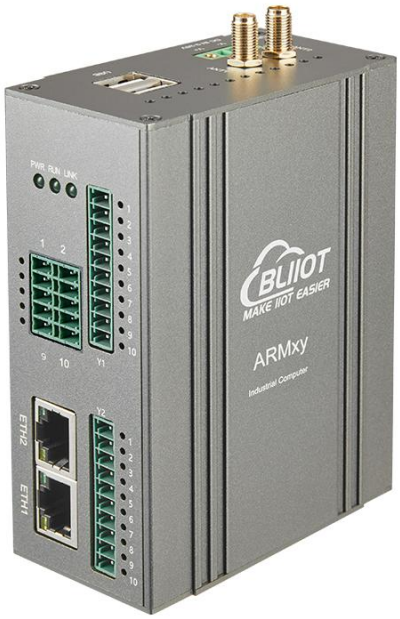

ARMXY EMBEDDED

COMPUTER DATASHEET

ARMxy BL310 Series

Version History

Version	V1.0	2024-12-10	Initial Release	

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1. Overview

ARMxy BL310 Series is an industrial-grade ARM controller that allows flexible selection of the SOM board and I/O interfaces. It uses NXP's classic i.MX6ULL industrial-grade high-performance and low-power SoC, based on the advanced ARM Cortex-A7 core, with a clock speed of up to 800MHz. The BL310 series combines high performance, ultra-efficiency, and low cost. It is widely used in fields such as industrial IoT gateways, industrial control, smart terminals, automation control, rail transportation, power, Industry 4.0, smart manufacturing, industrial testing, and medical equipment.

Key Features:

- **High-Performance Processor**

The device uses the NXP i.MX6ULL SoC, based on the ARM Cortex-A7 core, with a clock speed of up to 800MHz, meeting high-performance computing needs.

- **Rich Interface Configuration:**
  - 2 x 10/100Mbps adaptive RJ45 Ethernet ports.
  - 2 x USB 2.0 ports.
  - Optional X-series and Y-series I/O boards, supporting various signal types such as RS485, RS232, CAN, DI, DO, relays, AI, AO, RTD, TC, and more.
  - Supports PWM output, pulse counting, and other data acquisition and control functions.
  - Built-in Mini PCIe interface, supporting Wi-Fi and 4G for wireless communication.

- **Rapid Development and Effortless Integration:**
  - Built-in BLIoTLink industrial protocol conversion software, supporting industrial data collection and conversion.
  - Quick integration with mainstream IoT cloud platforms and industrial configuration software (e.g., SCADA).
  - Supports BLRAT remote access tool, enabling remote operation and management.
  - Supports the QuickConfig tool, enabling fast configuration and efficient system management. In addition, it supports AI-assisted application development and “what-you-see-is-what-you-get” programming, making the creation of intelligent industrial solutions faster, easier, and more intuitive.
  - Integrated Node-Red for rapid IoT application development.

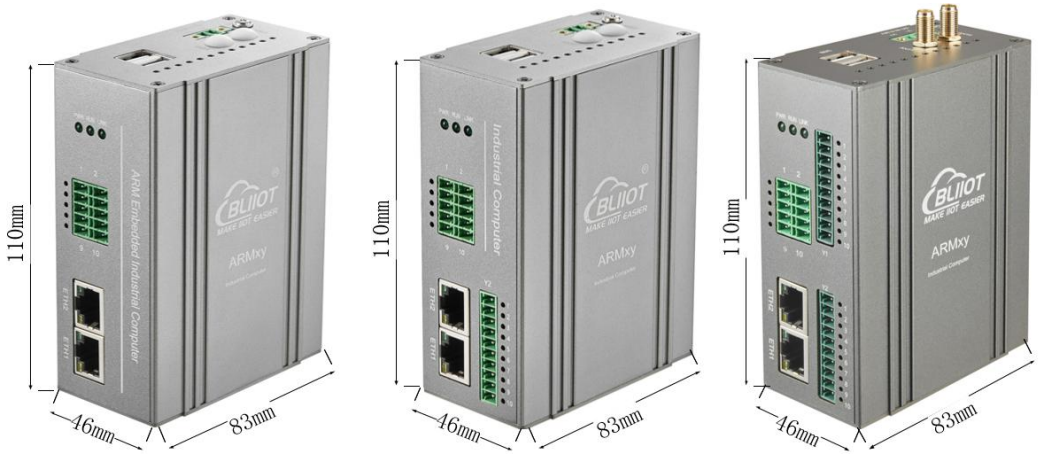
- **Industrial-Grade Reliability:**
  - Designed with professional electrical performance and high/low temperature testing, capable of stable operation in a wide temperature range of -40°C to 85°C.
  - Resistant to electromagnetic interference, suitable for harsh industrial environments.
  - Supports DIN35 rail mounting, making it easy to integrate into various industrial devices.

2. Typical Application Areas

- ✓ Industrial Control
- ✓ Smart Terminals
- ✓ Industrial IoT Gateways
- ✓ Automation Control
- ✓ Rail Transit
- ✓ Smart Devices
- ✓ Industrial Measurement
- ✓ Energy Storage Systems

3. Software and Hardware Specifications

BL310 BL310A BL310B



Hardware	Parameters
CPU	NXP i.MX6ULL
	Cortex-A7@800MH
ROM	1G/8GB eMMC
RAM	256MB/512MB DDR3L
ETH	2x10/100Mbps adaptive RJ-45, ESD Level 3, EFT Level 3
USB	1xUSB 2.0 HOST, 1xUSB 2.0 OTG, with a data rate of up to 480Mbps, ESD Level 3
I/O Slot	X series I/O board slot: 1, X series I/O board support RS485, CAN, RS232, GPIO, etc; Y series I/O board slot: 2, Y series I/O board support RS485, RS232, DI, DO, Relay output, AI, AO, PT100, PT1000, TC, etc.

LED	1xpower indicator light
	2xuser-programmable indicator light
Mini PCIe	1, Supports Wi-Fi, 4G module, etc.
SIM Slot	1 slot, NANO
Antenna	2, For 4G/Wi-Fi/GPS
Debug	1xMicro USB debug port
SD Slot	1
Reset	1 reset button
Watchdog	Onboard independent hardware watchdog
Power	Rated DC 24V, supports wide voltage range of 12-24VDC Equipped with reverse polarity protection and overcurrent protection 2-pin terminal block with screw terminals
Grounding	1-pin GND terminal
Installation	DIN35 rail mounting, wall mounting
Material	Aluminum alloy casing
Dimension	110*83*46mm

Software	Parameters
Kernel	Linux-4.1.15
Operating System	Debian10, Linux-4.1.15
GUI Development Framework	Qt 5.15.11

4. Software Ecosystem

Category	Software	Type	Highlights
Industrial Communication & Protocols	IGH EtherCAT Master	Open Source	Supports real-time EtherCATmaster for high-precision motion control and synchronized I/O.
Data Acquisition Edge Processing	BLIoTLink	Proprietary	Data acquisition and protocol conversion, supporting multiple protocols and API-based secondary development.

	Node-RED	Open Source	Low-code logic orchestration tool,supporting visual flow design and custom nodes.
	Vnode	Open Source	Lightweight edge computing node,suitable for high-efficiency data pipeline processing.
Industrial Control & Execution	OpenPLC	Open Source	Open-source PLC, suitable for simple logic control and local automation.
	CODESYS Runtime	Licensed	Industrial control platform, supporting full IEC61131-3 programming and motion control.
	Beremiz	Open Source	Open-source IEC61131-3 compliant PLC integrated development environment for machine automation,providing tools to create HMI.
	NexPLC	Proprietary	Next-generation industrial control and operation & maintenance integrated platform, supporting cloud-based collaboration.
Visualization & Monitoring	FUXA	Open Source	Lightweight web-based SCADA, suitable for rapid configuration and small to medium monitoring projects.
	Ignition	Open Source	Enterprise-level industrial platform,supporting integrated SCADA, MES, and IoT deployment.
	Grafana	Open Source	Professional time-series data visualization and analytic dashboards, supporting multiple data sources.
Communication &Middleware	Nginx/Apache	Open Source	Web portal for exposing and securely managing edge services.
AI / Machine Vision	YOLOv5/8 OpenCV	Open Source	Complete edge AI vision stack, supporting object detection and image prepossessing.
	TensorFlow Lite, PyTorch Mobile	Open Source	Lightweight AI model inference frameworks, supporting edge-side intelligent analysis.
Remote Operation & Maintenance Management	BLRAT	Proprietary	Secure remote operation & maintenance channel, supporting remoted evice debugging and maintenance.

	QuickConfig	Proprietary	Graphical gateway configuration and management tool, supporting one-click deployment and monitoring.
Development & Support Environment	Python, C/C++, Node.js, Java	Open Source	Multi-language development support, suitable for diverse development scenarios and performance requirements.
	Python 3, Node.js	Open Source	Provides standard runtime, supporting scripting and containerized applications.
	Docker, Kubernetes(K3s)	Open Source	Supports application containerization and cluster management, enabling micro services architecture.
	API Documentation, Deployment Guides, Sample Projects	Proprietary / Open Source	Provides comprehensive technical documentation and typical scenario examples.
System & Security	OpenSSL	Open Source	Provides communication encryption and secure tunneling to ensure data transmission security.
	iptables	Open Source	Kernel-level firewall for network protection.
	Encryption Chip Demo	Proprietary	Encapsulates SHA-256 encryption and authentication algorithms.
	Wireshark, tcpdump	Open Source	Network protocol analysis for security monitoring.
	Prometheus + Grafana	Open Source	System resource monitoring and alerting, supporting visualized operation & maintenance.

5. Product Selection

The ARMxy series ARM embedded controllers adopt a flexible design concept, allowing users to customize ROM and RAM combinations by choosing different System-on-Module(SOM) boards as needed. Additionally, various X and Y boards can be selected to achieve diverse IO configurations, catering to the requirements of different application scenarios.

Product naming convention

Host Model Number - SOM Model Number - X Board Model Number - Y1 Board Model Number - Y2 Board Model Number

For example: BL310-SOM312-X4

Means 2 Ethernet port, 512MB DDR3L, 8GByte eMMC, and 2 RS485+2 CAN

If you need to add Wi-Fi, then you would append "W" to the host model number.

For example: BL310W-SOM312-X4

If you need to add a 4G module, you would append "L" to the host model number.

For example: BL310L-SOM312-X4

ARMxy BL310 Host Model List

Model	ETH	USB	X board I/O Slot	Y board I/O Slot	Dimension
BL310	2x10/100M	2	2x5PIN	X	46x83x110mm
BL310A	2x10/100M	2	2x5PIN	1	46x83x110mm
BL310B	2x10/100M	2	2x5PIN	2	46x83x110mm

ARMxy BL310 SOM Model List

You can select the appropriate ROM, RAM, and temperature grade based on your requirements.

Model	MCU	Clock Speed	Kernel	DDR3L	eMMC	Temperature
SOM311	i.MX6ULL	800MHz	Cortex-A7	256MB	1GByte	-40~85°C
SOM312	i.MX6ULL	800MHz	Cortex-A7	512MB	8GByte	-25~85°C
SOM313	i.MX6ULL	800MHz	Cortex-A7	512MB	8GByte	-40~85°C

X Series I/O Board Model List

You can select the appropriate X series I/O board based on your requirements, ensuring that the number of pins on the X series I/O board is compatible with the industrial computer's casing.

X Board	RS485	RS232	CAN	GPIO	PIN
X0	x	x	x	8	2x5PIN
X1	4	x	x	x	2x5PIN
X2	x	4	x	x	2x5PIN
X3	2	2	x	x	2x5PIN
X4	2	x	2	x	2x5PIN
X5	x	2	2	x	2x5PIN
X6	2	x	x	4	2x5PIN
X7	x	2	x	4	2x5PIN
X8	1	1	1	2	2x5PIN

Y Series I/O Board Model List

When the Y63 is selected, you can not choose second Y-series I/O board.

Model	Description		Model	Description
Y01	4xDI+4xDO(NPN)		Y41	4xAO, 0~20mA/4~20mA
Y02	4xDI+4xDO(PNP)		Y43	4xAO, 0~5V/0~10V
Y11	8xDI(NPN)		Y46	4xAO, ±5V/±10V
Y12	8xDI(PNP)		Y51	2xRTD, 3-Wire PT100
Y13	8xDI(Dry Contact)		Y52	2xRTD, 3-Wire PT1000
Y21	8xDO(PNP)		Y53	2xRTD, 4-Wire PT100
Y22	8xDO(NPN)		Y54	2xRTD, 4-Wire PT1000
Y24	4xDO(Relay)		Y56	Resistance Measurement
Y31	4xAI, Single-ended, 0~20mA/4~20mA		Y57	Voltage Measurement
Y33	4xAI, Single-ended, 0~5V/0~10V		Y58	4xTC
Y34	4xAI, Differential, 0~5V/0~10V		Y63	4xRS485 or RS232
Y36	4xAI, Differential, ±5V/±10V		Y95	4xPWM Output(NPN) + 4xPulse Counter Input
Y37	4xIEPE		Y96	4xPWM Output(PNP) + 4xPulse Counter Input

Ordering Notes

Y01: DI channels support dry contacts or NPN-type wet contact sensors.

Y02: DI channels support dry contacts or PNP-type wet contact sensors.

Y58: Supports thermocouples of types J, K, T, E, R, S, B, and N.

6. Electromagnetic Compatibility Testing

Test	Item	Standard	Level	Condition	Result	Remarks
Electromagnetic Emission	Conducted Emission	GB/T 9254 Class A/ CISPR 32 Class A	Class A	150 kHz - 30 MHz	PASS	Complies with limits for general industrial environments
	Radiated Emission	GB/T 9254 Class A/ CISPR 32 Class A	Class A	30 MHz - 1 GHz	PASS	Complies with limits for general industrial environments

Immunity Testing	ESD	GB/T 17626.2/IEC 61000-4-2	Level III	Contact discharge: ±4 kV; Air discharge: ±8 kV	PASS	—
	Radiated RF Immunity	GB/T 17626.3/ IEC 61000-4-3	Level III	Field strength: 10 V/m, 80 MHz – 1 GHz	PASS	—
	EFT	GB/T 17626.4/ IEC 61000-4-4	Level III	Power lines: 2 kV; Signal lines: 1 kV	PASS	—
	Surge	GB/T 17626.5/ IEC 61000-4-5	Level III	Differential mode: 2 kV; Common mode: 4 kV	PASS	—
	Voltage Dips and Interruptions	GB/T 17626.11/ IEC 61000-4-11	Level III	Voltage dip: 70% for 500 ms; Complete interruption: 10 ms	PASS	—
	Power Frequency Magnetic Field Immunity	GB/T 17626.8/ IEC 61000-4-8	Level III	Test intensity: 30 A/m, 50 Hz	PASS	—

7. Environmental Suitability Testing

Test Item	Standard	Level	Condition	Result	Remarks
Low-Temperature Startup & Operation	GB/T 2423.1-2008/IEC 60068-2-1	N/A	Ambient temperature: +40°C, device starts and operates normally	Compliant	Meets basic low-temperature startup requirements for industrial environments.
High-Temperature Startup & Operation	GB/T 2423.2-2008/IEC 60068-2-2	N/A	Ambient temperature: +85°C, device starts and operates normally	Compliant	Meets basic high-temperature startup requirements for industrial environments.
Constant Damp Heat	GB/T 2423.3-2016/IEC 60068-2-78	N/A	Ambient temperature: +40°C, relative humidity: 85%, powered operation for 48 hours	Compliant	Ensures stable operation in humid environments.
Sinusoidal Vibration	GB/T 2423.10-2019/IEC 60068-2-6	N/A	Frequency range: 5 Hz to 500 Hz, acceleration: 2g, 10 cycles per axis (3 axes)	Compliant	Validates vibration resistance during transportation and installation.
Free Fall	GB/T 2423.7-2018/IEC 60068-2-	N/A	With packaging: Free fall from 0.8 meters, 1 drop	Compliant	Ensures impact resistance during

	31		per face (6 faces total)		transportation.
IP	GB/T 4208-2017/IEC 60529	IP30	Dust protection: Prevents entry of solid foreign objects ≥2.5mm in diameter	Compliant	Meets industrial environmental protection requirements.

Test Conclusion

After undergoing fundamental environmental adaptability testing, the device fully complies with the basic requirements of the Chinese GB/T national standards and corresponding IEC standards, demonstrating stable operation in standard industrial environments.

The following results ensure the device meets a wide range of industrial application scenarios:

- Low/High-Temperature Tests: Validates the device's operational capability under basic industrial environmental conditions.
- Vibration and Free Fall Tests: Ensures reliability during transportation and installation.
- IP Test: Complies with fundamental protection requirements for industrial environments.

8. Packing List

- One ARM embedded controller
- One set of DIN35 mounting brackets
- Linux file system
- Pressure-free terminal blocks configured according to selected accessories
- When purchasing Wi-Fi and 4G modules, antennas for Wi-Fi and 4G modules will be included.

9. Technical Support & Services

- ◆ Provide system firmware images, file system images, kernel driver source code, and a variety of demo programs.
- ◆ Offer a comprehensive platform development kit and introductory tutorials to save software organization time and simplify application development.
- ◆ Provide a rich set of development examples for reference to simplify application development, including:
- ✓ BLIoTLink Industrial Protocol Data Collection and Cloud Platform Integration Development Case
- ✓ BLRAT Remote Access Usage Case
- ✓ Node-Red IoT Application Development Case
- ✓ 4G/Wi-Fi/Bluetooth Development Examples
- ✓ X Board, Y Board, and Other Peripheral Drivers

- ✓ Assistance with Product Customization and Development
- ✓ Customized Research and Development (R&D) and Manufacturing
- ✓ Provide Long-Term After-Sales Service

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