

# ONT M-97RG2 Hardware Installation Manual

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# Preface

## About This Document

This guide describes how to install the CIG Wi-Fi extender device unit (Gateway) at the customer premises.

## Intended Audience

This document is intended for technicians responsible for:

- Unpacking and mounting the Gateway and power supply
- Connecting the Gateway to the MoCa2.5 network
- Auto-negotiation and MDI/MDIX auto-sensing
- Built-in layer-2 switch
- Advanced data features such as VLAN tag manipulation, classification, and filtering
- The M-97RG2 supports video service delivered in form of data (by multicast or unicast).
- M-97RG2 supports IGMP snooping function. When IGMP snooping is enabled, M-97RG2 monitors the member joining and leaving activities at the Ethernet/WLAN service port, and then selectively delivers the multicast streams.

# Safety

Please read and follow all warning notices and instructions marked on the product or included in its packaging, and observe all safety instructions listed in this manual.

## 1.1. Basic Requirements

- Install the device in a well-ventilated place that is not directly exposed to sunlight.
- Keep the device dry and prevent the device from coming into contact with other objects during storage, transportation, and operation of the device.
- Install the device in compliance with the requirements.
- Do not open the device enclosures without permission, but contact the service technician when a problem occurs with the device.
- No entity or person should modify the structure, security design, performance design, etc. of the device without authorization.
- Abide by local laws and regulations and respect the legal rights of others when using the device.

## 1.2. Environmental Requirements

- Install the device in a well-ventilated place that is not directly exposed to sunlight.
- Keep the device clean.
- Keep the device away from water sources or wet places.
- Do not place any objects on top of the device. This is to protect the device from damage, such as overheating or melting, which can be caused by those objects.
- Leave a space of at least 50mm around the device for heat dissipation.
- Leave a space of at least 100mm on the top of the device for heat dissipation.
- Keep the device away from heat sources or fire sources, such as electric heaters and candles.
- Keep the device away from electrical appliances with strong magnetic fields or strong electric fields, such as microwave ovens, refrigerators, and mobile phones.
- Do not store the device in an environment where there are corrosive chemicals.

## 1.3. Electrical Safety

- Use the accessories delivered with the device, such as the power adapter, battery, etc..
- The power supply voltage and current of the device must meet the requirements on the input voltage and current of the device, and provide current overload protection.
- Keep the power plug clean and dry to avoid electric shock or other hazards.
- Follow the insulation requirements of operational safety, for example, keep your hands dry, use insulated tools, etc., when plugging in the device's cables.
- Switch off the power and remove the power plug if the device needs to be shut down for a long period of time.
- Protect the device from water or other liquids. If such an incident occurs, switch off the power immediately and remove all the cables from the device, including the power cable, and network cables. Contact the service technician in the event of a device failure.
- Do not step on, pull, drag, or excessively bend the cables because they may become damaged. Damaged cables can cause a device failure.
- Do not use cables that are damaged or have deteriorated.

## 1.4. Instructions for Cleaning

- Before cleaning the device, stop operation of the device, switch off the power, and remove all cables from the device, including the power cable, network cables, etc. When cleaning the device, do not use liquids such as cleaning fluid or spray-on detergents to clean the outer case of the device. Use a soft, dry cloth instead.

## 1.5. Other Instructions

- In case of any abnormalities, such as smoke, abnormal sound, or odor, being emitted from the device, immediately stop operation of the device, switch off the power, and remove all cables, from the device, including the power cable and network cables. Contact the service technician in the event of a device failure.
- Prevent foreign objects such as metal objects from falling into the device through the heat dissipation mesh.
- Protect the outer case of the device from scratches, as paint that peels off the scratched areas can cause device abnormalities. If the paint falls into the device it may cause short circuits. In addition, peeled-off paint can cause an allergic reaction in the human body.

- Ensure that the device is kept out of the reach of children. Guard against risks such as children playing with the device or swallowing small parts of the device.

## 1.6. Instructions for Environment Protection

- Deposit the used devices and batteries at the specified recycling facility.
- Abide by local laws and regulations when handling and disposing of packaging materials, dead batteries and used devices

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### **Disclaimer**

Please read and follow all safety instructions and warnings marked on the outside of the product and its packaging, as well as all the safety instructions outlined in this manual when using this product. Once this product is installed and used, it is the responsibility of the user to know and understand how to safely use this product as described. The user shall bear the loss and/or any liability resulting from a violation of the safety instructions. The equipment manufacturers are not liable for any direct, indirect, incidental, special, consequential or punitive damages.

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## 2. Product Description

### 2.1. Introduction

M-97RG2 is a high-performance Wi-Fi extender device with MOCA WAN and dual band wireless interface, providing a cost-effective networking solution for both the home and office. The subscriber can utilize the existing coax cable network to extend their Wi-Fi coverage.

Appearance of products and individual components, refer to Figure 1

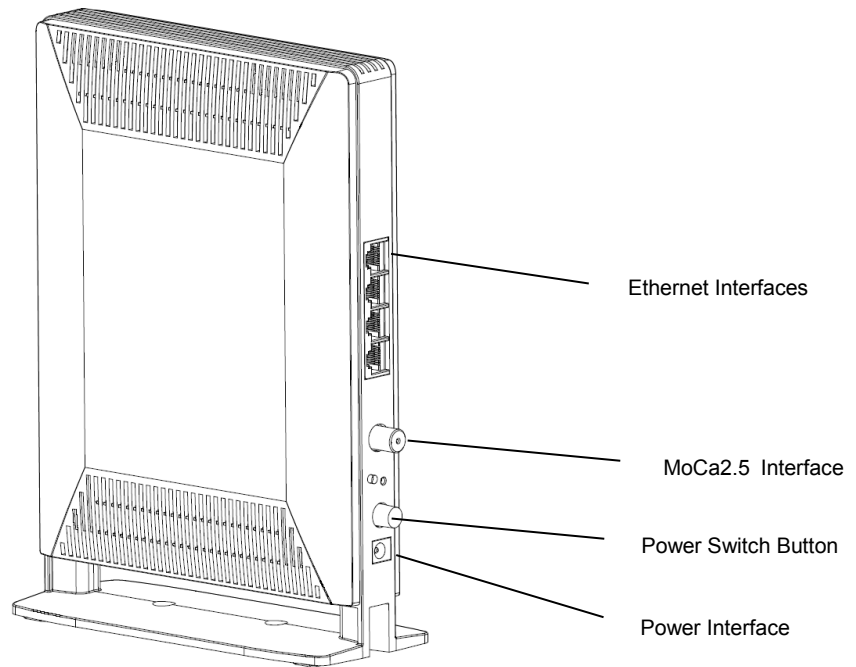


Figure 1

Interface	Description
Power	12 V DC power input interface, connecting to power adapter
RESET	Reset the Gateway
LAN1/LAN2/LAN3/LAN4	RJ-45 10/100/1000 Base-T Ethernet Interface or 10/100 fast Ethernet Interface, connecting to PC or Set-Top-Box
MoCa2.5	Connection established with MOCA client
ON/OFF	Power switch on/off the Gateway power

## 2.2. Services

### 2.2.1. Data

- The M-97RG2 is delivered with four 10/100/1000 Base-T Ethernet and dual band WLAN interfaces, supporting:



- Auto-negotiation and MDI/MDIX auto-sensing
- Built-in layer-2 switch
- Advanced data features such as VLAN tag manipulation, classification, and filtering

## 2.2.2. Video

- The M-97RG2 supports video service delivered in form of data (by multicast or unicast).
- M-97RG2 supports IGMP snooping function. When IGMP snooping is enabled, M-97RG2 monitors the member joining and leaving activities at the Ethernet/WLAN service port, and then selectively delivers the multicast streams.

## 2.3. Specifications

Gateway physical, electrical, MoCa2.5, and environmental specifications and compliance information are listed in the following tables.

Table 1 Physical specification

<b>Dimensions</b>	240mm(bracket inclusive) x170mm x72mm (H x W x D)
<b>Weight</b>	1KG
<b>MoCa2.5 interface</b>	MOCA WAN frequency range:1125MHz~1675MHz TX Power: -1~+7dBm,typical +3dBm
<b>Ethernet interface</b>	RJ-45 connector

Table 2 Electrical specification

<b>Input Power</b>	+12V DC Power input
<b>Power Supply</b>	2-PIN AC Power input
<b>Power Consumption</b>	<18W

Table 3 Environmental specification

<b>Temperature</b>	0° C ~ 40° C
<b>Humidity</b>	5% ~ 95% relative humidity

## 3. Hardware Operation

### 3.1. Environmental Requirements

The Gateway will operate in temperatures ranging from 0° C to 40° C, relatively humidity ranging from 5% to 95%.

### 3.2. Power Requirements

The Gateway will be shipped with a universal power adaptor. However, before installation, check if the AC power input matches the specification printed on the power adaptor (input voltage, current, etc.)



**CAUTION:** Please use the power adaptor within the package only, or the replacement unit that provided by CIG. Other power adaptor may cause damage to the Gateway and other disasters.

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### 3.3. Mountings the Gateway

The device supports two installation methods: Installed on the wall and installed on the desktop.

#### Installing the Gateway on the Wall:

1. Locate a safe and accessible site for installation.
2. Align the Gateway mounting bracket on the wall. There are two mounting directions, either horizontal or vertical. Make sure the install arrows is up when correctly mounted.
3. Mount the bracket into a wall stud by driving the two sheet metal screws into the wall through the bracket mounting holes.
4. Plug in the cables connector to connect the Gateway to the network.

#### Installing the Gateway on Desktop:

1. Locate a safe and accessible site for installation.
2. Place the Gateway unit on the desk.
3. Plug in the cables connector to connect the Gateway to the network.

### 3.4. Uninstall the Gateway

**For uninstall the Gateway on the wall:**

1. Plug out the cables connector.
2. If necessary, remove the screw on the brackets, and take off the brackets.

**For uninstall the Gateway on the desktop:**

4. Plug out the cables connector.

## 4. Services enabled

### 4.1. Connecting Power

For AC power supply

1. Plug the 2-pin 12V DC power connector of AC power connector to ONT AC power interface.
2. Plug the input of electricity cable into a live AC outlet.
3. Verify that the power (PWR) LED on the Gateway is lit green indicating that local power is on and voltage is good.

### 4.2. Connecting Ethernet Interface

1. Locate the premises' Ethernet LAN cable.
2. If the cable is not terminated, follow local practices to attach an RJ-45 connector. Table 8 shows Ethernet RJ-45 connector wiring information.
3. Plug the Ethernet cable into the Gateway RJ-45 Ethernet port.
4. Repeat step 2-3 as needed to connect additional Ethernet cables.

Table 1 Ethernet RJ-45 connector wiring pattern

Pin	Color	Signal	Pin	Color	Signal
1	Orange/White	Tx +	5	Blue/White	BI-
2	Orange	Tx-	6	Green	Rx —

Pin	Color	Signal	Pin	Color	Signal
3	Green/White	Rx +	7	Brown/White	BI-
4	Blue	BI-	8	Brown	BI-

## 5. Verify the Installation and Services

### 5.1. Verify the Installation

Check LED states to verify Gateway status (Section 5.2).

Services are not available until the Gateway is ranged and provisioned in the network. If services must be verified at the time of installation, refer to Section for additional instructions.

### 5.2. Activating the Gateway

Once the Gateway installation is complete, follow the procedure below for verifying Gateway status. Figures below shows the typical status LED display after the Gateway boot sequence is complete.

Gateway has not yet been provisioned:



Figure 2

MoCa2.5 has already been provisioned:



Figure3

- Verify that the PWR LED lights green indicating that local power level is good.

- Verify that the NET LED lights green, indicating that the Gateway interface is operating normally.
- The Gateway is placed into service remotely through the OLT. Services to the Gateway are likely wise provisioned and turned up remotely through the MoCa2.5 network.
- If the NET LED lights green, indicating that the Gateway is communicating with the MoCa2.5 network, no further activation is necessary and you can proceed to Verifying Services.

### 5.3. Verifying Services

Follow local practices to connect to each active service port in the Gateway to confirm service activation.

1. If Ethernet service is included in this installation, confirm that data is being received and transmitted normally. The LAN LED will be flashed during data transmission.
2. If WLAN service is included in this installation, confirm that data is being received and transmitted on WLAN interface. Verify the WLAN LED is green when the WLAN is connected.

## 6. Troubleshooting

### 6.1. Gateway Status LEDs

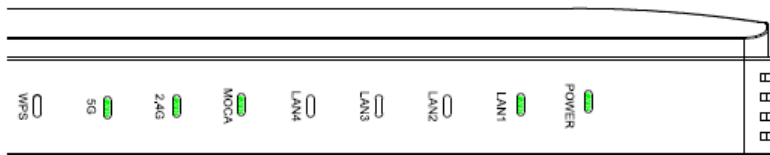


Figure4) Assist with installation and maintenance procedures. These LEDs are described in detail in Table4.

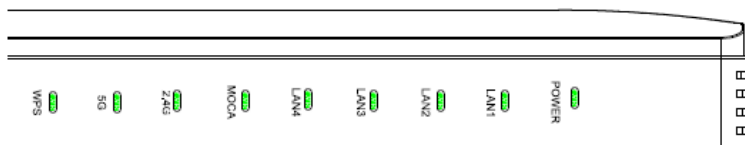


Figure4 Gateway Status LEDs location

LEDs Description

Table4 Gateway Status LEDs description

NO	LED indicate		Status	Describe
1	POWER		Green/Solid	Normal
			Off	No power
2	LAN1		Green/Solid	Active or Link
		---	Green/Flash	data receive and transfer
			Off	Not active
3	LAN2		Green/Solid	Active or Link
		---	Green/Flash	data receive and transfer
			Off	Not active
4	LAN3		Green/Solid	Active or Link
		---	Green/Flash	data receive and transfer
			Off	Not active
5	LAN4		Green/Solid	Active or Link
		---	Green/Flash	data receive and transfer
			Off	Not active
6	MOCA		Green/Solid	Connection established with MOCA client with no traffic running
		---	Green/Flash/Slow	Establishing connection with MOCA client
		---	Green/Flashing/Fast	Connection established with MOCA client, and traffic is running
			Off	No MOCA service provisioned
7	WLAN@2.4G		Green/Solid	WALN enable or Connected
		---	Green/Flash	Data receive and transfer (2Hz flash)
			Off	Error//WLAN disable
8	WLAN@5G		Green/Solid	WALN enable or Connected
		---	Green/Flash	Data receive and transfer (2Hz flash)
			Off	Error//WLAN disable
9	WPS		Green/Solid	Linked
		---	Green/Flash	Button press and waiting for link
			Off	Not active

## 6.2. Troubleshooting Procedures

Table 5 Troubleshoot procedures

Problem	Possible Solutions
The PWR LED is off	Check whether the ON/OFF button on the rear „ panel is pressed.
	Check whether the power adapter matches the M-97RG2.
	Check whether the power connection is correct.
The LAN LED is off	Check whether the power connection is correct.
	Check whether the Ethernet cable is connected correctly.
	Check whether the indicator of the network adapter is on.
	Check whether the network adapter works normally: Check whether there are devices with the ? or ! mark under Network adapters. If there are such devices, uninstall and then re-install them, or insert the network adapter into another slot. If the problem remains, change the network adapter.
The Internet LED is off	Check if WAN port is configured correctly
The WPS LED is off	Check whether the WPS service is started.
The 2.5G LED is off	Check whether the WLAN service is started.
The 5G LED is off	Check whether the WLAN service is started.

**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
- (2) This device must accept any interference received, including interference that may cause undesired operation.

**FCC Statement**

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 device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and consider removing the no-collocation statement.

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.

### **Caution!**

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



## Compliance with CE Marking Certification (Class B)

The equipment was tested and found to comply with **EN 62368-1:2014/A11:2017;EN62311:2008**. The equipment is tested and only used with power adaptor included in the package.

The equipment complies with the requirements according to the following standard:

**ETSI EN 300 386 V1.4.1:2008**: Electromagnetic compatibility and radio spectrum Matters (ERM); Telecommunication network equipment; Electromagnetic compatibility (EMC) requirements

**EN 55032: 2015, EN55024: 2010; EN61000-3-2:2014;EN61000-3-3:2013** : Information technology equipment – Radio disturbance characteristics Limits and methods of measurement.

**EN 61000-4-2:2009**: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 2: electrostatic discharge immunity test

**EN 61000-4-3:2006+A1:2008**:Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 3: radiated, radio frequency, electromagnetic field immunity test

**EN 61000-4-4:2004+A1:2010**: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 4: electric fast transient/burst immunity test

**EN 61000-4-5:2006**: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 5: surge immunity test

**EN 61000-4-6:2009**: 1996/+A1:2001: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 6: immunity to conducted disturbance, induced by radio frequency field.


**EN 61000-4-11:2004**: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 11: voltage dips, short interruption and voltage variations immunity test

**EN 61000-3-2:2006+A1:2009+A2:2009:** Limits for harmonic current emissions (equipment input current  $\leq 16\text{A}$  per phase)

**EN 61000-3-3:2008:** Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current  $\leq 16\text{A}$

CIG offers technical support 24 hours a day, 7 days a week. To contact the CIG technical assistance center, use one of the following methods:

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 **NOTE:** For urgent support requests, please contact CIG by telephone. Delays caused by e-mail may result in a longer response time.

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Telephone: 400 157 7899

Email: [support@cambridgeig.com](mailto:support@cambridgeig.com)

When you contact CIG, please have the following information ready:

- Product model name, part number, and serial number
- List of system hardware and software, including version
- Diagnostic error messages, if any
- Details about recent configuration changes, if applicable

## Appendix C: Ordering

To order CIG components and documents, contact your local sales representative, or contact CIG at the address, telephone, fax number or e-mail address.

**Address:**

5/F, Building 8,  
2388 ChenHang Road  
MinHang District Shanghai 201114, China  
Phone: +86 21 8023 3300  
Fax: +86 21 8023 3300

**Email:** [sales@cambridgeig.com](mailto:sales@cambridgeig.com)

**Web URL:** <http://www.cambridgeig.com>