AMAX-8580

Intel® Core™ AIoT Controller



Features

- Intel® 12th/13th/14th Gen Core™ i CPU socket-type (LGA1700) with Intel® R680E chipset
- Wide operating temperature (-20 ~ 60°C)
- 2 x GigaLAN, 2 x USB 3.2 (Gen2) and 6 x USB 3.2 (Gen1); 2 x RS-232/422/485 and 4 x RS232 serial ports (optional)
- 1 x 2.5" HDD/SSD, 1 x mSATA, and 1 x NVMe M.2
- 9 ~ 36 V_{DC} input power range
- IP40 dust proof for deployment in harsh environments
- Supports FlexIO and iDoor technologies, enabling flexible configuration of additional DP, DVI, COM ports, DIO, and remote switch I/O
- Supports Advantech i-Modules
- Supports Advantech SUSI API and embedded software APIs
- Supports Intel® vPro™/AMT and TPM technologies
- Supports Advantech iBMC 1.2 remote out-of-band power management solution on WISE-DeviceOn
- Supports Windows 11 IoT Enterprise LTSC and AdvLinux RT (Ubuntu 22.04)

Introduction

AMAX-8580, an Intel Core AIoT controller featuring 12th, 13th, and 14th Gen processors, is designed for advanced edge computing and control requirements. The AMAX control platform is system-level optimized (1 ms real-time with low jitter) to provide a robust real-time environment for running CODESYS SoftLogic under Windows and Linux operating systems. The AMAX control platform comes with a pre-installed CODESYS license to enable EtherCAT for OT networks, and supports Modbus, OPC UA, and MQTT for IT networks. With optional NVRAM installation, the data retention feature can be reliably executed while running CODESYS. Moreover, Advantech also provides flexible expansion modules, such as EtherCAT I/O from the Slice I/O series and Block I/O series, and CODESYS-ready iDoor. AMAX-8580 focuses on the Intel R680E chipset for flexible I/O configuration and expansion via Advantech iModules. Thanks to the modular design concept of the MIC-770 V3 model, users can configure CPU, RAM, and SSD based on application requirements. AMAX offers RT BIOS selection within build-to-order configurations, with comprehensive OS and CODESYS control software integration. AMAX delivers a diverse array of control systems in various form factors tailored to meet the demands of different application scenarios.

Hardware Specifications

Part Number		AMAX-8580-100NNAW AMAX-8580-102NNAW AMAX-8580-106NNAW AMAX-8580-108NNAW AMAX-8580-200NNAW AMAX-8580-202NNAW AMAX-8580-206NNAW AMAX-8580-208NNAW
System Hardware	Processor	Intel® Core™ processors (LGA1700 14th/13th/12th Gen.)
	BIOS	AMI 256Mb SPI Flash
	Memory	DDR5 SODIMM 4800/5600 dual sockets (support up to 64 GB per socket)
	Storage	1 x 2.5" HDD/SSD (up to 2 x 2.5" SSD by optional kit; 2 x 3.5" HDD by i-Module); 1 x mSATA; 1 x M Key 2280 with PCIe Gen 4 x 4 (operating temp. -20 ~ 50°C) RAID:0/1/5/10
	Retain Memory Support	1 x Full-size mPCIe shared with iDoor expansion module
	Ethernet	LAN1: Intel® I219LM, LAN2: Intel® i210IT
	LED Indicator	1 x storage, 1 x power, 4 x COM1 TX/RX and COM2 TX/RX
	Security	TPM 2.0
	Expansion	AMAX-8580-xxxANNAW: 1 x PCIe x16 1 x mPCIe (iDoor expansion) Supports Advantech MIC-75 series i-module, please refer to optional i-Modules
I/O Interface	LAN Port	2 x RJ45, 10/100/1000 Mbps (IEEE 802.3u 1000BASE-T)
	USB Port	2 x USB3.2 (Gen2), 6 x USB3.2 (Gen1), 1 x USB 2.0 (Internal)
	Serial Port	2 x DB9, RS-232/422/485 supports auto flow control; 4 x RS-232 (optional)
	Audio	2 (1 x line out and 1 x mic in)
	Display ChipSet	Core i: Intel® UHD Graphics 770 Pentium/Celeron: Intel® HD Graphics 710

All product specifications are subject to change without notice.

Hardware Specifications (Cont.)

I/O Interface	Display interface	1 x DB15, up to 1920 x 1200 maximum resolution 1 x HDMI, up to 4096 x 2160@30Hz Total 4 x independent displays (third and fourth display output via optional cable)
	Grounding Protection	Chassis grounding
	Power Connector	1 x 5-pin terminal block (single power input)
General	OS Support	Windows 10 IoT/Windows 11 IoT/ AdvLinux RT-Ubuntu 22.04
	Power Requirements	9 ~ 36 V_{DC} (AT/ATX, default ATX)
	Power Consumption	Typical: 45.7W, maximum: 108W
	Mounting	Desktop/wall mount
	Dimension	Extreme: 107.3 x 192 x 230 mm (4.22" x 7.55" x 9.05") FAN Kit: 120 x 200 x 230 mm (4.73" x 7.87" x 9.05")
	Weight	Standard: 2.8 kg (6.17 lbs); Extreme: 4.5 kg (9.92 lbs); fan kit: 4.4kg (9.48 lbs)
	EMC Certification	CE/FCC Class A, CCC, BSMI
	Safety Certification	CB/UL, CCC, BSMI CB/UL, CCC, BSMI
Environment	Operating Temperature (65W CPU w/ ind. wide Temp. SSD)	Extreme: -20 ~ 65°C with 0.7 m/s air flow Extreme: -20 ~ 35°C without air flow Fan kit: -20 ~ 55°C without air flow
	Operating Temperature (35W CPU w/ ind. Wide Temp. SSD)	Extreme: -20 ~ 70°C with 0.7 m/s air flow Extreme: -20 ~ 50°C without air flow
	Operating Temperature (Non-operating)	-40 ~ 85°C (-40 ~ 185°F)
	Relative Humidity	95% @ 40°C (non-condensing)
	Shock Protection	With SSD: 20G, IEC-68-2-27, half-sine wave, 11 ms duration
	Vibration	With SSD: 3 Grms @ 5 ~ 500 Hz, random, 1 hr/axis With 2.5"" HDD: 1 Grms @ 5 ~ 500 Hz, random, 1 hr/axis

CODESYS Package for Windows

Below part number is ONLY controller platform with CODESYS license sticker. All working systems shipment shall **follow BTO process to complete the accessories selection, OS installation and CODESYS activation**.

Part Number		AMAX-8580-100NNAW	AMAX-8580-102NNAW	AMAX-8580-106NNAW	AMAX-8580-108NNAW
CODESYS Basic Run Time	Runtime	CODESYS control RTE V3.5 SP20			
	OT Network	EtherCAT MainDevice, Profinet Controller CIFX, Ethernet I/P Scanner CIFX, CANopen Manager			
	IT Network	Modbus/TCP Client and Server, Modbus/RTU Client, OPC UA Server			
	EtherCAT I/O Connection	No I/O Points Limitation			
CODESYS HMI	Visualization	N/A	Target visualization (TV, local HMI) & Web visualization (WV, web browser)		
	Tags				
CODESYS SoftMotion	Motion Control Benchmark	N/A	N/A	32 axis with 1ms cycle time Tested under INTEL CPU P-core, Windows CODESYS, EtherCAT CSP mode, PTP (point-to-point) command. Use 13 generation Core i5 CPU as test case.	
	EtherCAT Servo Connection			No axes limitation in EtherCAT servo drive connections	
CODESYS CNC & Robotics	CNC Interpolator	N/A	N/A	N/A	No axes interpolation limitations

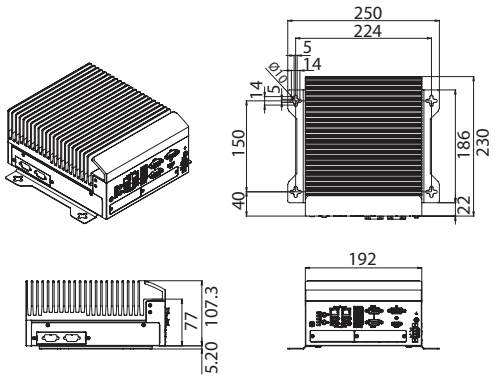
CODESYS Package for Linux

Part Number		AMAX-8580-200NNAW	AMAX-8580-202NNAW	AMAX-8580-206NNAW	AMAX-8580-208NNAW
CODESYS Basic Run Time	Runtime	CODESYS Linux Control V3 SP20			
	OT Network	EtherCAT MainDevice, Profinet Controller IEC, Ethernet I/P Scanner IEC, CANopen Manager			
	IT Network	Modbus/TCP Client and Server, Modbus/RTU Client/Server, OPC UA Server			
	EtherCAT I/O Connection	No I/O points limitation			
CODESYS HMI	Visualization	N/A	Web visualization (WV, web browser)		
	Tags		Unlimited tags		
CODESYS SoftMotion	Motion Control Benchmark	N/A	N/A	64 axis with 500 µs cycle time [Tested under Linux CODESYS, EtherCAT CSP mode, PTP (point-to-point) command]	
	EtherCAT Servo Connection			No axes limitation in EtherCAT servo drive connections.	
CODESYS CNC & Robotics	CNC Interpolator	N/A	N/A	N/A	No axes interpolation limitations.

Dimensions

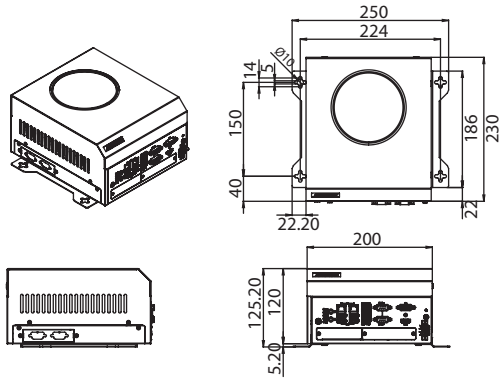
Unit: mm

Extreme (AMAX-8580-xxxNNAW)*



Note 1: Extreme SKU can be equipped with i-Module.

Fankit (AMAX-8580-xxxNNAW +98R17501303)*



Note 2: 98R17501303 fan kit can only be equipped with the AMAX-8580 standard SKU; Extreme and i-Module are not supported.

Ordering Information

Below part number is ONLY controller platform with CODESYS license sticker. All working systems shipment shall **follow BTO process to complete the accessories selection, OS installation and CODESYS activation**.

Part Number	COO	Description
AMAX-8580-100NNAW	China	AIoT Controller, R680E, 3COM3LAN, 1*X16, WCDS
AMAX-8580-102NNAW		AIoT Controller, R680E, 3COM3LAN, 1*X16, WCDS+Target/WebVisu
AMAX-8580-106NNAW		AIoT Controller, R680E, 3COM3LAN, 1*X16, WCDS+Target/WebVisu+SoftMotion
AMAX-8580-108NNAW		AIoT Controller, R680E, 3COM3LAN, 1*X16, WCDS+Target/WebVisu+SoftMotion+CNC
AMAX-8580-200NNAW	China	AIoT Controller, R680E, 3COM3LAN, 1*X16, LCDS
AMAX-8580-202NNAW		AIoT Controller, R680E, 3COM3LAN, 1*X16, LCDS+WebVisu
AMAX-8580-206NNAW		AIoT Controller, R680E, 3COM3LAN, 1*X16, WCDS+WebVisu+SoftMotion
AMAX-8580-208NNAW		AIoT Controller, R680E, 3COM3LAN, 1*X16, WCDS+WebVisu+SoftMotion+CNC

CPU Selection

Please refer to Intel LGA1700 CPU sku with 12th/13th/14th/15th Generation P/N

DRAM Selction

Please refer to SODIMM DDR5 4800/5600 selection, recommended to choose industrial wide temp. from available P/N

Storage Selection

Please refert to 2.5" HDD/SSD, M.2 M 2280 NVME, mSATA storage P/N from available P/N

AMAX Assembly Accessories

Real Time BIOS (CODESYS usage Mandatory)

- **1420065581** BIOS MIC-770V3W WF60A600(Real Time BIOS)

NVRAM Module

- **PCM-2300MR-BE** 4MB MRAM, mPCIE interface

iDoor Expansion (M.2 B+M) For AMAX-8580

- **PCM-37D24DI-AE** 24ch Isolation Digital I/O, 16DI/ 8DO, DB37 x1
- **PCM-34D2R2-AE** Isolated RS-232, DB9 x2, M.2 Bkey (2242, USB)
- **PCM-34D2R4-AE** Isolated RS-422/485, DB9 x2, M.2 Bkey (2242, USB)
- **PCM-34R2GL-AE** 2 Port Giga LAN Intel i350, M.2 B+M key

Note: These listed iDoor modules are supported by Advantech CODESYS run time. For other iDoor support, please contact Advantech.

Embedded OS

- **20706WX1HS0024** img W10 21HL MIC-770V3W 64b 21H2 ENU
- **20706WX1VS0024** img W10 21VL MIC-770V3W 64b 21H2 ENU
- **20706WX1ES0024** img W10 21EL MIC-770V3W 64b 21H2 ENU
- **20706WLH1S0038** img W11 24HL MIC-770V3W 64b 24H2 ENU
- **20706WLV1S0038** img W11 24VL MIC-770V3W 64b 24H2 ENU
- **20706WLE1S0038** img W11 24EL MIC-770V3W 64b 24H2 ENU
- **20701U22DS0017** Image AdvLinuxTu-IOTG_x64 V4.3.5 for AMIC series

Windows Real-Time Control Software(CODESYS RTE)

- **32OTADVWX86004** Software CODESYS WRTE Driver V3.5.2010.2

Linux Real-Time Control Software(CODESYS Control V3 for Linux)

- **32OTADVLX86004** SW CDS x86Linux Driver V3.5.20P4.2098 (w/o TV)

Optional i-Modules*

Part Number	Description
MIC-75M10-00A2	1-slot expansion module (1 x PCIe)
MIC-75M11-00B1	2-slot expansion module (1 x PCIe and 1 x PCI slots)
MIC-75M13-00B1	4-slot expansion module (1 x PCIe and 3 x PCI slots)
MIC-75M20-00C1	2-slot expansion module (2 x PCIe slots)
MIC-75M20-01A2**	2-slot expansion module (2 x PCIe slots)
MIC-75M40-01A2**	3-slot expansion module (3 x PCIe slots)
MIC-75G20-10C1	GPU card expansion module (2 x PCIe and 2 x removable 2.5" storage bay)
MIC-75G30-00C1**	Dual GPU card expansion module (3 x PCIe and 2 x removable 2.5" storage bay, 1 x HDMI, 1 x DP)
MIC-75GF10-00A1	MXM GPU expansion module (1 x MXM, 1 x PCIe and 2 x removable 2.5" storage bay, 1 x HDMI, 3 x DP)
MIC-75S00-00A1	2 x removable 2.5" storage bay
MIC-75S20-00A2	2-slot expansion storage module (2 x PCIe and 2 x removable 2.5" storage bay)
MIC-75S20-01A2	2-slot expansion storage module (2 x PCIe and 2 x removable 2.5" storage bay)
98R17520301	2 x 3.5" HDD kit

*Please refer to i-Module datasheet for more detail.
** R680E SKU only

Optional Accessories

Part Number	Description
Adaptor	
96PSA-A230W24P4-3	ADP A/D 100-240V 230W 24V C14 TERMINAL BLOCK 4P
1702002600	Power cord (USA) UL/CSA, 3-pin, 10A, 125V, 1.83 M, 180 D
1700000237-31	Power Cord PSE 3P 12A 125V 183cm
1702002605	Power Cord (EU), 3-pin, 10A, 250V 1.83M, 90D
Din Rail PSU	
96PSD-A240W24-MN*	A/D 100-240V 240W 24V NDR DIN RAIL
1700031170-01	DC-DC power cord, A cable TEM*4/TEM*4 UL2464 18AWG 150cm
1700029720-01	AC-DC power cord (US), M cable AC CONN 3P 183cm
1700030520-01	AC-DC power cord (CN), M cable conn 3P CCC 10A 250V 150cm
1700034561-01	AC-DC power cord (EU), M cable Type E 3P/TEMx3 80CM

Note:
1. MIC-770 V3 supports Advantech iDoor modules (both MOS and PCM series), excluding the PoE model.
2. The **PCM** series module requires a bracket (P/N: **1960065854N021**) that must be ordered separately.

Optional Flex I/O* & Kits

Part Number	Description
Flex I/O	
AIIS-DIO32-00A1E**	AIIS GPIO module (32 bit)
PCA-TPMSPI-00A1	TPM 2.0 module (SPI)
98R17500001	MIC DVI FIO
98R17500101	MIC HDMI/Remote power on/off FIO
98R17500301	MIC HDMI kit FIO
98R17500401	MIC Remote power on/off FIO
98R17500601	MIC COMport kit FIO (4x COM RS-232 via 2x dual DB9 cable)
98R17500802	MIC Reset/Remote power on/off/5VDC kit FIO (SATA)
98R17500901	MIC GPIO kit FIO
98R17501001	MIC DP kit FIO
98R17501101	COM and HDMI kit
Small Flex IO	
98R17502000	MIC HDMI kit for SFIO
98R17503000	MIC Display Port kit for SFIO
98R17504000	MIC DVI kit for SFIO
98R17500701	MIC Remote Switch kit for SFIO
98R17500803	MIC Reset/Remote power on/off/5VDC kit FIO (SATA) for SFIO
Advanced Flex I/O* **	
98910770320	2 x 1GbE Ethernet Ports (Intel® i210-AT)
98910770330	4 x 1GbE Ethernet Ports (Intel® i210-AT), 1 x M.2 NVMe Slot
98910770340	2 x 2.5GbE Ethernet Ports (Intel® I226-V)
98910770350	4 x 2.5GbE Ethernet Ports (Intel® i226-V), 1 x M.2 NVMe Slot
98910770401	1 x M.2 NVMe Slot
98910770501****	4 x 1GbE Ethernet Ports with PoE (Intel® I350-AM4)
Storage Kit	
98R1752010E	2nd 2.5" HDD/SSD kit (used in 2-slot i-Module)
98R1752020E	2 x 2.5" SSD kit (Thickness: 7mm)
Mounting Kit	
98R17500210	MIC Din Rail Mounting kit
98R17500501	MIC Wall Mounting kit
Fan Kit	
98R17501303*****	MIC Fan Kit

* Please refer to Flex I/O datasheet for more detail.
** Can only be placed in the small FIO location and can't be installed with other flex IO.
*** R680E SKU only.
**** Can't be installed with other flex IO.
***** Only compatible with the MIC-770 standard SKU system without the i-module or extreme SKU.