

# AIMB-523

## Micro-ATX Motherboard AMD Ryzen™ Embedded 7000/9000 Processors



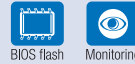
### Features

- AMD Ryzen™ Embedded 7000/9000 Series processors with B650 chipset
- 6 LAN ports with 2.5GbE for multiple IP-based devices
- Triple displays by 1 DP and 2 HDMI
- High-speed expansions: PCIe16 Gen5, 8 USB 3.2, 1 M.2 M-key (PCIe Gen4 x4)
- 1 internal USB2.0 type A to support USB keylock functions
- Support Windows 10/11 and Ubuntu

#### Software APIs:



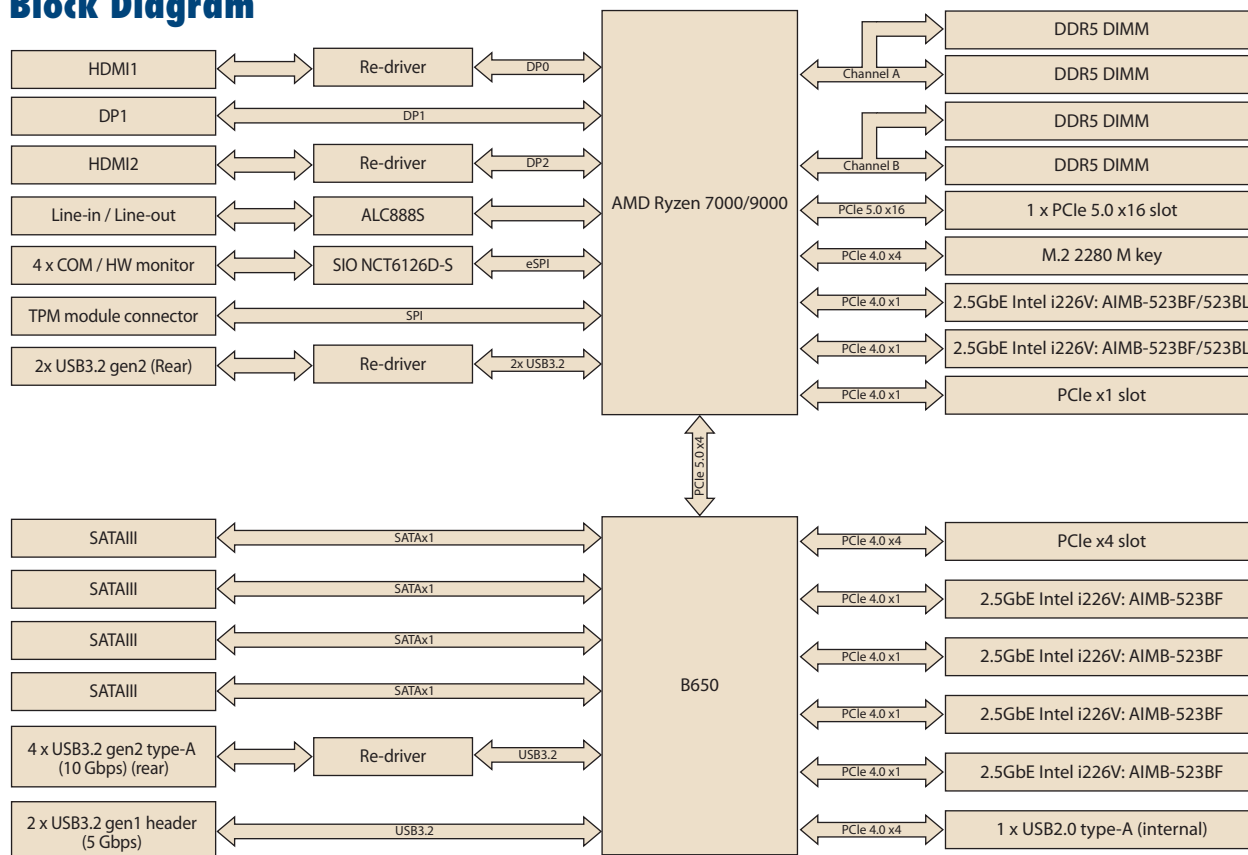
#### Utilities:



### Specifications

AMD Ryzen™ Embedded 9000 Processors	CPU	9950X	9900X	9700X	9600X	
	Core	16	12	8	6	
	Base frequency (GHz)	4.3	4.4	3.8	3.9	
	Max Speed (GHz)	5.7	5.6	5.5	5.4	
	L3 Cache (MB)	64	64	32	32	
TDP (W)	170	120	65	65		
AMD Ryzen™ Embedded 7000 Processors	CPU	Ryzen 7 7700X	Ryzen 5 7600X	Ryzen 9 PRO 7945	Ryzen 7 PRO 7745	Ryzen 5 PRO 7645
	Core	8	6	12	8	6
	Base frequency (GHz)	4.5	4.7	3.7	3.8	3.8
	Max Speed (GHz)	5.4	5.3	5.4	5.3	5.1
	L3 Cache (MB)	32	32	64	32	32
	TDP (W)	105	105	65	65	65
Processor System	Chipset	B650				
	BIOS	AMI EFI 256 Mbit SPI				
Memory	Technology	DDR5, Dual Channel, support UDIMM				
	Frequency	AMD Ryzen™ Embedded 9000: 5600MT/s (2SPC, 1DCP), 3600MT/s (2SPC, 2DPC) AMD Ryzen™ Embedded 7000: 5200MT/s (2SPC, 1DCP), 3600MT/s (2SPC, 2DPC)				
	Max. Capacity	AMD Ryzen™ Embedded 9000: 192GB (up to 48GB per DIMM) AMD Ryzen™ Embedded 7000: 128GB (up to 32GB per DIMM)				
	ECC Support	Yes				
	Socket	4 x 288-pin DDR5 UDIMM sockets				
Graphics	Controller	Radeon™ Graphics				
	HDMI	2, up to 3840 x 2160@60Hz				
	DP	1, up to 3840 x 2160@60Hz				
	Multi Displays	Up to 3 independent displays				
Network	Ethernet	10/100/1000/2500 Mbps				
	Controller	AIMB-523BF-6AA1/ AIMB-523BF-6AA1U: 6 x Intel I226V 2.5 GbE AIMB-523BL-2AA1: 2 x Intel I226V 2.5 GbE				
	Connector	AIMB-523BF-6AA1/ AIMB-523BF-6AA1U: 6 x RJ45 AIMB-523BL-2AA1: 2 x RJ45				
Audio	Codec	Realtek ALC888S, High Definition Audio (HD)				
SATA	Max data transfer rate	Max. 600 MB/s				
	Channel	4				
Expansion Slot	M.2	1 x M-key (2280, for NVMe SSD, PCIe gen4x4)				
	PCIe x1	1 x PCIe x1 slot with x1 Gen4 lanes				
	PCIe x4	1 x PCIe x4 slot with x4 Gen4 lanes				
	PCIe x16	1 x PCIe x16 slot with x16 Gen5 lanes				
Rear I/O	HDMI	2				
	DP	1				
	RJ45	AIMB-523BF-6AA1/ AIMB-523BF-6AA1U: 6 x RJ45 AIMB-523BL-2AA1: 2 x RJ45				
	USB	6 x USB3.2 Gen2 type A				
Internal Connector	Audio	1 x Mic in 1 x Line out				
	USB	2 x USB3.2 Gen1 (one box header) 1 x USB 2.0 type A vertical connector				
	Serial	4, COM1&2 support RS-232/422/485; COM3&4 support RS-232				
	SATA	4				
	GPIO	1 x 8-bit				
	Intrusion Protection	1				
	M.2	1 x M-key				
	CPU & System Fan Connector	1 x PWM CPU FAN 4 x PWM SYS FAN				
	Power Connector	1 x ATX PSU 24pin power connector 1 x ATX PSU 8pin power connector for CPU/APU				
	Watchdog Timer	Output	System reset			
	Interval	Programmable 1 ~ 255 (second or minute)				
Power Requirements	Input voltage	ATX				
	Connector	1 x ATX PSU 24pin power connector 1 x ATX PSU 8pin power connector for CPU/APU				
	Operation	+5V		3.3V		12V
	Configuration: AMD Ryzen 9 Pro 7945 12-Core Processor 3.7GHz with UDIMM DDR5 5600 32GB*4pcs	4.37120A	1.59790A	1.26122A	10.17750A	
	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")				

### Block Diagram



### Ordering Information

P/N	Chipset	Support CPU TDP	Memory slot	USB 3.2 Gen2	USB 3.2 Gen1	USB 2.0 Internal TypeA	PCIe x16 (Gen 5)	PCIe x4 (Gen 4)	PCIe x1 (Gen 4)	M.2 (Gen 4)	2.5 GbE LAN	DP	HDMI	SATA III	COM	Audio Jack	TPM
AIMB-523BF-GAA1	B650	65-170W	4	6	2	1	1	1	1	1	6	1	2	4	4	2 jacks	(1)*
AIMB-523BL-2AA1	B650	65-105W	4	6	2	1	1	1	1	1	2	1	2	4	4	2 jacks	(1)*
AIMB-523BF-GAA1U	B650	65-170W	4	6	2	1	1	1	1	1	6	1	2	4	4	2 jacks	(1)*

(U) means BOM option  
 \* Please refer to the Optional Accessories for TPM module

### Packing List

Part Number	Description	Quantity
1700003194	SATA HDD cable	2
1700000447	1-to-4 serial ports cable	1
1960116132T001	I/O port bracket	1
1930005673-11	M.2 screws	1
2046052300	AIMB-523 Startup manual	1

### Optional Accessories

Part Number	Description
AIMB-TPMSPI-0IA1	TPM 2.0 SPI module (SLB9672 FW15.23)
1970005786N001	AMD AM5 CPU cooler H: 125mm (for TDP 105W, Operating Ta 35°C)
MIOE-PSE-DPA1	MIOe-PSE Dual Port 15.4W PoE PSE module
1970005287T001	AMD AM5 CPU cooler H: 79.55mm (for TDP 65W, Operating Ta 60°C)

### I/O view



### Embedded OS/API

OS/API	P/N	Description
Windows11	20706WLE1S0130	img W11 24EL 64b 24H2 ENU
Windows11	20706WLH1S0130	img W11 24HL 64b 24H2 ENU
Windows11	20706WLV1S0130	img W11 24VL 64b 24H2 ENU
Ubuntu	20706U24ES0014	img Ubuntu Pro-E 64b 24.04 ENU
Ubuntu	20706U24HS0014	img Ubuntu Pro-H 64b 24.04 ENU
Ubuntu	20706U24VS0017	img Ubuntu Pro-V 64b 24.04 ENU
Ubuntu	20706U24DS0049	img Ubuntu Desktop 64b 24.04 ENU