



X1 Sensing Camera

SC541 / SC541-HL

User Guide



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 disassembled or remodeled in any way.
- ❖ To avoid risk of fire and electric shock, do keep the product away from rain and moisture before installation.
- ❖ Do not place the device where the temperature is below/above the operating range.
- ❖ The device must never be subjected to shocks or impacts.
- ❖ Make sure the device is firmly fixed when installing.
- ❖ The battery should be removed from the device if it is not to be used for an extended period. Otherwise, the battery might leak and damage the device. Never leave a discharged battery in the battery compartment.
- ❖ Make sure all batteries are newest when install, or battery life will be reduced.
- ❖ Do not expose the device to where a laser beam equipment is used.

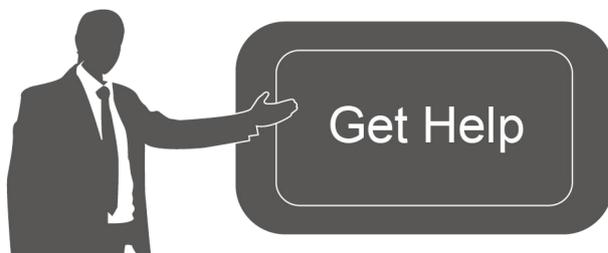
Declaration of Conformity

SC541 is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.



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Revision History

Date	Doc Version	Description
March 15, 2023	V 1.0	Initial version
Nov.17, 2023	V1.1	Add the configuration description of SC541-HL models

Contents

1. Product Introduction	5
1.1 Overview	5
1.2 Key Features	5
2. Hardware Introduction	6
2.1 Packing List	6
2.2 Hardware Overview	6
2.3 Button and LED Patterns	7
2.4 Dimensions (mm)	7
3. Power Supply	8
4. Installation	8
5. Access the Camera	9
6. Operation Guide	10
7. Communication Protocol	16

1. Product Introduction

1.1 Overview

X1 Sensing Camera SC541 is a creative AIoT product with applicable and intelligent applications. By capturing pictures, SC541 can replace human inspection in multiple scenarios and economize manpower. High-quality picture-capturing function and embedded supplement light make it more competitive and useful under different environmental conditions.

SC541 has featured low-power consumption and allows for different power supplying methods for extending its service life and maximizing its utilization.

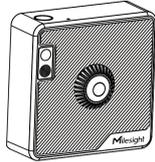
With a compact size, SC541 allows for easy deployment. It supports easy configuration via Wi-Fi and allows for remote management and data transmission via standard MQTT to the Milesight AIoT Sensing Platform.

1.2 Key Features

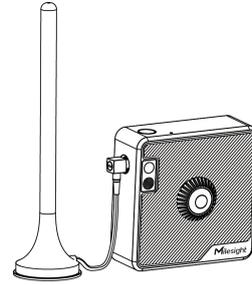
- Provide full HD resolution 1920 x 1080 pixels
- Support multi-type picture-capturing modes depending on time interval, scheduled time, Alarm-in settings, and one external button
- Support close focus lens and super close focus lens to meet different close-range capture needs
- Equip with one advanced supplement light to increase light level under specific conditions
- Supports both Wi-Fi and Wi-Fi HaLow communication versions to meet different networking requirements
- Compact size with wireless deployment
- Smart sleep-mode logic and low-power consumption provide it a longer service life
- Provide universal camera bracket interface for more installation options
- Support easy configuration via wireless Wi-Fi connection
- Support remote management with assorted Milesight AIoT Sensing Platform for extending its applications

2. Hardware Introduction

2.1 Product Overview



X1 Sensing Camera (SC541)



X1 Sensing Camera^{Wi-Fi HaLow} Version (SC541-HL)

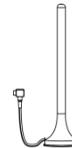
2.2 Packing List



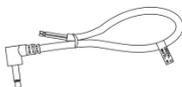
1 × SC541 Device



2 x Lithium and Iron Disulfide Batteries (Only for SC541-HL)



1 x SMB Antenna (Only for SC541-HL)



1 × Alarm Transfer Cable



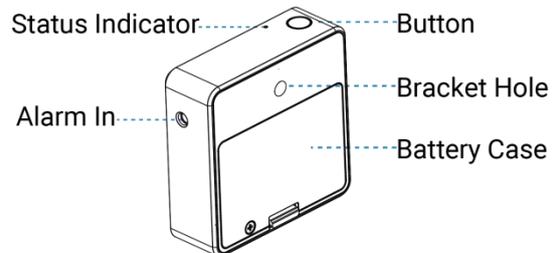
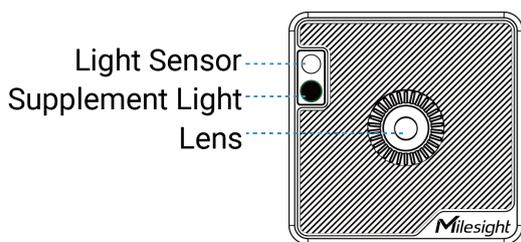
1 × Quick Start Guide

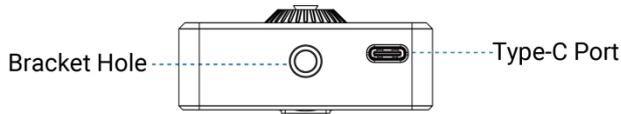


1 × Warranty Card

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

2.3 Hardware Introduction

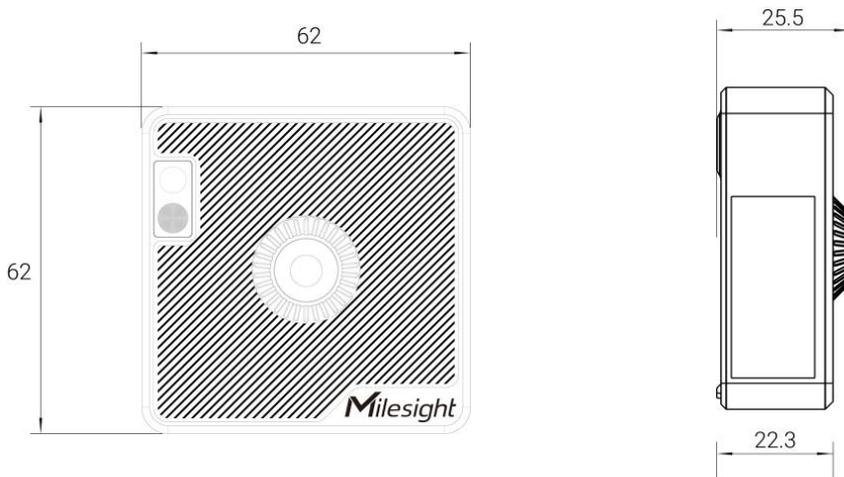




2.4 Button and LED Patterns

Function	Action	LED Indication
Device Wake-up	Press the button once.	Off → Static On
Capture One Screenshot	After device wakes up, capture the picture by pressing the button once or triggering via alarm input/software.	Blinks twice
Enter Sleep Mode	When the device is not being connected for 1 minute or there's no operation on the device for 5 minutes after being connected.	On → Off
Reset to Factory Default	Press and hold the button for more than 3 seconds.	Blinks constantly

2.5 Dimensions (mm)

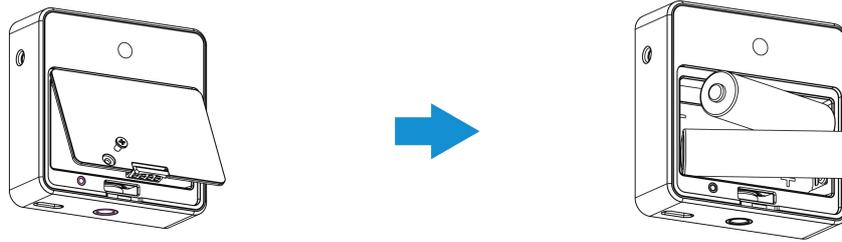


3. Power Supply

Step1: Unscrew the battery case and remove the battery cover, insert the two new AA/LR6 alkaline batteries into the battery case of device with correct direction. After inserting, the device will be powered on automatically.

Note:

- SC541 can only be powered by two new alkaline batteries.
- SC541-HL can be powered by two new lithium and iron disulfide batteries.



Step2: Put the battery cover back and fix it with the screw.

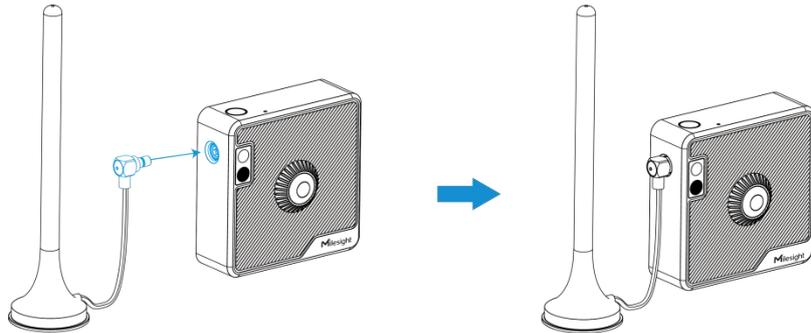


Note:

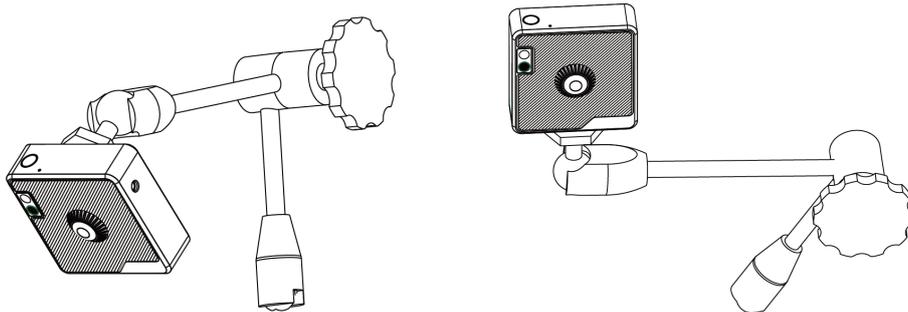
- The batteries should be removed from the device if it is not to be used for an extended period. Otherwise, the battery might leak and damage the device.
- Make sure that install new batteries into the device, or battery life will be reduced.
- The device can also be powered by USB type-C port (5V/1A). If both are connected, type-C will be the preferred power supply option.
- Type-C port can't be used to charge batteries.

4. Installation

Step1: Connect the SMB antenna to the SMB antenna Connector of the device with the device model SC541-HL.



Step2: The device can be fixed to universal camera brackets through different bracket holes.



Note:

- The dimensions of the bracket holes is 1/4-20UNC.
- To avoid reflections from the object surface like meter, make sure the device is placed with angle to the object, instead of being installed in front of it.
- When the PN of your device is 1020, the distance between the device and the target should be 10-20cm and 15cm would be preferred. You can log in to the web page to view the live image stream for adjustment.
- When the PN of your device is 0510, the distance between the device and the target should be 5-10cm and 8cm would be preferred. You can log in to the web page to view the live image stream for adjustment.

5. Access the Camera

SC541 provides user-friendly web GUI for configuration and users can access it via Wi-Fi connection. The recommended browsers are Chrome, Microsoft Edge, and Safari.

The default settings are as below:

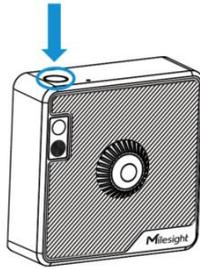
Default IP: 192.168.1.1

Wi-Fi SSID: SC541_XXXXXX (The XXXXXX is the last six digits of the mac address and can be found on the label.)

The steps are as below:

Step 1: Install the batteries to power on the device, press the button on the device to wake it up.

The LED indicator will turns on when the device wakes up.

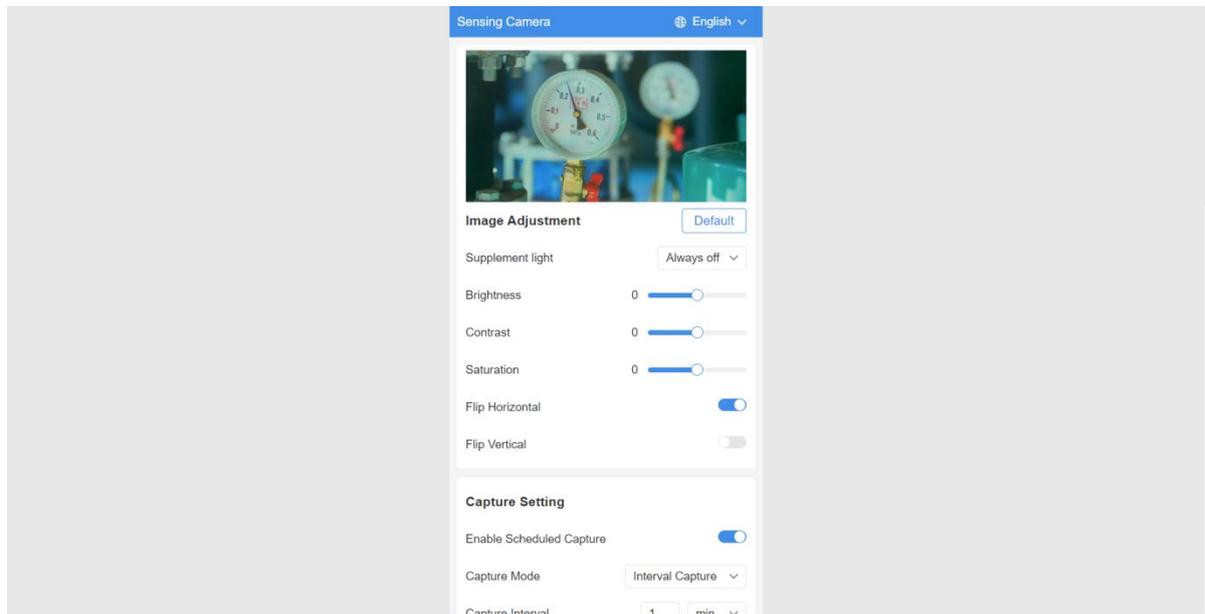


Step 2: Enable the Wireless Network Connection on your computer or smartphone and search for corresponding access point of the device, then connect to this access point.

Step 3: Open a Browser and type **http://192.168.1.1** to access the web GUI.

Note:

- When the device is not being connected for 1 minute or there's no operation on the device for 5 minutes after being connected, the device will enter sleep mode automatically and you can not find the Wi-Fi access point.
- The display will not smooth since it update the live view as images not videos.
- If multiple devices need to be configured, it is suggested to clean the caches of browser before every device configuration or use incognito mode of browsers to ensure the configurations are all taken effect.



6. Operation Guide

Step 1: Adjust the distance and image settings to ensure a clear view to read the meter values.

Image Adjustment Default

Supplement light Customize ▾

Time Range 23 : 00 - 07 : 00

Brightness 0

Contrast 0

Saturation 0

Flip Horizontal

Flip Vertical

Image Adjustment

Parameters	Description
Supplement Light	Set supplement light mode. Auto: when the environment light value is lower than the light shreshold , turn on the light Customize: set the time range to turn on the light Always on: turn on the light continuously Always off: turn off the light continuously
Brightness	Adjust the brightness of the live image stream.
Contract	Adjust the color and light contrast.
Saturation	Adjust the Saturation of the image. Higher Saturation makes colors appear more "pure" while the lower one appears more "wash-out".
Flip Horizontal	Horizontal flip the live image stream.
Flip Vertical	Vertical flip the live image stream.
Default	Restore to default image adjustment settings.

Step 2: Set the condition to capture.

Capture Setting

Enable Scheduled Capture

Capture Mode Interval Capture v

Capture Interval 8 min v

Enable Alarm-In Capture

Enable Capture Button

Capture Setting

Enable Scheduled Capture

Capture Mode Timed Capture v

Time Setting Wed. v 00 : 00 +

Daily 00:00 X	Mon. 00:00 X
Tue. 00:00 X	Wed. 00:00 X

Enable Alarm-In Capture

Enable Capture Button

Capture Setting

Parameters	Description
Enable Scheduled Capture	Enable or disable to capture by schedule. Timed Capture: set the weekday and time to capture Interval Capture: set the interval (min, hour, day) to capture
Enable Alarm-in Capture	Enable or disable to capture the picture when it receives a high-level signal for 150us from alarm-in interface. The voltage range of alarm in: High Level: 3-5V Low Level: <0.5V

Enable Capture Button	Enable to press the button to capture the picture when the device has been woke up.
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Step 3: Set data reporting. When the device captures a picture, it will send the picture to platform immediately.

Note: If the device drops connection, it can store up to 40 pictures locally. When connection is restored, the device will send stored pictures right away.

Data Report

Platform

Host

MQTT Port

HTTP Port

[Save](#)

Data Report

Platform

Host

MQTT Port

Topic

Client ID

QoS

Username

Password

[Save](#)

Data Report

Parameters	Description
Platform	Select data report platform to receive the capture information, which includes sensing platform and other MQTT Platform

Sensing Platform	<p>Host: The address of Milesight AIoT Sensing Platform.</p> <p>MQTT Port: The MQTT port of Milesight AIoT Sensing Platform and the default is 1883.</p> <p>HTTP Port: The HTTP port of Milesight AIoT Sensing Platform and the default is 5220.</p>
Other MQTT Platform	<p>Host: The address of MQTT broker.</p> <p>MQTT Port: The communication port of MQTT broker.</p> <p>Topic: Topic name of the data type used for publishing.</p> <p>Client ID: The Client ID of MQTT broker.</p> <p>QoS: The QoS of MQTT broker, which includes QoS 1, QoS 2 and QoS 3.</p> <p>QoS 1: Only one transmission at most;</p> <p>QoS 2: At least one transmission until the pushback from the server is received. Duplicate transmissions may occur;</p> <p>QoS 3: Only one transmission and ensuring that each message is received only once. This is the most secure QoS, but also the slowest.</p> <p>Username: The username to connect to MQTT broker.</p> <p>Password: The password to connect to MQTT broker.</p>

Step 4: Check basic information of device and upgrade if necessary.

Device Maintenance

Device Name	X1 Sensing Camera
MAC Address	34:85:18:A8:11:10
SN	undefined
Battery	98%
Hardware Version	V1.0
Firmware Version	C_54.2.0.2-a1
Upgrade Firmware	

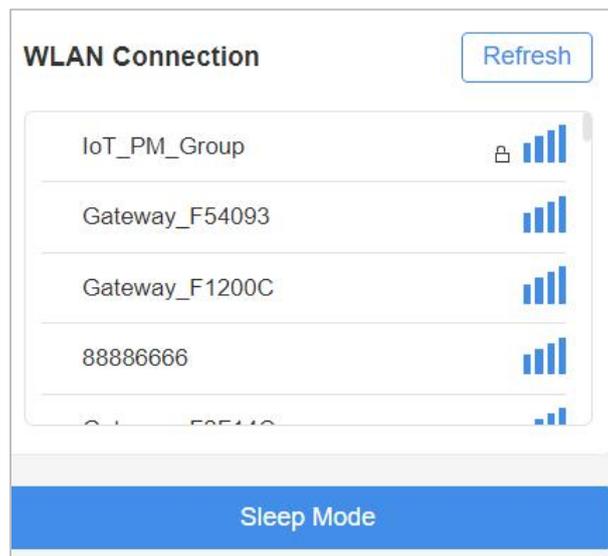
Device Management

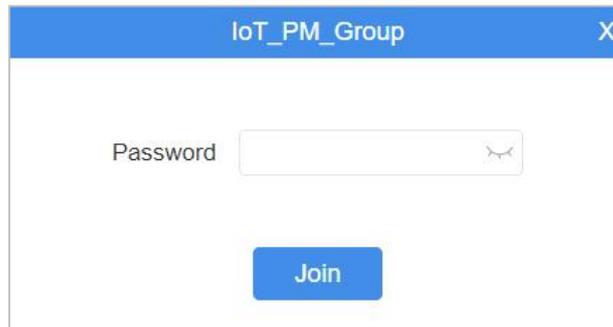
Parameters	Description
Device Name	Customize a device name.
MAC Address	MAC address of Wi-Fi interface.
SN	A unique serial number of device.
Battery	Battery level of the device.
Hardware Version	Hardware version of device. It's fixed.
Firmware Version	Firmware version of device. It can be upgraded.
Upgrade Firmware	<p>Click the Browse button and select the upgrading file locally, then click the Upgrade button to upgrade. After the system reboots successfully, the update is done.</p> <p>Note: Do not disconnect the power of the device during the upgrade process. The device will be restarted to complete the upgrading.</p>

Step 5: Set the connection of network.

- **WLAN Connection** (Only for SC541)

Click **Refresh** to scan the Wi-Fi access point of network router and connect to it. If all settings are completed, click **Sleep Mode**.

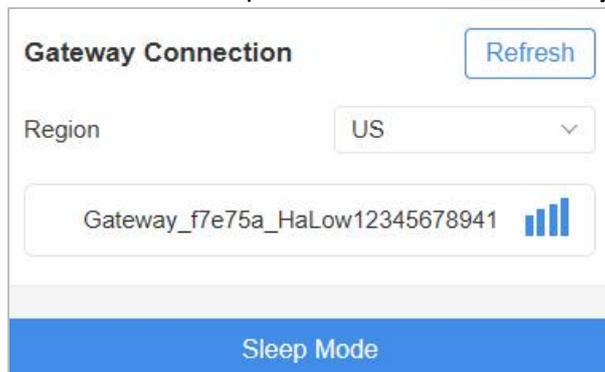




- **Gateway Connection** (Only for SC541-HL)

Select the region of Wi-Fi Halow which is the same as the region on the Wi-Fi Halow Gateway.

And click **Refresh** to scan the Wi-Fi access point of Wi-Fi Halow Gateway and connect to it.



7. Communication Protocol

SC541 will send device information and screenshot data in json format to MQTT broker. The red part is the screenshot content displayed as base64 format.

```
{
  "ts": 1689065610613, //capture timestamp, unit: ms
  "values":
  {
    "devName": "X1 Sensing Camera",
    "devMac": "1C:C3:16:43:01:62",
    "battery": 82,
    "snapType": "Button", //capture type: Button, Timer, Alarm in
    "localtime": "2023-07-11 16:53:30", //upload time
    "imageSize": 62163,
    "image": "data:image/jpeg;base64,/9j/4AAQSkZJRgABAQA...(Image code)"
  }
}
```

—END—