



Industrial LoRaWAN[®] Gateway

UG56

Quick 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 modeled 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.
- Do not power on the device or connect it to another electrical device when installing.
- Check lightning and water protection when used outdoors.
- Do not connect or power the equipment using cables that have been damaged.

Related Documents

This Quick Start Guide only explains the installation of Milesight UG56 LoRaWAN® Gateway. For more functionality and advanced settings, please refer to the relevant documents as below.

Document	Description
UG56 Datasheet	Datasheet for UG56 LoRaWAN® Gateway.
UG56 User Guide	Users can refer to the guide for instruction on how to log in the web GUI, and how to configure all the settings.

The related documents are available on Milesight website: <https://www.milesight-iot.com>

Declaration of Conformity

UG56 is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.



FCC Statement:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

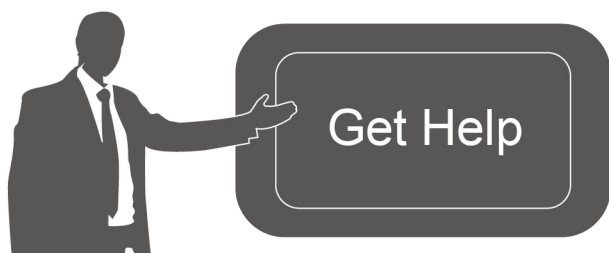
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may

cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



For assistance, please contact
Milesight technical support:
Email: iot.support@milesight.com
Tel: 86-592-5085280
Fax: 86-592-5023065

Revision History

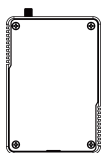
Date	Doc Version	Description
Aug.8, 2022	V1.0	Initial version

Contents

1. Packing List	5
2. Hardware Introduction	5
2.1 Overview	5
2.3 LED Indicators	6
2.4 Reset Button	6
3. Hardware Installation	7
3.1 SIM & Micro SD Installation	7
3.2 Antenna Installation	7
3.3 Power Supply	8
3.4 Gateway Installation	9
4. Web GUI Access	10
4.1 Wireless Access	10
4.2 Wired Access	11
5. Network Connection	14
5.1 Configure the Ethernet Connection	14
5.2 Configure the Wi-Fi Connection	14
5.3 Configure the Cellular Connection	15
6. Packet Forwarder Configuration	17
7. Network Server Configuration	19
7.1 Connect UG56 to Milesight IoT Cloud	19
7.2 Connect UG56 to MQTT/HTTP Server	21

1. Packing List

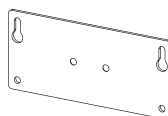
Before you begin to install the UG56 LoRaWAN® Gateway, please check the package contents to verify that you have received the items below.



1 × UG56 Device



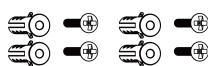
1 × LoRaWAN®
Magnetic Antenna



1 × Wall Mounting
Bracket



2 × M3 Bracket Fixing
Screws



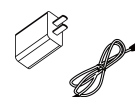
4 × Wall Mounting
Kits



1 × Quick Start Guide



1 × Warranty Card



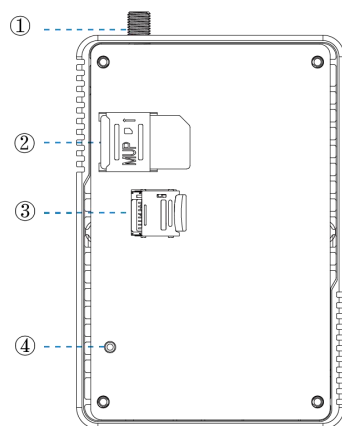
1 × Type-C Cable & Power
Adapter (Optional)



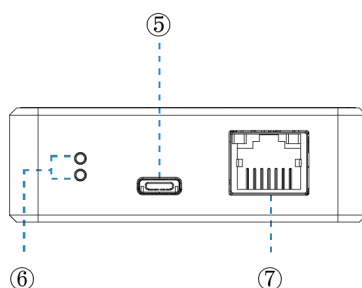
If any of the above items is missing or damaged, please contact your sales representative.

2. Hardware Introduction

2.1 Overview

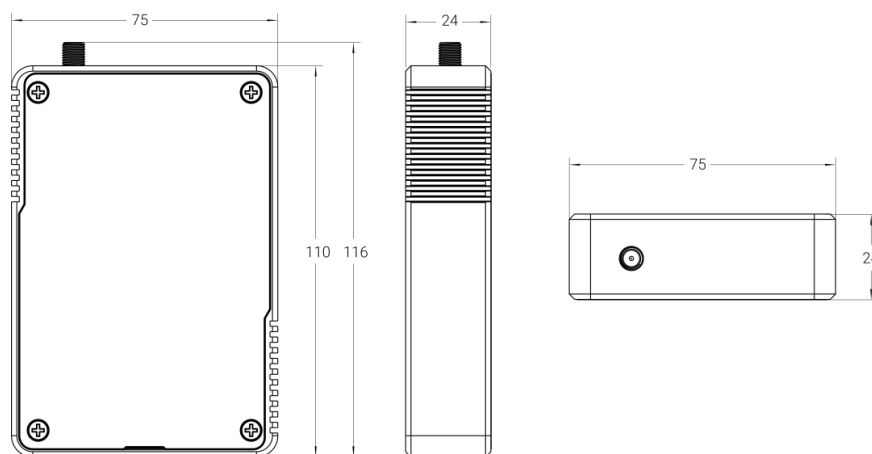


- ① LoRaWAN® Antenna Connector
- ② SIM Slot
- ③ Micro SD Slot
- ④ Reset Button



- ⑤ Type-C Power & Console Port
- ⑥ LED Indicators
- ⑦ Ethernet Port (PoE)

2.2 Dimensions (mm)



2.3 LED Indicators

LED	Indication	Status	Description
SYS	System Status	Off	The system is starting up
		Red Light	The system goes wrong
		Green Light	The system is running properly
LoRa	LoRa Status	Off	Packet Forwarder mode is running off
		On	Packet Forwarder mode is running well
Ethernet Port	Link Indicator (Yellow)	Off	Disconnected or connect failure
		On	Connected
		Blinking	Transmitting data
	Rate Indicator (Green)	Off	Other modes
		On	100 Mbps mode

2.4 Reset Button

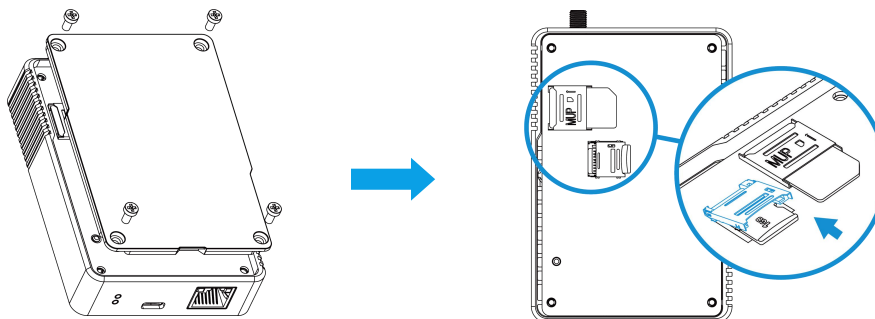
Function	Description	
	SYS LED	Action
Reset	Static Green	Press and hold the reset button for more than 5 seconds.
	Static Green → Rapidly Blinking	Release the button and wait.
	Off → Static Green	The gateway resets to factory default.

3. Hardware Installation

3.1 SIM & Micro SD Installation

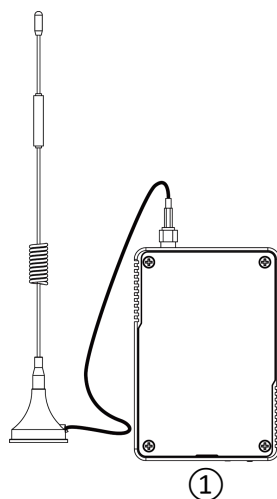
Remove the front panel of the device, insert the SIM card or micro SD card into the corresponding slot.

Note: UG56 does not support hot plugging (also called hot swapping). please turn off the power before you insert or take off cards.



3.2 Antenna Installation

Rotate the LoRa antenna into the antenna connector.



Note:

- 1) The external antenna should be installed vertically always on a site with a good signal.
- 2) Keep away from metal objects and power lines which may affect the signal.

Antenna Specifications

Milesight provides a magnetic LoRaWAN antenna and here is the specification:

Electrical Properties

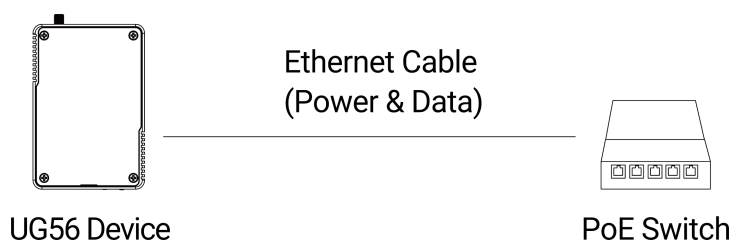
Frequency Range	902~928 MHz
Impedance	50Ω Nominal
Return Loss	8.5 dB Min.
Radiation	Omni-directional
Gain(Peak)	5.06dBi
Polarization	Vertical
Input Power	50W
Connector	SMA Male

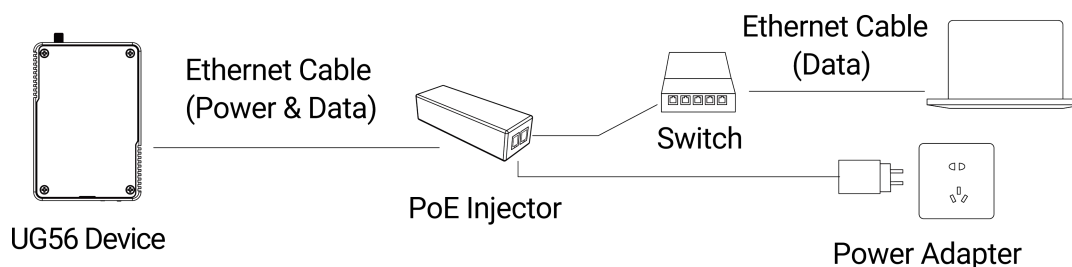
Physical Characteristics

Dimension	Φ29×225mm
Operating Temperature	-40°C ~ 70°C

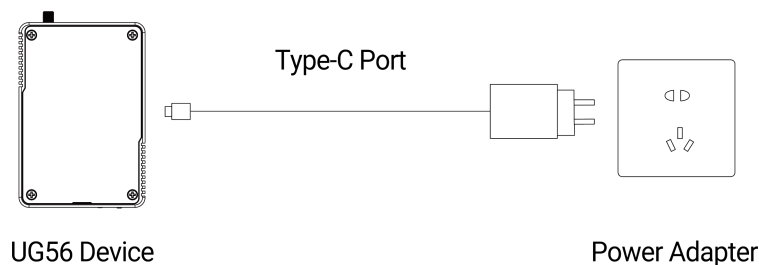
3.3 Power Supply

UG56 can be powered by 802.3af standard PoE or Type-C port (5 VDC). If both are connected, the device will be powered by the former method (PoE).

● Power by a PoE Switch**● Power by a PoE injector**



● Power by a Type-C Port

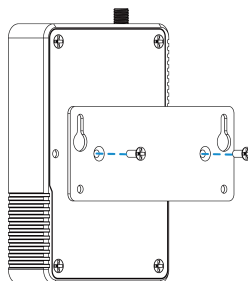


Note: When connecting, Ethernet cable of UG56 device side should be installed first, otherwise, PoE devices or gateway may be damaged.

3.4 Gateway Installation

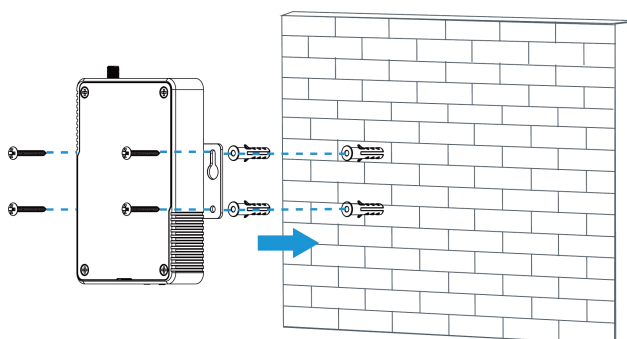
Before you get started, make sure all fittings are installed and the power supply is disconnected.

A. Fix the wall mounting bracket to the device with 2 x M3 bracket fixing screws.



B. Drill 4 holes on the wall according to the wall mounting bracket, then fix the wall plugs into the wall.

C. Fix the device to the wall plugs with M3 wall mounting screws. When installation, it's suggested to fix the upper two screws first.



4. Web GUI Access

UG56 provides web-based configuration interface for management. If this is the first time you configure the gateway, please use the default settings below:

ETH IP Address: **192.168.23.150**

Wi-Fi IP Address: **192.168.1.1**

Wi-Fi SSID: **Gateway_*******

Username: **admin**

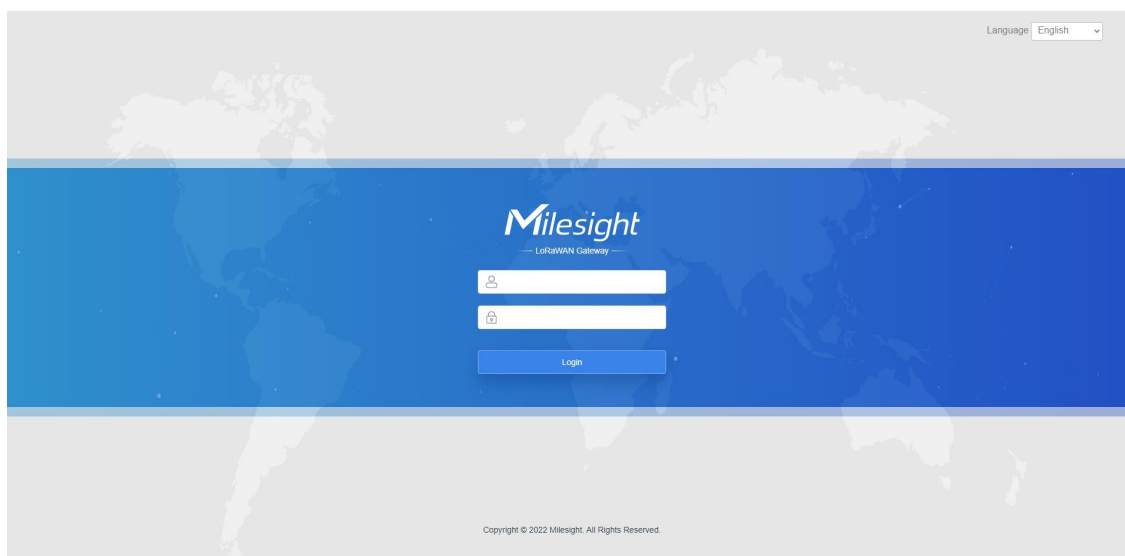
Password: **password**

Browser: **Chrome(recommended)**

4.1 Wireless Access

A. Enable wireless network connection on your computer and search for access point **"Gateway_*****"** to connect it.

B. Open a web browser on your PC (Chrome is recommended) and type in the IP address **192.168.1.1** to access the web GUI, enter the username and password, click "Login".



If you enter the username or password incorrectly more than 5 times, the login page will be locked for 10 minutes.

D. After logging the web GUI, follow the guide to complete the basic configurations. It's suggested that you change the password for the sake of security.

Change Your Default Password

For your device security, please change the default password in time.

Old Password

New Password

Confirm New Password

Close

Save

E. You can view system information and perform configuration of the gateway.

Milesight

admin

For your device security, please change the default password

Status

Packet Forwarder

Network Server

Network

System

Maintenance

APP

Overview

Cellular

Network

WLAN

VPN

Routing

Host List

Help

Model

Region

Serial Number

Firmware Version

Hardware Version

Local Time

Uptime

System Information

Model

Region

Serial Number

Firmware Version

Hardware Version

Local Time

Uptime

CPU Load

RAM (Available/Capacity)

eMMC (Available/Capacity)

UG56-L00E-915M

US915

6041C2232749

56.0.0.1-a2

V1.0

2022-08-10 16:31:28 Wednesday

03:10:23

6%

194MB/512MB (37.89%)

6.2GB/7.0GB (88.46%)

Manual Refresh

Refresh

Model

Region

Serial Number

Firmware Version

Hardware Version

Local Time

Uptime

Show the model name of gateway.

Show the Region of gateway.

Show the serial number of gateway.

Show the current firmware version of gateway.

Show the current hardware version of gateway.

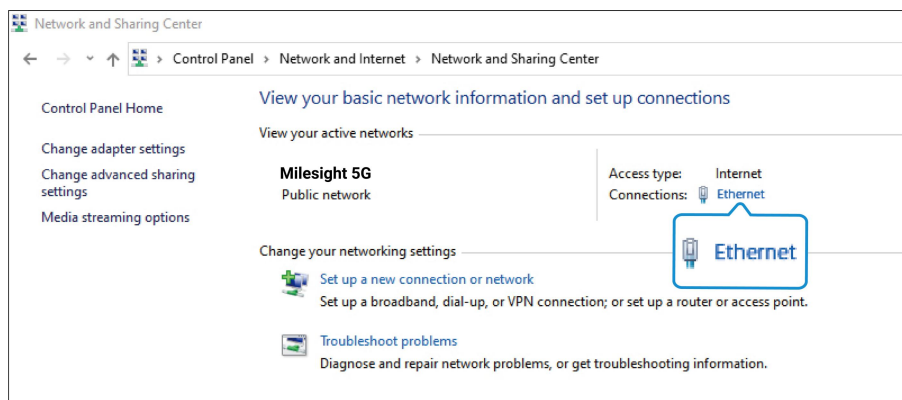
Show the current local time of system.

Show the information on how long the gateway has been running.

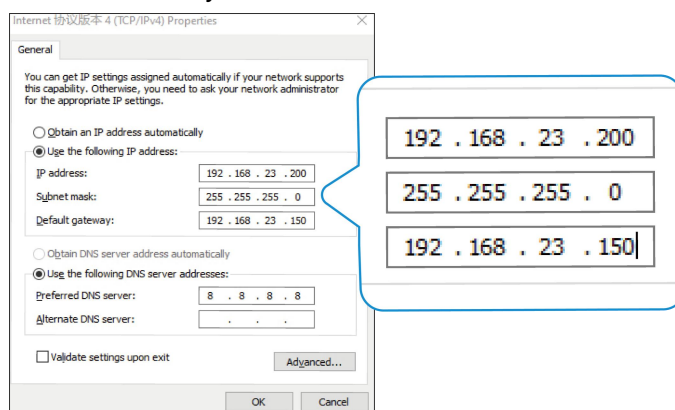
4.2 Wired Access

Connect PC to UG56 ETH port directly or through PoE injector to access the web GUI of gateway. The following steps are based on Windows 10 system for your reference.

A. Go to "Control Panel" → "Network and Internet" → "Network and Sharing Center", then click "Ethernet" (It may have different names).

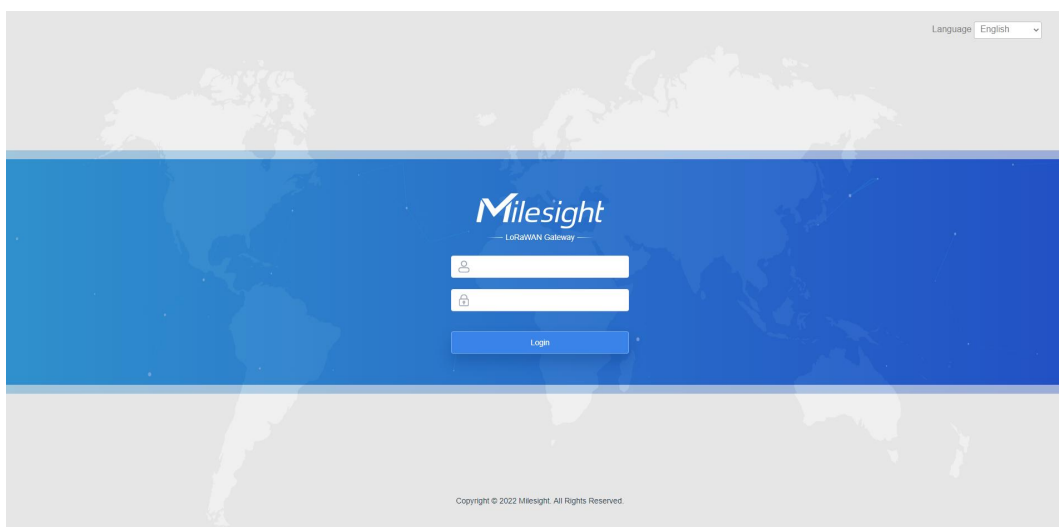


B. Go to “Properties” → “Internet Protocol Version 4 (TCP/IPv4)” and select “Use the following IP address”, then assign a static IP manually within the same subnet of UG56.



C. Open a Web browser on your PC (Chrome is recommended) and type in the IP address 192.168.23.150 to access the web GUI.

D. Enter the username and password, click “Login”.



If you enter the username or password incorrectly more than 5 times, the login page will be locked for 10 minutes.

E. After logging the web GUI, follow the guide to complete the basic configurations. It's suggested that you change the password for the sake of security.

Change Your Default Password

For your device security, please change the default password in time.

Old Password

New Password

Confirm New Password

Close

Save

F. You can view system information and perform configuration of the gateway.

Milesight

admin

For your device security, please change the default password

Status

Packet Forwarder

Network Server

Network

System

Maintenance

APP

Overview

Cellular

Network

WLAN

VPN

Routing

Host List

System Information

Model

Region

Serial Number

Firmware Version

Hardware Version

Local Time

Uptime

CPU Load

RAM (Available/Capacity)

eMMC (Available/Capacity)

Model

Region

Serial Number

Firmware Version

Hardware Version

Local Time

Uptime

Manual Refresh

Refresh

Model

Region

Serial Number

Firmware Version

Hardware Version

Local Time

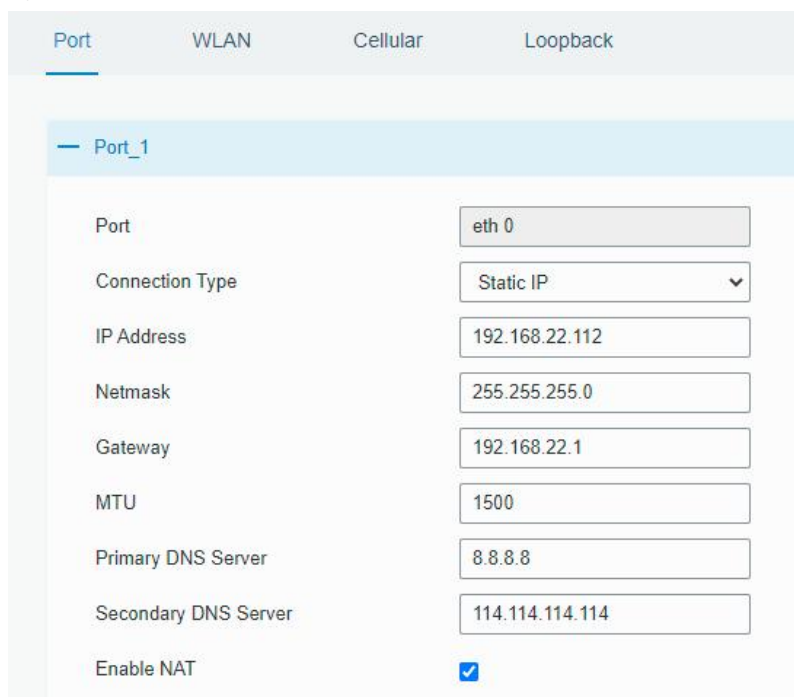
Uptime

5. Network Connection

This section explains how to connect the gateway to network via WAN connection, Wi-Fi or cellular.

5.1 Configure the Ethernet Connection

- A. Go to “Network”→ “Interface” → “Port” page to select the connection type and configure Ethernet port information.
- B. Click “Save & Apply” for changes to take effect.



Port	WLAN	Cellular	Loopback
— Port_1			
Port	eth 0		
Connection Type	Static IP		
IP Address	192.168.22.112		
Netmask	255.255.255.0		
Gateway	192.168.22.1		
MTU	1500		
Primary DNS Server	8.8.8.8		
Secondary DNS Server	114.114.114.114		
Enable NAT	☒		

- C. Connect Ethernet port of gateway to the devices like router or modem.
- D. Log in the web GUI via the newly assigned IP address and go to “Status”→ “Network” to check Ethernet port status.

Overview

Packet Forward

Cellular

Network

WLAN

VPN

Host List

| WAN

Port	Status	Type	IP Address	Netmask	Gateway	DNS	Duration
eth 0	up	Static	192.168.22.112	255.255.255.0	192.168.22.1	8.8.8.8	1days,02h 34m 22s

5.2 Configure the Wi-Fi Connection

- A. Go to “Network” → “Interface” → “WLAN” and select “Client” mode.
- B. Click “Scan” to search for Wi-Fi access points. Select the available one and click “Join Network”.

Port

WLAN

Cellular

Loopback

< GoBack

SSID	Channel	Signal	Cipher	BSSID	Security	Frequency	
AAA	Auto	-61dBm	AES	24:e1:24:f0:c4:13	WPA-PSK/WPA2-PSK	2412MHz	Join Network

C. Type the key of Wi-Fi.

Port	WLAN	Cellular	Loopback
WLAN			
Enable	☒		
Work Mode	Client ▼ Scan		
SSID	AAA		
BSSID	24:e1:24:f0:c4:13		
Encryption Mode	WPA-PSK/WPA2-PSK ▼		
Cipher	AES ▼		
Key	*****		
IP Setting			
Protocol	DHCP Client ▼		

D. Go to “Status”→“WLAN” to check Wi-Fi status. If it shows “Connected”, it means gateway connects to Wi-Fi successfully.

Overview	Packet Forward	Cellular	Network	WLAN
WLAN Status				
Wireless Status	Enabled			
MAC Address	24:e1:24:f0:de:14			
Interface Type	Client			
SSID	AAA			
Channel	Auto			
Encryption Type	WPA-PSK/WPA2-PSK			
Cipher	AES			
Status	Connected			
IP Address	192.168.1.145			
Netmask	255.255.255.0			
Connection Duration	0 days, 02:44:45			

5.3 Configure the Cellular Connection

A. Go to “Network” → “Interface” → “Cellular” → “Cellular Setting” page to enable cellular settings.

- B. Choose relevant network type and fill in SIM card information like APN or PIN code.
- C. Click “Save” and “Apply” for changes to take effect.

Port	WLAN	Cellular	Loopback
Cellular Setting			
Enable		☒	
Network Type		Auto	
APN			
Username			
Password			
Access Number			
PIN Code			
Authentication Type		Auto	
Roaming		☒	
SMS Center			
Connection Setting		☐	
Enable NAT		☒	

- D. Go to “Status” → “Cellular” page to view the status of the cellular connection. If it shows “Connected”, it means the SIM has dialed up successfully. On the other hand, you can check the status of LTE indicator. If it keeps on light statically, it means SIM has dialed up successfully.

Overview	Packet Forward	Cellular	Network	WLAN
Modem				
Status		Ready		
Model		EC25		
Version		EC25ECGAR06A07M1G		
Signal Level		23asu (-67dBm)		
Register Status		Registered (Home network)		
IMEI		860425047368939		
IMSI		460019425301842		
ICCID		89860117838009934120		
ISP		CHN-UNICOM		
Network Type		LTE		
PLMN ID				
LAC		5922		
Cell ID		340db83		
Network				
Status		Connected		
IP Address		10.132.132.59		
Netmask		255.255.255.240		
Gateway		10.132.132.60		

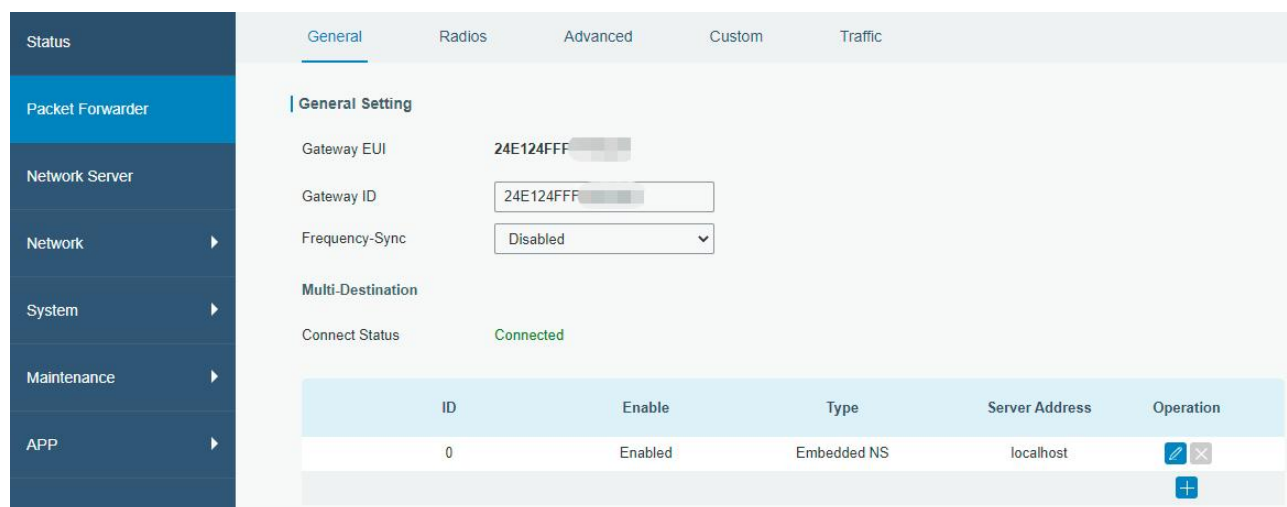
6. Packet Forwarder Configuration

UG has installed multiple packet forwarders including Semtech, Chirpstack-Generic MQTT broker, etc. This section explains how to connect the gateway to network servers.



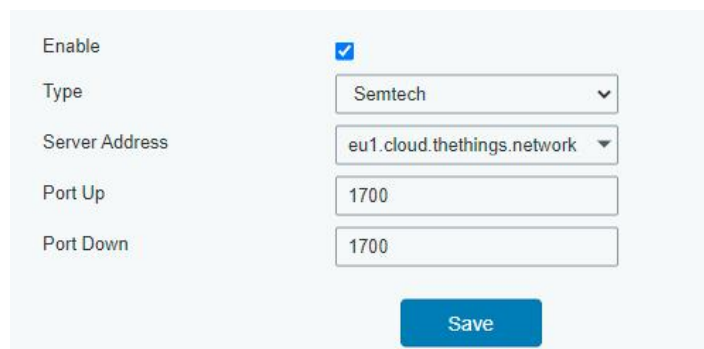
Make sure the gateway connects to the network as shown in [Section 5](#).

A. Go to “Packet Forwarder” → “General” page and click  to add a network server.



ID	Enable	Type	Server Address	Operation
0	Enabled	Embedded NS	localhost	 
				

B. Fill in the server information and enable this server.



Enable ☒

Type

Server Address

Port Up

Port Down

C. Go to “Packet Forwarder” → “Radio” page, center frequency and channels. The channels of the gateway and network server need to be the same.

Region US915

Name	Center Frequency/MHz
Radio 0	904.3
Radio 1	905.0

Multi Channels Setting

Enable	Index	Radio	Frequency/MHz
☒	0	Radio 0	903.9
☒	1	Radio 0	904.1
☒	2	Radio 0	904.3
☒	3	Radio 0	904.5
☒	4	Radio 1	904.7
☒	5	Radio 1	904.9
☒	6	Radio 1	905.1
☒	7	Radio 1	905.3

D. Add the gateway on network server page. For more details about the network server connection please refer to [Milesight IoT Support portal](#).

E. Go to "Traffic" page to view the data communication of UG56.

General

Radios

Advanced

Custom

Traffic

Traffic Setting

Stop

Clear

Rfch	Direction	Time	Ticks	Frequency	Datarate	Coderate	RSSI	SNR
1	up	11:52:38	317882157 1	865.985	SF7BW125	4/5	-91	5.0
1	up	11:52:22	316226269 2	866.585	SF7BW125	4/7	-108	-11.8
0	down	-	311888813 1	865.0625	SF7BW125	4/5	-	-
0	up	11:51:37	311788813 1	865.0625	SF7BW125	4/5	-95	-0.8

7. Network Server Configuration

UG56 can work as network server and transmit data to Milesight IoT Cloud or another platform via MQTT/HTTP/HTTPS.



Make sure the gateway connects to the network as shown in [Section 5](#).

7.1 Connect UG56 to Milesight IoT Cloud

A. Go to “Packet Forwarder” → “General” page to enable the embedded network server.

ID	Enable	Type	Server Address	Operation
0	Enabled	Embedded NS	localhost	

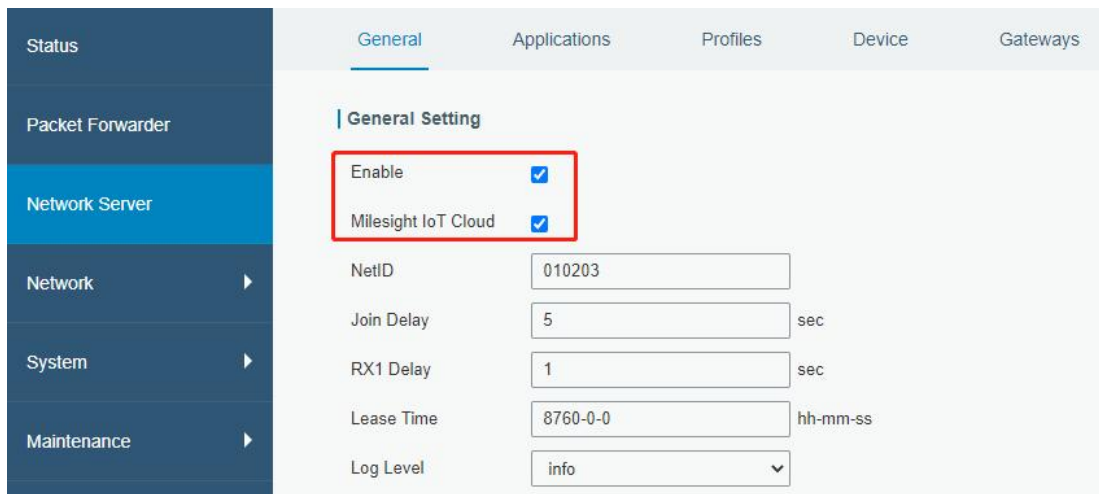
B. Go to “Packet Forwarder” → “Radio” page to select the antenna type, center frequency and channels. The channels of the gateway and nodes need to be the same.

Name	Center Frequency/MHz
Radio 0	904.3
Radio 1	905.0

Multi Channels Setting

Enable	Index	Radio	Frequency/MHz
☒	0	Radio 0	903.9
☒	1	Radio 0	904.1
☒	2	Radio 0	904.3
☒	3	Radio 0	904.5
☒	4	Radio 1	904.7
☒	5	Radio 1	904.9
☒	6	Radio 1	905.1
☒	7	Radio 1	905.3

C. Go to “Network Server” → “General” page to enable the network server and “Milesight IoT Cloud” mode.



General Setting

☒ Enable

☒ Milesight IoT Cloud

NetID: 010203

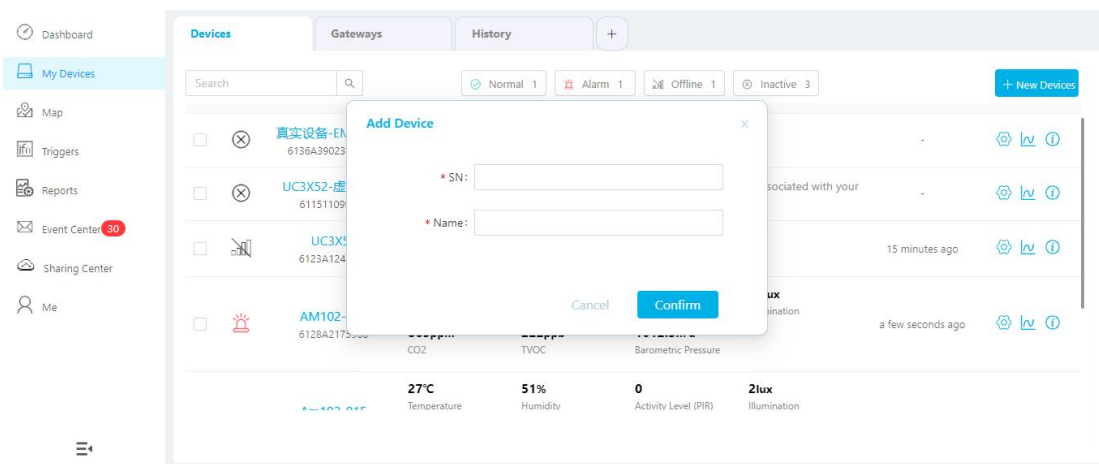
Join Delay: 5 sec

RX1 Delay: 1 sec

Lease Time: 8760-0-0 hh-mm-ss

Log Level: info

D. Log in the Milesight IoT Cloud. Then go to “My Devices” page and click “+New Devices” to add gateway to Milesight IoT Cloud via SN. Gateway will be added under “Gateways” menu.



My Devices

Search: []

Normal 1 Alarm 1 Offline 1 Inactive 3

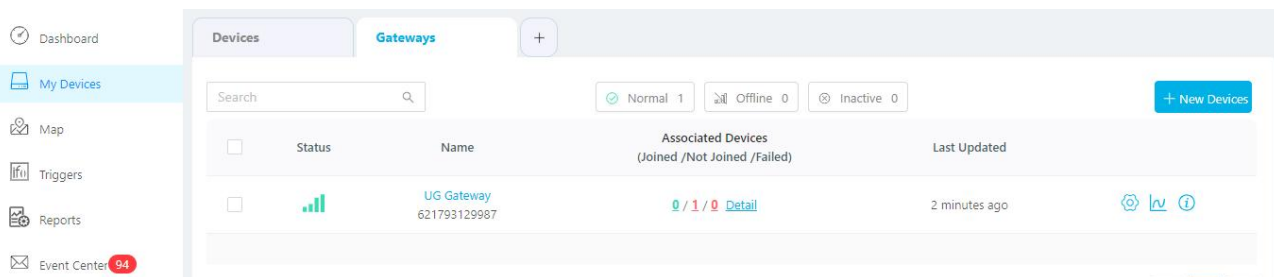
Add Device

* SN: []

* Name: []

Cancel Confirm

E. The gateway is online on Milesight IoT Cloud.



Gateways

Search: []

Normal 1 Offline 0 Inactive 0

+ New Devices

Status	Name	Associated Devices (Joined / Not Joined / Failed)	Last Updated
	UG Gateway 621793129987	0 / 1 / 0 Detail	2 minutes ago

7.2 Connect UG56 to MQTT/HTTP Server

A. Go to “Packet Forwarder” → “General” page to enable the embedded network server.

The screenshot shows the 'General Setting' page for the Packet Forwarder. The 'Connect Status' is 'Connected'. Below the settings, there is a table with the following data:

ID	Enable	Type	Server Address	Operation
0	Enabled	Embedded NS	localhost	Edit Delete

B. Go to “Packet Forwarder” → “Radio” page to select the antenna type, center frequency and channels. The channels of the gateway and nodes need to be the same.

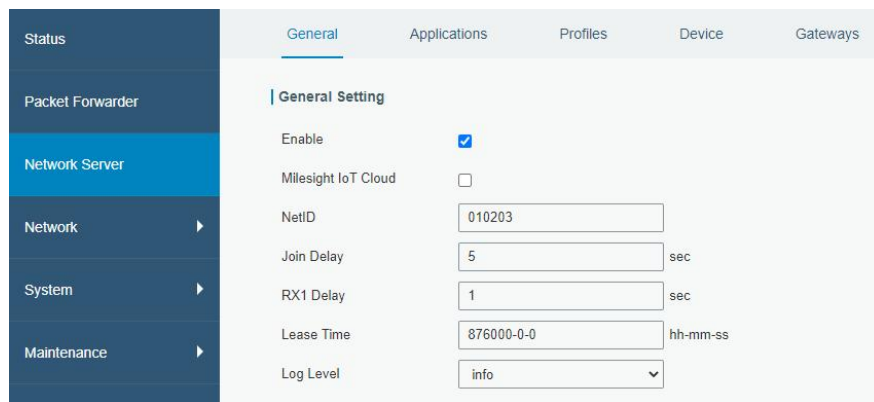
The screenshot shows the 'Radio' page. The 'Region' is set to 'US915'. Below it, there is a table for 'Radio' settings:

Name	Center Frequency/MHz
Radio 0	904.3
Radio 1	905.0

Below this table is the 'Multi Channels Setting' section, which contains a table with the following data:

Enable	Index	Radio	Frequency/MHz
☒	0	Radio 0	903.9
☒	1	Radio 0	904.1
☒	2	Radio 0	904.3
☒	3	Radio 0	904.5
☒	4	Radio 1	904.7
☒	5	Radio 1	904.9
☒	6	Radio 1	905.1
☒	7	Radio 1	905.3

C. Go to “Network Server” → “General” page to enable the network server mode.

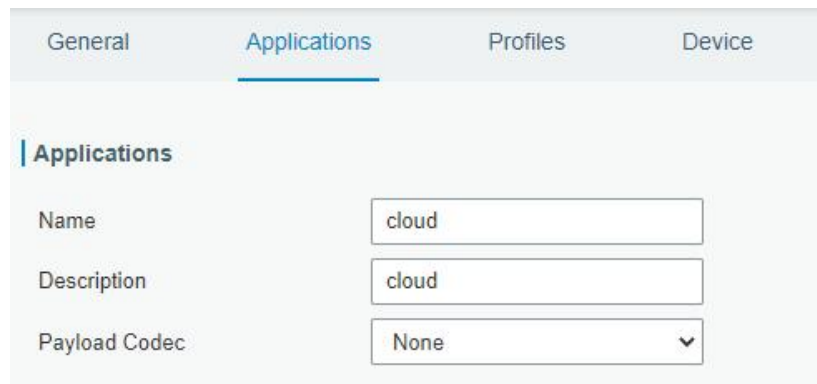


	General	Applications	Profiles	Device	Gateways
Status					
Packet Forwarder					
Network Server					
Network					
System					
Maintenance					

General Setting

Enable	☒
Mulesight IoT Cloud	☐
NetID	010203
Join Delay	5 sec
RX1 Delay	1 sec
Lease Time	876000-0-0 hh-mm-ss
Log Level	info

D. Go to "Network Server"→"Application" to add a new application.

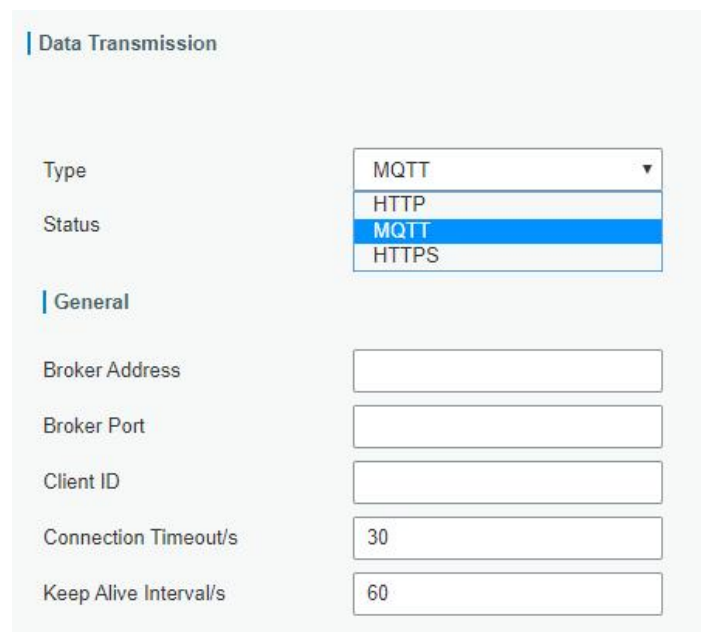


General	Applications	Profiles	Device

Applications

Name	cloud
Description	cloud
Payload Codec	None

After saving the application, you can select HTTP, HTTPS or MQTT protocol and fill in corresponding server information to send data to another server.



Data Transmission

Type	MQTT
Status	

General

Broker Address	
Broker Port	
Client ID	
Connection Timeout/s	30
Keep Alive Interval/s	60

E. Go to "Profiles" page to add a new profile for the device.

General Applications **Profiles** Device

Device Profiles

Name

Max TXPower

Join Type

Class Type ☒ Class A ☐ Class B ☐ Class C

Advanced ☐

Save **Cancel**

F. Go to “Device” page and click “Add” to add LoRaWAN® node devices.

General Applications Profiles **Device** Gateways Packets

Device

Add **Bulk Import** **Delete All**

Device Name	Device EUI	Device-Profile	Application	Last Seen	Activated	Operation
No matching records found						

Device Name

Description

Device EUI

Device-Profile

Application

Frame-counter Validation ☐

Application Key

Device Address

Network Session Key

Application Session Key

Uplink Frame-counter

Downlink Frame-counter

Save & Apply

You can also click “Bulk Import” if you want to add many nodes all at once.

Import File **Browse** **Import** **Template Download**

Click “Template Download” to download template file and add device information to this file. Application

and device profile should be the same as you created on web page.

	A	B	C	D	E	F	G	H	I
1	name	description	deveui	application	deviceprofile	appkey	devaddr	appskey	nwkskey
2	24e1242191323266		24e1242191323266	cloud	ClassC-OTAA	112233445566778899aa112233445566			
3									
4									
5									

Import this file to add bulks of devices.

F. Go to “Packets” page to check the packets from LoRaWAN® node devices. The type starts from “Up” means uplinks and “Dn” means downlinks.

Network Server										
<button>Clear</button>						Search				
Device EUI	Frequency	Datarate	SNR	RSSI	Size	Fcnt	Type	Time	Details	
24e124126a146579	868300000	SF7BW125	8.5	-85	4	14	UpUnc	2020-04-28T15:09:25+08:00	!	
24e124126a146579	868300000	SF7BW125	10.2	-75	4	13	UpUnc	2020-04-28T15:04:25+08:00	!	

Click “Details” to check the properties and payload contents of packets.

Packets Details			
Fcnt	14		
Port	85		
Modulation	LORA		
Bandwidth	125		
SpreadFactor	7		
Bitrate	0		
CodeRate	4/5		
SNR	8.5		
RSSI	-85		
Power	-		
Payload(b64)	A3cYAA==		
Payload(hex)	03771800		
MIC	f5acdeb2		

[END]