



RG-S6510-4C Switch Datasheet

FEATURE HIGHLIGHTS

- Compact 2U design with high-density 25G and 100G
- Flexible module configuration: 24×25G+2×100G or 8×100G
- Maximum support 96x25G ports and 8x100G ports, or 32x100G ports
- Bundled with Advanced Datacenter features without additional investment e.g. VXLAN, RDMA, IPv6, Telemetry, etc.
- High reliability: Hot patches, power and fan redundancy support

Ruijie's **RG-S6510-4C Switch** is a new-generation switch released by Ruijie Networks for cloud data centers and high-end parks. It is highlighted by its high performance, high density, and flexible card insertion. RG-S6510-4C is a 2U box switch, which supports three types of cards: M6500-24VS2CQ, M6500-08CQ. It can accommodate a maximum of 96x25G ports, or 32x100G ports. Each 100G port supports 100G and 40G adaptive. The switch provides 1+1 power redundancy and 2+1 fan redundancy and both the power module and fan support hot swap.



Figure 1: RG-S6510-4C (Rear View)

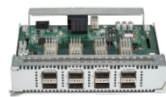


Figure 2: M6500-08CQ



Figure 4: M6500-24VS2CQ

PRODUCT FEATURES

Non-blocking Performance with Powerful Caching Capacity

The whole series of switches oriented towards next-generation data centers and cloud computing are line-rate products. They are in line with the development trend of bidirectional traffic between the Internet and data centers and are applicable to heavy-traffic next-generation data centers.

RG-S6510-4C is capable of providing 96x25G ports and 8x100G ports, or 32x100G ports in the 2U height, achieving 1:1 convergence ratio in the upstream and downstream direction. All the ports can forward data at the line rate.

In allusion to requirements for unblocked transmission of heavy-traffic data in data centers, RG-S6510-4C offers powerful cache capacity and uses the advanced cache scheduling mechanism, to ensure that the cache capacity of the device is effectively leveraged.

Data Center Virtualization

RG-S6510-4C adopts the virtual switch unit (VSU) 2.0 technology to virtualize multiple physical devices into one logical device, which reduces network nodes and enhances network reliability. These physical devices can be operated and managed in a unified manner. The switch can implement fast link switching within 50 ms to 200 ms in case of a failure, thereby ensuring uninterrupted transmission of key services. The inter-device link aggregation

feature implements dual active uplinks for data through access servers and switches.

The device supports Ethernet VPN (EVPN) Virtual Extensible LAN (VXLAN), which overcomes network scale expansion difficulties caused by inadequate network VLANs in conventional data centers. The VXLAN technology encapsulates layer-2 packets into User Datagram Protocol (UDP) packets to build a logically layer-2 network on the layer-3 network. Users can deploy VXLAN without changing the original network architecture and flexibly migrate hosts (virtual machines) in data centers regardless of physical networks. In addition, network resources can be assigned to different new subnets without changing the physical topology, and restrictions on IP addresses and broadcast domains of physical networks do not need to be taken into account.

The switch also introduces a reliable control plane protocol EVPN to automatically discover and authenticate virtual tunnel end point (VTEPs), thereby reducing flooding at the VXLAN data plane and preventing VXLAN from relying on deployed underlying multicast services. EVPN can learn layer-2 and layer-3 information of servers on the control plane, which is conducive to the robustness and extension of VXLANs. The switch supports anycast gateway, which can optimize the mutual server access traffic, provide layer-3 gateway redundancy, and support virtual machine migration.

RDMA Lossless Infrastructure

The switch implements low-delay forwarding of the lossless Ethernet based on the Remote Direct Memory Access (RDMA) and optimizes service forwarding performance. It greatly reduces the operation cost per bit of the entire network and enhances the competitive edge of service products.

Hardware-based Traffic Visualization

Switch chips support the visualization hardware feature and can visualize the end-to-end traffic of complex multipath networks composed of multiple nodes. In this way, the forwarding path and delay of each session can be monitored in a centralized manner, thereby raising the fault locating efficiency by more than ten times.

Carrier-Class Reliability Protection

The RG-S6510-4C is equipped with built-in redundant power modules and modular fan assemblies. All interface boards, power modules, and fan modules can be hot-swapped without affecting normal running of the device. The switch provides fault detection and alarm functions for power modules and fans. It can automatically adjust the fan speed based on temperature changes, to better adapt to the environment in data centers. The device also provides multiple device-level and link-level reliability protection as well as overcurrent protection, overvoltage protection and overheating protection.

In addition, the switch supports Graceful Restart (GR), Bidirectional Forwarding Detection (BFD), and other mechanisms. They ensure appropriate network convergence time and normal running of services even if multiple services and heavy traffic are carried over the network.

IPv4/IPv6 Dual-Stack Multi-Layer Switching

The hardware of RG-S6510-4C supports IPv4 and IPv6 protocol stacks and multilayer line-rate switching. The hardware differentiates and processes IPv4 and IPv6 packets and supports multiple tunnel technologies (such as manually configured tunnels, automatic tunnels, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels). The switch can be used to flexibly build IPv6 inter-network communication solutions based on IPv6 network planning and network conditions.

The device supports numerous IPv4 routing protocols, including static routing, Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Intermediate System to Intermediate System (IS-IS), Border Gateway Protocol version 4 (BGP4). Users can select required routing protocols based on network environments, to flexibly build networks.

The device also supports abundant IPv6 routing protocols, including static routing, Routing Information Protocol next generation (RIPng), OSPFv3, and BGP4+.

Appropriate routing protocols can be selected to upgrade an existing network to an IPv6 network or build a new IPv6 network.

Flexible and Comprehensive Security Policies

RG-S6510-4C has a variety of internal mechanisms to effectively prevent and control virus propagation and hacker attacks to ensure green network environment. Such mechanisms include DoS attack prevention, anti-hacker IP scanning mechanism, port ARP packet validity check, and multiple hardware ACL strategies. The hardware-based IPv6 ACL can easily control the access of IPv6 users at the network boundary even if there are IPv6 users on an IPv4 network. The switch supports the coexistence of IPv4 and IPv6 users and can control access permissions of IPv6 users, for example, restrict the access to sensitive resources on the network.

The telnet access control based on source IP addresses can prevent illegitimate users and hackers from maliciously attacking and controlling the device, enhancing the network management security of the device. The Secure Shell (SSH) and Simple Network Management Protocol version 3 (SNMPv3) can encrypt management information in the telnet and SNMP processes, thereby ensuring information security of the switch and preventing hackers from attacking and controlling the switch.

The switch rejects the network access from illegitimate users and enables legitimate users to use networks properly by employing multi-element binding, port security, time-based ACL, and data stream-based rate limit. It can strictly control the user access to enterprise networks and campus networks and restrict the communication of unauthorized users.

Advanced Management

The switch provides various management interfaces such as the Console interface, MGMT interface, and USB interface, and supports SNMP v1/v2/v3 as well as universal network management platform and service management software such as BMC. It supports CLI-based management, telnet, and cluster management, which facilitates device management. The supported encryption modes such as SSH2.0 and SSL ensure more secure management.

In addition, the device supports the Switched Port Analyzer (SPAN)/Remote Switched Port Analyzer (RSPAN) and multiple SPAN observation ports. It can analyze network traffic and take proper management and maintenance measures accordingly, clearly presenting the service traffic on a network. The device can provide various network traffic analysis reports so that users can optimize the network structure and adjust resource deployment in a timely manner.

TECHNICAL SPECIFICATIONS

Hardware Specifications

Model		RG-S6510-4C
Ports		96x25G ports and 8x100G ports, or 32x100G ports
Module Type		M6500-24VS2CQ, M6500-08CQ
Module Slots		4
Management Ports		One MGMT port, one Console port, and one USB port, compliant with the USB2.0 standard
Expansion Modules		2 Power module slots (1+1 Hot swappable) 3 Fan module slots (2+1 Hot swappable)
Switching Capacity		6.4 Tbit/s
Packet Forwarding Rate		2000 Mpps
CPU		4 cores processor at 1.0GHz
RAM		4GB
Flash Memory		8GB
System Buffer		32MB
Dimensions		442 x 520 x 86 (W x D x H, mm) (2U height)
Operating Temperature		0°C to 40°C
Operating Humidity (non-condensing)		10% to 90% RH
Weight		About 19 kg (including power modules and fans)
Maximum Power		< 650 W
Input Voltage	AC	Rated voltage range: 100 V to 240V AC, 50–60 Hz Maximum voltage range: 90 V to 264 V AC, 50–60 Hz Rated input current: 5 A to 10 A
	High-voltage DC	Input voltage range: 192–288 V DC Input current range: < 4.5 A
Reliability		390,000 hours
Safety Standards		GB4943-2011
Emission Standards		GB9254-2008 CLASSA, EN 300 386, EN 55032, EN 61000-3-2, EN 61000-3-3, EN 55035, EN61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11

Functions and Features

Model		RG-S6510-4C
Layer-2 Protocols		IEEE802.3ad (link aggregation), IEEE802.1p, IEEE802.1x, IEEE802.1Q, IEEE802.1D (STP), IEEE802.1w (RSTP), IEEE802.1s (MSTP), IGMP Snooping, Jumbo Frame (9 KB), IEEE802.1ad (QinQ), and GVRP
Layer-3 Protocols (IPv4)		BGP4, OSPFv2, RIPv1, RIPv2, MBGP, LPM Routing, Policy-based Routing, Route-policy, ECMP, WCMP, VRRP, IGMP v1/v2/v3, DVMRP, PIM-SSM/SM/DM, MSDP, Any-RP
IPv6 Basic Protocols		Neighbor Discovery (ND), ICMPv6, Path MTU Discovery, DNSv6, DHCPv6, ICMPv6, ICMPv6 redirection, ACLv6, TCP/UDP for IPv6, SNMP v6, Ping/Traceroute v6, IPv6 RADIUS, Telnet/SSH v6, FTP/TFTP v6, NTP v6, IPv6 MIB support for SNMP, VRRP for IPv6, IPv6 QoS
IPv6 Features		Static routing, equal-cost routing, PBR, OSPFv3, RIPng, BGP4+, MLDv1/v2, PIM-SMv6, manual tunnel, automatic tunnel, IPv4 over IPv6 tunnel, and ISATAP tunnel
Data Center Features		Supports PFC, ECN, and other data center features. Supports RDMA. Support VXLAN routing and VXLAN bridging. Supports EVPN VXLAN. Supports OpenFlow 1.3.
Visualization		Supports the GRPC protocol. Supports sFLOW high-precision sampling.
QoS		Supports EXP priority mapping including 802.1p, DSCP, ToS, ACL-based traffic classification, priority marking/remarking, multiple queue scheduling mechanisms including SP, WRR, DRR, SP+WRR, and SP+DRR.
Virtualization		Supports the VSU technology (virtualizes multiple devices into one device).
HA Design		Supports GR for RIP, OSPF, BGP, and other routing protocols; Supports BFD. Supports REUP dual-link fast switching and RLDP unidirectional link detection. Supports 1+1 power redundancy and fan redundancy. Supports hot swap for all cards and power modules.

Model	RG-S6510-4C
Security Functions	Network Foundation Protection Policy (NFPP), CPP, DDoS attack defense, illegitimate data packet detection, data encryption, source IP spoofing prevention, IP scanning prevention, RADIUS/TACACS, ACL-based IPv4/v6 packet filtering by standard and extended VLANs, plaintext-based and MD5 ciphertext-based authentication for OSPF, RIPv2, and BGPv4 packets, telnet login and password mechanisms for restricted IP addresses, uRPF, broadcast packet suppression, DHCP Snooping, gateway ARP spoofing prevention, and ARP check
Management	SNMP v1/v2/v3, Telnet, Console, MGMT, RMON, SSHv1/v2, FTP/TFTP-based file upload/download management, NTP, Syslog, and SPAN/RSPAN
Other Protocols	DHCP Client, DHCP Relay, DHCP Server, DNS Client, UDP relay, ARP Proxy, and Syslog

Performance and Capacity

Model	RG-S6510-4C
Maximum MAC Address	96K
Maximum Forwarding Routes (FIB IPv4/IPv6)	128K
ARP Table	100K
Maximum VRF	2K
Maximum IPv6 ND (Neighbor Discovery)	60K
Maximum VRRP Groups	500
Maximum ECMP Paths	512
Maximum ACL	Ingress 4500/Egress 1000
Maximum Tunnel Endpoints (VTEP)	512
Maximum MSTP Instance	64
Maximum 802.1q VLAN	4K

Application

Ruijie RG-S6500 Series is designed for the data center network in AI, Big Data and Cloud Computing era. With the breakthrough of deep learning algorithm, enormous sample data and HPC (high-performance computing) capabilities are used in the data center. The data center need a network which featured with

high throughput, zero packet loss and low latency. With the technologies related to RoCE (RDMA over Converged Ethernet), the RG-S6500 series can be used to help kinds of customers, such as Cloud providers, AI and Big Data companies and HPC users, build a visible and lossless data center.

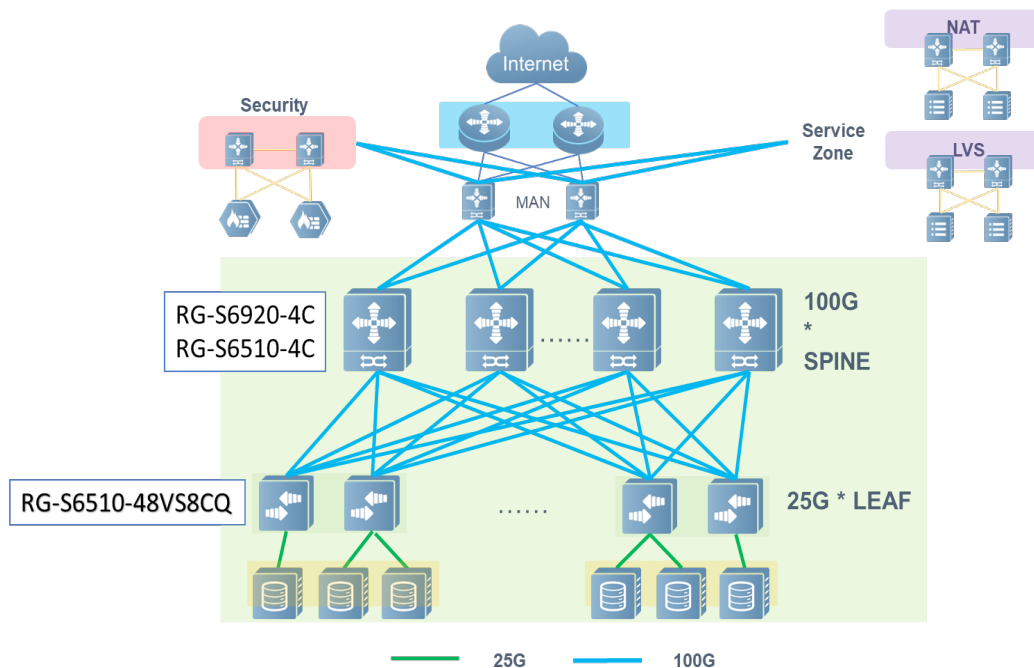


Figure 5: Ruijie 25G/100G Lossless Data Center Network Architecture

Ordering Information

1. Switches, expansion modules, fans and power modules

Model	Description
RG-S6510-4C	4-slot module 25G/100G Data Centre Switch (2U Compact Design) (Max ports: 96x25G ports and 8x100G ports, or 32x100G ports) Support 1+1 power supply redundancy (factory default with 2 RG-PA800I-F) Support 2+1 fan tray redundancy (factory default with 3 M6500-FAN-F)
RG-PA800I-F	AC Power Supply Module for RG-S6510-4C, support 1+1 redundancy, hot swap, and front-to-rear ventilation channel design
M6500-FAN-F	Fan Tray for RG-S6510-4C, support 2+1 redundancy, hot swap, and front-to-rear ventilation channel design
M6500-08CQ	Eight QSFP28 interface cards, supports the 40G/100G rates
M6500-24VS2CQ	Twenty-four 25G SFP28 interface cards and two QSFP28 interface boards SFP28 supports 10G/25G rates QSFP28 supports 40G/100G rates and 4x10G/4x25G ports

2. Transceivers and Accessories

Model	Description
VG-SFP-SR-SM850	25G SR optical transceiver, SFP28 encapsulation, LC interfaces, and 850 nm wavelength. The transmission distance is 100 m when OM4 optical fibers are used and 70 m when OM3 optical fibers are used.
VG-SFP-LR-SM1310	25G LR optical transceiver, SFP28 encapsulation, LC interfaces, and 1310 nm wavelength. The transmission distance is 10 km when single-mode fibers are used.

3. Optional 40G and 10G Optical Transceivers

Model	Description
40G-QSFP-SR-MM850	40G SR optical transceiver for QSFP+ interfaces (OM3/OM4 MPO optical fibers, 8-core, and 850 nm wavelength. The transmission distance is 100 m when OM3 optical fibers are used and 150 m when OM4 optical fibers are used.)
40G-QSFP-LSR-MM850	40G SR optical transceiver for QSFP+ interfaces (used in combination with OM3/OM4 MPO optical fibers, 8-core or 12-core, and 850 nm wavelength. The transmission distance is 300 m when OM3 optical fibers are used and 400 m when OM4 optical fibers are used.)
40G-QSFP-LR4-SM1310	40G LR single-mode optical transceiver for QSFP+ interfaces. The maximum transmission distance is 10 km (LC optical fibers required, 2-core, and 1310 nm wavelength).

4. Optional 100G Optical Transceivers

Model	Description
100G-QSFP-SR-MM850	(SR4 optical transceiver) 100G SR optical transceiver, QSFP28 encapsulation, MPO interfaces, and 850 nm wavelength. The transmission distance is 100 m when OM4 optical fibers are used and 70 m when OM3 optical fibers are used. It can be split into four 25GE SFP+ multi-mode short-distance optical transceivers.
100G-QSFP-iLR4-SM1310	(CWDM4 optical transceiver) 100G iLR optical transceiver, QSFP28 encapsulation, LC interfaces, and 1310 nm wavelength. The maximum transmission distance is 2 km (applicable to single-mode optical fibers).
100G-QSFP-LR4-SM1310	(LR4 optical transceiver) 100G LR optical transceiver, QSFP28 encapsulation, LC interfaces, and 1310 nm wavelength. The maximum transmission distance is 10 km (applicable to single-mode optical fibers).

