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Chapter 4 Ethernet Aggregation Switch Platform-FRM220A

Chapter 5 Multi-Service Platform -FRM220

Ethernet Switch

10G Media Converter

Transponder

EDFA

Optical Protection Switch

WDM Multiplexer

Ethernet over E1 Converter

CCF

Voice over Fiber

1 SmartView™ WEB EMS

NEW

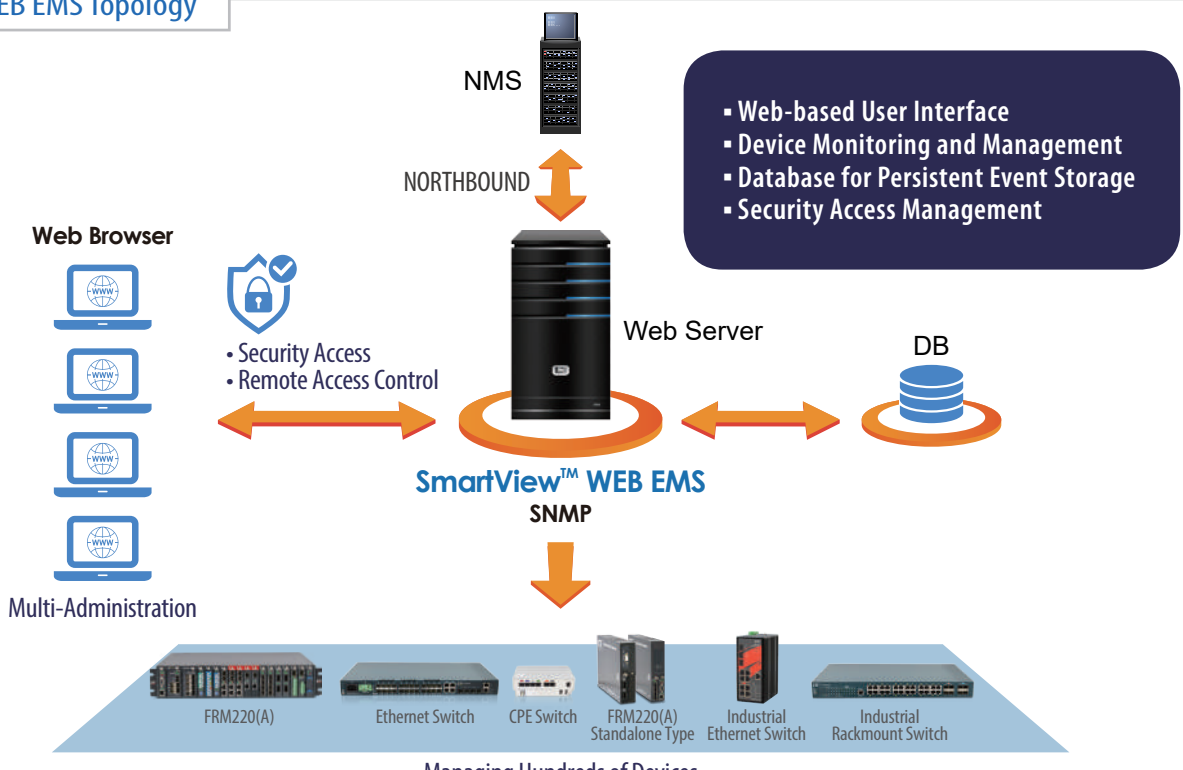
- *Web-based User Interface*
- *Remote Access and Centralized Device Management*
- *Real-time visual representations & processing of alarms*
- *Long term event storage (up to 1 year)*

CTC Union's SmartView™ WEB EMS (Element Management System) is a comprehensive device management solution that monitors performance, enables remote configuration and provisioning and provides fault notification status for CTC Union network devices. Smartview™ Web EMS uses the Database Server for long term storage along with Web Server to provide a Web based management experience for device administrators. By utilizing a Web based platform, administrators are free to use their favorite Web browser on personal computers or on mobile devices anywhere. All devices under Smartview™ Web EMS management are accessed via the Simple Network Management Protocol or SNMP, as they are constantly polled and monitored for alarm traps. A single Smartview™ Web EMS server is capable of managing hundreds of devices.

Features

- Main Functions (FCAPS): Fault Management, Configuration Management, Accounting Management, Performance Management, Security Management
- Remote access control for efficient configuration
- Network element performance monitoring
- Alarm event and notification
- Auto discovery and device viewer
- Allow multiple concurrent operating users

WEB EMS Topology



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SmartView™ WEB EMS Server

The server handles connection with the network devices using SNMP protocol, and is responsible for HTTP requests from management clients. Smartview™ Web EMS Server collects the information data from specific SNMP agents, stores the information into a persistent database and sends commands to control network elements.

Microsoft SQL Server Database

SQL Server is the place where Smartview™ Web EMS stores collected data, such as alarms, traps and user actions, for long term retrieval. Smartview™ Web EMS supports the free Microsoft SQL Server Express Edition for data storage.

Multi-Administrators

Management clients use web browser to monitor and control the devices at far end. Multiple operating connections are allowed, up to the limit of hardware and network.

Features at a Glance

■ Fault Management

Alarm Detection

SmartView™ WEB EMS continuously polls all network devices under its management and will visually display all alarm conditions found. Alarms will be categorized as Major, Minor or Warning, depending on severity and be cleared when alarm condition recovered.

Alarm Selection

Alarm events of network element are configurable. All alarm events are warned by default, but they can be manually disabled to ignore warning messages.

Alarm Notification

SmartView™ WEB EMS is capable of sending emails to selected administrators when critical alarms occur. Prompt notification of system problems aid in getting problems in the network devices fixed in the shortest time possible.

Trap Collection

When an SNMP agent experiences an abnormal condition, it will send a SNMP trap message to SmartView™ WEB EMS which then receives the message, and records it in the database.

Network Topology

Network elements and connections are monitored and displayed in network topology. Elements in color indicate some alarm condition is present. The screen may be zoomed in or out and a search function may be used to quickly find a device.

■ Configuration Management

Network Element Configuration

SmartView™ WEB EMS is able to provide a single point of configuration for the device elements. Most settings only require mouse clicks and by using a tab format, most scrolling is eliminated. Current settings and status are displayed along with hardware and firmware versions for each element.

Firmware Upgrade

SmartView™ WEB EMS is able to upgrade firmware for a device. The upgrade status is displayed during upgrade process.

Configuration Backup

SmartView™M WEB EMS is able to backup configuration for a device. Backup configuration can be used to restore the settings to a device.

Network Element Discovery

SmartView™ WEB EMS has a tool for automatically discovering SNMP agents on the network. Simply enter an IP address range and the discovery program will ping every IP address looking for SNMP agents. Once discovered, the agents can be selected and brought into the polling.

■ Accounting Management

Network Inventory

SmartView™ WEB EMS is able of accounting the number of network elements and line cards. Firmware version, MAC address and factory programmed serial number are displayed for each element.

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■ Performance Management

Performance Monitor

SmartView™ Web EMS is able to monitor device performance parameters through polling of specific OIDs. Graphs of performance information (for example hardware parameters such as fan speed, temperature, optical Tx/Rx power) can be generated on an X Y axis showing different trend data.

■ Security Management

User Privilege

The administrator can add necessary user logins with specific privileges, from Administrator to Operator and lastly to normal user.

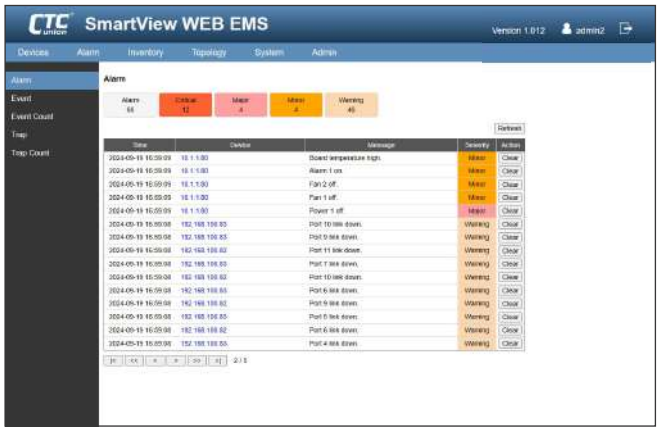
User Role

A user role is a group and defines privileges for users to perform management tasks. The access to network elements is also restricted by user role.

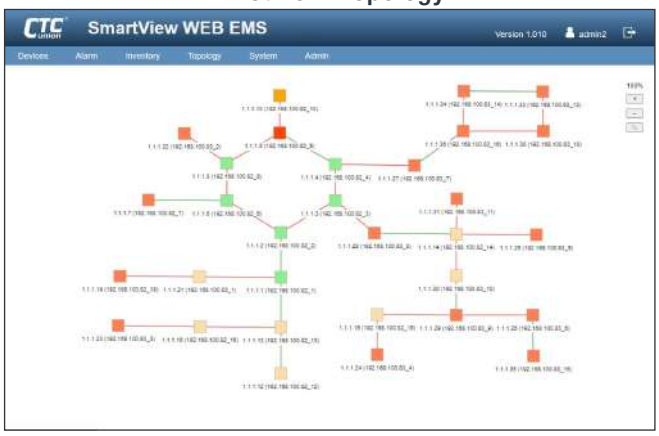
User Activity

Provides viewing and clearing of the user login and configuration action logs.

Alarm Detection

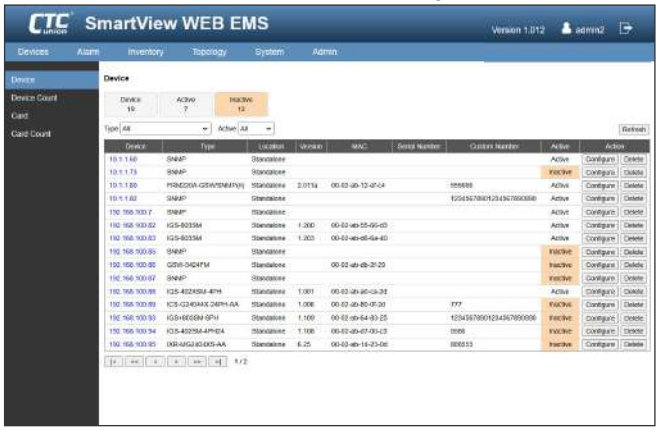


Network Topology



Network Element Configuration

Network Inventory



System Requirements

- Operating System:

  Windows Server 2016, Win 10 Pro 64bit.

- Hardware:

  Intel Core I5 or Xeon E5 2.4GHz 4 cores Processors, 8GB RAM, 100GB HD

Ordering Information

Model Name	Description
SVW1-AGT-50	SmartView™ WEB EMS management software with 50 nodes
SVW1-AGT-100	SmartView™ WEB EMS management software with 100 nodes
SVW1-AGT-200	SmartView™ WEB EMS management software with 200 nodes
SVW1-AGT-500	SmartView™ WEB EMS management software with 500 nodes

2

XGS-2000M

16 x 10G SFP+ + 4 x 10G combo ports Managed Ethernet Switch

Preliminary

CTC Union Technologies unveils the brand-new gear to enable high-density 10G SFP+ slots Ethernet Switch. The XGS-2000M is designed to enable the application for aggregation network or core switching and connection for agile network deployment. It is equipped 16 ports 10G SFP+ slot + 4 ports 10G combo (10G SFP+ slot or 100M/1G/2.5G/5G/10G RJ45) in high performance switching and wire speed connectivity to boost the connection efficiency.

With anticipating AI-driven applications era is coming in the near future, every kind of appliance will be triggered to internet ready capability as it is aimed at the smart device. No matter what the enterprise or mission-oriented park such as hospital, manufacturing or campus etc. as well as SMB, they all have to keep the room and flexibility to expand the network capacity for increasing traffic from server, wireless access and IoT gears.

The 10G combo ports option maximizes the usability to extend the network deployment as you wish. When XGS-2000M is adopted in the access network deployment, it offers up to 20 10G fiber ports for highly extendable and easy installation features. The 10G RJ45 port is capable of supporting the NBase-T multi-gigabit standards to pave the way for future-proof WiFi 6E/7 gear and edge computing. It also can be used as the network expansion as connecting to the 10G fiber aggregation layer network. The business or telecom service provider can leverage XGS-2000M to provision 10Gbps speed migrated backbone network for multiple access and fulfilling versatile application scenarios.

The XGS-2000M is featured robust L2 switching functionality such as VLAN, port trunking, QoS, span tree protocol and IGMP multicast service as well as some L3 routing features included static route, RIP v1/v2, OSFP v1/v2/v3 and VRRP. The hard-wired based ACL enabled the secured network access and traffic transportation as network administrator desired to reduce the risks of unauthorized or illegal intruders. The diversified management interfaces via Web GUI, Telnet and SNMP offer friendly and ease-to-use as well as secured remotely management in traffic encrypted or isolated. Also, the adaptive fan speed control design delivers the noise suppression operation as silent as possible by detecting the traffic load in real time.

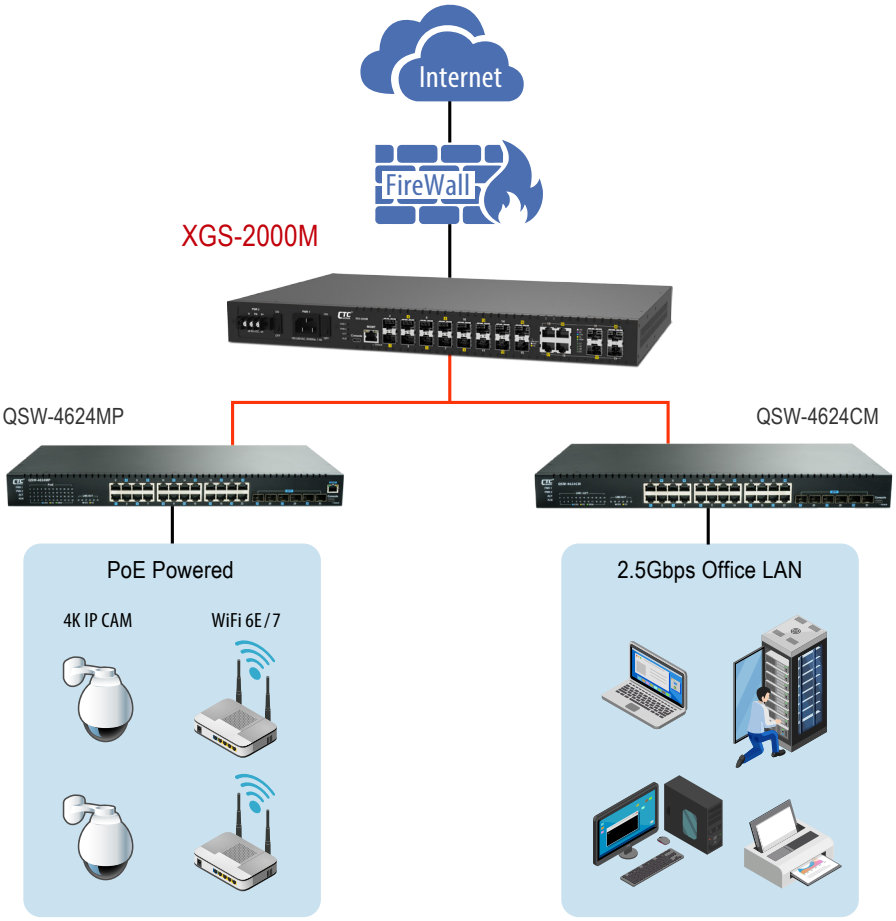
Specifications

Interface	Fiber port: 16x 10G SFP+	
	Combo port: 4x (10G SFP+ slot or 100M/1G/2.5G/5G/10G RJ45)	
	Console port: RS-232 in USB type C	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	3720000pps	@2.5Gbps
	7440000pps	@5Gbps
	14880000pps	@10Gbps
Switching Fabric Capacity	400Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	

10G Ethernet Switch

VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups)
	IEEE 802.1ad QinQ VLAN
	Voice VLAN, MAC based VLAN, Protocol based VLAN
	IP subnet based VLAN
	Private VLAN for port isolation, VLAN translation
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)
	IEEE 802.3ad LACP, 8 LACP trunk groups Max; 8 port Max. per LACP trunk group
	IEEE 802.1AX
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP
	Loop Protection
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port
	Traffic scheduling based on strict/WRR priority
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking
	Per port/queue based ingress/egress rate limit in steps of 100kbps
	IEEE 802.3x flow control
	IEEE 802.1Qbb priority based full-duplex flow control
	Multicast/Broadcast/Unicast storm control with flooding control
Security	Static port security (MAC based)
	Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	512 ACL rules based on L2~L4 information
	RADIUS/TACACS+ AAA
	HTTPs & SSH v2
	IP/MAC binding
	IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy
	MLD snooping v1/v2
	IGMP fast leave
	IGMP query
	IGMP filtering/throttling
	MVR (Multicast VLAN Registration)
L3 Routing	Static route, RIP v1/v2, OSPF v1/v2/v3, VRRP
Management	WebGUI/Telnet CLI interface
	SNMP v1/v2c/v3
	RMON I (1,2,3,9 groups) & RFC1213 MIB II
	DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN
	Event syslog server
	DNS client/proxy
	NTP client
	UPnP
	IPv4/IPv6 management
	SFF-8472 DDMI
	IEEE 802.1ab LLDP
Power Input	100~240VAC ; 36~60VDC
Power Consumption	< 50W
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 x 280 x 43.5 mm (W x D x H)
Certification	CE, FCC class A

2 Application



Ordering Information

Model Name	Description
XGS-2000M-AC	16 x 10G SFP+ Slots + 4 x 10G combo ports Managed Ethernet Switch with Single AC Power Supply
XGS-2000M-DC	16 x 10G SFP+ Slots + 4 x 10G combo ports Managed Ethernet Switch with Single DC Power Supply (-48V)
XGS-2000M-AA	16 x 10G SFP+ Slots + 4 x 10G combo ports Managed Ethernet Switch with Dual AC Power Supply
XGS-2000M-DD	16 x 10G SFP+ Slots + 4 x 10G combo ports Managed Ethernet Switch with Dual DC power Supply (-48V)
XGS-2000M-AD	16 x 10G SFP+ Slots + 4 x 10G combo ports Managed Ethernet Switch with AC + DC Power Supply

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2 XGS-1208SE

8 × GbE RJ45 + 12 × 10G SFP+
L2+ Managed 10G Ethernet Switch with SyncE/PTP

CTC Union Technologies unveils the brand-new gear to enable high-density 10G SFP+ slots Ethernet Switch. The XGS-1208SE is designed to enable the application for 4G/5G mobile backhaul network or core switching and connection for agile network deployment. It is equipped 8 ports GbE RJ45 and 12 ports 10G SFP+ slot in high performance switching and wire speed connectivity to boost the connection efficiency as well as capable of delivering time sentitive application.

The XGS-1208SE is featured robust L2 switching functionality such as VLAN, port trunking, QoS, span tree protocol and IGMP multicast service. The hard-wired based ACL enabled the secured network access and traffic transportation as network administrator desired to reduce the risks of unauthorized or illegal intruders. The diversified management interfaces via Web GUI, Telnet and SNMP offer friendly and ease-to-use as well as secured remotely management in traffic encrypted or isolated.

Every Ethernet copper or fiber port on XGS-1208SE except management port can be configured to deliver the timestamp messages of SyncE or IEEE 1588v2 inside Ethernet packets for the precision time purpose of mobile backhaul or smart factory automation network. XGS-1208SE is built-in 1PPS input and output SMA connectors. The output SMA interface supports the waveform measurement of IEEE 1588v2 via external instrument as well as the input SMA interface can be connected to external time source as the reference clock for the network.

Specifications

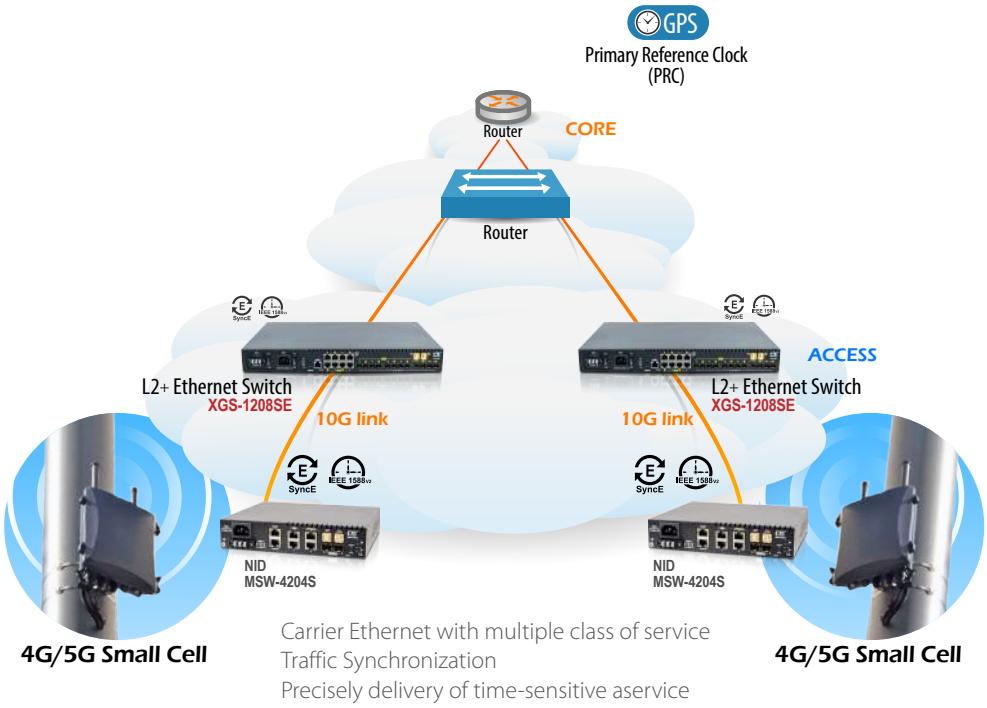
Interface	Fiber port: 12x 10G SFP+	
	Copper port: 8x 10/100/1000Base-T RJ45	
	1PPS port: SMA connector × 2 (input/output)	
	Cosole port: RS-232 in USB type C	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Switching Fabric Capacity	256Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation, VLAN translation	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, IEEE 802.1AX, 8 port Max. per LACP trunk group; 10 LACP trunk groups Max	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress / egress rate limit in steps of 100kbps, IEEE 802.3x flow control	
	IEEE 802.1Qbb priority based full-duplex flow control, Multicast / Broadcast / Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	512 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA, HTTPs & SSH v2	
	IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	

L2+ Managed 10G Ethernet Switch with SyncE

SyncE	ITU-T G.8261/G.8262/G.8264 on all Ethernet interfaces, Sync status message support
PTP	ITU-T G.8263 slave clock, ITU-T G.8273.2 boundary clock, ITU-T G.8273.3 transparent clock
	ITU-T G.8265.1/G.8275.1 telecom profile (optional), IEEE 802.1AS gPTP
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN, Event syslog server, DNS client/proxy, NTP client, UPnP
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
Power Input	100~240VAC ; 36~60VDC
Power Consumption	38.4 Watts Max.
Operating Temperature	0~50 ℃
Storage Temperature	-25~70 ℃
Humidity	5%~95% (non-condensing)
Dimension	440 × 280 × 43.5 mm (W×D×H)
Certification	CE, FCC class A

Application

10G Managed Ethernet Switch with SyncE



Carrier Ethernet with multiple class of service
Traffic Synchronization
Precisely delivery of time-sensitive aservice

Ordering Information

Model Name	Description
XGS-1208SE-AC	8 × GbE RJ45 + 12 × 10G SFP+ Slots L2+ Managed Ethernet Switch with Single AC Power Supply
XGS-1208SE-DC	8 × GbE RJ45 + 12 × 10G SFP+ Slots L2+ Managed Ethernet Switch with Single DC Power Supply (-48V)
XGS-1208SE-AA	8 × GbE RJ45 + 12 × 10G SFP+ Slots L2+ Managed Ethernet Switch with Dual AC Power Supply
XGS-1208SE-DD	8 × GbE RJ45 + 12 × 10G SFP+ Slots L2+ Managed Ethernet Switch with Dual DC power Supply (-48V)
XGS-1208SE-AD	8 × GbE RJ45 + 12 × 10G SFP+ Slots L2+ Managed Ethernet Switch with AC + DC Power Supply

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2 XGS-1208M

8 × GbE RJ45 + 12 × 10G SFP+
L2+ Managed 10G Ethernet Switch

With anticipating AI-driven applications era is coming in the near future, every kind of appliance will be triggered to internet ready capability as it is aimed at the smart device. No matter that the enterprise or mission-oriented park such as hospital, manufacturing or campus etc. as well as SMB, they all have to keep the room and flexibility to expand the network capacity for increasing traffic from server, wireless access and IoT gears.

When XGS-1208M is adopted in the access network deployment, it offers up to 12 10G fiber ports for highly extendable and easy installation features. It also can be used as the network expansion as connecting to the 10G fiber aggregation layer network. The business or telecom service provider can leverage XGS-1208M to provision 10Gbps speed migrated backbone network for multiple access and fulfilling versatile application scenarios.

The XGS-1208M is featured robust L2 switching functionality such as VLAN, port trunking, QoS, span tree protocol and IGMP multicast service. The hard-wired based ACL enabled the secured network access and traffic transportation as network administrator desired to reduce the risks of unauthorized or illegal intruders. The diversified management interfaces via Web GUI, Telnet and SNMP offer friendly and ease-to-use as well as secured remotely management in traffic encrypted or isolated. Also, the adaptive fan speed control design delivers the noise suppression operation as silent as possible by detecting the traffic load in real time.

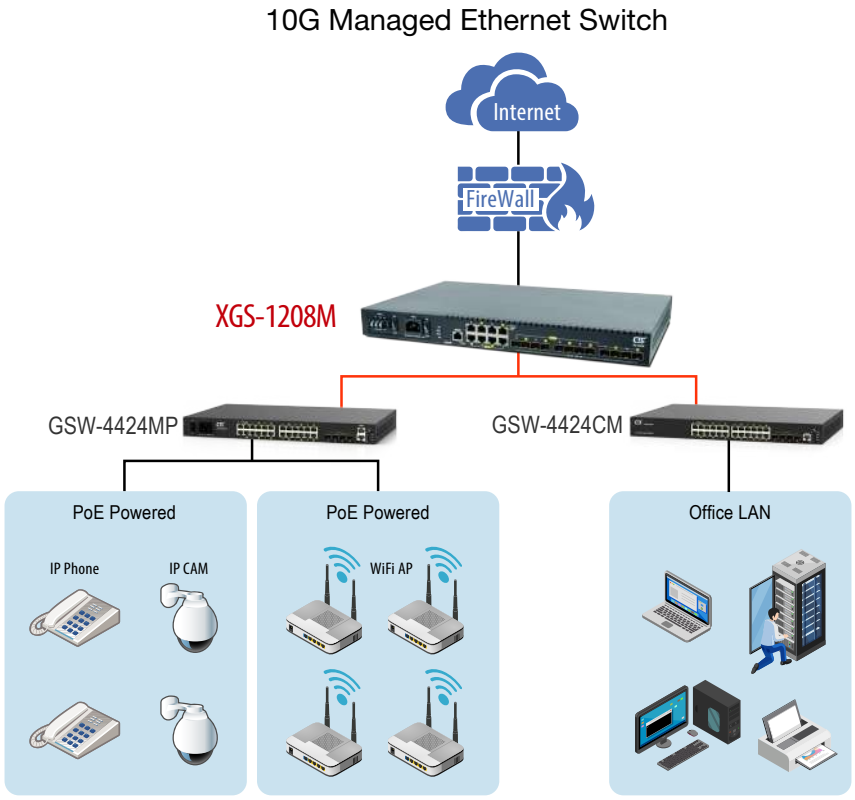
Specifications

Interface	Fiber port: 12x 10G SFP+	
	Copper port: 8x 10/100/1000Base-T RJ45	
	Console port: RS-232 in USB type C	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Switching Fabric Capacity	256Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN	
	Voice VLAN, MAC based VLAN, Protocol based VLAN, IP subnet based VLAN	
	Private VLAN for port isolation, VLAN translation	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, IEEE 802.1AX, 8 port Max. per LACP trunk group; 10 LACP trunk groups Max	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port, IEEE 802.1p priority tag remarking	
	DSCP remarking, Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, IEEE 802.1Qbb priority based full-duplex flow control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	512 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA, HTTPs & SSH v2	
	IP/MAC binding, IP source guard & ARP inspection	

L2+ Managed 10G Ethernet Switch

IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2
	IGMP fast leave, IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN, Event syslog server, DNS client/proxy, NTP client, UPnP
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
Power Input	100~240VAC ; 36~60VDC
Power Consumption	38.4 Watts Max.
Operating Temperature	0~50 ℃
Storage Temperature	-25~70 ℃
Humidity	5%~95% (non-condensing)
Dimension	440 × 280 × 43.5 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
XGS-1208M-AC	8 × GbE RJ45 + 12 × 10G SFP+ Slots Managed Ethernet Switch with Single AC Power Supply
XGS-1208M-DC	8 × GbE RJ45 + 12 × 10G SFP+ Slots Managed Ethernet Switch with Single DC Power Supply (-48V)
XGS-1208M-AA	8 × GbE RJ45 + 12 × 10G SFP+ Slots Managed Ethernet Switch with Dual AC Power Supply
XGS-1208M-DD	8 × GbE RJ45 + 12 × 10G SFP+ Slots Managed Ethernet Switch with Dual DC power Supply (-48V)
XGS-1208M-AD	8 × GbE RJ45 + 12 × 10G SFP+ Slots Managed Ethernet Switch with AC + DC Power Supply

Optional Accessory

▪ **10G SFP+ Transceiver Module**

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2

MSW-4428X

24 × GbE/SFP + 4 × GbE/RJ-45 with 4 × 10G/SFP+ L2+ Carrier Ethernet Switch

Aimed at Carrier Ethernet market application, CTC Union Technologies unveils the L2+ gigabit carrier Ethernet switch, MSW-4428X, which fully meets the attributes of Carrier Ethernet standards proposed by MEF (Metro Ethernet Forum). With the deployment of MSW4428X, operators or service providers can flexibly provision the bandwidth of either 100Mbps or 1000Mbps as well as uplink connection of Gigabit or 10G speed upon their service application.

The MSW-4428X is equipped with 24 100Base-FX/1000Base-X dual speed SFP slots, 4 ports GbE (10/100/1000Base-T) ports and 4 1G/10Gbps dual speed SFP+ uplink slots. It has built-in dual power supplies to enable power redundancy and enhance high network availability. It also complies with CE2.0 standard to support E-Line/E-LAN/E-Tree/E-Access service and enables the bandwidth profile configuration delivering SLA (Service Level Agreement) for end-to-end performance characteristics as well as Ethernet OAM functionality to support carrier grade service OAM management rapidly detecting and recovering from the network incidents in real time.

Features

Fully dual rate architecture of fiber link port

Completely dual speed ports of fiber link to offer the scalable physical connection of Metro Ethernet network for operators

Fully Ethernet OAM enabled

Enables Ethernet OAM features (IEEE 802.3ah/802.1ag/ITU-T Y.1731) to rapidly detect and recover network fault and save the OPEX for operators as well as increase customer satisfaction

MEF standards compliant solution

CE2.0 compliant product to guarantee the compatibility with other MEF certified equipment and reduce the risk and cost for Metro Ethernet network deployment of operators

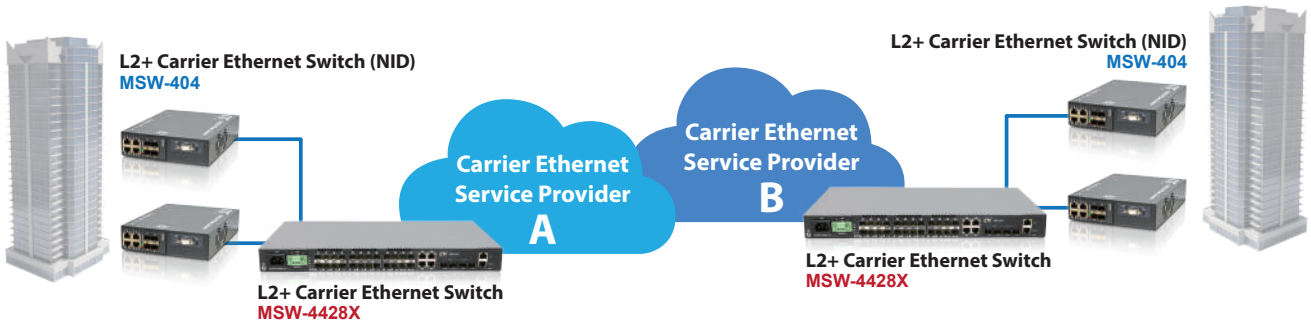
Specifications

Interface	24x 100/1000Mbps SFP slots + 4x 10/100/1000Base-T RJ45 + 4x 1G/10Gbps SFP+ slots
Console Port	1x RJ-45 console port
Management Port	1x 10/100/1000Base-T RJ45
Switching Fabric Capacity	136Gbps
Packet Forwarding Capacity	102Mpps
Filter & Forward Rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps
Transmission Method	Store and Forward Switching
Standards	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.1p, IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1D, IEEE 802.1w
	IEEE 802.1s, IEEE 802.1x, IEEE 802.3ad, IEEE 802.3az, IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731
Packet Buffer	32M bits
Mac Table Size	32K
Jumbo Frames Size	10,240 bytes
VLAN Feature	IEEE 802.1Q tagged VLAN(Max. 4K VLAN groups), port based VLAN, MAC based VLAN, protocol based VLAN
	private VLAN, IEEE 802.1ad Q-in-Q, VLAN translation, GVRP
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, CoS based on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking, Port based ingress/egress rate limit
	3 colors marker-CIR/EIR/Burst bandwidth control, IEEE 802.3x flow control

L2+ Gigabit Carrier Ethernet Switch

L2 switching Protection	STP, RSTP, MSTP, ITU-T G.8031/G.8032
Trunking	IEEE 802.3ad LACP (Max. 16 trunking group; Max. 8 ports per trunking group)
Security	IEEE 802.1x port based access control, MAC based access control authentication
	RADIUS/TACACS+ AAA, Per port limited MAC address learning, IP/MAC binding, ACL rule based filtering
	IP source guard, DHCP client/snooping/relay option 82, ARP inspection
IP Multicasting	IGMP throttling, IGMP filtering, IGMP fast leave, IGMP snooping v1/v2/v3, MVR, MLD snooping v1/v2
Storm Control	Unicast/Broadcast/Multicast storm suppression
Management	Web/Telnet CLI/SNMP/console interface, Web/CLI authentication, SSH v2, HTTPs, Port mirroring
	RSPAN, Syslog, IPv6 management, NTP
	IEEE 802.3az Energy/Efficient/Ethernet (EEE) power management, SFF-8472 DDMI
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9
Software Upgrade	TFTP/HTTP
Ethernet OAM	IEEE 802.3ah/IEEE 802.1ag/ITU-T Y.1731, RFC2544, ITU-T Y.1564
LED Display	Power, System, Console, Link/Act, Speed
Power Input	100~240VAC ; 36~60VDC
Build in Power Module Combination	AC, DC, AD (AC+DC), AA (AC+AC) or DD (DC+DC)
Power Consumption	40.3 Watts Max.
Operating Temperature	-10~60°C
Storage Temperature	-25~70°C
Humidity	5% ~ 90% (non-condensing)
Dimension	440 × 250 × 43.5mm (W×D×H)
Certification	FCC, CE

Application



Ordering Information

Model Name	Description
MSW-4428X-AC	L2+ 10G Fiber Access Switch and Build-in Single AC Power Module
MSW-4428X-DC	L2+ 10G Fiber Access Switch and Build-in Single DC Power Module
MSW-4428X-AA	L2+ 10G Fiber Access Switch and Build-in Dual AC Power Module
MSW-4428X-DD	L2+ 10G Fiber Access Switch and Build-in Dual DC power Module
MSW-4428X-AD	L2+ 10G Fiber Access Switch and Build-in AC + DC Power Module

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2

MSW-4424C

20x GbE, SFP + 4x GbE Combo + 4x 10GE SFP+ L2+ Managed Carrier Ethernet Switch

The MSW-4424C is positioned as a layer 2+ Gigabit access switch solution. It is equipped with 20 100Base-FX/1000Base-X dual speed SFP slots, 4 ports GbE combo (10/100/1000Base-T or 100/1000Base-X SFP) ports and 4 1000Base-X/10G Base-X dual speed SFP+ uplink slots. The MSW-4424C offers the best flexibility and scalability for operators or service providers to deploy their Metro Ethernet network. With the deployment of MSW-4424C, operators or service providers can flexibly provision the bandwidth for either 100Mbps or 1000Mbps as well as uplink connection of Gigabit or 10G speed in their service applications. The MSW-4424C has built-in dual power supplies to enable power redundancy and enhance the high network availability.

Aimed at Metro Ethernet applications, the specifications of MSW-4424C fully meet the attributes of Carrier Ethernet proposed by MEF (Metro Ethernet Forum). It complies with MEF 9 standard to support E-Line/E-Access service and MEF 14 standard to enable the bandwidth profile configuration delivering SLA (Service Level Agreement) for end-to-end performance characteristics as well as Ethernet OAM functionality to support carrier grade service OAM management rapidly detecting and recovering from the network incidents in real time.

Features

Fully dual rate architecture of fiber link port

Completely dual speed ports of fiber link to offer the scalable physical connection of Metro Ethernet network for operators

Fully Ethernet OAM enabled

Enables Ethernet OAM features (IEEE 802.3ah/802.1ag/ITU-T Y.1731) to rapidly detect and recover network fault and save the OPEX for operators as well as increase customer satisfaction

MEF standards compliant solution

CE2.0 compliant product to guarantee the compatibility with other MEF certified equipment and reduce the risk and cost for Metro Ethernet network deployment of operators

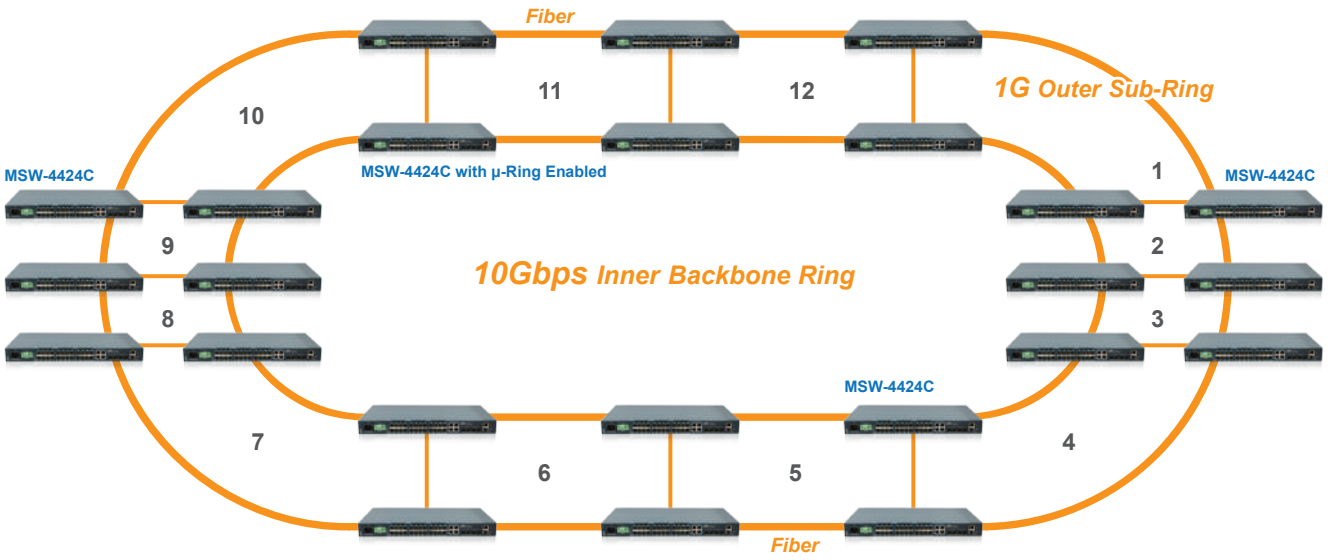
Specifications

Interface	4x 100/1000Mbps SFP slots x 20 + GbE combo port (10/100/1000Base-T or 100/1000Mbps SFP slot)
	4x 1/10Gbps SFP+ slot
Console Port	RJ-45 console port x 1
Management Port	10/100/1000Base-T RJ45 x 1
Filter & Forward Rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps
Switching Fabric Capacity	128Gbps
Packet Forwarding Capacity	95Mpps
Transmission Method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.1p
	IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1d, IEEE 802.1w
	IEEE 802.1s, IEEE 802.1x, IEEE 802.3ad, IEEE 802.3ah
	IEEE 802.1ag, IEEE 802.3az, ITU-T Y.1731
Packet Buffer	32M bits
Mac Table Size	32K
Max. Packet Size	10K Bytes

L2+ Gigabit Carrier Ethernet Switch

VLAN Feature	IEEE 802.1Q tagged VLAN (Max. 4K VLAN groups)
	Port based VLAN, MAC based VLAN, Protocol based VLAN
	Private VLAN, IEEE 802.1ad Q-in-Q, VLAN translation, GVRP
QoS Feature	IEEE 802.1p 8 priority queues per port, CoS based on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking, Port based ingress/egress rate limit
	3 colors marker-CIR/EIR/Bursts bandwith control
L2 switching Protection	STP, RSTP, MSTP, ITU-T G.8031/G.8032
Trunking	IEEE 802.3ad LACP (Max. 14 trunking group; Max. 8 ports per trunking group).
Security	IEEE 802.1x port based access control
	MAC based access control authentication
	RADIUS authentication, Per port limited MAC address learning
	IP/MAC binding, ACL rule based filtering, TACACS+
	IP source guard, DHCP client/snooping/relay option 82
	ARP inspection
IP Multicasting	IGMP throttling, IGMP filtering, IGMP fast leave
	IGMP snooping v1/v2/v3, MVR, MLD snooping v1/v2
Storm Control	Unknown Unicast/Broadcast/Multicast storm suppression
Management	Web/Telnet CLI/SNMP/console interface
	Web/CLI authentication, SSH v2, HTTPs, port mirroring
	Syslog, IPv6 management, NTP, SNTP, IEEE 802.3az, Energy, Efficient, Ethernet (EEE) power management
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9
Software upgrade	TFTP/HTTP
Ethernet OAM	IEEE 802.3ah/IEEE 802.1ag/ITU-T Y.1731
LED display	Power, System, Console, Link/Act, Speed
Power input	100~240VAC ; 36~60VDC
Build in power module combination	AC, DC, AD (AC+DC), AA (AC+AC) or DD (DC+DC)
Power Consumption	32.84 Watts Max.
Operating Temperature	-10~60°C
Storage Temperature	-25~70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	250 x 440 x 43.5mm (DxWxH)
Certification	FCC, CE

Application



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Ordering Information

Model Name	Description
MSW-4424C-AC	L2+ 10G Fiber Access Switch with Build-in Single AC Power Module
MSW-4424C-DC	L2+ 10G Fiber Access Switch with Build-in Single DC Power Module
MSW-4424C-AA	L2+ 10G Fiber Access Switch with Build-in Dual AC Power Module
MSW-4424C-DD	L2+ 10G Fiber Access Switch with Build-in Dual DC power Module
MSW-4424C-AD	L2+ 10G Fiber Access Switch with Build-in AC + DC Power Module

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2

MSW-4424A

24x GbE, SFP + 4x 10GE SFP+ L2+ Carrier Ethernet Switch

MSW-4424A L2+ managed Gigabit Ethernet switches are positioned as a Carrier Ethernet access switch solution. They are equipped with 24 SFP based 100Base-FX/1000Base-X dual speed optical ports and 4 10G Base-X SFP+ or 1000Base-X SFP uplink ports. The MSW-4424A offers the best flexibility and scalability for operators and service providers to deploy their Metro Ethernet networks. Aimed specifically at Metro Ethernet deployment, the specifications of MSW-4424A fully meet the attributes of Carrier Ethernet proposed by the Metro Ethernet Forum. The switches comply with MEF 9 standard to support E-Line/E-Access services and MEF 14 standard to enable the bandwidth profile configuration for delivering SLA (Service Level Agreement) with predictable end-to-end performance characteristics. MSW-4424A also supports advanced service OAM management to rapidly detect and recover from the network incidents in real time.

Features

Front access and hot swappable design

All of the system modules are front accessible, the hot swappable power and FAN module are designed to keep high network availability without service interruption when components fail

Fully dual rate architecture of fiber link port

Dual speed fiber ports offer scalable physical connections for Metro Ethernet network operators

Fully Ethernet OAM enable

Ethernet OAM features (IEEE 802.3ah/802.1ag/ITU-T Y.1731) help to rapidly detect and recover network faults and save OPEX for operators as well as increase customer satisfaction

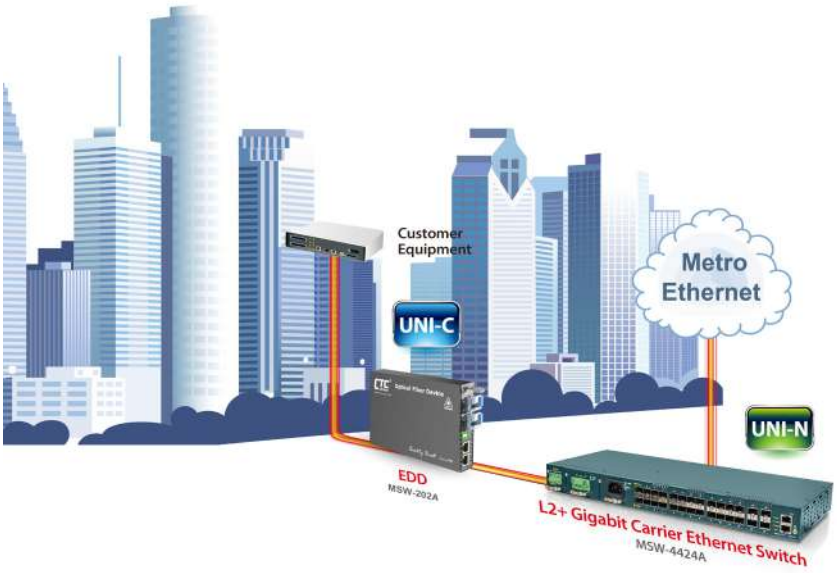
Specifications

Interface	24x 100/1000Mbps SFP slots + 4x 1G/10Gbps SFP+ slot
Console Port	1x RJ-45 console port
Management Port	1x 10/100/1000Base-T RJ45
Filter & Forward Rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps
Switching Fabric Capacity	128Gbps
Packet Forwarding Capacity	95Mpps
Transmission Method	Store and Forward Switching
Standards	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.1p
	IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1D, IEEE 802.1w
	IEEE 802.1s, IEEE 802.1x, IEEE 802.3ad, IEEE 802.3ah
	IEEE 802.3az, IEEE 802.1ag, ITU-T Y.1731
Packet Buffer	32M bits
Mac Table Size	32K
Max. Packet Size	10K Bytes
VLAN Feature	IEEE 802.1Q tagged VLAN (Max. 4K VLAN groups)
	Port based VLAN, MAC based VLAN, Protocol based VLAN
	Private VLAN, IEEE 802.1ad Q-in-Q, VLAN translation, GVRP
QoS Feature	IEEE 802.1p 8 priority queues per port, CoS based on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking, Port based ingress/egress rate limit
	3 colors marker-CIR/EIR/Burst bandwith control
L2 switching Protection	STP, RSTP, MSTP, ITU-T G.8031/G.8032
Trunking	IEEE 802.3ad LACP (Max. 14 trunking group; Max. 8 ports per trunking group)

L2+ Gigabit Carrier Ethernet Switch

Security	IEEE 802.1x port based access control, MAC based access control authentication
	RADIUS authentication, Per port limited MAC address learning, IP/MAC binding, ACL rule based filtering
	TACACS+, IP source guard, DHCP client/snooping/relay option 82, ARP inspection
IP Multicasting	IGMP throttling, IGMP filtering, IGMP fast leave
	IGMP snooping v1/v2/v3, MVR, MLD snooping v1/v2
Storm Control	Unknown Unicast/Broadcast/Multicast storm suppression
Management	Web/Telnet CLI/SNMP/console interface, Web/CLI Authentication, SSH v2, HTTPs, Port mirroring
	Syslog, IPv6 management, NTP, SNTP, IEEE 802.3az, Energy, Efficient, Ethernet (EEE) power management
SNMP Agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9
Software upgrade	TFTP / HTTP
Ethernet OAM	IEEE 802.3ah / IEEE 802.1ag / ITU-T Y.1731
LED display	Power, System, Console, Link/Act, Speed
Power input	100~240VAC ; 36~60VDC
Power Consumption	39 Watts Max.
Operating Temperature	-10 ~ 60°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	270.3 x 437.5 x 43.5 mm (D x W x H)
Certification	FCC, CE

Application



Ordering Information

Model Name	Description
MSW-4424A-AC	L2+ 10G Fiber Access Switch and Build-in Single AC Power Module
MSW-4424A-DC	L2+ 10G Fiber Access Switch and Build-in Single DC Power Module
MSW-4424A-AA	L2+ 10G Fiber Access Switch and Build-in Dual AC Power Module
MSW-4424A-DD	L2+ 10G Fiber Access Switch and Build-in Dual DC power Module
MSW-4424A-AD	L2+ 10G Fiber Access Switch and Build-in AC + DC Power Module

Optional Accessory

▪ **10G SFP+ Transceiver Module**

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2

QSW-4624CM

24 × 1G/2.5G, RJ45 + 6 × 1G/10G SFP+ L2+ Managed Ethernet Switch

NEW

The next generation Ethernet switch in high-density port configuration leveraged NBase-T multigigabit technology, QSW-4624CM, is designed for enterprise or service provider to migrate to the reliable and secure Ethernet based high speed network access by connecting the existed Cat5e/Cat6 cabling infrastructure from 1Gbps to multigigabit speed. It is ideal solution to save your investment without disruptive and expensive wiring reconstruction required for offering more bandwidth capacity.

The latest content richer application and technology such as WiFi 6E/7 wireless access and 4K UHD video streaming or IP surveillance make the standard gigabit reveal the problem of bandwidth insufficiency. QSW-4624CM is equipped 24 ports 1G/2.5G RJ45 and 6 slots 1G/10G SFP+ uplink. It offers 2.5Gbps and 10Gbps connectivity to fulfill the bandwidth consumed popular network gears.

It is featured completely L2+ switch functionality which guarantees high network availability, robust network access and security as well as comprehensive QoS in the network edge. It will deliver the benefits of optimal traffic transportation performance and lower ownership cost while maintaining the network deployment simply.

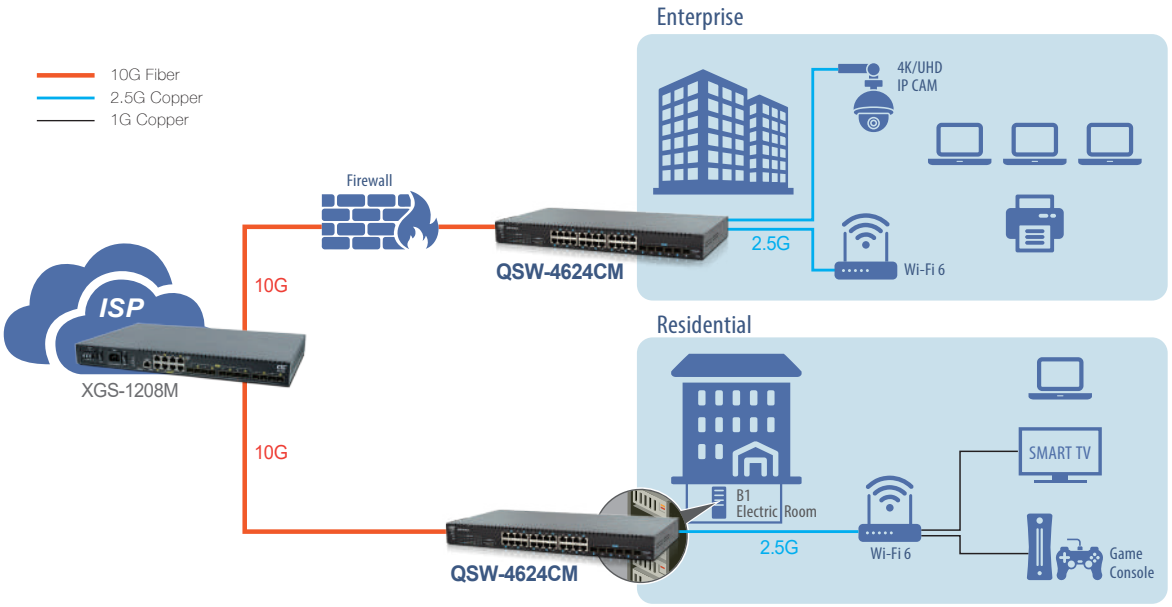
Specifications

Interface	Fiber port: 6x 1G/10G SFP+	
	Copper port: 24x 1G/2.5G RJ45	
	Console port: RS-232 in USB type C	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	3720000pps	@2.5Gbps
	14880000pps	@10Gbps
Switching Fabric Capacity	240Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN	
	Voice VLAN, MAC based VLAN, Protocol based VLAN, IP subnet based VLAN	
	Private VLAN for port isolation, VLAN translation, GVRP(GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.1AX	
	IEEE 802.3ad LACP, 15 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port, IEEE 802.1p priority tag remarking	
	DSCP remarking, Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, IEEE 802.1Qbb priority based full-duplex flow control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	512 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA	
	HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	

L2+ Managed 2.5G Ethernet Switch

Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II, Private MIB
	DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, RSPAN
	Event syslog server, DNS client/proxy, NTP client, UPnP, IPv4/IPv6 management
	SFF-8472 DDMI, IEEE 802.1ab LLDP
Power Input	100~240VAC ; 36~60VDC
Power Consumption	TBD
Operating Temperature	0~50 ℃
Storage Temperature	-25~70 ℃
Humidity	5%~95% (non-condensing)
Dimension	440 × 220 × 43.5 mm (W×D×H)
Weight	3.05 kg
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
QSW-4624CM-AC	24 × 1G/2.5G RJ45 + 6 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single AC Power Supply
QSW-4624CM-DC	24 × 1G/2.5G RJ45 + 6 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single DC Power Supply
QSW-4624CM-AA	24 × 1G/2.5G RJ45 + 6 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual AC Power Supply
QSW-4624CM-DD	24 × 1G/2.5G RJ45 + 6 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual DC Power Supply
QSW-4624CM-AD	24 × 1G/2.5G RJ45 + 6 × 1G/10G SFP+ Slots Managed Ethernet Switch with AC + DC Power Supply

Optional Accessory

▪ **10G SFP+ Transceiver Module**

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2 QSW-4416CM

16 × 1G/2.5G, RJ45 + 4 × 1G/10G SFP+ L2+ Managed Ethernet Switch

NEW

The next generation Ethernet switch in high-density port configuration leveraged NBase-T multigigabit technology, QSW-4416CM, is designed for enterprise or service provider to migrate to the reliable and secure Ethernet based high speed network access by connecting the existed Cat5e/Cat6 cabling infrastructure from 1Gbps to multigigabit speed. It is ideal solution to save your investment without disruptive and expensive wiring reconstruction required for offering more bandwidth capacity.

The latest content richer application and technology such as WiFi 6E/7 wireless access and 4K UHD video streaming or IP surveillance make the standard gigabit reveal the problem of bandwidth insufficiency. QSW-4416CM is equipped 16 ports 1G/2.5G RJ45 and 4 slots 1G/10G SFP+ uplink. It offers 2.5Gbps and 10Gbps connectivity to fulfill the bandwidth consumed popular network gears.

It is featured completely L2+ switch functionality which guarantees high network availability, robust network access and security as well as comprehensive QoS in the network edge. It will deliver the benefits of optimal traffic transportation performance and lower ownership cost while maintaining the network deployment simply.

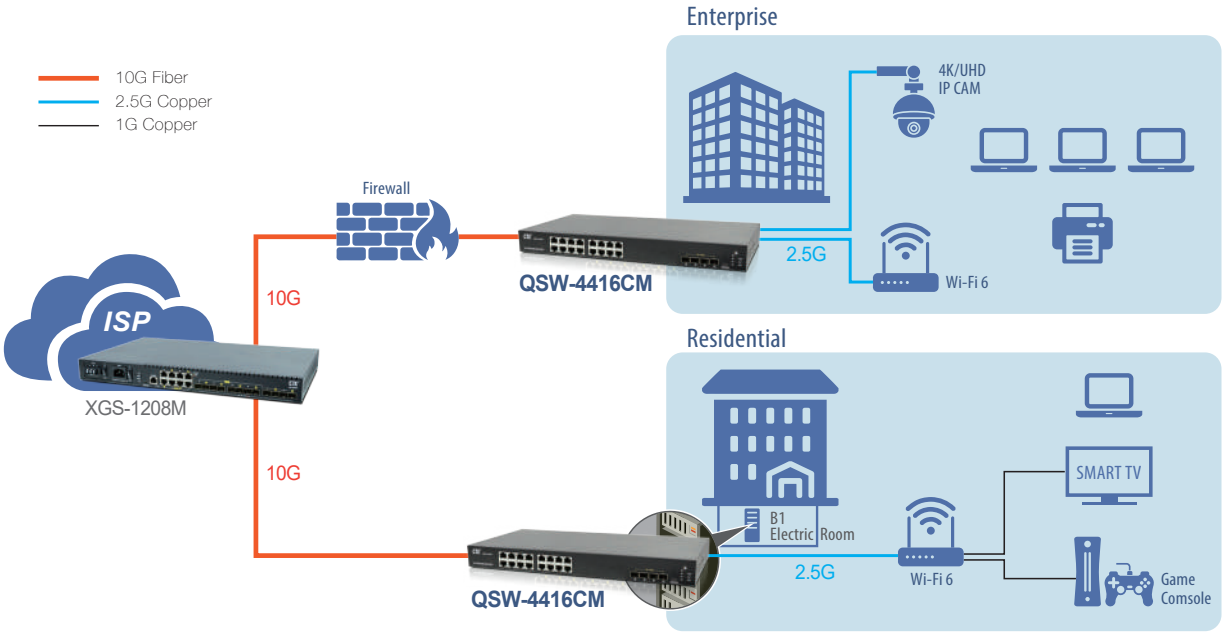
Specifications

Interface	Fiber port: 4x 1G/10G SFP+	
	Copper port: 16x 1G/2.5G RJ45	
	Console port: RS-232 in USB type C	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	3720000pps	@2.5Gbps
	14880000pps	@10Gbps
Switching Fabric Capacity	160Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN	
	Voice VLAN, MAC based VLAN, Protocol based VLAN, IP subnet based VLAN	
	Private VLAN for port isolation, VLAN translation, GVRP(GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.1AX	
	IEEE 802.3ad LACP, 10 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking, Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, IEEE 802.1Qbb priority based full-duplex flow control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	512 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA	
	HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	

L2+ Managed 2.5G Ethernet Switch

Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II, Private MIB
	DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, RSPAN
	Event syslog server, DNS client/proxy, NTP client, UPnP, IPv4/IPv6 management
	SFF-8472 DDMI, IEEE 802.1ab LLDP
Power Input	100~240VAC ; 36~60VDC
Power Consumption	TBD
Operating Temperature	0~50 ℃
Storage Temperature	-25~70 ℃
Humidity	5%~95% (non-condensing)
Dimension	440 × 220 × 43.5 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
QSW-4416CM-AC	16 × 1G/2.5G RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single AC Power Supply
QSW-4416CM-DC	16 × 1G/2.5G RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single DC Power Supply
QSW-4416CM-AA	16 × 1G/2.5G RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual AC Power Supply
QSW-4416CM-DD	16 × 1G/2.5G RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual DC Power Supply
QSW-4416CM-AD	16 × 1G/2.5G RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with AC + DC Power Supply

Optional Accessory

▪ **10G SFP+ Transceiver Module**

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2

GSW-4448CM

24 × CSFP (48 × GbE) with 4 × GbE Combo + 4 × 1G/10G SFP+ Managed Ethernet Switch

CTC Union technologies unveils the special BX optics (cSFP) based Ethernet switch, GSW-4448CM, which is designed for FTTx deployment. The compact SFP can double the fiber port density compared with the general SFP transceiver. It is suitable for the FTTx deployment scenario where increased user links are required in the limited construction space.

The GSW-4448CM is equipped with 48 1000Base-X CSFP ports included 4 Gigabit combo ports (RJ45 or CSFP slot) and 4 1G/10Gbps dual rate SFP+ slots. This switch is targeted at multi-service operators (MSO) with a desire to deploy provisioned multiple play services via active Ethernet FTTx network infrastructures. The GSW-4448CM Ethernet access switch provides VLAN, QoS and IGMP L2 feature sets as well as robust security management to facilitate service provider's build out of a manageable and secure FTTx access network.

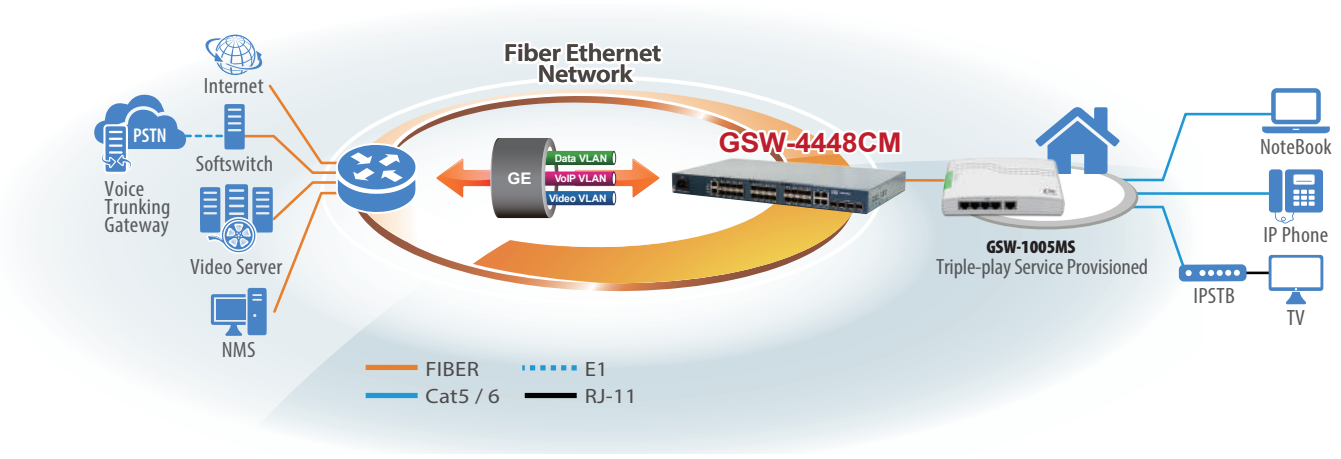
Specifications

Interface	Access port: 22x 1000Base-X CSFP slots + 4x GbE combo (CSFP or RJ45)	
	Uplink port: 4x 1000Base-X/10GBase-X SFP+ slots	
	Management port: 1x 10/100/1000Base-T RJ45	
	Console port: 1x RS-232 in RJ45	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Switching Fabric Capacity	176Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN	
	Voice VLAN, MAC based VLAN, Protocol based VLAN, IP subnet based VLAN	
	Private VLAN for port isolation, VLAN translation	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.1AX	
	IEEE 802.3ad LACP, 26 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, IEEE 802.1Qbb priority based full-duplex flow control	
	Multicast/Broadcast/Unicast storm control with flooding controls	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	512 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA, HTTPs & SSH v2	
	IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	

L2+ CSFP Ethernet Switch

Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN, Event syslog server, DNS client/proxy, NTP client, UPnP, IPv4/IPv6 management
	SFF-8472 DDMI, IEEE 802.1ab LLDP, Text based CLI configuration download and upload
Power Input	AC 100~240V, 50/60Hz or 36~60VDC
Power Consumption	56.5 Watts Max.
Operating Temperature	0~50 ℃
Storage Temperature	-25~70 ℃
Humidity	10 - 90% non-condensing
Dimension	440 × 220 × 43.5 mm (W×D×H)
Certification	RoHS, CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-4448CM-AC	24 × CSFP (48 × GbE) with 4 × GbE Combo (RJ45 or CSFP) + 4 × 1G/10G SFP+ Slots Uplink with Single AC Power Supply
GSW-4448CM-DC	24 × CSFP (48 × GbE) with 4 × GbE Combo (RJ45 or CSFP) + 4 × 1G/10G SFP+ Slots Uplink with Single DC Power Supply (-48V)

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2

GSW-3424FM

24 × GbE/SFP + 4 × GbE/RJ45 with 4 × 1G/10G SFP+ L2+ Managed Ethernet Switch

CTC Union Technologies unveils an SNMP manageable Gigabit Ethernet switch for FTTx deployment, GSW-3424FM, which is targeted at multi-service operators (MSO) with a desire to deploy provisioned triple play services via active Ethernet FTTx network infrastructures. Fiber based network infrastructures offer the data rates required by triple play services such as high-speed internet access, VoIP and HD IPTV.

It is equipped with 24 dual rate 100/1000Base-X SFP ports, 4 10/100/1000Base-T RJ45 ports and 4 1G/10Gbps dual rate SFP+ slots. The GSW-3424FM Ethernet access switch provides VLAN, QoS and IGMP L2 feature sets as well as robust security management to facilitate service provider's build out of a manageable and secure FTTx access network.

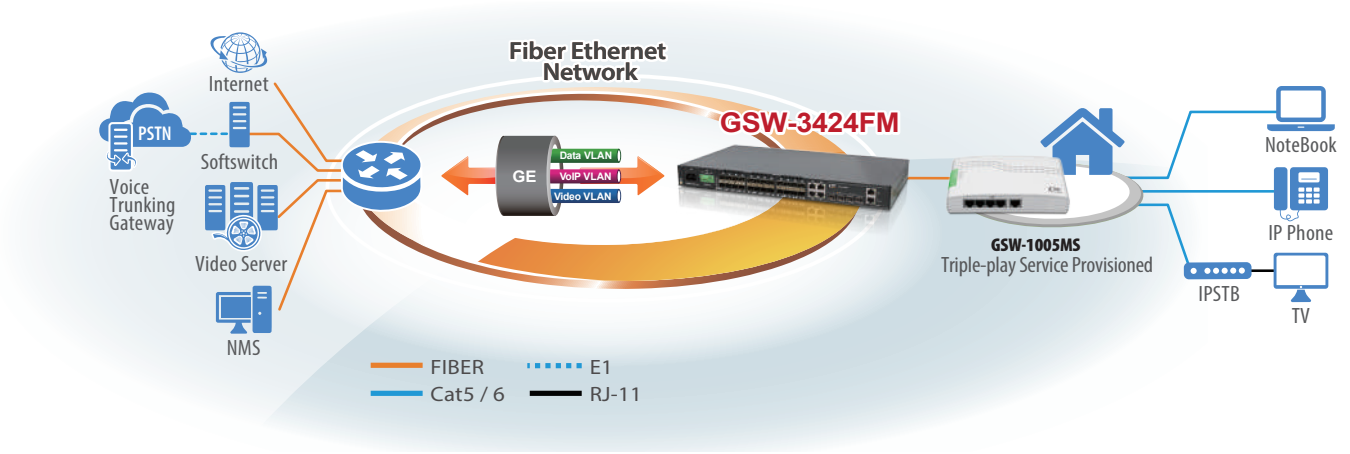
Specifications

Interface	Access fiber port: 24x 100Base-FX/1000Base-X SFP slot	
	Access copper port: 4x 10/100/1000Base-T RJ45	
	Uplink port: 4x 1000Base-X/10GBase-X SFP+ slot	
	Management port: 1x 10/100/1000Base-T RJ45	
	Console port: 1x RS-232 in RJ45	
Switching Fabric Capacity	136Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Packet Forwarding Capacity	102Mpps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 16 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress/egress rate limit in steps of 100kbps, IEEE 802.3x flow control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based / MAC base / single / multiple IEEE 802.1x access control	
	256 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA, HTTPs & SSH v2	
	IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	

L2+ Managed Ethernet Switch

Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade, Port mirroring
	RSPAN, Event syslog server, DNS client/proxy, NTPv4 client, UPnP
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
	Text based CLI configuration download and upload
Power Input	100~240VAC ; 36~60VDC
Power Consumption	38.6 Watts Max.
Operating Temperature	0~50℃
Storage Temperature	-25~70℃
Humidity	5%~95% (non-condensing)
Dimension	440 × 250 × 43.5 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-3424FM-AC	24 × GbE SFP Slots + 4 × GbE RJ45 + 4 × 1G/10Gbps SFP+ Slots Uplink with Single AC Power Supply
GSW-3424FM-DC	24 × GbE SFP Slots + 4 × GbE RJ45 + 4 × 1G/10Gbps SFP+ Slots Uplink with Single DC Power Supply (-48V)
GSW-3424FM-AA	24 × GbE SFP Slots + 4 × GbE RJ45 + 4 × 1G/10Gbps SFP+ Slots Uplink with Dual AC Power Supply
GSW-3424FM-DD	24 × GbE SFP Slots + 4 × GbE RJ45 + 4 × 1G/10Gbps SFP+ Slots Uplink with Dual DC Power Supply (-48V)
GSW-3424FM-AD	24 × GbE SFP Slots + 4 × GbE RJ45 + 4 × 1G/10Gbps SFP+ Slots Uplink with AC + DC (-48V) Power Supply

Optional Accessory

▪ **10G SFP+ Transceiver Module**

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2 GSW-4424CM

24 × GbE/RJ45 + 4 × 1G/10G SFP+ L2+ Managed Ethernet Switch

The new generation L2+ managed Ethernet switch, GSW-4424CM, is designed for FTTH and enterprise network application. The 10G uplink ports relieve the insufficiency of Gigabit links for new demanding bandwidth consumption applications such as 4K UHD video streaming, WiFi-6 network and cloud service access in the enterprise and SMB network.

The GSW-4424CM is equipped with 24 Gigabit RJ45 ports and 4 1G/10G SFP+ based fiber optics ports. It is featured completely L2+ switch functionality which guarantees high network availability, robust network access and security as well as comprehensive QoS in the network edge. It will deliver the benefits of optimal traffic transportation performance and lower ownership cost while maintaining the network deployment simply.

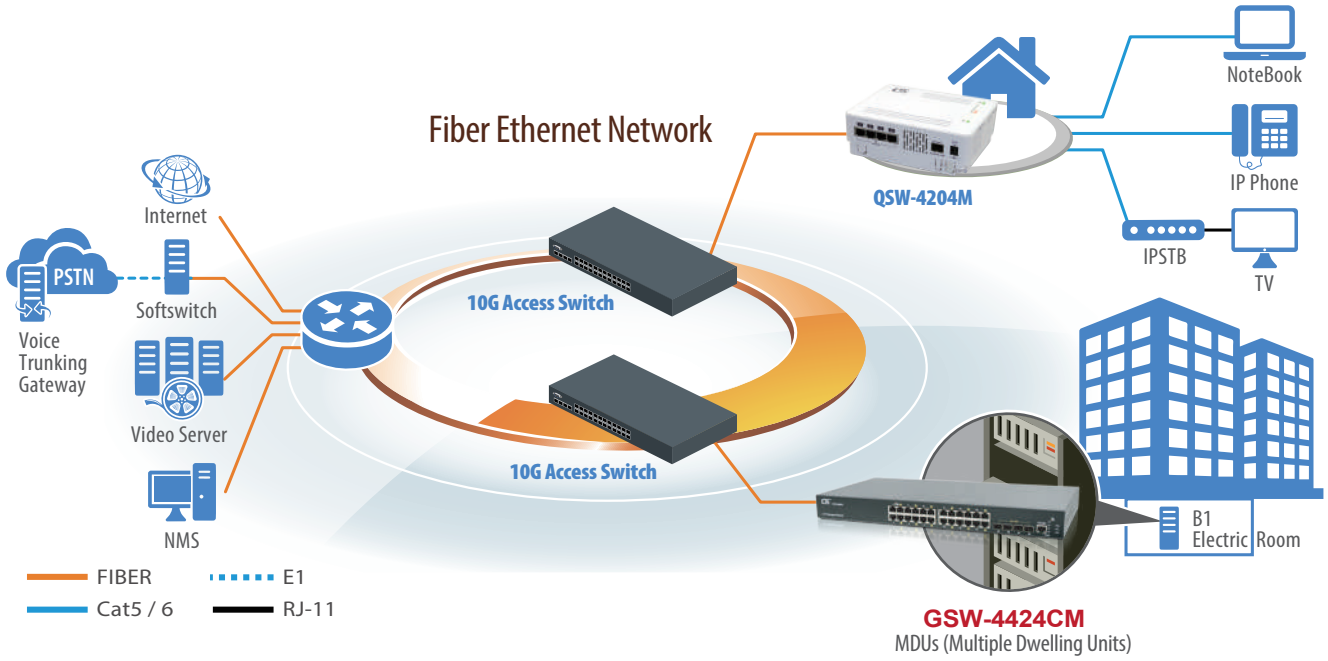
Specifications

Interface	Copper port: 24x 10/100/1000Base-T RJ45	
	Uplink port: 4x 1000Base-X/10GBase-X SFP+ slot	
	Console port: 1x RS-232 in RJ45	
Switching Fabric Capacity	128Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN	
	Private VLAN for port isolation, VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 14 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress/egress rate limit in steps of 100kbps, IEEE 802.3x flow control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	256 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA, HTTPs & SSH v2	
	IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB	
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade, Port mirroring	
	RSPAN, Event syslog server, DNS client/proxy, NTPv4 client, UPnP	
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP	
	Text based CLI configuration download and upload	

L2+ Managed Ethernet Switch

Power Input	100~240VAC ; 36~72VDC
Power Consumption	35.45 Watts Max.
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 × 250 × 43.5 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-4424CM-AC	24 × 10/100/1000Base-T RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single AC Power Supply
GSW-4424CM-DC	24 × 10/100/1000Base-T RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single DC Power Supply (-48V)
GSW-4424CM-AA	24 × 10/100/1000Base-T RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual AC Power Supply
GSW-4424CM-DD	24 × 10/100/1000Base-T RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual DC Power Supply (-48V)
GSW-4424CM-AD	24 × 10/100/1000Base-T RJ45 + 4 × 1G/10G SFP+ Slots Managed Ethernet Switch with AC + DC Power Supply

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

2 GSW-4208CM

8 × GbE/RJ45 + 2 × 1G/10G SFP+ L2+ Managed Ethernet Switch

CTC Union Technologies unveils the L2+ managed Ethernet switch, GSW-4208CM, which is positioned as low port count density switch but supports 10G fiber uplink connectivity. It is aimed at the small & medium business market segment and MDU (Multiple Dwelling Unit) of FTTH deployment. It is equipped with 8 Gigabit RJ45 ports and 4 10G SFP+ slots. It will deliver the benefits of optimal traffic transportation performance and lower ownership cost while maintaining the network deployment simply.The GSW-4208CM Ethernet switch provides VLAN, QoS and IGMP L2 feature sets as well as robust security management to facilitate service provider and MIS team of enterprise build out of a manageable and secure Ethernet access network rapidly. The redundant power design can increase the high network availability due to the power supply outage unpredictably.

Specifications

Interface	Copper port: 8x 10/100/1000Base-T RJ45	
	Uplink port: 2x 1000Base-X SFP slot	
	Console port: 1x RS-232 in DB-9	
Switching Fabric Capacity	56Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Transmission Method	Store and Forward Switching	
Packet Buffer	8M bits	
MAC Table Size	16K	
Jumbo Frame Size	10240 Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN, MAC based VLAN	
	Protocol based VLAN, IP subnet based VLAN	
	Private VLAN for port isolation, VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.3ad LACP, 5 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port; IEEE 802.1p priority tag remarking	
	DSCP remarking, Per port/queue based ingress/egress rate limit in steps of 100kbps, IEEE 802.3x flow control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control, 256 ACL rules based on L2~L4 information	
	RADIUS/TACACS+ AAA, HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB	
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade, Port mirroring	
	RSPAN, Event syslog server, DNS client/proxy, NTPv4 client, UPnP, IPv4/IPv6 management, SFF-8472 DDMI	
	IEEE 802.1ab LLDP, Text based CLI configuration download and upload, Dying gasp in SNMP trap message	
Power Input	100~240VAC ; 18~72VDC	
Power Consumption	12.65 Watts Max.	
Operating Temperature	0~50°C	
Storage Temperature	-25~70°C	
Humidity	5%~95% (non-condensing)	
Dimension	250 × 117 × 43.8 mm (W×D×H)	
Certification	CE, FCC class A	

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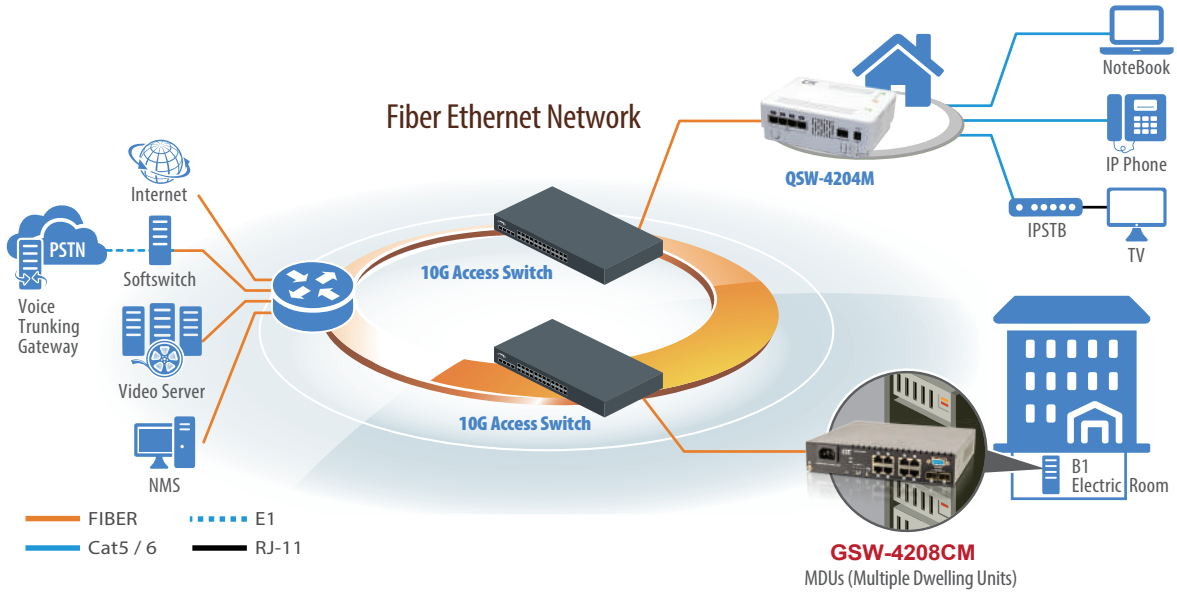
Application



Ordering Information

Model Name	Description
GSW-4208CM-AC	8 × GbE RJ45 + 2 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single AC Power Supply
GSW-4208CM-DC	8 × GbE RJ45 + 2 × 1G/10G SFP+ Slots Managed Ethernet Switch with Single DC Power Supply (-48V)
GSW-4208CM-AA	8 × GbE RJ45 + 2 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual AC Power Supply
GSW-4208CM-DD	8 × GbE RJ45 + 2 × 1G/10G SFP+ Slots Managed Ethernet Switch with Dual DC Power Supply (-48V)
GSW-4208CM-AD	8 × GbE RJ45 + 2 × 1G/10G SFP+ Slots Managed Ethernet Switch with AC + DC Power Supply

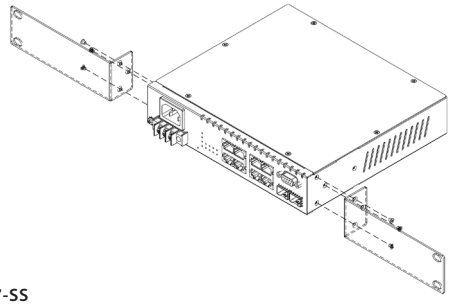
Optional Accessory

▪ 10G SFP+ Transceiver Module

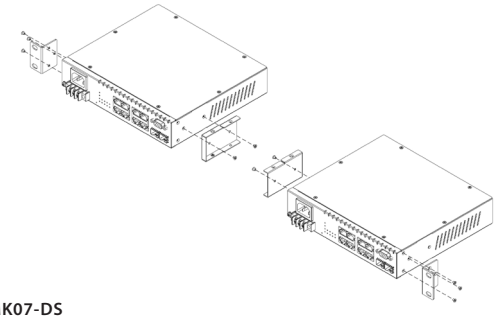
Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

▪ Rack Mount Kit

Model Name	Description
RMK07-SS	Rack Mounting Kits for GSW-4208CM/MSW-4204 Series Single Unit Chassis Mounting in 19" Rack
RMK07-DS	Rack Mounting Kits for GSW-4208CM/MSW-4204 Series Two Units Chassis Mounting in 19" Rack



RMK07-SS



RMK07-DS

2 GSW-3424CM

24 × GbE/RJ45 + 4 × 1G SFP L2+ Managed Ethernet Switch

CTC Union Technologies unveils the L2+ managed Ethernet switch, GSW-3424CM, which is aimed at the enterprise intranet network and MDU (Multiple Dwelling Unit) of FTTH deployment. It is equipped with 24 Gigabit RJ45 ports and 4 1G SFP based fiber optics ports. It will deliver the benefits of optimal traffic transportation performance and lower ownership cost while maintaining the network deployment simply.

The GSW-3424CM Ethernet switch provides VLAN, QoS and IGMP L2 feature sets as well as robust security management to facilitate service provider and MIS team of enterprise build out of a manageable and secure Ethernet access network rapidly. The redundant power design can increase the high network availability due to the power supply outage unpredictably.

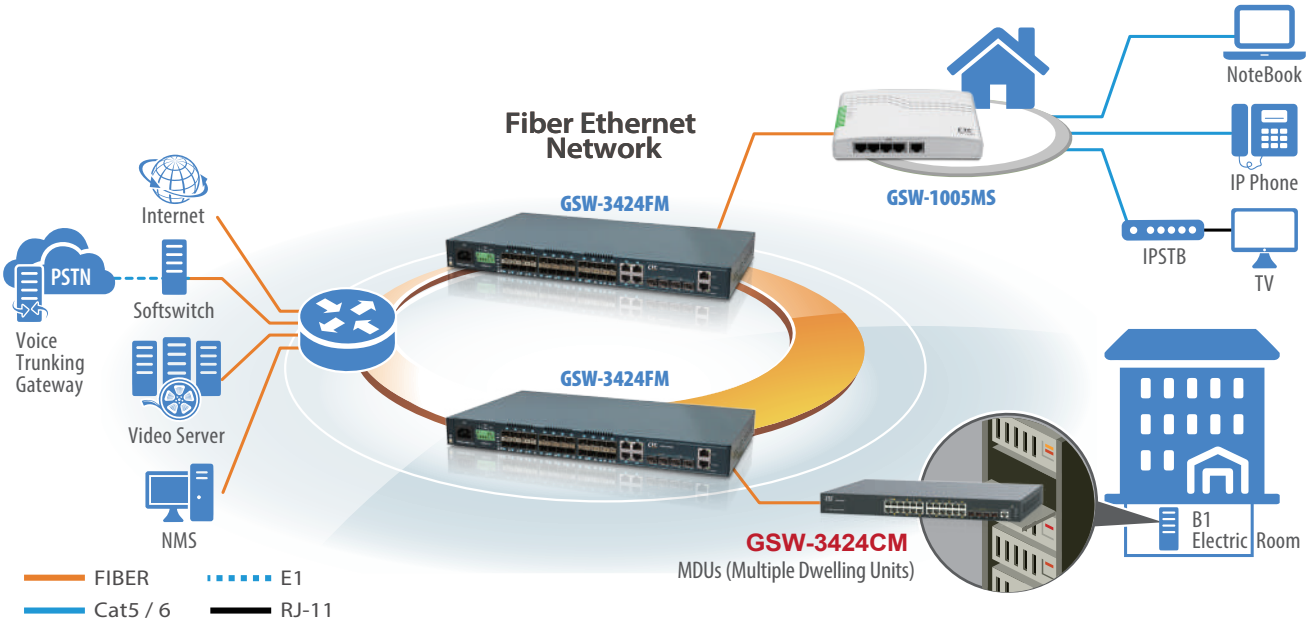
Specifications

Interface	Copper port: 24x 10/100/1000Base-T RJ45	
	Uplink port: 4x 1000Base-X SFP slot	
	Console port: 1x RS-232 in RJ45	
Switching Fabric Capacity	56Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 14 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	256 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA, HTTPs & SSH v2	
	IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB	
	DHCP client/snooping/relay option 82	
	TFTP/HTTP based firmware and configuration upgrade	
	Port mirroring, RSPAN, Event syslog server, DNS client/proxy, NTPv4 client, UPnP	
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP	
	Text based CLI configuration download and upload	

L2+ Managed Ethernet Switch

Power Input	100~240VAC ; 36~72VDC
Power Consumption	35.45 Watts Max.
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 x 250 x 43.5 mm (WxDxH)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-3424CM-AC	24 × 10/100/1000Base-T RJ45 + 4 × 1G SFP Slots Managed Ethernet Switch with Single AC Power Supply
GSW-3424CM-DC	24 × 10/100/1000Base-T RJ45 + 4 × 1G SFP Slots Managed Ethernet Switch with Single DC Power Supply (-48V)
GSW-3424CM-AA	24 × 10/100/1000Base-T RJ45 + 4 × 1G SFP Slots Managed Ethernet Switch with Dual AC Power Supply
GSW-3424CM-DD	24 × 10/100/1000Base-T RJ45 + 4 × 1G SFP Slots Managed Ethernet Switch with Dual DC Power Supply (-48V)
GSW-3424CM-AD	24 × 10/100/1000Base-T RJ45 + 4 × 1G SFP Slots Managed Ethernet Switch with AC + DC Power Supply

2 GSW-3208M2

8 × GbE/RJ45 + 2 × 1G SFP L2+ Managed Ethernet Switch

CTC Union Technologies unveils the layer 2 managed switch solution for high speed connectivity, GSW-3208M2, which supports popular traffic priority and management capabilities for small and medium businesses. It features 8-port 10/100/1000Base-T RJ45 and 2-100/1000Base-X SFP based fiber optics. More and more corporations are adapting new IT technologies over the network such as voice over IP, video conference to improve productivity and save operation expenditure.

The GSW-3208M2 is designed with a high-performance switching architecture and offers wire-speed transportation capability for bandwidth-intensive applications of enterprises. It provides VLAN, QoS and IGMP L2 feature sets as well as robust security management to facilitate service provider and MIS team of enterprise build out of a manageable and secure Ethernet access network rapidly. The optionally redundant power design can increase the high network availability due to the power supply outage unpredictably.

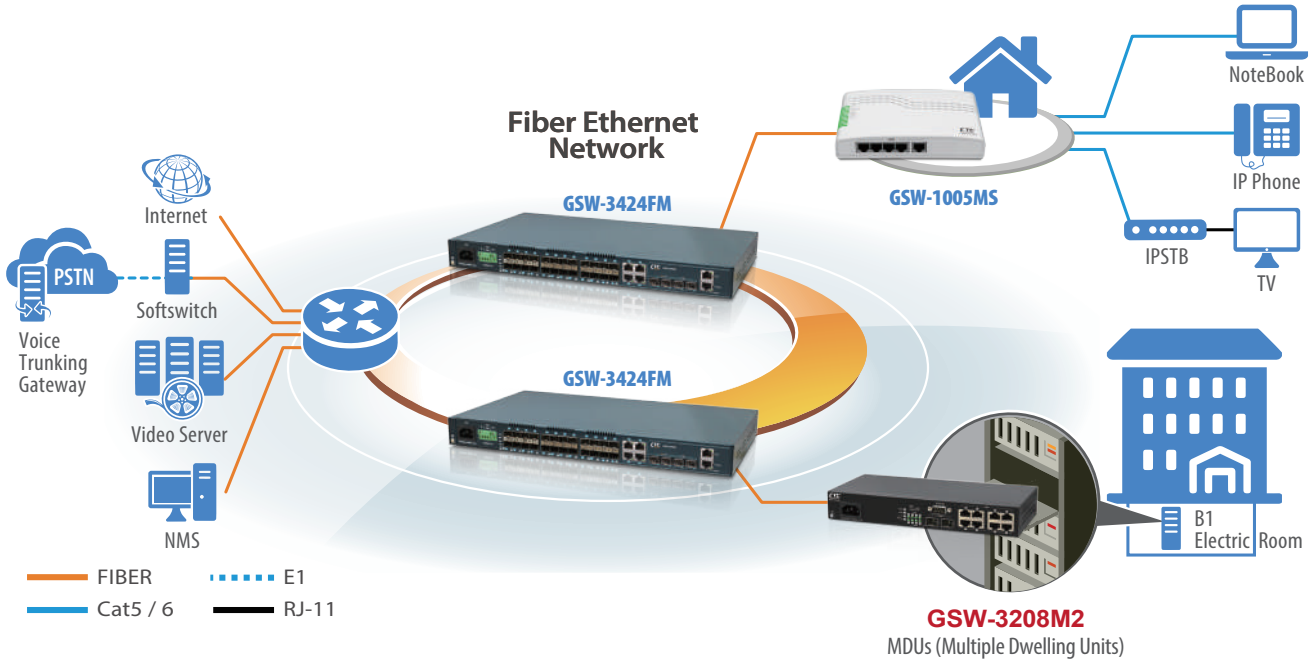
Specifications

Interface	Fiber port: 2x 100/1000Base-X SFP	
	Copper port: 8x 10/100/1000Mbps RJ45	
	Console port: RS-232 in D-Sub 9	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
Transmission Method	Store and Forward Switching	
Packet Buffer	4M bits	
MAC Table Size	8K	
Jumbo Frame Size	9600 Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN	
	Voice VLAN, MAC based VLAN, Protocol based VLAN, IP subnet based VLAN	
	Private VLAN for port isolation, VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 5 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port	
	Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	256 ACL rules based on L2~L4 information, RADIUS/TACACS+ Authentication, HTTPs & SSH v2	
	IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave, IGMP query	
	IGMP filtering/throttling, MVR (Multicast VLAN Registration)	
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II	
	Dying gasp in SNMP trap message, DHCP client/snooping/relay option 82	
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, Event syslog server	
	DHCP auto provisioning with option 60/66/67/254	
	NTP client, UPnP, IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP	

L2+ Gigabit Ethernet Switch

Power Input	100~240VAC ; 18~60VDC
Power Consumption	7.08 Watts Max.
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)
Dimension	250 x 117 x 43.8 mm (WxDxH)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-3208M2-AC	8 × 10/100/1000Base-T RJ45 + 2 × GbE SFP Slot L2 Managed Switch with AC Power Supply
GSW-3208M2-DC48	8 × 10/100/1000Base-T RJ45 + 2 × GbE SFP Slot L2 Managed Switch with DC 48V Power Supply

Optional Accessory

▪ **Rack Mount Kit**

Model Name	Description
GSW/MSW-RMK	19" rack mount kit

2 GSW-3100M

5 x 1G/2.5G RJ45 + 2 x 1G/10G SFP+ L2 Managed Ethernet Switch with Cable Tray Optional

NEW

CTC Union Technologies unveils the brand new 10G CPE switch, GSW-3100M, which supports multigigabit technology for active Ethernet based FTTH application. This new 10G CPE switch is designed with 5 ports 10M/100M/1G/2.5Gbps as well as 2 ports 1G/10Gbps SFP+ based fiber optics. As usual, the GSW-3100M adopts the evolutionary cable tray structural design to help the installer more easily and protectively manage the excess fiber within the unit.

The GSW-3100M leverages the technology strength of chipset provider to enable the multigigabit speed feature. The enterprise and residential users will be able to experience the reliable and secure Ethernet based high speed network access and also connect the existing Cat5e/Cat6 cabling infrastructure with popular WiFi 6E/7 device, NAS access as well as small cell or powerful workstations to break through the limitation of 1Gbps data rate for content richer applications such as Cloud storage, 4K streaming video/game services or HD/UHD teleconferencing.

CTC Union Technologies adopts the new generation SoC single chip insides the GSW-3100M. It is developed through highly circuit integration and manufactured by the advance wafer process. Therefore, GSW-3100M can benefit a low power consumption and cost-effective targets from this SoC solution compared with the previous generation product which was the combination of multiple chips. However, The GSW-3100M remains supporting most of popular Layer 2 feature sets with network management interfaces such as Web GUI, SNMP. The GSW-3100M also supports ZTP (Zero Touch Provisioning) function which is suitable for the very large-scale deployment from operator or service provider. These device management features can avoid truck rolls and save OPEX for FTTH service providers.

Specifications

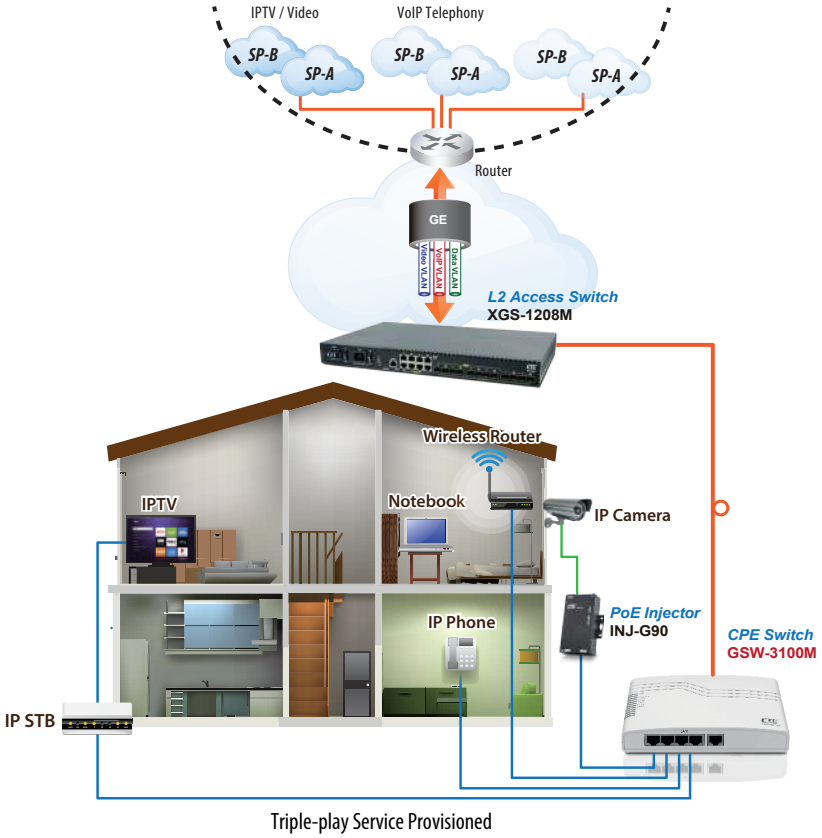
Interface	LAN	RJ-45 Port: 10/100/1000/2500Base-T x 5 Ports
	WAN	Fiber Port: 1000Base-X/10GBase-SR SFP+ x 2 slots
Hardware	Supports Auto-negotiation for TP Port (10/100/1000/2500Base-T and Full/Half Duplex mode)	
	Supports Auto MDI / MDIX auto-crossover for TP ports	
	Store and forward switching	
	8 megabits of integrated shared packet memory	
	Supports 16K MAC Address Table	
	Supports 10K Bytes Jumbo Frame size	
Standard Compliance	IEEE 802.3	10BASE-T
	IEEE 802.3u	100BASE-TX/FX
	IEEE 802.3ab	1000BASE-T
	IEEE 802.3bz	2.5GBASE-T
	IEEE 802.3z	1000BASE-X
	IEEE 802.3ae	10GBASE-SR
	IEEE 802.3x	Flow Control
	IEEE 802.1p	QoS
	IEEE 802.1Q	VLAN Tagging
	IEEE 802.1ad	Q-in-Q Provider Bridges
	IEEE 802.3ad	Link aggregation
	IEEE 802.1x	Port based network access
	IEEE 802.1D	MAC Bridges/STP
	IEEE 802.1w	RSTP
	IEEE 802.1s	MSTP
	IEEE 802.1ab	Link Layer Discovery Protocol
	IEEE 802.3az	Energy Efficient Ethernet (EEE) function

VLAN Feature	IEEE 802.1Q tagged VLAN (1K VLAN groups)
	IEEE 802.1ad Q-in-Q VLAN
	MAC Based VLAN
	Private VLAN for port isolation
Link Aggregation & Protection	Static trunk (SA, DA, IP, TCP/UDP port)
	IEEE 802.3ad LACP
	STP/RSTP
	Loop Protection
QoS Feature	Hard wired IEEE 802.1p 8 priority queue per port
	Traffic scheduling based on Strict / WRR priority
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking / DSCP remarking
	Per port/queue based ingress/egress rate limit in steps of 1000kbps
	Multicast/Broadcast/Unicast storm control with flooding control
Security Feature	Static port security (MAC based)
	Per port limited MAC learning
	Port limited flooding of unknown MAC address on fiber uplink port
	Port based/MAC based/single/multiple IEEE 802.1x access control
	128 ACL rules based on L2~L4 information
	IP/MAC binding
	IP source guard & ARP inspection
	HTTPs
IP Multicasting	IGMP snooping v1/v2/v3, MLD snooping v1/v2
	IGMP fast leave / query
	IGMP filtering / throttling
Management	Management via Web / HTTP
	Support SNMP v1 & v2c, RMON I (1, 2, 3, 9 groups), RFC 1213 MIB (MIB-II) and Private MIB
	Support dying gasp in trap message
	Support DHCP client for IPv4/IPv6
	Support DHCP Snooping
	DHCP Auto Provisioning for firmware and configuration upgrade based on ・Option 60: Class identifier ・Option 66: Server IP ・Option 67: File name ・Option 254: File type
	TFTP/HTTP based Firmware and configuration upgrade
	Dual Bank Image
	DNS client/proxy
	Port mirroring
	NTP client
	UPnP
Power Input	AC/DC power adaptor, 12VDC/1A
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)
Certification	CE, FCC class A

Ordering Information

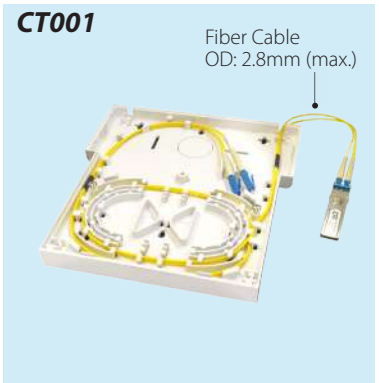
Model Name	Description
GSW-3100M	5-port 1G/2.5G RJ45 + 2-port 1G/10G SFP+ Managed Ethernet Switch (cable tray optional)

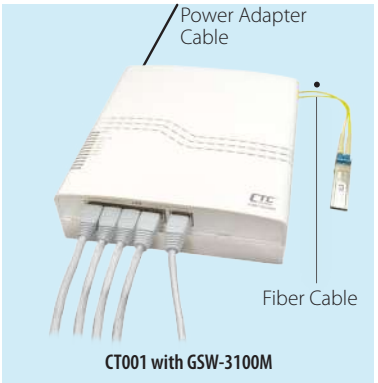
2 Application



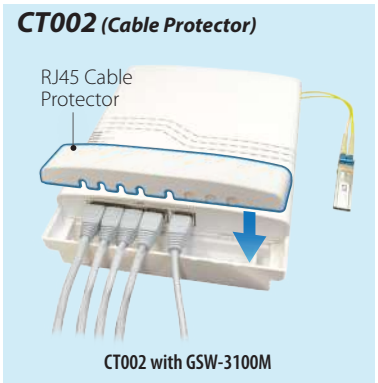
Cable Tray Assembly

CT001/CT002 is an optional fiber tray and mounting hardware for deploying GSW-3100M for residential fiber to the home applications. CT001/CT002 tray options is wall mounted, allowing secure termination of fiber leads.





CT001 with GSW-3100M



CT002 with GSW-3100M

Optional Accessory

Model Name	Description
CT001	Cable Tray for GSW-3100M
CT002	Cable Tray & LAN cable protection cover for GSW-3100M

Dimensions (mm)

CT001

CT002

2 QSW-4204M

1 × GbE RJ45 + 4 × 1G/2.5G RJ45 + 2 × 1G/10G SFP+ L2+ Managed Ethernet Switch with Cable Tray Option

CTC Union Technologies unveils the next generation CPE switch, QSW-4204M, which supports multigigabit technology for active Ethernet based FTTH application. This new CPE switch is designed with 1 ports 10M/100M/1Gbps RJ45 and 4 ports 10M/100M/1G/2.5Gbps as well as 2 ports 1G/10Gbps SFP+ based fiber optics. As usual, the QSW-4204M adopts the evolutionary cable tray structural design to help the installer more easily and protectively manage the excess fiber within the unit.

Its design concept is well considered from the basis of stylish and elegant appearance for the residential user as well as the advantage of easy installation for the FTTH service provider. Hence, the QSW-4204M makes an Internet connected device no longer like the legacy ones hidden in the corner of household. Oppositely, it can become as an eye-catching furniture to blend into the overall decoration aesthetics at home.

The QSW-4204M leverages the technology strength of chipset provider which is the member of NBASE-T alliance to enable the multigigabit speed feature. The enterprise and residential users will be able to experience the reliable and secure Ethernet based high speed network access and also connect the existing Cat5e/Cat6 cabling infrastructure with WiFi 6/6E device or even beyond, NAS access as well as small cell or powerful workstations to break through the limitation of 1Gbps data rate for content richer applications such as Cloud storage, 4K video streaming or HD/UHD teleconferencing.

The QSW-4204M fully supports Layer 2 feature sets with complete network management interfaces such as Web GUI, CLI and SNMP. The QSW-4204M also supports DHCP auto provisioning and TR-069 client function which are suitable for the very large-scale deployment from operator or service provider. Both device management features can avoid truck rolls and save OPEX for FTTH service providers.

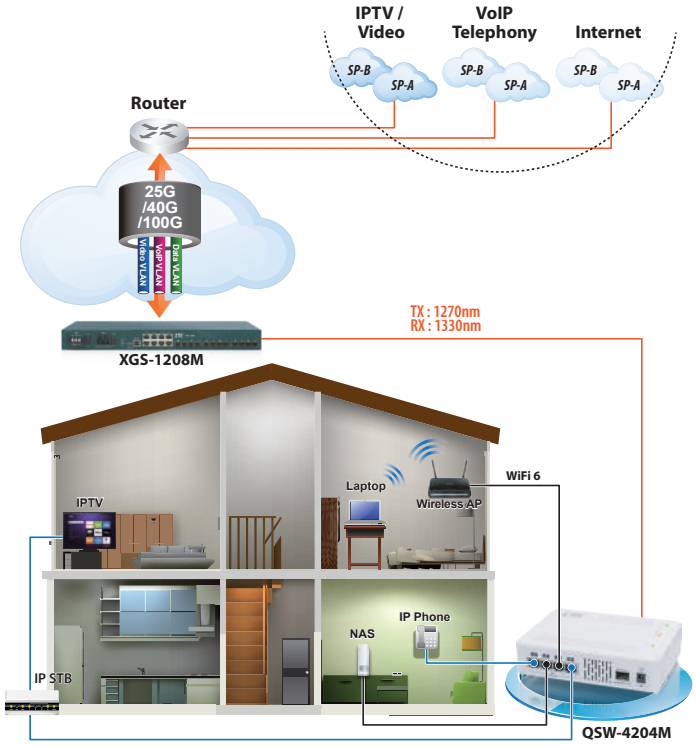
Specifications

Interface	Fiber port: 2x 1G/10Gbps SFP+	
	Copper port: 4x 10M/100M/1G/2.5Gbps RJ45 1x 10/100/1000Mbps RJ45 for telemetry	
Switching Fabric Capacity	62Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	3720000pps	@2500Mbps
	14880000pps	@10Gbps
Transmission Method	Store and Forward Switching	
Packet Buffer	8M bits	
MAC Table Size	16K	
Jumbo Frame Size	10240 Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 3 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN, ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking, Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, Multicast/Broadcast/Unicast storm control with flooding control	

10G CPE Switch

Security	Static port security (MAC based), Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	256 ACL rules based on L2~L4 information
	RADIUS/TACACS+ AAA, HTTPs & SSH v2
	IP/MAC binding, IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave, IGMP query
	IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3
	TR-069 client for remotely device management and configuration
	RMON I (1,2,3,9 groups) & RFC1213 MIB II, Dying gasp in SNMP trap message
	DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, Event syslog server
	Smart detect functionality for configurable log and trap warning option, DNS client/proxy
	DHCP auto provisioning (option 55/60/66/67/132/240/254), NTP client, UPnP
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
Power Input	12V/2A AC power adaptor
Power Consumption	14.3 Watts Max.
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)
Dimension	162 × 122 × 43.5mm (W×D×H)
Certification	CE, FCC, class A

Application



Ordering Information

Model Name	Description
QSW-4204M	1-port GbE, RJ45 and 4-ports 1G/2.5G, RJ45 to 2 × 1G/10G SFP+ L2+ Managed Ethernet Switch

Optional Accessory

Model Name	Description
GSW-20FT	Fiber Tray set for GSW-20 series CPE

2 GSW-2020C7

7× GbE, RJ45 + 1× Dual Rate SFP L2+ Managed CPE Switch with Cable Tray

The GSW-2020C7 is a new generation CPE switch developed by CTC Union Technologies. This new CPE switch is designed with 7 ports 10/100/1000Base-T RJ45 and 1 port 100/1000Base-X SFP based fiber optics for P2P FTTH service applications. Its design concept is well considered from the basis of stylish and elegant appearance for the residential user as well as the advantage of easy installation for the FTTH service provider. Hence, the GSW-2020C7 makes an Internet connected device no longer like the legacy ones hidden in the corner of household. Oppositely, it can become as an eye-catching furniture to blend into the overall decoration aesthetics at home. As usual, the GSW-2020C7 adopts the evolutionary cable tray structural design to help the installer more easily and protectively manage the excess fiber within the unit.

The GSW-2020C7 fully supports Layer 2 feature sets with complete network management interfaces such as Web GUI, CLI and SNMP. The GSW-2020C7 also supports DHCP auto provisioning and TR-069 client function which are suitable for the very large scale deployment from operator or service provider. Both device management features can avoid truck rolls and save OPEX for FTTH service providers.

Features

- Built-in IPTV probe feature can monitor IPTV service quality and performance in real-time
- Smart interrogator function - automatically gather vital information from the CPE at all times and store in database accessible by the operator
- Smart fiber tray design makes fiber cable management more handy

Specifications

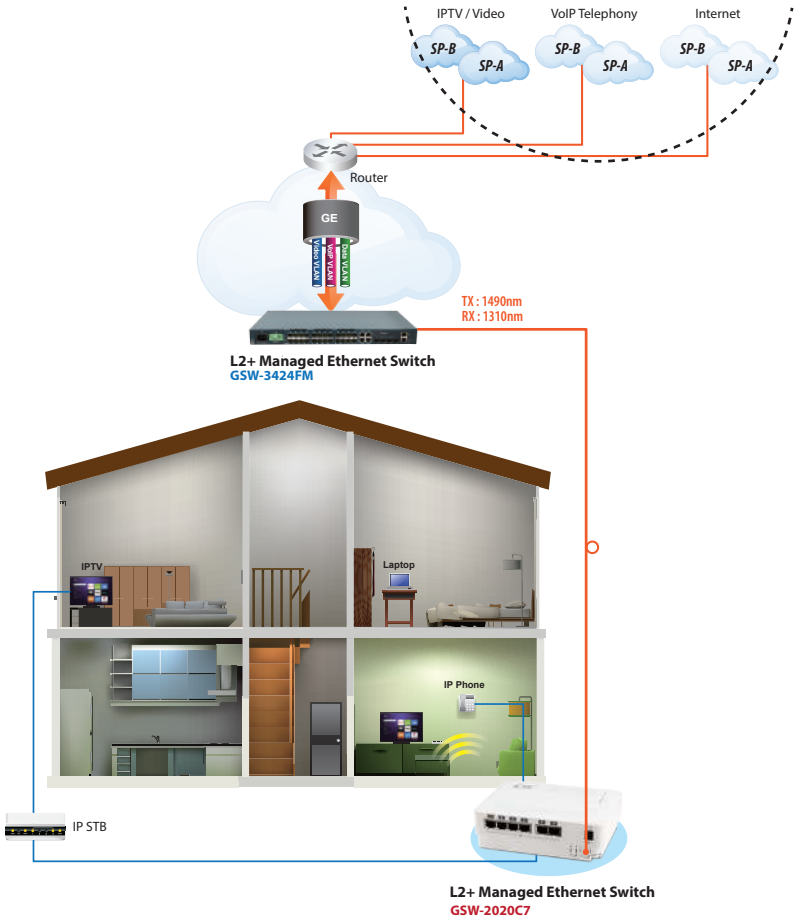
Interface	fiber port: 1x 100M/1Gbps SFP	
	Copper port: 6x 10/100/1000Mbps RJ45 1x 10/100/1000Mbps RJ45 for telemetry	
Packet forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
Transmission Method	Store and Forward Switching	
Packet Buffer	1.75M bits	
MAC Table Size	4K	
Jumbo Frame Size	10240 Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN	
	Voice VLAN, MAC based VLAN, Protocol based VLAN, GVRP (GARP VLAN registration protocol)	
	IP subnet based VLAN, Private VLAN for port isolation, VLAN Translation	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 4 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port, IEEE 802.3x flow control	
	IEEE 802.1p priority tag remarking, DSCP remarking, Multicast/Broadcast/Unicast storm control with flooding control	
	Per port/queue based ingress/egress rate limit in steps of 100kbps	
Security	Static port security (MAC based), Per port limited MAC learning, 128 ACL rules based on L2~L4 information	
	Port based/MAC base/single/multiple IEEE 802.1x access control, HTTPs & SSH v2	
	RADIUS/TACACS+ AAA, IP/MAC binding, IP source guard & ARP inspection	

Hybrid-Triple Play CPE Switch

IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave, IGMP query, IGMP filtering/throttling
	MVR (Multicast VLAN Registration), IPTV probe functionality
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, TR-069 client for remote device management and configuration
	RMON I (1,2,3,9 groups) & RFC1213 MIB II, Dying gasp in trap message, DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, Event syslog server, DNS client/proxy
	DHCP auto provisioning, NTP client, UPnP, IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
	Smart detect functionality for configurable log and trap warning option
Power Input	AC/DC power adaptor 12VDC/1A
Power Consumption	7.9 Watts Max.
Operating Temperature	0~45°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)
Dimension	162 × 122 × 32.2mm (W×D×H)
Certification	CE, FCC, RoHS

Application

P2P FTTH Hybrid-Triple Play Service Application



Ordering Information

Model Name	Description
GSW-2020C7	7-port 10/100/1000Base-T to 100/1000Base-X Managed GbE Ethernet Switch

Optional Accessory

Model Name	Description
GSW-20FT	Fiber Tray set for GSW-20 series CPE

2 GSW-1005MS

5 × GbE/RJ45 + 1 × 1G/SFP L2+ Managed Ethernet Switch

CTC Union technologies unveils the initial generation CPE switch, GSW-1005MS, which is equipped 5 ports 10/100/1000Base-T RJ45 and 1 port 100/1000Base-X SFP based fiber optics for P2P FTTH service. The transmission distance of Gigabit Ethernet over RJ45 copper can be extended up to 100km over a fiber optics interface. GSW-1005MS has an optional cable tray that allows the installer to enclose the excess fiber within the unit, thus providing protection for the sensitive fiber at subscriber side.

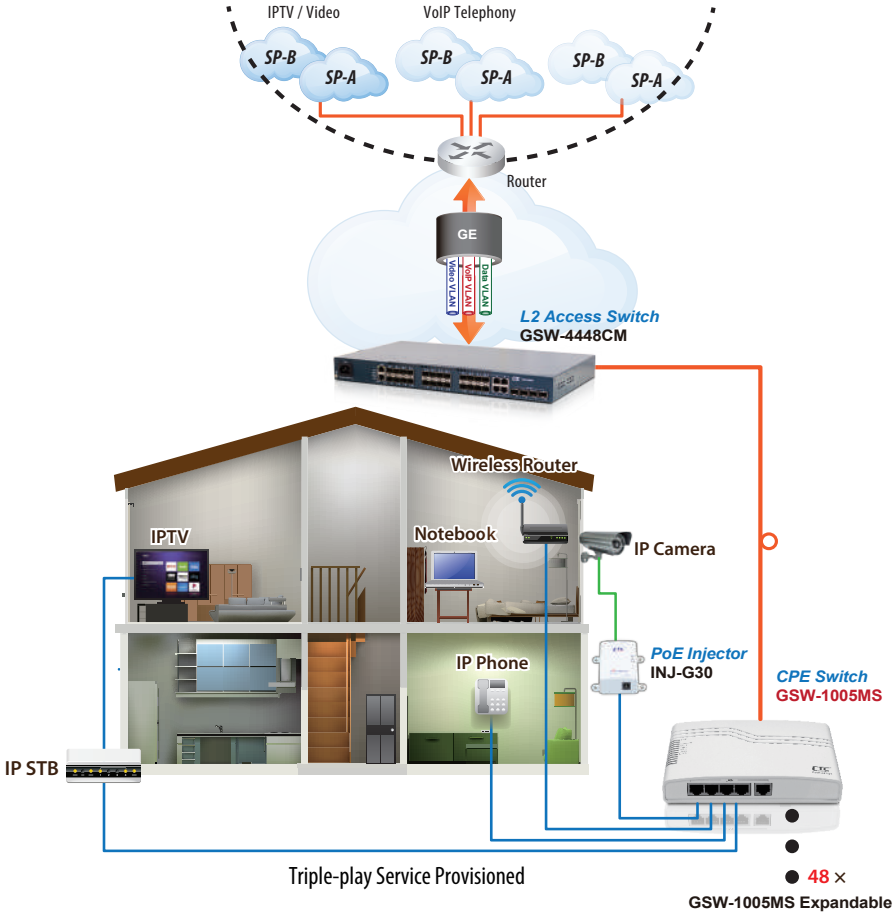
The GSW-1005MS fully supports Layer 2 feature sets with popular network management interfaces such as Web GUI, SNMP. The GSW-1005MS also supports DHCP auto provisioning which are suitable for the very largescale deployment from operator or service provider. Both device management features can avoid truck rolls and save OPEX for FTTH service providers.

Specifications

Interface	Fiber port: 1x 100/1000Base-X SFP
	Copper port: 5x 10/100/1000Mbps RJ45
Packet Forwarding Rate	14880pps @10Mbps
	148800pps @100Mbps
	1488000pps @1000Mbps
Transmission Method	Store and Forward Switching
Packet Buffer	4M bits
MAC Table Size	8K
Jumbo Frame Size	9600 Bytes
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking
	Per port/queue based ingress/egress rate limit in steps of 100kbps, IEEE 802.3x flow control
	Multicast/Broadcast/Unicast storm control with flooding control
Security	Static port security (MAC based), Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	256 ACL rules based on L2~L4 information, RADIUS/TACACS+ Authentication, HTTPs & SSH v2
	IP/MAC binding, IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1, IGMP fast leave, IGMP query
	IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II
	Dying gasp in SNMP trap message, DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, Event syslog server
	DHCP auto provisioning with option 60/66/67/254, NTP client, UPnP, IPv4/IPv6 management
	SFF-8472 DDMI, IEEE 802.1ab LLDP
Power Input	AC/DC power adaptor, 12VDC/1A
Power Consumption	4.8 Watts Max.
Operating Temperature	0~50℃
Storage Temperature	-25~70℃
Humidity	5%~90% (non-condensing)
Dimension	170 × 120 × 35 mm (W×D×H)
Certification	CE, FCC class A

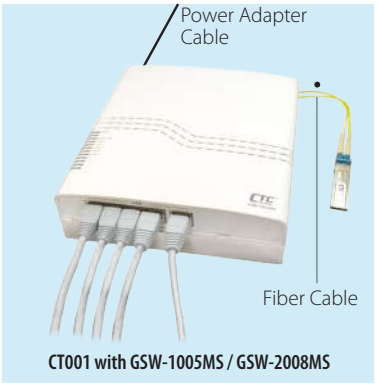
2

Application

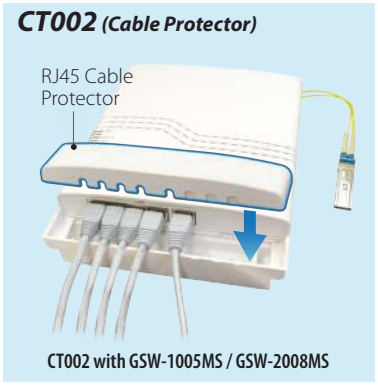


Cable Tray Assembly

CT001/CT002 is an optional fiber tray and mounting hardware for deploying GSW-1005MS/2008MS for residential fiber to the home applications. CT001/CT002 tray options is wall mounted, allowing secure termination of fiber leads.



CT001 with GSW-1005MS / GSW-2008MS



CT002 with GSW-1005MS / GSW-2008MS

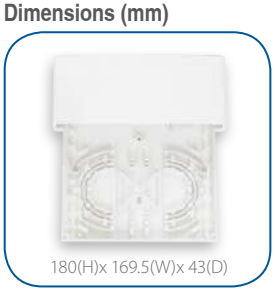
Ordering Information

Model Name	Description
GSW-1005MS	5-port 10/100/1000 Base-T to 100/1000 Base-X Managed GbE Ethernet Switch (cable tray optional)

Optional Accessory

Model Name	Description
CT001	Cable Tray for GSW-1005MS/GSW-2008MS
CT002	Cable Tray & LAN cable protection cover for GSW-1005MS/2008MS

Dimensions (mm)

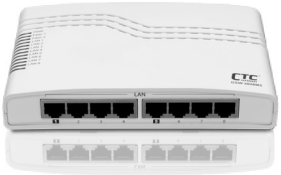


CT001

CT002

2 GSW-2008MS

8 × GbE/RJ45 + 2 × 1G/SFP L2+ Managed Ethernet Switch



CTC Union technologies unveils the series extension of CPE switch, GSW-2008MS, which is equipped 8 ports 10/100/1000Base-T RJ45 and 2 port 100/1000Base-X SFP based fiber optics for P2P FTTH service. The transmission distance of Gigabit Ethernet over RJ45 copper can be extended up to 100km over a fiber optics interface. GSW-2008MS has an optional cable tray that allows the installer to enclose the excess fiber within the unit, thus providing protection for the sensitive fiber at subscriber side.

The GSW-2008MS fully supports Layer 2 feature sets with popular network management interfaces such as Web GUI, SNMP. The GSW-2008MS also supports DHCP auto provisioning which are suitable for the very largescale deployment from operator or service provider. Both device management features can avoid truck rolls and save OPEX for FTTH service providers.

Specifications

Interface	Fiber port: 2x 100/1000Base-X SFP
	Copper port: 8x 10/100/1000Mbps RJ45
Packet Forwarding Rate	14880pps @10Mbps
	148800pps @100Mbps
	1488000pps @1000Mbps
Transmission Method	Store and Forward Switching
Packet Buffer	4M bits
MAC Table Size	8K
Jumbo Frame Size	9600 Bytes
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)
	IEEE 802.3ad LACP, 5 LACP trunk groups Max, 8 port Max. per LACP trunk group
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port, DSCP remarking
	IEEE 802.1p priority tag remarking, Per port/queue based ingress/egress rate limit in steps of 100kbps
	IEEE 802.3x flow control, Multicast/Broadcast/Unicast storm control with flooding control
Security	Static port security (MAC based), Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control, 256 ACL rules based on L2~L4 information
	RADIUS/TACACS+ Authentication, HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1, IGMP fast leave, IGMP query
	IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II
	Dying gasp in SNMP trap message, DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, Event syslog server
	DHCP auto provisioning with option 60/66/67/254, NTP client, UPnP, IPv4/IPv6 management
	SFF-8472 DDMI, IEEE 802.1ab LLDP
Power Input	AC/DC power adaptor, 12VDC/1A
Power Consumption	7.08 Watts Max.
Operating Temperature	0~50℃
Storage Temperature	-25~70℃
Humidity	5%~90% (non-condensing)
Dimension	170 × 120 × 35 mm (W×D×H)
Certification	CE, FCC class A

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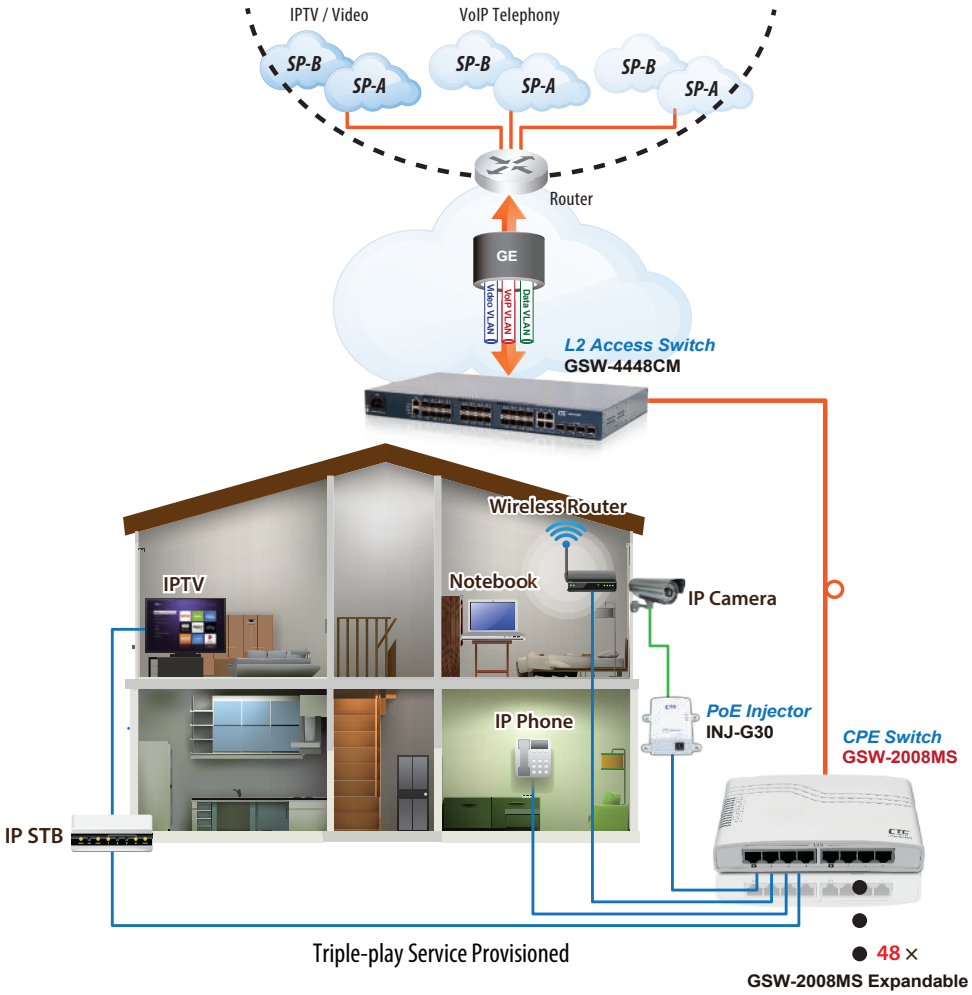
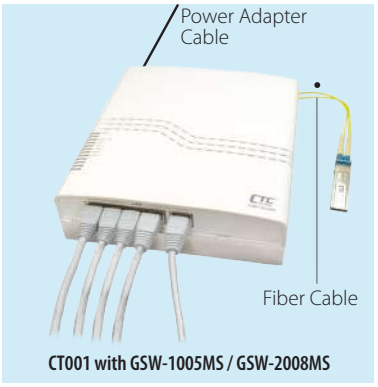
Application

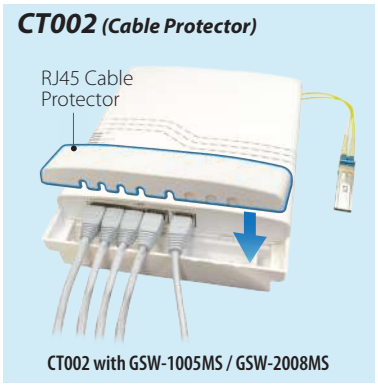


Cable Tray Assembly

CT001/CT002 is an optional fiber tray and mounting hardware for deploying GSW-1005MS/2008MS for residential fiber to the home applications. CT001/CT002 tray options is wall mounted, allowing secure termination of fiber leads.



CT001 with GSW-1005MS / GSW-2008MS



CT002 with GSW-1005MS / GSW-2008MS

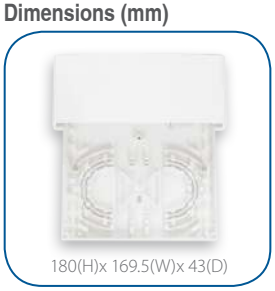
Ordering Information

Model Name	Description
GSW-2008MS	8-port 10/100/1000 Base-T to 2-port 100/1000 Base-X Managed GbE Ethernet Switch (cable tray optional)

Optional Accessory

Model Name	Description
CT001	Cable Tray for GSW-1005MS/GSW-2008MS
CT002	Cable Tray & LAN cable protection cover for GSW-1005MS/2008MS

Dimensions (mm)



CT001

CT002

2 MSW-4204S

4 × GbE/RJ45 + 2 × 1G/10G SFP+ L2+ Carrier Ethernet Switch with SyncE/PTP

The next generation Carrier Ethernet Network Interface Device (NID) is designed for mobile backhaul transportation of 4G LTE-A/5G network. The MSW-4204S is equipped with 2 SFP+ slots, dual rate 1G/10Gbps and 4 ports Gigabit RJ45 network interfaces. It can be configurable as either UNI or NNI device which are CE(Carrier Ethernet) 2.0 compliant for Metro Ethernet network deployments.

The MSW-4204S is positioned as an universal network interface device (NID) for most carrier Ethernet access applications. It has built-in hardware based Ethernet OAM engine and is compliant to the latest OAM standards to deliver the committed SLA performance KPIs measurement on a per service basis.

Precise Time synchronization

Every Ethernet copper or fiber port on MSW-4204S except management port can be configured to deliver the timestamp messages of SyncE or IEEE 1588v2 inside Ethernet packets for the precision time purpose of mobile backhaul network. MSW-4204S is built-in 1PPS/ToD input and output SMA connectors. The output SMA interface supports the waveform measurement of IEEE 1588v2 via external instrument as well as the input SMA interface can be connected to external time source as the reference clock for the network.

Features

- The next generation Ethernet demarcation device, at customer premise, fulfills the large-scale carrier Ethernet deployment for intelligent business connection and mobile backhaul services compliant to CE 2.0 standard.
- CE2.0 standards compliant product guarantees the full interoperability with other MEF certified equipment and reduces the risks and cost of Carrier Ethernet network deployment for operators and service providers.
- Advanced clock synchronization features for carrier Ethernet network allows operators to deliver time sensitive services with optimal stability and continuity in the end-to-end connectivity.

Specifications

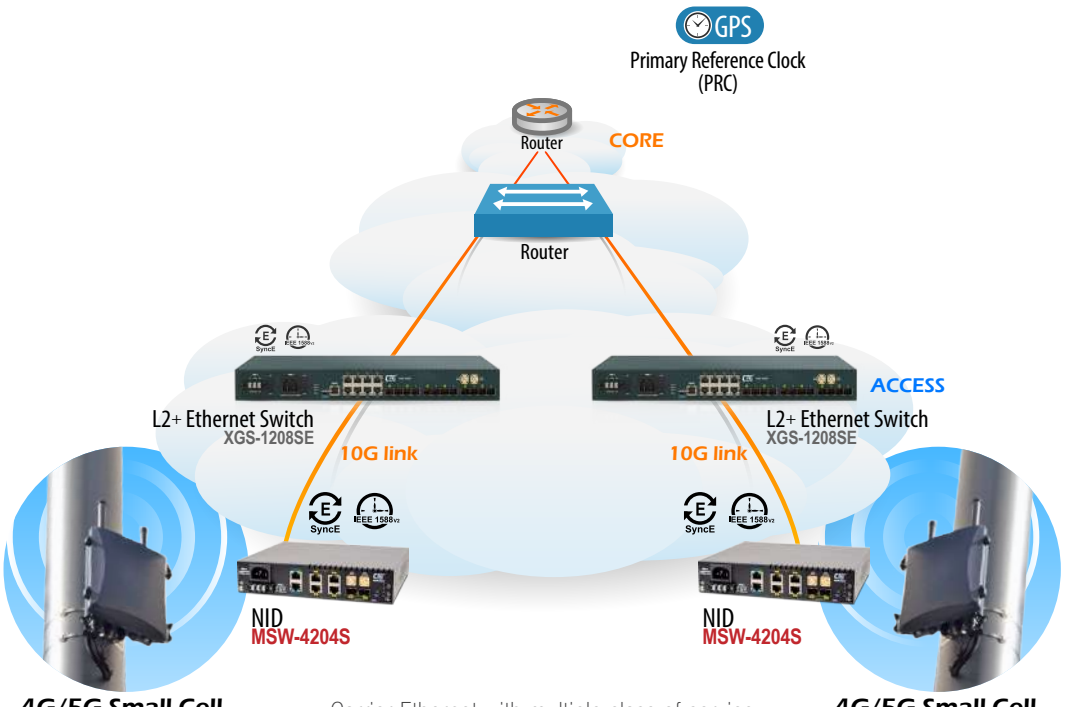
Interface	Fiber port: 2x 1G/10Gbps SFP+	
	Copper port: 4x 10/100/1000Mbps RJ45	
	1PPS port: 2x SMA connector (input/output)	
Console/ToD Port	1x RJ45 (RS-232)	
Management Port	1x 10/100/1000Base-T RJ45	
Switching Fabric Capacity	48Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Transmission Method	Store and Forward Switching	
Packet Buffer	8M bits	
MAC Table Size	16K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 3 LACP trunk groups Max; 6 port Max. per LACP trunk	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, ITU-T G.8031 ELPS/G.8032 ERPS	

Network Interface Device

QoS Feature	Hierarchical QoS, IEEE 802.1Qbb priority based flow control, Hard wired IEEE 802.1p 8 priority queues per port
	IEEE 802.1p priority tag remarking, DSCP remarking
	CoS based traffic classification on switch port, VLAN, ID, DSCP, TCP/UDP port
	Per port/queue based ingress/egress rate limit in steps of 100kbps, 3 colors marker – CIR/EIR/Burst bandwidth control
Storm Control	Multicast/Broadcast/Unicast storm suppression with flooding control
Security	Static port security (MAC based), Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	128 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA, IP/MAC binding
	DHCP client/snooping/relay option 82, IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, HTTPs, SSHv2, SNMP v1/v2c/v3
	RMON I (1,2,3,9 groups) & RFC1213 MIB II, Private MIB, Dying gasp in SNMP trap message
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, Event syslog server, DNS client/proxy, NTP client, UPnP, IPv4/IPv6 management, SFF-8472 DDMI
	Text based CLI configuration upload and download
Ethernet OAM	IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731, RFC2544, ITU-T Y.1564
SyncE	ITU-T G.8261/G.8262/G.8264 on all Ethernet interfaces, Sync status message support
IEEE 1588v2 PTP	ITU-T G.8263 slave clock, ITU-T G.8273.2 boundary clock, ITU-T G.8273.4 transparent clock
	ITU-T G.8265.1/ITU-T G.8275.1 telecom profile (optional)
Power Input	100V~240VAC, 18~60VDC
Power Consumption	13.65 Watts Max.
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)
Dimension	215 × 190 × 44 mm (W×D×H)
Certification	CE, FCC class A

Application

Mobil Backhaul Application



- Carrier Ethernet with multiple class of service
- Traffic Synchronization
- Precisely delivery of time-sensitive service

2

Ordering Information

Model Name	Description
MSW-4204S-AC	4x 1G RJ45 + 2x 1G/10G SFP+ slots L2+ Carrier Ethernet Switch with SyncE and Single AC Power Supply Built-In
MSW-4204S-DC	4x 1G RJ45 + 2x 1G/10G SFP+ slots L2+ Carrier Ethernet Switch with SyncE and Single DC Power Supply Built-In
MSW-4204S-AD	4x 1G RJ45 + 2x 1G/10G SFP+ slots L2+ Carrier Ethernet Switch with SyncE and AC & DC Power Supply Built-In

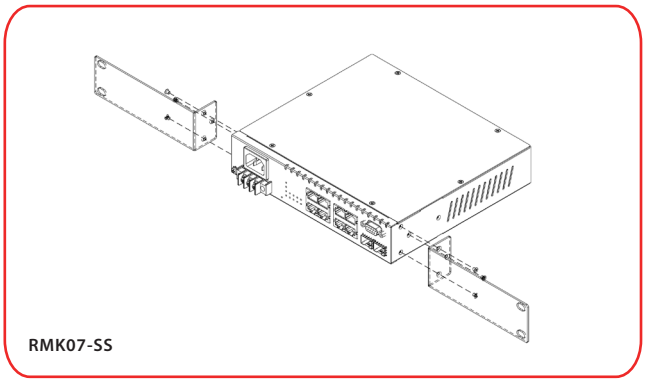
Optional Accessory

▪ 10G SFP+ Transceiver Module

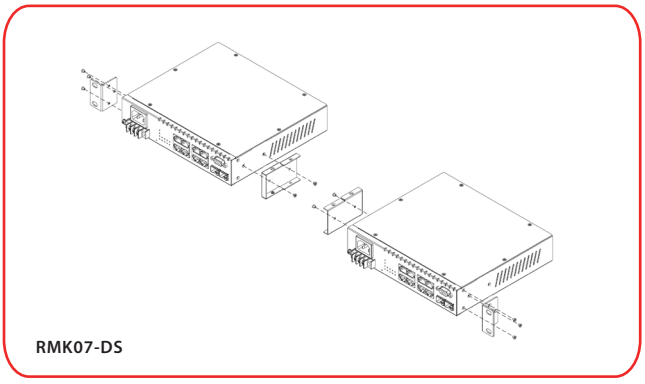
Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

▪ Rack Mount Kit

Model Name	Description
RMK07-SS	Rack Mounting Kits for GSW-4208CM/MSW-4204 Series Single Unit Chassis Mounting in 19" Rack
RMK07-DS	Rack Mounting Kits for GSW-4208CM/MSW-4204 Series Two Units Chassis Mounting in 19" Rack



RMK07-SS



RMK07-DS

2 MSW-4204

4 × GbE/RJ45 + 2 × 1G/10G SFP+ L2+ Carrier Ethernet Switch

The next generation Carrier Ethernet Network Interface Device (NID) is designed for business connection in Ethernet virtual connection technology. The MSW-4204 is equipped with 2 SFP+ slots, dual rate 1G/10Gbps and 4 ports Gigabit RJ45 network interfaces. It can beconfigurable as either UNI or NNI device which are CE(Carrier Ethernet) 2.0 compliant for Metro Ethernet network deployments.

The MSW-4204 is positioned as an universal network interface device (NID) for most carrier Ethernet access applications. It has built-in hardware based Ethernet OAM engine and is compliant to the latest OAM standards to deliver the committed SLA performance KPIs measurement on a per service basis.

Features

- The next generation Ethernet demarcation device, at customer premise, fulfills the large-scale carrier Ethernet deployment for intelligent business connection and mobile backhaul services compliant to CE 2.0 standard.
- CE2.0 standards compliant product guarantees the full interoperability with other MEF certified equipment and reduces the risks and cost of Carrier Ethernet network deployment for operators and service providers.

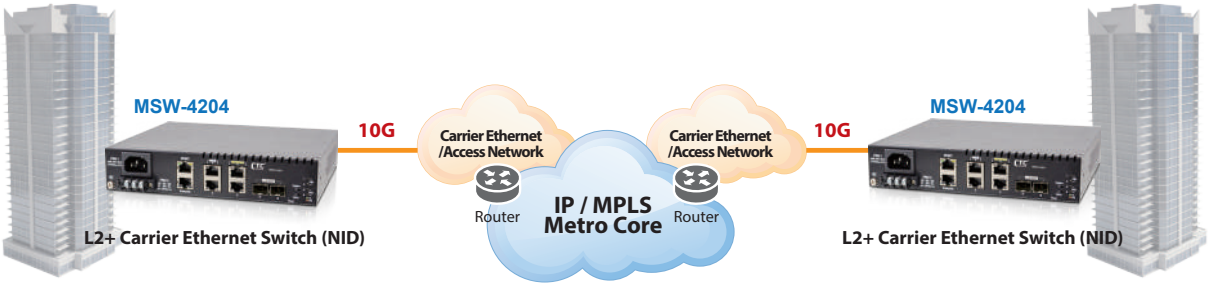
Specifications

Interface	Fiber port: 2x 1G/10Gbps SFP+ slots	
	Copper port: 4x 10/100/1000Mbps RJ45	
Console/ToD Port	1x RJ45 (RS-232)	
Management Port	1x 10/100/1000Base-T RJ45	
Switching Fabric Capacity	48Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Transmission Method	Store and Forward Switching	
Packet Buffer	8M bits	
MAC Table Size	16K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.3ad LACP, 3 LACP trunk groups Max; 6 port Max. per LACP trunk	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, ITU-T G.8031 ELPS/G.8032 ERPS	
QoS Feature	Hierarchical QoS, IEEE 802.1Qbb priority based flow control	
	Hard wired IEEE 802.1p 8 priority queues per port, IEEE 802.1p priority tag remarking, DSCP remarking	
	CoS based traffic classification on switch port, VLAN, ID, DSCP, TCP/UDP port	
	Per port/queue based ingress/egress rate limit in steps of 100kbps	
	3 colors marker – CIR/EIR/Burst bandwidth control	
Storm Control	Multicast/Broadcast/Unicast storm suppression with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	128 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA	
	IP/MAC binding, DHCP client/snooping/relay option 82, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	

Network Interface Device

Management	WebGUI/Telnet CLI interface, HTTPs, SSHv2, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups) & RFC1213 MIB II
	Private MIB, Dying gasp in SNMP trap message, DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade, Port mirroring, Event syslog server, DNS client/proxy
	NTP client, UPnP, IPv4/IPv6 management, SFF-8472 DDMI Text based CLI configuration upload and download
Ethernet OAM	IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731, RFC2544, ITU-T Y.1564
Power Input	100V~240VAC, 18~60VDC
Power Consumption	13.65 Watts Max.
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)
Dimension	215 × 190 × 44 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
MSW-4204-AC	4x 1G RJ45 + 2x 1G/10G SFP+ Slots L2+ Carrier Ethernet Switch with single AC Power Supply Built-In
MSW-4204-DC	4x 1G RJ45 + 2x 1G/10G SFP+ Slots L2+ Carrier Ethernet Switch with single DC Power Supply Built-In
MSW-4204-AD	4x 1G RJ45 + 2x 1G/10G SFP+ Slots L2+ Carrier Ethernet Switch with AC & DC Power Supply Built-In

Optional Accessory

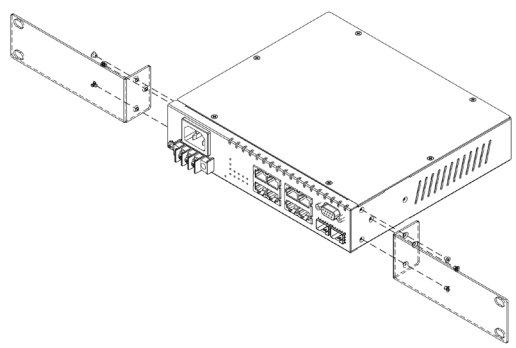
▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

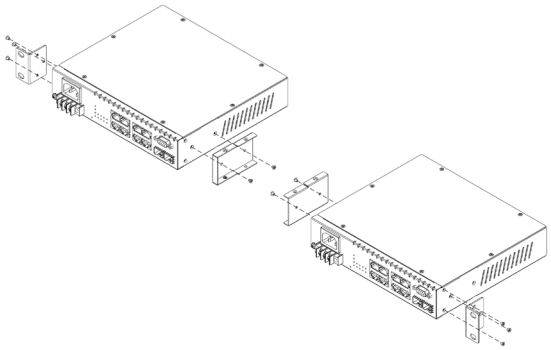
▪ Rack Mount Kit

Model Name	Description
RMK07-SS	Rack Mounting Kits for GSW-4208CM/MSW-4204 Series Single Unit Chassis Mounting in 19" Rack
RMK07-DS	Rack Mounting Kits for GSW-4208CM/MSW-4204 Series Two Units Chassis Mounting in 19" Rack

RMK07-SS



RMK07-DS



2 MSW-202A

2 × GbE/RJ45 + 2 × 1G/SFP L2+ Carrier Ethernet Switch

CTC Union Technologies unveils the first generation of carrier grade Ethernet demarcation device, MSW-202A, which is designed for business connection service delivered by carriers. It is equipped 2 SFP slots as dual rate 100/1000Base-X and 2 ports 10/100/1000Base-T RJ45 network interfaces. It is designed to enable E-Line, E-Access services which are CE (Carrier Ethernet) 2.0 compliant for Metro Ethernet network deployments.

The MSW-202A device enables carriers and service providers to deliver SLA-based network service with extensive fault detection and diagnostic capabilities which are compliant with the latest Ethernet OAM standards such as IEEE 802.3ah, IEEE 802.1ag and ITU-T Y.1731. The CE2.0 compliant functions support EVCs and 3 colors marker QoS traffic management to enable service providers management of bandwidth and to enforce SLA guarantees.

Specifications

Interface	Copper port: 2x 10/100/1000Base-T RJ45	
	Uplink port: 2x 1000Base-X SFP slots	
	Console port: 1x RS-232 in RJ45	
Switching Fabric Capacity	8Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
Transmission Method	Store and Forward Switching	
Packet Buffer	4M bits	
MAC Table Size	8K	
Jumbo Frame Size	9.6K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 2 LACP trunk groups Max; 4 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, ITU-T G.8031 ELPS	
	ITU-T G.8032 ERPS, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/Service based ingress/egress rate limit in steps of 100kbps	
	3 colors marker-CIR/EIR/Burst bandwidth control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	256 ACL rules based on L2~L4 information	
	RADIUS/TACACS+ Authentication, HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB	
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade	
	Port mirroring, Event syslog server, DNS client/proxy, NTPv4 client, UPnP, SFF-8472 DDMI	
	IEEE 802.1ab LLDP, Text based CLI configuration download and upload	

Ethernet Demarcation Device

Ethernet OAM	IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731
Power Input	100~240VAC ; 18~72VDC
Power Consumption	3.8 Watts Max.
Operating Temperature	0~50℃
Storage Temperature	-25~70℃
Humidity	5%~95% (non-condensing)
Dimension	180 × 135 × 30 mm (W×D×H)
Certification	CE, FCC class A

Application

Figure 1 : Business Connection Service

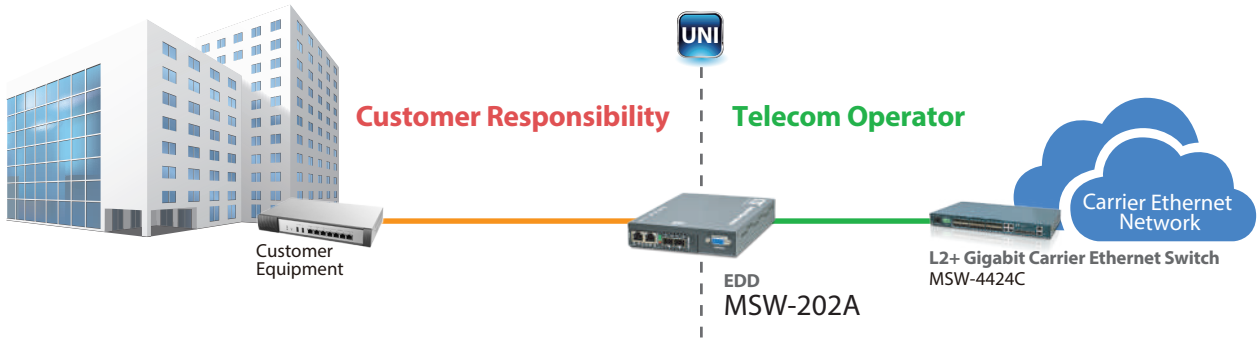
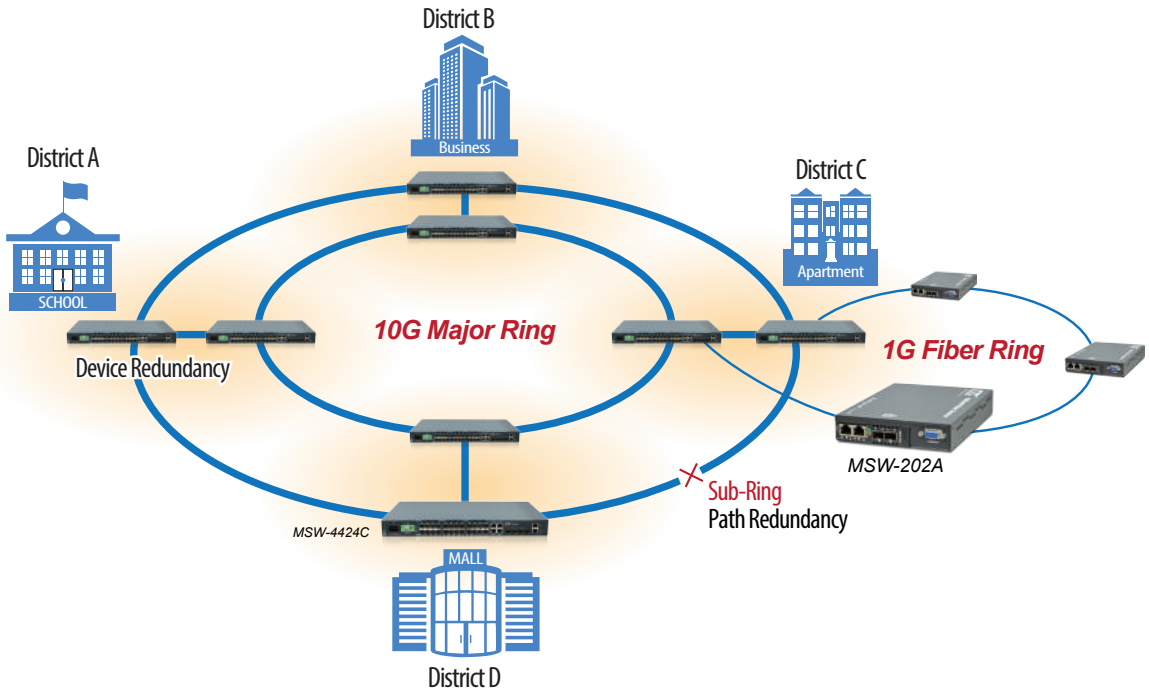


Figure 2 : µ-Ring Protected Ethernet Backbone Application



Ordering Information

Model Name	Description
MSW-202A-AC	2x SFP Slots in Dual Rate 100/1000Base-X and 2x 10/100/1000Base-T RJ45 OAM Managed Carrier Ethernet Switch with Single AC Power Supply
MSW-202A-DC	2x SFP Slots in Dual Rate 100/1000Base-X and 2x 10/100/1000Base-T RJ45 OAM Managed Carrier Ethernet Switch with Single DC Power Supply
MSW-202A-AD	2x SFP Slots in Dual Rate 100/1000Base-X and 2x 10/100/1000Base-T RJ45 OAM Managed Carrier Ethernet Switch with AC & DC Power Supply

2 MSW-404

4 × GbE/RJ45 + 4 × 1G/SFP L2+ Carrier Ethernet Switch

CTC Union Technologies unveils a new generation of carrier grade Ethernet demarcation device, MSW-404, which is designed for business connection and mobile backhaul transportation service delivered by carriers. It is equipped 4 SFP slots as dual rate 100/1000Base-X and 4 ports 10/100/1000Base-T RJ45 network interfaces. It is designed to enable E-Line, E-LAN, E-Tree services which are CE (Carrier Ethernet) 2.0 compliant for Metro Ethernet network deployments.

The MSW-404 device enables carriers and service providers to deliver SLA-based network service with extensive fault detection and diagnostic capabilities which are compliant with the latest Ethernet OAM standards such as IEEE 802.3ah, IEEE 802.1ag and ITU-T Y.1731. With built-in RFC2544 and ITU-T Y.1564 feature sets, the MSW-404 also enables the service providers to perform the SLA verification anytime to ensure the quantitative latency, jitter and throughput delivery performance indexes. The CE2.0 compliant functions support EVCs and 3 colors marker QoS traffic management to enable service providers management of bandwidth and to enforce SLA guarantees.

Specifications

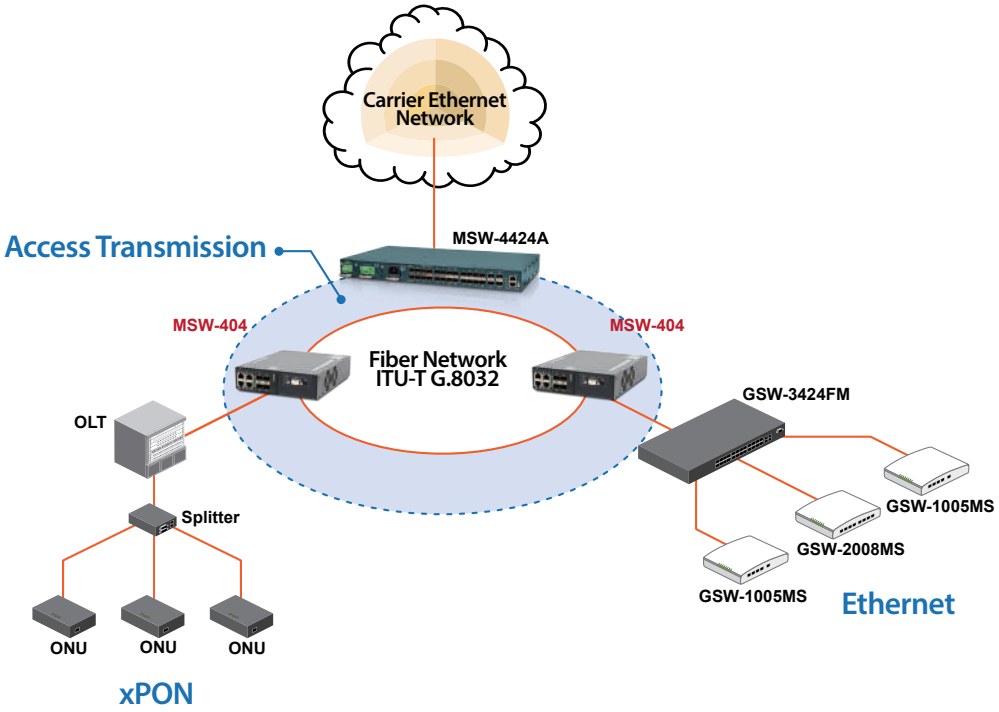
Interface	Copper port: 4x 10/100/1000Base-T RJ45	
	Uplink port: 4x 1000Base-X SFP slots	
	Console port: 1x RS-232 in RJ45	
Switching Fabric Capacity	16Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
Transmission Method	Store and Forward Switching	
Packet Buffer	8M bits	
MAC Table Size	8K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)	
	IEEE 802.3ad LACP, 4 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, ITU-T G.8031 ELPS	
	ITU-T G.8032 ERPS, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/Service based ingress/egress rate limit in steps of 100kbps	
	3 colors marker-CIR/EIR/Burst bandwidth control, IEEE 802.3x flow control	
	Multicast/Broadcast/Unicast storm control with flooding control	
Security	Static port security (MAC based), Per port limited MAC learning	
	Port based/MAC base/single/multiple IEEE 802.1x access control	
	256 ACL rules based on L2~L4 information, RADIUS/TACACS+ Authentication	
	HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection	
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave	
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)	

Ethernet Demarcation Device

Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN, Event syslog server, DNS client/proxy, NTPv4 client, UPnP
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
	Text based CLI configuration download and upload
Ethernet OAM	IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731, RFC2544, ITU-T Y.1564
MPLS feature	MPLS-TP compliant to ITU-T G.8113.1
Power Input	100~240VAC ; 18~72VDC
Power Consumption	6.72 Watts Max.
Operating Temperature	0~50℃
Storage Temperature	-25~70℃
Humidity	5%~95% (non-condensing)
Dimension	219.4 × 167.4 × 44.5 mm (W×D×H)
Certification	CE, FCC class A

Application

Figure 1 : Ethernet Backbone Application



Ordering Information

Model Name	Description
MSW-404-AC	4x SFP Slots in Dual Rate 100/1000Base-X and 4x 10/100/1000Base-T RJ45 OAM Managed Carrier Ethernet Switch with Single AC Power Supply
MSW-404-DC	4x SFP Slots in Dual Rate 100/1000Base-X and 4x 10/100/1000Base-T RJ45 OAM Managed Carrier Ethernet Switch with Single DC Power Supply
MSW-404-AD	4x SFP Slots in Dual Rate 100/1000Base-X and 4x 10/100/1000Base-T RJ45 OAM Managed Carrier Ethernet Switch with AC & DC Power Supply

3

QSW-4624MP

24 x 1G/2.5G, RJ45 + 6 x 1G/10G SFP+ with 24 x PoE+ Managed Switch 720W Power Budget

Preliminary

The next generation PoE switch in high-density port configuration leveraged NBase-T multi-gigabit technology, QSW-4624MP, is designed for SMB and enterprise to migrate to the reliable and secure Ethernet based high speed network access by connecting the existed Cat5e/Cat6 cabling infrastructure from 1Gbps to multi-gigabit speed. It is ideal solution to save your investment without disruptive and expensive wiring reconstruction required for offering more bandwidth capacity.

The latest content richer application and technology such as WiFi 6E/7 wireless access and 4K UHD video streaming or IP surveillance make the standard gigabit reveal the problem of bandwidth insufficiency. QSW-4624MP is equipped 24 ports 1G/2.5G RJ45 and 6 slots 1G/10G SFP+ uplink. Each Ethernet copper port complies with IEEE 802.3at standard to supply 30W power injection maximum. The 10G uplink ports relieve the insufficiency of Gigabit links to offer instantly demanding bandwidth consumption for PoE powered FHD/UHD IPcam surveillance, WiFi network access in the enterprise network.

It is featured completely L2+ switch functionality which guarantees high network availability, robust network access and security as well as comprehensive QoS in the network edge. It will deliver the benefits of optimal traffic transportation performance and lower ownership cost while maintaining the network deployment simply.

Features

- 24 × RJ45/PoE+ ports with 720W power budget totally
- Cable diagnostics to test UTP cable or determine broken point distance
- Text based CLI configuration download and upload
- Advanced PoE management
  - -PoE PD failure auto check and reset if PD failed
  - -PoE port on/off scheduling
  - -PoE configuration for power planning

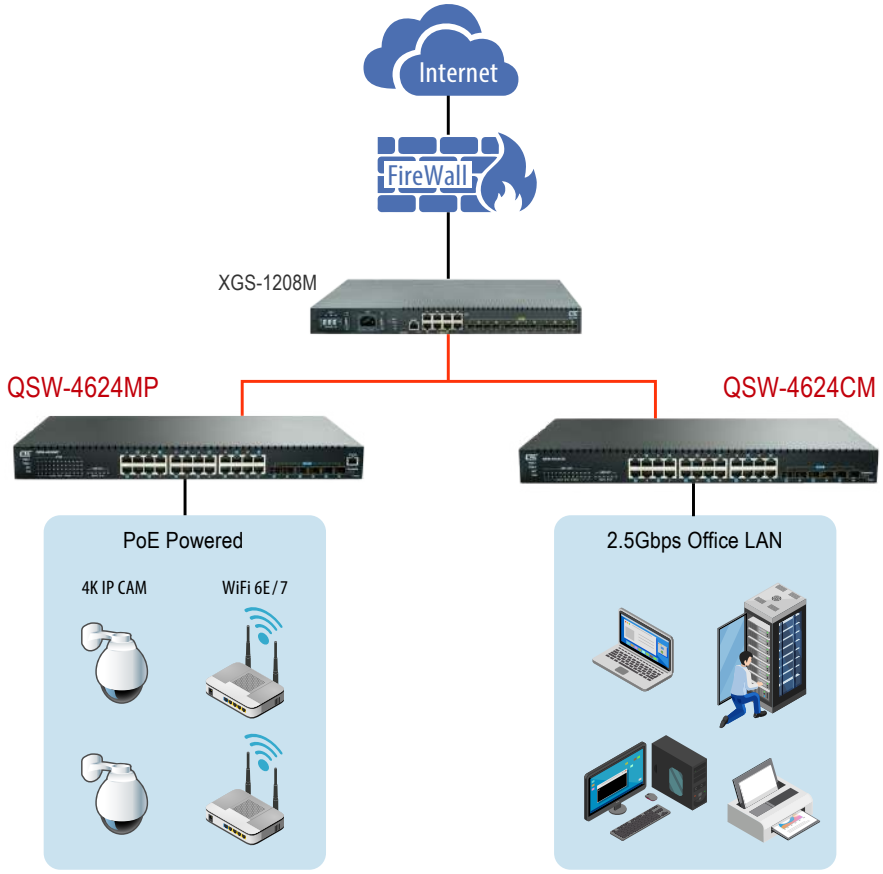
Specifications

Interface	Fiber port: 6x 1G/10G SFP+	
	Copper port: 24x 1G/2.5G RJ45	
	Management port: 1x 10/100/1000Base-T RJ45	
	Console port: 1x RS-232 in USB type C	
Packet forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	3720000pps	@2.5Gbps
	14880000pps	@10Gbps
PoE Power Budget	720Watts	
Switching Fabric Capacity	240Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	

Access Switch

VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups)
	IEEE 802.1ad QinQ VLAN
	Voice VLAN, MAC based VLAN, Protocol based VLAN
	IP subnet based VLAN
	Private VLAN for port isolation, VLAN translation
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)
	IEEE 802.3ad LACP, 15 LACP trunk groups Max; 8 port Max. per LACP trunk, IEEE 802.1AX
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking
	Per port/queue based ingress/egress rate limit in steps of 100kbps
	IEEE 802.3x flow control
	IEEE 802.1Qbb priority based full-duplex flow control
	Multicast/Broadcast/Unicast storm control with flooding control
Security	Static port security (MAC based)
	Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	512 ACL rules based on L2~L4 information
	RADIUS/TACACS+ AAA
	HTTPs & SSH v2
	IP/MAC binding
	IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy
	MLD snooping v1/v2
	IGMP fast leave
	IGMP query
	IGMP filtering/throttling
	MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface
	SNMP v1/v2c/v3
	RMON I (1,2,3,9 groups) & RFC1213 MIB II
	DHCP client/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN
	Event syslog server
	DNS client/proxy
	NTP client
	UPnP
	IPv4/IPv6 management
	SFF-8472 DDMI
	IEEE 802.1ab LLDP
Advanced PoE Management	PoE PD failure auto check and reset if PD failed
	PoE port enable/disable
	Power limit by PD classification
Power Input	AC power input (100~240V)
Power Consumption	800W @ PoE full load
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 x 280 x 43.5 mm (W x D x H)
Certification	CE, FCC class A

3 Application



Ordering Information

Model Name	Description
QSW-4624MP	24 x 1G/2.5G RJ45 + 6 x 1G/10G SFP+ L2+ Managed PoE Switch

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

3

QSW-4208MP

8 x 1G/2.5G, RJ45 + 2 x 1G/10G SFP+ with 8 x PoE+ Managed Switch 240W Power Budget

Preliminary

The next generation PoE switch in low-density port configuration leveraged NBase-T multi-gigabit technology, QSW-4208MP, is designed for SOHO and small business to migrate to the reliable and secure Ethernet based high speed network access by connecting the existed Cat5e/Cat6 cabling infrastructure from 1Gbps to multi-gigabit speed. It is ideal solution to save your investment without disruptive and expensive wiring reconstruction required for offering more bandwidth capacity.

The latest content richer application and technology such as WiFi 6E/7 wireless access and 4K UHD video streaming or IP surveillance make the standard gigabit reveal the problem of bandwidth insufficiency. QSW-4208MP is equipped 8 ports 1G/2.5G RJ45 and 2 slots 1G/10G SFP+ uplink. Each Ethernet copper port complies with IEEE 802.3at standard to supply 30W power injection maximum. The 10G uplink ports relieve the insufficiency of Gigabit links to offer instantly demanding bandwidth consumption for PoE powered FHD/UHD IPcam surveillance, WiFi network access in the enterprise network.

It is featured completely L2+ switch functionality which guarantees high network availability, robust network access and security as well as comprehensive QoS in the network edge. It will deliver the benefits of optimal traffic transportation performance and lower ownership cost while maintaining the network deployment simply.

Features

- 8 × RJ45/PoE+ ports with 240W power budget totally
- Cable diagnostics to test UTP cable or determine broken point distance
- Text based CLI configuration download and upload
- Advanced PoE management
  - -PoE PD failure auto check and reset if PD failed
  - -PoE port on/off scheduling
  - -PoE configuration for power planning

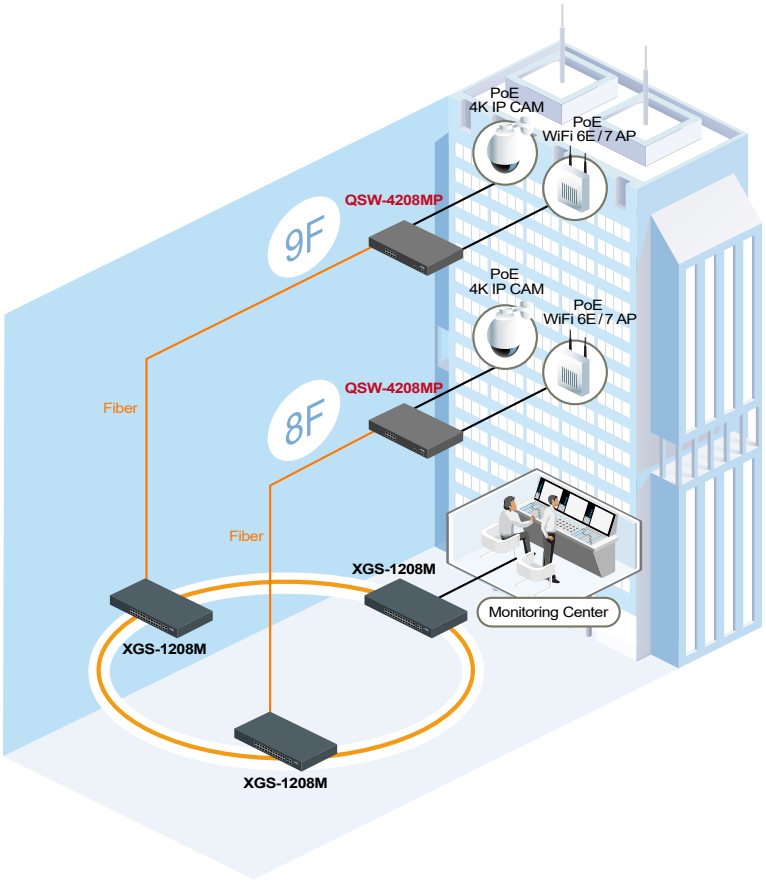
Specifications

Interface	Fiber port: 2x 1G/10G SFP+	
	Copper port: 8x 1G/2.5G RJ45	
	Management port: 1x 10/100/1000Base-T RJ45	
	Console port: 1x RS-232 in USB type C	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	3720000pps	@2.5Gbps
	14880000pps	@10Gbps
PoE Power Budget	240W	
Switching Fabric Capacity	80Gbps	
Transmission Method	Store and Forward Switching	
Packet Buffer	12M bits	
MAC Table Size	16K	
Jumbo Frame Size	10K Bytes	

Access Switch

VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN
	Voice VLAN, MAC based VLAN, Protocol based VLAN, IP subnet based VLAN
	Private VLAN for port isolation, VLAN translation
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port)
	IEEE 802.3ad LACP, 5 LACP trunk groups Max; 8 port Max. per LACP trunk
	IEEE 802.1AX
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port
	Traffic scheduling based on strict/WRR priority
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking
	Per port/queue based ingress/egress rate limit in steps of 100kbps
	IEEE 802.3x flow control
	IEEE 802.1Qbb priority based full-duplex flow control
	Multicast/Broadcast/Unicast storm control with flooding control
Security	Static port security (MAC based)
	Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	512 ACL rules based on L2~L4 information
	RADIUS/TACACS+ AAA
	HTTPs & SSH v2
	IP/MAC binding
	IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy
	MLD snooping v1/v2, IGMP fast leave, IGMP query, IGMP filtering/throttling
	MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface
	SNMP v1/v2c/v3
	RMON I (1,2,3,9 groups) & RFC1213 MIB II
	DHCP client/relay/snooping/relay option 82
	TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN
	Event syslog server
	DNS client/proxy
	NTP client
	UPnP
	IPv4/IPv6 management
	SFF-8472 DDMI
	IEEE 802.1ab LLDP
Advanced PoE Management	PoE PD failure auto check and reset if PD failed
	PoE port on/off failure
	PoE port enable/disable
	Power limit by PD classification
Power Input	AC power input (100~240V)
Power Consumption	300 Watts @ PoE full load
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	290 x 140 x 43.8 mm (W x D x H)
Certification	CE, FCC class A

3 Application



Ordering Information

Model Name	Description
QSW-4208MP	8 x 1G/2.5G RJ45 + 2 x 1G/10G SFP+ L2+ Managed PoE Switch

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

3 GSW-4424MP

24 × GbE/RJ45 + 4 × 1G/10G SFP+ with 24 × PoE+ (450W) L2+ Managed Ethernet Switch

The high-density version of managed power over Ethernet switch in best cost performance ratio, GSW-4424MP, is designed for SMB and enterprise network application. Each Ethernet copper port complies with IEEE 802.3at standard to supply 30W power injection maximum. The 10G uplink ports relieve the insufficiency of Gigabit links to offer instantly demanding bandwidth consumption for PoE powered FHD/UHD IPcam surveillance, WiFi network access and VoIP telephony deployed in the enterprise network.

The GSW-4424MP is equipped with 24 × Gigabit RJ45 ports and 4 × 1G/10G SFP+ based fiber optics ports. It is featured completely L2+ switch functionality which guarantees high network availability, secured robust network access and comprehensive QoS in the network edge. Also, the GSW-4424MP can be managed by CTC in-house developed Smartview EMS, which offers a user-friendly and centralized device management platform. It makes the administrators be able to monitor and configure the switches remotely.

Features

- 24 × RJ45/PoE+ ports with 450W power budget totally
- Cable diagnostics to test UTP cable or determine broken point distance
- Text based CLI configuration download and upload
- Advanced PoE management
  - -PoE PD failure auto check and reset if PD failed
  - -PoE port on/off scheduling
  - -PoE configuration for power planning

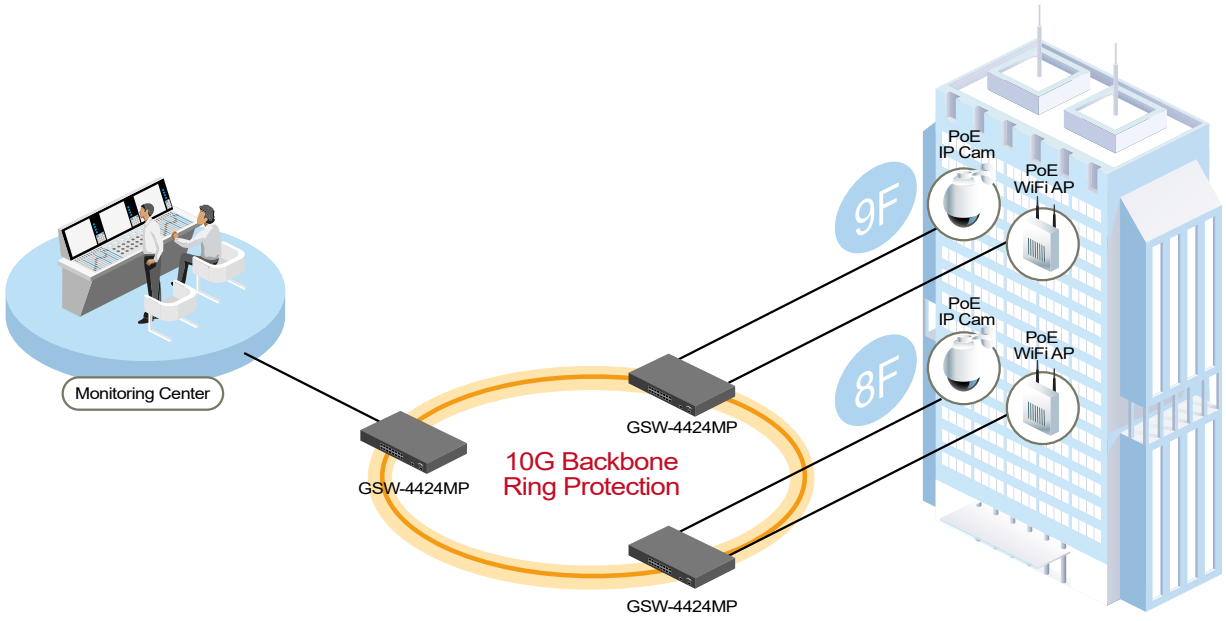
Specifications

Interface	Fiber port: 4x 1G/10Gbps SFP+ uplink	
	Copper port: 24x 10/100/1000Base-T RJ45	
	Management port: 1x 10/100/1000Base-T RJ45	
	Console port: 1x RS-232 in RJ45	
PoE Power Budget	450W	
Switching Fabric Capacity	128Gbps	
Packing Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	14880000pps	@10Gbps
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.3ad LACP	
	14 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN, ID, DSCP, TCP/UDP port, IEEE 802.1p priority tag remarking	
	DSCP remarking, Per port/queue based ingress/egress rate limit in steps of 100kbps, IEEE 802.3x flow control	
	Multicast/Broadcast/Unicast storm policing with flooding control	

L2+ Managed PoE Switch

Security	Static port security (MAC based), Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control, 512 ACL rules based on L2~L4 information
	RADIUS/TACACS+ AAA, HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade, Port mirroring
	RSPAN, Event syslog server, DNS client/proxy, NTPv4 client, UPnP, IPv4/IPv6 management
	SFF-8472 DDMI, IEEE 802.1ab LLDP, Text based CLI configuration download and upload
Advanced PoE Management	PoE PD failure auto check and reset if PD failed, PoE port on/off failure, PoE port enable/disable
	Power limit by PD classification, Totally PoE power budget limitation (450W maximum), Power feeding priority
Power Input	AC power input (100~240V)
Power Consumption	490 Watts @ PoE full load
Operating Temperature	0~50℃
Storage Temperature	-25~70℃
Humidity	5%~95% (non-condensing)
Dimension	440 × 280 × 43.5 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-4424MP	24 × GbE/RJ45, PoE+ + 4 × 1G/10G SFP+ L2+ Managed PoE Switch

Optional Accessory

▪ 10G SFP+ Transceiver Module

Model Name	Description
SFM-1000-SR85	10G SFP+ SR/SW MMF 300m, 850nm VCSEL, 10G Ethernet/FC/SDH/SONET
SFS-1010-LR31	10G SFP+ LR/LW SMF 10km, 1310nm DFB DML, 10G Ethernet/FC/SDH/SONET
SFS-1040-ER55	10G SFP+ ER/EW SMF 40km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET
SFS-1080-ZR55	10G SFP+ ZR/EW SMF 80km, 1550nm DFB EML, 10G Ethernet/FC/SDH/SONET

3

GSW-3424MP

24 × GbE/RJ45 + 4 × 1G SFP with 24 × PoE+ (450W)
L2+ Managed Ethernet Switch

The high-density version of managed power over Ethernet switch in best cost performance ratio, GSW-3424MP, is designed for SMB and enterprise network application. Each Ethernet copper port complies with IEEE 802.3at standard to supply 30W power injection maximum.

The GSW-3424MP is equipped with 24 × Gigabit RJ45 ports and 4 × 1G SFP based fiber optics ports. It is featured completely L2+ switch functionality which guarantees high network availability, secured robust network access and comprehensive QoS in the network edge. Also, the GSW-3424MP can be managed by CTC in-house developed Smartview EMS, which offers a user-friendly and centralized device management platform. It makes the administrators be able to monitor and configure the switches remotely.

Features

- 24 × RJ45/PoE+ ports with 450W power budget totally
- Cable diagnostics to test UTP cable or determine broken point distance
- Text based CLI configuration download and upload
- Advanced PoE management
  - -PoE PD failure auto check and reset if PD failed
  - -PoE port on/off scheduling
  - -PoE configuration for power planning

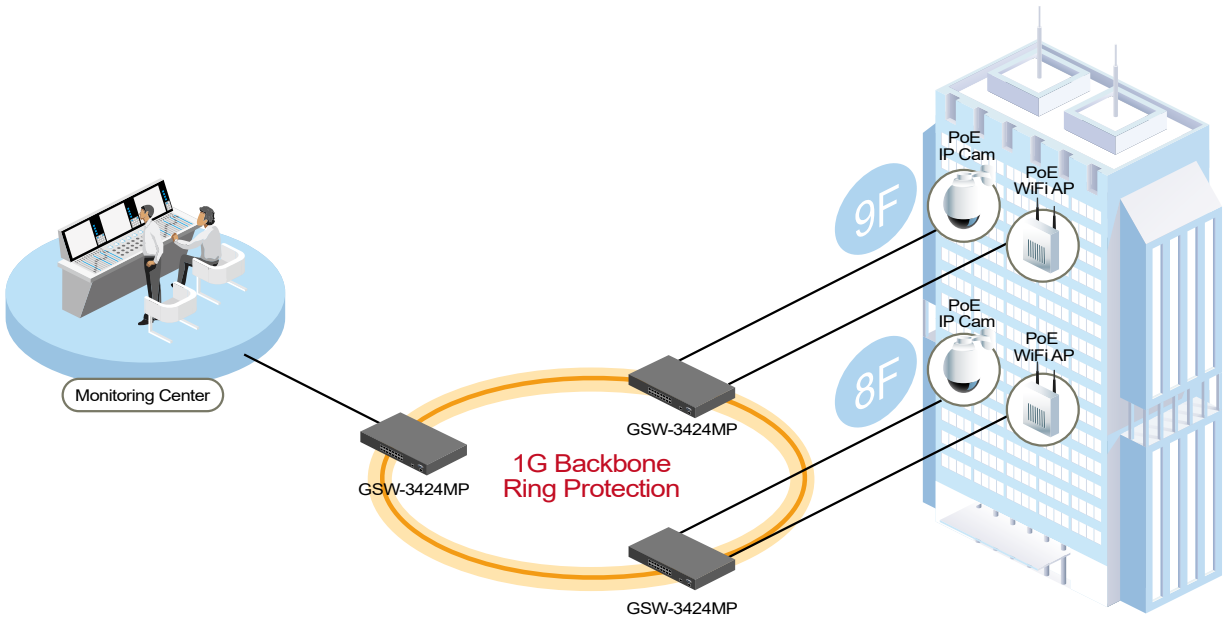
Specifications

Interface	Fiber port: 4x 1Gbps SFP uplink	
	Copper port: 24x 10/100/1000Base-T RJ45	
	Management port: 1x 10/100/1000Base-T RJ45	
	Console port: 1x RS-232 in RJ45	
PoE Power Budget	450W	
Switching Fabric Capacity	56Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
Transmission Method	Store and Forward Switching	
Packet Buffer	32M bits	
MAC Table Size	32K	
Jumbo Frame Size	10K Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, Voice VLAN, MAC based VLAN, Protocol based VLAN	
	IP subnet based VLAN, Private VLAN for port isolation, VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.3ad LACP	
	14 LACP trunk groups Max; 8 port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN, ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress/egress rate limit in steps of 100kbps, IEEE 802.3x flow control	
	Multicast/Broadcast/Unicast storm policing with flooding control	

L2+ Managed PoE Switch

Security	Static port security (MAC based), Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	512 ACL rules based on L2~L4 information, RADIUS/TACACS+ AAA
	HTTPs & SSH v2, IP/MAC binding, IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, RSPAN, Event syslog server, DNS client/proxy, NTPv4 client, UPnP
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
	Text based CLI configuration download and upload
Advanced PoE Management	PoE PD failure auto check and reset if PD failed, PoE port on/off failure, PoE port enable/disable
	Power limit by PD classification, Totally PoE power budget limitation (450W maximum)
	Power feeding priority
Power Input	AC power input (100~240V)
Power Consumption	490 Watts @ PoE full load
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 × 280 × 43.5 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-3424MP	24 × GbE/RJ45, PoE+ + 4 × 1G SFP L2+ Managed PoE Switch

3 GSW3208MP-1

8 × GbE/RJ45 + 2 × 1G/SFP with 8 × PoE+ (180W) L2+ Managed Switch

CTC Union Technologies unveils the enhanced version of cost-effective high performance managed power over Ethernet switch, GSW3208MP-1, which is equipped 8 GbE/RJ45 ports and 2 GbE SFP slots. Each Ethernet copper port complies with IEEE 802.3at standard to supply 30W power injection maximum. It's designed for small and medium business network deployment for office applications such as PoE powered IP telephony, WiFi access and IP surveillance.

It is featured completely L2 switch functionality which guarantees high network availability, secured robust network access and comprehensive QoS in the network edge. Also, the GSW3208MP-1 can be managed by CTC in-house developed Smartview EMS, which offers a user-friendly and centralized device management platform. It makes the administrators be able to monitor and configure the switches remotely.

Features

- 8 × RJ45/PoE+ ports with 180W power budget totally
- Cable diagnostics to test UTP cable or determine broken point distance
- Text based CLI configuration download and upload
- Advanced PoE management
  - -PoE PD failure auto check and reset if PD failed
  - -PoE port on/off scheduling
  - -PoE configuration for power planning

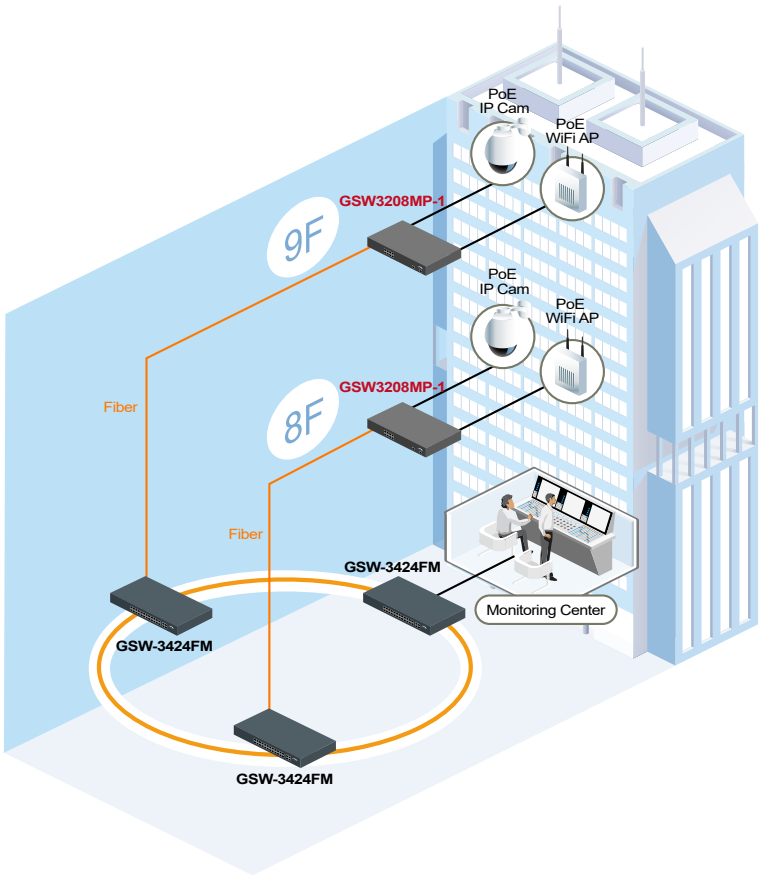
Specifications

Interface	Fiber port: 2x 100/1000Base-X SFP	
	Copper port: 8x 10/100/1000Base-T RJ45	
	Console port: 1x RS-232 in RJ45	
PoE Power Budget	180W	
Switching Fabric Capacity	20Gbps	
Packet Forwarding Rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
Transmission Method	Store and Forward Switching	
Packet Buffer	4M bits	
MAC Table Size	8K	
Jumbo Frame Size	9600 Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (4K VLAN groups), IEEE 802.1ad QinQ VLAN, Voice VLAN	
	MAC based VLAN, Protocol based VLAN, IP subnet based VLAN, Private VLAN for port isolation	
	VLAN translation, GVRP (GARP VLAN registration protocol)	
Link Aggregation	Static trunk (SA, DA, IP, TCP/UDP port), IEEE 802.3ad LACP	
	5 LACP trunk groups Max; 8-port Max. per LACP trunk group	
L2 Switching Protection	IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP, Loop Protection	
QoS Feature	Hard wired IEEE 802.1p 8 priority queues per port, Traffic scheduling based on strict/WRR priority	
	CoS based traffic classification on switch port, VLAN ID, DSCP, TCP/UDP port	
	IEEE 802.1p priority tag remarking, DSCP remarking	
	Per port/queue based ingress/egress rate limit in steps of 100kbps	
	IEEE 802.3x flow control, Multicast/Broadcast/Unicast storm control with flooding control	

L2+ Managed PoE Switch

Security	Static port security (MAC based), Per port limited MAC learning
	Port based/MAC base/single/multiple IEEE 802.1x access control
	256 ACL rules based on L2~L4 information, RADIUS/TACACS+ authentication, HTTPs & SSH v2
	IP/MAC binding, IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy, MLD snooping v1/v2, IGMP fast leave
	IGMP query, IGMP filtering/throttling, MVR (Multicast VLAN Registration)
Management	WebGUI/Telnet CLI interface, SNMP v1/v2c/v3, RMON I (1,2,3,9 groups), RFC1213 MIB II, Private MIB
	DHCP client/snooping/relay option 82, TFTP/HTTP based firmware and configuration upgrade
	Port mirroring, Event syslog server, DNS client/proxy, NTP client, UPnP
	IPv4/IPv6 management, SFF-8472 DDMI, IEEE 802.1ab LLDP
Advanced PoE Management	PoE PD failure auto check and reset if PD failed, PoE port on/off failure, PoE port enable/disable
	Power limit by PD classification, Totally PoE power budget limitation (180W maximum), Power feeding priority
Power Input	AC power input (100~240V)
Power Consumption	228 Watts @ PoE full load
Operating Temperature	0~50℃
Storage Temperature	-25~70℃
Humidity	5%~95% (non-condensing)
Dimension	290 × 140 × 43.8 mm (W×D×H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW3208MP-1	8 × GbE/RJ45, PoE+ + 2 × GbE SFP L2+ Managed PoE Switch

3 PMC-1000S

10/100/1000Base-T to 100/1000Base-X SFP with PoE+ (30W) Media Converter

PMC-1000S is an managed Gigabit Ethernet media converter that supports conversion between electrical 10/100/1000Base-T and optical 1000Base-X Ethernet and as PSE (Power Source Equipment) provide PoE+ power over Ethernet. PMC-1000S provides an SFP cage for 100/1000Base-X compatible SFP modules. By offering in-band management, this converter can be remotely controlled and monitored in a centrally located managed rack via FMC-1800 media converter rack.

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X
- Supports dual rate (100/1000) SFP for selectable Fast or Gigabit speed on fiber
- PoE output voltage up to 55VDC
- Supports IEEE 802.3at/af PoE, output 30Watts Power Budget
- Supports LFPT (Link Fault Pass Through)
- Supports DIP SW for setting LFPT, Switch or Converter mode, SFP speed
- Wall Mount and compact size for easy installation
- Supports Jumbo frame 16K bytes packet
- Supports remote in-band management by FMC-1800 SNMP manager

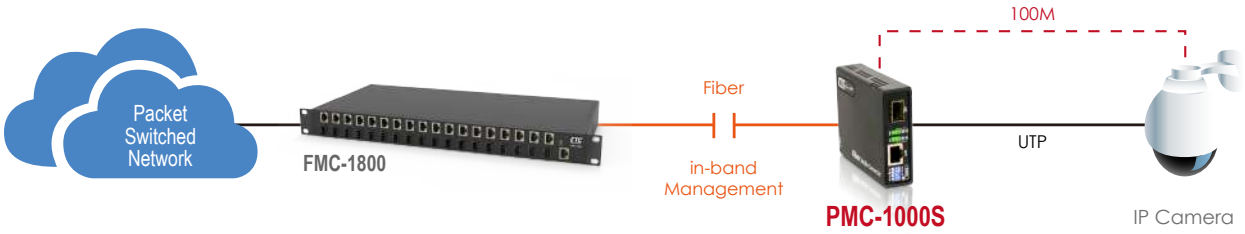
Specifications

Standard	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-T(X), IEEE 802.3u 100Base-FX	
	IEEE 802.3ab 1000Base-T(X), IEEE 802.3z 1000Base-SX/LX	
	IEEE 802.3x Flow Control and Back pressure, IEEE 802.3at Power over Ethernet + PoE+	
	IEEE 802.3af Power over Ethernet, PoE	
RJ45 Ports	10/100/1000Base-T	
Fiber Ports	100/1000Base-X SFP	
Data Process Architecture	Store and Forward mode or Pass through mode, set by DIP SW	
Jumbo Frame	16K bytes	
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um, 62.5/125um	
	Fiber Cable (Single-mode): 9/125um	
	Wavelength: 1310nm (Multi-mode/Single-mode)	
	Available distance: 500M (Multi-mode SX) 20/40KM (Single-mode)	
	SFP, Distance depend on plug-in Fiber Transceiver	
Link Fault Pass Through (LFPT)	TX–Fiber: If TX port link down, the media converter will force Fiber port to link down	
	Fiber–TX: If Fiber port link down, the media converter will force TX port to link down	
DIP Switch	DIP 1	OFF: Store and Forward
		ON: Pass Through
	DIP 2	OFF: LFPT Disable
		ON: LFPT Enable
	DIP 3	OFF: 1000 Base X
		ON: 100 Base X
	DIP 4	OFF: PoE Enable
		ON: PoE Disable

PoE Media Converter

Connector and Pin Assignment	SFP Slot
	RJ-45 Socket: CAT-3/5 (10/100Mbps) Twisted Pair cable
	Auto MDI/MDI-X and Auto-Negotiation Function Support
	RJ-45 port support IEEE 802.3at/af End-Span, Alternative A mode
	Positive (V+): RJ-45 pin 1, 2
	Negative (V-): RJ-45 pin 3, 6
	Data : 1, 2, 3, 6, 4, 5, 7, 8
LED	Per Unit: Power (Green), Fiber LNK/ACT (Green)
	RJ-45 port: 100LNK/ACT(Green), 1000LNK/ACT(Green)
	PoE Status (Green): On: PoE normal working Off: PoE No Power output
Power Input	48V~57VDC Input (Ship with 56VDC Power Adapter)
Power Adapter	Input 100/110/120/220/240 VAC (Wide Range), Output 36W, 56VDC
PoE Output Voltage	55VDC
PoE Power Budget	30W (Maximum)
Power Consumption	Maximum 35.4W (include PoE power budget 30W)
Operating Humidity	10 ~ 90% non-condensing
Operating Temperature	0°C ~ 50°C
Storage Temperature	-40°C ~ 85°C
Housing	Plastic
Dimension	108 × 23 × 74mm (D×W×H)
Weight	80g
Installation	Desk top or Wall Mounting (Optional)
EMC	FCC Class A, CE
MTBF	749556

Application



Ordering Information

Model Name	Description
PMC-1000S	10/100/1000Base-T to 100/1000Base-X SFP With PoE+ (PSE) Fiber Converter (30W)

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

■ Wall-Mounting Kit

3

PMC-100PD

10/100Base-TX to 100Base-FX
PoE PD Media Converter

The PMC-100PD is Power over Ethernet 10/100Base-TX to 100Base-FX non-managed PD(Power Device) Fiber converter, which give you the options to choose from the most popular fiber cabling connectors, ST, SC, FC. Both multi-mode and single mode converter models are available as well as BiDi which allows bi-directional transmissions using only a single fiber cable. With Power over Ethernet (PoE) feature, PMC-100PD takes power supply over Ethernet cable from PoE Ethernet Switch and may work without external power adapter. When auto-negotiation is selected, these units will automatically tailor themselves to convert both half-duplex and full-duplex signals, according to IEEE802.3u standards. LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status.

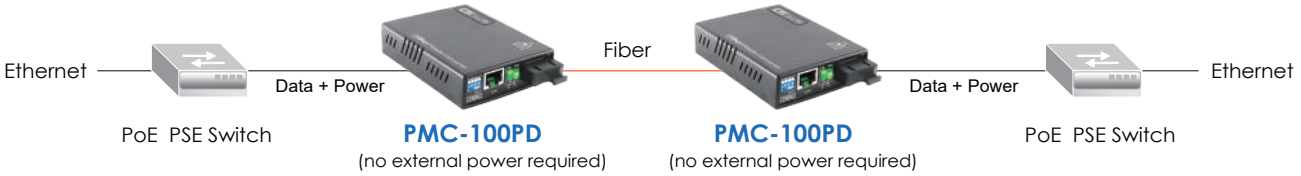
Features

- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 1600 bytes (Max.) packets
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1Q Tag VLAN pass thru
- Supports flow control (Pause)
- Supports Link Fault Pass-Through (LFPT)
- Forward 9K jumbo packets in converter mode
- Supports IEEE802.3af/at Power over Ethernet

Specifications

Optical Interface	Connector	1 × 9 (SC, ST, FC)
	Data rate	125Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	WDM 1310Tx/1550Rx (type A)1550Tx/1310Rx (type B)
Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mpbs
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e or higher
		1000Base-T Cat 5, 5e or higher
	PD Input Power	48VDC
Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.3af/at	
Indications	LED (Power, FX Link, TX SPD, TX Link, TX Duplex, FEF)	
Power Input	PoE or DC12V : DC 12V In	
Power Consumption	< 4W	
Dimensions	108 × 74 × 23mm (D×W×H)	
Weight	120g	
Temperature	0 ~ 50℃ (Operating), -10 ~ 70℃ (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	

3 Application



Ordering Information

Model Name	Description
PMC-100PD	10/100Base-TX to 100Base-FX PoE PD Media Converter

Connector Type	Connectivity Distance
SC, ST, FC	002: 2km 015: 15km 030: 30km 050: 50km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type

3 INJ-G90

Multigigabit Ethernet IEEE802.3bt PoE++ Injector (90W)

CTC Union Technologies unveils the next generation PoE++ injector, which is compliant to the latest IEEE 802.3bt PoE standards, model name as INJ-G90. The Ethernet connection from any one port of Ethernet switch/hub via Cat 5e/6 cable can be enabled IEEE 802.3bt/PSE feature by connecting with this PoE injector then feed power to the PoE/PD device remotely.The PoE injector can be bundled with the EXT-G104P PoE extender developed by CTCU to offer the distance extension more than 100 meters for PoE feeding application. This bundled solution can not only offer the one-to-many PoE/PD network device flexibly but also solve the location limitation lack of power outlet perfectly. The compact size and wall mounting design of this PoE injector can simplify the installation in which the space is limited as well.

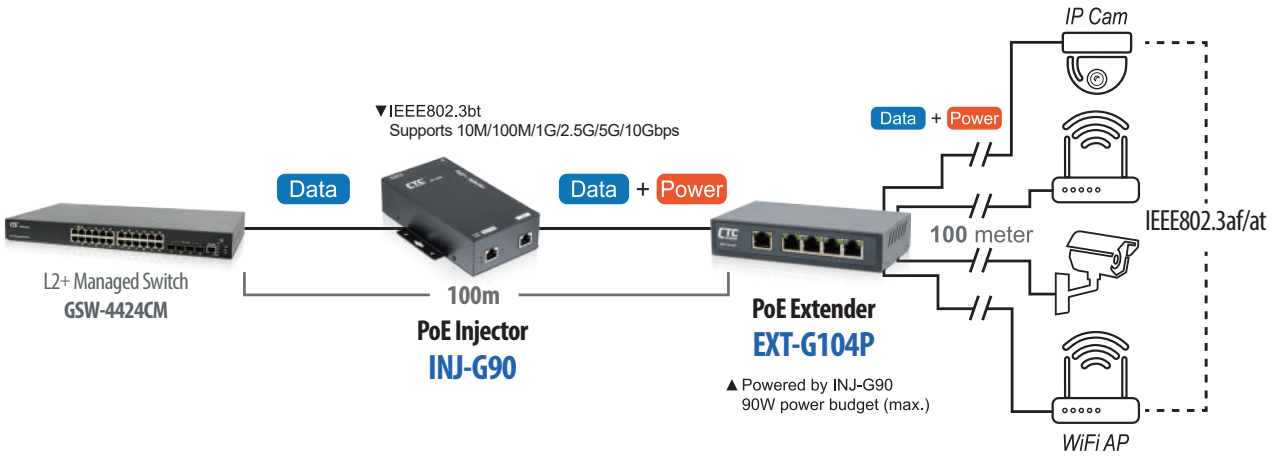
Features

- Compliant to IEEE 802.3bt standards
- Compact size and wall mountable
- PoE short circuit protection to guard the remote PoE/PD device

Specifications

IEEE Standard	IEEE802.3 10Base-T Ethernet, IEEE802.3u 100Base-TX Fast Ethernet, IEEE802.3ab 1000Base-T Gigabit Ethernet
	IEEE802.3bz 2.5G/5GBase-T Ethernet, IEEE802.3an 10GBase-T Ethernet
	IEEE802.3af PoE standard, IEEE802.3at PoE+ standard, IEEE802.3bt PoE++ standard
PoE/PSE Output	RJ45 pin assignment: Both 1/2 (+), 3/6 (-) and 4/5 (+), 7/8 (-)
LED Indicator	"PWR" LED: System power, "PoE" LED: 10M/100M/1G/2.5G/5G/10G RJ45 PoE output
PoE Power Budget	90W (max.)
PoE Output Voltage	53VDC (Minimum)
Built-in Power Supply	Input: 110~240VAC, Output power: 90W, 53VDC
Temperature	0 ~ 50°C (operating), -10 ~ 70°C (Storage)
Humidity	10% ~ 90% (non-condensing)
Regulatory Certification	CE, FCC

Application



Ordering Information

Model Name	Description
INJ-G90	1 port Mulitgigabit Ethernet, IEEE 802.3bt PoE++ Injector (90W)

3 INJ-G30

Gigabit Ethernet IEEE 802.3af/at PoE Injector (15/30/36W)

This device consists of 1 PoE Injector port. It can solve the limitation of the power outlet location and offer the system designer a flexible solution to locate the PD network device everywhere. The compact size and wall mounting was specifically designed for easy installation. It can be installed where space is limited; moreover, it provides smooth network migration and easy upgrade to network capacity.

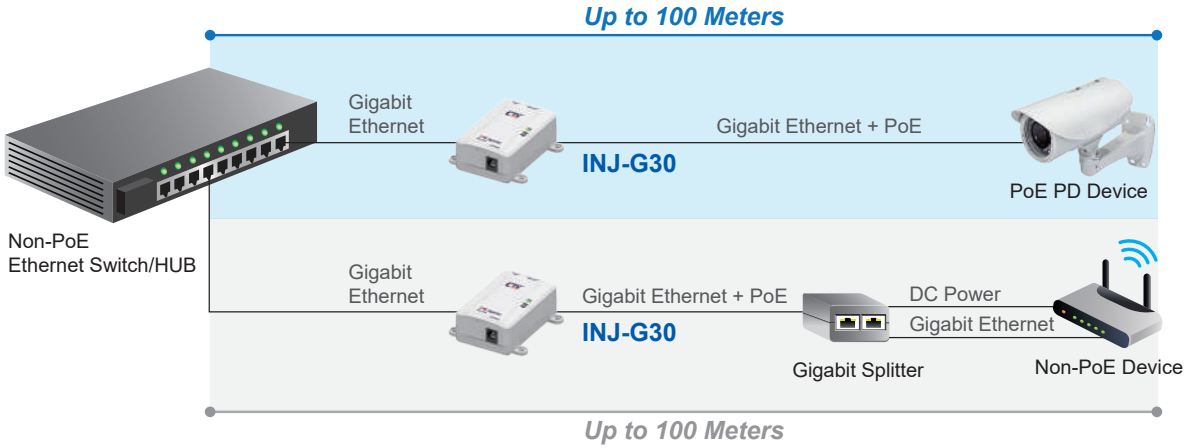
Features

- 1 Port PoE Injector, 55VDC /30W output
- Compliant with IEEE 802.3af/at
- Providing 1 10/100/1000Mbps pass through data rate
- Wall Mountable
- Compliant with IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX and IEEE 802.3ab 1000Base-T
- Safety & EMI Certificates: CE & FCC Class B Smart plug & play
- Compact Size

Specifications

Ethernet Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair
Network Cable	IEEE 802.3af Power over Ethernet (PoE), IEEE 802.3at Power over Ethernet (PoE+)
Indications	1x RJ-45 for 10/100/1000Base-T data
	1x RJ-45 for 10/100/1000Base-T data and PoE Power output
Power Input	10Base-T Cat. 3, 4, 5e UTP/STP, 100/1000Base-T Cat. 5 UTP/STP
Filtering/Forwarding Rate	10/100/1000Mbps pass through data rate
PoE Power Output Pin	RJ45 Pin 1, 2(V+), Pin 3, 6(V-)
LED	System Power
External Power Adapter	Input 100/110/120/220/240 VAC (Wide Range), Output 36W, 56VDC
PoE Output Voltage	55VDC
PoE Power Budget	30W (Maximum)
Operating Temperature	0 ~ 45°C
Storage Temperature	-20 ~ 85°C
Humidity	10 ~90% RH (Non-condensing)
Dimension	68 × 80 × 24mm (W×D×H)
Weight	138g
Installation Mounting	Wall mount
Certificates	CE & FCC Class B

3 Application



■ Related Products

◀ **INJ-IG60-24**
Industrial 1 Port GbE PoE+ Injector, IEEE802.3at/af, 15.4/30/36/60/72W (12/24/48VDC)

▌ **INJ-IG01-PH**
Industrial 1 Port GbE PoE+ Injector, IEEE802.3at/af, 15.4/30/36/60W (48VDC)

▶ **INJ-IG02-PH**
Industrial 1 Port Passive PoE Injector, IEEE802.3at, 15.4/30/60W (24/48VDC)

Ordering Information

Model Name	Description
INJ-G30	1 Port Gigabit Ethernet, IEEE 802.3af/at high power PoE+ Injector

3 INJ-SPL01

GbE, IEEE802.3af/at PoE Splitter, output voltage 12/19/24VDC selectable

INJ-SPL01 is an Industrial Grade, Gigabit Ethernet, PoE Splitter, designed to deliver data, via RJ-45 Ethernet connector, and electrical power, via screw terminal block, to non-PoE devices. This device saves the high cost of running separate electrical service to edge devices. The INJ-SPL01 acts as PD equipment and can be powered by standard PoE IEEE802.3af/at PSE (Power Source Equipment) switches or work when paired with either INJ-IG01-PH or INJ-IG60-24 PoE Injectors. The data transmission, up to Gigabit speeds, with selectable power output voltages of 12V, 19V or 24V DC, run simultaneously up to the Ethernet limit of 100 meters. Simple settings of the INJ-SPL01, make it a plug and play device, requiring no tools or software configuration, and provides ease of use, with flexible installation and high reliability.

Features

- Splits power and data from PoE Input
- Supports PoE IEEE802.3af/at A mode (1,2,3,6) or B mode (4,5,7,8)
- Selectable output voltage, 12/19/24VDC select by slide SW
- Supports output power upto 12VDC/1.4A, 19VDC/1.05A, or 24VDC/0.85A
- Compliant with 10/100/1000Base-T(X)
- CE, FCC, Railway traffic EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Wide operating temperature -40 ~ 75°C (INJ-SPL01-E)
- IP30 rugged metal housing and fanless

Specifications

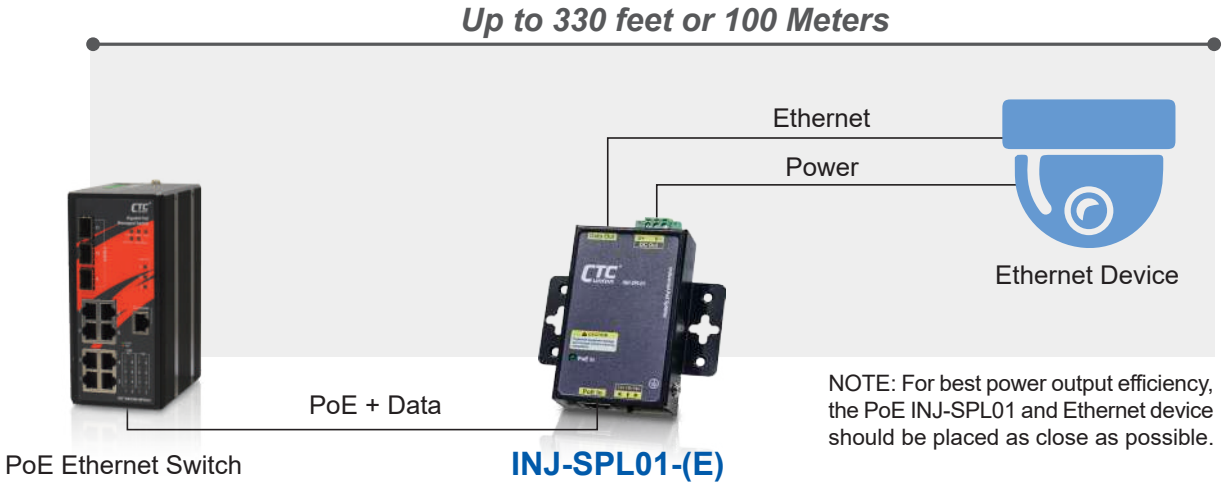
IEEE Standard	IEEE 802.3 10Base-T Ethernet, IEEE 802.3u 100Base-TX Fast Ethernet	
	IEEE 802.3ab 1000Base-T Gigabit Ethernet, IEEE802.3af PoE (Power over Ethernet)	
	IEEE802.3at PoE+ (Power over Ethernet enhancements)	
PoE In	PoE Standard	PoE Standard IEEE 802.3af, IEEE802.3at
	RJ45 Pin Assignments	Supports both PoE A mode or B mode (don't need select)
		A mode: Positive (V+): RJ-45 pin 1, 2, Negative (V-): RJ-45 pin 3, 6
		B mode: Positive (V+): RJ-45 pin 4, 5, Negative (V-): RJ-45 pin 7, 8
		Support 10/100/1000Base-T(X)
		Data (1, 2, 3, 6, 4, 5, 7, 8)
Output Voltage & Power	12, 19, 24VDC select by slide switch	
	12VDC: 1.4A, 19VDC: 1.05A, 24VDC: 0.85A with Removable terminal block	
Data Out	RJ45 10/100/1000Base-T(X)	
Network Cable	UTP/STP above Cat. 5e cable, EIA/TIA-568 100-ohm (100m)	
LED	PoE in (Green)	
Power Supply	Powered from PoE in IEEE802.3af/at, 44~57VDC, 30W Max	
Output Power	12VDC, 1.4A (max), 19VDC, 1.05A (max), 24VDC, 0.85A (max)	
Operating Temperature	-10 ~ 60°C (INJ-SPL01), -40 ~ 75°C (INJ-SPL01-E)	
Operating Humidity	5% to 95% (Non-condensing)	
Storage Temperature	-40 ~ 85°C	
Housing	Rugged Metal, IP30 Protection and fanless	
Dimensions	22 × 84.2 × 80.7 mm (D×W×H)	
Weight	85g	
Installation Mounting	Wall Mounting	
MTBF	3,371,427 Hours, (MIL-HDBK-217)	
Warranty	5 years	

Gigabit PoE Injector

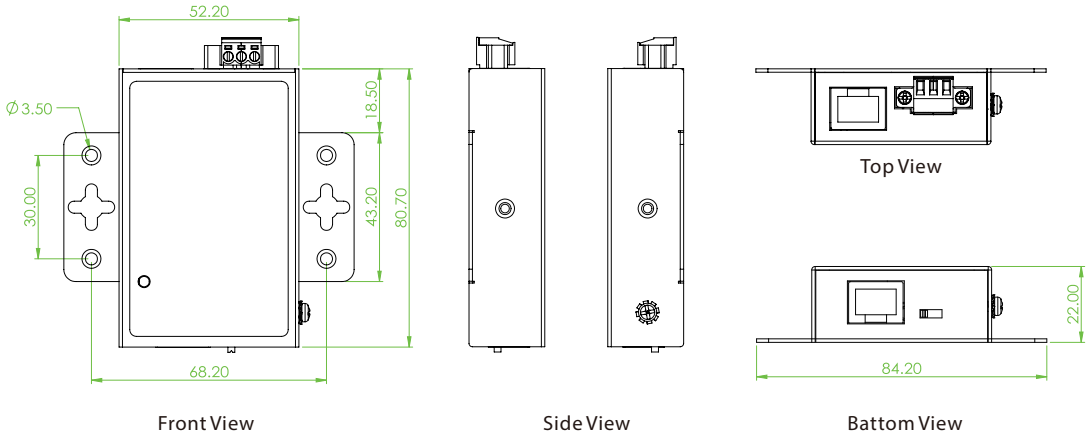
Certification	
EMC	CE (EN55032, EN55035)
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN 61000-6-2
Emission for Heavy Industrial Environment	EN 61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B, EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (EFT) Level 3, Criteria A, EN 61000-4-5 (Surge) Level 3, Criteria B
	EN 61000-4-6 (CS) Level 3, Criteria A, EN61000-4-8 (PFMF) Field strength 300A/m Criteria A
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
Vibration	IEC 60068-2-6

Application

Figure 1: INJ-SPL01 application topology



Dimensions



3 Ordering Information

Model Name	Ethernet with PoE In		Power & Data Out		Certification			Operating Temperature
	10/100/1000 Base-T(X)	IEEE802.3af/at	10/100/1000 Base-T(X)	Output Voltage Selectable 12/19/24VDC	EN61000-6-2 EN61000-6-4	EN50121-4	CE/FCC	
INJ-SPL01	1	1	1	✓	✓	✓	✓	-10~60°C
INJ-SPL01-E	1	1	1	✓	✓	✓	✓	-40~75°C

■ Package List

- INJ-SPL01 device
- Terminal block

3 EXT-G104P

1 port PoE++/PD to 4 ports PoE+/PSE GbE PoE Extender

CTC Union Technologies unveils the 5 ports PoE extender, which is not powered via AC/DC power adaptor, model names as EXT-G104P. It is featured 1 port Gigabit based RJ45 in PoE++/PD compliant and 4 ports Gigabit based RJ45 in POE+/PSE compliant. The PoE++/PD RJ45 port is powered by an externally PoE extender or injector complies to IEEE 802.3bt standard. It behaves as an extender to support more than 100 meters distance for power over Ethernet feeding.The PoE++/PD RJ45 port can be powered up to 90W maximized externally then feed power to other 4 ports PoE+/PSE RJ45 for connecting PoE/PD devices such as IPCam, WiFi AP/gateway or VoIP phone set…etc. It is indeed cost effective solution to extend the distance for PoE application field in plug & play manner.

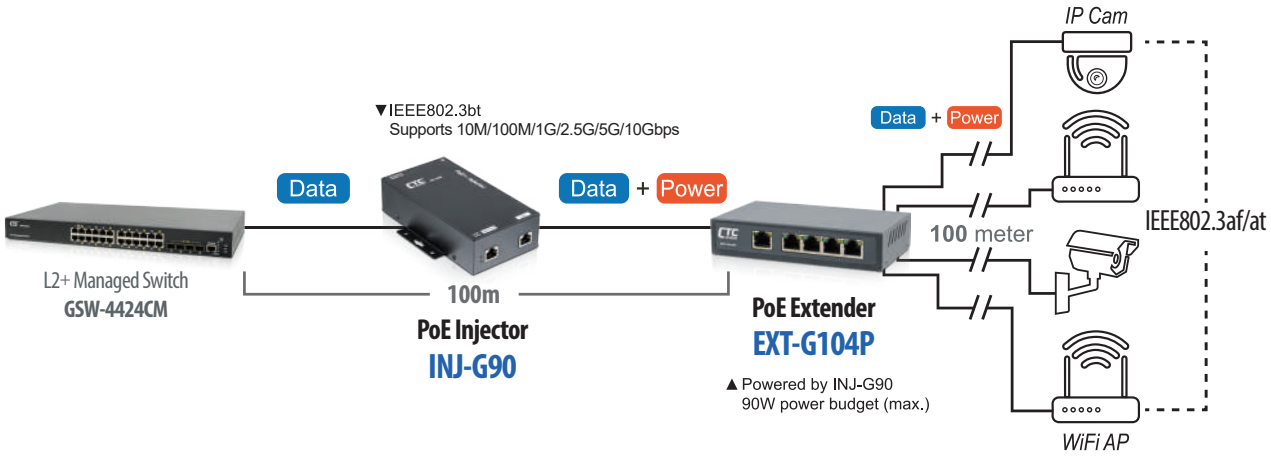
Features

- Plug and Play installation
- No additionally AC/DC power supply required
- Extending the PoE signal for additional 100 meters

Specifications

IEEE Standard	IEEE802.3 10Base-T Ethernet, IEEE802.3u 100Base-TX Fast Ethernet, IEEE802.3ab 1000Base-T Gigabit Ethernet
	IEEE802.3af PoE standard (15.4W), IEEE802.3at PoE+ standard (30W), IEEE802.3bt PoE++ standard (90W)
PoE/PD Input	RJ45 pin assignment: Both 1/2 (+), 3/6 (-) and 4/5 (+), 7/8 (-), Auto MDI/MDIX, Auto negotiation function
PoE/PSE Output	RJ45 pin assignment: 1/2 (+), 3/6 (-), Auto MDI/MDIX, Auto negotiation function
LED Indicator	LED embedded on the RJ45 connectors, “Power” LED: PoE/PD powered success, “PoE” LED: PoE/PSE enabled
	“Link/ACT” LED: Network indicator
Dimension	138mm(W) × 76.58mm(D) × 28mm(H)
Installation	Wall mounting
Temperature	0 ~ 50℃ (operating), -10 ~ 70℃ (Storage)
Humidity	10% ~ 90% (non-condensing)
Regulatory Certification	CE, FCC

Application



Ordering Information

Model Name	Description
EXT-G104P	1 port PoE++/PD to 4 ports PoE+/PSE GbE PoE Extender

4 Ethernet Aggregation Switch Platform

- FRM220A

The FRM220A series is an Ethernet based aggregation platform, which incorporates a 24 + 4 port L2 Gigabit Ethernet switch (FRM220A-GSW/SNMP-1G or a new 20 + 4 port L2 Gigabit Ethernet switch with 4 × 10Gigabit uplink (FRM220A-GSW/SNMP-10G). The FRM220A has a built-in Gigabit Ethernet backplane to interconnect the Ethernet access with the FRM220-GSW/SNMP card. The L2 switch card supports many advanced Layer 2 switch technologies including port and tag based VLAN, QoS, LACP, RSTP to name just a few. The FRM220A chassis solution significantly lowers the OPEX for operator and service provider when deploying fiber access networks.

Specifications

Physical Specifications	Dimensions	303 × 438 × 88 mm (D×W×H)
	Weight (w/o Power)	5.2kg
Power	AC	18~240VAC
	DC24	18~36VDC
	DC48	36~60VDC
Temperature	Operating 0~60°C	
	Storage -10~70°C	
Humidity	5%~90% non-condensing	
MTBF	65,000 hrs	
Certification	FCC Class A, VCCI Class A, CE, RoHS compliant	

Chassis Overview

(Front Side)

2U 19" 20-slot Rackmount Chassis

(Rear Side)

1G/10G Uplink Ethernet Aggregation Switch Card

The FRM220A chassis incorporates an Ethernet trunk card (FRM220A-GSW/SNMP-10G), for grooming traffic from all twenty (20) card slots and for Device Management. This card has four (4) uplink ports of either 1G/10G SFP+, depending on model, and is built with GbE interfaces to connect the backplane with each slot of FRM220A chassis. The FRM220A-GSW/SNMP-10G Ethernet switch trunk card transmits Ethernet between the subscriber equipment (bridge/modem or network interface card) and provides a user-networking interface with Ethernet packets.

10G Ethernet Aggregation Switch Platform-FRM220A

FRM220A-GSW/SNMP-10G

10G uplink Ethernet Aggregation Switch Card with In-Band Management

- Provides chassis aggregation via 4×1G/10Gigabit Base-X SFP/SFP+ plus 4 × 10/100/1000Base-T uplink ports
- Supports IEEE 802.1p HW based 8 priority queues and L2~L4 QoS functions
- Supports IPv6 management
- Provides Web (https), Telnet, SSHv2, SNMP(V1, V2c, V3) management interfaces

FRM220A-GSW/SNMP-1G

Gigabit uplink Ethernet Aggregation Switch Card with In-Band Management

- Supports secure authentication by IEEE802.1x, RADIUS or TACACS+
- Supports IEEE802.1D/802.1w/802.1s for ring protection on all interfaces
- Supports IEEE 802.1Q tagged VLAN and IEEE 802.1ad Q-in-Q application

FRM220A Cards

The products listed below are designed for FRM220A-CH20 Ethernet Aggregation Switch Applications

Ethernet Switch

FRM220A-2000EAS/4F

- 4-port 100/1000Base-X SFP
- Standalone IP Based, Web GUI, Telnet and SNMP management
- Supports dying gasp
- Supports Cisco® like CLI
- Online local / remote F/W upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management

Ethernet Switch

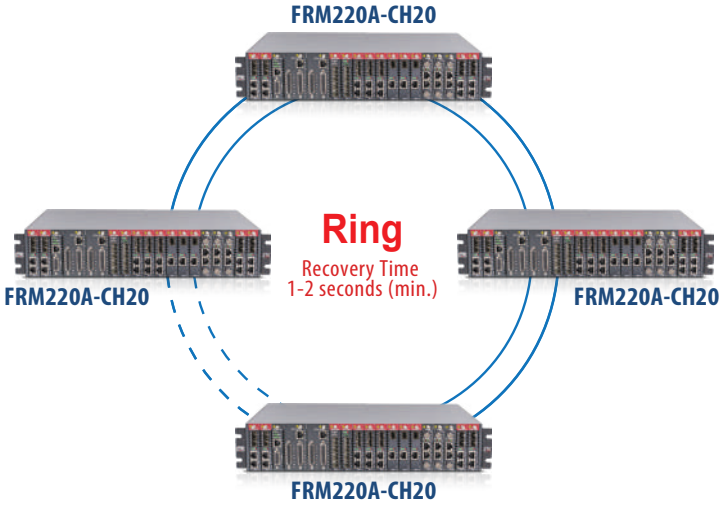
FRM220A-2000EAS/1 & FRM220A-2000EAS/2

- 10/100/1000Base-T and 100/1000Base-X SFP (2000EAS/1)
- 2 × 10/100/1000Base-T and 2 × 100/1000Base-X SFP (2000EAS/2)
- Standalone IP Based, Web GUI, Telnet and SNMP management
- Supports dying gasp
- Online local / remote F/W upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management

Benefit of FRM220A Chassis Platform

Enabling IP Transportation Protection Mechanism

- STP / RSTP Featured Ring Protection
  - Standard based but advanced fault protection systems
  - Rapidly recovery path from failed connection (1-2 seconds min. recovery time)



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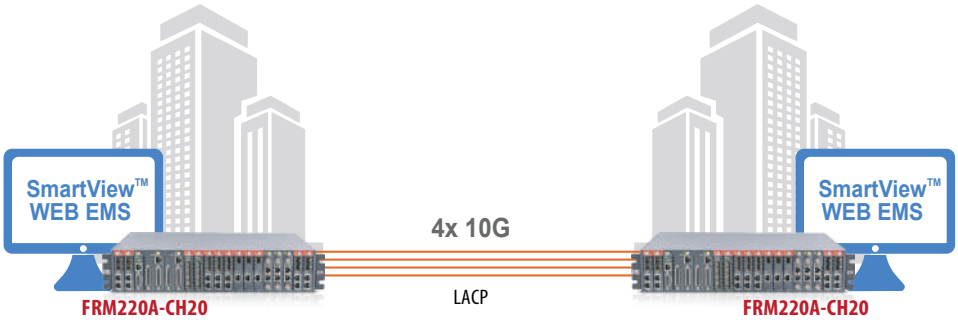
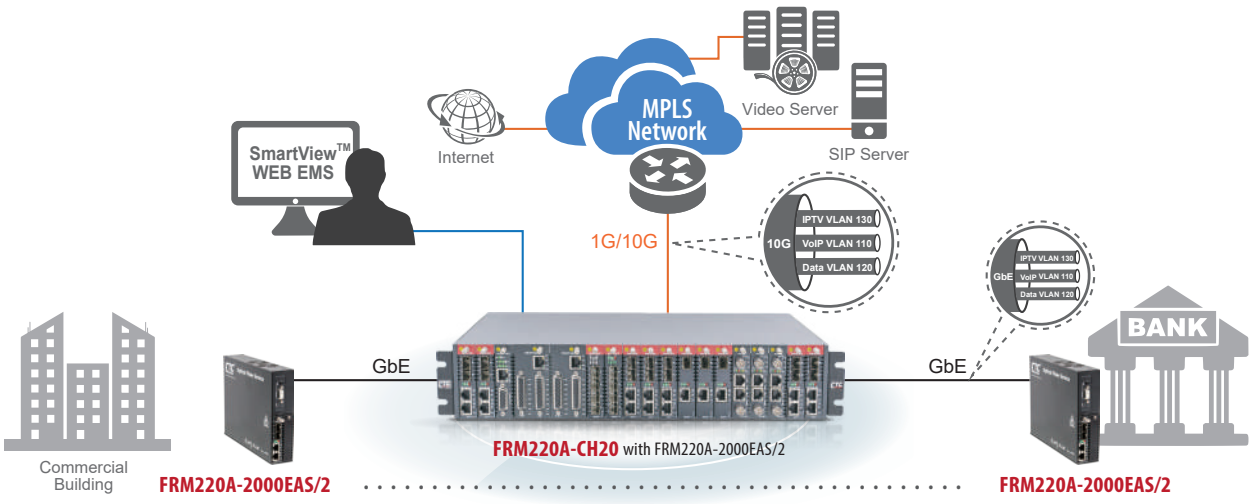
LACP Enabled Traffic Aggregation

- Fiber Redundant / Trunking Application

- Dynamic port aggregation or trucking to increase bandwidth between LACP peer devices
- Redundant paths to reduce network fault risk

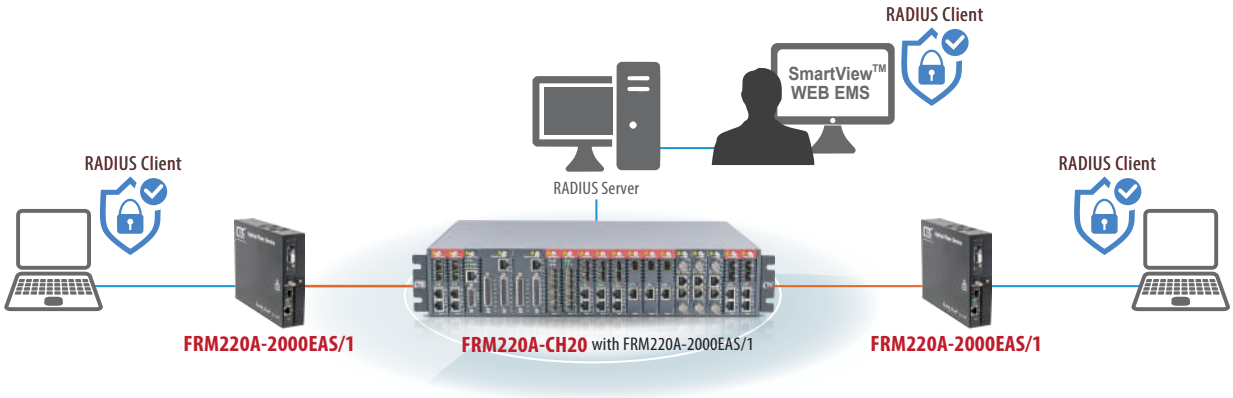


Enabling VLAN & QoS Prioritized Multiple Play Services



Secured Access Control Enhancement

- Centralized Management of Accessing the Network for user or device



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FRM220A-GSW/SNMP-10G
FRM220A-GSW/SNMP-1G

CTC union

10G uplink Ethernet Aggregation Switch Card
1G uplink Ethernet Aggregation Switch Card

FRM220A-GSW/SNMP-10G and FRM220A-GSW/SNMP(n) are next generation switch/management trunk cards for the FRM220A chassis. Twenty (20) GbE switch ports supply each slot of the 2U 20-slot chassis with an electrical gigabit Ethernet uplink with a remaining four (4) electrical gigabit ports accessible via the rear of the chassis. The additional four uplink SFP ports provide 1G/10G Ethernet connections, also on the rear of the chassis. All rear facing eight (8) ports (4 × GE+ 4 × 1G/10G or 4 × GE + 4 × 1G) are usable without restrictions for uplink aggregation to the Ethernet Metropolitan Area Network (E-MAN). The FRM220A-GSW/SNMP trunk card transmits Ethernet between the subscriber equipment (bridge/modem or network interface card) and the E-MAN. The trunk card also provides a management interface with Ethernet packets via Telnet, SSHv2, http/https and SNMP (v1,v2c,v3).

Features

- Provides chassis aggregation via 4 × 1G/10Gigabit Base-R SFP/SFP+ uplink slots (FRM220A-GSW/SNMP-10G)
- Provides chassis aggregation via 4 × 1G Gigabit Base-X SFP uplink slots (FRM220A-GSW/SNMP-1G)
- Supports IEEE 802.1p HW based 8 priority queues and L2~L4 QoS functions
- Supports IPv6 management
- Fiber optical ports supports Ring topology
- Built-in gigabit Ethernet interface to link with each slot of FRM220A chassis
- Provides Web (https), Telnet, SSHv2, SNMP(V1, V2c, V3) management interface
- Supports IEEE 802.1D/802.1w/802.1s for ring protection on the trunk interfaces
- Supports IEEE 802.1Q tagged VLAN and IEEE 802.1ad Q-in-Q application

Specifications

Trunk Interface	4 × 1G Base-X SFP + 4 × 10/100/1000Base-T RJ45 switch trunk card	
	Supports full-duplex mode for 1G/10G Mbps (FRM220A-GSW/SNMP-10G)	
	Supports full-duplex mode for 1G Mbps (FRM220A-GSW/SNMP-1G)	
Capacity	Supports up to 20 service cards	
Temperature	0~60°C (Operating), -10~70°C (Storage)	
Humidity	5~90% non-condensing	
Certification	CE, FCC, RoHS compliant	
Management Specifications	In-band management	Provides all system OAM functions: software updates, and management system interaction through Ethernet trunk port
	Out-band management	Supports Web, Telnet and SNMP, SSHv2, EMS management
Indications	PWR, FAN, Alarm, STK	
Dimensions	142 × 200 × 26 mm (D×W×H)	
Weight	0.5kg	
MTBF	65,000 hrs	

4

Ordering Information

Model Name	Type	Description
FRM220A-CH20	Chassis	2U 20-Slot rack mount chassis with 20 line console blank plate
FRM220A-GSW/SNMP-10G	Card	10G Ethernet Aggregate switch card supports web, telnet, SNMP management interface
FRM220A-GSW/SNMP-1G	Card	1G Ethernet Aggregate switch card supports web, telnet, SNMP management interface
FRM220A-AC	Power	Chassis power module 100 ~ 240 VAC, IEC connector
FRM220A-DC24	Power	Chassis power module 18 ~ 36 VDC, 3 pin terminal block
FRM220A-DC48	Power	Chassis power module 36 ~ 60 VDC, 3 pin terminal block

5 Multi-Service Platform

- FRM220

The FRM220 series is a multi-service platform chassis, which provides a reliable solution of high density media converter modules for applications such as telecom operator, enterprise, long haul transmission and factory automation. All of critical components of FRM220-CH20 and FRM220-CH08 chassis such as power modules, fans, management module and interface cards are hot swappable, allowing online field replacement. FRM220 series is offered in three chassis densities, a 2U 20-slot (FRM220-CH20), a 1U 8-slot (FRM220-CH08), and a 1U 4-slot (FRM220-CH04A). FRM220-CH04A utilizes fixed type AC, DC power built-in. The available power options are built-in AC, DC power or built-in AC+DC, AC+AC, DC+DC redundant power.

All FRM220/FRM220A series cards are hot-swappable and can be installed in a 20 slots (2U), or 8 slots (1U) rack-mountable chassis with any combination of redundant hot swappable AC, 24VDC or 48VDC power supplies, providing a scalable solution that is space-efficient and cost-effective. The cards can also be mounted in 4 slots, 2 slots, or 1 slot standalone housings with fixed AC/DC powered chassis.

The cards of FRM220/FRM220A series provide telecommunication solutions for most applications. CTC union offers a universal and cost-efficient transmission series for a variety of fiber optic technologies (Multimode, Single mode, WDM, CWDM) starting from converters and switches, to modems and extending to intelligent voice/data multiplexer systems. The products are designed as cards in combination with various chassis types. The concept is to ensure an extremely variable mixture of products at low storage costs for spares.

Features

- Interface cards are hot swappable
- Supports AC/DC power modules hot swappable and power redundancy (CH20 & CH08)
- Supports fixed type AC/DC power built-in and power redundancy (CH04A)
- Supports DB9 console port for local management (CH02M, CH01M)
- Telnet, Web, Console, SNMP management via NMC Card (CH20, CH08, CH04A, CH02/SMT, CH02/NMC)
- Two alarm relay contacts for critical events warnings (CH20/CH08)
- Chassis backplane consists of passive components (CH20/CH08)
- Fanless (CH02, CH01, CH01M)
- Cooling Fan (CH20, CH08, CH04A, CH02M, CH02/SMT, CH02/NMC)

Specifications

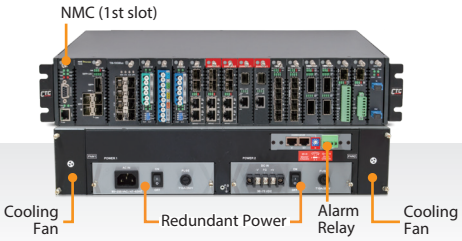
Power Input	AC	100-240VAC (CH20/CH08/CH04A/CH02/CH01)
	DC24	18-36VDC (CH20/CH08)
	DC48	36-60VDC (CH20/CH08)
	DC	18-60VDC (CH04A, CH02, CH01)
	Adapter Type (CH01)	Input Voltage 100-240VAC 50/60Hz
		Output Voltage 12VDC 1A
Weight	5.2kg (CH20), 3.5kg (CH08), 1.5kg (CH04A-AC/DC), 1.9kg (CH04A-AD)	
	0.53kg (CH02M Adapter Type), 1.3kg (CH02M), 1kg (CH02/NMC), 1.46kg (CH02/SMT)	
	0.5kg (CH01 Adapter Type), 0.8kg (CH01 Power Built-in Type), 1.2kg (CH01M)	
Temperature	Operationg 0-60C, Storage -10~70C	
Humidity	5%~90% non-condensing	
Certification	FCC Class A, VCCI Class A, CE	
Safety	UL60950-1 (FRM220-CH20)	

5

Chassis Overview

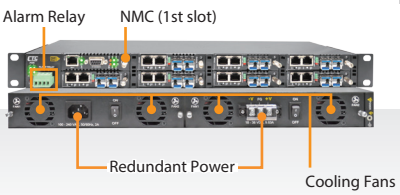
Rackmount Chassis

CH20 (2U 19" 20 Slots)



- DIM: 303(D) × 438 (W) × 88(H)mm

CH08 (1U 19" 8 Slots)



- DIM: 310(D) × 440(W) × 44(H)mm

CH04A (1U 4 Slots)

- Rack mount kits uses (A) type
- DIM: 170(D) × 310(W) × 44.7(H)mm

Ordering Information

Model Name	Description
CH20	
FRM220-CH20	2U 19", 20 slots rack mount chassis with cooling fan and rack mounting kit
FRM220-CH20 (HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
Power Module	
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-AC (HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-DC48 (HP)	Chassis power module 36 ~ 60 VDC, 3 pin terminal block, 300W
NOTE: When high power dissipation cards are placed in CH20 chassis, we recommend choosing the 300W power module option to ensure adequate power and avoid any performance degradation.	
CH08	
FRM220-CH08	1U 8-slot Rackmount Chassis
FRM220-CH08-AC	Chassis Power module 100~240 VAC, IEC connector, 180W
FRM220-CH08-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
CH04	
FRM220-CH04A-AC	4-slot Chassis with built-in AC Power, 65W
FRM220-CH04A-DC	4-slot Chassis with built-in DC Power, 50W
FRM220-CH04A-AD	4-slot Chassis with built-in AC/65W+DC/50W

Standalone Chassis

■ 1-Slot Chassis

CH01 (Adapter Type)

- DIM: 139 (D) × 23.2(W) × 88(H)mm

CH01 (Power Built-in)

- DIM: 180(D) × 30(W) × 135(H)mm

CH01M (Power Built-in)

- DIM: 185(D) × 30(W) × 135(H)mm

■ 2-Slot Chassis

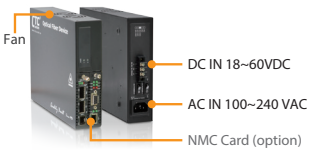
CH02M (Adapter Type)

- DIM: 139(D) × 88(W) × 44.5(H)mm

CH02M (Power Built-in)

- DIM: 219.4(D) × 44.5(W) × 167.4(H)mm
- Rack mount kits uses (B) type

CH02/NMC (Power Built-in)



- DIM: 219.4(D) × 44.5(W) × 167.4(H)mm
- Rack mount kits uses (B) type

CH02/SMT (Power Built-in)

- DIM: 220(D) × 44.7(W) × 205(H)mm
- Rack mount kits uses (C) type

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■ Rack Mount Kits (optional)

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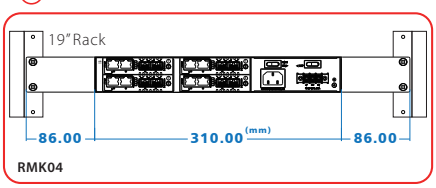

RMK04

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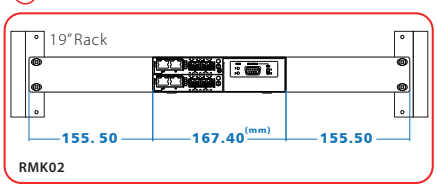

RMK02

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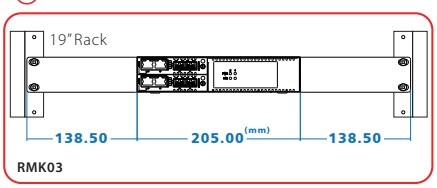
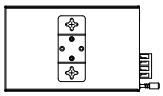


RMK03

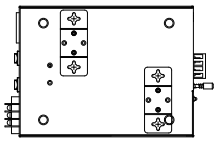
■ Wall Mount Kits (optional)

Adapter Type
CH01



WMK01

Power Built-in Type
CH01-AC/DC/AD,
CH01M
CH02M,
CH02/NMC,
CH02/SMT



WMK01

Remark:
Adapter Type uses one wall mount kit, Power built-in Type uses two wall mount kits.

Ordering Information

Model Name	Description
FRM220-CH01	1-slot chassis with 100 ~240VAC to 12VDC adapter (12W) , fanless
FRM220-CH01-AC	1-slot chassis with 100 ~240VAC (12W), fanless
FRM220-CH01-DC	1-slot chassis with 18 ~60VDC (12W), fanless
FRM220-CH01-AD	1-slot chassis with AC/12W+DC/12W, fanless
FRM220-CH01M-AC	1-slot chassis with console port and 100 ~240VAC (12W), fanless
FRM220-CH01M-DC	1-slot chassis with console port and 18 ~60VDC (12W), fanless
FRM220-CH01M-AD	1-slot chassis with console port and AC/12W+DC/12W, fanless
FRM220-CH02M	2-slot chassis with console port, cooling fan and AC adapter
FRM220-CH02M-AC	2-slot chassis with console port and 100 ~240VAC (30W), with fan
FRM220-CH02M-DC	2-slot chassis with console port and 18 ~60VDC (30W), with fan
FRM220-CH02M-AD	2-slot chassis with console port and AC/30W+DC/30W, with fan
FRM220-CH02/NMC-AC	2-slot chassis with fan, managed via optional NMC card and with 100~240VAC (30W) power
FRM220-CH02/NMC-DC	2-slot chassis with fan, managed via optional NMC card and with 18~60VDC (30W) power
FRM220-CH02/NMC-AD	2-slot chassis with fan, managed via optional NMC card and with AC/30W+DC/30W power
FRM220-CH02/SMT-AC	2-slot chassis with fan, managed via optional NMC card and with 100~240VAC (30W) power plus fan/power alarm detection
FRM220-CH02/SMT-DC	2-slot chassis with fan, managed via optional NMC card and with 18~60VDC (30W) power plus fan/power alarm detection
FRM220-CH02/SMT-AD	2-slot chassis with fan, managed via optional NMC card and with AC/30W+DC/30W power plus fan/power alarm detection

■ Optional Accessories

Item	Model Name	Description
Wall Mount Kit	RMK01	Single unit rack mount kits only for 1 slot chassis power build-in type (CH01M and CH01/P-AC/DC/AD)
	RMK02	Single unit rack mount kits only for 2 slots chassis power build-in type (CH02M and CH02/NMC)
	RMK03	Single unit rack mount kits only for 2 slots chassis power build-in type (CH02/SMT)
	RMK04	Single unit rack mount kits only for 4 slots chassis power build-in type (CH04A)
Wall Mount Kit	WMK01	Single unit wall mounting kit

5

iAccess™ Platform Solutions

The iAccess™ Multi-Service Platform offers a full range of solutions for service providers and enterprises, including **Optical Transport Solutions** (transponders, EDFA, CWDM, DWDM), **Ethernet Services** (switches and converters), **Data Communication Solutions** (Sync/Async serial over fiber) and **TDM/Voice Solutions**. The iAccess™ Multi-Service Platform is a fully modular product series that integrates a wide range of modules for any interface or protocol hosted in a selection of Chassis sizes for simple and flexible operations.

NMC

NEW	▪ FRM220-NMC-R5	Network Management Controller
	▪ FRM220-NMC-R3	Network Management Controller

Optical Transport Solutions

Transponder

▪ FRM220-100GE-2Q	100GE QSFP28 to QSFP28 3R Transponder
▪ FRM220-40G-2Q	40G QSFP+ to QSFP+ 3R Transponder
▪ FRM220-40G-1Q4S	40G QSFP+ to 4x 10G SFP+ Transponder
▪ FRM220-16G-3R	16G 3R Multi-rate Transponder with Optical Line Protection
▪ FRM220-10G-3R	10G 3R Multi-rate Transponder with Optical Line Protection
▪ FRM220-4G-3R	4G 3R Multi-rate Transponder with Optical Line Protection
▪ FRM220-1000DS	1G 2R Multl-rate Transponder

EDFA

▪ FRM220-OAP17	Single Channel EDFA Preamp 17dB
▪ FRM220-OAB15	Single Channel EDFA Booster 15dB
▪ FRM220-OAB21A	Single Channel EDFA Booster 21dB

Optical Protection Switch

▪ FRM220-OPS51	1:1 Single-mode Fiber Optical Protection Switch
▪ FRM220-OPS52	1+1 Single-mode Fiber Optical Protection Switch
▪ FRM220-OPS51M	1:1 Multi-mode Optical Protection Switch

WDM Optical Multiplexer

▪ FRM220-DWMD	DWDM Mux/DeMUX
▪ FRM220-CWMD	CWDM Mux/DeMUX

Ethernet Services

Ethernet Switch

▪ FRM220A-2000EAS/4F	4×100/1000Base-X SFP OAM/IP GbE Managed Switch
▪ FRM220A-2000EAS/2	2×100/1000Base-T + 2×100/1000Base-X SFP OAM/IP GbE Managed Switch
▪ FRM220A-2000EAS/1	100/1000Base-T + 100/1000Base-X SFP OAM/IP GbE Managed Switch
▪ FRM220-2000MS	100/1000Base-T to 100/1000Base–X SFP Web Smart In-Band OAM Managed GbE Switch

10G Media Converter

NEW	▪ FRM220-10GCM	10G In-Band Managed Media Converter, 100M/1G/10GBase-T + 2 × 10GBase-R SFP+
	▪ FRM220-10/100i	In-Band Managed FE Media Converter, 100Base-TX to 100Base-FX
	▪ FRM220-10/100	Non-Managed FE Media Converter, 100Base-TX to 100Base-FX

Datacom Solutions

CCF

▪ FRM220-CCF20	2ch Contact Closure Fiber Converter, In-Band Managed
▪ FRM220-CCF40	4ch Contact Closure Fiber Converter, In-Band Managed

Serial Fiber Converter

▪ FRM220-Serial	RS232/485 over Fiber

Data Fiber Modem

▪ FRM220-DATA	RS232/530/V35 over Fiber

TDM & Voice Solutions

TDM

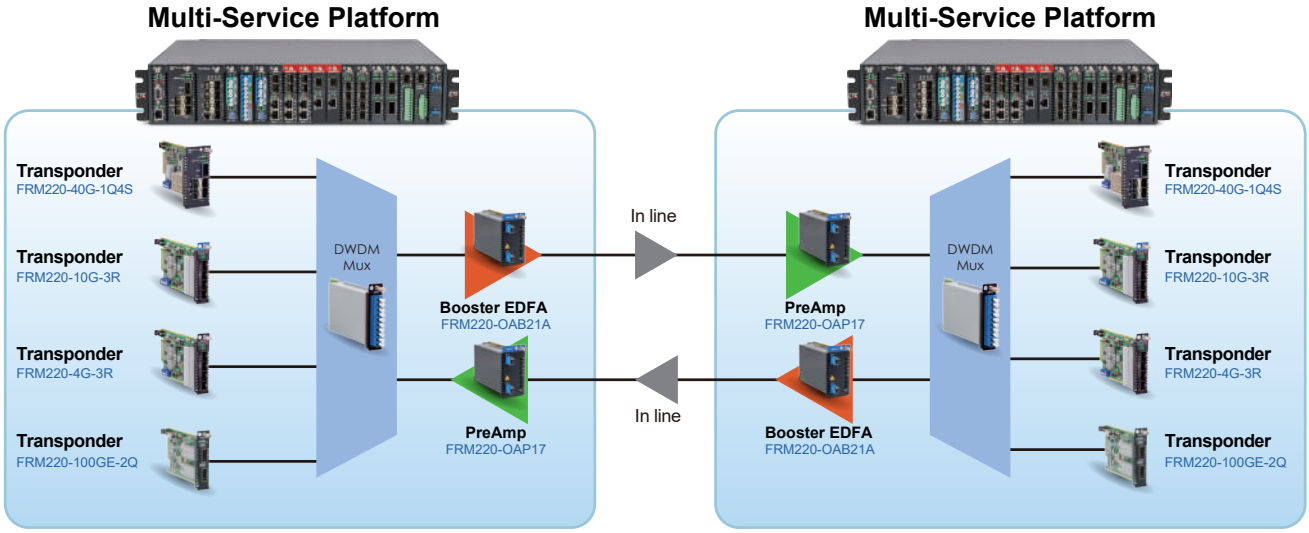
▪ FRM220A-Eoe1/G	Ethernet Bridge over E1, In-Band Managed
▪ FRM220-Eoe1	Ethernet Bridge over E1

Voice over Fiber

▪ FRM220-FXO/FXS	FXO/FXS over Fiber In-Band Managed Converter
▪ FRM220-FXO-4	4×FXO over Fiber In-Band Managed Converter
▪ FRM220-FXS-4	4×FXS over Fiber In-Band Managed Converter

Optical Transport Solution

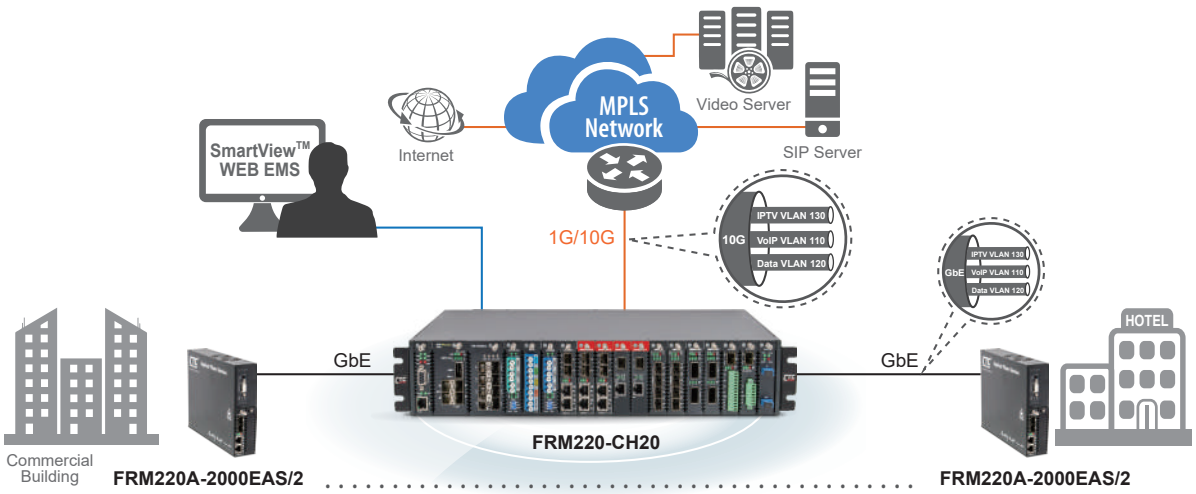
Optical transport is important in providing data over long distances. CTC Union's Optical Transport Solutions include the optical transport building blocks of Mux/Demux, transponders, muxponders, EDFA and optical protection switching.



CWDM /DWDM P to P Application

Ethernet Services

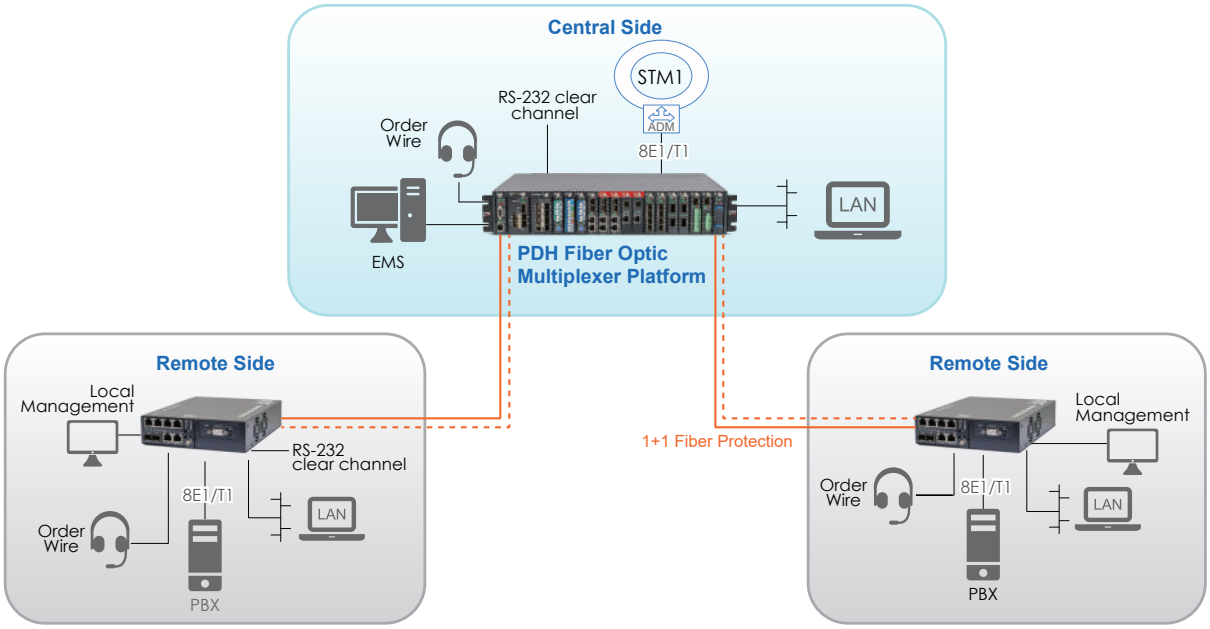
Ethernet solutions require a range of Ethernet products. CTC Union provides media conversion, Ethernet switching and carrier class Ethernet, through a wide range of product selections.



Typical FTTB Application

TDM/PDH/Voice solution

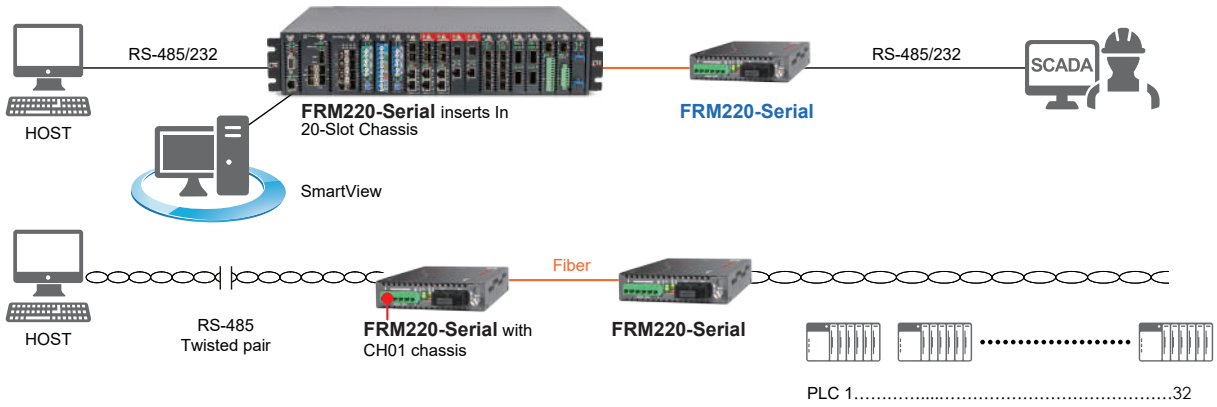
TDM and PDH are becoming legacy protocols, however, much of the world's voice communications still rely on devices that transport these protocols. CTC Union's solutions include DSU/CSU access units, Time Division Multiplexers, PDH over fiber and POTS over fiber devices.



PDH Fiber Optical Multiplexer P2P Application

Data Communication Solution

Data communications are important for device control and satellite communications. CTC Union's devices provide low latency data communications over fiber optical transport.



Data Communications Application

5

FRM220-NMC-R5

Network Management Controller Card

- *2x 10/100/1000Base-T RJ45 plus 2x 100/1000Base-X SFP*
- *Supports Security Features*

NEW

The FRM220-NMC-R5 is a Network Management Controller card that can be placed in a compatible FRM220 series chassis to provide device management function. The FRM220-NMC-R5 features 2x 10/100/1000Base-T RJ45 plus 2x 100/1000Base-X SFP ports, supports remote TCP/IP management by **SSHv2, HTTPS** and **SNMPv1, v2c, v3** protocols and is designed to be hot swapped so that it may be field replaced without affecting any online service of any other rack cards. The FRM220-NMC-R5 also supports online firmware upgrade from TFTP server, using any user interface, without affecting any other inserted line card's transmissions. Support for any standard NMS is provided by the included enterprise MIB file. CTC Union also provides and maintains our own EMS (Element Management System) which is a Java based client/server manager for monitoring and maintaining a large number of network elements over a long period of time.

List of support card for NMC-R5

Transponder: FRM220-100GE-2Q, FRM220-40G-2Q, FRM220-40G-1Q4S, FRM220-16G-3R, FRM220-10G-3R, FRM220-4G-3R

Ethernet Switch: FRM220-2000MS, FRM220A-2000EAS/4F

Optical Protection Switch: FRM220-OPS51

EDFA: FRM220-OAB21A, FRM220-OAP17

(For more details on these, please check our websites)

Features

- User interfaces for SSH & Web
- Configure, monitor and provide fault management for all installed line cards
- Monitor power and fan status in chassis
- Provides upgrade feature for most line card types
- SNMP agent for complete management by enterprise MIB
- Running System log with time stamping by NTP (time server)
- Parameter management for quick configuration, configuration copy/backup/restore
- Card alias and inventory by type and serial number
- eCos Kernel based for high stability and reliability
- Supports IPv6, SNMP v1/v2/v3
- Supports USB Console management
- Supports secure authentication by IEEE802.1x, RADIUS or TACACS+

(2U/19" rack mountable, 20 slots)

FRM220-NMC R5 must be installed in to the first slot of chassis.

5

Specifications

Optical Interface	Connector	SFP LC × 2
	Data rate	100M/1000M
	Duplex mode	Full duplex
Electrical nterface	Connector	UTP port × 2
	Data rate	UTP 10M/100M/1000M (auto or forced)
	Duplex mode	Full or Half Duplex (RJ-45)
	Cable	10Base-T Cat. 3,4,5,5e UTP
		100Base-TX Cat. 5, 5e or higher
		1000Base-T Cat 5, 5e, 6 or higher
Standards	IEEE802.3, 802.3u, 802.3z, 802.3ad, 802.3x	
Management	HTTPs, Syslog, IPv6, NTP, SNTP, Web/Telnet/SNMP/SSHv2	
Jumbo Frame Size	9.6K bytes	
MAC Table Size	8K	
Indicators	Power, Fan, ALM, UTP Link/ACT, UTP Speed, Fiber Speed	
Power	Input	12VDC, 0.5A
	Consumption	< 6W
Dimensions	155mm (D) × 88mm (W) × 39mm (H)	
Weight	120g	
Certification	CE, FCC, RoHS Compliant	

Ordering Information

Model Name	Type	Description
FRM220-NMC-R5	Card	Network management controller card

5

FRM220-NMC-R3

Network Management Controller Card

The Network Management Controller card (FRM220-NMC-R3) is placed in a compatible FRM220 series chassis to provide device management functions. The management interface supports a local RS-232 serial console or remote TCP/IP management by Telnet, HTTP and SNMPv1, v2c protocols and is designed to be hot swapped so that it may be field replaced without affecting any online service of any other rack cards. The card also supports online firmware upgrade from TFTP server, using any user interface, without affecting any other inserted line card's transmissions. Easy software update means the management card will always support the latest FRM220 Series cards, such as transponders, EDFA, CWDM/DWDM and the latest FRM220A-2000EAS series. Support for any standard NMS is provided by the included enterprise MIB file. CTC Union also provides and maintains our own EMS (Element Management System) which is a Java based client/server manager for monitoring and maintaining a large number of network elements over a long period of time.

Features

NMC-R3 card provides central management for FRM220-CH20, FRM220-CH08, FRM220-CH04A, CH02/SMT and CH02/NMC

- User interfaces for serial console, Telnet & Web
- Configure, monitor and provide fault management for all installed line cards
- Monitor power and fan status in chassis (CH20, CH08 & CH02/SMT only)
- Provides upgrade feature for most line card types
- SNMP agent for complete management by enterprise MIB
- Running System log with time stamping for SNTP (time server)
- Parameter management for quick configuration, configuration copy/backup/restore
- Card alias and inventory by type and serial number
- Linux Kernel based for high stability and reliability

Specifications

Protocol	IP, UDP, SNMP V1/V2c, TCP, ARP, ICMP, TFTP, HTTP
Ports	DB9-F (×1), RJ45(×1)
Indicators	PWR1, PWR2, FAN1, FAN2, ALM1, ALM2, STK, ACT, LAN LNK/SPD
MIB Supported	MIB II, Enterprise MIB
Management	Web GUI, Telnet, Console, SNMP
Power	12VDC, 150mA
Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Weight	120g
Temperature	0~60 (Operating), -10 ~70 (storage)
Humidity	5 ~ 90% (non-condensing)
MTBF	65000 hrs

Ordering Information

Model Name	Type	Description
FRM220-NMC-R3	Card	Network Management Controller card, support web, telnet, console, SNMP functions

5

FRM220A-2000EAS/1
FRM220A-2000EAS/2

1/2 × 10/100/1000Base-T + 1/2 × 100/1000Base-X SFP OAM/IP GbE Managed Switch

The FRM220A-2000EAS/1 and FRM220A-2000EAS/2 are OAM compliant Gigabit Ethernet switch designed to make conversion between 10/100/1000Base-T(X) + 100/1000Base-X SFP (2000EAS/1) and 2 × 10/100/1000Base-T(X) + 2 × 100/1000Base-X SFP (2000EAS/2).

With embedded SNMP and Web-based management, the administrator can monitor, configure and control the activity of each switch card both locally and remotely. Based on a powerful L2+ switch architecture, this switch supports bandwidth control, duplex and speed configuration, VLAN tagging, Q-in-Q, QoS, Spanning tree, jumbo frames as well as auto laser shutdown, link fault pass through, OAM loop back and dying gasp. This card may also be controlled and monitored via an GSW/SNMP in a managed FRM220A chassis.

Features

- 10/100/1000Base-T and 100/1000Base-X SFP (2000EAS/1)
- 2 × 10/100/1000Base-T and 2× 100/1000Base-X SFP (2000EAS/2)
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Supports RMON counter
- Supports dying gasp
- D/D function for supported SFP fiber transceiver
- Supports Cisco® like CLI
- Online local / remote f/w upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management
- Auto Laser Shutdown (ALS)

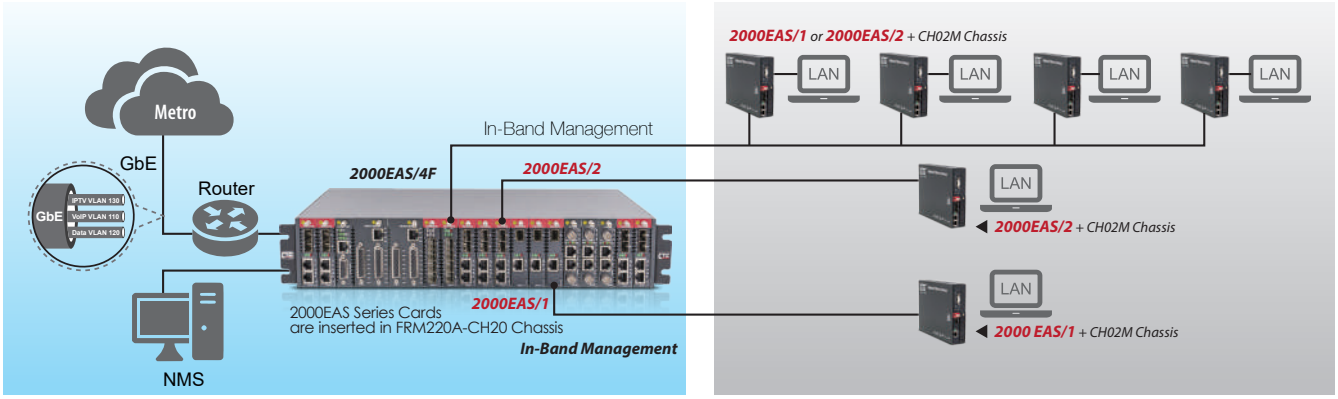
Specifications

Optical Interface	Connector	SFP LC
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 550m, 2km, SM 15/30/50/80/120km
		WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
LEDs	Power, FX-Link, Test, UTP-Link, UTP-SPD	
Transmission Method	Store and Forward Switching	
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ah, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q	
	IEEE 802.1ad, IEEE 802.1D, IEEE 802.1w, IEEE 802.1s, IEEE 802.3ad	
Packet Buffer	4M bits	
MAC Table Size	8K	
Max. Packet Jumbo Frame Size	9600 Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (Max. 4K VLAN groups), MAC based VLAN, Protocol based VLAN	
	Private VLAN for port isolation, IEEE 802.1ad Q-in-Q	
L2 Switching Protection	STP, RSTP, MSTP	

In-Band OAM/IP GbE Managed Switch

Trunking	IEEE 802.3ad LACP
QoS feature	IEEE 802.1p 8 priority queues per port, Port Default Priority, QoS Control List (QCL Mode)
	Port Ingress Shaping, Port egress shaper, Queue egress shapers, DiffServ (RFC2474) remarking
	Tag remarking, Scheduler mode
Security	ACL rule based filtering
Storm Control	Unknown Unicast/Broadcast/Multicast storm, suppression
Management	Web/Telnet CLI interface, Web/CLI authentication, SSH v2, HTTPs, Port mirroring
	System syslog, IPv4/IPv6 management, NTP, Text based CLI configuration upload or download
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9, Multiple trap destinations
Software upgrade	TFTP/HTTP
Power Consumption	8W
Power Input	12VDC
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Weight	130g

Application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220A-2000EAS/2	2 × 10/100/1000Base-T and 2 × 100/1000Base-X SFP-LC managed switch card (optional SFP module)
FRM220A-2000EAS/1	10/100/1000Base-T to 100/1000Base-X SFP-LC managed converter card (optional SFP module)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC or DC power, with fan
FRM220-CH02/NMC-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power
FRM220-CH02/SMT-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power plus fan/power alarm detection

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FRM220-2000MS

100/1000Base-T to 100/1000Base-X SFP Web Smart In-Band Managed GbE Switch

The FRM220-2000MS is an IEEE 802.3ah OAM compliant copper to fiber Gigabit Ethernet solution designed to make conversion between 10/100/1000Base-T and 100/1000Base-X with SFP modules. With SNMP and Web-based management in the FRM220, the administrator can monitor, configure and control the activity of each series card and remotely connected OAM compliant converter. Converter settings include bandwidth control, duplex, and speed configuration, VLAN tagging, limited Q-in-Q support and SFP DDMI. When used as stand-alone converters, the 2000MS can be managed by a friendly Web Smart user interface via any web browser.

Features

- 1-Port 10/100/1000Base-T to 100/1000Base-X SFP Converter
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 16K Packet
- Egress bandwidth control
- Supports in-band IEEE 802.3ah management
- Firmware upgrade via Web (for standalone unit only)
- Management Password Setting (for standalone unit only)
- Dying gasp (remote power failure detection on stand-alone)
- Supports Link Fault Pass-Through (LFPT) Function
- Supports Auto Laser Shutdown (ALS) Function
- Supports D/D function for SFP fiber transceiver
- Supports 16 Tag VLAN Group
- RMON counters (for standalone unit only)
- USB Console port, Telnet, SNMP, Web Management

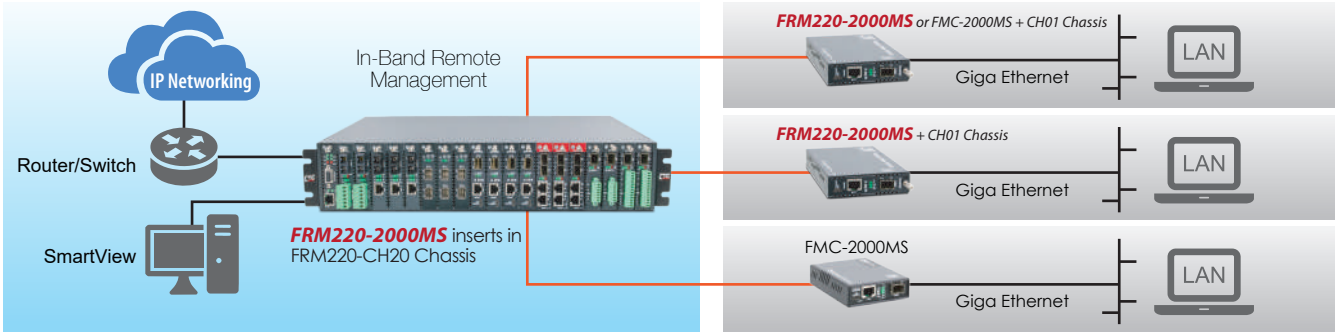
Specifications

Optical Interface	Connector	SFP LC
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Electrical Interface	Connector	RJ45
	Data rate	10Mbps, 100Mbps, 1000Mbps
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e or higher
		1000Base-TX Cat.6 or higher
Standards	IEEE 802.3, IEEE 802.3u IEEE 802.3ab, 802.3z, 802.3ah, 802.1Q	
Indications	LED (Power, FX-Link, LAN Speed, LAN Link)	
Power Input	12VDC	
Power Consumption	< 6W	
Dimensions	159.5 × 20.8 × 88mm (D×W×H)	
Weight	120g	

Web Smart In-Band OAM GbE Switch

Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	65,000 hrs

Application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220-2000MS	10/100/1000Base-T to 100/1000Base-X SFP web smart managed switch card. (Optional SFP)

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FRM220A-2000EAS/4F

4-port 100/1000Base-X SFP OAM/IP GbE Managed Switch

The FRM220A-2000EAS/4F is a managed Gigabit Ethernet slide-in switch card designed with 4-port 100/1000Base-X SFP. With embedded SNMP and Web-based management, the administrator can monitor, configure and control the activity of each switch card both locally and remotely. Based on a powerful L2+ switch architecture, this switch supports bandwidth control, speed configuration, VLAN tagging, Q-in-Q, QoS, Spanning tree, jumbo frames as well as auto laser shutdown, link fault pass through, OAM loop back and dying gasp. This card may also be controlled and monitored via an GSW/SNMP in a managed FRM220A chassis.

Features

- 4-port 100/1000Base-X SFP
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Supports RMON counter
- Supports dying gasp
- D/D function for supported SFP fiber transceiver
- Supports Cisco® like CLI
- Online local / remote f/w upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management
- Auto Laser Shutdown (ALS)

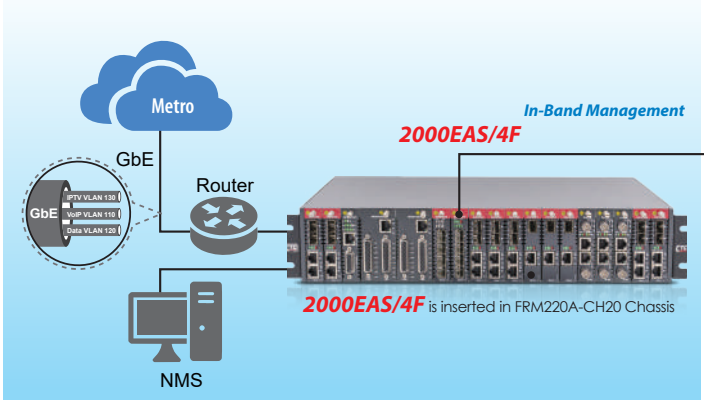
Specifications

Optical Interface	Connector	SFP LC
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 550m, 2km, SM 15/30/50/80/120km
		WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Indications	LED (Power, FX-Link, Test)	
Transmission Method	Store and Forward Switching	
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ah, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q	
	IEEE 802.1ad, IEEE 802.1D, IEEE 802.1w, IEEE 802.1s, IEEE 802.3ad	
Packet Buffer	4M bits	
MAC Table Size	8K	
Max. Packet Jumbo Frame Size	9600 Bytes	
VLAN Feature	IEEE 802.1Q tagged VLAN (Max. 4K VLAN groups), MAC based VLAN	
	Protocol based VLAN, Private VLAN for port isolation, IEEE 802.1ad Q-in-Q	
L2 Switching Protection	STP, RSTP, MSTP	
Trunking	IEEE 802.3ad LACP	
QoS Feature	IEEE 802.1p 8 priority queues per port, Port Default Priority, QoS Control List (QCL Mode)	
	Port Ingress Shaping, Port egress shaper, Queue egress shapers	
	DiffServ (RFC2474) remarking, Tag remarking, Scheduler mode	
Security	ACL rule based filtering	

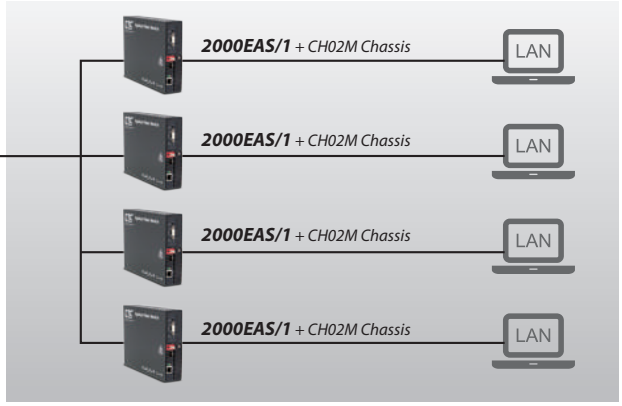
In-Band OAM/IP GbE Managed Switch

Storm Control	Unknown Unicast/Broadcast/Multicast storm, suppression
Management	Web/Telnet CLI interface, Web/CLI authentication, SSH v2, HTTPs, Port mirroring, System syslog
	IPv4/IPv6 management, NTP, Text based CLI configuration upload or download
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9, Multiple trap destinations
Software upgrade	TFTP/HTTP
Power Consumption	8W
Power Input	12VDC
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Weight	130g

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220A-2000EAS/4F	4-port 100/1000Base-X SFP-LC managed switch card (optional SFP module)

■ Chassis Option

Model Name	Description
FRM220A-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220A-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220A-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC or DC power, with fan
FRM220-CH02/NMC-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power
FRM220-CH02/SMT-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power plus fan/power alarm detection

5

FRM220-10GCM

100M/1G/10GBase-T + 2 × 10GBase-R SFP+ In-Band Managed Media Converter

NEW

10G In-band managed media converter, FRM220-10GCM is a 2-port 10GBase-R + 1-port 100M/1G/2.5G/10GBase-T Ethernet converter. With embedded SNMP and Web-based management, the network administrator can monitor, configure and control the activity of each 10G converter both locally and remotely.

This media converter supports duplex and speed configuration, jumbo frames allocation of 10G Gigabit interfaces. By offering additional function, this 10G converter also provides 1-port 100M/1G/2.5G/10GBase-T RJ45 port allowing 100M/1G/2.5G/10G based devices to connect to 10G Ethernet fiber backbone. This 10G converter may also be controlled and monitored via an NMC in a FRM220 managed chassis.

Features

- 2-port 1G/2.5G/5G/10G Base-R SFP+ with 1-port 100M/1G/2.5G/5G/10GBase-T RJ45
- Supports local / remote In-band management
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Auto-Negotiation / Auto MDI/MDIX
- Forward 10K bytes Jumbo packets (max.)
- Supports Flow control (Pause)
- Supports BERT / loopback test
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- D/D function for supported SFP fiber transceiver
- Auto Laser Shutdown (ALS)
- Online local / remote f/w upgrade
- Fiber Redundant mode
- Supports DWDM Tunable SFP+

Specifications

Interface	1-port 100M/1G/2.5/5G/10Gbps RJ45 + 2-port 10G/5G/2.5G/1Gbps SFP+ with USB console port
Filter & Forward Rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps
Transmission Method	Store and Forward
Standard	IEEE 802.3 IEEE 802.3u, IEEE 802.3x, IEEE 802.3z, IEEE 802.3ab, IEEE 802.3ae, IEEE 802.1D
	IEEE 802.1w, IEEE 802.1s
Packet Buffer	2M bits
MAC Table Size	16K
Max. Packet Size	10K Bytes
Management	Web/Telnet /SNMP, HTTP, IPv6/IPv4 management
SNMP Agent	SNMP v1/v2c
Software Upgrade	HTTP, console
LED Display	Power, System, Link, Speed/Act, Test
Power Input	12VDC
Power Consumption	< 10W
Operating Temperature	0 ~ 45°C
Storage Temperature	-10 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Regulatory	FCC, CE

Ordering Information

Model Name	Description
FRM220-10GCM	1 × 100M/1G/2.5G/10G Base-T RJ45 + 2 × 10GBase-R SFP+ In-Band Managed Media Converter

5

FRM220-10/100

10/100Base-TX to 100Base-FX Media Converter

The FRM220-10/100 is a Fast Ethernet 10/100Base-TX to 100Base-FX non-managed stand-alone media converter, which gives the options to choose from the most popular fiber cabling connectors, ST, SC or FC. Both multi-mode and single mode converter models are available as well as BiDi which allows bi-directional transmissions using only a single fiber core. When auto-negotiation is selected, these units will automatically tailor themselves to convert both half-duplex and full-duplex signals, according to IEEE 802.3u standards. LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status. These non-managed stand-alone converters may also be concentrated into either the FRM220-CH20 or FRM220-CH08 managed chassis.

Features

- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 1600 bytes (Max.) packets
- Supports transparent Q in Q double tagged frame
- Supports IEEE 802.1q Tag VLAN pass thru
- Support flow control (Pause)
- Supports Link Fault Pass through (LFP)
- Forward 9K jumbo packets in converter mode

Specifications

Optical Interface	Connector	1 × 9 (SC, ST, FC)
	Data rate	125Mbps
	Duplex Mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Standards	IEEE 802.3, IEEE 802.3u	
Indications	LED (Power, FX Link, TX SPD, TX Link, TX Duplex, FEF)	
Certification	CE, FCC, RoHS	
Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mpbs
	Cable	10Base-T Cat.3, 4, 5, UTP, 100Base-TX Cat.5, 5e or higher
Power	12VDC	
Power Consumption	< 4W	
Dimensions	159.5 × 20.8 × 88mm (D×W×H)	
Weight	120g	
Temperature	0 ~ 60°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
MTBF	65,000 hrs	

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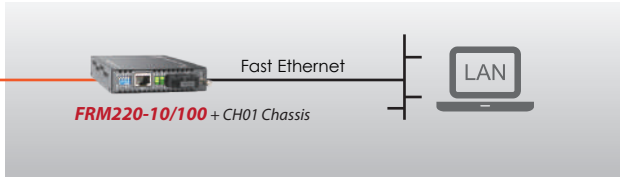
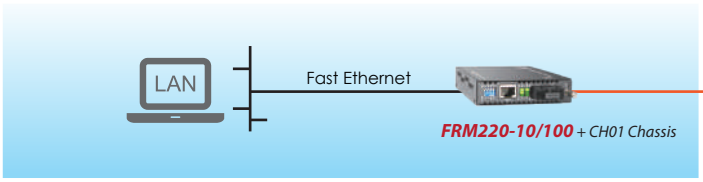
Application

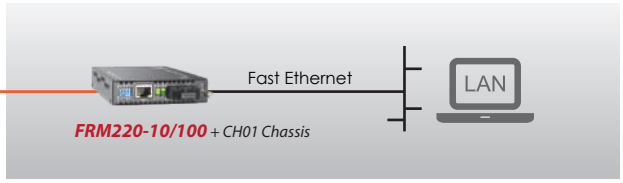
Central Office (CO)



Customer Premise Equipment (CPE)



Customer Premise Equipment (CPE)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220-10/100	10/100Base-TX to 100Base-FX media converter card

Connector Type	Connectivity Distance
SC, ST, FC	002: 2km 015: 15km 030: 30km 050: 50km 080: 80km 120:120km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type 60A: WDM 60km A type 60B: WDM 60km B type 80A: WDM 80km A type 80B: WDM 80km B type

5

FRM220-10/100i

10/100Base-TX to 100Base-FX In-Band Managed Converter

The FRM220-10/100i is a 10/100Base Ethernet to 100Base-FX fiber slide-in card converter designed for central and remote applications. With advanced features like bandwidth control, this media converter is targeted for customer premises equipment in metro LAN, campus, enterprise and FTTx applications. By offering in-band management, this converter can be completely controlled and monitored from a centrally located managed rack controlling all converter settings including bandwidth control, duplex, and speed configuration. This media converter is completely transparent to Layer 2 and Layer 3 protocols including IEEE 802.1q, VLAN tag, Q in Q, STP, IPX, IP, etc. When used stand-alone, this converter has no access to management functions except to force Ethernet connection and apply Link Fault Pass-thru via setting of a 4-pole DIP switch.

Features

- 1-Port 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports Loop Back Test
- Supports RMON counter
- Auto Laser Shutdown (ALS)
- Auto MDI/MDIX
- Forward 2046 bytes (max.) packets in switch mode
- Forward 9K jumbo packets in converter mode
- Supports transparent Q in Q double tagged frame
- Supports IEEE 802.1q Tag VLAN pass thru
- Supports local / remote In-band management (Monitor and Configure) by the SNMP manager. (NMC)
- Bandwidth control (Nx32Kbps or Nx512Kbps)
- Supports IEEE 802.3x flow control (Pause)
- Fiber Hardware Reset (FHR)
- Online local / remote f/w upgrade

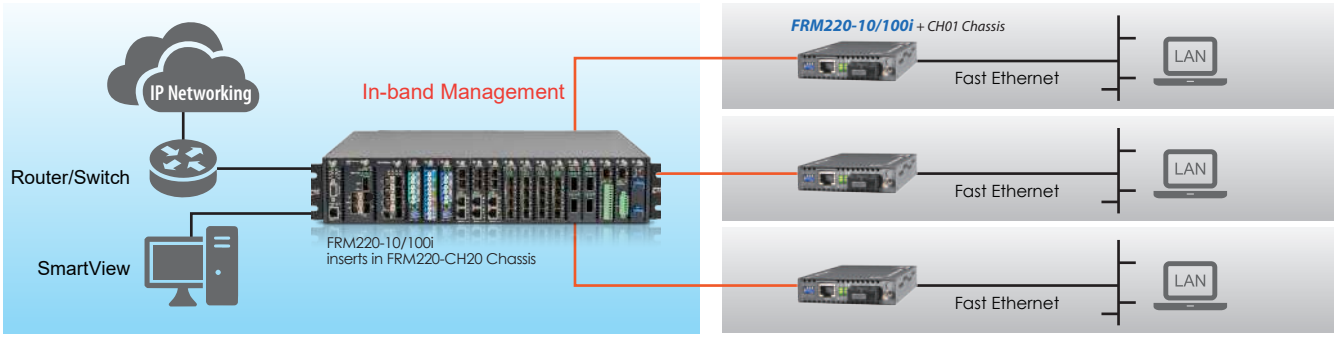
Specifications

Optical Interface	Connector	1 × 9 (SC, ST, FC)
	Data rate	125Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50km
		WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Electrical Interface	Connector	RJ45
	Data rate	10Mbps, 100Mbps
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e or higher
Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.3x	
Indications	LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link)	
Power Input	12VDC	
Power Consumption	< 6W	

In-Band Managed FE Media Converter

Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Weight	120g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	65,000 hrs

Application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220-10/100i	10/100Base-TX to 100Base-FX In-band managed converter card

Connector Type	Connectivity Distance
SC, ST, FC	002: 2km 015: 15km 030: 30km 050: 50km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type

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FRM220-10/100iS-2

Dual Channel 10/100Base-TX to 100Base-FX In-Band Managed Converter

The FRM220-10/100iS-2 is a dual (2 in 1) 10/100Base Ethernet to 100Base-FX fiber slide-in card converter based on the popular FRM220-10/100i. With advanced features like bandwidth control, this dual media converter is targeted for central equipment in metro LAN, campus, enterprise and FTTx applications. By offering in-band management, this converter can be completely controlled and monitored in a centrally located managed rack. By offering two completely isolated converters on one card, this card can effectively double the conversion capacity of a rack.

Features

- Dual independent converters 10/100Base-TX to 100Base-FX
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 2046 bytes (max.) packets in switch mode
- Supports IEEE 802.1Q Tag VLAN pass thru
- Supports Q in Q double tagged frame transparent
- Forward 9K jumbo packets in converter mode
- Supports local / remote In-band management (Monitor and Configure) by the SNMP manager (NMC)
- Bandwidth control (Nx32Kbps or Nx512Kbps) & flow control (Pause)
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI) and Link Fault Pass-Through (LFPT)
- Supports Loop Back Test and RMON counter
- D/D function for supported SFP fiber transceiver
- Auto Laser Shutdown (ALS) and Fiber Hardware Reset (FHR)
- Online local / remote f/w upgrade

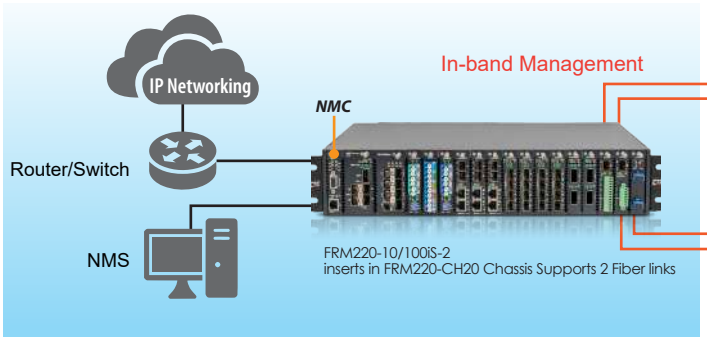
Specifications

Optical Interface	Connector	SFP LC x 2
	Data rate	125Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Electrical Interface	Connector	RJ-45 x 2
	Data rate	10Mbps, 100Mbps
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e or higher
Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.3x	
Indications	LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link)	
Power Input	12VDC	
Power Consumption	< 4W	
Dimensions	159.5 × 20.8 × 88mm (D×W×H)	
Weight	130g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	

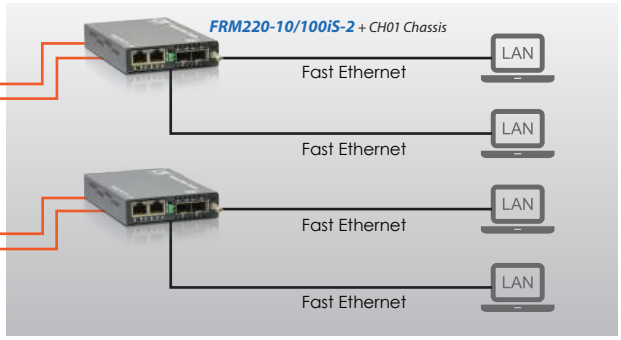
In-Band Managed FE Media Converter

Humidity	10 ~ 90% non-condensing
Certification	CE, FCC, RoHS compliant
MTBF	65,000 hrs

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220-10/100iS-2	Dual converter 10/100Base-TX to 100Base-FX SFP converter card with In-band management, (optional SFP)

5

FRM220-100GE-2Q

100GE QSFP28 to QSFP28 3R Transponder

The FRM220-100GE-2Q is a 100G QSFP28 to QSFP28 3R transponder that provides media conversion and distance extension for 100G Ethernet links. The FRM220-100GE-2Q is developed for high capacity and long- distance optical transport solutions. It is a highly integrated platform for providing a unified 100G optical transport layer, supporting various 100G client services including 100GBASE-LR4/100GBASE-ER4 and 100GBASE-SR4. The FRM220-100GE-2Q is hot-swappable with two QSFP28 sockets for 100G QSFP28 transceivers. The installation and setup are simple plug and play. The FRM220-100GE-2Q can be inserted into any powered FRM220- CH20, CH08, CH04 chassis or CH02M, CH02/SMT standalone chassis with QSFP28 transceivers required for the application.

Features

- Device management via FRM220 chassis with NMC
- 100G link interface — IEEE:100G QSFP28-SR4/LR4/ER4
- QSFP28 ports for flexibility and scalability
- Hot-swap support (module and interfaces)
- Supports BERT test function
- Supports DMI function for QSFP28 module
- Supports Loopback test function
- Supports Auto laser shotdown
- Supports LFPT function
- Supports 25GE with break-out cable

Specifications

Equipment function	3R Transponder (Regenerator, Reshaper, Retimer)	
Protocol	100GbE	
Forward Error Correction Modes	RS-FEC (100GbE)	
Line Interface	QSFP28	
Client Interface	QSFP28	
Transmission Distance	Up to QSFP28 module	
Power Requirement	Power input 12VDC	
	Power consumption: <18W	
Work Environment	Operating Temperature	0 ~ 40℃
	Storage Temperature	-10 ~ 70℃
	Humidity	5 ~ 90% (non-condensing)
Weight	300g	
Dimension	159.5 × 20.8 × 88mm (D×W×H)	
Certification	CE, FCC	

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Ordering Information

Model Name	Description
FRM220-100GE-2Q	100G 3R QSFP28 to QSFP28 transponder card

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-DC48	Chassis power module 36 ~ 60 VDC, 3 pin terminal block, 300W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC, DC or AD power, with fan
FRM220-CH02/NMC-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power
FRM220-CH02/SMT-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power plus fan/power alarm detection

5 FRM220-40G-2Q

40G 3R Transponder

The FRM220-40G-2Q is a 40G QSFP+ to 40G QSFP+ 3R transponder that provides media conversion and distance extension for 40G Ethernet links. The FRM220-40G-2Q meets the growing need for more bandwidth for data centers and enterprises. The emergence of high-end servers and Ethernet switches with 40G Ethernet interfaces increases the need for media conversion (multi-mode to single-mode) and link range (single-mode to single mode) extension. The FRM220-40G-2Q is hot-swappable with two QSFP+ sockets for 40G QSFP+ transceivers. The installation and setup is simple plug and play. The FRM220-40G-2Q can be inserted into any powered FRM220-CH20,CH08, CH04 chassis or CH02M, CH02/SMT standalone chassis with QSFP+ transceivers required for the application.

Features

- Device management via FRM220 chassis with NMC
- Supports 40G repeater mode or Quad 10G optical multiplexer mode
- 40G link interface -- Ethernet/IEEE: 802.3ba 40GESR4/LR4/ER4
- 40G multi-link (fiber) interfaces – Ethernet/IEEE: 802.3ba XLAUI and OIF: CEI-11G
- QSFP+ ports for flexibility and scalability
- Supports hot-swapping (module and interfaces)
- Supports jumbo frame
- Supports DMI function for QSFP+ fiber module
- RoHS compliant and Lead-Free
- Supports loopback test function
- 3R function (Regenerator, Reshaper, Retimer)
- Supports LFPT function

Specifications

Equipment function	3R Transponder (Regenerator / Reshaper / Retimer)	
Protocol	Multiple functions in one module: 40G converter/repeater—Quad 10G optical multiplexer 40G link interface	
	Ethernet/IEEE 802.3ba 40GE-SR4/LR4/ER4	
	10G interface:9.95 ~ 11.3125Gbps	
Access Type	40G Ethernet	
Interface Type	QSFP+	
Transmission Distance	Up to QSFP+ module	
Power requirement	Power input 12VDC	
	Power consumption: ≤12W	
Work Environment	Operating Temperature	0 ~ 50℃
	Storage Temperature	-10 ~ 70℃
	Humidity	5 ~ 90% (non-condensing)
Weight	130g	
Dimension	159.5 × 20.8 × 88mm (D×W×H)	
Certification	CE, FCC	

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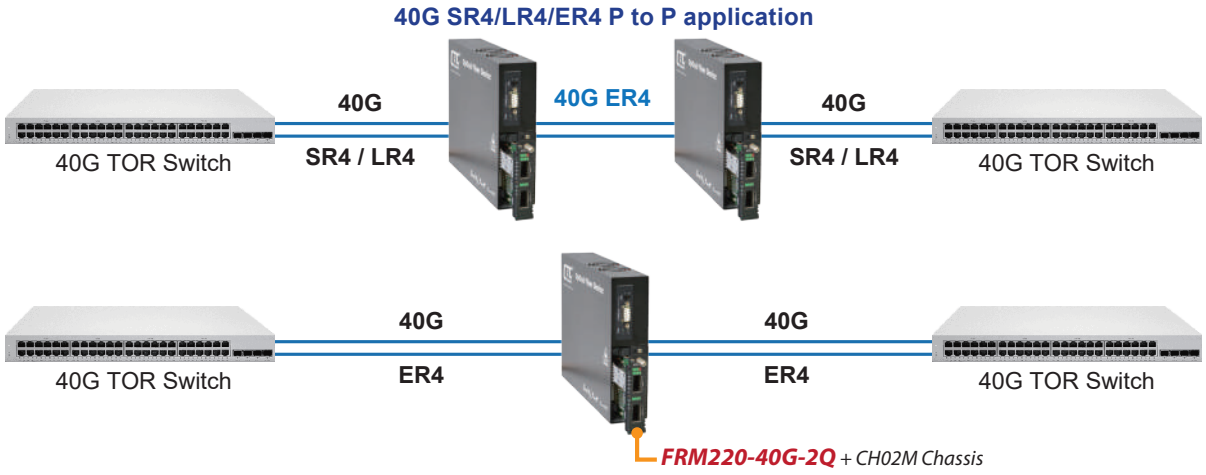
Application



Ordering Information

Model Name	Description
FRM220-40G-2Q	40G QSFP+ to 40G QSFP+ 3R transponder card (optional 40G QSFP+ module)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC or DC power, with fan
FRM220-CH02/NMC-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power
FRM220-CH02/SMT-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power plus fan/power alarm detection

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FRM220-40G-1Q4S

40G QSFP+ to 4 × 10G SFP+ Transponder

The FRM220-40G-1Q4S is a 40G QSFP+ to 4 × 10G SFP+ transponder that provides media conversion and distance extension for 40G over 10G links. The FRM220-40G-1Q4S meets the growing need for more bandwidth for data centers and enterprises. The emergence of high-end servers and Ethernet switches with 40G Ethernet interfaces increases the need for media conversion (multi-mode to single-mode) and link range extension. The FRM220-40G-1Q4S is a two slot wide hot-swappable card with one QSFP+ slot for QSFP+ 40G transceiver and four SFP+ slots for SFP+ 10G transceivers. The installation and setup is simple plug and play. The FRM220-40G-1Q4S can be inserted into any powered FRM220-CH20 chassis with QSFP+ and SFP+ transceivers required for the application.

Features

- Device Management via FRM220 Chassis with NMC
- Multiple functions in one module: 40G converter/repeater and Quad 10G optical multiplexer
- 40G link interface -- Ethernet/IEEE: 802.3ba 40GE-LR4
- 40G multi-link (fiber) interfaces -- Ethernet/IEEE: 802.3ba XLAUI and OIF: CEI-11G
- QSFP+ ports for flexibility and scalability
- Hot-swap support (module and interfaces)
- Supports 1 × 40G QSFP+ and 4 × 10G SFP+
- Supports DMI function for QSFP+ & SFP+ module
- Supports Loopback test function
- 3R function
- Supports LFPT function

Specifications

Equipment function	3R Transponder, Regenerator, Reshaper, Retimer	
Data Rate	Aggregate Data Rate	32 - 56.8 Gbps
	Data Rate per Lane	8 - 14.2 Gbps
Protocol	CPRI × 16	
	STM - 64	
	OC - 192	
	FC8, FC10	
	10G Ethernet	
Interface Type	40Gbps : QSFP+ (1 port), 10Gbps : SFP+ (4 ports)	
Transmission Distance	depends on QSFP+ & SFP+ module	
Power requirement	Power input 12VDC	
	Power consumption: ≤12W	
Work Environment	Operating Temperature	0 ~ 50℃
	Storage Temperature	-10 ~ 70℃
	Humidity	10 ~ 90% (non-condensing)
Weight	170g	
Dimension	159.5 × 42.1 × 88mm (D×W×H)	
Certification	CE, FCC	

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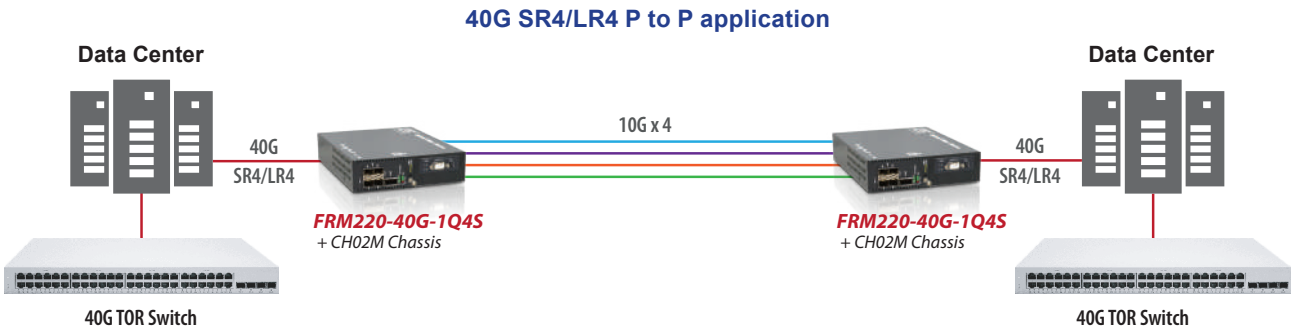
Application



Ordering Information

Model Name	Description
FRM220-40G-1Q4S	40G converter/repeater, Quad 10G Optical Multiplexer module with QSFP Interfaces (optional SFP+, QSFP+)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC, DC or AD power, with fan
FRM220-CH04A-AC/DC/AD	4-slot chassis with built-in AC, DC or AD power

5 FRM220-16G-3R

16G 3R Multi-rate Transponder

The FRM220-16G-3R has 4 SFP+ slots that can be configured as a dual channel 16G 3R multi-rate transponder or in a 1-to-2 port protection mode. The device provides a flexible transmission of various protocols, such as 1G/10G Ethernet, SDH STM16/STM64, OTU1/OTU1e/OTU2/OTU2e, Fiber Channel 1/2/4/8/10/16, ODU, OBSAI, CPRI, etc. Using SFP+ ports with dedicated CWDM or DWDM wavelengths, the 16G transponder supports multi-rate functionality with optical data rates from 1Gbps up to 14Gbps. With its functionality the FRM220-16G-3R transponder is also suitable as a repeater for transmission over extended distances. In addition, the use of state of the art components greatly reduces the power requirements and heat dissipation factors over our previous transponders.

Features

- Multi-rate supports 1Gbps ~ 14Gbps
- Protocol Transparent 3R fiber Media Transponder / Repeater
- Supports 1+1 Optical Line Protection, switching time <50ms
- Supports 2 channels with different bit rate
- Supports Loopback Test
- Supports Auto Laser Shutdown (ALS)
- SFP DDM Information
- Firmware Upgrade
- Setting from DIP Switch, Console, NMC
- Supports LFPT function

Specifications

Optical Interface	Connector	LC (SFP+, SFP)
	Wavelength	CWDM 1271 ~ 1611nm
		DWDM 1529.5 ~ 1565.50nm
Operation mode	Dual channel mode :	Ch 1 SFP1 line / SFP2 client Ch 2 SFP3 line / SFP4 client
	Protection mode : SFP1 line / SFP2, SFP3 client	
Protocol	SONET	OC-12, OC-24, OC-48, OC-192
	SDH	STM-4, STM-16, STM-64
	Ethernet	1G, 2.5G, 10G
	OTU	10GE OTU2e, 10GE OTU1e, STM-64 OTU2, STM-16 OTU1, 10GFC OTU2
	ODU	10GE ODU2e, 10GE ODU1e, STM-64 ODU2, STM-16 ODU1
	OBSAI	OBSAI × 1, × 2, × 4, × 8
	CPRI	CPRI × 1, × 2, × 4, × 5, × 8, × 10, × 16, × 20
	Fiber Channel	1/2/4/8/10/16G FC
Regeneration	Re-Amplification, Re-Shaping, Re-Timing	
LEDs	Power, System, Mode, Test, FX1 Link, FX2 Link, FX3 Link, FX4 Link	
Power	Input	12V / 1A
	Power Consumption	< 8W
Size	Dimensions	Card: 155 × 20.8 × 88mm (D×W×H)
	Weight	150g
Environment	Operating Temperature	0 ~ 50°C
	Storage Temperature	-10 ~ 70°C
	Humidity	10 ~ 90%
	Certification	CE, FCC
	MTBF	65000 hrs
Dimension	159.5 × 20.8 × 88mm (D×W×H)	

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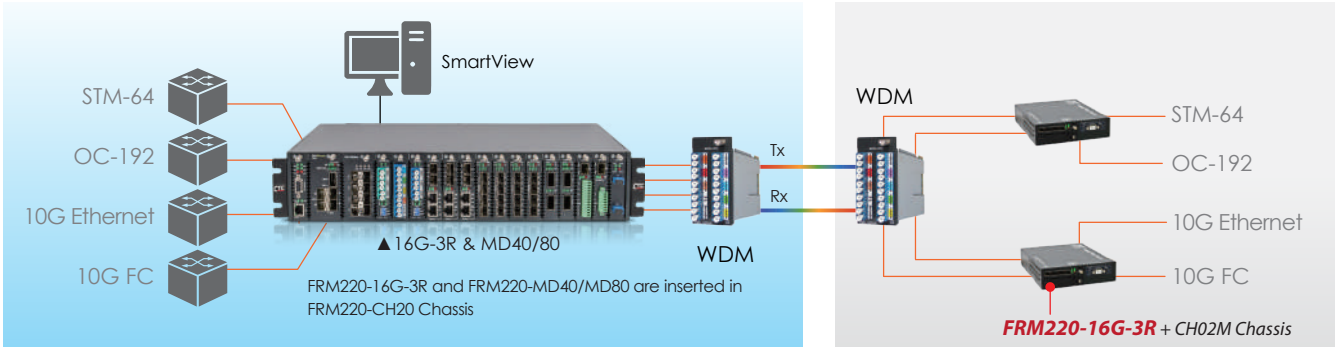
Application

16G-3R CWDM P to P application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220-16G-3R	2 Channels 16Gbps 3R Multi-rate transponder card (optional SFP+)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC or DC power, with fan
FRM220-CH04A-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power
FRM220-CH02/SMT-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power plus fan/power alarm detection

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FRM220-10G-3R

10G 3R Multi-rate Transponder with Optical Line Protection

The FRM220-10G-3R has 4 SFP+ slots that can be configured as a dual channel 10G 3R multi-rate transponder or in a 1-to-2 port protection mode. The device provides a flexible transmission of various protocols, such as 1G/10G Ethernet, SDH STM16/STM64, OTU1/OTU1e/OTU2/OTU2e, Fiber Channel 1/2/4/8/10, OBSAI, CPRI, etc. Using SFP+ ports with dedicated CWDM or DWDM wavelengths, the 10G transponder supports multi-rate functionality with optical data rates from 1Gbps up to 10Gbps. With its functionality the FRM220-10G-3R transponder is also suitable as a repeater for transmission over extended distances. In addition, the use of state of the art components greatly reduces the power requirements and heat dissipation factors over our previous transponders.

Features

- Multi-rate supports 1Gbps ~ 10Gbps
- Protocol Transparent 3R fiber Media Transponder / Repeater
- Supports 1+1 Optical Line Protection, switching time <50ms
- Supports 2 channels with different bit rate
- Supports Loopback Test.
- Supports 1550nm ITU-T C-band tunable DWDM SFP+ Transceiver
- SFP DDM Information
- Firmware Upgrade
- Setting from DIP Switch, Console, NMC
- Supports Auto Laser Shutdown (ALS)
- Supports LFPT function

Specifications

Optical Interface	Connector	LC (SFP+, SFP)
	Wavelength	CWDM 1271 ~ 1611nm
		DWDM 1529.5 ~ 1565.50nm
Operation mode	Dual channel mode : Ch 1 SFP1 line / SFP2 client Ch 2 SFP3 line / SFP4 client	
	Protection mode : SFP1 line / SFP2, SFP3 client	
Protocol	SONET	OC-12, OC-24, OC-48, OC-192
	SDH	STM-4, STM-16, STM-64
	Ethernet	1G, 2.5G, 10G
	OTU	10GE OTU2e, 10GE OTU1e, STM-64 OTU2, STM-16 OTU1, 10GFC OTU2
	ODU	10GE ODU2e, 10GE ODU1e, STM-64 ODU2, STM-16 ODU1
	OBSAI	OBSAI × 1, × 2, × 4, × 8
	CPRI	CPRI × 1, × 2, × 4, × 5, × 8, × 10, × 16, × 20
	Fiber Channel	1/2/4/8/10G FC
Regeneration	Re-Amplification, Re-Shaping, Re-Timing	
LEDs	Power, System, Mode, Test, FX1 Link, FX2 Link, FX3 Link, FX4 Link	
Power	Input	12V / 1A
	Power Consumption	< 8W
Size	Dimensions	Card: 155 × 20.8 × 88mm (D×W×H)
	Weight	150g
Environment	Operating Temperature	0 ~ 50°C
	Storage Temperature	-10 ~ 70°C
	Humidity	10 ~ 90%
	Certification	CE, FCC
	MTBF	65000 hrs
Dimension	159.5 × 20.8 × 88mm (D×W×H)	

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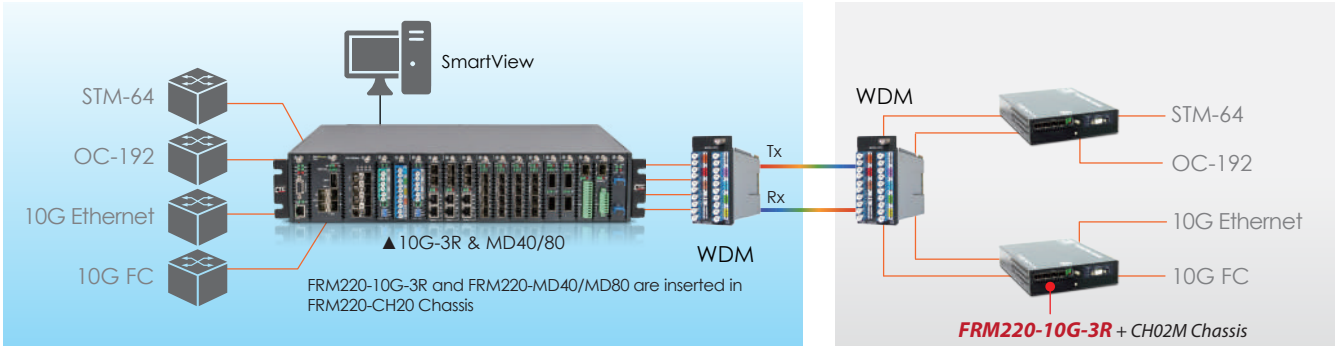
Application

10G-3R CWDM P to P application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220-10G-3R	2 Channels 10Gbps 3R Multi-rate transponder card (optional SFP+)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC or DC power, with fan
FRM220-CH04A-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power
FRM220-CH02/SMT-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power plus fan/power alarm detection

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FRM220-4G-3R

4G 3R Multi-rate Transponder

The FRM220-4G-3R has 4 SFP slots that can be configured as a dual channel 4G 3R multi-rate transponder or in a 1-to-2 port protection mode. The device provides a flexible transmission of various protocols, such as 1G Ethernet, SDH STM-16, OC-24, OC48 , Fiber Channel 1/2/4, OBSAI, CPRI, etc. Using SFP ports with dedicated CWDM or DWDM wavelengths, the FRM220-4G-3R transponder supports multi-rate functionality with optical data rates from 1Gbps up to 4.25Gbps. With its functionality the FRM220-4G-3R transponder is also suitable as a repeater for transmission over extended distances. In addition, the use of state of the art components greatly reduces the power requirements and heat dissipation factors over our previous transponders.

Features

- Multi-rate supports 1Gbps ~ 4.25Gbps
- Protocol Transparent 3R fiber Media Transponder / Repeater
- Supports 1+1 Optical Line Protection, switching time <50ms
- Supports 2 channels with different bit rate
- Supports Loopback Test
- SFP DDM Information
- Firmware Upgrade
- Setting from DIP Switch, Console, NMC
- Supports Auto Laser Shutdown (ALS)
- Supports LFPT function

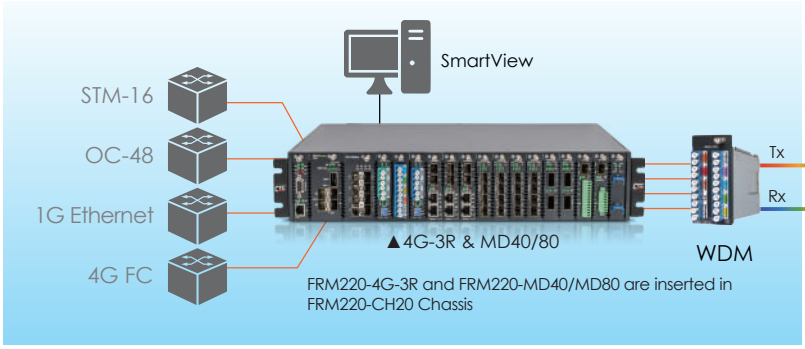
Specifications

Optical Interface	Connector	LC (SFP)
	Wavelength	CWDM 1271 ~ 1611nm
		DWDM 1529.5 ~ 1565.50nm
Operation mode	Dual channel mode :	Ch 1 SFP1 line / SFP2 client Ch 2 SFP3 line / SFP4 client
	Protection mode : SFP1 line / SFP2, SFP3 client	
Protocol	SONET	OC-12, OC-24, OC-48
	SDH	STM-4, STM-16
	Ethernet	1G
	OBSAI	OBSAI × 1, × 2, × 4
	CPRI	CPRI × 1, × 2, × 4, × 5
	Fiber Channel	1/ 2/4G FC
Regeneration	Re-Amplification, Re-Shaping, Re-Timing	
LEDs	Power, System, Mode, Test, FX1 Link, FX2 Link, FX3 Link, FX4 Link	
Power	Input	12V / 1A
	Power Consumption	< 8W
Size	Dimensions	159.5 × 20.8 × 88mm (D×W×H)
	Weight	150g
Environment	Operating Temperature	0 ~ 50°C
	Storage Temperature	-10 ~ 70°C
	Humidity	10 ~ 90%
	Certification	CE, FCC
	MTBF	65000 hrs

5

Application

4G-3R CWDM P to P application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220-4G-3R	2 Channels 4Gbps 3R Multi-rate transponder card (optional SFP)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-DC48	Chassis Power module 36~60 VDC, 3 pin terminal block, 200W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC or DC power, with fan
FRM220-CH04A-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power
FRM220-CH02/SMT-AC/DC/AD	2-slot chassis with fan, managed via optional NMC card and with AC, DC or AD power plus fan/power alarm detection

5

FRM220-OAP17

Single Channel EDFA Preamp

The FRM220-OAP17 is a single channel optical amplifier/preamp module that provides multi-function, low noise, Erbium-Doped Fiber Amplifier (EDFA) solutions for metro Dense Wavelength Division Multiplexing (DWDM) applications. The FRM220-OAP17 operates at the receiving end of an optical link. It features medium to low input power sensitivity, medium output power, and medium gain and is designed for optical amplification to compensate for losses in a De-multiplexer located near the optical receiver. The FRM220-OAP17 provides Automatic Gain Control (AGC) via rack management or RS-232 console interface. Its fast-transient suppression feature allowing the output power to be kept at a constant level when there are fast changes in input power.

Features

- Automatic Gain Control (AGC)
- Advanced performance monitoring
- Input and output power levels
- Up to 17 dBm output power
- Gain flattening filters (GFF) assure flat gain (<1dB variance) over the entire amplified C-band
- LC/UPC connector
- Hot-swap support
- Single channel EDFA with FRM220 chassis rack management

■ Applications

- Metropolitan WAN network system
- C-Band DWDM network systemInput and output power levels
- CATV transmission system

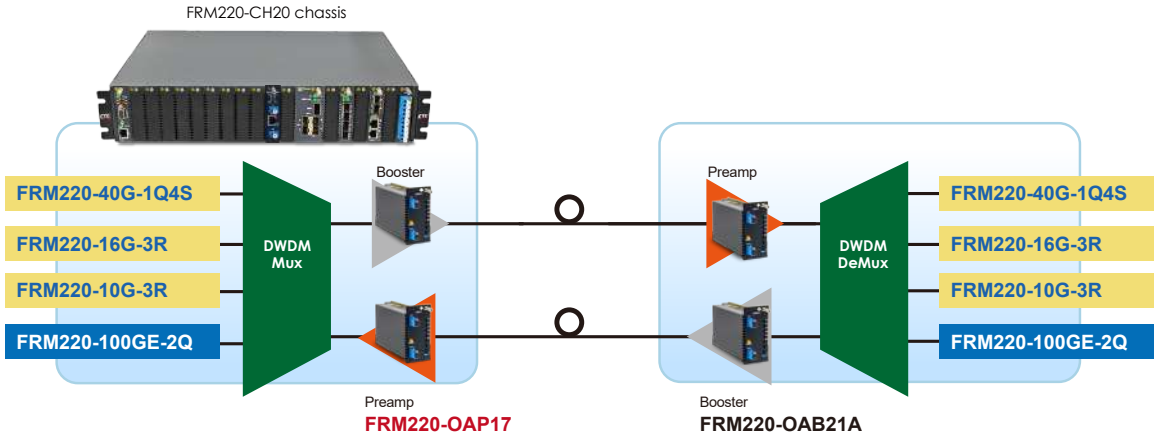
Specifications

Operating wavelength	1528 ~ 1563nm
Input power	-35~ -10dBm
Signal gain	25 ~ 35dB
Total saturated output power	+17dBm
Gain flatness (Max.)	≤ ±1.0dB
Noise figure	5.5dB (Typ)
Polarization dependent gain (Max.)	0.5dB
Polarization mode dispersion (Max.)	0.5ps
Output power stability (Max.)	±0.1dB
Return loss (Min.)	45dB
Connector	LC/UPC
Control mode	AGC
Operation case temperature	0 ~ 65°C
Relative humidity (non-condensing)	5 ~ 85%
Laser Class	Class 1M
Power consumption	10W
Dimension	159.5 × 42.1 × 88mm (D×W×H)

5

Application

EDFA booster/Preamp DWDM P to P application



Ordering Information

Model Name	Description
FRM220-OAP17	DWDM C -band EDFA preamp card 17dBm with automatic gain control (AGC)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-DC48(HP)	Chassis power module 36 ~ 60 VDC, 3 pin terminal block, 300W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC, DC or AD power, with fan
FRM220-CH04A-AC/DC/AD	4-slot chassis with built-in AC, DC or AD power

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FRM220-OAB15

Single Channel EDFA Booster

The FRM220-OAB15 is a FRM220 chassis rack managed single channel Erbium Doped Fiber Amplifier (EDFA) booster line card for C-band. It has a large dynamic range while providing excellent broadband noise performance. It provides Automatic constant output Power Control (APC) and Automatic Constant Current (ACC) via rack management or RS-232 console interface. Its fast transient suppression feature allowing the output power to be kept at a constant level when there are fast changes in input power.

Features

- Single channel EDFA with FRM220 chassis rack management
- Up to 15 dBm output power
- Output level constant control mode
- Output current constant control mode
- Low noise figure
- Low power dissipation

■ Applications

- Booster Amplifier for 10Gbps, 40Gbps, and 100Gbps applications
- Long haul C - band DWDM applications

Specifications

Parameter	Specifications.		Remarks
	Min.	Max.	
Wavelength Bandwidth	1528nm	1562nm	
Input Power Range	-10dBm	0dBm	
Output Power Range		+15dBm	@ Input Power = -6~0dBm
Noise Figure		7.0dBm	@ -6dBm input with 16dB gain
PDG		0.5dBm	
PMD		0.5ps	
Power Consumption		2W	
Operation Temperature	-5°C	+70°C	
Storage Temperature	-20°C	+70°C	
Transportation Temperature	-40°C	+85°C	72 hrs max.
Dimensions	159.5 × 20.8 × 88 (D×W×H)		

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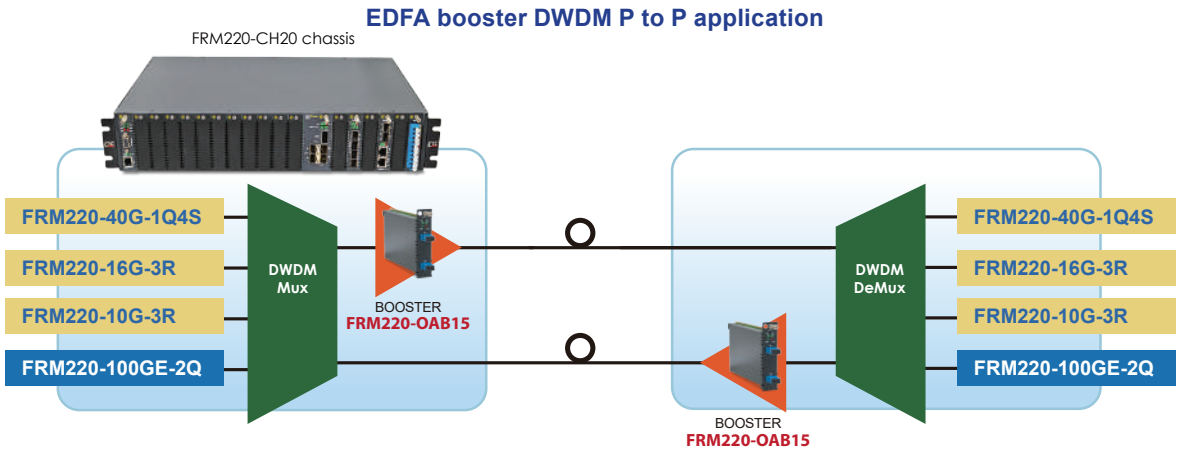
Application



Ordering Information

Model Name	Description
FRM220-0AB15	DWDM C-band EDFA Booster card 15dBm

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FRM220-OAB21A

Single Channel EDFA Booster 21dB

The FRM220-OAB21A is a single channel optical amplifier/booster module that provides multi-function, low noise, Erbium-Doped Fiber Amplifier (EDFA) solutions for metro Dense Wavelength Division Multiplexing (DWDM) applications. The FRM220-OAB21A operates at the transmission side of the link. It features high input power, high output power, and medium optical gain and is designed to amplify aggregated optical input power for reach extension. The FRM220-OAB21A provides Automatic Gain Control (AGC) via rack management or RS-232 console interface. Its fast-transient suppression feature allows the output power to be kept at a constant level when there are fast changes in input power.

Features

- Automatic Gain Control (AGC)
- Advanced performance monitoring
- Input and output power levels
- Up to 21 dBm output power
- Gain flattening filters (GFF) assure flat gain (<0.75 dB variance) over the entire amplified C-band.
- LC/UPC connector
- Hot-swap support
- Single channel EDFA with FRM220 chassis rack management

■ Applications

- Metropolitan WAN network system
- C-Band DWDM network system
- CATV transmission system

Specifications

Operating wavelength	1528 ~ 1563nm
Input power	-20 ~ +5dBm
Signal gain	15 ~ 25dB
Total output power	-5 ~ +21dBm
Total saturated output power	+21dBm
Gain flatness (Max.)	≤ ±0.75dB
Noise figure	5.5dB (Typ)
Polarization dependent gain (Max.)	0.5dB
Polarization mode dispersion (Max.)	0.5ps
Output power stability (Max.)	±0.1dB
Return loss (Min.)	45dB
Connector	LC/UPC
Control mode	AGC
Operation case temperature	0 ~ 65°C
Relative humidity (non-condensing)	5 ~ 85%
Laser Class	Class 1M
Power consumption	14W
Dimension	159.5 × 42.1 × 88mm (D×W×H)

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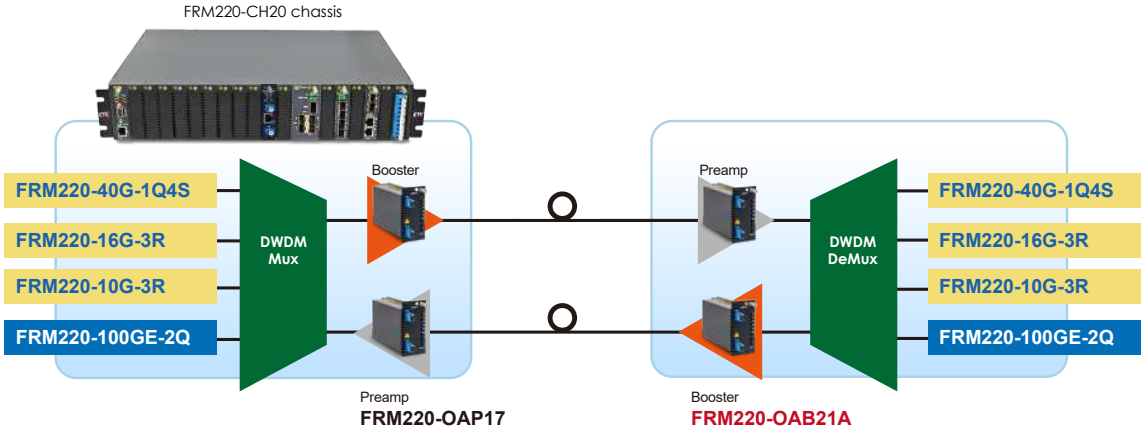
Application

EDFA booster/Preamp DWDM P to P application



Ordering Information

Model Name	Description
FRM220-OAB21A	DWDM C -band EDFA booster card 21dBm with automatic gain control (AGC)

■ Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-AC(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-DC48(HP)	Chassis power module 36 ~ 60 VDC, 3 pin terminal block, 300W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC, DC or AD power, with fan
FRM220-CH04A-AC/DC/AD	4-slot chassis with built-in AC, DC or AD power

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FRM220-OPS51
FRM220-OPS52

Fiber Optical Protection Switch

The FRM220-OPS Series are able to provide fiber path redundancy on a channel by channel basis. These units are particularly well suited for protection in any type of fiber data transmission, including CWDM & DWDM links. The OPS52 includes monitoring capabilities for both the working and protected path fibers. In case of a fiber cut in the active path, traffic will be switched over to the protected path in less than 50ms (FRM220-OPS51) or 20ms (FRM220-OPS52). Monitoring is available through SNMP Management when both card is placed in FRM220 rack with SNMP management. The management can view the converter card's status, type, version, fiber link status and alarms. The card can be configured to enable or disable the port, reset the port, and configure receive threshold levels for path switching.

Features

- Latch feature, if power is lost the switch remains in its current state
- Protection transition < 50 ms (FRM220-OPS51)
- Protection transition < 20 ms (FRM220-OPS52)
- Works with any combination of 1 ~16 wavelengths
- Traffic is switched in one of three modes : revertive,
- non-revertive, manual (OPS52) or non-revertive, manual (OPS51)
- Programmable Rx threshold setting for switch-over
- Optical Interface Type : LC connectors
- Working and protected lines are physically separated fiber
- Supports auto-switching delay time can be set in auto-switch mode

Specifications

Connector	LC/PC
LEDs	Power System, Working Path, Protection Path, Work mode
Power	DC 12V In
Operating Wavelength	1261 ~ 1621
Switch Type	2×1 / Latching
Input Power (Optical)	-35~5dBm
Accuracy	≤ 2dBm
Insertion Loss	≤ 3dB (Pair) (FRM220-OPS51)
	≤ 5.5dB (Pair) (FRM220-OPS52)
Return Loss	≥ 45dB
Cross-talk	≥ 60dB
Polarization Dependent Loss (PDL)	≤ 0.1dB
Input Power Sensitivity	-35dBm
Restoration Time	≤20ms
Power Consumption	< 3W
Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	5%RH to 95%RH non-condensing
Certification	CE, FCC
MTBF	65,000 hours

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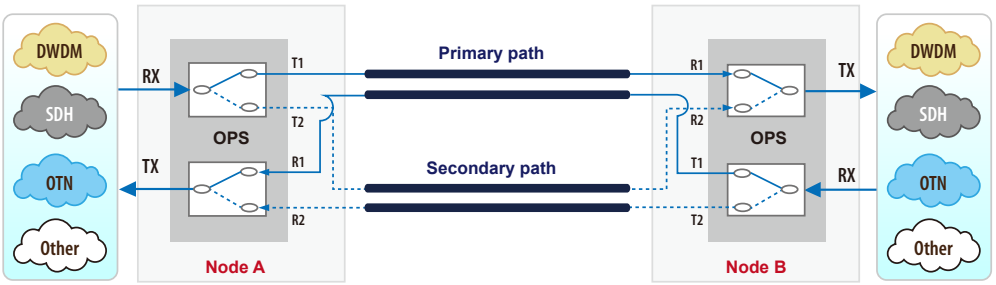
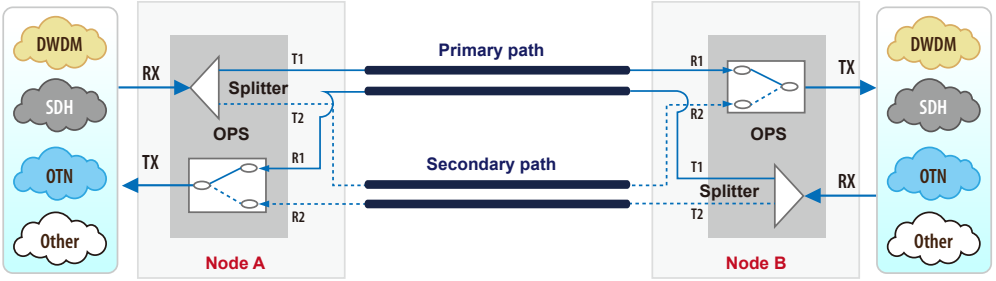
Application

FRM220-OPS51▶
Working Theory



FRM220-OPS52▶
Working Theory



Ordering Information

Model Name	Description
FRM220-OPS51	1:1 optical line protection switch card, dual fiber on WAN port, LC/PC connector
FRM220-OPS52	1+1 optical line protection switch card, dual fiber on WAN port, LC/PC connector

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FRM220-OPS51M

1:1 Multi-mode Optical Protection Switch

The FRM220-OPS51M is a Multi-mode Fiber Optical Protection Switch that is able to provide Multi-mode fiber path redundancy on a channel by channel basis. This unit is particularly well suited for protection in 50/125um Multi-mode 850nm type of fiber data transmission. This solution includes monitoring capabilities for the working fiber only. In case of a fiber cut in the active path, traffic will be switched over to the protected path in less than 50ms. Monitoring is available through SNMP Management when both card is placed in FRM220 rack with SNMP management. The management can view the converter card's status, type, version, fiber link status and alarms. The card can be configured to enable or disable the port, reset the port, and configure receive threshold levels for path switching.

Features

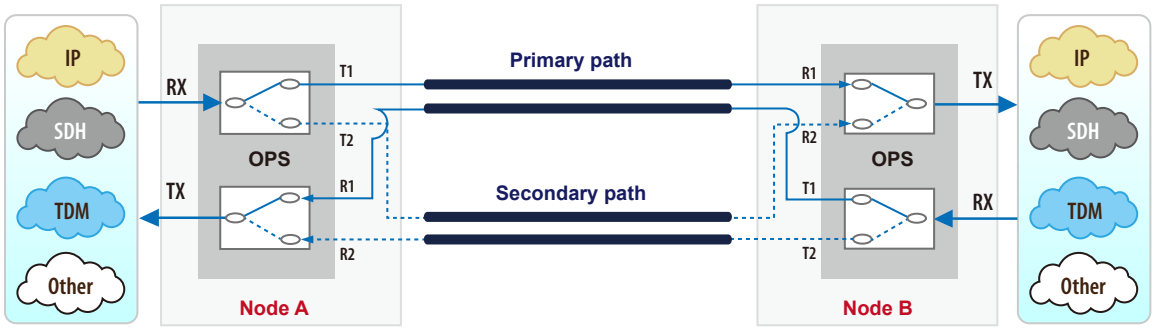
- Latch feature, if power is lost the switch remains in its current state
- Work with Multi-mode 850 wavelength
- Traffic is switched in one of two modes : non-revertive, manual
- Programmable RX threshold setting for switch-over
- Optical interface type : LC connector
- Working and protected lines are physically separated fiber
- High channel isolation
- Highly stable and reliable

Specifications

Connecter LC / PC	LC / PC
LEDs	Power System, Working Path, Protection Path, Work mode
Power	DC 12V In
Operating Wavelength	850nm
Fiber Type	Multimode 50/125um
Switch Type	2×1 / Latching
Input Power (Optical)	-30~5dBm
Insertion Loss	≤ 3dB (Pair)
Return Loss	≥ 30dB (SM)
Cross-talk	≥ 30dB (SM)
Restoration Time	≤20ms
Power Consumption	< 3W
Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	5%RH to 95%RH non-condensing
Certification	CE, FCC
MTBF	65,000 hours

5

Application



Ordering Information

Model Name	Description
FRM220-OPS51M	1:1 multi-mode fiber optical line protection switch card, dual fiber on WAN port, LC/PC connector

5 FRM220-DWMD

DWDM Mux/DeMux

CTC Union DWDM MUX DEMUX Modules, with 100GHz channel spacing, can be used to combine or separate wavelength channels at standard ITU grid. We supply the common configuration including 4, 8, 16 channels. These DWDM modules passively multiplex the optical signal outputs from 4 or more electronic devices, and send them over a single optical fiber and then de-multiplex the signals into separate, distinct signals for input into electronic devices at the other end of the fiber optic link. All the DWDM MUX DEMUX modules provide excellent optical performance and high reliability to ease of fiber handling and power saving solution.

Features

- Low Optical Insertion Loss
- High channel isolation
- Low PDL
- Good channel-to-channel uniformity
- Exceptional reliability and stability
- Reliable passive WDM optical technology
- Scales easily for ring networks
- Compliance with RoHS

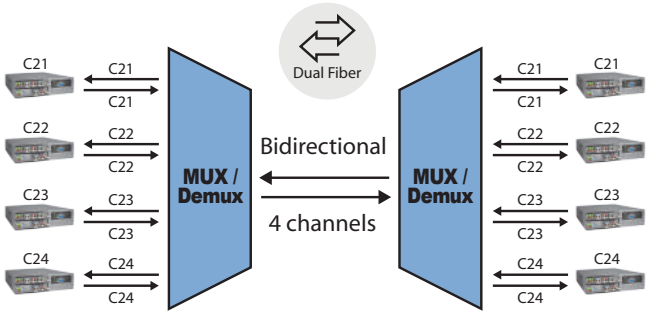
Specifications

Item	100GHz DWDM	
Type	Mux	DeMux
Channel No.	4 / 8 / 16	
Center Wavelength, nm	Ch 21~60 or ITU Standard (specity)	
Channel Spacing, nm	0.8	
Channel Spacing, GHz	100	
Passband @0.5dB, nm	ITU ± 0.1	
Insertion Loss, dB for 4 channel	≤2.0	
Insertion Loss, dB for 8 channel	≤3.5	
Insertion Loss, dB for 16 channel	≤4.5	
Adjacent Channel Isolation, dB	N/A	≥25
Non-adjacent Channel Isolation, dB	N/A	≥35
Uniformity, dB	≤1.5 (Mux-DeMux Pair only)	
Directivity, dB	≥45	
Optical Input Return Loss, dB	≥45	
Polarization Dependent Loss, dB	≤0.15	
Polarization Mode Dispersion (PMD), ps	≤0.1	
Thermal Stability Drift, pm/˚C	≤1	
Max. Optical Power, mW	300	
Max. Tensile Load, N	5	
Storage Temperature, ˚C	-40~85	
Operating Temperature, ˚C	0~70	
Dimensions	4ch: 159.5 × 20.8 × 88mm (D×W×H)	8ch: 159.5 × 42.1 × 88mm (D×W×H)

5

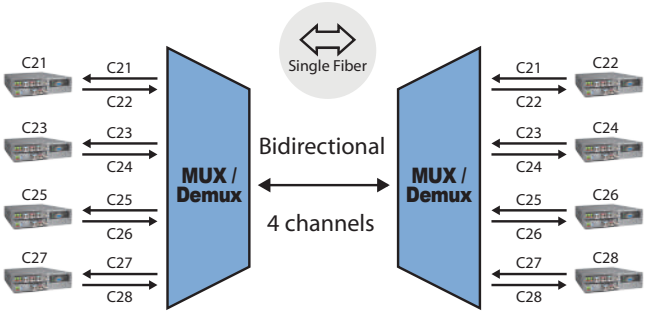
Application

Figure 1 :



The DWDM transceivers connected to DWDM Mux/Demux should have the same wavelength as the client.

Figure 2 :



The DWDM transceivers should have the same wavelength as the transmit wavelength of the client port.

Ordering Information

Model Name	Description
FRM220-DWMD401-C21C24	FRM220 DWDM 100GHz 4 channels MUX/DEMUX, C21~ C24, LC/UPC, dual fiber on WAN port
FRM220-DWMD801-C21C28	FRM220 DWDM 100GHz 8 channels MUX/DEMUX C21 ~ C28 LC/UPC, dual fiber on WAN port
FRM220-DWMX1601-C21C36	FRM220 DWDM 100GHz 16 channels MUX C21 ~ C36 LC/UPC, single fiber on WAN port
FRM220-DWDX1601-C21C36	FRM220 DWDM 100GHz 16 channels DEMUX C21~ C36 LC/UPC, single fiber on WAN port

5 FRM220-CWMD

CWDM Mux/DeMux

The FRM220-CWMD Mux/DeMux are modular design cards that support ITU-T G.694.2 wavelengths between 1271nm to 1611nm in 20nm increments. The FRM220-CWMD modules are protocol and rate transparent allowing different services such as 10G Ethernet, 10GFC, STM-64, OC-192 to be transported across the same fiber link. The passive FRM220-CWMD Mux/DeMux modules are available in 4 and 8-Channel (wavelength) models, supporting a variety of wavelength combinations and port configurations. The small and compact size of the CWDM modules yields one of the highest port densities in the industry. A 2U high 19-module FRM220 chassis populated with modules can yield up to 120 channels of capacity. FRM220-CWMD modules are passive deviceas that require no external power. They can also be installed in an FRM220 powered chassis with a NMC management module[1] and can be managed using SmartView EMS device management software, third-party SNMP software, Telnet or a serial console port. The modules can be installed in any FRM220 chassis equipped with other FRM220 media converters and transponders to provide a multi-service platform capable of delivering Ethernet, TDM, Voice and other services across a CWDM fiber common link.

Features

- Full native mode performance
- Passive model requires no power
- Protocol transparent, no limitation
- Utilizes industry standard ITU CWDM wavelength
- Standard LC connectors
- Passive device that can be installed in a powered chassis for managed applications
- Integration with Transponder in FRM220 chassis for CWDM application

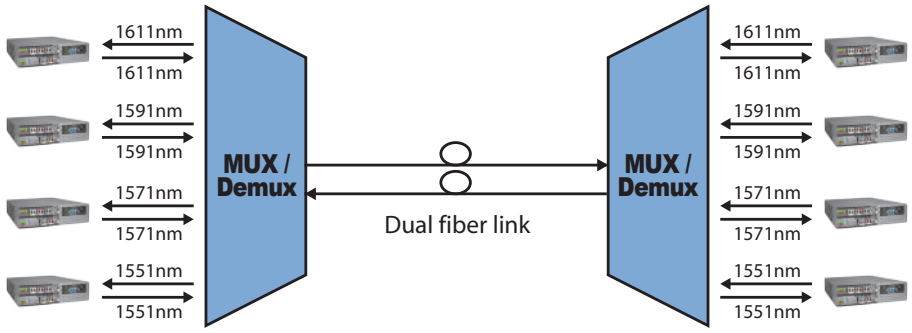
Specifications

Channel	4 or 8 channels
Standards	ITU-T G.694.2
Wavelength	1271 ~ 1611nm
Insertion Loss	4ch < 1.8dB, 8ch < 3.0dB
Return Loss	>45dB
Option	Upgrade port
	Wide 1310 ± 50 nm
Line Link	Single fiber or two fiber
Connector	LC / UPC
Dimension	4ch : 159.5 × 20.8 × 88mm (D×W×H)
	8ch : 159.5 × 42.1 × 88mm (D×W×H)
Weight	4ch : 200g
	8ch : 380g
Temperature	0 ~ 50°C (Operating)
	-40 ~ 70°C (Storage)
Humidity	0 ~95% (non-condensing)
Certification	CE, FCC

5

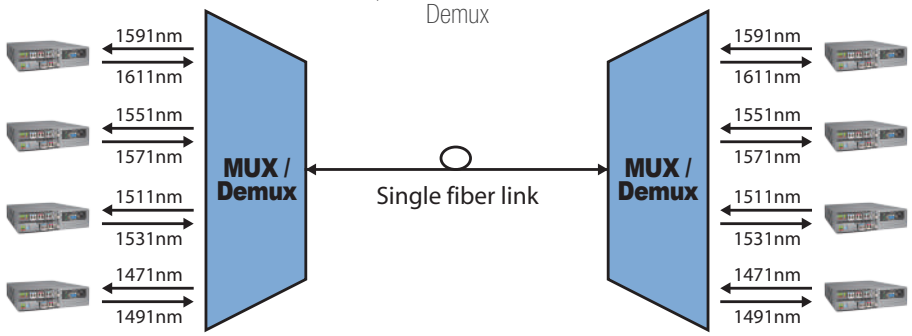
Application

Figure 1 :



4 channels Duplex Transmission CWDM Mux & Demux

Figure 2 :



4 channels Bi-Directional Transmission CWDM Mux & Demux

Ordering Information

Model Name	Description
Dual Fiber CWDM Mux/Demux	
FRM220-CWMD40-5157	4Ch TX/RX(1511, 1531, 1551, 1571nm), LC/UPC
FRM220-CWMD40-5561	4Ch TX/RX(1551, 1571, 1591, 1611nm), LC/UPC
FRM220-CWMD80-4761	8Ch TX/RX(1471 ~ 1611nm), LC/UPC
Single Fiber CWDM Mux/Demux	
FRM220-CWMD40A-4761	4Ch, TX(1471, 1511, 1551, 1591nm), RX(1491, 1531, 1571, 1611nm) type A, LC/UPC
FRM220-CWMD40B-4761	4Ch, TX(1491, 1531, 1571, 1611nm), RX(1471, 1511, 1551, 1591nm) type B, LC/UPC
FRM220-CWMD81A-2759	8ch, TX(1271,1311,1351,1431,1471,1511,1551,1591nm), RX(1291,1331,1411,1451,1491,1531,1571,1611 nm) type A, with monitor port, LC/UP
FRM220-CWMD81B-2961	8ch, TX(1291,1331,1411,1451,1491,1531,1571,1611nm), RX(1271,1311,1351,1431,1471,1511,1551,1591 nm) type B, with monitor port, LC/UPC

5

FRM220A-Eoe1/G

Ethernet Bridge over E1

- HDLC
- MTU 2046bytes
- Unframed E1

The FRM220A-Eoe1/G is an Ethernet over E1 Bridge for cost-effective connection of 10/100Base-TX LANs over a single E1 transport. By using standard HDLC encapsulation, the FRM220A-Eoe1/G is able to transmit up to a 2M bits Ethernet over an E1 link. The FRM220A-Eoe1/G supports an E1 attenuation of up to 43 dB on twisted pair or coax cable, which provides an approximate operating range up to 2km (using 22AWG). The FRM220A-Eoe1/G fully meets E1 specifications including ITU-T G.704 and G.823. The Ethernet copper interface supports auto-negotiation and auto MDI/MDIX, allowing plug-and-play Ethernet connection without any additional configuration. When placed in FRM220 system, the Ethernet may be aggregated to the chassis's built in Ethernet switch. When placed in a single slot chassis and used standalone without management, the card may be configured by serial terminal.

Features

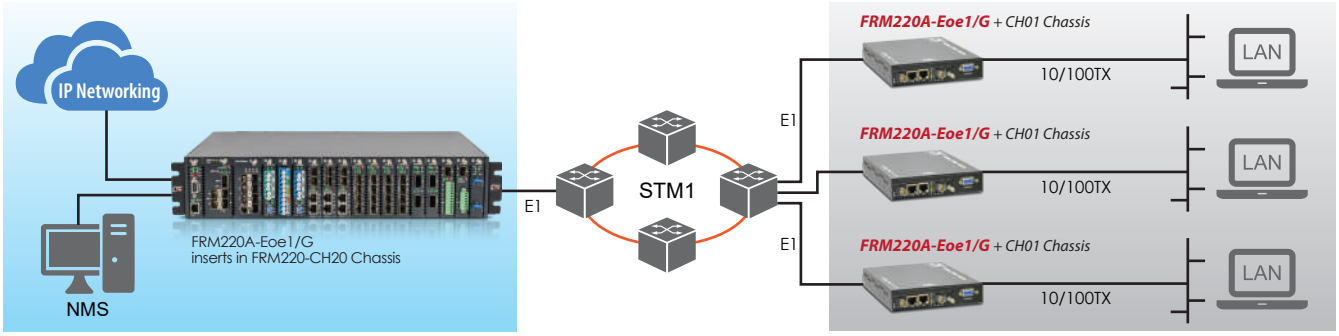
- Connects one Fast Ethernet over E1 links (2.048Mbps)
- Built-in bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- LED Alarm indication
- Standalone RS232 console management via CH01M

Specifications

E1 Interface	Framing	Unframed
	Standard	ITU-T G.703/G.704/G.706 & G.732, G.823
	Bit rate	2.048Mbps± 50ppm
	Line code	HDB3
	Clock setting	Internal OSC or recovery clock
	Receive level	-43dB
	Line impedance	75 ohm (BNC) / 120 ohm (RJ-45)
	Jitter Performance	Complies with ITU-T G.823
	Pulse Mask	Complies with ITU-T G.703
	Pulse amplitude	Nominal 2.37V ± 10%
	Delay Variance	220ms
	Connector	RJ-45, BNC
Ethernet Interface	Diagnostics	Digital remote loopback
	Standards	IEEE 802.3, 802.3u
Ethernet Interface	Data rate	10/100Base-TX
	MTU	2046bytes
Connector	RJ45	10/100Base-T
Indications	Power, ALM,E1 signal loss ,E1 Alarm (AIS, LOF, RAI, LOMF), LAN link /ACT, 10/100M	
Power Input	12VDC	
Power Consumption	< 6W	
Dimensions	159.5 × 20.8 × 88mm (D×W×H)	
Weight	DC12 : 280g AC/DC 48/AD : 580g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% RH (non-condensing)	
Certifications	CE, FCC, RoHS compliant	
MTBF	65,000 hrs	

5

Application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220A-Eoe1/G	10/100Base-TX to E1 bridge operates at WAN

5

FRM220-Eoe1

Ethernet Bridge over E1

- HDLC
- MTU 1522bytes
- Framed / Unframed E1

The FRM220-Eoe1 is an Ethernet over E1 Bridge for cost-effective connection of 10/100Base-TX LANs over a single E1 transport. By using standard HDLC encapsulation, the FRM220-Eoe1 is able to transmit up to a 2M bits Ethernet over an E1 link. The FRM220-Eoe1 supports an E1 attenuation of up to 43 dB on twisted pair or coax cable, which provides an approximate operating range up to 2km (using 22AWG). The FRM220-Eoe1 fully meets E1 specifications including ITU-T G.703 and G.823. The FRM220-Eoe1 features diagnostic capabilities for performing remote loopback. The operator at either end of the line may test both the FRM220-Eoe1 and the line in the digital loopback mode. The Ethernet copper interface supports auto-negotiation and auto MDI/MDIX, allowing plug-and-play Ethernet connection without any additional configuration. When placed in FRM220 system, the Ethernet may be aggregated to the chassis's built in Ethernet switch. When placed in a single slot chassis and used standalone without management, the card may be configured by DIP switch.

Features

- Connects one Fast Ethernet over E1 links (64k~2048Kbps)
- Built-in HDLC bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220 chassis
- SNMP management with FRM220 chassis
- LED Alarm indication
- Standalone RS232 console management via CH01M

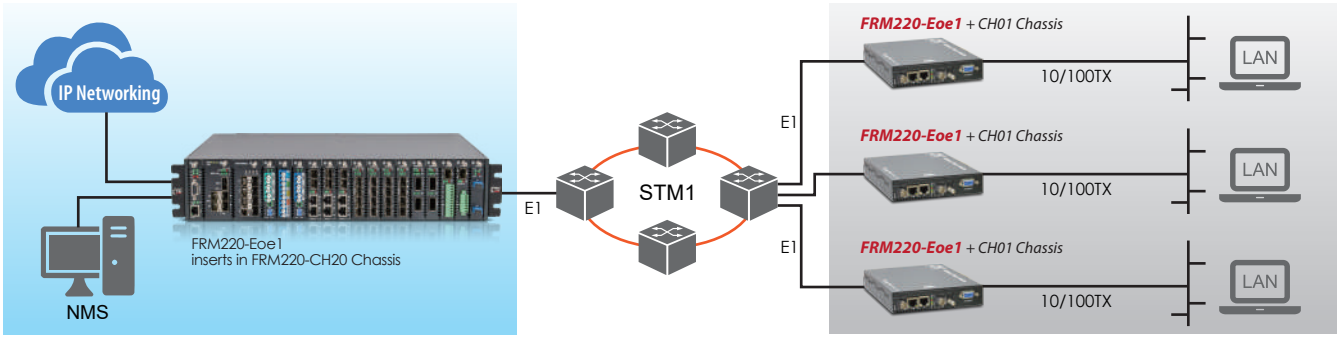
Specifications

E1 Interface	Framing	Framed / Unframed
	MTU	1522bytes (Max.)
	Standard	ITU-T G.703/G.704/G.706 & G.732, G.823
	Bit rate	2.048Mbps± 50ppm
	Line code	HDB3
	Clock setting	Internal OSC or recovery clock
	Receive level	-43dB
	Line impedance	75 ohm (BNC) / 120 ohm (RJ45)
	Jitter Performance	Complies with ITU-T G.823
	Pulse shape	Complies with ITU-T G.703
	Pulse amplitude	Nominal 2.37V ± 10%
	Delay Variance	220ms
	Connector	RJ-45, BNC
	Diagnostics	Digital remote loopback
Ethernet Interface	Standards	IEEE 802.3, 802.3u
	Data rate	10/100Base-TX, Half/Full duplex
	Connector	RJ-45 10/100Base-TX
Indications	Power, ALM, E1 signal loss, E1 Alarm (AIS, LOF, RAI, LOMF), LAN link /ACT, 10/100M , SD (100Base-FX)	
Power Input	12VDC	
Power Consumption	< 6W	
Dimensions	155 x 88 x 24mm (DxWxH)	
Weight	130g	

Ethernet over E1 Converter

Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% RH (non-condensing)
Certifications	CE, FCC, RoHS compliant
MTBF	65,000 hrs

Application



Central Office (CO) **Customer Premise Equipment (CPE)**

Ordering Information

Model Name	Description
FRM220-Eoe1	10/100Base-TX to E1 HDLC bridge card

5

FRM220-CCF40
FRM220-CCF20

- 4 ch. Contact Closure Fiber Converter
- 2 ch. Contact Closure Fiber Converter

The FRM220-CCF contact closure fiber converter comes in two models, one with 2 channels (CCF20) and one with 4 channels (CCF40) and provides the transmission of contact closure over a single fiber optic link. With SFP cage on fiber ports, the FRM220-CCF gives you the fiber cabling connector SFP-LC, both multi-mode and single-mode, as well as BiDi which allows bi-directional transmission using only a single fiber core. The FRM220-CCF has contact inputs and 0.5 amp contact output relays. The relay output follows the "relay input" from the remote end. When the remote "relay input" is shorted, the local relay output is closed and vice-versa. Any one of the relay outputs can be configured to close when "carrier loss" is detected from the remote end. (Either through a CH01M console or via NMC in managed chassis.) Carrier Loss indicates that the optical fiber is disconnected or that the remote end has lost power and is not operating. This "carrier loss" relay can then be connected to an appropriate alarm circuit.

Features

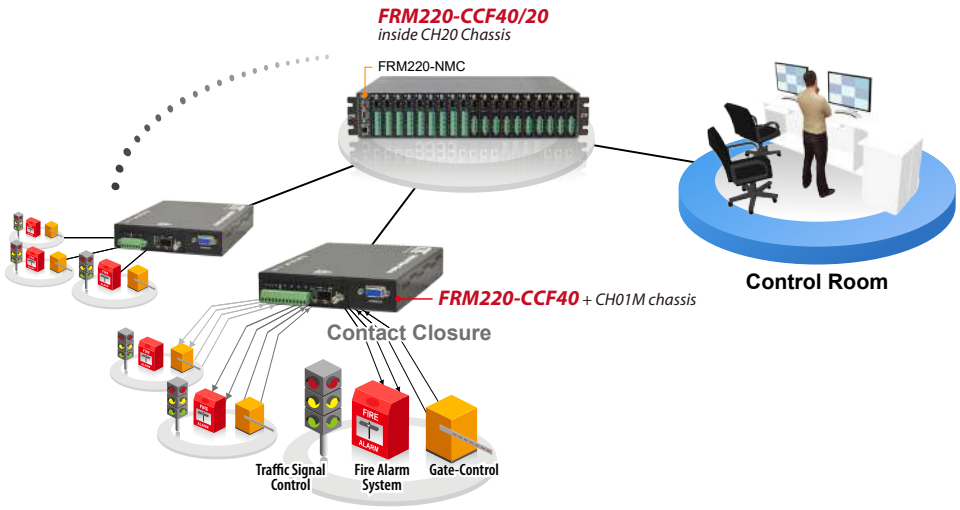
- Transmits a single contact closure in one or two directions
- Distances up to 120km
- 30 VDC, 0.5 amp relay N.O. (Normally Open)
- Point-to-Point transmission architecture
- Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments
- Relay contact for Carrier Detect, N.C. (Normally Close)
- Indicating LEDs are provided for confirming equipment operating status
- Managed when places in FRM220 chassis with NMC

Specifications

Contacts	Contact Interface Response Time : 4 msec
	Input Dry Contact Closure
	Output SPST Relay, 30 VDC @ 0.5 A, Resistive loads only. 0.5 A Contact Rating - normally open
Optical	1xSFP/LC (155m)
Connectors	Optical SFP-LC, Contact, Terminal Block
LED Indicators	Contact Relay, Carrier Detect
Power	Operating Voltage Range 8 to 15 VDC
	Power Consumption 4W Max
Electrical & Mechanical	Current Protection Automatic Resettable Solid-State Current Limiters
	Circuit Board Meets IPC Standard
Dimension	159.5 × 20.8 × 88mm (D×W×H)
Weight	200g
MTBF	>100,000 hours
Operating Temperture	0℃ to +50℃
Storage Temperture	-10℃ to +85℃
Relative Humidity	0% to 95% (non-condensing)

5

Application



■ Related Product

IFC-BT40

(Industrial 4 Channel Binary Transducer, 4 binary input ,4 high power MSR Relay output)

Ordering Information

Model Name	Description
FRM220-CCF40	4ch Contact closure fiber converter
FRM220-CCF20	2ch Contact closure fiber converter

5

FRM220-FXO/FXS
FRM220-FXO/FXS-SFP

Single port FXO/FXS Fiber Converter

The FRM220-FXO/FXS is a POTS (Plain Old Telephone System) over fiber converter/extender. The POTS connection uses a standard RJ-11C modular connector for one copper pair connection. A pair of FRM220-FXO/FXS is required to implement an end to end system. FXO mode connects to a telephone line (PSTN) or PBX station line and has ability to detect ringing voltages and to act as a telephone. FXS mode is the reciprocal unit and has ability to act as PSTN and connects to a telephone device. When the FRM220-FXO/FXS card is placed in the FRM220 rack with NMC management, in-band management allows configuring and viewing the card and remote converter's status, type, version, fiber link status, on hook status and alarms. Both card and remote can be configured to enable or disable the port, reset the port and set the FXO or FXS mode. When configured in an FXS to FXS fashion, a private "hot line" or direct line is created. When placed in a single slot chassis and used standalone without management, the card may be configured by DIP switch.

Features

- Extend telephone voice transmission up to 120km over fiber
- Network management via terminal, web or SNMP in FRM220 (NMC)
- Supports caller ID Pass-Through
- Selectable FXO or FXS mode
- Supports FXS to FXS hot line
- Supports D/D function for SFP fiber transceiver
- Will not support FAX or Modems

Specifications

Optical Interface	Connector	SFP-LC / 1×9 (SC, ST, FC)
	Fiber	MM 62.2/125μm, 50/125μm, SM 9/125μm
		Rate: 51.84Mbps
	Distance	MM 2km, SM 15/30/50km, WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Indications	LED (Power, FX Link, Phone Act, Test)	
Power Input	12VDC	
Power Consumption	< 6W	
Dimensions	159.5 × 20.8 × 88mm (D×W×H)	
Weight	120g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	65,000 hrs	

Voice over Fiber with In-Band Management

Electrical Interface	Connector	RJ-11
	FXO mode	Impedance : 600 ohms
		Coding : 16 bits liner
		Loop Current : 10~100mA
		Ring Frequency : Acceptable 20 ~55Hz
		Insertion Loss: 0.0 ± 1.0dB at 1000Hz
		Level Gain : TX 0dB, RX -3dB
	FXS mode	Coding : 16 bits liner
		Dial: DTMF and Dial Pulse
		Battery Source: 48VDC ± 4V
		Ringing Waveform : Sine wave
		Impedance : 600 ohms
		Ringing Frequency : 20/25/30/35/40/45/50/55 Hz selectable
		Ring Cadence: FXS to FXS : On / 1 sec, Off / 2 sec
		FXO to FXS, Reproduces the cadence detected by FXO
		Insertion Loss 0.0 ± 1.0dB at 1000Hz
		REN: 4.0B(Ring Equivalence Number)
		Level Gain : TX 0dB, RX -3dB

Application

Figure 1 : Automatic Ring down hotline

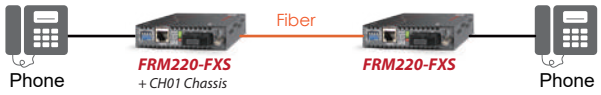


Figure 2 : Voice Transmission from 2km to 120km over fiber

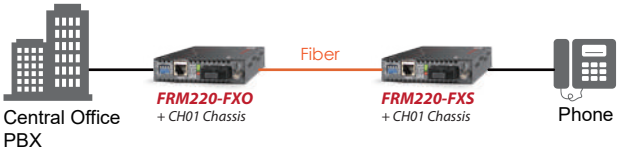
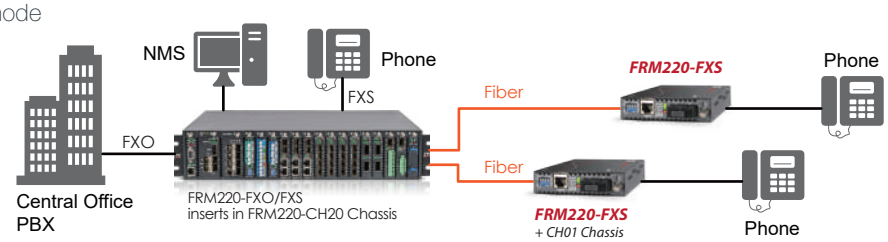


Figure 3 : Selectable FXO or FXS mode



Ordering Information

Model Name	Description
FRM220-FXO/FXS	FXO / FXS fiber converter card
FRM220-FXO/FXS-SFP	FXO / FXS fiber converter card (SFP-LC)

Connector Type	Connectivity Distance
SC, ST, FC (Not Applicable for SFP type)	002: 2km 015: 15km 030: 30km 050: 50km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type

5

FRM220-FXO-4
FRM220-FXS-4

4 × FXO over fiber & 4 × FXS over fiber

◀ with CH01 chassis

FRM220-FXO-4/FXS-4 are 4 channel POTS (Plain Old Telephone System) over fiber converter/extender. The four POTS connection uses standard RJ-11C modular connectors for each copper pair connection. A pair of FRM220-FXO-4/FXS-4 is required to implement an end to end system. FXO type unit connects to a telephone line (PSTN) or PBX station line and has ability to detect ringing voltages and to act as a telephone. FXS type unit is the reciprocal unit and has ability to act as PSTN and connects to a telephone device. Two FXS cards may be connected back-to-back to provide a private "hot line".

When the FRM220-FXO-4/FXS-4 cards are placed in the FRM220 rack with SNMP management, in-band management allows configuring and viewing the card and remote converter's status, type, version, fiber link status, on hook status and alarms. When placed in a single slot chassis and used standalone without management, the card may be configured by DIP switch.

Features

- Extend telephone voice transmission up to 120km over fiber
- Network management via terminal, web or SNMP in FRM220 (NMC)
- Supports telephone voice transmission
- Supports FXS to FXS hot line
- Supports caller ID Pass-Through
- Supports FAX and Modem transmissions

Specifications

Optical Interface	Connector	SFP-LC
	Fiber	MM 62.2/125μm, 50/125μm, SM 9/125μm
		Rate: 155Mbps
	Distance	MM 2km, SM 15/30/50km, WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Indications	LED (Power, FX Link, Phone Act, Test)	
Power Input	12VDC	
Power Consumption	< 6W (FRM220-FXO-4)	
	< 12W (FRM220-FXS-4)	
Dimensions	159.5 × 20.8 × 88mm (D×W×H)	
Weight	120g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	65,000 hrs	

Voice over Fiber with In-Band Management

Electrical Interface	Connector	RJ-11
	FXO model	Impedance : 600 ohms
		Coding : 16 bits liner
		Loop Current : 10~100mA
		Ring Frequency : Acceptable 20 ~55Hz
		Insertion Loss: 0.0 ± 1.0dB at 1000Hz
		Level Gain : TX 0dB, RX -3dB
	FXS model	Coding : 16 bits liner
		Dial: DTMF and Dial Pulse
		Provides 48VDC ± 4V to FXO
		Ringing Waveform : Sine wave
		Impedance : 600 ohms
		Ringing Frequency : 20/25/30/35/40/45/50/55 Hz selectable
		Ring Cadence: FXS to FXS : On / 1 sec, Off / 2 sec
		FXO to FXS, Reproduces the cadence detected by FXO
		Insertion Loss 0.0 ± 1.0dB at 1000Hz
		REN: 4.0B(Ring Equivalence Number)
		Level Gain : TX 0dB, RX -3dB

Application

Figure 1 : Automatic Ring down hotline

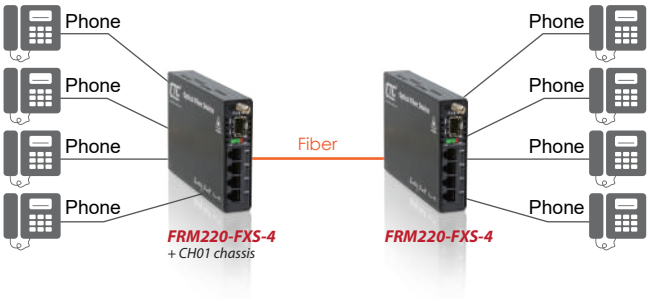
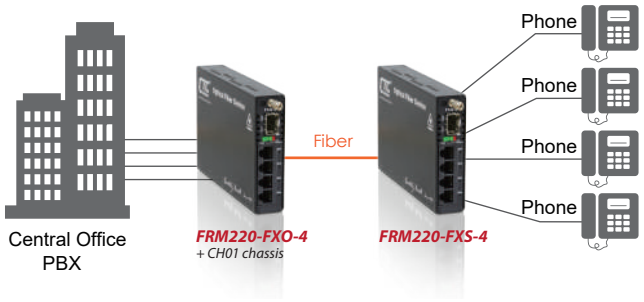


Figure 2 : Voice transmission from 2km to 120km over fiber



Ordering Information

Model Name	Description
FRM220-FXO-4	4-port FXO fiber converter card (SFP-LC)
FRM220-FXS-4	4-port FXS fiber converter card (SFP-LC)

■ Chassis Option

Model Name	Description
FRM220-CH1	1-slot chassis with 100~240VAC to 12VDC adapter (12W), fanless
FRM220-CH01-AD	1-slot chassis with AC/12W+DC/12W, fanless
FRM220-CH01M	1-slot chassis with console port and AC/12W+DC/12W, fanless

5

FRM220-GFOM04
FRM220-GFOM08

4/8 E1/T1 + GbE Fiber Multiplexer

The FRM220-GFOM04/GFOM08 is a 4/8 channel E1/T1 fiber multiplexer with an additional Gigabit Ethernet trunk, plus order wire and clear channel RS- 232, constructed as a two slot wide card for the FRM220 series. When the FRM220-GFOM04/GFOM08 card is placed in the FRM220 rack with NMC, the administrator can view the converter card's status, type, version, fiber link status and alarms. Remote, fiber connected standalone card, can also be managed through in-band management via the chassis NMC. The card can be configured to enable or disable the port, reset the port, and provide local or remote diagnostic loopback. The 1+1 redundant optical aggregate of this multiplexer employs industry standard pluggable optics (SFP) operating at 1.25Gbps data rates. The SFP modules can be chosen to support single-mode, multi-mode, single fiber bi-directional or Coarse and Dense Wave Division Multiplexing (CWDM and DWDM).

Features

- 8 channels unframed E1/T1 (transparent)(FRM220-GFOM08)
- 4 channels unframed E1/T1 (transparent)(FRM220-GFOM04)
- 10/100/1000Base-T Ethernet
- Auto MDI/MDIX & Auto-Negotiation or Force Mode
- Supports flow control 802.3x & 9K jumbo packets
- Supports link fault Pass-Through for Ethernet
- One clear channel RS232 up to 250Kbps(Async)
- 1+1 fiber protection, switching time < 50ms
- Supports Digital Diagnostics Monitoring Interface (DDMI) SFP
- AIS on signal loss on E1/T1 and fiber port
- Loopback test on E1/T1, RS232, fiber ports
- Supports local or remote In-band management (Monitor or Configure status) by SNMP manager and console port
- Supports Order wire Ear / Microphone port
- Supports On-Line F/W upgrade & Dying Gasp

Specifications

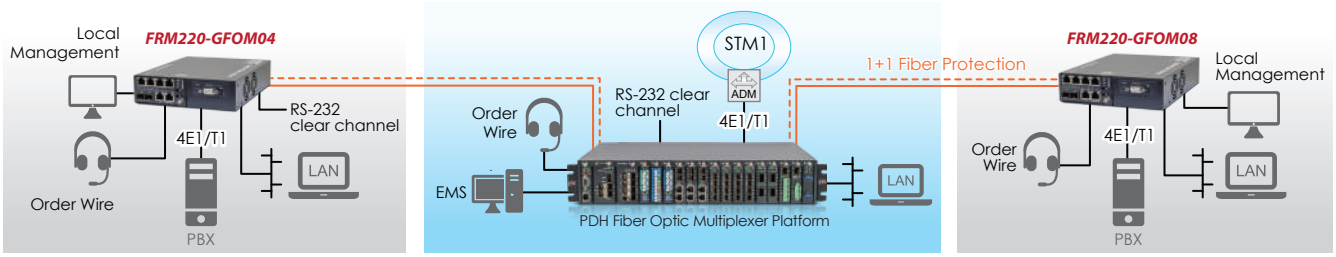
E1/T1 ports	Framing	Unframed (transparent)
	Bit Rate	E1:2.048 Mb/s , T1: 1.544Mb/s
	Line Code	E1:AMI/HDB3, T1: AMI/B8ZS
	Line Impedance	E1: Unbalanced 75 ohms (BNC)
		E1: Balanced 120 ohms (RJ-45)
		T1: Balanced 100 ohms (RJ-45)
	Receiver sensitivity	Short haul
	"Pulse" Amplitude	Nominal 2.37V+/-10% for 75 ohms
		Nominal 3.00V+/-10% for 120 ohms
	"Zero" Amplitude	+/-0.3V
	Internal Timing	+/-30 ppm
	Jitter Performance	According to ITU-T G.823
	Performance monitoring	According to ITU-T G.821
	Standards	ITU-T G.703, G.704, G.706 and G.732
	Interface Connectors	RJ-45
	Test Loops	LLB (Local Loop Back)
		NELB (Near End Loop Back)
		RLB (Remote Loop Back)
		RRLB (Request Remote Loop Back)

GbE Fiber Multiplexer with In-Band Management

Fiber	Connector	SFP LC
	Data Rate	1.25 Gbps
Ethernet	Interface Type	10/100/1000Base-T
	Connector	RJ-45
	Standards	IEEE 802.3, 802.3u, 802.3ab
	Duplex modes	full/half
Indications	FX1 Link, FX2 link, E1/T1 Mode/Link/Loopback test, Order wire phone indicator, LAN Link/Speed	
Power Input	12VDC	
Power Consumption	< 12W	
Dimensions	159.5 × 42.1 × 88mm (D×W×H)	
Weight	200g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% RH (non-condensing)	
Certifications	CE, FCC	
MTBF	65,000hrs	

Application

Managed 4E1/T1 + Gigabit Ethernet Fiber Optical Multiplexer Application



Ordering Information

Model Name	Description
FRM220-GFOM04-SR	4 x E1/T1 RJ-45 and 10/100/1000Base-T Ethernet fiber optic multiplexer card (optional SFP module)
FRM220-GFOM04-SB	4x E1 BNC and 10/100/1000Base-T Ethernet fiber optic multiplexer card (optional SFP module)
FRM220-GFOM08-SR	8x E1/T1 RJ45 and 1000Mbps Ethernet fiber mux card with 4x2E1 RJ45 cable (optional SFP module, Model : SFS-70xx-xx)
FRM220-GFOM08-SB	8x E1 BNC and 1000Mbps Ethernet fiber mux card with 4x2E1 BNC cable (optional SFP module, Model : SFS-70xx-xx)

2E1 RJ45 cable

6 XMC-10GC

10G/5G/2.5G/1G/100M Copper to 10GBASE-R SFP+ Media Converter

NEW

The 10G Media Converter, XMC-10GC is equipped with one 10G/5G/2.5G/1G/100BASE-T auto-negotiation port and one 10GBASE-R SFP+ slot. This converter uses Cat.6a/Cat 7 twisted pair cable as copper transmission media with RJ-45 and 10G optical solution with SFP+ LC connector. The data stream can be converted bi-directionally from 10G Base-T to 10G Base-R and vice versa. With full duplex wire speed forwarding capability between these two media, the XMC-10GC brings you the best and simplest solution for the 10G Ethernet conversion between copper wire and fiber.

Features

- 1× 10G/5G/2.5G/1G/100BASE-T RJ45 interface with auto MDI/MDI-X function
- 1× 10GBASE-X SFP+ slot interface
- Supports auto-negotiation and 100Mbps and 1/2.5/5/10Gbps full duplex mode
- 16K jumbo frame size support
- Wall-mount design
- Loopback Test
- Link Fault Pass Through
- Supports USB console for set up and status checking
- Supports DWDM Tunable SFP+
- Supports Energy, Efficient, Ethernet (EEE)
- Supports Cable Diagnostic
- Supports Pattern Test
- Supports Local F/W upgrade

Specifications

Copper Interface	1 × 10G/5G/2.5G/1G/100BASE-T RJ45
Fiber Optic Interface	1 × 10GBASE-R SFP+ slot
LED	PWR, LFP, FX Link, FX Speed, LAN Link, LAN Speed
Switch Processing Scheme	Store and Forward
Enclosure	Compact-sized metal case
Installation	Desktop, wall mountable
Dimensions (W×D×H)	95 × 23 × 73.4mm
Weight	280g
Power Requirements	12VDC / 1A
Power Consumption	6W (max)
Fabric	20Gbps
Jumbo Frame	16K
Regulatory Compliance	FCC Part 15 Class A, CE
Operating Temperature	0 ~ 45 °C
Storage Environment	-10 ~ 70 °C
Operating Humidity	5 ~ 95%, (non-condensing)
Storage Humidity	5 ~ 95%, (non-condensing)
Standards Compliance	IEEE 802.3u 100BASE-TX, IEEE 802.3ab 1000BASE-T, IEEE 802.3bz 2.5G/5GBASE-T
	IEEE 802.3an 10GBASE-T, IEEE 802.3ae 10Gbps Ethernet over Fiber
Network Cable	10GBase-T : 100meters over CAT6A and CAT7, 55meters over CAT6, Best Effort over CAT5e

6

Application

Ordering Information

Model Name	Description
XMC-10GC	10G/5G/2.5G/1G/100M RJ45 to 10GBASE-R SFP+ 10G Media Converter

NOTE: The XMC-10GC may be placed in FMC-CH17 chassis with 6 pcs (max.)

6 FMC-1001S

100/1000Base-T to 100/1000Base-X SFP Media Converter

The FMC-1001S family are Gigabit Ethernet 10/100/1000Base-T to 100/1000Base-X non-managed stand-alone media converters, which give you the fiber cabling connectors, LC with SFP module. Pluggable SFP are available in both multi-mode and single mode types as well as BiDi which allows bi-directional transmissions using only a single fiber cable. Auto-negotiation will automatically tailor to convert full-duplex signals, according to IEEE 802.3u standards. LED indicators signal the power status of the converter, UTP port speed and Link status FX port speed and Link status.

Features

- 10/100/1000Base-T to 100/1000Base-X Converter
- Auto-Negotiation
- Auto MDI/MDIX
- Forward 2048 bytes (Max.) packets in switch mode (copper & fiber port in different speed)
- Forward 16k bytes in converter mode (fiber & copper port at the same speed)
- Provides DIP switch to set function
  -Select fiber speed (100/1000M)
  -Select LFP enable / disable
  -Flow control enable / disable
- Supports transparent Q in Q double tagged frame
- Supports IEEE 802.1Q Tag VLAN pass thru
- May be concentrated into FMC-CH17 chassis (Adapter Type only)
- Supports store and forward switch mode

Standalone Option

Adapter Type

Dimension: 96.5×23×73.4mm(W×D×H)

DC Type
(12V Power Jack)

▲ Module for FMC-CH17 Chassis

Power Built-in Type

Dimension: 135×23×73.4mm(W×D×H)

AC Type
(100-240V)

Specifications

Optical Interface	Connector	SFP LC
	Data rate	1.25G / 125M
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm, SM 9/125μm
	Distance	MM 2km, SM 15/30km, WDM 20/40km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (Type A)
		1550Tx/1310Rx (Type B)
Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mbps, 1000Mbps
	Duplex mode	Full duplex
	Cable	100Base-TX Cat.5, 5e or higher
		1000Base-T Cat.5, 5e or higher
DIP Switch	Fiber Speed	100M/1000M
	LFP Fiber	Enable/Disable
	LFP Copper	Enable/Disable
	Flow Control	On/Off

Compact Media Converter

Standards	IEEE 802.3, 802.3u, 802.3x, 802.3Z, 802,3ab	
Indications	LED (Power, FX Link, FX SPD, TX SPD, TX Link, FDX)	
Power Input	Adapter Type: DC 12V	
	Power Built-in Type: AC 100~240V	
Power Consumption	< 3W	
Enclosure	Plastic	
Dimensions (W×D×H)	Adapter Type:	96.5 × 23 × 73.4mm
	Power Built-in Type :	135 × 23 × 73.4mm
Weight	Adapter Type :	120g
	Power Built-in Type :	140g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	65,000 hrs	

Application

Figure 1: As Rack Module with Remote

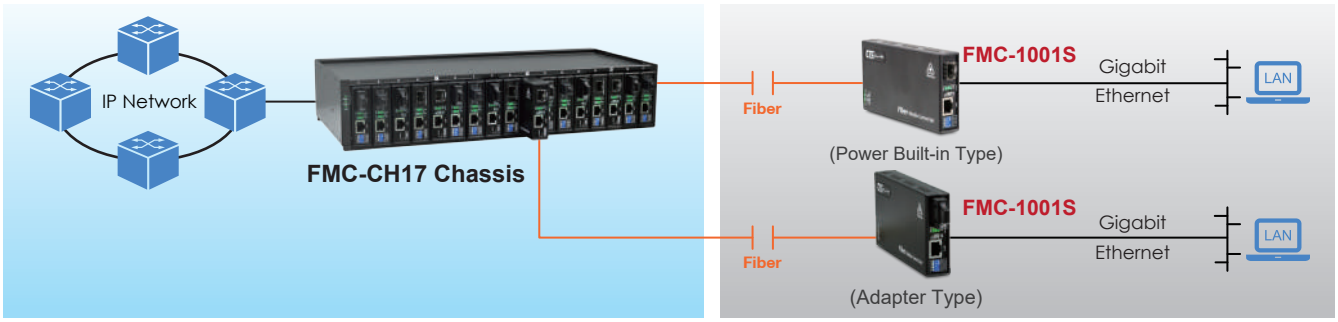
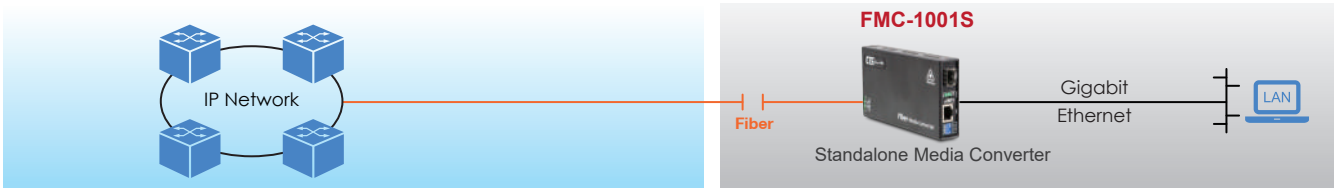


Figure 2: As Standalone Media Converter



Ordering Information

Model Name	Description
FMC-1001S	10/100/1000Base-T to 100/1000Base-X SFP media converter with adapter, plastic case
FMC-1001S-AC	10/100/1000Base-T to 100/1000Base-X SFP media converter with AC power, plastic case

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

■ Wall-Mounting Kit

6 FMC-2000MS

Web Smart OAM Managed 100/1000Base-T to 100/1000Base-X SFP GbE Switch

The FMC-2000MS family are Web Smart OAM/IP managed Gigabit Ethernet 10/100/1000Base-T to 100/1000Base-X fiber Ethernet Switch/Converter, which provide simple control and setting function on each Ethernet port through in band network via a Web browser. The FMC-2000MS Ethernet Switch/Converter gives you the fiber cabling connector, SFP-LC. Both multi-mode and single mode models are available as well as BiDi which allows bi-directional transmissions using only a single fiber cable. Auto-negotiation will automatically tailor to convert both half-duplex and full-duplex signals, according to IEEE 802.3u standards. LED indicators signal the power status of the Switch, UTP port speed, Link, and duplex status, FX port Link and duplex status.

Features

- 10/100/1000Base-T to 100/1000Base-X SFP Ethernet Switch
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or Manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 16K Packet
- Ingress/Egress Bandwidth control
- Supports IEEE 802.3ah OAM management
- Supports SNMPv1
- Digital Diagnostic (DOM) SFP Support
- Management Password Setting
- Dying gasp (remote power failure detection)
- Supports Link Fault Pass-Through (LFPT) Function
- Supports Auto Laser Shutdown (ALS) Function
- USB console port and Web management on stand-alone
- Supports On-Line F/W upgrade (local) by the Web manager
- Supports 16 Tag VLAN Groups
- RMON counters
- May be concentrated into FMC-CH17chassis (Adapter Type only)
- May be used as a remote to FRM220-2000MS
- Wall-Mountable

Standalone Option

Adapter Type

Dimension: 96.5×23×73.4mm(W×D×H)

DC Type
(12V Power Jack)

▲ Module for FMC-CH17 Chassis

Power Built-in Type

Dimension: 135×23×73.4mm(W×D×H)

AC Type
(100-240V)

Specifications

Optical Interface	Connector	SFP LC
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm, SM 9/125μm
	Distance	MM 2km, SM 15/30km, WDM 20/40km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (Type A)
		1550Tx/1310Rx (Type B)

Compact Ethernet Switch with In-Band Management

Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mbps, 1000Mbps
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e or higher
Console Port	USB Type C™	
Standards	IEEE 802.3, IEEE 802.3u IEEE 802.3ab, 802.3z, 802.1Q	
Indications	LED (Power, FX-Link, FX SPD, LAN Speed, LAN Link)	
Power Input	Adapter Type: DC 12V	
	Power Built-in Type: AC 100~240V	
Power Consumption	< 3W	
Enclosure	Plastic	
Dimensions (W×D×H)	Adapter Type:	96.5 × 23 × 73.4mm
	Power Built-in Type :	135 × 23 × 73.4mm
Weight	Adapter Type :	120g
	Power Built-in Type :	140g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	>65,000 hrs	

Application

Figure 1: As a Remote to FRM220-2000MS

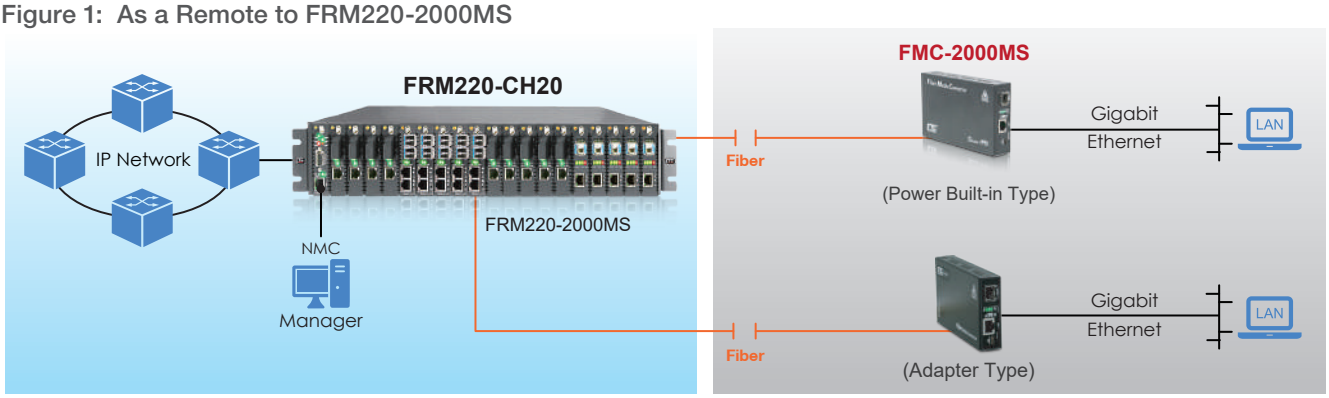


Figure 2: As Rack Module with Remote

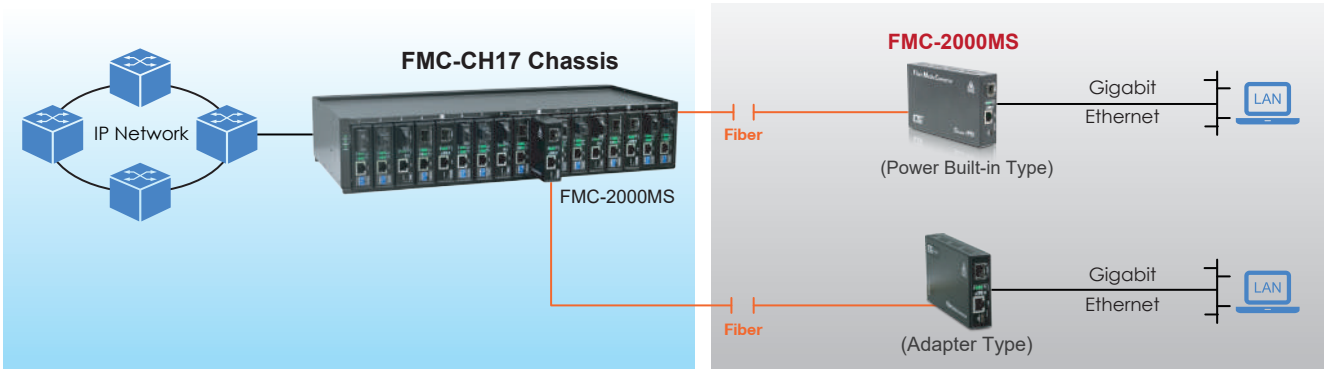
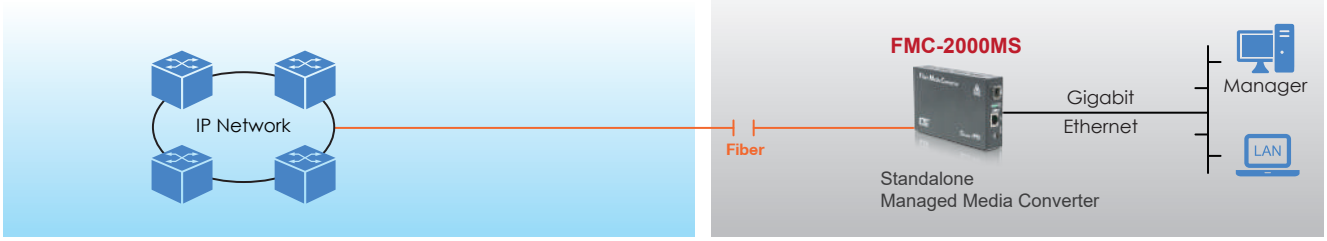


Figure 3: As Standalone Managed Converter



6

Ordering Information

Model Name	Description
FMC -2000MS	10/100/1000Base-T to 100/1000Base-X SFP Web Smart managed Ethernet switch (optional SFP module) with adapter, plastic case
FMC-2000MS-AC	10/100/1000Base-T to 100/1000Base-X SFP Web Smart managed Ethernet switch (optional SFP module) with AC power, plastic case

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

■ Wall-Mounting Kit

6 FMC-10/100

10/100Base-TX to 100Base-FX Media Converter

The FMC-10/100 family are Fast Ethernet 10/100Base-TX to 100Base-FX non-managed stand-alone media converters, which give you the options to choose from the most popular fiber cabling connectors, ST, SC or FC. Both multi-mode and single mode converter models are available as well as BiDi which allows bi-directional transmissions using only a single fiber cable. Auto-negotiation will automatically tailor to convert both half-duplex and full-duplex signals, according to IEEE 802.3u standards. LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status.

Features

- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 1600 bytes (Max.) packets
- Supports flow control (Pause)
- Supports Link Fault Pass-Through (LFPT)
- Supports Far End Fault Indication (FEFI)
- Forward 9K jumbo packets in converter mode (100M/Full)
- May be concentrated into FMC-CH17 chassis (Adapter Type only)

Standalone Option

Adapter Type

Dimension: 96.5×23×73.4mm(W×D×H)

DC Type (12V Power Jack)

▲ Module for FMC-CH17 Chassis

Power Built-in Type

Dimension: 135×23×73.4mm(W×D×H)

AC Type (100-240V)

Specifications

Optical Interface	Connector	1 × 9 (SC, ST, FC)
	Data rate	125Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30km
		WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (Type A)
		1550Tx/1310Rx (Type B)
Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mpbs
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, cat.6
		100Base-TX Cat.5, 5e or cat.6
Standards	IEEE 802.3, IEEE 802.3u	
Indications	LED (Power, FX Link, FX SPD, TX Link, TX Duplex, FEF)	
Power Input	Adapter Type: DC 12V	
	Power Built-in Type: AC 100 ~ 240V	

Compact Media Converter

Power Consumption	< 2W	
Enclosure	Plastic	
Dimensions (W×D×H)	Adapter Type :	96.5 × 23 × 73.4mm
	Power Built-in Type :	135 × 23 × 73.4mm
Weight	Adapter Type :	120g
	Power Built-in Type :	140g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	65,000 hrs	

Application

Figure 1: As Rack Module with Remote

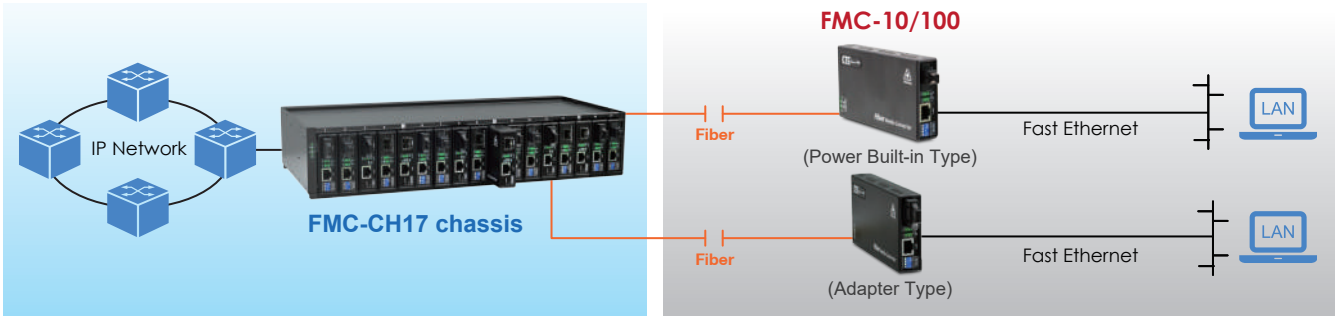
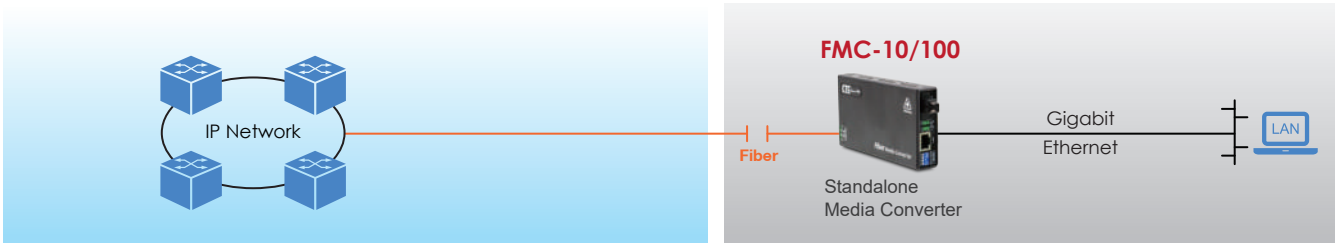


Figure 2: As Standalone Managed Converter



Ordering Information

Model Name	Description
FMC-10/100	10/100Base-TX to 100Base-FX Non-managed media converter adapter type, plastic case
FMC-10/100-AC	10/100Base-TX to 100Base-FX Non-managed media converter with AC power, plastic case

Connector Type	Connectivity Distance
SC, ST, FC	002: 2km 015: 15km 030: 30km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type 80A: WDM 80km A type 80B: WDM 80km B type 120A: WDM 120km A type 120B: WDM 120km B type

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

■ Wall-Mounting Kit

6 FMC-10/100i

10/100Base-TX to 100Base-FX In-Band Managed Converter

The FMC-10/100i family are Fast Ethernet 10/100Base-TX to 100Base-FX In-band managed media converters, which give you the options to choose from the most popular fiber cabling connectors, ST, SC or FC. With advanced features like bandwidth control, this media converter is targeted for customer premises equipment in metro LAN, campus, enterprise and FTTx applications. By offering in-band management, this converter can be completely controlled and monitored from a centrally located managed rack controlling all converter settings including band-width control, duplex, and speed configuration. This media converter is completely transparent to Layer 2 and Layer 3 protocols including IEEE 802.1q, VLAN tag, Q in Q, STP, IPX, IP, etc.

Features

- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 2046 bytes (Max.) packets in switch mode
- Forward 9K jumbo packets in converter mode
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1q Tag VLAN pass thru
- Supports local / remote In-band management (Monitor and Configure) by the SNMP manager with FRM220-NMC
- Bandwidth control (Nx32K or Nx512Kbps)
- Supports flow control (Pause)
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports Loop Back Test
- Supports RMON counter
- Auto Laser Shutdown (ALS)
- Fiber Hardware Reset (FHR)
- Online local / remote f/w upgrade

Standalone Option

Adapter Type

Dimension: 96.5×23×73.4mm(W×D×H)

DC Type
(12V Power Jack)

▲ Module for FMC-CH17 Chassis

Power Built-in Type

Dimension: 135×23×73.4mm(W×D×H)

AC Type
(100-240V)

Specifications

Optical Interface	Connector	1 × 9 (SC, ST, FC)
	Data rate	125Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30km
		WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (Type A)
		1550Tx/1310Rx (Type B)
Standards	IEEE 802.3, IEEE 802.3u	
Power Input	Adapter Type : DC 12V	
	Power Built-in Type : AC 100 ~ 240V	
LEDs	Power, FX Link, FX SPD, TX Link, TX Duplex, FEF	

Compact Media Converter with In-Band Management

Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mpbs
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e
	Distance	100 meters
Power Consumption	< 3W	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Enclosure	Plastic	
Dimensions (W×D×H)	Adapter Type :	96.5 × 23 × 73.4mm
	Power Built-in Type :	135 × 23 × 73.4mm
Weight	Adapter Type :	120g
	Power Built-in Type :	140g
Certification	CE, FCC	
MTBF	65,000 hrs	

Application

Figure 1: As a Remote to FRM220-10/100i

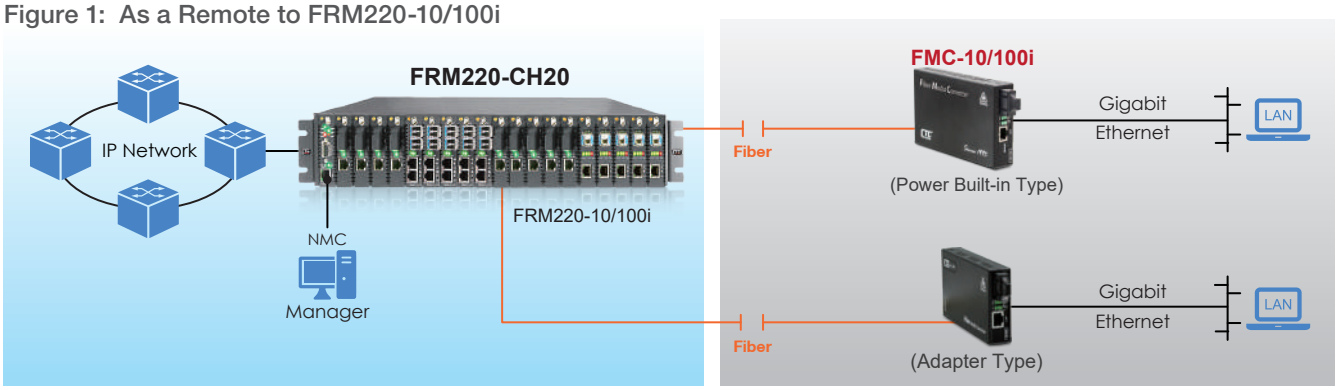


Figure 2: As Rack Module with Remote

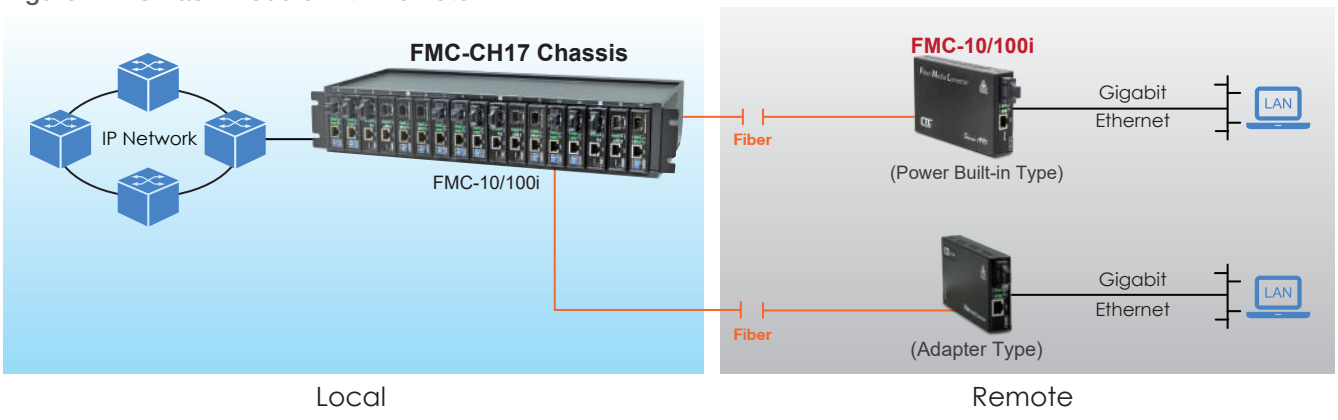
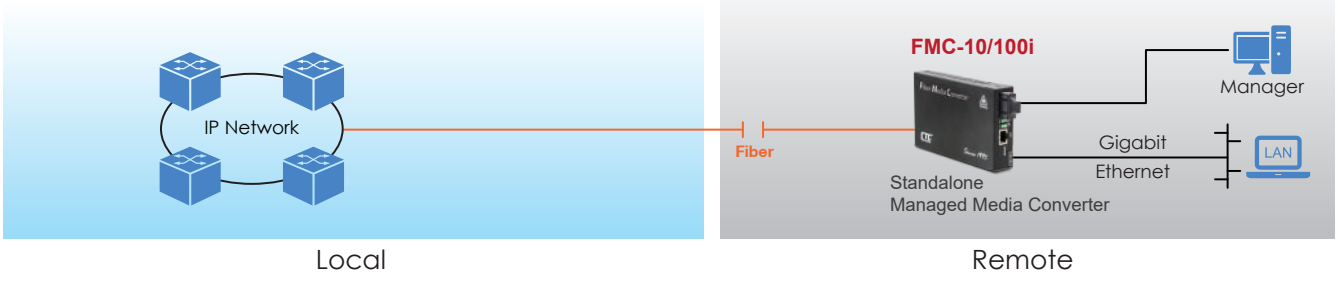


Figure 3: As Standalone Managed Converter



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Ordering Information

Model Name	Description
FMC-10/100i	10/100Base-TX to 100Base-FX In-band managed media converter adapter type, plastic case
FMC-10/100i-AC	10/100Base-TX to 100Base-FX In-band managed media converter with AC power, plastic case

Connector Type	Connectivity Distance
SC, ST, FC	002: 2km 015: 15km 030: 30km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

■ Wall-Mounting Kit

6

FMC-1800

1U Managed GbE Media Converter Rack
18 × 100/1000Base-T to 18 × 100/1000Base-X SFP

The 18-channel managed Gigabit Ethernet Media Converter Rack, FMC-1800 converts Ethernet copper 100/1000Base-TX to SFPs working at 100Mbps or 1000Mbps. FMC-1800 can connect to any RJ-45 Ethernet switch and supports any third-party standard SFP module from any SFP vendor. With different kinds of fiber optic media, both multi-mode and single mode fiber are available as well as BiDi which allows bi-directional transmissions using only a single fiber to extend the distance of Fast Ethernet and Gigabit Ethernet networks. With SNMP and Web-based management, the administrator can monitor, configure and control the activity of FMC-1800 remotely.

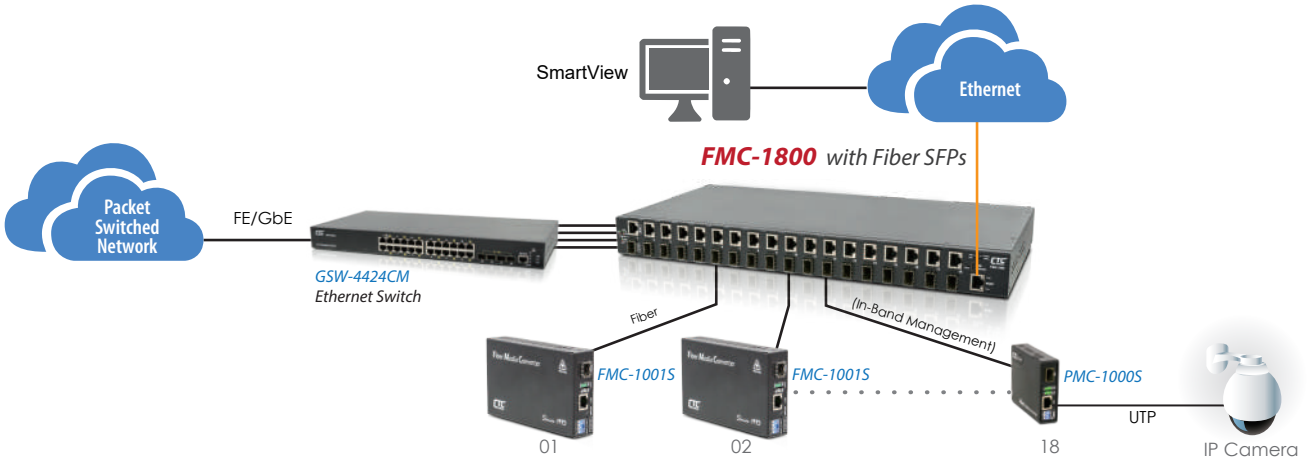
Features

- 1U 19" 18 channels Managed Media Converter Rack
- 18-port 100/1000Base-T to 18-port 100/1000Base-X SFP
- Auto MDI/MDIX in TP port
- Auto-Negotiation in TP port
- Supports hot-swappable SFPs working at 100 Mbps or 1000 Mbps
- Supports Web, Telnet, SNMP, Console Management
- Local configuration via USB console port
- Supports Link Pass-Through & Link loss Alarm
- Supports any third-party standard SFP module
- Supports SFP DDMI
- Layer 2 wire-speed conversion with fully transparent function
- Available in 3 types : power built-in AC, DC, AC+DC
- Jumbo frame packets up 16k bytes

Specifications

Optical Interface	Connector	SFP LC
	Number of ports	18
	Data rate	100/1000Mbps
	Duplex	Full duplex
	Fiber	MM 50/125um, 62.5/125um, SM 9/125um
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	850nm, 1310nm, 1550nm, CWDM 1271~1611nm
	Console port	USB Type C™
	Standards	IEEE 802.3, 802.3u, 802.3ab, 802.3z, 802.3x
	Indications	Power, SYS, Alarm, FX-Link/Act, TX-Link/Act, LFPT
Electrical Interface	Connector	RJ45
	Number of ports	18
	Data rate	10/100/1000Mbps
	Duplex	Half/Full duplex
	Cable	10Base-T Cat. 3,4,5 UTP
		100/1000Base-T Cat 5, 5e or higher
Management	Console, Web, Telnet, SNMP	
Power	100 ~ 240VAC, 36 ~ 60VDC	
Power Consumption	<60W	
Dimensions	440 × 250 × 43.5mm (W×D×H)	
Weight	TBD	
Humidity	5% ~ 90% (non-condensing)	
Operating Temperature	Operating 0 ~ 50°C , Storage -10 ~ 70°C	
Certification	FCC, CE	
MTBF	>65000hrs	

6 Application



Ordering Information

Model Name	Description
FMC-1800-AC, DC, AD	18ch, 1U 19" GbE media Converter Rack, built-in AC, DC, AD power

6 FMC-CH17 & FMC-CH08

17 or 8 slots Compact Media Converter Chassis

The FMC-CH17 is a 2U high 19" 17 slots chassis and the FMC-CH08 is a 2U high 10" 8 slots cassis. The FMC chassis provides an economic solution in low density fiber converter installations where no management features are required. Each FMC converter is an independent Ethernet to fiber or Ethernet to copper media converter that may be used as a standalone converter or placed in the FMC-CH17 or FMC-CH08 chassis. With two power supplies, the FMC-CH17 chassis supports redundant power from any of two power options while FMC-CH08 supports single power options. The AC supplies operate from (100-240VAC) and DC supplies operate from 18-60VDC. The built in cooling fan ensures that the temperatures in the rack remain within the tolerated working range.

Features

- 2U, 19", 17-Slot chassis with single or dual built-in power for AC or DC (FMC-CH17)
- 2U, 10", 8-slot chassis with single built-in power for AC or DC (FMC-CH08)
- Cross flow cooling fan built-in. (FMC-CH17)
- Designed for 19" Rack mounting
- FMC units are hot swappable

Specifications

Power Input	AC : 100 ~240V or DC : 18 ~ 60V
Power Consumption	<60W (FMC-CH17), <30W (FMC-CH08)
Dimensions (D×W×H)	199 × 476 × 88 mm (FMC-CH17), 173 × 252 × 89 mm (FMC-CH08)
Weight	2.6Kg (FMC-CH17), 1.47Kg (FMC-CH08)
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	65,000hrs

Chassis Overview

FMC-CH17 Chassis

Compact Media Converter Chassis

FMC-CH08 Chassis

FMC Opeion
- Fast Ethernet
- Gigabit Ethernet
- VDSL2 LAN Extender

Front view

8-Slot

Rackmount bracket

Rear view

Power Switch

AC Power or
DC Power Terminal

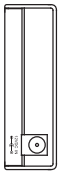
Adapter Type (Module for FMC-CH17 & FMC-CH08 Chassis)

■ Plastic Case

FMC-1001S

FMC-10/100

FMC-2000MS



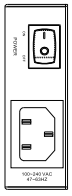
Dimension: (D×W×H)
96.5×23×73.4mm

DC 12V
Power Jack

Power Built-in Type

■ Metal Case

Dimension: (D×W×H)
145×27×87mm

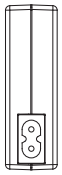


◀ Power Switch

AC Type
(100-240V)

■ Plastic Case

Dimension: (D×W×H)
135×23×73.4mm



AC Type
(100-240V)

Ordering Information

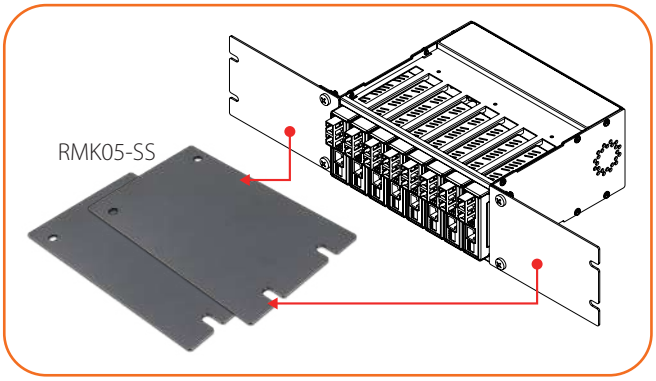
Model Name	Description
FMC-CH17-AC	2U, 19", 17-Slot Chassis with AC Power
FMC-CH17-DC	2U, 19", 17-Slot Chassis with DC Power
FMC-CH17-AD	2U, 19", 17-Slot Chassis with AC+DC Power
FMC-CH17-AA	2U, 19", 17-Slot Chassis with AC+AC Power
FMC-CH17-DD	2U, 19", 17-Slot Chassis with DC+DC Power
FMC-CH08-AC	2U, 10", 8-Slot Rack with 10" Rack Mount Ear and AC Power
FMC-CH08-DC	2U, 10", 8-Slot Rack with 10" Rack Mount Ear and DC Power

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit
RMK05-SS	Rack Mounting Kits for FMC-CH08 single chassis mounting in 19" rack

■ Wall-Mounting Kit

■ FMC-CH08 chassis with RMK05-SS for rack installation



7 CMD40/80/180

Dual Fiber CWDM Mux/Demux Rack

The CMD series is a standalone dual fiber CWDM Mux/Demux rack for CWDM wavelengths from 1271nm to 1611nm. When fiber availability is limited, the CMD Mux/Demux can increase the bandwidth on the existing fiber infrastructure. By using CMD Mux/Demux for 10Gbps per channel service, up to 180 Gbps could be supported on dual core fiber. The CMD Mux/Demux provides the primary wave division and combination functions for CWDM. Line side wave lengths require translation to client side equipment via a transponder card or direct connection to CWDM wavelength SFP or SFP+ modules.

Features

- Full native mode performance
- Standard LC/UPC connectors
- Passive model requires no power
- Protocol transparent, no limitation
- Utilizes industry standard ITU-T CWDM wavelength
- Integration with Transponder for CWDM application

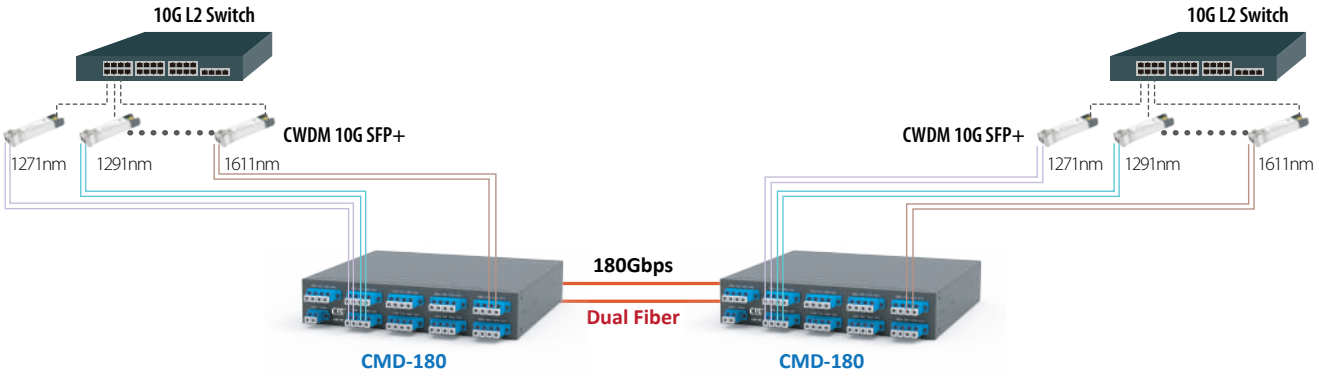
Specifications

Model Name	CMD180	CMD80	CMD40
CWDM Wavelength	1271~1611nm	1471 ~1611nm	1551~1611nm
Operation Wavelength	1260~1620nm	1260~1620nm	1260~1620nm
Channel Spacing	20nm	20nm	20nm
Channel Passband	ITU±6.5nm	ITU±6.5nm	ITU±6.5nm
IL-CWDM channel (with connector)	1.8nm	1.4nm	1.1nm
Pair IL-CWDM channel (M+D,with connector)	3.6dB(Max)	2.8dB(Max)	2.2dB(Max)
Ripple	0.5dB(Max)	0.5dB(Max)	0.5dB(Max)
Adjacent Isolation	30dB(Max)	30dB(Max)	30dB(Max)
Non-Adjacent Isolation	40dB(Max)	40dB(Max)	40dB(Max)
Polarization Dependent Loss	0.2dB(Min)	0.2dB(Min)	0.2dB(Min)
Polarization Mode Dispersion	0.2dB(Min)	0.2dB(Min)	0.2dB(Min)
Directivity	50dB(Max)	50dB(Max)	50dB(Max)
Return Loss	45dB(Min)	45dB(Min)	45dB(Min)
Operating Temperature	-40~85°C	-40~85°C	-40~85°C
Storage Temperature	-40~85°C	-40~85°C	-40~85°C
Connector	LC/UPC	LC/UPC	LC/UPC
Dimension (W×D×H)	215 × 211 × 44mm	215 × 211 × 44mm	215 × 211 × 44mm

7

Application

▪ Dual Fiber 18ch CWDM Mux/Demux Application



Ordering Information

Model Name	Description
CMD180	18Ch 1U 9" rack ,wavelength (1271 ~ 1611nm), LC/UPC
CMD80	8Ch 1U 9" rack, wavelength (1471 ~ 1611nm), LC/UPC
CMD40	4Ch 1U 9" rack, wavelength (1551 ~ 1611nm), LC/UPC

8

STE211W & STE211

2-port Serial to Ethernet Wireless Device Server

2-port Serial to Ethernet Device Server

The serial to Ethernet wireless device server (STE211W) and serial to Ethernet device server(STE211) provide a bridging device to connect RS-232/RS-485 Serial Data communications to hardwired Ethernet networks or WiFi wireless networks. It connects serial devices such as PLC, alarm sensors and PTZ camera control to IP networks. Applications include industrial/factory automation, public safety, and surveillance systems. The Serial converter is built for use in light industrial environments, featuring a compact wall-mount design. It operates from 9-32VDC power supply voltages with terminal block connectors and is easy to configure through its web GUI interface.

Features

- 1-port RS-232 + 1-port RS-422/485
- As a Server, supports 4 TCP Clients connection simultaneously
- As a Client, supports connecting with 4 TCP Servers
- Easy installation with Windows IP Search utility
- Web browser configuration
- Supports 802.11b/g/n and Ethernet, 2 IPs (STE211W)
- Watch Dog Function

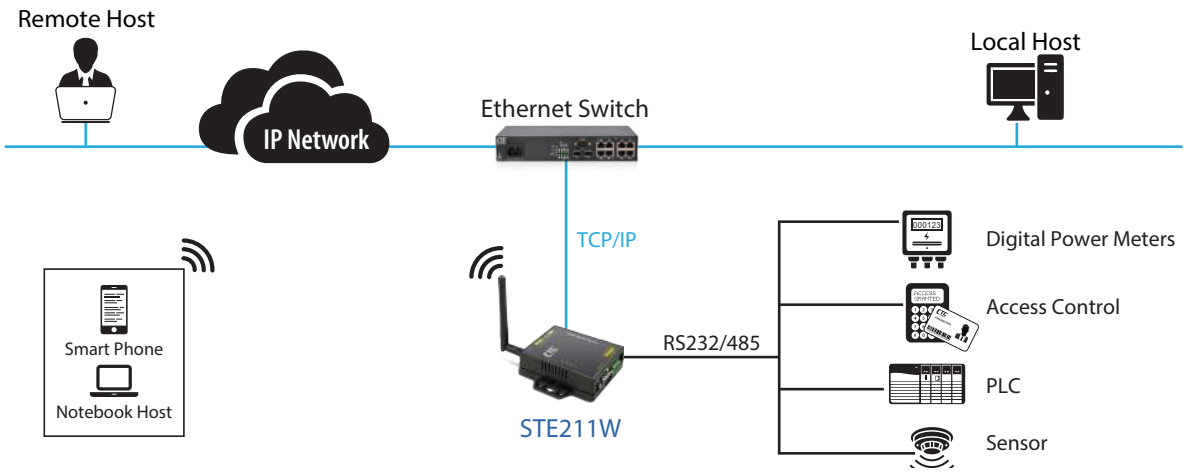
Specifications

Ethernet	Port Type	RJ-45 Connector
	Speed	10/100 M bps (Auto Detecting)
	Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, DNS, NTP
	Mode	TCP Server/TCP Client/UDP/Virtual Com
	Setup	HTTP Browser Setup (IE, Chrome, Firefox)
	Security	Setup Password
	Protection	Built-in 1.5KV Magnetic Isolation
Serial Ports *2	Port	RS-232 (RX/TX only)
	Port	RS-422 / 485 (Surge Protect)
	Speed	300 bps ~ 921.6 K bps
	Parity	None, Odd, Even
	Data Bit	5, 6, 7, 8
	Stop Bit	1, 2
	RS-232 Pins	Rx , Tx , GND
	RS-422	Rx+, Rx-, Tx+, Tx- (Surge Protect)
	RS-485	Data+, Data- (Surge Protect)
	15KV ESD for all signals	

IP Device Server

WiFi (STE211W)	Standard	802.11b/g/n
	Data Rate	11/54/72.2 Mbps @ 20Mhz Band Width
	Modulation	DSSS, OFDM
	Frequency	2.4GHz
	Tx Power 11b	Max. 22dBm
	Tx Power 11g/n	Max. 19dBm
	Rx Sensitivity	-76dBm@54Mbps, -89.5dBm@11Mbps
	Tx Rate	Max. 54Mbps with auto fallback
	Tx Distance	Up to 100 Meters
	Security	WEP 64-bit / 128-bit data encryption, WPA / WPA2
	Antenna	2 dBi, RP-SMA connector
	Network Mode	Infrastructure, Soft AP (for Setup)
LED	SYS, RX, TX, LAN and WiFi (STE211W)	
Power	DC 9~32V, supports DC Jack & Terminal Input	
Power Consumption	2W	
MTBF	60,000 hours (MIL-HDBK-217)	
Dimensions	Dimensions	110 × 90 × 26 mm (W×D×H)
	Weight	110g
	Housing	plastic
Installation Mounting	Wall Mounting	
Environment	Operating Temperature	-20°C ~ 70°C
	Storage Temperature	-25°C ~ 80°C
Certification	FCC, CE	

Application



Ordering Information

Model Name	Description
STE211W	1 × RS232, 1 × RS422/485 Serial to Ethernet Wireless Device Server with Power Adapter
STE211	1 × RS232, 1 × RS422/485 Serial to Ethernet Device Server with Power Adapter

8

STE400A-485 & STE400A-232

4 × RS232/422/485 to IP Device Server

4 × RS232 to IP Device Server

▲ STE400A-485

▲ STE400A-232

The STE400A are 4-port RS232/422/485 to IP Device Servers that enable the ability to control asynchronous devices located virtually anywhere over a TCP/IP connection. The STE400A have 4 DB9 serial ports and a 10/100 Mbps Ethernet connection on the same side. It connects serial devices such as PLC, alarm sensors and PTZ camera control to IP networks. Applications include industrial/factory automation, public safety and surveillance systems. The STE400A Windows® driver is designed to control the IP Serial Server. The driver installs a virtual COM on Windows® which maps a COM port to the IP address of the IP Serial Server across the network, enabling the Windows® applications to access remote serial devices over Ethernet. IP Device Server can function as a server or client for TCP connection that provides a Serial over Ethernet solution. The application scenarios for the STE400A are direct IP mode, virtual COM mode, or paired mode.

Features

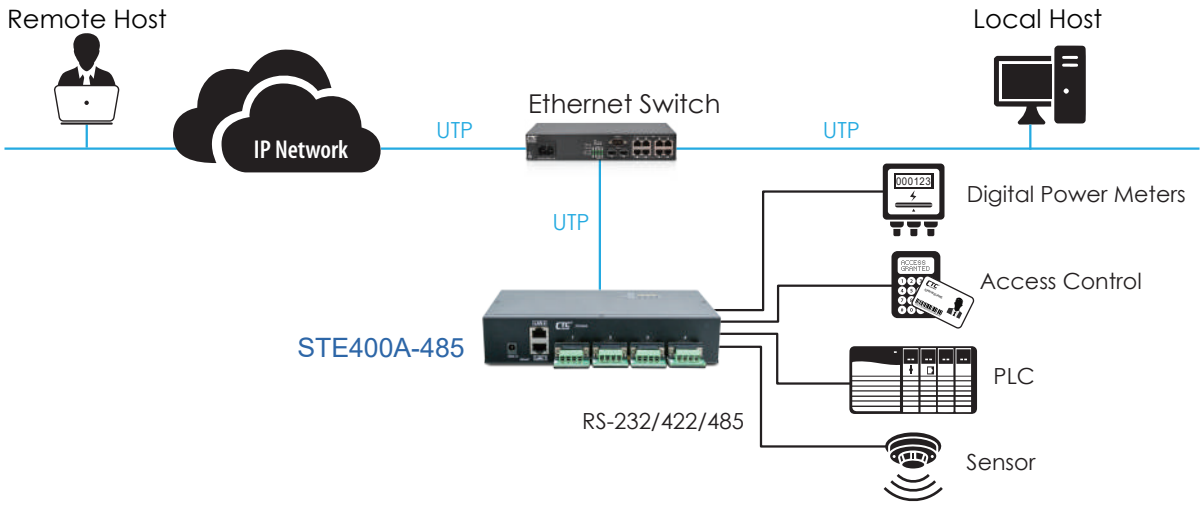
- 10/100Mbps Ethernet port
- 921.6kbps serial interface (software programmable)
- TCP Server, TCP client, Paired or Virtual com modes
- Supports Virtual COM application software
- Easy to use with Windows® utility
- Supports RS232/422/485 Interface with physical DB9M port
- Configuration by web browser, Telnet
- Low power consumption with 12VDC input
- Wall mount

Specifications

General	LED	TP Link/Act, Data TX/RX
	OS supported	Windows XP / 2000 / 2003 / 2008 /VISTA / WIN7 / WIN8 / WIN10
Serial Interface	RS232/422/485	
Serial Connector	DB9M	
Baudrate	50 to 921.6kbps	
Data bits	5, 6, 7, 8	
Stop bits	1, 1,5 for Data bits 5 mode, 1, 2 for data bits 6, 7, 8 mode	
Parity	None, Even, Odd	
Flow Control	None or RTS / CTS, XON/XOFF	
Data Packing Delimiter	1,2	
LAN Interface	RJ-45 connector, IEEE802.3 10/100Base-TX	
Communication Modes	TCP Server, TCP Client, Virtual COM mode, UDP	
Protocols	TCP, UDP, IP, ARP, ICMP, HTTP, DHCP	
Management	Web browser, Firmware upgrade, Telnet	
Security	Password Access	
Power	12VDC external switching power adapter	
Operating Temperature	0 ~ 60°C	
Storage Temperature	-10 ~ 70°C	
Humidity	0 – 90% non-condensing	
DIN rail mount	DIN-Rail Mounting Kit (Optional)	
Panel mount	Yes	
Dimensions	215 × 130 × 44mm (W×D×H)	
Certifications	CE, FCC	
MTBF	65,000 Hours	

8

Application



Ordering Information

Model Name	Description
STE400A-485	4-port RS232/422/485 serial server with DB9 to 5-pin terminal block and AC power adapter
STE400A-232	4-port RS232 serial server with DB9M port and AC power adapter

■ Package List

- One device of the series
- 12V DC switching power adapter

8

STE800A-232

8-Port RS232 to IP Device Server

The STE800A-232 is 8-port RS232 to IP Device Servers that enable the ability to control asynchronous RS-232 (3 or 5 wire) devices located virtually anywhere over a TCP/IP connection. The STE800A-232 has 8 DB9 serial ports and a 10/100 Mbps Ethernet connection on the same side. It connects serial devices such as PLC, alarm sensors and PTZ camera control to IP networks. Applications include industrial/factory automation, public safety and surveillance systems. The STE800A-232 Windows® driver is designed to control the IP Serial Server. The driver installs a virtual COM on Windows® which maps a COM port to the IP address of the IP Serial Server across the network, enabling the Windows® applications to access remote serial devices over Ethernet. IP Device Server can function as a server or client for TCP connection that provides a Serial over Ethernet solution. The application scenarios for the STE800A-232 is direct IP mode, virtual COM mode, or paired mode.

Features

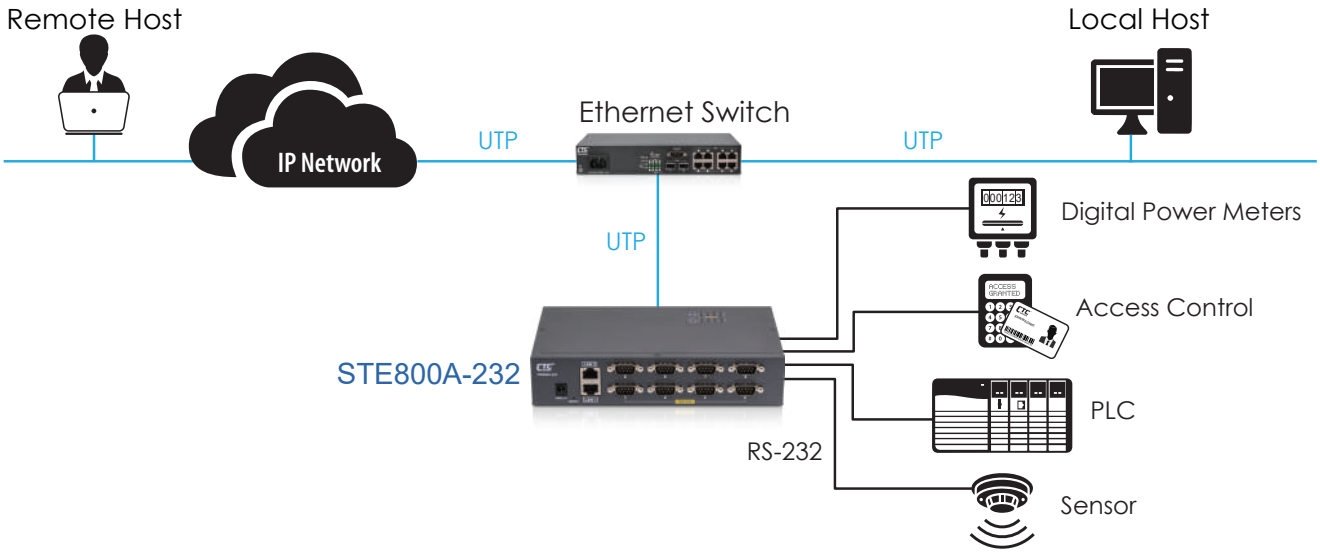
- 10/100Mbps Ethernet port
- 921.6kbps serial interface (software programmable)
- TCP Server, TCP client, Paired or Virtual com modes
- Supports Virtual COM application software
- Easy to use with Windows® utility
- Supports RS232 Interface with physical DB9M port
- Configuration by web browser, Telnet
- Low power consumption with 12VDC input
- Wall mount

Specifications

General	LED	TP Link/Act, Data TX/RX
	OS supported	Windows XP / 2000 / 2003 / 2008 /VISTA / WIN7 / WIN8 / WIN10
Serial Interface	RS232	
Serial Connector	DB9M	
Baudrate	50 to 921.6kbps	
Data bits	5, 6, 7, 8	
Stop bits	1, 1,5 for Data bits 5 mode, 1, 2 for data bits 6, 7, 8 mode	
Parity	None, Even, Odd	
Flow Control	None or RTS / CTS, XON/XOFF	
Data Packing Delimiter	1,2	
LAN Interface	RJ-45 connector, IEEE802.3 10/100Base-TX	
Communication Modes	TCP Server, TCP Client, Virtual COM mode, UDP	
Protocols	TCP, UDP, IP, ARP, ICMP, HTTP, DHCP	
Management	Web browser, Firmware upgrade, Telnet	
Security	Password Access	
Power	12VDC external switching power adapter	
Operating Temperature	0 ~ 60°C	
Storage Temperature	-10 ~ 70°C	
Humidity	0 – 90% non-condensing	
DIN rail mount	DIN-Rail Mounting Kit (Optional)	
Panel mount	Yes	
Dimensions	215 × 130 × 44mm (W×D×H)	
Certifications	CE, FCC	
MTBF	65,000 Hours	

8

Application



Ordering Information

Model Name	Description
STE800A-232	8-port RS232 serial server with DB9M port and AC power adapter

■ Package List

- One device of the series
- 12V DC switching power adapter

8

ET100A (V3)

Ethernet to WAN (V.35/RS530/449/232/X.21) Bridge

The ET100A Network Bridge is a high performance remote, self-learning, Ethernet bridge. Its compact size and low cost makes it ideal for cost-sensitive bridging applications, or as a LAN extender or segmenter over bit stream type infrastructures. The built-in n x 64 (56) Kbps timing clock generator makes it easy to connect to other n x 64 (56)Kbps related data equipment. Several options of data interfaces, including V.35, RS-530, RS-449, RS-232, and X.21 make this unit's connection between 10Base-T or 100Base-TX LAN and various data port interfaces convenient.

Features

- Protocol : Synchronous HDLC (ISO 13239), PPP, CISCO® HDLC
- 10Base-T or 100Base-TX Ethernet bridge
- Auto MDI/MDIX
- Supports IEEE 802.3x flow control
- Selectable data port : V.35, RS-530, RS-449, RS-232, X.21
- Transparent half / Full duplex support on WAN, LAN interface
- Nx64, Nx56 timing clock generator for Sync WAN link
- LEDs indication for LAN, WAN status

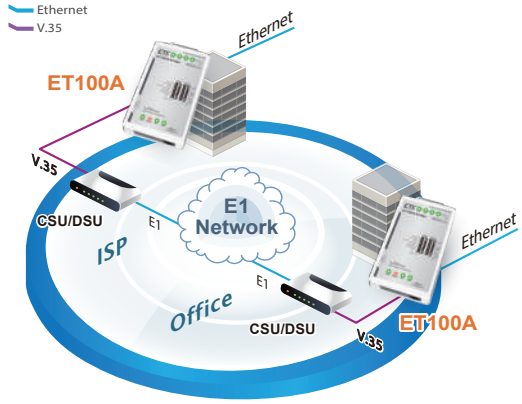
Specifications

WAN	Interface:	Selectable RS-232(Sync), V.35, RS-530, RS-449, RS-232, X.21with Adapter Cable
	Protocol:	Synchronous PPP, HDLC (ISO 13239), CISCO® HDLC
	Connector:	DB25M
	Type:	DTE
	Configuration:	All Configuration by Dip switch (Protocol, interface, Clock mode, data rate)
	Data rate:	Nx56Kbps, Nx64Kbps
		RS-232 up to 128Kbps
		V.35, X21, RS-530, RS-449 up to 10Mbps
	Clock source:	Tx/Rx internal or external
	Handshake(DCD)	Follow CTS/RTS or Always Ons
Indications	LEDs	(PWR, WAN Rx/Tx, LAN Tx/Rx/Link/Err/Speed)
LAN	Compliant with IEEE 802.3, 802.3u, 802.3x	
	Connector: RJ-45	
	Speeds: 10/100Base-TX, Full/Half duplex	
	Frames: Support 64 ~ 2044 byte packet lengths	
Bridge Specifications	MAC Address learning, aging and deletion after 5 minutes	
	256 addresses MAC table, 1763 packet buffer	
Power	12VDC	
Power Consumption	< 5 W	
Dimensions	135 x 79 x 25mm (D x W x H)	
Weight	180g	
Temperature	0°C ~ 50°C (Operating), -10°C ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	

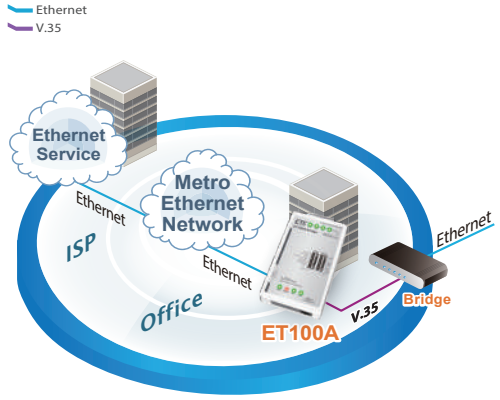
Ethernet to WAN Bridge

Application

Ethernet over TDM, Point to Point



HDLC Bridge Application



Ordering Information

Model Name	Description
ET100A/V35M	Ethernet to V35 WAN Bridge with V.35 cable: DB25F to MB34M, 1 meter
ET100A/X21M	Ethernet to X21 WAN Bridge with X21 cable: DB25F to DB15M, 1 meter
ET100A/RS530M	Ethernet to RS530 WAN Bridge with RS530 cable: DB25F to DB25M , 1 meter
ET100A/RS449M	Ethernet to RS449 WAN Bridge with RS449 cable: DB25F to DB37M , 1 meter
ET100A/RS232M	Ethernet to RS232 WAN Bridge with RS232 cable: DB25F to DB25M , 1 meter

8

GW211W-MQ

Modbus to MQTT Gateway

The MQTT Wi-Fi / Ethernet / Serial Gateway, GW211W-MQ provides an easy to deploy device to send RS-232/RS-485 Serial Modbus RTU Data communications to MQTT TCP networks on hard-wired Ethernet or over wireless WiFi networks. The MQTT Gateway works with standard Modbus Slave device, such as PLCs, IoT Sensors, Energy meters (AMRs), Solar Inverters, Wind Turbines, IO Modules, Flow Meters and more. The MQTT Gateway is built for use in light industrial environments and features a compact wall-mount design. It operates from 9-32VDC power supply voltages with terminal block connectors and is easy to configure through its web GUI interface.

Features

- Supports Modbus RTU to MQTT
- Supports 802.11b/g/n and Ethernet, 2 IPs
- Supports 32 Topics, register length adjustable
- Supports to query 4 remote TCP devices
- Easy MQTT settings by web browser configuration
- Easy installation with Windows IP utility
- On line F/W upgrade
- Watch Dog Function

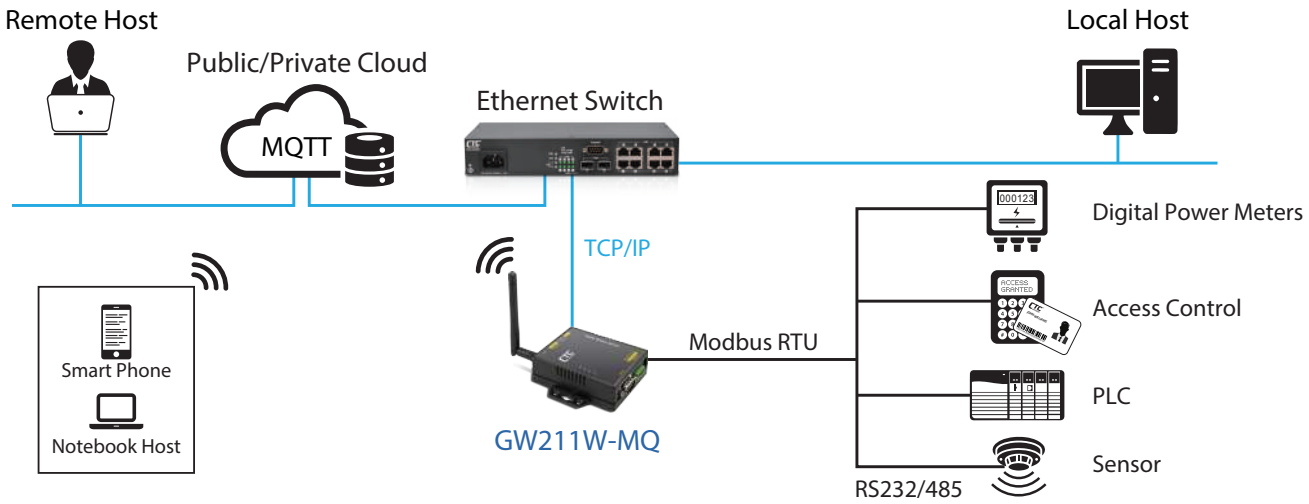
Specifications

Ethernet	Port Type	RJ-45 Connector
	Speed	10/100 M bps (Auto Detecting)
	Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, DNS, NTP
	Mode	Modbus TCP
	Setup	HTTP Browser Setup (IE, Chrome, Firefox)
	Security	Setup Password
	Protection	Built-in 1.5KV Magnetic Isolation
Serial Ports *2	Port	RS-232
	Port	RS-422 / 485 (Surge Protect)
	Speed	300 bps ~ 921.6 K bps
	Parity	None, Odd, Even
	Data Bit	5, 6, 7, 8
	Stop Bit	1, 2
	RS-232 Pins	Rx , Tx , GND
	RS-422	Rx+, Rx-, Tx+, Tx- (Surge Protect)
	RS-485	Data+, Data- (Surge Protect)
	15KV ESD for all signals	

Modbus Gateway

WiFi	Standard	802.11b/g/n
	Data Rate	11/54/72.2 Mbps @ 20Mhz Band Width
	Modulation	DSSS, OFDM
	Frequency	2.4GHz
	Tx Power 11b	Max. 22dBm
	Tx Power 11g/n	Max. 19dBm
	Rx Sensitivity	-76dBm@54Mbps, -89.5dBm@11Mbps
	Tx Rate	Max. 54Mbps with auto fallback
	Tx Distance	Up to 100 Meters
	Security	WEP 64-bit / 128-bit data encryption, WPA / WPA2
	Antenna	2 dBi, RP-SMA connector
	Network Mode	Infrastructure, Soft AP (for Setup)
LED	SYS, WiFi, RX, TX, LAN	
Power	DC 9~32V, supports DC Jack & Terminal Input	
Power Consumption	2W	
MTBF	60,000 hours (MIL-HDBK-217)	
Mechanical	Dimensions	110 × 90 × 26 mm (W×D×H)
	Weight	110g
	Housing	Plastic
Installation Mounting	Wall Mounting	
Environment	Operating Temperature	-20°C ~ 70°C
	Storage Temperature	-25°C ~ 80°C
Certification	FCC, CE	

Application



Ordering Information

Model Name	Description
GW211W-MQ	1 × RS232, 1 × RS422/485 Modbus to MQTT Wireless Gateway with Power Adapter

8

GW211W-MB

Modbus RTU to Modbus TCP Gateway

The Modbus Wi-Fi / Ethernet / Serial Gateway, GW211W-MB provides an easy to deploy device to send Modbus serial data communications over a packet network such as Ethernet or TCP/IP on a hard-wired network or via WiFi. The Modbus Gateway works with standard Modbus Slave devices, such as PLCs, IoT Sensors, Energy meters (AMRs), Solar Inverters, Wind Turbines, IO Modules, Flow Meters and more. The Modbus Gateway is built for use in light industrial environments and features a compact wall-mount design. It operates from 9-32VDC power supply voltages with terminal block connectors and each Modbus Gateway is easily configure through its web GUI interface.

Features

- TCP to RTU support 8 simultaneous TCP Master
- RTU to TCP support 8 TCP Slaves on each port
- Software support :
  TCP to RTU Slaves, RTU to TCP Slaves
  TCP to ASCII Slaves, ASCII to TCP Slaves
- Supports 802.11b/g/n and Ethernet, 2 IPs
- Web browser configuration
- Easy installation Windows utility
- On line F/W upgrade
- Watch Dog Function

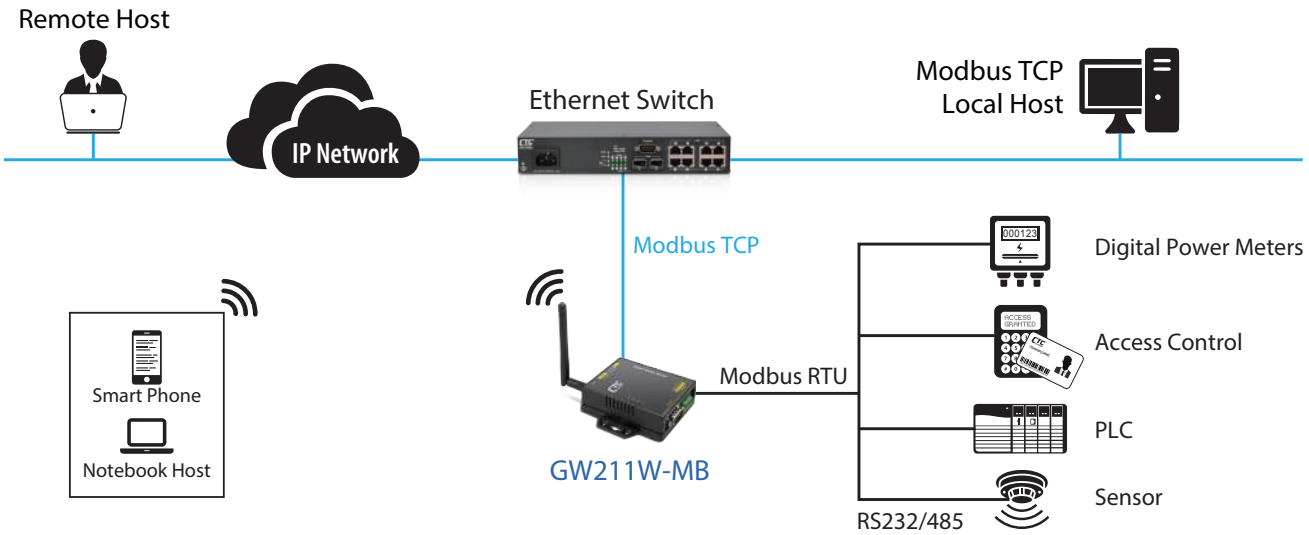
Specifications

Ethernet	Port Type	RJ-45 Connector
	Speed	10/100 M bps (Auto Detecting)
	Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, DNS, NTP
	Mode	Modbus TCP
	Setup	HTTP Browser Setup (IE, Chrome, Firefox)
	Security	Setup Password
	Protection	Built-in 1.5KV Magnetic Isolation
Serial Ports *2	Port	RS-232*1
	Port	RS-422 / 485*1 (Surge Protect)
	Speed	300 bps ~ 921.6 K bps
	Parity	None, Odd, Even
	Data Bit	5, 6, 7, 8
	Stop Bit	1, 2
	RS-232 Pins	Rx , Tx , GND
	RS-422	Rx+, Rx-, Tx+, Tx- (Surge Protect)
	RS-485	Data+, Data- (Surge Protect)
	15KV ESD for all signals	

Modbus Gateway

WiFi	Standard	802.11b/g/n
	Data Rate	11/54/72.2 Mbps @ 20Mhz Band Width
	Modulation	DSSS, OFDM
	Frequency	2.4GHz
	Tx Power 11b	Max. 22dBm
	Tx Power 11g/n	Max. 19dBm
	Rx Sensitivity	-76dBm@54Mbps, -89.5dBm@11Mbps
	Tx Rate	Max. 54Mbps with auto fallback
	Tx Distance	Up to 100 Meters
	Security	WEP 64-bit / 128-bit data encryption, WPA / WPA2
	Antenna	2 dBi, RP-SMA connector
	Network Mode	Infrastructure, Soft AP (for Setup)
LED	SYS, WiFi, RX, TX, LAN	
Power	DC 9~32V, supports DC Jack & Terminal Input	
Power Consumption	2W	
MTBF	60,000 hours (MIL-HDBK-217)	
Mechanical	Dimensions	110 × 90 × 26 mm (W×D×H)
	Weight	110g
	Housing	Plastic
Installation Mounting	Wall Mounting	
Environment	Operating Temperature	-20°C ~ 70°C
	Storage Temperature	-25°C ~ 80°C
Certification	FCC, CE	

Application



Ordering Information

Model Name	Description
GW211W-MB	1 × RS232, 1 × RS422/485 Modbus RTU to Modbus TCP Wireless Gateway with Power Adapter

9 VDTU2-B130

1-port VDSL2 Gigabit LAN Extender

The VDSL2 Gigabit LAN Extender, VDTU2-B130 supports an aggregated bandwidth up to 300Mbps (Downstream: 150 Mbps/ Upstream/150 Mbps) and delivers fiber-optic like speeds on existing copper infrastructure. The VDTU2-B130 is equipped with 1x 10/100/1000Base-T RJ-45 ports and 1x VDSL2 RJ-45. Built in a plastic enclosure. Symmetric profiles can be applied as a long-reach Ethernet connection up to 3,000 meters, while Asymmetric profiles can be used for other services such as Video streaming or IP surveillance services which require high traffic flow in one direction. The VDTU2-B130 supports transparent LAN bridging to extend Ethernet service over UTP, Cat 5+ cables or simple single pair telephone cable. It is the best high throughput Long Reach Ethernet Extender for service providers when deploying their IP-based networking services to meet various application scenarios.

Features

- High speed Ethernet extension over UTP, CAT 5e/6/7
- Supports ITU-T G.993.5 G.Vectoring and G.INP
- Selectable profile setting via Dip switch
- Supports VDSL2 profile 35b/30a/17a
- IEEE 802.1Q VLAN tag transparent.
- Cost effective bridge function to connect two Ethernet LAN
- May be concentrated into FMC-CH17 chassis

Specifications

VDSL2 Interface	RJ45 connector
	DMT Encoding
	On-board surge protection
LAN Interface	1x RJ45 connector
	10/100/1000 Base-T, Auto-Negotiation, Auto-MDI/MDI-X
	Complying with IEEE 802.3/802.3u/802.3z
4-position DIP Switch	Selectable Master(CO) or Remote(RT) mode
	Selectable Symmetric or Asymmetric mode
	Selectable G.INP or Interleave mode
	Selectable SNR High and SNR Low
LED	System power
	CO/RT mode
	VDSL2 link status
	Ethernet link status
Power Supply	12~24 VDC over 2.1mm DC Jack
	Power Consumption: 4.5 Watts (Max)
Environment	Operating Temperature: 0°C ~45°C, Humidity: 0%~95%RH (non-condensing)
Physical Characteristics	Dimension (W × H × D): 94.5 × 23.0 × 72.5 mm, Weight: 110g
Certification	FCC, CE

VDSL2 LAN Extender

Performance

Distance (Feet)	UTP, 26AWG			
	Symmetric, SNR Low, G.INP		Asymmetric, SNR Low, Interleave	
	Upstream Line Rate(Mbps)	Downstream Line Rate(Mbps)	Upstream Line Rate(Mbps)	Downstream Line Rate(Mbps)
500	146	162	64	284
1,000	116	112	59	171
2,000	35	61	31	67
3,000	28	30	10	35

NOTE: The above performance data is for reference only, the actual data rate may vary depending on the quality of the copper wire and environmental conditions.

Application

Ordering Information

Model Name	Description
VDTU2-B130	1-port VDSL2 Gigabit LAN Extender with AC Power Adapter

9 LX100

10/100 Base-TX LAN Extender

CTC's LAN Extender pair (LX100) can extend data beyond the 100 meters limitation of standard Ethernet. The paired units work in a point-to-point topology over 1 or 2 pair unshielded twisted pair (UTP) cabling up to 800 meters. These products can extend your 10/100Mbps Ethernet network by up to 800m over UTP cable.

Features

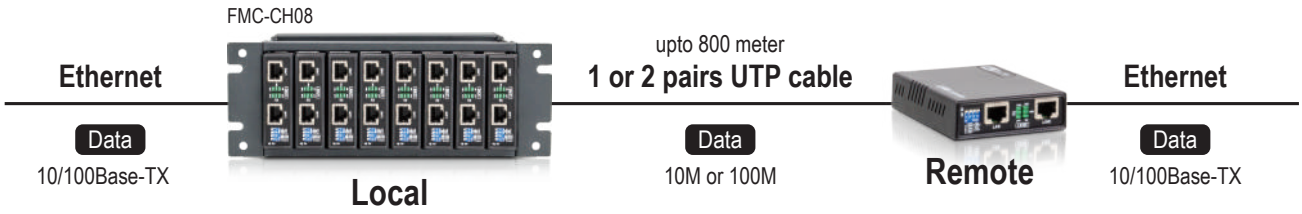
- Long distance data transmission up to 800 meter on 1/2 pair UTP cable
- Quick deployment and easy maintenance

Specifications

Standard	IEEE 802.3, 802.3u
Connector	1x 10/100Base-TX RJ45 LAN port
	1x RJ-45 WAN port
Dip Switch	SW 1 : Link Fault Pass Through (LFPT)
	Off: Disable/On: Enable
	SW 2 : Line Speed
	Off: Auto/On: 10M
	SW 3 : Negotiation Mode
	Off: Auto/On: Local
LED	Power (Green)
	LFPT (Green)
	LAN Link active (Green)
	Line Speed/Link active 10M(Green), 100M(Green)
	Local(Green)
Data Rate	The line speed between LX100 will be 10M or 100M that depend on extension length
	The LAN speed of LX100 is same with line speed
Cable	1 or 2 pair UTP cable Cat.5e, Cat. 6
Operating Temperature	0 ~ 50°C
Humidity	5% ~ 90% (non-condensing)
Power Input	12VDC
Power Consumption	<3W
Dimensions	23 × 96.5 × 73.4mm (W×D×H)
Weight	73.5g
MTBF	>65000 hours
Certification	FCC, CE

9

Application



Ordering Information

Model Name	Description
LX100	10/100Base-TX Ethernet LAN Extender

■ Chassis Option

Model Name	Description
FMC-CH17-AC	2U, 19", 17-Slot Chassis with AC Power
FMC-CH17-DC	2U, 19", 17-Slot Chassis with DC Power
FMC-CH17-AD	2U, 19", 17-Slot Chassis with AC+DC Power
FMC-CH08-AC	2U, 10", 8-Slot Rack with 10" Rack Mount Ear and AC Power
FMC-CH08-DC	2U, 10", 8-Slot Rack with 10" Rack Mount Ear and DC Power

Appendix

- FRM220 Slide-in Cards

NMC

Model Name	Description
FRM220-NMC-R5	Network Management Controller
FRM220-NMC-R3	Network Management Controller

Ethernet Switch

Model Name	Description
FRM220A-2000EAS/4F	4x 100/1000Base-X SFP OAM/IP GbE Managed Switch
FRM220A-2000EAS/2	2x 100/1000Base-T + 2x 100/1000Base-X SFP OAM/IP GbE Managed Switch
FRM220A-2000EAS/1	100/1000Base-T + 100/1000Base-X SFP OAM/IP GbE Managed Switch
FRM220-2000MS	100/1000Base–T to 100/1000Base–X SFP Web Smart In-Band OAM Managed GbE Switch

Transponder

Model Name	Description
FRM220-100GE-2Q	100GE QSFP28 to QSFP28 3R Transponder
FRM220-40G-2Q	40G QSFP+ to QSFP+ 3R Transponder
FRM220-40G-1Q4S	40G QSFP+ to 4x 10G SFP+ Transponder
FRM220-16G-3R	16G 3R Multi-rate Transponder with Optical Line Protection
FRM220-10G-3R	10G 3R Multi-rate Transponder with Optical Line Protection
FRM220-4G-3R	4G 3R Multi-rate Transponder with Optical Line Protection

EDFA

Model Name	Description
FRM220-OAP17	Single Channel EDFA Preamp 17dB
FRM220-OAB15	Single Channel EDFA Booster 15dB
FRM220-OAB21A	Single Channel EDFA Booster 21dB

Optical Protection Switch

Model Name	Description
FRM220-OPS51	1:1 Single-mode Fiber Optical Protection Switch
FRM220-OPS52	1+1 Single-mode Fiber Optical Protection Switch
FRM220-OPS51M	1:1 Multi-mode Optical Protection Switch

WDM Optical Multiplexer

Model Name	Description
FRM220-DWMD	DWDM Mux/DeMUX
FRM220-CWMD	CWDM Mux/DeMUX

Ethernet Media Converter

Model Name	Description
FRM220-10GCM	100M/1G/10GBase-T + 2x 10G SFP+ In-band Managed Media Converter
FRM220-10/100	10/1000Base-TX to 100Base-FX Media Converter
FRM220-10/100i	10/100Base-TX to 100Base-FX In-Band Managed Media Converter
FRM220-10/100iS-2	Dual Channel 10/100Base-TX to 100Base-FX, In-Band Managed Converter

Ethernet over E1 Converter

Model Name	Description
FRM220A-Eoe1/G	Ethernet Bridge over E1, In-band Managed
FRM220A-Eoe1	Ethernet Bridge over E1

CCF (Contact Closure Fiber Converter)

Model Name	Description
FRM220-CCF20	2ch Contact Closure Fiber Converter, In-Band Managed
FRM220-CCF40	4ch Contact Closure Fiber Converter, In-Band Managed

Voice over Fiber

Model Name	Description
FRM220-FXO/FXS	FXO/FXS over Fiber In-Band Managed Converter
FRM220-FXO-4	4x FXO over Fiber In-Band Managed Converter
FRM220-FXS-4	4x FXS over Fiber In-Band Managed Converter