Ruijie RG-WS6816 Series Wireless Controllers

Hardware Installation and Reference Guide V1.02

Copyright statement

Exemption statement

Preface

Thank you for using our products. This manual will guide you through the installation of the device.

Scope

It is intended for the users who have some experience in installing and maintaining network hardware. At the same time, it is assumed that the users are already familiar with the related terms and concepts.

Obtaining Technical Assistance

- Ruijie Networks Website: https://www.ruijienetworks.com/
- Technical Support Website: https://ruijienetworks.com/support
- Case Portal: https://caseportal.ruijienetworks.com
- Community: https://community.ruijienetworks.com
- Technical Support Email: service_rj@ruijienetworks.com
- Skype: service_rj@ruijienetworks.com

Related Documents

Documents	Description
Configuration Guide	Describes network protocols and related mechanisms that supported by the product, with configuration examples.
Command Reference	Describes the related configuration commands, including command modes, parameter descriptions, usage guides, and related examples.

Documentation Conventions

The symbols used in this document are described as below:

 This symbol brings your attention to some helpful suggestions and references.

 This symbol means that you must be extremely careful not to do some things that may damage the device or cause data loss.

1 Product Overview

The RG-WS6816 wireless LAN controller is introduced by Ruijie Networks to provide powerful WLAN access control for medium-large-sized wireless networks.

1.1 RG-WS6816

Table 1-1 Technical Specifications of RG-WS6816

Model	RG-WS6816
Memory	DDR3 SDRAM:16GB
	BOOTROM: 8MB
	FLASH: 512MB
Port	8-1000M combo Ethernet ports. The copper port supports 10/100/1000Mbps auto-negotiation and network cable/cross-over cable auto-identification. The fiber port supports the 1000BASE-SX/LX/ZX mini GBIC optical transceiver. 4-10Gigabit fiber ports are provided, including port 2 combo with 1000M ports 0/1, 0/2, 0/3, 0/4 and port 3 combo with 1000M ports 0/5, 0/6, 0/7, 0/8. Modules XG-SFP-SR-MM850, XG-SFP-LR-SM1310 and XG-SFP-ER-SM1550 are supported.
	One management port, which supports 10/100/1000Mbps auto-negotiation and network cable/cross-over cable auto-identification.
	One console port.
	Two USB ports.
Power Supply Module	Up to two RG-PA300I power modules are supported. One is supplied.
Hot Swapping	Fan tray hot swapping: supported Power hot swapping: supported
Interface Standard	Ethernet port: 10Base-T/100Base-TX/1000Base-TX and 1000BASE-SX/LX/ZX
	Configuration port (Console port): RS-232
Dimensions (W x D x H)	560mm x 440mm x 88.1mm (excluding foot pad)
Voltage	100-240V~, 50/60Hz
Power Consumption	100W max.
Operating Temperature	0ºC to 45ºC (32 to 113ºF)
Operating Humidity	5% to 95% RH (noncondensing)

The system may not support all USB disks. It is recommended to use the Kingston USB disk and set the file system format to FAT32.

RG-WS6816 wireless controller is a class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Product Image

Figure 1-1 Front Panel of RG-WS6816

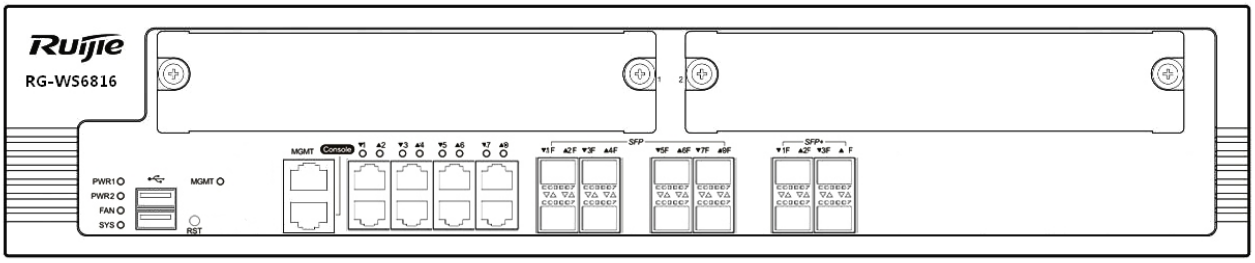
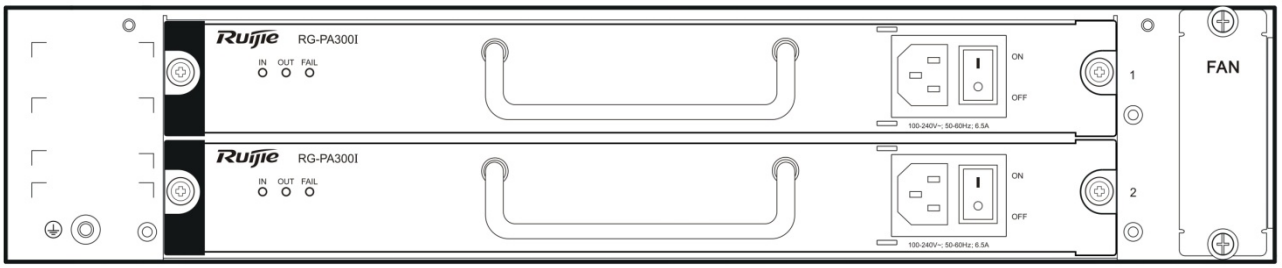


Figure 1-2 Rear Panel of RG-WS6816



LED Indicators

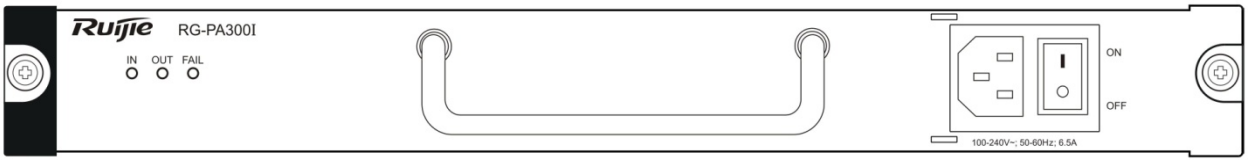
LED	State	Meaning
PWR1 and PWR2	Off	The power module is NOT in the position.
	Solid green	The power module is operational.
	Solid red	The power module fails or NOT receiving power.
SYS	Blinking green	The system is being initialized.
	Solid green	The initialization process is complete.
	Solid red	The system sends out an alarm.
FAN	Off	The fan module is NOT in the position.
	Solid green	The fan module is operational.
	Solid red/ Blinking green	The fan module fails.
Link	Solid green	The management port is connected.
ACT	Blinking green	The management port is receiving or transmitting data,
1-8 Gigabit copper ports	Solid green	The copper port is connected at 1000 Mbps.
	Solid green	The copper port is connected at 10/100 Mbps.
	Blinking green	The copper port is receiving or transmitting data.
1F-8F Gigabit fiber ports	Solid green	The fiber port is connected.
	Blinking green	The fiber port is receiving or transmitting data.

1.2 Module

1.2.1 RG-PA300I

Module Appearance

Figure 1-3 Appearance of RG-PA300I Power Module



Indicator

LED	State	Meaning
IN	Off	The power input fails.
	Solid green	The power input is operational.
OUT	Off	The power output fails.
	Solid green	The power output is operational.
FAIL	Off	The power module fails.
	Solid red	The power module is operational.

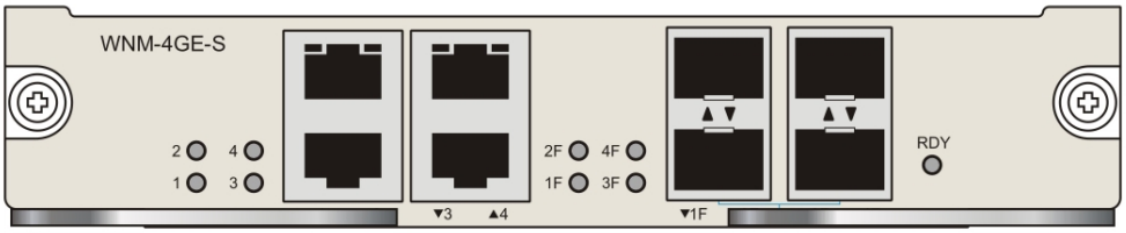
Specifications

Model	RG-PA300I
Rated Input Voltage and Current	100-240V~, 50-60Hz, 6.5A
Rated Output Voltage and Current	12V: 1-25 A 12VFAN: 0-5 A
Rate Output Power.	300W
Hot Swapping	Supported
N+1 Backup	Supported
Power Factor Correction	Supported
Protection	Input overvoltage protection, input undervoltage protection, output overvoltage protection, output overcurrent protection, short circuit protection, over-temperature protection
Communication	Communication with the host is supported. You can check the power temperature, output power and other information through the host. The valid power temperature is in the range from -5ºC to +50ºC (±2ºC).Otherwise, errors may occur to temperature display.

1.2.2 WNM-4GE-S

Module Appearance

Figure 1-4 Appearance of WNM-4GE-S



The WNM-4GE-S module applies to only RG-WS6816.

Indicator

LED	State	Meaning
RDY	Solid green	The system is being initialized.
	Blinking green	The initialization process is complete.
	Solid red	The system sends out an alarm.
1-4 Gigabit copper ports	Solid green	The port is connected at 1000 Mbps.
	Solid yellow	The port is connected at 10/100 Mbps.
	Blinking	The port is receiving or transmitting data.
1F-4F Gigabit fiber ports	Solid green	The port is connected.
	Blinking green	The port is receiving or transmitting data.

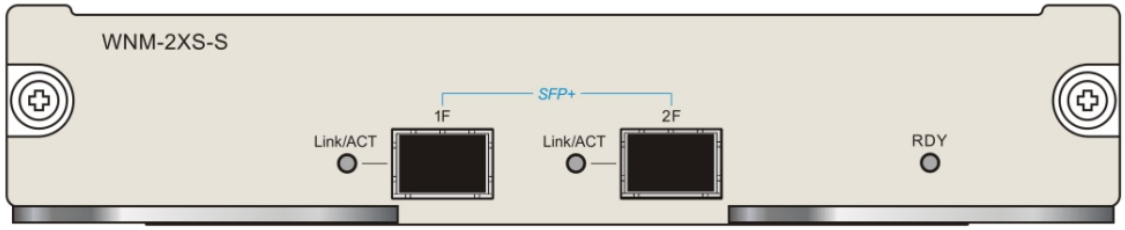
Specifications

Model	WNM-4GE-S
Memory	EEPROM: 2Kb
I/O Configuration	4-1000M combo Ethernet ports are provided.
	The copper port supports 10/100/1000Mbps auto-negotiation and network cable/cross-over cable auto-identification.
	The fiber port supports the 1000BASE-SX/LX/ZX mini GBIC optical transceiver.
Hot Swapping	Not supported
Interface Standard	Ethernet port: 10Base-T/100Base-TX/1000Base-TX and 1000BASE-SX/LX/ZX copper port 1000BASE-SX/LX/ZX fiber port.
Dimensions (W x D x H)	176 mm x 213 mm x 32 mm
Voltage	12V
Power Consumption	15 W max
Operating	0 to 45ºC (32 to 113℉)

Temperature	
Operating Humidity	10% to 90% RH (noncondensing)

1.2.3 WNM-2XS-S

Figure 1-5 Appearance of WNM-2XS-S



The WNM-2XS-S module applies to only RG-WS6816.

Indicator

LED	State	Meaning
RDY	Solid green	The system is being initialized.
	Blinking green	The initialization process is complete.
	Solid red	The system sends out an alarm.
0F-1F 10 Gigabit fiber ports	Solid green	The port is connected.
	Blinking green	The port is receiving or transmitting data.

Specifications

Model	WNM-2XS-S
Memory	EEPROM: 2Kb
I/O Configuration	The 10 gigabit fiber port supports the 10G-BASE-SR/LR/ER/ZR optical transceiver.
Hot Swapping	Not supported
Interface Standard	10G-BASE-SR/LR/ER/ZR fiber port.
Dimensions (W x D x H)	176 mm x 213 mm x 32 mm
Voltage	12V
Power Consumption	15 W max
Operating Temperature	0ºC to 45ºC (32 to 113℉)
Operating Humidity	10-90% RH (noncondensing)

2 Preparation for Installation

2.1 Precautions

The wireless controller acts as a network repeater and its working affects the normal operation of the whole network.

The following suggestions are advised for the installation and use of RG-WS6816:

- Do not place the wireless controller in a damp/wet location. Do not let any liquid enter the chassis.
- Keep the wireless controller far away from the heat source.
- Ensure that the wireless controller is properly grounded.
- Wear an anti-static wrist strap during installation and maintenance.
- Do not wear loose clothes to avoid hooking any parts. Before operation, tighten your band, shawl, and sleeves.
- Put the tools and parts away from where people walk by.
- Use UPS to prevent power failure and other interferences.
- If the clock is not accurate, check whether the clock has been configured. If not, the inaccuracy is likely to occur. If the clock has been configured, the inaccuracy may be caused by the battery running out of power. In general, the button battery lasts about 10 years.

- Misuse of battery may cause damage to the device or hurt to people. Do not replace battery by yourself. Instead, contact Ruijie Service Center for the replacement of battery.
- This device is an A-class product. It may cause radio interference in living environment, which may require you to take anti-interference measures.
- Keep the device within the restricted-access area.
- The device should be installed by professionals or technicians.

2.2 Preparing Installation Site

RG-WS6816 is for indoor use only. To ensure its normal operation and prolong its life span, the installation site should meet the following requirement:

2.2.1 Temperature and Humidity Requirements

To ensure normal operation and service life of the device, maintain appropriate temperature and humidity levels in your equipment room. See Table 2-1. Improper room temperature and humidity can cause damages to the device. High relative humidity may affect insulation materials, resulting in poor insulation and even electrical leakage, and sometimes may lead to change of mechanical properties of materials and corrosion of metal parts. Low relative humidity may dry and shrink insulation sheets and cause static electricity that can damage the circuitry inside the device. High temperature greatly reduces reliability of the device and shortens its service life.

Table 2-1 Required Temperature and Humidity for the RG-WS6816

Relative Temperature		Relative Temperature	
Long-time working condition	short-time working condition	Long-time working condition	short-time working condition
15ºC to 30ºC (59ºF to 86ºF)	0ºC to 45ºC (32ºF to 113ºF)	40%~65%	5%~95%

- The ambient temperature and humidity are measured at a point 1.5 meters (4.9 feet) above the ground and 0.4 meters (1.3 feet) before the device when there is no protective board in the front or back of the rack.
- The short-term working condition refers to a period no longer than consecutive 48 hours or accumulated 15 days a year.
- The extreme working condition refers to the temperature and humidity of the machine room where the air conditioner fails for no more than five hours.

2.2.2 Cleanness Requirements

Dust poses a serious threat to device operation. Dust that falls onto the surface of the device can be absorbed onto metal contact points by static electricity, resulting in poor contact. Electrostatic absorption of dust occurs more easily when the relative humidity is low, which may shorten the service life of the device and cause communication failures. Table 2-2 shows the maximum concentration and diameter of dust allowed in the equipment room.

Table 2-2

Maximum diameter (μm)	0.5	1	3	5
Maximum content (number of particles in one cubic meter)	1.4×10^7	7×10^5	2.4×10^5	1.3×10^5

Besides, the contents of salts, acids and sulfides in the air are also strictly limited for the equipment room. These substances can accelerate metal corrosion and the aging of some parts. Table 2-3 describes the limit of some hazardous gases such as SO_2, H_2S, NO_2 and Cl_2 in the equipment room.

Table 2-3

Gas	**Average (mg/m^3)**	**Maximum (mg/m^3)**
SO_2	0.2	1.5
H_2S	0.006	0.03
NO_2	0.04	0.15
NH_3	0.05	0.15
Cl_2	0.01	0.3

2.2.3 Static Discharge Damage Prevention

Although much has been done in RG-WS6816 to prevent static electricity, great damage may be caused to the circuitry when the static electricity exceeds a certain limit. Electrostatic induction may come from the following sources:

- External electric field produced by the high-voltage supply cable, lightning, etc;
- Internal systems such as the indoor floor and the entire structure.

To prevent damage from static electricity, you must pay attention to the following:

- Properly ground the equipment.
- Take dust prevention measures in the room.
- Maintain an appropriate humidity and temperature.

- Always wear an anti-static wrist strap when you touch any circuit board.
- Place the circuit board on an anti-static workbench or in an anti-static shielding bag.
- Try to hold a circuit board by its edges. Do not touch any components or the PCB.

2.2.4 Anti-Interference Requirements

The wireless controller is susceptible to external interference such as electromagnetic wave and current. Note that:

- Provide the power system with effective anti-interference measures.
- It is recommended that the wireless controller be installed far away from the grounding device.
- Keep the wireless controller away from high-power radio stations, radar stations, and high-frequency high-current devices.
- Use EMI shielding when necessary.

2.2.5 Installation Site Requirements

To install the wireless controller whether in the cabinet or on the workbench, pay attention to the following items:

- Ensure that enough space is reserved around the air inlet and exhaust vents for ventilation and heat dissipation. It is recommended that the wireless controller be installed in a standard 19-inch cabinet. Otherwise, use a clean platform as a workbench. It is recommended to equip the installation site with an air conditioner if it is hot.
- Ensure that the cabinet or the workbench is provided with proper ventilation and heat dissipation system.
- Ensure that the cabinet or the workbench is sound enough to bear the weight of the wireless controller and its accessories.
- Ensure that the cabinet or the workbench is properly grounded.

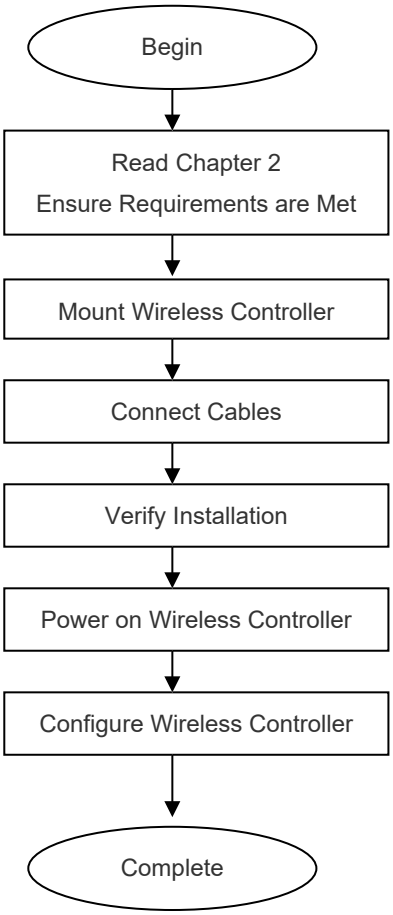
2.3 Installation Tools

Installation Tool	Cross screwdriver and anti-static wrist strap
Cable	Power cord, configuration cable, Ethernet cable and grounding cable
Device	Hub/switch, configuration terminal (such as PC with Hyperterm) and power socket

3 Installing Wireless Controller

3.1 Installation Flowchart

Please follow the following procedure to install the wireless controller to ensure the smooth installation and avoid any damage to the device.



3.2 Mounting Wireless Controller

Now the wireless controller is ready for installation. Mount it to either of these two places.

- A cabinet
- A workbench

3.2.1 Mounting RG-WS6816 in Cabinet

RG-WS6816 is designed according to the specification of 19-inch standard cabinet. Use the supplied mounting accessory for installation.

3.2.2 Mounting RG-WS6816 on Workbench

In the absence of a 19-inch standard cabinet, install the wireless controller on a clean workbench. During the operation, pay attention to the following items:

- The workbench is firm and well-grounded.
- The supplied plastic cushion is stuck to the small hole at the bottom of the wireless controller and a 10 cm clearance is reserved for dissipation.
- No weight is placed on the top of the wireless controller.

3.3 Installing Power Cable

RG-WS6816 supports AC (100 VAC to 240 VAC; 50/60 Hz). Make sure that your power supply meets the requirement.

See Chapter 1 for details about the power module.

RG-WS6816 uses three-wire power cable. It is recommended to use single-phase three-wire power socket or multi-functional microcomputer socket with neutral-point connector. The neutral-point needs to be grounded safely. Check whether the power supply in your building is grounded properly.

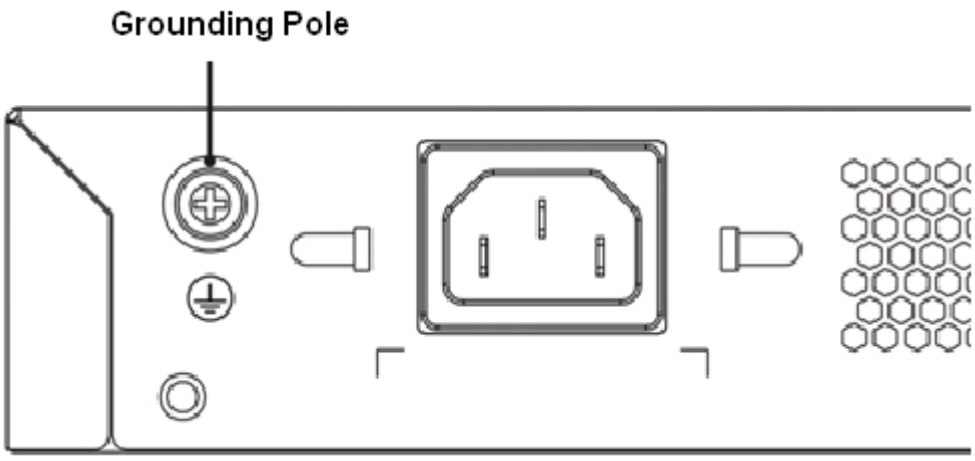
Follow the following steps to install the power cable:

1) Connect one end of the supplied power cable to the socket on the rear panel of the device and another to the AC power socket.
2) Check the power indicator on the front panel is on. If it is, it means that the power cable is correctly connected.

3.4 EMS & Secure Grounding

The ground required for EMC design includes shielding ground, filter ground, noise and interference suppression, and level reference. All the above constitute the comprehensive grounding requirements. The grounding resistance should be smaller than 1Ω. The RG-WS6816 wireless controller has a grounding pole on the rear panel, as shown in Figure 3-1.

Figure 3-1 RG-WS6816 Grounding



3.5 Connecting Console

RG-WS6816 supplies an EIA/TIA-232 configuration console for local configuration. If you configure RG-WS6816 through Web, skip this part.

Table 3-1 Console Attributes

Parameter	Description
Connector	RJ-45
Interface Standard	Asynchronous EIA/TIA-232
Baud Rate	57,600 bps, 115,200 bps, 9,600 bps (default)
Supported Services	Command line interface Connection to character terminals Providing terminal access service as an asynchronous interface

Connect one end of the supplied configuration cable to the console port of the wireless controller, and the other end to the DB-9 male serial adapter of the microcomputer.

3.6 Verification

When you have installed the wireless controller, before powering on it, pay attention to the following items:

- If the wireless controller is stalled in a cabinet, check the mounting brackets of the cabinet and wireless controller are firm. If the wireless controller is installed on the workbench, check there is enough room around the wireless controller for heat dissipation and the workbench is firm.
- Check the power supply meets the requirements.
- Check the grounding cable is correctly connected.
- Check the wireless controller is connected correctly to other devices such as the configuration terminal

4 Configuration Guide

4.1 Setting up Configuration Environment

When you use the wireless controller for the very first time, you will need to configure it through a console port as follows:

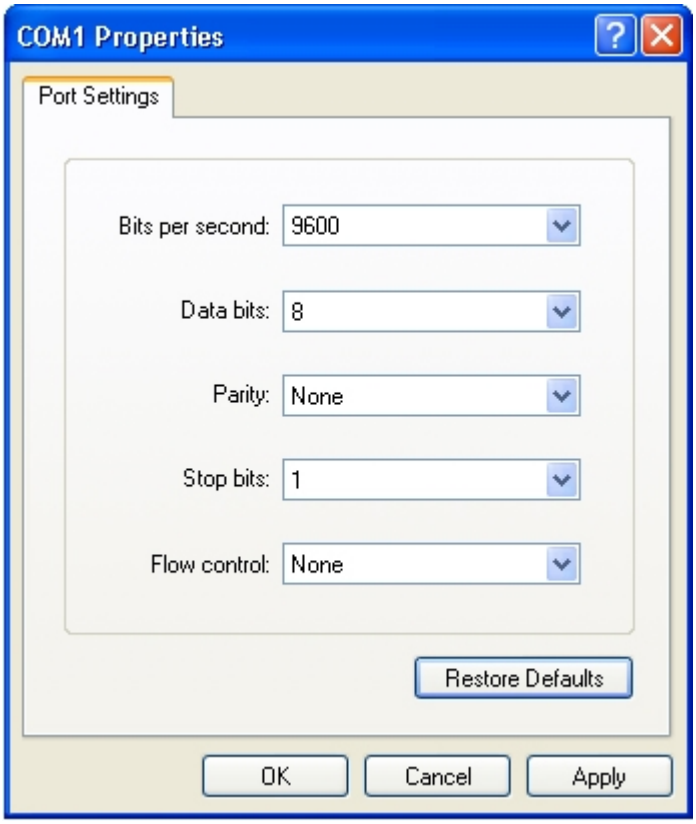
- As shown in the following figure, connect the serial port of a character terminal or microcomputer to the console port through an RS232 cable.
- Set the communication parameters of the terminal. For a microcomputer, you will need to run a terminal emulation program like Windows operating system's Hyperterm. Take Hyperterm for example.

1. Run Hyperterm and create a connection.
2. Select the serial port to be connected with the console port of the wireless controller, as shown in figure 4-2.
3. Set communication parameters as follows: baud rate to 9600, data bit to 8, stop bit to 1, parity to No, flow control to No, as shown in figure 4-3.
4. Go to **File**->**Property**->**Settings** and set terminal emulation type to VT100.

Figure 4-1 Creating Connection

Figure 4-2 Selecting Serial Port to be Connected with Console Port.

Figure 4-3 Setting Communication Parameters for Serial Port.



After building the configuration environment, you may power on the wireless controller

4.2 Powering on Wireless Controller

4.2.1 Verification Before Power-on

Before powering on the wireless controller, please check the following items:

- If the power cable and the grounding cable are connected correctly.
- If the power supply voltage meets the requirement.
- If the configuration cable is connected correctly, the microcomputer or terminal is turned on, and the setting is complete.

⚠ Before powering on the wireless controller, check the position of the power switch so that you may cut power supply in time in case of accident.

4.2.2 Power-on

- Turn on the power supply.
- Turn the power switch of the wireless controller to the **on** position.

4.2.3 Verification After Power-on

After powering on the wireless controller, please check the following items:

- If the ventilation system is functional.

When the wireless controller is powered on, you will hear the fan working. Put your hand near the air inlet and exhaust vents, you will feel the air flowing.

- If the indicators on the front panel of the wireless controller are in the proper state.

See **LED Indicators** in Chapter 1.

- If the configuration terminal displays information as expected.

When the wireless controller is powered on, information on the software self-decompression will appear on the terminal display.

4.2.4 Startup Process

When the wireless controller is started for the first time, the following information appears:

```
********************************************
Boot 1.2.0-00346-g2d7093f (Build time: Mar 27 2014 - 16:04:49)

DRAM: 16 GiB
NAND:  512 MiB
Flash: 8 MiB
SETMAC: Setmac operation was performed at 2014-04-22 10:38:33 (version: 11.0)
Press Ctrl+C to enter Boot Menu
Bootloader: Done loading app on coremask: 0xffffffff
[    0.000000] Linux version 2.6.32.13-Cavium-Octeon (ngcf@ngcf75) (gcc version 4.3.3 (Cavium Networks Version:
2_0_0 build 95) ) #1 SMP Thu May 8 04:34:42 CST 2014
[    0.000000] CVMSEG size: 2 cache lines (256 bytes)
[    0.000000] Cavium Inc. SDK-2.3
[    0.000000] bootconsole [early0] enabled
[    0.000000] CPU revision is: 000d910a (Cavium Octeon II)
[    0.000000] Checking for the multiply/shift bug... no.
```

```
[    0.000000] Checking for the daddiu bug... no.
[    0.000000] Determined physical RAM map:
[    0.000000]  memory: 000000000003f000 @ 0000000000dd1000 (usable after init)
[    0.000000]  memory: 000000000f000000 @ 0000000000f00000 (usable)
[    0.000000]  memory: 00000000d0000000 @ 0000000020000000 (usable)
[    0.000000]  memory: 000000000ffff000 @ 00000000f0001000 (usable)
[    0.000000]  memory: 000000030efff000 @ 0000000100001000 (usable)
mount: Mounting /dev/sda1 on /var/storage failed: No such device or address
Starting rg_lowmem_killer...                                          [  OK  ]
......
Starting snooping.elf...                                              [  OK  ]
Starting postgresql server...
/mnt/sata0/pgsql/bin/postgres not found...                            [  OK  ]
Starting rg-mtdoops-cli...                                            [  OK  ]
Starting sntp.elf...                                                  [  OK  ]
Press RETURN to get started
*May 15 11:08:01: %CAPWAP-4-NO_IP_ADDR: Please config the IP address for capwap.
Ruijie>
```

Now the wireless controller is ready for configuration.

- Such information may vary with hardware configuration or software version.
- When using the wireless controller for the first time, it is recommended to set basic parameters during configuration.

5 Troubleshooting

5.1 Power Troubleshooting

You may use the power indicator on the front panel to decide if the power supply system is operating normally. For description of indicators, see Chapter 1. If a fault occurs, check the following items:

- If RG-WS6816 power switch is in the on position.
- If the power supply is turned on.
- If the power cord is connected correctly.
- If the power supply meets the requirements.

⚠ Never attempt hot swapping of the power cord. If the steps above did not solve your problem, contact your local distributor or technical support personnel.

5.2 System Troubleshooting

Fault	Possible Cause	Solution
Forgot login password	-	Contact Ruijie Technical Assistance Center for help
Status LED is off after the wireless controller is booted	The wireless controller is not receiving power. A power cable is loose.	Verify that the power outlet functions correctly. Verify that the power cord is plugged in properly and not loose.
Status LED is red	Temperature alarms	The wireless controller is now not operational. Please check the operating environment, clear dusts on the chassis and reduce the temperature.
The terminal outputs nothing or gibberish	The COM port in use is not the one set on the terminal The terminal parameter settings are not correct.	Select a correct COM port. Check the terminal parameter settings.
RJ45 Ethernet port cannot be connected or receives/sends error frames	The connected twisted pairs are faulty. The cable length exceeds 100 meters. The Ethernet port is configured for other purposes. The speed and duplex settings are not the same with connected wireless controllers.	Replace twisted pairs. Check speed and duplex settings on the port. Make sure it shares the same operation mode with the connected wireless controller.
Fiber port cannot be connected	The Rx and Tx pins are connected incorrectly. The optical module type does not match with the connected one.	Correct the positions of Rx and Tx pins. Replace the optical module with one of the matched type. Replace the fiber type with a correct one.

	The fiber type is not correct. The fiber length exceeds the allowed length of the optical module.	Replace the optical fiber with one of the proper length.