

AIG-501 Series

4-port Modbus to Azure advanced IIoT gateways with Intel Atom® quad-core 1.91 GHz processor, Azure IoT Edge



Features and Benefits

- Supports generic MQTT client
- Supports MQTT connection with built-in device SDKs for Azure/AWS cloud
- Supports Modbus RTU/ASCII/TCP master/client
- Supports Modbus TCP server
- Supports Azure IoT Edge
- Supports easy device-provisioning with the ThingsPro Proxy utility
- Supports data buffering using store and forward and datalogger
- Provides robust OTA function to prevent system failure during software upgrades
- Equipped with Secure Boot to prevent malicious software-injection attacks
- -40 to 70°C operating temperature range
- LTE Cat. 4 US, EU, and APAC models available

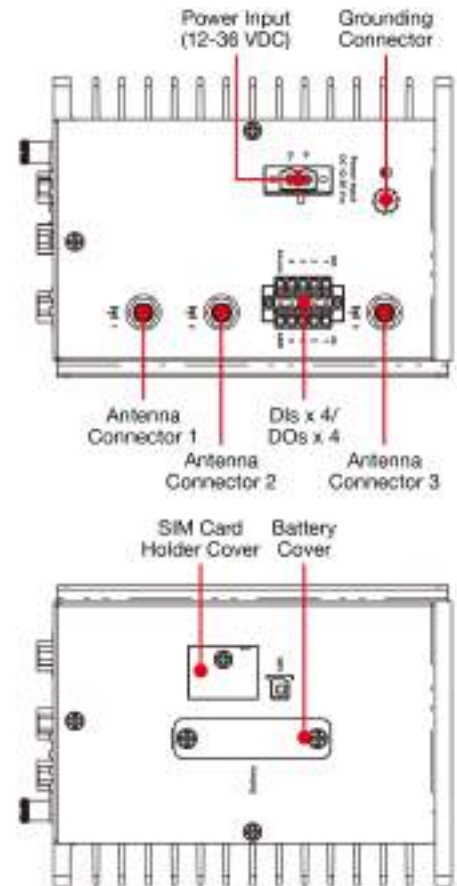
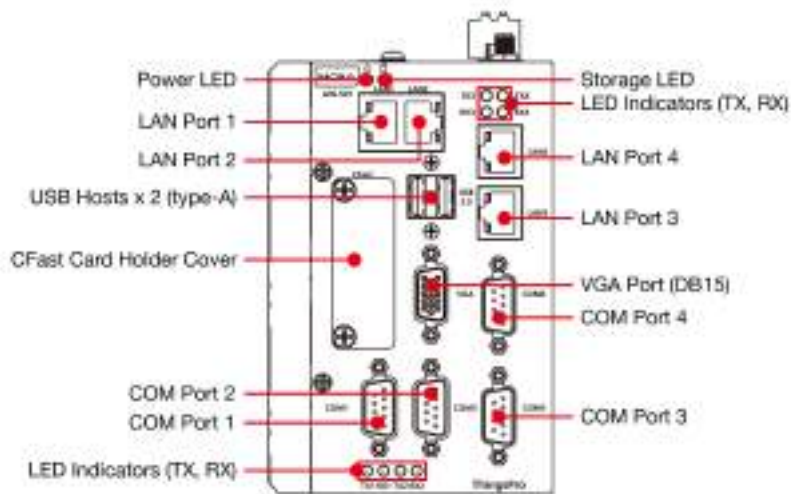
Certifications



Introduction

AIG-501 Series advanced IIoT gateways are designed for Industrial IoT applications, especially for distributed and unmanned sites in harsh operating environments. The gateways implement Modbus RTU/TCP master/client protocols which can help you to effortlessly collect data from Modbus devices. Moreover, Azure IoT Edge software is preloaded and seamlessly integrated with the AIG-501 to enable easy, reliable, yet secure sensor-to-cloud connectivity for data acquisition and device management using the Azure Cloud solution. With the use of the ThingsPro Proxy utility, the device provisioning process is easier than ever. Thanks to the robust OTA function, you never have to worry about system failure during software upgrades. With the Secure Boot function enabled, you can prevent malicious software injection attacks, especially during the boot-up process.

Appearance



Specifications

Computer

CPU	Intel Atom® E3845 processor (2M cache, 1.91 GHz)
DRAM	4 GB DDR3L
Storage Pre-installed	32 GB CFast eMMC
Pre-installed OS	Linux Debian 9, Kernel 4.9
Graphics Controller	Intel® HD Graphics
No. of Tags Supported	4096

Computer Interface

Ethernet Ports	Auto-sensing 10/100/1000 Mbps ports (RJ45 connector) x 4
Serial Ports	RS-232/422/485 ports x 4 (software-selectable, DB9 male connector)
Digital Input	DiS x 4
Digital Output	DOs x 4
USB 2.0	USB 2.0 hosts x 2, type-A connectors
Wi-Fi Antenna Connector	RP-SMA x 2 (AIG-501-T-AZU-LX)
Cellular Antenna Connector	SMA x 2 (excluding AIG-501-T-AZU-LX)
GPS Antenna Connector	SMA x 1 (excluding AIG-501-T-AZU-LX)
Expansion Slots	mPCIe slots x 1 (AIG-501-T-AZU-LX)

SIM Format	Mini
Number of SIMs	1
Video Output	VGA x 1, 15-pin D-sub connector (female)
Buttons	Reboot Reset to factory default
TPM	TPM v2.0

Ethernet Interface

10/100/1000BaseT(X) Ports (RJ45 connector)	4
Magnetic Isolation Protection	1.5 kV (built-in)

Ethernet Software Features

Industrial Protocols	Modbus TCP Client (Master) / Server (Slave) Generic MQTT Azure IoT Device AWS IoT Core Azure IoT Edge Sparkplug B Client OPC UA Server FTP/SFTP
Configuration Options	Web Console (HTTP/HTTPS) ThingsPro Proxy Utility
Time Management	NTP Server/Client GPS

Serial Interface

No. of Ports	4
Connector	DB9 male
Baudrate	300 bps to 115.2 kbps
Data Bits	5, 6, 7, 8
Stop Bits	1, 2
Parity	None Even Odd Space Mark
Flow Control	RTS/CTS, XON/XOFF

Serial Signals

RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND

Serial Software Features

Industrial Protocols	Modbus RTU/ASCII Master
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Digital Inputs

Connector	Spring-type Euroblock terminal
Sensor Type	Dry contact
Dry Contact	Off: open On: short to GND
Isolation	None

Digital Outputs

Connector	Spring-type Euroblock terminal
Current Rating	10 mA (max.) total for all channels
I/O Type	Sink
Isolation	None

Cellular Interface

Cellular Standards	LTE Cat. 4
Band Options (US)	LTE Band 2 (1900 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) UMTS/HSPA Band 2 (1900 MHz) / Band 5 (850 MHz) Carrier Approval: Verizon, AT&T 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) UMTS/HSPA Band 1 (2100 MHz) / Band 3 (1900 MHz) / Band 8 (900 MHz)
Band Option (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) UMTS/HSPA Band 1 (2100 MHz) / Band 5 (850 MHz) / Band 8 (900 MHz)

GPS Interface

Receiver Types	GPS/GLONASS/BeiDou/Galileo/QZSS
Accuracy	Position: 2.0 m @CEP50
Time to First Fix (TTFF)	Hot start: 1.1 s Warm start: 22.1 s Cold start: 29.9 s
Sensitivity	Acquisition: -147 dBm Cold starts: -145 dBm Tracking: -160 dBm
Update Rate	1 Hz

Azure IoT Edge

Versions Supported	v1.4.33
Authentication Methods	Manual / Connection String DPS / Symmetric Encryption DPS / X.509 Certificate DPS / TPM
Azure Direct Methods	Reboot Software Upgrade Remote API Invocation

Azure Module Twin	Device Configuration
Moxa Functions	Custom Payload Message Group

Sparkplug B Client

Versions Supported	v2.2
Node Commands (NCMD)	Next Broker Reboot Rebirth
Moxa Functions	Store and Forward Custom Payload

OPC UA Server

No. of Client Connections	2
Security	Sign and encrypt with policies Basic128Rsa15, Basic256, and Basic256Sha256
User Authentication and Authorization	Username/password
Supported Profiles	OPC UA v1.02
No. of Supported Tags	1000

Generic MQTT Client

Versions Supported	v3.1.1 v3.1
QoS Levels	0, 1, 2
Authentication Methods	Username and password
Secure Transmission	TLS 1.0 TLS 1.1 TLS 1.2
Native Capabilities	Keep Alive Retain Message Clean Session Will and Testament
Moxa Functions	Store and Forward Custom Payload Remote API Invocation

Azure IoT Device

Connection Protocols Supported	MQTT MQTT over WebSockets AMQP AMQP over WebSockets
Authentication Methods	Symmetric Key X.509 Certificate
Azure Direct Methods	Reboot Software Upgrade Remote API Invocation

AWS IoT Core

QoS Levels	0,1
Authentication Methods	X.509 Certificate Private Key Trusted Root CA

Native Capabilities	Keep Alive
Moxa Functions	Store and Forward Custom Payload
Commands Invokable Via Jobs	Reboot Software Upgrade Remote API Invocation

Modbus RTU/ASCII

Mode	Client (Master)
Functions Supported	1, 2, 3, 4, 5, 6, 15, 16, 23
Max. No. of Commands	256/port
Max. No of Connected Devices	124

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	4096

LED Indicators

System	Power x 1 Storage x 1
LAN	2 per port (10/100/1000 Mbps)
Serial	2 per port (Tx, Rx)

Power Parameters

Input Voltage	12 to 36 VDC
Input Current	2.5 A @ 12 VDC
Power Consumption	30 W (max.)
Power Connector	Screw-fastened Euroblock terminal

Reliability

Automatic Reboot Trigger	External WDT (watchdog timer)
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Physical Characteristics

Housing	Metal
IP Rating	IP20
Dimensions	132 x 122 x 87 mm (5.2 x 4.81 x 3.43 in)
Weight	1,340 g (2.95 lb)
Installation	DIN-rail mounting (with optional kit) 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 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 IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV IEC 61000-4-5 Surge: Power: 1 kV; Signal: 1 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8 PFMF
Safety	UL 62368-1 EN 62368-1
Radio	NCC RCM
Carrier Approvals	AT&T Verizon PTCRB
RED	EN 300 328 EN 301 489-1/17/19/52 EN 301 511 EN 301 893 EN 301 908-1 EN 303 413 EN 62311
Hazardous Locations	Class I Division 2 ATEX
Green Product	RoHS, CRoHS, WEEE

MTBF

Time	AIG-501-T-US-AZU-LX, AIG-501-T-EU-AZU-LX, AIG-501-T-AP-AZU-LX: 441,032 hrs AIG-501-T-AZU-LX: 453,637 hrs
Standards	Telcordia (Bellcore) Standard TR/SR

Warranty

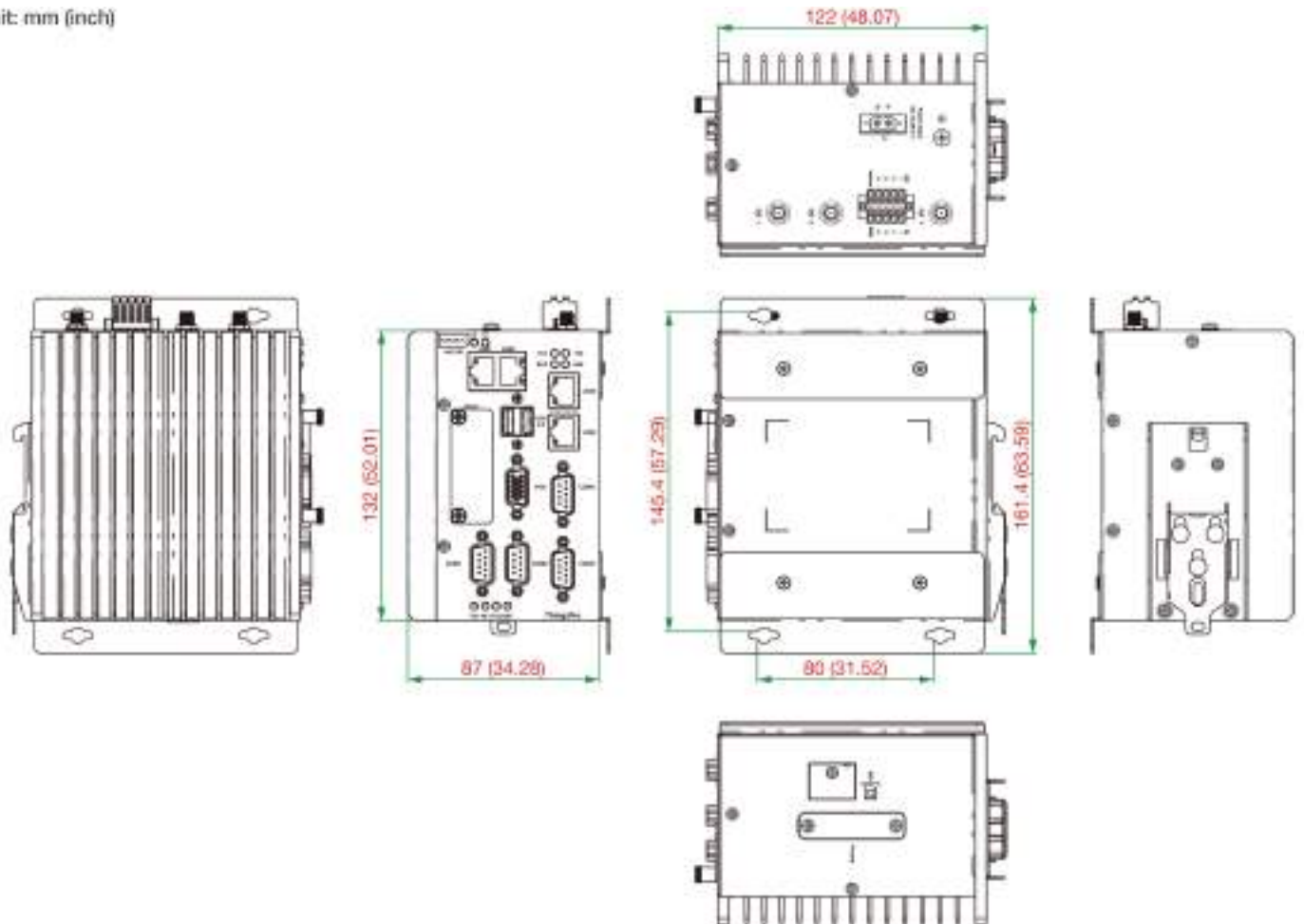
Warranty Period	3 years
Details	See www.moxa.com/warranty

Package Contents

Device	1 x AIG-501 Series computer
Installation Kit	1 x terminal block to power jack converter
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

Unit: mm (inch)



Ordering Information

Model Name	CPU	RAM	Storage	TPM	mPCIe Slot	Operating Temperature
AIG-501-T-AZU-LX	1.91 GHz	4 GB	32 GB	Built-in	Reserved for Wi-Fi module	-40 to 70°C
AIG-501-T-US-AZU-LX	1.91 GHz	4 GB	32 GB	Built-in	US region LTE module preinstalled	-40 to 70°C
AIG-501-T-EU-AZU-LX	1.91 GHz	4 GB	32 GB	Built-in	Europe region LTE module preinstalled	-40 to 70°C
AIG-501-T-AP-AZU-LX	1.91 GHz	4 GB	32 GB	Built-in	APAC region LTE module preinstalled	-40 to 70°C

Accessories (sold separately)

Power Wiring

CBL-PJTB-10	Non-locking barrel plug to bare-wire cable
Mini DB9F-to-TB	DB9 female to terminal block connector

Wi-Fi Wireless Modules

UC-8200-WLAN22-AC	Wireless package for UC-8200 V2.0 or later with Wi-Fi module, 2 screws, 2 spacers, 1 heat sink, 1 pad
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Antennas

ANT-LTEUS-ASM-01	GSM/GPRS/EDGE/UMTS/HSPA/LTE, 1 dBi, omnidirectional rubber-duck antenna
ANT-LTE-ASM-04 BK	704 to 960/1710 to 2620 MHz, LTE omnidirectional stick antenna, 4.5 dBi
ANT-LTE-OSM-03-3m BK	700-2700 MHz, multiband antenna, specifically designed for 2G, 3G, and 4G applications, 3 m cable
ANT-LTE-ASM-05 BK	704-960/1710-2620 MHz, LTE stick antenna, 5 dBi
ANT-LTE-OSM-06-3m BK MIMO	Multiband antenna with screw-fastened mounting option for 700-2700/2400-2500/5150-5850 MHz frequencies
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-OSM-05-3M	26 dBi at 1575.42 MHz, SMA (male), omnidirectional active GPS antenna, 3 m cable
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

DIN-Rail Mounting Kits

MC-1100 DIN-Rail Kit	DIN-rail mounting kit, 4 screws
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Wall-Mounting Kits

MC-1100 Wallmount Kit	Wall-mounting kit, 4 screws
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