rg2i WS101 LoRaWAN based smart button wireless controls User Guide

Contents

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Safety Precautions

Milesight will not shoulder responsibility for any loss or damage resulting from not following the instructions of this operating guide.

- The device must not be modified in any way.
- Do not place the device close to objects with naked flames.
- Do not place the device where the temperature is below/above the operating range.
- When installing the battery, please install it accurately, and do not install the reverse or wrong model.
- Remove the battery if the device will not be used for a period of time. Otherwise, the battery will leak and damage the device.
- The device must never be subjected to shocks or impacts.

Declaration of Conformity
WS101 is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.

Revision History

Date	Doc Version	Description
July 12, 2021	V 1.0	Initial version

Product Introduction

Overview

WS101 is a LoRaWAN®-based smart button for wireless controls, triggers, and alarms. WS101 supports multiple press actions, all of which can be defined by the user to control devices or trigger scenes. Besides, Milesight also provides a red button version that is primarily used for emergency situations. Compact and battery-powered, WS101 is easy to install and carry everywhere. WS101 can be widely used in smart homes, smart offices, hotels, schools, etc.

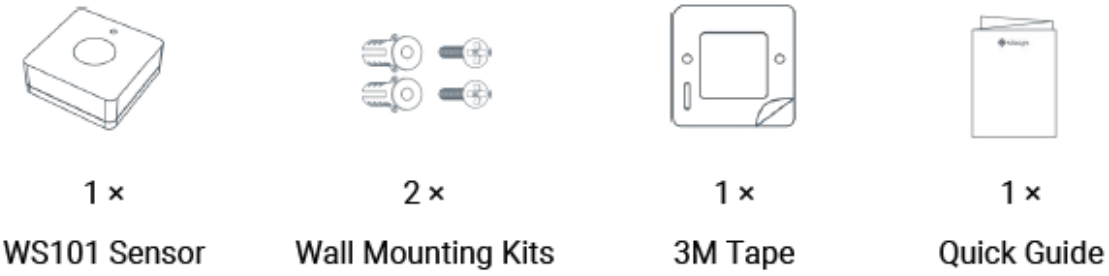
Sensor data are transmitted in real-time using the standard LoRaWAN® protocol. LoRaWAN® enables encrypted radio transmissions over long distances while consuming very little power. The user can get alarmed through Milesight IoT Cloud or through the user's own Application Server.

Features

- Up to 15 km communication range
- Easy configuration via NFC
- Standard LoRaWAN® support
- Milesight IoT Cloud compliant
- Support multiple press actions to control devices, trigger a scene or send emergency alarms
- Compact design, easy to install or carry
- Built-in LED indicator and buzzer for press actions, network status, and low battery indication

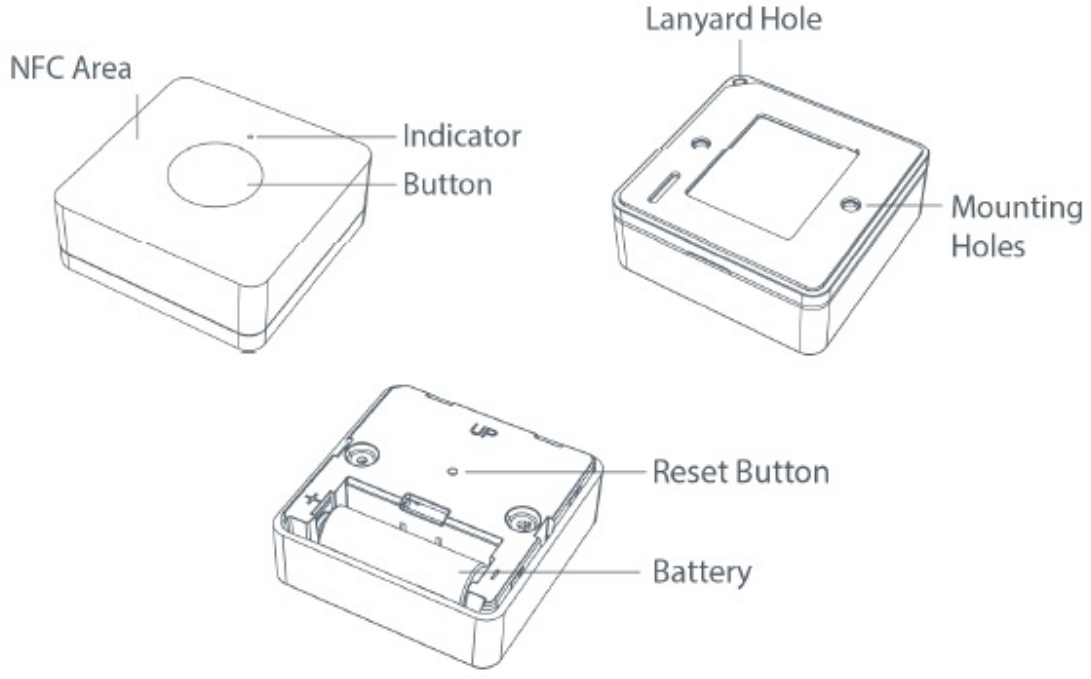
Hardware Introduction

Packing List

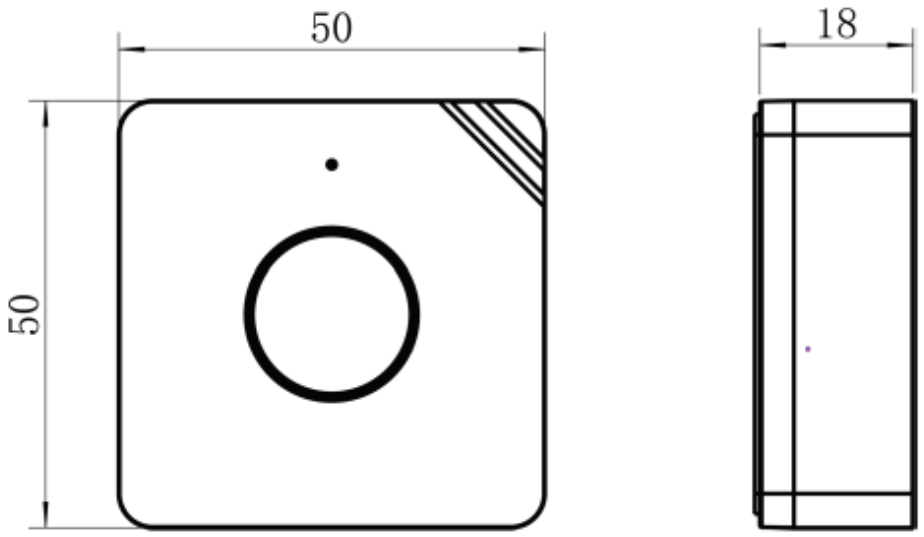


If any of the above items are missing or damaged, please contact your sales representative.

Hardware Overview



Dimensions (mm)



LED Patterns
WS101 equips with a LED indicator to indicate the network status and reset button features. Besides, when a button is pressed, the indicator will light up at the same time. The red indicator means the network is unregistered, while the green indicator means the device has registered on the network.

Function	Action	LED Indicator
Network Status	Send join network requests	Red, blinks once
	Joined the network successfully	Green, blinks twice
Reboot	Press and hold the reset button for more than 3s	Slowly blinks
Reset to Factory Default	Press and hold the reset button for more than 10s	Quickly blinks

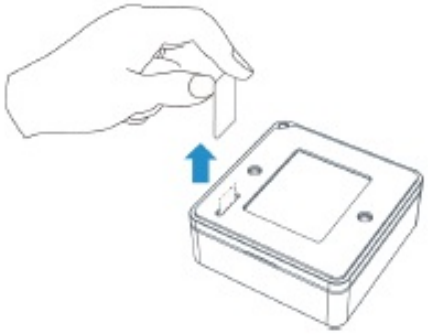
Operation Guide

Button Mode
WS101 provides 3 kinds of pressing actions allowing users to define different alarms. Please refer to chapter 5.1 for a detailed message of every action.

Mode	Action
Mode 1	Short press the button (≤3 seconds).
Mode 2	Long press the button (>3 seconds).
Mode 3	Double press the button.

NFC Configuration
WS101 can be configured via an NFC-enabled smartphone.

1. Pull out the battery insulating sheet to power the device. The indicator will light up in green for 3 seconds when the device turns on.



2. Download and install the “Milesight ToolBox” App from Google Play or App Store.
3. Enable NFC on the smartphone and open Milesight ToolBox.
4. Attach the smartphone with an NFC area to the device to read device information.

5. Basic information and settings of devices will be shown on ToolBox if it’s recognized successfully. You can read and configure the device by tapping the Read/Write button on the App. In order to protect the security of devices, password validation is required when configuring a new smartphone. The default password is 123456.

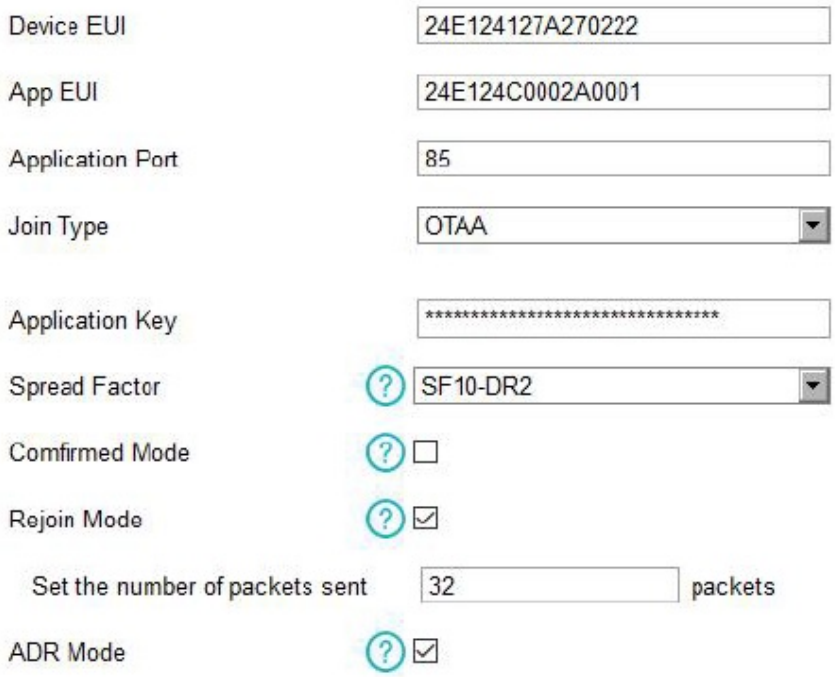
   Note:
6. Ensure the location of the smartphone NFC area and it’s recommended to take off the phone case.
7. If the smartphone fails to read/write configurations via NFC, move the phone away and back to try again.
8. WS101 can also be configured by ToolBox software via a dedicated NFC reader provided by Milesight IoT, you can also configure it via the TTL interface inside the device.

LoRaWAN Settings

LoRaWAN settings are used for configuring the transmission parameters in the LoRaWAN® network.

Basic LoRaWAN Settings:

Go to **Device -> Setting -> LoRaWAN Settings** of ToolBox App to configure join type, App EUI, App Key, and other information. You can also keep all settings by default.



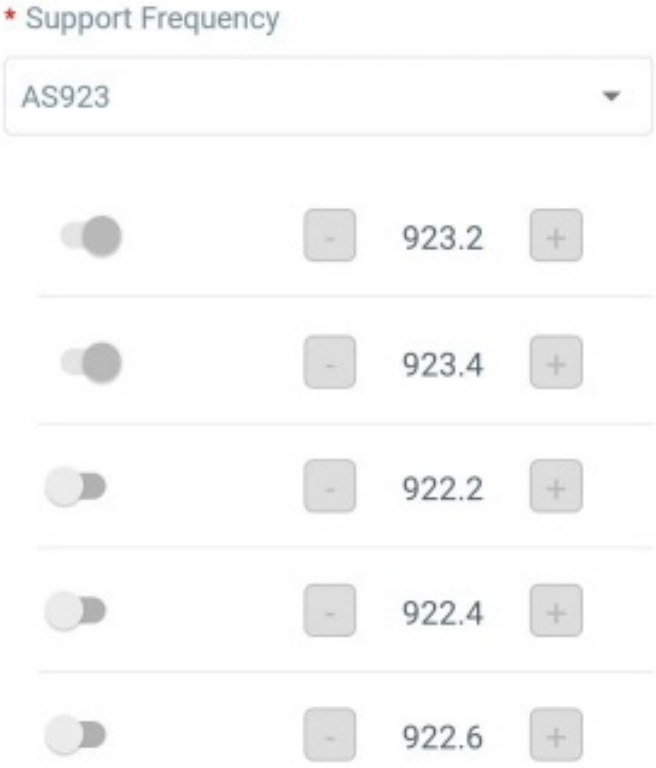
Parameters	**Description**
Device EUI	The unique ID of the device can also be found on the label.
App EUI	Default App EUI is 24E124C0002A0001.
Application Port	The port used for sending and receiving data, the default port is 85.
Join Type	OTAA and ABP modes are available.
Application Key	Appkey for OTAA mode, default is 5572404C696E6B4C6F52613230313823.
Device Address	Devendra for ABP mode, the default is the 5th to 12th digits of SN.
Network Session Key	Nwkskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.
Application Session Key	Appskey for ABP mode, default is 5572404C696E6B4C6F52613230313823.

Spread Factor	If ADR is disabled, the device will send data via this spread factor.
Confirmed Mode	If the device does not receive an ACK packet from a network server, it will resend data 3 times at most.
Rejoin Mode	Reporting interval ≤ 30 mins: the device will send specific mounts of LoRaMAC packets to check connection status every 30 mins; If no reply after specific packets is being sent , the device will re-join. Reporting interval > 30 mins: the device will send specific mounts of LoRaMAC packets to check connection status at every reporting interval; If no reply after specific packets is being sent, the device will re-join.
ADR Mode	Allow the network server to adjust the data rate of the device.
Tx Power	Transmit power of the device.

Note:

1. Please contact the sales representative for the device EUI list if there are many units.
2. Please contact the sales representative if you need random App keys before purchase.
3. Select OTAA mode if you use Milesight IoT Cloud to manage devices.
4. Only OTAA mode supports rejoin mode.

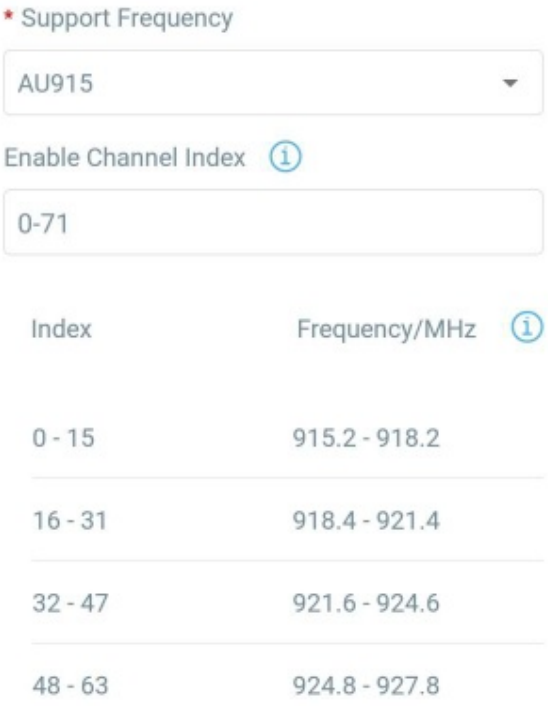
LoRaWAN Frequency Settings:
Go to **Setting->LoRaWAN Settings** of ToolBox App to select the supported frequency and select channels to send uplinks. Make sure the channels match the LoRaWAN® gateway.



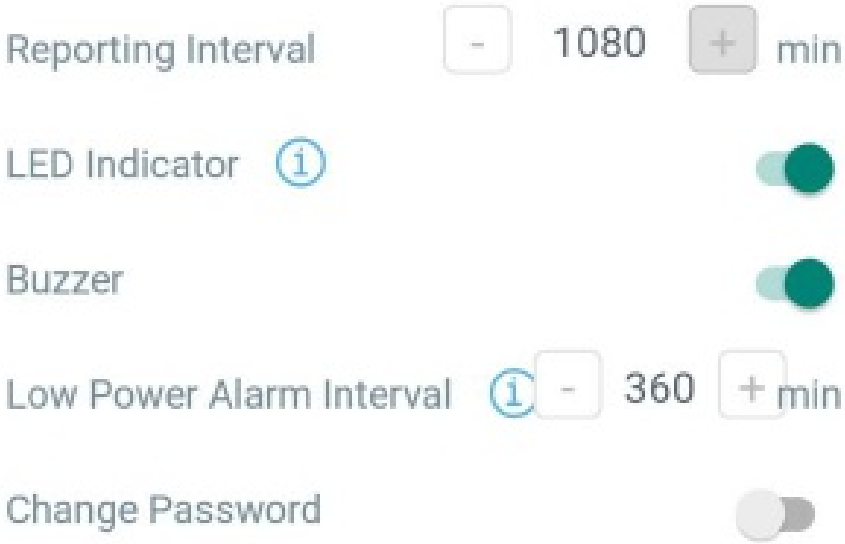
If the device frequency is one of CN470/AU915/US915, you can enter the index of the channel that you want to enable in the input box, making them separated by commas.

Examples:
1, 40: Enabling Channel 1 and Channel 40
1-40: Enabling Channel 1 to Channel 40

1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60 All: Enabling all channels
Null: Indicates that all channels are disabled



Note:
For the -868M model, the default frequency is EU868;
For the -915M model, the default frequency is AU915.
General Settings
Go to **Device->Setting->General Settings** of ToolBox App to change the reporting interval, etc.



Parameters	Description
Reporting Interval	Reporting interval of battery level to a network server. Default: 1080min
LED Indicator	Enable or disable the light indicated in chapter 2.4. **Note:** The indicator of the reset button is not allowed to be disabled.
Buzzer	The buzzer will be triggering together with an indicator if the device is registered to the network.
Low Power Alarm Interval	The button will report low power alarms according to this interval when the battery is lower than 10%.
Change Password	Change the password for ToolBox App to write this device.

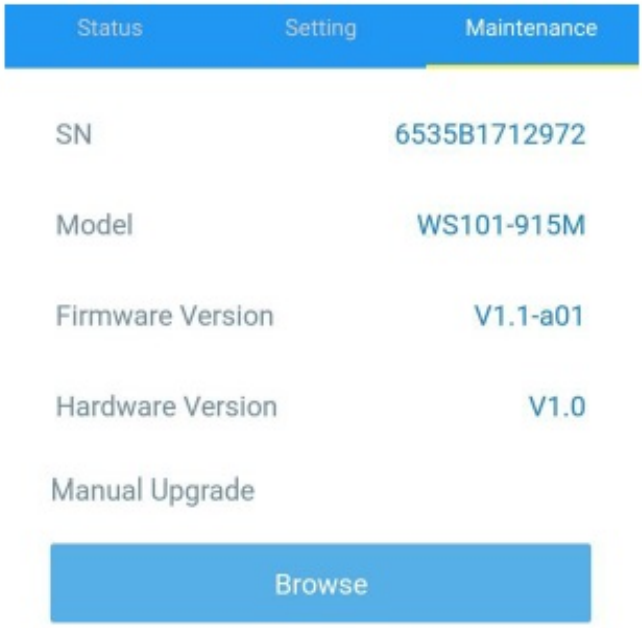
Maintenance

Upgrade

1. Download firmware from the Milesight website to your smartphone.
2. Open Toolbox App and click “Browse” to import firmware and upgrade the device.

Note:

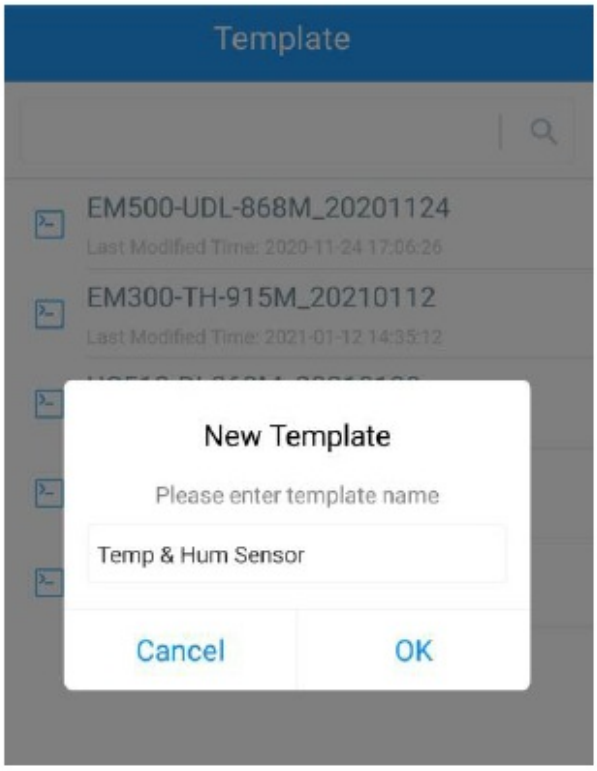
1. Operation on ToolBox is not supported during an upgrade.
2. Only the Android version of ToolBox supports the upgrade feature.



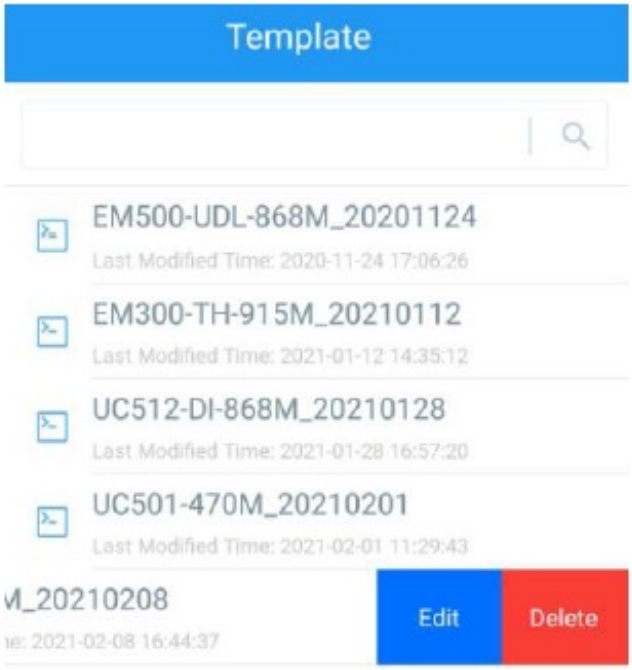
Backup

WS101 supports configuration backup for easy and quick device configuration in bulk. Backup is allowed only for devices with the same model and LoRa frequency band.

1. Go to the “Template” page on the App and save current settings as a template. You can also edit the template file.
2. Select one template file that is saved in the smartphone and click “Write”, then attach it to another device to write the configuration.



Note: Slide the template item to the left to edit or delete the template. Click the template to edit the configurations.



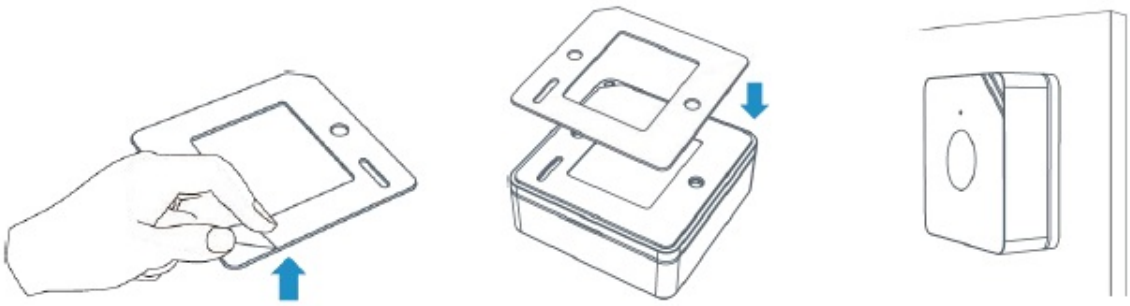
Reset to Factory Default

Please select one of the following methods to reset the device:
Via Hardware: Hold on to the reset button for more than 10s. After the reset is complete, the indicator will blink in green twice and the device will reboot.
Via Toolbox App: Go to **Device -> Maintenance** to tap “Reset”, then attach a smartphone with an NFC area to a

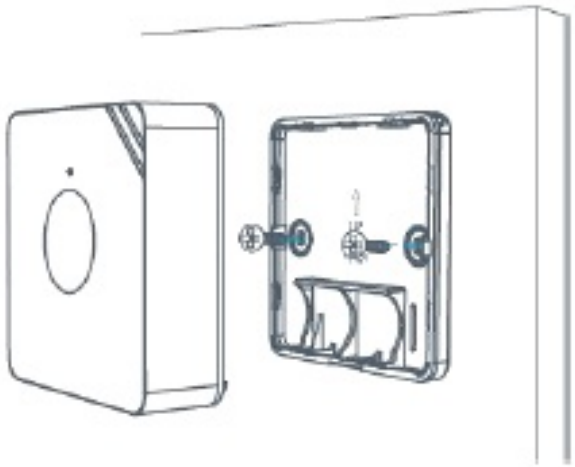
device to complete the reset.

Installation

3M Tapes Fix:
Paste 3M tape to the back of the button, then tear the other side and place it on a flat surface.



Screw Fix:
Remove the back cover of the button, screw the wall plugs into the wall, and fix the cover with screws on it, then install back the device.



Lanyard:
Pass the lanyard through the aperture near the edge of the button, then you can hang the button onto keychains and the like.

Device Payload

All data are based on the following format(HEX):

Channel1	Type1	Data1	Channel2	Type2	Data2	Channel 3	…
1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	M Bytes	1 Byte	…

For decoder examples, you can find them at **https://github.com/Milesight-IoT/SensorDecoders.**

Basic Information

WS101 reports basic information about buttons every time joining the network.

Channel	Type	Data Example	Description
ff	01(Protocol Version)	01	V1
	08 Device SN	61 27 a2 17 41 32	Device SN is 6127a2174132
	09 (Hardware Version)	01 40	V1.4
	0a (Software Version)	01 14	V1.14
	0f(Device Type)	00	Class A

Example:

ff 09 01 00 ff 0a 01 02 ff 0f 00					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	09 (Hardware version)	0100 (V1.0)	ff	0a (Software version)	0102 (V1.2)
Channel	**Type**	**Value**			
ff	0f (Device Type)	00 (Class A)			

Button Message

WS101 reports battery level according to reporting interval (1080 mins by default) and button message when a button is pressed.

Channel	Type	Description
01	75(Battery Level)	UINT8, Unit: %
ff	2e(Button Message)	01: Mode 1(short press) 02: Mode 2 (long press) 03: Mode 3 (double press)

Example:

01 75 64		
Channel	**Type**	**Value**
01	75 (Battery)	64 => 100%

ff 2e 01		
Channel	**Type**	**Value**
ff	2e(Button Message)	01 => short press

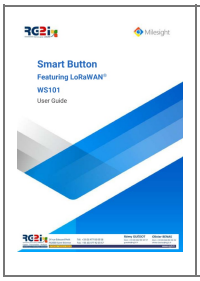
Downlink Commands

WS101 supports downlink commands to configure the device. The application port is 85 by default.

Channel	Type	Data Example	Description
ff	03(Set Reporting Interval)	b0 04	b0 04 => 04 b0 = 1200s

- For assistance, please contact Milesight technical support:
- Email: iot.support@milesight.com
- Tel: 86-592-5085280
- Fax: 86-592-5023065
- Address: 4/F, No.63-2 Wanghai Road,
- 2nd Software Park, Xiamen, China

Documents / Resources

	rg2i WS101 LoRaWAN based smart button wireless controls [pdf] User Guide WS101 LoRaWAN based smart button wireless controls, LoRaWAN based smart button wireless controls, button wireless controls, wireless controls

References

- GitHub - Milesight-IoT/SensorDecoders