WirelessHART Product Quick Start Guide

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WirelessHART Introduction

On the basis of compatible with the existing HART device and application, WirelessHART has feature added and application extended, is able to satisfy key requirements of process industry application, including reliability, stability, safety of wireless communication technology. It is very positive to decrease cost of industrial measuring system, improve product quality and production efficiency.

WirelessHART protocol provides a kind of wireless solution with low cost and low transfer rate. Mainly used for field of process industry supervision, asset management, on-line test and diagnostics, etc.

WirelessHART protocol works in 2.4 GHz ISM radio frequency, compatible with IEEE802.15.4 wireless standard, in view of factory's complex environment, provide high reliable wireless network communication technology under public bands.
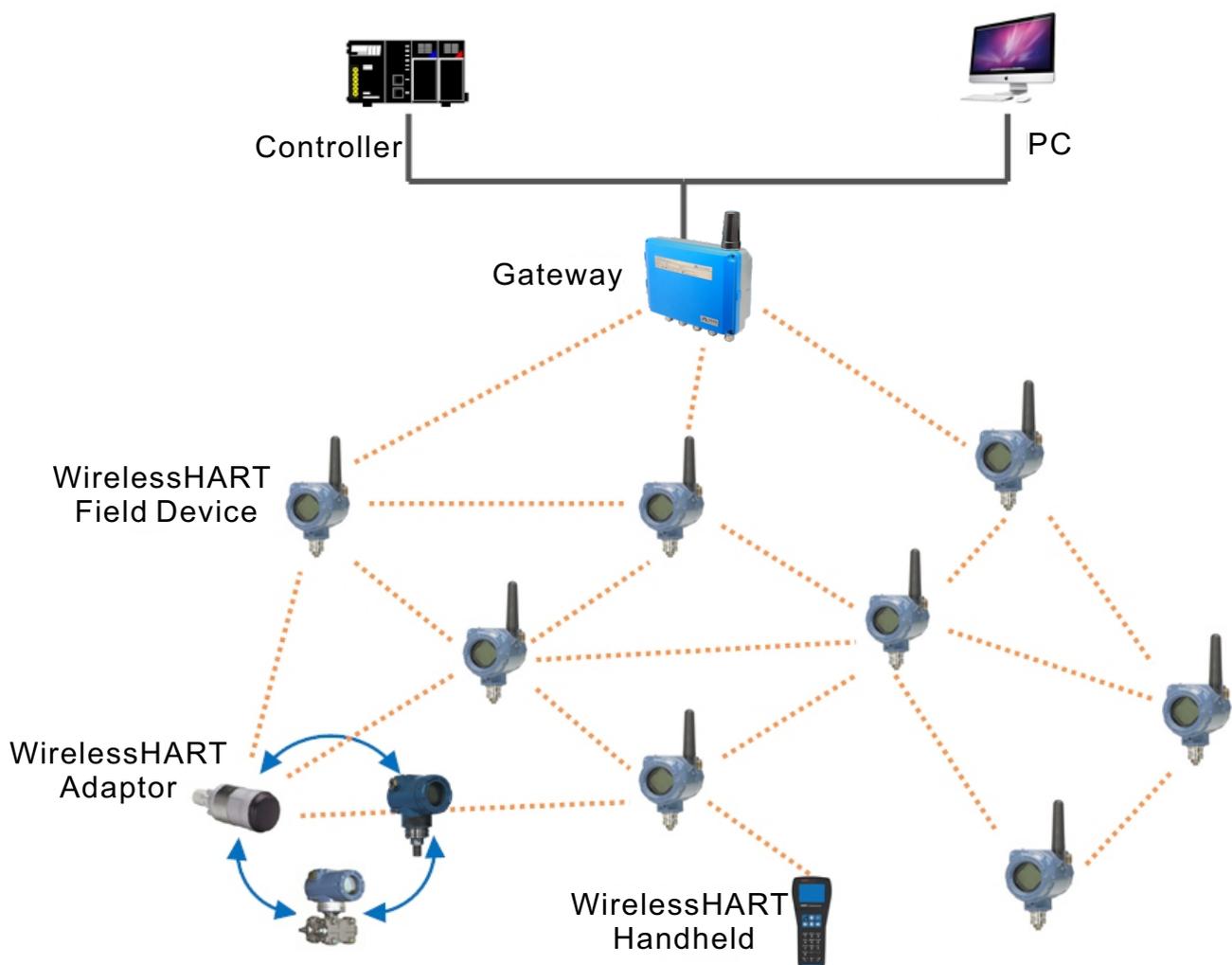
WirelessHART Network Topology

Overview

+ WirelessHART Module

WirelessHART module is tallied with HART 7.6 protocol, as core part of WirelessHART field device. Rapidly realize WirelessHART field device by re-develop with the module.

+ WirelessHART Smart Gateway

WirelessHART gateway is tallied with HART 7.6 protocol, mainly provides functions of network management, safety management, device management and process data protocol converting of the whole wireless network.

+ WirelessHART Module Multi-function Development Board

WirelessHART module multi-function development board is conveniently for user to evaluate WirelessHART module, and to shorten development cycle of the user's product. Development board has device maintenance port, the user can directly configure WirelessHART module to satisify the user's development requirements.

+ WirelessHART Module Low-power Development Board

WirelessHART module low-power development board is similar to multi-function development, but it provides battery supply, with small volume, convenient for carrying and mobile deployment.

+ HART-MTP Configuration Tool

HART-MTP configuration tool software is used to send commands by maintenance port, to read and write the configuration information of wirelessHART module.

+ HART Protocol Stack Library Files

HART protocol stack library files provide abundant library files, sample code and design reference files for the user, and enable the user simply and rapidly develop WirelessHART field device, no need to understand WirelessHART protocol.

Wireless Network Setup

1 Setup WirelessHART Gateway

● **Power supply for gateway**

Gateway is powered by 24VDC (nominal value) power. Positive and negative poles are connected onto left side of terminal blocks (Figure 1). Attached case's earth wire is on the right side of junction box's case. When wiring, external power break switch or breaker shall be used near the gateway.
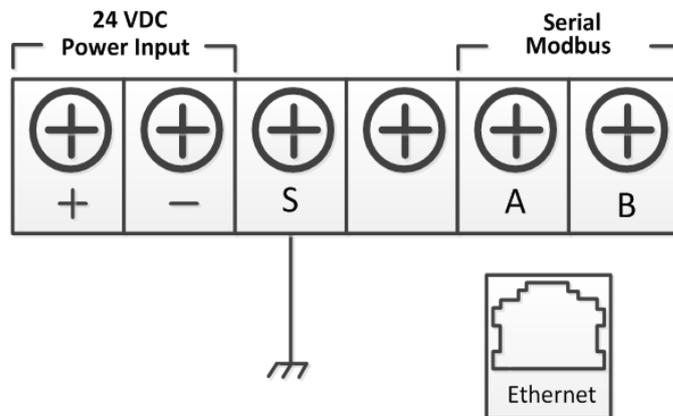
Figure 1. Gateway Terminal Block Diagram

Warning

■ Be very careful when touch wire and terminal.

■ In the physical connection to the gateway, cable pipe inlet at the bottom of the case must be used. Open lid of the gateway to connect directly, connection may be pressed, and damage the gateway.

● **Initial Connection**

Before communicating with the gateway, PC / portable computer shall be configured to compose a special network. Use network cable to connect PC / portable computer to the gateway.

Network Configuration Steps:
1.Open "Network Connections".
2.Select "Local Area Connection".
3.Right click, select "Properties" from the list.
4.Select "Internet Protocol" (TCP/IP), then select "Properties" button.
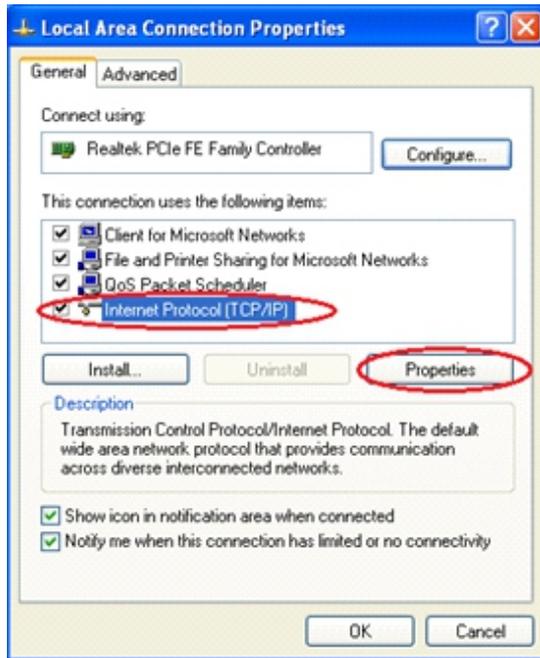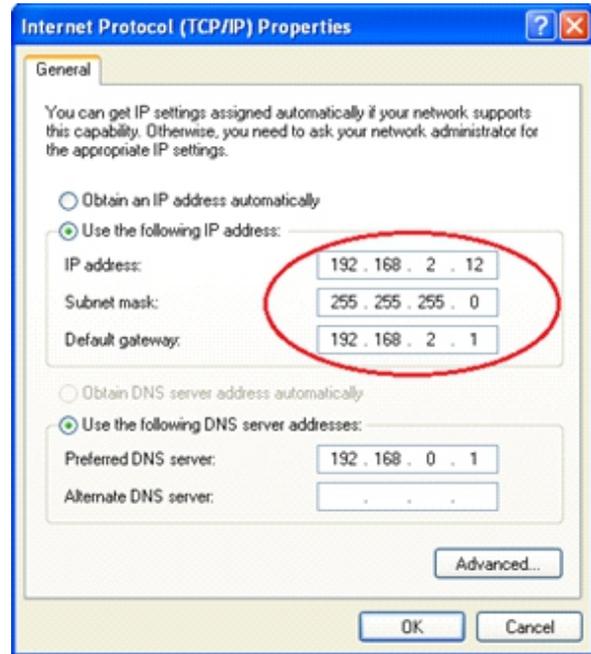
Wireless Network Setup

Figure 2

Figure 3

Attention

If PC / portable computer is from another network, record current IP and other settings, then after configuring the gateway, the PC / portable computer can turn back original network to continue work.

5.Select "Use the following IP address" button from "General" tab.
6.Set IP address as 192.168.2.XX (cannot be the same with the gateway).
7.Subnet mask shall be 255.255.255.0.
8.Click "OK" close Internet Protocol (TCP/IP) window and LAN connection window.

Wireless Network Setup

● **Configure Gateway**

Now, log in the gateway for the first time, and begin to configure it to field control network.

1.Log in gateway webpage

Log in the gateway by defaulted webpage https://192.168.2.253, recommend Firefox or browser above IE 8.

Attention
Use https, not http.

User name: admin
Password: 123456

2. TCP / IP setting

Before installing and connecting the gateway into field control network, shall configure its IP address and other TCP/IP network setting. Network setting steps are as below:

1) Select "Setup"->"Ethernet".
2) Input the following information:
   - IP address: 192.168.2.253
   - Subnet mask: 255.255.255.0
   - Gateway address: 192.168.2.1
3) Click "Submit".
4) If "Successful!" prompted, click "Confirmed" button; If "Failed!" prompted, then submit again or check internet connection of the gateway.
5) If "Restart gateway now?" prompted, click "Yes" button, the gateway will be restarted.
6) Restart network browser.

Figure 5 Ethernet Setting

> **Notice**
>
> User need to reset the gateway after changing its IP address. Restart the browser and use new IP address and other TCP/IP network setting to login in again.

> **Warning**
>
> User should be careful when changing the TCP/IP. User may be not able to log in the gateway if the setting is wrong or lost.

3. Wireless network setting

User should configure gateway's wireless network information before installing and connecting it to field control system. Please follow the steps below:

1) Select "Setup"->"Network".
2) Set following information:
   - Network Name: field wireless network name
   - Network ID: 1~65535
   - Join Key: 16 bytes hexadecimal number

   Wireless network information in default:
   - Network ID: 1229
   - Join Key: 00000000 00000000 00000000 00000000
3) Click "Submit" button.
4) If prompt message "Successful!", click "Confirmed". If prompt message "Failed!", submit it again and check gateway's connection.
5) Click "Restart" button and restart gateway. Then setting will take effect.

Wireless Network Setup

Figure 6 Network Setting

Please refer to G1100-WirelessHART-G1100 WirelessHART Smart Gateway User Manual for details.

Wireless Network Setup

<table>
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Module Configuration

● Module connection

As shown in figure 7, connect WirelessHART module and development board to form a simple WirelessHART field device. Development board is mainly used for power supply for module, meanwhile it completes the function of maintaining port setting.

Main parameter of development board:

• 5VDC power supply
• 3 AA batteries
• RS232 maintenance port
• Potentiometer analog input
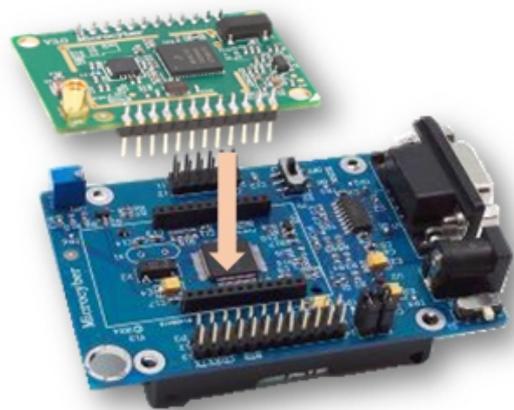• Module pin output

Figure 7 Module and development
board assembly diagram

<table>
<tr><td>Warning</td></tr>
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Power supply should not be higher than 6VDC, otherwise it may cause permanent damage to development board.

● Module setting

Before setting the module, user need to connect development board and computer via serial port extension cord or USB-serial port cable, as shown in figure 8.

Figure8 Development board and computer connection diagram

Wireless Network Setup

User should install "HartMPT" on computer, which can be found on CD. After installation, the icon , as shown in figure 9 will appear.

Figure9 HartMPTShortcut Icon

1. Open "HartMPT" configuration tool software and choose usable serial port. Select "Setting(S)-Serial Port(S) ".
2. When serial port is selected, its name and number will appear on left window. Select this serial port and right-click it, and choose "SingleNode" or "Search All". Then configuration tool begin searching device. When searching successfully, it will be shown like figure 10. Left window shows searched device tag, and right window shows searched device list, including device tag, manufacturer, device type and delivery date.
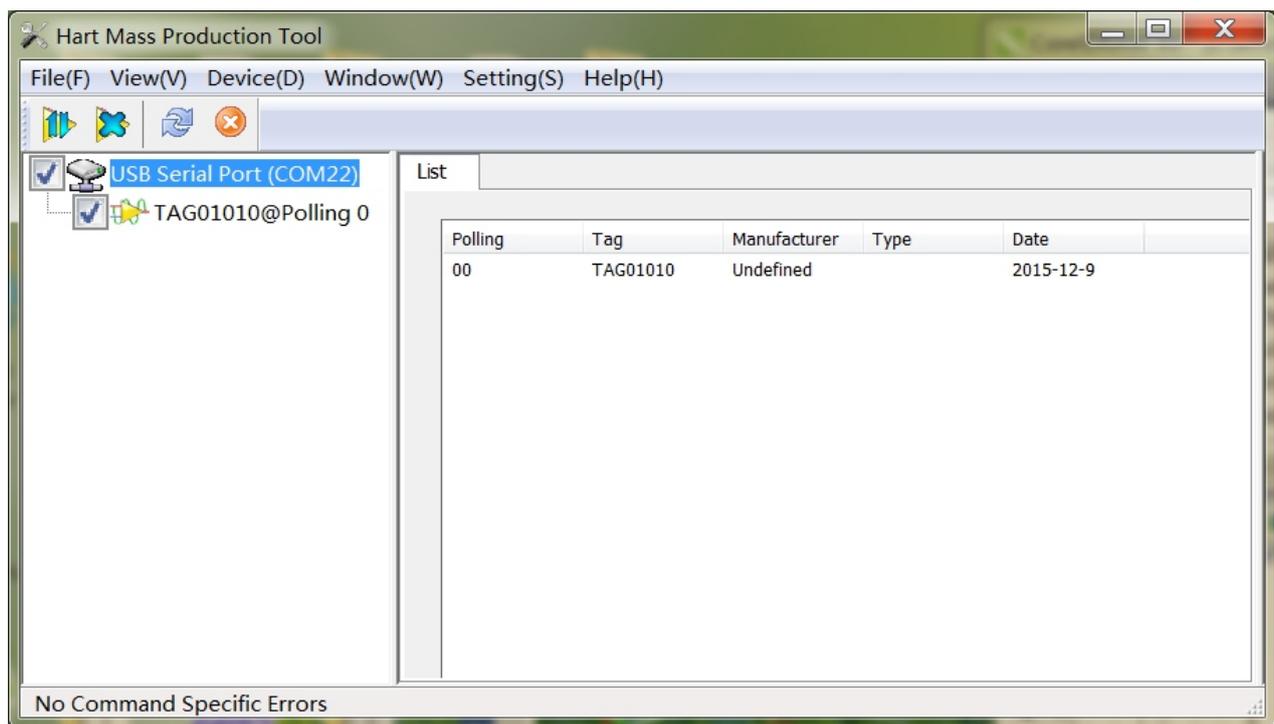

Figure 10   Device list page

3. When device is successfully searched, left-click the device tag on left window to enter the window as shown in figure 11. Then the read-write operation for WirelessHART module's parameter begins.
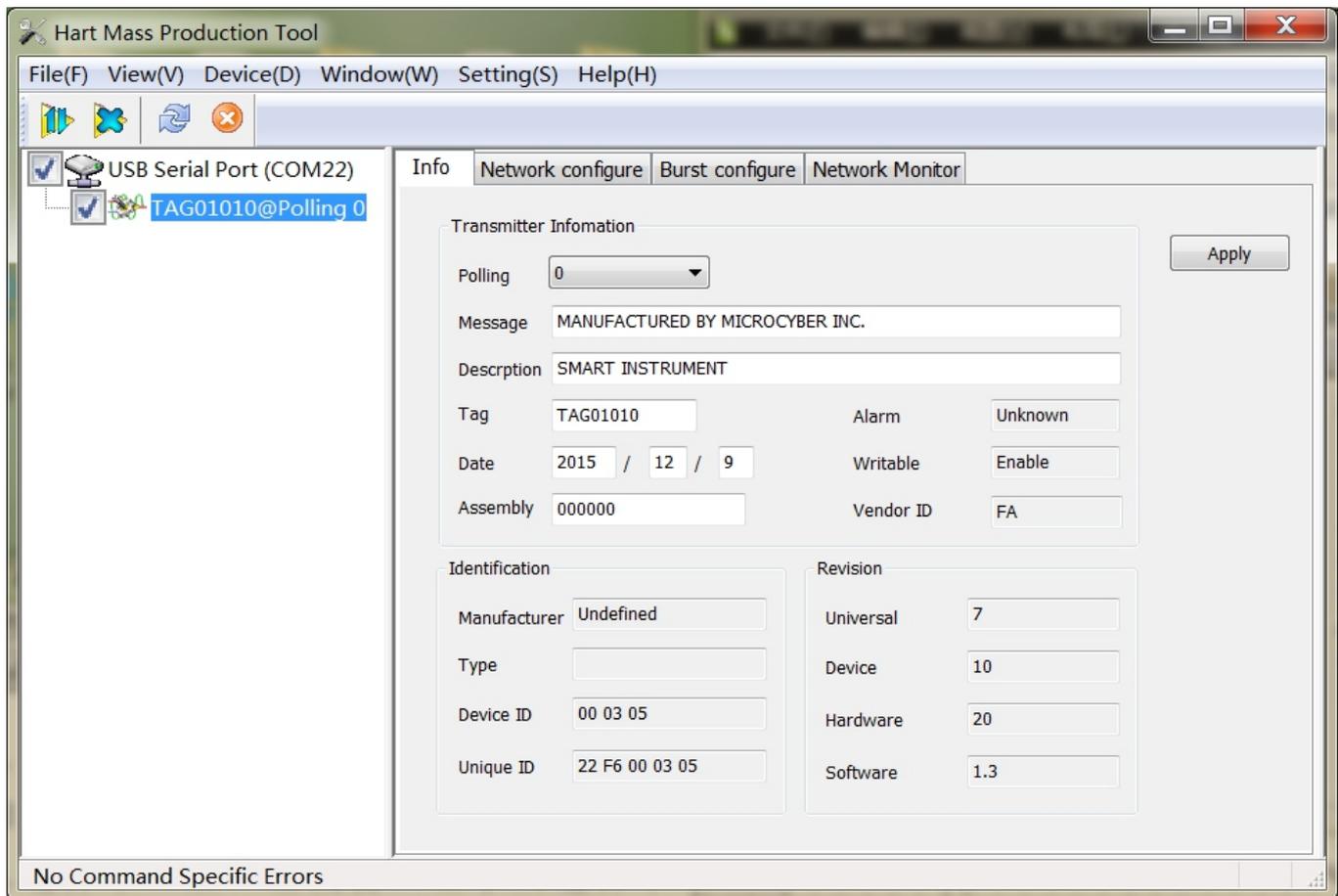
Figure 11 Device basic information page

4. Click "Network configure" column on right window of figure 11.Related information will be shown on configuration tool page, as shown in figure 12.

Configuration module's Join key, network ID (must be the same with gateway) and join mode:

- Network ID: 1229
- Join Key: 00000000 0000000 0000000 00000000
- Join Mode: Join now

Click "Apply" button to finish the configuration of parameter above. Module is ready to access network.
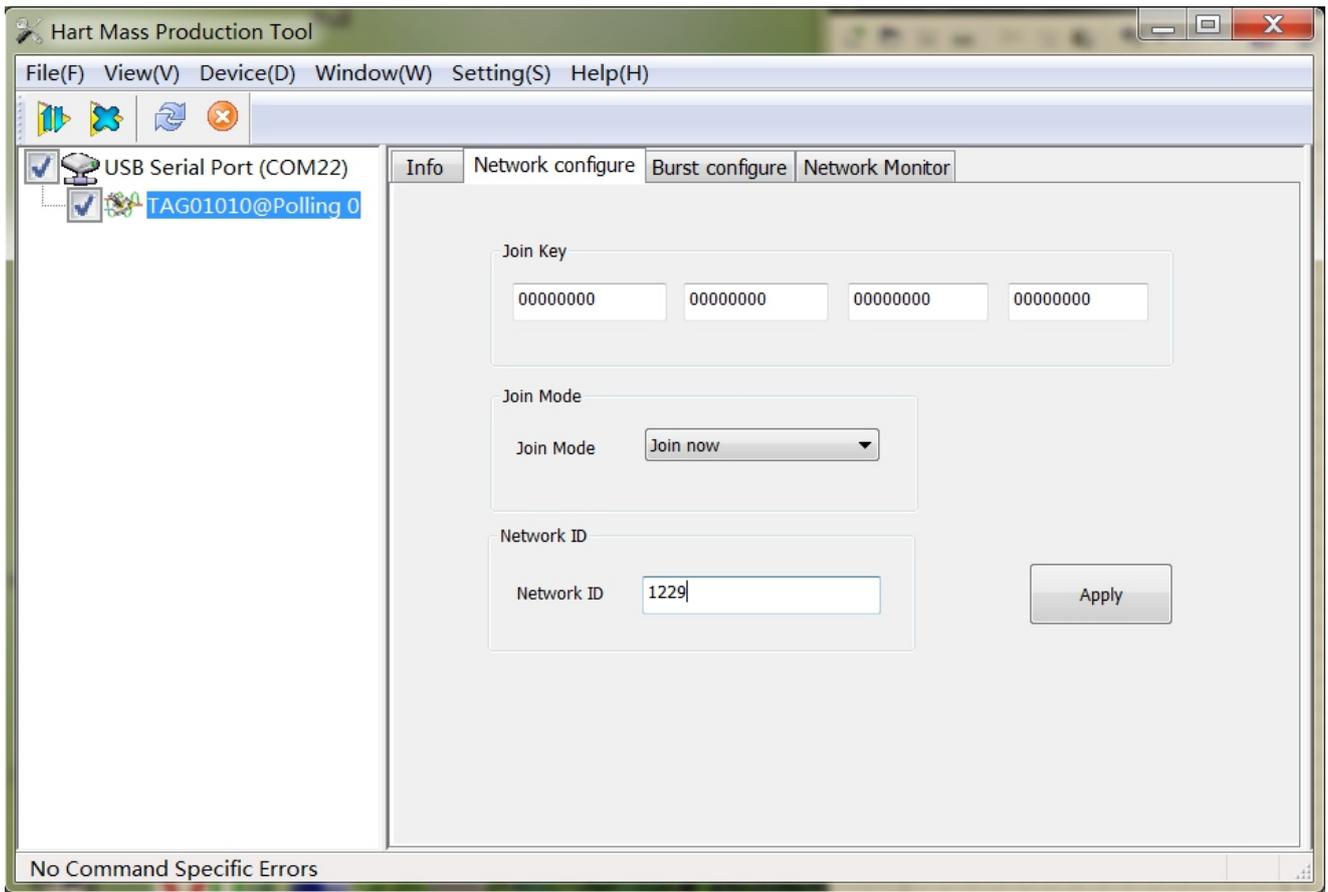
Wireless Network Setup

Figure 12 Configuration of network

> **3**
>
> ### Process of Monitoring Network Access

After above setup is finished, the module then will be ready to join wireless network that established by gateway.

● Joining process monitoring

Click on the "Network Monitor" column as shown in the figure 12, then enter the interface as shown in the figure 13.

This interface could be used to observe the status of access network, when the green indicator for the item "Normal Operation" lights up that the module has successfully joined wireless network that established by gateway.
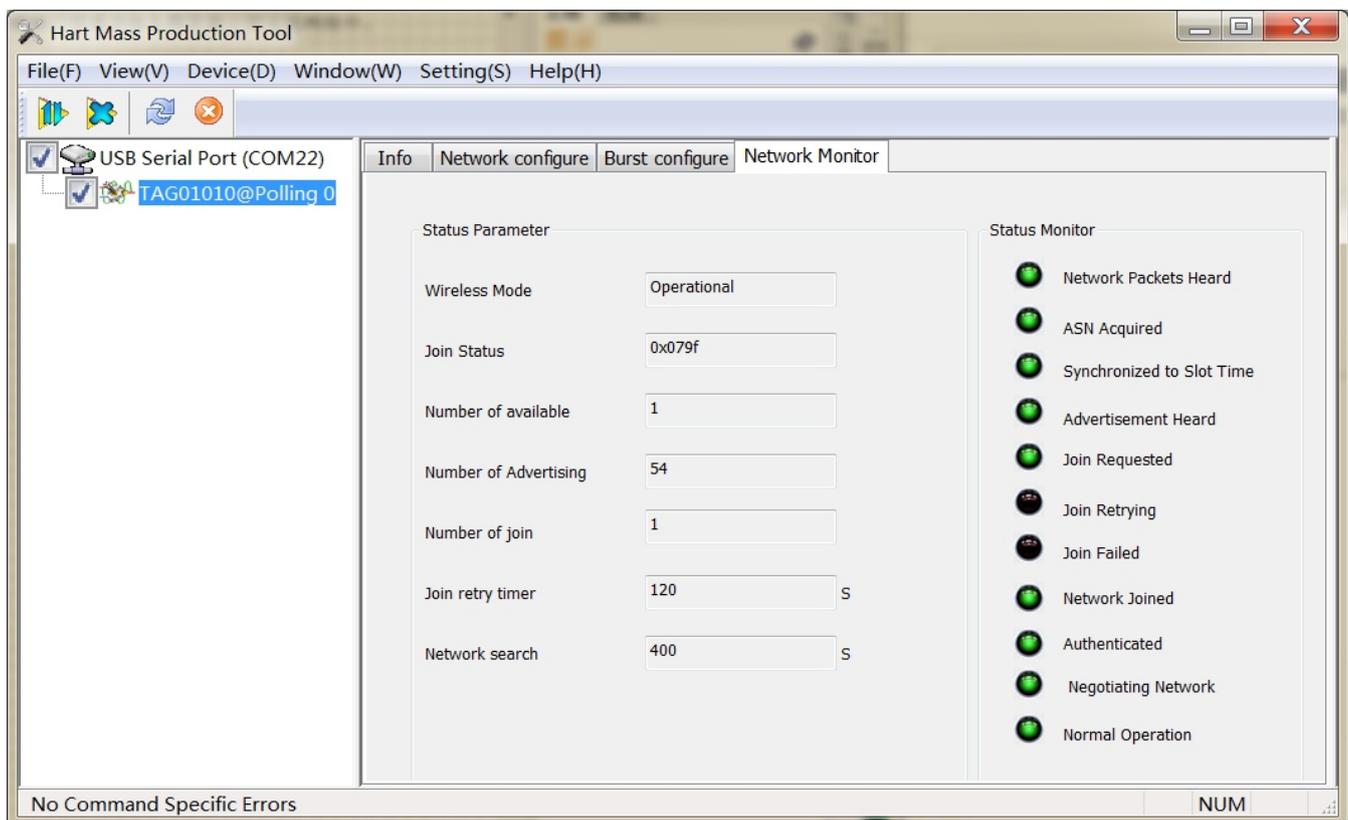

Figure 13 Network monitoring interface

● Network status monitoring

On the webpage of gateway , select "Network Information"->"Node Information"
->"Node Details", enter the webpage as shown in the figure 14.User can observe the node details of wireless network via this webpage.
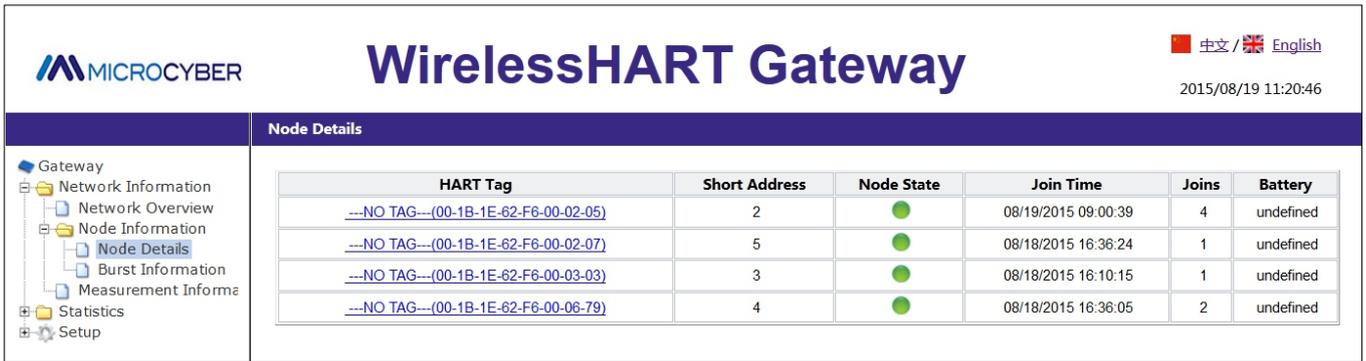
Figure14 Node Details

● Process data monitoring

On the webpage of gateway , select "Network Information"->" Measurement Information", enter the webpage as shown in the figure 15, User can observe the node's process data of wireless network via this webpage.
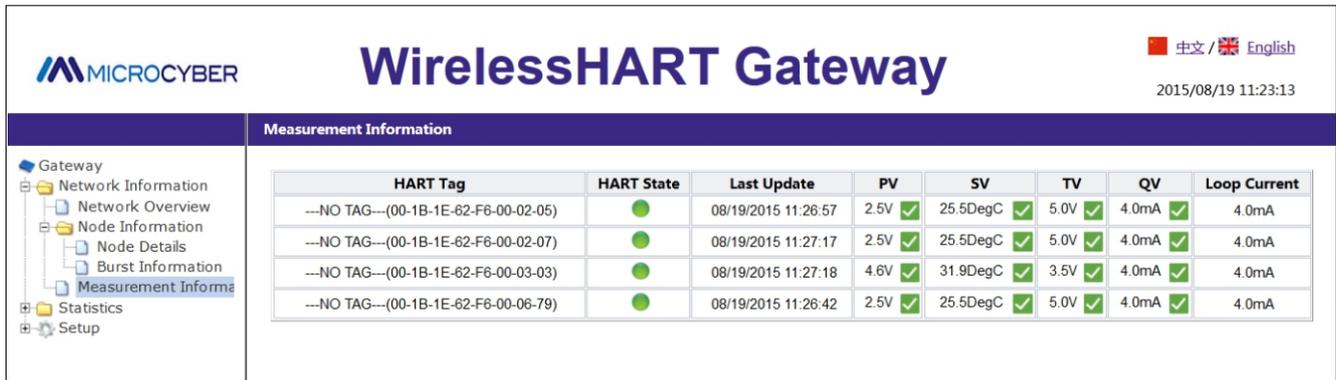

Figure15 Measurement Information

See the webpage of gateway for more details.

Extended development

In order to help users use Microcyber's WirelessHART module quickly and develop wireless device, we will provide a complete engineering example and teach you how to develop wireless device.

● **Hardware Solution**

Hardware Architecture

- Instrument card+ Module solution

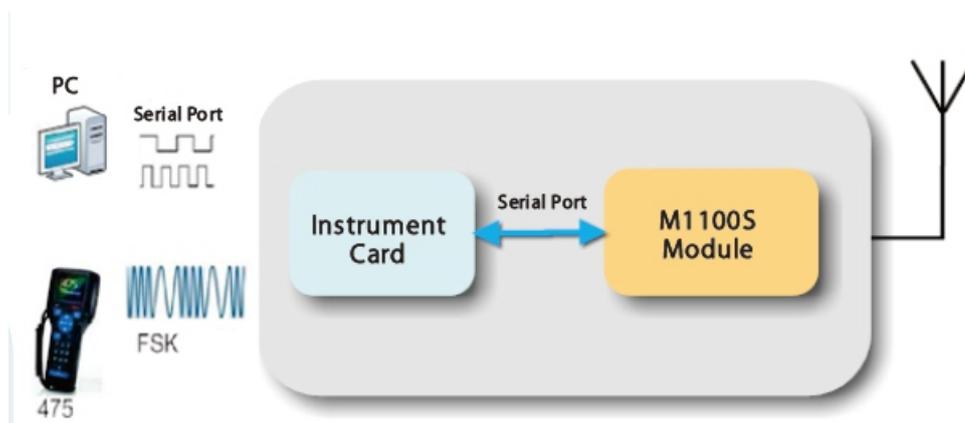- Instrument card provides maintenance port

Figure16 Hardware architecture

Figure17 Hardware frame diagram

● **Software Solution**

Software Design

- Instrument card CPU:
    MSP430 ARM AVR…..

- Lib document of specified CPU

- Referenced document User-library Instructions

Figure18 Software frame diagram

See *M1100S-WirelessHART-M1100S WirelessHART Module Software Development Guide* and *M1100S-WirelessHART-M1100S WirelessHART Module User Manual* for more details.

Reference Document

M1100S-WirelessHART-M1100S WirelessHART Module User Manual

M1100S-WirelessHART-M1100S WirelessHART Module Software Development Guide

DK11-WirelessHART-WirelessHART Development Board User Manual

G1100-WirelessHART-G1100 WirelessHART Smart Gateway User Manual

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