

# AIG-502 Series

*Advanced IIoT gateways with Intel® Core™ i7 processor, Azure IoT Edge software, -40 to 70°C operating temperature*



## Features and Benefits

- Supports Modbus RTU/ASCII/TCP Client
- Supports Azure IoT Edge
- Equipped with Secure Boot to prevent malicious software-injection attacks
- Built-in network traffic monitoring and diagnostic tool for easy troubleshooting
- Provides robust OTA function to prevent system failure during software upgrades
- LTE Cat. 4 US, EU, and APAC models available
- Compliance with IEC 62443-4-2 Security Level 2 requirements
- -40 to 70°C operating temperature range

## Certifications



## Introduction

The AIG-502 is a robust Industrial IoT (IIoT) gateway designed to provide secure and reliable data communication for industrial applications. Compliance with the IEC 62443-4-2 Security Level 2 requirements ensures secure network connectivity, data transmission, and device authentication. The AIG-502 is equipped to acquire field data via Modbus RTU, ASCII, and TCP protocols, enabling seamless integration with the Azure cloud platform. With ample computing power, it supports advanced edge computing capabilities using Azure IoT Edge modules, making it an ideal solution for industries seeking to enhance data-driven operations securely and efficiently.

### Boost Edge Computing Capabilities With Azure IoT Edge

AIG-502 supports Azure IoT Edge to bring in a multitude of benefits including edge computing capabilities, reduced bandwidth costs, flexibility and scalability, seamless integration with Azure services, and ease of management and update. Specifically, with the AIG-502 processing data locally, it not only offers rapid responses and low latency but also effectively reduces network bandwidth usage, thereby cutting costs. Additionally, the modular design of the AIG-502 and Azure IoT Edge support make your system both flexible and easily expandable. At the same time, AIG-502's seamless integration with Azure cloud services allows you to effortlessly extend cloud capabilities to edge devices.

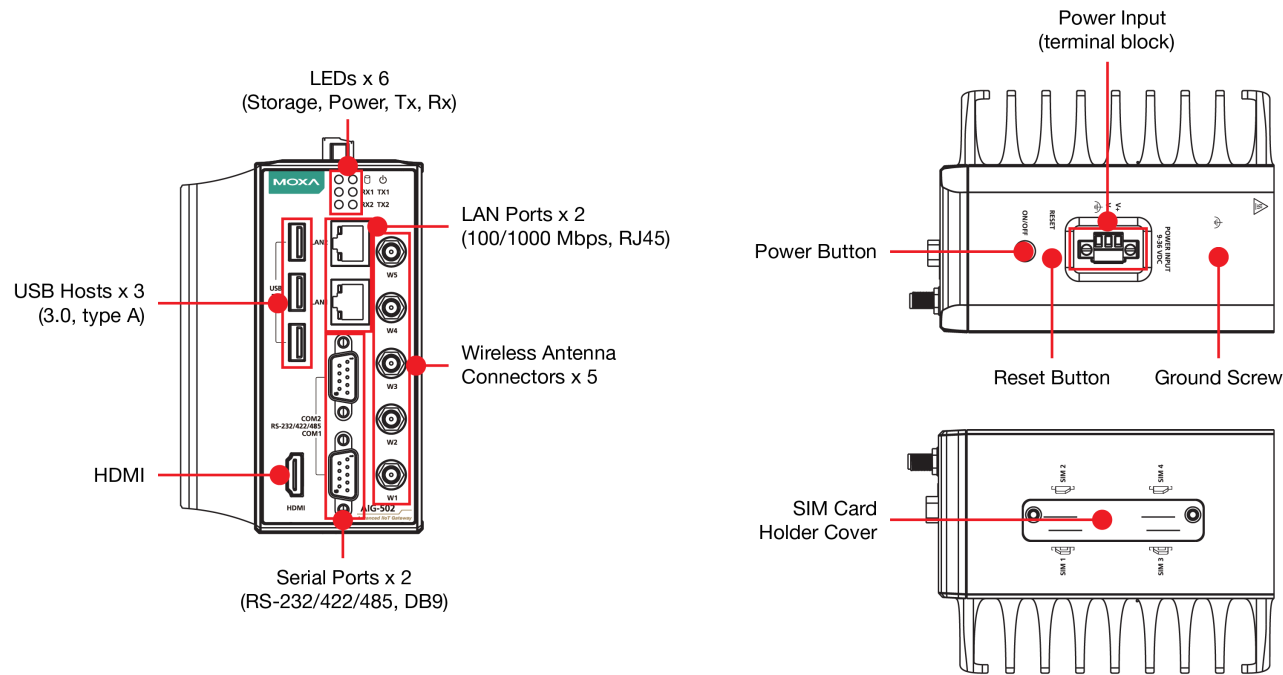
### Reliable Software Updates With Easy Installation and Recovery

The software update function ensures easy, reliable, and secure system upgrades. Through the web console, users can install Debian, and specific patches using Debian APT, or apply a comprehensive update pack provided by Moxa. Updates can be retrieved online or manually uploaded with options for immediate or scheduled installation. The function also supports download resumption and automatic recovery, providing a seamless and resilient update experience to keep systems running smoothly.

### Security Dashboard Optimized for Detecting Security Issues

A security dashboard utilizes device scans to identify potential cybersecurity threats from multiple angles, such as during account settings management, application networking, application resource usage monitoring, product certificates deployment, service settings modifications, and system status checks. Upon detecting threats, a mitigation plan is recommended to resolve issues.

Appearance



Specifications

|                                            |                                                                    |
|--------------------------------------------|--------------------------------------------------------------------|
| Computer                                   |                                                                    |
| CPU                                        | Intel® Core™ i7-7600U processor (4M cache, up to 3.90 GHz)         |
| DRAM                                       | 32 GB SODIMM DDR4                                                  |
| Storage Pre-installed                      | 32 GB mSATA                                                        |
| Pre-installed OS                           | Moxa Industrial Linux (Debian 11, kernel 5.10.x)                   |
| Graphics Controller                        | Intel® HD Graphics 620                                             |
| Computer Interface                         |                                                                    |
| Ethernet Ports                             | Auto-sensing 10/100/1000 Mbps ports (RJ45 connector) x 2           |
| Serial Channels                            | RS-232/422/485 ports x 2 (software-selectable, DB9 male connector) |
| USB 3.0                                    | USB 3.0 hosts x 3, type-A connectors                               |
| Wi-Fi Antenna Connector                    | RP-SMA x 2 (excluding AIG-502-T-AZU-LX)                            |
| Cellular Antenna Connector                 | SMA x 2 (excluding AIG-502-T-AZU-LX)                               |
| GPS Antenna Connector                      | SMA x 1 (excluding AIG-502-T-AZU-LX)                               |
| Expansion Slots                            | mPCIe slots x 1 (for optional Wi-Fi module)                        |
| SIM Format                                 | Nano (excluding AIG-502-T-AZU-LX)                                  |
| Number of SIMs                             | 2                                                                  |
| Video Output                               | HDMI x 1                                                           |
| TPM                                        | TPM v2.0                                                           |
| Ethernet Interface                         |                                                                    |
| 10/100/1000BaseT(X) Ports (RJ45 connector) | 2                                                                  |
| Magnetic Isolation Protection              | 1.5 kV (built-in)                                                  |

## Ethernet Software Features

|                       |                                     |
|-----------------------|-------------------------------------|
| Industrial Protocols  | Azure IoT Edge                      |
| Configuration Options | Web Console (HTTP/HTTPS)            |
| Time Management       | NTP Server/Client<br>GPS            |
| Security              | SSH<br>HTTPS/SSL<br>TLS<br>Firewall |

## Serial Interface

|              |                                                                       |
|--------------|-----------------------------------------------------------------------|
| No. of Ports | 2                                                                     |
| Connector    | DB9 male                                                              |
| Baudrate     | 50 bps to 115.2 kbps                                                  |
| Data Bits    | 7, 8                                                                  |
| Stop Bits    | 1, 2                                                                  |
| Parity       | None, Even, Odd, Space, Mark                                          |
| Flow Control | RTS/CTS, XON/XOFF, ADDC (automatic data direction control) for RS-485 |

## Serial Signals

|           |                         |
|-----------|-------------------------|
| RS-232    | TxD, RxD, RTS, CTS, GND |
| RS-422    | Tx+, Tx-, Rx+, Rx-, GND |
| RS-485-2w | Tx+, Tx-, Rx+, Rx-, GND |
| RS-485-4w | Data+, Data-, GND       |

## Serial Software Features

|                      |                         |
|----------------------|-------------------------|
| Industrial Protocols | Modbus RTU/ASCII Master |
|----------------------|-------------------------|

## Cellular Interface

|                     |                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cellular Standards  | LTE Cat. 4                                                                                                                                                                                                                                                                                                                                                                                                  |
| Band Options (US)   | LTE Band 2 (1900 MHz) / LTE Band 4 (1700 MHz) / LTE Band 5 (850 MHz) / LTE Band 12 (700 MHz) / LTE Band 13 (700 MHz) / LTE Band 14 (700 MHz) / LTE Band 66 (1700 MHz) / LTE Band 71 (600 MHz)<br>UMTS/HSPA 850 MHz / 1900 MHz<br>Carrier Approval: Verizon, AT&T<br>Note: LTE Band 71 (600 MHz). is not included in the selectable antenna support range. Please contact Moxa if you need to use this band. |
| Band Options (EU)   | LTE Band 1 (2100 MHz) / LTE Band 3 (1800 MHz) / LTE Band 7 (2600 MHz) / LTE Band 8 (900 MHz) / LTE Band 20 (800 MHz)<br>UMTS/HSPA 900 MHz / 1800 MHz / 2100 MHz                                                                                                                                                                                                                                             |
| Band Options (APAC) | LTE Band 1 (2100 MHz) / LTE Band 3 (1800 MHz) / LTE Band 5 (850 MHz) / LTE Band 8 (900 MHz) / LTE Band 28 (700 MHz)<br>UMTS/HSPA 850 MHz / 900 MHz / 2100 MHz                                                                                                                                                                                                                                               |

## GPS Interface

|                |                                 |
|----------------|---------------------------------|
| Receiver Types | GPS/GLONASS/BeiDou/Galileo/QZSS |
| Accuracy       | Position: 2.0 m @CEP50          |

|             |                                                                        |
|-------------|------------------------------------------------------------------------|
| Sensitivity | Acquisition: -147.0 dBm<br>Cold starts: -145 dBm<br>Tracking: -160 dBm |
| Update Rate | 1 Hz                                                                   |

#### Azure IoT Edge

|                        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| Versions Supported     | v1.4.33                                                                                          |
| Authentication Methods | Manual / Connection String<br>DPS / Symmetric Encryption<br>DPS / X.509 Certificate<br>DPS / TPM |
| Azure Direct Methods   | Reboot<br>Software Upgrade<br>Remote API Invocation                                              |
| Azure Module Twin      | Device Configuration                                                                             |
| Moxa Functions         | Custom Payload<br>Message Group                                                                  |

#### Modbus RTU/ASCII

|                              |                                  |
|------------------------------|----------------------------------|
| Mode                         | Client (Master)                  |
| Functions Supported          | 1, 2, 3, 4, 5, 6, 15, 16, 23     |
| Max. No. of Commands         | 256 per port                     |
| Max. No of Connected Devices | 31 slave devices per serial port |

#### Modbus TCP

|                                |                                 |
|--------------------------------|---------------------------------|
| Mode                           | Client (Master), Server (Slave) |
| Functions Supported            | 1, 2, 3, 4, 5, 6, 15, 16, 23    |
| Max. No. of Server Connections | 64                              |
| Max. No. of Client Connections | 4                               |
| Max. No. of Commands           | 3000                            |

#### LED Indicators

|        |                               |
|--------|-------------------------------|
| System | Power x 2                     |
| LAN    | 2 per port (10/100/1000 Mbps) |
| Serial | 2 per port (Tx, Rx)           |

#### Power Parameters

|                   |                                                           |
|-------------------|-----------------------------------------------------------|
| Input Voltage     | 9 to 36 VDC<br>12 to 36 VDC, 6A (for hazardous locations) |
| Input Current     | 8 A @ 9 VDC<br>2 A @ 36 VDC                               |
| Power Consumption | 72 W (max.)                                               |
| Power Connector   | 3-pin terminal block                                      |

#### Reliability

|                          |                               |
|--------------------------|-------------------------------|
| Automatic Reboot Trigger | External WDT (watchdog timer) |
|--------------------------|-------------------------------|

## Physical Characteristics

|              |                                                                            |
|--------------|----------------------------------------------------------------------------|
| Housing      | Metal                                                                      |
| IP Rating    | IP20                                                                       |
| Dimensions   | 134 x 60.4 x 120 mm (5.28 x 2.38 x 4.72 in)                                |
| Weight       | 1,500 g (3.3 lb)                                                           |
| Installation | DIN-rail mounting (with optional kit)<br>Wall mounting (with optional kit) |

## Environmental Limits

|                                        |                            |
|----------------------------------------|----------------------------|
| Operating Temperature                  | -40 to 70°C (-40 to 158°F) |
| Storage Temperature (package included) | -40 to 75°C (-40 to 167°F) |
| Ambient Relative Humidity              | 5 to 95% (non-condensing)  |
| Shock                                  | IEC 60068-2-27             |
| Vibration                              | IEC 60068-2-64             |

## Standards and Certifications

|                        |                                                                                                                                                                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC                    | EN 55032/35<br>EN 61000-6-2/-6-4                                                                                                                                                                                                           |
| EMI                    | CISPR 32, FCC Part 15B Class A                                                                                                                                                                                                             |
| EMS                    | IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m<br>IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV<br>IEC 61000-4-5 Surge: Power: 1 kV; Signal: 1 kV<br>IEC 61000-4-6 CS: 10 V<br>IEC 61000-4-8 PFMF |
| Cybersecurity          | EN 18031-1                                                                                                                                                                                                                                 |
| Hazardous Locations    | Class I Division 2, ATEX, IECEx                                                                                                                                                                                                            |
| Safety                 | UL 62368-1<br>EN 62368-1                                                                                                                                                                                                                   |
| Radio                  | NCC<br>RCM                                                                                                                                                                                                                                 |
| Carrier Approvals      | AT&T<br>Verizon<br>PTCRB                                                                                                                                                                                                                   |
| RED                    | EN 300 328<br>EN 301 489-1/17/19/52<br>EN 301 511<br>EN 301 893<br>EN 301 908-1<br>EN 303 413<br>EN 62311                                                                                                                                  |
| International Approval | BSMI                                                                                                                                                                                                                                       |
| Green Product          | RoHS, CRoHS, WEEE                                                                                                                                                                                                                          |

## MTBF

|           |                                         |
|-----------|-----------------------------------------|
| Time      | 510,913 hrs                             |
| Standards | Telcordia (Bellcore) Standard TR/SR, GB |

## Warranty

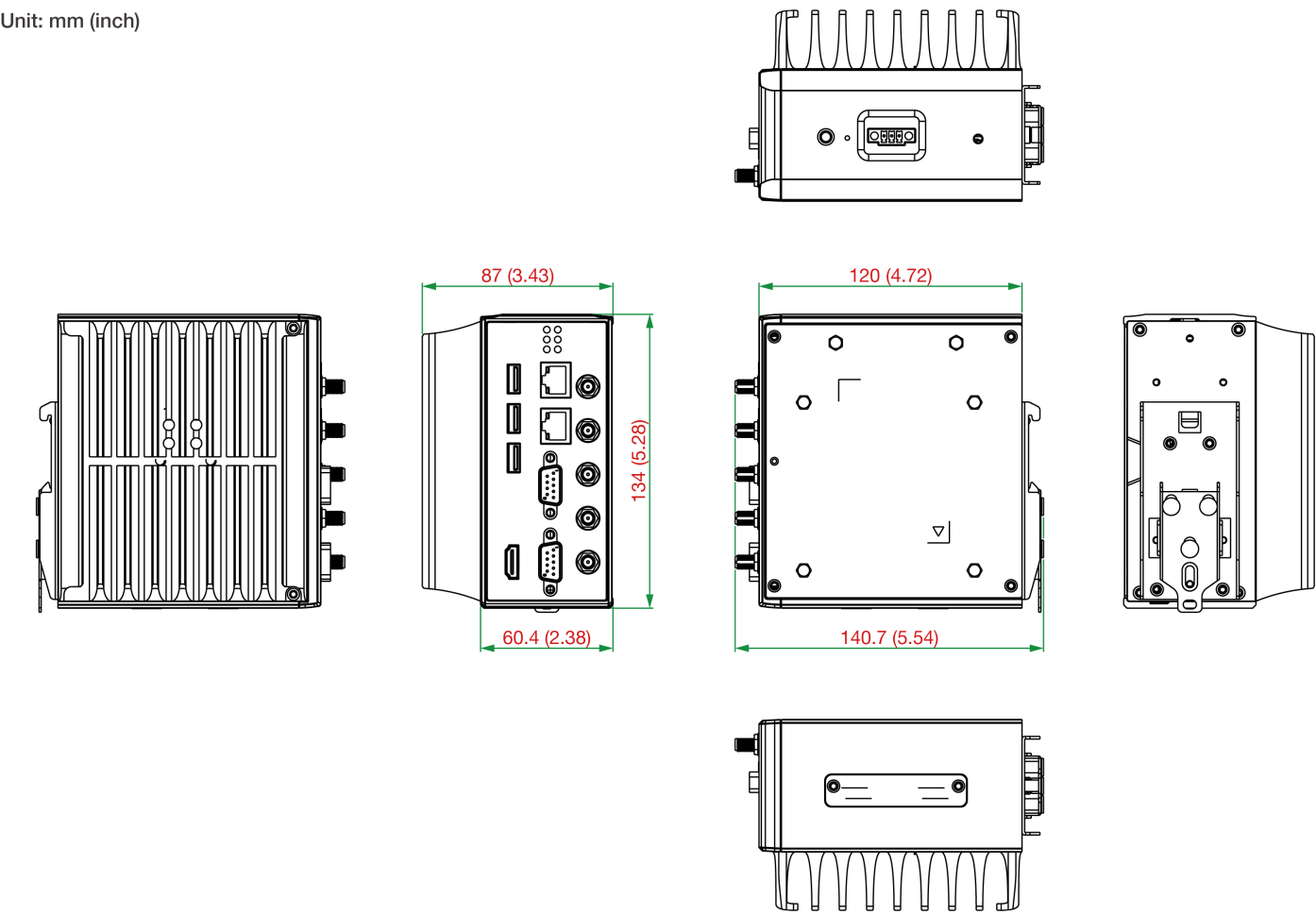
|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| Warranty Period | 3 years                                                              |
| Details         | See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a> |

## Package Contents

|                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| Device           | 1 x 1 x AIG-502 Series computer                                                       |
| Installation Kit | 1 x DIN-rail mounting kit                                                             |
| Cable            | 1 x terminal block to power jack converter                                            |
| Documentation    | 1 x quick installation guide<br>1 x warranty card<br>1 x sheet of tamper-proof labels |

## Dimensions

Unit: mm (inch)



## Ordering Information

| Model Name          | mPCIe Slot 1 for LTE Module           | mPCIe Slot 2 for Wi-Fi Module | Operating Temperature |
|---------------------|---------------------------------------|-------------------------------|-----------------------|
| AIG-502-T-AZU-LX    | –                                     | –                             | –40 to 70°C           |
| AIG-502-T-US-AZU-LX | US region LTE module preinstalled     | Reserved                      | –40 to 70°C           |
| AIG-502-T-EU-AZU-LX | Europe region LTE module preinstalled | Reserved                      | –40 to 70°C           |
| AIG-502-T-AP-AZU-LX | APAC region LTE module preinstalled   | Reserved                      | –40 to 70°C           |

Accessories (sold separately)

Power Adapters

|                 |                                                                                                            |
|-----------------|------------------------------------------------------------------------------------------------------------|
| PWR-24250-DT-S1 | Desktop power supply (requires power cord), 24 VDC, 2.5 A, 100 to 240 VAC, 0 to 40°C operating temperature |
|-----------------|------------------------------------------------------------------------------------------------------------|

Wi-Fi Wireless Modules

|                   |                                                                                                              |
|-------------------|--------------------------------------------------------------------------------------------------------------|
| MC-1220-WLAN11-AC | Wireless package for the MC-1200 Series with WPEQ-261ACNI(BT) 802.11ac/a/b/g/n Wi-Fi module and mPCIe module |
|-------------------|--------------------------------------------------------------------------------------------------------------|

Antennas

|                      |                                                                                                                    |
|----------------------|--------------------------------------------------------------------------------------------------------------------|
| ANT-LTEUS-ASM-01     | GSM/GPRS/EDGE/UMTS/HSPA/LTE, 1 dBi, omnidirectional rubber-duck antenna                                            |
| ANT-LTE-OSM-03-3m BK | 700-2700 MHz, multiband antenna, specifically designed for 2G, 3G, and 4G applications, 3 m cable                  |
| ANT-WDB-ARM-0202     | 2 dBi at 2.4 GHz or 2 dBi at 5 GHz, RP-SMA (male), dual-band, omnidirectional antenna                              |
| ANT-GPS-CSM-04-3m BK | 20 dBi at 1575 to 1605 MHz, SMA (male), right-hand circular polarization (RHCP), active GPS antenna, 3-meter cable |

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