UA-5000 IIoT Communication Server

UA-5231/UA-5241

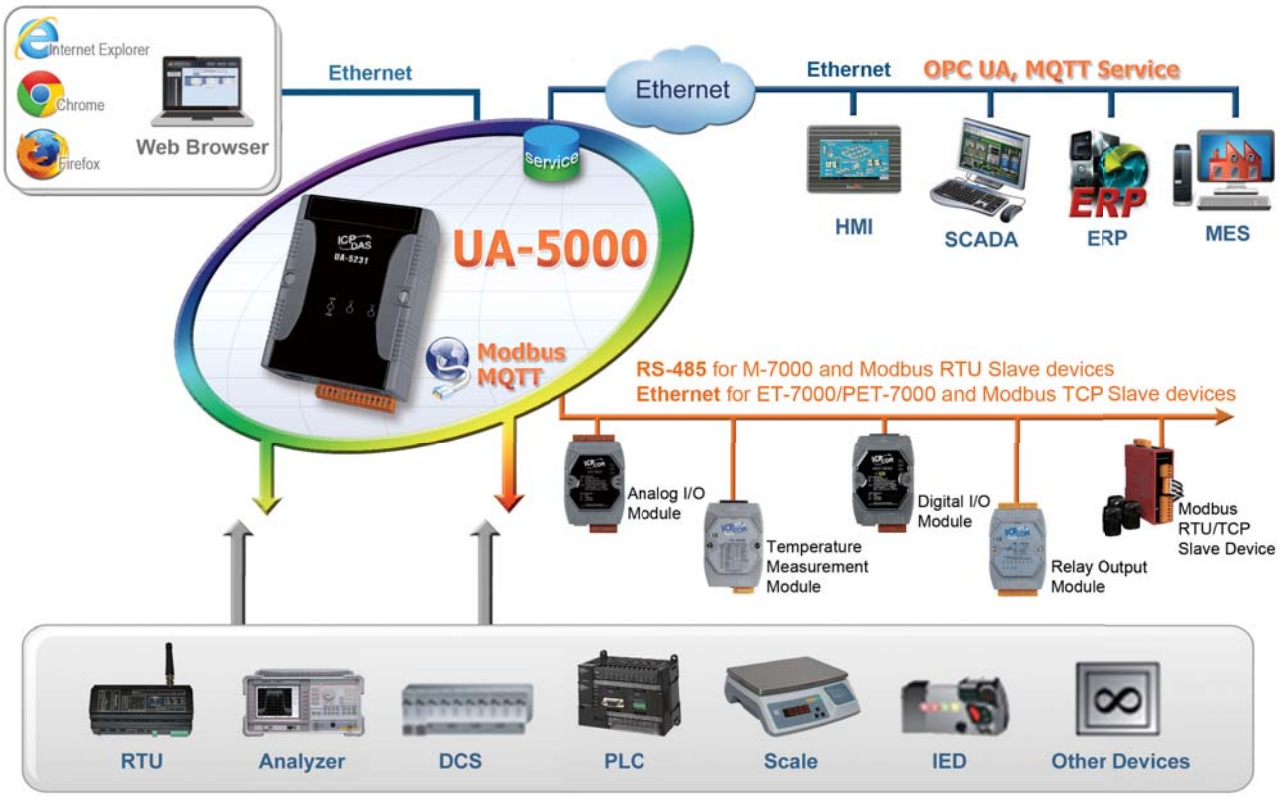
Features

- OPC UA Server and MQTT Client Service
- MQTT Broker Inside
- AM3352, 720 MHz
- 512 MB RAM and 256 MB Flash
- Linux kernel 3.2.14 OS
- Real-Time Capability
- 64-bit Hardware Serial Number for Software Protection
- Support Redundancy and PID
- 10/100/1000 Mbit/s Ethernet Port
- 4 Serial Ports (RS-232/RS-485)
- Wide Operating Temperature Range: -25 ~ +75°C

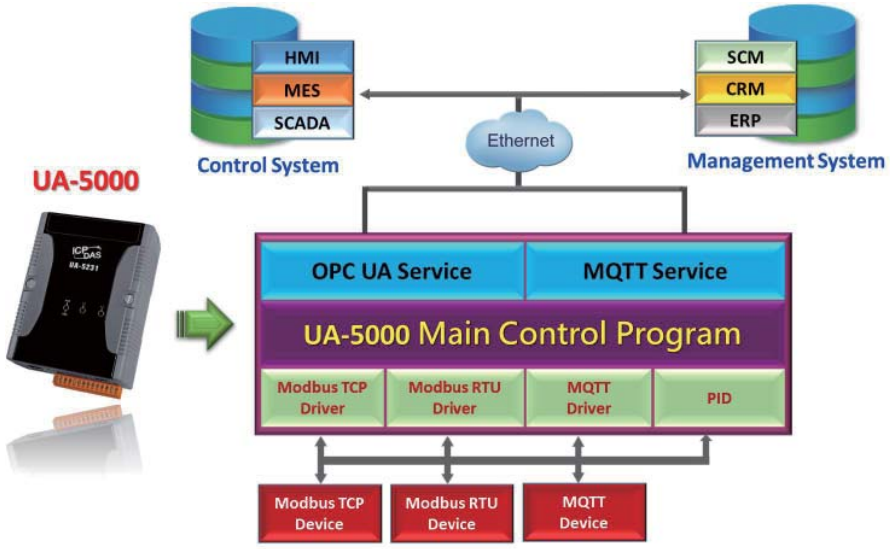
Introduction

The **UA-5000** is a series of data acquisition controller and also an IIoT communication server by ICP DAS (IIoT: Industrial Internet of Things). The UA-5000 built-in **OPC UA Server** and **MQTT Client Service** support a variety of common industrial communication protocols. Its RISC-based CPU architecture has the advantages of small size and low power consumption that lets this series can be placed in a small space to fit variety of rooms, equipment and case environment. In the hardware, it provides a variety of communication interfaces, such as Gigabit Ethernet, USB, RS-232 and RS-485… ports to connect diverse devices.

Applying **OPC UA** can integrate the I/O products of ICP DAS with the third-party devices, import the data information to the SCADA, database or decision-making systems for the back-end management, and satisfy the reliability, interoperability and security needs of the industrial automation system. Using **MQTT** communication can bridge the system with the Internet of Things (IoT) to meet the current trend of the smart internet.



Functions



■ Web-based UI

With the Web-based User Interface, users can log in and configure the controller via a normal web browser that only need a mobile device or computer with web browsing capabilities.

■ OPC UA Server: IEC 62541 Standard

The OPC UA Server certified by the OPC Foundation can assist the integration for the local-end devices, actively upload data to the application system, and support to across the multiple platforms.

■ PID Logic Operation

The PID function can dynamically combine the remote I/O devices for the PID logic control to provide temperature control and case field solutions.

■ Support Modbus TCP/RTU Master

Through the controller's RS-485, RS-232 and Ethernet ports can connect to the Modbus TCP/RTU Slave devices. Build systems with scalability and flexibility to meet the diverse application needs and expansion at any time.

■ MQTT Broker Inside

Compliance with MQTT v3.1.1 protocol. Support MQTT message distribution management. Users do not need to build Broker system when using MQTT communications.

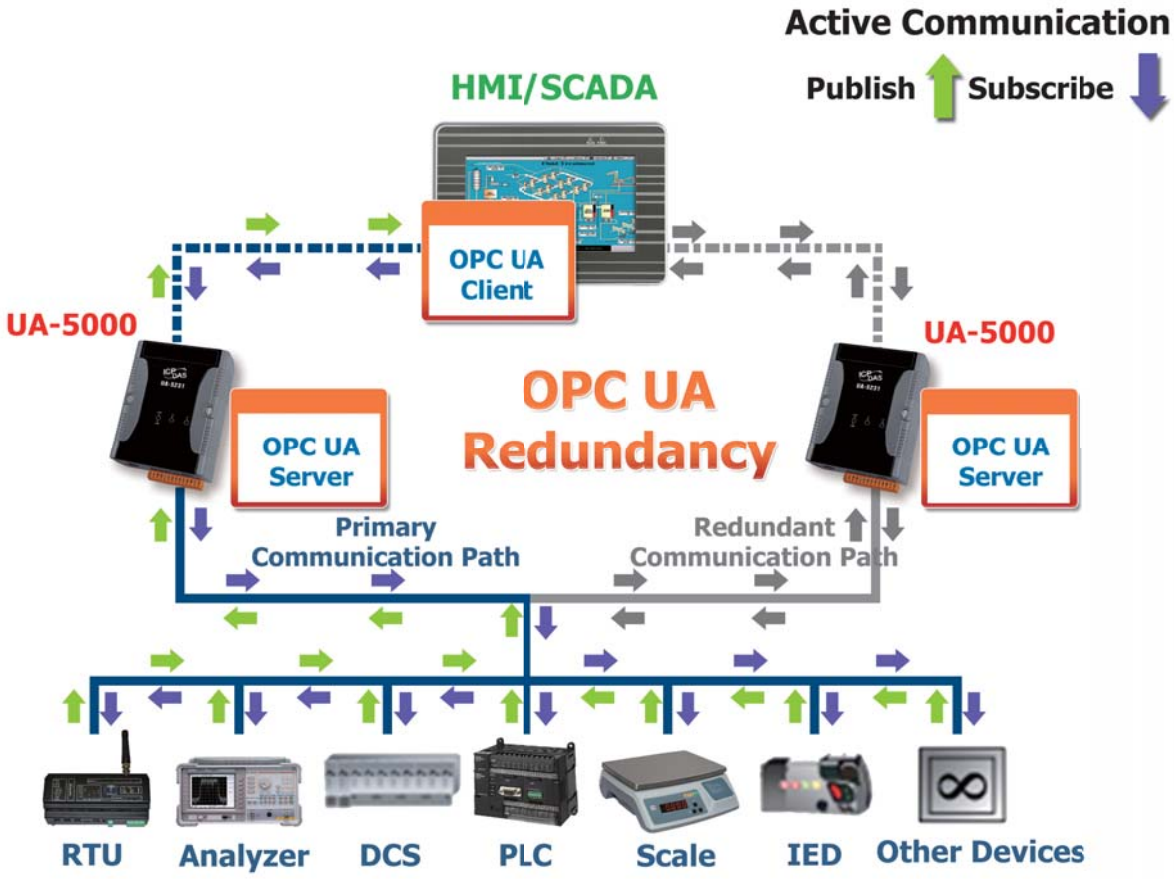
■ Support MQTT Protocol

Support MQTT to allow the IoT devices communicating with the OPC UA system and the UA-5000 conducting the data acquisition and management; and also can convert and publish the devices' data under the UA-5000 to the IoT system.

UA-5000 Function Overview		
Web-based UI	Built-in Web-based User Interface	
Flexible System Configuration	Variable Table/Communication Task Dynamic Editor	
OPC UA	Compliance with IEC 62541 Standard Cross-platform Data Integration (DA/AE/HDA) Transmission Security SSL Encryption Active Transmission Support Redundancy Support Remote Function Call	
MQTT Broker Inside	Compliance with MQTT V.3.1.1 Protocol	
PID Logic Operation	Dynamic Combination of I/O Devices for PID Logic Control	
Service Up to Interact with the Host	Protocol	OPC UA Server MQTT
	Interface	Ethernet Data Transmission
Driver Down to Interact with the I/O Modules	Protocol	Modbus RTU/TCP MQTT
	Interface	RS-232/RS-485 Ethernet Data Transmission

OPC UA: New Generation Industrial Communication Standard

OPC UA is the interoperability standard for security, reliable multi-vendor, multi-platform data exchange for Industrial Automation. It extends the classical OPC communication protocol, enabling data acquisition and information modeling and communication between the plant floor and the enterprise reliably and securely.



Key Features of OPC UA are:

■ **Platform Independent Data Communication**
OPC UA is designed to be independent of the platform. Using SOAP/XML over HTTP, OPC UA can be deployed on Linux, Windows XP Embedded, Windows 7, and Classical Windows platforms.

■ **Unified Access**
OPC UA integrates existing OPC specifications DA, A&E, HDA, Commands, Complex data, and Object Types in one specification. This reduces system integration costs by providing a common architecture for accessing information.

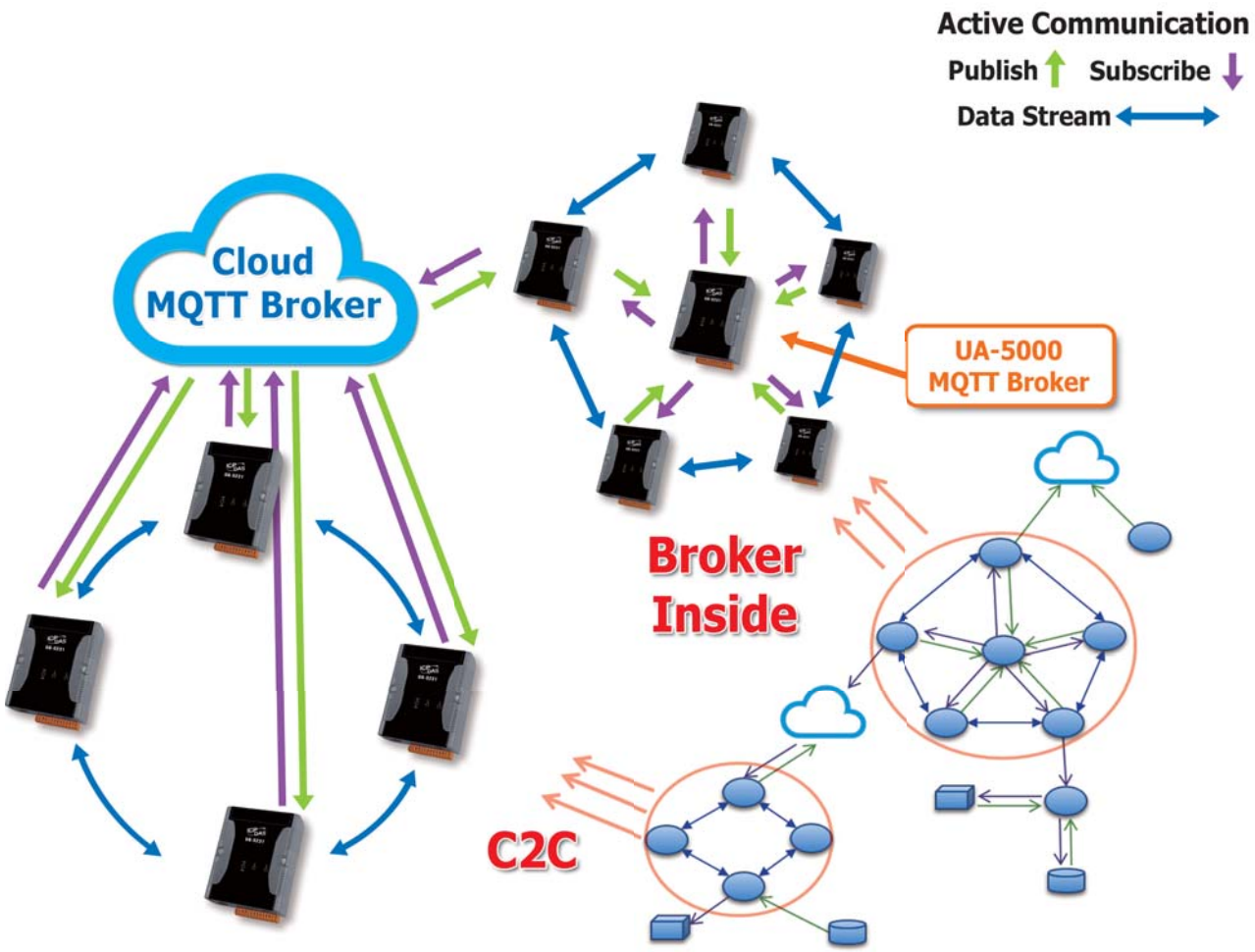
■ **Standardized Communication via Firewalls and Internet**
OPC UA uses message based security which means messages can be relayed through HTTP, UA TCP port or any other single port available.

■ **Reliability & Redundancy**
OPC UA implements a configurable timeouts, error detection, and communication failure recovery. OPC UA allows redundancy between applications from different vendors to be deployed.

■ **Security**
OPC UA is Secure-by-default, encryption enabled, and uses advanced certificate handling which includes Authentication, Authorization, Confidentiality, and Integrity.

MQTT: Active M2M Transmission Mechanism

MQTT is a method of **M**achine to **M**achine (**M2M**) communication by writing and retrieving application-specific data (messages) to and from queues, without having a private, dedicated connection to link them. It simplifies and accelerates the integration of diverse applications data between IIoT devices under assured, secure and reliable exchange of information circumstance. Using MQTT in IIoT devices not only dramatically simplifies the creation and maintenance of Industrial application but also makes connectivity for the "internet of things" and mobile devices easily.



MQTT Features:

- **Rapid, seamless connectivity**
  Rapid, seamless connectivity of information with a single, robust and trusted messaging backbone for dynamic heterogeneous environments.

- **Secure, reliable message delivery**
  Secure, reliable message delivery that preserves message integrity and minimizes risk of information loss.

- **High-performance Deployment**
  High-performance and scalable message transfer to meet the demands of today's enterprise and beyond.

- **Simplified management and control**
  Simplified management and control for better control and usability.

- **Lower cost**
  Lower cost of ownership by reducing cost of integration and accelerating time to deployment.

Hardware Specifications

Model	UA-5231	UA-5241
System Software		
OS	Linux Kernel 3.2.14	
Embedded Service	SFTP server, Web server, SSH	
CPU Module		
CPU	AM3352, 720 MHz	
DDR3 SDRAM	512 MB	
Flash	256 MB	
FRAM	64 KB	
Expansion Flash Memory	microSD socket with one 4 GB microSD card (support up to 32 GB microSDHC card)	
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year	
64-bit Hardware Serial Number	Yes, for Software Copy Protection	
Dual Watchdog Timers	Yes	
LED Indicators	4 LEDs (Power, Running and 2 user defined LEDs)	
Rotary Switch	Yes (0 ~ 9)	
VGA & Communication Ports		
VGA & Communication Ports	Yes, resolution: 640 × 480, 800 × 600, 1024 × 768, 1280 x 720	
Ethernet	RJ-45 x 1	RJ-45 x 2
	10/100/1000 Based-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
USB 2.0 (host)	1	
Console Port	RS-232 (RxD, TxD and GND); Non-isolated	
ttyO2	RS-485 (Data+, Data-); Non-isolated	
ttyO4	RS-232 (RxD, TxD and GND); Non-isolated	
ttyO5	RS-485 (Data+, Data-); 2500 VDC isolated	
Mechanical		
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm	
Installation	DIN-Rail Mounting	
Environmental		
Operating Temperature	-25 ~ +75°C	
Storage Temperature	-30 ~ +80°C	
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)	
Power		
Input Range	+12 ~ +48 VDC	
Consumption	4.8 W	

Software Specifications

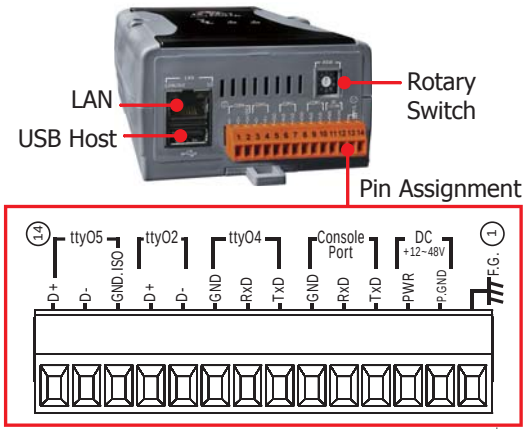
Model	UA-5000 Series
OPC UA	
OPC UA Server	• OPC Unified Architecture: 1.02 • Core Server Facet • Data Access Server Facet • Method Server Facet • Client Redundancy Facet • UA-TCP UA-SC UA Binary • User Token User Name Password & X509 Certificate • Security Policy ◦ None ◦ Basic128Rsa15 • Sign • Sign & Encrypt ◦ Basic256 • Sign • Sign & Encrypt
Modbus Master	
Modbus TCP	To read or control the devices that support standard Modbus TCP Slave protocol. Recommend to keep the maximum number of devices within 100 connections.
Modbus RTU	A max. of 3 ports: ttyO2, ttyO4, ttyO5 to connect other Modbus RTU Slave devices (e.g. M-7000). Recommend no more than 32 devices per port for better communication quality.
MQTT	
MQTT Client	Connect the MQTT Broker to read/control the devices supporting the MQTT protocol.
MQTT Service	Connect the MQTT Broker to externally read/control the devices supporting other protocols that linking with the UA-5000 series.
MQTT Broker	Compliance with MQTT v3.1.1 protocol. Support MQTT message distribution management. Recommend to keep the connection number of Client within 400.
Virtual Device	
PID Function	Combine the remote I/O devices for the PID logic control system.

Appearance

Front View

Top View

UA-5231 Bottom View



Ordering Information

UA-5231 CR	**IIoT Communication Server, with 1 Ethernet port (RoHS)**
UA-5241 CR	**IIoT Communication Server, with 2 Ethernet ports (RoHS)**

Option Accessories

DIN-KA52F	24 V/1.04 A, 25 W Power Supply with Din-Rail Mounting
MDR-20-24	24 V/1 A, 24 W Power Supply with DIN-Rail Mounting