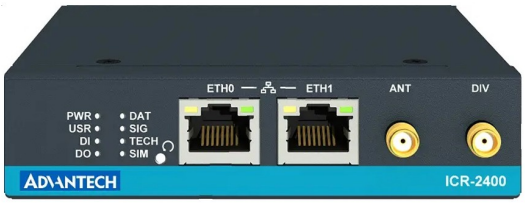
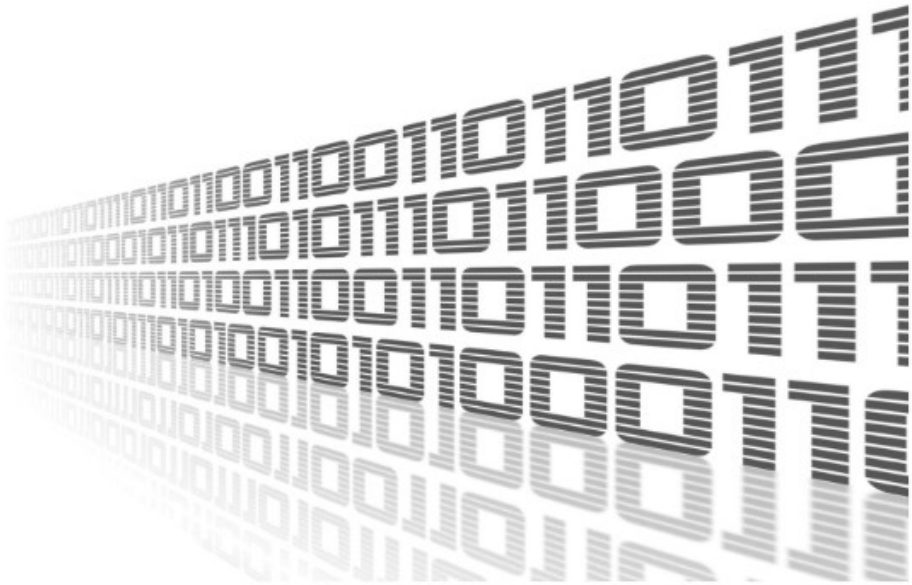


ADVANTECH Modbus To MQTT Router App User Guide

ADVANTECH

RouterApp

Modbus to MQTT



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Contents

Modbus To MQTT Router App

Used symbols

	Danger – Information regarding user safety or potential damage to the router.
	Attention – Problems that can arise in specific situations.
	Information – Useful tips or information of special interest.
	Example – Example of function, command or script.

Changelog

1. **Modbus to MQTT Changelog**

   v2.0.5

   • Change openssl (1.0.2u) to static library.

   v2.0.6

   • Add option of Azure SAS-token generation.

   • Need to install Python3 user module.

   • Add Data Type: Double World – Frame.

   • Add “Byte Swap” field in csv file.

• Add supported Data type “String”.

• Add “Word Swap” and “Byte Swap” for String Data Type.

v2.0.7

• Add show mosquitto error code and error message in the connected/disconnected function.

v2.0.8

• Add upload local cert and local key features for AWS.

v2.0.9

• Change modbus command maximum from 100 to 500.

v2.0.10

• Add polling the user module processes for each 5 seconds, if the user module crashed, it will run again.

v2.0.11

• Add “Custom2 Field” field in csv file.

• Add “Send Group” field in csv file, for MQTT send group feature.

• Add “Send interval” field in csv file, for MQTT send group feature.

v2.0.12

• Add Azure SAS-token generation (without Python3 user module). When Python3 user module installed, it will to use SAS-token generation by python.

v2.0.13

• Added ability to edit CSV, CA certificate, Local certificate and Local Private Key from WebUI.

v2.0.14

• Fixed issue when the Router App mb2mqtt is loading default configuration after Firmware update.

v2.0.15

• Fixed an issue with displaying space values in the Mapping Table page.

• Fixed an issue where the old value was displayed in the Mapping Table page when the configuration value was empty. v2.0.16

• For WADMP: Fixed the issue that the default value has whitespaces.

v2.0.17

• To support Integer with 2 bytes size (Example: convert 0xFFFF to -1).

• Set permissions to 755 for all files in the User Module.

v2.0.18

• Fixed an issue with integer-to-float conversion.

• Add more log message for MQTT value.

v2.0.19

• Increase Custom Fields to 10 (CSV configuration fields : Q, R, U AB)

v2.0.20

Fixed an issue where configuration comments were causing issues in the management system WADMP.

Description of the module

 This Router app is not contained in the standard router firmware. Uploading of this router app is described in the Configuration manual (see Chapter Related Documents).

 The router app is v2 router platform compatible.

Modbus to MQTT is an router app for providing seamless communication between Modbus/TCP devices and

MQTT device. Modbus to MQTT works as Modbus/TCP master to communicate with Modbus/TCP devices, and works as MQTT publisher/subscriber to communicate with MQTT broker.

Web Interface

Once the installation of the module is complete, the module's GUI can be invoked by clicking the module name on the Router Apps page of router's web interface.
Left part of this GUI contains menu with Router menu section. Return to Router menu section switches back from the module's web page to the router's web configuration pages. The main menu of module's GUI is shown on Figure 1.

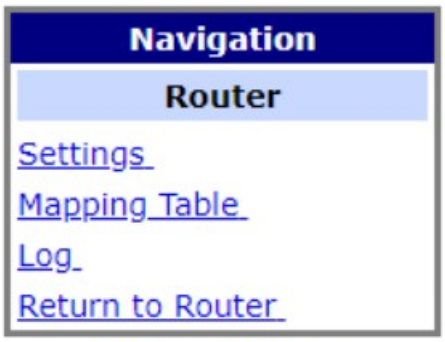

Figure 1: Menu

1. **Router**

   1.1 Settings

   Configuration of this router app can be done on Settings page, under Router menu section. All configuration items for Settings configuration page are described in the table below.

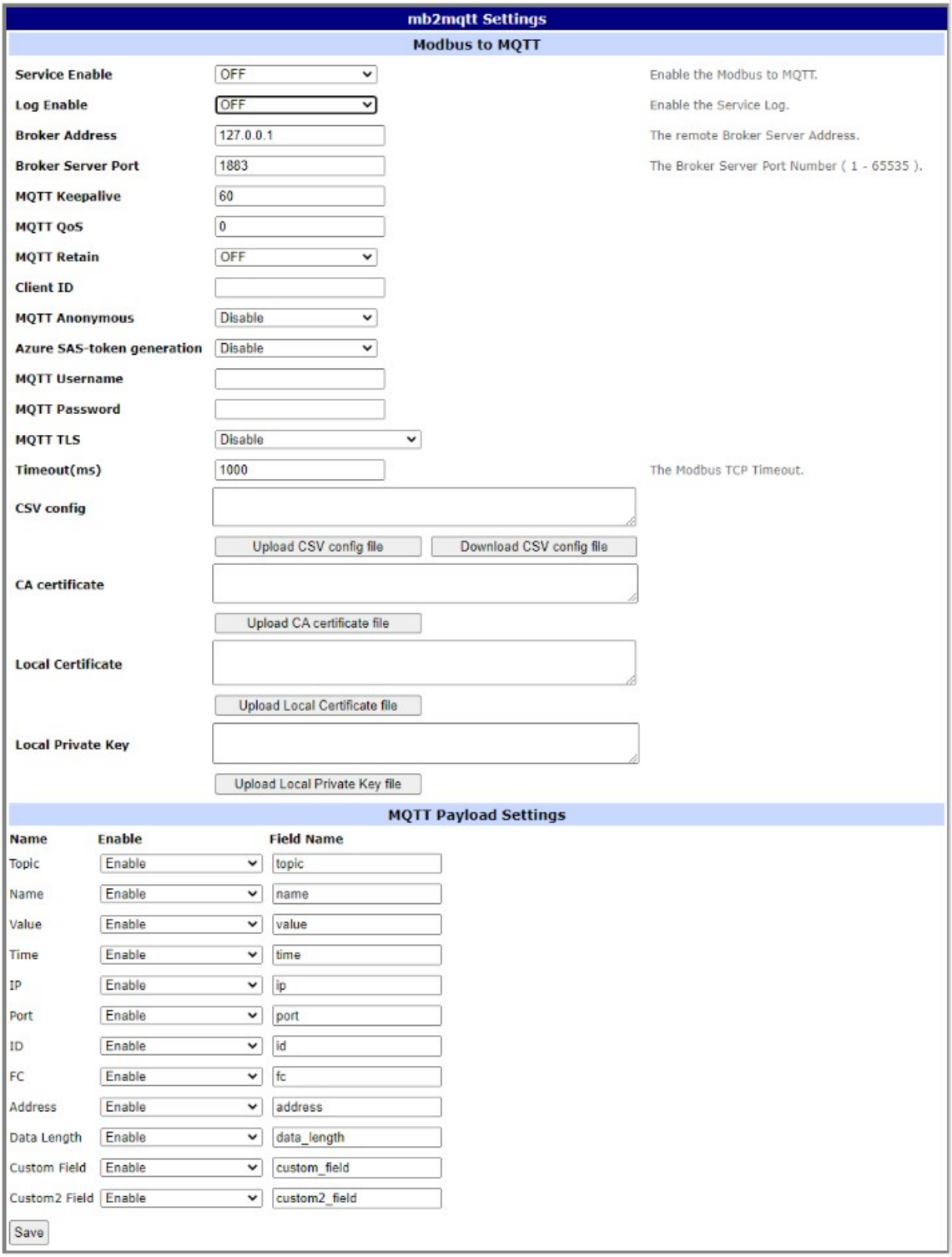

Figure 2: Settings

Item	Description
Service Enable	Enabled, Modbus to MQTT APN functionality of the module is turned on.
Log Enable APN	Enable the Service Log.
Broker Address	Enter the remote Broker Server Address.
Broker Server Port	Enter Broker Server Port Number (1-65535).
MQTT Keepalive	Enter MQTT keepalive interval (1-3600).
MQTT QoS	Enter MQTT QoS value (0,1,2).
MQTT Retain	Enable for message retaining.
Client ID	Enter Client ID.
MQTT Anonymous	Enable MQTT Anonymous
MQTT Username	Enter MQTT Username.
MQTT Password	Enter MQTT Password.
MQTT TLS	Enable MQTT TLS.
Interval(ms)	Enter Modbus TCP Polling Interval.
Timeout(ms)	Enter Modbus TCP Timeout.
CSV Config	Upload the file containing your CSV config here.
CA Certificate	Upload your CA Certificate here.
Local Certificate	Upload your Local Certificate here.
Local Private Key	Upload your Local Private Key here.

Table 1: Settings Example Items Description

1.2 Config file

In Modbus to MQTT, user configures the mapping between Modbus/TCP and MQTT through CSV file. In the csv file, the field separator (delimiter) is a comma.

Topic	Name	IP	Port	Device ID	Function Code	Address	Data length	Modbus Data type	Data Swap	Byte Swap	MQTT Data Type	Multiplier	Offset	Polling Interval (ms)	Send When Change	Custom Field	custom2 field	Send Group	Send Interval
env1-DI	DI_01	192.168.1.15	502	1	2	1	1	Boolean	None	False	Boolean	1	0	10000	No	0	0	0	1
env1-DO	DO	192.168.1.15	502	1	1	1	1	Boolean	None	False	Boolean	1	0	10000	No	0	0	0	1
env1-Temp	Temperature	192.168.1.15	502	1	4	1	2	Float	None	False	Float	1	0	10000	Yes	0	0	0	1
env1-Mode	Mode	192.168.1.15	502	1	3	10	2	Unsigned Integer	None	False	Unsigned Integer	1	0	10000	No	0	0	0	1
env1-Mode-w	Mode	192.168.1.15	502	1	16	10	2	Unsigned Integer	None	False	Unsigned Integer	1	0	10000	No	0	0	0	1
env2-DI	DI_01	192.168.1.16	502	1	2	1	1	Boolean	None	False	Boolean	1	0	10000	No	0	0	0	1
env2-DO	DO	192.168.1.16	502	1	1	1	1	Boolean	None	False	Boolean	1	0	10000	No	0	0	0	1
env2-Temp	Temperature	192.168.1.16	502	1	4	1	2	Float	None	False	Float	1	0	10000	Yes	0	0	0	1
env2-Mode	Mode	192.168.1.16	502	1	3	10	2	Unsigned Integer	None	False	Unsigned Integer	1	0	10000	No	0	0	0	1
env2-Mode-w	Mode	192.168.1.15	502	1	16	10	2	Unsigned Integer	None	False	Unsigned Integer	1	0	10000	No	0	0	0	1

Figure 3: CSV file

Item	**Description**
Topic	MQTT topic
Name	The name to identify the mapping.
IP	The Modbus device IP address.
Port	The TCP port number of the remote Modbus slave device.
Device ID	The Modbus/TCP slave ID.
Function Code	Modbus Function Code (FC). In Modbus to MQTT, supported function codes are: 1, 2, 3, 4, 5, 6, 15, 16 01: Read coils; 02: Read discrete inputs; 03: Read holding registers; 04: Read input register; 05: Write single coil; 06: Write single register; 15: Write multiple coils; 16: Write multiple registers.
Address	Designate the read from/write to starting address for the Modbus registry.
Data length	When FC=1, 2, 5 or 15, the unit is bit(s) When FC=3, 4, 6 or 16, the unit is word(s)
Modbus Data type	Modbus data type. Options: Boolean, Integer, Unsigned Integer, Float

Data Swap	The Data Swap field determines the order in which the particular bytes of the received/transmitted data are delivered. None: Do not swap; Word: 0x01, 0x02 becomes 0x02, 0x01; Double Word: 0x01, 0x02, 0x03, 0x04 becomes 0x04, 0x03, 0x02, 0x01. Double Word – Frame: 0x01, 0x02, 0x03, 0x04 becomes 0x04, 0x03, 0x02, 0x01. Quad Word: 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07980 becomes 0x07980, 0x05, 0x06, 0x03, 0x04, 0x01, 0x02.
Byte Swap	Option: True, False When option is True: 0x01, 0x02 becomes 0x01, 0x02. 0x01, 0x02, 0x03, 0x04 becomes 0x01, 0x02, 0x03, 0x04.
MQTT Data type	MQTT data type. Options: Boolean, Integer, Unsigned Integer, Float, Long Integer, Unsigned
Multiplier	The value used to multiply the data value.
Offset	The value used to add/substract the data value.
Polling Interval (ms)	Modbus Polling Interval, unit: milliseconds. The value range: 1 10000000
Send When Change	Select that the data is sent immediately when change happens on modbus slave. Options: Yes, No
Custom Field	Custom definition value
Custom2 Field	Custom definition value
Send Group	Set group number for MQTT multiple messages to one message. The value range is from 0 to 500. When the value is 0, this feature is disabled.
Send Interval	Send MQTT message interval for the group in seconds. The value range is from 1 to 10000 seconds.

Table 2:Configuration items description

The CSV file can be imported into Advantech router in router app Setting WEB page. After import CSV file and click “Save” button, the new mapping configuration will take effect immediately.

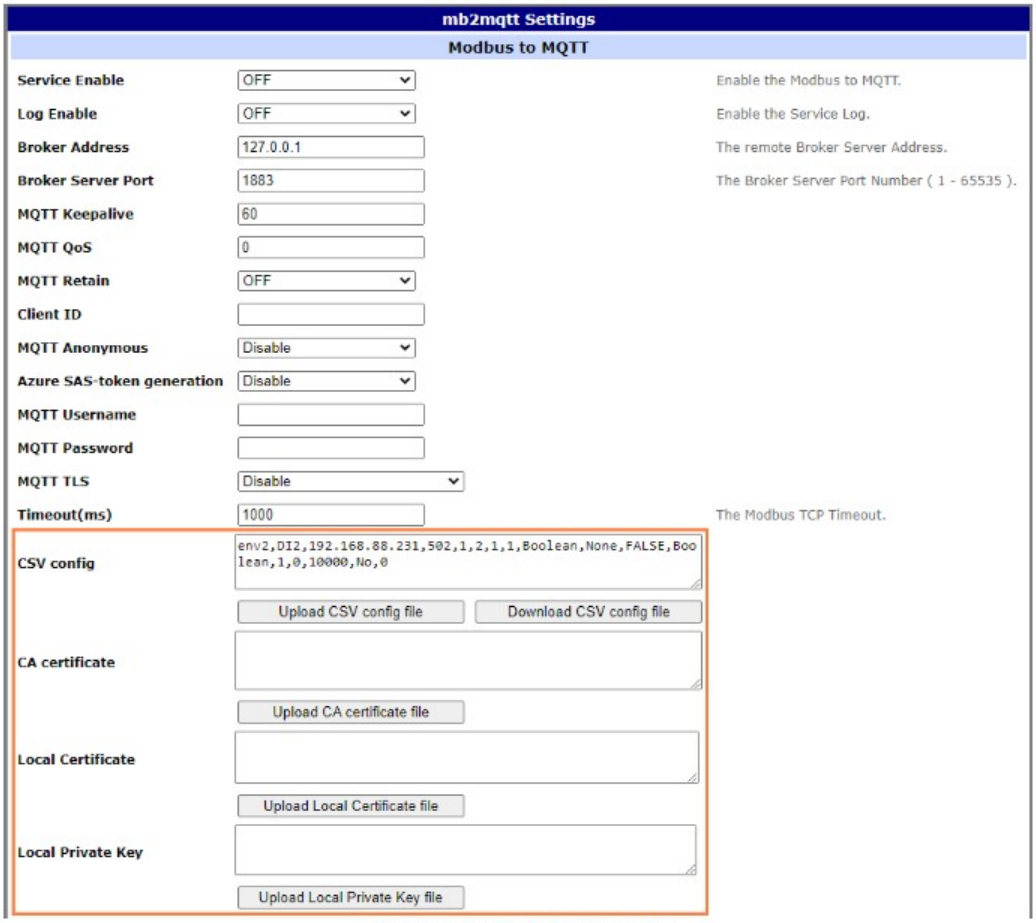

Figure 4: CVS file import

1.3Mapping table

The Modbus/TCP to MQTT mapping will be shown in Mapping Table WEB page.

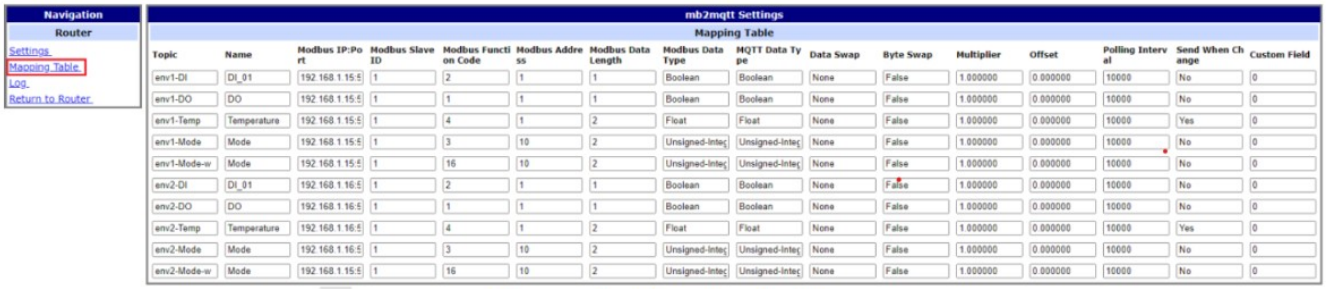

Figure 5: Mapping table

1.4MQTT Data Format

When Modbus/TCP FC is 1, 2, 3 or 4, Modbus to MQTT will work as MQTT publisher to post Modbus/TCP data in JSON format to MQTT broker. When Modbus/TCP FC is 5, 6, 15 or 16, Modbus to MQTT will work as MQTT subscriber to ask subscription information, and forward the data to Modbus/TCP device.

Here are the example of MQTT data that is published from Modbus to MQTT.

```
{
   "time" : "2020-06-09 15:25:06.667",
   "topic" : "env1-DI"
   "name" : "DI_01",
   "value" : true,
   "ip" : "192.168.1.15",
   "port" : "502",
   "id" : "1",
   "fc" : "1",
   "address" : "1",
   "data length" : "1"
}
```

Note that Modbus to MQTT verify just topic, name and value fields of the received subscription information.

```
{
   "topic": "env1-Mode-w",
   "name": "Mode",
   "value": "1234"
}
```

Related Documents

You can obtain product-related documents on Engineering Portal at **icr.advantech.cz** address.
To get your router's Quick Start Guide, User Manual, Configuration Manual, or Firmware go to the **Router Models** page, find the required model, and switch to the Manuals or Firmware tab, respectively.
The Router Apps installation packages and manuals are available on the **Router Apps** page.
For the Development Documents, go to the **DevZone** page.

ADVANTECH
Modbus to MQTT Manual

Documents / Resources

	**ADVANTECH Modbus To MQTT Router App** [pdf] User Guide Modbus To MQTT Router App, Modbus, To MQTT Router App, MQTT Router App, Router App

References

- **Advantech 4G, 5G Cellular Routers & Gateways for IoT applications - Engineering Portal**
- **Advantech 4G, 5G Cellular Routers & Gateways for IoT applications - Engineering Portal**
- **DevZone - Cellular Routers Engineering Portal**
- **Router Apps - Cellular Routers Engineering Portal**
- **Router Models - Cellular Routers Engineering Portal**