

Industrial Computer Products

Data Acquisition Systems

# **MQ-7200M** Series



# **User Manual**

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Email: service@icpdas.com

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# 1. Introduction

The MQ-7200M series is a web-based Ethernet I/O module equipped with a built-in web server allows the user to configure module and control/monitor the status of digital I/O by simply using a regular web browser.

Support for MQTT protocol makes it easy to connect sensors to Internet of Things (IoT) system via the MQ-7200M series module. Users can simply and effectively control/monitor remote sensors with MQTT client tools on the PC/NB or mobile devices.



### 1.1 Features

The MQ-7200M module offers the most comprehensive configuration focused on meeting specific application requirements. The following details the features designed to simplify installation, configuration and application.

#### **Support for MQTT Protocol**

MQTT stands for Message Queuing Telemetry Transport. It is a machine-to-machine (M2M) /"Internet of Things" connectivity protocol with extremely lightweight publish/subscribe messaging transport. It is useful for mobile applications because of its small size, low power usage, minimized data packets, and efficient distribution of information to one or many receivers.

#### Built-in I/O

Various I/O components are mixed with multiple channels in a single I/O module, which provides the most cost effective I/O usage and enhances performance of the I/O operations.

#### **Daisy-Chain Ethernet Cabling**

The MQ-7200M Series has a built-in two-port Ethernet switch to implement daisy-chain topology. The cabling is much easier and total costs of cable and switch are significantly reduced.



#### LAN Bypass

LAN Bypass feature guarantees the Ethernet communication. It will automatically activate to continue the network traffic if any one of the MQ-7200M loses its power



#### **Dual Watchdog**

The Dual Watchdog consists of a Module Watchdog and a Communication Watchdog. The actions of digital output are also associated to the Dual Watchdog.

<u>Module Watchdog</u> is a built-in hardware circuit to monitor the operation of the module and will reset the CPU if a failure occurs in the hardware or the software. Then the Power-on Value of digital output will be loaded.

**<u>Communication Watchdog</u>** is a software function to monitor the communication between the MQTT broker and the MQ-7200M. When the MQ-7200M is disconnected from the MQTT broker for a while, the watchdog forces the digital output to pre-defined Safe Value to prevent unpredictable damage of the connected devices.

#### Power-on Value and Safe Value

Power-on value and Safe Value are designed to improve system safety:

**<u>Power-on Value</u>**: The Power-on Value is loaded into the digital output when the module is powered-on or reset by Module Watchdog.

<u>Safe Value</u>: When the Communication Watchdog is enabled and a Communication Watchdog timeout occurs, the "safe value" is loaded into the digital output.

#### **Highly Reliable Under Harsh Environment**

Wide Operating Temperature Range: -25 ~ +75°C Storage Temperature: -30 ~ +80°C Humidity 10 ~ 90% RH (Non-condensing)



#### **Reset Button**

The reset button is used to restore all settings to factory defaults. It is very useful especially when the user forgets the IP address to access the MQ-7200M module. Pressing and holding the reset button for at least 3 seconds will restore the module to its factory defaults. For more information, see section "7.4. How to restore MQ-7200M to default settings?".



the power input to ease the wiring.

## **1.2 Overview**



| MQ-7200M     | Label         | Status  | Description  |  |
|--------------|---------------|---|--|--|
|              | RUN           | Flashing  | The unit is turned on and ready.                     |  |
|              | E1            | On  | A link has been established on the E1 port.          |  |
|              |               | Off   | No link is established on the E1 port.               |  |
| LED          |               | Flashing  | Data is now transferred via the E1 port.             |  |
| Indicators   | E2            | On  | A link has been established on the E2 port.          |  |
|              |               | Off   | No link is established on the E2 port.               |  |
|              |               | Flashing  | Data is now transferred via the E2 port.             |  |
|              | I/O Indictors | The number of I/O will vary depending on the module mode    |  |  |
| Connector 1  |               | The specific  | design and functionality of the module depend on its |  |
| Connector 2  |               | specifications.   |  |  |
| Reset Button |               | Reset the module by pressing the Reset button for 3 seconds |  |  |

# **1.3** Dimensions (Unit: mm)



**Top View** 



Left Side View

**Front View** 



**Bottom View** 

# 2. Hardware Information

## 2.1 MQ-7244M

### I/O Specifications

| Digital Input            |  |
|--------------------------|--|
| Channels                 | 8  |
| Туре                     | Wet Contact                                |
| Sink/Source (NPN/PNP)    | Sink/Source                                |
| On Voltage Level         | +10 V <sub>DC</sub> ~ +50V <sub>DC</sub>   |
| Off Voltage Level        | +4 V <sub>DC</sub> max.                    |
| Input Impedance          | 10 ΚΩ                                      |
| Overvoltage Protection   | 70 V <sub>DC</sub>                         |
| Digital Output           |  |
| Channels                 | 8  |
| Туре                     | Isolated Open Collector                    |
| Sink/Source (NPN/PNP)    | Sink                                       |
| Max Load Current         | 650 mA/Channel at 25°C                     |
|                          | Direct Drive Power Relay Module            |
| Load Voltage             | +3.5 V <sub>DC</sub> ~ +50 V <sub>DC</sub> |
| Overvoltage Protection   | 60 V <sub>DC</sub>                         |
| Overload Protection      | 1.4 A                                      |
| Short-circuit Protection | Yes  |
| Power-on Value           | Programmable                               |
| Safe Value               | Programmable                               |

### **Pin Assignments**



### **Wire Connections**

| Digital Input | Readback as 1             | Readback as 0                 |
|---------------|---------------------------|-------------------------------|
|               | +10 ~ +50 V <sub>DC</sub> | Open or < 4 V <sub>DC</sub>   |
| Sink          | INX 10K<br>               | INX 10K<br>To other<br>IN.COM |
| Source        | INX 10K<br>               | INX 10K<br>                   |

| Digital Output  | ON State: Readback as 1 | OFF State: Readback as 0 |
|-----------------|-------------------------|--------------------------|
| Drive Relay     |                         |                          |
| Resistance Load |                         |                          |

## 2.2 MQ-7251M

### I/O Specifications

| Digital Input          |  |
|------------------------|--|
| Channels               | 16                                       |
| Туре                   | Wet Contact                              |
| Sink/Source (NPN/PNP)  | Sink/Source                              |
| On Voltage Level       | +10 V <sub>DC</sub> ~ +50V <sub>DC</sub> |
| Off Voltage Level      | +4 V <sub>DC</sub> max.                  |
| Input Impedance        | 10 ΚΩ                                    |
| Overvoltage Protection | 70 V <sub>D</sub>                        |

### **Pin Assignments**



#### **Wire Connections**

| Digital Input | Readback as 1                                      | Readback as 0               |
|---------------|--|-----------------------------|
|               | +10 ~ +50 V <sub>DC</sub>                          | Open or < 4 V <sub>DC</sub> |
| Sink          | INX 10K<br>INX 10K<br>To other<br>IN.COM<br>IN.COM | INX 10K<br>                 |
| Source        | INX 10K  | INX 10K                     |

## 2.3 MQ-7252M

### I/O Specifications

| Digital Input            |   |
|--------------------------|---|
| Channels                 | 8   |
| Туре                     | Wet Contact                               |
| Sink/Source (NPN/PNP)    | Sink/Source                               |
| On Voltage Level         | +10 V <sub>DC</sub> ~ +50V <sub>DC</sub>  |
| Off Voltage Level        | +4 V <sub>DC</sub> max.                   |
| Input Impedance          | 10 ΚΩ                                     |
| Overvoltage Protection   | 70 V <sub>DC</sub>                        |
| Digital Output           |   |
| Channels                 | 8   |
| Туре                     | Isolated Open Collector                   |
| Sink/Source (NPN/PNP)    | Source                                    |
| Max. Load Current        | 650 mA/Channel at 25°C                    |
| Load Voltage             | +10 V <sub>DC</sub> ~ +40 V <sub>DC</sub> |
| Overvoltage Protection   | 47 V <sub>DC</sub>                        |
| Overload Protection      | -   |
| Short-circuit Protection | Yes                                       |
| Power-on Value           | Programmable                              |
| Safe Value               | Programmable                              |

### **Pin Assignments**



### Wire Connections

| Digital Input | Readback as 1   | Readback as 0  |
|---------------|---|--|
|               | +10 ~ +50 V <sub>DC</sub>                                 | Open or < 4 V <sub>DC</sub>  |
| Sink          | INX 10K<br>+-<br>III -<br>III -<br>To other<br>IN.COM<br> | INX 10K<br>  |
| Source        | INX 10K<br>→ → → → → → → → → → → → → → → → → → →          | INX 10K<br>INX |



## 2.4 MQ-7253M

### I/O Specifications

| Digital Input          |              |
|------------------------|--------------|
| Channels               | 16           |
| Туре                   | Dry Contact  |
| Sink/Source (NPN/PNP)  | Source       |
| On Voltage Level       | Close to GND |
| Off Voltage Level      | Open         |
| Overvoltage Protection | -            |
| Effective Distance     | 500 M Max.   |

### **Pin Assignments**



#### **Wire Connections**

| Digital Input | ON State: Readback as 1  |
|---------------|--------------------------|
|               | T<br>Relay Close         |
| Dry Contact   | OFF State: Readback as 0 |
|               |                          |

# 2.5 MQ-7255M

### I/O Specifications

| Digital Input            |                   |   |  |
|--------------------------|-------------------|---|--|
| Channels                 |                   | 8   |  |
| Туре                     |                   | Dry and Wet Contact                       |  |
| Sink/Source (N           | (מואס/ ואסו       | Dry: Source                               |  |
| Sink/Source (N           | IPIN/PINP)        | Wet: Sink/Source                          |  |
| Wat Contact              | On Voltage Level  | +10 V <sub>DC</sub> ~ +50 V <sub>DC</sub> |  |
| Wet Contact              | Off Voltage Level | +4 V <sub>DC</sub> max.                   |  |
| Dry Contact              | On Voltage Level  | Close to GND                              |  |
| Dry Contact              | Off Voltage Level | Open                                      |  |
| Input Impedan            | ice               | 10 ΚΩ                                     |  |
| Overvoltage Pr           | otection          | +70 V <sub>DC</sub>                       |  |
| Digital Output           | :                 |   |  |
| Channels                 |                   | 8   |  |
| Туре                     |                   | Isolated Open Collector                   |  |
| Sink/Source (N           | IPN/PNP)          | Source                                    |  |
| Max. Load Cur            | rent              | 650 mA/channel at 25°C                    |  |
| Load Voltage             |                   | +10 V <sub>DC</sub> ~ +40 V <sub>DC</sub> |  |
| Overvoltage Pr           | otection          | 47 V <sub>DC</sub>                        |  |
| Overload Protection      |                   | -   |  |
| Short-circuit Protection |                   | Yes                                       |  |
| Power-on Valu            | e                 | Programmable                              |  |
| Safe Value               |                   | Programmable                              |  |

### **Pin Assignments**



### Wire Connections

| Digital Input           | Readback as 1             | Readback as 0                                 |
|-------------------------|---------------------------|---|
|                         | +10 ~ +50 V <sub>DC</sub> | Open or < 4 V <sub>DC</sub>                   |
| Wet Contact<br>(Sink)   | INX 10K<br>               | INX 10K<br>                                   |
| Wet Contact<br>(Source) | INX 10K                   | INX 10K<br>INX 10K<br>INCOM<br>INCOM<br>INCOM |

| Digital Input | ON State: Readback as 1 | OFF State: Readback as 0 |
|---------------|-------------------------|--------------------------|
| Dry Contact   |                         | × Relay Open             |

| Digital Output | ON State: Readback as 1  |
|----------------|--|
|                | → DO.PWR<br>+<br>-<br>DOx<br>Load DO.GND<br>Load DO.GND<br>Load DO.GND<br>Load DO.GND<br>To other channels     |
| Source         | OFF State: Readback as 0   |
|                | → DO.PWR<br>+ DO.PWR<br>+ Fuse Overvoltage Protection<br>Current Limit InK<br>Load DO.GND<br>To other channels |

# **3. Getting Started**

If the user is new to using the MQ-7200M module, start with this chapter as it includes a guided tour that provides a basic overview of how to install, configure and use the module.

### What's in the BOX?

Before starting any task, please check the package contents. If any of the following items are either missing or damaged, contact the dealer or distributor.



MQ-7200M Module



Quick Start Guide

### **Technical Support**

- MQ-7200M User Manual https://www.icpdas.com/en/download/show.php?num=2675
- MQ-7200M Website

https://www.icpdas.com/en/product/guide+Remote\_\_I\_O\_\_Module\_\_and\_\_Unit+Ethern et\_\_I\_O\_\_Modules+MQ-7200M

• ICP DAS Website http://www.icpdas.com/

## 3.1 Cabling Power and Network

#### Step 1:

Connect the computer to the Ethernet Port via the Hub or Switch.

#### Step 2:

Connect the positive of the power supply to the terminal marked "(R)+Vs". Connect the negative of the power supply to the terminal marked "(B)GND".



# 3.2 Installing the MiniOS7 Utility

The MiniOS7 Utility provides a quick and easy way to configure the Ethernet settings, update OS image or firmware file to the MQ-7200M from a computer. After the installation has been completed, a new shortcut for the MiniOS7 Utility will be displayed on the desktop.

#### Step 1: Install the MiniOS7 Utility tool



The latest version of the MiniOS7 Utility can be obtained from the ICP DAS website: https://www.icpdas.com/en/product/guide+Software+Development Tools+MiniOS7

#### Step 2: Follow the instructions in the Setup Wizard to complete the installation

After the installation has been completed, a new short cut for the MiniOS7 Utility will be displayed on the desktop.



# 3.3 Configuring Network Settings

The MQ-7200M comes with default network settings as the table below. Before starting the MQ-7200M, valid network settings for the LAN where the module will operate need be set to the module.

#### **Default Ethernet Settings**

| Item        | Default       |
|-------------|---------------|
| IP Address  | 192.168.255.1 |
| Subnet Mask | 255.255.0.0   |
| Gateway     | 192.168.0.1   |

#### Step 1: Run the MiniOS7 Utility



| 🏙 MiniOS7 Utility Version 3 | .2.7           |                    |            |        |              |               |            |        | ×        |
|-----------------------------|----------------|--------------------|------------|--------|--------------|---------------|------------|--------|----------|
| 🔯 File 🌔 Connection 👻       | 🕨 Command 🛽    | Configuration      | 📑 Tools 🤞  | 🛛 Help | •            |               |            |        |          |
| Look jn: MiniOS7_Utility    |                | 💽 🔇 🏚 🖻            |            |        | Lock in: Dis | ¢٨            | ~          |        | 働        |
| Name                        | Size           | Туре               | Modified   | No     | Name         |               | Size       |        | Modified |
| 🔄 🔜 bin                     |                | File Folder        | 2022/17:   |        |              |               |            |        |          |
| FIRMWARE                    |                | File Folder        | 2022/1/:   |        |              |               |            |        |          |
| OS_IMAGE                    |                | File Folder        | 2022/17:   |        |              |               |            |        |          |
| 💽 icpdas                    | 1KB            | URL File           | 2022/17:   |        |              |               |            |        |          |
| 🛯 🚳 load232.dll             | 88KB           | DLL File           | 2007/1/:   |        |              |               |            |        |          |
| 🛃 MiniOS7_Utility.chm       | 1,015KB        | CHM File           | 2009/10    |        |              |               |            |        |          |
| MiniOS7_Utility.exe         | 2,544KB        | EXE File           | 2015/7/    |        |              |               |            |        |          |
| MiniOS7_Utility.ini         | 1KB            | INI File           | 2015/7/    |        |              |               |            |        |          |
| 🧕 uart.dll                  | 56KB           | DLL File           | 2006/12    |        |              |               |            |        |          |
| unins000.dat                | 18KB           | DAT File           | 2022/1/:   |        |              |               |            |        |          |
| 🕞 unins000.exe              | 1,166KB        | EXE File           | 2022/1/:   |        |              |               |            |        |          |
|                             |                |                    |            |        |              |               |            |        |          |
| <                           |                |                    | >          |        |              |               |            |        |          |
|                             |                |                    |            |        |              |               |            |        |          |
| Connection(F2)              | d(F5) 📓 DiskTo | ool(F6) 🛅 Info(F7) | 🗴 Delete(F | 8)     | Refresh(F9)  | E Console(F10 | 🖭 DOS(F11) | 🏘 Sear | ch(F12)  |

Step 2: Click the menu "Connection > Search" (or press the "F12" key) to search for the module.

| Dook in:       | Connection<br><u>New connec</u><br>Last Connec | Command<br>tion F2<br>tion Alt+F2 | 🛐 Configurat               | ion<br>🦻          |              |             |   |
|----------------|--|-----------------------------------|----------------------------|-------------------|--------------|-------------|---|
| Name           | Disconnect                                     | Ctrl+F2                           | Туре                       | _                 |              |             |   |
| FIRMV-         | Search   | F12                               | File Folder<br>File Folder |                   |              |             |   |
|                | iniOS7 Scan                                    | `                                 | File Folder                |                   | —            |             | × |
| <u>S</u> earch | n Options <u>C</u> or                          | nect Clear IP se                  | tting <u>H</u> elp         | E <u>x</u> it     |              |             |   |
| Туре           |  | IP/Port                           | Name                       | Alias             | Mask         | Gateway     | ^ |
| TCP            | BroadCast                                      | 192.168.123.20                    | DL-302                     | EtherIO           | 255.255.0.0  | 192.168.1.1 | _ |
| TCP            | BroadCast                                      | 192.168.83.70                     | VP4231                     | VP4231            | 255.255.0.0  | 192.168.1.1 |   |
| TCP            | BroadCast                                      | 192.168.16.221                    | IR-712-MTCP                | IrLearn           | 255.255.0.0  | 192.168.1.1 |   |
| TCP            | BroadCast                                      | 192.168.1.241                     | ACS-11-MF                  | ACS-11-MF         | 255.255.0.0  | 192.168.1.1 |   |
| ► TCP          | BroadCast                                      | 192,168,255,1                     | MQ-7255M                   | MQ7255M_65FA52    | 255.255.0.0  | 192.168.1.1 |   |
| <              | dana Che                                       | ock the status h                  | ar to monito               | r for the progres | s of the sea | rch         | > |

#### Step 3: Click the "192.168.255.1" in the IP/Port field and click the "IP Settings" button

Click the item you want to configure (the default IP= "**192.168.255.1**") and then click the "**IP Settings**" button to display the configuration dialog box.

| 🏙 MiniOS7 Scan |                        |             |                | -           |             | ×  |
|----------------|------------------------|-------------|----------------|-------------|-------------|----|
| Search Options | Connect Clear (IP sett | ing Help    | E <u>x</u> it  |             |             |    |
| Туре           | IP/Port                | Name        | Alias          | Mask        | Gateway     | ^  |
| TCP BroadCast  | 192.168.123.20         | DL-302      | EtherIO        | 255.255.0.0 | 192.168.1.1 | _  |
| TCP BroadCast  | 192.168.83.70          | VP4231      | VP4231         | 255.255.0.0 | 192.168.1.1 |    |
| TCP BroadCast  | 192.168.16.221         | IR-712-MTCP | IrLearn        | 255.255.0.0 | 192.168.1.1 |    |
| TCP BroadCast  | 192.168.1.241          | ACS-11-MF   | ACS-11-MF      | 255.255.0.0 | 192.168.1.1 |    |
| TCP BroadCast  | 192.168.255.1          | MQ-7255M    | MQ7255M_65FA52 | 255.255.0.0 | 192.168.1.1 |    |
| <              |                        |             | -              |             | 2           | ×  |
| Search done.   |                        |             |                |             |             | // |

#### Step 4: Specify the appropriate IP/Mask/Gateway address

In the **IP Settings** dialog box, the user can manually specify the IP, Mask, Gateway addresses, and alias. Alternatively, the user can enable the DHCP Client function to dynamically obtain an IP address from the DHCP Server. After entering the appropriate values, click the "**Set**" button to update the configuration.

|            | 🚵 IP Setting 🛛 🗆 🗆                            | × |
|------------|---|---|
|            | Recommend Settings                            |   |
| IP setting | IP: 192.168.255.1                             | 1 |
|            | Mask: 255.255.0.0                             | ] |
|            | Gateway: 192.168.0.1                          | ] |
|            | Alias: MQ7255M_65FA52                         | 1 |
|            | DHCP  | 1 |
|            | <ul> <li>Disable</li> <li>C Enable</li> </ul> |   |
|            |   |   |
|            | Set Cancel                                    | ] |

#### **Step 5:** Verify the new settings

Reboot the module and repeat Step 2 by pressing the "F12" key to search for the module again. Confirm that the new settings have been applied.

| 🔯 File               | Connection                                       | n 두 🚸 Command  | 😨 Configurat  | ion   |   |  |   |
|----------------------|--|--|---|---|---|--|---|
| Look jn:             | <u>N</u> ew conne<br><u>L</u> ast Conne          | ection F2<br>ection Alt+F2   | 🔽 🔇 🤌 I   | <b>*</b>  |   |  |   |
| Name<br>bin<br>FIRMW | Disconnect                                       | : Ctrl+F2  | File Folder   |   |   |  |   |
|                      | liniOS7 Scan                                     |  | File Felder   |   | -   |  | × |
|                      | h Options <u>C</u> or                            | nnect Clea <u>r</u> IP setti   | ing Help E  | <b>x</b> it   |   |  |   |
| Тур                  | e  | IP/Port  | Name  | Alias   | Mask  | Gateway  | 1 |
| TCF                  | BroadCast  | 102.100.101.15   | D.L. 000  |   |   |  | ^ |
|                      |  | 132.166.101.15   | DL-302  | EtherIO   | 255.255.0.0   | 192.168.1.1  | ^ |
| TCF                  | BroadCast  | 192.168.123.20   | DL-302<br>DL-302                                      | EtherIO<br>EtherIO  | 255.255.0.0<br>255.255.0.0  | 192.168.1.1<br>192.168.1.1   |   |
|                      | BroadCast<br>BroadCast                           | 192.168.101.15<br>192.168.123.20<br>192.168.83.70                                    | DL-302<br>DL-302<br>VP4231                            | EtherIO<br>EtherIO<br>VP4231                              | 255.255.0.0<br>255.255.0.0<br>255.255.0.0                               | 192.168.1.1<br>192.168.1.1<br>192.168.1.1  |   |
|                      | BroadCast<br>BroadCast<br>BroadCast              | 192.168.123.20<br>192.168.83.70<br>192.168.16.221                                    | DL-302<br>DL-302<br>VP4231<br>IR-712-MTCP             | EtherIO<br>EtherIO<br>VP4231<br>IrLearn                   | 255.255.0.0<br>255.255.0.0<br>255.255.0.0<br>255.255.0.0                | 192.168.1.1<br>192.168.1.1<br>192.168.1.1<br>192.168.1.1                               |   |
| TCF<br>TCF<br>TCF    | BroadCast<br>BroadCast<br>BroadCast<br>BroadCast | 192.168.101.15<br>192.168.123.20<br>192.168.83.70<br>192.168.16.221<br>192.168.79.55 | DL-302<br>DL-302<br>VP4231<br>IR-712-MTCP<br>MQ-7255M | EtherIO<br>EtherIO<br>VP4231<br>IrLeam<br>MQ7255M_65FA52  | 255.255.0.0<br>255.255.0.0<br>255.255.0.0<br>255.255.0.0<br>255.255.0.0 | 192.168.1.1<br>192.168.1.1<br>192.168.1.1<br>192.168.1.1<br>192.168.1.1                |   |
|                      | BroadCast<br>BroadCast<br>BroadCast<br>BroadCast | 192.168.101.15<br>192.168.123.20<br>192.168.83.70<br>192.168.16.221<br>192.168.79.55 | DL-302<br>DL-302<br>VP4231<br>IR-712-MTCP<br>MQ-7255M | EtherIO<br>EtherIO<br>VP4231<br>IrLearn<br>MQ7255M_65FA52 | 255.255.0.0<br>255.255.0.0<br>255.255.0.0<br>255.255.0.0<br>255.255.0.0 | 192.168.1.1<br>192.168.1.1<br>192.168.1.1<br>192.168.1.1<br>192.168.1.1<br>192.168.1.1 |   |

## 3.4 Logging in to Web Interface

The MQ-7200M series module provides a web-based user interface that allows users to manage the module, access I/O, and monitor the running status through a standard web browser.

#### Step 1: Launch the browser

The user can use a standard web browser such as Mozilla Firefox or Internet Explorer to log in to the MQ-7200M module.

#### Step 2: Enter the IP address for the MQ-7200M

If the user has not changed the default IP address of the MQ-7200M module, refer to Sections 3.2. and 3.3. to configure it.



#### Step 3: Enter the User name and Password

The factory default username and password are as follows:

| Item      | Default |
|-----------|---------|
| User name | Admin   |
| Password  | Admin   |

| Sign in to<br>Authorizatio<br>Your connect | access this site<br>on required by http://192.168.79.55<br>tion to this site is not secure |
|--|--|
| Username                                   | Admin  |
| Password                                   |  |
|  | Sign in Cancel   |

#### **Step 4:** Welcome to the MQ-7200M web interface

After logging into the module, the Overview page provides a brief description of the module, including its MAC address, the current firmware version, and other relevant information.

| MQ-7200M                 | l    | × +               |           |              |           |            |         |           |        |         |           | -      | 0 | × |
|--------------------------|------|-------------------|-----------|--------------|-----------|------------|---------|-----------|--------|---------|-----------|--------|---|---|
| < C ⋒                    |      | Not secure   192. | 68.79.55  |              |           | ii A       | h) Đ    | 20        | ₹1     | Ē       | <b>(</b>  | 9      |   | b |
| ICP DAS<br>http://www.ic | pdas | .com              |           | -            | -         | 1          | -       | _         | L      | ][      |           |        |   |   |
| Overview                 |      |                   |           |              |           |            |         |           |        |         |           |        |   |   |
| Configuration            | +    |                   |           | Ν            | ΛC.       | )_7        | 2       | 55        | SN     |         |           |        |   |   |
| Authentication           | +    |                   |           | ••           |           | ς ι        |         |           |        | •       |           |        |   |   |
| Web HMI                  |      | A                 | n Etherne | et module th | iat is eq | lipped w   | ith 8 d | igital oı | utputs | and 8 d | ligital i | nputs. |   |   |
|                          |      |                   |           |              | MAC       | Address:   | 00:0D   | :E0:65:F/ | A:52   |         |           |        |   |   |
|                          |      |                   |           |              | Firmwar   | e Version: | 2.0.2   | Oct. 24,  | 2019)  |         |           |        |   |   |
|                          |      |                   |           |              | 1/0       | ) Version: | 1.01    |           |        |         |           |        |   |   |
|                          |      |                   |           |              | Etherne   | t Version: | 1.28 (  | May. 20,  | 2015)  |         |           |        |   |   |
|                          |      |                   |           | V            | Veb Serve | r Version: | 2.1.1 ( | Feb. 26,  | 2016)  |         |           |        |   |   |
|                          |      |                   |           |              | 03        | Version:   | 2.3.4 ( | Nov. 24,  | 2016)  |         |           |        |   |   |
|                          |      |                   |           |              |           |            |         |           |        |         |           |        |   |   |

# 4. Configuration

The web-based user interface allows users to configure the module, access and monitor the I/O status through a web browser. Before starting the configuration steps, please refer to **Chapter 3** - **Getting Started** to configure and log in to the MQ-7200M module.

#### Step 1: Welcome to the MQ-7200M web interface

After logging into the MQ-7200M web interface, the user will see relevant information about the module on the "**Overview**" page.

| П MQ-7200М ×                      | +                                     |                         |                |        | 0   | × |
|-----------------------------------|---------------------------------------|-------------------------|----------------|--------|-----|---|
| ← C බ ▲ Not secure                | 192.168.79.55 A                       | ⊕ t <u>è</u>            | Ē 🧭            |        | ••• |   |
| ICP DAS<br>http://www.icpdas.com  |                                       |                         |                | 1      |     |   |
| Configuration –<br>Basic Settings | MQ-7                                  | 255M                    |                |        |     |   |
| I/O Settings                      | An Ethernet module that is equipped w | ith 8 digital outputs a | nd 8 digital i | nputs. |     |   |
| MQTT                              | MAC Address:                          | 00:0D:E0:65:FA:52       |                |        |     |   |
| Authentication _                  | Firmware Version:                     | 2.0.2 (Oct. 24, 2019)   |                |        |     |   |
| User Management                   | I/O Version:                          | 1.01                    |                |        |     |   |
|                                   | Ethernet Version:                     | 1.28 (May. 20, 2015)    |                |        |     |   |
| Web HMI                           | Web Server Version:                   | 2.1.1 (Feb. 26, 2016)   |                |        |     |   |
|                                   | OS Version:                           | 2.3.4 (Nov. 24, 2016)   |                |        |     |   |
|                                   |                                       |                         |                |        |     |   |

## 4.1 Basic Settings

The Basic Settings page includes Network Configuration and Basic Settings sections.

| ICP DAS               |                                      |                            | ERIPIC      |
|-----------------------|--------------------------------------|----------------------------|-------------|
| http://www.icpdas.com |                                      |                            |             |
| Overview              | Network Configuratio                 | n                          |             |
| Basic Settings        | Configure: Manually                  |                            |             |
| I/O Settings          | IP address                           | Subnet mask                | Gateway     |
| MQTT                  | 192.168.79.55                        | 255.255.0.0                | 192.168.1.1 |
| Authentication _      | DNS Server                           |                            |             |
| User Management       |                                      |                            |             |
| Web HMI               |                                      | APPLY                      |             |
|                       |                                      |                            |             |
|                       |                                      |                            |             |
|                       | Basic Settings                       |                            |             |
|                       | Module Name                          | MQ-7255M                   |             |
|                       |                                      | ICP DAS                    |             |
|                       | Page Header Information (First line) | [Maximum of 20 characters] |             |
|                       |                                      | Color Blue V Font size     | 9 7 ₩       |
|                       |                                      | http://www.icpdas.com      |             |
|                       | Page Header Information (Second line | (Maximum of 50 characters) |             |
|                       |                                      | Color Red 🗸 Font size      | ● 4 ✔       |
|                       | Web Server Port                      | 80                         |             |
|                       |                                      | APPLY                      |             |

#### **Network Configuration**

In the **Configure** dropdown menu, there are two ways to configure the network:

- Manual configuration Manually: If DHCP is not available, you can manually set up the IP address, subnet mask, and gateway addresses for the MQ-7200M module.
- **Dynamic configuration Using DHCP**: By using DHCP, the MQ-7200M can automatically acquire a network address from the DHCP server.

In general, network settings include the following parameters:

- **IP address**: Each MQ-7200M module needs to be configured with a unique IP address to log in to the module's settings page on the network.
- A subnet mask: The subnet mask indicates which portion of the IP address that is used to identify the local network or subnet.
- **Gateway**: A gateway (or router) is a system that is used to connect a network with one or more other networks.
- **DNS Server:** DNS stands for domain name system whose main function is to translate domain names (e.g., www.icpdas.com) to IP addresses and vice versa.

#### Manual Configuration

<u>Method</u>: Select the **Manually** in the **Configure** dropdown menu. Enter the appropriate addresses in the respective fields, and then click the **Apply** button to complete the network configuration.

| Network Configurat  | ion         |             |   |
|---------------------|-------------|-------------|---|
| Configure: Manually | 1           |             |   |
| IP address          | Subnet mask | Gateway     |   |
| 192.168.79.55       | 255.255.0.0 | 192.168.1.1 |   |
| DNS Server          |             |             | 2 |
|                     | APPLY 3     |             |   |

#### **Dynamic Configuration**

<u>Method</u>: Select the **Using DHCP** in the **Configure** dropdown menu and then click the **Apply** button. When utilizing DHCP, the addresses cannot be changed manually.

| Configure: Using DHC |             |             |
|----------------------|-------------|-------------|
| IP address           | Subnet mask | Gateway     |
| 192.168.1.81         | 255.255.0.0 | 192.168.1.1 |
| DNS Server           |             |             |
|                      | APPLY       | 2           |

#### **Basic Settings**

This section includes the following items:

- **Module Name**: The initial value for this field will depend on the model of the module and cannot be modified.
- Page Header Information (First line) and Page Header Information (Second line): The title of the website that is displayed at the top left-hand corner of the interface, for example the company name and web address as per the example below.
- Web Server Port: This option specifies which port is to be used for the web server. By default, the HTTP port is 80.
- If there are any changes, click the "Apply" button to complete the setting. Also, press the Ctrl + R to refresh this page.

| ICP DAS • • • • • • • • • • • • • • • • • • • |   |   |
|---|---|---|
| Overview                                      | Basic Settings                          |   |
| Configuration<br>Basic Settings               | Module Name                             | MQ-7255M  |
| I/O Settings<br>MQTT                          | Page Header Information (First line)    | ICP DAS<br>[Maximum of 20 characters]<br>Color Blue V Font size 7 V |
| Authentication +<br>Web HMI                   | Page Llagder Information (Caccard line) | http://www.icpdas.com   |
|   | Page Reader mornation (Second line)     | Color Red V Font size 4 V   |
|   | Web Server Port                         | 80  |
|   |   | APPLY   |

# 4.2 I/O Settings

In industrial applications, maintaining a "safe" state for the module's output when power is restored after a power loss caused by either a normal or abnormal event is crucial to prevent accidents. In addition, in the case of host failure or network communication exceptions, it is equally important to output a safety value.

On the **I/O Settings** page, Power-on Value and Safe Value for each output channel can be specified. Remember to click on the "**Apply**" button to update new settings.

| Overview         | Power-on Va | llue   |
|------------------|-------------|--|
| Configuration —  |             |  |
| Basic Settings   | DO0         | ● Off ○ On   |
| 1/O Settings     | D01         | ● Off ○ On   |
| Authentication + | DO2         | ● Off ○ On   |
| Web HMI          | DO3         | ● Off ○ On   |
|                  | DO4         | ● Off ○ On   |
|                  | DO5         | ● Off ○ On   |
|                  | DO6         | ● Off ○ On   |
|                  | D07         | ● Off ○ On   |
|                  | Safe Value  | APPLY  |
|                  |             |  |
|                  | DO0         | Maintain the current status    On    Off   |
|                  | D01         | Maintain the current status $\bigcirc$ On $\bigcirc$ Off   |
|                  | DO2         | Maintain the current status O on O off     On O If     On     On O If     On     O   |
|                  | DO3         | Maintain the current status O on O off   O |
|                  | DO4         | Maintain the current status O on O off   O |
|                  | DO5         | Maintain the current status O On O Off     On     On O Off     On     On    |
|                  | DO6         | Maintain the current status O on O off   O |
|                  | D07         | Maintain the current status    On    Off   |
|                  |             | APPLY  |

#### Power-on Value

The user can set the power-on value for each output channel. When the module is powered on normally or reset by the module watchdog, it loads its power-on value.

| Power-on Va | alue       |
|-------------|------------|
| DO0         |            |
| DO1         | ◉ Off ○ On |
| DO2         | ◉ Off ○ On |
| DO3         | ◉ Off ○ On |
| DO4         | ◉ Off ○ On |
| DO5         | ◉ Off ○ On |
| DO6         | ◉ Off ○ On |
| DO7         |            |
|             | APPLY      |

Method: After selecting **On** or **Off**, clicking the **Apply** button to complete the setting.

#### Safe Value

The user can set the safe value for each output channel. In the event of a communication interruption between the MQTT Broker and MQ-7200M, the module will output a predefined safe value.

Method: After selecting Maintain the current status or On or Off, clicking the Apply button.

| Safe Value |   |
|------------|---|
| DO0        | Maintain the current status      On      Off                    |
| DO1        | Maintain the current status ○ On ○ Off                          |
| DO2        | Maintain the current status ○ On ○ Off                          |
| DO3        | Maintain the current status ○ On ○ Off                          |
| DO4        | Maintain the current status O On O Off                          |
| DO5        | Image: Maintain the current status $\bigcirc$ On $\bigcirc$ Off |
| DO6        | Maintain the current status ○ On ○ Off                          |
| DO7        | Maintain the current status      On      Off                    |
|            | APPLY 2   |

# 4.3 MQTT

MQTT is a Client Server publish/subscribe messaging transport protocol. It is light weight, open, simple, and designed so as to be easy to implement. These characteristics make it ideal for use in many situations, including constrained environments such as for communication in Machine to Machine (M2M) and Internet of Things (IoT) contexts where a small code footprint is required and/or network bandwidth is at a premium.

#### Citation from the official MQTT.org

The MQ-7200M module, as an MQTT client, can publish messages for DIO status to the broker and subscribe to control messages for DO. Similarly, other MQTT clients also can subscribe to the broker's topics to obtain DIO status or publish messages for controlling DO to the broker.



On the **MQTT** page, the user can enable/disable the MQTT function, set the broker information, define the Last Will and Testament for announcing a module's offline message, and obtain the topic names for each I/O.

| Overview         | MQTT conversation           |  |      |  |
|------------------|-----------------------------|--|------|--|
| Configuration _  |                             |  |      |  |
| Basic Settings   | DISABLED                    |  |      |  |
| I/O Settings     |                             |  |      |  |
|                  |                             | APPLY  |      |  |
| Authentication + |                             |  |      |  |
| Web HMI          |                             |  |      |  |
|                  | Connectivity                |  |      |  |
|                  | Connectivity                |  |      |  |
|                  |                             | 192 168 255 2                                | 1883 |  |
|                  | Broker URI                  | [e.g. www.mybroker.com or 192.168.255.2]     |      |  |
|                  | Client identifier           | MQ7255M_65FA52                               |      |  |
|                  |                             |  |      |  |
|                  | Alias name                  | MQ7255M_65FA52<br>[maximum of 30 characters] |      |  |
|                  |                             |  |      |  |
|                  | Connection timeout (sec)    | 5<br>[between 3 and 120 seconds]             |      |  |
|                  |                             |  |      |  |
|                  | Reconnection interval (sec) | 10   |      |  |
|                  |                             | [between 5 and 120 seconds]                  |      |  |
|                  | Keep alive interval (sec)   | 20   |      |  |
|                  |                             | [between 10 and 300 seconds]                 |      |  |
|                  |                             |  |      |  |
|                  |                             | APPLY  |      |  |

#### **MQTT Conversation**

The user can enable/disable the MQTT function. If the **MQTT conversation** is disabled, the module will stop publishing messages.

<u>Method</u>: Switch the toggle to the right to enable this function and click the **Apply** button.

| MQTT conversation |         |
|-------------------|---------|
| ENABLED 1         |         |
|                   | APPLY 2 |

### **Connectivity**

The user can customize the settings related to the Broker and the connection, and if any changes are made, click the **Apply** button.

| Connectivity                |  |
|-----------------------------|--|
| Broker URI                  | 192.168.255.2 1883<br>[e.g. www.mybroker.com or 192.168.255.2] |
| Client identifier           | MQ7255M_65FA52   |
| Alias name                  | MQ7255M_65FA52<br>[maximum of 30 characters]                   |
| Connection timeout (sec)    | 5<br>[between 3 and 120 seconds]                               |
| Reconnection interval (sec) | 10<br>[between 5 and 120 seconds]                              |
| Keep alive interval (sec)   | 20<br>[between 10 and 300 seconds]                             |
|                             | APPLY  |

| ltem                                 | Description  |
|--------------------------------------|--|
| Broker URI                           | Enter the Broker URI and port for MQTT connection.<br>The Broker URI can be an URL or an IP address.   |
| Client identifier                    | The identifier for each MQTT Client to connect to the MQTT Broker<br>must be unique. It is composed of the module name, the underline<br>character, and the last 6 digits of the MAC address, and cannot be<br>modified. |
| Alias name                           | The alias of the module must be unique to distinguish it from other modules with the same model. A simple identifier can make the topic easier to read.  |
| Connection timeout<br>(Unit: second) | Specify the maximum waiting time for the MQ-7200M module to establish a connection with the MQTT Broke (Default: 30 seconds)   |

| Reconnection interval<br>(Unit: second) | In the event of a connection failure, how long does the MQ-7200M wait before attempting to reconnect to the Broker?  |
|---|--|
| Keep alive interval<br>(Unit: second)   | The Keep-alive mechanism ensures the availability of both the Client<br>and the Broker for communication purposes. If the Client has no<br>message to send within the specified Keep Alive Interval, it is required<br>to send a PINGREQ packet to the Broker, while the Broker must reply<br>with a PINGRESP packet. If the Client fails to send a PINGREQ or any<br>other message within 1.5 times the Keep Alive Interval, the Broker will<br>disconnect from the Client. (Default: 20 seconds) |

#### **Security**

In certain cases, the MQTT Broker may require the Client to provide authentication through an account and password.

<u>Method</u>: Tick the **Enable user authentication** box, enter the username and password, and then click the **Apply** to update the settings.

| Security                   |                              |
|----------------------------|------------------------------|
| Enable user authentication |                              |
| User name                  | 2 [maximum of 36 characters] |
| Password                   | [maximum of 36 characters]   |
|                            | APPLY 3                      |

#### Last Will

The Last Will and Testament (LWT) function notifies other clients when a client disconnects abnormally. The MQ-7200M can retain the Last Will (LWT) message on the Broker. If the MQ-7200M unexpectedly disconnects, the Broker will send the LWT message to all clients that have subscribed to this Offline topic.

#### Method:

- 1. To enable this function, tick the Last Will and Testament box.
- 2. Enter the topic name (Topic) and the LWT message (Data), and select the Quality of Service (QoS) for message transmission (default value is 0). If the **Retained** box is checked, it indicates that the LWT message will be stored on the Broker.
- 3. Click the **Apply** button to update the settings.

| Last Will               |  |
|-------------------------|--|
| Last Will and Testament |  |
| Торіс                   | Offline<br>[maximum of 30 characters]        |
| Data                    | MQ7255M_65FA52<br>[maximum of 30 characters] |
| QoS                     | 0 - At most once 🗸                           |
| Retained                |  |
|                         | APPLY 3                                      |

#### QoS

- 0 At most once: Send the message only once
- 1 At least once: Send the message at least once
- 2 Exactly once: Make sure the message is delivered

In the publisher/subscriber model, once subscribe to a topic (or I/O channel), the subscriber can receive the information (status) related to that topic. The publisher can periodically send its content to all subscribers of the topic, or whenever there is new information available.

#### **Publications**

The I/O status can be published to topics based on either a time-driven or event-driven approach.

- <u>Time-driven</u>: The I/O status is regularly published at specific intervals (10-600 seconds), which can be configured in the "**Periodic publish interval (Sec)**" field.
- <u>Event-driven</u>: The I/O status is published when specific conditions are met. The user can learn how to configure the conditions in the subsequent content.

| Publications                    |                                    |
|---------------------------------|------------------------------------|
| QoS                             | 0 - At most once 🗸                 |
| Periodic publish interval (sec) | 10<br>[between 10 and 600 seconds] |
|                                 | APPLY                              |

#### **QoS (Quality of Service)**

- **0 At most once:** Send the message only once
- 1 At least once: Send the message at least once
- 2 Exactly once: Make sure the message is delivered

The user can customize the topic name and published conditions for each I/O. If the MQTT conversation feature is enabled, the MQ-7200M will automatically subscribe to all DO topics upon startup.

#### **Digital Outputs**



### **Digital Inputs**

| Digital              | l Inputs                       |   |              |  |
|----------------------|--------------------------------|---|--------------|--|
| Publish topic prefix |                                | MQ7255M_65FA52                            |              |  |
| Channel              | Condition to publish           | Topic                                     | PREVIEW      |  |
| DIO                  | publish on status change or pe | Publish<br>Priodically V MQ7255M_65FA52/G | GetValue/DI0 |  |

A topic for each I/O channel on a MQ-7200M module consists of 3 topic levels; each topic level is separated by a forward slash (/):

For example

F001/GetValue/DO1 Level1 Level2 Level3

#### Level 1: The default is the name specified in the "Connectivity - Client identifier" field.

| Level 1           |   |
|-------------------|---|
| Client identifier | The default is the module name followed by the MAC address. |
| Topic prefix      | The user can set topic level one                            |

#### Level 2: To get or set the I/O status

| Level 2  |  |
|----------|--|
| SetValue | Subscribed topic: The MQTT client will send a message to control the output, and the MQ-7200M will carry out the output command. |
| GetValue | Published topic: The client can subscribes to this topic to receive the I/O status published by the MQ-7200M.                    |

**Level 3:** The I/O name. Up to 16 characters, and each name must be unique.

#### **Configure the Published/Subscribed Topic:**

- 1. Enter a name for the topic at level 1 in the "...Topic prefix" field and then click the Update button.
- 2. Click the **Edit** button to modify the name for the topic at level 2, 3 and click the **Apply** button to update the settings.

| Digital     | Outputs   |  |         |
|-------------|---|--|---------|
| Subscribe/F | Publish topic prefix  | of 40 characters]  |         |
| Channel     | Condition to publish  | Торіс  | PREVIEW |
| DO0         | publish on status change or periodically $ {\color{black} \!$ | Subscribe<br>Set_Value/DO_0<br>Publish<br>Get_Value/DO_0 |         |
| DO7         | publish on status change or periodically $\checkmark$   | Publish<br>Get_Value/DO_7                                |         |
|             |   | APPLY  |         |

The DO operation can be divided into two steps, for example, the steps to turn off the lights (DO1) are as follows:



- 1. The MQTT client publishes a control message of "0" to the Broker on the topic "F001/Set\_Value/DO\_1" to request turning off the lights.
- 2. The broker delivers the message to the subscriber MQ-7200M, and then the MQ-7200M sets DO1 to "0".

#### **Configure the Published Condition:**

The user can configure the published condition for each I/O.

| Digital Inputs       |   |                            |                              |         |  |
|----------------------|---|----------------------------|------------------------------|---------|--|
| Publish topic prefix |   | F001<br>UPDATE<br>[maximum | of 40 characters]            |         |  |
| Channel              | Condition to publish  |                            | Торіс                        | PREVIEW |  |
| DIO                  | publish on status change or per   | iodically 🗸                | Publish<br>F001/GetValue/DI0 |         |  |
| DI1                  | periodically publish<br>publish only on status change<br>publish on status change or pe | riodically                 | Publish<br>F001/GetValue/DI1 |         |  |

Stop publishing: Stop publishing the I/O status.

Periodically publish: The I/O status will be published periodically

#### Publish only on status change:

The I/O status is published only when there is a change in the status. After selecting this item, the time interval set in the Publications section will become invalid.

#### Publish on status change or Periodically:

The I/O status is published either when the status changes or periodically.

# 5. Authentication

To ensure secure access to the MQ-7200 web interface, authentication is implemented as a requirement. When attempting to connect to the web interface, users are prompted to provide both a username and password. Authentication is enabled by default.

| User Management             |                           |  |      |  |
|-----------------------------|---------------------------|--|------|--|
| Authentication requires     | the user to enter a usern | ame and password to access the web user interface. |      |  |
| Authentication is currently |                           |  |      |  |
| User Type                   | Username                  | Password   |      |  |
| administrator               | Admin                     | Admin  | SAVE |  |
| user 🗸                      | user                      | password DISABLED                                  | SAVE |  |

#### **User Management**

The factory default employs the administrator account, and you can establish an additional administrator or user account.

#### <u>Method</u>

Select the User Type (administrator/user), enter a username/password, move the toggle to the right to set it to enable, and then click the save button. Next time, the user can log in to the web interface by using the new account.

# 6. Web HMI

On this Web HMI page, the user can get the following information:

- 1. Connection status between the PC and the MQ-7200M module,
- 2. Connection status between the MQ-7200M module and the broker you set,
- 3. The status of each I/O channel. The user can control the output channels by clicking the **On** or **Off** button.

|                  | Сог                    | nnectior             | n Status: 🙆 = G     | iood, 💫 = Disconnection  | n |
|------------------|------------------------|----------------------|---------------------|--------------------------|---|
|                  |                        |                      | •                   |                          |   |
|                  | The device u<br>the MC | sed to lo<br>Q-7200N | og in to MQ-72<br>A | 200M MQTT broker         |   |
| Overview         | Тні                    | s Compu              | ter - 🏠 - MQ7255M_( | 55FA52 - 奋 - Matt Broker |   |
| Configuration +  |                        |                      |                     |                          |   |
| Authentication + | 1/0                    | NO.                  | Торіс               | Status                   |   |
|                  | Digital Output         | 0                    | F001/Get_Value/DO_0 | OFF OFF ON               |   |
|                  | Digital Output         | 1                    | F001/Get_Value/DO_1 | OFF OFF ON               |   |
|                  | Digital Output         | 2                    | F001/Get_Value/DO_2 | OFF OFF ON               |   |
|                  | Digital Output         | 3                    | F001/Get_Value/DO_3 | OFF OFF ON               |   |
|                  | Digital Output         | 4                    | F001/Get_Value/DO_4 | OFF OFF ON               |   |
|                  | Digital Output         | 5                    | F001/Get_Value/DO_5 | OFF OFF ON               |   |
|                  | Digital Output         | 6                    | F001/Get_Value/DO_6 | OFF OFF ON               |   |
|                  | Digital Output         | 7                    | F001/Get_Value/DO_7 | OFF OFF ON               |   |
|                  | Digital Input          | 0                    | F001/GetValue/DI0   | OFF                      |   |
|                  | Digital Input          | 1                    | F001/GetValue/DI1   | OFF                      |   |
|                  | Digital Input          | 2                    | F001/GetValue/DI2   | OFF                      |   |
|                  | Digital Input          | 3                    | F001/GetValue/DI3   | OFF                      |   |
|                  | Digital Input          | 4                    | F001/GetValue/DI4   | OFF                      |   |
|                  | Digital Input          | 5                    | F001/GetValue/DI5   | OFF                      |   |
|                  | Digital Input          | 6                    | F001/GetValue/DI6   | OFF                      |   |
|                  | Digital Input          | 7                    | F001/GetValue/DI7   | OFF                      |   |

# 7. Example: MQTT Publish/Subscribe I/O Status

## 7.1 Publishing the I/O status of MQ-7200M



- 1. On the **MQTT** page, make sure that the MQTT function is enabled.
- Enter both the URL and port number of the Broker, and click the Apply button to update the settings. In the example, we use the HiveMQ Broker, visit to https://www.mqtt-dashboard.com/ (Host: broker.hivemq.com, TCP Port: 1883)

| Overview                       | M                           | IQTT conversation  |
|--------------------------------|-----------------------------|--|
| Configuration<br>Basic Setting | on —<br>JS                  | ENABLED 1<br>APPLY   |
|                                | Connectivity                |  |
|                                | Broker URI                  | broker.hivemq.com [e.g. www.mybroker.com or 192.168.255.2] |
|                                | Client identifier           | MQ7255M_65FA52   |
|                                | Alias name                  | MQ7255M_65FA52<br>[maximum of 30 characters]               |
|                                | Connection timeout (sec)    | 5<br>[between 3 and 120 seconds]                           |
|                                | Reconnection interval (sec) | 10<br>[between 5 and 120 seconds]                          |
|                                | Keep alive interval (sec)   | 20<br>[between 10 and 300 seconds]                         |
|                                |                             | APPLY  |

3. On the **Basic Settings** page, make sure that the DNS Server has been configured properly.

| Overview         | Network Configuratio  | n           |             |
|------------------|-----------------------|-------------|-------------|
| Configuration _  | Configure: Manually ~ |             |             |
| 1/O Settings     | IP address            | Subnet mask | Gateway     |
| MQTT             | 192.168.79.55         | 255.255.0.0 | 192.168.1.1 |
| Authentication _ | DNS Server            |             |             |
| User Management  | 168.95.1.1            |             |             |
| Web HMI          |                       |             |             |

4. On the **Web HMI** page, the user can verify if the connection is successful.

|                      | Connec         | tion Stat | us: 👍 = Good, 🁌     | = Disconnection         |
|----------------------|----------------|-----------|---------------------|-------------------------|
| Overview             | Тні            | s Compu   | ter - 🕋 - MQ7255M_6 | 5FA52 - 🕋 - Matt Broker |
| Configuration _      |                |           |                     |                         |
| Basic Settings       | 1/0            | No.       | Торіс               | Status                  |
| I/O Settings<br>MQTT | Digital Output | 0         | F001/Get_Value/DO_0 | OFF OFF ON              |
| Authentication _     | Digital Output | 1         | F001/Get_Value/DO_1 | OFF OFF ON              |
| User Management      | Digital Output | 2         | F001/Get_Value/DO_2 | OFF OFF ON              |
| Web HMI              | Digital Output | 3         | F001/Get_Value/DO_3 | OFF OFF ON              |

If the connection between the MQ-7200M and the MQTT broker is established successful, all the topics listed on this page will automatically be published to the Broker. For more information, please refer to Section 4.3 on MQTT.

## 7.2 Subscribing the I/O Status of the MQ-7200M



Before proceeding with the testing of the I/O subscription function, it is essential to install the MQTT client on your PC. **MQTTX** is an open source, cross-platform MQTT 5.0 desktop client originally developed by EMQ, which can run on macOS, Linux and Windows. MQTTX allows users to publish messages to an MQTT broker, subscribe to MQTT topics, and receive messages.

- Download and execute the installation file (V1.9.4) from the MQTTX website. (https://mqttx.app/)
- 2. After the installation is complete, MQTTX will be automatically opened, and the user can also double-click the shortcut on the desktop to open the software.



|             |                 |   |               | <br> |
|-------------|-----------------|---|---------------|------|
| S MQTTX     |                 |   | 2 <b>.</b> _2 | ×    |
| File Edit V | iew Window Help |   |               | -    |
| 8           | Connections     | ⊕   |               |      |
| ዊ           |                 |   |               |      |
|             |                 | Ср Колона Срана С<br>Срана Срана Ср |               |      |
|             |                 |   |               |      |
| ß           | No Data         | + New Connection  |               |      |
|             |                 | To deploy a self-managed MQTT Broker, try EMQX.   |               |      |
| 2           |                 | Need a fully managed MQTT cloud service? Try EMQX Cloud Now!  |               |      |
| O           |                 |   |               |      |

3. Click the "+" button and then click **New Connection** to establish a connection. Enter the Broker's name and URL address (Host: broker.hivemq.com, refer to Section 7.1), and then click the **Connect** button.

| S MQTTX     |                               |                     | -  |         |
|-------------|-------------------------------|---------------------|--|---------|
| File Edit V | Connections                   | < Back              | New 4                                    | Connect |
|             | 1 New Connection<br>New Group | General             |  |         |
|             |                               | 2 * Name Broker     | Enter a name for easy identification: Br | oker    |
| ዋ           |                               | * Client ID mqttx_3 | 353545a                                  | 00      |
| +           |                               | 3 * Host mqtt://    | Enter the Broker's IP address or a host  | name    |
|             |                               | Username            | v  |         |
| ß           | No Data                       | Password SSL/TLS    |  |         |
| ŝ           |                               | Advanced 🔺          |  |         |
|             |                               | MQTT Version        | 5.0                                      |         |
| <u>)</u>    |                               | Connect Timeout     | 10                                       | (s)     |
| (i)         |                               | Keep Alive          | 60                                       | (s)     |
|             |                               | Auto Reconnect      |  |         |

4. If the connection is available, the green light will be displayed.

| 🕺 ΜΩΤΤΧ                                |   |                       |                                    | - 🗆 X              |
|--|---|-----------------------|------------------------------------|--------------------|
| File Edit View Window Help Connections | + | Broker 🖗 🕕            |                                    | ڻ 🖉 …              |
| • • • • • • • • • • • • • • • • • • •  |   | + New Subscription    | Plaintext ~ All                    | Received Published |
| Connections                            | + | Broker 📎 🚺            |                                    |                    |
| • Broker@broker.hivem                  |   | + New Subscription    | ● Plaintext ∨                      |                    |
|  | ( | F001/Get_Value/ QoS 0 | Topics:<br>F001/Get Value/         | /DO 0              |
|  |   | F001/Get_Value/ QoS 0 | F001/Get_Value/<br>F001/Get_Value/ | /DO_1<br>/DO_2     |
|  |   | F001/Get_Value/ QoS 0 |                                    |                    |

5. Users can view all subscribed/published topics listed on the **Web HMI** page. Afterward, click the **ON/OFF** button to change the I/O status, and then observe the subscribed messages in MQTTX.

#### Change the status of the I/O

| Overview         | This Co        | мритен | २ - 🕋 - MQ7255N     | 1_65FA52 - 🕋 - Матт Broker |
|------------------|----------------|--------|---------------------|----------------------------|
| Configuration –  |                |        |                     |                            |
| Basic Settings   | I/O            | No.    | Торіс               | Status                     |
| MQTT             | Digital Output | 0      | F001/Get_Value/DO_0 | ON OFF ON                  |
| Authentication + | Digital Output | 1      | F001/Get_Value/DO_1 | ON OFF ON                  |
| Web HMI          | Digital Output | 2      | F001/Get_Value/DO_2 | OFF OFF ON                 |
|                  | Digital Output | 3      | F001/Get_Value/DO_3 | OFF OFF ON                 |
|                  | Digital Output | 4      | F001/Get_Value/DO_4 | OFF OFF ON                 |

#### Review the subscribed messages

| 🐼 MQTTX       |                     |                       | – 🗆 X  |
|---------------|---------------------|-----------------------|--|
| File Edit Vie | w Window Help       |                       |  |
|               | Connections +       | Broker 📎 <b>2</b>     | <u> </u>   |
|               | Broker@broker.hivem | + New Subscription    | Plaintext V All Received Published                                   |
|               |                     | F001/Get_Value/ QoS 0 | Topic: F001/Get_Value/DO_0 QoS: 0                                    |
| ዋ             |                     | F001/Get_Value/ QoS 0 | 1<br>2023-09-11 11:08:57:352   |
| +             |                     | F001/Get_Value/ QoS 0 | Topic: F001/Get_Value/DO_1 QoS: 0                                    |
|               |                     | F001/Get_Value/ QoS 0 | 2023-09-11 11:09:07:379  |
| F             |                     | F001/Get_Value/ QoS 0 | It will receive the message when the                                 |
|               |                     | F001/Get_Value/ QoS 0 | I/O status is changed. The condition can be set on the MQTT page.    |
| ŵ             |                     | F001/Get_Value/ QoS 0 | D0_0 = 1 (ON) ; D0_1 = 1 (ON)  |
|               |                     | F001/Get_Value/ QoS 0 |  |
| 2             |                     |                       | Payload: Plaintext V QoS: 1 V O Retain Meta<br>F001/Get_Value/DO_0 V |
| ()            |                     |                       | € ⊖ 🦻  |
|               |                     |                       | <  |

## 7.3 Controlling the DO Status of the MQ-7200M



- 1. Ensure that the MQTT function is enabled and the broker is correctly configured on the **MQTT** page of the MQ-7200M module. Refer to Section 7.1 Steps 1 to 4.
- 2. Verify the **Web HMI** page to confirm that the connection between the MQ-7200M and the broker has been established.

| Overview             |   | Тн             | IS COMPUT | rer - 🕢 - MQ7255M_  | 65FA52 - 奋 - Matt Broker |
|----------------------|---|----------------|-----------|---------------------|--------------------------|
| Configuration        | - |                |           |                     |                          |
| Basic Settings       |   | I/O            | No.       | Торіс               | Status                   |
| I/O Settings<br>MQTT |   | Digital Output | 0         | F001/Get_Value/DO_0 | OFF OFF ON               |
| Authentication       | + | Digital Output | 1         | F001/Get_Value/DO_1 | OFF OFF ON               |
| Web HMI              |   | Digital Output | 2         | F001/Get_Value/DO_2 | OFF OFF ON               |

- 3. Confirm that the MQTT Client software **MQTTX** has been installed and the connection between it and the broker has been established. Refer to Section 7.2.
- 4. When the MQTT function is enabled, all DO topics of the MQ-7200M will be automatically subscribed. The user can review topics in the **Digital Outputs** section on the **MQTT** page.

| Overview  | Digital Outputs   | *  |
|---|---|--|
| Configuration –<br>Basic Settings<br>I/O Settings | Subscribe/Publish<br>topic prefix<br>(maximum of 40 chara | acters]                                      |
| Authentication +                                  | Channel Condition to publish                              | Topic PREVIEW EDIT                           |
| Web HMI   | DO0 publish on status change or period                    | odically V<br>Publish<br>F001/Get_Value/DO_0 |

5. In the MQTTX, enter the message to be published for the specific topic, and click the button in the right corner to send the message.

| Connections         | + | Broker 📎 🕦         | () ∠ …                                      | •    |
|---------------------|---|--------------------|---|------|
| Broker@broker.hivem |   | + New Subscription | Plaintext      All Received Publishe        | ed : |
|                     |   |                    | Topic: F001/Set_Value/DO_0 QoS: 1           |      |
|                     |   |                    | 2023-09-11 11:46:12:96                      | 4    |
|                     |   |                    |   |      |
|                     |   |                    | Topic: F001/Set_Value/DO_0                  |      |
|                     |   |                    | Message: 1                                  |      |
|                     |   |                    | Payload: Plaintext V QoS: 1 V O Retain Meta |      |
|                     |   |                    | 1 (C)   |      |
|                     |   |                    |   |      |
|                     |   |                    | 2 4   |      |

Now, the user can observe that the DO0 indicator of the MQ-7200M has been switched on, and the status of DO0 on the Web HMI page reflects as "ON."

| Overview             |   | Тніз           | в Сомрит | rer - 🕋 - MQ7255M_6 | 5FA52 - 奋 | - Mqtt Broker |
|----------------------|---|----------------|----------|---------------------|-----------|---------------|
| Configuration        | - |                |          |                     |           |               |
| Basic Settings       |   | I/O            | No.      | Торіс               | Status    |               |
| I/O Settings<br>MQTT |   | Digital Output | 0        | F001/Get_Value/DO_0 | ONO       | FF            |
| Authentication       | + | Digital Output | 1        | F001/Get_Value/DO_1 | OFF O     | FFON          |
| Web HMI              |   | Digital Output | 2        | F001/Get_Value/DO_2 | OFF O     | FF ON         |

# 8. Frequently Asked Question (FAQ)

## 8.1 Establishing a Connection by Using MiniOS7 Utility

MiniOS7 Utility is a tool for uploading firmware to flash memory and updating the OS to the MQ-7200M module embedded with MiniOS7 with easiness and quickness. If the MiniOS7 Utility is not yet installed on the system, installation of the MiniOS7 Utility should be the first step. Please refer to section "3.2 Installing the MiniOS7 Utility" to install it.

To upload firmware or update the OS to MQ-7200M module, the user must first establish a connection between the PC and the MQ-7200M module.

| MiniOS7 Utility<br>Ver 3.27 | Double-clic        | ∢the " <b>№</b> | 1iniOS7 Utili     | t <b>y</b> " s | hortcut on      | the deskto   | op.        |         |          |
|-----------------------------|--------------------|-----------------|-------------------|----------------|-----------------|--------------|------------|---------|----------|
| 📸 MiniOS7 Utility Vers      | sion 3.2.7         |                 |                   |                |                 |              | —          |         | ×        |
| 🔯 File 🌓 Connectio          | n 👻 🚸 Command [    | Configur        | ation 📑 Tools 🤅   | 👂 Help         | o <del>▼</del>  |              |            |         |          |
| Look in: MiniOS7_U          | tility             | - 3 🕫           | · 🃂               |                | Lock in: Disk A |              | ·]         |         | 8        |
| Name                        | Size               | Туре            | Modified          | No             | Name            |              | Size       |         | Modified |
| 🔄 bin                       |                    | File Folder     | 2022/1/:          |                |                 |              |            |         |          |
| FIRMWARE                    |                    | File Folder     | 2022/17:          |                |                 |              |            |         |          |
| OS_IMAGE                    |                    | File Folder     | 2022/17:          |                |                 |              |            |         |          |
| 💽 icpdas                    | 1KB                | URL File        | 2022/1/:          |                |                 |              |            |         |          |
| 🛛 🔄 load232.dll             | 88KB               | DLL File        | 2007/1/:          |                |                 |              |            |         |          |
| MiniOS7_Utility.chm         | 1,015KB            | CHM File        | 2009/10           |                |                 |              |            |         |          |
| MiniOS7_Utility.exe         | 2,544KB            | EXE File        | 2015/7/           |                |                 |              |            |         |          |
| MiniOS7_Utility.ini         | 1KB                | INI File        | 2015/7/           |                |                 |              |            |         |          |
| 🛯 🕙 uart.dll                | 56KB               | DLL File        | 2006/12           |                |                 |              |            |         |          |
| unins000.dat                | 18KB               | DAT File        | 2022/1/:          |                |                 |              |            |         |          |
| Contraction (Contraction)   | 1,166KB            | EXE File        | >                 |                |                 |              |            |         |          |
| Connection(F2)              | Upload(F5) 📓 DiskT | ool(F6)         | Info(F7) 🗵 Delete | F8)            | Refresh(F9)     | Console(F10) | 🔤 DOS(F11) | 🏘 Searc | :h(F12)  |

#### Step 1: Run the MiniOS7 Utility

#### Step 2: Press the "F12" key or choose the "Search" option from the "Connection" menu

After pressing the **"F12**" key or choosing the **"Search**" option from the **"Connection**" menu, the MiniOS7 utility performs a search of all modules on the network.

| 🔯 F     | ile 🕨 Connection         | n 🗟 🚸 Command               | 😴 Configura                | tion              |               |             |   |
|---------|--------------------------|-----------------------------|----------------------------|-------------------|---------------|-------------|---|
| Look    | in: Last Conn            | ection F2<br>ection Alt+F2  | 🗔 🧿 🍺                      | ₽°                |               |             |   |
| Name    | <u>D</u> isconnec        | t Ctrl+F2                   | Туре                       |                   |               |             |   |
| bin     | Search                   | F12                         | File Folder<br>File Folder |                   |               |             |   |
| 2       | 🕈 MiniOS7 Scan           |                             |                            |                   | -             |             | × |
| s       | earch Options <u>C</u> o | nnect Clea <u>r</u> IP sett | ing <u>H</u> elp           | E <u>x</u> it     |               |             |   |
|         | Туре                     | IP/Port                     | Name                       | Alias             | Mask          | Gateway     | ^ |
|         | TCP BroadCast            | 192.168.123.20              | DL-302                     | EtherIO           | 255.255.0.0   | 192.168.1.1 |   |
|         | TCP BroadCast            | 192.168.83.70               | VP4231                     | VP4231            | 255.255.0.0   | 192.168.1.1 |   |
|         | TCP BroadCast            | 192.168.16.221              | IR-712-MTCP                | IrLearn           | 255.255.0.0   | 192.168.1.1 |   |
|         | TCP BroadCast            | 192.168.1.241               | ACS-11-MF                  | ACS-11-MF         | 255.255.0.0   | 192.168.1.1 |   |
|         | TCP BroadCast            | 192,168,255,1               | MQ-7255M                   | MQ7255M_65FA52    | 255.255.0.0   | 192.168.1.1 |   |
| <<br>Se | arch done.               | heck the status b           | ar to monit                | or the progress o | of the search | ı. ,        |   |

# Step 3: Click the IP address in the IP/Port field list and then click the "Connect" icon in the toolbar.

After the search has been completed, click the IP address for the MQ-7200M module in the IP/Port field list and then click the "**Connect**" icon in the toolbar to connect to the MQ-7200M.

|                 | $\frown$                    |                     |                |             |             |    |
|-----------------|-----------------------------|---------------------|----------------|-------------|-------------|----|
| 🏙 MiniOS7 Scan  | 2.                          |                     |                | —           |             | ×  |
| Search Options  | Connect Clea <u>r</u> IP se | etting <u>H</u> elp | E <u>x</u> it  |             |             |    |
| Туре            | IP/Port                     | Name                | Alias          | Mask        | Gateway     | ^  |
| TCP BroadCast   | 192.168.123.20              | DL-302              | EtherIO        | 255.255.0.0 | 192.168.1.1 | _  |
| TCP BroadCast   | 192.168.83.70               | VP4231              | VP4231         | 255.255.0.0 | 192.168.1.1 |    |
| TCP BroadCast   | 192.168.16.221              | R-712-MTCP          | IrLearn        | 255.255.0.0 | 192.168.1.1 | _  |
| TCP BroadCast   | 192.168.1.241 1             | · CS-11-MF          | ACS-11-MF      | 255.255.0.0 | 192.168.1.1 |    |
| ▶ TCP BroadCast | 192.168.255.1               | MQ-7255M            | MQ7255M_65FA52 | 255.255.0.0 | 192.168.1.1 |    |
| <               |                             |                     |                |             | 2           | >  |
| Search done.    |                             |                     |                |             |             | // |

#### Step 4: Check the connection symbol to make sure that the connection is established

Check the connection symbol status in the top right side to make sure the connection has been established.

| MiniOS7 Utility Version 3.2   | 2.7                                       |              |                 |                   |                  |                        | - 🗆  | $\times$   |
|---|---|--------------|-----------------|-------------------|------------------|------------------------|--|--|
| 🔯 File 🌓 Connection 👻   | 🔈 Comma                                   | nd 🛐 Cont    | figuration 📑 To | ols 🥔 Help        | -                |                        |  | $\frown$   |
| Look jn: MiniOS7_Utility  |   | - (          | 3 🦻 🛤           | Lock              | t in: Disk A     | ∼ 161,9                | 50 bytes available   | . <sub>O</sub> fi  |
| Name<br>bin<br>FIRMWARE<br>OS_IMAGE<br>cicpdas<br>load232.dll<br>MiniOS7_Utility.chm<br>MiniOS7_Utility.exe | Size<br>1KB<br>88KB<br>1,015KB<br>2,544KB |              | C<br>Conr       | Connect<br>nected | ion Statu        | s<br>Disconnecte       | Modi<br>2019 1:3<br>2015 2:3<br>016 11:3<br>2019 2:4'<br>/2017 3:<br>2019 1:2'<br>2019 1:2'<br>5/2017 2: | ned            D:         1:           1:         1:           1:         1:           1:         1: |
| MiniOS7_Utility.ini   | 1KB                                       | INI File     | 5/30/2023 1:28  | 🦲 7 m             | enu.htm          | 2,629                  | 7/18/2019 11:4   | 4  |
| uart.dll  | 56KB                                      | DLL File     | 12/8/2006 10:0  | 📙 8 m             | odbus.js         | 11,030                 | 2/17/2017 4:03   | 3:   |
| unins000.dat  | 18KB                                      | DAT File     | 8/18/2022 10:1  | 📙 9 m             | q7255.exe        | 126,534                | 10/24/2019 11  | :  |
| 时 unins000.exe  | 1,166KB                                   | EXE File     | 8/18/2022 10:1  | 📙 10 m            | qtt.htm          | 24,056                 | 7/18/2019 8:20   | J:   |
| <   |   |              | >               | 📙 11 m            | qttio.htm        | 4,205                  | 7/18/2019 6:40   | 5: 🗸   |
| 1   |   |              |                 | 10MQ-7255M        | >IP:192.168.79.5 | 55 Port:10000 via TCP, | 17 files(s) 230,65   | 30 bytes   |
| Connection(F2)  | ad(F5) 🧕                                  | DiskTool(F6) | 📑 Info(F7)      | Delete(F8)        | 🛃 Refresh(F9)    | 📇 Console(F10)         | 🔤 DOS(F11)   | >>   |

# 8.2 Exchanging the Protocol (TCP/IP to UDP)

MiniOS7 Utility supports both UDP and TCP protocols. For MiniOS7 Utility, the TCP/IP is the default protocol for communicating with MQ-7200M, and the UDP is used to update the OS. Hence, if the user wants to update the operating system, please change the communication protocol to UDP.

#### Step 1: Establish a connection to the MQ-7200M

Refer to section "8.1. Establishing a Connection" for more information.

#### Step 2: Stop the firmware running

Right-click the file list of the right side windows, and then choose "**Quit Firmware**" to stop the firmware running and exchange TCP/IP protocol to UDP protocol.

| 📸 MiniOS7 Utility Versic  |             |             |          |            |                  |                  |                 | ×         |
|---------------------------|-------------|-------------|----------|------------|------------------|------------------|-----------------|-----------|
| i File Connection         | ommand      | 🛐 Configu   | ration 🛽 | 🔄 Tools    | 🥔 Help 🔻         |                  |                 |           |
| Look in: MiniOS7_Utility  |             | - 3 🕫       | · 🏓      |            | Lock in: Disk A  | ~                | 94,027<br>bytes | ŧ         |
| Name                      | Size        | Туре        | Mod      | No         | Name             | Size             | Mod             | ified 🔺   |
| 🔄 🔜 bin                   |             | File Folder | 2022     | 13         | menu htm         | 3.103            | 2017/2/2/       | 4         |
| FIRMWARE                  |             | File Folder | 2022     | 1          | Diabt alialu     | ha fila list     | /5/2            | 3         |
| OS_IMAGE                  |             | File Folder | 2022     | <b>B</b> 1 | Right-Click      | the me list      | //2/13          | 7         |
| 💽 icpdas                  | 1KB         | URL File    | 2022     | 16         | modset.htm       | 17,207           | 2018/11/        | 14        |
| 📓 load232.dll             | 88KB        | DLL File    | 2007     | 17         | C Rup            |                  | Y9              |           |
| 🛃 MiniOS7_Utility.chm     | 1,015KB     | CHM File    | 2009     | 18         | - Run with a     | aramatara        | <b>2.</b> pr.   | 29        |
| MiniOS7_Utility.exe       | 2,544KB     | EXE File    | 2015     | 9 📔        | Run with p       | iarameters       | .010/7/1        | 1         |
| MiniOS7_Utility.ini       | 1KB         | INI File    | 2022     | 1 20       | Reset Min        | IOS F4           | 2018/7/11       | 1         |
| 🔄 uart.dll                | 56KB        | DLL File    | 2006     | 21         | Erase Disk       |                  | 2018/4/20       | J         |
| unins000.dat              | 18KB        | DAT File    | 2022     | 22         | Ouit Firms       | /are             | 2017/2/10       | S         |
| 🔀 unins000.exe            | 1,166KB     | EXE File    | 2022     | 23         | Quittinin        |                  | 2:018/8/14      | 4         |
| <                         |             |             | >        | 24         | skeleton.css     | 1,452            | 2014/12/2       | 29 🗸      |
|                           |             |             |          | 10ET-70    | 17/PET-7017>IP:1 | 192.168.15.17 Po | rt:10000 via    | a TCP, 27 |
| Connection(F2) 🗊 Upload(F | F5) 🧕 DiskT | ool(F6) 📑   | Info(F7) | 🙆 Dele     | ete(F8) 🛃 Refre  | esh(F9) 🛛 📇 Cor  | nsole(F10)      | »         |

#### Step 3: Click the "Yes" button to continue and the settings will take effect

After executing the Quick Firmware command, the "Confirm" dialog will appear, and then click the "Yes" button to continue and stop the firmware running.

<u>Note</u>: The MQ-7200M support to update the firmware via the UDP connection.



## 8.3 Updating the MQ-7200M OS

Additional features to MQ-7200M OS will continue to be added in the future, so we advise the user to periodically check with ICPDAS web site for the latest updates. The latest version of the OS image can be obtained at: http://www.icpdas.com/en/download/show.php?num=2678



### 8.3.1 Using the MiniOS7 Utility

#### Step 1: Establish a connection to MQ-7200M.

Be sure that the MiniOS7 Utility is connecting with the MQ-7200M using the UDP connection. For a more detailed description of this instruction, refer to the section "8.2. Exchanging the Protocol (TCP/IP to UDP)".

#### Step 2: Choose "Update MiniOS7 Image" from the "File" menu

Choose "Update MiniOS7 Image" from File menu to start the update procedure.

| MiniOS7 Utility Version 3.2.7 |         |             |            |             |                 | —            |             | ×          |
|-------------------------------|---------|-------------|------------|-------------|-----------------|--------------|-------------|------------|
| 🔯 File 🕨 Connection 👻 🚸 Co    | mmand   | 🕫 Config    | juration   | 📑 Tools     | ; 🥔 Help 🔻      |              |             |            |
| Update MiniOS7 Image          |         | - 3         | 🏂 · 📂      | 1           | lock in: Disk A | ~            | 6           | £.         |
| Hot List Ctrl+D               |         |             |            |             |                 |              | 5           | 비          |
|                               | Size    | Туре        | Moc        | No          | Name            | Size         | Modifie     | <u>d ^</u> |
| Exit Alt+X                    |         | File Folder | r 202      | 0           | 7188eu.ini      | 30           | 2019/1/24   |            |
| FIRMWARE                      | -       | File Folder | r 202      | <b> </b> ]1 | acce_ip.htm     | 5,807        | 2018/7/11   |            |
| GS_IMAGE                      |         | File Folder | r 202      | <b>B</b> 2  | autoexec.bat    | 6            | 2018/3/5    |            |
| 💽 icpdas                      | 1KB     | URL File    | 202        | <b>B</b> 3  | comm_api.js     | 6,799        | 2019/1/23   |            |
| 🔄 load232.dll                 | 88KB    | DLL File    | 200        | <b>4</b>    | conn.png        | 2,381        | 2016/7/5    |            |
| 😭 MiniOS7_Utility.chm         | 1,015KB | CHM File    | 200        | 95          | custom.css      | 2,468        | 2018/3/22   |            |
| MiniOS7_Utility.exe           | 2,544KB | EXE File    | 201        | 6           | edit.htm        | 11,943       | 2018/8/1    |            |
| 🔊 MiniOS7_Utility.ini         | 1KB     | INI File    | 202        | 97          | editpt.htm      | 8,392        | 2018/11/13. |            |
| 🔊 uart.dll                    | 56KB    | DLL File    | 200        | 8           | et7017.exe      | 127,613      | 2019/1/24   |            |
| unins000.dat                  | 18KB    | DAT File    | 202        | 9           | index.htm       | 561          | 2018/3/5    |            |
| 🔂 unins000.exe                | 1,166KB | EXE File    | 202        | 10          | io.js           | 5,687        | 2018/5/2    |            |
| <                             |         |             | >          | 11          | javahmi.htm     | 23,887       | 2018/9/25   | ~          |
|                               |         |             |            |             |                 |              |             |            |
| Connection(F2) 🗊 Upload(F5)   | 🥞 DiskT | ool(F6)     | 🗐 Info(F7) | 🙆 Dele      | ete(F8) 🛃 Refre | esh(F9) 📇 Co | nsole(F10)  | »          |

#### Step 3: Select the latest version of the MiniOS7 OS image

After choosing the **update MiniOS7 Image** command, a dialog box titled "**Select MiniOS7 Image file**" will appear. Please select the most recent version of the MiniOS7 OS image.

| DS7 Image file |  |   | ×                          |
|----------------|--|---|----------------------------|
| OS_Image       | -  | * <mark>*1</mark> 🗗 🕂   |                            |
| BT7K_UDP_      | 20161124.img   |   |                            |
|                | $\mathbf{N}$   |   |                            |
|                |  |   |                            |
|                |  |   |                            |
|                |  |   |                            |
|                |  |   |                            |
|                |  |   |                            |
|                |  |   |                            |
|                |  |   |                            |
|                |  |   |                            |
| 檔案名稱(N):       | ET7K_UDP_20161124.img  | •   | 開啟(0) <b>▶</b>             |
| 檔案類型(T):       | OS Image   | •   | 取消                         |
|                | DS7 Image file<br>OS_Image<br>ET7K_UDP<br>KUDP<br>檔案名稱(M):<br>檔案類型(T): | DS7 Image file<br>OS_Image<br>ET7K_UDP_20161124.img<br>檔案名稱(N): ET7K_UDP_20161124.img<br>檔案4類型(T): OS Image | DS7 Image file<br>OS_Image |

#### Step 4: Click "OK" to finish the procedure

After confirming the command, the user just need to wait awhile until the following dialog appear, and then click "OK" button to finish the procedure.

| MiniOS7 Utility Verion 3 🔀        |
|-----------------------------------|
| Please wait a while for rebooting |
| OK                                |

<u>Note</u>: If you are unable to perform the update, please refer to the next chapter for instructions on updating the OS using the Command Line.

### 8.3.2 Using the 7188EU.exe and Command Line

#### Step 1: Establish a connection to MQ-7200M.

Be sure that the MiniOS7 Utility is connecting with the MQ-7200M using the UDP connection. For a more detailed description of this instruction, refer to the section "8.2. Exchanging the Protocol (TCP/IP to UDP)".

#### Step 2: Choose the location where the MinisOS7 image file is stored.

| MiniOS7 Utility Version 3.2.7 |  |             |                                   | -                | - 🗆                    | ×    |  |  |  |  |
|-------------------------------|--|-------------|-----------------------------------|------------------|------------------------|------|--|--|--|--|
| 🔯 File 🌔 Connection 👻 🚸       | Command 🛐 Configuration 📑  | Tools       | 蔘 Help 🔻                          |                  |                        |      |  |  |  |  |
| Look in: OS                   | <b>Q</b> 🕸 🖻   |             | Lock in: Disk A                   | ✓ 161<br>ava     | ,950 bytes  <br>ilable | ł    |  |  |  |  |
| Name                          | Size Type  | No          | Name                              | Size             | Modifie                | ed 🔺 |  |  |  |  |
| GET7200_UDP_20161124.img      | 64KB IMG File  | <b>  </b> 0 | auth.htm                          | 5,241            | 7/18/2019 1:3.         |      |  |  |  |  |
|                               |  | 1           | autoexec.bat                      | 24               | 6/22/2015 2:3.         |      |  |  |  |  |
|                               |  | 2           | conn.png                          | 2,381            | 7/5/2016 11:3.         |      |  |  |  |  |
|                               |  | <b>B</b> 3  | custom.css                        | 2,578            | 7/18/2019 2:4.         |      |  |  |  |  |
|                               |  | 4           | index.htm                         | 553              | 12/19/2017 3:.         |      |  |  |  |  |
|                               |  | 95          | javahmi.htm                       | 9,057            | 7/23/2019 1:2.         |      |  |  |  |  |
| <                             | >  | 6           | main.htm                          | 3,532            | 11/15/2017 2:.         |      |  |  |  |  |
|                               | ET7K_UDP>IP:192.168.79.55 Port:23 via UDP, 17 files(s) 230,690 bytes |             |                                   |                  |                        |      |  |  |  |  |
| Connection(F2) 🗊 Upload(I     | F5) 🧕 DiskTool(F6) 📑 Info(F7)  | 🙁 De        | e <mark>lete(F8)</mark> 🛃 Refresh | (F9) 📇 Console(I | F10)                   | »    |  |  |  |  |

#### Step 3: Connect to the module by using UDP

Click **Tools > 7188EU** on the menu bar and enter "/s: IP address of the module /p:23" in the "**Parameters**" dialog.

#### **Description of parameters:**

/s:192.168.255.1 → IP address of the module  $/p:23 \rightarrow$  UDP Port 23 (fixed)

| MiniOS7 Utility | Version 3.2.7 |               |                 | $\frown$         |            |          |                |              |                  |           | ×    |
|-----------------|---------------|---------------|-----------------|------------------|------------|----------|----------------|--------------|------------------|-----------|------|
| 🔯 File 🌔 Conn   | ection 🝷 🚸    | Command 💈     | ] Configuration | 🛅 Tools 🥥        | Help 🔻     |          |                |              |                  |           |      |
| Look in: 📘 OS   |               |               | - 3 🕫 🖻         | 7188XW<br>7188EU |            | A        | ~              | 161,<br>avai | 950 byl<br>Iable | tes 🖡     | r    |
| Name            |               | Size          | Туре            | 7188E            |            |          |                | Size         |                  | Modified  | ~ L  |
| GET7200_UDP_20  | )161124.img   | 64KB          | IMG File        | Send232          |            |          | 5,             | 241          | 7/18/2           | 2019 1:3  |      |
|                 |               |               |                 | SendTCP          |            | at       |                | 24           | 6/22/2           | 2015 2:3  |      |
|                 |               |               |                 | VxComm           | Utility    |          | 2,             | 381          | 7/5/20           | )16 11:3  |      |
|                 |               |               |                 | VACONIII         |            |          | 2,             | 578          | 7/18/2           | 2019 2:4  |      |
|                 | 7188EU Pa     | rameters      |                 | $\times$         | F10        |          |                | 553          | 12/19/           | /2017 3:  |      |
|                 |               |               |                 |                  | javanmi.ni | m        | 9,             | .057         | 7/23/2           | 2019 1:2  |      |
| <               | Parameter     | IS:           |                 |                  | main.htm   |          | 3,             | 532          | 11/15/           | /2017 2:  | ~    |
|                 | /s:192.16     | 8.79.55 /p:23 |                 |                  | >IP:192.1  | 68.79.55 | Port:23 via UD | P, 17        | files(s)         | 230,690 Ь | ytes |
| Connection(F2)  |               | 0K )          | 1               | 1                | (F8) 🔁     | Refresh( | (F9) 📇 Con     | isole(F      | 10)              |           | »    |
|                 | ļ             | UK            | Cancel          |                  |            |          |                |              |                  |           |      |

#### Step 4: Upload the MiniOS7 image

Press **Enter** to see "ET7K\_UDP>" in the window and input the **upload** command, then press Enter. Also, press **ALT + E** and enter the full name of the image file (e.g., **ET7200\_UDP\_20161124.img**)



#### Step 5: Update the OS image file to a Flash

Enter the **bios1** command to update the image to the flash. The MQ-7200M will automatically restart after the update is completed. The user can perform another search for the module to check if the TCP connection has been re-established.



Note: The user can log in to the MQ-7200M's web interface to view the firmware version.

## 8.4 Updating the MQ-7200M Firmware

The firmware is stored in flash memory and can be updated to fix functionality issues or add additional features, so we advise the user to periodically check the ICP DAS web site for the latest updates.

![](_page_58_Figure_2.jpeg)

The latest version of the MQ-7200M firmware can be obtained from:

http://www.icpdas.com/en/download/show.php?num=2677

#### Step 1: Establish a connection to connection to the MQ-7200M.

Be sure that the MiniOS7 Utility is connecting with the MQ-7200M using the UDP connection. For a more detailed description of this instruction, refer to the section "6.2. Exchanging the Protocol (TCP/IP to UDP)"

#### Step 2: Choose "Erase Disk" from the "Command" menu

After establishing a UDP connection, then choose "**Erase Disk**" from **Command** menu (or right-click on the right of window) to delete all files from the flash memory.

| 🏙 MiniOS7 Utility Version 3.2.7  |                           |  | - 0   | ×     |
|----------------------------------|---------------------------|--|---|-------|
| 🔯 File ႃ Connection 👻 🚸 Co       | ommand 🛐 Configuration 🛅  | ] Tools 🥔 Help 🔻   |   |       |
| Look jn: 📃 Desktop               | 💽 🕝 🍺 📂                   |  | 4,027 bytes (   | ł     |
| Name                             | Size Type                 | Not Right-click the file list  | e Modified  | ^     |
| ET7017_V300.HEX                  | 157KB HEX File            | 🗐 0 🛛 7168eu.ini   | 30 2019/1/24  |       |
|                                  |                           | 1       Run         2       Run with parameters         3       Reset MiniOS         4       F4         5       Erase Disk         6       7         6       77         8       et7017.exe         9       index.htm | 807         2018/7/11           6         2018/3/5           .799         2019/1/23           .881         2016/7/5           .468         2018/3/22           .943         2018/8/1           .8,392         2018/11/1           27,613         2019/1/24           561         2018/3/5 |       |
| <                                | >                         | 10 io.js   | 5,687 2018/5/2  | ×     |
|                                  |                           | ET7K_UDP>IP:192.168.15.17 Port:23 via L  | JDP, 27 files(s) 298,293  | bytes |
| Connection(F2)<br>Connection(F2) | 🥞 DiskTool(F6) 📑 Info(F7) | 🙆 Delete(F8) 🛃 Refresh(F9) 📇 C   | onsole(F10)   | »     |

![](_page_59_Picture_1.jpeg)

The user has to delete all files existed on the MQ-7200M before uploading the firmware.

#### **Step 3:** In the Confirm dialog box, click the "Yes" button to continue.

After executing the Erase Disk command, the Confirm dialog will appear, and then click "Yes" button to continue erasing the memory contents.

![](_page_59_Picture_5.jpeg)

#### Step 4: Select the latest version of the firmware.

Right-click on the firmware which is downloaded on the computer and select **Upload** to start the upload process.

| 2   | MiniOS7 Utility             | Version 3.2.7    |                |           |         |            |             |               | _               |                  | ×        |
|-----|-----------------------------|------------------|----------------|-----------|---------|------------|-------------|---------------|-----------------|------------------|----------|
| 3   | File 🌔 Conn                 | iection 👻 🚸 Coi  | mmand 🗾 Confi  | guration  | 🔄 Tools | i 🥔 Help   | -           |               |                 |                  |          |
| Lo  | ok in: 📃 Desk               | top              | <b>•</b> G     | ) 🏚 📂     |         | Lock in:   | Disk A      | ~             | 393,1<br>availa | 84 bytes<br>able | qf       |
| Nar | me                          |                  | Size Type      |           | No      | Name       |             |               | Size            |                  | Modified |
|     | MQ725 <mark>5M_V20</mark> 2 | .HEX             | 136KB HEX Fi   | е         |         |            |             |               |                 |                  |          |
|     | Up                          | oload            | F5             |           |         |            |             |               |                 |                  |          |
|     | Up                          | load & Execute[R | AM]            |           |         |            |             |               |                 |                  |          |
|     | Up                          | date MiniOS7 Im  | age            |           |         |            |             |               |                 |                  |          |
|     | DC                          | DS               | F11            |           |         |            |             |               |                 |                  |          |
|     |                             |                  |                |           |         |            |             |               |                 |                  |          |
|     |                             |                  |                |           |         |            |             |               |                 |                  |          |
|     |                             |                  |                |           |         |            |             |               |                 |                  |          |
| <   |                             |                  |                | >         |         |            |             |               |                 |                  |          |
|     |                             |                  |                |           | ET7K_L  | JDP>IP:192 | 2.168.79.55 | Port:23 via U | DP, 0 file      | es(s) O byl      | tes      |
|     | Connection(F2)              | Upload(F5)       | 🧕 DiskTool(F6) | 📑 Info(F7 | ) 🙆 (   | )elete(F8) | 🛃 Refres    | h(F9) 📇 (     | Console(F       | -10)             | »        |

#### Step 5: Reboot the module.

After the update is completed, reboot the module.

![](_page_60_Picture_2.jpeg)

![](_page_60_Picture_3.jpeg)

## 8.5 Restoring the MQ-7200M to Default Settings

If the network configuration on the MQ-7200M is lost, press and hold the reset button for at least 3 seconds can restore the MQ-7200M to default factory settings.

![](_page_61_Picture_2.jpeg)

![](_page_61_Picture_3.jpeg)

#### **Network Configuration**

| Item        | Factory Default Settings |
|-------------|--------------------------|
| IP Address  | 192.168.255.1            |
| Gateway     | 192.168.0.1              |
| Subnet Mask | 255.255.0.0              |
| DNS Server  | Empty                    |
| DHCP        | Disabled                 |

#### Web Configuration

| Item                                  | Factory Default Settings          |
|---------------------------------------|-----------------------------------|
| Module Name                           | Depends on the name of the module |
| Page Header Information (First line)  | ICP DAS                           |
| Page Header Information (Second line) | https://www.icpdas.com            |
| Web Server Port                       | 80                                |
| Modbus TCP Port                       | 502                               |

#### I/O Settings

The information displayed on the settings page varies depending on the model number.

#### **Digital Output**

| Item           | Factory Default Settings |
|----------------|--------------------------|
| Power-on Value | OFF                      |
| Safe Value     | OFF                      |

# 9. Modbus Register Table

#### Coils (0xxxx)

| Reg                 | gister            | Doints | Description   | Sattings                                | Attribute | Factory |
|---------------------|-------------------|--------|---|---|-----------|---------|
| DEC                 | HEX               | FUILTS | Description   | Settings                                |           | Value   |
| 00000<br>:<br>00005 | 0000<br>:<br>0005 | 6      | DO value  | 0: Off<br>1: On                         | R/W       | -       |
| 00032               | 0020              | 1      | Clear 1-ch historical DI max. value                 | 1: Clear                                | W         | -       |
| 00033               | 0021              | 1      | Clear 1-ch historical DI min. value                 | 1: Clear                                | W         | -       |
| 00064<br>:<br>00069 | 0040<br>:<br>0045 | 6      | DI value  | 0: Off<br>1: On                         | R         |         |
| 00126               | 007E              | 1      | Reset the I/O settings to the factory default state | 1: Reset                                | W         | -       |
| 00133               | 0085              | 1      | Reboot the module                                   | 1: Reboot                               | W         | -       |
| 00235<br>:<br>00240 | 00EB<br>:<br>00F0 | 6      | Enable/Disable the DO power-on value function       | 0: Disable<br>1: Enable<br>(Default: 0) | R/W       | 0       |

#### Discrete Inputs (1xxxx)

| Regis               | ster              | Dointe | Description                 | Data Format             | Attribute |
|---------------------|-------------------|--------|-----------------------------|-------------------------|-----------|
| DEC                 | HEX               | POINTS | Description                 |                         |           |
| 10000<br>:<br>10005 | 0000<br>:<br>0005 | 6      | DI value                    | 0: Off<br>1: On         | R         |
| 10032<br>:<br>10037 | 0020<br>:<br>0025 | 6      | Read DI "high latch" status | 0: Normal<br>1: Latched | R         |
| 10064<br>:<br>10069 | 0040<br>:<br>0045 | 6      | Read DI "low latch" status  | 0: Normal<br>1: Latched | R         |

#### Input Register (3xxxx)

| Regi  | ster | Doints | No. Per | Description              | Data Format               | Attributo |
|-------|------|--------|---------|--------------------------|---------------------------|-----------|
| DEC   | HEX  | POINTS | Point   | Description              |                           | Allibule  |
| 30100 | 0064 | 1      | 1       | Number of the DI channel | 6                         | R         |
| 30110 | 006E | 1      | 1       | Number of the DO channel | 6                         | R         |
| 30150 | 0096 | 1      | 1       | OS image version         | 0x123 means version 1.2.3 | R         |
| 30151 | 0097 | 1      | 1       | Firmware version         | 0x123 means version 1.2.3 | R         |
| 30153 | 0099 | 1      | 1       | I/O version              | 0x123 means version 1.2.3 | R         |

### Holding Register (4xxxx)

| Regi  | ster | Dointo | No. Per | Description   | Data Format  | Attributo | Factory |
|-------|------|--------|---------|---|--|-----------|---------|
| DEC   | HEX  | Points | Point   | Description   |  | Allfibule | Value   |
| 40255 | 00FF | 1      | 1       | Read the module reset status  | <ol> <li>Power-on</li> <li>Module Watchdog</li> <li>Software Reset</li> <li>Command</li> </ol> | R         | -       |
| 40256 | 0100 | 1      | 1       | Read the boot count of the<br>module<br>The factory default value is 0<br>when the settings are set to<br>the factory default values. | 1 to 32767   | R         | -       |
| 40260 | 0104 | 1      | 1       | Read the module name  | 0x7260   | R         | -       |
| 40271 | 010F | 1      | 1       | Set the module identification<br>(Modbus NetID)   | 1 to 255   | R/W/E     | 1       |

# **10. Troubleshooting**

A number of common problems are easy to diagnose and fix if the user knows the cause.

| Symptom/Problem   | Possible cause  | Solution   |
|---|---|--|
| The Run LED doesn't light   | Internal power has failed   | Return the module for repair.  |
| The Run LED indicator is ON (light), but not flashing.  | The module has possibly crashed.  | Reboot the module  |
| Cannot communicate via the<br>Ethernet port, but the<br>MQ-7200M is still operating.                                    | The IP/Mask/Gateway<br>address isn't within the IP<br>address range of the LAN. | Change the IP/Mask/Gateway<br>address to match the LAN, or<br>ask the MIS administrator for<br>assistance. |
|   | There are more than 30<br>TCP/IP connections.                                   | Reboot the module.   |
| Able to explore the web page<br>through using a web browser,<br>but the connection to broker<br>can not be established. | Port 1883 has been restricted by the firewall.                                  | Consult the MIS administrator for assistance.  |

# **Revision History**

The table below shows the revision history.

| Revision | Date      | Description   |
|----------|-----------|---|
| 1.1      | Sep, 2023 | Revise Section 7.2, Section 7.3 (p46-50) using the MQTTX                          |
| 1.0.1    | May, 2023 | Adjust the order of chapters, add or modify some chapter content and screenshots. |
| 1.0.0    | Aug, 2016 | Initial issue   |