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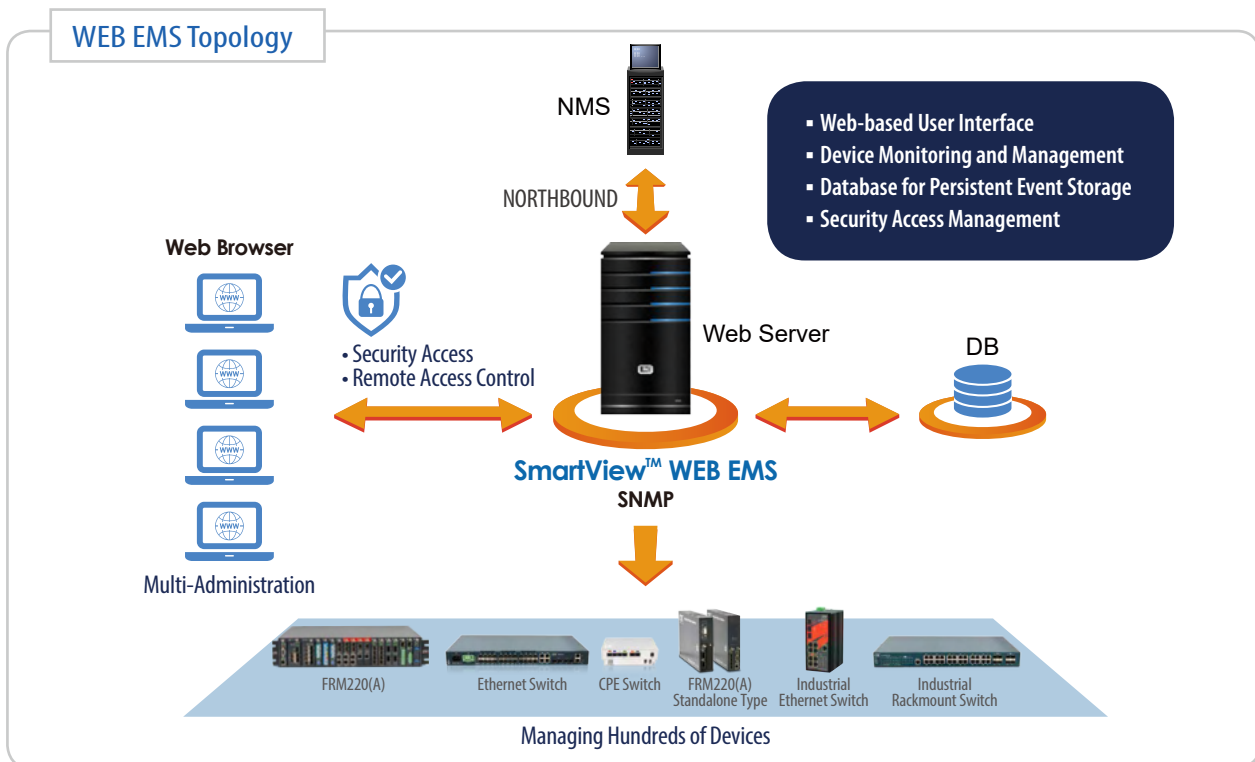
NEW

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Smartview™ Web EMS

- ## WEB EMS Topology



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.

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.

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

The 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 and Forwarding

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. The SmartView™ WEB EMS is capable of forwarding received traps to upper network management.

▪ 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 download firmware to device elements and perform configuration backup/restore.

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

The accounting management supports reading a factory programmed serial number specific for each line card. The location, status and serial numbers of all assets can be managed and exported.

▪ Performance Management

SmartView™ is able to monitor device performance parameters through polling of specific OIDs. Graphs of performance information (for example PDH PM data such as ES, UAS, etc. as well as 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.

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

NEW


XGS-1208SE

8 x GbE RJ45 + 12 x 10G SFP+

L2+ Managed Ethernet Switch with SyncE

CTC Union Technologies unveils a brand-new product that enables 10Gbps speed for fiber Ethernet interfaces. The XGS-1208SE is designed to enable applications for 4G/5G mobile backhaul network or core switching and connection in the network of smart factory automation. It is equipped with 8 ports GbE RJ45 and 12 ports 10G SFP+ slot with high performance switching and wire speed connectivity to boost the connection efficiency as well as capability of delivering time sensitive applications.

The XGS-1208SE features robust L2 switching functionality such as VLAN, port trunking, QoS, span tree protocol and IGMP multicast service. The hard-wired based ACL enables secure network access and traffic transportation that network administrators desire, reducing the risks of unauthorized or illegal intruders. The diverse management via Web GUI, SSH and SNMP, offer friendly and ease-to-use interfaces, as well as secured remote management with traffic encryption. 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 timing purposes of mobile backhaul or smart factory automation network.

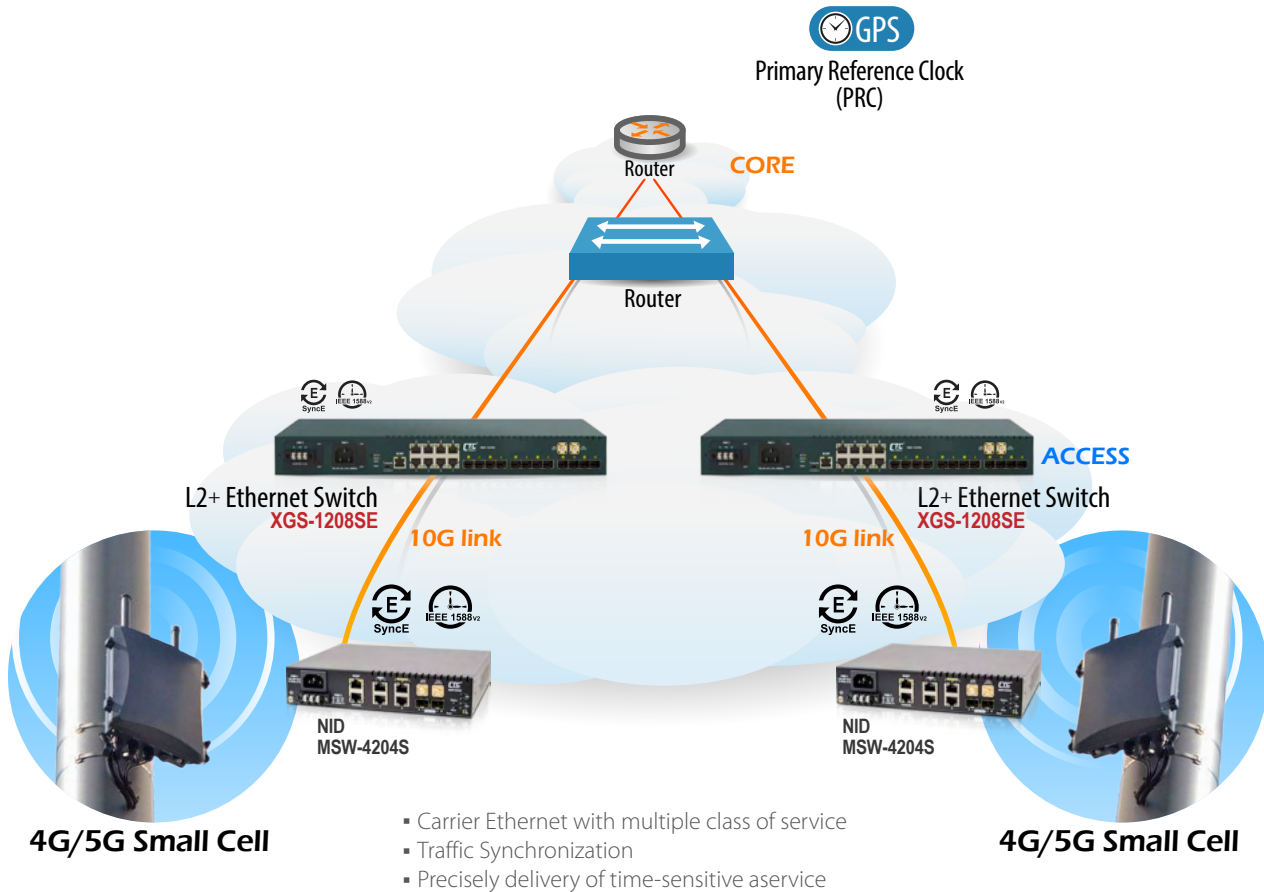
XGS-1208SE has built-in 1PPS input and output SMA connectors. The output SMA interface supports the waveform measurement of IEEE 1588v2 via external instrument, as well, the input SMA interface may be connected to external time source as the reference clock for the network.

Specifications

Interface	Fiber port: 10G SFP+ *12 Copper port: 10/100/1000Mbps RJ45*8 1PPS port: SMA connector*2 (input/output) Console port: RS-232 in USB type C	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+ authentication HTTPs & SSH v2 IP/MAC binding IP source guard & ARP inspection
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps 14880000pps @10Gbps	IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting MLD snooping v1/v2 IGMP fast leave IGMP query IGMP filtering/throttling MVR (Multicast VLAN Registration)
Switching Fabric Capacity	256Gbps	SyncE	ITU-T G.8261/G.8262/G.8264 on all Ethernet interfaces Sync status message support
Transmission method	Store and Forward Switching	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/G.8275.1 telecom profile (option)
Packet buffer	32M bits	Management	IEEE 802.1AS gPTP 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
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, 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		

Application

10G Managed Ethernet Switch with SyncE



Ordering Information

Model Name	Description
XGS-1208SE-AC	8× GbE RJ45 + 12× 10G SFP+ slots L2+ Managed Ethernet Switch with SyncE built-in single AC power supply
XGS-1208SE-DC	8× GbE RJ45 + 12× 10G SFP+ slots L2+ Managed Ethernet Switch with SyncE built-in single DC power supply (-48V)
XGS-1208SE-AA	8× GbE RJ45 + 12× 10G SFP+ slots L2+ Managed Ethernet Switch with SyncE built-in dual AC power supply
XGS-1208SE-DD	8× GbE RJ45 + 12× 10G SFP+ slots L2+ Managed Ethernet Switch with SyncE built-in dual DC power supply (-48V)
XGS-1208SE-AD	8× GbE RJ45 + 12× 10G SFP+ slots L2+ Managed Ethernet Switch with SyncE built-in AC + DC power supply

NEW


XGS-1208M

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

CTC Union Technologies unveils a brand-new product that enables 10Gbps speed for fiber Ethernet interfaces. The XGS-1208M is designed to enable applications for aggregate networks or core switching and connections in an enterprise network. It is equipped with 8 ports GbE RJ45 and 12 ports 10G SFP+ slot with high performance switching and wire speed connectivity to boost the connection efficiency among servers, workstations and other facilities inside of offices or campus.

The XGS-1208M features robust L2 switching functionality such as VLAN, port trunking, QoS, span tree protocol and IGMP multicast service. The hard-wired based ACL enables secure network access and traffic transportation that network administrators desire, reducing the risks of unauthorized or illegal intruders. The diverse management via Web GUI, SSH and SNMP, offer friendly and ease-to-use interfaces, as well as secure remote management with traffic encryption.

Specifications

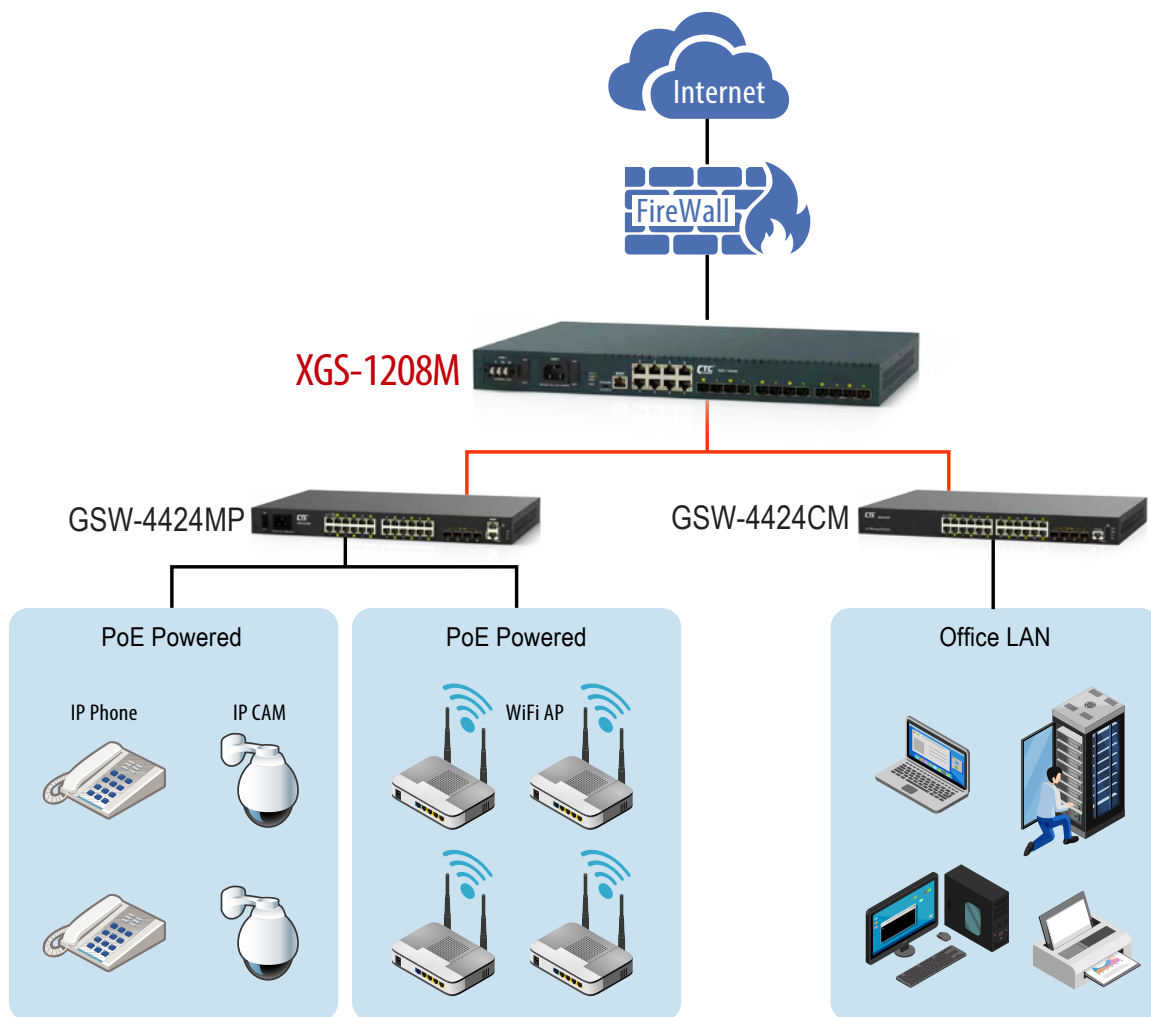
Interface	Fiber port: 10G SFP+ *12 Copper port: 10/100/1000Mbps RJ45*8 Console port: RS-232 in USB type C	IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting MLD snooping v1/v2 IGMP fast leave IGMP query IGMP filtering/throttling MVR (Multicast VLAN Registration)
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps 14880000pps @10Gbps	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
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, 10 LACP trunk groups Max, IEEE 802.1D STP/IEEE 802.1w RSTP/IEEE 802.1s MSTP		
L2 switching protection	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+ authentication HTTPs & SSH v2 IP/MAC binding IP source guard & ARP inspection		

2

L2+ Managed Ethernet Switch XGS-1208M

Application

10G Managed Ethernet Switch



Ordering Information

Model Name	Description
XGS-1208M-AC	8 x GbE RJ45 + 12 x 10G SFP+ slots Managed Ethernet Switch with single AC power supply
XGS-1208M-DC	8 x GbE RJ45 + 12 x 10G SFP+ slots Managed Ethernet Switch with single DC power supply (-48V)
XGS-1208M-AA	8 x GbE RJ45 + 12 x 10G SFP+ slots Managed Ethernet Switch with dual AC power supply
XGS-1208M-DD	8 x GbE RJ45 + 12 x 10G SFP+ slots Managed Ethernet Switch with 2 x DC power supply (-48V)
XGS-1208M-AD	8 x GbE RJ45 + 12 x 10G SFP+ slots Managed Ethernet Switch with AC + DC power supply

CE^{2.0}

MSW-4428X

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

The MSW-4428X is positioned as a layer 2+ Gigabit access switch solution. It 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. The MSW-4428X offers the best flexibility and scalability for operators or service providers to deploy their Metro Ethernet network. With the deployment of MSW-4428X, 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 applications. The MSW-4428X has built-in dual power supplies to enable power redundancy and enhance high network availability.

Aimed at Metro Ethernet applications, the specifications of MSW-4428X fully meet the attributes of Carrier Ethernet proposed by MEF (Metro Ethernet Forum). It 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

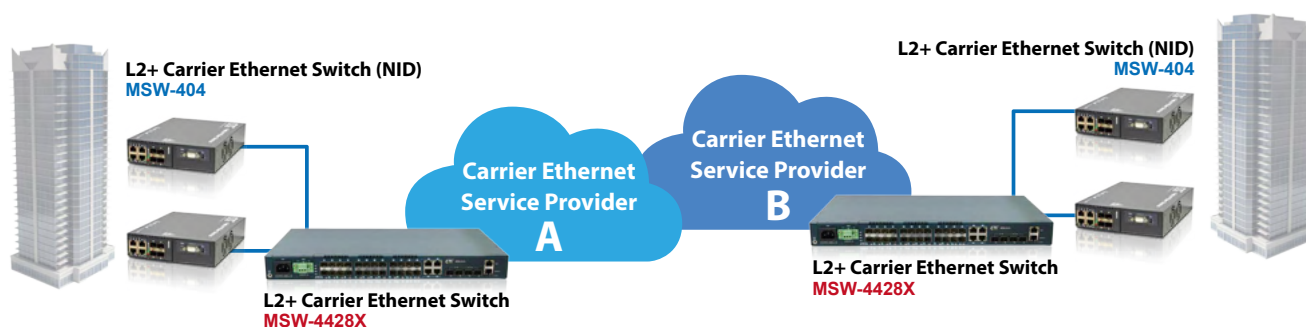
CE2.0 compliant product to guarantee the compatibility with other MEF certified equipment and reduce the risk and cost for Metro Ethernet network deployment of operators

Specifications

Interface	100/1000Mbps SFP slots × 24 + 10/100/1000Base-T RJ45 × 4 + 1G/10Gbps SFP+ slot × 4
Console Port	RJ-45 console port × 1
Management Port	10/100/1000Base-T RJ45 × 1
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
Max. Packet Size	10,240 bytes - jumbo frames
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 bandwidth control IEEE 802.3x flow control
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 authentication, limited MAC address learning IP/MAC binding, ACL rule based filtering, TACACS+ IP source guard, DHCP 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 Management	Unknown/Broadcast/Multicast storm suppression 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	100V ~ 240V AC, -36 ~ -60V DC
Build in power module combination	AC, DC, AD (AC+DC), AA (AC+AC) or DD (DC+DC)
Power Consumption	< 60W
Operating Temperature	-10 ~ 60°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	440 × 250 × 43.5mm (WxDxH)
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

Power Type
MSW – 4428X – ☐ ☐
 Example: MSW – 4428X – AC

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

CE^{2.0}

NEW



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 be configurable 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.

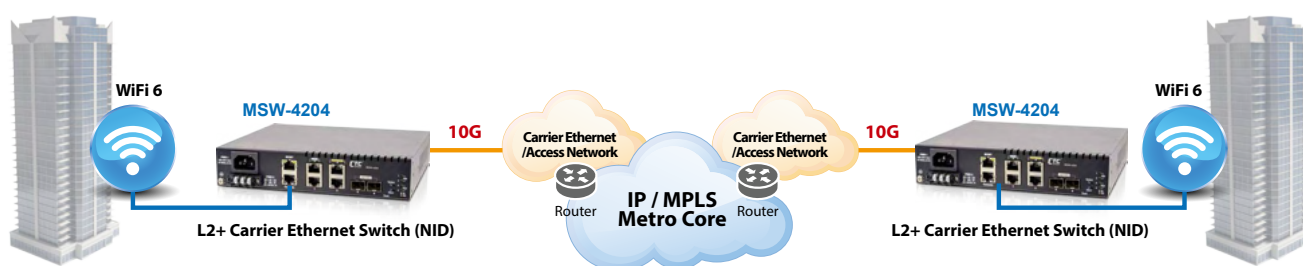
Specifications

Interface	Fiber port: 1G/10Gbps SFP+ x 2 Copper port: 10/100/1000Mbps RJ45 x 4	IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting MLD snooping v1/v2 IGMP fast leave IGMP query IGMP filtering/throttling MVR (Multicast VLAN Registration)
Console Port	RJ45 x 1 (RS-232)	Management	WebGUI/Telnet CLI interface HTTPs, SSHv2 SNMP v1/v2c/v3 RMON I (1,2,3,9 groups) & RFC1213 MIB II Dying gasp in trap message DHCP client/relay 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
Management Port	10/100/1000Base-T RJ45 x 1	Ethernet OAM	IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731, RFC2544, ITU-T Y.1564
Switching Fabric Capacity	54Gbps	Power Input	100V~240VAC, -24 ~ -60VDC
Packet Forwarding Rate	14880pps@10Mbps, 148800pps@100Mbps, 1488000pps@1000Mbps, 14880000pps@10Gbps,	Power Consumption	< 15W
Transmission Method	Store and Forward Switching	Operating Temperature	0~50°C
Packet Buffer	8M bits	Storage Temperature	-25~70°C
MAC Table Size	16K	Humidity	5%~90% (non-condensing)
Jumbo Frame Size	10K Bytes	Dimension	215 x 190 x 44 mm (DxWxH)
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)	Certification	CE, FCC class A
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 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 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+ authentication IP/MAC binding DHCP snooping/relay option 82 IP source guard & ARP inspection		

2

Network Interface Device (NID) MSW-4204

Application



Ordering Information

Model Name	Description
MSW-4204-AC	1G RJ45 x 4 + 1G/10G SFP+ slots x 2 L2+ Carrier Ethernet Switch with single AC power supply built-in
MSW-4204-DC	1G RJ45 x 4 + 1G/10G SFP+ slots x 2 L2+ Carrier Ethernet Switch with single DC power supply built-in
MSW-4204-AD	1G RJ45 x 4 + 1G/10G SFP+ slots x 2 L2+ Carrier Ethernet Switch with AC & DC power supply built-in

Accessory Optional

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
GSW/MSW-RMK	19" rack mount kit

Power Type
MSW – 4204 - ☐ ☐
Example: MSW – 4204



NEW



MSW-4204S

4× GbE/RJ45 + 2× 1G/10G SFP+

L2+ Carrier Ethernet Switch with SyncE

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 2 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.

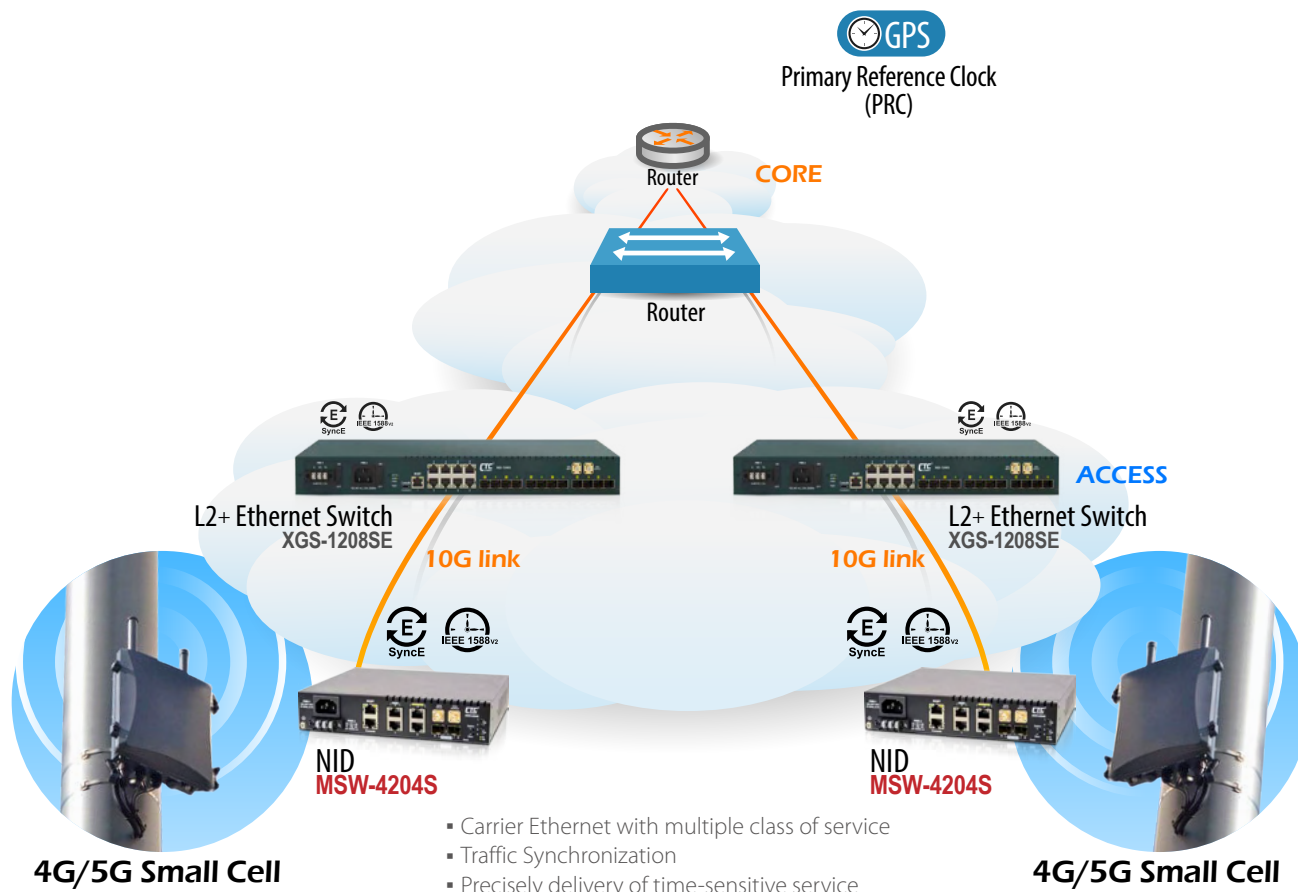
Specifications

Interface	Fiber port: 1G/10Gbps SFP+ x 2 Copper port: 10/100/1000Mbps RJ45 x 4 1PPS/ToD port: SMA connector x 2 (input/output)
Console/ToD Port	RJ45 x 1 (RS-232)
Management Port	10/100/1000Base-T RJ45 x 1
Switching Fabric Capacity	54Gbps
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 VRRP (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 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 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

Security	128 ACL rules based on L2~L4 information RADIUS/TACACS+ authentication IP/MAC binding DHCP snooping/relay option 82 IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting 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 Dying gasp in trap message DHCP client/relay TFTP/HTTP based firmware and configuration upgrade Port mirroring Event syslog server DNS client/proxy NTP client UPnP IPv4/IPv6 management SFF-8472 DDMI
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 (option).
Power Input	100V~240VAC, -24 ~ -60VDC
Power Consumption	< 15W
Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)
Dimension	215 x 190 x 44 mm (WxDxH)
Certification	CE, FCC class A

Application

Mobile backhaul application



Ordering Information

Model Name	Description
MSW-4204S-AC	1G RJ45 × 4 + 1G/10G SFP+ slots × 2 L2+ Carrier Ethernet Switch with SyncE and single AC power supply built-in
MSW-4204S-DC	1G RJ45 × 4 + 1G/10G SFP+ slots × 2 L2+ Carrier Ethernet Switch with SyncE and single DC power supply built-in
MSW-4204S-AD	1G RJ45 × 4 + 1G/10G SFP+ slots × 2 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
GSW/MSW-RMK	19" rack mount kit

Power Type

MSW – 4204S- ☐ ☐

Example: MSW – 4204S

CE^{2.0}

MSW-202A

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

MSW-202A is a carrier class Ethernet Demarcation Device (EDD) with 2× 10/100/1000Base-T Ethernet ports and 2× 100/1000Base-X dual rate SFP fiber ports which enables E-Line & E-Access services with advanced carrier Ethernet features per CE2.0. By supporting link and service Ethernet OAM schemes, the MSW-202A also provides extensive fault detection and diagnostic capabilities to ensure that actual network use complies with pre-agreed service level agreements (SLAs).

Features

- Complies with CE2.0 (E-Line / E-Access)
- IPv6 management
- IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731
- IEEE 1588v2

Specifications

Interface	100/1000Mbps SFP slots × 2 + 10/100/1000Base-T RJ45 × 2
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps
Switching Fabric Capacity	8Gbps
Transmission Method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ab, IEEE 802.3x, 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, ITU-T G.8031, ITU-T G.8032
Packet Buffer	4M bits
MAC Table Size	8K
Max. Packet Size	9.6K 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 bandwidth control
L2 switching protection	STP, RSTP, MSTP, ITU-T G.8031/G.8032 Ethernet ring protection, μ-Ring
Trunking	IEEE 802.3ad LACP (Max. 2 trunking groups, Max. 4 ports per trunking group)
Security	IEEE 802.1x port based access control, MAC based access control authentication, RADIUS authentication, limited MAC address learning, IP/MAC binding, ACL rule based filtering, TACACS+, IP source guard, DHCP 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, 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
Timing Synchronization	IEEE 1588v2
LED Display	Power, System, Console, Link, Speed/Act
Power Input	100V ~ 240VAC, -18 ~ -75VDC
Power Consumption	< 12W
Operating Temperature	0 ~ 50°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	135 × 180 × 30 mm (WxDxH) (with CH01M Chassis)
Regulatory	FCC, CE

Application

Figure 1 : Business Connection Service

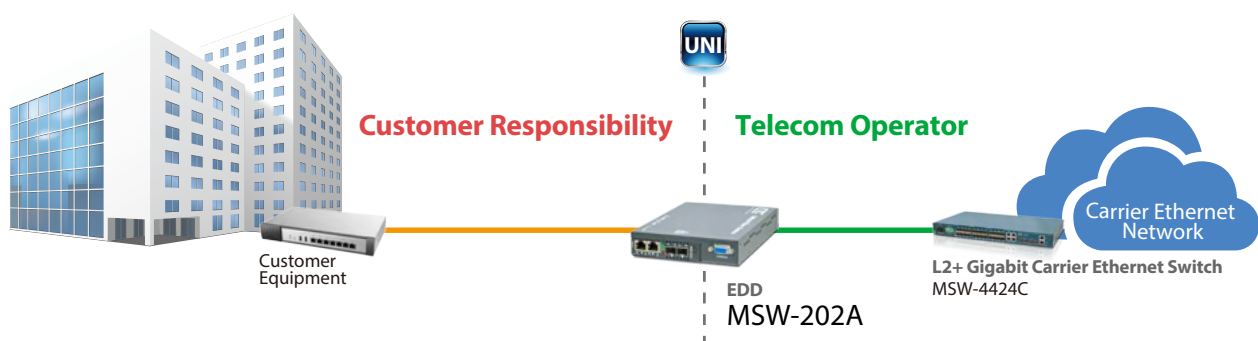
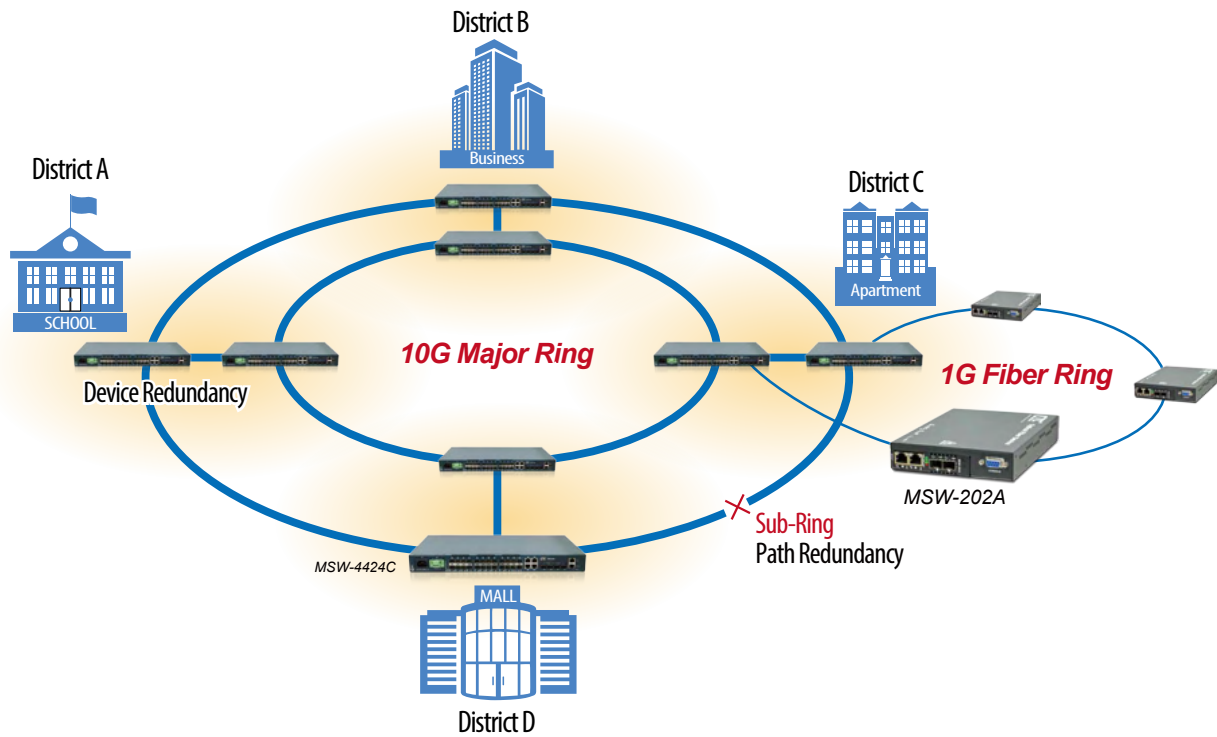


Figure 2 : μ -Ring Protected Ethernet Backbone Application



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

Power Type
MSW – 202A – ☐
 Example: MSW – 202A –AC

CE 2.0



MSW-404

4× GbE/RJ45 + 4× 1G/SFP

L2+ Carrier Ethernet Switch (NID)

MSW-404 is a new generation of carrier grade Ethernet demarcation device for business connection and mobile backhaul transportation service delivered by carriers. The MSW-404 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 delivered 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.

Features

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

Specifications

Interface	100/1000Mbps SFP slots × 4 + 10/100/1000Base-T RJ45 × 4
Switching Fabric capacity	16Gbps
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps
Switching Capacity	16Gbps
Transmission Method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1D, IEEE 802.1w, IEEE 802.1s, IEEE 802.1x, IEEE 802.3ad
Packet Buffer	8M bits
MAC Table Size	8K
Max. Packet Size	10K Bytes
VLAN Feature	IEEE 802.1Q tagged VLAN, 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 bandwidth control
L2 switching protection	STP, RSTP, MSTP, ITU-T G.8031/G.8032 Ethernet ring protection, μ-Ring
Trunking	IEEE 802.3ad LACP(Max. 4 trunking groups, Max. 8 ports per trunking group)
Security	IEEE 802.1x port based access control, MAC based access control authentication, RADIUS authentication, limited MAC address learning, IP/MAC binding, ACL rule based filtering, TACACS+, IP source guard, DHCP 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, 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
MPLS feature	MPLS-TP compliant to ITU-T G.8113.1
LED Display	Power, System, Console, Link, Speed/Act
Power Input	100V ~ 240VAC, -18 ~ -75VDC
Power Consumption	< 20W
Operating Temperature	0 ~ 50°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	167.4 × 219.4 × 44.5 mm (WxDxH) (with CH02M Chassis)
Regulatory	FCC, CE

Application

Figure 1 : Ethernet Backbone Application

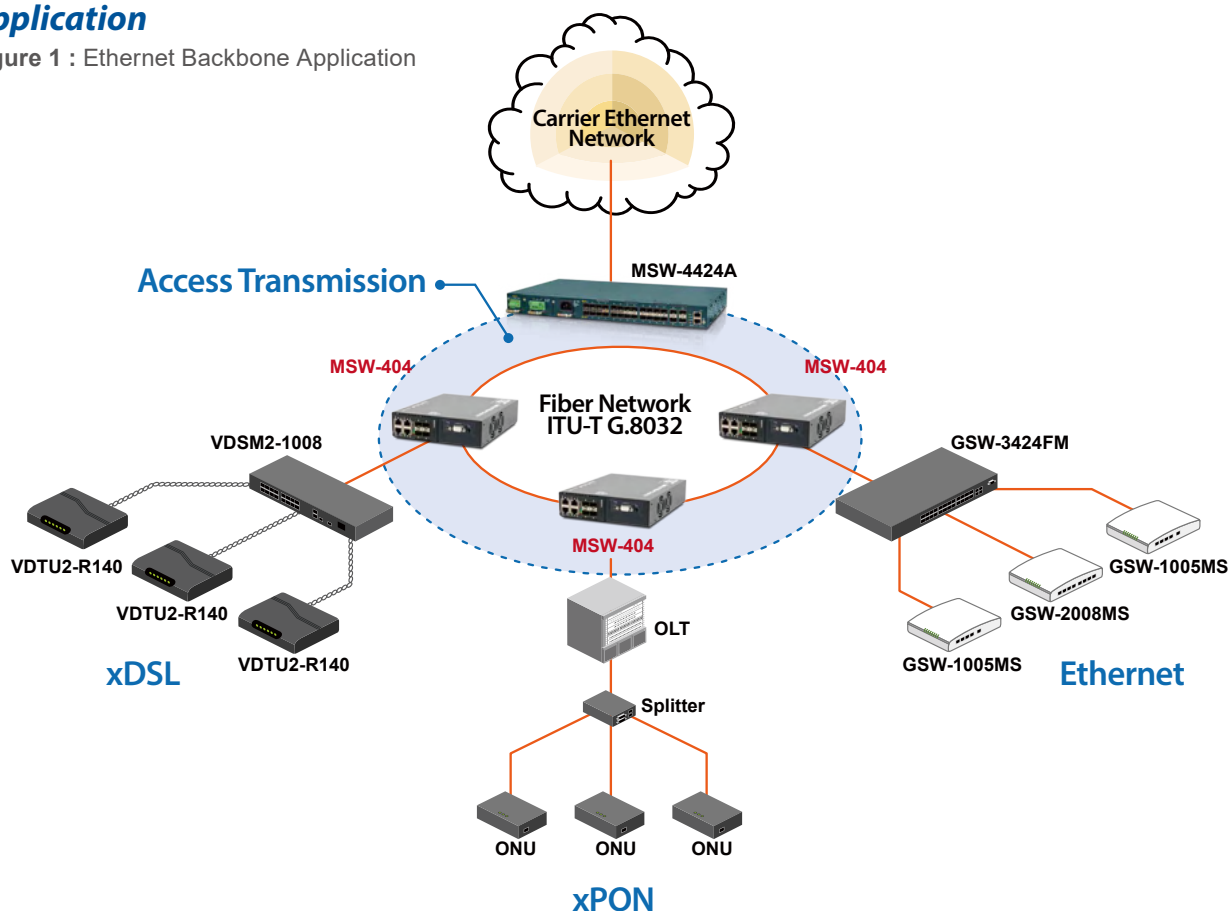
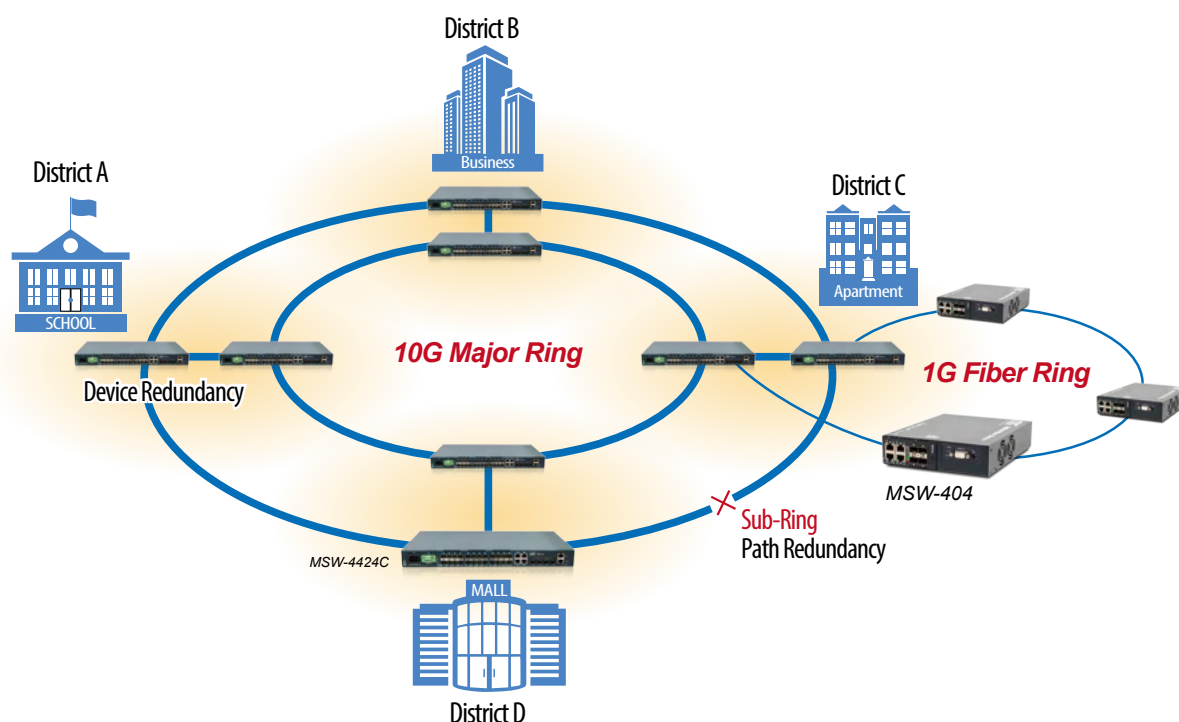


Figure 2 : μ -Ring Protected Ethernet Backbone Application



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

Power Type
MSW - 404 - ☐ ☐
 Example: MSW - 404 - AC



GSW-4448CM

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

GSW-4448CM is an SNMP manageable Gigabit Ethernet switch for FTTx deployment or Gigabit Ethernet fiber aggregation that 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. The GSW-4448CM supports a special BX optics (Compact SFP) which can double the fiber port density to 48 links, make it be attractive for the FTTx deployment and scenarios where increased user links are required in limited construction space. With advanced layer 2 and QoS features, this switch 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. 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.

Feature and Benefits

- IPv6 management
- 8 priority queues are supported on each port for QoS application
- Port-based VLAN, 802.1Q VLAN, Voice VLAN and Q-in-Q(double tagging) function
- Protected Port and Loop Detection function
- IEEE 802.1x security function, and VLAN assignment, Guest VLAN functions
- Static MAC address access limit and Dynamic MAC address number on port
- IEEE 802.1D & 802.1w & 802.1s
- DHCP Client / DHCP Option 82 Relay / DHCP Snooping function
- ACL function for L2 ~ L4 packet control, Ingress/Egress rate control on port
- IP Multicast with IGMP snooping / query / fast leave / filtering / group limited /MVR
- Broadcast/Multicast/Unknown Unicast storm control
- ARP inspection / IP source guard
- RMON 1,2,3,9
- SFP Transceiver DDMI function
- Remote port configuration setting and statistics monitoring
- Text based CLI configuration download and upload

Specifications

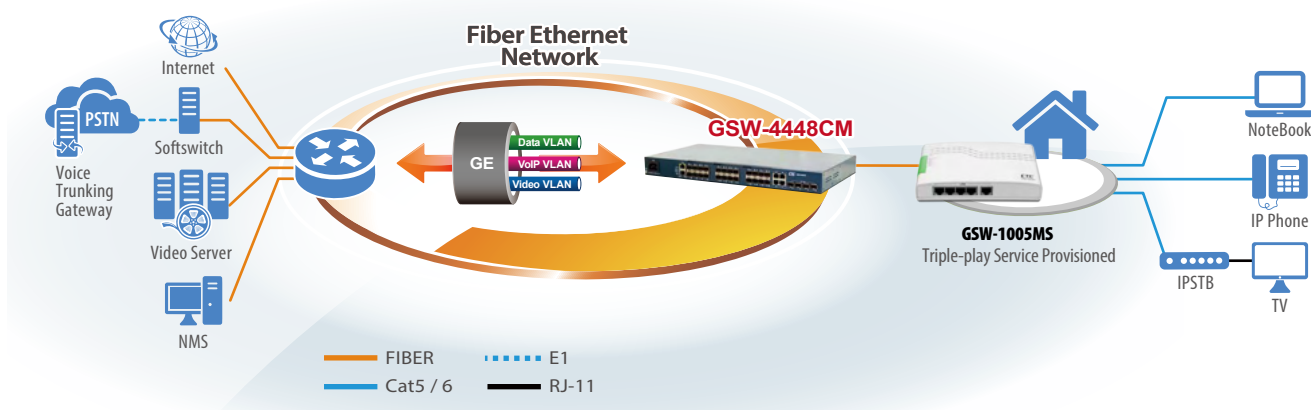
System	
1G CSFP or 100M/1G SFP Slot	24
1G Combo 10/100/1000Base-T Port	4
1G/10G Uplink Port	4
Memory	Flash : 256MB / RAM: 2GB
Packet buffer	32M bits
MAC Table size	32K
Max Packet Size	10K Bytes
Filter & Forward rate	14880pps at 10Mbps 148800pps at 100Mbps 1488000pps at 1Gbps 14880000pps at 10Gbps
Switching Fabric Capacity	178Gbps
Packet Forwarding Capacity	132Mpps
FAN	3 x independent fans with speed sensors
Console port	RJ-45
SFP DDMI	Yes
Dimension (mm)	440(W) × 220(D) × 43.5(H)
Operatin Temperature	0 ~ 50°C
Storage Temperature	-25 ~ 70°C
Humidity	10% ~ 90% (non-condensing)
Power Consumption	<100W Max.
Power Input	100V ~ 240VAC or -36 ~ -60VDC

Software	
Port Control	Port speed, duplex mode, and flow control Port Auto MDI/MDI-X Port maximum frame size (10240 bytes) Port state (administrative status) Port status (link monitoring) Port statistics (MIB counters)
L2 Switching	Auto MAC address learning/aging. Per port limited MAC address learning IEEE 802.1Q static VLAN(4K VLAN groups), Voice VLAN, Port isolation, Private VLAN, MAC based VLAN protocol based VLAN, IP subnet based VLAN IEEE 802.1D STP/802.1w RSTP/802.1s MSTP IEEE 802.3ad Link Aggregation, static and LACP BPDU guard and restricted role, Error Disable Recovery DHCP client, DHCP snooping, DHCP option 82 relay ARP inspection Port mirroring, RSPAN
Layer 2 Multicast	IGMP snooping v1,v2, v3 snooping, (1024 groups) IGMP snooping Fast and Immediate leave IGMP throttling, filtering, and leave proxy MVR and MVR profile IPv6 MLD v1/v2 snooping
QoS	8 Priority Queues per Port Port Based priority Scheduler priority QoS Control List Storm control for UC, MC, and BC Per port/per queue based ingress policing and egress shaping DiffServ (RFC 2474) remarking Tag remarking

Security	Port-based 802.1X, Single 802.1X, Multiple 802.1X MAC-based authentication, VLAN assignment, QoS assignment, Guest VLAN RADIUS accounting MAC address limit TACACS+ Web and CLI authentication and authorization ACLs for filtering, policing, and port copy (1K entries Max.) IP source guard
Synchronization	NTPv4 Client
SFF-8472 DDMI	Yes

Management	HTTP server CLI console port Telnet CLI Management access filtering SSHv2 and HTTPS IPv6 Management Syslog Software upload through Web and TFTP SNMPv1/v2c/v3 Agent RMON Group 1, 2, 3, and 9 IEEE 802.1AB-2005 Link Layer Discovery, LLDP Text Configuration download or upload Daylight Saving
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Application



Ordering Information

Model Name	Description
GSW-4448CM-AC	48x GbE (24x CSFP), 4x GbE combo (RJ45 or CSFP) + 4x 1G/10G, SFP+ slots uplink with single AC power supply
GSW-4448CM-DC	48x GbE (24x CSFP), 4x GbE combo (RJ45 or CSFP) + 4x 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

Power Type
GSW - 4448CM - ☐ ☐
 Example: GSW - 4448CM - AC

NEW

GSW-4424CM

24x GbE/RJ45 + 4x 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.

Features

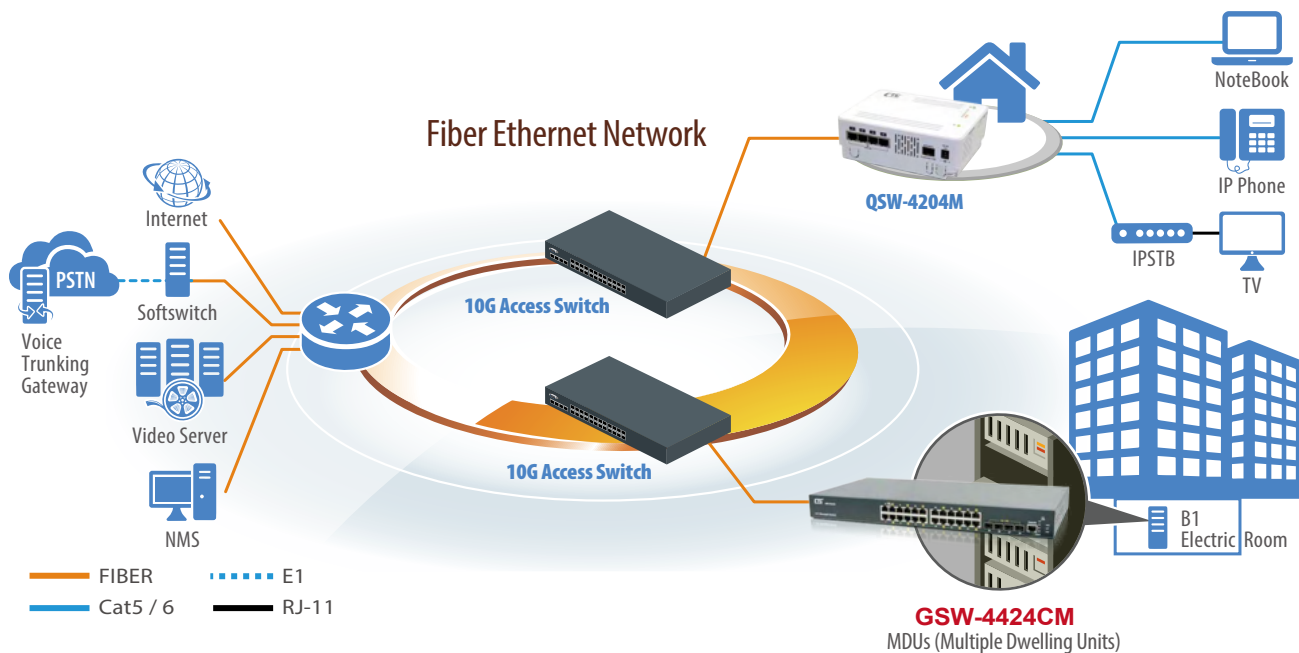
- IPv6 management
- 8 priority queues are supported on each port for QoS application
- Port-based VLAN, 802.1Q VLAN, Voice VLAN and Q-in-Q(double tagging) function
- Protected Port and Loop Detection function
- IEEE 802.1x security function, and VLAN assignment, Guest VLAN functions
- Static Mac address access limit and Dynamic Mac address number on port
- IEEE802.1d & 802.1w & 802.1s
- DHCP Client / DHCP Option 82 Relay / DHCP Snooping function
- ACL function for L2 ~ L4 packet control, Ingress/Egress rate control on port
- IP Multicast with IGMP snooping / query / fast leave / filtering / group limited / MVR
- Broadcast/Multicast/Unknown Unicast storm policing
- ARP inspection / IP source guard
- RMON 1,2,3,9
- SFP Transceiver DDMI function
- Remote port configuration setting and statistics monitoring
- Text based CLI configuration download and upload
- IEEE 802.3az power management / Green Ethernet

Specifications

Interface	fiber port: 1G/10Gbps SFP+ uplink * 4 Copper port: 10/100/1000Base-T RJ45 * 24 Console port: RS-232 in RJ45 * 1	
Switching Fabric capacity	128Gbps	
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, 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 512 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 reporting 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 SFP-8472 DDMI IEEE 802.1ab LLDP Text based configuration download and upload
Power input	AC power input (100~240V) ; -36 ~ -72 DC power input
Power consumption	< 60W
Operating temperature	0~50°C
Storage temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 x 250 x 43.5 mm (W x D x H)
Certification	CE, FCC class A

Application



Ordering Information

Model Name	Description
GSW-4424CM-AC	24 x 10/100/1000Base-T RJ45+4 x 1G/10G SFP+ slots Managed Ethernet Switch with single AC Power Supply
GSW-4424CM-DC	24 x 10/100/1000Base-T RJ45+4 x 1G/10G SFP+ slots Managed Ethernet Switch with single DC Power Supply (-48V)
GSW-4424CM-AA	24 x 10/100/1000Base-T RJ45+4 x 1G/10G SFP+ slots Managed Ethernet Switch with 2 x AC Power Supply
GSW-4424CM-DD	24 x 10/100/1000Base-T RJ45+4 x 1G/10G SFP+ slots Managed Ethernet Switch with 2 x DC Power Supply (-48V)
GSW-4424CM-AD	24 x 10/100/1000Base-T RJ45+4 x 1G/10G SFP+ slots Managed Ethernet Switch with AC + DC Power Supply



GSW-3424FM

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

GSW-3424FM is an SNMP manageable Gigabit Ethernet switch for FTTx deployment or Gigabit Ethernet fiber aggregation that 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. With advanced layer 2 and QoS features, this switch 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. 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.

Features

- IPv6 management
- 8 priority queues are supported on each port for QoS application
- Port-based VLAN, 802.1Q VLAN, Voice VLAN and Q-in-Q(double tagging) function
- Protected Port and Loop Detection function
- IEEE 802.1x security function, and VLAN assignment, Guest VLAN functions
- Static Mac address access limit and Dynamic Mac address number on port
- IEEE802.1d & 802.1w & 802.1s
- DHCP Client / DHCP Option 82 Relay / DHCP Snooping function
- ACL function for L2 ~ L4 packet control, Ingress/Egress rate control on port
- IP Multicast with IGMP snooping / query / fast leave / filtering / group limited /MVR
- Broadcast/Multicast/Unknown Unicast storm control
- ARP inspection / IP source guard
- RMON 1,2,3,9
- SFP Transceiver DDMI function
- Remote port configuration setting and statistics monitoring
- Text based CLI configuration download and upload
- IEEE 802.3az power management / Green Ethernet

Specifications

System		
100M/1G SFP Port	24	
10/100/1000 Base-T RJ45	4	
1G/10G Uplink Port	4	
Memory	Flash : 16MB / RAM: 128MB	
Packet buffer	32M bits	
MAC Table size	32K	
Max Packet Size	10K	
Transmission Method	Store and Forward Switching	
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps	
Switching Fabric capacity	136Gbps	
Packet Forwarding capacity	102Mpps	
FAN Design	Yes	
Console port	RJ-45	
19" Rack-Mount	Yes, with kits	
SFP DDMI	Yes	
Dimension	440 x 250 x 43.5mm (WxDxH)	
Operating Temperature	0 ~ 50°C	
Storage Temperature	-25 ~ 70°C	
Humidity	10% ~ 90% (non-condensing)	
LED Display	Per Port : Link/Act (Green: Gigabit, Yellow:10/100M) Per Device : Power and System	
Power Consumption	<60W Max.	
Power Input	AC Power input (100V~240V); -36~-60VDC	
LED		
Power	Lights(Green)	System is receiving power
System	Lights(Green)	System is ready
Link / Act	Lights	Link is ready 1000Mbps : Amber 100Mbps : Green
	Flashing	Data packets being received or sent

Software	
Port Control	Port speed, duplex mode, and IEEE 802.3x flow control Port Auto MDI/MDI-X Port frame size (jumbo frames), Maximum ingress frame size (10056 bytes) Port state (administrative status) Port status (link monitoring) Port statistics (MIB counters) Port VeriPHY (cable diagnostics)
L2 Switching	Auto MAC address learning/aging Per port limited MAC address learning IEEE 802.1Q static VLAN(4K VLAN groups), Voice VLAN, Port isolation, Private VLAN, MAC based VLAN protocol based VLAN IP subnet based VLAN IEEE 802.1D STP/802.1w RSTP/802.1s MSTP IEEE 802.3ad Link Aggregation, static and LACP BPDU guard and restricted role, Error Disable Recovery DHCP client, DHCP snooping, DHCP option 82 relay ARP inspection(256 entries Max.) Port mirroring, RSPAN
Layer 2 Multicast	IGMP snooping v1,v2, v3 snooping, (1024 groups) IGMP snooping Fast and Immediate leave IGMP throttling, filtering, and leave proxy MVR and MVR profile IPv6 MLD v1/v2 snooping
QoS	IEEE 802.1p 8 Priority Queues per Port Port Based priority Scheduler priority QoS Control List(256 entries Max.) Storm control for UC, MC, and BC Per port/per queue based ingress policing and egress shaping DiffServ (RFC 2474) remarking Tag remarking

Security

Port-based 802.1X, Single 802.1X, Multiple 802.1X
MAC-based authentication, VLAN assignment, QoS
assignment,
Guest VLAN
RADIUS accounting
MAC address limited learning
TACACS+
Web and CLI authentication and authorization
ACL rules based on L2~L4 information
IP source guard

Synchronization

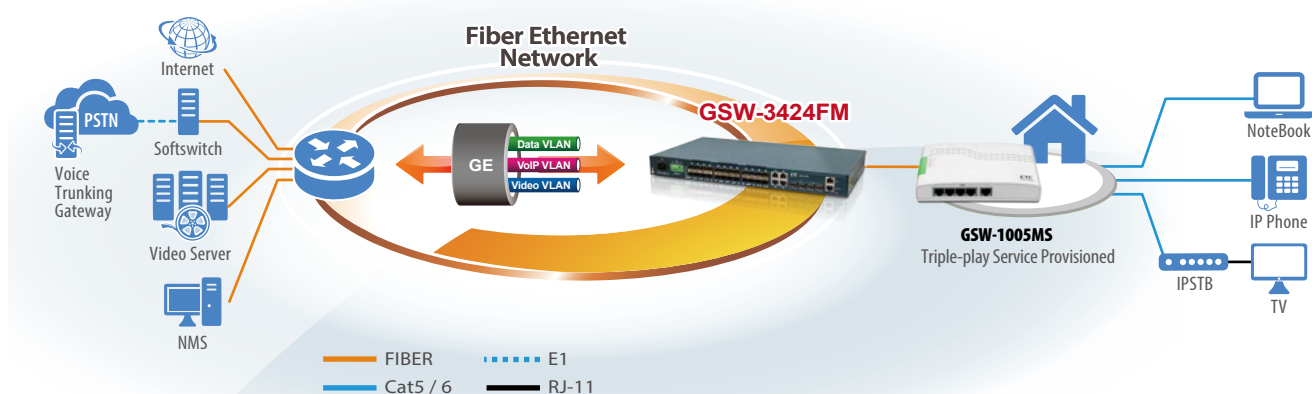
NTPv4 Client

SFF-8472 DDMI

Yes

Management

HTTP server
CLI console port
Telnet CLI
Management access filtering
SSHv2 and HTTPS
IPv6 Management
Syslog
Software upload through Web and TFTP
SNMPv1/v2c/v3 Agent
RMON Group 1, 2, 3, and 9
IEEE 802.1AB-2005 Link Layer Discovery, LLDP
Text Configuration download or upload
Daylight Saving

Application**Ordering Information**

Model Name	Description
GSW-3424FM-AC	24x GbE SFP slots + 4x GbE RJ45 + 4x 1G/10Gbps SFP+ slots uplink with single AC power supply
GSW-3424FM-DC	24x GbE SFP slots + 4x GbE RJ45 + 4x 1G/10Gbps SFP+ slots uplink with single DC power supply (-48V)
GSW-3424FM-AA	24x GbE SFP slots + 4x GbE RJ45 + 4x 1G/10Gbps SFP+ slots uplink Dual AC power supply
GSW-3424FM-DD	24x GbE SFP slots + 4x GbE RJ45 + 4x 1G/10Gbps SFP+ slots uplink Dual DC power supply (-48V)
GSW-3424FM-AD	24x GbE SFP slots + 4x GbE RJ45 + 4x 1G/10Gbps SFP+ slots uplink 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

Power Type
GSW - 3424FM - ☐ ☐
Example: GSW - 3424FM - AD



GSW-4208CM

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

The new generation L2+ managed Ethernet switch, GSW-4208CM, is designed for SMB and FTTH networks. 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 SOHO environment.

Full Layer 2+ Management Features

The GSW-4208CM is equipped with 8 Gigabit RJ45 ports and 2 1G/10G SFP+ based fiber optics ports. It is also a feature complete L2+ switch 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 simple network deployment.

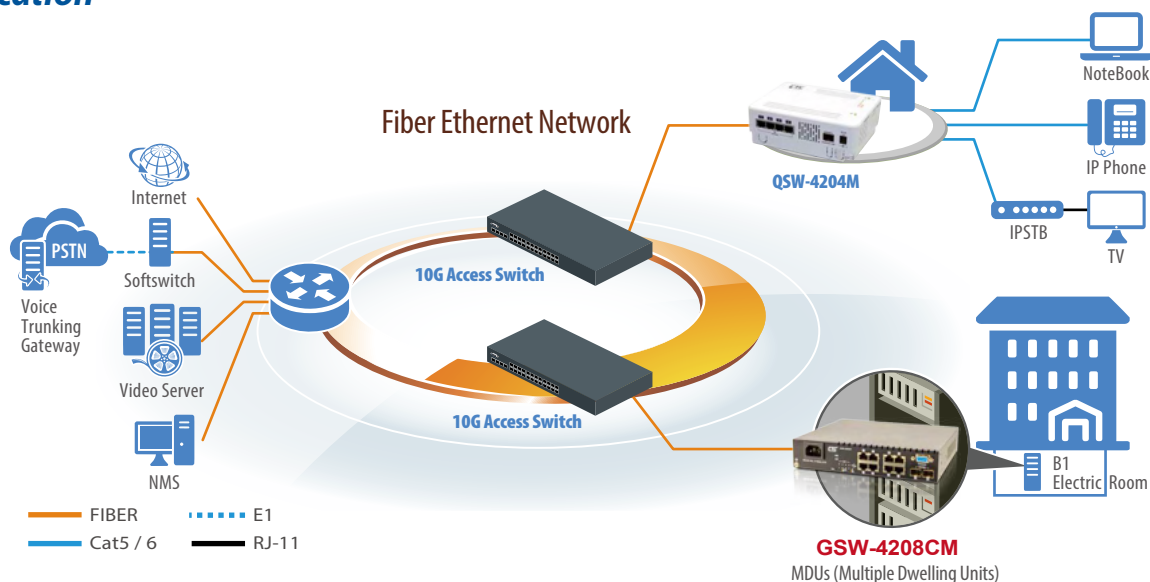
Features

- 8-port GbE RJ45 + 2-port 1G/10G SFP+ uplink slot
- Supports 10240 Bytes jumbo frame
- Supports dying gasp
- Supports Cisco® like CLI

Specifications

Interface	fiber port: 1G/10Gbps SFP+ × 2 Copper port: 10M/100M/1G RJ45 × 8		IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting MLD snooping v1/v2 IGMP fast leave IGMP query IGMP filtering/throttling MVR (Multicast VLAN Registration)
Switching Fabric Capacity	68Gbps		Management	WebGUI/Telnet CLI interface SNMP v1/v2c/v3 RMON I (1,2,3,9 groups) & RFC1213 MIB II Dying gasp in trap message DHCP client/relay/snooping/relay option 82 TFTP/HTTP based firmware and configuration upgrade Port mirroring Event syslog server DNS client/proxy DHCP auto provisioning (option 55/60/66/67/254) NTP client UPnP IPv4/IPv6 management SFF-8472 DDMI IEEE 802.1ab LLDP
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps 3720000pps @2500Mbps		Power Input	AC power input (100~240V) ; -36 ~ -60 DC power input
Transmission Method	Store and Forward Switching		Operating Temperature	0~50 degree C
Packet buffer	8M bits		Storage Temperature	-25~70 degree C
MAC table size	16K		Humidity	5%~95% (non-condensing)
Jumbo frame size	10240 Bytes		Dimension	215 × 190 × 44 mm (WxDxH)
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)		Certification	CE, FCC class A
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			
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			

Application



Ordering Information

Model Name	Description
GSW-4208CM-AC	8x GbE RJ45 + 2x 1G/10G SFP+ slots Managed Ethernet Switch with single AC power supply
GSW-4208CM-DC	8x GbE RJ45 + 2x 1G/10G SFP+ slots Managed Ethernet Switch with single DC power supply (-48V)
GSW-4208CM-AA	8x GbE RJ45 + 2x 1G/10G SFP+ slots Managed Ethernet Switch with 2x AC power supply
GSW-4208CM-DD	8x GbE RJ45 + 2x 1G/10G SFP+ slots Managed Ethernet Switch with 2x DC power supply (-48V)
GSW-4208CM-AD	8x GbE RJ45 + 2x 1G/10G SFP+ slots Managed Ethernet Switch with AC + DC power supply



GSW-3424M1A

22 ports GbE RJ45 + 2 ports GbE combo (RJ45 or SFP)
+ 2 ports GbE SFP uplink
L2+ Managed Ethernet Switch

The new L2 switch GSW-3424M1A is equipped 22-port 10/100/1000Base-T RJ45 + 2-Port GbE combo + 2-slot GbE SFP for SMB to strengthen their network. The switch supports Layer 2+ software features such as network control, security and management. Including 19" rack-mount brackets to fit into the rack installation.

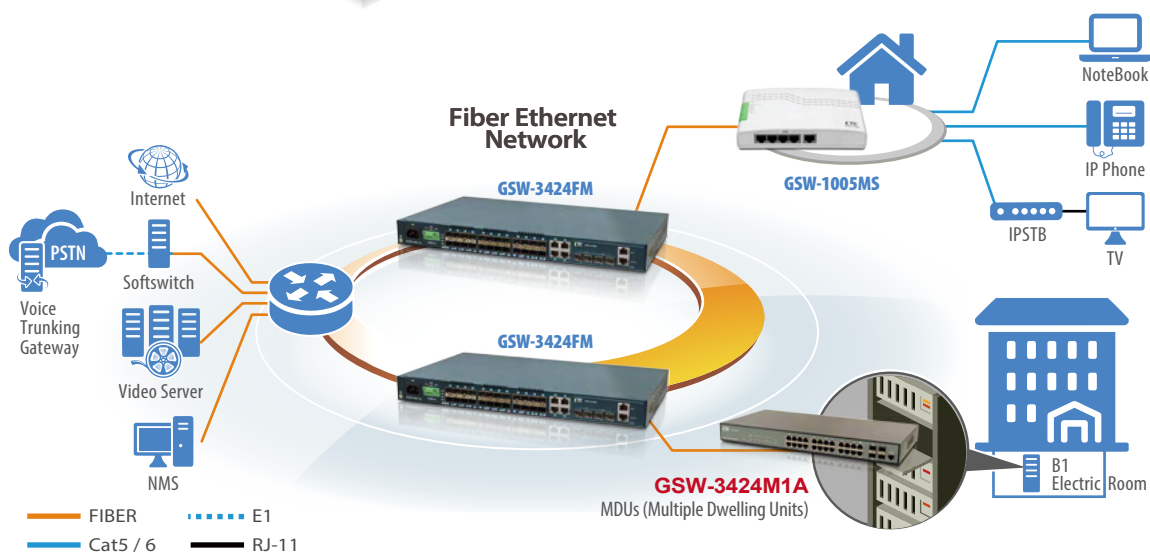
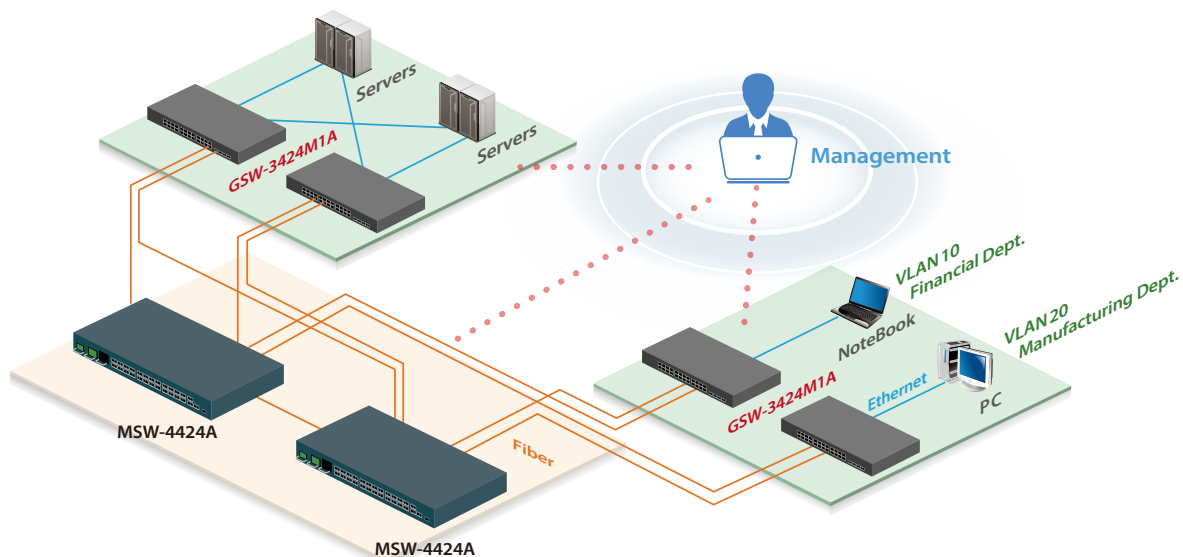
Fully Layer 2+ Management

The switch includes full Layer 2+ Management features. The software set includes up to 4K 802.1Q VLAN and advanced Protocol VLAN, Private VLAN, MVR... advanced VLAN features. There are 8 physical queues Quality of Service, IPv4/v6 Multicast filtering, Rapid Spanning Tree protocol to avoid network loop, LACP, LLDP; sFlow, port mirroring, cable diagnostic and advanced Network Security features. It also provides Console CLI for out of band management and SNMP, Web GUI for in band Management.

Specifications

Interface	Fiber port: 1G SFP x 2 Combo port: (1G SFP or 10/100/1000Mbps RJ45) x 2 Copper port: 10/100/1000Mbps RJ45 x 22 Management port: GbE RJ45 x 1	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 HTTP based firmware and configuration upgrade Port mirroring Event syslog server NTP client IPv4/IPv6 management IEEE 802.1ab LLDP Cable Diagnostics
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps	Power input	100V~240VAC power module
Switching Fabric Capacity	52Gbps	Power consumption	25W
Transmission method	Store and Forward Switching	Operating temperature	0~50 degree C
Packet buffer	4M bits	Storage temperature	-20~80 degree C
MAC table size	8K	Humidity	5%~90% (non-condensing)
Jumbo frame size	9600 Bytes	Dimension	440 x 220 x 44 mm (WxDxH)
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	Certification	CE, FCC class A
Link aggregation	Static trunk (SA, DA, IP, TCP/UDP port) IEEE 802.3ad LACP, 13 LACP trunk groups Max, 8 port Max. per LACP trunk		
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/Hybrid priority CoS based traffic classification on IEEE 802.1p, IP ToS precedence, IP DSCP IEEE 802.1p priority tag remarking; Diffserv Per Port/Queue based ingress/egress rate limit in steps of 1kbps 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 reporting MLD snooping v1 IGMP fast leave IGMP query MVR (Multicast VLAN Registration)		

Application



Ordering Information

Model Name	Description
GSW-3424M1A	22x 10/100/1000Base-T RJ45 + 2x GbE Combo + 2x GbE SFP with built-in AC power supply



GSW-3208M2

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

GSW-3208M2 is positioned as a layer 2 managed switch solution for high speed connectivity with 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. The GSW-3208M2 is designed with a high-performance switching architecture and offers wire-speed transportation capability for bandwidth-intensive applications of enterprises. 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 also supports features such as VLAN, QoS, IGMP for multicast applications and network management to fulfill SMB requirements. The GSW-3208M2 delivers a cost effective Gigabit Ethernet solution to meet the converged applications for enterprise customer's networks.

Features

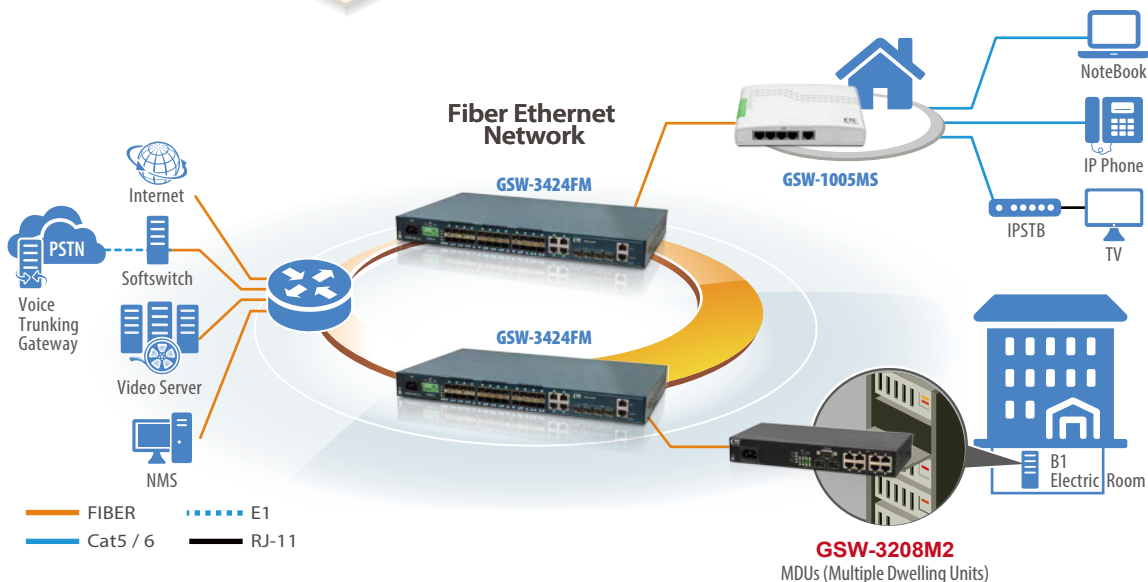
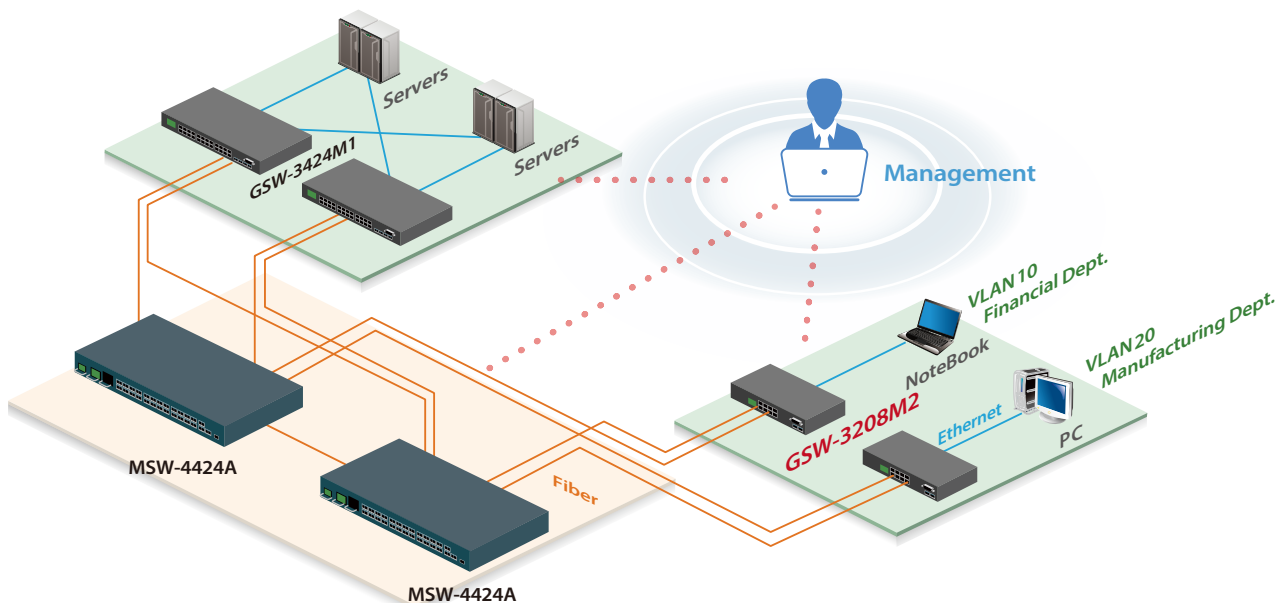
- 8-port 10/100/1000Base-T RJ45 + 2 uplink 100/1000Base-X SFP slot
- Supports 9.6K Bytes jumbo frame
- Supports IEEE 802.1Q tagged VLAN & Q-in-Q VLAN stacking
- Supports IEEE 802.1p priority queue
- Supports IGMP snooping v1/v2/v3
- Supports dying gasp
- Supports power redundancy (optional)
- Supports Cisco® like CLI

Specifications

Interface	8x 10/100/1000Base-T(X) RJ-45 with 2x 100/1000Base-X SFP
Console port	D-Sub 9
FAN design	Fanless
19" rack mountable	Yes, with kits (optional)
Switching fabric capacity	20Gbps
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps
Transmission method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1x, IEEE 802.1D, IEEE 802.1w, IEEE 802.1s, IEEE 802.3ad, IEEE 802.1ab
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 IP subnet based VLAN, Voice VLAN VLAN translation, 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, User Priority, Input priority mapping, QoS Control List (QCL Mode), Storm Control for UC, BC and Unknown Port policers, Global/VCAP (ACL) policers, Port egress shaper, Queue egress shapers, DiffServ (RFC2474) remarking, Tag remarking, Scheduler mode

Security	Port based/single/multiple IEEE 802.1x access control MAC based access control authentication RADIUS authentication, limited MAC address learning IP/MAC binding, ACL rule based filtering TACACS+, IP source guard DHCP 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 interface, Web/CLI authentication, SSH v2, HTTPs, port mirroring, system syslog, IPv6 management, NTP, text based CLI configuration upload or download, IEEE 802.1ab LLDP, DHCP auto provisioning 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, Multiple trap destinations
Software upgrade	TFTP/HTTP
Power input	100 ~ 240VAC -18 ~ -60VDC (-48VDC)
Operating Temperature	0 ~ 50°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	250 x 117 x 43.8 mm (WxDxH)
Certification	FCC, CE
Installation Type	19" rack mount or wall mount

Application



Ordering Information

Model Name	Description
GSW-3208M2-AC	8x 10/100/1000Base-T RJ45 + 2x GbE SFP slot L2 Managed Switch with AC power supply
GSW-3208M2-DC48	8x 10/100/1000Base-T RJ45+ 2x 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

Power Type
GSW – 3208M2 – ☐ ☐ ☐ ☐
 Example: GSW – 3208M2 – DC48



QSW-4204M

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

The QSW-4204M is a next generation CPE switch developed by CTC Union Technologies. 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 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 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. 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.

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 IEEE 802.11ac wave 2 or even WiFi 6 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 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.

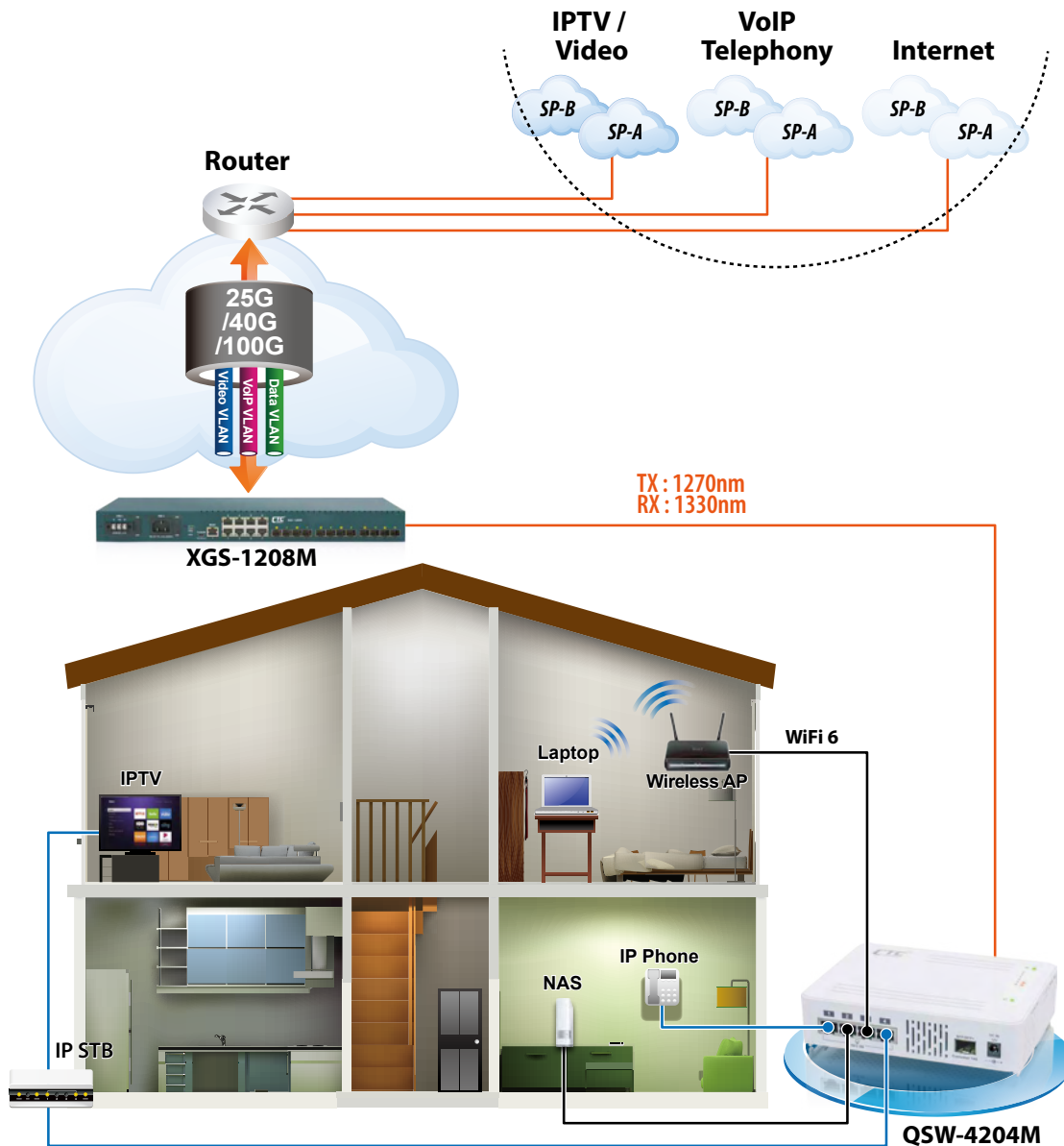
Feature

- 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: 1G/10Gbps SFP+ x2 Copper port: 10M/100M/1G/2.5Gbps RJ45 x4; 10/100/1000Mbps RJ45 for telemetry x1		Security	256 ACL rules based on L2~L4 information RADIUS/TACACS+ authentication HTTPs & SSH v2 IP/MAC binding IP source guard & ARP inspection
Switching Fabric Capacity	62Gbps		IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting MLD snooping v1/v2 IGMP fast leave IGMP query IGMP filtering/throttling MVR (Multicast VLAN Registration)
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps 3720000pps @2500Mbps		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 trap message DHCP client/relay/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
Transmission Method	Store and Forward Switching		Power Input	12V/2A AC power adaptor
Packet buffer	8M bits		Operating Temperature	0~50°C
MAC table size	16K		Storage Temperature	-25~70°C
Jumbo frame size	10240 Bytes		Humidity	5%~90% (non-condensing)
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)		Dimension	162 × 122 × 43.5mm (WxDxH)
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		Certification	CE, FCC, class A
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			

Application

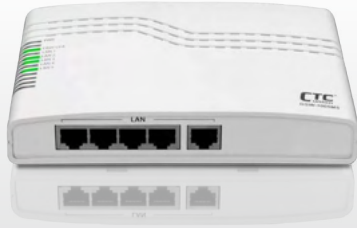


Ordering Information

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

Optional Accessory

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



GSW-1005MS

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

GSW-1005MS is a managed Gigabit Ethernet CPE switch designed 5-Ports 10/100/1000Base-T RJ45 and 1 port 100/1000Base-X SFP based fiber optics. The traditional transmission distance of Gigabit Ethernet over RJ45 copper can be extended up to 100km over a fiber optics interface. GSW-1005MS has a 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. LEDs provide visual monitoring of Ethernet connected devices such as Ethernet home gateways, wireless access points or PC/laptop via 10/100/1000Base-T twisted pair RJ45 ports on GSW-1005MS. When GSW-1005MS is deployed as a stand-alone solution, it incorporates an easy to use Web user interface for operation, administration and maintenance both locally and remotely. All of the enabled Layer 2 features and functions of GSW-1005MS can be configured and monitored via web, CLI or SNMP management. GSW- 1005MS is particularly suitable for deploying and provisioning active Ethernet FTTX service of multi-service operators (MSO).

Features

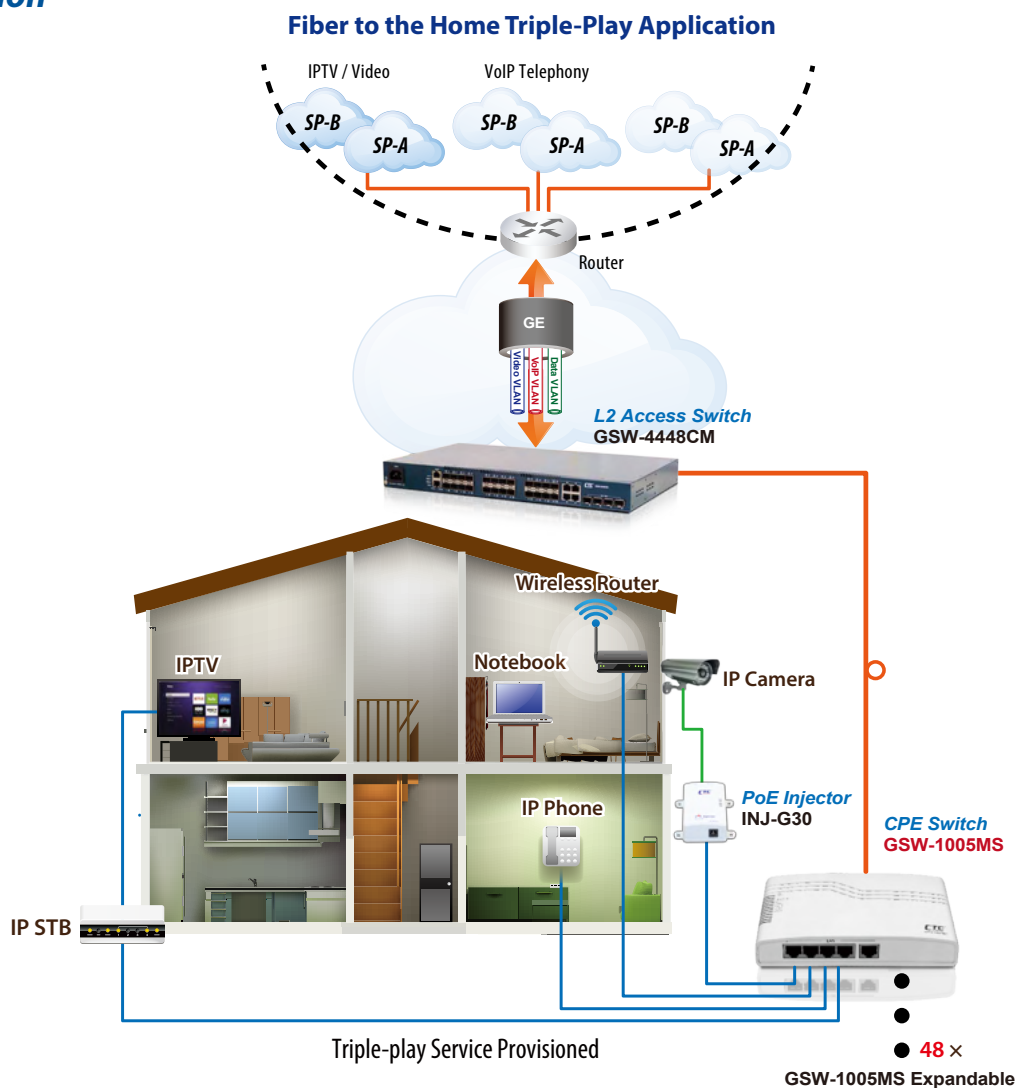
- 5-Port 10/100/1000Base-T + 100/1000Base-X SFP uplink
- Supports 9.6K Bytes jumbo frame
- Supports IEEE 802.1Q tagged VLAN & Q-in-Q VLAN stacking
- Supports IEEE 802.1p priority queue
- Supports IGMP snooping v1/v2/v3
- Supports DHCP auto provisioning
- Supports dying gasp
- Fiber cable tray(optional)

Specifications

Interface	5× 10/100/1000Base-T RJ-45 with 1× 100/1000Base-X SFP
Switching fabric capacity	12Gbps
Packet forwarding capacity	8.928Mpps
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps
Transmission method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1x, IEEE 802.1ab, IEEE 802.3az
Packet buffer	4M bits
MAC table size	8K
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 IP subnet based VLAN, Voice VLAN VLAN translation, IEEE 802.1ad Q-in-Q
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
Security	Port based/single/multiple IEEE 802.1x access control MAC based access control authentication RADIUS authentication, limited MAC address learning IP/MAC binding, ACL rule based filtering TACACS+, DHCP snooping/relay option 82 ARP inspection, IP source guard
IP multicasting	IGMP throttling, IGMP filtering, IGMP fast leave, IGMP snooping v1/v2/v3, MVR, MLD snooping v1
Storm Control	Unknown Unicast/Broadcast/Multicast storm suppression
Management	Web/Telnet CLI interface Web/CLI authentication SSH v2 HTTPs port mirroring

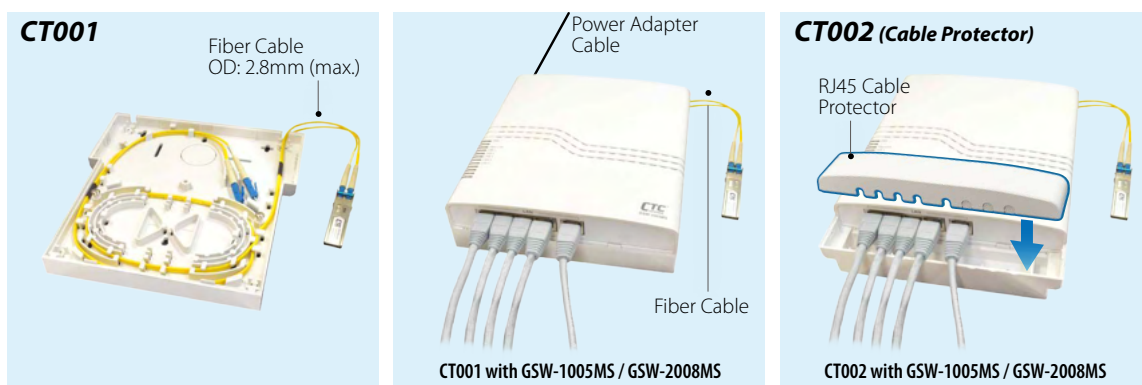
Management	system syslog IPv6 management NTP text based configuration upload or download, IEEE 802.1ab LLDP DHCP auto provisioning IEEE 802.3 az, Energy, Efficient, Ethernet (EEE) power management, SFF-8472 DDMI
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9
Software upgrade	TFTP/HTTP
Power Input	100v~240VAC power adapter
Operating Temperature	0 ~ 50°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	120 × 170 × 35mm (WxDxH)
Certification	FCC, CE

Application



Cable Tray Assembly

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



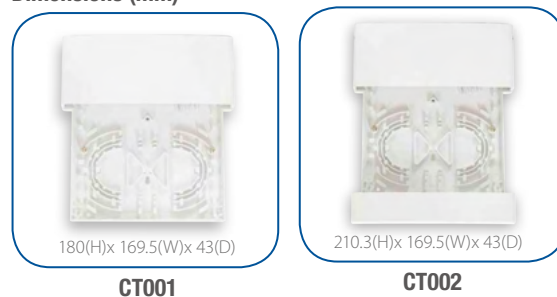
Ordering Information

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

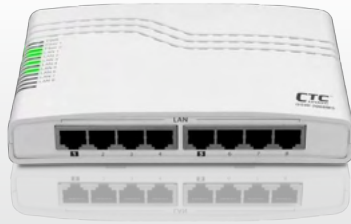
Model Name	Description
CT001	Cable Tray for GSW-1005MS/GSW-2008MS
CT002	Cable Tray & LAN cable protection cover for GSW-1005MS/2008MS

Dimensions (mm)



CT001

CT002



GSW-2008MS

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

GSW-2008MS is a managed Gigabit Ethernet CPE switch positioned as a layer 2 managed switch solution for high speed connectivity with 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. The GSW-2008MS is designed with a high-performance switching architecture and offers wire-speed transportation capability for bandwidth-intensive applications of enterprises. 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-2008MS also supports features such as VLAN, QoS, IGMP for multicast applications and network management to fulfill SMB requirements. The GSW-2008MS delivers a cost effective Gigabit Ethernet solution to meet the converged applications for enterprise customer's networks.

Features

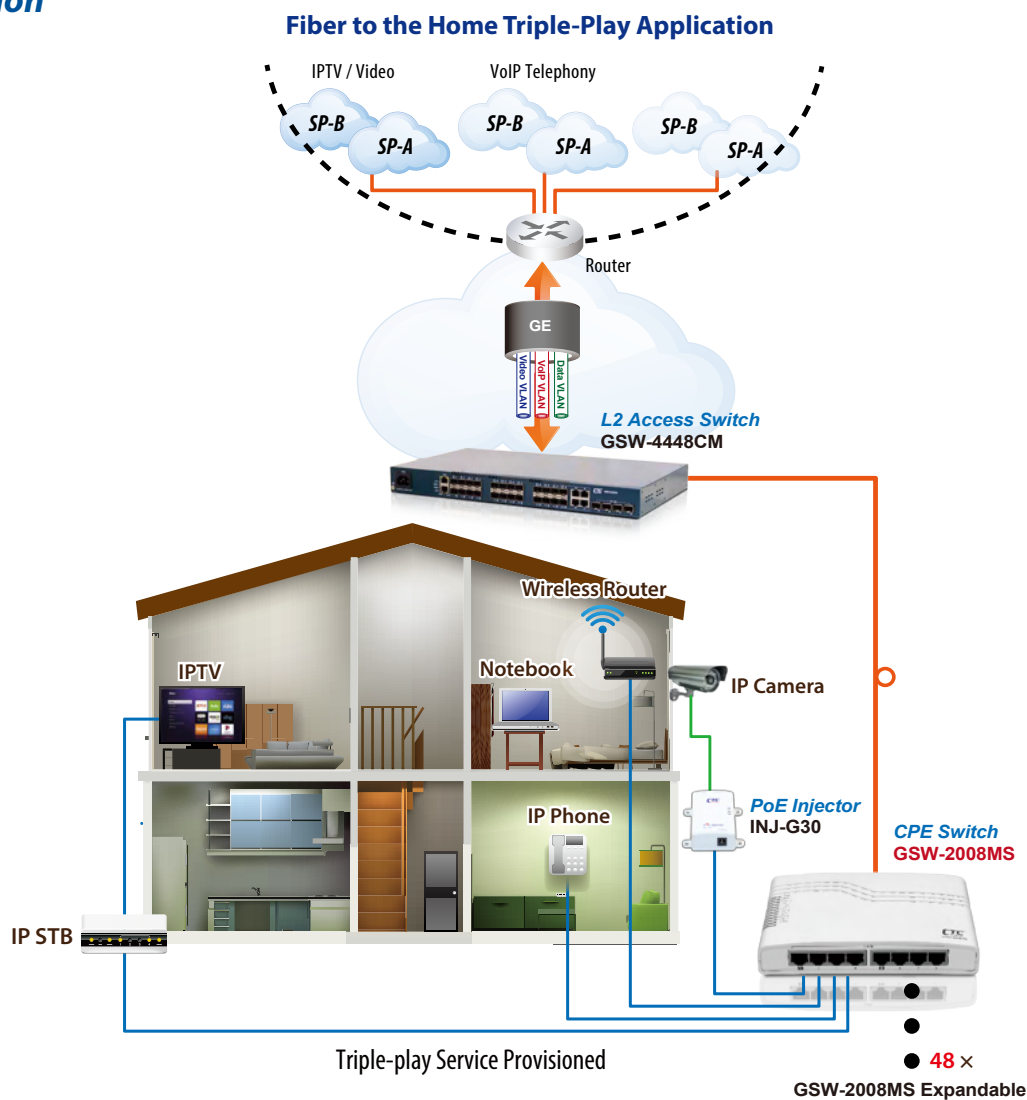
- 8-port 10/100/1000Base-T RJ45 + 2 uplink 100/1000Base-X SFP slot
- Supports 9.6K Bytes jumbo frame
- Supports IEEE 802.1Q tagged VLAN & Q-in-Q VLAN stacking
- Supports IEEE 802.1p priority queue
- Supports IGMP snooping v1/v2/v3
- Supports dying gasp
- Fiber Cable Tray (optional)

Specifications

Interface	8× 10/100/1000Base-T RJ-45 with 2× 100/1000Base-X SFP
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps
Switching Fabric capacity	20Gbps
Transmission method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1x, IEEE 802.1D, IEEE 802.1w, IEEE 802.1s, IEEE 802.3ad, IEEE 802.1ab, IEEE 802.3az
Packet buffer	4M bits
MAC table size	8K
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 IP subnet based VLAN, Voice VLAN VLAN translation, 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, User Priority, Input priority mapping, QoS Control List (QCL Mode), Port policers, Global/VCAP (ACL) policers, Port egress shaper, Queue egress shapers, DiffServ (RFC2474) remarking, Tag remarking, Scheduler mode
Security	Port based/single/multiple IEEE 802.1x access control MAC based access control authentication RADIUS authentication, limited MAC address learning IP/MAC binding, ACL rule based filtering
Security	TACACS+, IP source guard DHCP snooping/relay option 82 ARP inspection

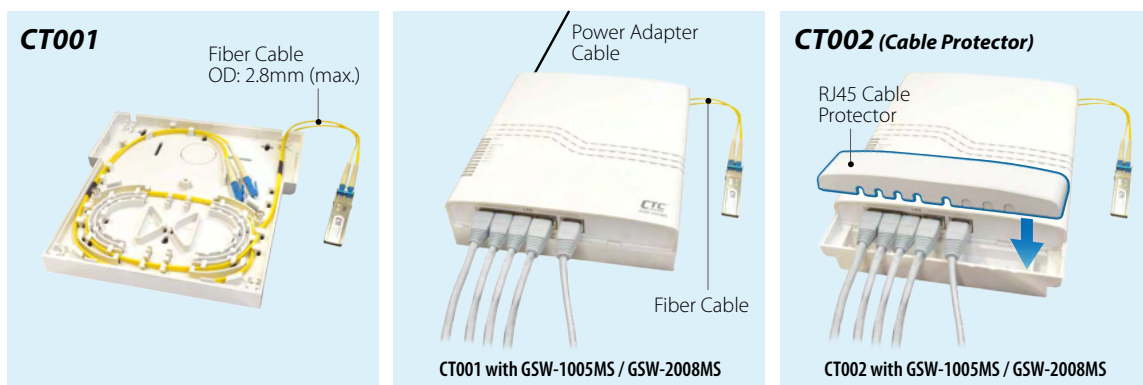
IP multicasting	IGMP throttling, IGMP filtering, IGMP fast leave, IGMP snooping v1/v2/v3, MVR, MLD snooping v1
Storm Control	Unknown Unicast/Broadcast/Multicast storm suppression
Management	Web/Telnet CLI interface, Web/CLI authentication, SSH v2, HTTPs, port mirroring, system syslog, IPv6 management, NTP, text based CLI configuration upload or download, IEEE 802.1ab LLDP, DHCP auto provisioning IEEE 802.3 az, 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
Operating Temperature	0 ~ 50°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	120 × 170 × 35mm (W×D×H)
Certification	FCC, CE

Application



Cable Tray Assembly

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



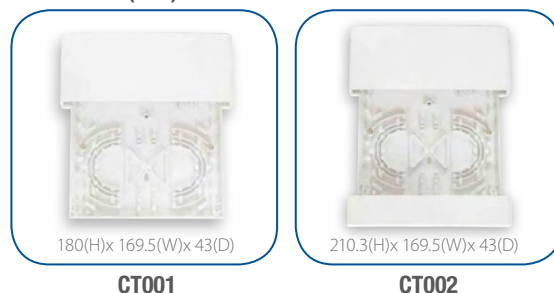
Ordering Information

Model Name	Description
GSW-2008MS	8-port 10/100/1000 Base-T to 2-port 100/1000 Base-X Managed GbE 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)



NEW

Ver. Apr. 2023

GSW-4424MP

24 x GbE/RJ45 + 4 x 10G SFP+ with 24 x 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 24x Gigabit RJ45 ports and 4x 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 x 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

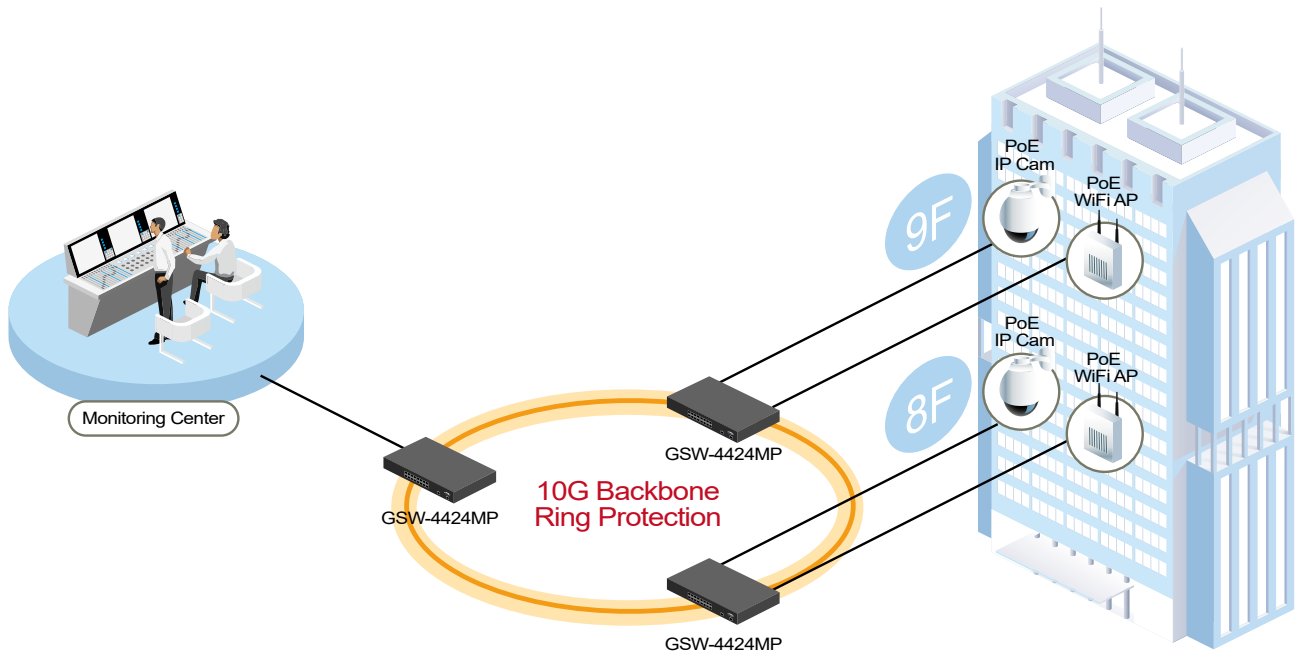
Interface	fiber port: 10Gbps SFP+ uplink * 4 Copper port: 10/100/1000Base-T RJ45 * 24 Management port: 10/100/1000Base-T RJ45 * 1 Console port: RS-232 in RJ45 * 1	
PoE power budget	450W	
Switching Fabric capacity	128Gbps	
Packet forwarding rate	14880pps	@10Mbps
	148800pps	@100Mbps
	1488000pps	@1000Mbps
	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, 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	

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+ authentication HTTPs & SSH v2 IP/MAC binding IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting 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 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)
Operating temperature	0~50°C
Storage temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 x 250 x 43.5 mm (W x D x H)
Certification	CE, FCC class A

3

L2+ Managed PoE Switch GSW-4424MP

Application



Ordering Information

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

3

L2+ Managed PoE Switch GSW-4424MP



GSW3208MP-1

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

The GSW3208MP-1 is the enhanced version of cost-effective high performance managed power over Ethernet switch, which is equipped 8 GbE/RJ45 with IEEE 802.3at standard 30W power injection per port and 2 GbE SFP slots. It's designed for enterprise network deployment for office applications such as PoE powered IP telephony, WiFi access and IP surveillance. The GSW3208MP-1 support a wide variety of L2+ feature sets and included the advanced PoE management functions. Additionally, the GSW3208MP-1 can be managed by CTC in-house developed Smartview Element Management System, which offers a user-friendly and centralized device management platform that make the administrators be able to monitor and configure the deployed switches remotely.

Features

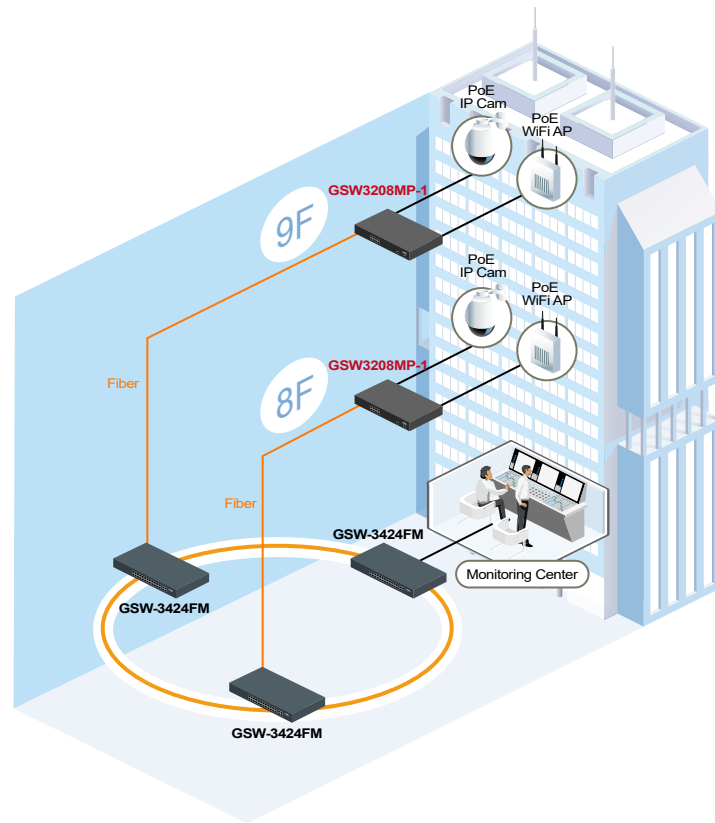
- 8x RJ45/PoE+ ports with 180W power budget totally
- Cable diagnostics to test UTP cable or determine broken point distance
- Text based CLI configuration download and upload
- Advanced PoE management
 - PoE PD failure auto check and reset if PD failed
 - PoE port on/off scheduling
 - PoE configuration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

Specifications

Interface	Fiber port: 100M/1Gbps SFP x2 Copper port: 10M/100M/1Gbps RJ45 x8	
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	
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 reporting 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/relay/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)
Operating temperature	0~50 degree C
Storage temperature	-25~70 degree C
Humidity	5%~95% (non-condensing)
Dimension	290 x 140 x 43.8 mm (WxDxH)
Certification	CE, FCC class A

Application



Ordering Information

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

3

L2+ Managed PoE Switch GSW3208MP-1

NEW

GSW-3424MP

24 x GbE/RJ45 + 4 x 1G SFP with 24 x 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 24x Gigabit RJ45 ports and 4x 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 x 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

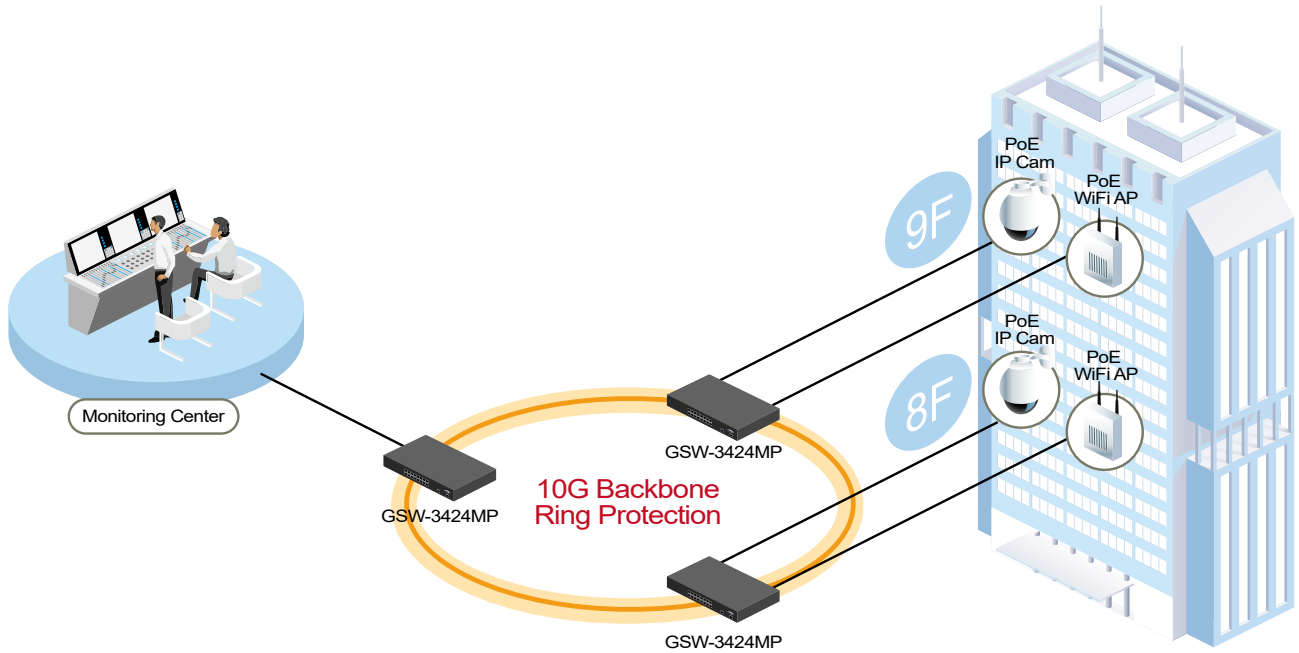
Interface	fiber port: 1Gbps SFP uplink * 4 Copper port: 10/100/1000Base-T RJ45 * 24 Management port: 10/100/1000Base-T RJ45 * 1 Console port: RS-232 in RJ45 * 1
PoE power budget	450W
Switching Fabric capacity	56Gbps
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps
Transmission 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; 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

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+ authentication HTTPs & SSH v2 IP/MAC binding IP source guard & ARP inspection
IP Multicasting	IGMP snooping v1/v2/v3, IGMP proxy reporting 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 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)
Operating temperature	0~50°C
Storage temperature	-25~70°C
Humidity	5%~95% (non-condensing)
Dimension	440 x 250 x 43.5 mm (W x D x H)
Certification	CE, FCC class A

3

L2+ Managed PoE Switch GSW-3424MP

Application



Ordering Information

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

3

L2+ Managed PoE Switch GSW-3424MP

NEW



PMC-1000S

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

PMC-1000S is a 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

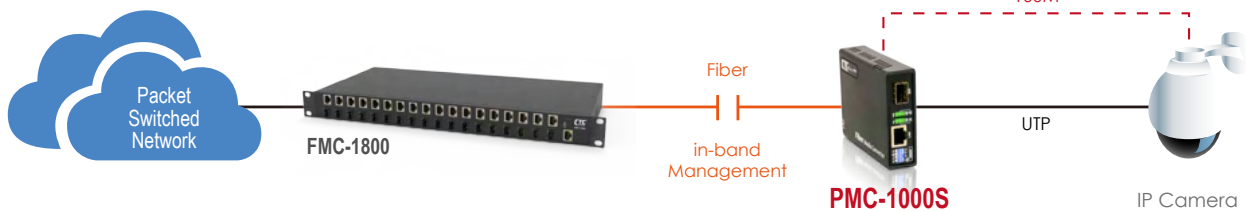
- Conversion between 10/100/1000Base-T and 100/1000Base-X
- Supports dual rate (100/1000) SFP for selectable Fast or Gigabit speed on fiber
- PoE output voltage up to 55VDC
- Supports IEEE 802.3at/af PoE, output 30Watts Power Budget
- Supports LFPT (Link Fault Pass Through)
- Supports DIP SW for setting 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)
Link Fault Pass through (LFPT)	SFP, Distance depend on plug-in Fiber Transceiver 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

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
Connector and Pin assignment	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: 100LK/Act (Green), 1000LK/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 x 23 x 74mm (D x W x 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



NEW



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

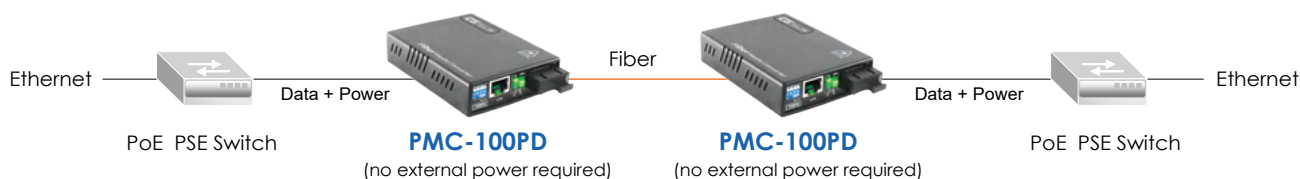
- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 1600 bytes (Max.) packets
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1Q Tag VLAN pass thru
- Supports flow control (Pause)
- Supports Link Fault Pass-Through (LFPT)
- Forward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

Specifications

Optical Interface	Connector	1x9 (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, 100Mbps
	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 x 74 x 23mm (D x W x H)
Weight	120g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC

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



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

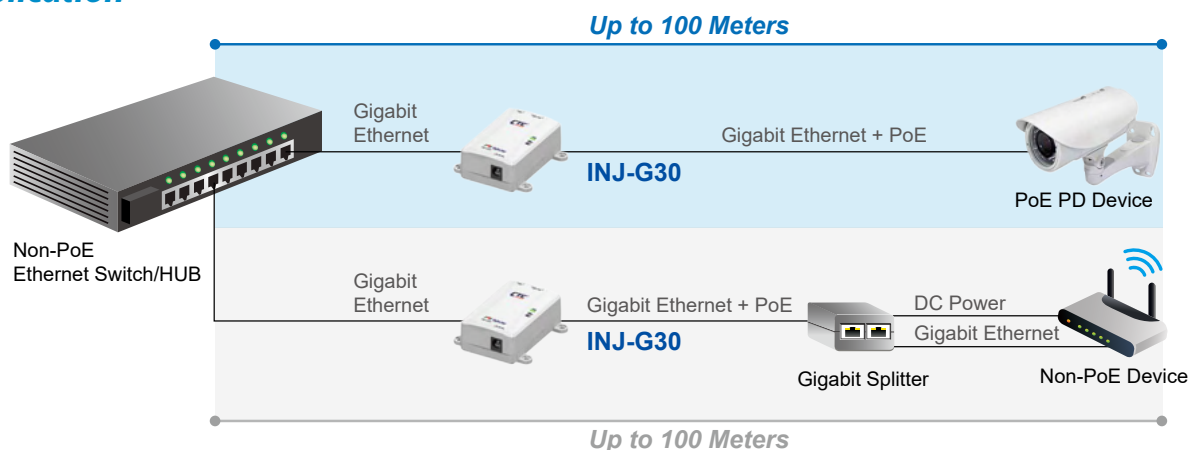
- 1 Port PoE Injector, 55VDC /30W output
- Compliant with IEEE 802.3af/at
- Providing 1 10/100/1000Mbps pass through data rate
- Wall Mountable
- Compliant with IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX and IEEE 802.3ab 1000Base-T
- Safety & EMI Certificates: CE & FCC Class B Smart plug & play
- Compact 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 (WxDxH)
Weight	138g
Installation mounting	Wall mount
Certificates	CE & FCC Class B

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



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

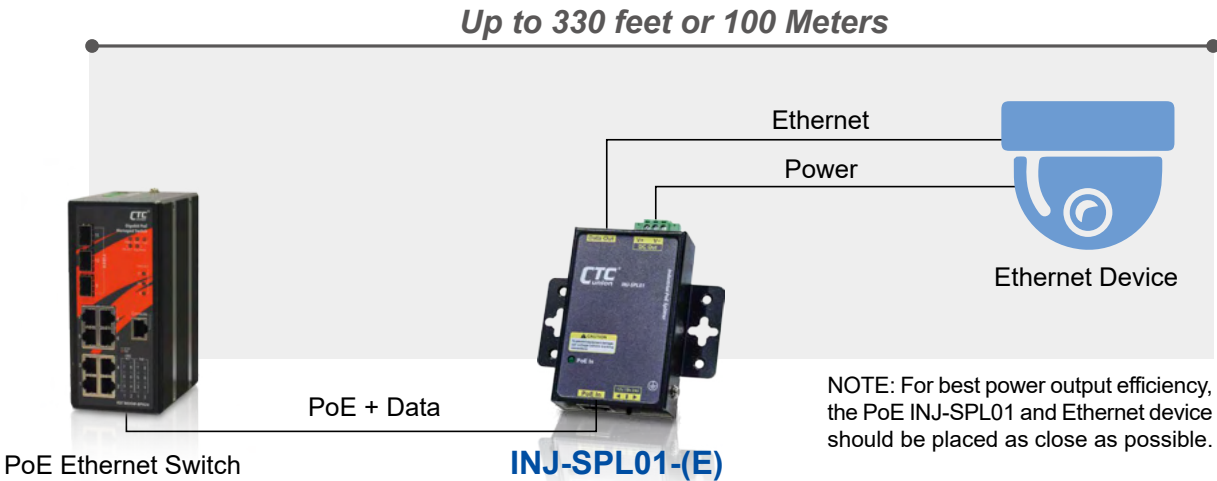
Specifications

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
		Support both PoE A mode or B mode (don't need select)
	RJ45 Pin Assignments	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 x 84.2 x 80.7 mm (D x W x H)	
Weight	85g	
Installation Mounting	Wall Mounting	
MTBF	3,371,427 Hours (MIL-HDBK-217)	
Warranty	5 years	

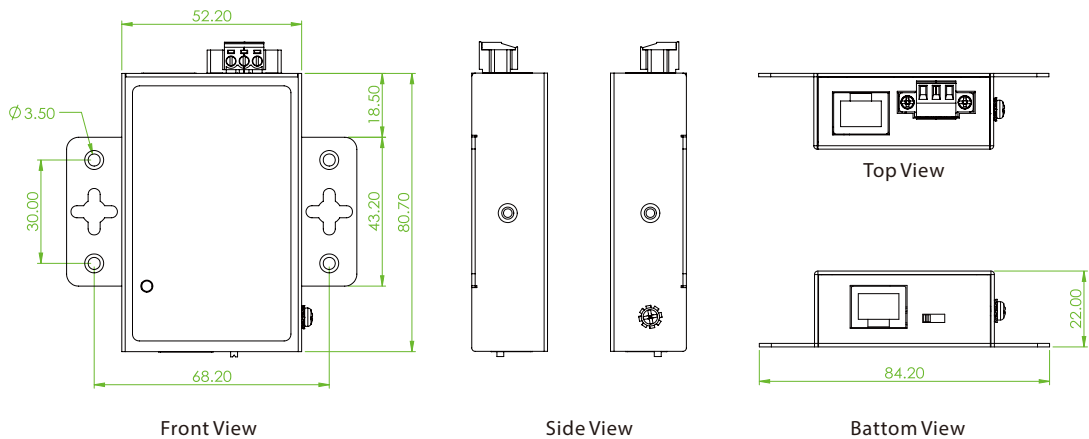
Certification	
EMC	CE (EN55032, EN55035)
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial environment	EN 61000-6-2
Emission for Heavy industrial environment	EN 61000-6-4
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria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

Application

Figure 1: INJ-SPL01 application topology



Dimensions



Ordering Information

Model Name	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	V	V	V	V	-10~60°C
INJ-SPL01-E	1	1	1	V	V	V	V	-40~75°C

Package List

- INJ-SPL01 device
- Terminal block



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 4x10Gigabit 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 x 438 x 88 mm (D x W x H)
	Weight (w/o Power)	5.2kg
Power	AC	18~240VAC
	DC24	18~36VDC
	DC48	36~72VDC

Temperatures	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)



Cooling Fan Redundant Power Cooling Fan
10G/1G Ethernet Aggregation Switch Card

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.

FRM220A-GSW/SNMP-10G

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



FRM220A-GSW/SNMP-1G

Gigabit uplink Ethernet Aggregation Switch Card with In-Band Management



- Provides chassis aggregation via 4x1G/10Gigabit Base-X SFP/SFP+ plus 4x10/100/1000Base-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
- 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



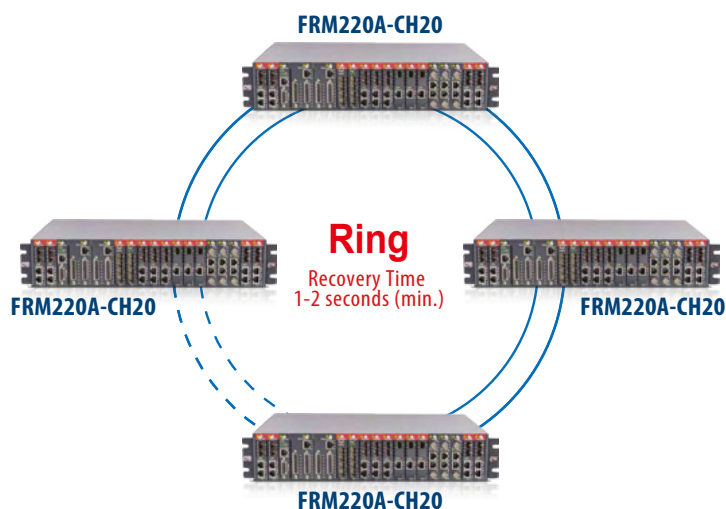
- 10/100/1000Base-T and 100/1000Base-X SFP (2000EAS/1)
- 2x 10/100/1000Base-T and 2x 100/1000Base-X SFP (2000EAS/2)
- Standalone IP Based, Web GUI, Telnet and SNMP management
- Supports dying gasp
- Online local / remote F/W upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management

Benefit of FRM220A Chassis Platform

Enabling IP Transportation Protection Mechanism

- STP/RSTP Featured Ring Protection

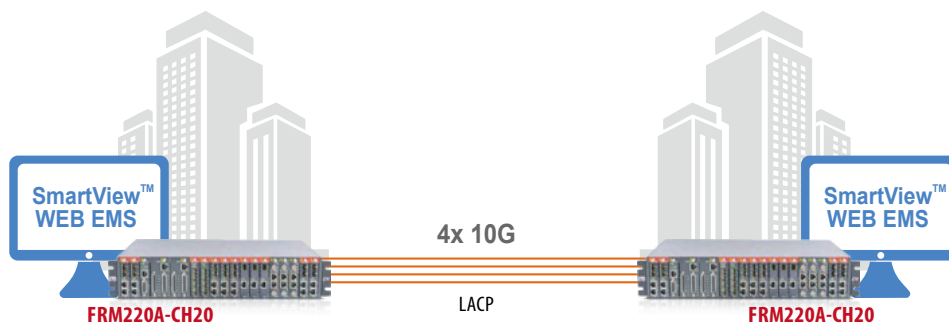
- Standard based but advanced fault protection systems
- Rapidly recovery path from failed connection (1-2 seconds min. recovery time)



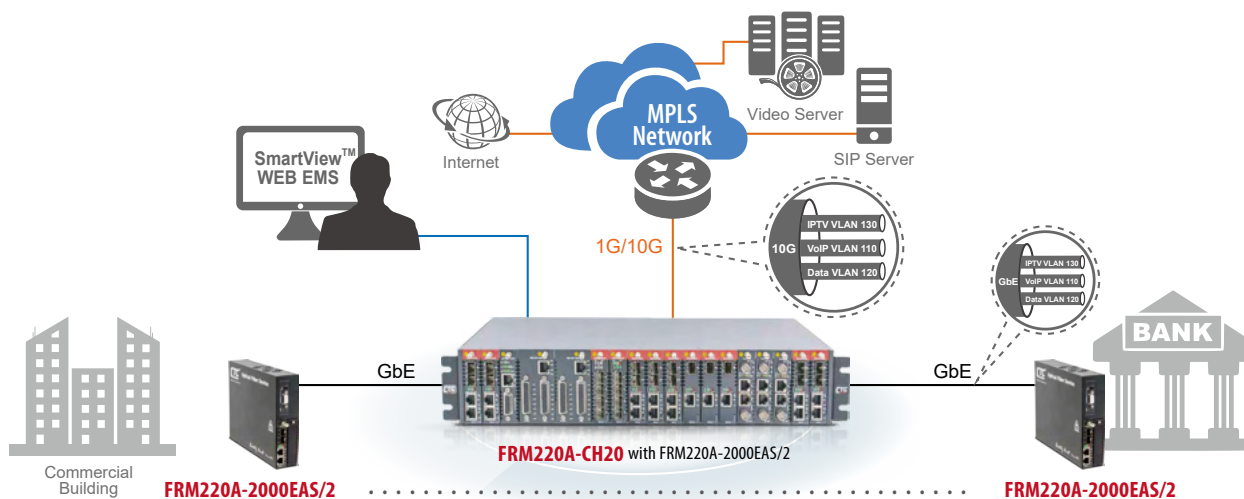
LACP Enabled Traffic Aggregation

- Fiber Redundant / Trunking Application

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

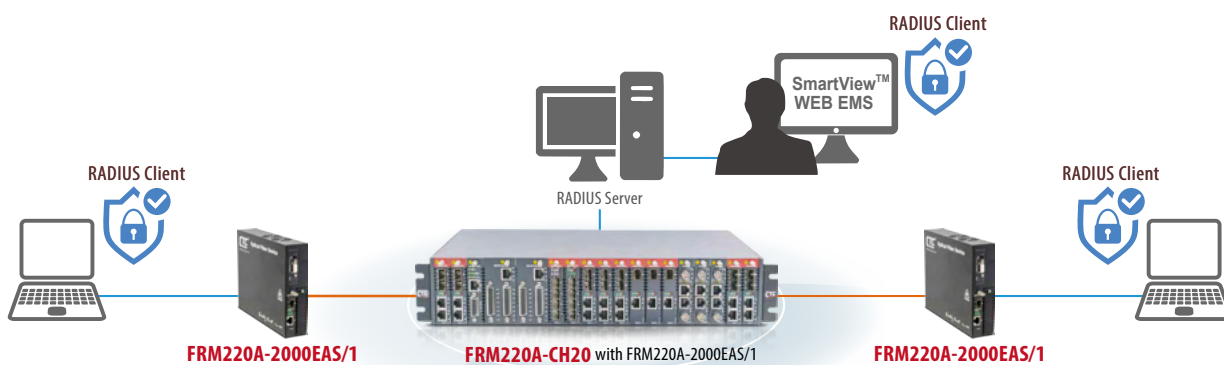


Enabling VLAN & QoS Prioritized Multiple Play Services



Secured Access Control Enhancement

- Centralized Management of Accessing the Network for user or device





FRM220A-GSW/SNMP-10G

10G uplink Ethernet Aggregation Switch Card

FRM220A-GSW/SNMP-1G

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

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 ~ 72 VDC, 3 pin terminal block

Chassis
FRM220A –
Example: FRM220A – CH20

Card
FRM220A – / –
Example: FRM220A – GSW/SNMP-10G



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

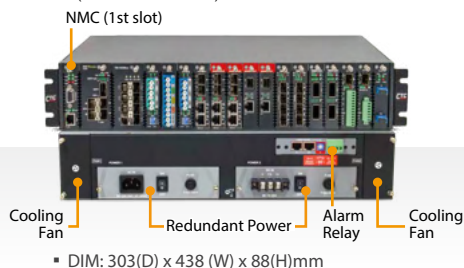
Power Input	AC	100-240VAC (CH20/CH08/CH04A/CH02/CH01)
	DC24	18-36VDC (CH20/CH08)
	DC48	36-75VDC (CH20/CH08)
	DC	18-60VDC (CH04A, CH02, CH01)
	Adapter Type (CH01)	Input Voltage 100-240VAC 50/60Hz Output Voltage 12VDC 1A
Weight	5.2kg (CH20), 3.5kg (CH08), 1.5kg (CH04A-AC/DC), 1.9kg (CH04A-AD)	
	1.3kg (CH02M), 1kg (CH02/NMC), 1.46kg (CH02/SMT)	
	0.5kg (CH01 Adapter Type), 0.8kg (CH01 Power Built-in Type),	
	1.2kg (CH01M)	

Temperature	Operating 0~60C, Storage -10~70C
Humidity	5%~90% non-condensing
Certification	FCC Class A, VCCI Class A, CE
Safety	UL60950-1 (FRM220-CH20)

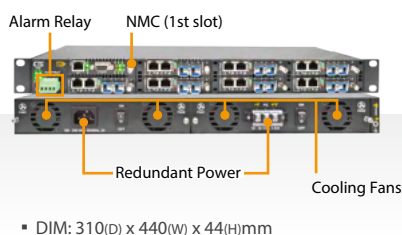
Chassis Overview

■ Rackmount Chassis

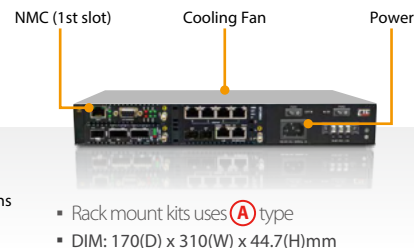
CH20 (2U 19" 20 Slots)



CH08 (1U 19" 8 Slots)



CH04A (1U 4 Slots)



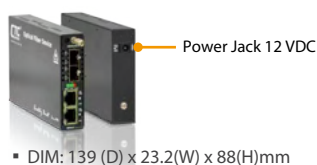
Ordering Information

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-DC24	Chassis Power module 18~36 VDC, 3 pin terminal block, 200W
FRM220-DC48	Chassis Power module 36~72 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 ~ 75 VDC, 3 pin terminal block, 300W
<i>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.</i>	
Cooling Fan	
FRM220-FNL	Chassis cooling fan left side module
FRM220-FNR	Chassis cooling fan right side module
FRM220-HFNL	Chassis high speed cooling fan left side module
FRM220-HFNR	Chassis high speed cooling fan right side module
CH08	
FRM220-CH08	1U 8-slot Rackmount Chassis
FRM220-CH08-AC	Chassis Power module 100~240 VAC, IEC connector, 180W
FRM220-CH08-DC24	Chassis Power module 18~36 VDC, 3 pin terminal block, 200W
FRM220-CH08-DC48	Chassis Power module 36~72 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

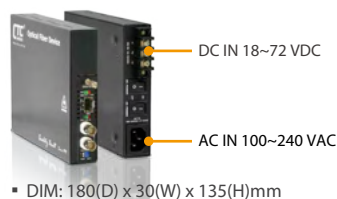
■ Standalone Chassis

■ 1-Slot Chassis

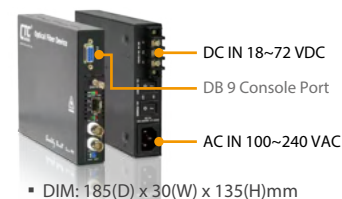
CH01 (Adapter Type)



CH01 (Power Built-in)



CH01M (Power Built-in)

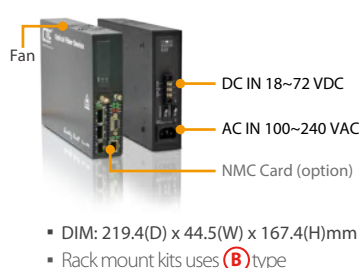


■ 2-Slot Chassis

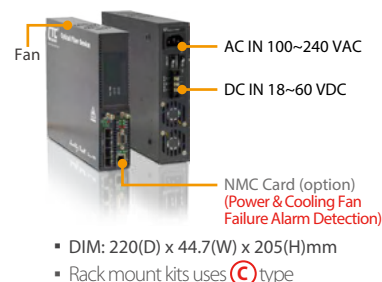
CH02M (Power Built-in)



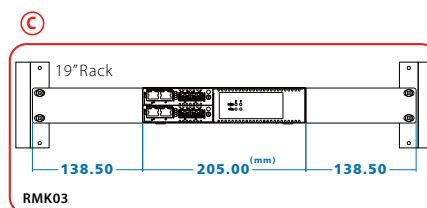
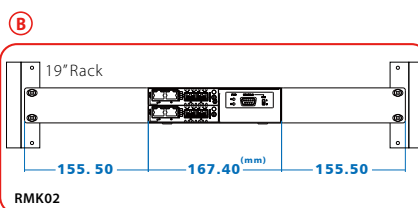
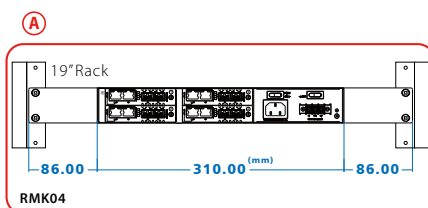
CH02/NMC (Power Built-in)



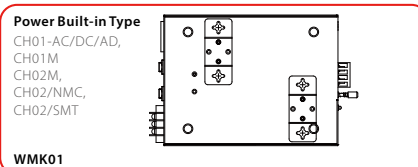
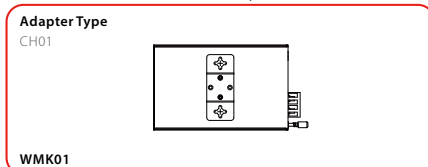
CH02/SMT (Power Built-in)



■ Rack Mount Kits (optional)



■ Wall Mount Kits (optional)



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-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
Rack 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

iAccess™ Platform Solutions

iAccess™ Multi-Service Platform offers a full range of solutions for service providers and enterprises, including **Optical Transport Solutions** (transponders, muxponders, CWDM, DWDM), **TDM/PDH/Voice Solutions** (fiber converters and multiplexers), **Ethernet Services** (switches and converters) and **Data Communication Solutions** (Sync/Async serial over fiber). The iAccess 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.

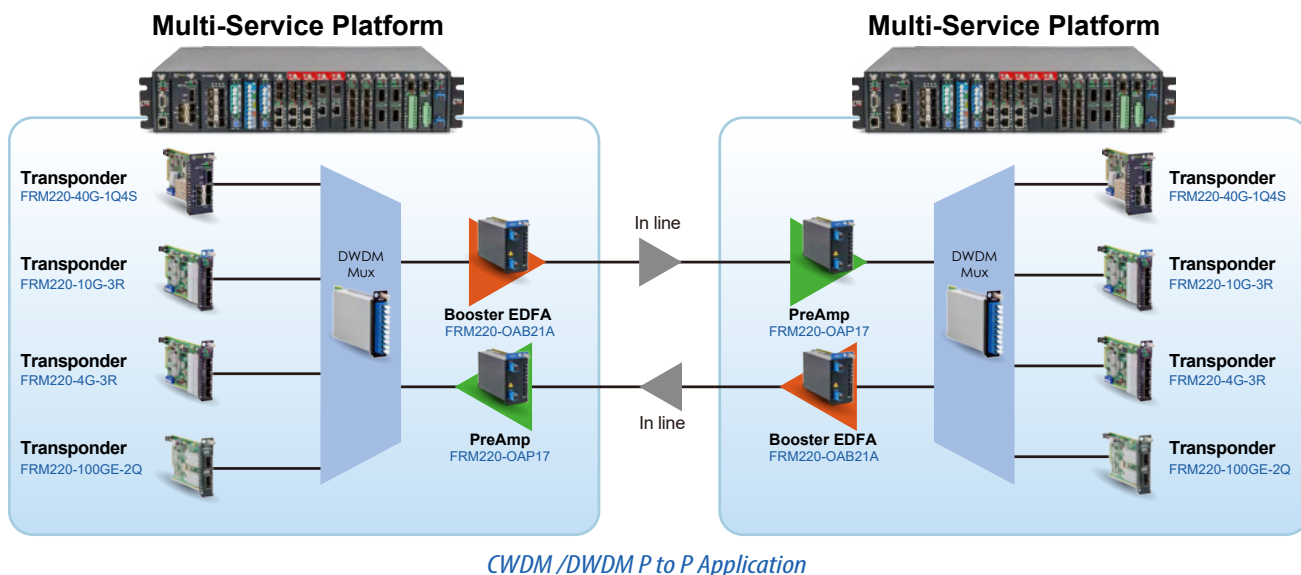


iAccess Platform Solution Category

Applications

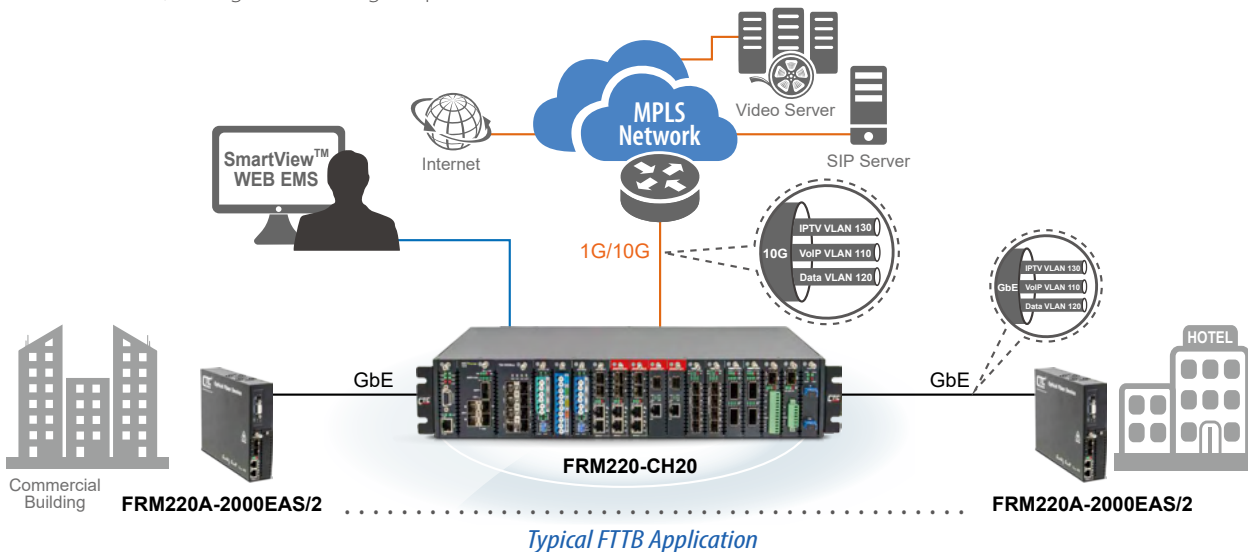
• Optical Transport Solution

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.



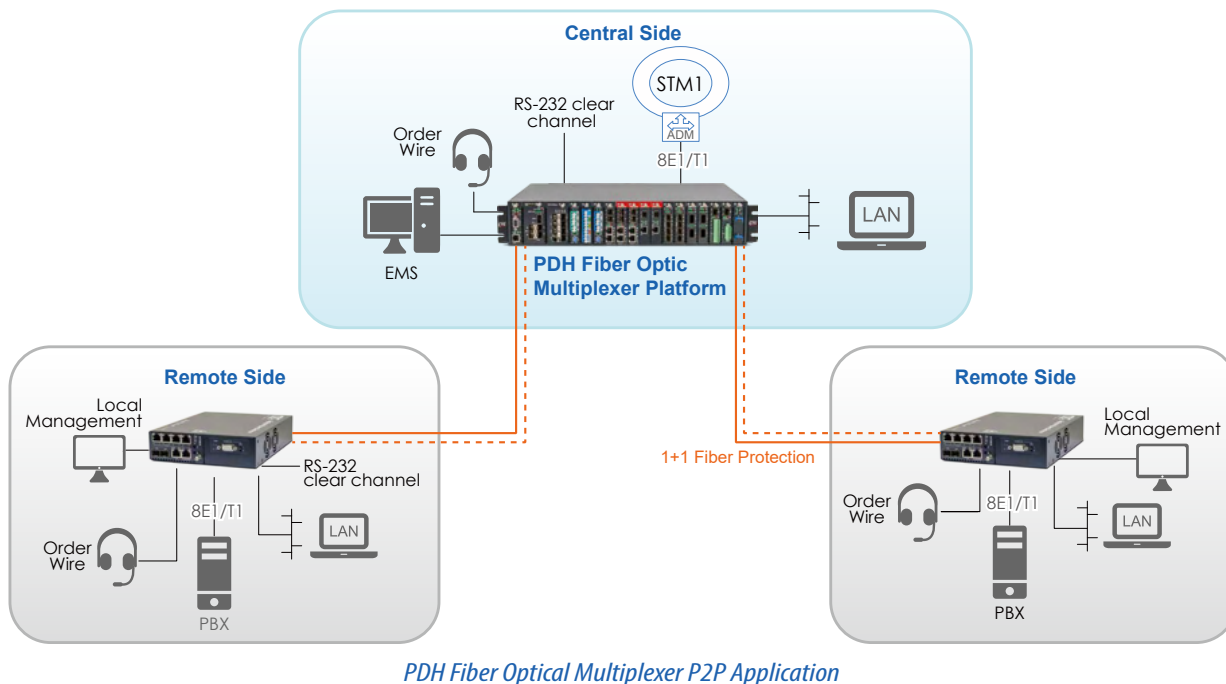
• Ethernet Services

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.



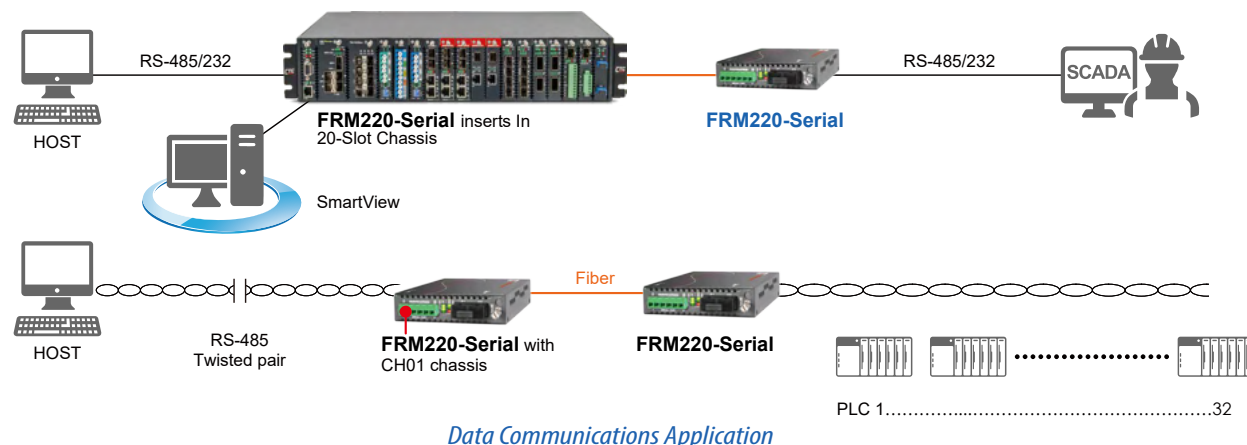
• TDM/PDH/Voice solution

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.



• 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.





FRM220-NMC-R3

Network Management Controller

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 (x1), RJ45(x1)
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



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

1/2x 10/100/1000Base-T + 1/2x 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 2x 10/100/1000Base-T(X)+2x 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

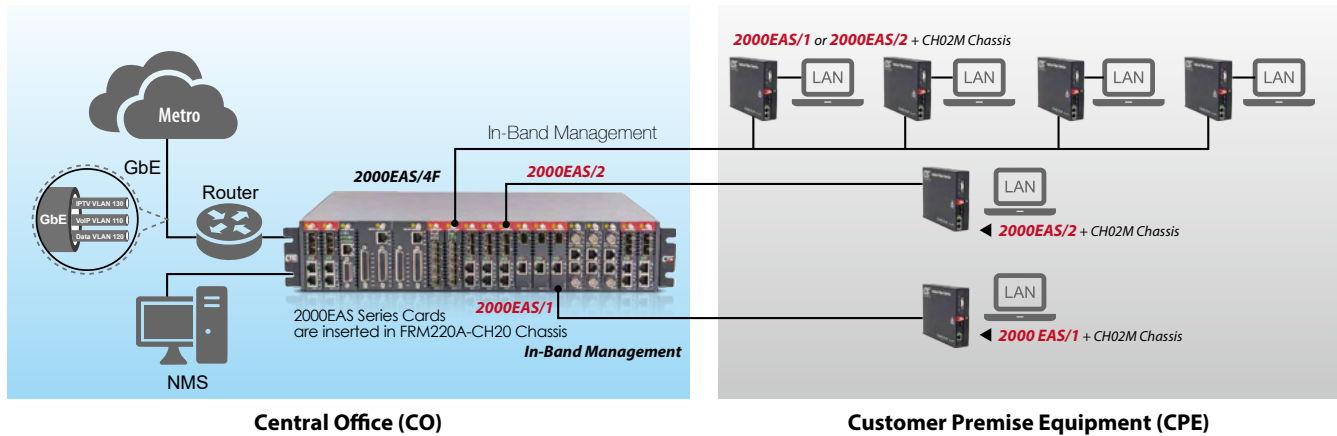
- 10/100/1000Base-T and 100/1000Base-X SFP (2000EAS/1)
- 2x 10/100/1000Base-T and 2x 100/1000Base-X SFP (2000EAS/2)
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Supports RMON counter
- Supports dying gasp
- D/D function for supported SFP fiber transceiver
- Supports Cisco® like CLI
- Online 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 802.3ae, 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	
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



Ordering Information

Model Name	Description
FRM220A-2000EAS/2	2x 10/100/1000Base-T and 2x 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 36~72 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



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 DDML. When used as stand-alone converters, the 2000MS can be managed by a friendly Web Smart user interface via any web browser.

Features

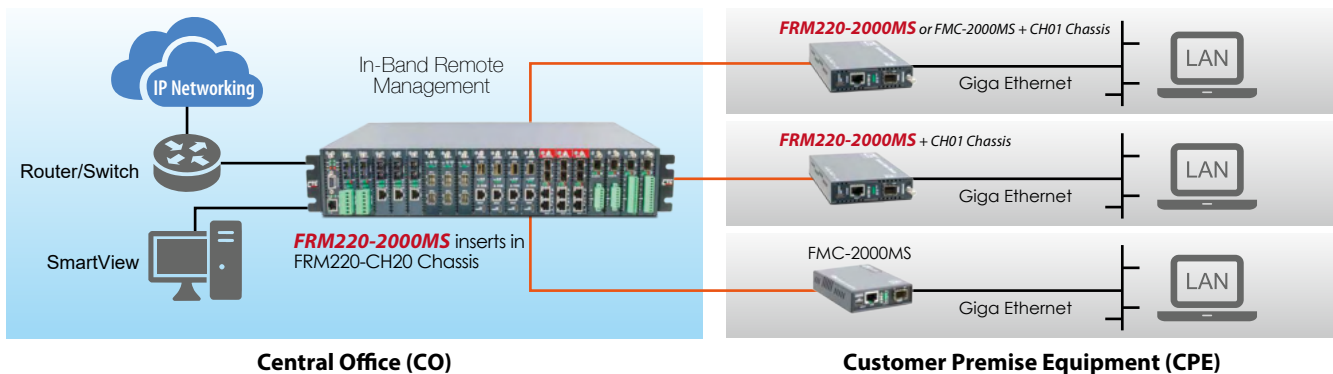
- 1-Port 10/100/1000Base-T to 100/1000Base-X SFP Converter
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 16K Packet
- Egress bandwidth control
- Supports in-band IEEE 802.3ah management
- Firmware 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
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	65,000 hrs

Application



Ordering Information

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



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

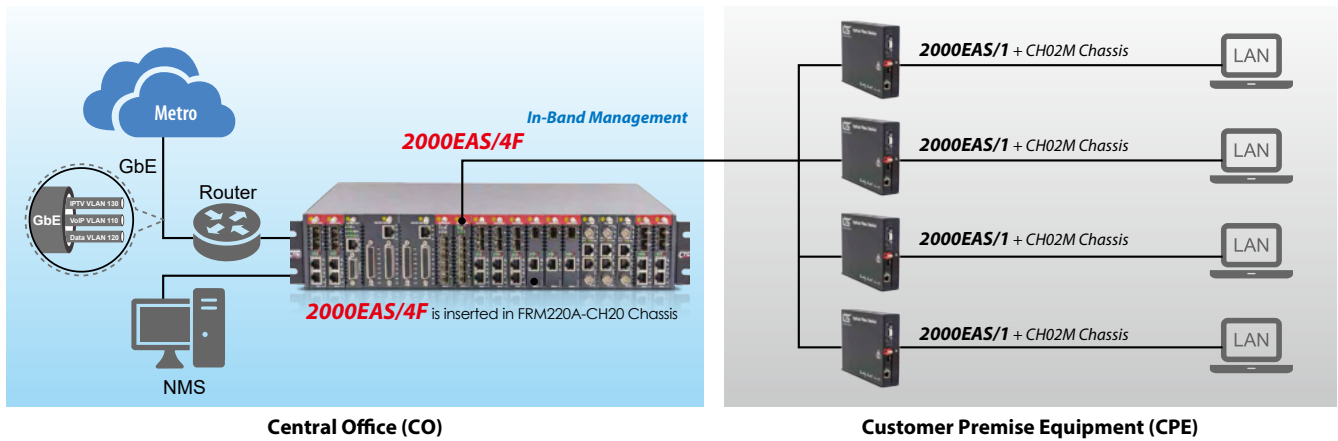
- 4-port 100/1000Base-X SFP
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Supports RMON counter
- Supports dying gasp
- D/D function for supported SFP fiber transceiver
- Supports Cisco® like CLI
- Online local / remote f/w upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management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



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 36~72 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



FRM220-100GE-2Q

100G QSFP28 to QSFP28 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 shutdown
- Supports LFPT function

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°C Storage Temperature -10 ~ 70°C Humidity 5 ~ 90% (non-condensing)
Weight	300g
Dimension	159.5 × 20.8 × 88mm (D×W×H)
Certification	CE, FCC

Application



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(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-DC48(HP)	Chassis power module 36 ~ 75 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



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

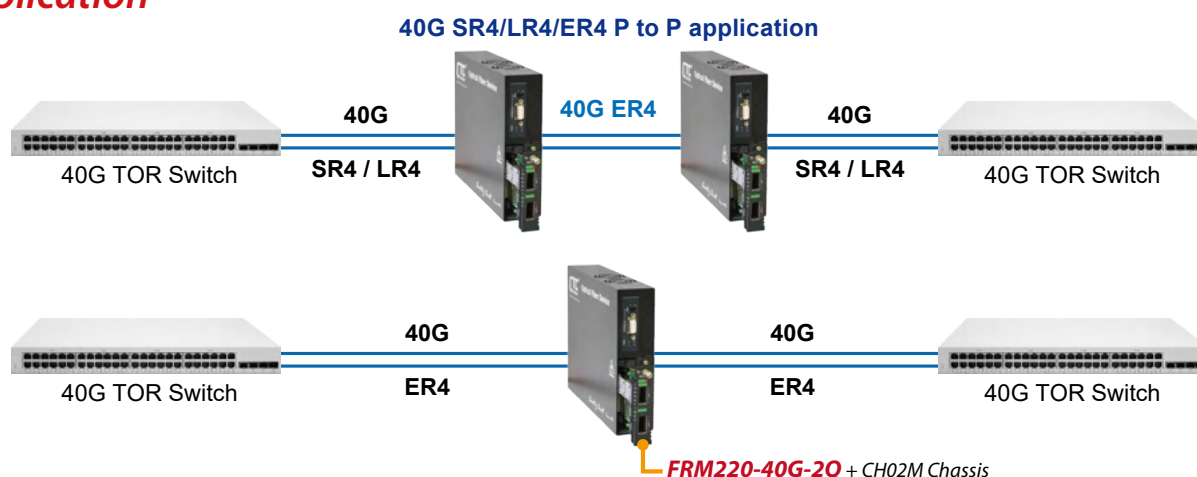
- Device management via FRM220 chassis with NMC
- Supports 40G repeater mode or Quad 10G optical multiplexer mode
- 40G link interface -- Ethernet/IEEE: 802.3ba 40GE-SR4/LR4/ER4
- 40G multi-link (fiber) interfaces -- Ethernet/IEEE: 802.3ba XLAUI and OIF: CEI-11G
- QSFP+ ports for flexibility and scalability
- 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°C Storage Temperature -10 ~ 70°C Humidity 5 ~ 90% (non-condensing)
Weight	130g
Dimension	159.5 × 20.8 × 88mm (D×W×H)
Certification	CE, FCC

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 36~72 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



FRM220-40G-1Q4S

40G QSFP+ to 4x 10G SFP+ Transponder

The FRM220-40G-1Q4S is a 40G QSFP+ to 4x 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 1x 40G QSFP+ and 4x 10G SFP+
- Supports DMI function for QSFP+ & SFP+ module
- Supports Loopback test function
- 3R function
- Supports LFPT function

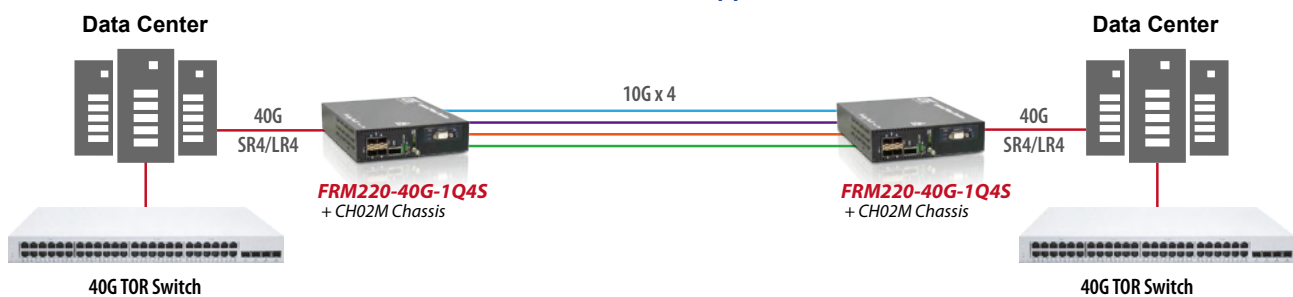
Specifications

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 x 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°C Storage Temperature -10 ~ 70°C Humidity 10 ~ 90% (non-condensing)
Weight	170g
Dimension	159.5 × 42.1 × 88mm (D×W×H)
Certification	CE, FCC

Application

40G SR4/LR4 P to P 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 36~72 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



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

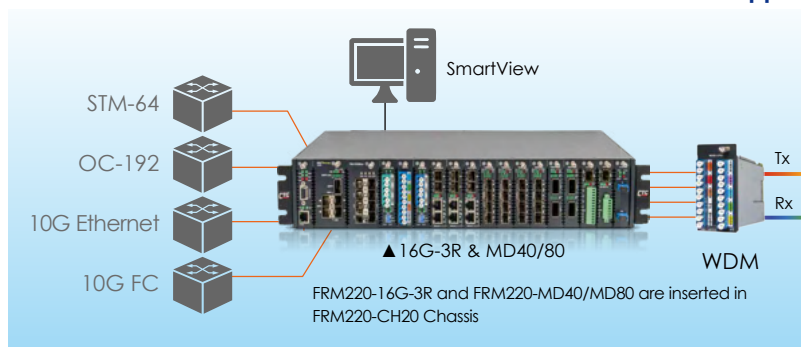
Specifications

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. Ch2 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 x1, x2, x4, x8
	CPRI	CPRI x1, x2, x4, x5, x8, x10, x16, x20
	Fiber Channel	1/ 2/4/8/10/16G FC

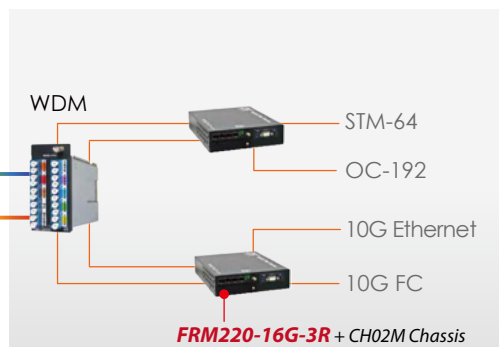
Regeneration	Re-Amplification, Re-Shaping, Re-Timing	
LEDs	Power, System, Mode, Test, FX1 Link, FX2 Link, FX3 Link, FX4 Link	
Power	Input	12V / 1A
	Power Consumption	< 8W
Size	Dimensions	Card: 155 × 20.8 × 88mm (D×W×H)
	Weight	150g
Environment	Operating Temperature	0 ~ 50°C
	Storage Temperature	-10 ~ 70°C
	Humidity	10 ~ 90%
	Certification	CE, FCC
	MTBF	65000 hrs
Dimension	159.5 × 20.8 × 88mm (D×W×H)	

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 36~72 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



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

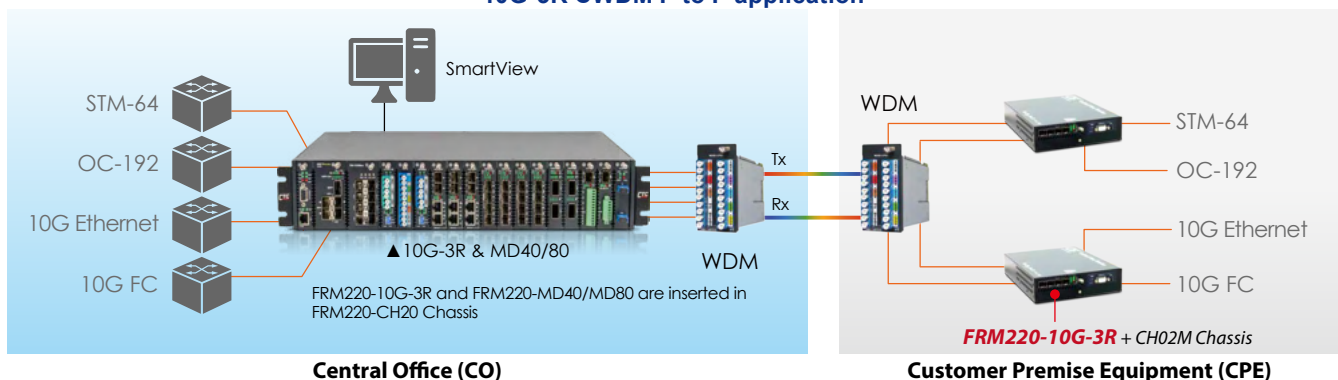
Specifications

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. Ch2 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 x1, x2, x4, x8
	CPRI	CPRI x1, x2, x4, x5, x8, x10, x16, x20
	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 x 20.8 x 88mm (DxWxH)
	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 x 20.8 x 88mm (DxWxH)	

Application

10G-3R CWDM P to P application



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 36~72 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



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

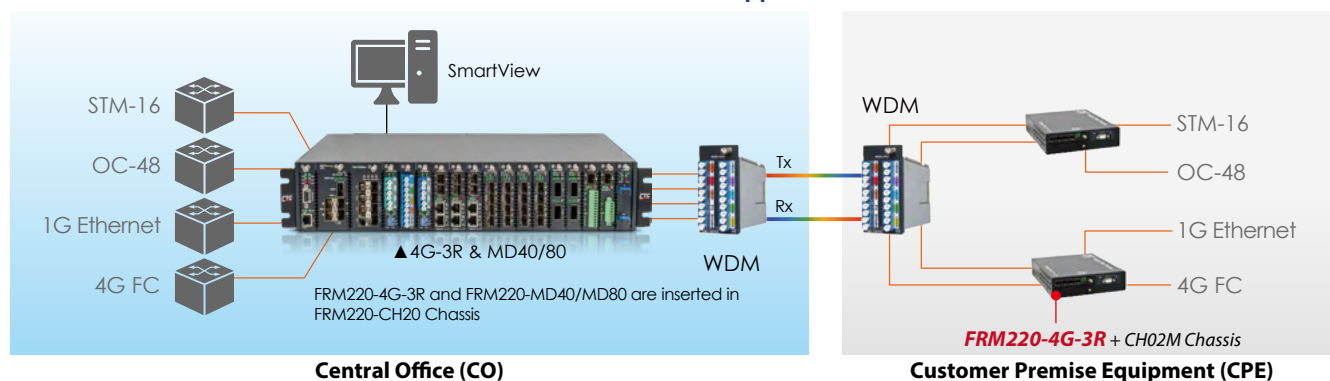
Specifications

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. Ch2 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 x1, x2, x4
	CPRI	CPRI x1, x2, x4, x5
Regeneration	Fiber Channel	1/ 2/4G FC
	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

Application

4G-3R CWDM P to P application



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 36~72 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



FRM220-OAP10

Single Channel EDFA Preamp

The FRM220-OAP10 is a FRM220 chassis rack managed 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-OAP10 operates at the receiving end of an optical link. It features medium to low input power, medium output power, and medium gain and designed for optical amplification to compensate for losses in a De-multiplexer located near the optical receiver. The FRM220-OAP10 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 10 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 system
- CATV transmission system

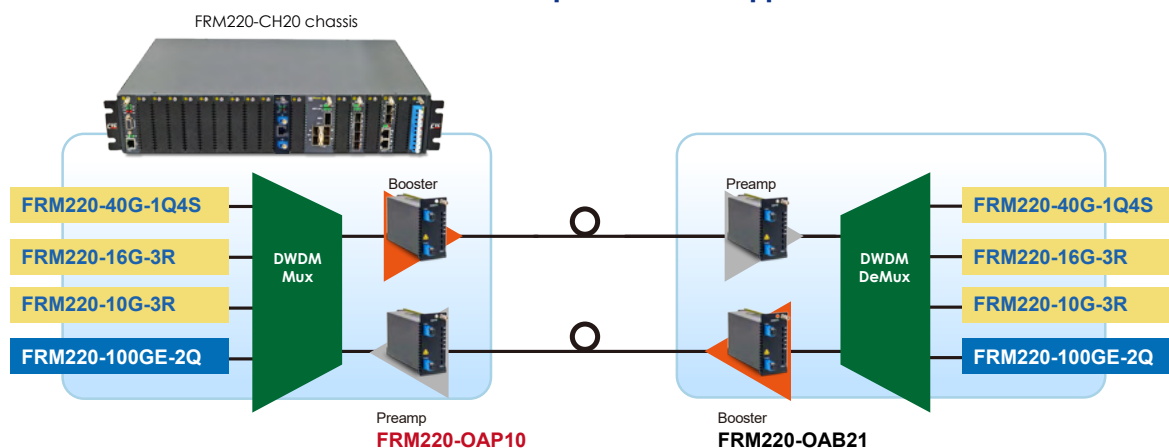
Specifications

Operating wavelength	1528 ~ 1563nm
Input power	-30 ~ -10dBm
Signal gain	15 ~ 25dB
Total saturated output power	+10dBm
Gain flatness (Max.)	±0.75dB
Noise figure	6.0dB (Typ)
Polarization dependent gain (Max.)	0.5dB
Polarization mode dispersion (Max.)	0.5ps
Output power stability (Max.)	±0.1dB

Return loss (Min.)	45dB
AGC gain (dB)	15 ~ 25dB
Connector	LC/UPC
Control mode	AGC
Operation case temperature	0 ~ 65°C
Relative humidity (noncondense)	5 ~ 85%
Laser Class	Class 1M
Power consumption	8.5W
Dimension	159.5 × 42.1 × 88mm (D×W×H)

Application

EDFA booster/Preamp DWDM P to P application



Ordering Information

Model Name	Description
FRM220-OAP10	FRM220-OAP10 DWDM C-band EDFA preamp card 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 ~ 75 VDC, 3 pin terminal block, 300W
FRM220-CH02M-AC/DC/AD	2-slot chassis with console port and AC, DC or DC power, with fan
FRM220-CH04A-AC/DC/AD	4-slot chassis with built-in AC, DC or AD power



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 system
- CATV transmission system

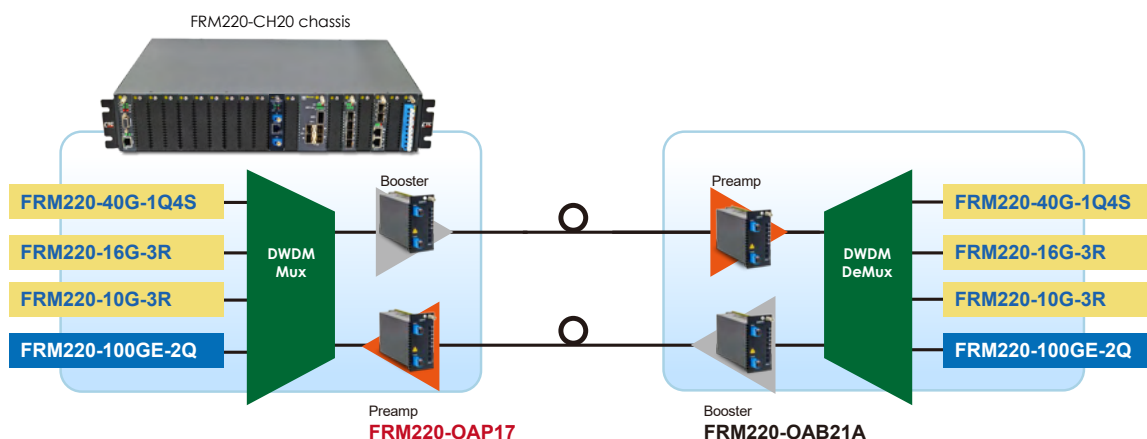
Specifications

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)

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 ~ 75 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



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

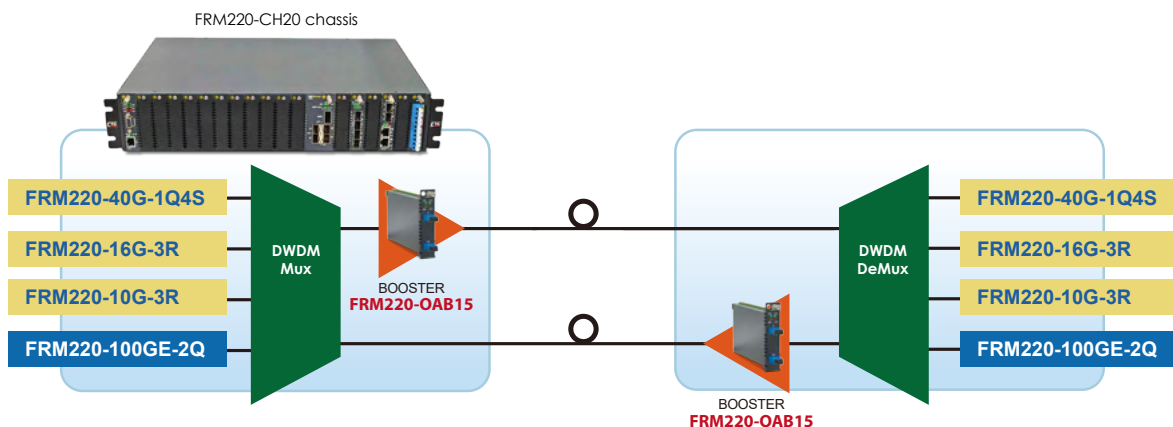
- Booster Amplifier for 10Gbps, 40Gbps, and 100Gbps applications
- Long haul C - band DWDM applications

Specifications

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

Application

EDFA booster DWDM P to P application



Ordering Information

Model Name	Description
FRM220-OAB15	DWDM C-band EDFA Booster card 15dBm



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

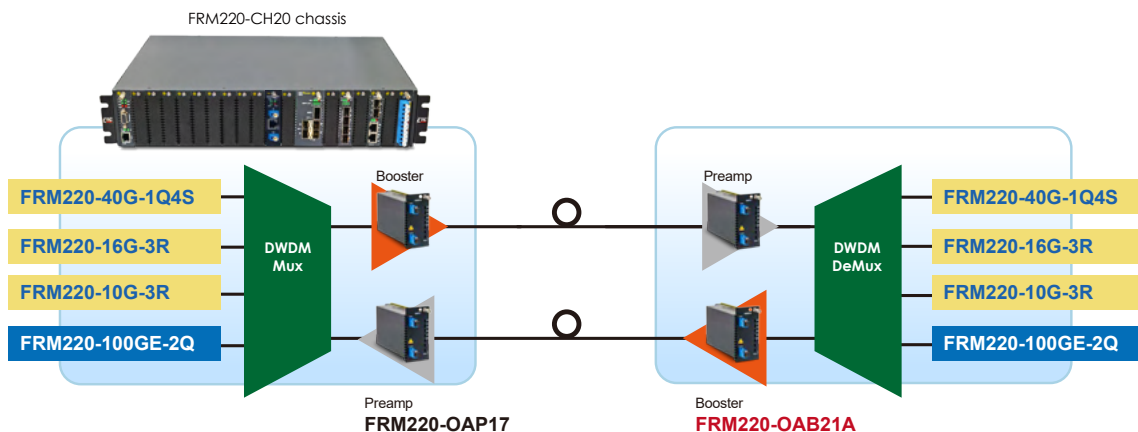
- Metropolitan WAN network system
- C-Band DWDM network system
- CATV transmission system

Specifications

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

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 ~ 75 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



FRM220-OAB21

Single Channel EDFA Booster

The FRM220-OAB21 is a FRM220 chassis rack managed 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-OAB21 operates at the transmission side of the link. It features high input power, high output power, and medium optical gain and designed to amplify aggregated optical input power for reach extension. The FRM220-OAB21 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 21 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 system
- CATV transmission system

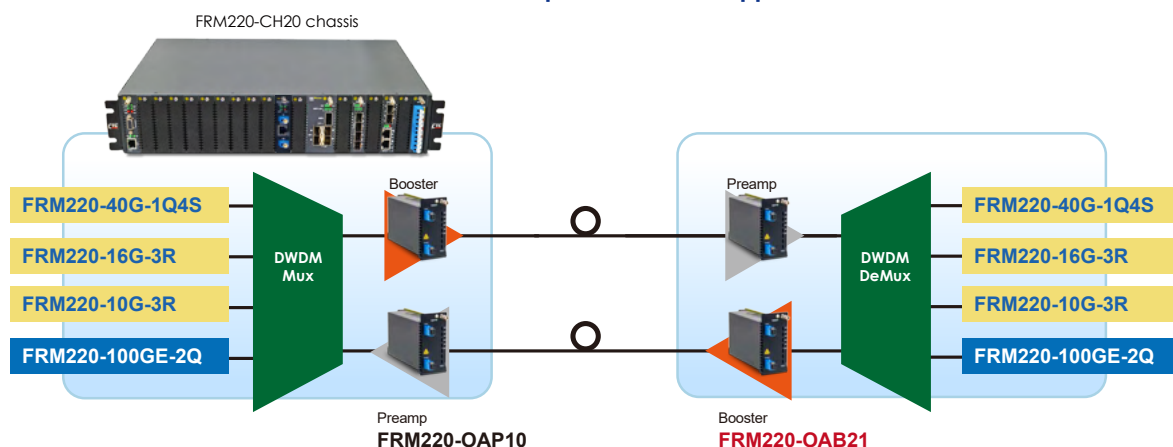
Specifications

Operating wavelength	1528 ~ 1563nm
Input power	-10 ~ +10dBm
Signal gain	11 ~ 20dB
Total saturated output power	+21dBm
Gain flatness (Max.)	±0.75dB
Noise figure	6.0dB (Typ.)
Polarization dependent gain (Max.)	0.5dB
Polarization mode dispersion (Max.)	0.5ps
Output power stability (Max.)	±0.1dB

Return loss (Min.)	45dB
AGC gain (dB)	11 ~ 20dB
Connector	LC/UPC
Control mode	AGC
Operation case temperature	0 ~ 65°C
Relative humidity (non-condense)	5 ~ 85%
Laser Class	Class 1M
Power consumption	13.5W
Dimension	159.5 × 42.1 × 88mm (D×W×H)

Application

EDFA booster/Preamp DWDM P to P application



Ordering Information

Model Name	Description
FRM220-OAB21	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 ~ 75 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



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.

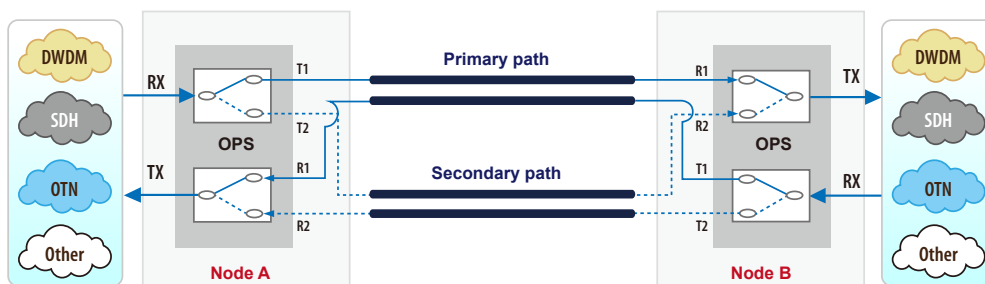
Specifications

Connector	LC/PC
LEDs	Power System, Working Path, Protection Path, Work mode
Power	DC 12V In
Operating Wavelength	1261 ~ 1621
Switch Type	2x1 / 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

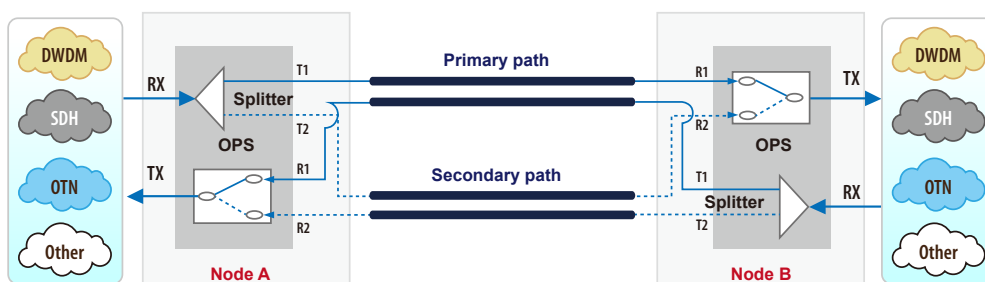
Polarization Dependent Loss (PDL)	≤ 0.1dB
Input Power Sensitivity	-35dBm
Restoration Time	≤20ms
Power Consumption	< 3W
Dimensions	159.5 × 20.8 × 88mm (D×W×H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	5%RH to 95%RH non-condensing
Certification	CE, FCC
MTBF	65,000 hours

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

Naming Rule FRM220-OPS5

- Optical Switch Mode
- 1 : 1:1 OPS
- 2 : 1+1 OPS



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

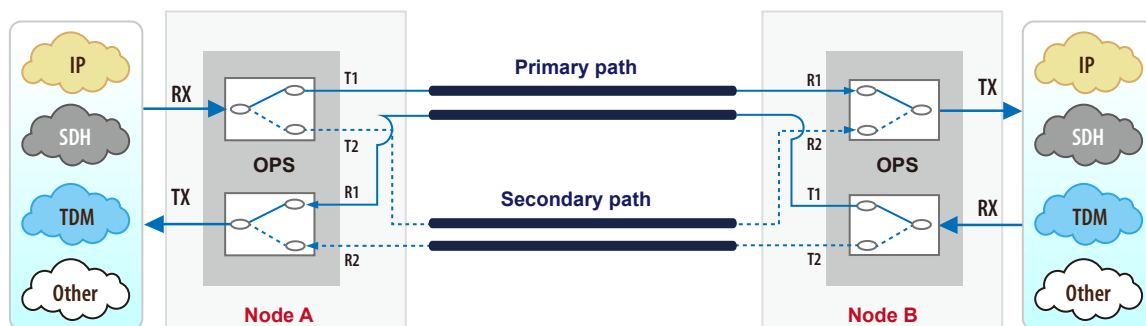
- Latch feature, if power is lost the switch remains in its current state
- Work with Multi-mode 850 wavelength
- Traffic is switched in one of two modes : non-revertive, manual
- Programmable RX threshold setting for switch-over
- Optical interface type : LC connector
- Working and protected lines are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

Specifications

Connector 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	2x1 / 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 (DxWxH)
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

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



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

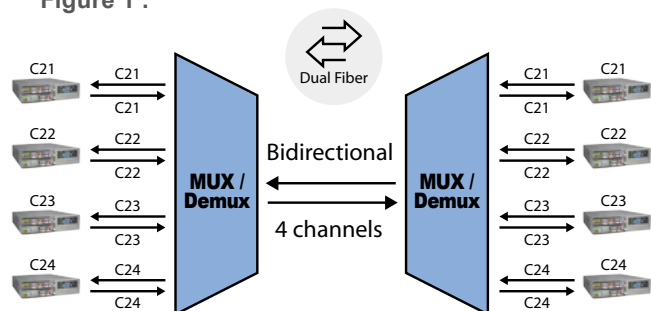
- Low Optical Insertion Loss
- High channel isolation
- Low PDL
- Good channel-to-channel uniformity
- Exceptional reliability and stability
- Reliable passive WDM optical technology
- Scales easily for ring networks
- Compliance with RoHS

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 \pm 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)

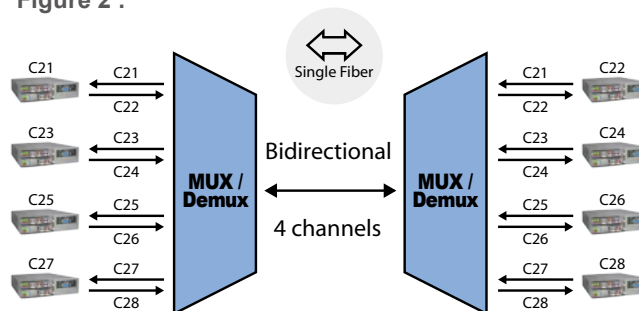
Application

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



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 devices that require no external power. They can also be installed in an FRM220 powered chassis with a NMC management module¹ 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

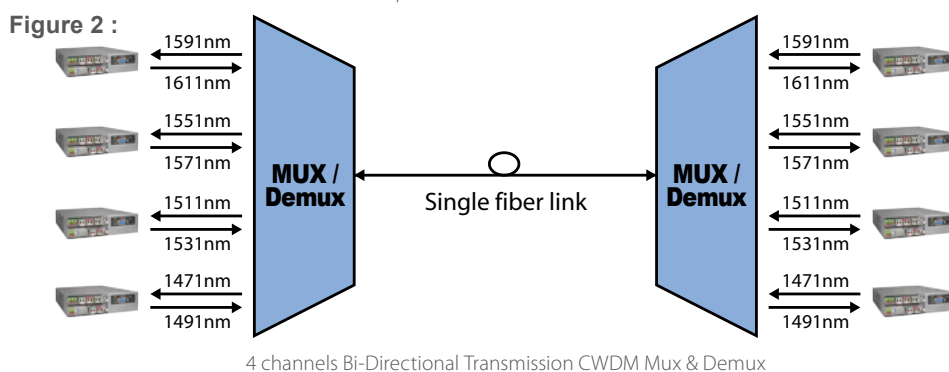
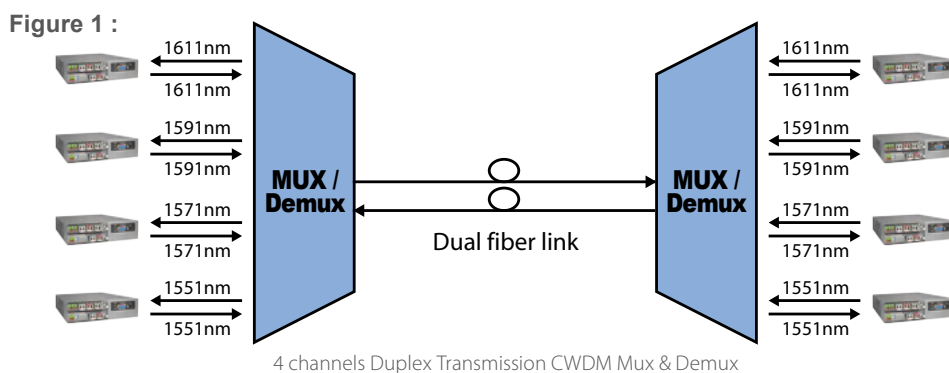
- Full native mode performance
- Passive model requires no power
- Protocol transparent, no limitation
- Utilizes industry standard ITU CWDM wavelength
- Standard LC connectors
- Passive device that can be installed in a powered chassis for managed applications
- Integration with Transponder in FRM220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

Application



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(1291,1331,1411,1451,1491,1531,1571,1611nm) type A, with monitor port, LC/UPC
FRM220-CWMD81B-2961	8ch, TX(1291,1331,1411,1451,1491,1531,1571,1611nm), RX(1271,1311,1351,1431,1471,1511,1551,1591nm) type B, with monitor port, LC/UPC



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

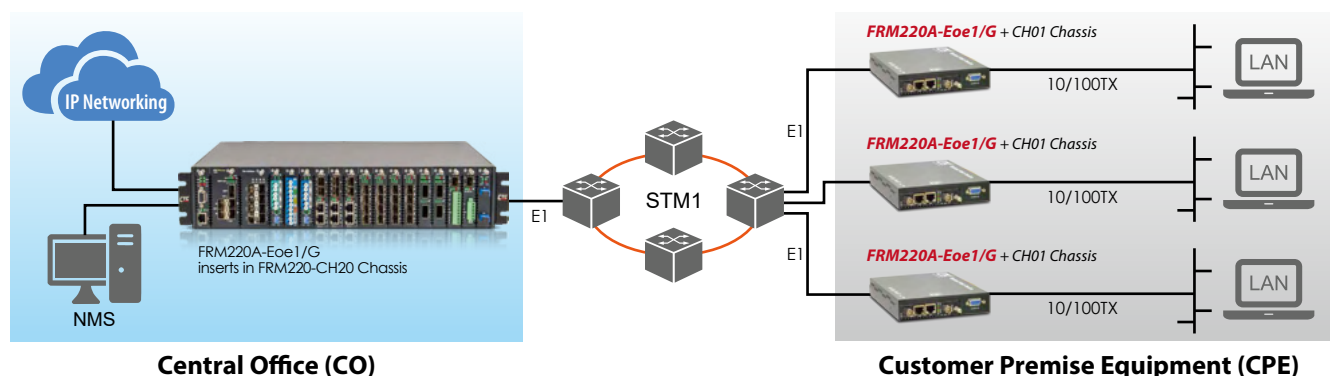
- Connects one Fast Ethernet over E1 links (2.048Mbps)
- Built-in bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- LED Alarm indication
- Standalone RS232 console management via CH01M

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

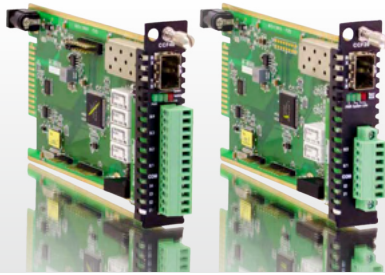
Ethernet Interface	Data rate	10/100Base-TX
	MTU	2046bytes
Connector	RJ45	10/100Base-T
Indications	Power, ALM,E1 signal loss ,E1 Alarm (AIS, LOF, RAI, LOMF), LAN link /ACT, 10/100M	
Power Input	12VDC	
Power Consumption	< 6W	
Dimensions	159.5 × 20.8 × 88mm (D×W×H)	
Weight	DC12 : 280g AC/DC 48/AD : 580g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% RH (non-condensing)	
Certifications	CE, FCC, RoHS compliant	
MTBF	65,000 hrs	

Application



Ordering Information

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



FRM220-CCF40

4 ch. Contact Closure Fiber Converter

FRM220-CCF20

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

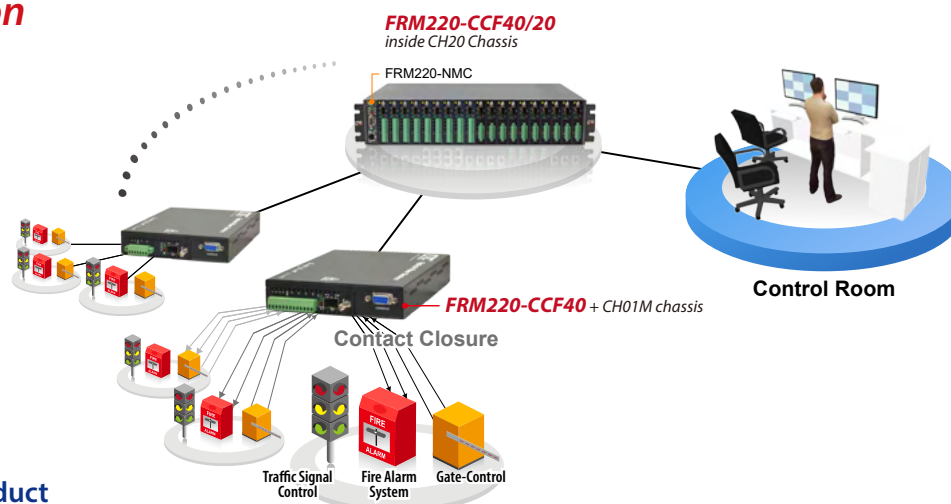
- Transmits a single contact closure in one or two directions
- Distances up to 120km
- 30 VDC, 0.5 amp relay N.O. (Normally Open)
- Point-to-Point transmission architecture
- Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments
- Relay contact for Carrier Detect, N.C. (Normally Close)
- Indicating LEDs are provided for confirming equipment operating status
- Managed when placed 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 Temperature	0°C to +50°C
Storage Temperature	-10°C to +85°C
Relative Humidity	0% to 95% (non-condensing) ¹

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



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 / 1x9 (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	

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

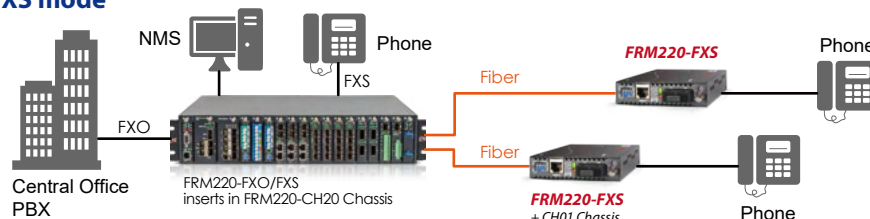
Figure 1 : Automatic Ring down hotline



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

Connector Type Connectivity Distance

FRM220 – FXO/FXS –

Example: FRM220 – FXO/FXS – SC002



FRM220-FXO-4 FRM220-FXS-4

4x FXO over fiber & 4x FXS over fiber

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	

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

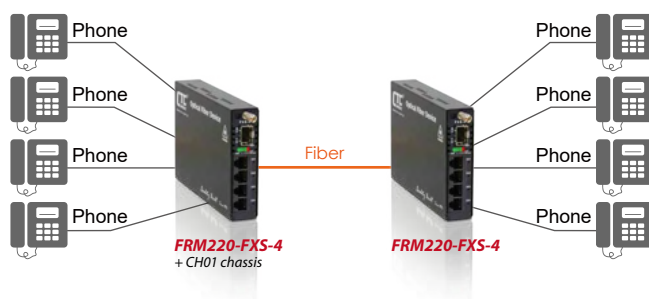


Figure 2 : Voice transmission from 2km to 120km over fiber



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)



Ver. Mar. 2023

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

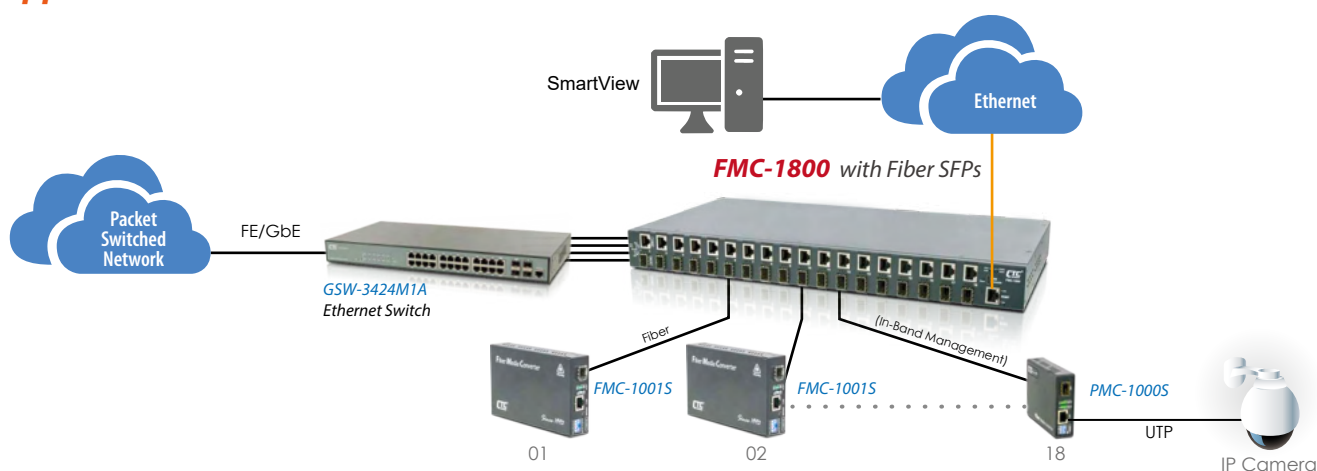
- 1U 19" 18 channels Managed Media Converter Rack
- 18-port 100/1000Base-T to 18-port 100/1000Base-X SFP
- Auto MDI/MDIX in TP port
- Auto-Negotiation in TP port
- Supports hot-swappable SFPs working at 100 Mbps or 1000 Mbps
- Supports Web, Telnet, SNMP, Console Management
- Local configuration via USB 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 (WxDxH)	
Weight	TBD	
Humidity	5% ~ 90% (non-condensing)	
Operating Temperature	Operating 0 ~ 50°C, Storage -10 ~ 70°C	
Certification	FCC, CE	
MTBF	>65000hrs	

Application



Ordering Information

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



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 chassis. The FMC chassis provides an economic solution in low density fiber converter installations where no management features are required. Each FMC or VDTU2-B110 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	Weight	2.6Kg (FMC-CH17), 1.47Kg (FMC-CH08)
Power Consumption	<60W (FMC-CH17)	Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
	<30W (FMC-CH08)	Humidity	10 ~ 90% non-condensing
Dimensions (D x W x H)	199 x 476 x 88 mm (FMC-CH17)	Certification	CE, FCC
	173 x 252 x 89 mm (FMC-CH08)	MTBF	65,000 hrs

Chassis Overview

FMC-CH17 Chassis



FMC-CH08 Chassis



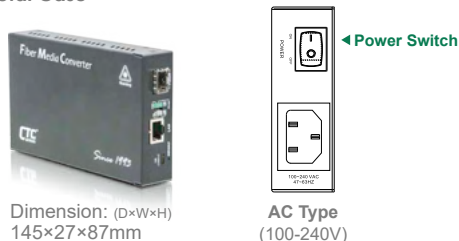
Adapter Type (Module for FMC-CH17 & FMC-CH08 Chassis)

■ Plastic Case

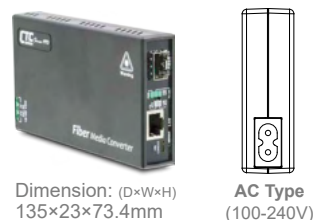


Power Built-in Type

■ Metal Case



■ Plastic Case



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

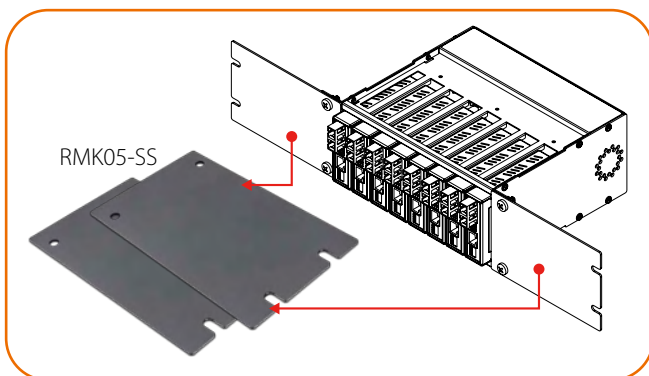
Optional Accessory

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



NEW

FMC-10GC

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

The 10G Unmanaged Media Converter, FMC-10GC is equipped with one 10G/5G/2.5G/1G/100BASE-T auto-negotiation port and one 10GBASE-X 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-X and vice versa. With full duplex wire speed forwarding capability between these two media, the FMC-10GC brings you the best and simplest solution for the 10G Ethernet conversion between copper wire and fiber.

Features

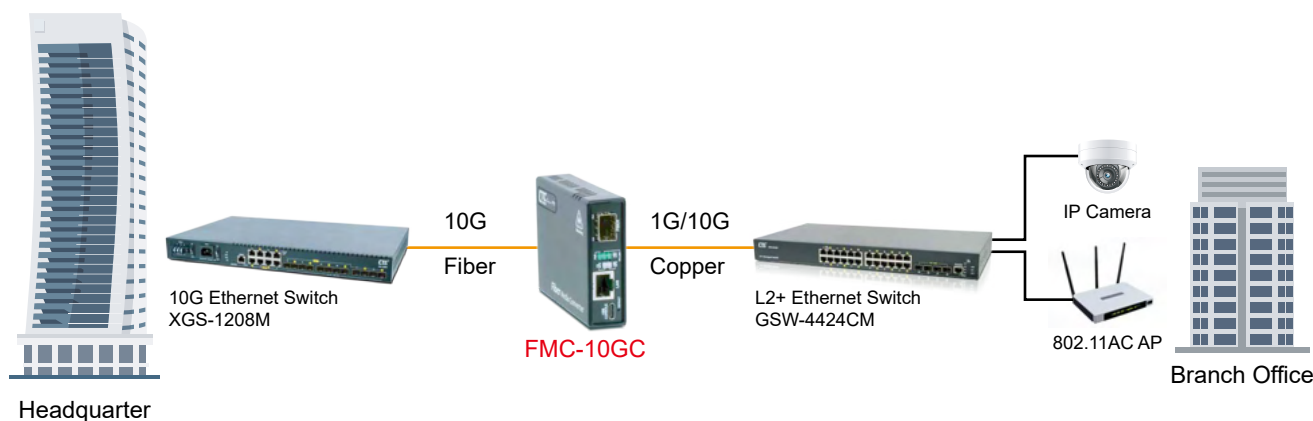
- 1x 10G/5G/2.5G/1G/100BASE-T RJ45 interface with auto MDI/MDI-X function
- 1x 10GBASE-X SFP+ slot interface
- Supports auto-negotiation and 100Mbps and 1/2.5/5/10Gbps full duplex mode
- 16K jumbo frame size support
- Wall-mount design
- Loopback Test
- Link Fault Pass Through
- Support USB console for set up and status checking.

Specifications

Copper Interface	1x 10G/5G/2.5G/1G/100BASE-T RJ45
Fiber Optic Interface	1x 10GBASE-X R SFP+ slot
LED	PWR FX Link, Speed LAN Link, Speed
Switch Processing Scheme	Store and Forward
Enclosure	Compact-sized plastic case
Installation	Desktop, wall mountable
Dimensions (WxDxH)	96.5 × 23 × 73.4mm
Weight	120g
Power Requirements	12V DC / 2A
Power Consumption	TBD
Fabric	20Gbps

Jumbo Frame	16K
Regulatory Compliance	FCC Part 15 Class A, CE
Operating environment	0 ~ 45 degrees C (TBD)
Storage environment	-10 ~ 70 degrees 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

Application



Ordering Information

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



FMC-1001S

10/100/1000Base-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 or FMC-CH08 chassis (Adapter Type only)

Standalone Option

Adapter Type



Dimension: 96.5×23×73.4mm(W×D×H)
(Plastic)



DC Type
(12V Power Jack)



▲ Module for FMC-CH17/CH08 Chassis

Power Built-in Type



Dimension: 145×27×87mm(W×D×H)
(Metal)

Power Switch



AC Type
(100-240V)



Dimension: 135×23×73.4mm(W×D×H)
(Plastic)



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
DIP Switch	LFP Copper	Enable/Disable
	Flow Control	On/Off
Standards	IEEE 802.3, 802.3u, 802.3x, 802.3Z, 802.3ab	
Indications	LED (Power, FX Link, FX SPD, TX SPD, TX Link)	
Power Input	Adapter Type: DC 12V	
	Power Built-in Type: AC 100~240V	
	Power Built-in Type: DC 18~60V	
Power Consumption	< 3W	

Dimensions (W×D×H)	Adapter Type:	96.5 × 23 × 73.4mm
	Power Built-in Type:	135 × 23 × 73.4mm (Plastic) 145 × 27 × 87mm (Metal)
Weight	Adapter Type:	120g
	Power Built-in Type:	140g (Plastic) 550g (Metal)
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

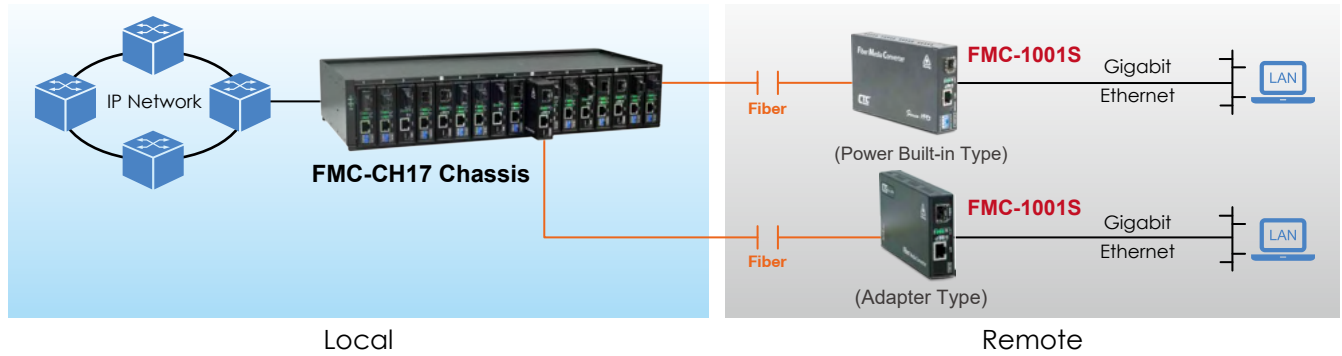
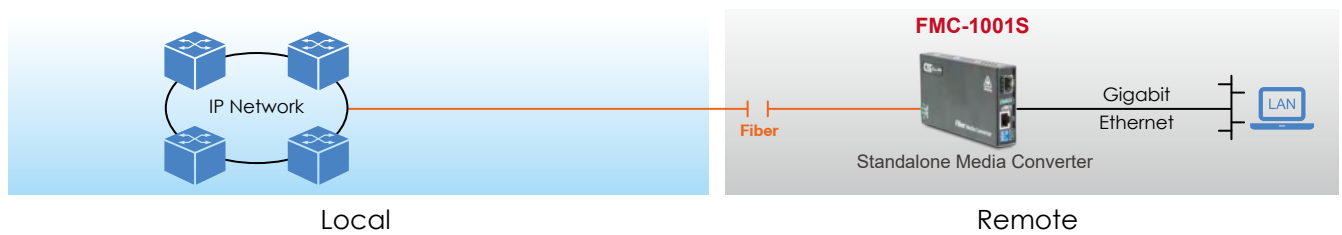


Figure 2: As Standalone Media Converter



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
FMC-1001S-AC-M	10/100/1000Base-T to 100/1000Base-X SFP media converter with AC power, metal case

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

■ Wall-Mounting Kit





FMC-2000MS

Web Smart OAM Managed 10/100/1000Base-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-CH17 or FMC-CH08 chassis (Adapter Type only)
- May be used as a remote to FRM220-2000MS
- Wall-Mountable

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)
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, LAN Speed, LAN Link)	
Power Input	Adapter Type: DC 12V	
	Power Built-in Type : AC 100 ~ 240V	

Standalone Option

Adapter Type



Dimension: 96.5×23×73.4mm(W×D×H)
(Plastic)



DC Type
(12V Power Jack)



▲ Module for FMC-CH17/CH08 Chassis

Power Built-in Type



Dimension: 145×27×87mm(W×D×H)
(Metal)

Power Switch



AC Type
(100-240V)



Dimension: 135×23×73.4mm(W×D×H)
(Plastic)



AC Type
(100-240V)

Power Consumption	< 3W
Dimensions (W×D×H)	Adapter Type : 96.5 × 23 × 73.4mm
	Power Built-in Type: 135 × 23 × 73.4mm (Plastic)
	145 × 27 × 87mm (Metal)
Weight	Adapter Type : 120g
	Power Built-in Type : 140g (Plastic)
	Type : TBD (Metal)
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

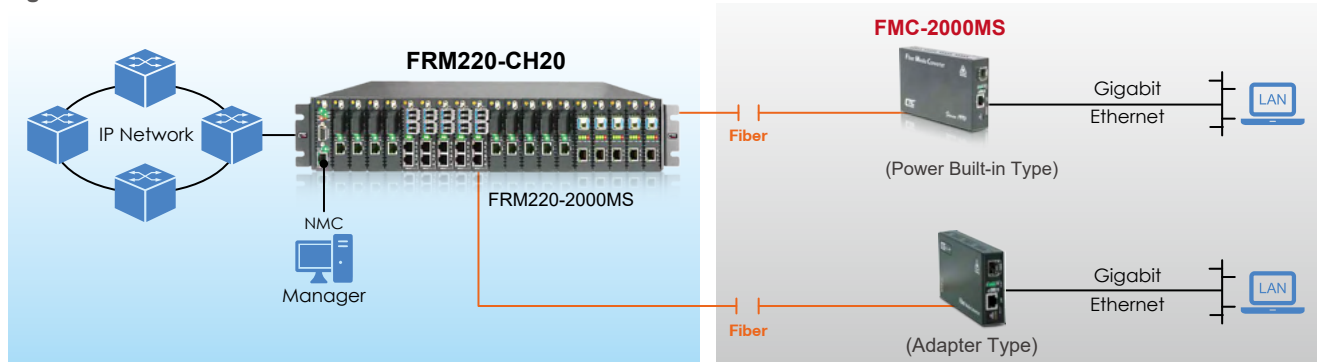


Figure 2: As Rack Module with Remote

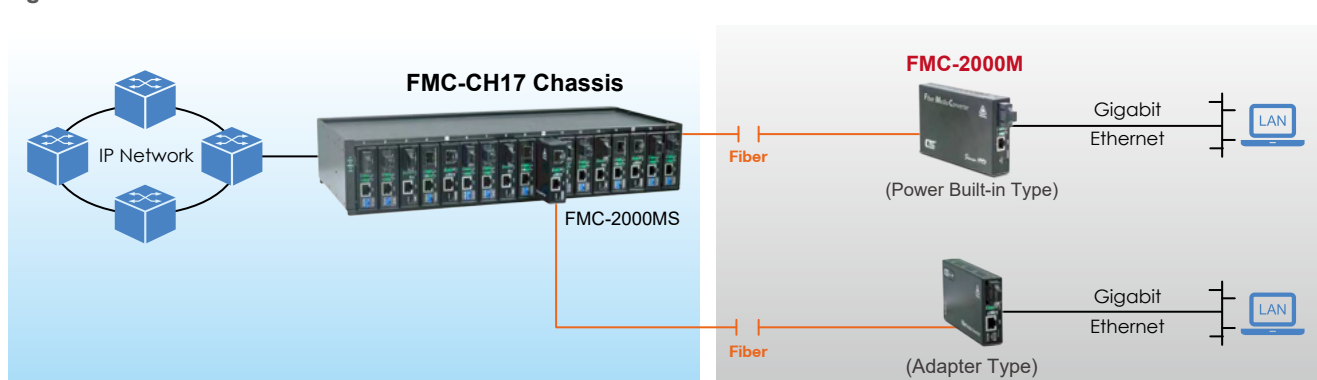
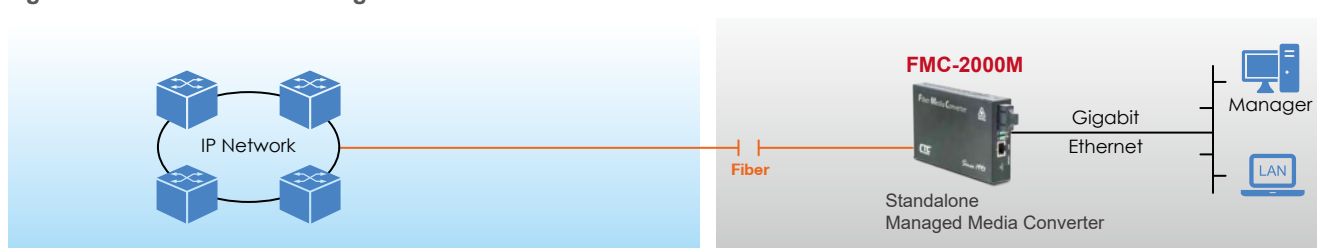


Figure 3: As Standalone Managed Converter



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
FMC-2000MS-AC-M	10/100/1000Base-T to 100/1000Base-X SFP Web Smart managed Ethernet switch (optional SFP module) with AC power, metal case

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

■ Wall-Mounting Kit





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

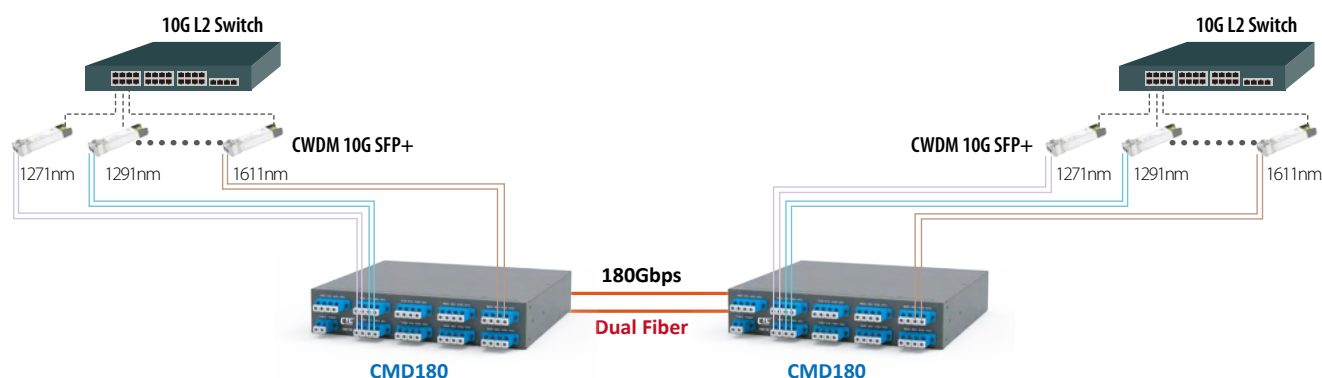
- Full native mode performance
- Standard LC/UPC connectors
- Passive model requires no power
- Protocol transparent, no limitation
- Utilizes industry standard ITU-T CWDM wavelength
- Integration with Transponder for CWDM application

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 (WxDxH)	215x211x44mm	215x211x44mm	215x211x44mm

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

NEW

STE211W

2-port Serial to Ethernet Wireless Device Server

STE211

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.

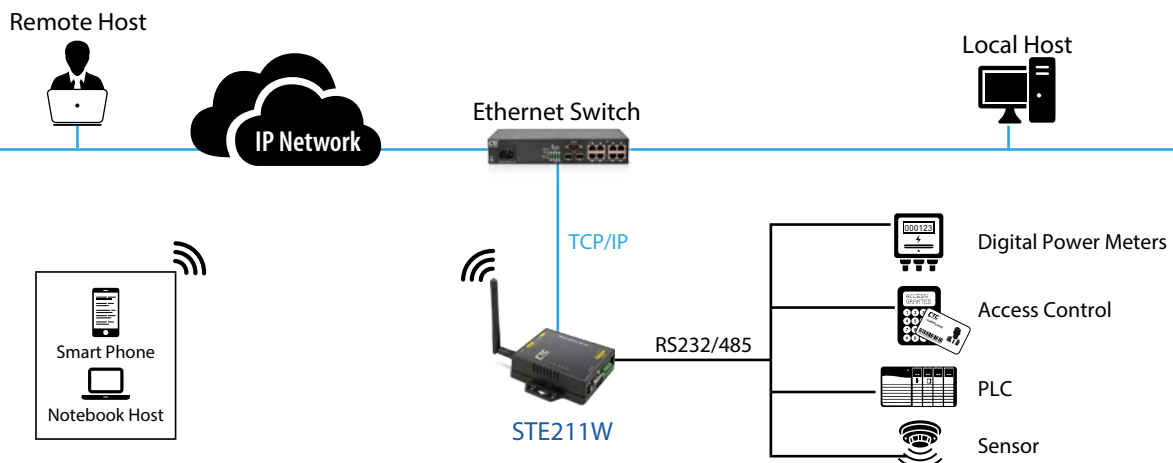
Features

- 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
Serial Ports *2	Protection	Built-in 1.5KV Magnetic Isolation
	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)
WiFi (STE211W)	15KV ESD for all signals	
	Standard	802.11b/g/n
	Data Rate	11/54/72.2 Mbps @ 20Mhz Band Width
	Modulation	DSSS; OFDM
	Frequency	2.4GHz
WiFi (STE211W)	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
LED	Security	WEP 64-bit / 128-bit data encryption, WPA / WPA2
	Antenna	2 dBi ; RP-SMA connector
Power	Network Mode	Infrastructure; Soft AP (for Setup)
	LED	SYS, RX, TX, LAN and WiFi (STE211W)
Power Consumption	Power	DC 9~32V, supports DC Jack & Terminal Input
	Power Consumption	2W
MTBF	MTBF	60,000 hours (MIL-HDBK-217)
	Mechanical	Dimensions 110 x 90 x 26 mm (W x D x H)
Installation Mounting	Weight	110g
	Housing	plastic
Environment	Installation Mounting	Wall Mounting
	Environment	Operating Temperature -20°C ~ 70°C
Certification	Storage Temperature	-25°C ~ 80°C
	Certification	FCC, CE

Application



Ordering Information

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



STE400A-232 / STE800A-232

4/8× RS232 to IP Device Server

The STE400A-232 / STE800A-232 are 4 or 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 STE400A-232 / STE800A-232 have 4 or 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 STE400A-232 / 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 STE400A-232 / STE800A-232 are direct IP mode, virtual COM mode, or paired mode.

Features

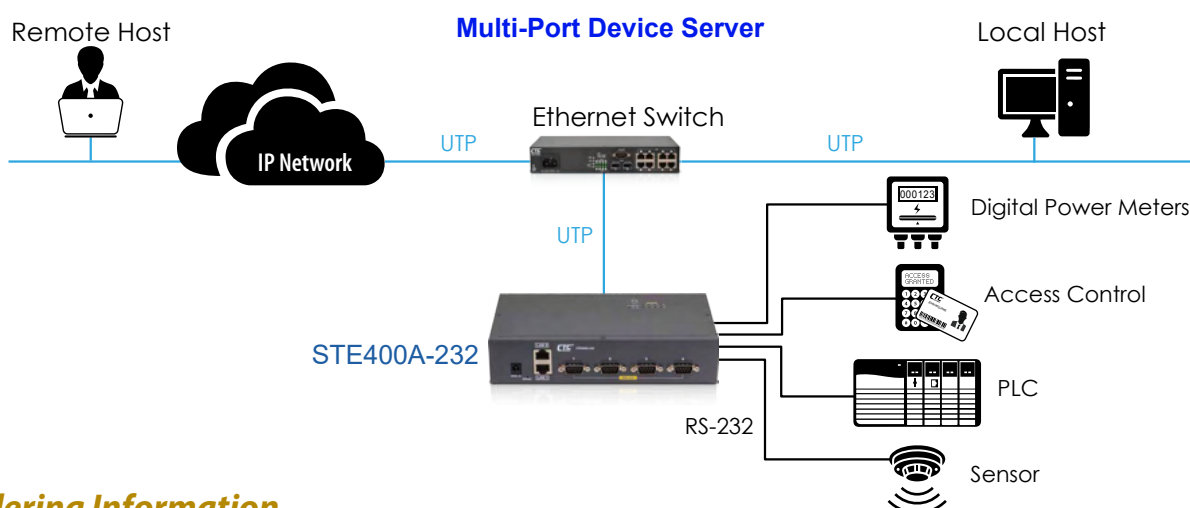
- 10/100Mbps Ethernet port
- 921.6kbps serial interface (software programmable)
- TCP Server, TCP client, Paired or Virtual com modes
- Supports Virtual COM application software
- Easy to use with Windows® utility
- Supports RS232 Interface with physical DB9M port
- Configuration by web browser, Telnet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

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 for RS-232, 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 (WxDxH)
Certifications	CE, FCC
MTBF	65,000 Hours

Application



Ordering Information

Model Name	Description
STE400A-232	4-port RS232 serial server with DB9M port and AC power adapter
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

Optional Accessory

Model Name	Description
RMK08-SS	Single unit rack mounting kit for STE400A-232 / STE800A-232
RMK08-DS	Dual units rack Mounting kit for STE400A-232 / STE800A-232

NEW

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.

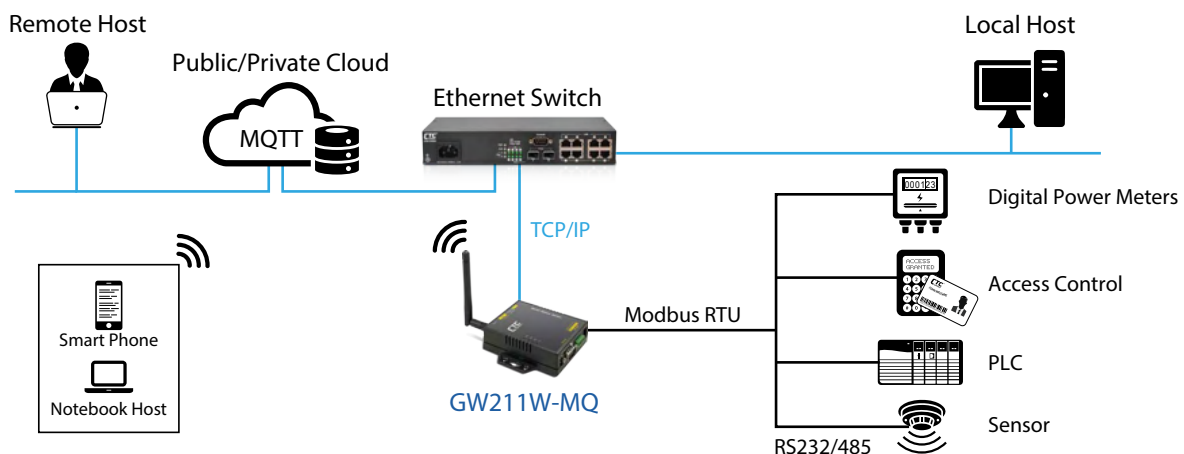
Features

- 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
Serial Ports *2	Protection	Built-in 1.5KV Magnetic Isolation
	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)
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
WiFi	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	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 x 90 x 26 mm (W x D x 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	1x RS232, 1x RS422/485 Modbus to MQTT Wireless Gateway with Power Adapter

NEW

GW211W-MB

Modbus RTU to Modbus TCP Gateway

The ModbusWi-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

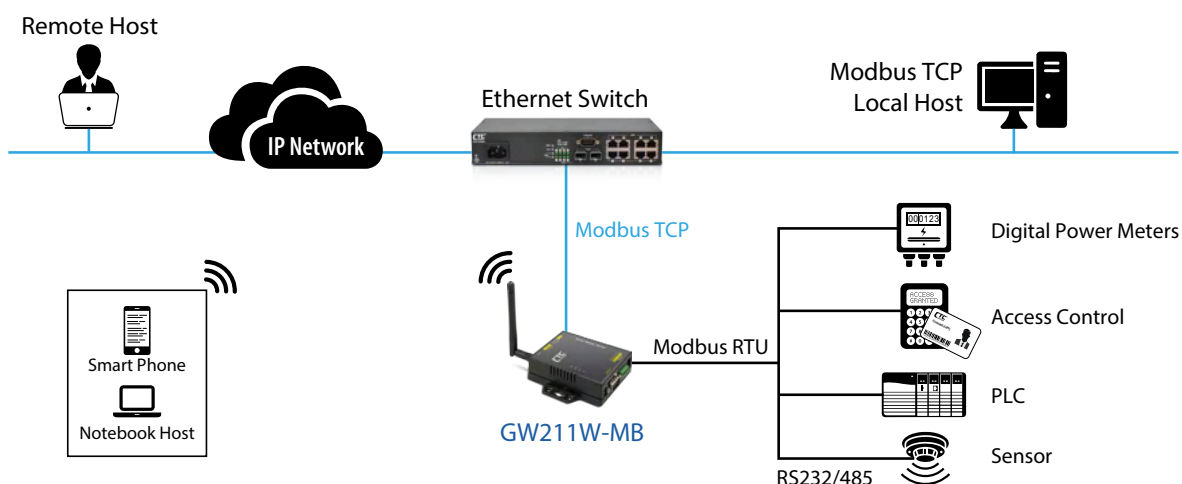
- TCP to RTU support 8 simultaneous TCP Master
- RTU to TCP support 8 TCP Slaves on each port.
- Software support : TCP to RTU Slaves, RTU to TCP Slaves
TCP to ASCII Slaves, ASCII to TCP Slaves
- Supports 802.11b/g/n and Ethernet, 2 IPs
- Web browser configuration
- Easy installation Windows utility
- 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	
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

WiFi	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 x 90 x 26 mm (W x D x 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	1x RS232, 1x RS422/485 Modbus RTU to Modbus TCP Wireless Gateway with Power Adapter



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.

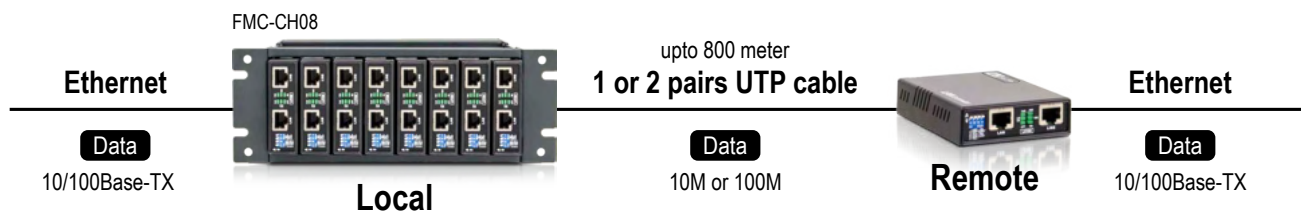
Features

- 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	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
Connector	1x10/100Base-TX RJ45 LAN port 1x RJ-45 WAN port	Cable	1 or 2 pair UTP cable Cat.5e, Cat. 6
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	Operating Temperature	0 ~ 50°C
LED	Power (Green) LFPT (Green) LAN Link active (Green) Line Speed/Link active 10M(Green), 100M(Green) Local(Green)	Storage Temperature	-10 ~ 70°C
		Humidity	5% ~ 90% (non-condensing)
		Power Input	12VDC
		Power Consumption	<3W
		Dimensions	23 × 96.5 × 73.4mm (WxDxH)
		Weight	73.5g
		MTBF	>65000 hours
		Certification	FCC, CE

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-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
FRM220A-1002ES	2x 100/1000Base-T + 2x 100/1000Base-X SFP 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
FRM220-4G-3S	4G 2R Multi-rate Transponder with Optical Line Protection
FRM220-4G-2S	4G 2R Multi-rate Transponder
FRM220-1000DS	1G 2R Multi-rate Transponder

Muxponder

Model Name	Description
FRM220-TM-10GMux	7x GE to 10Gbps Muxponder

EDFA

Model Name	Description
FRM220-OAP10	Single Channel EDFA Preamp 10dB
FRM220-OAP17	Single Channel EDFA Preamp 17dB
FRM220-OAB15	Single Channel EDFA Booster 15dB
FRM220-OAB21A	Single Channel EDFA Booster 21dB
FRM220-OAB21	Single Channel EDFA Booster with AGC

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
FRM220-10/100i	In-Band Managed FE Media Converter, 100Base-TX to 100Base-FX
FRM220-10/100iS-2	In-Band Managed FE Media Converter, Dual Channel 10/100Base-TX to 100Base-X SFP
FRM220-1000TS	Managed GbE Media Converter, 1000Base-TX to 1000Base-X SFP
FRM220-10/100	Non-managed FE Media Converter, 100Base-TX to 100Base-FX

10G Ethernet Converter

Model Name	Description
FRM220-10GCM	10G Base-T to 10G Base-R SFP+

Appendix

- FRM220 Slide-in Cards

Ethernet over E1 Converter

Model Name	Description
FRM220A-Eoe1/G	Ethernet Bridge over E1 (GFP), In-Band Managed.

E1/T1 Cross Rate Converter

Model Name	Description
FRM220-FTEC	E1/T1 Cross Rate Converter

Fiber Modem

Model Name	Description
FRM220-E1/T1	E1/T1 over Fiber, In-Band Managed
FRM220-DS3/E3	DS3/E3 over Fiber, In-Band Managed
FRM220-DATA	RS232/530/V35 over Fiber, In-Band Managed
FRM220-Serial	RS232/485 over Fiber, In-Band Managed

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

Inverse Multiplexer

Model Name	Description
FRM220A-iMux16	Ethernet over Bonded 16 E1 NTU, In-Band Managed
FRM220A-iMux8	Ethernet over Bonded 8 E1 NTU, In-Band Managed
FRM220A-iMux4	Ethernet over Bonded 4 E1 NTU, In-Band Managed

Fiber Multiplexer

Model Name	Description
FRM220-FOM04	4x E1/T1+ FE Fiber Multiplexer with In-Band Management