

AIMB-523

Micro-ATX Motherboard AMD Ryzen™ Embedded 7000 Series Processors



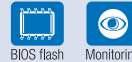
Features

- AMD Ryzen™ Embedded 7000 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
- Windows 10/11 and Windows Server

Software APIs:



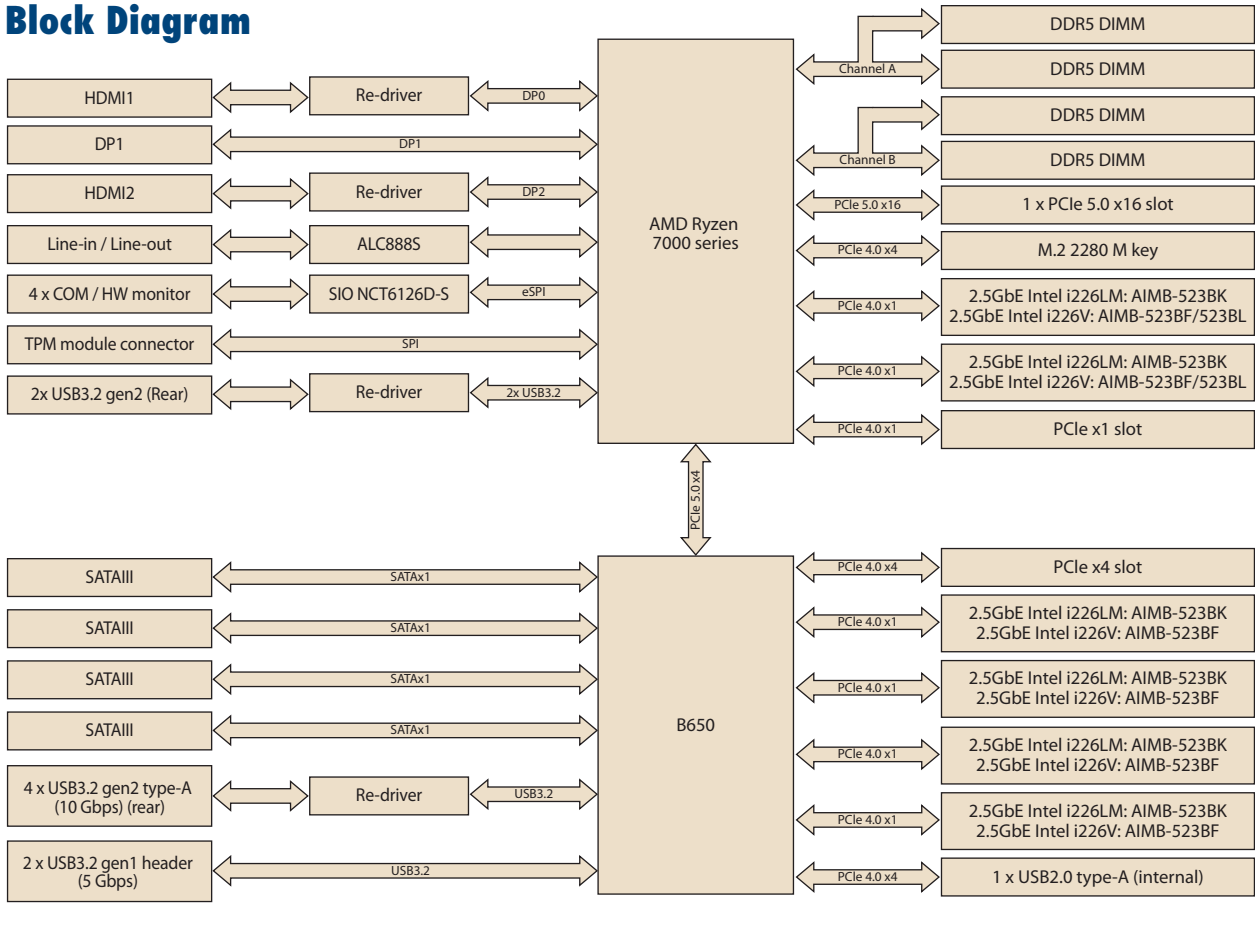
Utilities:



Specifications

Processor System	CPU	Ryzen 7 7700X	Ryzen 5 7600X	Ryzen 9 PRO 7945	Ryzen 7 PRO 7745	Ryzen 5 PRO 7645
	Core Number	8C	6C	12C	8C	6C
	Base Frequency	4.5 GHz	4.7 GHz	3.7 GHz	3.8 GHz	3.8 GHz
	L2 cache	8MB	6MB	12MB	8MB	6MB
	L3 Cache	32 MB	32 MB	64 MB	32 MB	32 MB
	TDP (W)	105W	105W	65W	65W	65W
	Graphic	Yes	Yes	Yes	Yes	Yes
	Chipset	B650				
	BIOS	AMI EFI 256 Mbit SPI				
Expansion Slot	PCIe x16	1 (Gen5, x16 signal from CPU)				
	PCIe x4	1 (Gen4, x4 signal from B650)				
	PCIex1	1 (Gen4, x1 signal from B650)				
	M.2	1 (2280 M key, PCIe Gen4 x4 from CPU)				
Memory	Technology	Supports Dual Channel DDR5 up to 5200MHz				
	Max. Capacity	128GB (32GB per DIMM)				
	Socket	4 x 288 pin U DIMM				
Graphics	Controller	Radeon™ Graphics				
	HDMI	2, up to 3840 x 2160@60Hz				
	Display Port	1, up to 3840 x 2160@60Hz				
	Dual Display	HDMI+DP, HDMI+HDMI				
Ethernet	Triple Display	HDMI+HDMI+DP				
	Controller	2.5GbE Intel i226V (523BF/523BL); 2.5GbE Intel I226LM (523BK) support Windows Server by request				
SATA	Connector	6 RJ45 (523BK/523BF) / 2 RJ45 (523BL)				
	Max Data Transfer Rate	600 MB/s Max. (SATA 3.0)				
Rear I/O	Q'ty	4				
	Display Port	1				
	HDMI	2				
	Ethernet	6				
	USB	6 USB 3.2 ports (2 ports from CPU, 4 ports from FCH B650)				
	Audio	2 Jacks (colay 3 Jacks)				
Internal Connector	USB 2.0	1, type A vertical connector				
	USB 3.2	2, one box header				
	Serial	4, COM1&2 support RS-232/422/485; COM3&4 support RS-232				
	SATA 3.0	4				
	M.2 (M key)	1 (2280 NVMe PCIe4)				
	GPIO	1, 8bit pin header				
Watchdog Timer	Output	System reset				
	Interval	Programmable 1 ~ 255 sec/min				
Power Requirements	Power On	+5 V	3.3 V	12 V	12V_8P	5VSB
		26.6A	14.4A	14.48A	36.5A	2.5A
Environment	Operating					
	Temperature	0 ~ 60 °C (depends on CPU speed and cooler solution)				
Physical Characteristics	Dimensions	244 x 244 mm				
Power	Input Mode	ATX input				

Block Diagram



Ordering Information

P/N	Chipset	Memory slot	USB3.2 Gen2	USB3.2 Gen1	Internal USB2.0 typeA	DP	HDMI	2.5Gbe LAN (PSE support)	2.5Gbe LAN	SATAIII	COM	M.2 M-key	Audio Jack	TPM module
AIMB-523BK-PAA1	B650	4	2	6	1	1	2	2*	4	4	4	1	2 jacks	(1)**
AIMB-523BF-6AA1	B650	4	2	6	1	1	2	0	6	4	4	1	2 jacks	(1)**
AIMB-523BL-2AA1	B650	4	2	6	1	1	2	0	2	4	4	1	2 jacks	(1)**

*Please refer to the Optional Accessories for MIOe-PSE module to support PSE function (a module supports two PSE LAN)

**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



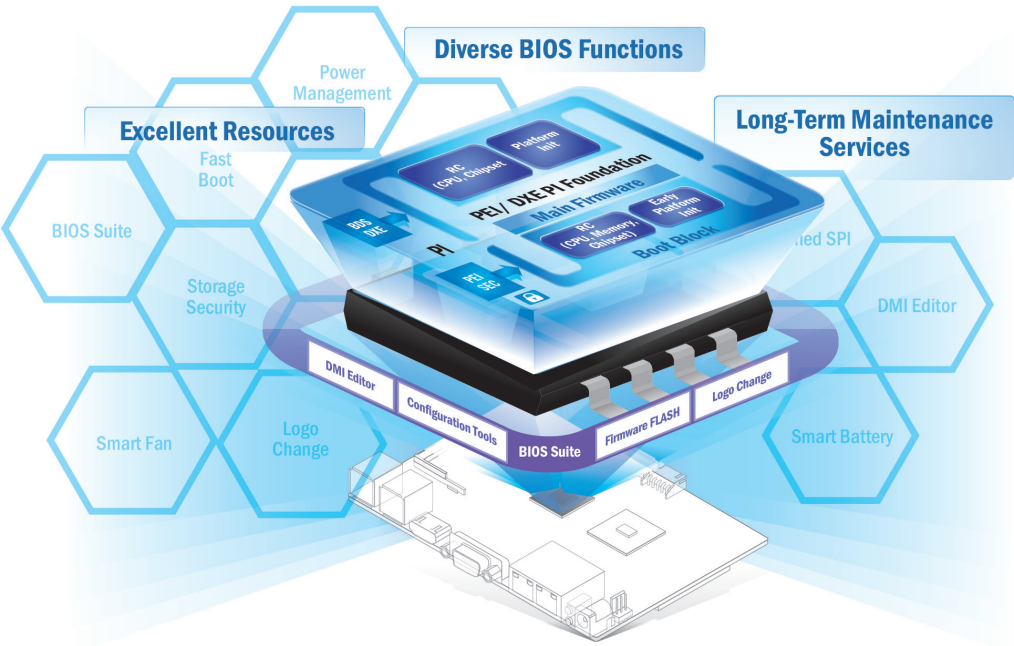
Embedded OS/API

OS/API	Part No.	Description
Windows 11	20706WLE1S0028	img W11 24EL AIMB-523 64b 24H2 ENU
Windows 11	20706WLH1S0028	img W11 24HL AIMB-523 64b 24H2 ENU
Windows 11	20706WLV1S0028	img W11 24VL AIMB-523 64b 24H2 ENU
Ubuntu	20706U22DS0063	img UbuntuD AIMB-523 64b 22.04

Reliable Embedded BIOS Solutions

Custom BIOS services with long-term support

Advantech's high-quality embedded BIOS solutions deliver rapid execution and feature expert BIOS team support. These solutions feature multi-functional designs that ensure security and enable power/boot management. Advantech further provides 10+ years of BIOS version management, internal management, and longevity support for both hardware and BIOS — enhancing application efficiency, diversifying functionality, and optimizing performance.



Embedded BIOS Solution Advantages

Sufficient Sources

- Strong partnership with BIOS vendors
- 50+ engineers with extensive industrial BIOS experience

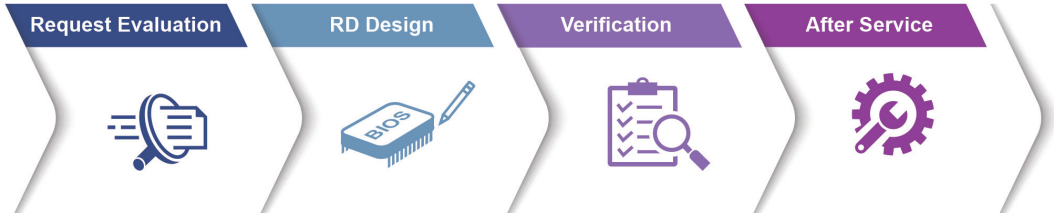
Diverse BIOS Functions

- Multi-layer security
- 3 second fast boot
- Power management
- BIOS suite utility

Long-Term Maintenance Services

- Platform longevity support
- 10-year BIOS version control
- BIOS remote backup

Value-Added Customization Process



WISE-DeviceOn

Massive IoT Device Management Utility

IoT deployment and management typically involves numerous disparate devices installed on multiple sites. These devices require effective monitoring, managing, and tracking. Advantech's easy-to-use WISE-DeviceOn interface enables users to remotely monitor device health, troubleshoot problems, and send software/firmware updates over-the-air (OTA). In sum, DeviceOn empowers quick real-time responsiveness to emerging problems.



Features

Comprehensive Management	Remote Access	Efficient Operations
<ul style="list-style-type: none">• Devices status• Peripherals/firmware• Open for extension	<ul style="list-style-type: none">• Real-time monitoring• Remote controls• Troubleshooting	<ul style="list-style-type: none">• Zero-touch on-boarding• OTA updates• Batch control

Product Highlights

- **SOM-6883**
High-performance 11th Gen Intel[®] COMe Type 6 Module
- **MIO-5375**
Compact 11th Gen Intel[®] Outdoor Focused 3.5" SBC
- **EPC-B5587**
10th Gen Intel[®] Xeon[®] based Edge server
- **EPC-R3220**
Arm based IoT Edge Gateway

Embedded Linux Support and Design-in Services

Hardware Certified Ubuntu and Yocto with Eco Partner Services

Linux is the most popular embedded OS for transportation, outdoor services, factory automation, and mission critical applications. Its open source and kernel reliability features ease security updates, and make it particularly adaptable to new AI and Edge computing technology. Advantech has cooperated with Canonical and other software partners to provide hardware certified Ubuntu image and Yocto BSP as Linux offerings. The Advantech, Embedded Linux, and Android Alliance (ELAA) delivers local software services and consultation.



Features

Certified OS and BSP	Licensed Services	Numerous AI and Edge Resources	Local Partner Alliance
<ul style="list-style-type: none"> Platform compatibility tests Preloaded functional driver and software stacks 	<ul style="list-style-type: none"> License authorized Canonical delivers 10-years of bug fixes and security updates In-house bundled service 	<ul style="list-style-type: none"> Containerized technology for service provision and deployment AI resources from Caffe, TensorFlow, and mxnet 	<ul style="list-style-type: none"> Embedded Linux and Android Alliance (ELAA)