

Advantech AE Technical Share Document

Date	2023/7/18	SR#	1-4192645288
Category	■FAQ □SOP	Related OS	N/A
Abstract	How to Send MQTT Command to WISE-6610 for time synchronizing or rebooting the WISE-2410-4610		
Keyword	WISE, LoRaWAN, vibration, time sync, downlink, reboot		
Related Product	WISE-2410 series, WISE-4610 LoRa series.		

■ Problem Description:

This document explains how to time synchronize for WISE-2410 and WISE-4610, or restart the nodes. A user can send the commands from WISE-6610 user interface or by using MQTT commands. If a user is using the MQTT topic to send commands, there is no limit for which brand of LoRaWAN gateway is used.

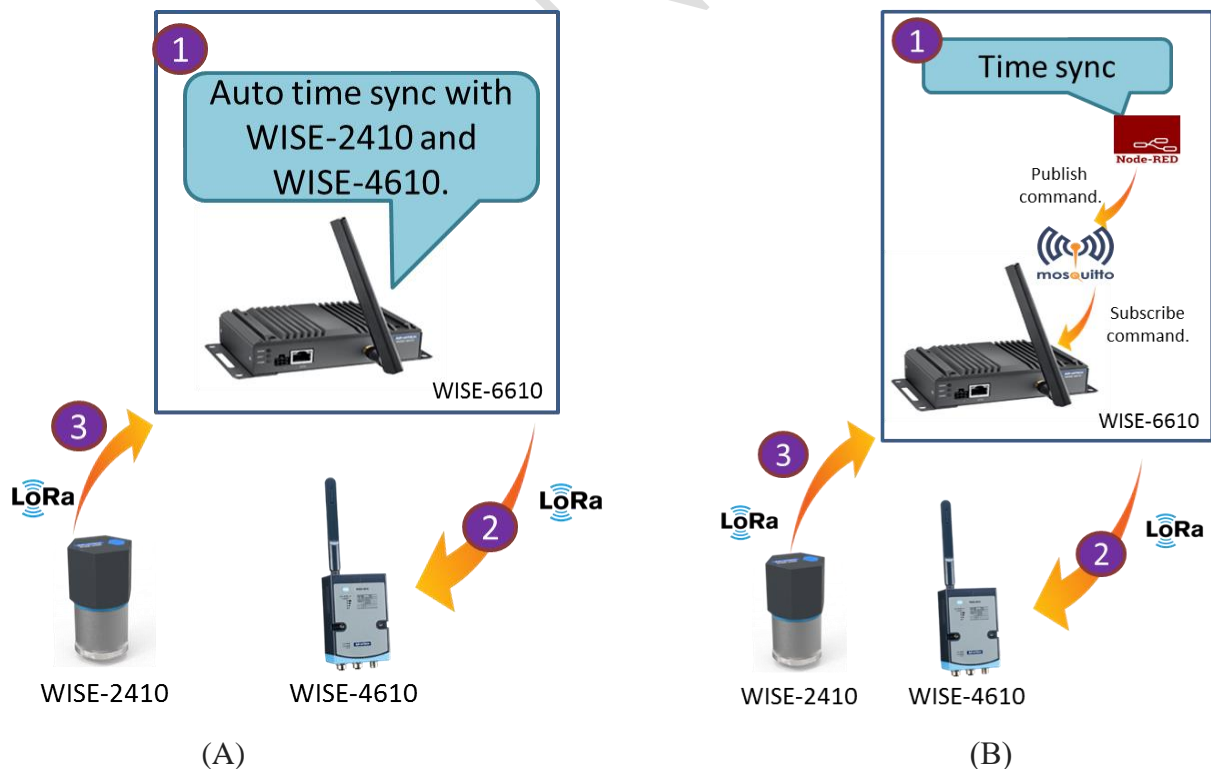


Figure 1. Topology of this scenario. (A) Is for method 1. (B) Is for method 2.

■ Brief Solution - Step by Step:

System requirements:

1. WISE-2410 firmware: A1.02 B05 or newer version.
2. WISE-4610 firmware: A1.12 B00 or newer version.
3. WISE-6610 LoRa user module: v1.1.4 or newer version. (for method 1)

Method 1.

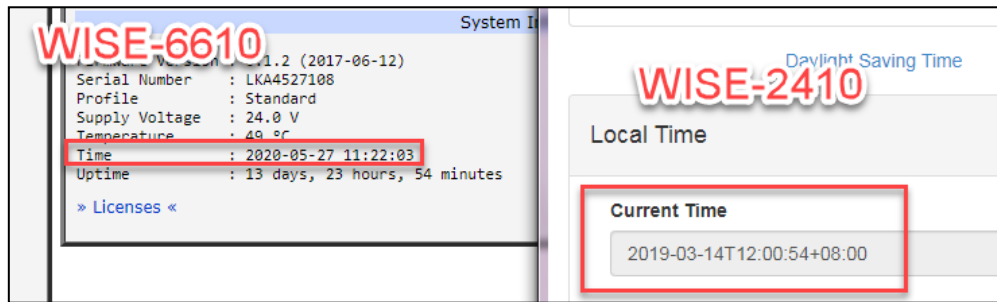
Utilize Application Server UI in WISE-6610 to work on time sync WISE-2410/4610.

Step 1. Enable “time sync” function on WISE-6610 application server.

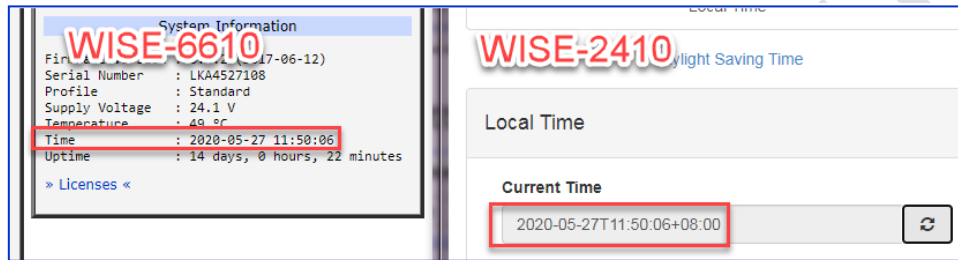
LoRaWAN Gateway Settings	
Advantech Application Server Setting	
Application Server Enable	<input type="text" value="On"/> Enable the Local Application Server.
Application Server Connect MQTT Address	<input type="text" value="127.0.0.1"/> Application Server remote MQTT broker address.
Application Server Connect MQTT Port	<input type="text" value="1883"/> Application Server remote MQTT broker TCP port number (1 - 65535).
MQTT Username	<input type="text"/> The user name for the remote MQTT broker.
MQTT Password	<input type="text"/> The password for the remote MQTT broker.
Uplink Topic	<input type="text" value="uplink/#"/> Subscribe topic from MQTT broker.
Downlink Topic	<input type="text" value="downlink/"/> publish topic to MQTT broker.
MQTT Publish Retain	<input type="text" value="Off"/> Enable the MQTT Publish Retain.
MQTT Publish QoS	<input type="text" value="0"/> Application Server internal Publish QoS (0 - 2).
Modbus TCP Server	<input type="text" value="On"/> Enable the Modbus TCP Server.
Modbus TCP Server Port	<input type="text" value="502"/> The modbus TCP server port number (1 - 65535).
Modbus Timeout	<input type="text" value="2"/> The modbus TCP Timeout number (2 - 30).
Time Sync	<input type="text" value="On"/> Enable time sync for WISE-4610 and WISE-2410 series

Step 2. The RTC synchronize command will be sent from WISE-6610 to WISE-2410/4610 automatically if the time difference is **greater than 10 seconds**.

Result:



Before

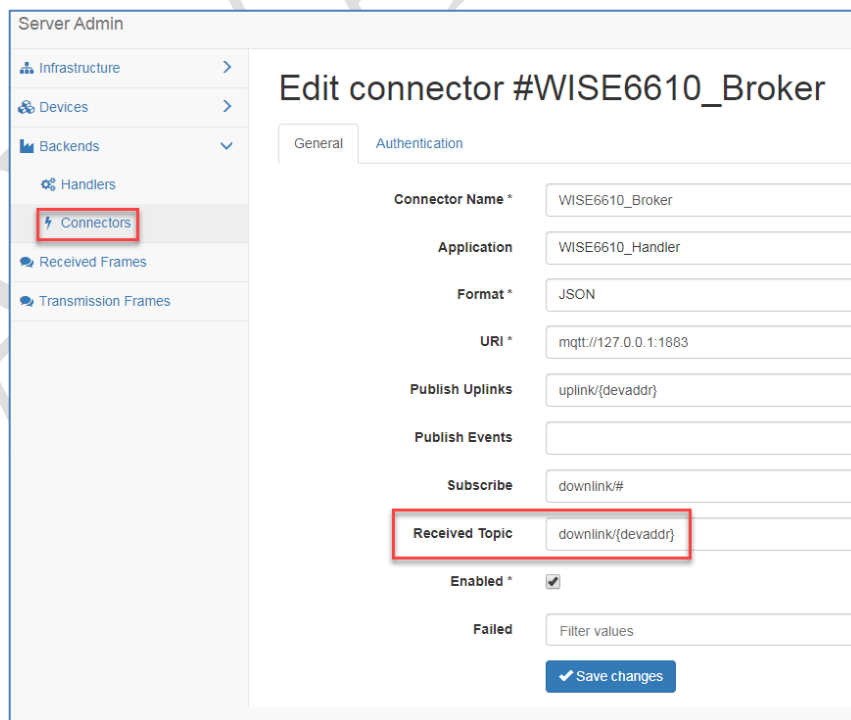


After

Method 2.

How does a user send a downlink command to the node without using WISE-6610 UI?

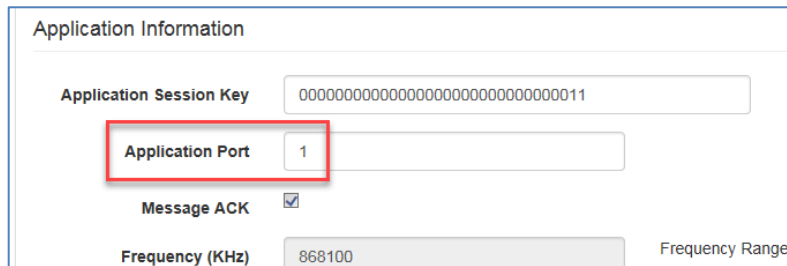
- The way is defined by the gateway.
 - Example: WISE-6610 can send command from SCADA through MQTT.
- If utilize MQTT, the topic is defined by the gateway.
 - Example: WISE-6610 define receive topic in “Network Server”



- If utilize MQTT, the payload can be found in “transmission frames” page.

- Format: {"data": "80001D611B023230323...", "port": 1}

→ Port number is "1" according to the setting in node.



CRC: 1 octet

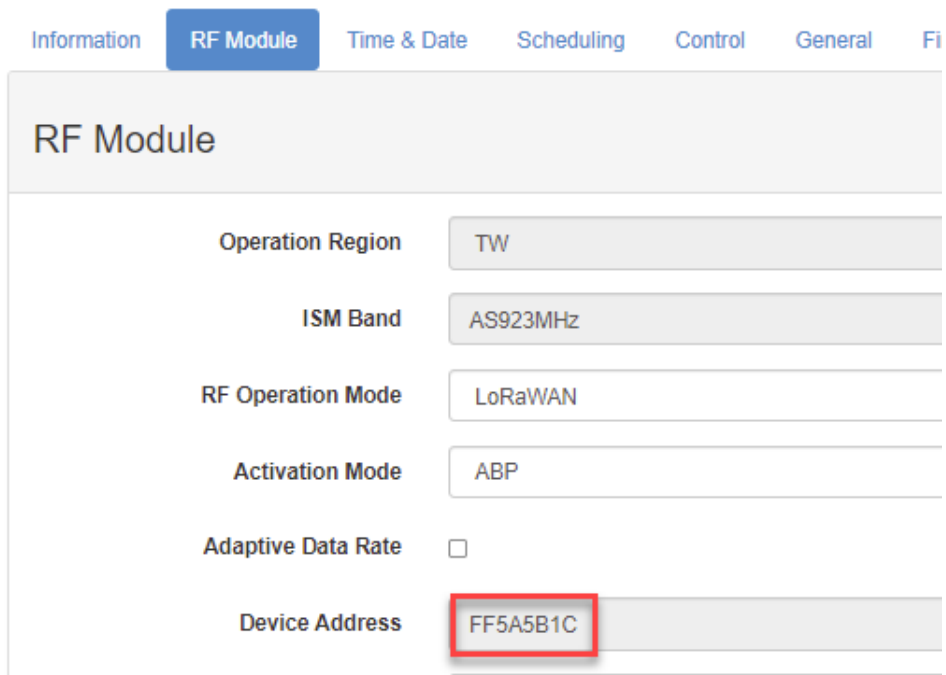
An 8-bit CRC-8-CCITT value calculated from WISE Payload data. It's a standard CRC-8, with polynomial x^8+x^2+x+1 and initial value 0xFF.

Suggested website: http://www.sunshine2k.de/coding/javascript/crc/crc_js.html

Examples:

- When trying to downlink MQTT command to Node with Device Address as "FF5A5B1C"

Configuration



- To set the **RTC time** to 2019-12-26T10:55:30+08:00
[0x80, seq, 0x1D,]0x61, 0x1B, 0x02, '2', '0', '1', '9', '-', '1', '2', '-', '2', '6', 'T', '1', '0', ':', '5', '5', ':', '3', '0', '+', '0', '8', ':', '0', '0', 0x00, [CRC]
- To set the **RTC time** to 2020-06-23T10:16:07+08:00
[HEX]:80001D611B02323032302D30362D32335431303A31363A30372B30383A30300066

ASCII to Hex

...and other free text conversion tools

Text (ASCII / ANSI)

2020-06-23T10:16:07+08:00

Hexadecimal

32 30 32 30 2d 30 36 2d 32 33 54 31 30 3a 31 36 3a
30 37 2b 30 38 3a 30 30

CRC Calculator (Javascript)

CRC width

Bit length: ☒ CRC-8 ☐ CRC-16 ☐ CRC-32 ☐ CRC-64

CRC parametrization

☐ Predefined ☒ Custom

CRC detailed parameters

Input reflected: ☐ Result reflected: ☐

Polynomial:

Initial Value:

Final Xor Value:

CRC Input Data

☐ String ☒ Bytes ☐ Binary string

611B02323032302D30362D32335431303A31363A30372B30383A3030
00

Show reflected lookups: ☐ Show CRC calculation, only the

**Data payload only.
Header is excluded.**

Calculate CRC!

Result CRC value: 0x66

- So, to send a downlink command with the example listed above, you will need to Publish to:
Topic to **downlink/FF5A5B1C**
Payload type as **JSON**
Payload as

```
{"data":"80001D611B02323032302D30362D32335431303A31363A30372B30383A30300066","port":1}
```

Topic to publish

downlink/FF5A5B1C

QoS

0 - Almost Once

Retain

☐

Payload Type

Strings / JSON / XML / Characters

e.g: {'hello':'world'}

Payload

{ "data": "80001D611B02323032302D30362D32335431303A31363A30372B30383A30300066", "port": 1 }

Publish

- And you will find a new item in **Transmission Frames** page, which tells that this MQTT downlink is successfully received by WISE-6610 and is in the queue that is ready to downlink to the LoRa node you specified.

Transmission Frames

<input type="checkbox"/> DevAddr	<input type="checkbox"/> Creation Time	<input type="checkbox"/> Txdata Port	<input type="checkbox"/> Txdata Data
<input type="checkbox"/> FF5A5B1C	2022-07-21 10:02:59	1	80001D611B02323032302D30362D32335431303A31363A30372B30383A30300066

- To **restart** the LoRa node.

[0x80, seq, 0x06,]0x61, 0x04, 0x03, 'R', 'S', 'T', [CRC]
[HEX]: 80000661040352535414

ASCII to Hex

...and other free text conversion tools

Text (ASCII / ANSI)	Hexadecimal
RST	52 53 54

CRC Calculator (Javascript)

CRC width
Bit length: ☒ CRC-8 ☐ CRC-16 ☐ CRC-32 ☐ CRC-64

CRC parametrization
☐ Predefined ☐ CRC8 ☒ Custom

CRC detailed parameters
Input reflected: ☐ Result reflected: ☐
Polynomial: 0x7
Initial Value: 0xff
Final Xor Value: 0x0

CRC Input Data
☐ String ☒ Bytes ☐ Binary string
610403525354

**Data payload only.
Header is excluded.**

Show reflected lookup table. (This option does not break the CRC calculation, only the displayed lookup table)

Calculate CRC!

Result CRC value: 0x14

- So, to send a downlink command with the example listed above, you will need to Publish to:
Topic to **downlink/FF5A5B1C**
Payload type as **JSON**
Payload as {"data": " 80000661040352535414", "port": 1}

Topic to publish

downlink/FF5A5B1C

QoS

0 - Almost Once

Retain

☐

Payload Type

Strings / JSON / XML / Characters

e.g: {'hello':'world'}

Payload

{"data":"80000661040352535414","port":1}

Publish

- And you will find a new item in **Transmission Frames** page, which tells that this MQTT downlink is successfully received by WISE-6610 and is in the queue that is ready to downlink to the LoRa node you specified.

Transmission Frames

<input type="checkbox"/>	DevAddr	Creation Time	Txdata Port	Txdata Data
<input type="checkbox"/>	FF5A5B1C	2022-07-21 10:08:32	1	80000661040352535414