U9016B
For GPON

■ Installation Guide

ALL IP
CONVERGENCE

ubiQuoss

U9016B

■ Installation Guide

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Preface

This preface provides the overview of U9016B installation guide, which describes guide conventions, and lists other publications that may be useful.

Introduction

This installation guide describes how to install U9016B, the PON OLT of ubiQuoss.

• It describes how to install U9016B and connection it to other devices.
• Chapter 1 describes the name and function of each part of U9016B and Chapter 2 describes the necessary items and notes for the installation. The user is recommended to understand U9016B and remember notes through Chapter 1 before the installation because it will be very useful for the user to install and use U9016B safely.
• This installation guide is for the experts with the experience of installing and managing network devices. Consequently, see other network-related references for the professional terms that are not explained in this user guide.

Related Documents

U9016B switch manual switch manual set includes the followings. For additional information on this equipment, refer to the following manuals.

Manual	Contents
Hardware Installation Guide	Hardware installation Initial operating environment configuration
User Guide	Operating configuration for services System operation, administration and maintenance Trouble Shooting

	Notice	You can download or request the latest documents and information on the products of ubiQuoss Inc. including U9016B OLT from the website (http://www.ubiQuoss.com). This document is the manual for all the U9016B OLTs.

Symbols in this Guide

The symbols below are used to indicate the product names and notes in the user guide.

Product Name

The name of the product (PON OLT system) is U9016B.

Description of Symbols

The installation guide uses the following icons and fonts to indicate special messages for the reader.

	Note	Presents the useful contents related to the user guide, the references and data related to the product use, etc.

	Caution	Describes the situation that data loss and incorrect product operation can occur, and provides the proper actions to take in the situation.

	Warning	Describes the situation that product damage and the user's injury can occur, and provides the proper actions to take in the situation.

	Warning	Warning: Optical Terminal Do not look at the optical terminal directly. It could cause serious damage to your eyes.

	Warning	Do not disassemble or assemble the product. The user must not remove/attach the product cover or disassemble/assemble the product when the power is on. Otherwise, it can cause personal injury or property loss.

Organization

The installation guide consists of four chapters and two appendices. The summary of each part is described below.

Chapter 1.   Introduction

This chapter introduces the product types and features of U9016B and the name and function of each part as well.

Chapter 2.   Installation Preparation

This chapter explains about the items necessary to install U9016B and notes for installing and using the product. The user should fully understand the notes in this chapter before installing the product to prevent any problem that may occur during the installation of product.

Chapter 3.   Installation

This chapter describes how to install U9016B onto a rack and connect each port of the device.

Chapter 4.   Troubleshooting

This chapter describes the problems that can occur during the installation and use of U9016B and how to resolve them.

Appendix A.   Product Spec

Appendix A describes the product specifications of U9016B.

Appendix B.   Cable Spec

Appendix B describes the specifications of the cable used to connect the ports of U9016B.

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Chapter 1.   Introduction

This chapter introduces the product types and features of U9016B and the name and function of each part as well.

The chapter consists of the followings:

• Overview
• Features

Overview

This section describes the function and features of an PON ONT device, U9016B.

Main Function and Features

In case of using as GPON OLT, ubiQuoss U9016B, adopted the state-of-the-art PON technology, can accommodate both the downstream 2.5G/upstream 1.25G GPON optical line service.

In addition, U9016B provides 1G sfp 4 ports and 10g sfp+ 2 ports for uplink to connect to the Ethernet network.

The PON Line Card is a modular type, giving flexibility in numbers of subscribers to be accommodated and bandwidth to be allocated the subscribers. The Uplink Line Cards also have modular type. U9016B provides scalability in PON OLT so that any PON Line Card can be plugged into any of 8 dedicated PON OLT slots.

Structure of PON OLT

ubiQuoss PON OLT system consists of;

- Optical Line Terminal(OLT) that is connected to the Internet Core Network in the Central Office, performs IP routing and Ethernet switching, and provides passive optical subscriber line

- Remote Nodes (RN) that consists passive optical distribution network and splits an optical line up to 64 without any electric power feed and management.

- Optical Network Terminal (ONT) that provides the passive optical subscriber line interface.

U9016B supports various functions exceeding those expected in the existing Ethernet switches, including Quality of Service(QoS) function, Management function that allows to take prompt actions against the problems with the system and a subscriber line, Security function that secures subscriber information safely, and Subscriber Management function that secures a user's right from illegal users such as cracker.

Features

Front Panel

Figure 1. Front Panel

Description on each U9016B unit

Table 1 Description on each U9016B unit

Unit	Description	Remarks
SCU	System Management Block and Switch Configuration Unit.	Common part
PSU-PA	AC 100–240 VAC, 50/60Hz Power Module: Supporting redundancy.	Common part
PSU-PD	DC -48 VDC Power Module: Supporting redundancy.	Common part
FMU	Fan Module Unit: Modular unit	Common part
PIU-8G	GPON 2.5G 8-port Line Card The applicable GPON optical module is SFP type. - Note (1)	Line Card

Note (1) – As for the applicable PON optical modules, only the approved products are supported.

Figure 2. SCU

Figure 3. PIU-8G

LED for each U9016B unit

Table 2 LED for each U9016B unit

Unit	LED	Status		Description
SCU	PWR	GREEN	ON	Power ON
		ORANGE	ON	Reset or Power Fail
	CR	RED	ON	System Critical Alarm ON
			OFF	System Critical Alarm OFF
	MJ	ORANGE	ON	System Major Alarm ON
			OFF	System Major Alarm OFF
	MN	ORANGE	ON	System Minor Alarm ON
			OFF	System Minor Alarm OFF
	FAN	GREEN	ON	FAN normal status
		ORANGE	ON	FAN Alarm status
	LNK/ACT	GREEN	ON	Management Ethernet Link Up
			BLINK	Management Ethernet TX/RX status
	P1 ~ P6	GREEN	ON	P1 ~ P6 : Uplink Port Link Up
			BLINK	P1 ~ P6 : Uplink Port TX/RX status
PSU	PWR	GREEN	OFF	Power: Normal
			ON	Power: ON
	FAIL	RED	OFF	Power: OFF
			ON	In case of PSU-PA: Fail In case of PSU-PD: The DC Power is ON the PSU.
FMU	RUN	GREEN	OFF	Power: OFF
			ON	FAN: ACT
	FAIL	RED	OFF	FAN: ACT/NORMAL
			ON	FAN: FAIL, STOP
PIU-8G	PWR	GREEN	ON	Power ON
		ORANGE	ON	Reset or Power Fail
	P1~8	GREEN	OFF	No Link
			ON	PON Interface link
			BLINK	PON Interface TX/RX Status
		ORANGE	OFF	Normal Status
			ON	Alarm on PON Interface

Fan Ventilation

The Fan Vent is the place that the external cold air is supplied through to prevent the product from being overheated.

Ground terminal

Figure 4. Rear and Side

	Caution	U9016B has the structure that the Fan Module (FMU) is located on the side of the device. Consequently, if the left side and the right side of the device are blocked, the internal warm air and the external cold air cannot be circulated properly and the product can be overheated.

Power Supply

U9016B uses AC or DC to supply power to the system, and it provides two terminals that provide power to the system for power redundancy as shown below.

The power switch is used to turn on or off the power supply. If the power supply is out of order, set the power switch of the applicable power supply to OFF (O direction) before replacing the power supply. The status of the power supply is displayed through the power display LED on the front of the device.

	Note	U9016B provides two power supplies for power redundancy in order to provide stable power. For power redundancy, each power input terminal should be connected to different power sources. In case a power supply has a problem and fails to provide power properly, the power redundancy function allows the other power supply to provide power to the system so that the system can seamlessly operate without any disturbance. This power redundancy does not require any additional action as long as the power is supplied from two different power supplies.

Ground Terminal

A ground terminal is used to connect the system and the ground.

	Warning	For the electric safety, the product administrator and user should ground the product before supplying power to the product. If the product is not grounded, static electricity or sparks can be generated and the product can be damaged by a surge or a thunderstorm

Chapter 2. Installation Preparation

This chapter explains about the items necessary to install U9016B and notes for installing and using the product. The user should fully understand the notes in this chapter before installing the product to prevent any problem that may occur during the installation of product.

This chapter consists of;

• Notes for installation
• Items necessary for installation
• Checking the contents of package

Notes to Take before Installation

Before installing and using U9016B, the user should fully understand the warnings and notes explained in this section and follow the instructions.

Do not disassemble the product

The user should not disassemble the product. If the user thinks that a repair is necessary, contact the ubiQuoss Technical Support Team.

Installation site condition

The product should be installed in the site satisfying the following conditions to use the product safely and stably:

- Avoid the location whose temperature is too high or too low.
- Avoid the top of a shaky shelf, a tilted location, or the place with big vibrations.
- Avoid the location that is not ventilated or airtight.
- Avoid the location with water or moisture and direct sunrays. Choose the cool and dry location. If water gets into the product, it can cause an electric shock or the product failure.
- Keep the surroundings of the product clean and dust-free during or after the product installation.
- An electro-magnetic wave can cause a problem to the product operation, so avoid the location where an electro-magnetic wave is generated.
- Install the product in the location that the user can easily access and connect a cable to the product easily.

Satisfying operational environment conditions

U9016B normally operates in the environment with the following conditions:

- Operating temperature: 0 ~ 50℃
- Relative humidity: 10 ~ 85% (non-condensation)

Even in the environment that satisfies the above conditions, if the product operates in the excessively low or high temperature for long time, the product life becomes shorter or the product is vulnerable to damage. So always maintain a proper environment.

Prevent static electricity

Because static electricity can cause serious damage to the device or a circuit, the user and the supervisor should take the following actions when using the product:

- Always discharge the static electricity on the body before touching the product. (Use the static electricity-preventing strap.)
- Do not touch the internal components or connector pins with hands.
- It is recommended to put the product into a static electricity-preventing envelop when storing or moving the product.

Notes to take when using power
- Ground all the cables connected to the product and connect them to the grounded outlets to prevent and minimize the problem related to electro-magnetic wave or surge.

- The power supplied to the product should comply with the power requirements specified in the Hardware Installation Guide.
- The administrator or user is encouraged to check the grounding status and take appropriate actions for the electric safety before supplying power to the product.
- Do not touch the power plug with wet hands because it can cause an electric shock.
- Do not pull out the power cable because it can cause a fire.
- Do not use the power cable that is peeled or the one whose plug connection is not tight because it can cause an electric shock and a fire.
- Always check the working place for the possibility of any danger, the wet floor, non-grounded power extension cable, and the floor with no grounding facility, etc.
- Use the grounding-type plug for connecting the AC power of U9016B and the properly-grounded power.
- The provided power cable includes a grounding line, so ground the outlet that the power cable is connected to.
- Connect the power cable in the safe place so that unknown people cannot be exposed to it.
- If the user uses other power cables than those provided with the product together, use the ones that satisfy the specifications.
- In case of product installation, installation site change, product transportation, and product disassembling (only relevant engineers are allowed to do this), turn off the power, remove the communication cables from all ports, and remove the power cables.

Grounding

For the electric safety, the product supervisor and user should check the grounding status before supplying power to the product, and ground the product using the ground hole on the rear of the product if the product is not grounded. The product grounding is the first thing to do before using the product and the last thing to remove in case of product transportation.

Lightening

Because lightening can cause a serious fault to the product, pay extra attention to prevent the product, the cables connected to the product, and the installation site from being exposed to lightening.

Checking a rack before installation

In case of installing U9016B on rack, check the stability of the rack first to prevent from occurrence of the case that the rack falls down or fails to hold the product weight after the product is installed.

Preventing overheating

Because the product overheating can cause a failure or an incorrect operation, pay attention to the followings to ensure the smooth air circulation in the product:

- During the production installation, secure a sufficient space (1U on the top/bottom) to prevent the product from being affected the temperature of other products or unsmooth air circulation.
- Do not block the cooling fan and vents on the top/bottom of the product because they play an important role of cooling down the system temperature.
- In case of installing the device on a rack, it is recommended to use an open-type rack. In case of using a closed-type rack, install an additional ventilation device.

Notes to take when cleaning the product
- Do not wipe the inside of the device with wet cloth.

- Do not use tough tools or chemical components, such as benzene, to wipe the product because it can deform the product appearance.

Other notes

- Do not put a heavy thing on the product.
- Do not take any action that can cause an injury to a person or damage to the device.

Checking the installation environment

This section describes the necessary installation environment to install and use U9016B safely.

It is recommended to keep the U9016B temperature and humidity stable. The product can be used in the following environment:

- Operating temperature: 0~50°C
- Relative humidity: 10~85%
- Power consumption: Max. 160W– based on full installation
- Input voltage: 100-240 VAC, 50/60Hz or DC -48 VDC

Necessary Items for Installation

An U9016B installation requires the items described below. The items marked by * are not supplied with the product. The user should prepare these before the product installation.

Table 3 List of items necessary for Installation

- U9016B Main Body
- U9016B Installation User Guide: a book or a manual CD
- Power Cord
- Console Cable
- Console Terminal *
- Management Ethernet Port Connection Cable
- Gigabit Ethernet Port Connection Cable *
- Rack*
- Binder head screw: 4 EA (used to mount the device onto the rack)*
- Cross screw driver *

Package Items

The U9016B package includes the followings:

Table 4 List of Package Items

Items	Quantity	Usage
Body	1 EA	U9016B Body
Hardware Installation Guide or a manual CD	1 EA	The manual that describes how to install the device and connect cables
		A manual CD that includes a release note, a user guide, a command guide, and a configuration user guide.
AC Power cable	2 EA	The cables to supply power (DC Power cable is optional)
Console cable	1 EA	The cable used to connect a console port and a console terminal (straight-through cable)

The user should thoroughly check the items in the product package for any missing item that is in the list and any damaged item. For any missing or damaged item, contact the product purchase place for new items.

Chapter 3.   Installation

This chapter describes how to install U9016B onto a rack and connect each port of the device.

The chapter consists of the following sections:

- Selecting an Installation Site
- Installation onto a Rack
- Connecting Power
- Connecting a Console Terminal
- Connecting a Management Ethernet Port
- Connecting a Gigabit Ethernet Port
- Checking the Operation

Selecting Installation Place

To install and use U9016B safely, it should be installed in the environment that satisfies the following conditions:

- Avoid the location whose temperature is too high or low. (Especially, avoid the location that is exposed to direct sunrays or the location around a heater.)
- Avoid the location that is not properly ventilated, airtight, or wet. Install the product in the location that is cool, dry, or ventilated properly.
- Secure the space of at least 10cm on the top/bottom of the product for ventilation.
- Avoid the top of a shaky shelf, a tilted location, or a place with big vibrations.
- Avoid the location where an electro-magnetic wave is generated.
- Keep the surroundings of the product clean and dust-free during or after the product installation.
- To prevent people from being exposed to any injury, put the device and tools away from the location that people often visit.
- Install the device in the location that the user can access easily and connect the cable easily.
- U9016B operates normally in the temperature and humidity below. If the temperature and the humidity are out of these ranges, the product can operate abnormally. Consequently, install the product in the location that can satisfy the following conditions:

    - Operating temperature: 0~50℃

    - Relative humidity: 10 ~ 85% (non-condensation)

Mounting on a Rack

U9016B can be mounted onto a standard 19" rack. The following describes how to install U9016B onto a rack:

1. Remove all the cables connected to the product and turn off the power.
2. Put the product on the floor or a firm table that is near the installation rack.
3. If another device is already installed on the rack, choose the location on the rack to install the product onto by considering the product size below. Ensure to secure the space of 1U on the top/bottom of the product.
   - U9016B size: 482X295X88.8(mm)
4. Two workers should work together to put the product with the rack brackets attached on the installation site of the 19" rack.
5. Align the rack brackets attached to the product and the holes of the 19" rack, and then fix the product to the rack by using 4 binder head screws.

   Note   The binder head screws are not supplied with U9016B. For these, contact the company that provided the 19" rack.

   Caution   Before installing the product onto the rack, check the stability of the rack in order to prevent the incident such as the rack falls down after the product installation or the rack fails to hold the product weight. In case of installing the product onto an empty rack, use the bottom of the rack first.

Installing LINE Card

1. Insert LINE Card in the chassis rail.
2. Hang the each side hinge of ejector at the hanging pin.
3. Press the lever with fingers and push it forward powerfully.
4. When the hinges of ejectors are inserted in the holes, the LINE card is installed on the backplane socket well.
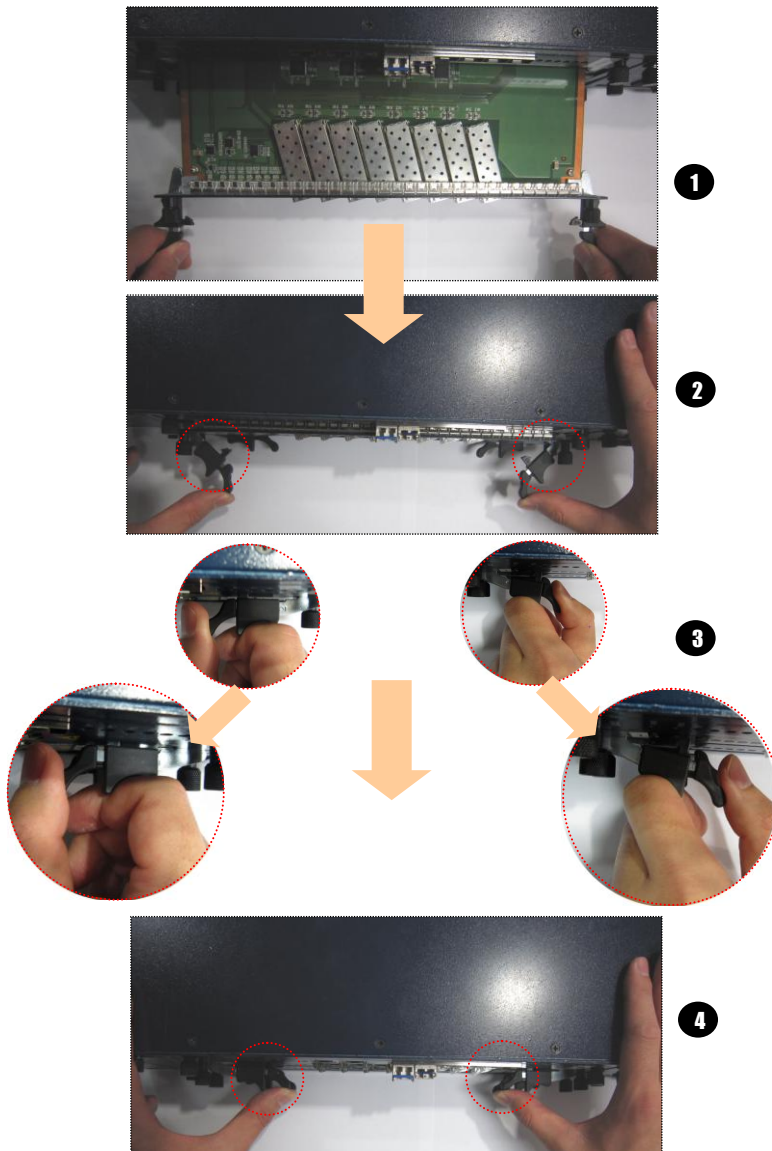

Figure 5. Installing the LINE Card

Uninstalling the LINE Card

1. Press the each lever of ejectors and pull out the each hinge from each hole.
2. Pull out the each side hinge of ejector from the hanging pin of a chassis.
3. Take the end of ejector lever and pull it backward powerfully.
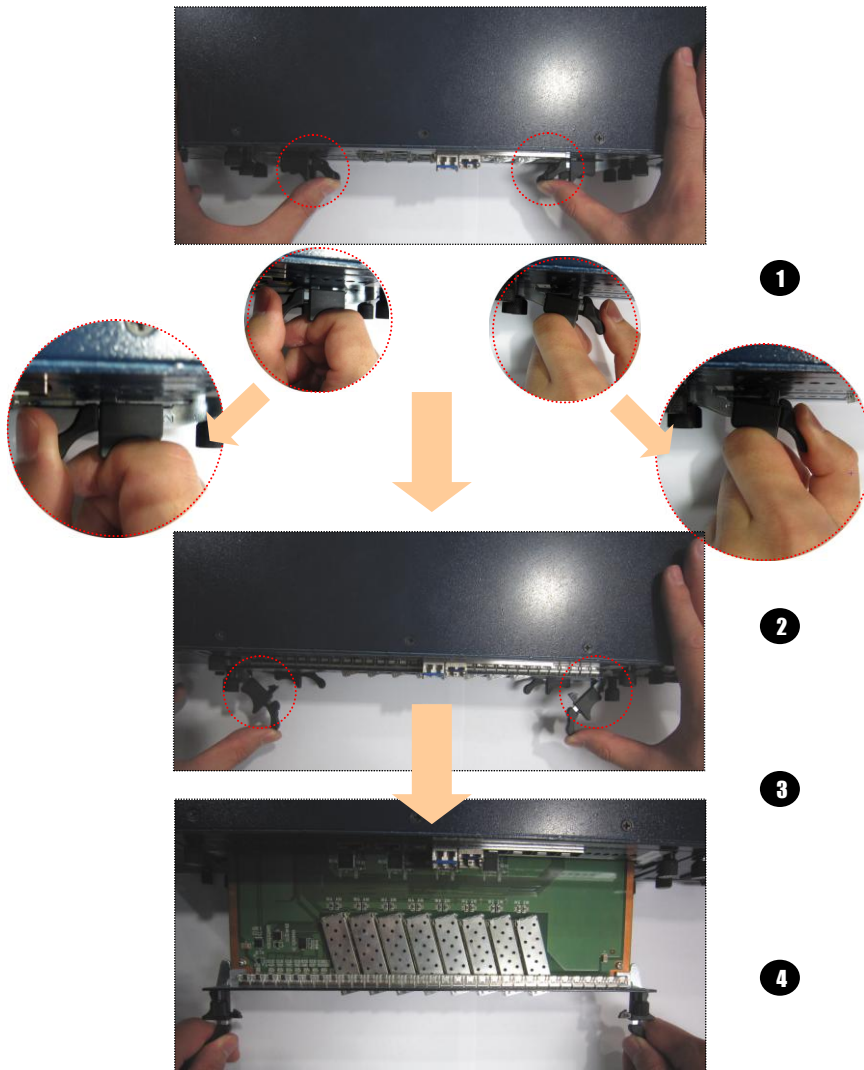4. While the ejectors unfold more, the LINE Card is separated from the backplane socket.

Figure 6. Unistalling the LINE Card

Connecting Power

Before connecting power to U9016B, make sure the power switches on the rear side of the product are set to OFF.

• AC power: Connect a power cable accompanying the product to a power input terminal and then connect the plug of the power cable to the grounded AC power outlet. Connect the terminal ground to that of the rack. In case of duplicating the U9016B power, connect power cables to two power input terminals and then connect the plugs to different power sources.
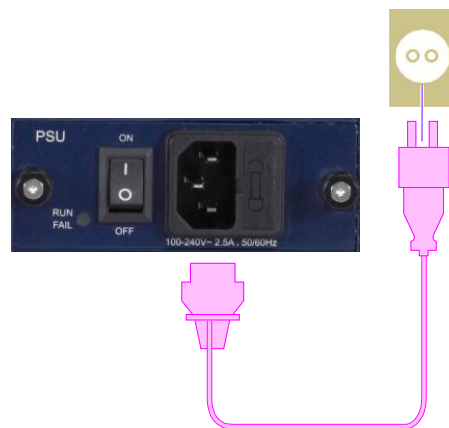

Figure 7. U9016B AC Connecting Power

• DC power: Connect the –48V DC power supplied from the rack to two –48V power input terminals, and then connects the ground terminal to that of the rack. In case of duplicating the U9016B power, connect the power supplied from the rack to two –48 VDC power input terminals.
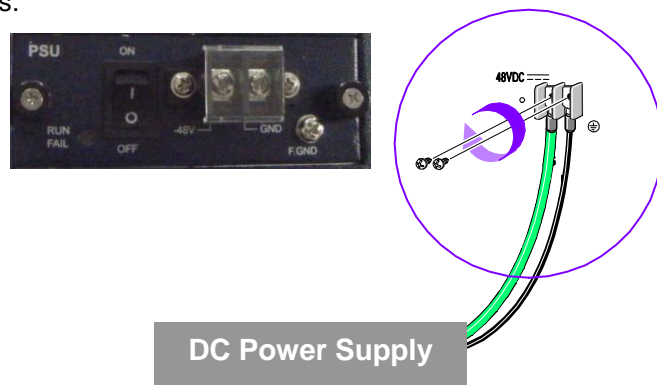

Figure 8. U9016B DC Connecting Power

	Caution	To prevent electric shock and protect the device from lightening and a surge, the device must be grounded. To ground the device, connect the ground hole on the rear of the device and the ground terminal in the installation site.

Caution The power for the U9016B using AC should satisfy the following specifications:

- Input Voltage: 100-240 VAC
- Power consumption: Max 160 Watt (– based on full installation
- Input frequency: 50/60Hz

The power for the U9016B using DC should satisfy the following specifications:

- Input Voltage: DC –48 VDC
- Power consumption: Max 160 Watt (– based on full installation

The supply of the power that fails to satisfy the above specifications can cause product damage or a fire.

Connecting Console Terminal

U9016B can be set or monitored through a local console port. The use of console cable that came with the product is recommended to connect between the product and the console terminal. Connect the RJ-45 connector of console cable to the console port of the product and the DB-9 connector (the other side of the cable) to the console terminal.

The terminal device used as the console terminal of U9016B should be set according to the following communication environment conditions so that it can communicate with U9016B normally.

- Bit Rate: 9600 bps
- Data Bit: 8 bit
- Stop bit: 1 bit
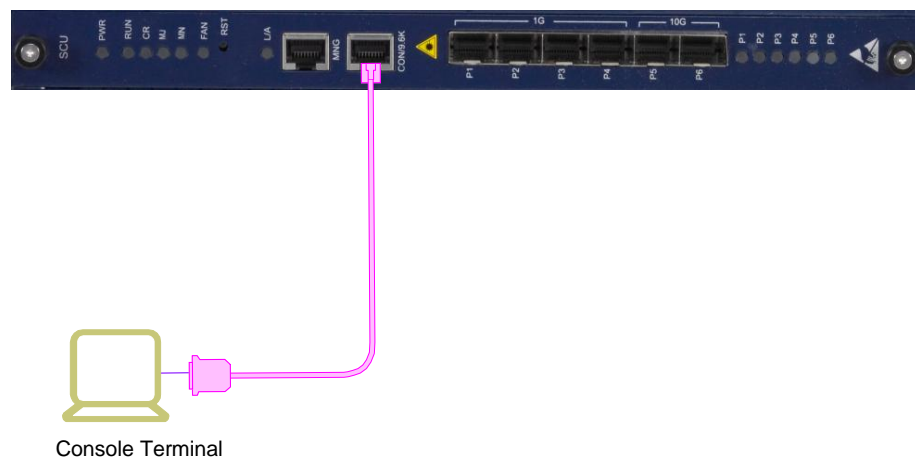- Parity bit: None.
- Flow control: None.

Console Terminal

Figure 9. Connecting Console Terminal

	Caution	Most of the cases that the screen output of the console terminal fails, it is due to the wrong setting of the number of bits per sec in the console terminal. In case that the characters on the console terminal screen are broken or that no character is displayed, check the number of bits per sec set in the terminal.

	Note	See the console cable specifications and "Appendix B "Cable Spec." (The connectors of a cable are pin-connected.)

Connecting Management Port

U9016B provides an Ethernet port so that the user can manage the product through the host connected to a local network. Use the Ethernet cable (UTP Category 5) accompanying the product for the connection of the management Ethernet port to the network. Connect one RJ-45 connector of the Ethernet cable to the management Ethernet port and the other connector to the device such as the switch connected to the network.

If a cable is connected to the management Ethernet port when power is supplied to U9016B, it is possible to check the network connection status through the LED operation. If the LED is turned on or blinks in green, it indicates that the management Ethernet port is connected to the network normally.
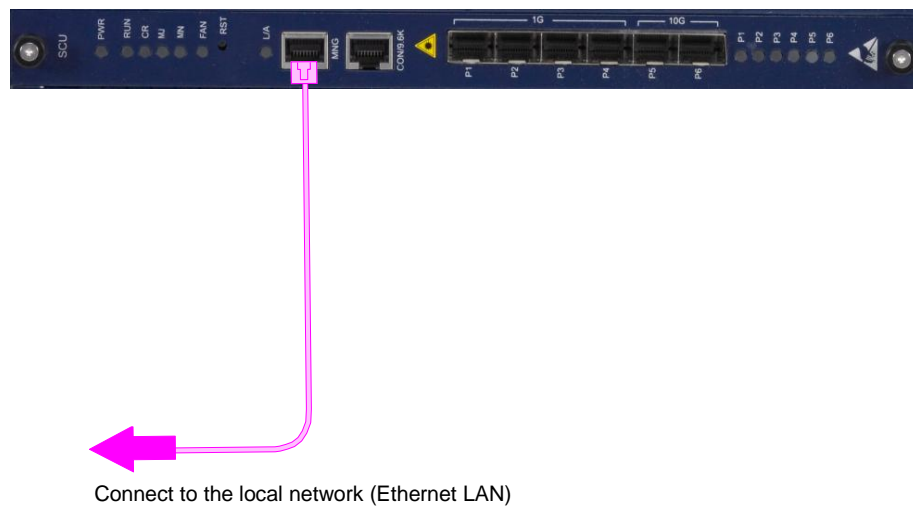

Connect to the local network (Ethernet LAN)

Figure 10. Connecting Management Port

	Cauti on	You must use only the crossover cable type to connect MNG port. In case of connecting MNG Fast Ethernet port using other cables than those accompanying the product, refer to the cable specification in Appendix B "Cable Spec."

Operation Checking

If the device installation is completed and all cables are connected, use the following procedure to check if the device operates with no problem:

Checking LEDs

Turn on the device by setting the power-connected power switch to ON. Then, check if the LEDs on the front of the device operate as described below.

- Check if the PWR LED on the front panel is turned on in green after the power switch is set to ON.
- If the power is supplied normally, the device is initialized. It is possible to check the initialization procedure even in the console terminal through a console port.
- If the system initialization is completed normally after about 40 seconds, the console terminal displays the prompt for the supervisor's input. If no prompt is displayed after about 40 seconds, it indicates that the system is not operating normally.
- If the initialization is completed, the LED of the port connected to a cable is turned on. The LINK LED of the ports properly connected to a PC or network devices are turned on in green.

Checking Console

The use of a console terminal is recommended when it is not easy to check the status of device only with LED indicators. As described before, connect a console terminal using the console port of the device and set the communication environment of the console terminal. If the console terminal is connected in the middle of the device initialization, the user can see in the console terminal the messages displayed in the initialization procedure below.

If the initialization procedure is completed normally, a login message is displayed. The user can log into the CLI of the device and set the device.

In case that a console terminal is connected after the device initialization is completed, the user can see the login message by pressing [Enter].

	Note	For how to set the device after the login through CLI, see the U9016B User Guide accompanying this Hardware Installation Guide.

	Note	The messages displayed on the console terminal screen can be different somehow, depending on the device type and the version of the firmware installed in the device.

Setting IP Address

The operator can change the IP address according to the network configuration.

IP address setup procedure of U9016B is as follows.

Connect a PC or workstation used as a management terminal to the Console port and run the terminal emulation program (for example, hyper terminal).
5. If a password input line appears, enter the password and press [Enter] key. The factory default id is "root" and the password is "frontier".
   Password : ********

U9016B>enable

U9016B#

6. If the password is entered correctly, the U9016B# prompt appears.
7. IP address can also be set up in config terminal mode. To enter into the config terminal mode, please use the following command.

U9016B# config terminal

U9016B(config)#

8. Set the desired IP address along with subnet mask. The following shows an example of setting the IP address to 10.1.13.220.

U9016B (config)#int eth0

U9016B(config-if-eth0)# ip address 10.1.13.220/24

U9016B (config-if-eth0)#end

9. To view the IP address previously set, the mode should be changed to root mode.
10. In a U9016B# prompt, please use the following command to check the current IP address

U9016B# show ip interfaces brief

11. After checking if the IP address is correct set, please use the following command to save the IP address in the system.

U9016B# copy running-config startup-config

* For CLI menu items, please refer to a separate manual.

Chapter 4.   Troubleshooting

This chapter describes the problems that can occur during the installation and use of
U9016B and how to resolve them.

Many of the problems occurring to the device are what the user can check and resolve
easily. If the device fails to operate normally, see the description in this chapter and check if
the problem can be resolved.

If the user thinks that the problem is too difficult, contact the Technical Support Team of
ubiQuoss Inc., and the team will take proper actions promptly.

Troubleshooting Case

[Problem 1] The Power LED is not turned on.

The power is not supplied normally.

Solution

1. Check if the power cable is properly connected to the power input terminal and the outlet.
2. Check the power supplying status of the outlet that the power cable is connected to.
3. If the plug of the power cable is connected to an extension cord, check if the power switch of the
4. extension cord is turned on
5. Remove the fuse socket on the left of the power input terminal and check if the fuse is broken.

[Problem 2] The characters on the console terminal screen are not broken, but the login message is not displayed.

The proper system initialization has failed.

Solution

Turn off the power switch and then turn it on to run the device again.

[Problem 3] No character is displayed on the console terminal screen or the displayed characters are broken.

An improper console cable is connected or the communication setting of the console terminal is not correct.

Solution

1. Check if the console cable is properly connected to the console port and the console terminal.
2. Check if the connected console cable is the one provided during the product purchase. If the connected console cable is not this one, check if the cable satisfies the console cable specifications in Appendix B.
3. Check if the console terminal has the following communication setting:
   • Bit Rate: 9600 bps
   • Data bit: 8 bit
   • Stop bit: 1 bit
   • Parity bit: None
   • Flow control: None

[Problem 4] After the cable is connected, the ports are not recognized or the port LEDs are not turned on.

The cable connection is not correct, an improper cable is used, or the connected device is not operating.

Solution

1. Check if the connector of the cable is inserted into the port properly.
2. Check if the connected device is operating normally.
3. Check if the cable used for the port satisfies the specifications in Appendix B.

Appendix A. Product Spec

Appendix A describes the product specifications of U9016B.

Overview
*   19" Rack mountable Shelf structure
*   3 Card Slots
*   Hot Swappable Cards
*   1G x 4PORT(SFP), 10G x 2PORT(SFP+)
*   2.5G GPON 8 PORT
*   1 FAN Interface Module
*   Dual Power Supply(AC, DC), Hot Swappable

Specification

Item	Description
Number of PON Interface	8 Ports Hot-Swappable card Max 2 Cards
Network Interfaces	4-port 1000Base-X (SFP), 2-port 10GBase-R(SFP+)
Management Interfaces	10/100Base-TX, RS-232 (Console)
Power Supply	AC type: 100-240 VAC, 50/60Hz
	DC type : -48 VDC
Dimension (WxDxH)	Main body: 429.2mm x 88.8mm x 295mm
Operating Temperature	0 ~ 50°C
Relative Humidity	10 ~ 85% (non-condensation)

Layer 2 Features

Items	Description
VLAN	802.1Q, Max 4K VLANs, 4K VLAN IDs Private VLAN
Link Aggregation	802.3ad Link Aggregation Load-balancing based on source and destination MAC/IP
Spanning Tree	802.1d Spanning Tree Protocol 802.1w Rapid STP Per VLAN STP
Multicast	IGMP v1/v2, Snooping Max 1K Group Support
Others	Static Mac Address Port Mirroring

Layer 3 Features

Items	Description
Routing	Static Routing RIP, OSPF, BGP Default Gateway VRRP ECMP Max 8 paths PBR (Policy Based Routing)
Multicast	PIM-SM, IGMP v2 Max 1K Group Support
DHCP	DHCP Server/Relay Blocking of illegal IP users DAI (Dynamic ARP Inspection)

QoS Features

Items	Description
Classification	Layer 2: Source/Destination MAC Address, VLAN ID, COS Field Layer 3: Source/Destination IP address, DSCP Layer 4: Source/Destination TCP/UDP port TCP control flag
Actions	Marking/Remarking: DSCP, COS Packet Drop Mirroring to Port, Redirect to Port Metering, Rate Limiting with 1Mbps unit
QoS Tables	COS – Queue DSCP - Queue
Queue	8 queues per port SPQ, DWRR, Hybrid (SPQ+DWRR)
Rate Shaping	Egress rate shaping per port/queue with 1Mbps unit

Security Features

Items	Description
Packet Filtering	Netbios, NBT filtering DHCP filtering Packet filtering with ACLs
Blocking illegal Traffic	Block the illegal Source MAC address ALL 0's, 1's, System Mac, Default G/W Mac Block the illegal Source IP address
Storming Control	Broadcast, DLF, Multicast packet rate control Cut-off of illegal traffic per Source MAC
Subscriber Access Control	Static Mac address Mac filtering Limitation on Maximum Mac counts
Subscriber Loop Detect	Port based Self Loop Detect

System Security Features

Items	Description
Access Control	RADIUS, TACACS+ Telnet, SNMP with ACL
Protection	CPU Packet Filtering with ACL Isolate the users who generate overly CPU-intensive Packet TCP sync attack protection with sync cookies CPU packet rate-limit
Management	Management packet priority control
Others	Gratuitous ARP

System Information

Line Item		PBA Description	Quantity
SCU	SCU	PON OLT system Switch & Control Unit - 4 1000Base-X(SFP) - 2 10GBase-R(SFP+)	1
PIU	PIU-8G	GPON Interface Unit for DS 2.5G/US 1.25G GPON, 8 ports	2
PSBP & Chassis		PON OLT system Back Board assembly	1
PSU-AC		PON OLT system Power Unit -AC	2
PSU-DC		PON OLT system Power Unit -DC	
FMU-P		PON OLT system FAN Module (3 FAN / 1 Module)	1

Appendix B. Cable Spec

Appendix B describes the specifications of the cable used to connect the ports of U9016B.

Appendix B consists of:

- Ethernet cable
- Optical cable
- Console cable

Ethernet cable

In case of connecting the management Ethernet port on the front of U9016B, use the UTP cable that has RJ-45 connectors on both sides.

In case of using a twisted-pair cable, choose the one of a proper category, depending on the device speed.
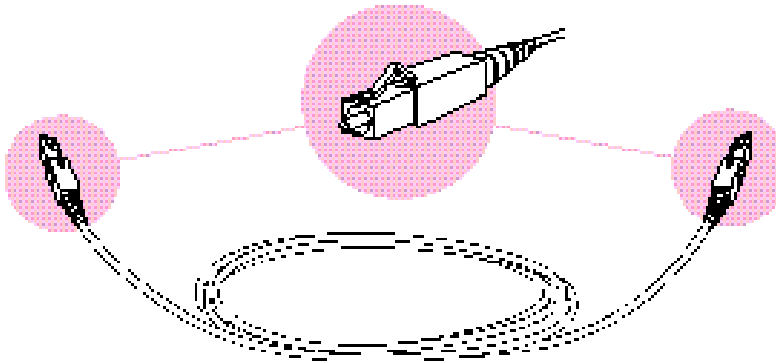
- 10M: Category 3, 4
- 100M: Category 5
- 1000M: Category 5, 5+, 6

Optical cable

For the GPON link of U9016B, use the single-mode optical cable that has SC/PC connectors on both sides. In case of connecting GPON interface of ONT, use the SC/APC type connectors.

If the other optical cables than this are used, the communication might fail or the data transmission distance cannot be guaranteed.
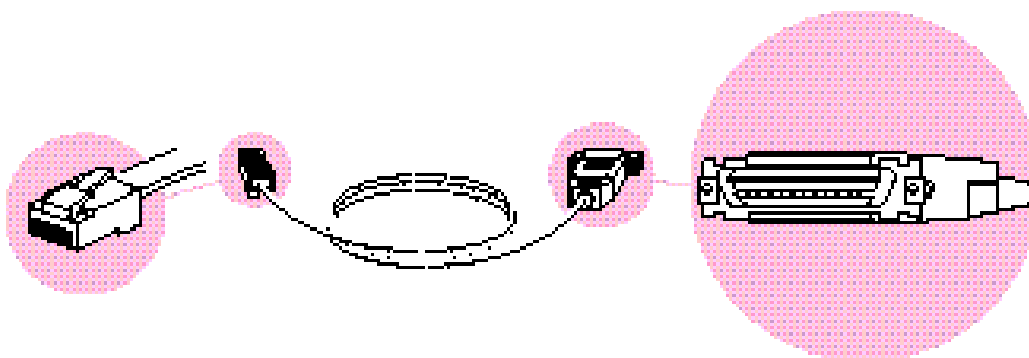
Console cable

To connect a console port to a console terminal, use the serial cable that has an RS-232 DB-9 connector on one side and an RJ-45 connector on the other side as describe below.

The table below describes the types of the signals transmitted from each pin of the connectors on both sides of a console cable.

Table 5 Console Cable Pin Signal

Pin No. (Console Port)	Pin No. (Console Terminal)	Signal	Pin Definition
3	3	TXD	Transmit Data
6	2	RXD	Receive Data
4,5	5	GND	