
	1					V					
							V				
								V			
									V		
		V				V					
				V				V			
		V		V							
Quantity	2					V		V			
of		V			V						
memory			V				V				
installed					V				V		
			V		V						
							V		V		
		V		V		V		V			
	4	V			V	V			V		
	-		V		V		V		V		
			V	V			V	V			
		V	V	V		V	V	V			
	6	V		V	V	V		V	V		
	Ŭ	V	V		V	V	V		V		
			V	V	V		V	V	V		
	8	V	V	V	V	V	V	V	V		

Note! 3, 5, 7 DIMMs are not recommended DIMM population.



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2

Table	1.8	B: DI	MM (Confi	igura	ation	with	Dua	I CP	U							
Channe	:	DIM- MA1	DIMM B1	DIM- MC1	DIM- MD1	DIMM E1	DIMM F1	DIM- MG1	DIMM H1	DIM- MI1	DIM- MJ1	DIM- MK1	DIM- ML1	DIM- MM1	DIMM N1	DIM- MO1	DIM MP
		V								V							
			V								V						
				V								V					
	2				V								V				
	2					V								V			
							V								V		
								V								V	
								V								V	
		V				V				V				V			
				V				V				V				V	
		V		V						V		V					
Quantity						V		V						V		V	
of memory	4	V	V		V		V			V	V		V		V		
installed			V		V		V		V		V		V		V		V
			V		V				v		V		V				v
			v		v		V		V		v		v		V		V
	-	V		V		V	v	V	v	V		V		V	v	V	•
		V		v	V	v		v	V	v		•	V	v		v	V
	8	-	V		V	-	V		V	-	V		V	-	V		V
			V	V			V	V			V	V			V	V	
		V	V	V		V	V	V		V	V	V		V	V	V	
		V		V	V	V		V	V	V		V	V	V		V	V
	12	V	V		V	V	V		V	V	V		V	V	V		V
			V	V	V		V	V	V		V	V	V		V	V	V
	16	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Note!

1, 3, 5, 7, 9, 11 DIMMs are not recommended DIMM population when dual CPU were installed.

Table 1.9: DCPMM Population Matrix												
Symmetric Population within CPU0												
mode	DIMMA1	DIMMB1	DIMMC1	DIMMD1	DIMME1	DIMMF1	DIMMG1	DIMMH1				
1LM +AD MM 1/2 perf (1)	DRAM	DCPMM	DRAM	DCPMM	DRAM	DCPMM	DRAM	DCPMM				
1LM +AD MM 1/2 perf (2)	DCPMM	DRAM	DCPMM	DRAM	DCPMM	DRAM	DCPMM	DRAM				
		Symr	netric Pop	ulation with	nin CPU1							
mode	DIMMI1	DIMMJ1	DIMMK1	DIMML1	DIMMM1	DIMMN1	DIMMO1	DIMMP1				
1LM +AD MM 1/2 perf (1)	DRAM	DCPMM	DRAM	DCPMM	DRAM	DCPMM	DRAM	DCPMM				
1LM +AD MM 1/2 perf (2)	DCPMM	DRAM	DCPMM	DRAM	DCPMM	DRAM	DCPMM	DRAM				

AD: App Direct Mode; MM: Memory Mode; AD+MM: Mixed Mode.

DRAM: RDIMM, 3DS RDIMM, LRDIMM, 3DS LRDIMM

Any capacity of DCPMM is allowed

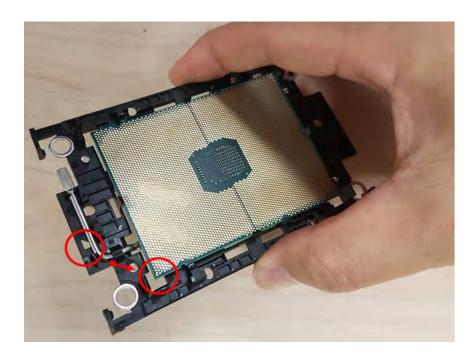
1.8 Processor Installation

The ASMB-976 is designed for Intel Xeon processor scalable family.

1. Remove dust cover.



2. Install CPU on CPU clip and align pin 1 mark.



3. Install the CPU clip assembly on the heatsink as a processor + heatsink module.



4. Put the processor heatsink module into the motherboard bolster plate by using a T-30 screw driver (follow heatsink label direction 1-2-3-4).





Connections

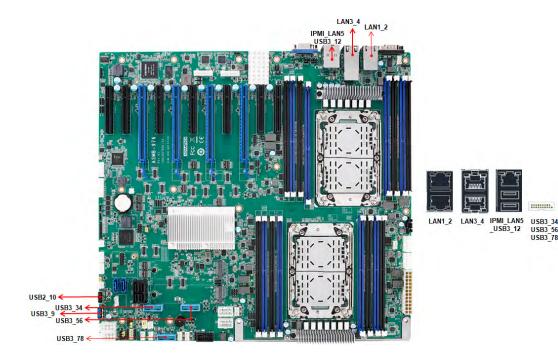
2.1 Introduction

You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed, you may need to partially remove a card to make all the connections.

2.2 USB Ports and LAN Port (USB1~USB10, LAN1~LAN5)

The USB ports comply with USB 2.0 & 3.2 gen1 Transmission rates of up to 480 Mbps (USB 2.0) / 5Gbps (USB 3.2 gen1) and fuse protection are supported. The USB interface can be disabled in the system BIOS setup.

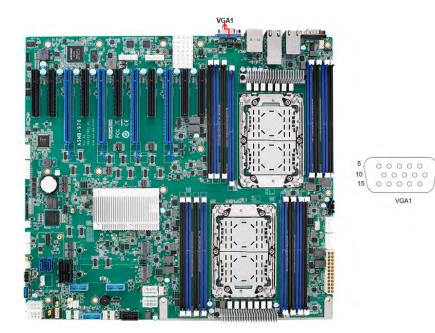
ASMB-976 is equipped with two 10GbE and two 1GbE LAN ports. They are all with RJ-45 jacks and supported by all major network operating systems. LAN5 is a dedicated LAN port for IPMI function. One of 10 GbE LAN (LAN3) can be used as IPMI LAN as well for system management.



6

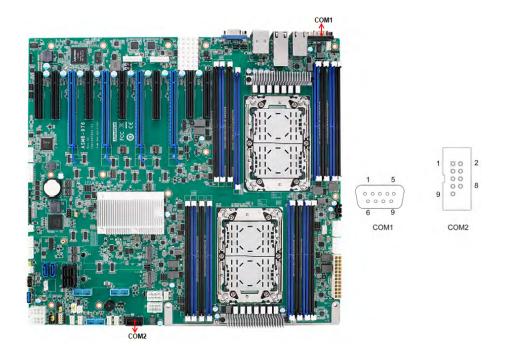
2.3 VGA Connector (VGA1)

The ASMB-976 includes a VGA interface that can drive conventional CRT and LCD displays.



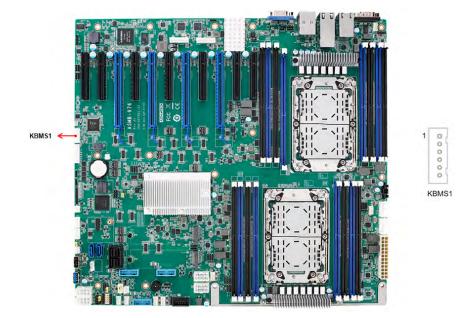
2.4 Serial Ports (COM1~2)

The ASMB-976 offers one serial port on the rear plate and one 2.54mm pitch 9-pin header onboard.



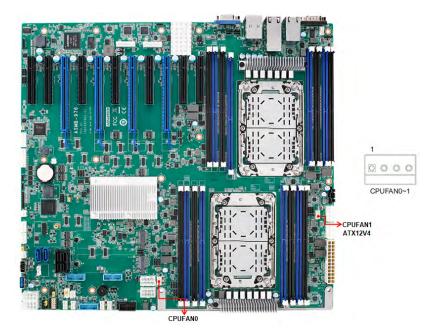
2.5 PS2 Keyboard and Mouse Connectors (KBMS1)

The 6-pin KBMS1 connector is for additional keyboard & mouse device usage.

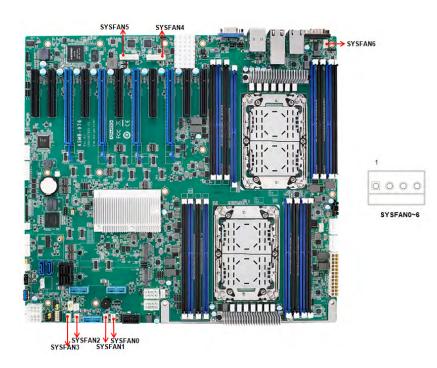


2.6 CPU Fan Connector (CPUFAN0~1)

If a fan is used, this connector supports cooling fans that draw up to 1.5A (18W).



2.7 System Fan Connector (SYSFAN0~6)



Front Panel Connector (JFP1) 2.8

There are several external switches and LEDs to monitor and control the ASMB-976.



P1	3	6	9	12		PWRSW	RESET
4	2(+)	5(-)	8	11		HDDLED	SNMP SM_BUS
P2	1(+)	4	7	10(-)		SPEA	KER
P3	1(+)	2	3(-)	4	5	PWRLED	KEYLOC

JFP1/2/3 <

2.8.1 Power LED (JFP3)

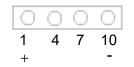
JFP3 pin 1 and pin 3 are for the power LED. Refer to Appendix B for detailed information on the pin assignments. If an ATX power supply is used, the system's power LED status will be as indicated as follows.

Table 2.1: ATX Power Supply LED Status								
ACPI Power Mode	LED (ATX power)							
System On (S0)	On							
System Hibernation(S4)	Slow flashes							
System Off (S5)	Off							



2.8.2 External Speaker (JFP2 pins 1, 4, 7, 10)

JFP2 pins 1, 4, 7, 10 connect to an external speaker. The ASMB-976 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 7-10 closed.



2.8.3 HDD LED Connector (JFP1 Pins 2 & 5)

You can connect an LED to connector JFP1 to indicate when the HDD is active.



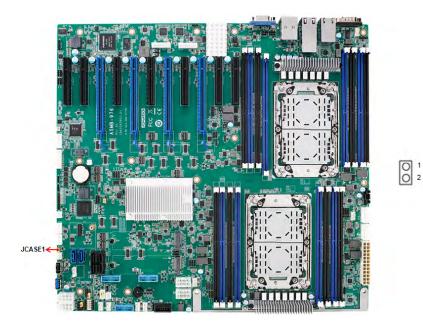
2.8.4 Reset Connector (JFP1 Pins 9 & 12)

Many computer cases offer the convenience of a reset button.



2.9 Case Open (JCASE1)

A chassis Intrusion header is located at JCASE1 on the motherboard. Attach the appropriate cable from the chassis to be informed of a chassis intrusion when the chassis is opened. The default function is disabled and Pin 1-2 is bridged by a jumper cap.



2.10 SATA SGPIO (SGPIO1)

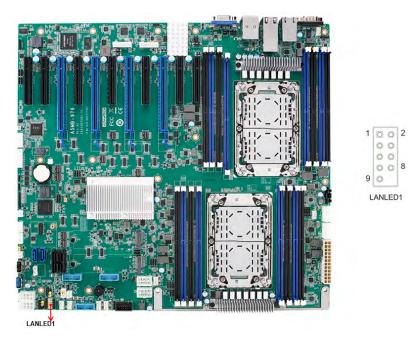


SGPIO

00

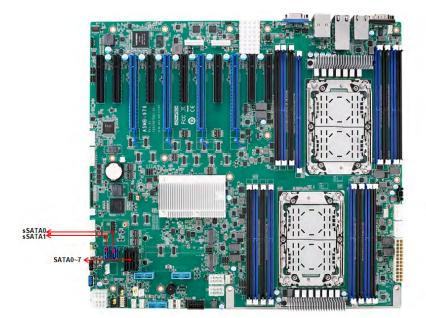
1 O SGPIO1

2.11 Front Panel LAN Indicator Connector (LANLED1)



2.12 SATA and sSATA (SATA0~7, sSATA0~1)

ASMB-976 features ten serial ATA III interfaces (up to 600 MB/s) which eases cabling to hard drives with thin and long cables.

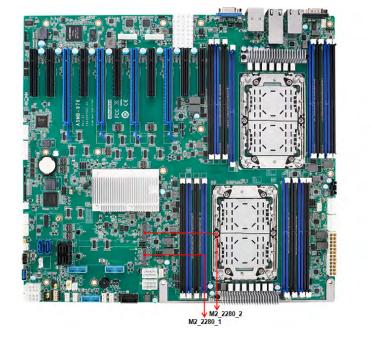




SATA0~7

2.13 M.2 Connector (sSATA3 and PCIe gen3 and PCIe The M.2 2280 connectors support SATA and PCIe devices.

M2_2280_1 (PCIe gen4) M2_2280_2 (sSATA3 or PCle gen3)

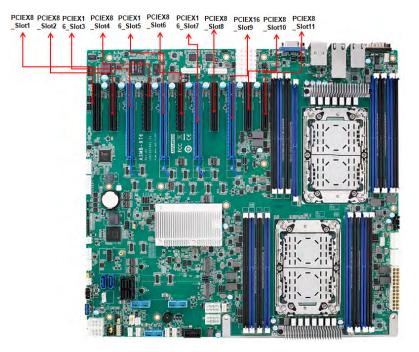


gen4)

Chapter 2 Connections

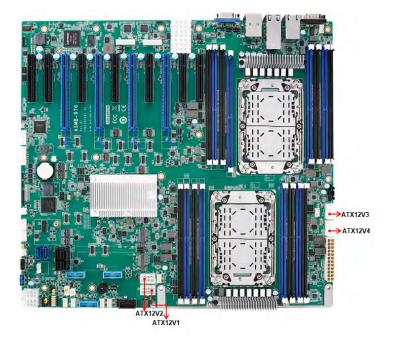
2.14 PCIe Expansion Slots

The ASMB-976 provides nine expansion slots that can support four double-deck cards, one PCIe x 8 card and one PCIe x4 card.



	Slot Length	Link	PCI-E Generation	PCIe link provide from
SLOT1	PCIE x8	PCIE x8	4	CPU0
SLOT2	PCIE x8	PCIE x8	4	CPU1
SLOT3	PCIE x16	PCIE x16	4	CPU0
SLOT4	PCIE x8	PCIE x8	4	CPU1
SLOT5	PCIE x16	PCIE x16	4	CPU0
SLOT6	PCIE x8	PCIE x8	4	CPU0
SLOT7	PCIE x16	PCIE x16	4	CPU1
SLOT8	PCIE x8	PCIE x8	4	CPU0
SLOT9	PCIE x16	PCIE x16	4	CPU1
SLOT10	PCIE x8	PCIE x8	4	CPU1
SLOT11	PCIE x8	PCIE x8	4	CPU1

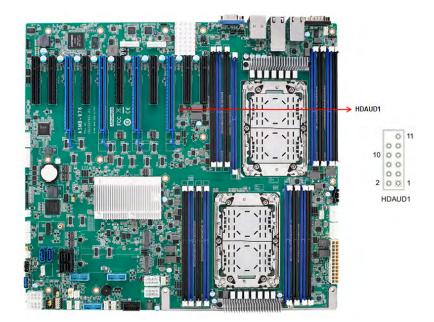
2.15 Auxiliary Power Connector (ATXPWR1/ ATX12V1/ATX12V/ATX12V3/ATX12V4)





- 1. Please use a power supply which is of SSI type; minimum output should be at least 700W with 5Vsb @2.5A.
- 2. ATXPWR1 & ATX12V1 & ATX12V3 should be all connected with power supply, otherwise ASMB-976 will not boot up normally.

2.16 HD Audio Interface Connector (HDAUD1)



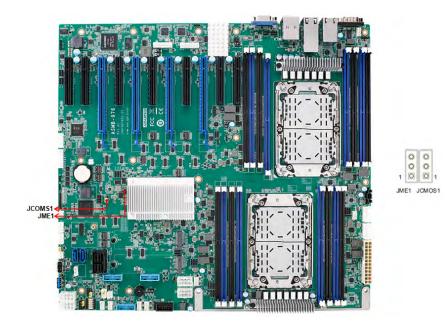
2.17 LPC Connector (LPC1)

ASMB-976 has one LPC connector that can be used to install Advantech's TPM Module (P/N: PCA-TPM-00A1E, PCA-TPM-00B1E) for security management.



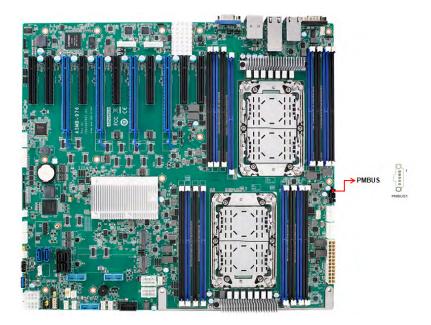
2.18 CMOS Clear and ME Update Connector (JCMOS1, JME1)

Setting jumper from pin 1-2 to pin 2-3, then back to pin 1-2 to reset CMOS data and enable ME update.

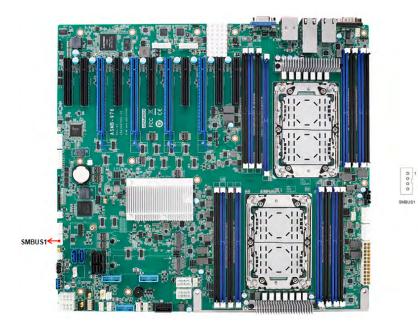


Chapter 2 Connections

2.19 PMBUS Connector (PMBUS1)

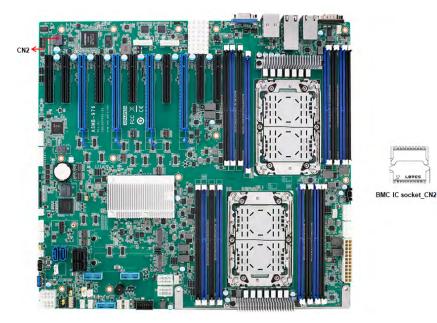


2.20 Front Panel SMBUS Connector (SMBUS1)



2.21 BMC IC Socket (CN2)

Enabling IPMI feature through CN2. The BMC IC socket has already been pre-installed on ASMB-976T2 sku.



2.22 VOLT1 Connector (VOLT1)

VOLT1 connects to the alarm board on the Advantech chassis. These alarm boards give warnings if a power supply or fan fails, if the chassis overheats, or if the backplane malfunctions.

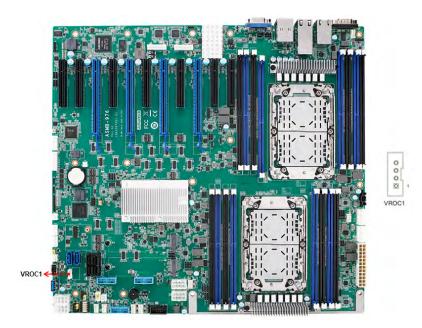


2.23 GPIO Connector (GPIO1)



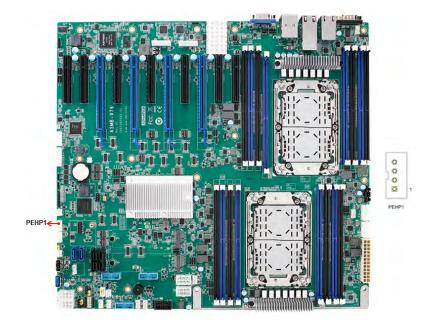
2.24 Intel Virtual RAID (VROC1)

Intel VROC license key of VMD allows NVMe SSDs to connect via PCIe and directly manages the CPU for better RAID performance. Enable NVMe SSD RAID, hot-plug and LED management features via VROC connector.



2.25 NVMe RAID LED Control (PEHP1)

Connect to storage chassis to enable NVMe RAID LED control feature.





AMI BIOS

3.1 Introduction

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 the special features on or off. This chapter describes the basic navigation of the ASMB-976 setup screens.

Build Date and Time	ASMB S825X020 06/30/2017 08:14:56	Year: 2005–2099 Months: 1–12 Days: dependent on month
Access Level	Administrator	bags, dependent on month
Main Board	ASMB-825T2	
Memory Information		
Total Memory	8192 MB	
System Date	[Fri 07/28/2017]	++: Select Screen
System Time	[11:05:49]	↑↓: Select Item Enter: Select
		+/-: Change Opt.
		F1: General Help F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit

AMI'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 up CMOS so it retains the Setup information when the power is turned off.

Note!

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The BIOS setup screens shown in this chapter are for reference only, they may not exactly match what you see on your display devices.

3.2 BIOS Setup

3.2.1 Main Menu

Press during bootup to enter AMI BIOS CMOS 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.

Main Advanced Platform Configu	Aptio Setup — AMI ration Socket Configuratior	n Server Mgmt Security Boot →
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time Access Level Memory Information Total Memory	American Megatrends 5.21 0.56 x64 UEFI 2.8; PI 1.7 ASMB S816X021 03/10/2021 14:01:38 Administrator 4096 MB	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.
System Language	[English]	
System Date System Time	[Tue 03/23/2021] [14:35:09]	<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 2.21.1280 Copyright (C) 2021 AMI		

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. Above the key 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.

System Date/System Time

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ASMB-976 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 <Arrow> 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.

Ap Main Advanced Platform Configuration	tio Setup – AMI Socket Configuration Se	anvan Mømt Securitu Boot 🔹 🕨
 Trusted Computing ACPI Settings IT8528 Super IO Configuration IT8528 HW Monitor Serial Port Console Redirection PCI Subsystem Settings USB Configuration Network Stack Configuration CSM Configuration iSCSI Configuration 		Frusted Computing Settings
	1 E F F F F F	<pre> +: Select Screen 14: Select Item inter: Select +/-: Change Opt. 51: General Help 52: Previous Values 53: Optimized Defaults 54: Save & Exit 550: Exit</pre>
Version 2.21.	1280 Copyright (C) 2021 A	IMI

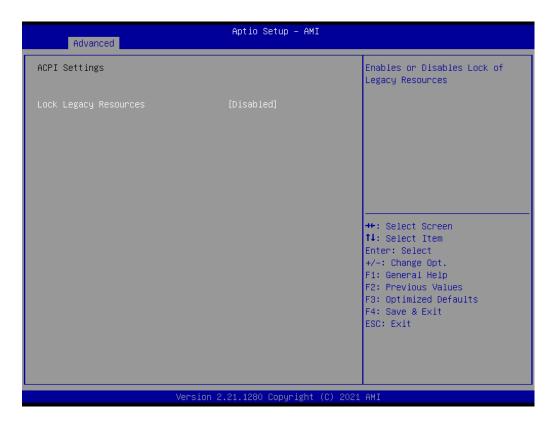
3.2.2.1 Trusted Computing

Advanced	Aptio Setup – AMI	
Configuration Security Device Support NO Security Device Found	[Enable]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INTIA interface will not be available. ++: Select Screen 14: 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 2.21.1280 Copyright (C) 2	2021 AMI

Security Device Support

Enables or disables BIOS support for security device. Purchase Advantech LPC TPM module to use TPM function. (P/N: PCA-TPM-00A1E/PCA-TPM-00B1E.)

3.2.2.2 ACPI Settings



Lock Legacy Resources

Enable or disable lock legacy resources feature.

3.2.2.3 IT8528 EC Super IO Configuration

Advanced	Aptio Setup – AMI	
IT8528 Super IO Configuration		Set Parameters of Serial Port 1 (COMA)
<pre>Super IO Chip > Serial Port 1 Configuration > Serial Port 2 Configuration</pre>	IT8528	<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	2.21.1280 Copyright (C) 2021	AMI

Serial Port 1 Configuration



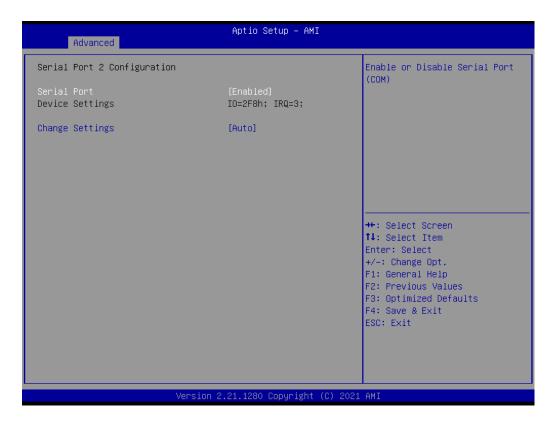
- Serial Port

Enable or disable serial port 1.

Change Settings
 To select an optimal setting for serial port 1.

Advanced	Aptio Setup — AMI	
Serial Port 1 Configuration		Select an optimal settings for Super IO Device
Serial Port Device Settings	[Enabled] IO=3F8h; IRQ=4;	
Change Settings	[Auto]	
	Change Settings Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12	; Select Screen
Version 2.21.1280 Copyright (C) 2021 AMI		

Serial Port 2 Configuration

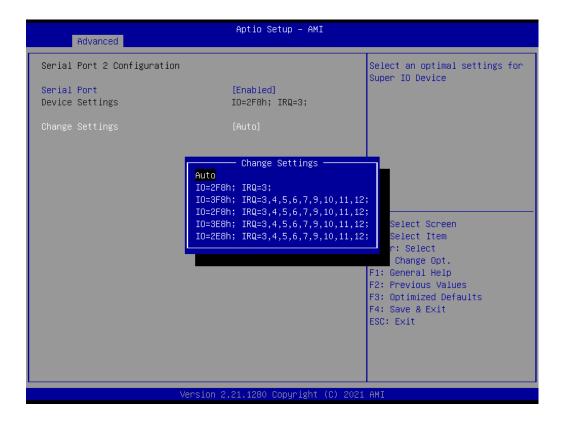


- Serial Port

Enable or disable serial Port 2.

- Change Settings

To select an optimal setting for serial port 2.



3.2.2.4 IT8528 HW Monitor

Advanced	Aptio Setup – AMI	
IT8528 HW Monitor		Enabled/Disabled Watchdog
Firmware Version	I28B8X0702	Timer.
Watchdog Timer CPU Warning Temperature CPU ACPI Shutdown Temperature ▶ FAN Configuration	[Disabled] [Disabled] [Disabled]	
System Temperature(TR1) CPU Temperature	: +28 °C : +52 °C	
VBAT +12V +5V +3.3V CPU Fan O Speed System Fan O Speed System Fan 1 Speed System Fan 2 Speed System Fan 3 Speed System Fan 4 Speed	: +2.862 V : +11.750 V : +5.072 V : +3.278 V : 4338 RPM : N/A : N/A : N/A : N/A : N/A : N/A	<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	n 2.21.1280 Copyright (C) 20	21 AMI

Watchdog Timer

Enable or disable the watchdog timer function.

CPU ACPI Shutdown Temperature

Enable or disable the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheat damage.

CPU Warning Temperature

Enable or disable the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.

Fan Configuration

The default of CPU/System FAN is Smart FAN mode and the BIOS will automatically control the FAN speed by CPU temperature.

When set to manual mode, fan duty setting can be changed; the range is from 30%~100%, default setting is 50%.



3.2.2.5 Serial Port Console Redirection

Advanced	Aptio Setup – AMI	
Serial Communication via IPMI COM Console Redirection ▶ Console Redirection Settings	[Disabled]	Console Redirection Enable or Disable.
COM1 Console Redirection ► Console Redirection Settings Legacy Console Redirection	[Disabled]	
 Legacy Console Redirection Settings Serial Port for Out-of-Band Management Windows Emergency Management Services Console Redirection EMS Console Redirection Settings 		<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.	21.1280 Copyright (C) 2021	AMI

Console Redirection Settings

Advanced	Aptio Setup – AMI	
Serial Communication via IPMI COM 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	[VT100+] [115200] [8] [None] [1] [None] [Enabled] [Disabled] [Disabled] [LINUX]	Emulation: ANSI: Extended 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. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version :	2.21.1280 Copyright (C) 202	1 AMI

Terminal Type

Select a terminal type to be used for console redirection. Options available: VT100/VT100+/ANSI/VT-UTF8.

Bits Per Second

Select the baud rate for console redirection. Options available: 9600/19200/57600/115200.

Data Bits

- Parity

A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the number of 1's in the data bits is even. Odd: parity bit is 0 if number of 1's 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. Options available: None/Even/Odd/Mark/Space.

- Stop Bits

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. Options available: 1/2.

- Flow Control

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. Options available: None/Hardware RTS/CTS.

- VT-UTF8 Combo Key Support

Enable VT-UTF8 combination key support for ANSI/VT100 terminals.

- Recorder Mode

When this mode enabled, only text will be send. This is to capture Terminal data.

Options available: Enabled/Disabled.

Resolution 100x31

Enables or disables extended terminal resolution.

- Putty Keypad

Select function key and keypad on putty.

Legacy Console Redirection Settings

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

Advanced	Aptio Setup – AMI	
Legacy Console Redirection Settings		Select a COM port to display redirection of Legacy OS and
Redirection COM Port	[Serial Communication via IPMI COM] [80x24]	Legacy OPROM Messages
Redirect After POST	[Always Enable]	
		↔: Select Screen ↑↓: Select Item Enter: Select
		+/−: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit
		ESC: Exit
Version 2	.21.1280 Copyright (C) 2021	AMI

3.2.2.6 PCI Subsystem Settings

Advanced	Aptio Setup — AMI	
PCI Bus Driver Version	A5.01.23	Enables or Disables 64bit capable Devices to be Decoded
PCI Devices Common Settings: Above 46 Decoding	[Enabled]	in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).
		<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	n 2.21.1280 Copyright (C) 20	21 AMI

Above 4G Decoding

Enable or disable 64-bit capability. Devices to be decoded in above 4G address space (only if the system supports 64-bit PCI decoding).

Note!

Some graphic or GPU cards need to enable 4G Decoding.

3.2.2.7 USB Configuration

Advanced	Aptio Setup – AMI	
USB Configuration		Enables Legacy USB support.
USB Module Version	26	AUTO option disables legacy 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, 2 Keyboards, 1 Mouse,	1 Hub	
Legacy USB Support	[Enabled]	
XHCI Hand-off USB Mass Storage Driver Support	[Enabled] [Enabled]	
USB hardware delays and time-outs:		++: Select Screen
USB transfer time-out	[20 sec]	↑↓: Select Item
Device reset time-out	[20 sec] [Auto]	Enter: Select
Device power-up delay	[Huto]	+/-: Change Opt. F1: General Help
Mass Storage Devices:		F2: Previous Values
1100	[Auto]	F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
Version 2	.21.1280 Copyright (C) 202	LAMI

Legacy USB Support

This is for supporting USB device under a 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, or disable USB legacy mode when no USB device is attached.

XHCI Hand-off

This is a workaround for OS without XHCI hand-off support.

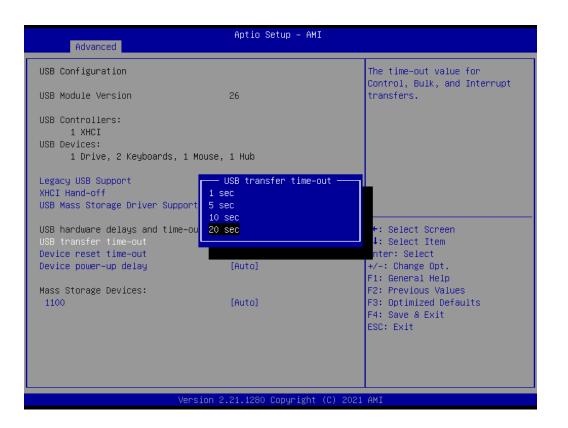
The XHCI ownership change should be claimed by XHCI driver.

USB Mass Storage Driver Support

Enable or disable USB mass storage driver support.

USB Transfer Time-out

Selects the USB transfer time-out value. [1,5,10,20sec]



Device Reset Time-out

Selects the USB device reset time-out value. [10,20,30,40 sec]

Advanced	Aptio Setup — AMI	
USB Configuration		USB mass storage device Start Unit command time-out.
USB Module Version	26	onit command time out.
USB Controllers: 1 XHCI		
USB Devices: 1 Drive, 2 Keyboards, 1 M	ouse, 1 Hub	
Legacy USB Support XHCI Hand-off USB Mass Storage Driver Support	Device reset time-out — 10 sec 20 sec 30 sec	
USB hardware delays and time-ou USB transfer time-out Device reset time-out		+: Select Screen ↓: Select Item nter: Select
Device power-up delay	[Auto]	+/−: Change Opt. F1: General Help
Mass Storage Devices: 1100	[Auto]	F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Vers	ion 2.21.1280 Copyright (C) 20	21 AMI

Device Power-up Delay

This item appears only when Device power-up delay item is set to [manual].

Aptio Setup - AMI Advanced		
USB Configuration		Maximum time the device will take before it properly
USB Module Version	26	reports itself to the Host Controller. 'Auto' uses
USB Controllers: 1 XHCI		default value: for a Root port it is 100 ms, for a Hub port
USB Devices: 1 Drive, 2 Keyboards, 1 Mou	se, 1 Hub	the delay is taken from Hub descriptor.
	[Enabled] — Device power-up delay — Auto Manual	
USB hardware delays and time-ou		+: Select Screen ↓: Select Item
Device reset time-out	[20 sec]	Enter: Select
Device power–up delay	[Auto]	+/−: Change Opt. F1: General Help
Mass Storage Devices:		F2: Previous Values
1100	[Auto]	F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.21.1280 Copyright (C) 2021 AMI		
Version 2.21.1280 copyright (C) 2021 HM1		

Mass Storage Devices

Default is "Auto" to enumerate mass storage devices according to media format.

Advanced	Aptio Setup — AMI	
USB Configuration USB Module Version USB Controllers:	26	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM',
1 XHCI USB Devices: 1 Drive, 2 Keyboards, 1 Mouse,	1 Hub	drives with no media will be emulated according to a drive type.
Legacy USB Support XHCI Hand-off USB Mass Storage Driver Support USB hardware delays and time-outs: USB transfer time-out Device reset time-out Device power-up delay Mass Storage Devices: 1100	[E 1100 [E Auto [E Floppy Forced FDD Hard Disk [2 CD-ROM [2 [Auto]	<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	.21.1280 Copyright (C) 2021	AMI

3.2.2.8 Network Stack Configuration

Aptio Setup – AMI Advanced		
Network Stack	[Disabled]	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 & Exit ESC: Exit
	Version 2.21.1280 Copyright ((C) 2021 AMI

Advanced	Aptio Setup – AMI	
Network Stack IPv4 PXE Support IPv4 HTTP Support IPv6 PXE 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
Ve	rsion 2.21.1280 Copyright (C	F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Enable or disable UEFI network stack function.

3.2.2.9 CSM Configuration

Advanced	Aptio Setup – AMI	
Compatibility Support Module Confi	guration	Enable/Disable CSM Support.
CSM Support	[Enabled]	
GateA20 Active Option ROM Messages	[Upon Request] [Force BIOS]	
Boot option filter	[UEFI and Legacy]	
Option ROM execution		
Network Storage Video Other PCI devices	[Legacy] [Legacy] [Legacy] [Legacy]	<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	2.21.1280 Copyright (C) 202	21 AMI

CSM Support

Enables or Disables UEFI CSM (Compatibility Support Module) to support a legacy PC boot process. Default is Disabled.

Advanced	Aptio Setup – AMI	I
Compatibility Support Modul	e Configuration	Enable/Disable CSM Support.
CSM Support	[Disabled]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
	Version 2.21.1280 Copyright	ESC: Exit

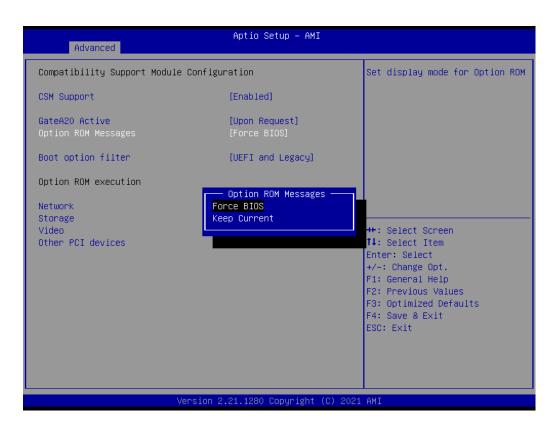
GateA20 Active

This item is useful when RT code is executed above 1MB. When it's set as "Upon Request", GA20 can be disabled using BIOS services. When it's set as "Always", it does not allow disabling of GA20.

Advanced	Aptio Setup - AMI	
Compatibility Support M	odule Configuration	UPON REQUEST - GA20 can be
CSM Support	[Enabled]	disabled using BIOS services. ALWAYS – do not allow disabling GA20; this option is
GateA20 Active Option ROM Messages	[Upon Request] [Force BIOS]	useful when any RT code is executed above 1MB.
Boot option filter	[UEFI and Legacy]	
Option ROM execution	GateA20 Active	
Network Storage Video	Upon Request Always	→+: Select Screen
Other PCI devices		↑↓: Select Item Enter: Select
		+/−: Change Opt. F1: General Help F2: Previous Values
		F2: Frevious values F3: Optimized Defaults F4: Save & Exit
		ESC: Exit
Version 2.21.1280 Copyright (C) 2021 AMI		

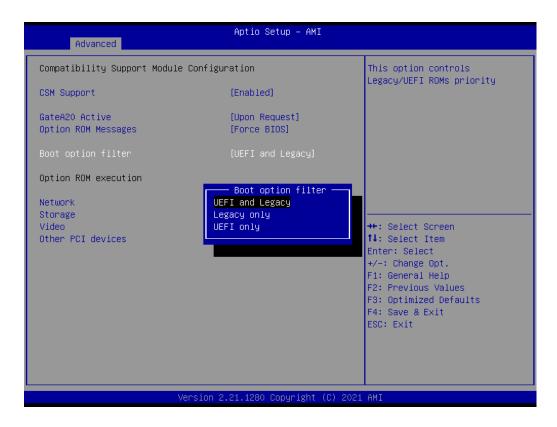
Option ROM Messages

To "Force BIOS or keep current" to set the display mode for Option ROM.



Boot Option Filter

Change UEFI/legacy ROM priority for boot option.



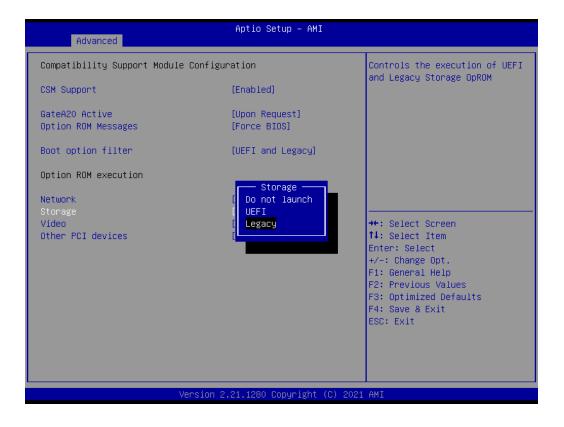
Network

Control the execution of UEFI and legacy PXE OpROM.



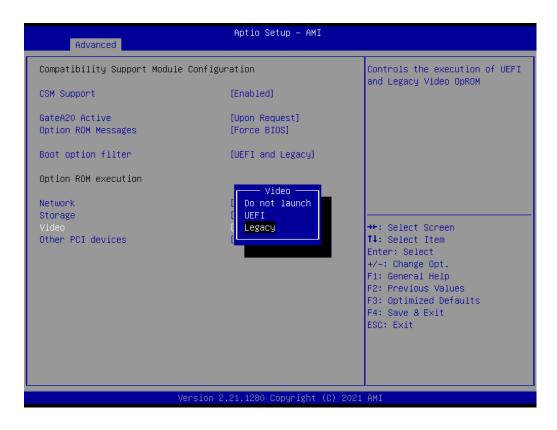
Storage

Control the execution of UEFI and legacy storage OpROM.



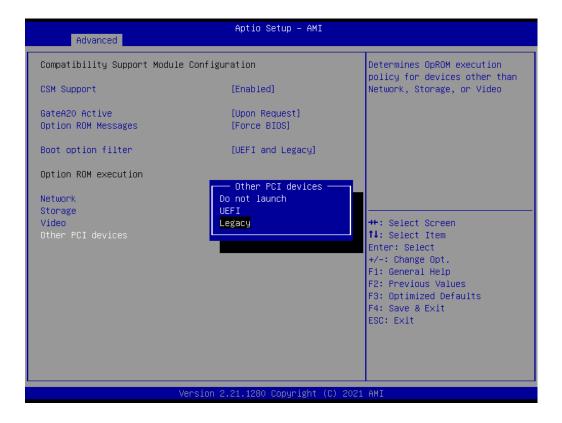
Video

Control the execution of UEFI and Legacy Video OpROM.



Other PCI Devices

Determines OpROM execution policy for devices other than Network., Storage, or Video.



3.2.2.10 iSCSI Configuration

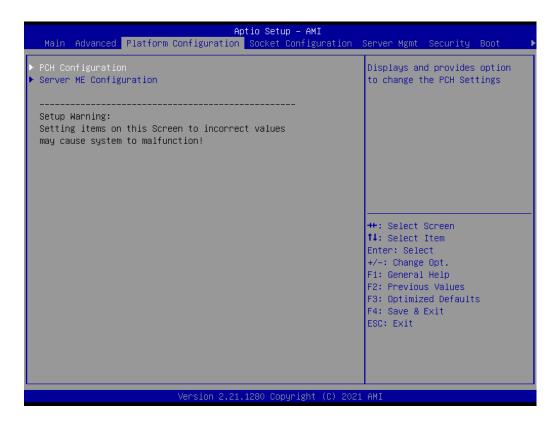
Aptio Setup – AMI Advanced	
▶ Host iSCSI Configuration	Host iSCSI Configuration
	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
د Version 2.21.1280 Copyright (آ	C) 2021 AMI

Host iSCSI Configuration

The worldwide unique name of iSCSI Initiator. Only IQN format is accepted. Range is from 4 to 223.

Aptio Setup - Advanced	AMI
iSCSI Initiator Name	The worldwide unique name of iSCSI Initiator. Only IQN
▶ Add an Attempt	format is accepted.Range is from 4 to 223
► Delete Attempts	
▶ Change Attempt Order	
	+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
version 2.21.1280 Copyri	ght (C) 2021 AMI

3.2.3 Platform Configuration



3.2.3.1 PCH Configuration

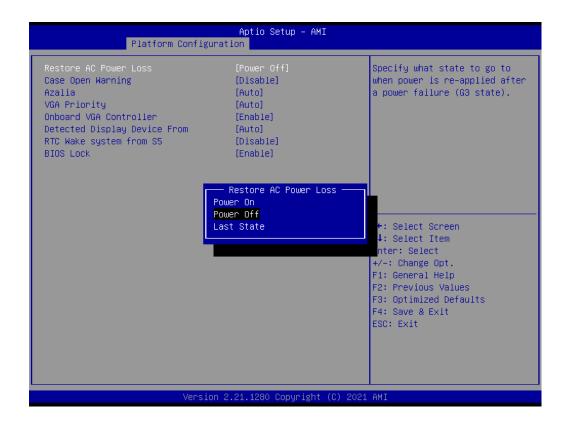
Aptio Setu Platform Configuration	p - AMI
PCH Configuration	Enable/Disable Intel(R) IO Controller Hub devices
 PCH Devices PCI Express Configuration PCH SATA Configuration PCH sSATA (M.2) Configuration Networking 	
	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.21.1280 Cop	yright (C) 2021 AMI

PCH Devices

This item is to set up IO Controller Hub devices.

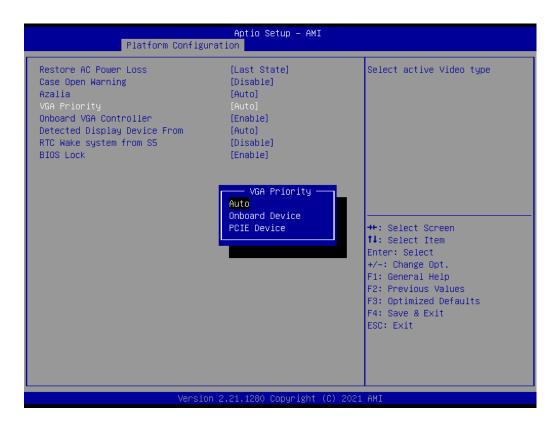
Restore AC Power Loss

Specify what state to go to when power is re-applied after a power failure (G3 state).



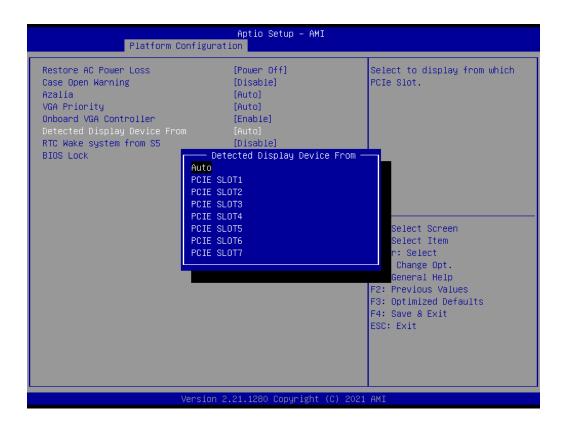
- VGA Priority

Determines priority between onboard and 1st off-board video device found.



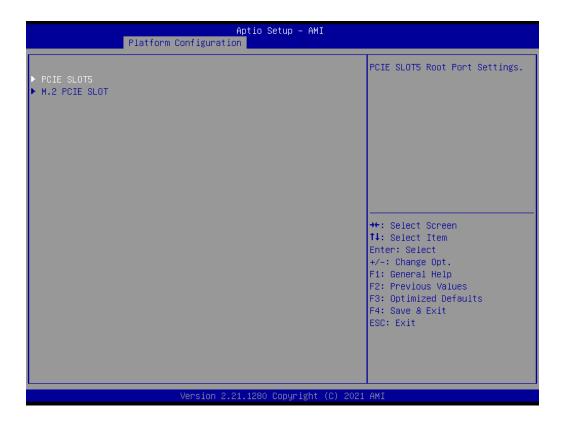
Onboard VGA Controller Enable/Disable Onboard VGA Controller (ASPEED AST2500).

Detected Display Device from Select to display from which PCIe Slot.



 RTC Wake System from S5 Enable or disable system wake on alarm event.

PCI Express Configuration



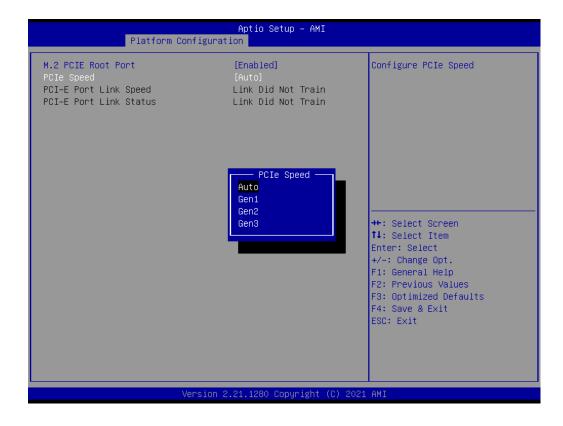
PCIE SLOTS

PCIE SLOTS Root Port Settings.

Plat	Aptio Setup tform Configuration	- AMI
PCIE SLOT5 Root Port PCIe Speed PCI-E Port Link Speed PCI-E Port Link Statu		
	PCIe Sp Auto Gen1 Gen2 Gen3	++: Select Screen 1↓: Select Item Enter: Select
		+/−: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.21.1280 Copy	right (C) 2021 AMI

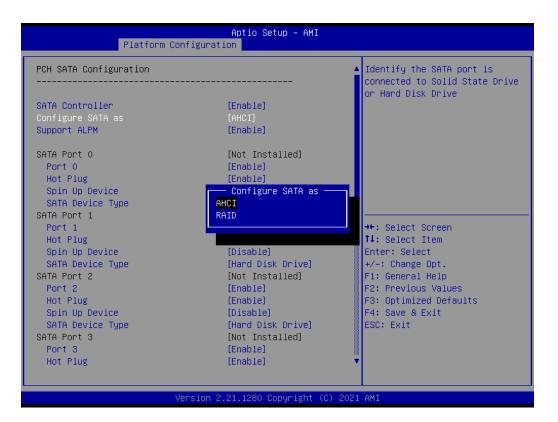
PCIe M.2 Slot

M.2 PCIE SLOT Root Port Settings.



PCH SATA Configuration

PCH SATA Configuration		 Enable or Disable SATA Controller
SATA Controller Configure SATA as Support ALPM SATA Port 0 Port 0 Hot Plug Spin Up Device SATA Device Type SATA Port 1 Port 1 Hot Plug Spin Up Device SATA Device Type SATA Port 2 Port 2 Hot Plug Spin Up Device	[Enable] [AHCI] [Enable] [Not Installed] [Enable] [Enable] [Disable] [Hard Disk Drive] [Enable] [Enable] [Disable] [Hard Disk Drive] [Mard Disk Drive] [Not Installed] [Enable] [Enable] [Enable] [Enable] [Enable] [Disable]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit</pre>
SATA Device Type SATA Port 3 Port 3 Hot Plug	[Hard Disk Drive] [Not Installed] [Enable] [Enable]	ESC: Exit



- SATA Controller

Enable or disable SATA devices.

- Configure SATA as Set as AHCI or RAID when SATA controllers are enabled.
- Support ALPM

Enable or disable Aggressive Link Power Management (ALPM) protocol for Advanced Host Controller Interface-compliant (AHCI) Serial ATA (SATA) devices.

- SATA Port 0~7
 Enable or disable SATA port 0~7.
- Hot Plug Port 0~7

Designates SATA port 0~7 as hot pluggable.

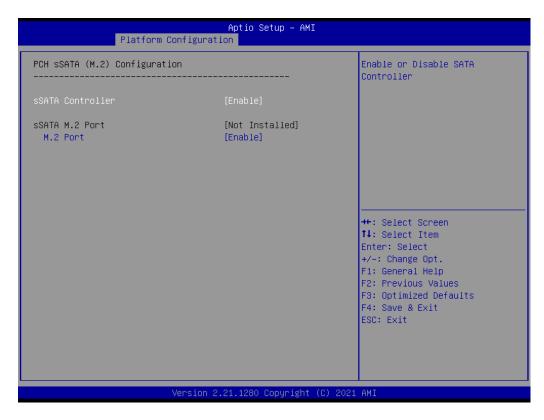
SATA Port 0~7 Spin Up Device

On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.

- SATA Port 0~7 Device Type

To identify the SATA is connected to Solid State Drive or Hard Disk Drive.

PCH sSATA (M.2) Configuration



- sSATA M.2 Controller
 Enable or disable SATA Controller.
- sSATA M.2 Port
 Enable or disable SATA port.

Networking

Platform Co	Aptio Setup – AMI onfiguration	
LAN1 Controller LAN1 PXE OpROM LAN2 Controller LAN2 PXE OpROM LAN3/4 Controller LAN3 PXE OpROM LAN4 PXE OpROM	[Enable] [Disable] [Enable] [Disable] [Enable] [Disable] [Disable]	Enable/Disable onbaord LAN1(Intel I210) NIC.
		<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>
1	/ersion 2.21.1280 Copyright	(C) 2021 AMI

LAN1 Controller

Enable or disable Intel I210 Controller support.

– LAN1 PXE OpROM

Enable or disable Boot option for Intel I210 controller.

- LAN2 Controller
 Enable or disable Intel I210 Controller support.
- LAN2 PXE OpROM

Enable or disable Boot option for Intel I210 controller.

- LAN3/LAN4 Controller

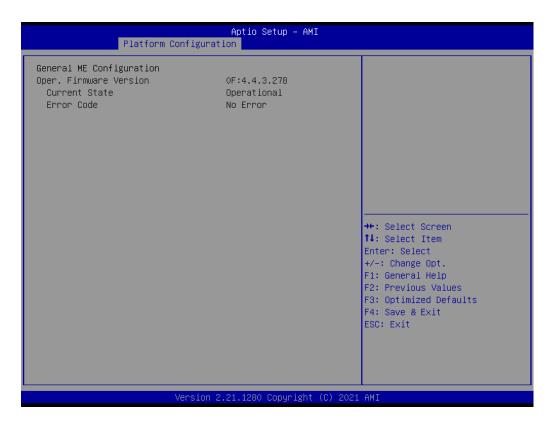
Enable or disable Intel X550 controller support.

- LAN3 PXE OpROM
 Enable or disable boot option for Intel X550 controller.
- LAN4 PXE OpROM

Enable or disable boot option for Intel X550 controller.

3.2.3.2 Server ME Configuration

This page shows the Server ME configuration information.



3.2.4 Socket Configuration

Processor Configuration Memory Configuration IIU Configuration Advanced Power Management Configuration	Displays and provides ontion to change the Processor Settings
	<pre>++: Select Screen 14: Select Ttem Enter: Select 47-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESO: Exit</pre>

3.2.4.1 Processor Configuration

Processor Configuration		Change Per-Socket Settings
Per-Socket Configuration		
Processor BSP Revision	606A6 - ICX DO	
Processor Socket	Socket 0 Socket 1	
Processor ID	000606A6* 000606A6	
Processor Frequency	2.200GHz 2.200GHz	
Processor Max Ratio	16H 16H	
Processor Min Ratio	08H 08H	
Microcode Revision	0D0002A0 0D0002A0	
L1 Cache RAM(Per Core)	80KB 80KB	
L2 Cache RAM(Per Core)	1280KB 1280KB	
L3 Cache RAM(Per Package)	49152KB 49152KB	The second se
Processor 0 Version	Intel(R) Xeon(R) Platin	H+: Select Screen
	um 8352Y CPU @ 2.20GHz	t4: Select Item
Processor 1 Version	Intel(R) Xeon(R) Platin	Enter: Select
	um 8352Y CPU @ 2.20GHz	+/-: Change Opt.
		F1: General Help
Hyper-Threading (ALL)	[Enable]	F2: Previous Values
Hardware Prefetcher	[Enable]	F3: Optimized Defaults
Adjacent Cache Prefetch	[Enable]	F4: Save & Exit
DCU Streamer Prefetcher	[Enable]	ESC: Exit
DCU IP Prefetcher	[Enable]	
DCU Mode	[Normal]	
VMX	[Enable]	*

Per-Socket Configuration

Use this to select how many processor cores you want to activate when you are using a dual or quad core processor.

Hyper-threading [All]

Enable or disable Intel Hyper Threading technology.

Execute Disable Bit

Enable or disable the Execute disable Bit feature. The Optimal and Fail-Safe default setting is enabled. If disable is selected, the BIOS forces the XD feature flag to always return to 0.

VMX

Enable or disable Intel Virtual Machine Extensions (VMX) for IA-32 processors that support Intel[®] Vanderpool Technology.

Enable SMX

Enable or disable Safer Mode Extensions. Safer Mode Extensions (SMX) provide a means for system software to launch an MLE and establish a measured environment within the platform to support trust decisions by end users.

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, so that it can improve the load-to-use latency.

Adjacent Cache Prefetch

The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When 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.

DCU Streamer Prefetcher

Enable prefetch of next L1 data line based upon multiple loads in same cache line.

DCU IP Prefetcher

Enable prefetch of next L1 line based upon sequential load history.

DCU Mode

Change the data cache unit mode.

AES-NI

This item is to Enable or disable CPU advanced encryption standard instructions.

3.2.4.2 UPI Configuration

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Socket Configuration			
UPI Configuration > UPI General Configuration	Displays and provides option to change the UPI General Settings		
	<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 2.19.1268. Copyright (C) 2017 American M	egatrends, Inc.		

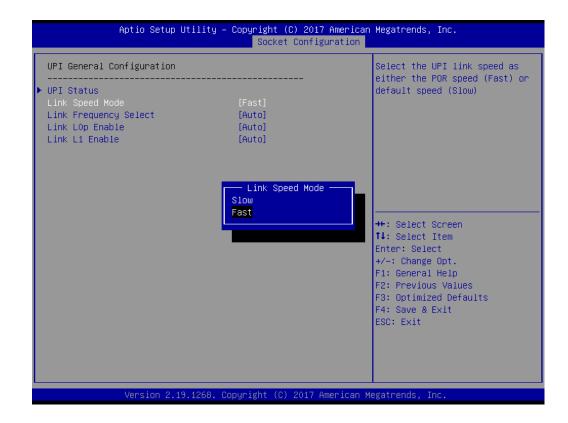
UPI Status

Display information of Intel UltraPath Interconnect (UPI).

	Copyright (C) 2017 American Socket Configuration	n Megatrends, Inc.
UPI General Configuration		UPI Status Help
UPI Status Link Speed Mode Link Frequency Select Link LOp Enable Link L1 Enable	[Fast] [Auto] [Auto] [Auto]	
		<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>
Aptio Setup Utility -	Copyright (C) 2017 American Socket Configuration) Megatrends, Inc.
UPI Status Number of CPU Number of IIO	Socket Configuration) Megatrends, Inc.
UPI Status Number of CPU Number of IIO Current UPI Link Speed Current UPI Link Frequency UPI Global MMIO Low Base / Limit UPI Global MMIO High Base / Limit	Socket Configuration 2 2 Fast 10.4 GT/s 90000000 / FBFFFFF 0000000000000 / 00	<pre>Megatrends, Inc. Hegatrends, Inc. ++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

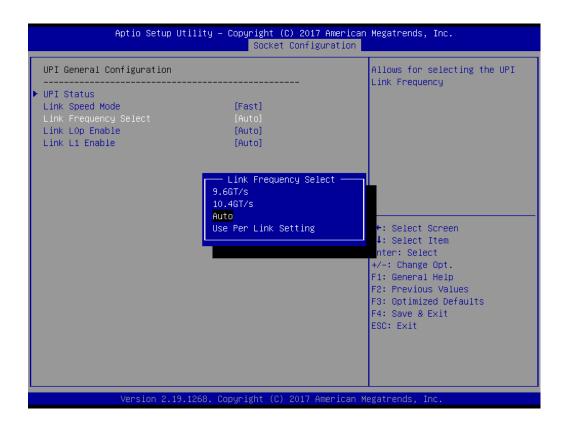
Link Speed Mode

Select the QPI link speed as either the Fast mode or Slow mode.



Link Frequency Select

Allows for selecting the QPI Link frequency.



Chapter 3 AMI BIOS

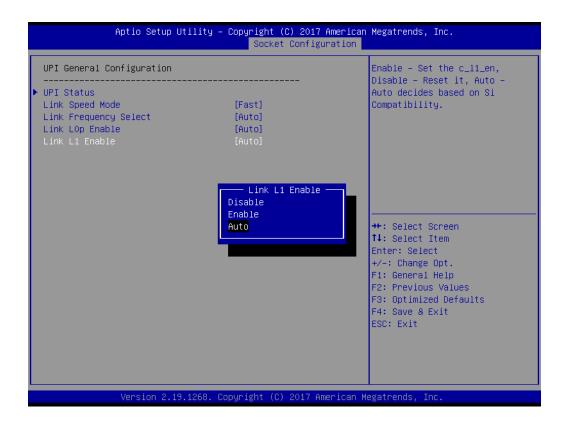
Link L0p Enable

Enable or disable QPI Link0p.

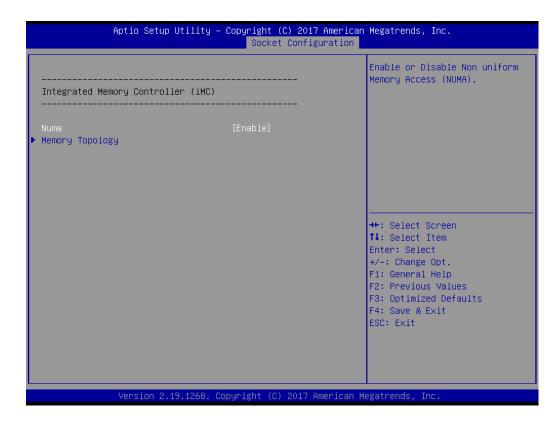
	Aptio Setup Util	ity – Copyright (C) 201 Socket Confi	7 American Megatrends, Inc. guration
Disable Enable Auto ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	▶ UPI Status Link Speed Mode Link Frequency Select Link LOp Enable	[Auto] [Auto]	
		Disable Enable	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

Link L1 Enable

Enable or disable QPI Link1.



3.2.4.3 Memory Configuration



NUMA

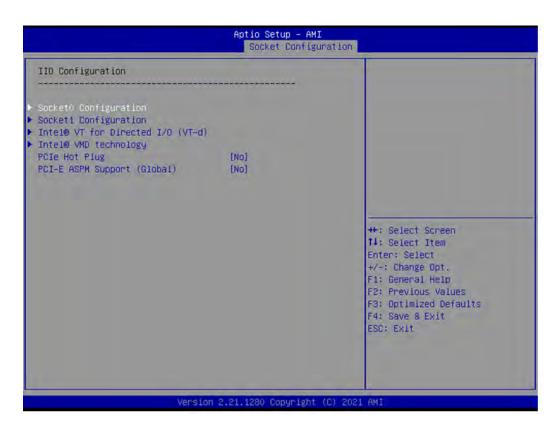
Enable or disable non uniform memory access (NUMA).

Memory Technology

Display memory topology with DIMM population information.

Chapter 3 AMI BIOS

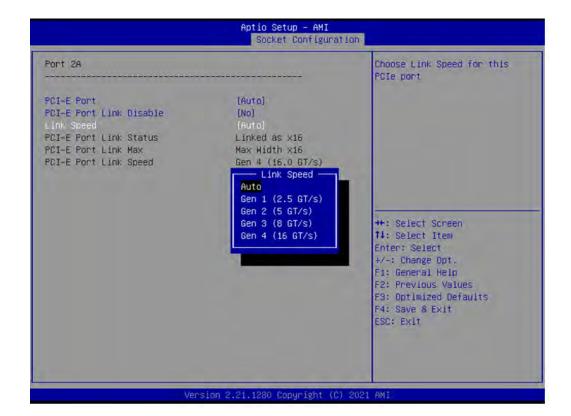
3.2.4.4 IIO Configuration



Socket0 PCIe Configuration

PCIe port bifurcation control and select target link speed as Gen1, Gen2, Gen3, Gen4.

Aptio Setup - AMI Socket Configuration			
IOUO (PCIE SLOT 6/8) IOU1 (PCIE SLOT 5) IOU3 (PCIE SLOT 3) IOU4 (PCIE SLOT 1/H.2 & X550 IOG-LAN) IOUO (PCIE SLOT 8) - PORT 1A IOU0 (PCIE SLOT 6) - PORT 1C IOU1 (PCIE SLOT 5) - PORT 2A IOU3 (PCIE SLOT 3) - PORT 4A IOU4 (PCIE H.2 SLOT) - PORT 5B IOU4 (PCIE SLOT 1) - PORT 5C	[Auto] [Auto] [Auto] [Auto] Auto x4x4x4x4 x4x4x8 x8x4x4 x8x4x4 x8x8 x16	Selects PCIe port Bifurcation for selected slot(s)	
Versi	lon 2.21.1280 Copyright ((C) 2021 AMI	



Aptio Setup - AMI Socket Configuration		
Port 1A PCI-E Port PCI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	[Auto] [No] [Auto] Link Did Not Train Max Width xB Link Did Not Train	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used to enable/disable the port and expose/hide its CFG space.
		<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>

Aptio Setup - AMI Socket Configuration			
Port 10 PCI-E Port PCI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	lAuto) [No] [Auto] Link Did Not Train Max Width x8 Link Did Not Train	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used to enable/disable the port and expose/hide its CFG space.	
		<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>	
Vér	rsion 2.21.1280 Copyright (C)	2021 AMI	
Ver	rsion 2.21.1280 Copyright (C) Aptio Setup – AMI Socket Configurati		
Ver Port 2A POI-E Port PCI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	Aptio Setup – AMI		



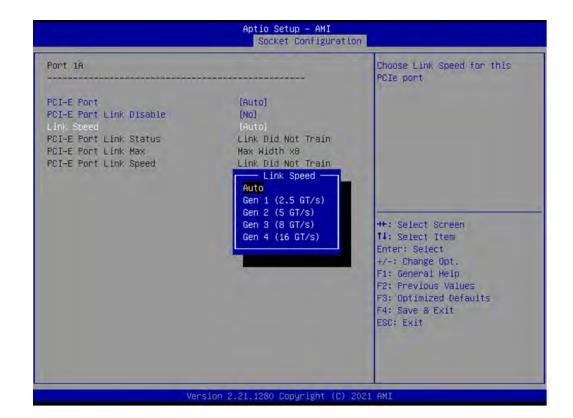
Aptio Setup — AMI Socket Configuration		
POI-E Port PCI-E Port PCI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	Socket Configuratio	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used to enable/disable the port and expose/hide its CFG space.
Ver	sian 2.21.1280 Copyright (C) {	2021 AMI

Port 50		In auto mode the BIOS will remove the EXP port if there
PCI-E Port PGI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	(Auto) [No] [Auto] Link Did Not Train Max Width x8 Link Did Not Train	is no device or errors on that device and the device is not HP capable. Enable/Disable is used to enable/disable the port and expose/hide its CFG space.
		<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>

Socket1 PCIe Configuration

PCIe port bifurcation control and select target link speed as Gen1, Gen2, Gen3, Gen4.

Aptio Setup - AMI Socket Configuration			
IOU0 (PCIE SLOT 2/4) IOU1 (PCIE SLOT 7) IOU3 (PCIE SLOT 9) IOU4 (PCIE SLOT 10/11) IOU0 (PCIE SLOT 2) - Port 1A IOU0 (PCIE SLOT 2) - Port 1C IOU1 (PCIE SLOT 7) - Port 2A IOU3 (PCIE SLOT 7) - Port 4A IOU3 (PCIE SLOT 10) - Port 5A IOU4 (PCIE SLOT 11) - Port 5C	[Auto] [Auto] [Auto] [Auto] IOU1 (PCIE SLOT T Auto x4x4x4x4	Selects PCIe port Bifurcation for selected slot(s)	
	x4x4x8 x8x4x4 x8x8 x16	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	



Aptio Setup – AMI Socket Configuration		
Port 1A PCI-E Port PCI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	(Auto) [No] [Auto] Link Did Not Train Max Width x8 Link Did Not Train	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used to enable/disable the port and expose/hide its CFG space. ++: Select Screen I4: Select Item Enter: Select
		+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Aptio Setup - AMI Socket Configuration Port 1C In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not [No] PCI-E Port Link Disable HP capable. Enable/Disable is Link Speed [Auto] used to enable/disable the Link Did Not Train port and expose/hide its CFG PCI-E Port Link Status PCI-E Port Link Max Max Width x8 space. PCI-E Port Link Speed Link Did Not Train ++: Select Screen †1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit sion 2,21.1280 Copyright 2021 AM Aptio Setup - AMI Socket Configuration Port 2A In auto mode the BIOS will remove the EXP port if there is no device or errors on that PCI-E Port PCI-E Port Link Disable device and the device is not [No] HP capable. Enable/Disable is used to enable/disable the [Auto] Link Speed port and expose/hide its CFG

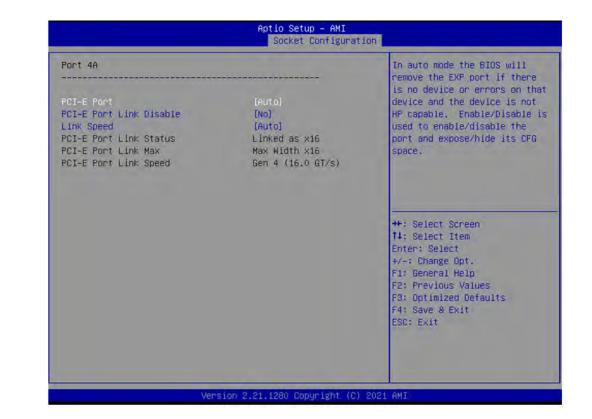
PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed

Linked as x16 Max Width x16 Gen 4 (16.0 GT/s)

> ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

space.

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Aptio Setup - AMI Socket Configuration		
Port SA PCI-E Port PCI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	[Auto] [No] [Auto] Link Did Not Train Max Width x8 Link Did Not Train	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used to enable/disable the port and expose/hide its CFB space. ++: 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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	and the second	a contract of and and
Port 5C PCI-E Port Link Disable Link Speed PCI-E Port Link Status PCI-E Port Link Max PCI-E Port Link Speed	[Auto] [No] [Auto] Link Did Not Train Max Width x8 Link Did Not Train	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Enable/Disable is used to enable/disable the port and expose/hide its CFG space.
		<pre>++: Select Screen t4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Intel VT for Directed I/O (VT-d)

Enable or disable Intel Virtualization Technology for Directed I/O.

	Aptio Setup – AMI Socket Configuration	
Intel® VT for Directed I/O (VT-d)		Enable/Disable Intel® Virtualization Technology for Directed I/O (VT–d) by
Intel® VT for Directed I/O ACS Control	[Enable] [Enable]	reporting the I/O device assignment to VMM through DMAR ACPI Tables.
		<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>
Version (2.21.1280 Copyright (C) 2021	. AMI

Intel VMD Technology

Enable or disable Intel Volume Management Device Technology.

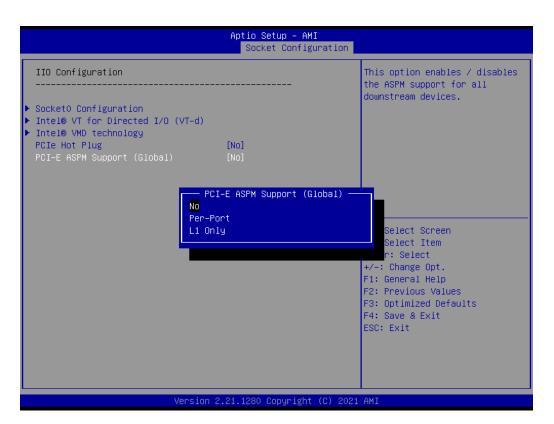


Aptio Setup – AMI Socket Configuration	
Intel® VMD technology	
▶ Intel® VMD for Volume Management Device on Socket O	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.21.1280 Copyright (C) 2021	AMI

PCle Hot Plug

Enable or disable PCIe hot plug for Intel VROC, while using Intel VROC, please enable this item.

PCI-E ASPM Support (Global) Set the ASPM level to Disable, Per-Port or L1 state only.



3.2.4.5 Advanced Power Management Configuration

Aptio Setup – AMI Socket Configuration	
Advanced Power Management Configuration CPU P State Control CPU C State Control Package C State Control	P State Control Configuration Sub Menu, include Turbo, XE and etc.
	<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 2.21.1280 Copyrig	(ht (C) 2021 AMI

CPU P State Control



Aptio Setup – AMI Socket Configuration		
CPU P State Control SpeedStep (Pstates) Boot performance mode Energy Efficient Turbo Turbo Mode	[Enable] [Max Performance] [Enable] [Enable]	Select the performance state that the BIOS will set before OS hand off.
	Boot performance mode — Max Performance Max Efficient	<pre>+: Select Screen 4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Ve	ersion 2.21.1280 Copyright (C) 2	021 AMI

Chapter 3 AMI BIOS

CPU C State Control

	Aptio Setup – AMI Socket Configur	
CPU C State Control CPU C1 auto demotion CPU C1 auto undemotion CPU C6 report Enhanced Halt State (C1E)	[Disable] [Disable] [Disable] [Disable]	Allows CPU to automatically demote to C1. Takes effect after reboot.
		<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 2.21.1280 Copyright (C) 2021 AMI		

Package C State Control

Aptio Setup – AMI Socket Configuration		
Package C State Control		Package C State limit
Package C State	[CO/C1 state]	
	Package C State CO/C1 state C2 state C6(non Retention) state Auto	<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	rsion 2.21.1280 Copyright (C) 203	21 AMI

3.2.5 Server Management

Main Advanced Platform Conf:	Aptio Setup – AMI iguration Socket Configu	ration Server Mgmt Security Boot I
BMC Self Test Status BMC Firmware Revision	PASSED 0006	Enable/Disable interfaces to communicate with BMC
BMC Support Wait For BMC OS Watchdog Timer OS Wtd Timer Timeout OS Wtd Timer Policy	[Enabled] [Disabled] [Disabled] 10 [Reset]	
 System Event Log Bmc self test log BMC network configuration BMC User Settings 		<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>
Vens	sion 2.21.1280 Copyright	(C) 2021 AMI

BMC Support

Enable or disable interfaces to communicate with BMC.

Wait for BMC

If enabled, motherboard will wait 30 ~ 60 seconds until BMC module boots up completely. After that, the normal BIOS post screen will be displayed. If disabled, motherboard will not wait for BMC module's response.

OS Watchdog Timer

If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads.

Chapter 3 AMI BIOS

3.2.5.1 System Event Log

	Aptio Setup – AMI	
	hptio ootap hili	Server Mgmt
Enabling/Disabling Options SEL Components	[Enabled]	Change this to enable or disable event logging for
Erasing Settings Erase SEL When SEL is Full	[No] [Do Nothing]	error/progress codes during boot.
Custom EFI Logging Options Log EFI Status Codes	[Error code]	
NOTE: All values changed here do not effect until computer is resta		
		++: Select Screen
		†↓: Select Item Enter: Select
		+/-: Change Opt.
		F1: General Help F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit ESC: Exit
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SEL Components

Enable/Disable all features of system event logging during boot.

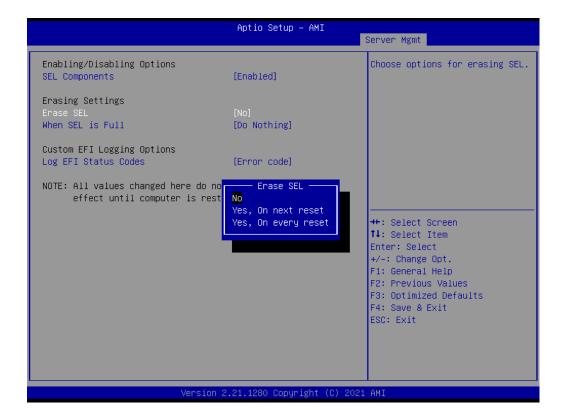
Erase SEL

Choose options for erasing SEL.

When SEL is Full Choose options for reactions to a full SEL.

Log EFI Status Codes

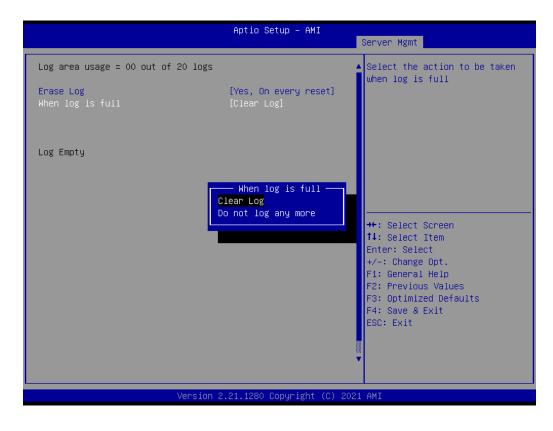
Disable the logging of EFI status codes or log only error code or only progress code or both.



	Aptio Setup — AMI	Server Mgmt
Enabling/Disabling Options SEL Components	[Enabled]	Choose options for reactions to a full SEL.
Erasing Settings Erase SEL When SEL is Full	<mark>[Na]</mark> [Do Nothing]	
Custom EFI Logging Options Log EFI Status Codes	[Error code]	
NOTE: All values changed here do effect until computer is re	When SEL is Full Do Nothing Erase Immediately	<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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3.2.5.2 BMC Self Test Log



Erase Log

Erase log options.

When Log is Full

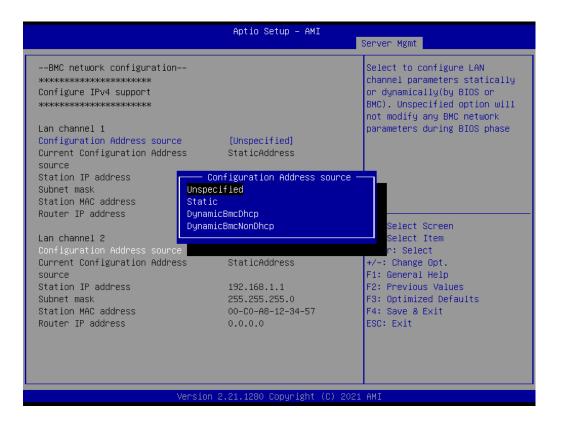
Select the action to be taken when log is full.

3.2.5.3 BMC Network Configuration

	Aptio Setup – AMI	
		Server Mgmt
BMC network configuration жижижижижижижижижи Configure IPv4 support жижижижижижижижижи		Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC). Unspecified option will not modify any BMC network
Lan channel 1		parameters during BIOS phase
Configuration Address source Current Configuration Address source	[Unspecified] StaticAddress	
Station IP address	192.168.0.1	
Subnet mask	255.255.255.0	
Station MAC address	00-C0-A8-12-34-56	
Router IP address	0.0.0.0	
		→+: Select Screen
Lan channel 2		↑↓: Select Item
Configuration Address source	[Unspecified]	Enter: Select
Current Configuration Address	StaticAddress	+/-: Change Opt.
source		F1: General Help
Station IP address	192.168.1.1	F2: Previous Values
Subnet mask	255.255.255.0	F3: Optimized Defaults
Station MAC address	00-C0-A8-12-34-57	F4: Save & Exit
Router IP address	0.0.0	ESC: Exit
line of a		
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Configuration Address Source

Select to configure LAN channel parameters statically or dynamically (by BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.



3.2.5.4 BMC User Settings

	Aptio Setup – AMI
	Server Mgmt
BMC User Settings	Press <enter> to Add a User.</enter>
▶ Add User	
	→+: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt.
	F1: General Help F1: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2	.21.1280 Copyright (C) 2021 AMI

Aptio Setup — AMI	Server Mgmt
BMC Add User Details User Name User Password	Enter BMC User Name
User Name	<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 2.21.1280 Copyright (C) 2021	I AMI

3.2.6 Security

Main Advanced Disting Co	Aptio Setup – AM	
Main Hovanced Platform Con	Triguration Socket Contig	uration Server Mgmt Security Boot
Password Description		Set Administrator Password
If ONLY the Administrator's p then this only limits access only asked for when entering If ONLY the User's password of is a power on password and m boot or enter Setup. In Setup have Administrator rights. The password length must be in the following range: Minimum length	to Setup and is Setup. is set, then this ust be entered to the User will 3	
Maximum length Administrator Password User Password	20	++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help
► Secure Boot		F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Ve	ersion 2.21.1280 Copyright	(C) 2021 AMI

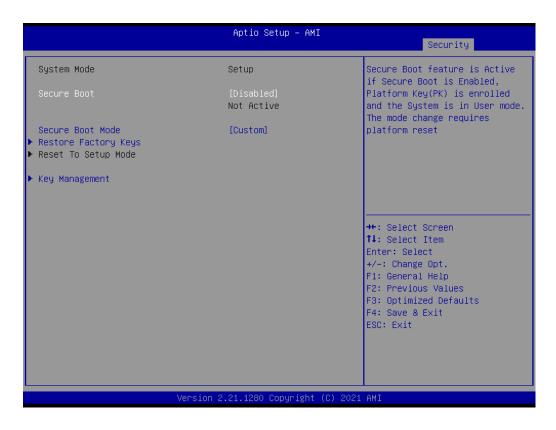
Aptio Setup – AMI Main Advanced Platform Configuration Socket Configuration	Conver Want Corunity Poot
Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length Maximum length Administrator Password User Password	Set Administrator Password
▶ Secure Boot	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Note!

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With AC power & Battery. Short CMOS1 Jumper: Date/Time & Password: Keep Setting: reset to default AC power and CMOS battery are removed. Short CMOS1 Jumper: Date/Time: reset to default Password: Keep Setting: reset to default

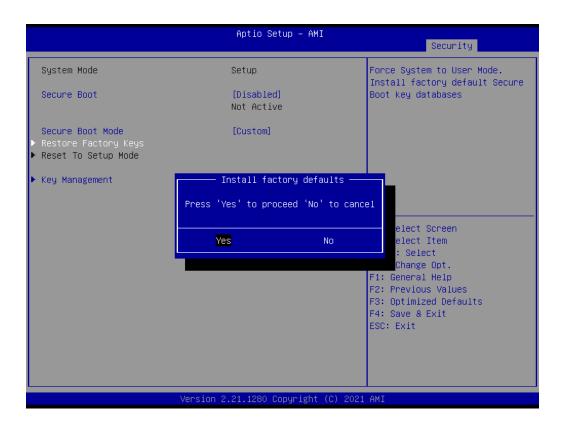
Secure Boot



- Secure Boot

Secure Boot feature is active if Secure Boot is Enabled. Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.

 Secure Boot Mode Secure Boot mode options.



- Restore Factory Keys Force System to User Mode.

	Aptio Setup – AMI	Security
Vendor Keys Factory Key Provision Restore Factory Keys Reset To Setup Mode Export Secure Boot variable Enroll Efi Image Device Guard Ready	Valid [Disabled] S	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode
 Remove 'UEFI CA' from DB Restore DB defaults Secure Boot variable Size Platform Key(PK) 0 Key Exchange Keys 0 Authorized Signatures 0 Forbidden Signatures 0 Authorized TimeStamps 0 	Keys Key Source 0 No Keys 0 No Keys	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults
	Version 2.21.1280 Copyright (C) 20	F4: Save & Exit ESC: Exit

- Key Management

Enables expert users to modify Secure Boot Policy variables without full authentication.

3.2.7 Boot



- Setup Prompt Timeout
 Number of seconds to wait for setup activation key.

 Bootup NumLock State
 Select the keyboard NumLock state as "On" or "Off".
- Quiet Boot
 Enable or disable quiet boot option.
- Boot Option Priorities
 Sets the system boot priorities.

3.2.8 Save & Exit

Save Options Save Changes and Exit	Exit system setup after saving the changes.
Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Changes Discard Changes	
Default Options Restore Defaults Save as User Defaults Restore User Defaults	++: Select Screen
Boot Override UEFI: 1100, Partition 1 UEFI: Built-in EFI Shell	<pre>fl: 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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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.
Boot Override

Save Changes and Exit



Chipset Software Installation Utility

4.1 Before Beginning

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the ASMB-976 are available online for download from the Advantech support website.

Before beginning, it is important to note that most display drivers need to have the relevant software application already installed on the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

4.2 Introduction

4.2.1 Main Menu

The Intel Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured. This is needed for the proper functioning of the following features:

- Core PCI PnP services
- Serial ATA interface support
- USB 1.1/2.0/3.2 gen1 support
- Identification of Intel chipset components in the Device Manager

Note!

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The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:

Windows Server 2019 Standard	x64
Windows Server 2016 Standard	x64
Windows 10 Ultimate	x64

Note!



It is necessary to update all the latest Microsoft hot fix files when using this OS.



Graphic Setup

5.1 Introduction

Install the ASPEED VGA driver to enable this function, which includes the following features:

- 32-bit 2D graphics engine on board for normal use.
- 64 MB RAM for this chip, the highest resolution is 1920x1200.

5.2 Windows Series Driver Setup

When the folder is displayed, navigate to the "Graphic" folder and click the executable file to complete the installation of the drivers for the OS that you need.

📕 00_Manual	
01_Chipset	
📕 02_Graphic	
03_LAN	
실 04_USB	
J 05_RSTe	



旨

1. If ASMB-976 Series carries an additional graphics card for VGA output, please set this additional graphic card as "major output" under the "Display properties" of OS.

- 2. The WDDM driver can support for the following OS versions:
 - Windows 8 x86/x64 version
 - Windows 8.1 x86/x64 version
 - Windows Server 2012 version (WHQL)
 - Windows Server 2012R2 version (WHQL)
 - Windows 10 x86/x64 version
 - Windows Server 2016 version (WHQL)
- 3. ASPEED Graphics WDDM Driver Limitation on Microsoft Windows OS.
 - It is non-WHQL certified driver because ASPEED VGA is a 2D VGA, it cannot meet the WHQL requirement of WDDM driver which requires 3D VGA function.
 - Because it is non-WHQL certified driver, it may meet some compatible issues with some specific applications.



LAN Configuration & USB 3.0

6.1 LAN Configuration

6.1.1 Introduction

The ASMB-976T2 Series has two Gigabit Ethernet LAN connections via dedicated PCI Express x1 lanes: GbE LAN1 - Intel I210; GbE LAN2 - I210; two 10G Base-T LAN connectors LAN3 and LAN4 - Intel X550 PHY. They eliminate bottlenecks of network data flow and incorporate Gigabit Ethernet at 10 Gbps.

6.1.2 Features

- 10/100/1000&10G Base-T Ethernet controller
- 10/100/1000&10G Base-T triple-speed MAC
- Full duplex at 10/100/1000 Mbps or 10 Gbps and half duplex at 10/100/1000 Mbps
- Wake-on-LAN (WOL) support
- PCIe x1 host and PHY interface

6.1.3 Installation

The integrated Intel gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.

6.1.4 Windows Series Driver Setup (LAN)

1. Select folder "03_LAN" then click the proper LAN driver for the OS.

📕 00_Manual	
🔒 01_Chipset	
📕 02_Graphic	
. 03_LAN	
04_USB	
U5_RSTe	

6.2 USB 3.2 gen1

6.2.1 Introduction

ASMB-976 offers nine USB 3.2 gen1 ports, two in rear side and seven via onboard header. The USB 3.2 gen1 could provide the bandwidth up to 500MB/s to shorter the time for data transmission.

6.2.2 Windows Series Driver Setup

Select folder "04_USB" then click the Setup.exe file for the installation.

📕 00_Manual	
📕 01_Chipset	
📕 02_Graphic	
03_LAN	_
04_USB	
05_RSTe	

6.3 SATA & PCIe SSD RAID

Intel C621A PCH chip offers SATA & PCIe SSD RAID under Windows operating system.



1.Please visit the Intel download center for "Intel Rapid Storage Technology enterprise for Microsoft Windows Operating System Software User's Guide" file download.

2.For the hotfix file download, please visit Microsoft website.

실 00_Manual	
01_Chipset	
🌡 02_Graphic	
03_LAN	
📕 04_USB	
05_RSTe	



Programming the Watchdog Timer

A.1 Watchdog Timer Overview

The ASMB-925 Series watchdog timer can be used to monitor system software operation 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. The watchdog timer is built in to the EC controller IT8528E. It provides the following functions for user programming:

- Can be enabled and disabled by user program
- Timer can be set from 1 to 255 seconds
- Generates an interrupt or resets signal if the software fails to reset the timer before time-out

A.2 Programming the Watchdog Timer

 Address
 Description

 0x57
 Event - Warm Reset: 0x04

 0x5E
 Warm Reset Timer (High BYTE)

Based 100ms

The I/O port address of the watchdog timer is as below:

Here is an	example to	step by	v step	program	the	Watchdog	Timer.
			/ /				

Warm Reset Timer (Low BYTE)

Step	Action	Description
00	Read 0x299 port	Clear I/O port
	Wait IBF clear	0x29A, BIT1, = 0
01	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0
02	Write 0x5E to 0x299 port	
	Wait IBF clear	0x29A, BIT1, = 0
03	Write 0x00 to 0x299 port	Set 10 sec (high byte)
	Wait IBF clear	0x29A, BIT1, = 0
04	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0
05	Write 0x5F to 0x299 port	
	Wait IBF clear	0x29A, BIT1, = 0
06	Write 0x64 to 0x299 port	Set 10 sec (low byte)
	Wait IBF clear	0x29A, BIT1, = 0
07	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0

⁰⁸

Write 0x57 to 0x299 port

0x5F

Watchdog Event

	Wait IBF clear	0x29A, BIT1, = 0	
09	Write 0x04 to 0x299 port	(Warm) Reset event	
	Wait IBF clear	0x29A, BIT1, = 0	
10	Write 0x28 to 0x29A	Start watchdog	
	Wait 1~9 sec		
	Wait IBF clear	0x29A, BIT1, = 0	
11	Write 0x29 to 0x29A	Stop watchdog	
	Wait IBF clear	0x29A, BIT1, = 0	
12	Go to Step 07		



I/O Pin Assignments

B.1 USB3.2 gen1 Header(USB3_34, USB3_56, USB3_78)

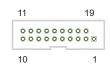


Table B.1: USB Header				
Pin	Signal	Pin	Signal	
1	+5 V	2	STDA_SSRX-	
3	STDA_SSRX+	4	GND	
5	STDA_SSRX-	6	STDA_SSRX+	
7	GND	8	D-	
9	D+	10	N/C (OC pin reserved)	
11	D+	12	D-	
13	GND	14	STDA_SSRX+	
15	STDA_SSRX-	16	GND	
17	STDA_SSRX+	18	STDA_SSRX-	
19	+5 V	20		

B.2 VGA Connector (VGA1)

Table B.	Table B.2: VGA Connector				
Pin	Signal	Pin	Signal		
1	RED	9	VCC		
2	GREEN	10	GND		
3	BLUE	11	N/C		
4	N/C	12	SDT		
5	GND	13	H-SYNC		
6	GND	14	V-SYNC		
7	GND	15	SCK		
8	GND				

B.3 RS-232 Interface (COM2)



Table B.3:	Table B.3: RS-232 Interface			
Pin	Signal			
1	DCD			
2	RXD			
3	TXD			
4	DTR			
5	GND			
6	DSR			
7	RTS			
8	CTS			
9	RI			

B.4 External Keyboard Connector (KBMS1)



Table B.4: External Keyboard Connector		
Pin	Signal	
1	KB CLK	
2	KB DATA	
3	MS DATA	
4	GND	
5	VCC	
6	MS CLK	

B.5 CPU and System Fan Power Connector (CPUFAN0~1, SYSFAN0~SYSFAN6)



Table B.5: Fan Power Connector		
Pin	Signal	
1	GND	
2	+12 V	
3	TACH	
4	PWM	

B.6 Power LED (JFP3)



Table B.6: F	Table B.6: Power LED		
Pin	Function		
1	LED power (3.3 V)		
2	N/C		
3	Ground		

B.7 External Speaker Connector (JFP2)



Table B.7: External Speaker Connector			
Pin	Function		
1	SPK+		
4	N/C		
7	BZ-		
10	SPK-		

B.8 Reset Connector (JFP1)

9 12 00

Table B.8: Reset Connector		
Pin	Signal	
9	RESET	
12	GND	

B.9 HDD LED Connector (JFP1)

2 5 00

Table B.9: HDD LED Connector		
Pin	Signal	
2	HDD_LED+	
5	HDD_LED-	

B.10 ATX Soft Power Switch (JFP1)

36 00

Table B.10: ATX Soft Power Switch		
Pin	Signal	
3	PWR-BTN	
6	GND	

B.11 Front Panel SMBus Connector (SMBUS1)



Table B.11: Front Panel SMBus Connector (SMBUS1)		
Pin	Signal	
1	+V5	
2	SMB_CLK_RESUME	
3	SMB_DATA_RESUME	
4	GND	

B.12 USB/LAN Ports (IPMI_LAN5_USB3_12)



Table B.12: USB Port				
Pin	Signal	Pin	Signal	
1	VCC_DUAL	3	Data0+	
2	Data0-	4	GND	

Table B.13: Giga LAN 10/100/1000 Base-T RJ-45 Port				
Pin	Signal	Pin	Signal	
1	MID0+	4	MID2+	
2	MID0-	5	MID2-	
3	MID1+	7	MID3+	
6	MID1-	8	MID3-	

B.13 Audio Connector (HDAUD1)

Table E	3.14: Front Panel Audi	o Connector		
Pin	Signal	Pin	Signal	
1	+5V_AUDIO	2	GND	
3	ACZ_SYNC	4	ACZ_BITCLK	
5	ACZ_SDOUT	6	ACZ_SDIN0	
7	ACZ_SDIN1	8	ACZ_RST	
9	+12V_AUDIO	10	GND	
11	GND			

B.14 Alarm Board Connector (VOLT1)



Table B.15: Alarm Board Connector				
Pin	Signal	Pin	Signal	
1	5VSB	5	+5V	
2	GND	6	+3.3V	
3	GND	7	-12V	
4	-5V	8	+12V	

B.15 Case Open Connector (JCASE1)

0 1 0 2

Table B.16: Case Open Connector		
Pin	Signal	
1	CASEOP	
2	GND	

B.16 Front Panel LAN LED Connector (LANLED1)

	_		
1	0	0	2
	0	0	
	0	0	
	0	0	8
9	0		

Table B.17: LAN LED Connector			
Pin	Signal	Pin	Signal
1	LAN1_LED_ACT#	2	LAN2_LED_ACT#
3	+V3.3_AUX	4	+V3.3_AUX
5	LAN3_LED_ACT#	6	LAN4_LED_ACT#
7	+V3.3_AUX	8	+V3.3_AUX
9	NC		

B.17 SATA SGPIO (SGPIO1/SGPIO2)

	0	
	0	
	0	
1	0	

Table B.18: SATA SGPIO Connector		
Pin	Signal	
1	SGPIO_SATA_CLOCK	
2	N/C	
3	SGPIO_SATA_LOAD	
4	SGPIO_SATA_DATA0	
5	SGPIO_SATA_DATA1	

B.18 LPC Connector (LPC1)



Table B.19: LPC Connector (LPC1)			
Pin	Signal	Pin	Signal
1	CLK_24M_LPCCN	2	LPC_AD1
3	PLTRST_LPC	4	LPC_AD0
5	LPC_FRAME#	6	+3.3 V
7	LPC_AD3	8	GND
9	LPC_AD2	10	SMB_SCL_LPC
11	SERIRQ_PCH	12	SMB_SDA_LPC
13	+5V_AUX	14	+5V

B.19 Clear CMOS and Update ME Connector (JCMOS1, JME1)

1

Table B.20: Clear CMOS and Update ME Connector (JCMOS1, JME1)			
Pin	Signal	Signal	
	JCMOS1	JME1	
1	N/C	N/C	
2	RTC_RST_PCH	PCH_HDA_SDO	
3	GND	V3.3_AUX	

B.20 PMBUS Connector (PMBUS1)



Table B.21: PMBUS Connector (PMBUS1)		
Pin	Signal	
1	SMB_SCL_PM	
2	SMB_SDA_PM	
3	SMB_ALERT_PM#	
4	GND	
5	+V3.3_AUX	

B.21 GPIO Connector (GPIO1)

10	00	9
	00	
	$\bigcirc \bigcirc$	
	$\bigcirc \bigcirc$	
2	$\bigcirc \bigcirc$	1

Table B.22: GPIO Connector (GPIO1)				
Pin	Signal	Pin	Signal	
1	EC_GPIO0	2	EC_GPIO4	
3	EC_GPIO1	4	EC_GPIO5	
5	EC_GPIO2	6	EC_GPIO6	
7	EC_GPIO3	8	EC_GPIO7	
9	+VCC_GPIO	10	GND	



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