

MQTT User Guide

MQTT

This guide walks through the MQTT usage in EasyBuilder Pro / Weintek HMI.

V1.00

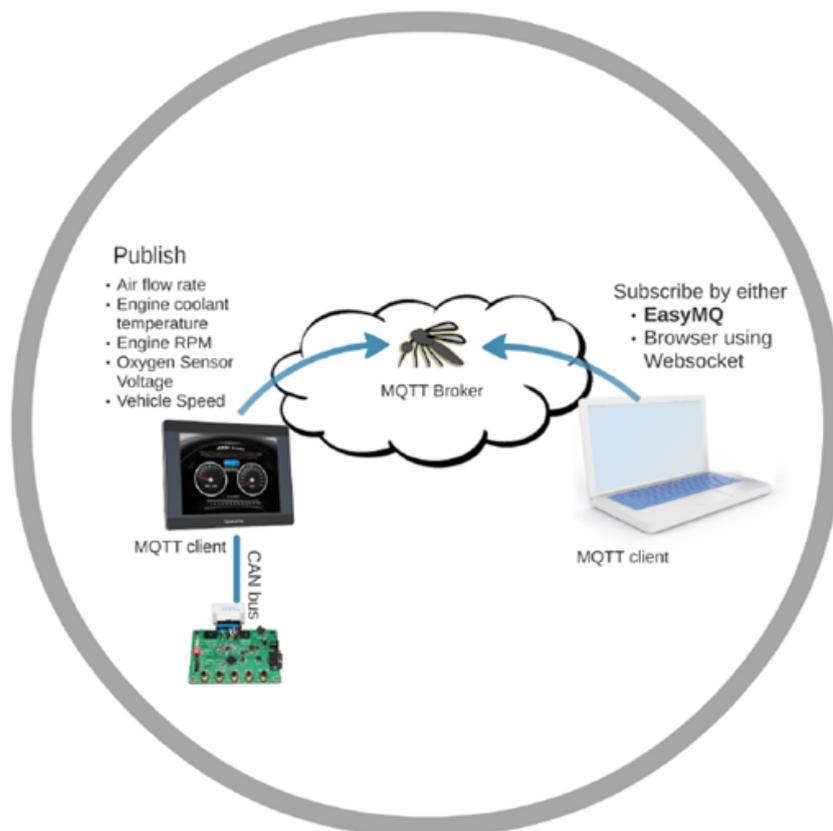
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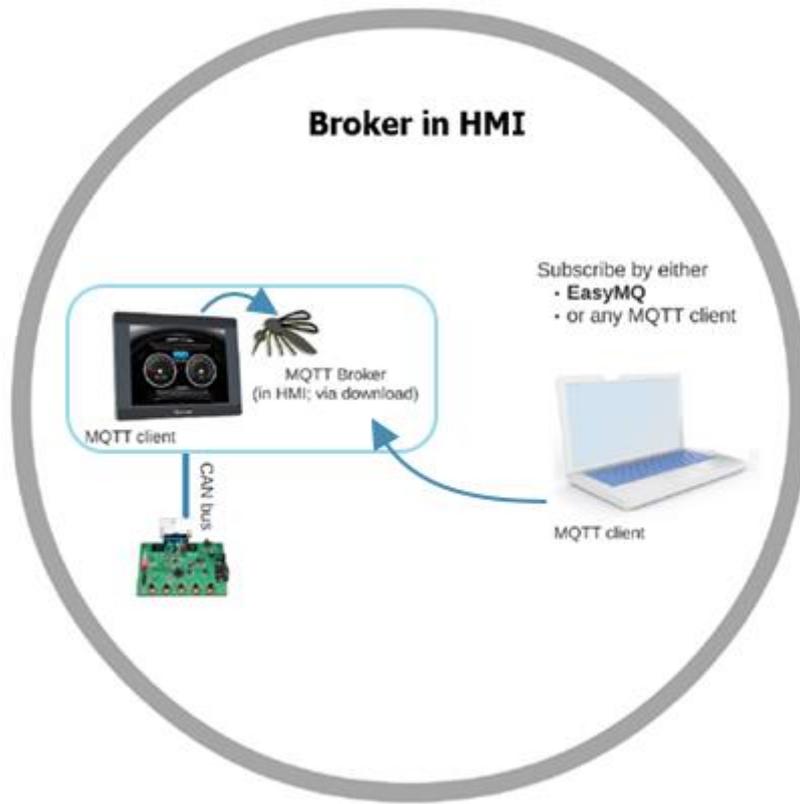
1. Overview

Designed to be light weight, open, and simple, MQTT is a subscriber/publisher messaging transport protocol that is considered a great solution for applications where small code footprint is required and/or network bandwidth is scarce. It is particularly suitable for continuous monitoring of sensory data such as temperature, pressure, water level, energy monitoring...etc.

HMI processes data from PLC and publishes messages to an MQTT broker, which will handle message delivery to the subscribers. In this manner, message publishing is possible even when the HMI is positioned behind firewalls and access to HMI is difficult.



Alternatively, MQTT messages can be published internally to a built-in MQTT broker. That is, an external broker is not necessary; one can use an MQTT client to subscribe directly to the MQTT broker inside the HMI and receive message updates! This scheme can be realized even remotely as long as the MQTT client can connect directly to HMI, such as with VPN or EasyAccess 2.0.

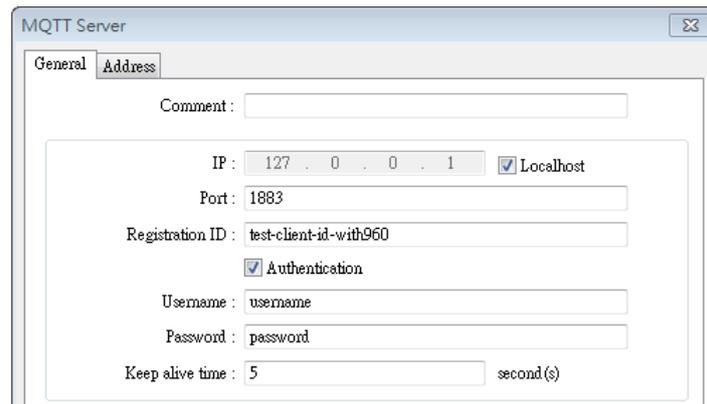


2. EasyBuilder Pro Settings

In EasyBuilder Pro, click [Objects] » [MQTT] to setup MQTT in the project.

Server Settings

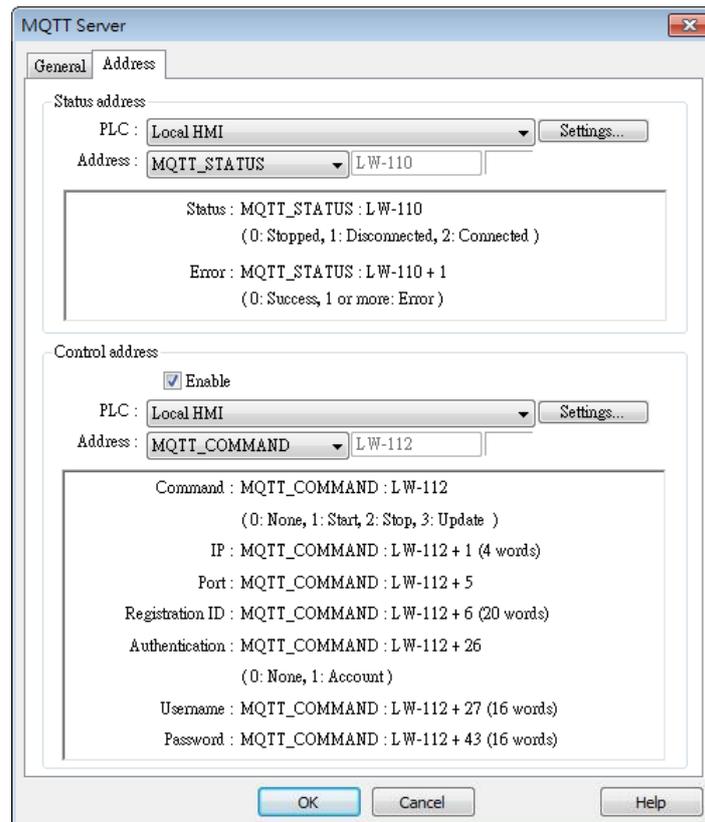
Firstly and most importantly, MQTT server information must be entered. The IP address of the server is the IP address of the broker. When the local address (127.0.0.1) is used, the messages will be published to the built-in broker in HMI.



The screenshot shows the 'MQTT Server' configuration window. It has two tabs: 'General' and 'Address'. The 'Address' tab is selected. The fields are as follows:

- Comment: [Empty text box]
- IP: [127 . 0 . 0 . 1] with a checked Localhost
- Port: [1883]
- Registration ID: [test-client-id-with960]
- Authentication
- Username: [username]
- Password: [password]
- Keep alive time: [5] second(s)

LW addresses can be designated to dynamically control MQTT or display MQTT status during HMI run time. After designating an address, its relative addresses (+1, +2, +3...etc.) will correspond to different attributes or parameters, as shown in the following EasyBuilder Pro settings dialog box. For instance, if MQTT_STATUS is set to LW-110, then LW-110 shows the status and LW-111 shows the error code.

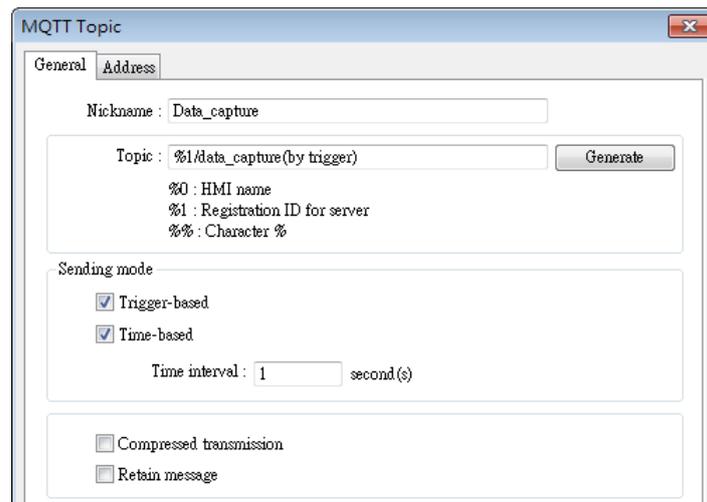


Topic Settings

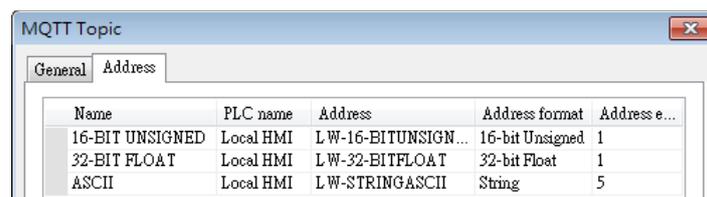
After setting MQTT Server, open MQTT Topic settings. Each topic contains a number of messages to be sent.

The name of the Topic can be user-defined, and by using the character % followed by certain codes ,HMI name/Server setting can be used in Topic name as well.

Sending Mode: If Trigger-based is selected, MQTT message is sent when any value in the Topic changes. If Time-based is selected, data is published at a fixed time interval.



In Address tab, set the data composition that will be contained in the topic. The addresses can be consecutive or nonconsecutive, and of different data types and lengths.



Project and Application

Two types of addresses can be found in the MQTT Server settings mentioned above: MQTT_COMMAND (control address) and MQTT_STATUS (status address)

The control addresses can be designated to set control parameters, and the corresponding addresses include MQTT_COMMAND+1 ~ MQTT_COMMAND+43...etc.

The status addresses can show connection status, and the corresponding addresses include MQTT_STATUS and MQTT_STATUS+1.

The information of the addresses can be found in EasyBuilder Pro settings dialog box.

During HMI run time:

Setting MQTT_COMMAND to 1 connects HMI with the broker.

Setting MQTT_COMMAND to 2 disconnects HMI with the broker.

Setting MQTT_COMMAND to 3 after updating the control parameters will connect HMI with the broker using the new parameters.

The MQTT settings can be changed dynamically during HMI run time by using the control addresses mentioned above.

3. Choosing a Broker

Built-in Broker in HMI

To use the built-in broker in HMI, select Localhost check box in MQTT Server settings dialog box (Default IP address: 127.0.0.1), or alternatively set the IP address to 127.0.0.1 on HMI. MQTT will use the built-in broker in HMI, and the client program can connect to the broker using the IP address of the HMI.

HMI's MQTT Broker should be downloaded to HMI from EasyBuilder Pro. Please select [Runtime] when downloading MQTT Broker.

External Broker

To use an external broker, enter the IP address of the external broker when configuring MQTT server information.

For example, when using a public broker HiveMQ, the data of the broker is:

Host: **broker.hivemq.com**

Port: **1883**

Websocket Port: **8000**

(<http://www.hivemq.com/try-out/>)

Since domain name is currently not supported, please enter the actual IP address of the broker. The IP address of the broker can be found using DNS. In this example, the broker IP is 212.72.74.21. (2016/2/2)

Self-build broker

The user can host an MQTT broker server. The following are two choices easy to find: HiveMQ and Mosquitto

HiveMQ Enterprise MQTT Broker (paid) <http://www.hivemq.com/downloads/> (Trial available)

Mosquitto (FREE) <http://mosquitto.org/download/>

Please visit their respective official websites for details on installation and restrictions.

4. Getting MQTT Data

Getting MQTT data updates requires an MQTT client program. The client program connects to the broker and registers to receive data updates from HMI. Many free client programs can be found on the web. This chapter introduces one of the free programs for PC: MQTT.fx.

MQTT Client Program

Many free MQTT client programs for PC and portable can be found on the web. The following briefly walks through the steps to use MQTT.fx on PC to connect to the broker in order to get message updates from HMI. For other programs, configuration steps may be similar.

1. Suppose an HMI is running MQTT Demo project. It's been configured to connect to MQTT server at 212.72.74.21/port 1883. It has an MQTT topic called Data_Bit.
2. In MQTT.fx » Edit Connection Profiles window, the connection profile should be set as follows.

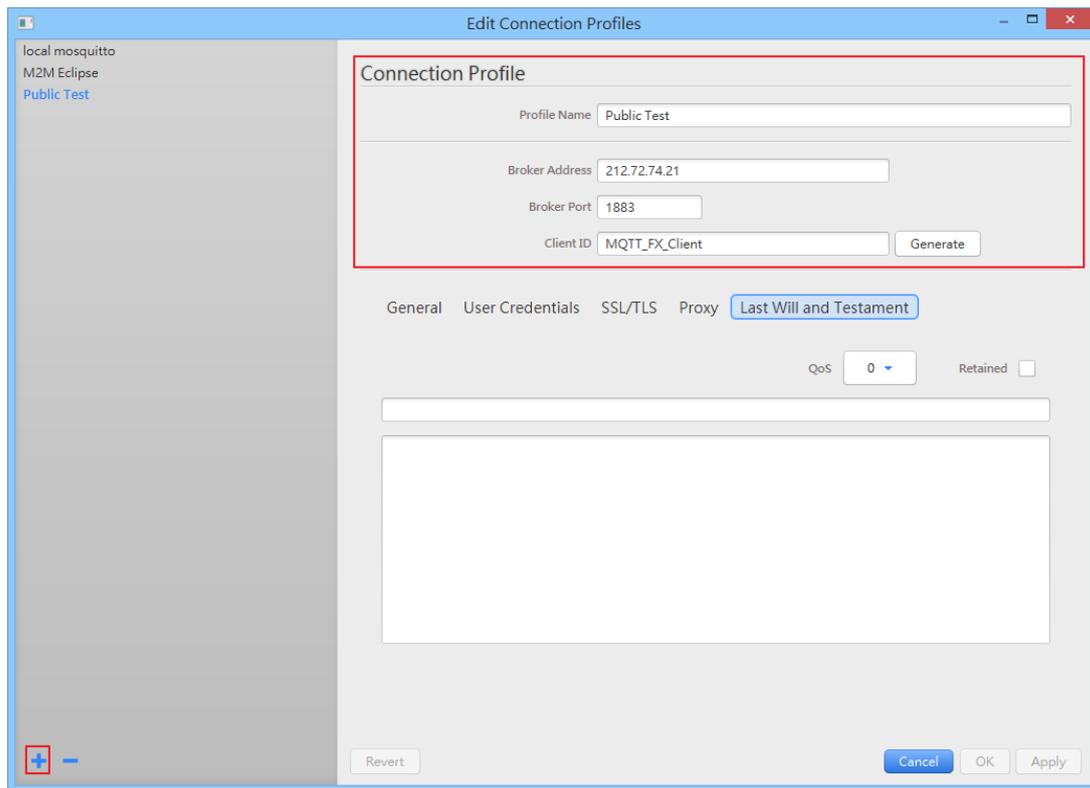
Broker Address: 212.72.74.21

Broker Port: 1883

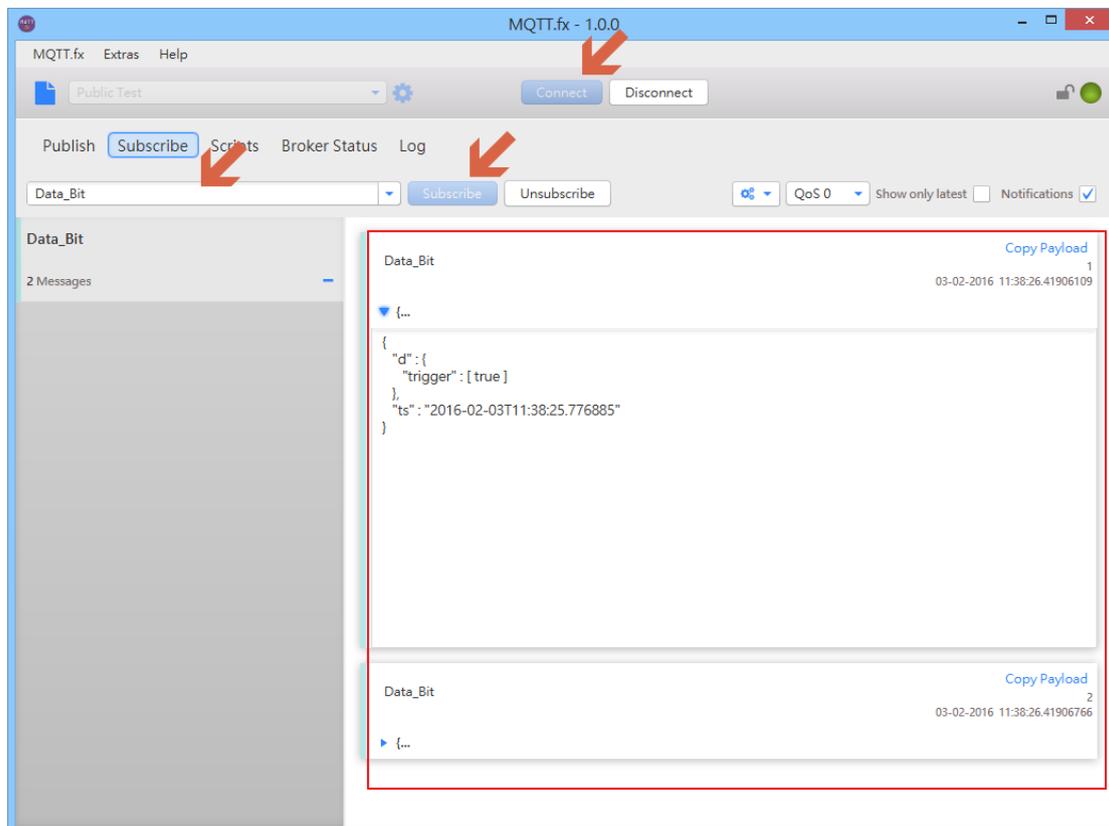
Profile Name: *user defined*

Client ID: *user defined*

The rest of the settings can remain in default. The connection with broker will start after clicking [Connect].



3. Open Subscribe tab » enter Data_Bit in the field shown below » click [Subscribe] button. Once successfully subscribed, when there are MQTT message updates, they will be received and displayed on the main screen.



5. References

The Seven Best MQTT Client Tools

<http://www.hivemq.com/blog/seven-best-mqtt-client-tools>