AIMB-589

Micro-ATX Motherboard
Intel® Core™ Ultra Series 2 Processors
(codename: Arrow Lake-S)

Preliminary

Features

- Intel® Core™ Ultra Series 2 Processors, max. 24Core. Support W880/Q870 chipsets
- Up to 192GB DDR5 UDIMMs/CUDIMMs for data transfer
- 2 x 2.5GbE LAN and 2 x GbE LAN for digital devices
- 1 x USB4, 8 x USB3.2, 4 x USB2.0
- 2 x M.2 M-Key 2280 for NVMe SSD
- Accommodate 2 double-deck GPU cards by PCIe x16 slots (x8 lanes)
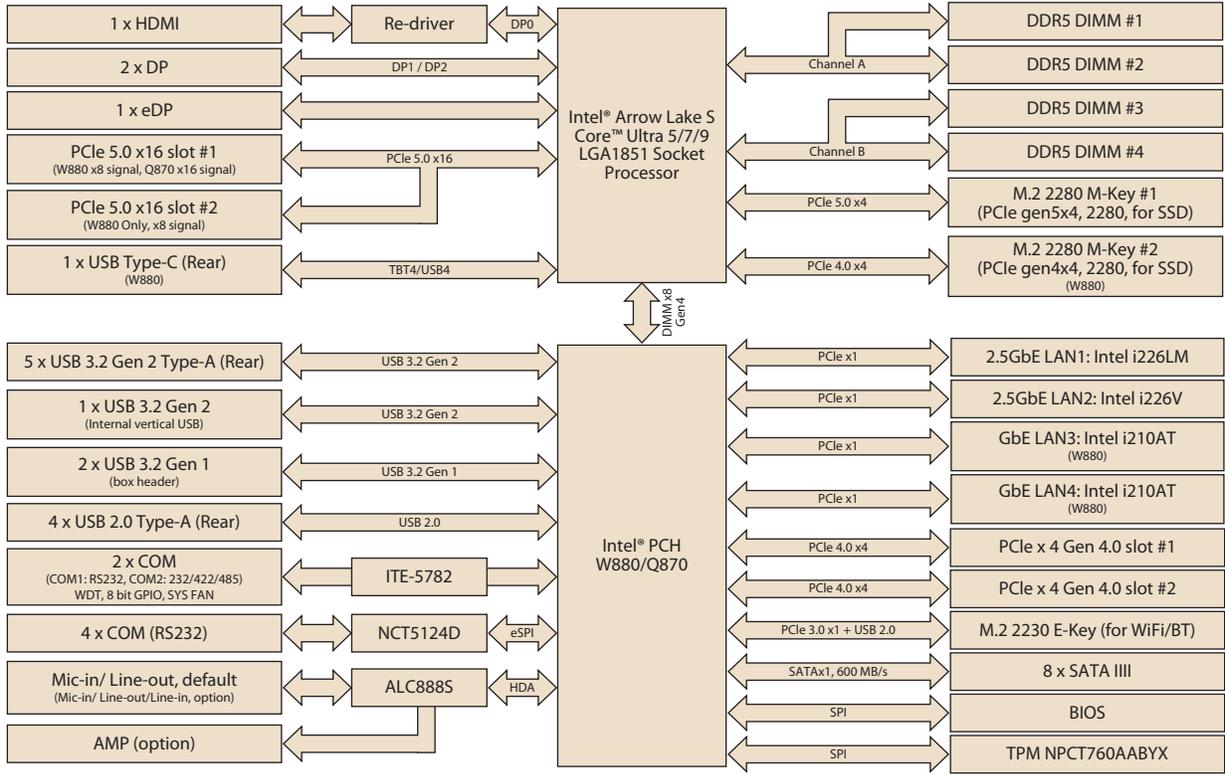- WISE-DeviceOn and Embedded Software APIs

Software APIs: SMBus | H/W Monitor | Watchdog | GPIO

Utilities: BIOS flash | Monitoring

Windows 11 | ubuntu | WISE-DeviceOn | CE | FC | RoHS COMPLIANT 2002/95/EC

Specifications

Processors	CPU	Ultra 9 285	Ultra 9 285T	Ultra 7 265	Ultra 7 265T	Ultra 5 245	Ultra 5 245T	Ultra 5 225	Ultra 5 225T
	Core Number	24	24	20	20	14	14	10	10
	Base frequency (GHz)	2.5/1.9	1.4/1.2	2.4/1.8	1.5/1.2	3.5/3.0	2.2/1.7	3.3/2.7	2.5/1.9
	Max Speed (GHz)	5.6/4.6	5.6/4.6	5.3/4.6	5.3/4.6	5.1/4.5	5.1/4.5	4.9/4.4	4.9/4.4
	Smart cache (MB)	36	36	30	30	24	24	20	20
	TDP (W)	65	35	65	35	65	35	65	35
Processor System	Chipset	W880/Q870							
	BIOS	AMI EFI 256 Mbit SPI							
Expansion Slot	M.2 M-Key	2 x M-key (2280, for NVMe SSD, 1 x PCIe gen5x4, 1 x PCIe gen4x4) (option by SKU)							
	M.2 E-Key	1 x E-Key (2230, for Wireless connection)							
	PCIe x16	2 x PCIe x16 slot with x8 Gen5 lanes or 1 x PCIe x16 slot with x16 Gen5 lanes (option by SKU)							
	PCIe x4	2 x PCIe x4 Gen4							
Memory	Technology	Dual Channel DDR5 up to 5600 MT/s, ECC memory supported by all CPU only with Chipset W880							
	Max. Capacity	192GB (up to 48GB per DIMM)							
	Frequency	5600MT/x (1DIMM 1R/2R), 4400MT/s (2DIMM 1R)							
	Socket	4 x 288-pin DDR5 UDIMM sockets							
Graphics	Controller	Enhanced Intel® Xe LPG architecture							
	HDMI	1 x HDMI 2.1 TMDS, up to 4096 x 2160 @ 60Hz							
	DP	3 x DP++ 1.4, up to 4096 x 2160 @ 60Hz, Including 1 x USB Type-C, support DisplayPort1.4 Alt. Mode (option by SKU)							
	eDP	1 x eDP1.4, up to 4096 x 2160 @ 60Hz (Internal pin header)							
	Multi Displays	Up to 4 independent displays							
Network	Ethernet	10/100/1000/2500 Mbps							
	Controller	1 x Intel I226LM 2.5 GbE (vPro support) 1 x Intel I226V 2.5 GbE 2 x Intel I210AT GbE (option by SKU)							
	Connector	4 x RJ45							
Audio	Codec	Realtek ALC888S, High Definition Audio (HD), Line-Out (default)							
	Amplifier	Option (Max. 3W)							
SATA	Max data transfer rate	600 MB/s Max. (SATA 3.0)							
	Channel	8							
Rear I/O	DP	2							
	HDMI	1							
	Ethernet	4							
	USB	1 x USB4 Gen 3×2 40Gbps Type-C, support DisplayPort1.4 Alt. Mode (option by SKU) 5 x USB3.2 Gen2 Type-A 4 x USB2.0 Type-A							
	Audio	2 (Mic-in/ Line-out, default), 3 (Mic-in/ Line-out/Line-in, option)							
Internal Connector	USB	1 x USB3.2 Gen2 Type-A (vertical) 2 x USB3.2 Gen1 (one box header)							
	Extended Display Port (eDP)	1							
	Serial	6 (5 x RS-232, COM 2 RS-232/422/485 with auto flow control)							
	SATA III	8							
	GPIO	8-bit GPIO							
Watchdog Timer	Output	System reset							
	Interval	Programmable 1 ~ 255 (second or minute)							
Power Requirements	Operation	+5V		3.3V		12V		12V_8P	
	Configuration	TBD							
	Standby (5Vsb)	3A							
Environment	Temperature	Operating: 0 ~ 60° C (32 ~ 140° F), depends on CPU speed and cooler solution							
	Storage	Non-Operating: -40 ~ 85° C (-40 ~ 185° F)							
Physical Characteristics	Dimensions	244 mm x 244 mm (9.6" x 9.6")							
Power	Input Mode	ATX							

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Block Diagram

1 x HDMI	Re-driver	DP0	
2 x DP		DP1 / DP2	
1 x eDP			
PCIe 5.0 x16 slot #1 (W880 x8 signal, Q870 x16 signal)		PCIe 5.0 x16	
PCIe 5.0 x16 slot #2 (W880 Only, x8 signal)			
1 x USB Type-C (Rear) (W880)		TBT4/USB4	

Intel® Arrow Lake S Core™ Ultra 5/7/9 LGA1851 Socket Processor

Channel A	DDR5 DIMM #1
	DDR5 DIMM #2
	DDR5 DIMM #3
Channel B	DDR5 DIMM #4
PCIe 5.0 x4	M.2 2280 M-Key #1 (PCIe gen5x4, 2280, for SSD)
PCIe 4.0 x4	M.2 2280 M-Key #2 (PCIe gen4x4, 2280, for SSD) (W880)

DIMM x8 Gen4

5 x USB 3.2 Gen 2 Type-A (Rear)		USB 3.2 Gen 2	
1 x USB 3.2 Gen 2 (Internal vertical USB)		USB 3.2 Gen 2	
2 x USB 3.2 Gen 1 (box header)		USB 3.2 Gen 1	
4 x USB 2.0 Type-A (Rear)		USB 2.0	
2 x COM (COM1: RS232, COM2: 232/422/485) WDT, 8 bit GPIO, SYS FAN	ITE-5782		
4 x COM (RS232)	NCT5124D	eSPI	
Mic-in/ Line-out, default (Mic-in/ Line-out/Line-in, option)	ALC888S	HDA	
AMP (option)			

Intel® PCH W880/Q870

PCIe x1	2.5GbE LAN1: Intel i226LM
PCIe x1	2.5GbE LAN2: Intel i226V
PCIe x1	GbE LAN3: Intel i210AT (W880)
PCIe x1	GbE LAN4: Intel i210AT (W880)
PCIe 4.0 x4	PCIe x 4 Gen 4.0 slot #1
PCIe 4.0 x4	PCIe x 4 Gen 4.0 slot #2
PCIe 3.0 x1 + USB 2.0	M.2 2230 E-Key (for WiFi/BT)
SATAx1, 600 MB/s	8 x SATA IIII
SPI	BIOS
SPI	TPM NPCT760AABYX

Ordering Information

P/N	Chipset	PCIe x16/PCIe x8* (Gen5)	PCIe x4 (Gen4)	USB Type C (20x2Gbps)	USB 3.2 Gen 2	USB 2.0	USB 3.2 Gen1	DP	HDMI	eDP	2.5 GbE LAN	GbE LAN	SATA III	M.2 Gen5 M-key	M.2 Gen4 M-key	M.2 E-key	COM	Audio jack	TPM
AIMB-589WF-0AA1	W880	(1)/2	2	1	6	4	2	2	1	1	2	2	8	1	1	1	6	2 ports**	1
AIMB-589QM-0AA1	Q870	1/(2)	2	0	6	4	2	2	1	1	2	0	8	1	0	1	6	2 ports**	(1)

() means BOM option
* 2 PCIe x8 Gen5 lanes at 2 PCIex16 physical slot.
  W880 SKU default 2 x PCIe x8, option 1 x PCIe x16
  Q870 SKU default 1 x PCIe x16, option 2 x PCIe x8
** Option for 3 ports

Packing List

P/N	Description	Quality
1700003194	SATA HDD cable	2
19Z0002619T000	I/O port bracket	1
1930006770-01	M.2 device screw	2
TBD	Startup manual for AIMB-589	1

I/O View

Optional Accessories

P/N	Description
1700020277-01	Dual port USB 3.0 cable 30cm with IO bracket
1700020809-11	1-to-2 serial ports cable, 35cm (for COM1/2)
1700000447	1-to-4 serial ports cable kit, 45cm
1701400181	1-to-4 serial ports cable kit, 18cm
1970005349T001	LGA1700 CPU Cooler (for CPU TDP <= 65W), H: 56.5mm
1970005672T001	LGA1700 CPU Cooler (for CPU TDP <= 35W), H: 32mm

Embedded OS/API

P/N	Description	968 PN	Description

Optional Chassis

OS/API	Part No.