



WirelessHART Development Board User Manual



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1. Terms, Abbreviations, and Explanations

M1100 *WirelessHART* Module

2. Preface

As a supplementary documentation for “M1100 *WirelessHART* Module User Manual”, it includes:

1. Instructions of M1100 development board, giving a detailed introduction on each port function and use of the WH - M development board.
2. Instructions of development board software, introducing the responsible task of instrument board (field device), connection and synchronization between the instrument board and the M1100.
3. M1100 configuration and read, introducing M1100's join network configuration, burst mode configuration and reading of information parameters.

3. Hardware Interface Description of M1100 Development Board

3.1 Structure Description of Development Board

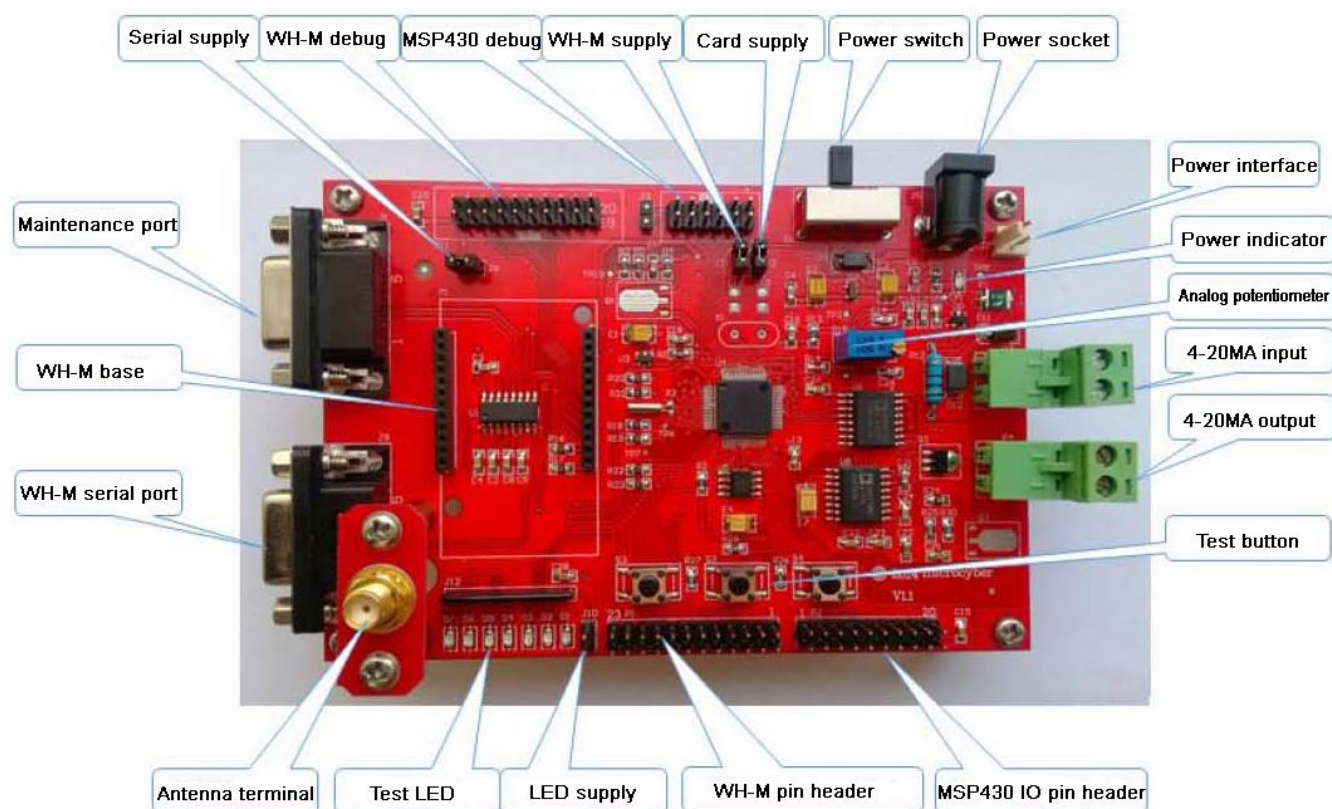


Figure 3.1 Photo of M1100 development board



- 3

- Power interface: Additional power plug can lead to power supply for several devices.
- Power indicator: Power indicating light of the development board.
- Analog potentiometer: Visual display on web of data changes collected can be provided by adjusting the potentiometer.
- 4-20MA input: 4-20MA external input terminal.
- 4-20MA output: 4-20MA output terminal, external power supply required.
- Test button: Button interface, easy for user to press when evaluating.
- MSP430 IO pin header: Easy for user to connect external device.
- M1100 pin header: Pin out all the interfaces of the M1100 module, easy for user to evaluate the module.
- LED supply: Designed for low-power evaluation and can be individually cut off.
- Test LED: Respectively connect M1100's IO and MSP430's IO, easy for information output during debugging.
- Antenna terminal: Connect omnidirectional rod antenna.
- M1100 serial port: Used for maintenance and to print some relevant information. Users don't have to care about.
- M1100 base: Socket of M1100 *WirelessHART* module.
- Maintenance port: For PC's configuration to M1100.

3.2 Circuit Description

The core controller of instrument board is MSP430F149. The functions of circuits users will need are shown as follows.

Button circuit shows that the 3 buttons of the development board respectively connect pin P1.0, P1.1 and P1.4 of MSP430F149. The user can modify function definition of each button on the basis of own needs.

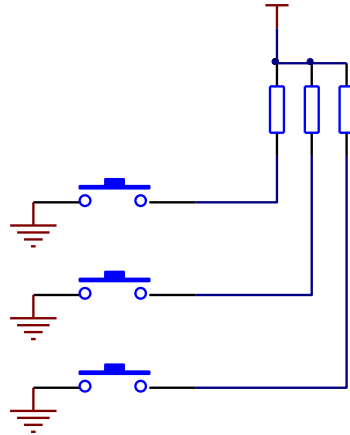


Figure 3.3 Schematic diagram of button pin definition

In the schematic diagram, P2 is partial pin header of MSP430. Figure 3.4 shows its pin definition. The user can modify them according to actual situation.

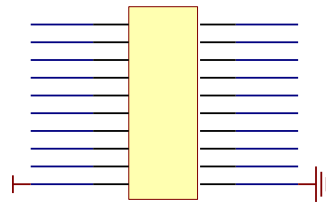


Figure 3.4 Definition of MSP430 IO pin header

Two external LEDs are connected to MSP430F149, easy for debugging information output, speed up the debug progress. Figure 3.5 shows MSP430 pins to LED. LED is on by low level. 1 k Ω current-limiting resistor is added to LED anode.

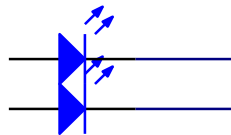


Figure 3.5 MSP430 pins to LED

4-20mA input circuits, provided by the development board, enable user to quickly evaluate the existing 4-20mA device, as shown in Figure 3.6. Through MSP430's built-in ADC channel 2, the user can collect data of the 4-20mA device directly by circuits, then converted into digital signal and transmitted by wireless.

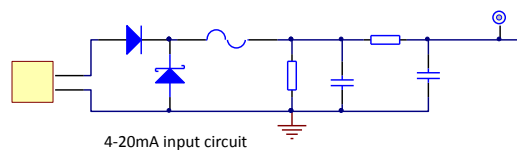


Figure 3.6 4-20mA input circuits

The development board also has 4-20mA output circuits with isolation, easy for circuit output requirements from the user, shown in Figure 3.7:

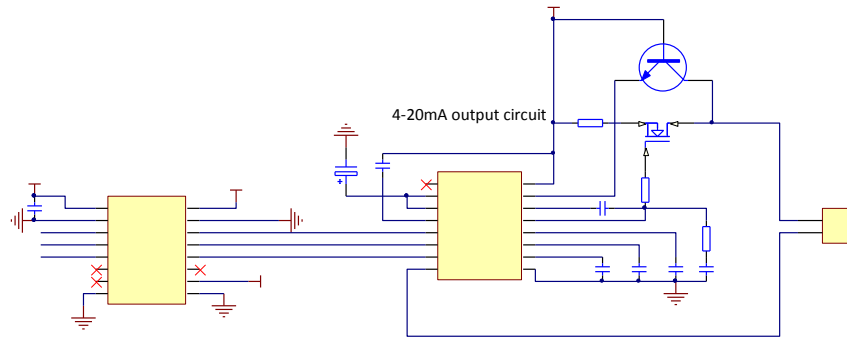


Figure 3.7 4-20mA output circuits

The user can find the relative driver files in routines for 4-20mA collection and output circuits mentioned above, and can be modified by the user.

4. M1100 Configuration and Read

By *WirelessHART* configuration tool, the user shall send commands through maintenance port to configure M1100 and read configuration information. The configuration tool's functions include read/write M1100's basic information, network information configuration, Burst configuration, network monitoring, etc. Refer to below for detail usage methods.

4.1 Connected Device

Open *WirelessHART* configuration tool, see Figure 4.1.

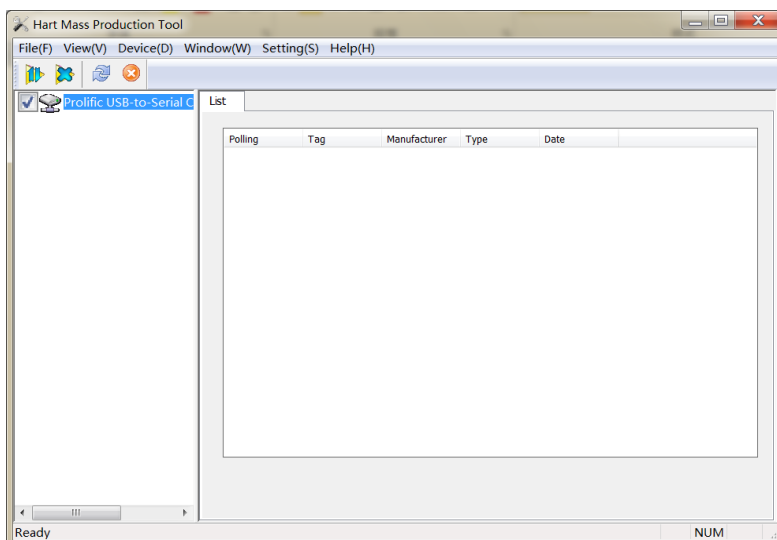


Figure 4.1 Main interface of *WirelessHART* configuration tool

Select an available serial port, select "Setting(S)-Serial port(S)", the popup window as shown in Figure 4.2.

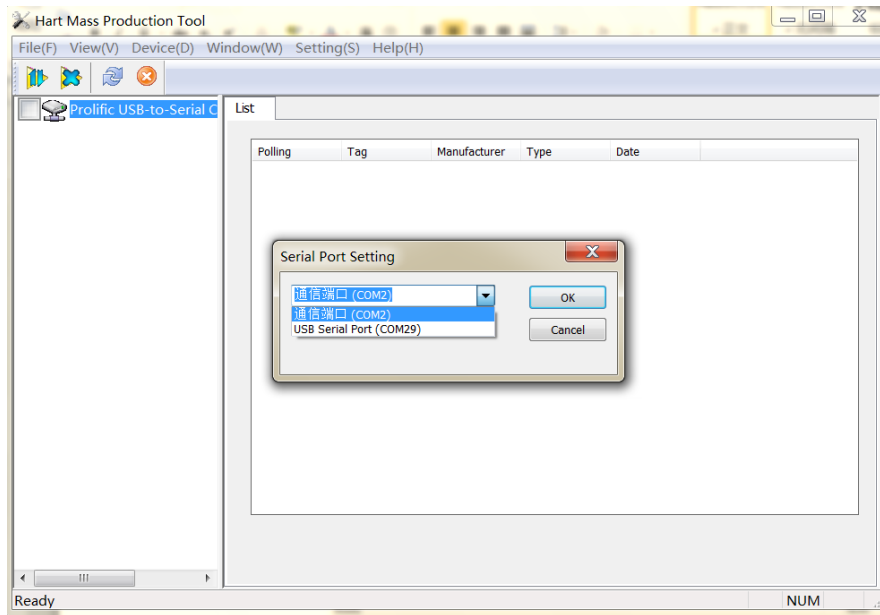


Figure 4.2

After selecting a serial port, its name and serial No. are showed on the left side of the window, right-click the serial port, as shown in Figure 4.3.

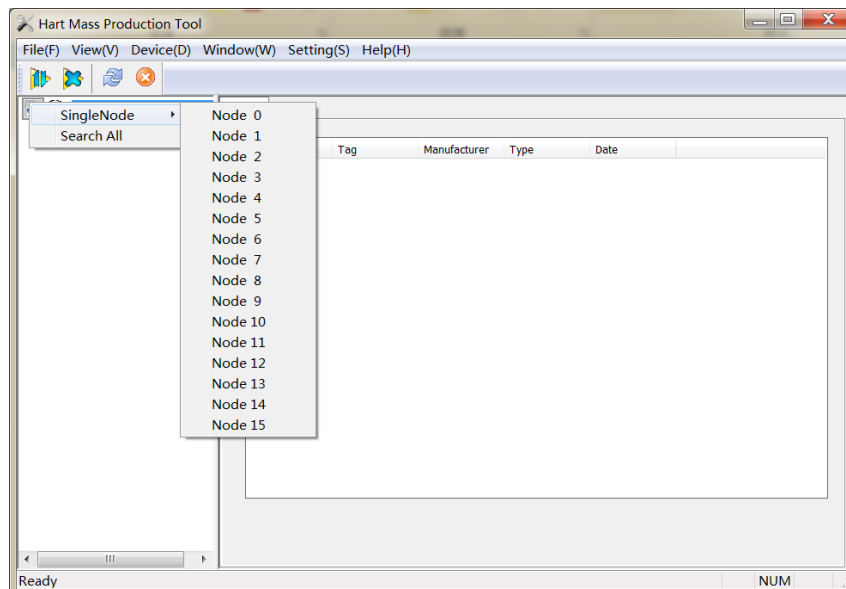


Figure 4.3

Select "SingleNode" or "Search All", the configuration tool begins to search device. When the device is found, the device label is shown on the left side of the window, and device list is shown on the right side of the window, including device label, manufacturer, device type, production date, etc. as shown in Figure 4.4.

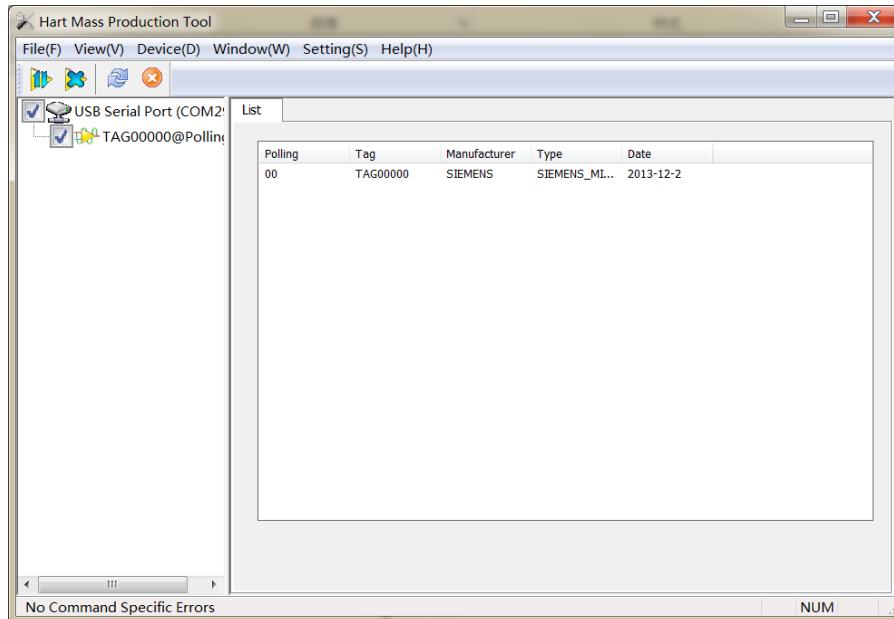


Figure 4.4

Click the device label on the left side of the window  TAG000000@Polling 0 , as shown in Figure 4.5, M1100's parameters are listed for read and write.

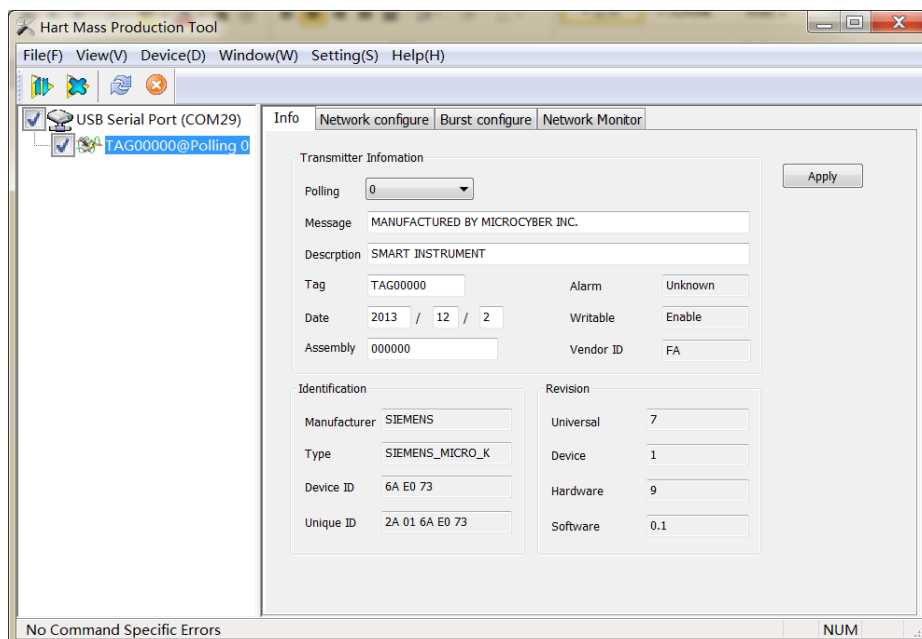


Figure 4.5 Parameter setting interface

4.2. Parameter Setting

4.2.1 Basic Information

In Figure 4.5, click "Info" on the right side of the window, the configuration tool will

transmit basic information reading command to M1100 via a serial port. If the M1100 responses correctly, the related information will be displayed on the configuration tool interface, as shown in Figure 4.5. These are factory default parameters, not be modified at best.

4.2.2 Network Information Configuration

Click “Network configure” on the right side of the window in Figure 4.5, the configuration tool will transmit module network configuration reading command to M1100 via a serial port, If the M1100 response correctly, the related information will be displayed on the configuration tool interface, as shown in Figure 4.6.

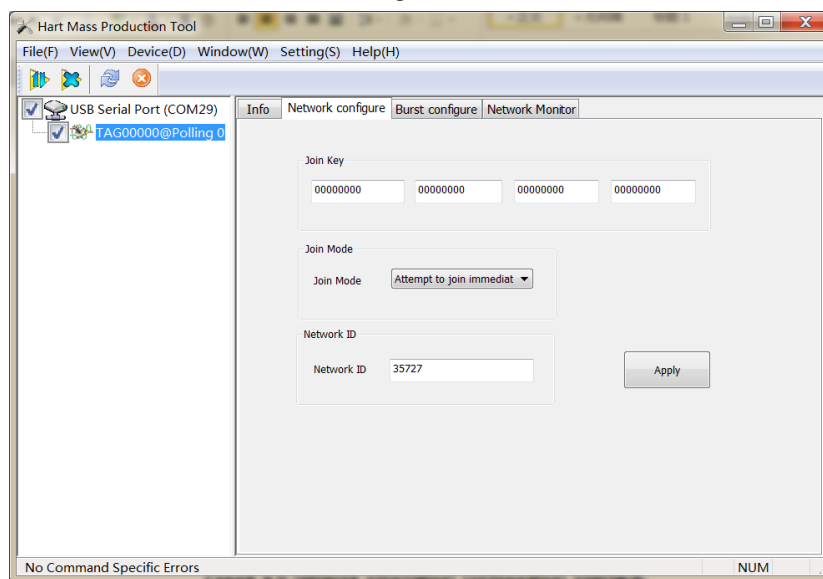


Figure 4.6 Network information configuration interface

“Join Key”: Hexadecimal number of 16 bytes, used to start security keys to join network.

“Join Mode”: “Don’t attempt to join.”

“Join now”, if M1100 isn’t in the network, to set this, M1100 will be ready for join at once.

“Attempt to join immediately on Powerup or reset”

“Network ID”: Decimal number, value range is 0~65535

Note: The above three parameters of the M1100 must be configured before it joins network, add keys and network ID values must be consistent with the gateway that is ready to join.

4.2.3 Burst Configuration

Click “Burst configure” on the right side of Figure 4.5 window, the configuration tool will transmit module Burst configuration reading command to M1100 via a serial port, If the

M1100 responds correctly, the related information will be displayed on the configuration tool interface, as shown in Figure 4.7.

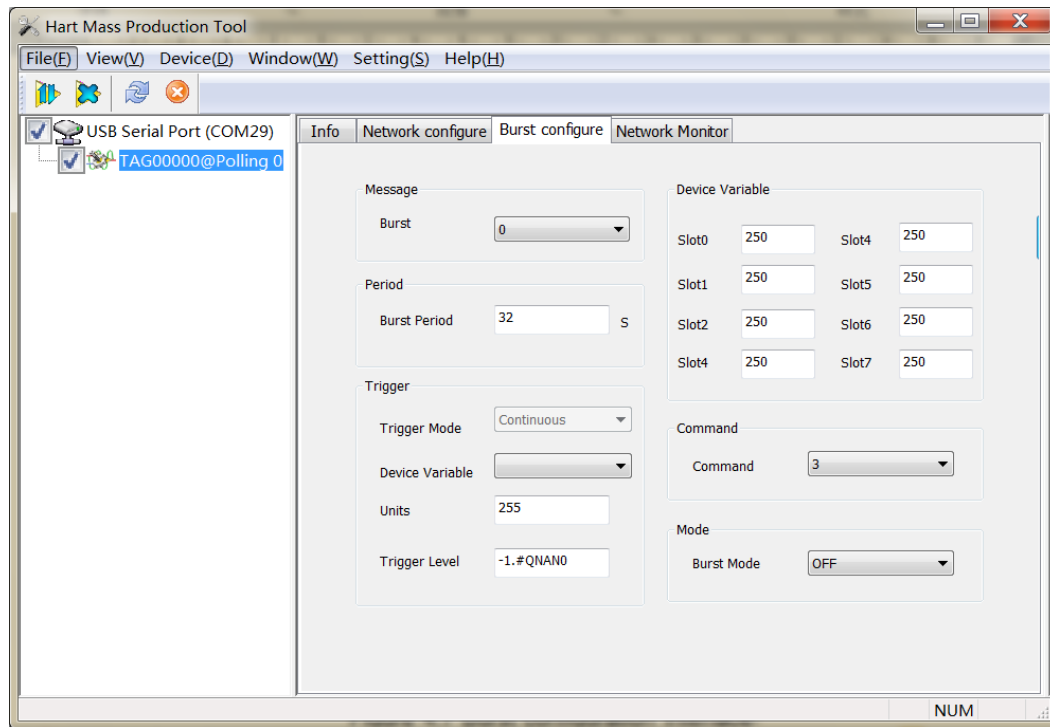


Figure 4.7 Burst configuration interface

“Burst Message”: Value range is 0~4. M1100 supports four Burst messages at most.

Note: When a different Burst message is selected from the drop-down menu, the corresponding parameter information will be displayed on the interface.

“Period”: Value range is 1, 2, 4, 8, 16, 32, 60~3600s.

“Trigger”: At present only support Continuous trigger mode, and not support device variables, unit and trigger benchmark.

“Command”: Burst message supports the response of 1, 2, 3, 9, 33 and 48.

“Burst Mode”: Used to start or stop Burst mode.

“Device Variable”: Codes of device variables, specific values and meaning are as below.

243	Battery life (floating point number, unit: day)
244	Percent range
245	Loop current
246	Master variable
247	The second variable
248	The third Variable
249	The fourth variable
250	Not available

This parameter is only associated with Burst command 9 and 33, refer to description

command 9 and 33 in HART protocol. "250" is set for unavailable device variable. When Burst command is not command 9 and 33, device variables can be set to "250"

4.2.4 Network Monitoring

Click "Network Monitor", enter the interface as shown in Figure 4.8.

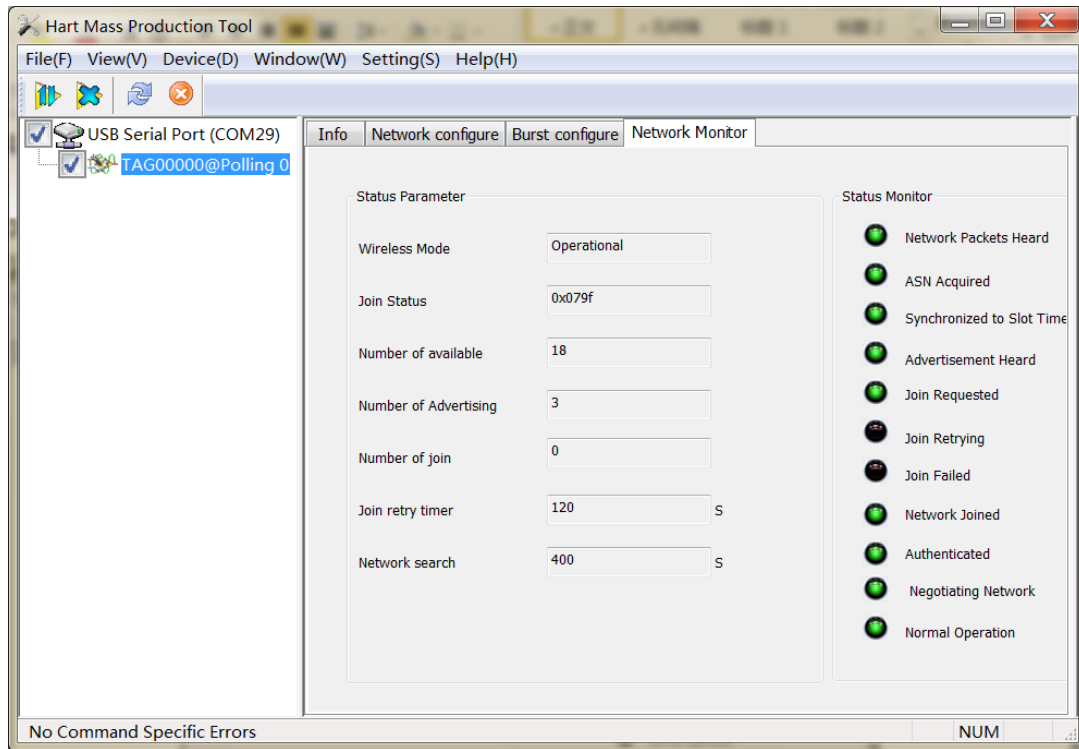


Figure 4.8 Network monitoring interface

"Status Parameter": Display network information of the M1100. See details in Figure 4.8

"Status Monitor": If green light is on, it shows M1100 passes some steps to join the network.

After entering the interface, the configuration tool periodically transmit network information read commands to M1100, then network monitoring interface will do real-time update.