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## ZTE ZXR10 5960-H Series Switch Data Sheet

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# ZTE

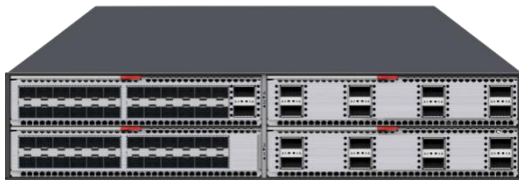


## Product Overview

The ZXR10 5960-H Series switch is next-generation carrier-grade data center TOR (Top of Rack) switch with ultra-big switching capacity and low latency. It provides high density 10GE/25GE/40GE/100GE interfaces, carrier-class reliability and superior scalability. The ZXR10 5960-H Series switch supports extensive data center service features such as VSC (Virtual Switch Cluster)/VXLAN (Virtual eXtensible Local Area Network)/ SDN (Software Defined Network)/ Front-to-back airflow. The ZXR10 5960-H Series switch can work with the ZXR10 9900/9900-S Series switch to build elastic, virtualized, high-quality switching network that meets the requirements of cloud-computing data centers.

**The ZXR10 5960-H Series switch offers the following switch products:**

### **5960-4M :**



**ZXR10 5960-4M-HC**



**ZXR10 5960-4M-S**

**5960-4M-S/HC:** 4 Sub Card Slots, 3 fan modules, 2 AC/DC/HVDC power supply modules, front-to-back airflow.

### **The Sub Card Slots of 5960-4M-S/HC support:**

- M24Q2U: 24\*25GE SFP28 + 2\*100GE QSFP28
- M24N2U: 24\*10GE RJ45 + 2\*100GE QSFP28(only 5960-4M-HC support)
- M16L: 16 \*QSFP+ (only 5960-4M-HC)
- M24Q: 24\*25GE SFP28
- M8U: 8\*100GE QSFP28



## 5960-H:



**ZXR10 5960-32LC-H**



**ZXR10 5960-52DU-H**



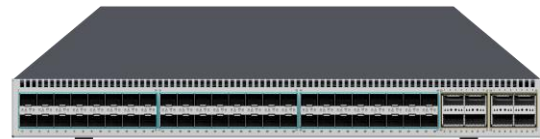
**ZXR10 5960-64DL-H**



**ZXR10 5960-72DL-H**



**ZXR10 5960-72NL-H**



**ZXR10 5960-56QU-HC**

**5960-32LC-H:** 32\*40GE QSFP+ optical ports (or 4\*10GE SFP+ optical ports, 4\*10GE RJ45 electrical ports and 30\*40GE QSFP+ optical ports), 2 fan modules, 2 AC/DC/HVDC power supply modules, front-to-back or back-to-front airflow.

**5960-52DU-H:** 48\*10GE SFP+ optical ports and 4\*100GE QSFP28 optical ports, 2 fan modules, 2 AC/DC/HVDC power supply modules, front-to-back or back-to-front airflow.

**5960-64DL-H:** 48\*10GE SFP+ optical ports and 4\*40GE QSFP+ optical ports, 2 fan modules, 2 AC/DC/HVDC power supply modules, front-to-back or back-to-front airflow.



**5960-72DL-H:** 48\*10GE SFP+ optical ports and 6\*40GE QSFP+ optical ports, 2 fan modules, 2 AC/DC/HVDC power supply modules, front-to-back or back-to-front airflow.

**5960-72NL-H:** 48\*10GE RJ45 electrical ports and 6\*40GE QSFP+ optical ports, 2 fan modules, 2 AC/DC/HVDC power supply modules, front-to-back or back-to-front airflow.

**5960-56QU-HC:** 48\*25GE SFP28 optical ports , 8\*100GE QSFP28 optical ports,2\*10GSFP+ ports, 2 fan modules, 2 AC/DC/HVDC power supply modules, front-to-back or back-to-front airflow.

## Product Features

- **2RU TOR ,flexible cards ,supports up to 32x100GE , 32x40GE, 128x25GE, 128x10GE Ports , 6.4Tbps switching capacity**
  - 5960-4M-HC/5960-4M-S is flexible, offers various combinations of 100G/40G/25G/10G ports.
  - 5960-4M-HC/5960-4M-S supports up to 6.4Tbps switching capacity, 3200Mpps forwarding performance, L2/L3 line-speed forwarding.
  - 5960-4M-HC/5960-4M-S switch supports up to 32 × 100GE/ 128 × 25GE ports.
  - All the 100GE QSFP28 ports support working as four 25GE SFP28 ports. All the 100GE ports support working as 40GE ports, All the 25GE ports support working as 10GE ports.
- **1RU TOR supports 100G/40G/25G/10G multiple interfaces: maximum access density 32 40G, maximum 80 25G (32 of which are split by 100G), maximum 128 10G, maximum switching capacity 2.56Tbps**
  - The industry of 1RU equipment has 128 10GE ports with the highest 10-Gigabit port density, which meets the high-density access requirements of 10-Gigabit servers.
  - 1RU TOR supports up to 2.56Tbps switching capacity, 1440Mpps forwarding performance, L2/L3 line-speed forwarding.



- The 100GE QSFP28 port can be divided into four 25GE SFP28 ports (except 5960-52DU-H). The 40GE QSFP + port can be divided into four 10GE SFP + ports. The 100GE QSFP28 port can be reduced to 40GE (except 5960-52DU-H), and the 10 SFP+ optical port can be reduced to GE port.
- **Step into SDN Era**
  - 5960-H series switches are based on EVPN protocol to realize network virtualization and provide user access as leaf nodes in data center construction.
  - Supporting VXLAN protocol, supporting data center operation of up to 16M tenants and interconnection networking requirements across DC, without changing the existing network, can realize the expansion of large and second tier business and rapid deployment and migration of business.
  - In the VXLAN application scenario, 5960-H series switches as virtual machine gateways expand the network scale, reduce the load of core equipment and improve network reliability.
  - Through southbound interface of SDN Controller Netconf/OpenFlow, the ZXR10 5960-H Series switch can download forwarding flow table, set up VxLAN forwarding tunnel, service configuration and centralized management.
  - Visual GUI interface of SDN controller helps customer realize easy operation and service provisioning.
- **Deliver Better Data Center Service Experience.**
  - Support DCB (Data Center Bridging) protocol family and fully guarantee network reliability and no loss in full range. The ZXR10 5960-H/HC Series switch supports PFC (Priority-based Flow Control), QCN (Quantized Congestion Notification), ETS (Enhanced Transmission Selection), DCBX (Data Center Bridging Exchange), which ensure low latency and zero packet loss for high-speed computing services.
  - Support a variety of EVB (Ethernet Virtual Bridging) styles including VM, VEB, VEPA (Virtual Ethernet Port aggregator). Support VEPA (Virtual Ethernet Port Aggregation) scheme, to meet the coexistence of VM, VEB and VEPA application modes, while supporting VDP, EDCP,



- CDCP protocols, to ensure the stable operation of EVB, to provide security for service virtualization transition.
- Supporting VXLAN protocol, supporting self-learning, SDN, EVPN and other control plane technologies, adapting to new, rebuilt and other application scenarios, can be docked with cloud platform to achieve unified management of hardware and software network.
  - Supporting VXLAN protocol, supporting self-learning, SDN, EVPN and other control plane technologies, adapting to new, rebuilt and other application scenarios, can be docked with cloud platform to achieve unified management of hardware and software network.
  - Support EVPN protocol, RT-2 (support for MAC synchronization, ARP synchronization), RT-5 (support for subnet synchronization); support IRB symmetric forwarding mode, support distributed routing, support EVPN RR
  - Supports DCI function, supports two-tier communication, three-tier communication and two-tier hybrid communication between DCI, supports VNI label conversion, realizes MAC and routing synchronization within and outside DC.
- **High-Performance VSC2.0 (Virtual Switch Cluster) Technology**
    - Support VSC2.0 (Virtual Switch Cluster), which enhances cluster system capacity and port density, simplifies network topology and management.
    - Real time hot-standby information synchronization between master and standby master to ensure seamless switch over against network failures, enhancing network reliability.
    - Stacking bandwidth between the VSC switches can be up to 800Gbps, which can solve the bandwidth bottleneck of VSC and deliver customers a real-time non-blocking VSC system.
    - The stacking distance can be up to 80km, it helps customers get rid of distance restriction while designing a reliable VSC system.
    - Master and slave in VSC works in 1+N redundancy mode, MAD (Multi-active Detect) technology is used to detect and avoid dual master in VSC system when failure happens. Together with real-time hot-standby and seamless switchover it brings customer a more flexible VSC network.



- No need special stacking sub-card, the normal ports can be used for VSC2.0 connecting, which helps customers save investments.
- **Powerful Service Bearing Capability**
  - By supporting rich L2 switching and L3 routing functions and low latency forwarding, The ZXR10 5960-H Series switch can bear lots of service including WLAN, Internet, Voice, Video, Enterprise private network and other data services.
  - Support Voice VLAN (which means the automatic assignment of dedicated VLAN and QoS strategy to voice equipment), thus enabling the voice traffic to enjoy high priority.
  - Support L2/L3 multicast, including IGMP snooping, Filtering, Proxy and Fast leave, MVR (Multicast VLAN Registration) and PIM to facilitate the services deployments such as Multi-terminal HD video surveillance and video conferencing.
- **Comprehensive IPv6 Solution**
  - The ZXR10 5960-H Series switch has passed the IPv6 Ready Phase 2 Gold Medal Certification issued by IPv6 Forum.
  - IPv4 unicast routing protocols such as RIP, OSPF, ISIS, BGP, IGMP, PIM-SM and PIM-DM are supported.
  - Support IPv6 unicast routing protocols: IPv6 static routing, RIPng, OSPFv3, IS-ISv6, and BGP4+ and multicast features: MLD v1/v2, MLD snooping, PIMv6.
  - Supports IPv4-to-IPv6 tunnel technologies: IPv6 manual tunnels, 6-to-4 tunnel, ISATAP tunnel and IPv4-compatible automatic tunnel, etc.
  - MPLS LDP, MPLS MCE, VPLS and VPWS, MPLS L2 VPN, MPLS L3 VPN, tag ECMP, MPLS L2 VPN support the access of SG and SG sub-interfaces, and tag hash export for SG.
- **Enhanced 10GE/40GE/100GE MPLS Network**
  - Supports MCE, enabling it to run multiple VPN instances without running MPLS, relieving pressure on the PE (provider edge) equipment.



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- Support LDP, LDP FRR, providing an stable MPLS application.
- Support MPLS L2/L3 VPN, providing an economical reliable VPN solution for carrier network leased line service.
- **Carrier-Grade Reliability and Multiple Dimensional Security**
  - Support dual redundant modular fan and dual modular power supply.
  - Support Ethernet OAM, including IEEE 802.3ah, 802.1ag, help monitor network real-time operating status and fulfill fast fault detection, fault location.
  - Support various authentication methods such as 802.1x, Radius, TACACS+. Support CPU overload protection, anti-DDOS, deliver customer a security network.
  - Supporting VRRPE not only enhances the protection of the network, but also keeps the backup device in the backup group working and improves the utilization of network resources.
  - Supporting MC-LAG cross-device link aggregation technology, realizing multi-device link aggregation, improving the flexibility of bi-directional networking equipment, enhancing the reliability of bi-directional system, and running spanning tree protocol on MC-LAG cross-link aggregation link.
- **Easy Maintenance, Saving OPEX**
  - Zero-touch provisioning, download software and configuration to the switch automatically from the server, reduce provision process and man power requirement.
  - Support ALS (automatic laser shutdown), protect people against laser injury when plug out the optical module.
- **Green for More**
  - Front-to-back shoot-through airflow and more air hole design in the front panel improve heat dissipation to reduce power consumption.





- Fan speed can automatically adjust by 5 levels in accordance with the temperature inside the switch. It not only saves the power consumption, but also reduces noise and extends life cycle of the fans.
- Complying with ROHS, WEEE and ISO14001 certification, No Plumbum (Pb) in not only product materials but also the whole product processing. Meanwhile, use re-cycles degradable packing materials, practice green for more.

## System Specification

Parameters	5960-4M-S	5960-4M-HC
Height	2RU	
Dimensions	88.1mm*444mm*600mm (H*W*D)	
Slots Number	4	4
Sub Card	<b>M24Q2U:</b> 24*25GE SFP28 + 2*100GE QSFP28 <b>M24Q:</b> 24*25GE SFP28 <b>M8U:</b> 8*100GE QSFP28 <b>M24N2U:</b> 24*10GE RJ45 + 2*100GE QSFP28 ( only 5960-4M-HC ) <b>M16L:</b> 16 *QSFP+ ( only 5960-4M-HC )	
Weight	<21.0kg	
Management Port	1 RJ45 Console, 1 Mini USB Console, 2*10GE MNG, 1 USB	
DC Power Supply	-38V ~ -72V	
HVDC Power Supply	240V/336V	
AC Power Supply	Maximum voltages: 90V~286V,45Hz~66Hz Rated voltages: 100V~127V/200~240V,50Hz~60Hz;	
Max Power Consumption	<580W	<650W
Typical Power Consumption	331W	550W
Power Redundancy Pattern	Support AC 1+1, DC 1+1, mixed AC DC 1+1 Two independent and swappable power supply module	
Heat Dissipation Pattern	Forced air cooling (Front-to-Rear flow )	Forced air cooling (Front-to-Rear/Rear-to-Front flow )



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Parameters	5960-4M-S	5960-4M-HC
Heat Dissipation	<1819 BTU/h	
Working Temperature	Long term working temperature: -5 °C ~ +45 °C Short term working temperature: -10 °C ~ +50 °C	
Humidity	10%~90%	
Working Altitude	<5000 meters	
MTBF/MTTR	>300000 hours/ < 30 minutes	
Switching Capacity	6.4Tbps	
Packet Forwarding Rate	3,200Mpps	

	5960-32LC-H	5960-52DU-H	5960-64DL-H	5960-72DL-H	5960-72NL-H	5960-56QU-HC
100GE QSFP28	0	4	0	0	0	8
40GE QSFP+	32	0	4	6	6	0
25GE SFP28	0	0	0	0	0	48
10GE SFP+	0"	48	48	48	0	2
10GE BASE-T	0"	0	0	0	48	0
Switching Capacity	2.56Tbps	1.76Tbps	1.28Tbps	1.44Tbps	1.44Tbps	4Tbps
Packet Forwarding Rate	1440Mpps	1320Mpps	960Mpps	1080Mpps	1080Mpps	2000Mpps
Dimensions	442mm×440mm×43.6mm					
Weight	≤9 kg	≤9 kg	≤9 kg	≤9 kg	≤9 kg	≤9 kg
External network management	1 *GE optical					
Management Port	1 ↑ RJ45 console port , 1 ↑ Mini USB console port					
Max Power Consumption	<298W	<260W	<221 W	<231 W	<327 W	<370W
Typical Power Consumption	213W	170W	148W	158W	275W	300W



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	5960-32LC-H	5960-52DU-H	5960-64DL-H	5960-72DL-H	5960-72NL-H	5960-56QU-HC
<b>Power Redundancy Pattern</b>	Two independent and swappable power supply module, support AC 1+1, DC 1+1, mixed AC DC 1+1					
<b>DC Power Supply</b>	-38V ~ -72V					
<b>AC Power Supply</b>	100~127V/200~240V, 50~60Hz					
<b>HVDC Power Supply</b>	240V/336V					
<b>Working Temperature Humidity</b>	Long term working temperature: -5 °C ~ +50 °C Short term working temperature: -10 °C ~ +50 °C 10%~90%					
<b>MTBF</b>	> 300000 hours					
<b>MTTR</b>	< 30 minutes					

## Function Specification

Function	The ZXR10 5960-H Series Switch
<b>Data Center Features</b>	<ul style="list-style-type: none"> <li>Support VSC2.0 (Virtual Switching Clustering)</li> <li>Support TRILL (Transparent Interconnection of Lots of Links)</li> <li>Support FCoE (FIP Snooping)</li> <li>Support DCB (Data Center Bridging)</li> <li>Support PFC (Priority-based Flow Control)</li> <li>Support ETS (Enhanced Transmission Selection)</li> <li>Support VxLAN (Virtual eXtensible Local Area Network)</li> <li>Support EVPN (Ethernet VPN)</li> <li>Support SDN (Software Defined Network)</li> <li>Support OpenFlow 1.5/Netconf</li> <li>Support VEPA ( 802.3Qbg )</li> <li>Support VDMG (Virtual Device Management Group)</li> <li>Support multi-channel technology</li> </ul>
<b>L2 Features</b>	<ul style="list-style-type: none"> <li>Support IEEE 802.1p (COS), IEEE 802.1q (VLAN), IEEE 802.3x</li> <li>Support IEEE 802.1d (STP)/ 802.1w (RSTP)/ 802.1s (MSTP)</li> <li>Support IEEE 802.3ad (LACP)</li> </ul>





Function	The ZXR10 5960-H Series Switch
	Support IEEE 802.3z (1000Base-X) / 802.3ab (1000BaseT) Support IEEE 802.3an (10GBase-T), IEEE 802.3ae (10Gbase) Support IEEE 802.3ba (40Gbase), IEEE 802.3ba (100Gbase) Support Port mirroring, Traffic mirroring Support VLAN switching, Support VLAN translation Support PVLAN, Support SuperVLAN Support GVRP Support LLDP
<b>IPv4 Features</b>	Support IPv4 routing protocols, such as static routing, policy based routing , RIP, OSPF, BGP, and IS-IS Support DHCP server/ relay/proxy, DHCP snooping
<b>IPv6 Features</b>	Support dual stack IPv4/IPv6 Support Pingv6、Telnetv6、SNMPv6、VRRPv3 Support IPv6 dynamic routing protocols, such as Static routing, Policy based routing , RIPng, OSPFv3, ISISv6, and BGP4+ Support ND, DHCPv6 snooping, PMTU Support IPv6 ACL Support manual IPv6 tunnel, 6to4 tunnel, 6PE, ISATAP tunnel
<b>Multicast</b>	Support IGMP v1/v2/v3, IGMPv1/v2/v3 snooping Support PIM-SM, PIM-DM, PIM-SSM, Bi-direction PIM, MSDP, MBGP, Any-RP Support MLD V1/V2、MLD V1/V2 Snooping Supporting IGMP listening, filtering, proxying and quick departure Support Controllable Multicast and CAC Channel Access Control Support multicast VLAN registration MVR Support PIMv6 Support PIM-SM、PIM-DM、PIM-SSM Support MSDP Support multicast VLAN registration MVR Supporting restrictions on the number of subscribers based on VLAN/Group
<b>MPLS</b>	Support MCE Support LDP, LDP FRR



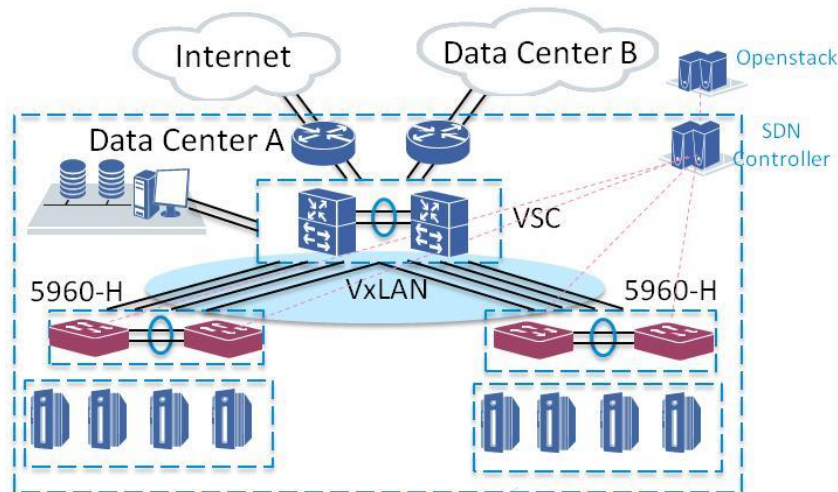
Function	The ZXR10 5960-H Series Switch
	<ul style="list-style-type: none"> <li>Support MPLS Load balance</li> <li>Support MPLS L2VPN (VPWS/VPLS)</li> <li>Support MPLS L3VPN</li> </ul>
<b>QOS</b>	<ul style="list-style-type: none"> <li>Support traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p priority</li> <li>Support 8 hardware-based queues per port</li> <li>Support queue scheduling algorithms, such as SP, WRR, DWRR, SP+WRR</li> <li>Support congestion avoidance mechanisms, such as WRED and tail drop</li> <li>Support policing/shaping based on port/flow</li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>Support L2-L4 ACL</li> <li>Support standard ACL, MAC ACL, L2 ACL, extended ACL, mixed ACL, VLAN ACL</li> <li>Support time-range ACL configuration, Bidirectional ACL</li> <li>Support 802.1x authentication and 802.1x server</li> <li>Support portal</li> <li>Support MAC authentication</li> <li>Support AAA/ RADIUS and TACACS+ authentication for login users</li> <li>Support SSH v1.0/v2.0 server</li> <li>Support CPU anti-attack, CPU overload protection,</li> <li>Support STP Root Guard, BPDU guard,</li> <li>Support URPF</li> <li>Support RIP/OSPF/BGP MD5 encryption checking</li> </ul>
<b>Equipment Management</b>	<ul style="list-style-type: none"> <li>Support CLI, Telnet, SSH, Local and remote (Radius/Tacacs+) authentication of user</li> <li>Support SNMP v1/v2/v3</li> <li>Support NetNumen U31</li> <li>Support Mirroring, RSPAN, ERSPAN</li> <li>Support EasyManager zero deployment and batch inspection tool</li> <li>Support RMON</li> <li>Support NTP</li> <li>Support Syslog, Sflow</li> <li>Support NetFlow (only 5960-HC)</li> <li>Support Hotfix</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>Support 1+1 redundancy power supply/ fan module</li> <li>Support LACP</li> </ul>



Function	The ZXR10 5960-H Series Switch
	Support ZESR/ZESR+(ZTE Ethernet Switch Ring) Support VRRP,VRRPv3,VRRPE Support NSF/GR for OSFP/BGP/IS-IS Support BFD for VRRP/ BGP/ IS-IS/ OSPF Support Ethernet OAM (802.1ag and 802.3ah)
<b>Enhanced Features</b>	Support Zero-touch-deployment

## Application Scenarios

- **TOR switch in SDN based VxLAN Data Center Network**



The ZXR10 5960-H Series switch works as TOR switch on a SDN required data center network. The ZXR10 5960-H Series switch has high-density 10GE/25GE/40GE/100GE interfaces to interconnect the 10GE/25GE/100GE servers and aggregates to the ZXR10 9900/ 9900-S Series switch through 40GE/100GE interfaces. Through SDN based VxLAN technology to build a non-blocking Layer 2 network, which allows large-scale VM migrations and flexible service deployments. The ZXR10 5960-H Series switch can also work as the VxLAN gateway.

## Order Information

### Mainframe



5960-4M-HC (OUT)	5960-4M-HC Switch (2*Power Module, 3*FAN Module)
5960-56QU-HC	5960-56QU-HC Switch (2*Power Module, 2*FAN Module)
5960-4M-S (OUT)	5960-4M-S Switch (2*Power Module, 3*FAN Module)
5960-52DU-H	5960-52DU-H Switch (2*Power Module, 2*FAN Module)
5960-32LC-H	5960-32LC-H Switch (2*Power Module, 2*FAN Module)
5960-72DL-H	5960-72DL-H Switch (2*Power Module, 2*FAN Module)
5960-64DL-H	5960-64DL-H Switch (2*Power Module, 2*FAN Module)
5960-72NL-H	5960-72NL-H Switch (2*Power Module, 2*FAN Module)

### Subcard Module (for 5960-4M-HC/S)

M24Q2U	24*25GE SFP28 (10GE/GE)+2*100GE QSFP28 (40GE) Subcard
M24N2U	24*10GE RJ45 (GE/FE) +2*100GE QSFP28 (40GE) Subcard (Only for 4M-HC)
M24Q	24*25GE SFP28 (10GE/GE) Subcard
M8U	8*100GE QSFP28 (40GE) Subcard

### Power Module

5960-PWR-AC70	5960-H/HC/S AC/HVDC Power Module
5960-PWR-DC40	5960-H/HC DC Power Module
5960-PWR-DC80	5960-4M-HC/5960-4M-S DC Power Module

### Fan Module

5960H-FAN	5960H Fan Module
5960M-FAN	5960M Fan Module



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