# S5648T-4Q Routing Switches

**48 Port 10Gb Base T,4 40Gb QSFP+ Uplinks,L3+ Managed Ethernet Switch**



**1*Console Port /
1* Management Port**          **48 *10G BASE-T**          **4*40Gb QSFP+**

## INTRODUCTION

### System Design for Green and Energy Saving

The S5648T-4Q Series supports the fans with speed control as well as power consumption adjustment which is based on the flow status of the ports (According to the temperature inside the box).Both can highly save the energy and go for green.

### Customized Profile for Different Deployment Scenarios

The Flexible Table Management (FTMTM) technology employed by HOS S5648T-4Q Series offers multiple table size configuration profiles as optimized choices for different network scenarios. S5648X-6Q supports up to 128K MAC address table or 32K IP routing table. Besides these pre-defined profiles, application-specific profile is also applicable with HOS Advanced Service.

### Data Center Features

S5648X-6Q provides dedicated features for Data Center applications, such as NVGRE/VXLAN/GENEVE, Priority Flow Control (PFC),Enhanced Transmission Selection (ETS), Quantized Congestion Notification (QCN), and Data Center TCP. MLAG features are also good candidates for TOR switch in data center network.

## Redundancy Design and Robust System

Hot swap power modules

AC 1+1 Power module redundancy

N+1 Fan redundancy

Real-time environment monitoring for chipset temperature, status of fan and power, etc

LACP, ECMP, VRRP, VARP, STP/RSTP/MSTP, Smart Link,BFD,ERPS and load-balancing

HOS-patented Sysmon for CPU status monitoring and protection upon unpredictable fault

## Outstanding QoS Control with Flexible Classification and Queuing Mechanism

HOS S5648T-4Q series routing switch provides 8 hardware queues per port to support multi-stage scheduling (WDRR, SP) and Tail Drop/WRED. 3-stage shaping (queue/group/port) can be applied for flow management.

Ingress and egress policer provide bandwidth monitoring with a granularity up to 64Kbps. Both SrTCM (Single Rate Three Color Marker) and TrTCM (Two Rate Three Color Marker) are supported.

## Triple-play Service Support with Bandwidth Guaranty

The HOS S5648T-4Q Series offers high bandwidth for Triple-Play services such as IPTV and video monitoring. The built-in QoS capabilities and flexible queuing technologies guarantee high quality of services.

Rich multicast protocol set (IGMP Snooping, IGMP v1/v2, PIM-SM) supports up to 16K multicast groups, 1K physical replications and 4K logical replications per group. With HOSOS software, IPTV service and multicast time-delay control is fully supported.

## Comprehensive Network Security Policy

The HOS S5648X-6Q Series supports subscriber-class, switch-class and network-class security control.

Basic IPv4/IPv6/MAC ACL is employed to filter IPv4/IPv6/Non-IP packet respectively and can be applied to

both port and VLAN. Besides that, extended IPv4/IPv6 ACL is also available. In a single ACL rule, both IP and MAC ACE can take effect to filter IP and Non-IP packets simultaneously.

HOS ARP Inspection and IP Source Guard features prevent network from malicious ARP attack. CPU Traffic Protection and Storm Control features optimize CPU load. Centralized 802.1x authentication forbids illegal user access to the network.

## CHARACTERISTICS

| S5648T-4Q Hardware Summary | | |
|---|---|---|
| **1. Basic** | | |
| **Product Name** | | S5648T-4Q |
| **Product Positioning** | | Data Center TOR access, Enterprise & Metro network access or aggregation |
| **Switching Method** | | Store and Forwarding/ Cut Through |
| **CPU Model/ Frequency** | | PowerPC P1010 533MHz |
| **Flash** | | 2GB (NAND) |
| **Memory** | | 1GB |
| **Hardware Configuration** | **Main Board Spec** | 48x10GE RJ45 + 4x40GE QSFP+ |
| | **Uplink Network Sub Card** | Not Support |
| | **Console Type** | RJ45 |
| | **Outband Eth Management Port** | 1 RJ45 GE Eth port |
| | **Inband Eth Management Port** | Support |
| | **USB Ports** | Not Support |
| **2. Performance Spec** | | |
| **Switching Capacity** | | 1.92Tbps (Chipset) |
| **3. Hardware and Software Description** | | |
| **Hardware Architecure** | | • Standard 1U 19'' rack mountable<br>• 48x10GE RJ45 Ethernet Port<br>•4x40GE QSFP+ Ethernet Port |
| **If Uplink network card support hot plug ?** | | Not Support |
| **Software upgrade method** | | Through TFTP/FTP/WEB |
| **Service interruption time when reboot** | | less than 120s |

| S5648T-4Q Hardware Summary | | |
|---|---|---|
| system for software update | | |
| **4. The Power Supply and Power Requirements** | | |
| **Type of Power Supply** | **AC** | Support |
| | **DC** | Support |
| **Power supply range** | **AC** | Operating Voltage: 100 ~ 240V; 50/60Hz |
| | | Maximum Voltage: 90 ~ 264V; 47~63Hz |
| | **DC** | Operating Voltage: 36 ~ 75Vdc Input |
| **Double Power Input** | | Support |
| **The power supply module is pluggable** | | Support |
| **Typical/Max Power Draw** | | 150W / 280W |
| **5. Overcurrent and overvoltage protection** | | |
| **Whether the equipment installation overcurrent, overvoltage protector ?** | | Yes |
| **Surge protection level** | | 4 KV |
| **6. Others** | | |
| **Hardware Size (H×W×D) in.** | | 440mm×420mm×44mm |
| **Weight (kg)** | | 5.3kg (include One PSU) |
| **Cooling Mode** | | Fan cooling (Front-to-Rear airflow) |
| **Noise** | | < 50 dB |
| **Quality of Fans** | | 4 (3 + 1 Backup) |
| **Whether to support the fan module pluggable?** | | Support |
| **If the fan support intelligent speed control function ?** | | Support |
| **Operating Temperature Range** | | Operating temperature: 0 to 45 ºC (Long term)    -5 to 50 ºC (Short term) |

**SOFTWARE FEATURE LIST**

| Feature List | | | |
|---|---|---|---|
| **Attribute** | | **Description** | **Support** |
| **Ethernet basic features** | **Ethernet** | Ethernet interface operating modes: full duplex, half duplex, and auto-negotiation | ● |
| | | Ethernet interface operating rates: 1Gbit/s, 10 Gbit/s, 40 Gbit/s, 100Gbit/s and auto-negotiation | ● |
| | | Flow control on (TX and RX direction) | ● |
| | | Jumbo frames (9600 Bytes) | ● |
| | | Link aggregation (Static/LACP) | ● |
| | | Static/Dynamic Load Balancing among the links of a Link aggregation | ● |
| | | EF-DLB(elephant flow based DLB) | ● |
| | | LAG self-healing | ● |
| | | LAG support RR | ● |
| | | Port Isolation | ● |
| | | L2 Protocol Tunnel | ● |
| | | Port-Block(unicast/broadcast/multicast) | ● |
| | | Storm Control (unicast/broadcast/multicast) | ● |
| | **VLAN** | Vlan access modes: access, trunk, and QinQ | ● |
| | | MAC based VLAN Classification | ● |
| | | IP based VLAN Classification | ● |
| | | Protocol based VLAN Classification | ● |
| | | QinQ(Basic QinQ and Selective QinQ) | ● |
| | | VLAN Translation | ● |
| | | Default VLAN | ● |
| | | VLAN mapping | ● |
| | | Voice Vlan | ● |
| | | Guest VLAN | ● |
| | | Private VLAN | ● |

| Feature List | | | |
|---|---|---|---|
| | **MAC** | Automatic learning and aging of MAC addresses (Support HW learning) | ● |
| | | Static, dynamic, and blackhole MAC address entries | ● |
| | | Packet filtering based on source MAC addresses | ● |
| | | Limitation on MAC address learning on interfaces (Port Security) | ● |
| | | Limitation on MAC address learning on Vlans VLAN Security | ● |
| **Ethernet loop protection** | **MSTP** | STP | ● |
| | | RSTP | ● |
| | | MSTP | ● |
| | | BPDU filter | ● |
| | | BPDU guard | ● |
| | | Root guard | ● |
| | | Partitioned STP and BPDU tunnel | ● |
| | **ERPS** | ERPS (Ethernet Ring Protection Switching) | ● |
| | | Single ERPS ring, tangent ERPS rings, and intersecting ERPS rings | ● |
| | | Hybrid networking of ERPS rings and other ring networks | ● |
| **Layer 2 multicast** | **Layer 2 multicast** | IGMP snooping v1v2v3 | ● |
| | | IGMP proxy | ● |
| | | Fast leave | ● |
| | | MAC based L2MC | ● |
| | | Layer 2 Static Multicast | ● |
| | | MVR(Inter-VLAN multicast replication) | ● |
| **IPv4 Forwarding** | **ARP** | Static and dynamic ARP entries | ● |
| | | Gratuitous ARP | ● |

| Feature List | | | |
|---|---|---|---|
| | | Aging of ARP entries | ● |
| | | ARP | ● |
| | | ARP Proxy | ● |
| | **Unicast routing** | Static Routes | ● |
| | | RIPv1&v2 | ● |
| | | OSPF | ● |
| | | BGP(Basic iBGP/eBGP) | ● |
| | | ECMP | ● |
| | | ECMP self-healing | ● |
| | | ECMP-DLB(Dynamic Load Balance ECMP) | ● |
| | | Route Map | ● |
| | | Policy-Based Route (PBR) | ● |
| | | uRPF check | ● |
| | | VRF | ● |
| | **Multicast routing** | IGMPv1/v2/v3 | ● |
| | | PIM-SM | ● |
| | | PIM-SSM | ● |
| | | PIM-DM | ● |
| | | Static Multicast | ● |
| **IPv6 Forwarding** | **IPv6 basic** | ICMPv6 | ● |
| | | NDP | ● |
| | | PMTU | ● |
| | **IPv6 Unicast routing** | IPv6 Static Route | ● |
| | | RIPng | ● |
| | | OSPFv3 | ● |
| | **IPv6 Multicast routing** | MLD v1/v2 | ● |
| | | MLD Snooping | ● |
| | | PIM-SMv6 | ● |

| | | | |
|---|---|---|---|
| **Feature List** | | | |
| | **IPv6/IPv4 Tunnel** | Static Tunnel / ISTAP Tunnel / 6to4 Tunnel | ● |
| | **IPv6 Application** | DHCPv6 Server/Relay/Snooping | ● |
| | | IPv6 Prefix-list | ● |
| **QoS** | **Traffic classification** | Traffic classification based on the combination of the MAC address, IPv4/IPv6 ddress, L2 protocol header, TCP, UTP, outgoing interface, and 802.1p field | ● |
| | **Traffic behaviors** | Access control after traffic classification | ● |
| | | Traffic policing based on traffic classification (Policer) | ● |
| | | Re-marking based on traffic classification (COS, DSCP) | ● |
| | | Class-based packet queuing | ● |
| | **Queue scheduling** | SP (8 Strict Priority) | ● |
| | | WDRR (Weighted Deficit Round Robin) | ● |
| | | SP + WDRR | ● |
| | **Congestion avoidance** | Tail Drop, WRED (Weighted Random Early Detection) | ● |
| | **Shapping** | Shapping based on Interfaces and queues | ● |
| | **Cloud Goodput** | Explicit congestion notification(ECN) | ● |
| | | High bandwidth, Ultra Low Latency(HULL)(Virtual queuing to mark ECN) | ● |
| **Device reliability** | **Smartlink** | SmartLink | ● |
| | | SmartLink multi-instance | ● |
| | | MonitorLink | ● |
| | **VRRP** | VRRP | ● |
| | **BFD** | BFD (for Static IPv4 Route/VRRP/OSPF/Track) | ● |
| | **M-LAG** | Multi-Chassis Link Aggregation | ● |
| | | MLAG with Overlay(VXLAN, NVGRE, GENEVE) | ● |
| **STM** | **Switch Table Management** | Switch Table Management (Flexible system profiles) | ● |

**HOHU**NET

| Feature List | | | |
|---|---|---|---|
| Security | System Security | Hierarchical CLI protection to prevent unauthorized users from accessing Switch | ● |
| | | SSH v2.0 | ● |
| | | RADIUS and TACACS+ authentication | ● |
| | | ACL filtering (Standard ACL and extend ACL) | ● |
| | | ACL filtering(Inner header filter) | ● |
| | | DHCP packet filtering (Option 82) | ● |
| | | ARP Inspection | ● |
| | | IP Source Guard | ● |
| | | CPU Traffic Limit | ● |
| | | Prevent DDOS attack (ICMP Flood/Smurf/Fraggle/LAND/SYN Flood) | ● |
| | | AAA | ● |
| | | 802.1X | ● |
| | | Telnet/SSH ACL filtering | ● |
| | | RSA Key Generate | ● |
| | | BHM (Beat Heart Monitor) | ● |
| Configuration and maintenance | Terminal service | Configurations through CLI (Command Line Interface) | ● |
| | | Help information | ● |
| | | Login through console and Telnet terminals | ● |
| | File system | File system | ● |
| | | Directory and file management | ● |
| | | Upload and download files through FTP or TFTP | ● |
| | IP Application | DHCP Server | ● |
| | | DHCP Relay | ● |
| | | DHCP Snooping | ● |
| | | DHCP Client | ● |
| | | DNS | ● |

| Feature List | | | |
|---|---|---|---|
| | | NTP | ● |
| | **Device Management** | UDLD (Unidirectional Link Detection) | ● |
| | | VCT (Virtual Cable Test) | ● |
| | | LLDP | ● |
| | | 802.3az EEE (Energy-Efficient Ethernet) | ● |
| | **Debugging and maintenance** | Management of logs, alarms, and debugging information | ● |
| | | User operation logs | ● |
| | | Detailed debugging information for diagnosing network faults | ● |
| | | Network test tools (Such as traceroute and ping) | ● |
| | | Local Mirror(Port Mirror and VLAN Mirror) | ● |
| | | Remote Mirror | ● |
| | | Multi-destination Mirror | ● |
| | | L2 ping | ● |
| | | Port loopback | ● |
| | | Loopback Detection | ● |
| | | SmartConfig | ● |
| | **Network management** | Ping and Traceroute (IPv4) | ● |
| | | SNMPv1/v2c/v3 (IPv4) | ● |
| | | Standard MIB | ● |
| | | WEB UI | ● |
| | | RMON | ● |
| | | s-Flow | ● |
| | **Version upgrade** | Online upgrade software image | ● |
| | | Online upgrade of the BootROM | ● |
| **Data Center** | **Extensibility** | Programmatic access to system state: Phython | ● |
| | | Open API | ● |

| Feature List | | | |
|---|---|---|---|
| | | OpenStack Neutron(cloud agent) | ● |
| | | OVSDB(configure VLAN/Tunnel) | ● |
| | **Virtualization Support** | VARP | ● |
| | | VXLAN gateway | ● |
| | | VXLAN bridge | ● |
| | | VXLAN routing | ● |
| | | GENEVE | ● |
| | | NvGRE | ● |
| | **DCB** | IEEE 802.1Qbb PFC (Priority Flow Control) | ● |

Tips : ● Support    o Unsupport

| Performance & Spec Table | | | | | | |
|---|---|---|---|---|---|---|
| **Class** | **Feature** | **Sub Spec** | **Default Profile** | **Layer 2 Profile** | **Layer 3 Profile** | **IPv6 Profile** |
| **Ethernet Basic** | **Jumboframe** | Maximum Size | 9600 | | | |
| | **Unicast MAC** | MAC address Capacity | 65536 | 131072 | 32768 | 32768 |
| | | MAC Learning Rate (SW) | 3144 fps | | | |
| | | MAC Learning Rate (HW) | 6046093 fps | | | |
| | | Blackhole MAC address capacity | 128 | | | |
| | **Multicast MAC** | MAC address Capacity | 2048 | 2048 | 1024 | 1024 |
| | **VLAN** | VLAN IDs | 4094 | | | |
| | | Vlan Instances | 4094 | | | |
| | **STP** | Convergence time | 30s | | | |
| | **RSTP** | Convergence time | 775ms | | | |
| | **MSTP** | Instance Num | 64 | | | |
| | | Convergence time | 774ms | | | |
| | **Link** | Maximum Member Num | 16 | | | |

| Performance & Spec Table | | | | | |
|---|---|---|---|---|---|
| | **Aggregation (Static&LACP)** | Maximum Group Num | 55 | | | |
| | | Load balance key mode | destport/inner-destport/inner-ip-protocol/inner-ipda/inner-ipsa/inner-macda/inner-macsa/inner-sourceport/ip-protocol/ipda/ipsa/macda/macsa/nvgre-vsid//sourceport/vxlan-vni | | | |
| | | Convergence time | < 20ms | | | |
| | **Smart-Link** | Maximum Groups Num | 16 | | | |
| | | Maximum Protection Instance Num | 64 | | | |
| | | Switchover time | < 25ms | | | |
| | **VLAN Classification** | Base MAC Capacity | 512 | 1024 | 512 | 512 |
| | | Base IPv4 Capacity | 512 | 512 | 1024 | 512 |
| | | Base IPv6 Capacity | N/A | N/A | N/A | 256 |
| **IPv4 Unicast** | **ARP** | ARP Capacity | 4096 | 1024 | 20480 | 4096 |
| | **IPv4** | FIB | 8192 | | | 2048 |
| | | ECMP Group | 240 | | | |
| | **VRRP** | Management Groups Num | 31 | | | |
| | | Switchover time | < 4*advt_interval (advt_interval=100ms or 1s) | | | |
| | **PBR** | Policy Route Map | 32 | N/A | 32 | 32 |
| | | Policy Based Routing ACE | 64 | N/A | 64 | 64 |
| | **IPv4 BFD** | Session Capacity | 128 | N/A | N/A | N/A |
| **IPv4 Multicast** | **IPMC** | Number of interfaces that support Multicast routing table | 255 | | | |
| | | Multicast Routing Table | 1023 | 0 | 1023 | 1023 |
| | **IGMP** | Maximum Groups Num | 2048 | | | |

| Performance & Spec Table | | | | | | |
|---|---|---|---|---|---|---|
| | **Snooping** | | | | | |
| | **MVR** | Maximum Entry Num | 511 | | | |
| **IPv6 Unicast** | **Host Route** | NDP Capacity | N/A | N/A | N/A | 4096 |
| | **IPv6** | FIB | N/A | N/A | N/A | 1536 |
| | | ECMP Group | N/A | N/A | N/A | 240 |
| **IPv6 Multicast** | **IPMC** | Number of interfaces that support Multicast routing table | N/A | N/A | N/A | 255 |
| | | Multicast Routing Table | N/A | N/A | N/A | 255 |
| | **MLD Snooping** | Maximum Groups Num | N/A | N/A | N/A | 4096 |
| | **MVR V6** | Maximum Entry Num | N/A | N/A | N/A | 255 |
| **IP Tunnel** | **IP Tunnel** | Tunnel Peer Capacity | 8 | N/A | 8 | 32 |
| **QoS** | **QoS** | Per-port Queue Num | 8 | | | |
| | | System Packet Buffer Capacity | 3M | | | |
| | | Policer granularity | 0-2Mbps : 16Kbps<br>2Mbps-100Mbps : 32Kbps<br>100Mbps-1Gbps : 64Kbps<br>1Gbps-2Gbps : 128Kbps<br>2Gbps-4Gbps : 256Kbps<br>4Gbps-10Gbps : 512Kbps<br>10Gbps-40Gbps : 1024Kbps<br>40Gbps-100Gbps : 2048Kbps | | | |
| | | Shape granularity | 8Kbps | | | |
| | | Ingress port qos ipv4 flow entries | 2043 | 2043 | 2043 | 1019 |
| | | Ingress port qos ipv6 flow | N/A | N/A | N/A | 507 |

| Performance & Spec Table | | | | | | |
|---|---|---|---|---|---|---|
| | | entries | | | | |
| ACL | IPv4 ACL | Ingress port acl for IPv4 | 2047 | 2047 | 2047 | 1023 |
| | | Ingress vlan acl for IPv4 | 255 | 255 | 255 | 127 |
| | | Egress port acl for IPv4 | 255 | 255 | 255 | 127 |
| | IPv6 ACL | Ingress port acl for IPv6 | N/A | N/A | N/A | 511 |
| | | Ingress vlan acl for IPv6 | N/A | N/A | N/A | 63 |
| | | Egress port acl for IPv6 | N/A | N/A | N/A | 63 |
| Security and Application | IP Source Guard | IPv4/IPv6 maximum rules Num | 1024 | 1024 | 512 | 512 |
| | 802.1x base MAC | Maximum Entries | 2048 | 512 | 512 | 512 |
| | DHCP-Snooping | Maximum bound entry | 4096 | | | |
| Metro Ethernet | Vlan Mapping | Maximum mapping table | 64 | | | |
| | | Maximum rules Num | 1024 | 2048 | 1024 | 1024 |
| | ERPS | Domain Num | 16 | | | |
| | | Ring Num | 3/domain | | | |
| | | Protection instance Num per Ring | 1 | | | |
| | | Switchover time | < 50 ms (optical port) | | | |
| Overlay | VXLAN | VXLAN tunnel | 8192 | 8192 | 8192 | 3072 |
| | | VNI | 2000 | | | |
| | | VTEP Peer | 1024 | | | |
| | | VXLAN Gateway MAC for DVR | 224 | 256 | 256 | 64 |
| IPFix | IPFix | IPfix Member | 16384 | N/A | 16384 | 16384 |

## ACCESSORIES

| Product Name | Quantity |
|---|---|
| Console Cable | 1PCS |
| Power Cords | 2PCS |
| Rack Mount Brackets | 2PCS |
| Bracket Screws | 10PCS |
| Rubber Pads | 4PCS |
| Cat5e Cable | 1PCS |
| Grounding Cable | 1PCS |
| Tieline Buckle | 2PCS |
| User Manual | 1PCS |
| SFP 28 Dust Plug | 4PCS |
| QSFP+ Dust Plug | 2PCS |

## ORDER INFORMATION

| Product Name | Description |
|---|---|
| Software Linsence | HOS-EB, basic Layer3 software features,Pre installed |
| Software Linsence | HOS-MS, Full layer3 software license key |
| Software Linsence | HOS-MA, Metro features software license key |
| | |
| | |
| | |
| | |