

# RG-S6990-128QC2XS

Next-Generation Data Center and  
Cloud Computing Core Switch



## 01 Product Overview

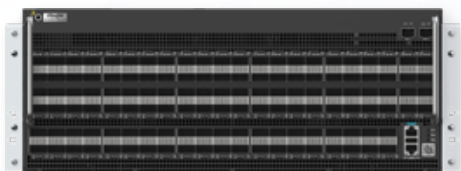
The RG-S6990-128QC2XS is a next-generation, high-performance, and high-density fixed switch launched by Ruijie Networks for high-end data centers and AIGC intelligent computing networks.

With an advanced hardware architecture, the switch provides 128 x 400GE ports and 2 x 10GE ports, all of which support line-rate forwarding. The switch enables swappable power redundancy and fan redundancy. Remote Adaptive Load Balancing (RALB) and Artificial Intelligence Scene Load Balancing (AILB) of the AI-Fabric solution improve the bandwidth and shorten the AI training time in AIGC intelligent computing scenarios. A typical two-tier network supports a cluster of up to 8,000 GPUs, while a typical three-tier network accommodates a cluster of up to 100,000 GPUs. One-click RoCE configuration can be employed to import ECN, PFC and other complicated RDMA-related configuration for quick deployment.

## 02 Product Appearance



RG-S6990-128QC2XS  
Front-Top View



RG-S6990-128QC2XS  
Front View



RG-S6990-128QC2XS  
Rear View

## 03 Product Features

### Building Next-Generation Data Center Networks

The rapid development of AI, machine learning, big data, high-performance computing, distributed storage, and other applications is driving the evolution of next-generation data center networks towards the evolution

to 200GE/400GE. The next-generation data center networks require devices to provide higher performance and greater bandwidth in a unit space.. The RG-S6990-128QC2XS provides up to 128 x 400GE ports and 2 x 10GE ports housed in a 4-RU enclosure, thereby coping with evolution requirements of next-generation data center networks.

## Building High-Performance and Low-Latency Data Center Networks

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The RG-S6990-128QC2XS works in conjunction with the RG-S6580 series switches to build end-to-end, lossless, low-latency remote direct memory access (RDMA) networks by using advanced network flow control technologies such as PFC and ECN, as well as the memory management unit (MMU) technology. In addition, the switch supports RALB and AILB of Ruijie AI-Fabric solution to resolve the equal-cost multi-path routing (ECMP) conflict caused by per-flow load balancing and increase the bandwidth in the AIGC intelligent computing scenario, thereby shortening the AI training time. This meets network deployment requirements across various scenarios including AI, machine learning, high-performance computing, distributed storage, big data, and other applications.

## Carrier-Class High Reliability

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The RG-S6990-128QC2XS supports 2+2 power redundancy and 4+1 fan redundancy. All power modules and fan modules can be hot swapped without affecting service continuity on the switch. The switch provides fault detection and alarm functions for power modules and fan modules, and can automatically adjust fan speed based on ambient temperature to adapt to environment changes in data centers. The switch also supports device-level and link-level reliability protection as well as overcurrent protection, overvoltage protection, and over temperature protection .

In addition, the switch integrates various link availability mechanisms such as networking through dual redundant ports, graceful restart (GR), and bidirectional forwarding detection (BFD). When multiple services and heavy traffic are carried over the network, these mechanisms can reduce the impact of exceptions on network services and enhance the overall availability.

## Quick Deployment

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The switch features automatic configuration of network parameters and profile-based provisioning, allowing for rapid deployment and significantly shortening project deployment time.

It also supports automated acceptance testing, including cable testing, optical transceiver testing, and device testing, to ensure high-quality delivery.

## Intelligent O&M

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The switch offers AI-powered automatic ECN tuning, real-time telemetry of key RoCE network metrics, visualization of server status and RoCE services, along with congestion and packet loss analytics.

## IPv4/IPv6 Dual-Stack Protocols and Multilayer Switching

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The hardware of the RG-S6990-128QC2XS supports IPv4 and IPv6 protocol stacks and multilayer line-rate switching. It is capable of distinguishing IPv4 and IPv6 packets and supports multiple tunneling technologies (such as manually configured tunnels), providing flexible communication solutions based on IPv6 network planning and the current network environment.

The switch supports various IPv4 routing protocols, including static routing, Routing Information Protocol (RIP), RIPv2, Open Shortest Path First (OSPF), and Border Gateway Protocol version 4 (BGP4). Users can select appropriate routing protocols based on network environments, to flexibly build networks.

The switch also supports abundant IPv6 routing protocols, including static routing, Routing Information Protocol next generation (RIPng), OSPFv3, and BGP4+. Users can select appropriate routing protocols to upgrade an existing network to an IPv6 network or build a new IPv6 network.

## All-Round Management Performance

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The RG-S6990-128QC2XS switch provides various management ports such as the Console port, MGMT port, and USB port, and supports Simple Network Management Protocol (SNMP) v1/v2c/v3 and universal network management platform. It supports CLI-based management, telnet, and cluster management, which facilitates device management. The switch also supports encryption protocols such as SSH2.0 and SSL to ensure the security of management operations.

In addition, the switch supports Switched Port Analyzer (SPAN) and Remote Switched Port Analyzer (RSPAN), and multiple mirroring destination ports, making network traffic monitoring intuitive and helping users optimize the network structure and resource configuration promptly based on traffic analysis reports.

## 04 Product Specifications

### Hardware Specifications

| Item                   | RG-S6990-128QC2XS                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions (W x D x H) | 446 mm x 800 mm x 173.6 mm (17.56 in. x 31.5 in. x 6.84 in.)                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Rack height            | 4 RU                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Unit weight            | 37.6 kg (82.89 lbs., empty chassis)<br>45 kg (99.21 lbs., a chassis with four power modules and five fan modules)                                                                                                                                                                                                                                                                                                                                                                  |
| Switching capacity     | 102.4 Tbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Packet forwarding rate | 21000 Mpps                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Service port           | 128 x 100G/200G/400G QSFP112 ports<br>2 x GE/10GE SFP+ ports                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Management port        | 1 x RJ45 console port<br>1 x RJ45 MGMT port                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| USB port               | 1 x USB 2.0 port (Type A connector)                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Module slot            | 4 x power module slots<br>5 x fan module slots                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Power consumption      | Maximum power consumption: 3160 W<br>Typical power consumption: 2432 W<br>Static power consumption: 433 W                                                                                                                                                                                                                                                                                                                                                                          |
| Power input            | RG-PA1600II-F (AC input):<br>Rated input voltage: 100 V AC to 127 V AC, 200 V AC to 240 V AC, 50 Hz/60 Hz<br>Maximum input voltage: 90 V AC to 140 V AC, 180 V AC to 264 V AC, 47 Hz to 63 Hz<br>Rated input current: 12 A (100 V AC to 127 V AC)<br>9.5 A (200 V AC to 240 V AC)<br>Power port type: C14<br><br>RG-PA1600II-F (HVDC input):<br>Rated input voltage: 240 V DC<br>Maximum input voltage: 180 V DC to 300 V DC<br>Rated input current: 9.5 A<br>Power port type: C14 |
| Temperature            | Operating temperature: 0°C to 40°C (32°F to 104°F)<br>Storage temperature: -40°C to +70°C (-40°F to +158°F)<br>Note: At altitudes ranging from 1,800 m (5,905.51 ft.) to 5,000 m (16,404.20 ft.), the maximum temperature decreases by 1°C (1.8°F) for every 200 m (656.17 ft) increase in elevation.                                                                                                                                                                              |
| Humidity               | Operating humidity: 10% RH to 90% RH (non-condensing)<br>Storage humidity: 5% RH to 95% RH (non-condensing)                                                                                                                                                                                                                                                                                                                                                                        |
| Altitude               | Operating altitude ≤ 5,000 m (16,404.20 ft.)<br>Storage altitude ≤ 5,000 m (16,404.20 ft.)                                                                                                                                                                                                                                                                                                                                                                                         |
| Cooling                | Air cooling, front-to-rear airflow (port-side intake)                                                                                                                                                                                                                                                                                                                                                                                                                              |

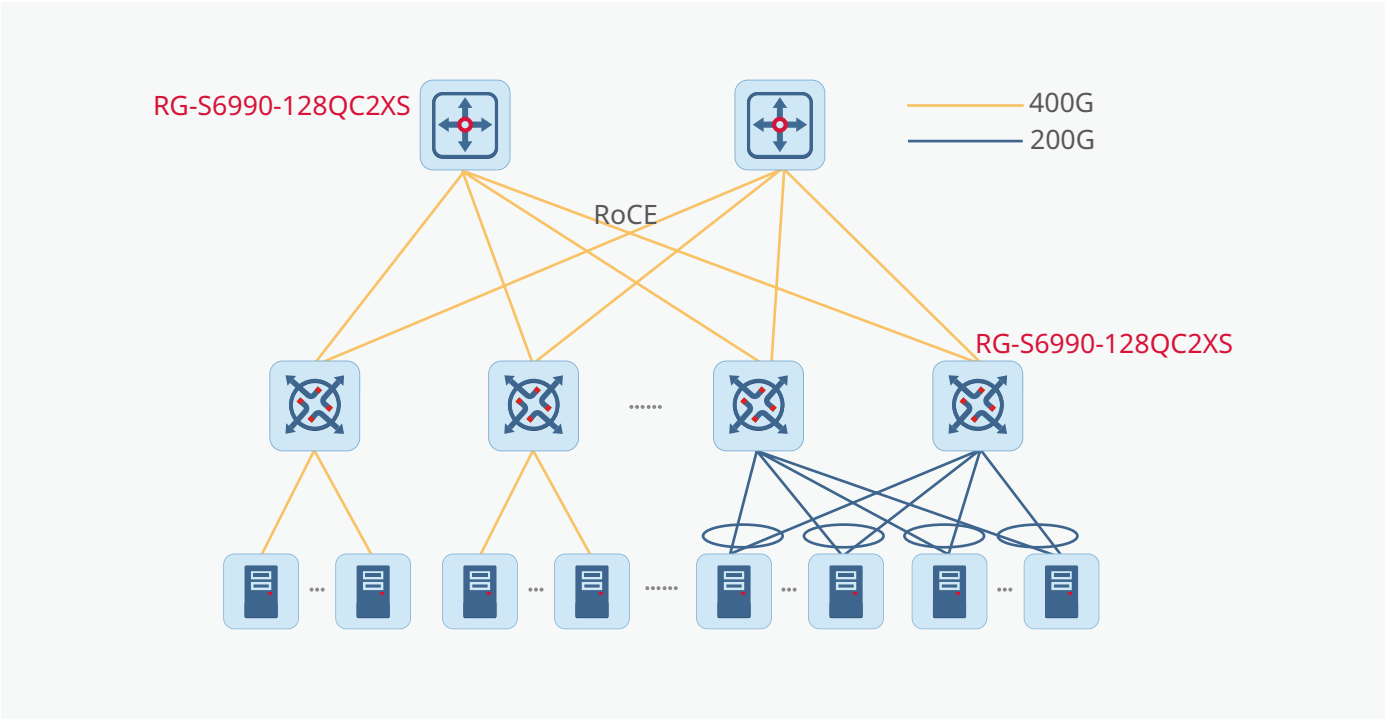
## Software Specifications

| Item                     | RG-S6990-128QC2XS                                                                                                                                                                                                                                                                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Layer 2 protocols        | IEEE 802.3ae (10GBase), IEEE 802.3ak, IEEE 802.3an, IEEE 802.3x, IEEE 802.3ad (Link Aggregation Control Protocol), IEEE 802.1p, IEEE 802.1Q, IEEE 802.1D (STP), IEEE 802.1w (RSTP), IEEE 802.1s (MSTP), Jumbo Frame (9 KB)                                                                                                                              |
| Layer 3 protocols (IPv4) | BGP4, OSPFv2, RIPv1, RIPv2, LPM Routing, Policy-based Routing, Route-policy, ECMP, WCMP, VRRP                                                                                                                                                                                                                                                           |
| Basic IPv6 protocols     | Neighbor Discovery, ICMPv6, Path MTU Discovery, DNSv6, DHCPv6, ICMPv6, ICMPv6 redirection, ACLv6, IPv6 TCP/UDP, SNMPv6, IPv6 Ping/Traceroute, IPv6 RADIUS, IPv6 Telnet/SSH, IPv6 FTP/TFTP, NTPv6, IPv6 MIB for SNMP, IPv6 VRRP, IPv6 QoS                                                                                                                |
| IPv6 features            | Static routing, ECMP, PBR, OSPFv3, RIPng, BGP4+                                                                                                                                                                                                                                                                                                         |
| Data center features     | VXLAN, BGP-EVPN<br>RDMA<br>PFC, ECN<br>PFC deadlock prevention<br>AI ECN<br>ECN overlay<br>Global loading balancing, Remote Adaptive Load Balancing (RALB), Artificial Intelligence Scene Load Balancing (AILB), end-to-network load balancing (ENLB), source port-based load balancing (SPLB)                                                          |
| Visualization            | Telemetry<br>sFlow<br>INT, MOD                                                                                                                                                                                                                                                                                                                          |
| QoS                      | IEEE 802.1p, DSCP, and ToS mapping<br>ACL-based traffic classification<br>Priority marking and re-marking<br>Multiple queue scheduling mechanisms, including SP, WRR, WFQ, DRR, SP+WRR, SP+WFQ, SP+DRR<br>Congestion avoidance mechanisms such as WRED and tail discarding                                                                              |
| High redundancy design   | GR for RIP/OSPF/BGP, BFD, DLDP, REUP, Rapid Link Detection Protocol (RLDP), 2 + 2 power redundancy, fan redundancy, and hot swapping of line cards and power modules                                                                                                                                                                                    |
| Security features        | Network Foundation Protection Policy (NFPP), CPU Protection Policy (CPP), RADIUS/TACACS, IPv4/IPv6 packet filtering by basic ACL, extended ACL or VLAN-based ACL, cleartext and MD5-based authentication for OSPF, RIPv2, and BGPv4 packets, telnet from specified IP addresses, broadcast packet suppression, and hierarchical user management<br>MLAG |
| Management mode          | SNMP v1/v2c/v3, telnet, console, MGMT, RMON, SSHv1/v2, FTP/TFTP, NTP clock, Syslog, SPAN/RSPAN/ERSPAN, ZTP, NETCONF, Python, fan and power alarm, temperature alarm                                                                                                                                                                                     |
| Other protocols          | DHCP Client, DHCP Relay, DHCP Server, DNS Client, ARP Proxy, and Syslog                                                                                                                                                                                                                                                                                 |

05

Typical Applications

AIGC Network Scenario



06

Ordering Guide

- Take the following steps to configure an RG-S6990-128QC2XS:
- Select the chassis.
  - Select optical transceivers based on the port types and quantity required.

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Ordering Information

Chassis, Fan Modules, and Power Modules

| Model             | Description                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------|
| RG-S6990-128QC2XS | Fixed 128 x 400GE ports, 2 x 10GE ports, four power module slots, and five fan module slots |
| RG-PA1600II-F     | Power module, hot swappable 2 + 2 redundancy, front-to-rear airflow                         |
| FAN80-180F        | Fan module, hot swappable 4 + 1 redundancy, front-to-rear airflow                           |

## 1GE Optical Transceivers

| Model                     | Description                                                                              |
|---------------------------|------------------------------------------------------------------------------------------|
| GE-SFP-LX20-SM1550-BIDI   | 1GE LX transceiver, SFP form factor, BIDI LC, 1550 nm, 20 km (65,616.80 ft.) over SMF    |
| GE-SFP-LX20-SM1310-BIDI   | 1GE LX transceiver, SFP form factor, BIDI LC, 1310 nm, 20 km (65,616.80 ft.) over SMF    |
| GE-SFP-LX03-SM1550-BIDI-I | 1GE LX transceiver, SFP form factor, BIDI LC, 1550 nm, 3 km (9,842.52 ft.) over SMF      |
| GE-SFP-LX03-SM1310-BIDI-I | 1GE LX transceiver, SFP form factor, BIDI LC, 1310 nm, 3 km (9,842.52 ft.) over SMF      |
| GE-SFP-LH40-SM1550-BIDI   | 1GE LH transceiver, SFP form factor, BIDI LC, 1550 nm, 40 km (131,233.59 ft.) over SMF   |
| GE-SFP-LH40-SM1310-BIDI   | 1GE LH transceiver, SFP form factor, BIDI LC, 1310 nm, 40 km (131,233.59 ft.) over SMF   |
| MINI-GBIC-ZX80-SM1550     | 1GE ZX transceiver, SFP form factor, duplex LC, 1550 nm, 80 km (262,467.20 ft.) over SMF |

## 10GE Optical Transceivers

| Model               | Description                                                                               |
|---------------------|-------------------------------------------------------------------------------------------|
| XG-SFP-AOC5M        | 10GE AOC cable, SFP+ form factor, 5 m (16.40 ft.)                                         |
| XG-SFP-LR-SM1310    | 10GE LR transceiver, SFP+ form factor, duplex LC, 1310 nm, 10 km (32,808.40 ft.) over SMF |
| XG-SFP-iLR-SM1310-I | 10GE LR transceiver, SFP+ form factor, duplex LC, 1310 nm, 1.4 km (4,593.18 ft.) over SMF |

## 100GE Optical Transceivers

| Model                 | Description                                                                                    |
|-----------------------|------------------------------------------------------------------------------------------------|
| 100G-QSFP-ER4-SM1310  | 100GE ER4 transceiver, QSFP28 form factor, duplex LC, 1310 nm, 40 km (131,233.59 ft.) over SMF |
| 100G-QSFP-iLR4-SM1310 | 100GE iLR4 transceiver, QSFP28 form factor, duplex LC, 1310 nm, 2 km (6,561.68 ft.) over SMF   |
| 100G-QSFP-LR4-SM1310  | 100GE LR4 transceiver, QSFP28 form factor, duplex LC, 1310 nm, 10 km (32,808.40 ft.) over SMF  |
| 100G-QSFP-SR-MM850    | 100GE SR transceiver, QSFP28 form factor, MPO, 850 nm, 100 m (328.08 ft.) over OM4 MMF         |

## 200GE Optical Transceivers

| Model                 | Description                                                                                                            |
|-----------------------|------------------------------------------------------------------------------------------------------------------------|
| 200G-Q56-SR4-MM850(D) | 200GE SR4 transceiver, QSFP56 form factor, MPO12/APC, 850 nm, 100 m (328.08 ft.) over OM4 MPO MMF, CMIS-compliance     |
| 200G-Q56-SR4-MM850    | 200GE SR4 transceiver, QSFP56 form factor, MPO12/APC, 850 nm, 100 m (328.08 ft.) over OM4 MPO MMF, SFF-8636-compliance |

## 400GE Optical Transceivers

| Model                | Description                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------|
| 400G-Q112-DR4-SM1310 | 400GE DR4 transceiver, QSFP112 form factor, MPO-12 APC, 1310 nm, 500 m (1,640.42 ft.) over SMF |
| 400G-Q112-VR4-MM850  | 400GE VR4 transceiver, QSFP112 form factor, MPO-12 APC, 850 nm, 50 m (164.04 ft.) over OM4 MMF |

## 08 Warranty

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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-Summary/>

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

## 09 More Information

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For more information about Ruijie Networks, visit the official website of Ruijie Networks 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](mailto:service_rj@ruijie.com)



**Ruijie Networks Co., Ltd.**

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