INNOVATION
Beyond Networks

RG-WS6012-L

High-Performance Wireless Access Controller

Datasheet

01 Product Overview

The RG-WS6012-L high-performance wireless access controller (AC), developed by Ruijie Networks, is targeted for high-speed wireless networks. It can be deployed on a Layer 2 or Layer 3 network without any architecture or hardware device changes, delivering seamless and secure control over wireless networks.

The RG-WS6012-L can manage up to 32 wireless access points (APs) by default. With licenses for capacity expansion, it can manage a maximum of 448 generic APs or 896 wall-mounted Aps.

Through powerful centralized and visualized management and control over wireless networks, the RG-WS6012-L can significantly simplify construction and deployment of wireless networks.

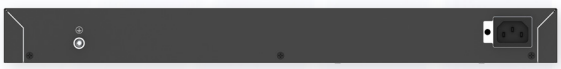
The RG-WS6012-L, adopting enhanced security and clustering technologies, offers identity-based networking services. Multiple ACs in a cluster can share a user database, allowing clients to seamlessly roam in different areas of a network. The cluster design guarantees the security and session integrity during roaming and smooth interaction of data and voice over Wi-Fi applications.

02 Product Appearance

Front Top View of the RG-WS6012-L

Right Top View of the RG-WS6012-L

Left View of the RG-WS6012-L



Rear View of the RG-WS6012-L

03 Product Highlights

High-Speed Forwarding

- Increased forwarding capacity with 10 Gbps connections
- Centralized/Distributed, integrated, and intelligent local forwarding, eliminating the traffic bottleneck of the wireless access controller

Intelligent Management

- Ruijie Aireorder, achieving advanced airtime fairness
- Intelligent load balancing through band steering
- Dynamic QoS based on channel utilization, unleashing full wireless capacity
- Advanced wireless access controller technology for fast roaming

Secure and Reliable Network Systems

- Advanced AC virtualization technology for high reliability as well as capacity and performance scaling
- Virtual AP technology, managing APs by group to isolate guest and business traffic
- Dynamic network policy for identity-based access control

04 Product Features

Smart Wireless Experience

Intelligent Client Identification
The built-in Portal server of the RG-WS6012-L can intelligently identify clients based on characteristics of the clients, and adaptively respond with a portal authentication page of matching size and layout. Intelligent client identification eliminates the need to drag and resize a window, delivering users with a better intelligent wireless experience. This technology supports mainstream intelligent client operating systems, including Apple iOS, Android, and Windows.

Fair Client Access
The RG-WS6012-L works with Ruijie Networks' APs to provide the same access time for clients in compliance with IEEE 802.11g, 802.11n, 802.11ac, 802.11ax, and other standards. This resolves issues such as high latency, slow speed, and low performance of APs caused by outdated NIC in clients or long distance between clients and APs. This also effectively improves the performance of low-speed clients, and ensures consistent and good wireless experience at the same location regardless of the client type.

Intelligent Load Balancing
In a high-density environment, the RG-WS6012-L can monitor the number of clients and traffic on each associated AP in real time to intelligently distribute clients connected to APs. This balances the traffic load, increases the average client bandwidth and QoS, and improves the availability of network connections.

In addition to client-based and traffic-based intelligent load balancing, the RG-WS6012-L also supports load balancing based on the frequency band. Most Wi-Fi devices use the 2.4 GHz frequency band by default, but can achieve increased throughput in the 5 GHz frequency band (IEEE 802.11a/n/ac/ax-compliant). Load balancing based on the frequency band enables dual-radio-capable clients to preferentially use the 5 GHz frequency band. This increases bandwidth utilization without additional cost and guarantees a high-speed wireless experience for clients.

High Performance and Reliability

Centralized/Distributed, Integrated, and Intelligent Forwarding
The RG-WS6012-L can be deployed on a Layer 2 or Layer 3 network without changing the original network architecture. It constitutes an overall switching architecture with APs to facilitate the control and processing of data transmission on all APs.

The intelligent local forwarding technology eliminates the traffic bottleneck of an AC. With this technology, the RG-WS6012-L can flexibly configure data forwarding modes for connected APs. That is, the RG-WS6012-L can determine whether data needs to be forwarded through itself, or directly enters the wired network for local forwarding based on the network SSID and VLAN planning. The local forwarding technology enables the RG-WS6012-L to forward data that is sensitive to the delay and requires real-time high-performance transmission through a wired network. Facing high throughput of 802.11ac- and 802.11ax-compliant clients, this technology

can greatly reduce the traffic forwarding pressure of the RG-WS6012-L to better adapt to future wireless networks such as high definition (HD) Video on Demand (VoD) and Voice over Wireless Local Area Network (VoWLAN) transmission.

Intelligent RF Management
The RG-WS6012-L enables an AP to perform on-demand RF scanning on the wireless network. The RG-WS6012-L can scan wireless frequency bands and channels, identify unauthorized APs and wireless networks, and notifies network administrators of alarms, providing all-round protection in a security-sensitive environment. Moreover, the RG-WS6012-L can control the RF scanning function of APs in real time, and measure the signal strength and interference. It can dynamically regulate the traffic load, transmit power, RF coverage area, and channel allocation using software tools to maximize the AP coverage and capacity.

Network-Wide Seamless Roaming
The RG-WS6012-L supports the advanced AC cluster technology. Multiple RG-WS6012-L controllers in a cluster can synchronize online connection information and roaming records of all clients in real time. When a client roams, the client can roam freely on the entire network based on shared client information and authorization information in the cluster. Furthermore, the client can roam seamlessly and securely, and keep the IP address and authentication status unchanged, so as to achieve fast roaming and voice support.

Abundant QoS Policies
The RG-WS6012-L supports abundant QoS policies such as bandwidth limiting in multiple modes and preferential bandwidth guarantee for key data applications.

Advanced AC Virtualization

The RG-WS6012-L supports the cutting-edge AC virtualization technology. The technology can virtualize up to four ACs into one logical AC, achieving high reliability and capacity expansion without additional hardware devices.

- **Simplified topology:** All member ACs of the logical AC use the same IP address. Regardless of whether the logical AC connects to an AP or an authentication server, there is no need to assign an IP address to each member AC.
- **Simplified configuration:** Multiple member ACs can be managed as one AC. Any configuration of the master AC can be automatically synchronized to all member ACs.
- **High reliability:** N+M hot standby is supported. The breakdown of any AC will not affect the overall system.
- **Smooth capacity expansion:** The AP and client capacity can be expanded by adding a physical AC.
- **License sharing:** A license installed on any member AC of the logical AC can be shared by other member ACs.

Flexible and Comprehensive Policies

Local Authentication
With a built-in local user database and a built-in Portal server, the RG-WS6012-L authenticates wireless clients locally through web-based authentication. Local authentication eliminates the need to deploy an authentication server such as the external Portal server and RADIUS server. Moreover, this authentication mode simplifies the entire network architecture and greatly reduces the network construction cost, meeting requirements for secure access to small- and medium-sized wireless networks.

Standard Communication Protocol
The RG-WS6012-L communicates with APs over Control and Provisioning of Wireless Access Points (CAPWAP) tunnels for encrypted communication. This achieves isolation from a wired network and ensures confidentiality of real-time communication between the RG-WS6012-L and APs. Additionally, the RG-WS6012-L can use CAPWAP to control third-party APs in the future, facilitating network expansion as well as protecting existing investment.

Virtual AP Technology
With the virtual AP technology, the RG-WS6012-L can allocate multiple SSIDs on a network. Network administrators can separately isolate and encrypt subnets or VLANs using the same SSID, and can configure the separate authentication mode and encryption mechanism for each SSID.

Secure Client Access
The RG-WS6012-L supports web-based authentication. Clients can complete the authentication process by using a browser.
The RG-WS6012-L supports 802.1X authentication on clients to guarantee network security. Moreover, it ensures host security because the 802.1X authentication client is embedded on a host for access control. Unlike web-based authentication, 802.1X authentication is applicable to security-sensitive areas. Furthermore, IP addresses, MAC addresses, WLANs, and other elements can be bound after authentication. This ensures that only authorized clients can access the network.

Multiple Easy-to-Use Authentication Modes
The RG-WS6012-L supports conventional web authentication and 802.1X authentication for monitoring network access behaviors. It also provides convenient authentication modes for customers based on actual scenarios, such as MAC authentication bypass (MAB) and SMS-based authentication.
When accessing a network through MAB authentication, a wireless client only needs to enter the username and password upon first login. The username and password

are no longer required when the wireless client is restarted and connected to the network.
When a guest accesses a wireless network through SMS-based authentication, an authentication page pops up. On the authentication page, the guest can register an account using the mobile number, and accesses the Internet using the username and password in the SM received. To implement SMS-based authentication, the AC needs to interconnect with the authentication server that is connected to the SMS gateway.

Management Information Security
Through the Secure Shell (SSH) and Simple Network Management Protocol version 3 (SNMPv3), the RG-WS6012-L encrypts management information in Telnet and SNMP processes, ensuring information security of management devices and preventing hackers from attacking and controlling devices. Telnet access control based on the source IP address means fine-grained device management and control. With this function, only the devices with IP addresses configured by administrators can connect to the RG-WS6012-L, enhancing network management security.

Rich Management Policies

Multiple Management Modes and Unified Management Platform
The RG-WS6012-L supports the CLI and other management modes to perform centralized, effective, and low-cost planning, deployment, monitoring, and management of network-wide APs.

The RG-WS6012-L provides the Eweb, on which O&M personnel can complete wireless configuration easily, and manage the wireless network uniformly. On the Eweb, O&M personnel can manage APs and connected clients, limit the client rates, and restrict network access behaviors of the connected clients. With the Eweb, O&M personnel can plan, manage, and maintain wireless networks conveniently.

05 Product Specifications

Hardware Specifications

System specifications

System specifications	RG-WS6012-L
Memory	4 GB
Flash memory	16 MB

Dimensions and Weight

Dimensions and Weight	RG-WS6012-L
Unit dimensions (W x D x H)	440 mm x 200 mm x 43.6 mm (17.32 in. x 7.87 in. x 1.72 in., without rack-mount brackets) 486.2 mm x 205 mm x 43.6 mm (19.14 in. x 8.07 in. x 1.72 in., including rack-mount brackets)
Shipping dimensions (W x D x H)	550 mm x 460 mm x 368 mm (21.65 in. x 18.11 in. x 14.49 in.)
Rack size	1 RU
Unit weight	2.7 kg (5.95 lbs)
Shipping weight	3.5 kg (7.72 lbs)
Mounting	Rack-mount

Port Specifications

Port Specifications	RG-WS6012-L
Fixed service port	8 x 10/100/1000BASE-T ports 2 x 1GE SFP/RJ45 combo ports • RJ45 ports support 10/100/1000BASE-T. • Port 9/MGMT can also be used as a management port. 2 x 10GE SFP+ ports
Fixed management port	1 x RJ45 console port 2 x USB 3.0 ports, compatibility with USB 2.0

Port Specifications	RG-WS6012-L
Status LED	1 x system status LED 1 x power status LED 8 x 10/100/1000BASE-T port LEDs 2 x 1GE SFP/RJ45 combo port LEDs 2 x 10GE SFP+ port LEDs
Button	1 x Reset button • Press the button for shorter than 3 seconds. Then the device restarts. • Press the button for longer than 3 seconds. Then the device restores to factory settings.

Note

A combo port consists of an optical Ethernet port and an electrical Ethernet port on the panel and can be used as the optical or electrical port at one time. When either of the Ethernet ports is working, the other port is automatically shut down. You can select a port type as required.

Power Supply and Consumption

Power Supply and Consumption	RG-WS6012-L
Maximum power consumption	30 W
Input power supply	1 x 40 W built-in power module
Input voltage	100 V AC to 240 V AC, 50 Hz to 60 Hz
Input current	0.25 A (maximum RMS current)
Output voltage	12 V/3.33 A

Environment and Reliability

Environment and Reliability	RG-WS6012-L
Temperature	Operating temperature: 0°C to 45°C (32°F to 113°F) Storage temperature: –40°C to +70°C (–40°F to +158°F) Note: At an altitude in the range of 1,800–4,000 m (5,905.51–13,123.36 ft.), every time the altitude increases by 220 m (721.78 ft.), the maximum temperature decreases by 1°C (1.8°F).
Altitude	Operating altitude: –500 m to +4,000 m (–1,640.42 ft. to +13,123.36 ft.) Storage altitude: –500 m to +4,000 m (–1,640.42 ft. to +13,123.36 ft.)
Humidity	Operating humidity: 10% RH to 90% RH (non-condensing) Storage humidity: 5% RH to 95% RH (non-condensing)
Acoustic noise	< 78 dB
Mean Time Between Failure (MTBF)	200,000 hours (22 years) at the operating temperature of 25°C (77°F)

Software Specifications

Performance and Capacity

Performance and Capacity	RG-WS6012-L
WLAN	
Default number of manageable APs	32 Note: The default number of APs that can be managed by the RG-WS6012-L is subject to the AP model. See the Ordering Information for details.

Performance and Capacity	RG-WS6012-L
Maximum number of configurable APs	2,048
Maximum number of manageable APs	896 Note: The maximum number of APs that can be managed by the RG-WS6012-L is subject to the AP model. See the Ordering Information for details.
Maximum number of manageable STAs	4,480 Note: The maximum number of STAs that can be managed by the RG-WS6012-L is subject to the network environment. Contact technical support team for details.
WLAN service	Maximum number of WLAN IDs: 2,048 Maximum number of associated STAs per WLAN: 4,480
Intra-AC roaming handoff time	< 50 ms
Maximum number of virtualized ACs	4
Number of concurrent CAPWAP data channels	896
Routing and Switching	
Forwarding capacity	10 Gbps (subject to the wireless network environment)
Number of MAC address entries	32,768
Number of VLANs	4,096
Number of ARP entries	32,768
DHCP address pools	Number of IPv4 address pools: 2,000 Number of IPv4 addresses: 24,576 Number of IPv6 address pools: 256 Number of IPv6 addresses: 2,048
Number of routing entries	IPv4 routing entries: 8,192 IPv6 routing entries: 10,000
Security and Authentication	
Maximum number of STAs supported by the built-in Portal server	1,500
Number of ACL entries	65,536

Applicable Software Version

Applicable Software Version	RG-WS6012-L
Applicable software version	AC_RGOS 11.9(6)W6B1 or later

WLAN

WLAN	RG-WS6012-L
IEEE 802.11 protocols	802.11, 802.11b, 802.11a, 802.11g, 802.11d, 802.11h, 802.11w, 802.11k, 802.11v, 802.11r, 802.11i, 802.11e, 802.11n, 802.11ac, and 802.11ax
CAPWAP	Layer 2 and Layer 3 topology supported between an AP and an AC An AP can automatically discover the accessible AC. An AP can be automatically upgraded through the AC. An AP can automatically download the configuration file from the AC. CAPWAP through NAT
Roaming	Intra-AC Layer 2 or Layer 3 roaming Inter-AC Layer 2 or Layer 3 roaming Intra-AC Layer 2 or Layer 3 roaming in local forwarding mode Inter-AC Layer 2 or Layer 3 roaming in local forwarding mode

WLAN	RG-WS6012-L
Forwarding mode	Centralized forwarding Local forwarding Service-based flexible forwarding
Wireless QoS	AP/WLAN/STA-based bandwidth limiting (STA-based rate limit range: 8–261,120 in the unit of 8 kbps. For example, if you set the value to 8, the rate limit is 8 x 8 kbps = 64 kbps.) Static and intelligent rate limiting based on STA quantity Fair scheduling
User isolation	AC-based user isolation AP-based user isolation WLAN-based user isolation
Reliability	AC virtualization AC failover Multi-AC hot standby (1+1 A/A and A/S hot standby, and N+1 hot standby) Multi-AC cluster (N-to-N) Remote intelligent perception technology (RIPT) Non-stop service during upgrade
STA management	Access control based on the number of STAs associated with the AP Access control based on the number of STAs associated with the SSID Balanced access control based on the number of STAs associated with the AP Balanced access control based on the AP traffic Band steering Configuration of the RSSI threshold in dBm (range: 0–100) Configuration of the STA idle timeout period in seconds (range: 60–86,400)
WLAN optimization	Adjustment of the transmit power for beacon or probe response frames
RF management	Country or region code setting Manual setting of the transmit power Automatic setting of the transmit power Manual setting of the operating channel Automatic setting of the operating channel Automatic adjustment of the data rate Coverage Hole Detection AP load balancing based on traffic and STA quantity Band selection Radio frequency interference (RFI) detection and mitigation

Security

Security	RG-WS6012-L
IPv4 security authentication	Web-based authentication 802.1X authentication MAB authentication SMS authentication
IPv6 security authentication	802.1X authentication Web-based authentication
IEEE 802.11 security and encryption	Multi-SSID mode SSID hiding IEEE 802.11i-compliant PSK authentication WPA and WPA2 WEP (WEP/WEP128) TKIP CCMP ARP anti-spoofing

Security	RG-WS6012-L
CPP	Supported
NFPP	Supported
WIDS	Supported
AP virtualization	Supported

*To implement SMS-based authentication, the AC needs to interconnect with the authentication server that is connected to the SMS gateway.

Protocols

Protocols	RG-WS6012-L
IPv4 protocols	Ping and traceroute DHCP server, DHCP client, DHCP relay, and DHCP snooping DNS client NTP Telnet TFTP server and TFTP client FTP server and FTP client
IPv6 protocols	DNSv6 client DHCPv6 relay and DHCPv6 server TFTPv6 client FTPv6 server and FTPv6 client IPv6 CAPWAP ICMPv6 IPv6 ping Manual tunnels, automatic tunnels, and ISATAP Manually configured IP addresses and automatically created local addresses IPv6 traceroute Neighbor discovery
IPv4 routing	Static routing, RIP, and OSPF
IPv6 routing	Static routing

Management

Management	RG-WS6012-L
Network management	SNMP v1/v2c/v3 RMON Syslog Remote probe
Network management platform	Eweb Wi-Fi heat map
User access management	Console port login, Telnet login, SSH login, and FTP upload

Regulatory Compliance

Regulatory Compliance	RG-WS6012-L
Safety regulation	IEC 62368-1, EN 62368-1
EMC regulation	EN 55032, EN 55035, EN 61000-3-3, EN IEC 61000-3-2, and ETSI EN 300 386

* For more country-specific regulatory information and approvals, contact your local sales agency.

06 Ordering Guide

Take the following ordering procedure:

- Order an RG-WS6012-L.
- To use an optical port, select an optical module.
- The RG-WS6012-L supports up to 32 APs by default. To increase the number of supported APs, purchase a corresponding license.

07 Ordering Information

Main Unit

Model	Description
RG-WS6012-L	The next-generation wireless access controller provides 8 x 10/100/1000BASE-T ports, 2 x SFP/RJ45 combo ports, and 2 x 10GE SFP+ ports. It supports 32 licenses by default. The maximum number of APs that can be managed by the AC is subject to the AP model: • A generic AP occupies one license. The RG-WS6012-L can manage up to 448 generic APs. • A wall plate AP occupies half of the license. The RG-WS6012-L can manage up to 896 wall plate APs. A power module is delivered with the main unit, which supports power redundancy

Optical Transceivers

1GE

Model	Description
MINI-GBIC-ZX80-SM1550	1000BASE-ZX, SFP transceiver, 1550 nm, Duplex LC, 80 km over SMF
MINI-GBIC-LH40-SM1310	1000BASE-LH, SFP transceiver, 1310 nm, Duplex LC, 40 km over SMF
MINI-GBIC-SX-MM850	1000BASE-SX, SFP transceiver, 850 nm, Duplex LC, 500 m over MMF
MINI-GBIC-LX-SM1310	1000BASE-LX, SFP transceiver, 1310 nm, Duplex LC, 10 km over SMF
GE-SFP-LX03-SM1310-BIDI-I	1000BASE-LX, SFP transceiver, TX1310/RX1550, BiDi LC, 3 km over SMF
GE-SFP-LX03-SM1550-BIDI-I	1000BASE-LX, SFP transceiver, TX1550/RX1310, BiDi LC, 3 km over SMF

Note: BiDi transceivers must be used in pairs. If one end uses GE-SFP-LX20-SM1310-BIDI, the other end must use GE-SFP-LX20-SM1550-BIDI.

10GE

Model	Description
XG-SFP-LR-SM1310	10GBASE-LR, SFP+ transceiver, 1310nm, Duplex LC, 10 km over SMF
XG-SFP-SR-MM850	10GBASE-SR, SFP+ transceiver, 850nm, Duplex LC, 300 m over MMF
XG-SFP-AOC3M	10GBASE, SFP+ active optical cable (AOC), 3 m, including one cable and two optical transceivers
XG-SFP-AOC5M	10GBASE, SFP+ active optical cable (AOC), 5 m, including one cable and two optical transceivers
XG-SFP-LR10-SM1270-BIDI-I	10GBASE-LR, SFP+ transceiver, TX1270/RX1330, BiDi LC, 10 km over SMF
XG-SFP-LR10-SM1330-BIDI-I	10GBASE-LR, SFP+ transceiver, TX1330/RX1270, BiDi LC, 10 km over SMF

License

Model	Description
RG-LIC-WS-16	The number of capacity expansion licenses for the RG-WS series wireless controller can be expanded to 16. Each license supports one generic AP or two wall plate APs.
RG-LIC-WS-32	The number of capacity expansion licenses for the RG-WS series wireless controller can be expanded to 32. Each license supports one generic AP or two wall plate APs.
RG-LIC-WS-128	The number of capacity expansion licenses for the RG-WS series wireless controller can be expanded to 128. Each license supports one generic AP or two wall plate APs.
RG-LIC-WS-512	The number of capacity expansion licenses for the RG-WS series wireless controller can be expanded to 512. Each license supports one generic AP or two wall plate APs.
RG-LIC-WS-1024	The number of capacity expansion licenses for the RG-WS series wireless controller can be expanded to 1,024. Each license supports one generic AP or two wall plate APs.

08 Package Contents

Item	Quantity
RG-WS6012-L AC	1
Power cord	1
Rubber pad	4
M4 x 8 mm Phillips countersunk screw	6
Console cable	1
Grounding wire	1
Rack-mount bracket	2
Power cord retention clip	1
Warranty Card and Hazardous Substance Table	1
Quick Installation Guide	1

09 Warranty

For more information about warranty terms and period, contact your local sales agency:

- Warranty terms: https://www.ruijie.com/support/servicepolicy
- Warranty period: https://www.ruijie.com/support/servicepolicy/Service-Support-Summany/

Note: The warranty terms are subject to the terms of different countries and distributors.

10 More Information

For more information about Ruijie Networks, visit the official Ruijie website or contact your local sales agency:

- Ruijie Networks official website: https://www.ruijie.com/
- Online support: https://www.ruijie.com/support
- Hotline support: https://www.ruijie.com/support/hotline
- Email support: service_rj@ruijie.com
- *WLAN Country or Region Codes and Channel Compliance:* https://www.ruijie.com/support/documents/slide_wlan-country-codes-overview

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For more information, visit www.ruijie.com or call 86-400-620-8818.