

About CTC Union

Since 1993



CTC Union Technologies Co. Ltd., founded in 1993, proactively designs and manufactures telecommunications, data communications and industrial networking products for a global market. With technologies based on Ethernet and Optical transmission, CTC Union can effectively meet the requirements of voice and data carriers, enterprises, as well as industrial grade Ethernet users.

Using the latest technologies, CTC Union has stormed into the "Industrial Ethernet" marketplace with a wide range of rugged Ethernet products for public utilities, transportation and power substation deployment. With a heavy focus on reliability, certifications and new standards, this proactive thinking will allow CTC Union to continue developing solutions for today and tomorrow's industrial markets.

CTC Union's global alliance is a network of worldwide branch offices, partners and distributors on every continent. By forming partnerships with major telecom operators, Internet Service providers, and value-added resellers, CTC Union reduces costs and improves services for customers. This alliance covers Europe, Asia, the Middle East, Africa, plus North and South America. This global partnership receives direct engineering and technical support from our company headquarters, located in Taipei, Taiwan.

Environmental Policy



As a socially responsible manufacturer, CTC Union is concerned with the environment and has taken active measures to reduce carbon emissions and eliminate hazardous materials in their products. None of CTC Union products use chlorofluorocarbons (CFC) in their production process and since 2007 all electronics use non-lead soldering according to RoHS 2.0 and WEEE directives.

Our Mission & Vision

- Provides innovative last-mile optical access solutions for telecommunication markets.
- Provides customers with “on time” solutions, quick and effective customer support, and valuable products with extended service life.
- We still ensure honesty and fairness in all our actions, we will always do the right thing.
- To be a trusted in providing creative connectivity products and solutions
- To be a leading communication transmission solution provider meets our customer’s needs

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NEW	4G LTE, WiFi IEEE802.11 a/b/g/n/ac, 5x GbE RJ45 with 1x SFP combo, with 4x PoE Cellular Router	ICR-W405-4PH	Coming Soon
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SmartView™ EMS

—— Manage 2,000 Devices

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

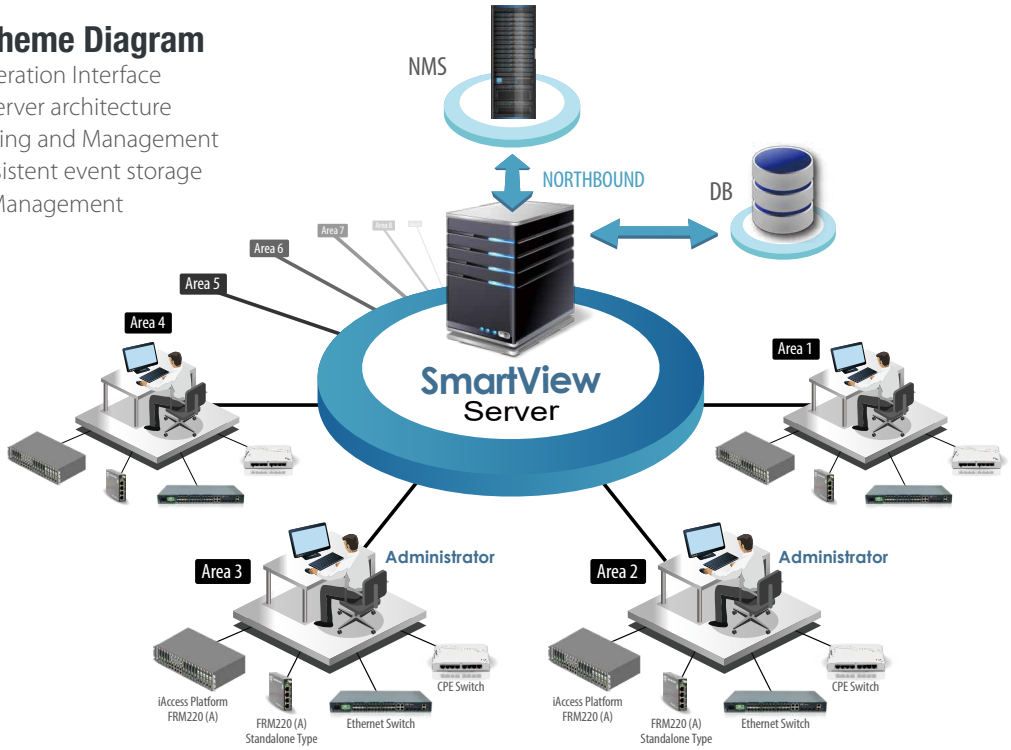
CTC Union's **SmartView™ Element Management System (EMS)** is a comprehensive management solution that monitors device performance, enables remote configuration and provisioning, and provides fault notification status.

■ Functions

- Main Functions **(FCAPS)**:
  Fault Management, **C**onfiguration Management, **A**ccounting Management, **P**erformance Management, **S**ecurity Management
- Remote access control for efficient configuration
- Traffic / Performance monitoring and management
- Alarm Trap and event log management
- Auto Discovery and Device Viewer
- Allow up to 25 administrators to login

■ Network Scheme Diagram

- User-Friendly Operation Interface
- Robust Client / Server architecture
- Network Monitoring and Management
- Database for persistent event storage
- Security Access Management



SmartView™ Server

The server handles connection with the network devices using SNMP protocol, and is responsible for communication of requests from management clients. SmartView™ Server collects the information data from specific SNMP agents, stores the information into a persistent database and updates that information to the management clients. SmartView™ server requires 64bit Microsoft® Windows™ O.S.

Microsoft® MS-SQL Server for Persistent Storage

SQL Server is the place where SmartView™ stores collected data, such as alarms, traps and user actions, for long term retrieval. SmartView™ requires Microsoft® SQL Server and is compatible with SQL 2008 Server, SQL 2008 Express, SQL 2014 Server and SQL 2014 Express. (The EMS installer will install the free version Microsoft® SQL 2008 Express or SQL 2014 Express under Windows 10 by default).

Multi-Administrators

Management clients are provided with the JAVA applet GUI to monitor and control the agents at far end. They also receive the Alarm and Traps from the corresponding SNMP Agents. Multiple workstations are allowed, with a maximum of 25 concurrent logged in users.

■ Features at a Glance

Fault Management

- Trap Collection

All traps will be stored in SQL database. When an SNMP agent experiences an abnormal condition it will send an SNMP trap message to SmartView™ which then receives the message, and records it in the database. Depending on preset conditions, SmartView™ may sound an audible alarm, send an email or SMS alert message or just simply flash the trap message on the administrative console screen.

- Active Alarm

SmartView™ 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. Although alarms may be acknowledged, they remain actively displayed on the alarm page until there is no longer an alarm condition.

- 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.

- Alarms sent by E-mail & SMS

The SmartView™ is capable of sending emails and or SMS text messages 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 Forwarding and Syslog messages

The SmartView is capable of forwarding received traps to upper network management and sending event messages to a syslog server.

Configuration Management

- Network Topology

User can load maps to SQL server, load maps from SQL server or delete attached maps. Map area may be used to layout any objects from Root and Node panel. Using drag-and-drop, put any object to map area. Any label or network element location name may be added to object. Objects in red color indicate some alarm condition is present in the device.

- Network Element Configuration

SmartView™ 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.

- Network Element Firmware Upgrade

SmartView™ is able to download firmware to device elements and perform configuration backup/restore.

- Network Element Time Synchronization

SmartView™ is able to trigger a command to network elements to perform time synchronization with Smartview or a NTP server.

- Network Element Discovery

SmartView™ 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 broker for 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 or RMON counters) can be generated on an X Y axis showing different trend data.

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Security Management

▪ User Privilege

- The administrator can add necessary user logins with specific privileges, from Administrator to Operator and lastly to normal user.
- Radius Authentication. Supports authentication login provided by credentials stored on RADIUS server.

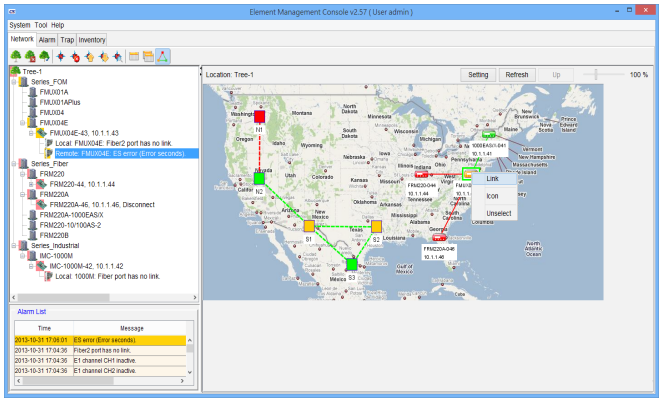
▪ User Role

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.

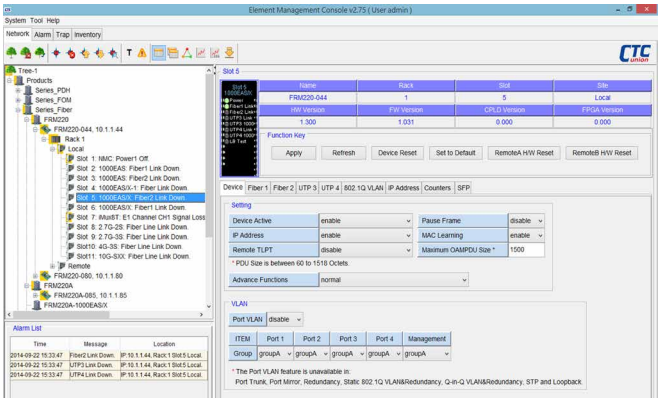
▪ User Activity

Provides viewing and clearing of the user login and configuration action logs.
User client login & logouts are recorded, including the client's source IP address.

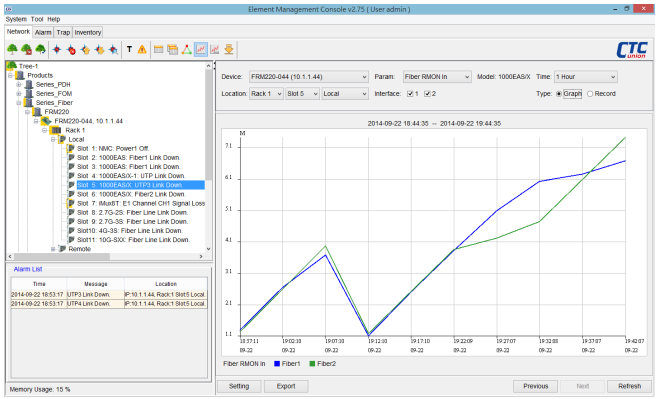
Network Topology



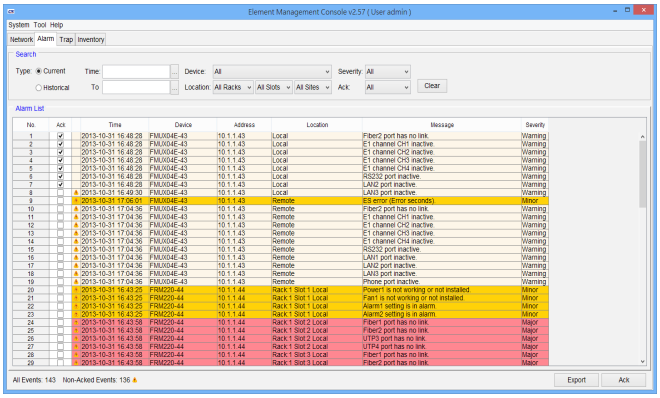
Network Element Configuration



Performance Graphics



Active Alarm



System Requirements

SmartView™	Hardware (minimum)	Software	Operating System
SmartView™ Server	Intel Core2 or higher processor, 2GB RAM, 40GB HD	JAVA JRE. SmartView™ Kit. MS-SQL Server	Windows Server 2012/2016, Win 10 Pro (64 bit)
SmartView™ Clients	Intel Core2 or higher processor, 2GB RAM, 20GB HD	JAVA JRE. SmartView™ Kit.	Windows 10 Pro (64 bit)
All-In-One	Intel Core2 or higher processor, 4GB RAM, 80GB HD	JAVA JRE. MS-SQL Server. SmartView™ Kit. SmartView™ Server/Client	Windows Server 2012/2016, Win 10 Pro (64 bit)

Ordering Information

SmartView™ EMS Server for Max 2,000 IP address nodes

Model Name	Description
SV1-AGT-50	SmartView™ management software with 50 nodes
SV1-AGT-100	SmartView™ management software with 100 nodes
SV1-AGT-200	SmartView™ management software with 200 nodes
SV1-AGT-500	SmartView™ management software with 500 nodes
SV1-AGT-1000	SmartView™ management software with 1000 nodes
SV1-AGT-1500	SmartView™ management software with 1500 nodes
SV1-AGT-2000	SmartView™ management software with 2000 nodes

NEW



ICR-W405 & ICR-W405-4PH

- 4G LTE, 2x SIM, WiFi IEEE 802.11 a/b/g/n/ac 2.4G/5G MIMO 2x 2, GPS,1x GbE Combo WAN, 4x GbE LAN, RS232 COM, RS485, and DI/DO Router
- 4G LTE, 2x SIM, WiFi IEEE 802.11 a/b/g/n/ac 2.4G/5G MIMO 2x 2, GPS,1x GbE Combo WAN, 4x GbE LAN with 4x PoE, RS232 COM, RS485, and DI/DO Router

ICR-W405 is an advanced, industrial grade, cellular router, with 4x 10/100/1000Base-T LAN ports and 1x combo 1000Base-X SFP / 1000Base-T RJ45 WAN port. Dual SIM slots provide both failover and load balance (between WAN and Mobile networks) features and supports multi-band of FDD LTE/ TDD LTE/ WCDMA and LTE Cat 6 mobile connectivity. Wireless LAN is also supported by IEEE 802.11 a/b/g/n/ac compliant WiFi over both 2.4GHz and 5GHz via MIMO 2x 2 antennas. Build-in GPS function supports TCP Push. Supports RS232 and RS485 serial ports and DI/DO interface can be deployed to collect real-time data transmissions is required for Industrial IoT and M2M (machine-to-machine) applications. The Router features VPN Tunneling with Firewall and management capability via TR069 and SNMP while providing highly secure authentication, encryption and management to protect data between public and private networks and simplify your complicated solutions for smart city and industrial networking.

Features

- Highly reliable and secure for mission-critical cellular communications
- 2x SIM slots, RS232, RS485 serial ports and DI/DO interfaces
- LED indicators for connection and data transmission status
- Industrial temperature rated from -20 ~ +70°C for use in harsh environments
- Support serial communication protocols for rich connectivity

Specifications

Standard	Cellular MobilComm standard: 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA GNSS: GPS	
	IEEE802.11	a/b/g/n/ac WiFi Standard
	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet Enhancements)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.3x	Flow Control for Full Duplex
	IEEE 802.1p	LAN Layer 2 QoS for Traffic Prioritization
	IEEE 802.1X	Port based and MAC based Network
	Access Control, Authentication	
LTE Interface	Cellular MobilComm standard: (Please see order information for optional area and band) 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA GNSS: GPS Carrier Aggregation: 2 CA LTE Data rate: Cat 6, 300Mbps (download) 50Mbps (upload) 2 x SIM slots	
WiFi Interface	IEEE 802.11 a/b/g/n/ac WiFi Standards 2.4G/5G dual band MIMO 2 x RP-SMA for WiFi Antenna	
Hardware Interface	LAN: 4x 10/100/1000Base-T(X) RJ45 PoE : 4x LAN port with PoE , 30W/port, total 120W power budget (ICR-W405-4PH) WAN: 1x 10/100/1000Base-T(X) RJ45 & 100/1000Base-X SFP combo port Reset Button for device reset 1x RS232 for serial COM port or console configuration (TXD/RXD/GND) 1x RS485 2x DI (non-Isolated), 3x DO (non-Isolated) 2x SMA connectors for detachable LTE Antenna 2x RP-SMA for WiFi Antenna 1x GPS detachable Antenna	
Housing	Rugged metal, Fanless, IP30 protection	
Dimensions (W x H x D)	TBD	
Weight	TBD	

Installation	DIN Rail mounting, or wall mounting (optional)	
LED Display	SYS: x1 VPN: x1 NET: x1 FN: x1 SIM: x2 (SIM1/SIM2) RSSI: x3 (H/M/L) WiFi: x2 (2.4G/5G) SFP: x1 Per Ethernet port: LNK/ACT	
Power Supply (ICR-W405)	Power Consumption TBD Redundant Dual DC 12/24/48VDC (9.6~60VDC) input power, (Removable Terminal Block) 1x Power jack for DC 12VDC power adapter	
Power Supply (ICR-W405-4PH)	Power Consumption TBD Redundant Dual 48VDC (44~57VDC) input power, (Removable Terminal Block) 50~57V input is recommended for IEEE802.3at PoE+ applications	
Operating Temperature	-20 ~ 70°C	
Storage Temperature	-40 ~ 85°C	
Operating Humidity	10 ~ 95% (non-condensing)	
MTBF	TBD	
Warranty	5 Years	
Certification	**EMC**	EN55032, EN55035
	Radio	NCC (ICR-W405-TW, ICR-W405-4PH-TW) EN62311 RED ETSI EN301 489-1 RED ETSI EN301 489-17 RED ETSI EN301 489-19 RED ETSI EN301 489-52 RED ETSI EN301 511 RED ETSI EN301 908-1 RED ETSI EN301 908-2 RED ETSI EN301 908-13 RED ETSI EN300 328 RED ETSI EN303 413
	Safety	EN62368-1
	Shock	IEC 60068-2-27
	Freefall	IEC 60068-2-31
	Vibration	IEC 60068-2-6

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Software Specifications

Network Protocols	IPv4, IPv6, IPv4/IPv6 dual stack, DHCP server and client, PPPoE, Static IP, SNTP, GPS sync time, DNS Proxy, VRRP, OSPF, Message Queue Telemetry Transport (MQTT Broker), MQTT Publisher, BGP, Flow (Modbus master <---> MQTT client)
Routing/Firewall	NAT, Virtual Server, DMZ, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing, RIP 1, RIP 2, IPS, Policy Route
VPN	OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256), GRE, PPTP, L2TP
WiFi	Authentication support 802.1X and Captive Portal Security with WPA2-PSK (AES) Multiple SSID Maximum 100 user Wireless MAC Filtering Wireless client isolation Wireless Connectivity: WAN WiFi Client

GPS	GPS Track Drawing, GPS TCP Push
Load Balance	Mobile & WAN (SFP/RJ45 combo port)
Others	DDNS, QoS, UPnP, SMS action
Alarm	DI, DO, SMS, VPN/WAN Disconnect, SNMP Trap, Email, TR069
Management	Web GUI for remote and local management, CLI
	Syslog monitor
	SNMP, TR069
	Remote management via SSH v2, HTTPS
	Local management via Telnet, SSH v2, HTTP/HTTPS

Application

4G Industrial Router in Remote Monitoring of Medical Equipment

High speed 4G Cat6 wireless communication technology provides reliable, fast data transmission network for mobile medical system, data.

Figure : Video Surveillance over 4G/LTE

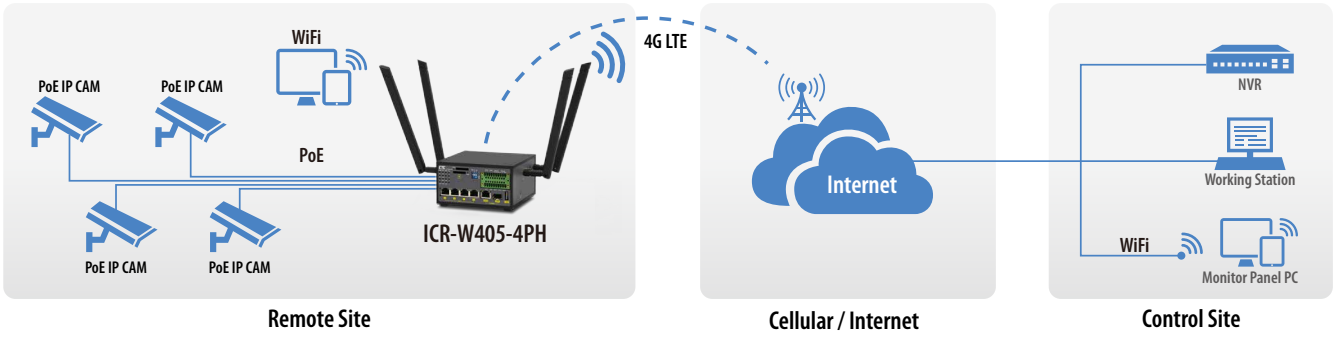
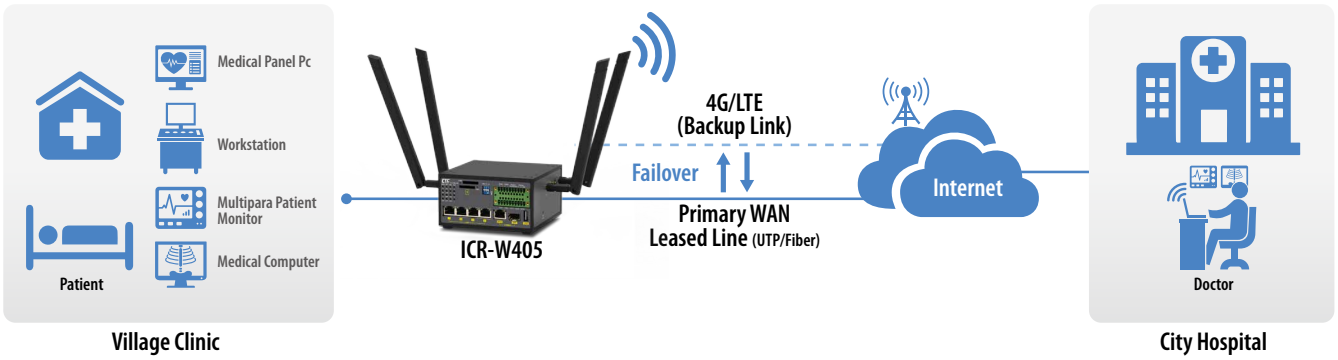


Figure : Uninterrupted Connectivity for Telemedicine



Ordering Information

Model Name	WAN		Local port						Certification				
	Cellular Mobil Band	Combo port 100/1000Base-X SFP, RJ45	WiFi IEEE802.11 a/b/g/n/ac MIMO	10/100/1000 Base-T(X)		RS232	RS485	DI/DO	Safety EN62368-1	NCC	RED	CE	Shock, Freefall, Vibration
				RJ45	PoE, Power Budget								
ICR-W405-EU	Region code EU	1	1	4		1	1	2x DI, 3x DO	V		V	V	V
ICR-W405-A	Region code A	1	1	4		1	1	2x DI, 3x DO	V		V	V	V
ICR-W405-AU	Region code AU	1	1	4		1	1	2x DI, 3x DO	V		V	V	V
ICR-W405-TW	Region code TW	1	1	4		1	1	2x DI, 3x DO	V	V	V	V	V
ICR-W405-4PH-EU	Region code EU	1	1	4	4, 120W	1	1	2x DI, 3x DO	V		V	V	V
ICR-W405-4PH-A	Region code A	1	1	4	4, 120W	1	1	2x DI, 3x DO	V		V	V	V
ICR-W405-4PH-AU	Region code AU	1	1	4	4, 120W	1	1	2x DI, 3x DO	V		V	V	V
ICR-W405-4PH-TW	Region code TW	1	1	4	4, 120W	1	1	2x DI, 3x DO	V	V	V	V	V

MobilComm Region Code Options

Region Code	4G LTE		3G	Region
	FDD LTE	TDD LTE	WCDMA	
EU	B1(2100), B3(1800), B5(850), B7(2600), B8(900), B20(800),B28(700), B32(1500)	B38(2600), B40(2300), B41(2500)	B1(2100), B5(850), B8(900)	Europe, Africa, Middle East, Korea, Thailand, India
A	B2(1900), B4(1700), B5(850), B7(2600), B12(700), B13(700), B25(1900), B26(850), B29(700), B30(2300), B66(1700)		B2(1900), B4(1700), B5(850)	North America
AU	B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B20(800), B28(700)		B2(1900), B3(1800), B4(1700) B5(850)	ANZ, Latin America
TW	B1(2100), B3(1800), B5(850), B7(2600), B8(900), B20(800),B28(700), B32(1500)	B38(2600), B40(2300), B41(2500)	B1(2100), B5(850), B8(900)	Taiwan

Optional Accessories



Antenna accessories

ANT-BASE-01	Antennas Base with Magnetic, SMF (Female) connector, 1.5 meter, for 4G LTE extension

Industrial Power Supply

MDR-40-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 40W, -20 ~ +70℃ (For ICR-W405)
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70℃ (For ICR-W405)
NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70℃ (For ICR-W405-4PH)
NDR-240-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70℃ (For more ref)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



ICR-W403

4G LTE, GPS, IEEE 802.11ac/b/g/n 2T2R,
2x SIM, 3x GbE + DI/DO, RS232

The ICR-W403 is a high-performance industrial grade wireless router. It combines IEEE 802.11b/g/n/ac WLAN and 4G LTE cellular technologies to provide flexible wireless network connectivity for industrial applications. ICR-W403 provides 3 Ethernet ports and dual SIM cards for failover redundancy, to ensure uninterrupted connectivity. ICR-W403 has support for secure VPN communications, GPS, static and dynamic IP routing of RIP1/2 and OSPF, NAT, port forwarding, Firewall, built-in DI/DO and Serial port services. In addition, ICR-W403 uses the highest level of industrial grade design for connection in the most demanding environments, and is an ideal solution for Industrial Internet of Things (IIoT) and M2M (Machine-to-Machine) applications, such as remote control and monitoring, fleet management, bus ticketing collection systems, CCTV, SCADA, digital signage, KIOSK and intelligent traffic systems.

Features

- IEEE 802.11 ac/b/g/n, multiple SSID, captive portal for WiFi hotspot
- Web, CLI ,SNMP, TR069, SMS for management and configuration
- Events triggered by pre-defined, and notification sent by SMS, SNMP trap, or e-mail
- Supports USB for log storage
- EN62368-1, CE, Radio RED, Rail Traffic EN50121-4 certified
- Rugged metal, IP30 protection & Fanless design

Specifications

Standard	Cellular MobilComm standard: (Please see order information for optional band) 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA 2G: GSM/EDGE GNSS: GPS	
	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit Ethernet over twisted pair
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1p	LAN Layer 2 QoS for Traffic Prioritization
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
WiFi Standard	IEEE802.11ac, IEEE802.11b, IEEE802.11g, IEEE802.11n	
Interface	WAN	1x 3G/4G LTE (Please see order information for detail optional mobil band)
		Built-in dual SIM card slots for network redundancy / failover/ roaming over/ back up
		IEEE 802.11ac (5G Hz)
		1x GbE UTP (WAN or LAN configureable)
	LAN	Concurrent WiFi 2.4G/5G with IEEE 802.11ac 2T2R (5GHz), and IEEE 802.11b/g/n 2T2R (2.4GHz)
		3x 10/100/1000Base-T UTP port, port 1 could be WAN or LAN configurable
	COM port	1x RS232
	DI/DO	2x DI, 1x DO, 1x IGN (Ignition Sense for Vehicle)
	GNSS	1x GPS receiver
	Log Storage	1x USB 2.0
Connector	2x 2.3dBi LTE Antenna and connector 2x 5dBi WiFi Antenna and connector 1x SMA Female connector for GPS antenna (Antenna optional) 2 SIM card sockets 1x USB 2.0 socket 3 RJ45 for GbE LAN/WAN 1x Removable Terminal block (Input power, 1x IGN, 2x DI, 1x DO, RS232)	
4G LTE data rate	Cat 4 , Maxium 150Mbps download, upload 50Mbps	
Power Supply	12/24VDC (9~36VDC)	
Power consumption	<14W	

LED	Power (Green), GPS (Green) 2.4G (Green), 5G (Green) SIM 1 (Green), SIM 2 (Green) LTE signal High (Green), LTE signal Low (Green) WAN/LAN LNK/ACT (Green)
Alarm message Handling	Events triggered by pre-defined, and notification sent by SMS, SNMP trap, or e-mail
Operation Temperature	-40~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions (D x W x H)	120 x 200 x 39.5 mm
Weight	975g
Installation	Wall mounting
MTBF	394,330 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
Railway Traffic	EN50121-4
Radio	RED ETSI EN301 489-1
	RED ETSI EN301 489-17
	RED ETSI EN301 489-19
	RED ETSI EN301 489-52
	RED ETSI EN301 511
	RED ETSI EN301 908-1
	RED ETSI EN301 908-2
	RED ETSI EN301 908-13
	RED ETSI EN300 328
	RED ETSI EN303 413
Safety	EN62368-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Routing	Static routing , Dynamic routing, RIP1/RIP2, OSPF, BGP
Security	Firewall: SPI Firewall with Stealth Mode, IPS
	VPN Tunneling: IPSec, OpenVPN, PPTP, L2TP, GRE; Tunneling with Full Tunnel, Tunnel Failover
	VPN Scenario: Site to Site, Site to Host, Host to Site, Host to Host, Hub and Spoke, Dynamic VPN
	Port Forwarding: Virtual Server/ Computer, DMZ Host,Special AP & APG, VPN Pass-through
	Access control: Packet Filter, URL Blocking, MAC Filter, Content Filter, Application Filter
	Authentication: Captive Portal, MAC Authentication
VLAN	Port-based VLAN, Tag-based VLAN
QoS	Policy-based Bandwidth Control and Packet Flow Prioritization
Management	Web, CLI, Telnet, SNMP V3, TR069
IPV6	Dual Stack
Upgrade F/W	Support
Backup & Restore Configuration file	Support

Others	
System Time Information	NTP client
DHCP	Server and Client
Cellular toolkit	SIM PIN, USSD, Network Scan, SMS, Data Usage
Alarm message Handling	DI, DO, SMS, Syslog, SNMP Trap, Email Alert, Reboot
Location Tracking	GPS
Diagnostic	Packet Analyzer, Diagnostic tools
Power Control	Ignition Sense for delay OFF
MobilComm Connectivity	Two SIM for muti ISP failover/ back up Seamless
Multi WAN connections	4G LTE , 1xWiFi IEEE 802.11ac and 1x Ethernet WAN for failover/ back up Seamless
WiFi mode	AP Router, WDS, WDS Hybrid
WiFi Security	WEP, WPA, WPA2, WPA-PSK, WPA2-PSK, IEEE 802.1X
Virtual COM	TCP Client, TCP Server, UDP, RFC2217
Others DDNS, UPnP, QoS	
Remote management via Telnet, SSH v2, HTTPS	
Local management via Telnet, SSH v2, HTTP/HTTPS	
Syslog monitor	

Application

Figure 1 : Application of Wireless Transmission in Logistics Center

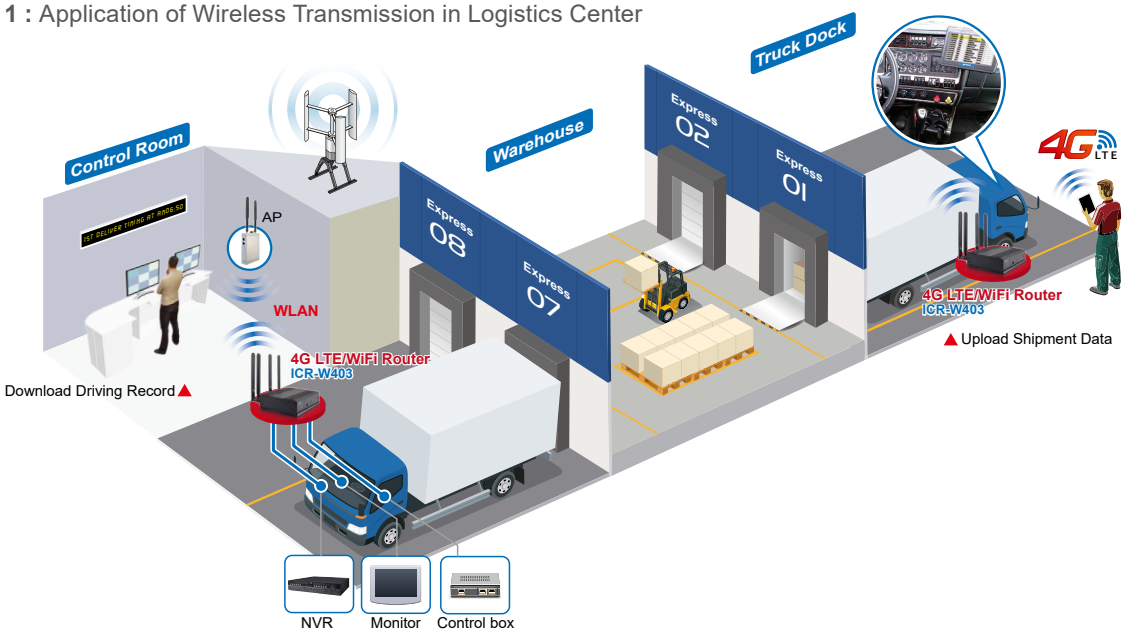
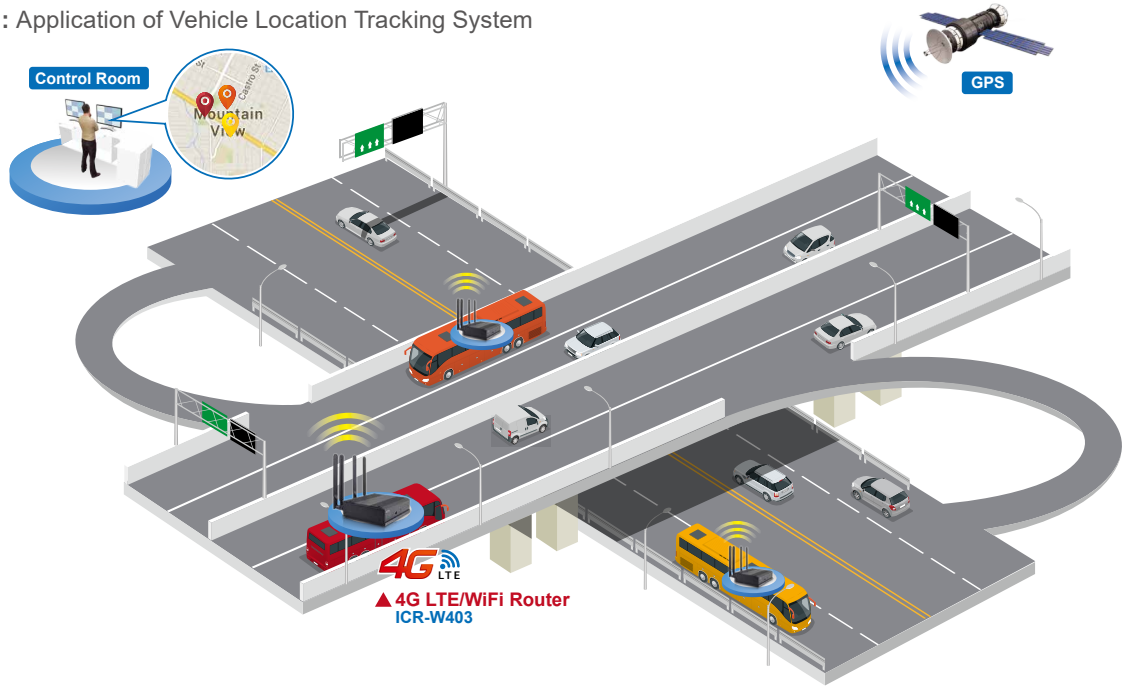
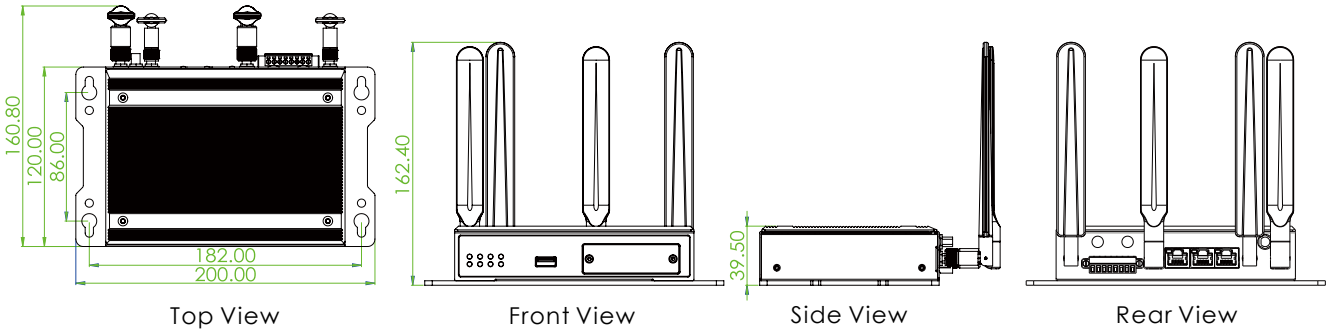


Figure 2 : Application of Vehicle Location Tracking System



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Dimensions



Top View | Front View | Side View | Rear View

Ordering Information

Model Name	WAN		WAN/LAN		LAN		Certification			
	Cellular Mobil Band (2 Sim for Redundant)	GPS (Ant. Optional)	WiFi	UTP 10/100/1000Base-T	DI, DO	RS232	Safety EN62368-1	RailWay EN50121-4	Radio	CE
ICR-W403-EU	see Region code table EU	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V
ICR-W403-A	see Region code table A	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V
ICR-W403-AU	see Region code table AU	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V
ICR-W403-J	see Region code table J	1x GNSS	IEEE 802.11ac/b/g/n (LAN) or IEEE 802.11ac (WAN)	2x(LAN) +1x (LAN or WAN)	2xDI, 1xDO	1	V	V	V	V

MobilComm Region Code Options

Region Code	4G LTE		3G	2G	GNSS	Region
	FDD LTE	TDD LTE	WCDMA	GSM / EDGE		
EU	B1(2100) , B3(1800), B7(2600), B8(900), B20(800)		B1(2100), B8(900)	B3(1800), B8(900)	Yes	Europe, Africa, Middle East, Korea,Thailand, India
A	B2(1900), B4(1700), B12(700)		B2(1900), B4(1700), B5(850)		Yes	USA (AT&T, T-Mobile)
AU	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	Yes	ANZ, South America, Taiwan
J	B1(2100), B3(1800), B8(900), B18(850), B19(850), B26(850)	B41(2500)	B1(2100), B6(850), B8(900), B19(850)		Yes	China

Optional Accessories

Antenna accessories

ANT-GPS-01	Antennas for GNSS
ANT-BASE-01	Antennas Base with Magnetic, SMA (Male) connector, 1.5meter for 4G LTE extension


ANT-GPS-01


ANT-BASE-01

Industrial Power Supply

MDR-40-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 40W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C



ICR-W401

4G LTE, GPS, WiFi IEEE 802.11 b/g/n 2T2R and DI/DO Router

The ICR-W401 is a compact, lightweight and cost-effective Industrial grade 4G LTE Router that has 1 LAN plus 1 WAN Fast Ethernet connection and supports uplink to 2G/3G/4G mobile data networks. Built for harsh environments, the router is equipped with a DI/DO interface. The ICR-W401 is simple to configure through its embedded Web user interface applications. The ICR-W401's WiFi is compliant with IEEE 802.11b/g/n wireless connectivity. The Router features VPN Tunneling with Firewall and management capability via TR069 and SNMP. The ICR-W401 provides highly secure authentication, encryption and management, to protect your data between public and private networks and simplify your complicated solutions for smart city and industrial networking.

Features

- Highly reliable and secure for mission-critical cellular communications
- Compact and lightweight design with 1 LAN and 1 WAN Ethernet interfaces
- Supports multi-band connectivity with FDD LTE/ TDD LTE/ WCDMA/ GSM/ LTE Cat 4
- Provides IEEE 802.11b/g/n WiFi 2T2R
- Micro SIM connector and DI/DO interfaces
- LED indicators for connection and data transmission status
- Industrial temperature rated from -30 ~ +70°C for use in harsh environments
- IPv6/IPv4 dual stack and all applications are IPv6 ready
- Enhance security and encryption for authentication and transmission

Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.1Q Virtual LANs (VLAN) IEEE 802.3x Flow control for Full Duplex IEEE 802.1p LAN Layer 2 QoS for Traffic Prioritization IEEE 802.1X Port based and MAC based Network Access Control, Authentication
LTE Interface	Cellular MobilComm standard: (Please see order information for optional area and band) 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA 2G: GSM/EDGE GNSS: GPS LTE Data rate: Cat 4, 150Mbps (Down load) 50Mbps (up load) 1 x micro SIM Connector (push-push type)
WiFi Interface (ICR-W401)	IEEE 802.11b/g/n WiFi Standards Support AP or Station mode 2 x RP-SMA for WiFi Antenna 2T2R 300Mbps wireless operation rate 2.4GHz radio for wireless
Hardware Interface	1 x Micro SIM Connector (push-push type) 1 x LAN 10/100 Mbps Ethernet port 1 x WAN 10/100 Mbps Ethernet port Reset Button for device reset 1x RS232 for console configuration (TXD/RXD/GND) 1 x DI (Non-Isolated), 1 x DO (Non-Isolated) 2 x SMA connectors for detachable LTE Antenna 2 x RP-SMA for WiFi Antenna 1 x GPS detachable Antenna
Housing	Rugged metal, Fanless, IP30 protection
Dimensions (D x W x H)	75x 92x 30mm
Weight	400g
Installation	DIN Rail mounting, or wall mounting (optional)

LED Display	1 x Power LED 2 x Ethernet LED for each port (LAN/WAN) 1x LTE LED 1 x Function LED (User define by Web)	
Power Supply	Power Consumption	7 Watt(Max)
	Power Input	12/24/48VDC (9.6~60VDC)
Operating Temperature	-30 ~ 70°C	
Storage Temperature	-40 ~ 85°C	
Operating Humidity	10 ~ 95% (non-condensing)	
MTBF	271,952 Hours (MIL-HDBK-217)	
Warranty	5 Years	
Certification	**EMC**	CE (EN55032, EN55035)
	Radio	NCC (ICR-W401-TW) EN62311 RED ETSI EN301 489-1 RED ETSI EN301 489-17 RED ETSI EN301 489-19 RED ETSI EN301 489-52 RED ETSI EN301 511 RED ETSI EN301 908-1 RED ETSI EN301 908-2 RED ETSI EN301 908-13 RED ETSI EN300 328 RED ETSI EN303 413
	Safety	EN62368-1
	Shock	IEC 60068-2-27
	Freefall	IEC 60068-2-32
	Vibration	IEC 60068-2-6

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

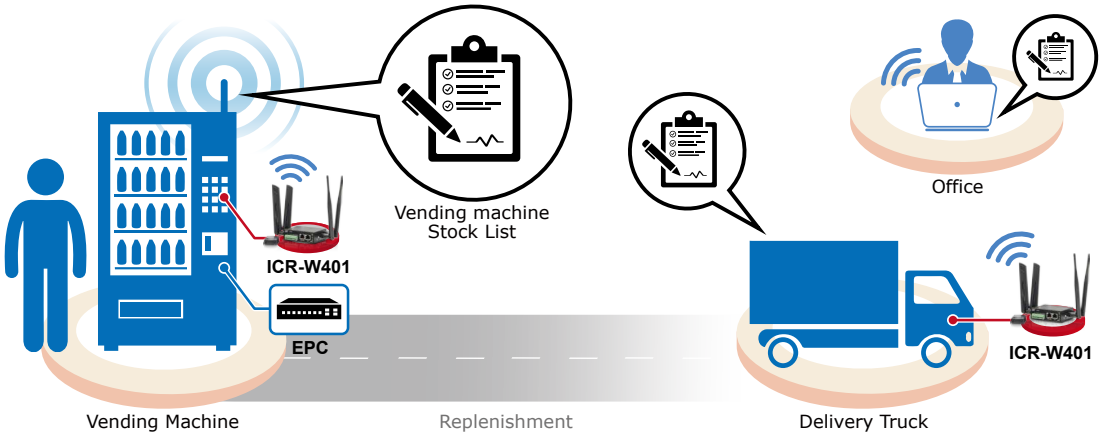
Software Specifications

Network Protocols	IPv4, IPv6, IPv4/IPv6 dual stack, DHCP server and client, PPPoE, Static IP, SNTP, GPS sync time, DNS Proxy, VRRP, OSPF, Message Queue Telemetry Transport (MQTT Broker), BGP
Routing/Firewall	NAT, Virtual Server, DMZ, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing, RIP 1, RIP 2, IPS, Policy Route
VPN	OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256), GRE, PPTP, L2TP
WiFi	Security with WPA2-PSK (AES) Multiple SSID Wireless Mac Filtering Wireless client isolation Wireless Connectivity: WAN WiFi Client

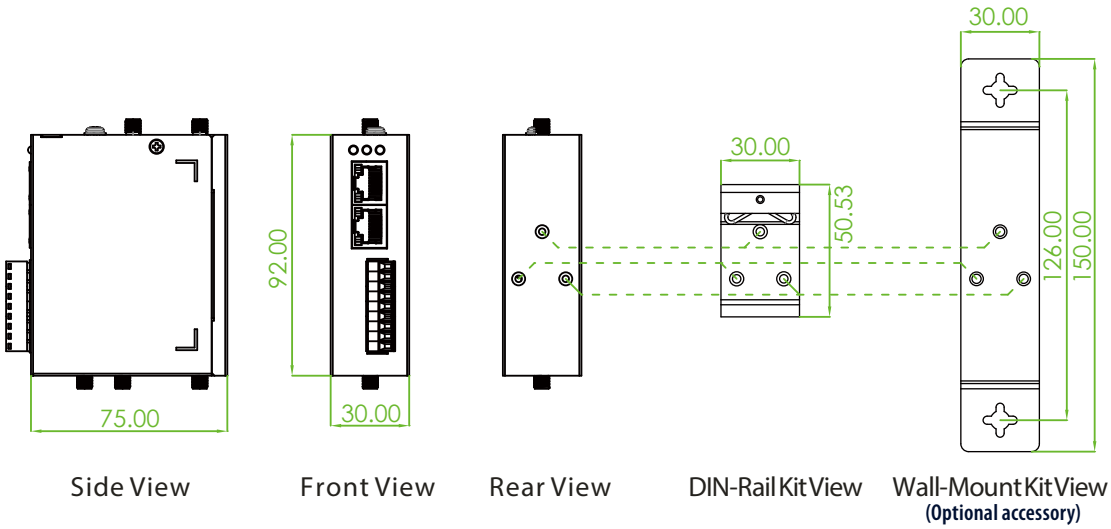
Others	DDNS, QoS, UPnP, SMS action, GPS track Drawing, GPS TCP Push
Alarm	DI, DO, SMS, VPN/WAN Disconnect, SNMP Trap, Email, TR069
Management	Web GUI for remote and local management, CLI
	Syslog monitor
	SNMP, TR069
	Remote management via SSH v2, HTTPS
	Local management via Telnet, SSH v2, HTTP/HTTPS

Application

The vending machine logistics system application



Dimensions



Ordering Information

Model Name	Managed	WAN		LAN			Safety	Certification			
		"Cellular Mobile Band"	"10/100 Base-TX"	"WiFi IEEE 802.11 b/g/n"	"10/100 Base-TX"	DI/DO	EN62368-1	CE	RED	NCC	Shock, Freefall, Vibration
ICR-W401-EU	V	see Region code table EU	1	1	1	1	V	V	V		V
ICR-W401-A	V	see Region code table A	1	1	1	1	V	V	V		V
ICR-W401-AU	V	see Region code table AU	1	1	1	1	V	V	V		V
ICR-W401-TW	V	see Region code table TW	1	1	1	1	V	V	V	V	V

MobilComm Region Code Options

Region Code	4G LTE		3G	2G	Region
	FDD LTE	TDD LTE	WCDMA	GSM / EDGE	
EU	B1(2100), B3(1800), B5(850), B7(2600), B8(900), B20(800)	B38(2600), B40(2300), B41(2500)	B1(2100), B5(850), B8(900)	B3(1800), B8(900)	Europe, Africa, Middle East, Korea,Thailand, India
A	B2(1900), B4(1700), B12(700)		B2(1900), B4(1700), B5(850)		USA (AT&T, T-Mobile)
AU	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	ANZ, South America, Taiwan
TW	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)		Taiwan

Optional Accessories



ANT-BASE-01

Antenna Accessories

ANT-BASE-01	Antennas Base with Magnetic, SMA (Male) connector, 1.5meter for 4G LTE extension

Wall Mount Kit Accessories

IND-WMK03	Wall Mount kit for Industrial product (Compact, 150x 30mm)

Industrial Power Supply

MDR-40-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 40W, -20 ~ +70℃
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70℃

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



ICR-4103

4G LTE, 2x SIM, 4x FE + 2x DI/1x DO, 1x RS485, 2x RS232

The ICR-4103 is a high-performance, industrial grade, 4G-LTE cellular router which is designed to offer fast connectivity over cellular networks for industrial applications. ICR-4103's Ethernet ports can allow up to 3 Ethernet devices to link to the cellular network. It provides dual SIM card slots and one Ethernet WAN port which can automatically re-connect and auto-switch to offer cellular network redundancy and ensure uninterrupted connectivity. The ICR-4103 cellular router is integrated with WAN, LAN, SIM, VPN, Firewall, built-in DI/DO and Serial port services. In addition, ICR-4103 uses the highest level of industrial grade design for connection in the most demanding environments and is an ideal solution for Industrial Internet of Things (IIoT) and M2M (Machine-to-Machine) applications, such as remote control and monitoring, bus ticketing collection system, CCTV, SCADA, digital signage, kiosk and intelligent traffic systems.

Features

- Supports multi-band connectivity with FDD 4G LTE/ TDD 4G LTE/ 3G WCDMA/2G GSM/ LTE Cat4
- 2 SIM card slots 4G LTE antenna, 1x WAN (10/100Base-TX) + 3x LAN (10/100Base-TX UTP), 2x DI + 1x DO, 3x Serial COM port (2x RS232, 1x RS485)
- Highly reliable and secure for mission-critical cellular communications
- Provide flexible options to configure LAN/ WAN ports
- Built-in dual SIM for network redundancy / failover/ roaming over/ back up
- Integrated dual detachable antenna against radio interference
- 4G LTE and WAN port for seamless connection and redundancy
- Supports 3x Serial port (1x RS485, 2x RS232) for IoT and automation application, Modbus RTU and Modbus/TCP gateway, MQTT
- Supports Routing/Firewall, NAT, Virtual Server, DMZ, Port filtering, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing and RIP 1 & 2, VRRP, OSPF V2 & V3, BGP
- Supports VPN, OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256), GRE, PPPTP, L2TP
- IPv6/IPv4 dual stack and all applications are IPv6 ready
- Supports DHCP server and client, PPPoE, Static IP, SNTP, DNS Proxy, DDNS, QoS, Virtual Com, UPnP
- Supports Alarm message : DO, SNMP Trap, E-mail
- Supports SNMP, TR069,Web, Telnet, CLI for management
- Supports dual Image firmware upgrade by Web
- CE, FCC, Rail Traffic EN50121-4 certified
- Safety EN60950-1 certified
- Radio RED ETSI EN301 489-1/-19/-52, EN301 908-1, EN303 413, NCC certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Rugged metal, IP30 protection & Fanless design
- Wide operating temperature -20 ~ 75°C

Specifications

Standard	Cellular MobilComm standard: (Please see order information for optional band) 4G LTE: FDD-LTE, TDD-LTE 3G: WCDMA 2G: GSM/EDGE
	IEEE 802.3 10Base-T 10Mbit/s Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.1Q Virtual LANs (VLAN)
	IEEE 802.3x Flow control for Full Duplex
Connector	**Cellular MobilComm and WAN:** Built-in dual SIM card slots for network redundancy / failover/ roaming over/ back up 2 SMA (female) connector for Antenna (Please see ordering information for optional accessories) 1x 10/100Base-TX RJ45 for WAN port **LAN:** 3x 10/100Base-TX RJ45 **Serial:** 1x RS485 and 2x RS232 (one of RS232 could be configured for console) **Programmable DI/DO:** 2xDI and 1x DO
LTE data rate	Cat 4 ,Max download 150Mbps, Max upload 50 Mbps
Removable terminal block	Provides for Power input, DO, DI1, DI2, COM2 (RS232), COM3 (RS485)
Power Supply	Input 10-32VDC removable terminal block
Power consumption	<7W
LED	System status (Green)
	VPN (Green), SIM 1 (Green), SIM 2 (Green)
	Cell signal Strong / Weak: H/L (Green)

DIP SW for RS485 port	DIP 1 Pull Low : OFF: Disable, ON: Enable
	DIP 2 Pull High : OFF: Disable, ON: Enable
	DIP 3 120 ohm terminal resistor : OFF: Disable, ON: Enable
Alarm message	DO for alarm message, with current capacity of 500mA/50VDC maximum SNMP trap, E-mail, SMS, Alarm trigger by DI, VPN or WAN disconnection
Operation Temperature	-20~75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless , IP30 grade housing protection
Dimensions (D x W x H)	106 x 62.5 x 135mm
Weight	0.74kg
Installation	Mounting : DIN Rail mounting or Wall mounting (Optional)
MTBF	296,306 Hours (MIL-HDBK-217)
Warranty	5 years

Certification	
EMC	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
EMS (Electromagnetic Susceptibility Protection Level)	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A
EMS (Electromagnetic Susceptibility Protection Level)	EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Radio	RED ETSI EN301 908-1 RED ETSI EN303 413 RED ETSI EN301 489-1 RED ETSI EN301 489-19 RED ETSI EN301 489-52 NCC (ICR-4103-TW)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Network Protocols	IPv4, IPv6, IPv4/IPv6 dual stack, DHCP server and client, DNS Proxy, PPPoE, Static IP, SNTP, VRRP, OSPF V2, OSPF V3, BGP, MQTT, TCP, UDP, ARP
Modbus TCP, Modbus RTU	Gatway between Ethernet and COM3 (RS485) port
Routing/Firewall	NAT, Virtual Server, DMZ, Port filtering, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing and RIP 1, RIP 2
VPN	OpenVPN, IPSec (3DES, AES128, AES196, AES256, MD5, SHA-1, SHA256), GRE, PPPTP, L2TP
MobilComm Connectivity	Two SIM for failover/ roaming over/ back up Seamless multi WAN connections switch (2x SIM and 1x Ethernet WAN)
Others	DDNS, UPnP, QoS Virtual COM for serial COM port
Alarm message	Sent by DO, SMS, SNMP Trap, E-mail
Management	Web GUI for remote and local management CLI Dual Image firmware upgrade by Web GUI, TFTP Syslog monitor SNMP V1, V2c, V3 TR069: TR098 model Access Control list, SSH v2 Remote management via Telnet, SSH v2, HTTPS Local management via Telnet, SSH v2, HTTP/HTTPS

Application

Figure 1 : Application for Environmental Monitoring

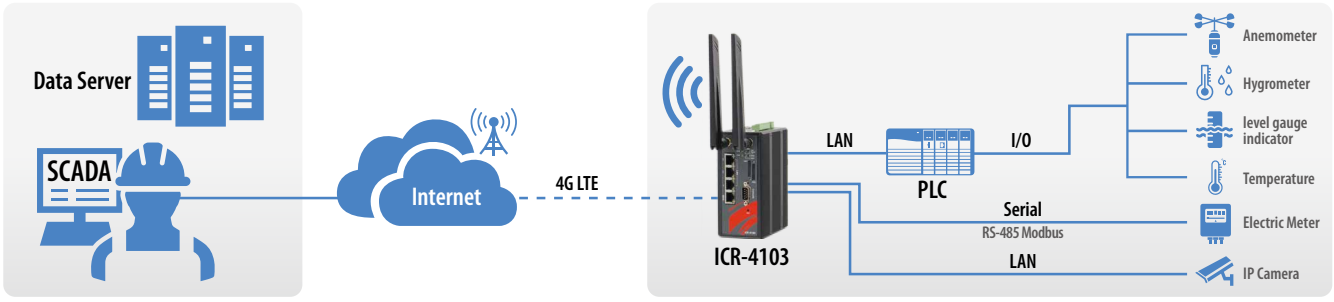
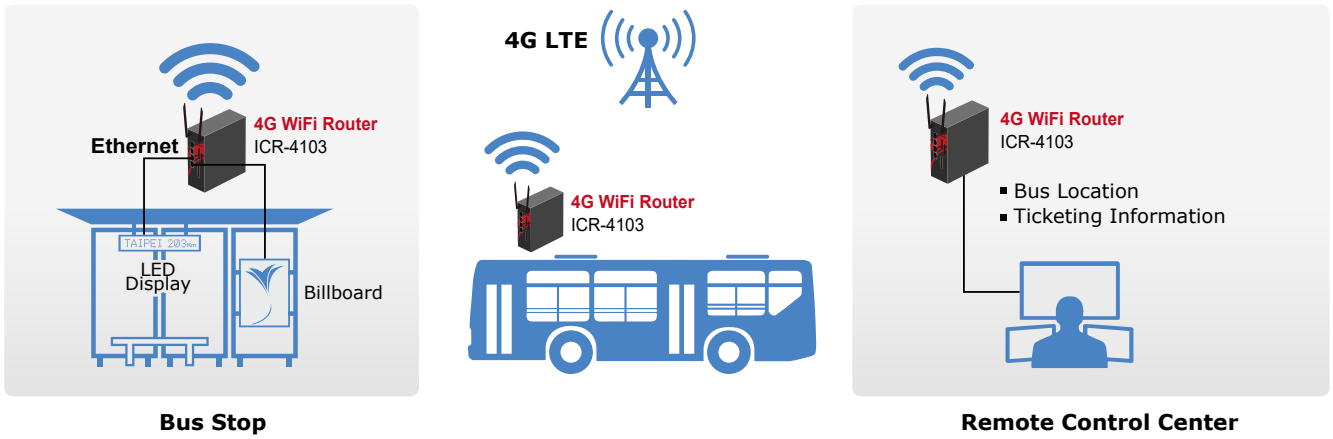
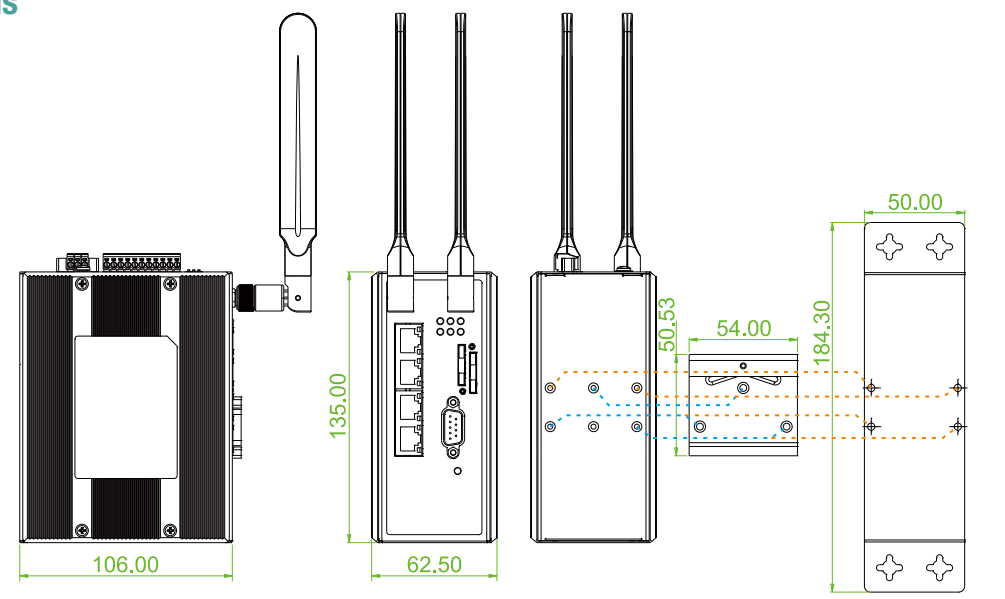


Figure 2 : Application for Transportation/Bus Communication



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Dimensions



Side View | Front View | Rear View | DIN-Rail Kit View | Wall-Mount Kit View (Optional accessory)

Ordering Information

Model Name	Managed	WAN		LAN			Certification			
		Cellular MobilComm band (2 SIM for Redundancy)	10/100Base-TX	10/100Base-TX	RS232	RS485 (Modbus)	Radio	Railway EN50121-4	EN61000-6-2 EN61000-6-4	CE, FCC
ICR-4103-EU	V	see Region code table EU	1	3	2	1	RED	V	V	V
ICR-4103-A	V	see Region code table A	1	3	2	1	RED	V	V	V
ICR-4103-AU	V	see Region code table AU	1	3	2	1	RED	V	V	V
ICR-4103-TW	V	see Region code table TW	1	3	2	1	NCC	V	V	V
ICR-4103-J	V	see Region code table J	1	3	2	1	RED	V	V	V

MobilComm Region Code Options

Region Code	4G LTE		3G	2G	Region
	FDD LTE	TDD LTE	WCDMA	GSM / EDGE	
EU	B1(2100) , B3(1800), B5(850), B7(2600), B8(900), B20(800)	B38(2600), B40(2300), B41(2500)	B1(2100), B5(850), B8(900)	B3(1800), B8(900)	Europe, Africa, Middle East, Korea,Thailand, India
A	B2(1900), B4(1700), B12(700)		B2(1900), B4(1700), B5(850)		USA (AT&T, T-Mobile)
AU	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	ANZ, South America
TW	B1(2100), B2(1900), B3(1800), B4(1700), B5(850), B7(2600), B8(900), B28(700)	B40(2300)	B1(2100), B2(1900), B5(850), B8(900)	B2(1900), B3(1800), B5(850), B8(900)	Taiwan
J	B1(2100), B3(1800), B8(900), B18(850), B19(850), B26(850)	B41(2500)	B1(2100), B6(850), B8(900), B19(850)		Japan (KDDI, Docomo, Softbank)

Optional Accessories

■ Antenna Accessories

ANT-BASE-01	Antennas Base with Magnetic, SMA (Male) connector, 1.5meter for 4G LTE extension



ANT-BASE-01

■ Wall Mount Kit Accessories

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)



IWA-AR114

WAN: 1x GbE SFP + 1GbE UTP
LAN: WiFi IEEE802.11 a/b/g/n/ac 2T2R + 4x GbE UTP

- Ethernet UTP and SFP for WAN Failover & Load Balancing
- USB2.0 port for log storage

The IWA-AR114 is a compact, lightweight and cost-effective Industrial Grade Router with 3 10/100/1000Base-T LAN ports plus 1 100/1000Base-T WAN/LAN and a 100/1000Base-X WAN SFP interface. It provides IEEE 802.11 a/b/g/n/ac dual band(2.4G/5G selectable) wireless connections for optimal coverage. Built for harsh environments, the router equips features such as NAT, port forwarding, VPN Tunneling, Firewall and management capability via TR-069 and SNMP. All in all, the IWA-AR114 provides highly secure authentication, encryption and management to protect your data between public and private networks and to simplify your complicated solutions for SoHo, smart city and industrial networking.

Features

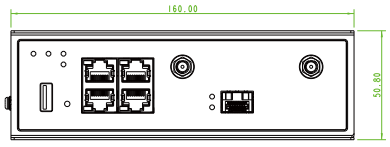
- WiFi IEEE 802.11 a/b/g/n/ac (2.4G/5G selectable) + 3 x GbE LAN + 1x WAN/LAN GbE + 1x GbE SFP WAN Router
- Compact and easy to be integrated into IP network solutions.
- Rich VPN tunnel technology to build VPN tunnel between IP network/network device with remote centers.
- Both IPv4/IPv6 protocol stack meet ISP requirements.
- Gateway based on IP pass through or DHCP-based NAT with Port Forwarding.
- Rich Routing function covers static, dynamic and OSPF compatible with most IP networks.
- Web UI, CLI and Command Script for basic and advanced configurations.

Specifications

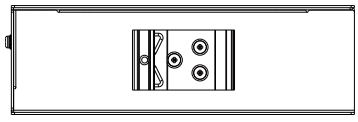
Device Interface	Ethernet	4x RJ45 GbE, 1x GbE SFP
	WiFI	802.11a/b/g/n/ac 2T2R (2.4G/5GHz Selectable)
	Log Storage	1x USB 2.0
	Power Input	12V (DC Jack)
WAN & Uplink	WAN	Ethernet UTP and SFP, for WAN Failover, Load Balancing
	Ether-WAN	Dynamic IP, Static IP, PPPoE, PPTP,L2TP
	Network Monitor	ICMP/DNS Query
WiFi	Standard	802.11 Industry Compliance
	Mode	AP Router, WDS, WDS Hybrid Modes
	Function	Multi-SSID, WMM
	Security	WEP, WPA, WPA2, WPA-PSK, WPA2-PSK, 802.1x, WPA-Enterprise, WPA2-Enterprise
	Captive Portal	External & Internal web portal
Protocol	LAN & VLAN	DHCP Server/Relay, Port/ Tag based VLAN
	IPv6	Static IPv6, DHCPv6, PPPoEv6
	Port Forward	Virtual Server, Virtual Computer, DMZ, VPN Pass-through
	Routing	Static, Dynamic - RIP1/RIP2, OSFP, BGP
	QoS	Policy-based Bandwidth Control and Packet Flow Prioritization
Security	VPN Tunneling	IPSec, OpenVPN, PPTP, L2TP, GRE
	Scenario	Site/Host to Site/Host ; Dynamic VPN
	VPN Capability	IPSec: Up to 16 tunnels
	Firewall	SPI Firewall with Stealth Mode, IPS
	Access Control	Packet Filter, URL Blocking, MAC Filter, IP, TCP, UDP

Object	Scheduling	Time Schedule List
	Grouping	Host Grouping List
	Ext. Server	Email, Syslog, SCEP
	Certificate	My Certificate, Trusted Certificate, Issue Certificate
Administration	Configuration	Web UI, CLI, Command Script
	Management	SNMP Std. MIB, TR-069
	System	Upgrade, Backup & Restore, Reboot & Reset, Syslog
	Software Upgrade	TFTP / Web
	Diagnostic	Packet Analyzer, Diagnostic Tools, Ethernet port setup
Service	Event Handling	User Defind Manage/Notify Event ; SMS, Mail, Syslog, SNMP Trap
Power	12/24/48VDC	(Power Jack)
Environment	OP/Store Temp.	-30°C ~ 60°C ; -40°C ~ 85°C
	Humidity	10%~95% (non-condensing)
	Enclosure	Metal, Bracket / DIN-Rail
	Dimension	50.8 x 125 x 160mm
Certificate-CE	Standard & Regulation	
	EMI	CE EN55032: 2015 +AC: 2016 ClassB, EN61000-3-6
	EMS	CE EN55024, IEC 61000, EN61000-6
	Radio	EN 301 489, EN 300 328, EN 301 893, EN50385
	Safety	EN60950-1, EN62368-1
Package List	1x Device	
	2x WiFi Antenna	
	Power Adapter DC12V/2A	
	1x DIN Rail Kit	

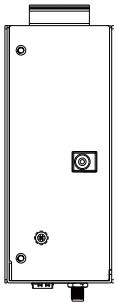
Dimensions



Front View



Rear View



Side View

Ordering Information

Model Name	WAN/LAN		WiFI (LAN)	Certification		
	Fiber	UTP Ethernet		Safety	CE	Radio
IWA-AR114	1x GbE SFP	3x GbE (LAN) + 1x GbE (LAN or WAN)	IEEE802.11 a/b/g/n/ac 2.4G/5G selectable	EN60950-1, EN62368-1	V	RED

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



iAccess™ 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(n) 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.

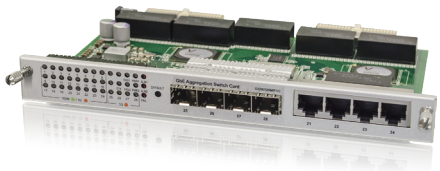
FRM220A-GSW/SNMP-10G

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



FRM220A-GSW/SNMP(n)

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



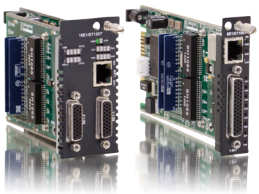
- 10/100/1000Base-T and 100/1000Base-X SFP (2000EAS/1)
- 2x 10/100/1000Base-T and 2x 100/1000Base-X SFP (2000EAS/2)
- Standalone IP Based, Web GUI, Telnet and SNMP management
- Supports dying gasp
- Online local / remote F/W upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management

Ethernet over E1 Converter: FRM220A-Eoe1/G(S)



- Connects one Fast Ethernet over E1 links (2.048Mbps)
- Built-in GFP bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- LED Alarm indication
- Support MTU 2046 bytes

Inverse Mux: FRM220A-iMux4 / 8 / 16



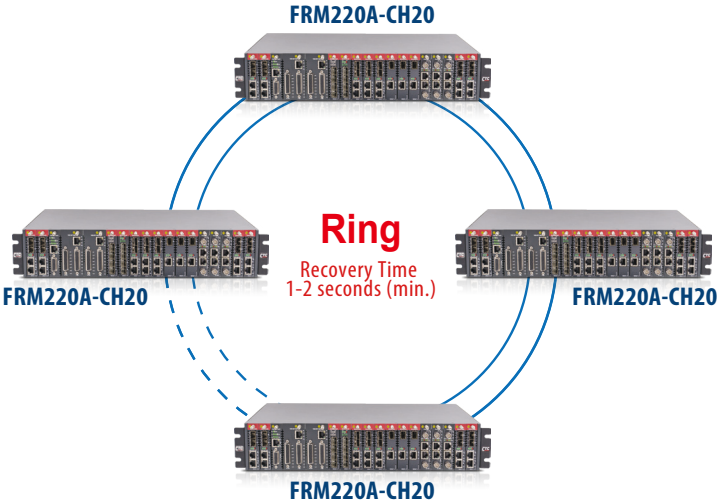
- The FRM220A-iMUX4/8/16 connects one Fast Ethernet over 4E1/8E1/16E1 links
- Built-in GFP bridge operates at WAN rate
- Maximum 220ms delay variance between E1 link
- Unbalanced E1/BNC or balanced E1/RJ45
- LED Alarm indication & Auto-Negotiation
- Supports MTU 1916 bytes

Benefit of FRM220A Chassis Platform

Enabling IP Transportation Protection Mechanism

- STP/RSTP Featured Ring Protection

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

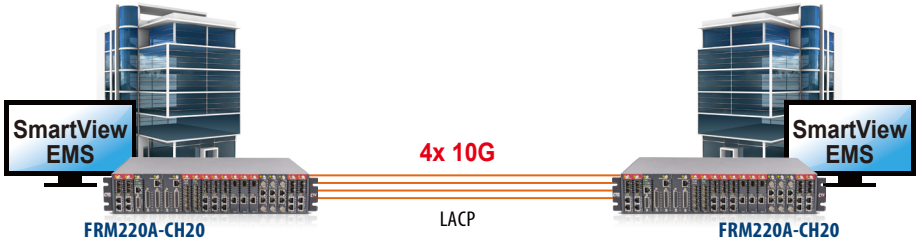


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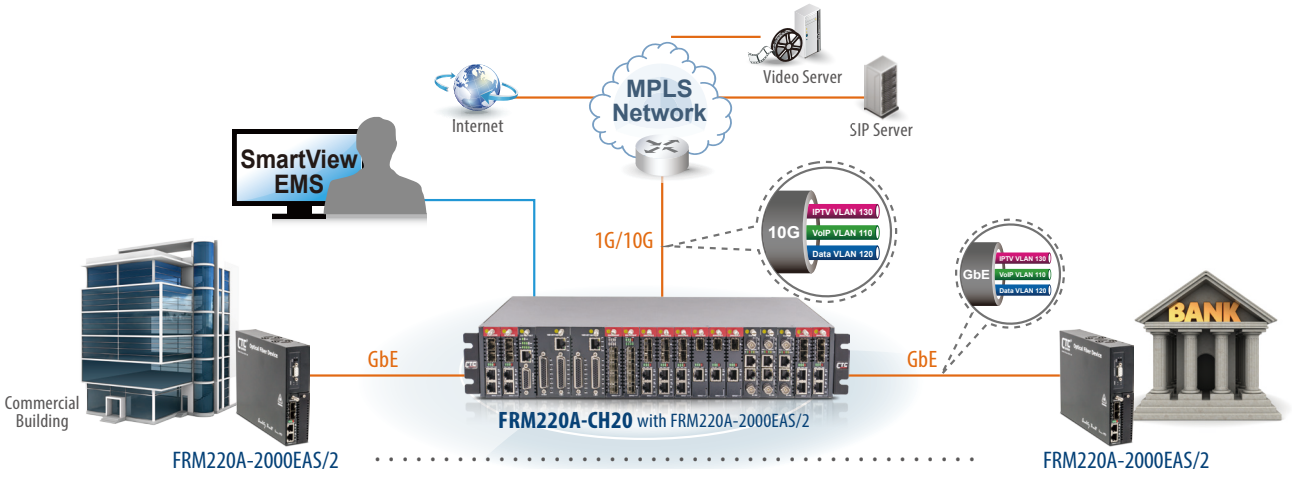
LACP Enabled Traffic Aggregation

- Fiber Redundant / Trunking Application

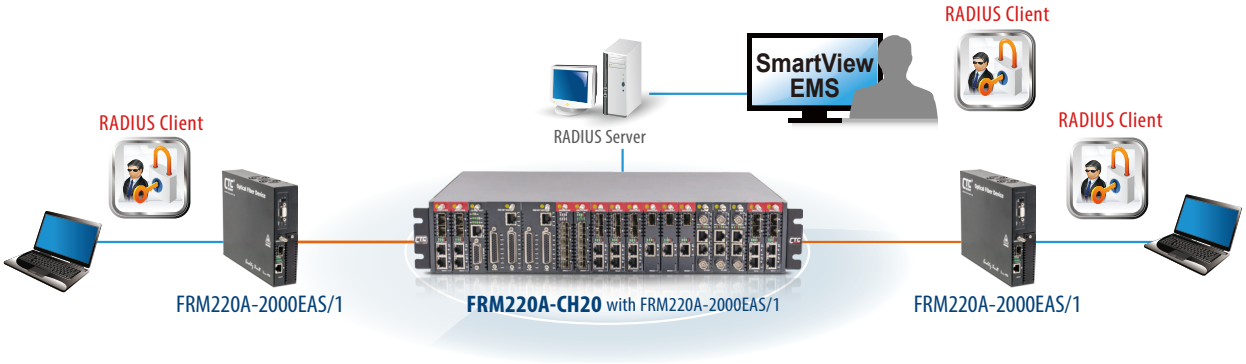
- Dynamic port aggregation or trucking to increase bandwidth between LACP peer devices
- Redundant paths to reduce network fault risk



Enabling VLAN & QoS Prioritized Multiple Play Services



Secured Access Control Enhancement *- Centralized Management of Accessing the Network for user or device*





FRM220A-GSW/SNMP-10G

10G uplink Ethernet Aggregation Switch Card

FRM220A-GSW/SNMP(n)

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-X SFP/SFP+ uplink slots (FRM220A-GSW/SNMP-10)
- Provides chassis aggregation via 4x 1G Gigabit Base-X SFP uplink slots (FRM220A-GSW/SNMP(n))
- 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
	Supports full-duplex mode for 1G/10G Mbps (FRM220A-GSW/SNMP-10G)
	Supports full-duplex mode for 1G Mbps (FRM220A-GSW/SNMP(n))
Capacity	Supports up to 20 service cards
Temperature	0~60°C (Operating), -10~70°C (Storage)
Humidity	5~90% non-condensing
Certification	CE, FCC, RoHS compliant

Management Specifications	In-band management	Provides all system OAM functions: software updates, and management system interaction through Ethernet trunk port
	Out-band management	Supports Web, Telnet and SNMP, SSHv2 EMS management
Indications	PWR, FAN, Alarm, STK	
Dimensions	142 x 200 x 26 mm (D x W x H)	
Weight	0.5kg	
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(n)	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

FRM220A – □□□□ (Chassis)
Example: FRM220A – CH20

FRM220A – □□□ / □□□□ – □□□ (Card)
Example: FRM220A – GSW/SNMP-10G

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



iAccess™ 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

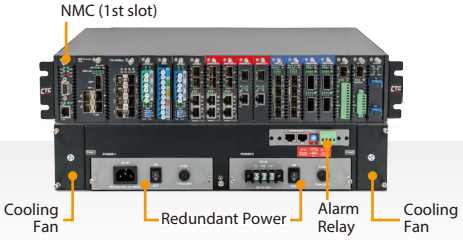
Power Input	AC	100-240VAC (CH20/CH08/CH04A/CH02/CH01)
	DC24	18-36VDC (CH20/CH08)
	DC48	36-75VDC (CH20/CH08)
	DC	18-60VDC (CH04A, CH02, CH01)
	Adapter Type (CH01)	Input Voltage 100-240VAC 50/60Hz
		Output Voltage 12VDC 1A

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	Operationg 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

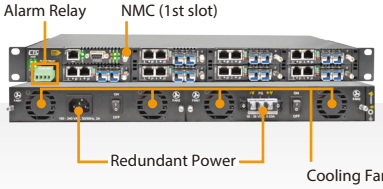
■ Rackmount Chassis

CH20 (2U 19" 20 Slots)



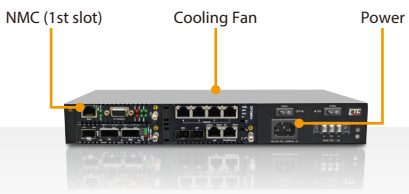
- DIM: 303(D) x 438 (W) x 88(H)mm

CH08 (1U 19" 8 Slots)



- DIM: 310(D) x 440(W) x 44(H)mm

CH04A (1U 4 Slots)



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

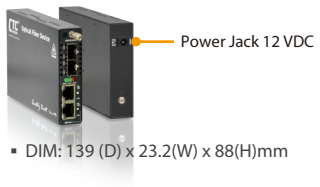
Ordering Information

Model Name	Description
CH20	
FRM220-CH20	2U 19", 20 slots rack mount chassis with cooling fan and rack mounting kit
FRM220-CH20 (HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
Power Module	
FRM220-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-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
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.	
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

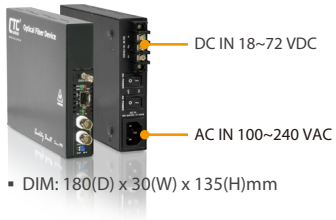
▪ *1-Slot Chassis*

CH01 (Adapter Type)



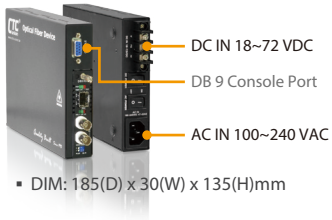
- DIM: 139 (D) x 23.2(W) x 88(H)mm

CH01 (Power Built-in)



- DIM: 180(D) x 30(W) x 135(H)mm

CH01M (Power Built-in)



- DIM: 185(D) x 30(W) x 135(H)mm

▪ *2-Slot Chassis*

CH02M (Power Built-in)



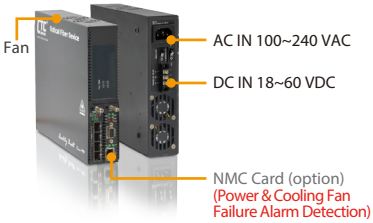
- DIM: 219.4(D) x 44.5(W) x 167.4(H)mm
- Rack mount kits uses (B) type

CH02/NMC (Power Built-in)



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

CH02/SMT (Power Built-in)

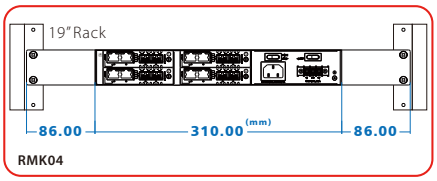


- DIM: 220(D) x 44.7(W) x 205(H)mm
- Rack mount kits uses (C) type

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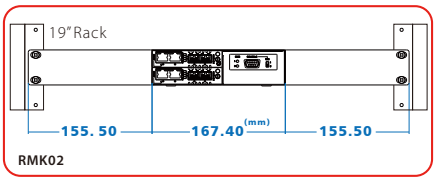
■ Rack Mount Kits (optional)

Ⓐ



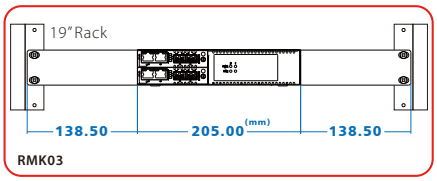
RMK04

Ⓑ



RMK02

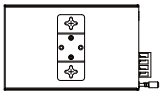
Ⓒ



RMK03

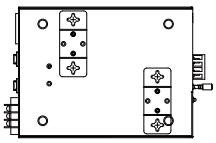
■ Wall Mount Kits (optional)

Adapter Type
CH01



WMK01

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



WMK01

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

Ordering Information

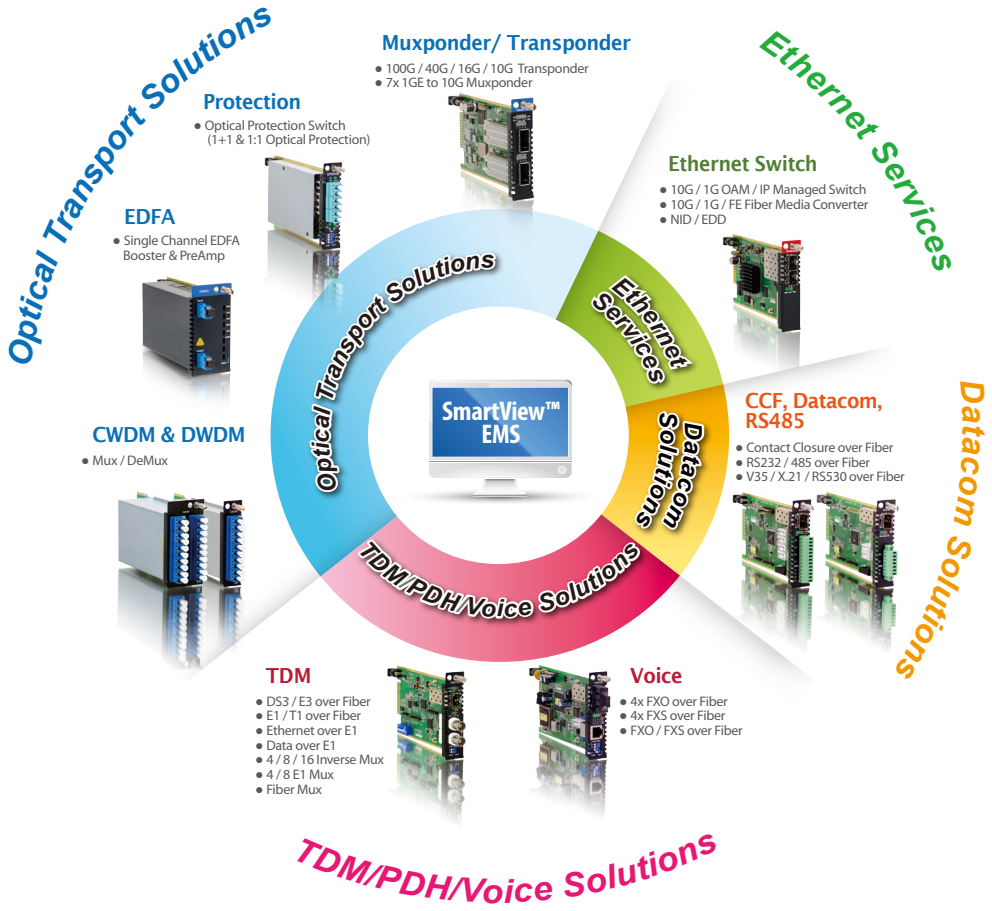
Model Name	Description
FRM220-CH01	1-slot chassis with 100 ~240VAC to 12VDC adapter (12W) , fanless
FRM220-CH01-AC	1-slot chassis with 100 ~240VAC (12W), fanless
FRM220-CH01-DC	1-slot chassis with 18 ~72VDC (12W), fanless
FRM220-CH01-AD	1-slot chassis with AC/12W+DC/12W, fanless
FRM220-CH01M-AC	1-slot chassis with console port and 100 ~240VAC (12W), fanless
FRM220-CH01M-DC	1-slot chassis with console port and 18 ~72VDC (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 ~72VDC (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 18~72VDC (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, converters and NID/EDD) 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.

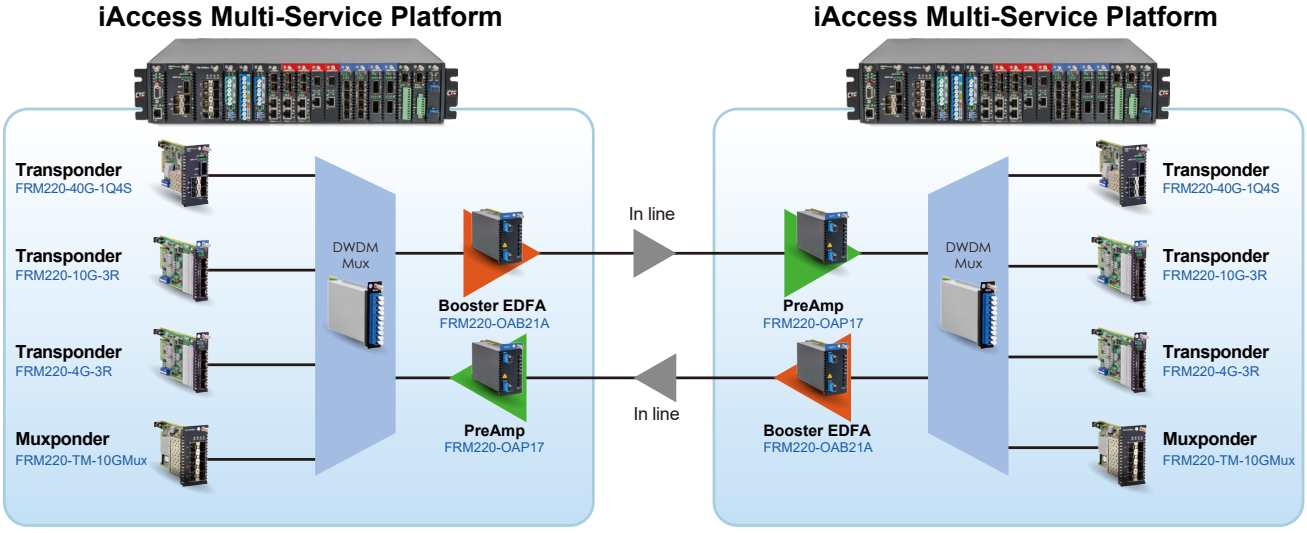


iAccess Platform Solution Category

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.

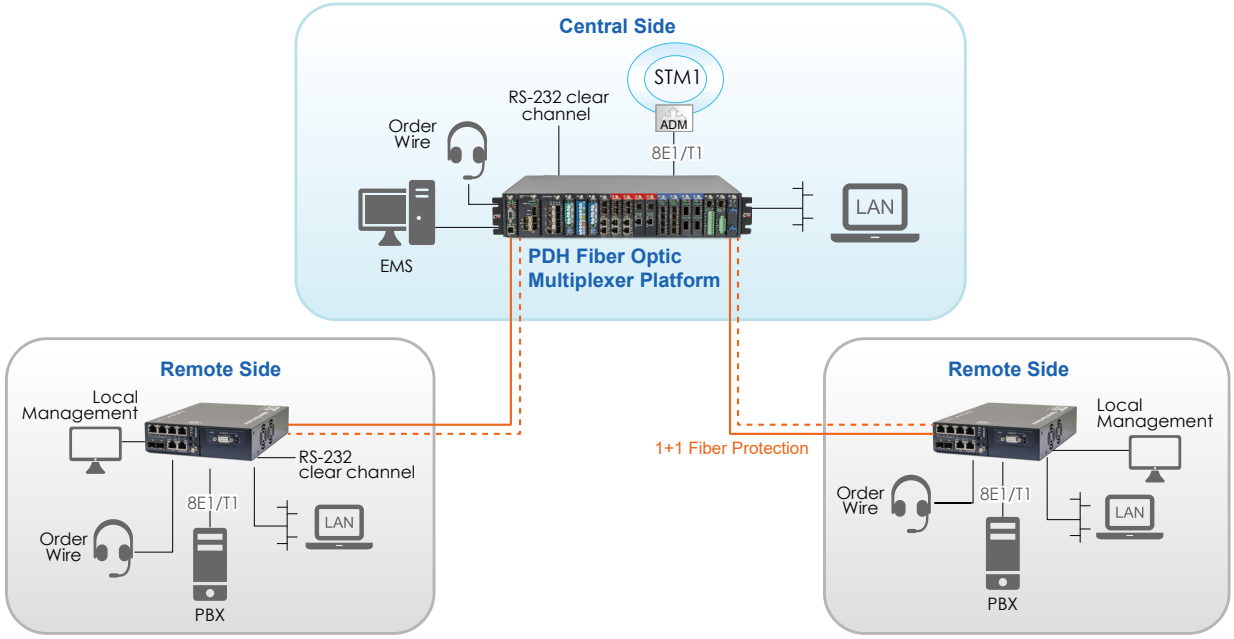


CWDM /DWDM P to P Application

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

▪ TDM/PDH/Voice solution

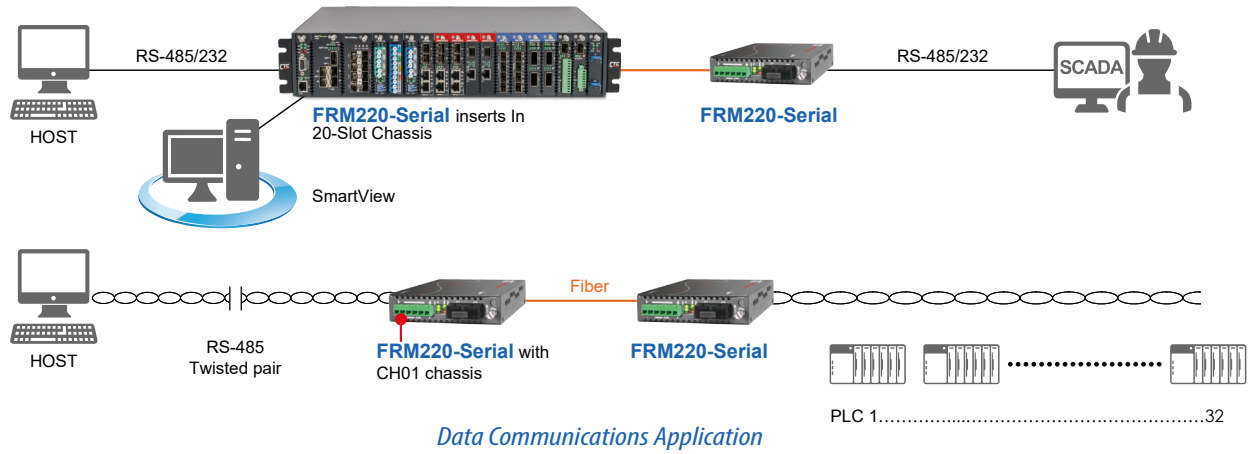
TDM and PDH are becoming legacy protocols, however, much of the world's voice communications still rely on devices that transport these protocols. CTC Union's solutions include DSU/CSU access units, Time Division Multiplexers, PDH over fiber and POTS over fiber devices.



PDH Fiber Optical Multiplexer P2P Application

▪ Data Communication Solution

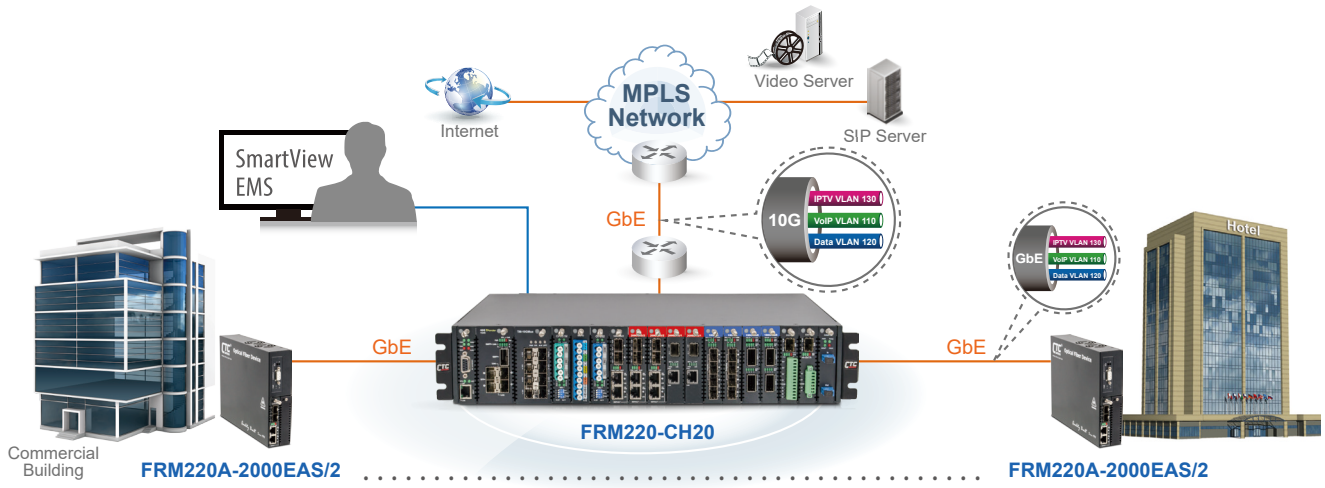
Data communications are important for device control and satellite communications. CTC Union's devices provide low latency data communications over fiber optical transport.



Data Communications Application

▪ Ethernet Services

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



Typical FTTB Application



FRM220-NMC-R3

Network Management Controller

The FRM220-NMC-R3 is a Network Management Controller card that can be 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. 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 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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



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

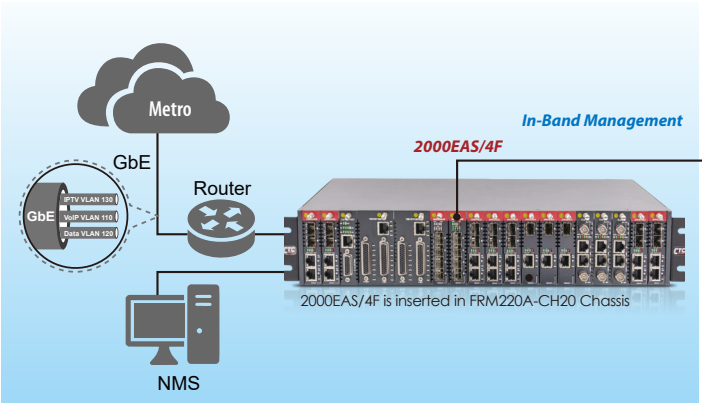
- 4-port 100/1000Base-X SFP
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Supports RMON counter
- Supports dying gasp
- D/D function for supported SFP fiber transceiver
- Supports Cisco® like CLI
- Online local / remote f/w upgrade
- Supports local / remote IEEE 802.3ah OAM / IP management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

Specifications

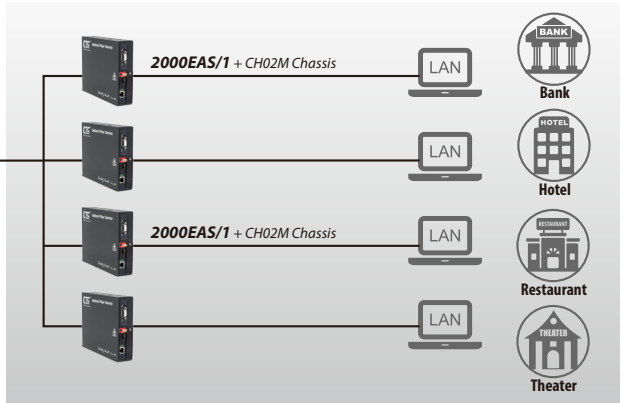
Optical Interface	Connector	SFP LC
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125µm, 62.5/125µm.
		SM 9/125µm
	Distance	MM 550m, 2km, SM 15/30/50/80/120km
		WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Indications	LED (Power, 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 802.1x, 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	
	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, QoS Control List (QCL Mode), Port policers, Port egress shaper, Queue egress shapers, DiffServ (RFC2474) remarking, Tag remarking, Scheduler mode
Security	IP/MAC binding, ACL rule based filtering
	ARP inspection
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, IEEE 802.1ab LLDP
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9, Multiple trap destinations
Software upgrade	TFTP/HTTP
Power Consumption	8W
Power Input	12VDC
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

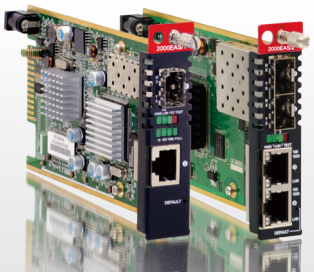
Model Name	Description
FRM220A-2000EAS/4F	4-port 100/1000Base-X SFP-LC managed switch card (optional SFP module)

Chassis Option

Model Name	Description
FRM220A-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220A-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220A-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



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

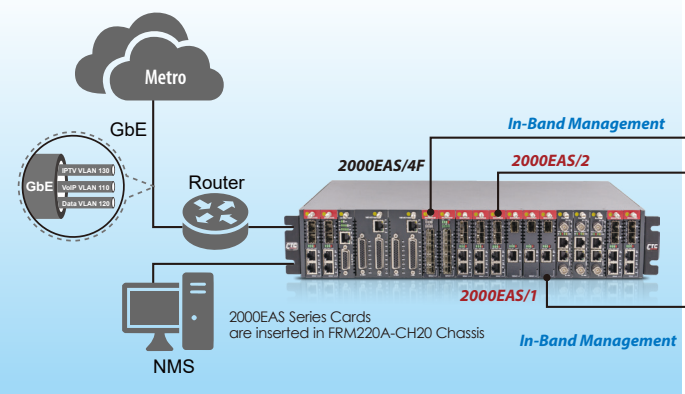
- 10/100/1000Base-T and 100/1000Base-X SFP (2000EAS/1)
- 2x 10/100/1000Base-T and 2x 100/1000Base-X SFP (2000EAS/2)
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Supports RMON counter
- Supports dying gasp
- D/D function for supported SFP fiber transceiver
- Supports Cisco® like CLI
- Online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

Specifications

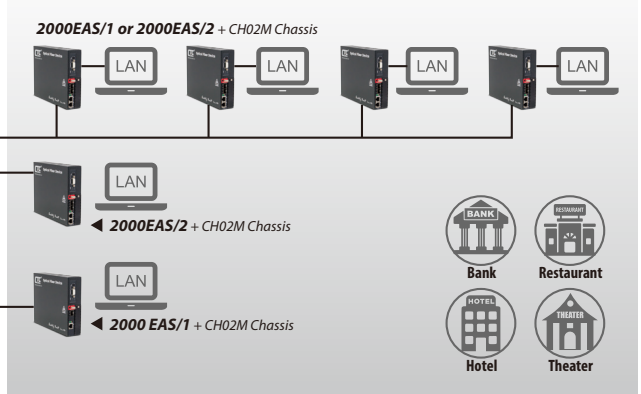
Optical Interface	Connector	SFP LC
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125µm, 62.5/125µm.
		SM 9/125µm
	Distance	MM 550m, 2km, SM 15/30/50/80/120km
		WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Indications	LED (Power, 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 802.1x, 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	
	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, QoS Control List (QCL Mode), Port policers, Port egress shaper, Queue egress shapers, DiffServ (RFC2474) remarking, Tag remarking, Scheduler mode
Security	IP/MAC binding, ACL rule based filtering
	ARP inspection
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, IEEE 802.1ab LLDP
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9, Multiple trap destinations
Software upgrade	TFTP/HTTP
Power Consumption	8W
Power Input	12VDC
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220A-2000EAS/2	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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



FRM220-2000EAS/2F

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

The FRM220-2000EAS/2F is a managed Gigabit Ethernet slide-in card switch designed with 100/1000Base-X SFP to 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, 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 NMC in a managed FRM220 chassis.

Features

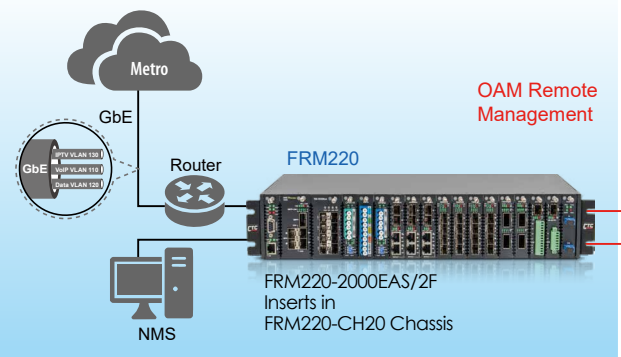
- 100/1000Base-X SFP to 100/1000Base-X SFP
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Supports RMON counter
- Supports dying gasp
- D/D function for supported SFP fiber transceiver
- Supports Cisco® like CLI
- Online local / remote f/w upgrade
- Supports local / remote IEEE 802.3ah OAM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

Specifications

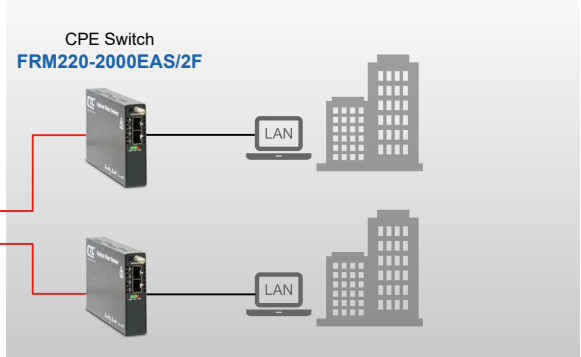
Optical Interface	Connector	SFP LC
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm.
		SM 9/125μm
	Distance	MM 550m, 2km, SM 15/30/50/80/120km
		WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Indications	LED (Power, FX-Link, Test, 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 802.1x, 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	IP/MAC binding, ACL rule based filtering ARP inspection
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, IEEE 802.3az, Energy, Efficient, Ethernet (EEE) power management
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9, Multiple trap destinations
Software upgrade	TFTP/HTTP
Power Consumption	8W
Power Input	12VDC
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220-2000EAS/2F	100/1000Base-X SFP to 100/1000Base-X SFP-LC managed switch 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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-1000M
FRM220-1000MS

Web Smart OAM Managed 10/100/1000Base-T to 100/1000Base-X GbE Switch

The FRM220-1000M(S) 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 (1000MS) and fixed type 1x9 SC connector (1000M). With SNMP and Web-based management in the FRM220, the administrator can monitor, configure and control the activity of each 802.3ah series card and remotely connected OAM compliant converter. Converter settings include bandwidth control, duplex, and speed configuration, VLAN tagging, limited Q-in-Q support and SFP DDMI. When used as stand-alone converters, the 1000M(S) can be managed by a friendly Web Smart user interface via any web browser.

Features

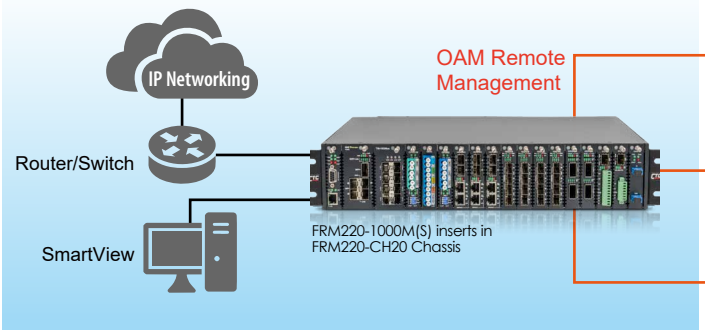
- 1-Port 10/100/1000Base-T to 1000Base-X Converter (FRM220-1000M)
- 1-Port 10/100/1000Base-T to 100/1000Base-X SFP Converter (FRM220-1000MS)
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 9K Packet
- Ingress/Egress bandwidth control
- Supports 802.3ah-OAM in-band 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
- Allow IP settings web or console management
- Supports D/D function for SFP fiber transceiver
- Supports 16 Tag VLAN Group
- RMON counters (for standalone unit only)

Specifications

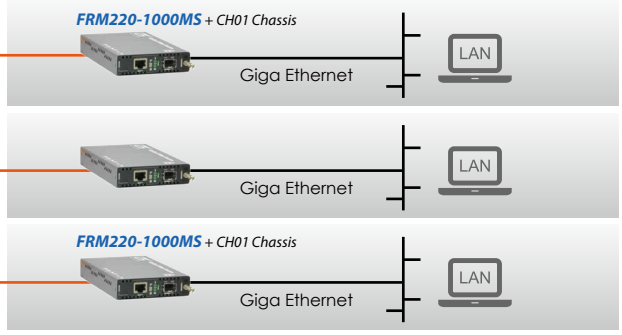
Optical Interface	Connector	SFP LC, 1x9 (SC)
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Electrical Interface	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



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220-1000MS	10/100/1000Base-T to 100/1000Base-X SFP web smart OAM managed switch card. (Optional SFP)
FRM220-1000M	10/100/1000Base-T to 1000Base-X, Web Smart OAM managed switch card
Connector Type	**Connectivity Distance**
SC	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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220A-1002ES

2x 10/100/1000Base-T + 2x 100/1000Base-X SFP GbE Switch

The FRM220A-1002ES is a dual copper and dual fiber Gigabit Ethernet switch designed to make conversion between 10/100/1000Base-T and 100/1000Base-SX/LX with SFP connector. With SNMP and Web-based management in the FRM220 or FRM220A chassis the network administrator can monitor, configure and control the activity of each FRM220A-1002ES switch card locally via the chassis management. Based on a powerful L2 switch architecture, this converter supports bandwidth control, duplex and speed configuration, VLAN tagging, Q-in-Q, QoS, jumbo frames as well as auto laser shutdown, and link fault pass through. When placed stand-alone, this card may only be managed via local serial console when placed in a CH01M single slot type chassis.

Features

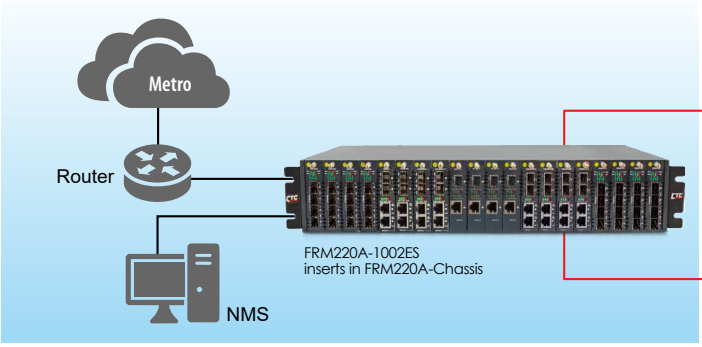
- 2-Port 10/100/1000Base-T and 2-Port 100/1000Base-X Switch
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 10K Bytes
- Supports 16 Tag VLAN Group
- Supports Double VLAN tag (Q-in-Q)
- Supports Bandwidth control
- Supports Loop Back Test
- Supports Link Fault Pass-Through (LFPT) Function
- Supports Auto Laser Shutdown (ALS) Function
- Supports local management on FRM220A rack management.
- Console management on stand-alone.
- Supports D/D function for SFP fiber transceiver
- Provide Product information for management

Specifications

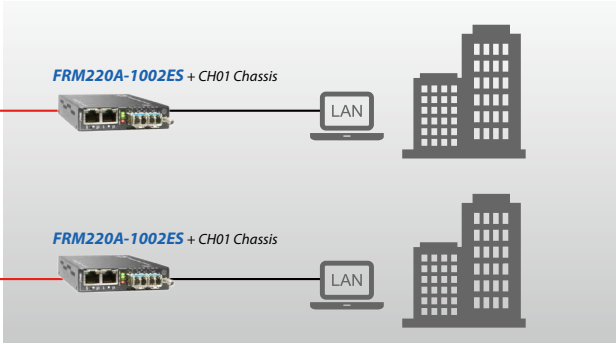
Optical Interface	Connector	SFP LC
	Data rate	125Mbps, 1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Standards	IEEE 802.3, IEEE 802.3u, 802.3z, 802.3ab, 802.1Q, 802.3X, 802.1ad	
Indications	PWR, LNK1, LNK2, TEST, LAN Link, LAN SPEED	

Certification	FCC Part 15 Class A, CE Mark	
Electrical Interface	Connector	RJ45
	Data rate	10Mbps, 100Mbps, 1000Mbps
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e or higher
		1000Base-X Cat.5e or higher
Power	12VDC	
Power Consumption	< 12W	
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	130g	
Temperature	0~50°C (Operating), -10~70°C (Storage)	
Humidity	0 ~ 95% non-condensing	

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220A-1002ES	2-Port 10/100/1000Base-T and 2-Port 100/1000Base-SX/LX SFP GE switch card (Optional SFP)



FRM220-10/100AS-2

2x 10/100Base-TX + 2x 100Base-FX
OAM / IP Managed FE Switch

FRM220-10/100AS-2 is an IEEE 802.3ah OAM compliant two copper to two fiber Fast Ethernet solution designed to make conversion between 10/100Base-TX and 100Base-FX with SFP. With stand-alone SNMP and Web-based management, the network administrator can monitor, configure and control the activity of each IEEE 802.3ah series card and remotely connected OAM compliant converter. By offering IEEE 802.3ah OAM in-band management, this converter can also be completely controlled and monitored from a centrally located managed rack. Based on a powerful L2 switch architecture, this converter supports bandwidth control, duplex and speed configuration, VLAN tagging, Q-in-Q, QoS, Spanning tree as well as auto laser shutdown, link fault pass through, OAM loop back and dying gasp.

Features

- 2x 10/100Base-TX + 2x 100Base-FX SFP
- Supports lasocal / remote IEEE 802.3ah OAM/IP In-band management
- Stand-alone IP Based, Web GUI, Telnet, SNMP management
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Supports IEEE 802.1Q Tagging
- Supports Q in Q double tagging
- Max. MTU size 1536 bytes
- Supports Flow control (Pause)
- Supports OAM remote loopback to assist in diagnosing network problems
- Supports bandwidth control
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports remote loopback
- D/D function for supported SFP fiber transceiver
- Auto Laser Shutdown (ALS)
- Online local / remote f/w upgrade
- Default port and IEEE 802.1Q Tagging priority QoS
- SNMP trap and LED alarm for loss of light and loss of signal

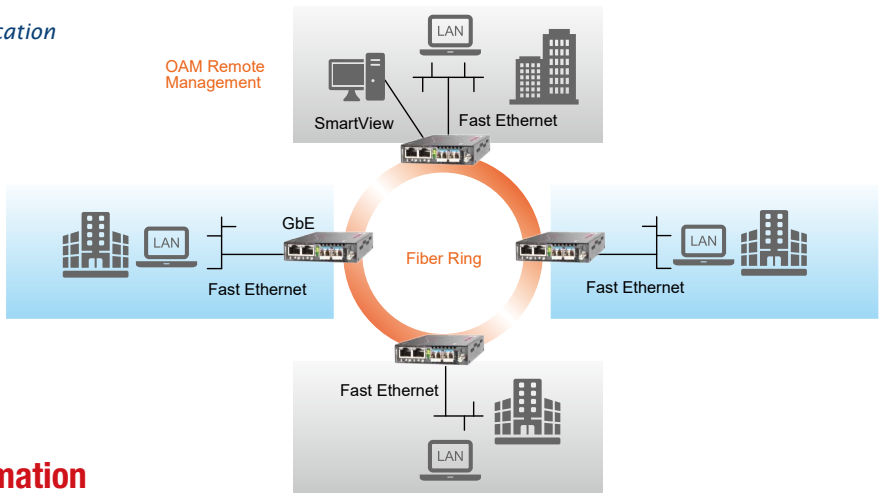
Specifications

Optical Interface	Connector	SFP LC
	Data rate	100Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm. SM 9/125μm
	Distance	MM 550M, 2km, SM15/30/50/80/120km WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310, 1550nm WDM 1310Tx/1550Rx (type A) 1550Tx/1310Rx (type B)
Power Consumption	< 12W	
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	120g	
Electrical Interface	Connector	RJ45
	Data rate	10Mbps, 100Mbps
	Duplex mode	Half / Full duplex

Electrical Interface	Cable: 10Base-T Cat.3, 4, 5, UTP 100Base-TX Cat.5, 5e or higher
Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.1Q, ITU-T G.644
Indications	LED: Power, FX-Link, FEF, TEST, Speed(10, 100), Full
Power Input	Card : 12VDC Standalone : AC, DC options
Temperature	Storage conditions Temperature range : -5~+45°C Relative Humidity : 5~95% Rh Absolute Humidity : 1~25g H2O/m3 Operation conditions Temperature range : -5~+45°C Relative Humidity : 5~95% Rh Exist conditions for condensation and icing Absolute Humidity : 1~29g H2O/m3
Certification	CE, FCC, EN60950 LVD compliant
MTBF	65,000 hrs

Application

Fiber Ring Application



Ordering Information

Model Name	Description
FRM220-10/100AS-2	2x 10/100Base-TX + 2x 100Base-FX with OAM/IP Based Managed FE Switch card (optional SFP)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



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-LR4/100GBASEER4 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 2x 100G QSFP28
- Supports DMI function for QSFP28 module
- Supports Loopback test function
- 3R 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-CH20-AC(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-CH20-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-2QP 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

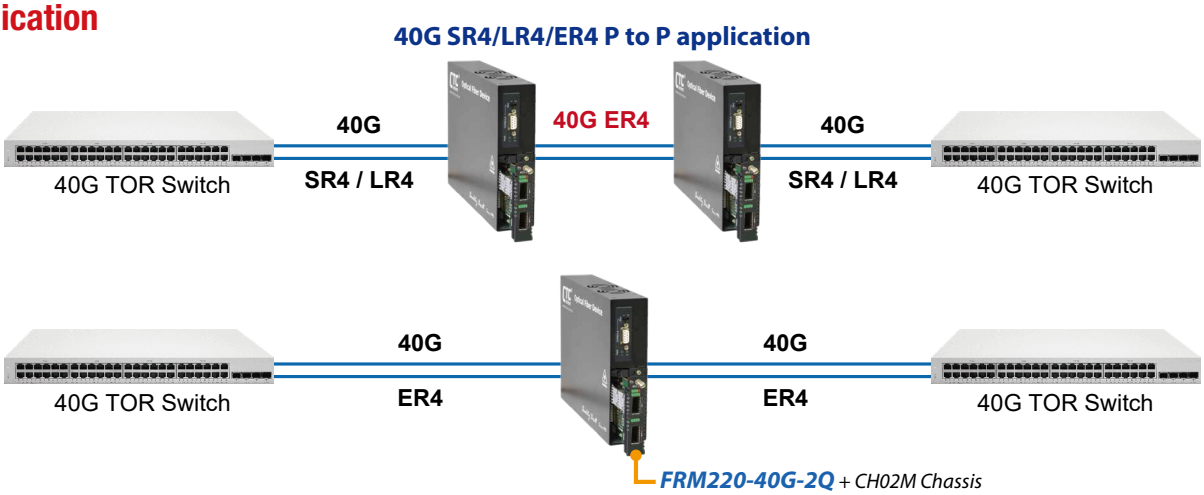
- Device management via FRM220 chassis with NMC
- Supports 40G repeater mode or Quad 10G optical multiplexer mode
- 40G link interface --Ethernet/IEEE: 802.3ba 40GE-SR4/LR4/ER4
- 40G multi-link (fiber) interfaces --Ethernet/IEEE: 802.3ba XLAUI and OIF: CEI-11G
- QSFP+ ports for flexibility and scalability
- 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)

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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



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.

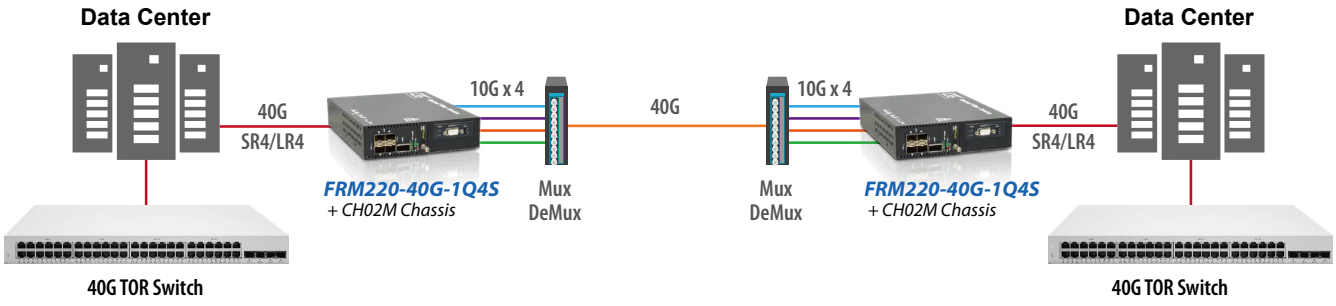
Specifications

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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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 1550nm ITU-T C-band tunable DWDM SFP+ Transceiver
- SFP DDM Information
- Firmware Upgrade
- Setting from DIP Switch, Console, NMC

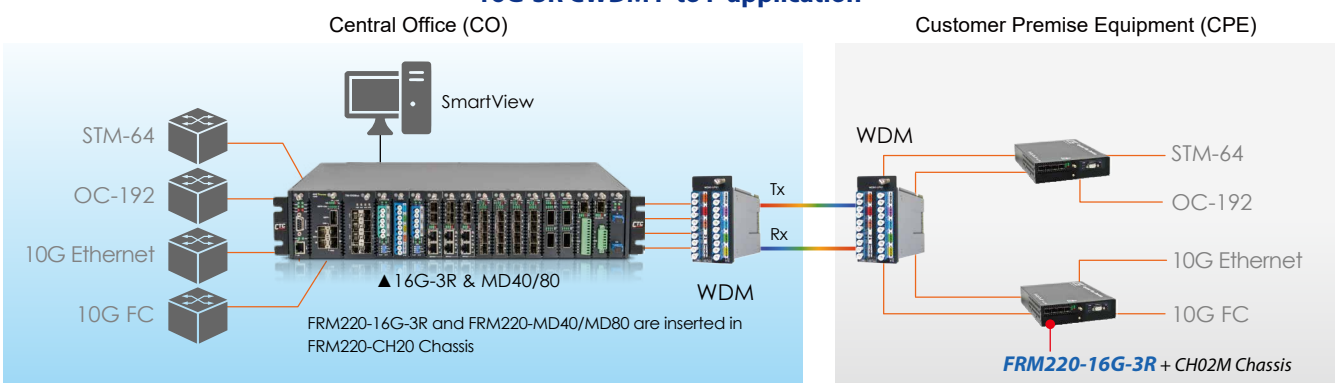
Specifications

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	

Indication	LED	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 (D x W x 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



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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



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

Specifications

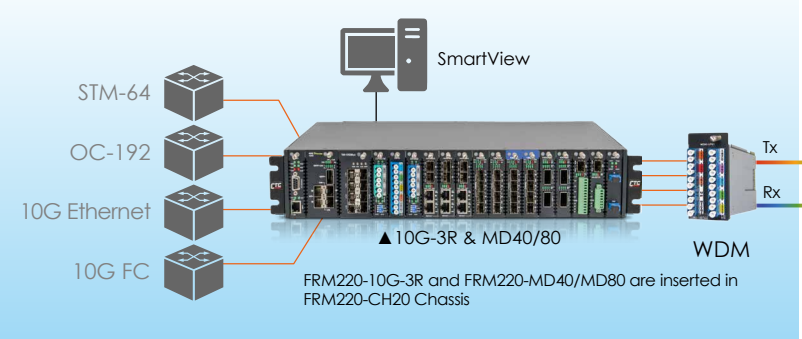
Optical Interface	Connector	LC (SFP+, SFP)
	Wavelength	CWDM 1271 ~ 1611nm DWDM 1529.5~1565.50nm
Operation mode	Dual channel mode : Ch 1 SFP1 line / SFP2 client. Ch2 SFP3 line/ SFP4 client. Protection mode : SFP1 line / SFP2, SFP3 client	
Protocol	SONET	OC-12, OC-24, OC-48, OC-192
	SDH	STM-4, STM-16, 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	

Indication	LED	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 (D x W x 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)	

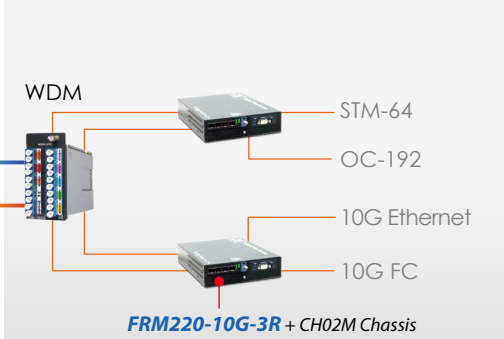
Application

10G-3R CWDM P to P application

Central Office (CO)



Customer Premise Equipment (CPE)



Ordering Information

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

Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications

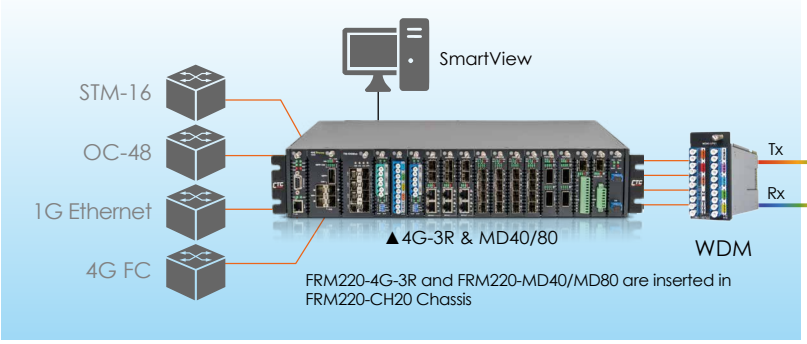
Optical Interface	Connector	LC (SFP)
	Wavelength	CWDM 1271 ~ 1611nm DWDM 1529.5~1565.50nm
Operation mode	Dual channel mode : Ch 1 SFP1 line / SFP2 client. Ch2 SFP3 line/ SFP4 client. Protection mode : SFP1 line / SFP2, SFP3 client	
Protocol	SONET	OC-12, OC-24, OC-48
	SDH	STM-4, STM-16
	Ethernet	1G
	OBSAI	OBSAI x1, x2, x4
	CPRI	CPRI x1, x2, x4, x5
	Fiber Channel	1/ 2/4G FC
Regeneration	Re-Amplification, Re-Shaping, Re-Timing	
Indication	LED	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

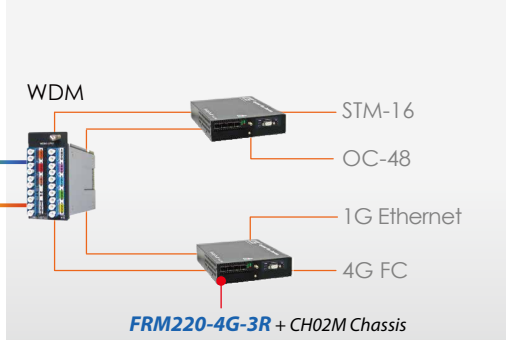
Application

4G-3R CWDM P to P application

Central Office (CO)



Customer Premise Equipment (CPE)



Ordering Information

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

Chassis Option

Model Name	Description
FRM220-CH20(HS)	2U 19", 20 slots rack mount chassis with high speed cooling fan and rack mounting kit
FRM220-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-4G-3S

4G 2R Multi-rate Transponder with Optical Line Protection

The FRM220-4G-3S is a 2R 4G optical regeneration device, which consists of Re-amplification and Re-shaping. The transponder card converts a data signal to the correct wavelength for transmission on a specific channel by supporting SFP optics on both line side and client side interfaces. 1+1 Automatic optical line Protection Switching is supported for the aggregate fiber ports. When the FRM220-4G-3S card is placed in the 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 perform diagnostic loop backs.

Features

- Multi-rate supports 28Mbps to 4.25Gbps
- Network management via Web, Telnet, SNMP in central FRM220 chassis
- Local configuration via DB9 console port (when placed in CH01M or CH02M)
- Digital diagnostic monitoring of SFP module
- Perform optical repeater function (Re-amplification, Re-shaping)
- Facility loopback on both Client / Line sides
- 1+1 optic fiber protection, switching time < 50ms
- Link Fault Pass-Through (LFPT)
- Auto Laser Shutdown (ALS)
- Detect transceiver transmitter alarm

Specifications

Optical Interface	Connector	SFP LC
	Protocol	OC -3, OC -6, OC -12, FC -1, FC -2, FC -4
	Regeneration	Re-amplification
		Re-shaping
	Loop back	Line/Client
	Fiber	MM 62.2/125µm, 50/125µm.
		SM 9/125µm
	Wavelength	MM 850, 1310nm
		SM 1310, 1550nm
		WDM 1310T/1550R, 1550T/1310R
		CWDM 1471 ~ 1611nm
Indications	LED (PWR, Line Link, Client Link, Test, Loop back, Port Active, Alarm)	

Power Input	12VDC
Power Consumption	< 12W
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

Managed 4G 2R transponder with fiber protection application



Protocols: Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, STM-1, STM-4, STM-16, FC-1, FC-2

Ordering Information

Model Name	Description
FRM220-4G-3S	4G 2R transponder card with fiber protection (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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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-2S

4G 2R Transponder

The FRM220-4G-2S is a 4G 2R optical regeneration device, which consists of Re-amplification and Re-shaping. The transponder card converts a data signal to the correct wavelength for transmission on a specific channel by supporting SFP optics on both line side and client side interfaces. When the FRM220-4G-2S card is placed in the 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 perform diagnostic loop backs.

Features

- Multiple protocol supported at bit rates 28Mbps to 4.25Gbps (Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, OC-24, OC-48, FC-1, FC-2, FC-4)
- Network management via Web, Telnet, SNMP in central FRM220 chassis
- Link Fault Pass-Through (LFPT)
- Auto Laser Shutdown (ALS)
- Local configuration via DB9 console port (when placed in CH01M or CH02M)
- Digital diagnostic monitoring of SFP module
- Perform optical repeater function (Re-amplification, Re-shaping)
- Facility loopback on both Client / Line sides
- Detect transceiver transmitter error alarm

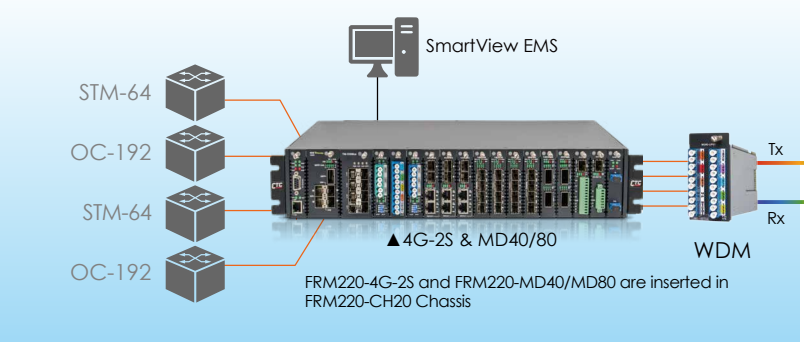
Specifications

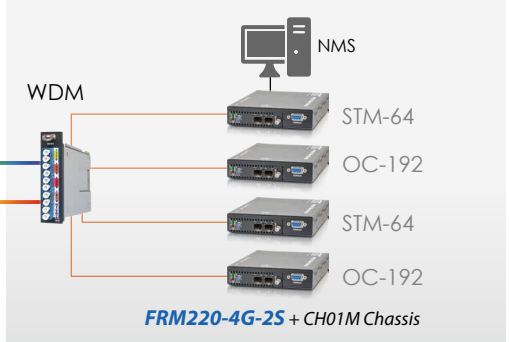
Optical Interface	Connector	SFP LC
	Data rate	28Mbps ~ 4.25Gbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm.
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km,
		WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A) 1550Tx/1310Rx (type B)
		CWDM 1470 ~ 1610nm

Indications	LED (PWR, Line Link, Client Link, Test, Loop back,Port Active, Alarm)
Power Input	Card : 12VDC
	Standalone : AC, DC options
Power Consumption	< 7W
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, LVD, RoHS
MTBF	65,000 hrs

Application

Managed 4G 2S Transponder





Ordering Information

Model Name	Description
FRM220-4G-2S	4G 2R Transponder, (optional SFP module)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-1000DS

1G 2R Multi-rate Transponder

The FRM220-1000DS is a fiber to fiber optical media converter and repeater that allows data rates up to 1Gbps. FRM220-1000DS supports 2R regeneration, which consists of re-amplification and reshaping. This converter is compatible with fiber interfaces such as 100Mbps Fast Ethernet and 1000Mbps Gigabit Ethernet, STM-1, Fiber Channel 1 and OC3, The FRM220-1000DS works as an FRM220 slide-in card, while the FRM220-1000DS plus FRM220-CH01 work as a stand-alone fiber converter. When the FRM220- 1000DS card is placed in the FRM220-CH20 rack with SNMP management, the management can view the converter card's status, type, fiber link status and SFP DOM.

Features

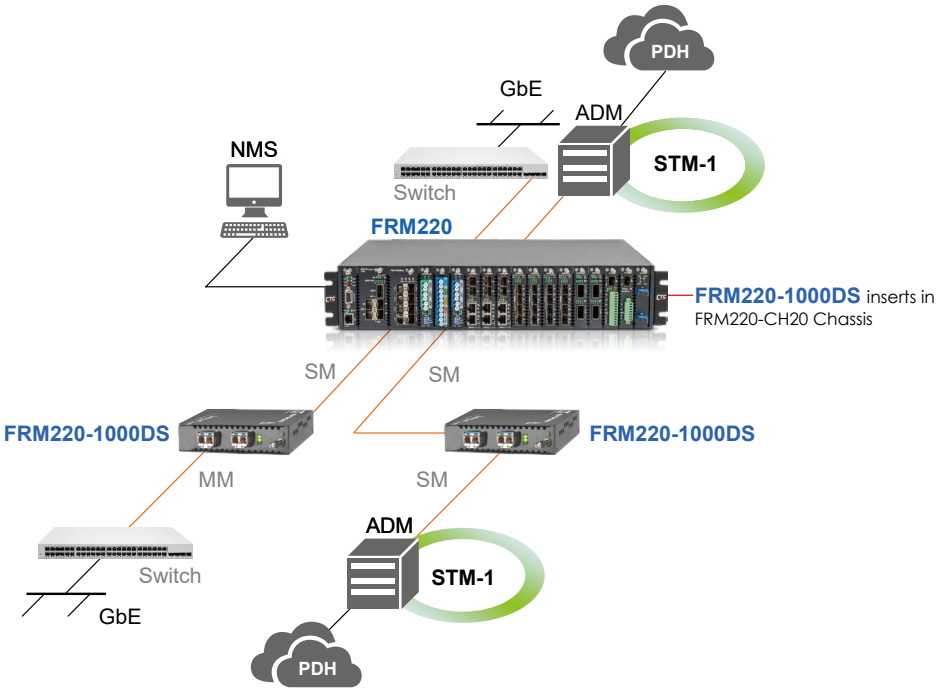
- Transparent FE or GbE fiber media converter / repeater
- Data rate up to 1G
- Device management via terminal or SNMP in FRM220 chassis
- Extend transmission from 2km to 120km over fiber
- Perform optical repeater function (Re-amplification & Reshaping)
- Digital diagnostic monitoring of SFP modules
- Supports Link Fault Pass-Through LFTP function
- Supports Auto Laser Shutdown (ALS) function

Specifications

Optical Interface	Connector	SFP LC x 2
	Data rate	Up to 1G
	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-Link1, FX-Link2)
Power Input	12VDC
Power Consumption	< 6W
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
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
FRM220-1000DS	1000Base-X SFP to 1000Base-X SFP media converter card (Optional SFP)



FRM220-TM-10GMux

7x 1 GE to 10G Muxponder

The FRM220-TM-10GMux is a 7x 1GE to 10G Muxponder. Based on TDM technology, the Muxponder transports seven separate Gigabit Ethernet data streams into a 10 Gbps SFP+ Based trunk port. This solution provides significant cost reduction and excellent fiber utilization when compared to CWDM optical multiplexing. The FRM220-TM-10GMux incorporates 7x 1GE SFP based access interfaces that can accommodate various types of SFP. Such as Multi-mode, Single mode and 1Gbps copper SFPs. The trunk port is a SFP+ 10Gbps permitting flexible connectivity options between the Muxponders either in a WDM system or directly between two devices. Two types of housings are available for installation in a 19" FRM220 chassis. 20 slots are provided by using the FRM220-CH20 chassis 2U while the 8 slots are provided by using FRM220-CH08 Chassis 1U. Both housings can be monitored and configured through SNMP, Web GUI or Telnet using a NMC management module.

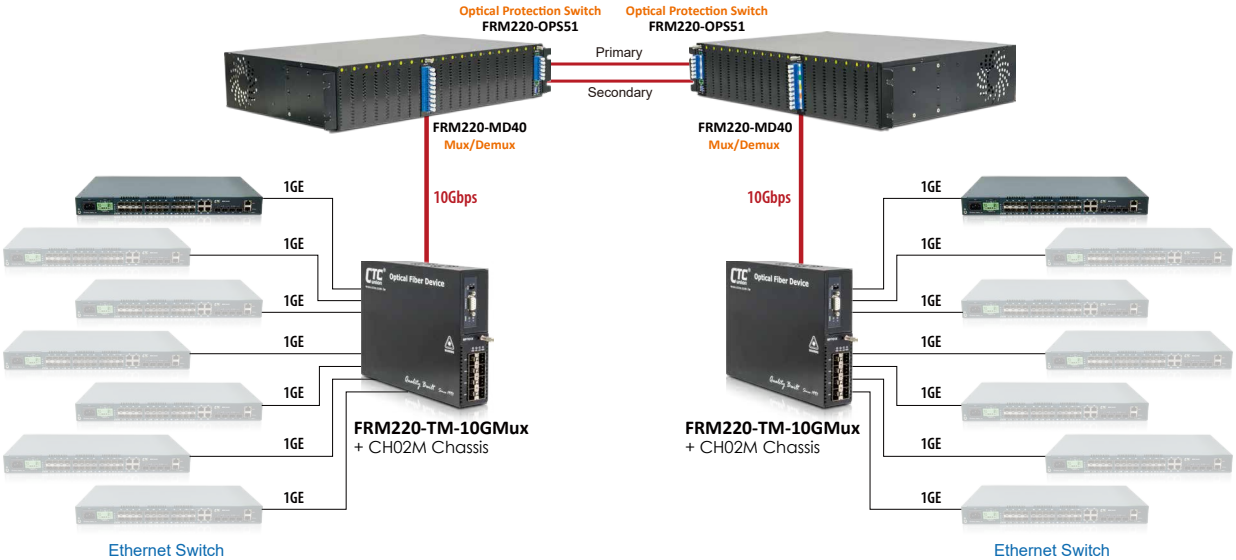
Features

- 7x 1 GE to 10G
- 10 Gbps trunk port rate
- Network management via NMC
- Remotely activated local or remote loopback
- 7 independent 1 GE services over 10G trunk port
- Supports ITU-T C-band tunable DWDM SFP+ transceiver
- SFP+ digital diagnostics monitoring
- Hot swappable
- In-Band management

Specifications

Access Data Rate	1G Ethernet
Trunk Data Rate	10Gbps
Optical parameters	1.25G SFP/ 10G SFP+
Operating Temperature	0 ~ 55°C
Storage Temperature	-10 ~ 80°C
Relative Humidity	10 ~ 90% (non-condensing)
Dimension	159.5 × 42.1 × 88mm (D × W × H)
Weight	300g
Connectors	7x SFP-LC & 1x SFP+ LC
Power Consumption	12W

Application



Ordering Information

Model Name	Description
FRM220-TM-10GMux	7x 1GE (SFP) to 10G (SFP+) muxponder card (optional 10G SFP+ / GE 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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-OAB21A

Single Channel EDFA Booster 21dB

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

Features

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

Applications

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

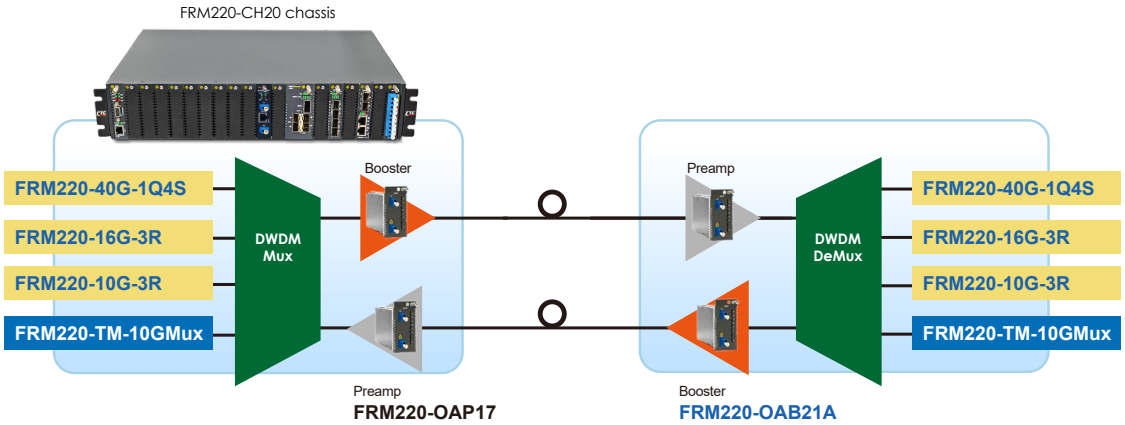
Specifications

Operating wavelength	1528 ~ 1563nm
Input power	-20 ~ +5dBm
Signal gain	15 ~ 25dB
Total output power	-5 ~ +21dBm
Total saturated output power	+21dBm
Gain flatness (Max.)	≤ ±0.75dB
Noise figure	5. 5dB (Typ.)
Polarization dependent gain (Max.)	0.5dB
Polarization mode dispersion (Max.)	0.5ps

Output power stability (Max.)	±0.1dB
Return loss (Min.)	45dB
Connector	LC/UPC
Control mode	AGC
Operation case temperature	0 ~ 65°C
Relative humidity (non-condensing)	5 ~ 85%
Laser Class	Class 1M
Power consumption	14W
Dimension	159.5 × 42.1 × 88mm (D × W × H)

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-CH20-AC(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-CH20-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

NEW



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

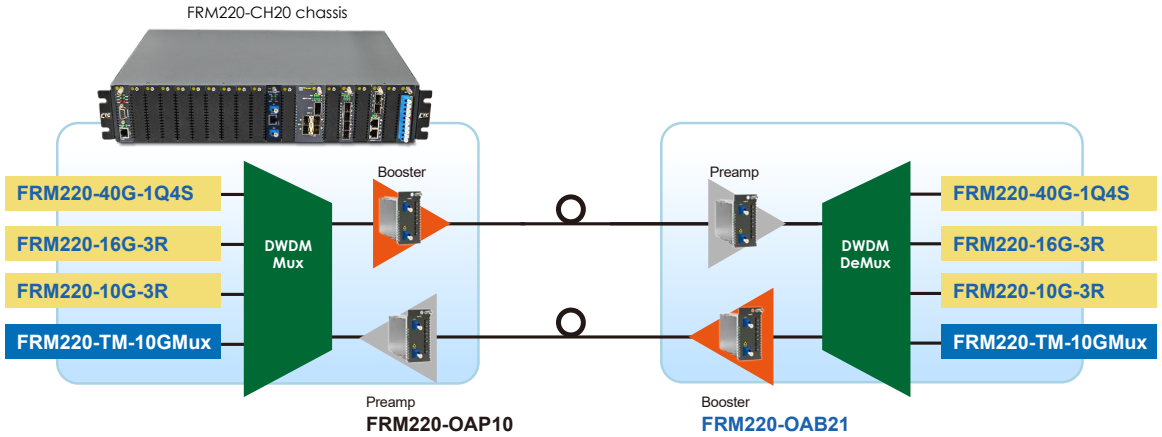
Specifications

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-CH20-AC(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



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

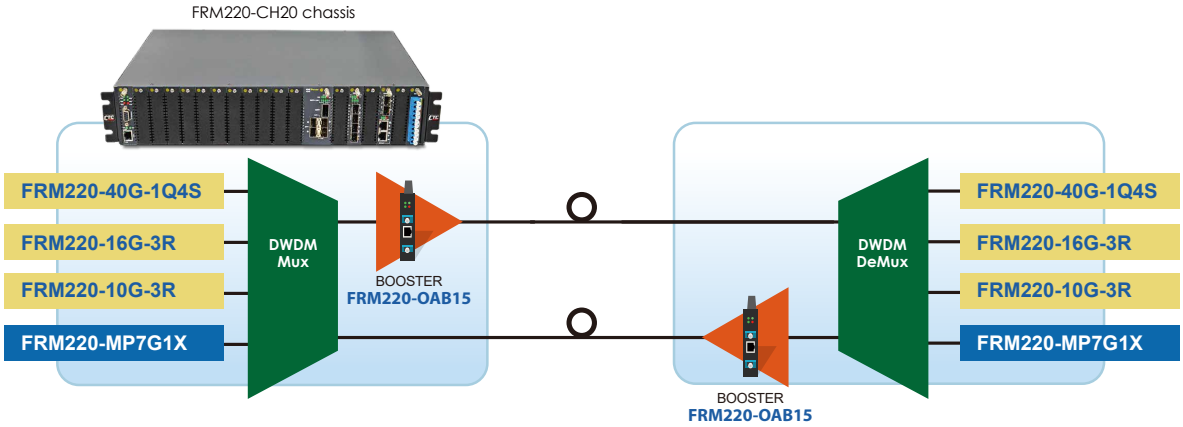
- Booster Amplifier for 10Gbps, 40Gbps, and 100Gbps applications
- Long haul C - band DWDM applications

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-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

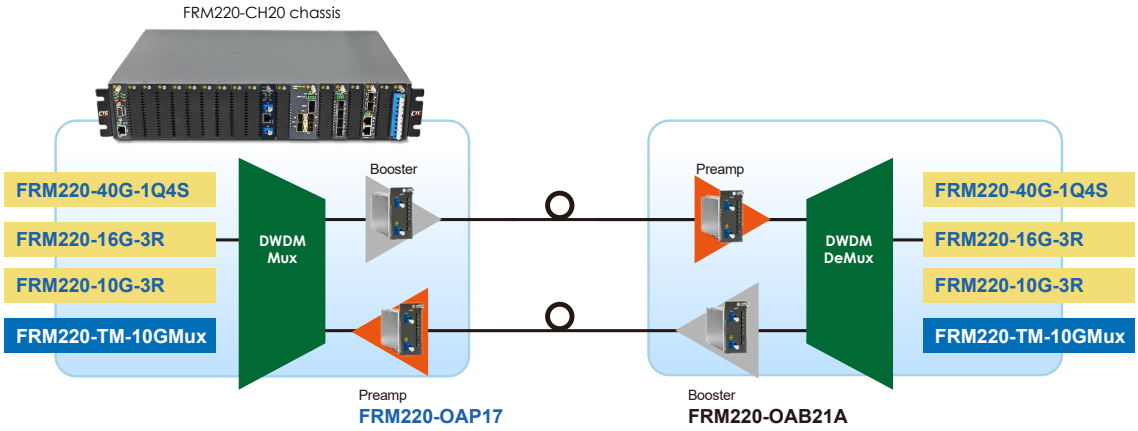
Specifications

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-CH20-AC(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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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

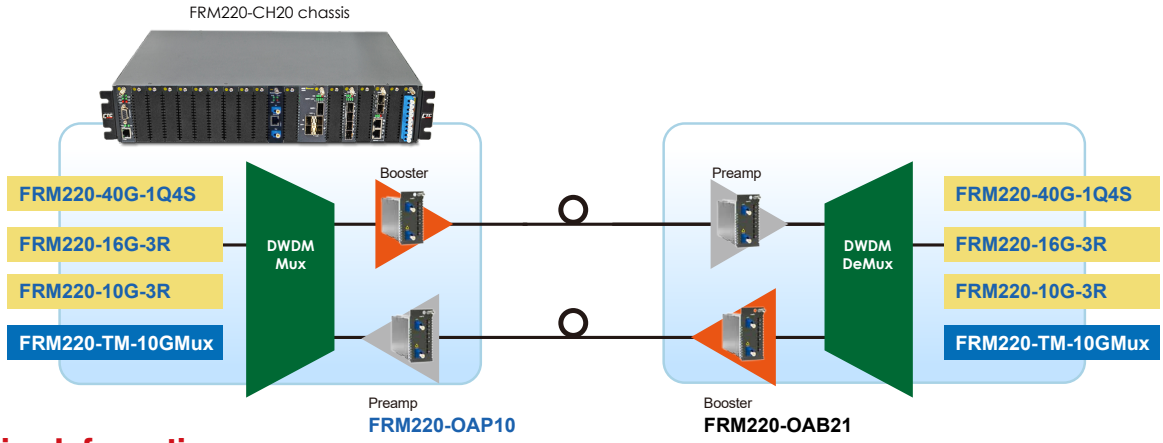
Specifications

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℃
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-CH20-AC(HP)	Chassis power module 90 ~ 264 VAC, IEC connector, 300W
FRM220-CH20-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-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.

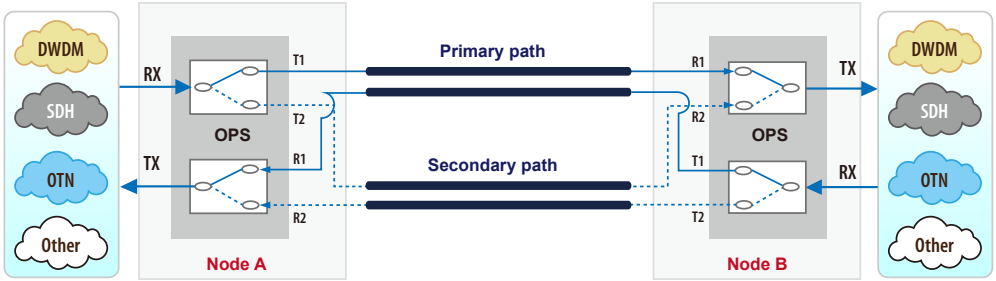
Specifications

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

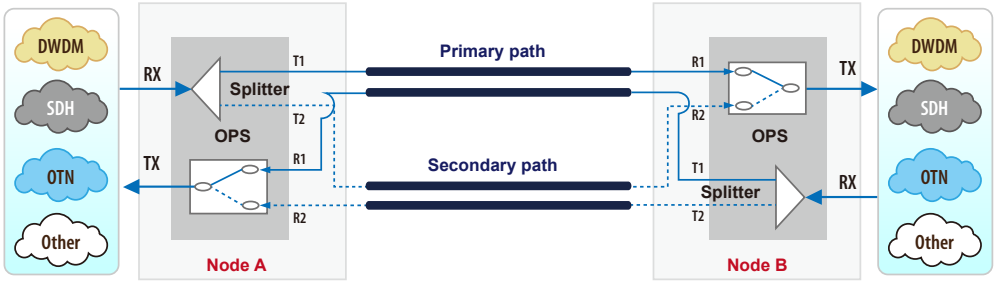
Polarization Dependent Loss (PDL)	≤ 0.1dB
Input Power Sensitivity	-35dBm
Restoration Time	≤20ms
Power Consumption	< 3W
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	5%RH to 95%RH non-condensing
Certification	CE, FCC
MTBF	65,000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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-OPS51M

1:1 Multi-mode Optical Protection Switch

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

Features

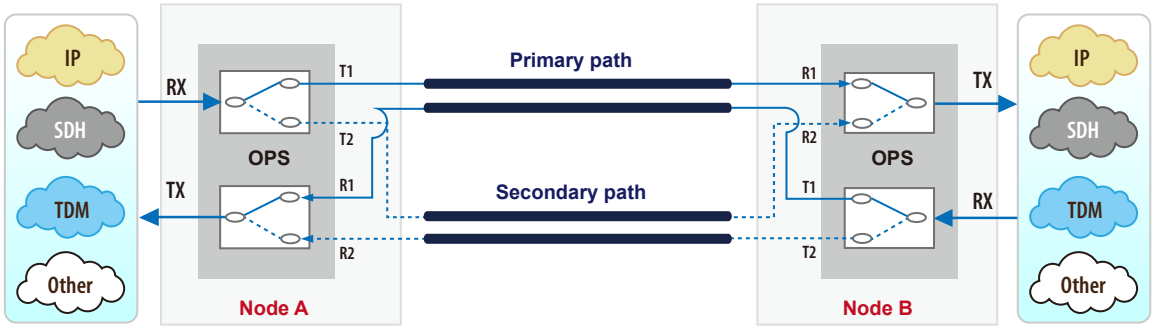
- Latch feature, if power is lost the switch remains in its current state
- Work with Multi-mode 850 wavelength
- Traffic is switched in one of two modes : non-revertive, manual
- Programmable RX threshold setting for switch-over
- Optical interface type : LC connector
- Working and protected lines are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

Specifications

Connecter LC / PC	LC / PC
LEDs	Power System, Working Path, Protection Path, Work mode
Power	DC 12V In
Operating Wavelength	850nm
Fiber Type	Multimode 50/125um
Switch Type	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 (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



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

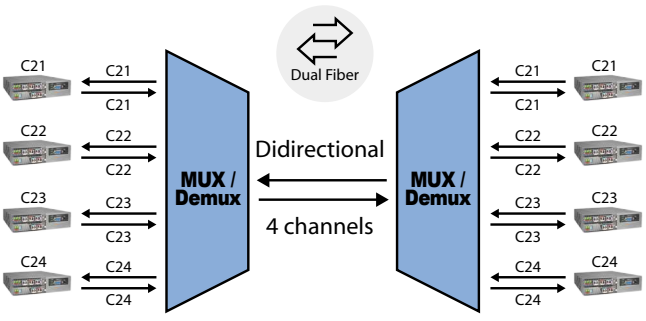
- Low Optical Insertion Loss
- High channel isolation
- Low PDL
- Good channel-to-channel uniformity
- Exceptional reliability and stability
- Reliable passive WDM optical technology
- Scales easily for ring networks
- Compliance with RoHS

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 ± 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)

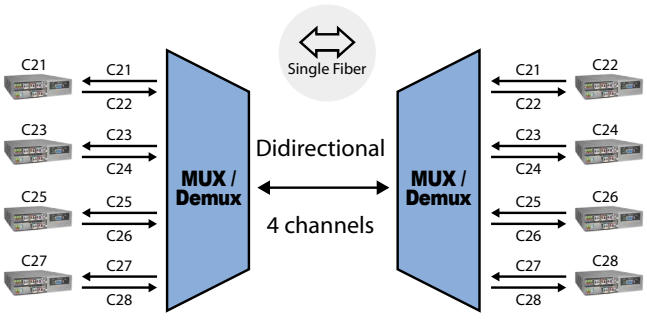
Application

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.

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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 deviceas that require no external power. They can also be installed in an FRM220 powered chassis with a NMC management module[1] and can be managed using SmartView EMS device management software, third-party SNMP software, Telnet or a serial console port. The modules can be installed in any FRM220 chassis equipped with other FRM220 media converters and transponders to provide a multi-service platform capable of delivering Ethernet, TDM, Voice and other services across a CWDM fiber common link.

Features

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

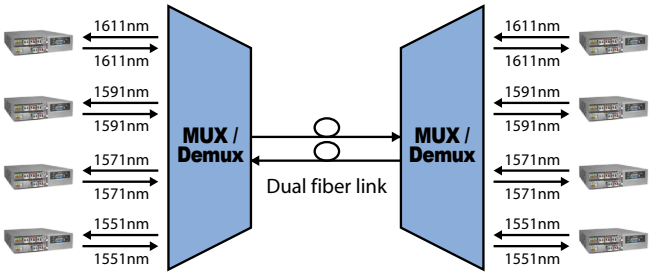
Specifications

Channel	4 or 8 channels
Standards	ITU-T G.694.2
Wavelength	1271 ~ 1611nm
Insertion Loss	4ch < 1.8dB, 8ch < 3.0dB
Return Loss	>45dB
Option	Upgrade port
	Wide 1310 ± 50 nm
Line Link	Single fiber or two fiber
Connector	LC / UPC

Dimension	4ch : 159.5 × 20.8 × 88mm (D × W × H)
	8ch : 159.5 × 42.1 × 88mm (D × W × H)
Weight	4ch : 200g
	8ch : 380g
Temperature	0 ~ 50°C (Operating)
	-40 ~ 70°C (Storage)
Humidity	0 ~95% (non-condensing)
Certification	CE, FCC

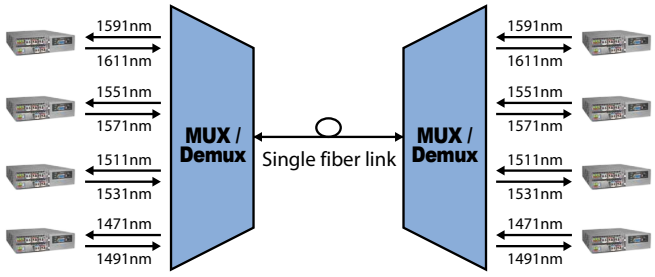
Application

Figure 1 :



4 channels Duplex Transmission CWDM Mux & Demux

Figure 2 :



4 channels Bi-Directional Transmission CWDM Mux & Demux

■ Related Products



CWMD-180 (18 ch Dual Fiber CWDM Fiber Mux / DeMux. (Rackmount))



CWMD-80 & CWMD-40 (8/4 ch Single Fiber CWDM Fiber Mux / DeMux. (Standalone))

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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/UP
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



FRM220-OADM

Optical Add-Drop Multiplexer

The FRM220-OADM Optical Add/Drop Multiplexer are modular designed cards that support ITU-T G.694.2 wavelengths between 1271nm to 1611nm in 20nm increments. The FRM220-OADM Optical Add/Drop Multiplexer takes a single wavelength from a trunk, pulls the signal out, and allows a new signal at the same wavelength to be inserted into the trunk at roughly the same spot. All the other wavelengths pass through the Add/Drop Multiplexer with only a small loss of power (usually < 2.5dB including connectors and adapters). FRM220-OADM modules are passive devices that require no external power. They can also be installed in an FRM220 powered chassis with a NMC management module and can be managed using SmartView EMS network management software, Telnet or a serial console port. The FRM220-OADM modules can be installed in any FRM220 chassis equipped with other FRM220 media converters and transponders to provide a multiservice platform capable of delivering Ethernet, TDM, Voice and other services across a CWDM fiber common link.

Features

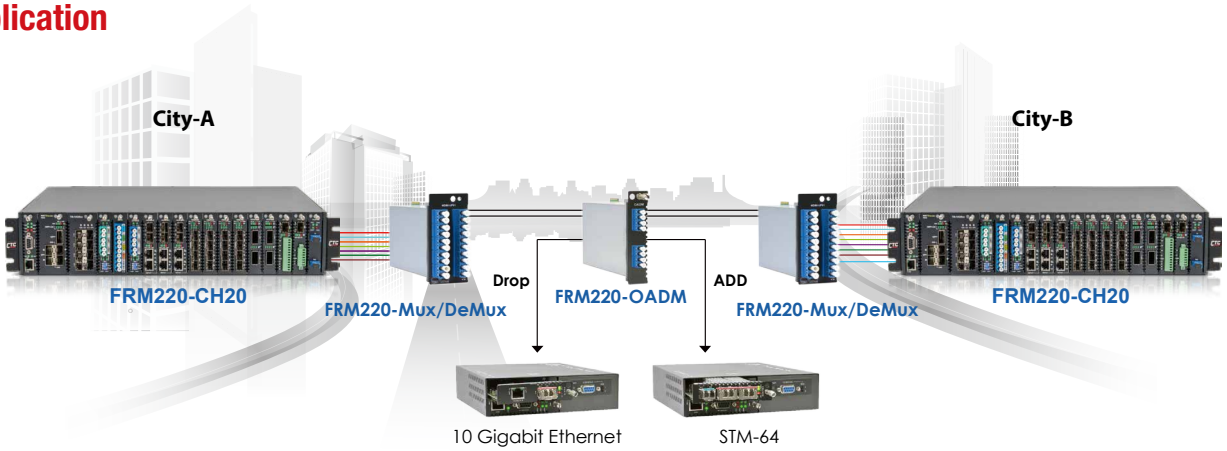
- Single Add/Drop Channel
- Operating channel : 1471,1491,1511,1531,1551,1571,1591,1611nm
- Passive optical module, no power required
- Protocol transparent, no limitation
- Utilizes Industry standard ITU CWDM wavelengths
- Optical connectors : LC/UPC

Specifications

Number of channels	CWDM: 1 add/drop channel
Operating Channel CWDM add & drop channel	Any channels out of 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611 nm (to be defined via order information)
Channel width: CWDM channels	>=13nm (around center wavelength)
Insertion Loss	IN-OUT >= 2.5 dB
	Add to Drop < 2.0 dB
Isolation	CWDM adjacent channel Isolation >= 30dB CWDM non-adjacent ch's at CWDM drop port >= 35dB

Optical Return Loss	>= 50dB
PDL	>= 0.1dB
Environment	Temperature : 0 ~ 50°C (Operating), -20 ~ 70°C (Storage)
Fiber Type	9 / 125 / 250um
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	200g
Compliance	FCC part 15 class A, CE Mark

Application



Ordering Information

Model Type	Model Name	Description	Model Name	Description
Two Fiber Add Drop Module	FRM220-OADM-61	1ch two fiber CWDM OADM 1611nm with West/East lines	FRM220-OADM-59	1ch two fiber CWDM OADM 1591nm with West/East lines
	FRM220-OADM-57	1ch two fiber CWDM OADM 1571nm with West/East lines	FRM220-OADM-55	1ch two fiber CWDM OADM 1551nm with West/East lines
	FRM220-OADM-53	1ch two fiber CWDM OADM 1531nm with West/East lines	FRM220-OADM-51	1ch two fiber CWDM OADM 1511nm with West/East lines
	FRM220-OADM-49	1ch two fiber CWDM OADM 1491nm with West/East lines	FRM220-OADM-47	1ch two fiber CWDM OADM 1471nm with West/East lines

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-100AS-1

OAM/IP Managed 10/100Base–TX to 100Base–FX FE Media Converter

The FRM220-100AS-1 is an IEEE802.3ah OAM compliant copper to fiber Fast Ethernet solution designed to make conversion between 10/100Base-TX and 100Base-FX with SFP. With stand-alone SNMP and Web-based management, the network administrator can monitor, configure and control the activity of each IEEE802.3ah series card and remotely connected OAM compliant converter. By offering IEEE802.3ah OAM in-band management, this converter can also be completely controlled and monitored from a centrally located managed rack. Based on a powerful L2 switch architecture, this converter supports bandwidth control, duplex and speed configuration, VLAN tagging, Q-in-Q, QoS, Spanning tree as well as auto laser shutdown, link fault pass through, OAM loop back and dying gasp.

Features

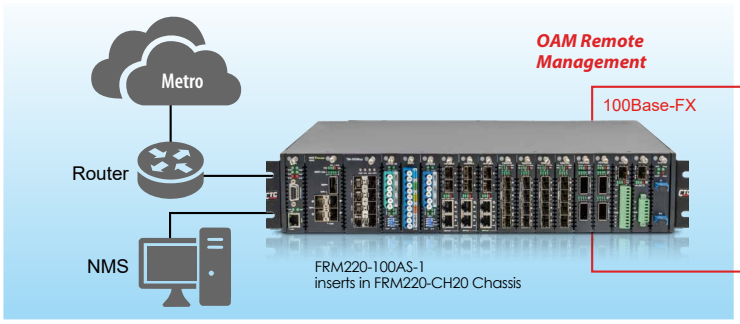
- 10/100Base-TX to 100Base-FX SFP
- Supports local / remote IEEE802.3ah OAM/IP In-band management
- Stand-alone IP Based, Web GUI, Telnet, SNMP management
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Supports IEEE 802.1Q Tagging
- Supports Q in Q double tagging
- Max. MTU size 10K bytes
- Supports Flow control (Pause)
- Supports OAM remote loopback to assist in diagnosing network problems
- Supports bandwidth control
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports remote loopback
- D/D function for supported SFP fiber transceiver
- Auto Laser Shutdown (ALS)
- Online local / remote f/w upgrade
- Default port and IEEE802.1Q Tagging priority QoS
- SNMP trap and LED alarm for loss of light and loss of signal

Specifications

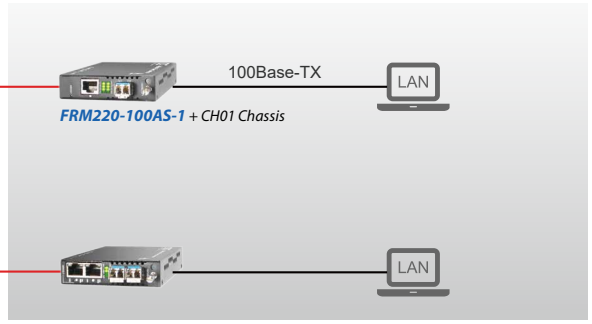
Optical Interface	Connector	SFP LC
	Data rate	100Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm. SM 9/125μm
	Distance	MM 550m, 2km, SM15/30/50/80/120km WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310, 1550nm WDM 1310Tx/1550Rx (type A) 1550Tx/1310Rx (type B)
Power Consumption	< 12W	
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	120g	
Electrical Interface	Connector	RJ45
	Data rate	10Mbps, 100Mbps
	Duplex mode	Half / Full duplex

Electrical Interface	Cable: 10Base-T Cat.3, 4, 5, UTP 100Base-TX Cat.5, 5e or higher
Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.1Q, ITU-T G.664
Indications	LED : Power, FX-Link, FEF, TEST, Speed(10,100), FULL
Power Input	Card : 12VDC Standalone : AC, DC options
Temperature	Storage conditions Temperature range : -5~+45°C Relative Humidity : 5~95% Rh Absolute Humidity : 1~25g H2O/m^3 Operation conditions Temperature range : -5~+45°C Relative Humidity : 5~95% Rh Exist conditions for condensation and icing Absolute Humidity : 1~29g H2O/m^3
Certification	CE, FCC, EN60950 LVD compliant
MTBF	65,000 hrs

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220-100AS-1	10/100Base-TX to 100Base-FX with OAM/IP-Based managed FE media converter card (optional SFP)



FRM220-10/100i

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

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

Features

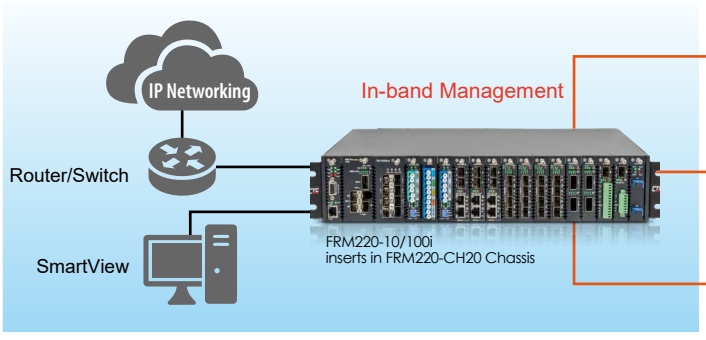
- 1-Port 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports Loop Back Test
- Supports RMON counter
- Auto Laser Shutdown (ALS)
- Auto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

Specifications

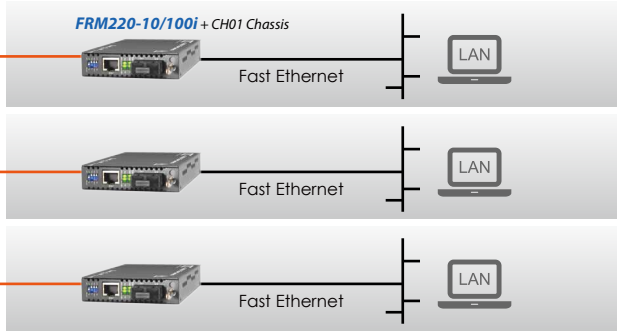
Optical Interface	Connector	1 x 9 (SC, ST, FC)
	Data rate	125Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50km
		WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Electrical Interface	Connector	RJ45
	Data rate	10Mbps, 100Mbps
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP
		100Base-TX Cat.5, 5e or higher

Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.3x, TS-1000
Indications	LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-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



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

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

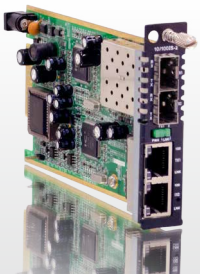
Connector Type	Connectivity Distance
SC, ST, FC	002: 2km 015: 15km 030: 30km 050: 50km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type

Connector Type / Connectivity Distance

FRM220 – 10/100i – □□□□□

Example: FRM220 – 10/100i – SC002

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-10/100iS-2

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

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

Features

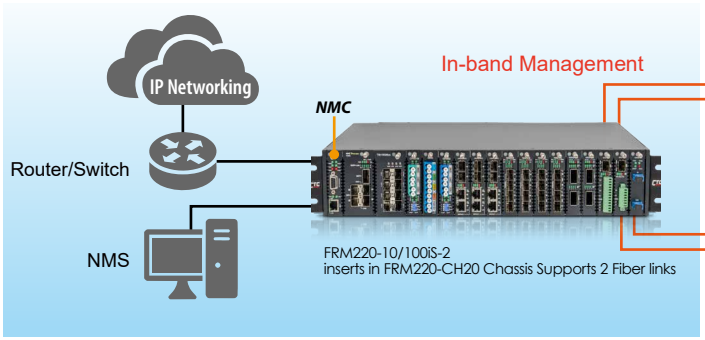
- Dual independent converters 10/100Base-TX to 100Base-FX
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 2046 bytes (max.) packets in switch mode
- Supports IEEE 802.1Q Tag VLAN pass thru
- Supports Q in Q double tagged frame transparent
- Forward 9K jumbo packets in converter mode
- Supports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

Specifications

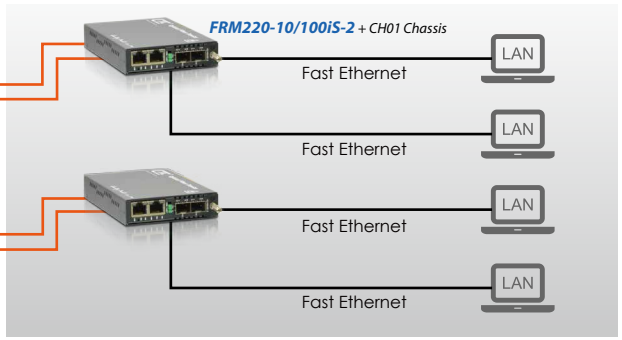
Optical Interface	Connector	SFP LC x 2
	Data rate	125 Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125µm, 62.5/125µm. SM 9/125µm
	Distance	MM 2km, SM 15/30/50/80/120km, WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm WDM 1310Tx/1550Rx (type A) 1550Tx/1310Rx (type B)
Electrical Interface	Connector	RJ-45 x 2
	Data rate	10Mbps, 100Mbps
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP 100Base-TX Cat.5, 5e or higher

Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.3x, TS-1000
Indications	LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link)
Power Input	12VDC
Power Consumption	< 4W
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC, RoHS compliant
MTBF	65,000 hrs

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

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



FRM220-1000TS

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

The FRM220-1000TS is a transparent Gigabit Ethernet 1000Base-T to 1000Base-SX/LX SFP converter with very low latency. They are managed (when installed in FRM220 with NMC) or non-managed stand-alone media converters, which give you the options to choose from a wide range of industry standard SFP modules with LC connectors. SFPs in multi-mode and single mode types are available as well as BiDi which allows bi-directional transmissions using only a single fiber cable. Because they are completely transparent to Ethernet packets, they are able to support any size frames, including undersized or jumbo packets (>9K bytes). LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status.

Features

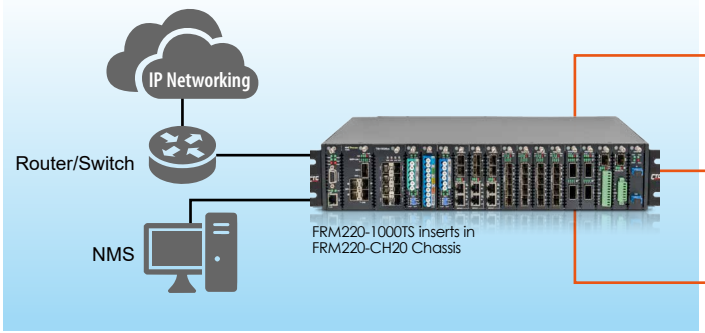
- 1000Base-T to 1000Base-SX/LX
- Device management via FRM220 Chassis with NMC
- Auto-negotiation or force mode
- Auto MDI/MDIX
- Forward > 9K bytes packets
- Supports Link Fault Pass Through (LFP) function
- Auto Laser Shutdown (ALS)
- Protocol Transparent (OAM, L2CP, etc)
- Latency 0.4μ-sec

Specifications

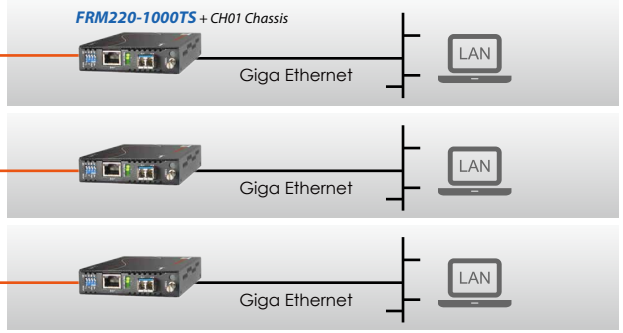
Optical Interface	Connector	SFP LC
	Data rate	1000Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 550m, 2km, SM15/30/50/80/120km
		WDM 20/40/60km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Electrical Interface	Connector	RJ45
	Data rate	1000Mbps
	Duplex mode	Full duplex
	Cable	1000Base-T Cat.6 or above UTP

Standard	IEEE 802.3ab
Indications	LED (Power, FX-Link, FX Duplex, TX-SPD, TX-Duplex, TX-Link)
Power Input	Card : 12VDC
	Standalone : AC, DC options
Power Consumption	< 12W
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, LVD
MTBF	65,000 hrs (25°C)

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220-1000TS	1000Base-T to 1000Base-X SFP media converter card (Optional SFP)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-10/100

10/1000Base-TX to 100Base-FX Unmanaged Media Converter

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

Features

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

Specifications

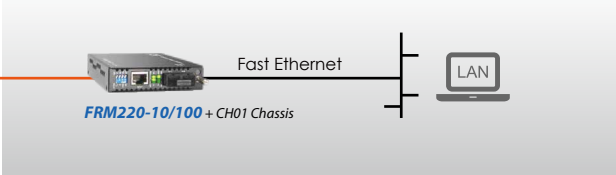
Optical Interface	Connector	1x9 (SC, ST, FC)
	Data rate	100Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Standards	IEEE 802.3, IEEE 802.3u	
Indications	LED (Power, FX Link, TX SPD, TX Link, TX Duplex, FEF)	
Certification	CE, FCC, RoHS	

Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mpbs
	Cable	10Base-T Cat.3, 4, 5, UTP,
		100Base-TX Cat.5, 5e or higher
Power	12VDC	
Power Consumption	< 4W	
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	120g	
Temperature	0 ~ 60°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
MTBF	65,000 hrs	

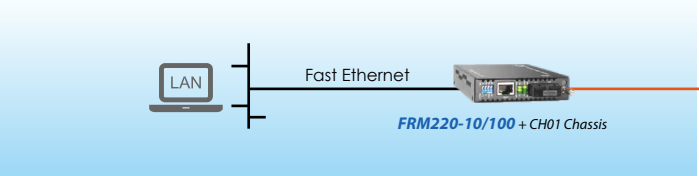
Application



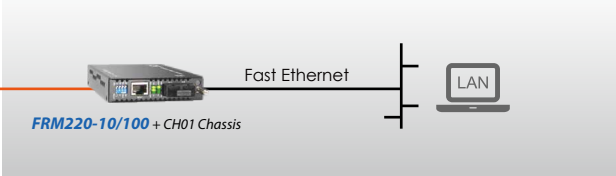
Central Office (CO)



Customer Premise Equipment (CPE)



Customer Premise Equipment (CPE)



Customer Premise Equipment (CPE)

Ordering Information

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

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

Connector Type / Connectivity Distance

FRM220 – 10/100 – □□□□□

Example: FRM220 – 10/100 – SC002



FRM220-10GC-TS

10G Base-T to 10G Base-R SFP+ Media Converter

The FRM220-10GC-TS is a copper to fiber 10G Ethernet media converter based on IEEE 802.3an and IEEE 802.3ae. With SNMP and Web-based management in the FRM220, the administrator can monitor, configure and control the activity of each card in the chassis. This converter uses Cat.6a/Cat 7 twisted pair cable as copper transmission media with RJ-45 and 10G optical solution with SFP+ LC connector. The data stream can be converted bi-directionally from 10G Base-T to 10G Base-R and vice versa. With full duplex wire speed forwarding capability between these two media, the FRM220-10GC-TS brings you the best and simplest solution for the 10G Ethernet conversion between copper wire and fiber.

Features

- Device Management via FRM220 Chassis with NMC
- Complies with IEEE 802.3an 10GBase-T and IEEE 802.3ae 10GBase-R
- Real-Time conversion between 10GBase-T and 10GBase-R
- Common used SFP+ fiber interface and RJ45 connector
- Full duplex wire speed forwarding
- Forwarding 18k bytes jumbo packet
- Loopback Test
- Link Fault Pass Through
- Fiber Fault Alert
- IEEE 802.1q VLAN pass through
- Supports manual Dip Switch for quick set up

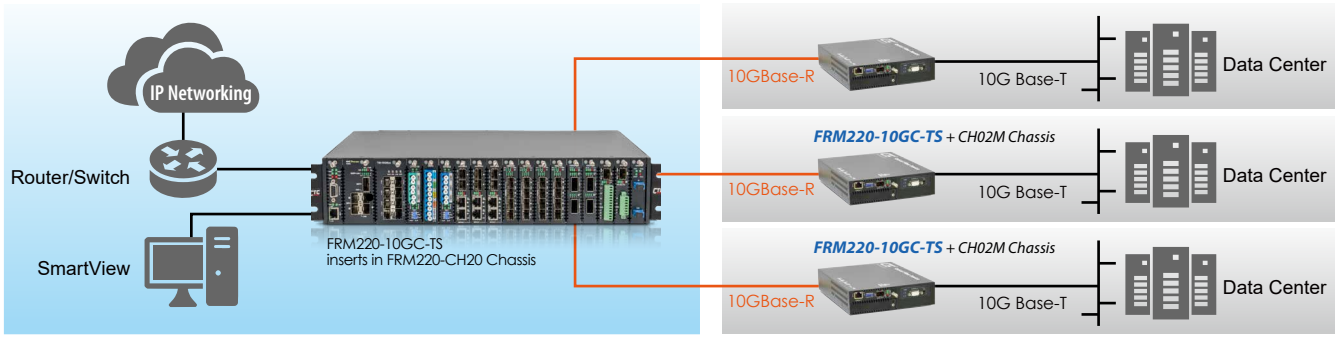
Specifications

Optical Interface	Connector	SFP+ LC
	Data rate	10.3125Gbps
	Distance	300m, 10km, 40km, 80km
	Wavelength	1550nm, 1310nm, 850nm, WDM
Electrical Interface	Connector	RJ45
	Data rate	10Gbps
	Cable type	Cat.6a, 7
	Distance	95 meters (Cat.7)
Management	Console port	RS-232 via CH01M, DIP Switch with CH01
Standards	IEEE 802.3an, IEEE 802.3ae	

LEDs	SFP+, LR, Link/Act, LBK A/B, SYS
Power	12VDC
Power Consumption	< 12W
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	0 ~ 85% non-condensing
Certification	CE, FCC
MTBF	57,000 hrs

Application

10G Media Conversion application



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

Ordering Information

Model Name	Description
FRM220-10GC-TS	10G Base-T RJ45 to 10G Base-R SFP+ media converter card, with DIP switch (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-CH20-AC	Chassis Power module 100~240 VAC, IEC connector, 200W
FRM220-CH20-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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220A-Eoe1/G(S)

Ethernet Bridge over E1 (GFP)

- HDLC & GFP
- MTU 2046bytes
- Unframed E1

The FRM220A-Eoe1/G(S) is an Ethernet over E1 Bridge for cost-effective connection of 10/100Base-TX or 100Base-FX LANs over a single E1 transport. By using GFP (Generic Framing Procedure) or standard HDLC encapsulation, the FRM220A-Eoe1/G(S) is able to transmit up to a 2M bits Ethernet over an E1 link. The FRM220A-Eoe1/G(S) 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(S)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 FRM220A 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

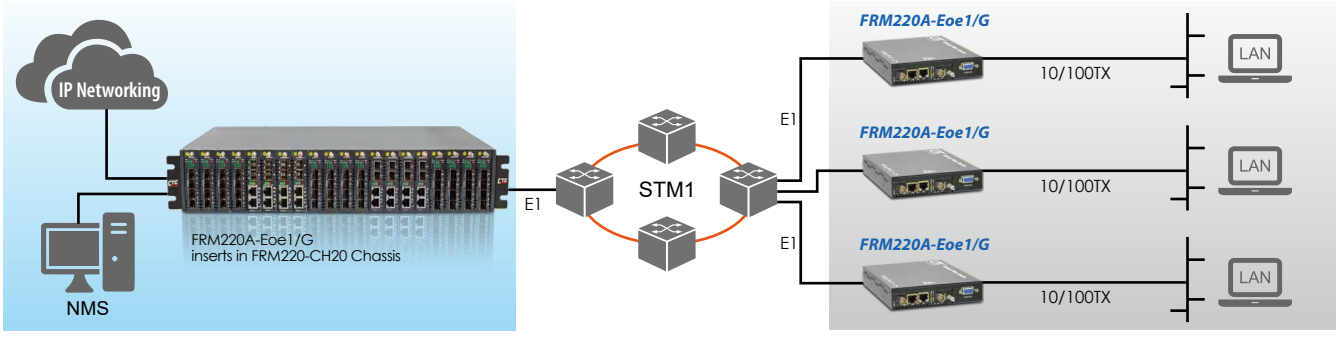
- Connects one Fast Ethernet over E1 links (2.048Mbps)
- Built-in GFP bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- LED Alarm indication
- Standalone RS232 console management via CH01M

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 or 100Base-FX Half/Full duplex
		Encapsulation GFP (G.7041)
	MTU	2046bytes
Connector	RJ45	10/100Base-T
	SFP-LC	100Base-FX
Indications	Power, ALM,E1 signal loss ,E1 Alarm (AIS, LOF, RAI, LOMF), LAN link /ACT, 10/100M , SD (100Base-FX)	
Power Input	12VDC	
Power Consumption	< 6W	
Dimensions	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



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

Ordering Information

Model Name	Description
FRM220A-Eoe1/G	10/100Base-TX to E1 GFP bridge operates at WAN
FRM220A-Eoe1/GS	100Base-FX SFP to E1 GFP bridge operates at WAN (Optical SFP module)



FRM220-FTEC

E1/T1 Cross Rate Converter

The FRM220-FTEC is a T1 (US Standard) /E1 (European Standard) converter and timeslot cross connect which enables conversion between one T1 signal and one E1 signal. T1 and E1 signals with framing employ u-Law and A-Law compander encoding principles respectively and encode those analog (voice) signals into 64kbits digital data. The T1 interface supports D4(SF) or ESF frame formats with B8ZS or AMI line code. The E1 interface supports CCS (PCM31) or CAS (PCM30) framing without CRC-4 and framing with CRC-4. The line coding is HDB3.
Tests and diagnostics can easily be performed from the local console interface or via Web based management of the FRM220. Diagnostics include T1 local/remote and E1 local/remote loop back. When placed in a single slot chassis and used standalone without management, the card may be configured by DIP switches.

Features

- Converts between T1 and E1 data and signaling
- Enable equipment to operate at T1 and E1 rates
- Supports G.802 Annex B (T1 over E1)
- Configures A-law/μ-law and signaling conversion
- Transparent conversion at 64kbps timeslot level
- Controlled slip for buffer over or under flow
- 24 time slots of T1 Nx64 can be inserted into E1 Nx64, 30/CAS or 31/CCS timeslots

Specifications

E1 Interface	Framing	CAS/PCM30 or CCS/PCM31 selectable
	Bit rate	2.048Mbps
	Line Code	HDB3
	Line Impedance	75 ohm (BNC) / 120 ohm (RJ-45)
		Voice channel sample rule A-Law
	CRC check	CRC-4 enable/disable
	Pulse amplitude	Nominal 2.37V ±10% for 75ohm
		Nominal 3.00V ±10% for 120ohm
	Zero amplitude	± 0.1V
	Connector	RJ-45
T1 Interface	Framing	D4, ESF selectable
	Bit rate	1.544Mbps
	Line Code	B8ZS / AMI
	Equalization	0 ~ 655 feet settable
		Voice channel sample rule μ-Law
	CRC check	CRC-6 when ESF
	Line Impedance	100 ohms
	Transmit Pulse level	3.0V ±10%,
	Receive signal level	0 ~ -10dB
	Connector	RJ-45

LEDs	PWR, Sys, Test, T1/E1
Standard	ITU-T G.703, G.704, G.706, G.823, G.824, ANSI T1.403
Power	12VDC
Power Consumption	< 6W
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	57,000 hrs

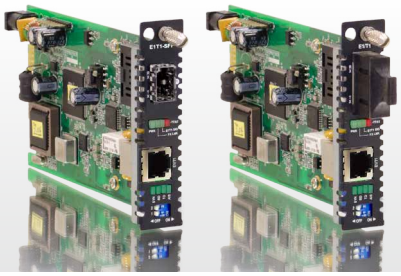
Application



Ordering Information

Model Name	Description
FRM220-FTEC	E1/T1 cross rate converter card

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-E1/T1
FRM220-E1/T1-SFP

E1/T1 over Fiber

The FRM220-E1/T1 is a fiber media transport for G.703 E1/T1 transmissions designed for point-to-point use. The BNC model provides unbalanced 75 Ohm coaxial E1 connections while the RJ-45 model provides switchable balanced 120 Ohm E1 or 100 Ohm T1 connections over twisted pair wiring. When the FRM220-E1/T1 card is placed in the FRM220 rack with in-band management, the card status, type, version, fiber link status, E1 or T1 link status and alarms for both local card and remote unit can all be displayed. When set for E1 mode, the FRM220-E1/T1 also supports fractional (structured) E1 when connected to a remote FRM220-Data, synchronous data communications converter. In an E1 transmission network where end connection requires synchronous data communication such as V.35 or RS-530 (X.21, RS-449), these units eliminate the need for an extra CSU/DSU. When placed in a single slot chassis and used standalone without management, the card may be configured by DIP switches.

Features

FRM220-E1R & FRM220-E1B

- RJ-45 (USOC RJ48C) or BNC (coaxial) to fiber converter
- Supports HDB3 or AMI Line coding
- Supports Nx64k connection to FRM220-DATA

FRM220-T1

- RJ-45 (USOC RJ48C) to fiber converter
- Supports B8ZS or AMI Line coding
- Supports unframed to FRM220-DATA

Common Features

- In-band management via terminal, web, SNMP when in managed FRM220 chassis
- Electrical and optical loop back tests
- Standalone RS232 console (when placed in CH01M)

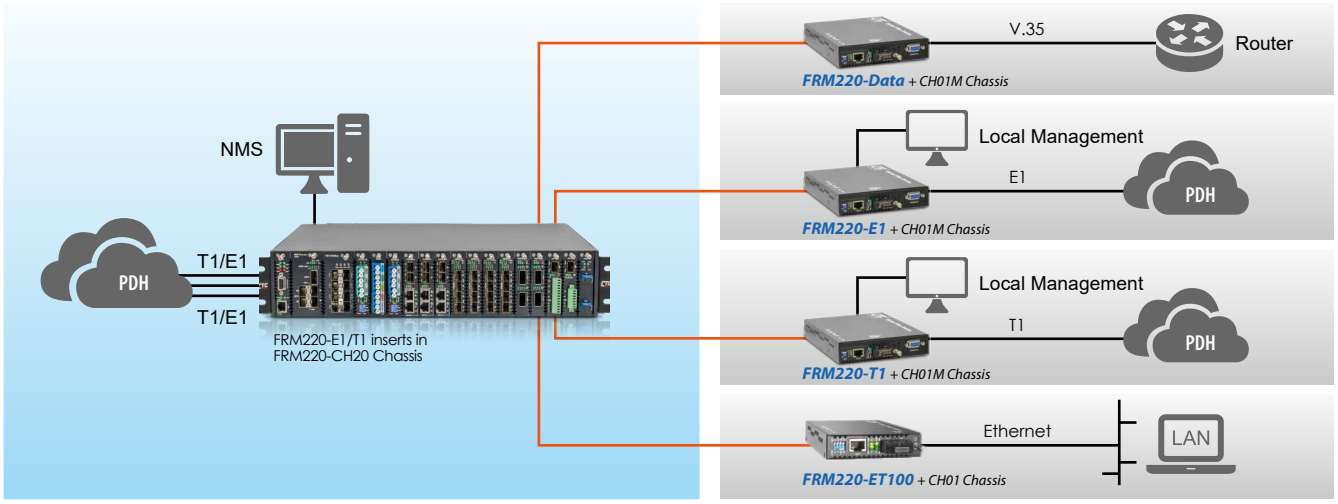
Specifications

Optical Interface	Connector	FRM220-E1/T1: 1x9 (SC, ST, FC) FRM220-E1/T1-SFP: SFP-LC
	Data rate	36.864Mbps
	Line coding	Scrambled NRZ
	Bit Error Rate	Less than 10-10
	Distance	MM 2km, SM 15/30/50km
		WDM 20/40km
	Wavelength	1310nm, 1550nm
Electrical Interface	**E1**	Connector: E1R: RJ-45(1) 120 Ω E1B: BNC(2) 75 Ω
		Data Rate: 2.048Mpbs
		Line Code: HDB3/AMI
	T1	Connector: RJ-45(1) 100 Ω
		Data Rate: 1.544Mbps
		Line Code: B8ZS/AMI
	Cable type	Cat.3 or higher Twisted-Pair cable

Standards	E1 ITU-T G.703, G.704, G.706, G.732, G.823
	T1 ITU-T G.703, G.704, AT&T, TR-62411, ANSI T1.403
Indications	Power, FX-Link, E1/T1 SIG, Test, SYN, RD, TD, AIS
	(E1/T1R) Power, FX-Link, E1 SIG, Test(E1B)
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

In-band Managed PDH Fiber Modem



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

Ordering Information

Model Name	Description
FRM220-E1R	E1 RJ-45 to fiber card
FRM220-E1B	E1 BNC to fiber card
FRM220-E1R-SFP	E1 RJ-45 to fiber card (SFP module not included)
FRM220-E1B-SFP	E1 BNC to fiber card (SFP module not included)
FRM220-T1R	T1 RJ-45 to fiber card
FRM220-T1R-SFP	T1 RJ-45 to fiber card (SFP module not included)

Connector Type / Connectivity Distance

FRM220 – □□□ – □□□□□

Example: FRM220 – E1R – SC002

Connector Type / Connectivity Distance

FRM220 – □□□ – □□□□□

Example: FRM220 – T1R – SC015

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-DS3/E3

DS3/E3 over Fiber

The FRM220-DS3/E3 is a fiber modem that works in pairs to transparently extend DS3, E3 or STS-1 transmissions over optical fiber. By utilizing pluggable SFP transceivers (155Mbps), these converters may be easily deployed on multimode or single mode fiber, at a distance up to 120km, or over a single core fiber using BiDi (WDM) SFP modules. The DS3/E3 connections utilize industry standard BNC connections for transmit and receive via coaxial cables. When the FRM220-DS3/E3 card is used standalone in a single slot chassis, DIP switches may be used for configuration and loopback control. When placed in a single slot chassis with console port, an easy to maneuver user menu is available via terminal to configure, monitor, and run diagnostic loop back functions. The EOC (embedded operations channel) allows in-band management to control the remotely connected modem over a working fiber link. When the FRM220-DS3/E3 card is placed in the FRM220 rack with NMC management, the administrator can configure and view the local and remote converter cards' status, type, version, fiber link status and alarms.

Features

- In-band network Managed via Terminal, web or SNMP in FRM220 chassis
- DS3/E3 Coax (BNC) to Fiber SFP fiber modem
- Supports AIS (Alarm Indication Signal)
- User selectable E3 or DS3 setting
- Electrical and optical Loop back tests
- Standalone RS232 console management via CH01M

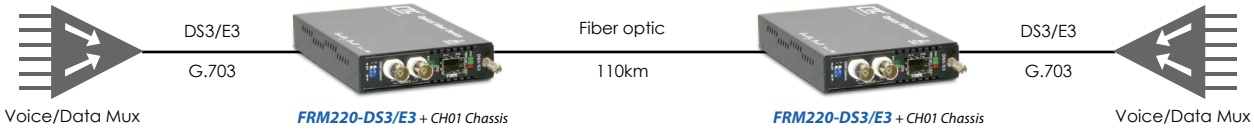
Specifications

Optical Interface	Connector	SFP : LC (Uses standard 100Base-X/OC-3 SFP)
	Data Rate	DS3/T3 = 44.7 Mbps; E3 = 34.4 Mbps
Line Coding	Distance	MM 2km, SM 15/30/50/80/120km, WDM 20/40/60/80km
	Wavelength	1310nm, 1550nm, CWDM 1471nm ~ 1611nm
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	120g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Certification	CE, FCC	

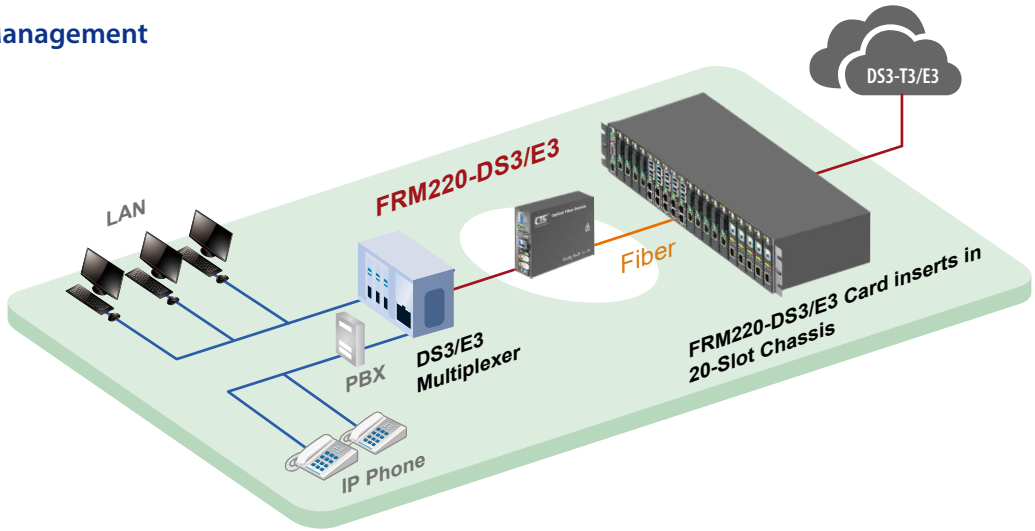
Electrical Interface	Connector	75 ohm Coax, TX output min: +2.5dBm max : +9.1dBm
		RX input min: -9.7dBm, max +10.5dBm
	Standards	ANSI, ITU-TS, ETSI, AT&T, G.703, G.921 & G.955
	Indications	Power, Coax link, coax loop-back, AIS on coax link; FX link, fiber loop-back ,AIS on FX link
Power Input	12VDC	
Power Consumption	< 6W	

Application

■ Integrate Voice & Data on Network

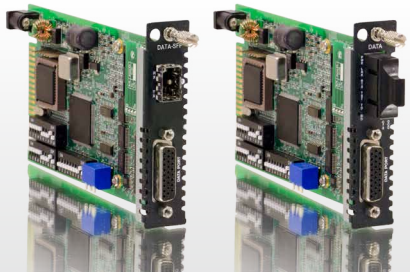


■ In-Band Management



Ordering Information

Model Name	Description
FRM220-DS3/E3	DS3/E3 coax (BNC) to fiber SFP fiber media converter card



FRM220-DATA
FRM220-DATA-SFP

RS232/530/V35 over Fiber

The FRM220-DATA is a fiber modem for high-speed (up to 8.192Mbps) synchronous or low speed synchronous and asynchronous data transmissions (V.35, RS-232, RS-530, X.21 or RS-449) over fiber optical media. When the FRM220-DATA card is placed in the FRM220 rack with SNMP management, in-band management allows viewing the card and remote converter's status, type, version, fiber link status, data link status and alarms. Both card and remote can be configured to enable or disable the port, reset the port, set the data rate, modify the clock mode, and initiate local or far end loop back tests. The FRM220-Data fiber modem may also be paired with the FRM220-E1/T1 for Nx64K transmissions. When placed in a single slot chassis and used standalone without management, the card may be configured by DIP switches.

Features

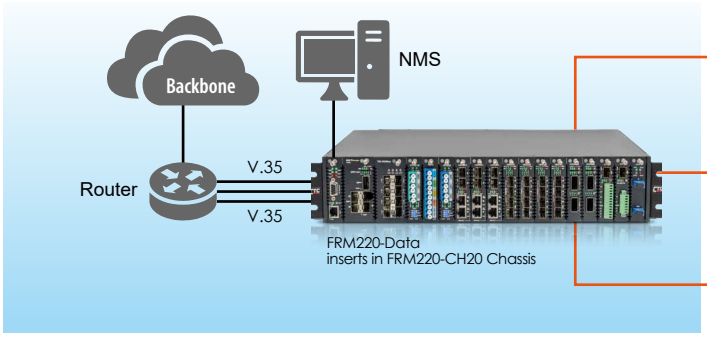
- Synchronous or Asynchronous data over fiber
- In-band network management via terminal, web or SNMP in FRM220 chassis
- Selectable I/F, V.35, X.21, RS-530, RS-449, RS-232
- Selectable DCE or DTE mode
- Data rate n x 64kbps, up to 9Mbps
- Multiple clock setting
- Electrical and optical loop back tests
- Compatible with FRM220-E1 on same fiber link for N x 64k
- Standalone RS232 console management via CH01M

Specifications

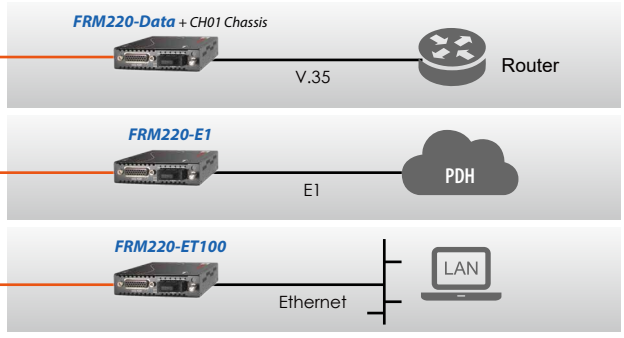
Optical Interface	Connector	FRM220-DATA: SFP LC FRM220-DATA-SFP: 1x9 (SC, FC, ST)
	Data rate	36.864Mbps
	Line coding	Scrambled NRZ
	Bit Error Rate	Less than 10-10
	Distance	MM 2km, SM 15/30km, WDM 20/40km
	Wavelength	1310nm, 1550nm
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	130g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	65,000 hrs	

Electrical Interface	Connector	HDB26F w/ adapter cable for V35
		X21, RS530, RS449,RS232
	Line Code	NRZ
	Baud Rate	RS-232 up to 384K async
		V.35/RS-530 up to 9152k sync
		where n=1 to 143 (64K ~ 9152KKbps)
	Clock source	Internal, Recovery, External
Standard	ITU-T	
Indications	LED (Power, FX Link, RTS, Test , TD, RD, CTS, DCD)	
Power Input	12VDC	
Power Consumption	< 6W	

Application



Central Office (CO)



Customer Premise Equipment (CPE)

Ordering Information

Model Name	Description
FRM220-V35	V.35 to fiber card with HD26M to MB34F cable (1m)
FRM220-X21	X.21 to fiber card with HD26M to DB15M cable (1m)
FRM220-RS530	RS530 to fiber card with HD26M to DB25M cable (1m)
FRM220-RS449	RS449 to fiber card with HD26M to DB37M cable (1m)
FRM220-RS232	RS232 to fiber card with HD26M to DB25M cable (1m)
FRM220-V35-SFP	V.35 to fiber card with HD26M to MB34F cable (1m) (SFP module not included)
FRM220-X21-SFP	X.21 to fiber card with HD26M to DB15M cable (1m) (SFP module not included)
FRM220-RS530-SFP	RS530 to fiber card with HD26M to DB25M cable (1m) (SFP module not included)
FRM220-RS449-SFP	RS449 to fiber card with HD26M to DB37M cable (1m) (SFP module not included)
FRM220-RS232-SFP	RS232 to fiber card with HD26M to DB25M cable (1m) (SFP module not included)

Interface Type / Connector Type / Connectivity Distance

FRM220 – □□□ – □□□□□

Example: FRM220 – V35 – SC002

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Interface Cable Adapters


V35


X21


RS530


RS449


RS232

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



FRM220-Serial
FRM220-Serial-SFP

RS232/485 over Fiber

The FRM220-Serial provides a fiber modem solution to extend asynchronous RS-232, RS-422 or RS-485 transmission distance up to 2km over multimode fiber or up to 120km over single mode fiber. The converter is equipped with multiple interface circuits for connection to RS-232 or RS485/422 (2 or 4 wire, full or half duplex). The FRM220-Serial secures data transmission over EMI resistant fiber at speeds up to 256kbps for RS-232 or up to 1024kbps for RS485/422. When the FRM220-Serial/485 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, data link status and alarms. When placed in a single slot chassis and used standalone without management, the card may be configured by DIP switches.

Features

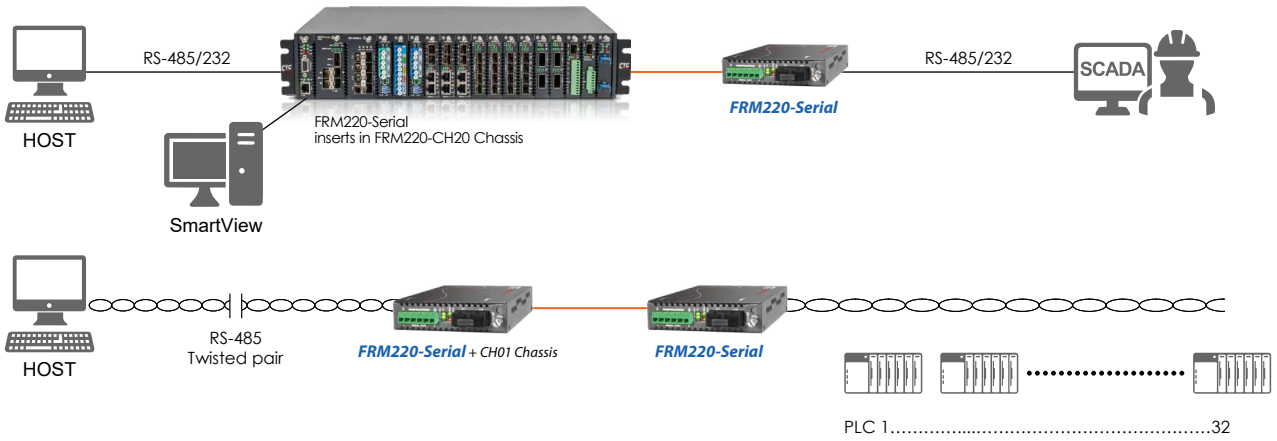
- Extend asynchronous serial transmission up to 120km over fiber
- In-band network management via terminal, Web or SNMP in FRM220-CH20 chassis with NMC
- Selectable data interface for RS-232/ 485
- RS232/Async. 3W or 5W up to 256Kbps
- RS485/Async. 2W (half duplex) or 4W (full duplex) up to 1Mbps
- Standalone RS232 console management via CH01M
- Software selectable two wires (half duplex) or four wires (full duplex) RS-485

Specifications

Optical Interface	Connector	FRM220-Serial: Fixed SC, ST, FC FRM220-Serial-SFP: SFP LC
	Data rate	36.864Mbps
	Line coding	Scrambled NRZ
	Bit Error Rate	Less than 10-10
	Fiber	MM 62.2/125μm, 50/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30/50km
		WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (type A)
		1550Tx/1310Rx (type B)
Standards	EIA/TIA RS-485, RS-232	
LEDs	Power, FX Link, DI, DO, Test	
Power Input	12VDC	

Electrical Interface	Connector	6 pins Terminal block
	Data Signal Formats	RS-485 2-wire
		RS-232 RTS/CTS 5-wire
		RS-232 3-wire
	Baud Rate	RS-422, RS-485 up to 1024kbps
		RS-232 up to 256kbps
	Bit Error Rate	Less than 10-10
Power Consumption	< 6W	
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	130g	
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-Serial	RS-232/485 fiber converter card
FRM220-Serial-SFP	RS-232/485 fiber converter card (SFP module not included)

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 – Serial – □□□□□

Example: FRM220 – Serial – SC002

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-E1/DATA

E1 to Data

The FRM220-E1/Data is a single port G.703/704 Fractional E1 DSU/CSU card for the FRM220 Series Platform Media Converter Rack. The converter supports Unframed, PCM31, PCM31+CRC4, PCM30, and PCM30+CRC4 framing modes. The clock source may be selected internally, recovered from received E1 signal, externally from the Data port or transparent. The data port interface utilizes a single hi-density 26pin connector. Cable solutions are provided for RS-530/449, X.21, V.35 and RS-232. The unit can recognize the cable type attached and automatically self-configure the interface circuits. Choosing from one of two model types, the E1 connection is either unbalanced 75 ohm with two BNC connectors or balanced 120 ohm with one RJ-45 connector. When the FRM220-E1/Data card is placed in the FRM220 rack with NMC management, the administrator can view the converter card's status, type, version, E1 link status and alarms. The card can be configured to enable or disable the port, reset the card, set clocking, frame mode, interface type and provide analog or digital diagnostic loopbacks. A unique feature of the FRM220-E1/Data is the use of a common card design which may either be inserted in the FRM220-CH01 single slot chassis as a stand-alone modem or as a card when placed in the FRM220-CH20 managed rack.

Features

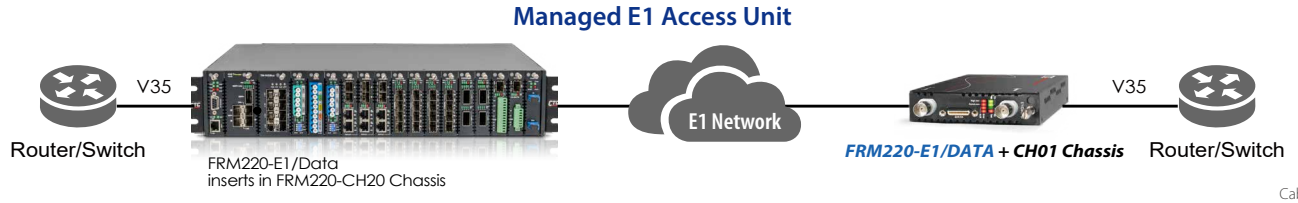
- Supports Fractional E1 and Unframed E1 services with V.35/X21/RS530 adapter cable
- I/O connectors all located on front panel
- Multiple clock source selection and remote loopback (Internal or External: E1 recovery, DTE or DCE)
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220-CH20 and FRM220A chassis
- SNMP management with FRM220-CH20 (NMC)
- LED Alarm indication
- Standalone RS232 console management via CH01M

Specifications

E1 Interface	Framing	Framed/Unframed
	Standards	ITU-T G.703/G.704/G.706 & G.732, G.823
	Bit rate	2.048Mbps± 50ppm
	Line code	HDB3
	Clock setting	Internal OSC or recovery clock
	Receive level	-43dB
	Line impedance	75 ohm (BNC) / 120 ohm (RJ45)
	Jitter Performance	Complies with ITU-T G.823
	Pulse Mask	Complies with ITU-T G.703
	Pulse amplitude	Nominal 2.37V ± 10%
	Delay Variance	8ms
	Connector	BNC / RJ-45
	Diagnostics	Digital remote loopback

Serial Interface	Standards	ITU-T, E1A
	Data rate	Nx56 / Nx64
	Connector	HDB26F w/ adapter cable for Data
LEDs	Power, TD, RD, RTS, DCD, TX Clock loss, Signal loss, Sync loss, Alarm, test error	
Power	12VDC	
Power Consumption	< 6W	
Dimensions	159.5 × 20.8 × 88mm (D × W × H)	
Weight	130g	
Temperature	0 ~ 50°C (Operating), -10 ~ 70 °C (Storage)	
Humidity	10 ~ 90% RH (non-condensing)	
Certifications	CE, FCC	
MTBF	65,000 hrs	

Application



Ordering Information

Cable Type

FRM220 –□□/□□□–□

Example: FRM220 – E1/V35 – R

Model Name	Description
FRM220-E1/V35-R	V35 to framed E1 RJ-45 card with HP26M to MB34F cable
FRM220-E1/V35-B	V35 to framed E1 BNC card with HP26M to MB34F cable
FRM220-E1/X21-R	X21 to framed E1 RJ-45 card with HP26M to DB15M cable
FRM220-E1/X21-B	X21 to framed E1 BNC card with HP26M to DB15M cable
FRM220-E1/RS530-R	RS530 to framed E1 RJ-45 card with HP26M to DB25M cable
FRM220-E1/RS530-B	RS530 to framed E1 BNC card with HP26M to DB25M cable
FRM220-E1/RS449-R	RS449 to framed E1 RJ-45 card with HP26M to DB37M cable
FRM220-E1/RS449-B	RS449 to framed E1 BNC card with HP26M to DB37M cable
FRM220-E1/RS232-R	RS232 to framed E1 RJ-45 card with HP26M to DB25M cable
FRM220-E1/RS232-B	RS232 to framed E1 BNC card with HP26M to DB25M cable

Interface Cable Adapters













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

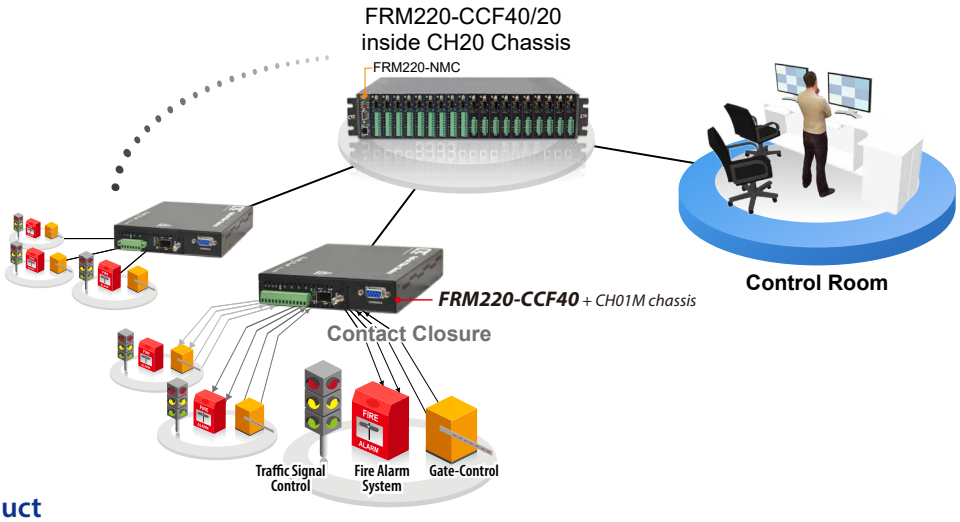
- Transmits a single contact closure in one or two directions
- Distances up to 120km
- 30 VDC, 0.5 amp relay N.O. (Normally Open)
- Point-to-Point transmission architecture
- Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments
- Relay contact for Carrier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

Specifications

Contacts	Contact Interface Response Time : 4 msec
	Input Dry Contact Closure
	Output SPST Relay, 30 VDC @ 0.5 A, Resistive loads only. 0.5 A Contact Rating - normally open
Optical	1xSFP/LC (155m)
Connectors	Optical SFP-LC, Contact, Terminal Block
LED Indicators	Contact Relay, Carrier Detect
Power	Operating Voltage Range 8 to 15 VDC
	Power Consumption 4W Max

Electrical & Mechanical	Current Protection Automatic Resettable Solid-State Current Limiters
	Circuit Board Meets IPC Standard
Dimension	159.5 × 20.8 × 88mm (D × W × H)
Weight	200g
MTBF	>100,000 hours
Operating Temperture	0°C to +50°C
Storage Temperture	-10°C to +85°C
Relative Humidity	0% to 95% (non-condensing)[1]

Application



■ Related Product



IFC-CCF40
(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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



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 ~50Hz
		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

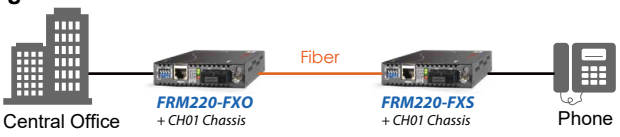
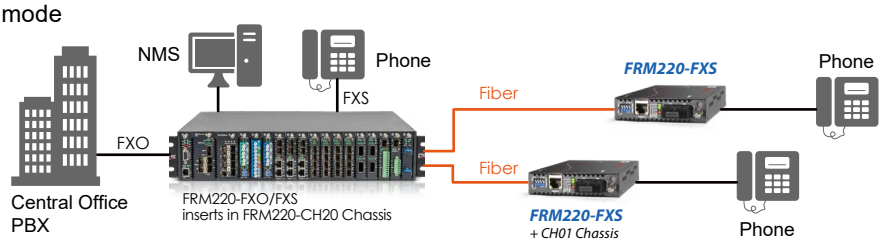


Figure 3 : Selectable FXO or FXS mode



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 ~50Hz
		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

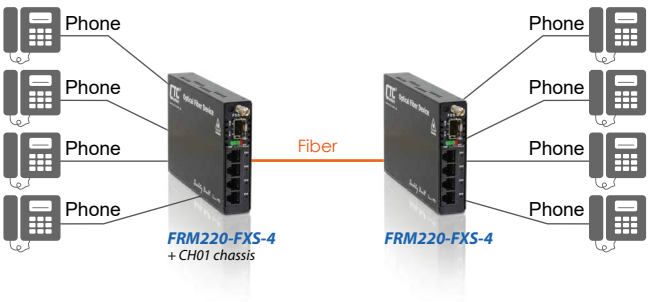
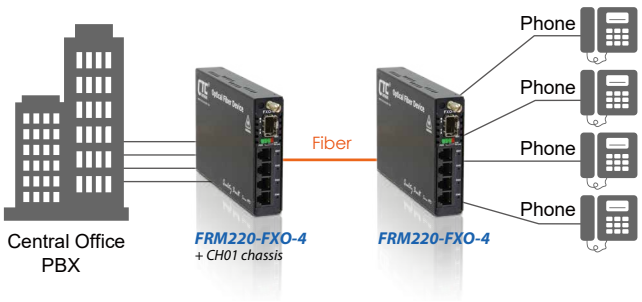


Figure 2 : Voice transmission from 2km to 120km over fiber



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)

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220A-iMux16
FRM220A-iMux8
FRM220A-iMux4

Ethernet over Bonded E1 NTU

The FRM220A-iMux is an E1 inverse multiplexer capable of bundling 4E1/ 8E1/16E1 lines for cost-effective connection of 10/100Base-TX LANs over multiple E1 transports. The FRM220A-iMux bridges the gap between E1 and E3, allowing bridges to operate at faster rates. It also provides high speed access to SDH/SONET backbones where the only access services available are E1 lines. The FRM220A-iMux supports E1 attenuation of up to 43 dB on twisted pair or coax cable. This provides an approximate operating range up to 2km (using 22AWG). The FRM220A-iMux features diagnostic capabilities for performing remote loopback. The operator at either end of the line may test both FRM220A-iMux NTU and the line in the digital loopback mode. The Ethernet copper interface supports auto-negotiation and auto MDI/MDIX, allowing plug-and-play Ethernet connection without any additional configuration.

Features

- The FRM220A - iMUX connects one Fast Ethernet over 1-4 E1 links (1.984Mbps to 7.93Mbps) for iMUX4, over 1- 8 E1 links (1.984Mbps to 15.87Mbps) for iMUX8, over 1- 16 E1 links (1.984Mbps to 31.74Mbps) for iMUX16
- Built-in GFP bridge operates at WAN rate
- Maximum 220ms delay variance between E1 link
- Unbalanced E1/BNC or balanced E1/RJ45
- LED Alarm indication & Auto-Negotiation
- Standalone RS232 console management via CH01M for iMUX4/iMUX8, CH02M for iMUX16
- Support MTU 1916 bytes

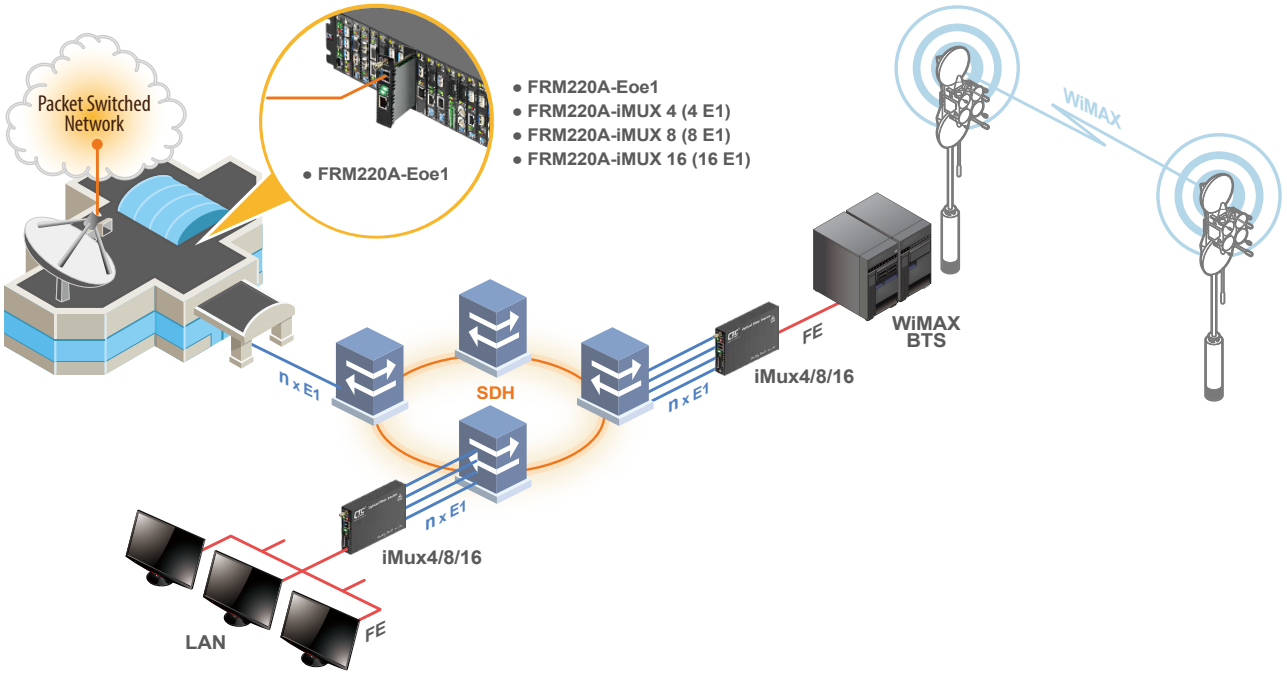
Specifications

E1 Interface	Framing	CCS+CRC (Framed)
	Standard	ITU-T G.703/G.704/G.706 & G.732, G.823
	Encapsulation Protocol	VCAT & LCAS (ITU-T G.7042) GFP-F (ITU-T G.7041)
	Bit rate	2.048Mbps± 50ppm (up to 5E1)
	Line code	HDB3
	Clock setting	Internal OSC or recovery clock
	Receive level	-43dB
	Line impedance	75 ohm (BNC) / 120 ohm (RJ45)
	Jitter Performance	Complies with ITU-T G.823
	Pulse Mask	Complies with ITU-T G.703
	Pulse amplitude	Nominal 2.37V ± 10%
	Delay Variance	220ms
	Connector	RJ45, BNC
	Diagnostics	Digital remote loopback
Ethernet Interface	Standards	IEEE 802.3, 802.3u, 802.1q VLAN, 802.1d bridging
	Mac Address	1K
	Data rate	10/100Base-TX, Half/Full duplex
	Connector	RJ45 10/100Base-TX
		Power, ALM, E1 signal loss
Indications	Power, ALM, E1 signal loss, E1 Alarm(AIS, LOF, RAI, LOMF), LAN link /ACT, 10/100M, SD (100Base-FX)	

Power Input	12VDC
Power Consumption	< 12W
Dimensions	iMux16 : 159.5 × 42.1 × 88mm (D × W × H)
	iMux8/4 : 159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% RH (non-condensing)
Certifications	CE, FCC
MTBF	65,000 hrs

Application

Fiber
Ethernet
E1



■ Related Product



iMux4A-100 & iMux8A-100 (Standalone Ethernet to 4E1/8E1 Multiplexer)

Ordering Information

Model Name	Description
FRM220A-iMux16T-R	10/100Base-TX to 16 E1 mux card with 16E1 RJ45 cable
FRM220A-iMux16T-B	10/100Base-TX to 16 E1 mux card with 16E1 BNC cable
FRM220A-iMux8T-R	10/100Base-TX to 8 E1 mux card with 8 E1 RJ45 cable
FRM220A-iMux8T-B	10/100Base-TX to 8 E1 mux card with 8 E1 BNC cable
FRM220A-iMux4T-R	10/100Base-TX to 4 E1 mux card with 4E1 RJ45 cable
FRM220A-iMux4T-B	10/100Base-TX to 4 E1 mux card with 4E1 BNC cable

Cable Type



RJ45 Cable



BNC Cable

FRM220A – iMux [nx E1] – [Cable Type]
Example: FRM220A – iMux16T – R

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FRM220-GFOM04
FRM220-GFOM08

4/8 E1/T1 + GbE Fiber Multiplexer

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

Features

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

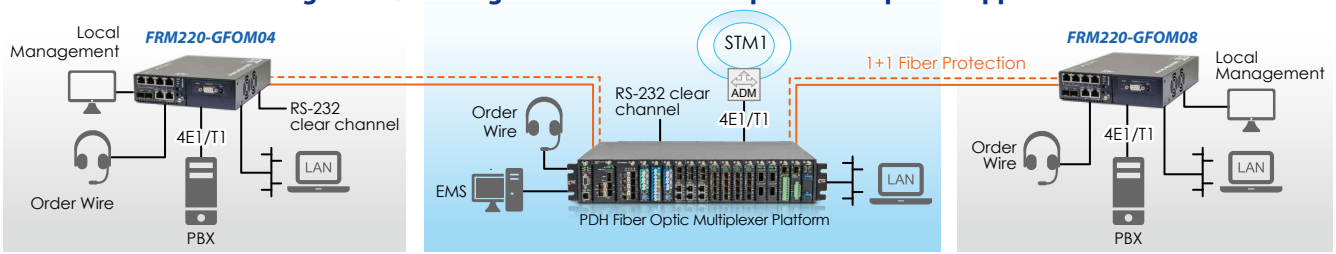
Specifications

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

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

Application

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



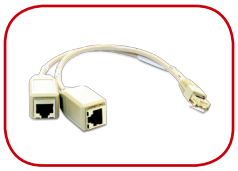
Ordering Information

Connector Type

FRM220 – GFOM04 – □□

Example: FRM220 – GFOM04 – SR

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



2E1 RJ45 cable



FRM220-FOM01

E1/T1 + FE Fiber Multiplexer

FRM220-FOM04

4x E1/T1 + FE Fiber Multiplexer

The FRM220-FOM01 is a single slot, single channel E1/T1 plus 100M Fast Ethernet fiber multiplexer card. The FRM220-FOM04 is a dual slot, 4-channel E1/T1 plus 100M Fast Ethernet to 1+1 redundant fiber multiplexer card with an additional clear channel RS-232 and order wire. When the FRM220-FOM cards are placed in the FRM220 rack with NMC, the administrator can view the converter card's status, type, version, fiber link status and alarms. Remote, fiber connected standalone card, can also be managed through in-band management via the chassis NMC. The card can be configured to enable or disable the port, reset the port, and provide local or remote diagnostic loopback. The optical aggregate of this multiplexer employs either a fixed transceiver or industry standard pluggable optics (SFP) operating at OC3/STM-1 data rates (155M). The SFP modules can be chosen to support single-mode, multi-mode, single fiber bi-directional or Coarse and Dense Wave Division Multiplexing (CWDM and DWDM)

Features

- 4 channels unframed E1/T1 (transparent) (FRM220-FOM04)
- 1 channels unframed E1/T1 (transparent) (FRM220-FOM01)
- 10/100Base-TX Ethernet (100M wirespeed)
- Auto MDI/MDIX & Auto-Negotiation or Force Mode
- Supports flow control 802.3x & 1514bytes MTU packets
- Supports link fault Pass-Through for Ethernet
- Supports Digital Diagnostics Monitoring Interface (DDMI) SFP
- Supports local or remote In-band management by SNMP manager and console port
- Supports On-Line F/W upgrade & Dying Gasp
- One clear channel RS232 up to 250Kbps(Async) (FRM220-FOM04)
- 1+1 fiber protection, switching time < 50ms (FRM220-FOM04)
- AIS on signal loss on E1/T1 and fiber port (FRM220-FOM04)
- Loopback test on E1/T1, RS232, fiber ports (FRM220-FOM04)
- Supports Order wire Ear / Microphone port (FRM220-FOM04)

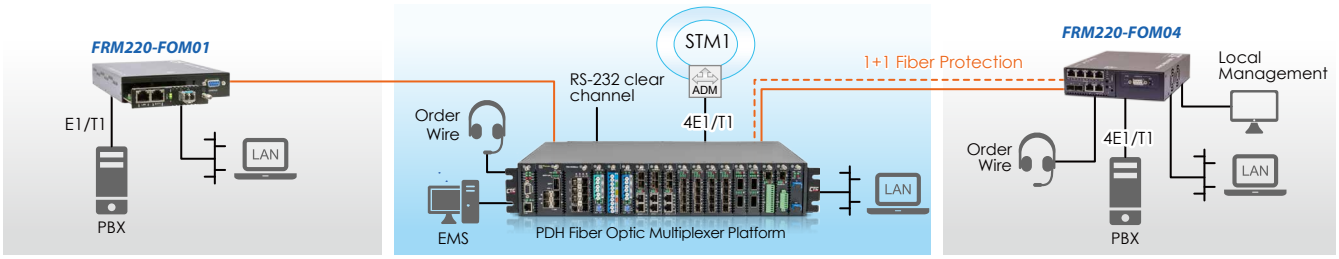
Specifications

E1/T1 ports	Framing	Unframed (transparent)
	Bit Rate	E1:2.048 Mb/s, T1: 1.544Mb/s
	Line Code	E1:AMI/HDB3, T1: AMI/B8ZS
	Line Impedance	E1: Unbalanced 75 ohms (BNC)
		E1: Balanced 120 ohms (RJ-45)
		T1: Balanced 100 ohms (RJ-45)
	Receiver sensitivity	Short haul
	"Pulse" Amplitude	Nominal 2.37V+/-10% for 75 ohms
		Nominal 3.00V+/-10% for 120 ohms
		+/-0.3V
	"Zero" Amplitude	w/external clock card option
	Internal Timing	+/-30 ppm
	Jitter Performance	According to ITU-T G.823
	Performance monitoring	According to ITU-T G.821
	Standards	ITU-T G.703, G.704, G.706 and G.732
	Interface Connectors	RJ-45
	Test Loops	LLB (Local Loop Back)
		RLB (Remote Loop Back)
		NELB(Near End Loop Back) (FRM220-FOM04)
		RRLB(Request Remote Loop) (FRM220-FOM04)

Fiber	Connector	SFP LC
	Data Rate	155 Mbps
Ethernet	Interface Type	10/100Base-TX
	Connector	RJ-45
	Standards	IEEE 802.3, 802.3u
	Duplex modes	full/half
Indications	FRM220-FOM04: Power FX1 Link, FX2 link, E1/T1 Mode/Link/Loop back test, Order wire phone indicator, LAN Link/Speed. FRM220-FOM01: Power FX Link, E1/T1 Mode/Link/Loop back test, LAN Link/Speed.	
Power Input	12VDC	
Power Consumption	< 7W (FRM220-FOM04) < 4W (FRM220-FOM01)	
Dimensions	159.5 x 42.1 x 88mm (D x W x H) (FRM220-FOM04) 159.5 x 20.8 x 88mm (D x W x H) (FRM220-FOM01)	
Weight	200g (FRM220-FOM04), 130g (FRM220-FOM01)	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% RH (non-condensing)	
Certifications	CE, FCC	
MTBF	57,000hrs	

Application

Managed 1/4 E1/T1 + Fast Ethernet Fiber Optical Multiplexer Application



Ordering Information

Model Name	Description
FRM220-FOM04-SR	4 x E1/T1 RJ-45 and 100Mbps Ethernet fiber optic multiplexer card (optional SFP module)
FRM220-FOM04-SB	4x E1 BNC and 100Mbps Ethernet fiber optic multiplexer card (optional SFP module)
FRM220-FOM01-SR	E1/T1 RJ-45 and 100Mbps Ethernet fiber optic multiplexer card (optional SFP module)
FRM220-FOM01-SB	E1 BNC and 100Mbps Ethernet fiber optic multiplexer card (optional SFP module)

Connector Type

FRM220 – FOM04 – □□

Example: FRM220 – FOM04 – SR

Connector Type

FRM220 – FOM01 – □□

Example: FRM220 – FOM01 – SR

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



PHB-200M
PHB-200

20x 100/1000Base-T to 20x 100/1000Base-X FE/GbE Media Converter Rack

PHB-200M is a 20-channel Managed Media Converter that converts Ethernet copper 100/1000Base-TX to SFPs working at 100Mbps and 1000Mbps. PHB-200M can connect to any RJ-45 Ethernet switch and supports any third-party standard SFP module from any SFP vendor. PHB-200M can also be used as an Ethernet copper-to-fiber media converter. 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 PHB-200M remotely.

Features

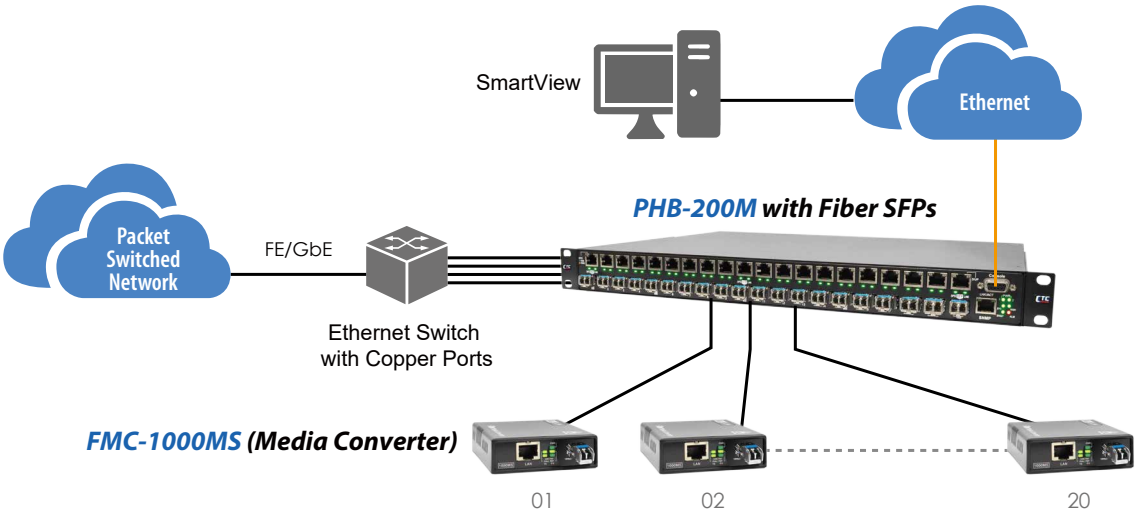
- 1U, 19", 20 channels Managed Media Converter Rack
- 20-port 100/1000Base-T to 20-port 100/1000Base-X SFP
- Auto MDI/MDIX in TP port
- Auto-Negotiation in TX port
- Supports hot-swappable SFPs working at 100 Mbps and 1000 Mbps
- Supports Web, Telnet, SNMP Management (PHB-200M)
- Local configuration via DB9 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

Specifications

Optical Interface	Connector	SFP LC
	Number of port	20
	Data rate	100/1000Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125um, 6.25/125um, SM 9/125um
	Distance	MM 2km, SM 15/30/50/80/120km, WDM 20/40/60/80km
	Wavelength	1310nm, 1550nm, CWDM 1471nm ~ 1611nm
Management	Console, Web, Telnet, SNMP	
Control Port	RS-232 DCE, DB-9, female	
Standards	IEEE 802.3, 802.3u, 802.3ab, 802.3z, 802.3x	
Indications	Power FX-Link, Duplex, TX-Link/Act, TX-Speed	

Electrical Interface	Connector	RJ-45
	Number of port	20
	Data rate	10/100/1000Mbps
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat. 3, 4, 5 UTP
		100/1000Base-T Cat.5, 5e or higher
Power	100 ~ 240VAC, 36~60 VDC	
Power Consumption	45W	
Dimensions	180 x 440 x 44mm (D x W x H)	
Weight	3.4kg	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Certification	CE, FCC	

Application



Ordering Information

Model Name	Description
PHB-200M-AC, DC, AD	20-ch Managed FE/GbE Media Converter Rack, built-in AC, DC or AD (AC+DC) Power
PHB-200-AC, DC, AD	20-ch FE/GbE Media Converter Rack, built-in AC, DC or AD (AC+DC) Power

Power Type
PHB – 200 □ – □□
Example: PHB – 200M – DC



FMC-CH17 & FMC-CH08

17 or 8 slots Compact Media Converter Chassis

The FMC-CH17 is a 2U high 19" 17 slots chassis and the FMC-CH08 is a 2U high 10" 8 slots cassis. The FMC chassis provides an economic solution in low density fiber converter installations where no management features are required. Each FMC 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
Power Consumption	<60W (FMC-CH17)
	<30W (FMC-CH08)
Dimensions (D x W x H)	199 × 476 × 88 mm (FMC-CH17)
	173 × 252 × 89 mm (FMC-CH08)

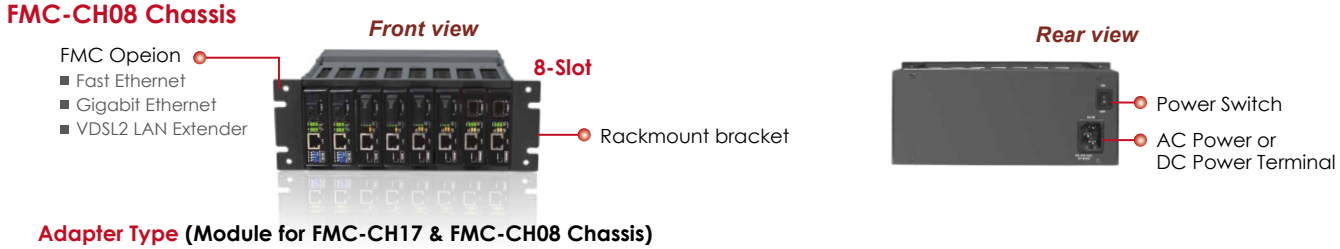
Weight	7.9Kg (FMC-CH17), 1.47Kg (FMC-CH08)
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	65,000 hrs

Chassis Overview

FMC-CH17 Chassis



FMC-CH08 Chassis



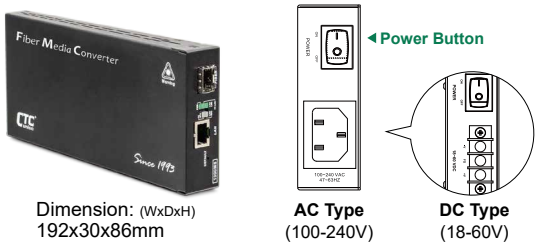
Adapter Type (Module for FMC-CH17 & FMC-CH08 Chassis)

■ Plastic Case

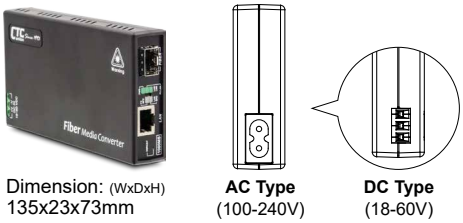


Power Built-in Type

■ Metal Case



■ Plastic Case



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

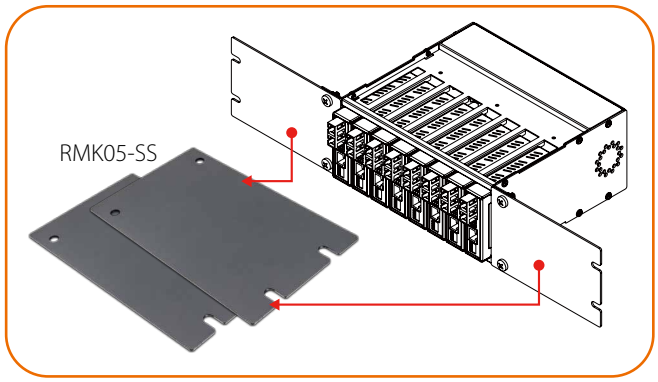
Optional Accessories

Model Name	Description
WMK01	Single Unit Wall Mounting Kit
RMK05-SS	Rack Mounting Kits for FMC-CH08 single chassis mounting in 19" rack

■ Wall-Mountable



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





FMC-1000M
FMC-1000MS

Web Smart OAM Managed 10/100/1000Base-T to 100/1000Base-X GbE Switch

The FMC-1000M(S) family are Web Smart OAM/IP managed Gigabit Ethernet 10/100/1000Base-T to 100/1000Base-X fiber Ethernet Switch, which provide simple control and setting function on each Ethernet port through out of band network via a Web browser. The FMC-1000M(S) Ethernet Switch give you the fiber cabling connector, SFP-LC(1000MS) and fixed type 1x9 SC connector(1000M). Both multi-mode and single mode Switch 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

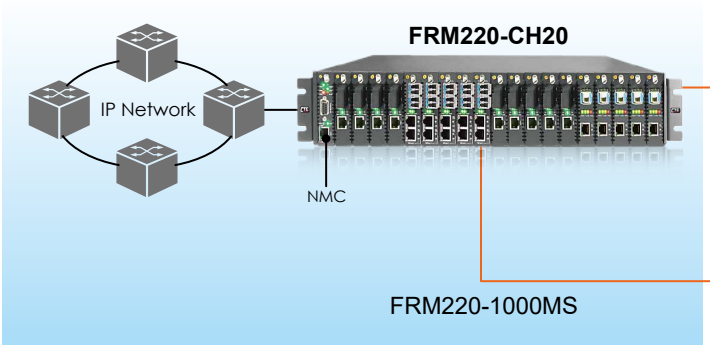
- 10/100/1000Base-T to 100/1000Base-X Ethernet Switch
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or Manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 9K Packet
- Ingress/Egress Bandwidth control
- Supports IEEE 802.3ah OAM management
- Firmware upgrade via Web
- 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
- Web management on stand-alone.
- Supports D/D function for SFP fiber transceiver
- Supports On-Line F/W upgrade (local) by the Web manager
- Supports 16 Tag VLAN Group
- RMON counters
- May be concentrated into FMC-CH17 or FMC-CH08 chassis (Adapter Type only)
- May be used as a remote to FRM-1000M(S)
- Wall-Mountable

Specifications

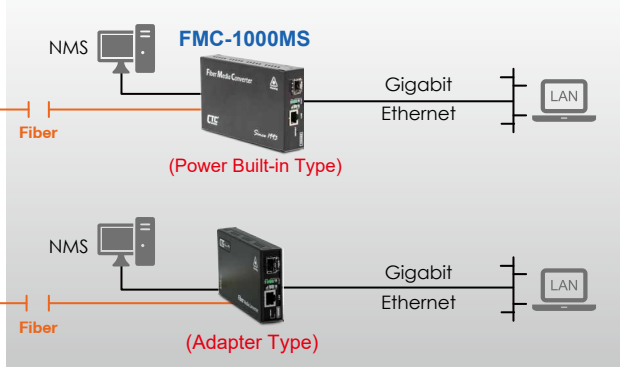
Optical Interface	Connector	SFP LC (FMC-1000MS), 1x9 SC (FMC-1000M)
	Data rate	125/1250Mbps
	Duplex mode	Full duplex
	Fiber	MM 50/125μm, 62.5/125μm
		SM 9/125μm
	Distance	MM 2km, SM 15/30km
		WDM 20/40km
	Wavelength	MM 1310nm, SM 1310,1550nm
		WDM 1310Tx/1550Rx (Type A)
		1550Tx/1310Rx (Type B)
Electrical 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

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
	Power Built-in Type : DC 18 ~ 60V
Power Consumption	< 3W
Dimensions (D x W x H)	Adapter Type : 108 x 23 x 73.4mm
	Power Built-in Type 135 x 23 x 73.4mm (Plastic)
	192 x 30 x 86mm (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



Local



Remote

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Ordering Information

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

Connector Type	Connectivity Distance
SC	MM 001:550m, 002: 2km S/M 010:10km, 020:20km, 040:40km WDM 20A: 20km A type, 20B: 20km B type, 40A: 40km A type, 40B: 40km B type

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit



FMC-10/100i

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

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

Features

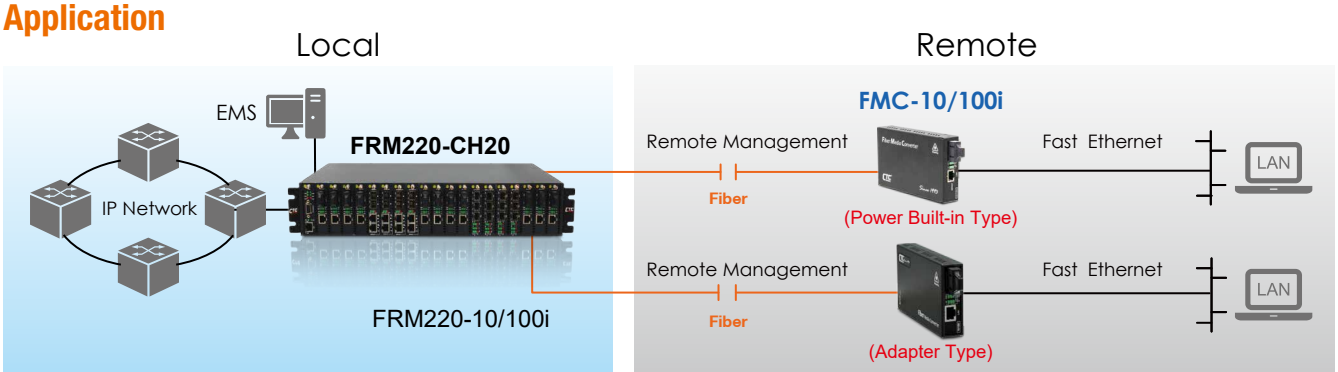
- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 2046 bytes (Max.) packets in switch mode
- Forward 9K jumbo packets in converter mode
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1q Tag VLAN pass thru
- Supports local / remote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

Specifications

Optical Interface	Connector	1x9 (SC, ST, FC)
	Data rate	125Mbps
	Duplex mode	Full duplex
	Fiber	MM 62.2/125μm, 50/125μm. SM 9/125μm
	Distance	MM 2km, SM 15/30km WDM 20/40km
	Wavelength	MM 1310nm, SM 1310,1550nm WDM 1310Tx/1550Rx (Type A) 1550Tx/1310Rx (Type B)
Standards	IEEE 802.3, IEEE 802.3u	
Power Input	Adapter Type : DC 12V	
	Power Built-in Type : AC 100 ~ 240V	
	Power Built-in Type : DC 18 ~ 60V	
LEDs	Power, FX Link, TX SPD, TX Link, TX Duplex, FEF	

Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mpbs
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, UTP 100Base-TX Cat.5, 5e
	Distance	100 meters
Power Consumption	< 3W	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Dimensions (D x W x H)	Adapter Type :	108 x 23 x 73.4mm
	Power Built-in Type :	135 x 23 x 73.4mm (Plastic) 192 x 30 x 86mm (Metal)
Weight	Adapter Type : 120g	
	Power Built-in Type : 140g (Plastic), 550g (Metal)	
Certification	CE, FCC	
MTBF	65,000 hrs	

Application



Ordering Information

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

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

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



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

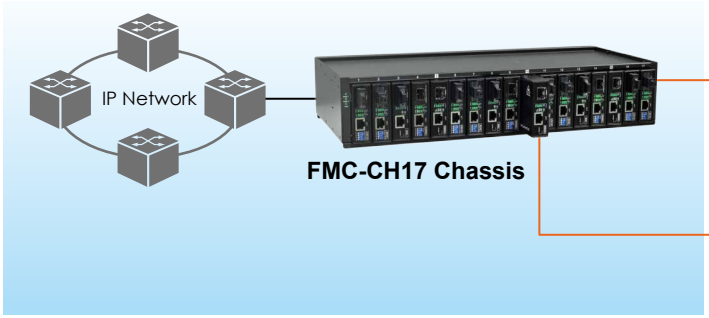
- 10/100/1000Base-T to 100/1000Base-X Converter
- Auto-Negotiation
- Auto MDI/MDIX
- Forward 2048 bytes (Max.) packets in switch mode (copper & fiber port in different speed)
- Forward 9k bytes in connector mode (fiber & copper port at the same speed)
- Provides DIP switch to set function
  -Select fiber speed (100/1000M)
  -Select LPF 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)

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 (D x W x H)	Adapter Type: 108 × 23 × 73.4mm	
	Power Built-in Type :	135 x 23 x 73.4mm (Plastic)
		192 x 30 x 86mm (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



Local Remote

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-DC	10/100/1000Base-T to 100/1000Base-X SFP media converter with DC power, plastic case
FMC-1001S-AC (Metal)	10/100/1000Base-T to 100/1000Base-X SFP media converter with AC power, metal case
FMC-1001S-DC (Metal)	10/100/1000Base-T to 100/1000Base-X SFP media converter with DC power, metal case

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit



FMC-10/100

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

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

Features

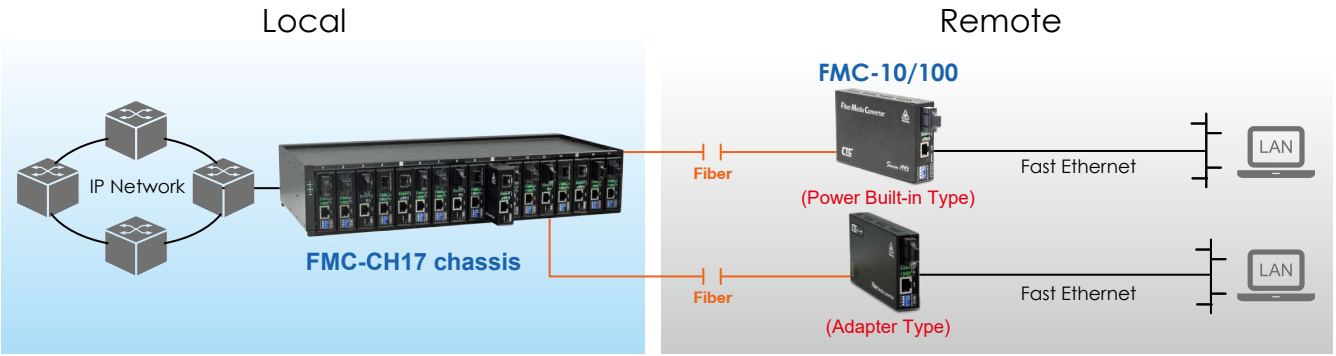
- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 1600 bytes (Max.) packets
- Supports flow control (Pause)
- Supports Link Fault Pass-Through (LFPT)
- Supports Far End Fault Indication (FEFI)
- Forward 9K jumbo packets in converter mode (100M/Full)
- May be concentrated into FMC-CH17 or FMC-CH08 chassis (Adapter Type only)

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 15/30km
		WDM 20/40km
	Wavelength	MM 1310nm, SM 1310, 1550nm
		WDM 1310Tx/1550Rx (Type A)
		1550Tx/1310Rx (Type B)
Electrical Interface	Connector	RJ-45
	Data rate	10Mbps, 100Mpbs
	Duplex mode	Half / Full duplex
	Cable	10Base-T Cat.3, 4, 5, cat.6
		100Base-TX Cat.5, 5e or cat.6

Standards	IEEE 802.3, IEEE 802.3u	
Indications	LED (Power, FX Link, TX SPD, TX Link, TX Duplex, FEF)	
Power Input	Adapter Type: DC 12V	
	Power Built-in Type: AC 100 ~ 240V	
	Power Built-in Type: DC 18 ~ 60V	
Power Consumption	< 2W	
Dimensions (D x W x H)	Adapter Type :	108 x 23 x 73.4mm
	Power Built-in Type :	135 x 23 x 73.4mm (Plastic)
		192 x 30 x 86mm (Metal)
Weight	Adapter Type : 120g	
	Power Built-in Type : 140g (Plastic), 550g (Metal)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	65,000 hrs	

Application



Ordering Information

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

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

Optional Accessory

Model Name	Description
WMK01	Single unit wall mounting kit

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



GSW-4448CM

24x CSFP (48x GbE) with 4x GbE Combo +
4x 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)	220(D) x 440(W) x 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

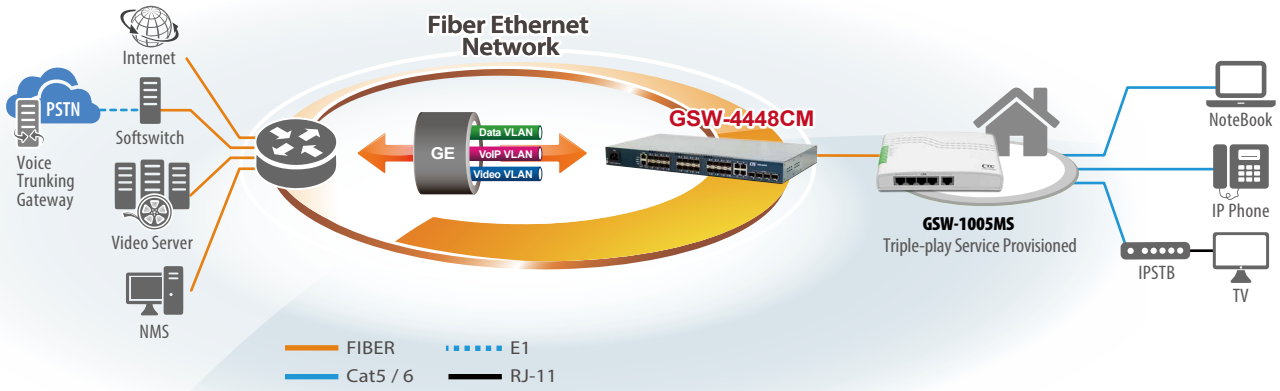
Software	
Port Control	Port speed, duplex mode, and flow control Port Auto MDI/MDI-X Port maximum frame size (10240 bytes) Port state (administrative status) Port status (link monitoring) Port statistics (MIB counters)
L2 Switching	Auto MAC address learning/aging. Per port limited MAC address learning IEEE 802.1Q static VLAN(4K VLAN groups), Voice VLAN, Port isolation, Private VLAN, MAC based VLAN protocal 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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
SFP 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-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)

Accessories (option)

10G SFP+ Transceiver Module

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



GSW-3424FM

24x GbE/SFP + 4x GbE/RJ45 + 4x 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	250x 440x 43.5mm (DxWxH)	
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

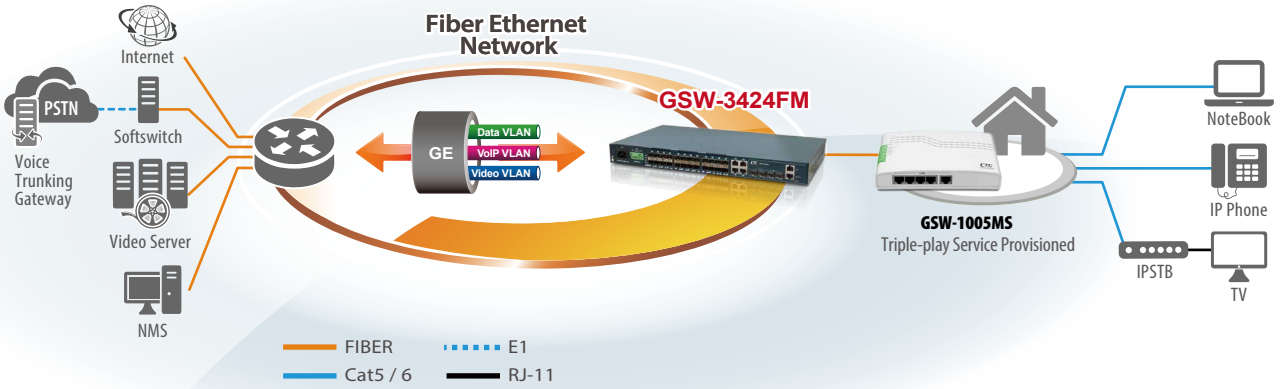
Software	
Port Control	Port speed, duplex mode, and IEEE 802.3x flow control Port Auto MDI/MDI-X Port frame size (jumbo frames), Maximum ingress frame size (10056 bytes) Port state (administrative status) Port status (link monitoring) Port statistics (MIB counters) Port VeriPHY (cable diagnostics)
L2 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 protocal 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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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
SFP 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

Power Type

GSW – 3424FM – □□

Example: GSW – 3424FM – AD

Accessories

10G SFP+ Transceiver Module

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



GSW-3424M1

20x GbE/RJ45 + 4x GbE Combo (SFP or RJ45)
L2+ Managed Ethernet Switch

GSW-3424M1 is a cost-effect, high performance, managed L2 Ethernet with 20x 10/100/1000Base-T ports and 4x Gigabit Ethernet combo (10/100/1000Base-T or 1000Base-X) ports. This switch supports remote management by SNMP, HTTP(HTTPS) and Telnet(SSH) interfaces along with local management by console interface. GSW-3424M1 supports many L2 switch management functions, including 802.1Q VLAN, 802.1x Port Security, Rate Control, Port Configuration, Port Mirroring, Port Statistics, QoS functions, Spanning tree and more.

Features

- 20x RJ45 ports, with 10/100/1000Mbps, Full/Half duplex auto-negotiation and Auto-MDIX functions
- 4x Dual Speed SFP sockets, shared with TX ports of Port 21~24 ;
- auto-detect TX/SFP connection
- CISCO-like command line interface, 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 (spanning tree)
- IP Multicast with IGMP snooping / query / fast leave / filtering / group limited /MVR
- DHCP Client / DHCP Option 82 Relay / DHCP Snooping function
- ACL function for L2 ~ L4 packet control, Ingress/Egress rate control on port
- Broadcast/Multicast/Unknown Unicast storm control
- ARP inspection / IP source guard, RMON 1, 2, 3, 9
- SFP Transceiver DDMI function / Dual Speed SFP Ports (100/1000Mbps)
- Remote port configuration setting and statistics monitoring
- Text based CLI configuration download and upload
- IEEE 802.3az power management / FANless / Green Ethernet

Specifications

System	
10/100/1000 Base-T	20
100M/1G SFP Slot	4 UTP/SFP Combo (Port 21~24)
Packet buffer	512KB
MAC Table size	8K
Max Packet size	9600 Bytes
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps
Switching Fabric capacity	48Gbps
Packet Forwarding capacity	35.7Mpps
FAN Design	FAN less
Console port	D-Sub 9
19" Rack-Mount	Yes, with kits
SFP DDMI	Yes
Dimensions	330 x 204 x 44 mm (W x D x H)
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	18 Watt Max.
Power Input	AC Power input (100V~240V)
Software	
Port Control	Port speed, duplex mode, and flow control Port frame size (jumbo frames), Maximum ingress frame size (9600 bytes) Port state (administrative status) Port status (link monitoring) Port statistics (MIB counters) Port VeriPHY (cable diagnostics), Power Control

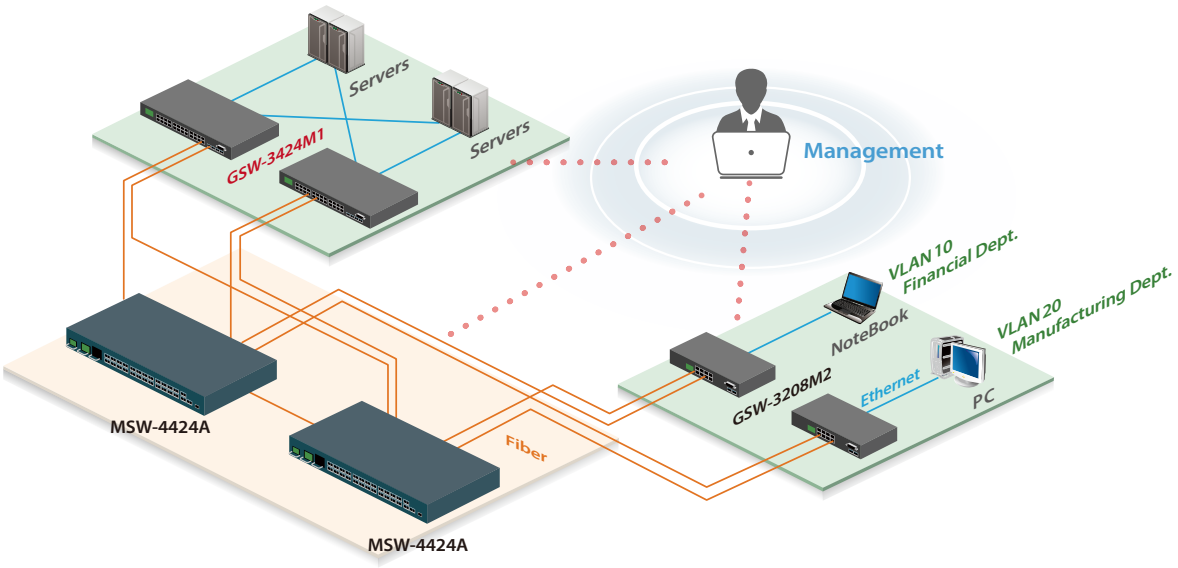
L2 Switching	Auto MAC address learning/aging and MAC addresses (static) IEEE 802.1Q static VLAN(Max. 4K VLAN groups), Voice VLAN, Port isolation, Port Based VLAN, IEEE 802.1ad Provider Bridge IEEE 802.1D STP/802.1w RSTP/802.1s MSTP IEEE 802.3ad Link Aggregation, static and LACP BPDU guard and restricted role, BPDU transparency DHCP client, DHCP snooping, DHCP option 82 relay ARP inspection, Port mirroring, IP MAC binding
Layer 2 Multicast	IGMP snooping v1,v2, v3 snooping, (1024 groups) IGMP snooping Fast and Immediate leave IGMP throttling, filtering, and leave proxy IGMP proxy mode and snooping mode selection MVR, IPv6 MLD snooping
QoS	8 Priority Queues per Port Port Based priority, Scheduler priority, QoS Control List Storm control for UC, MC, and BC Policing and shaping per port and per queue Ingress Policing : (100-1000000 when the "Unit" is "kbps" or "fps" and 1-3300 when the "Unit" is "Mbps" or "kfps") Egress Shaping : (100-1000000 when the "Unit" is "kbps", and 1-3300 when the "Unit" is "Mbps".) DiffServ (RF 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 Authorization (3 levels) ACLs for filtering(256 entries), policing, and port copy IP source guard
Synchronization	NTPv4 Client
Power Saving	ActiPHY, PerfectReach, Ethernet Energy Efficient power management(EEE)
SFP DDMI	Yes

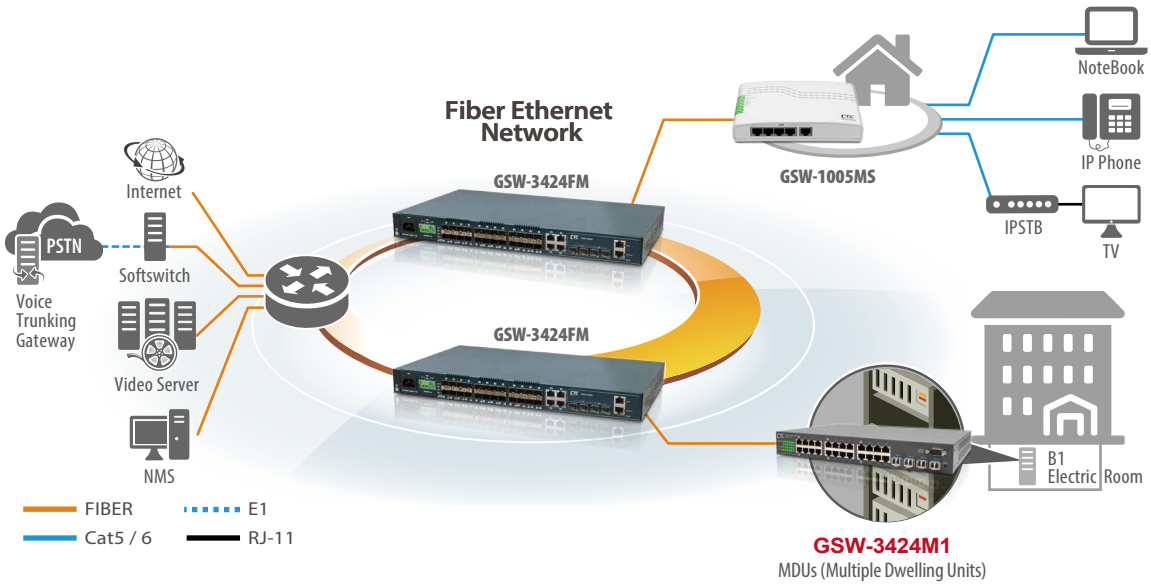
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Management	HTTP server, CLI console port, Telnet CLI, Management access filtering, SSHv2 and HTTPS IPv6 Management, System Syslog Software download through Web

Management	SNMPv1/v2c/v3 Agent RMON Group 1, 2, 3, and 9 IEEE 802.1AB-2005 Link Layer Discovery, LLDP Text Configuration download or upload, sFlow, Daylight Saving

Application





Ordering Information

Model Name	Description
GSW-3424M1-AC	20x 10/100/1000Base-T + 4x GbE Combo with AC power supply
GSW-3424M1-DC48	20x 10/100/1000Base-T + 4x GbE Combo with DC 48V power supply

Power Type

GSW – 3424M1 – □□□□

Example: GSW – 3424M1 – DC48

NEW



GSW-4208M

4 x GbE/RJ45 + 4 x 1G/2.5G RJ45 + 2 x 1G/10G SFP+
L2+ Managed Ethernet Switch

The GSW-4208M is the new generation L2 managed Ethernet switch for SMB and FTTH network application. To fulfill the demanding bandwidth consumed and network connectivity speed such as 4K UHD video streaming and real time gaming, VR/AR application, WiFi-6 access triggered by the 5G mobile new era, the uplink or service ports of Ethernet switch are driven to migrate from Gigabit to multi-Gigabit or even 10G gradually.

The GSW-4208M is equipped 4 ports Gigabit RJ45 and 4 ports 1G/2.5G RJ45 as well as 2 ports 1G/10G SFP+ based fiber optics. The SMB 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 currently popular WiFi-6 device, NAS access as well as small cell or powerful workstations to break through the limitation of 1 Gigabit data rate for content richer applications.
The GSW-4208M 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

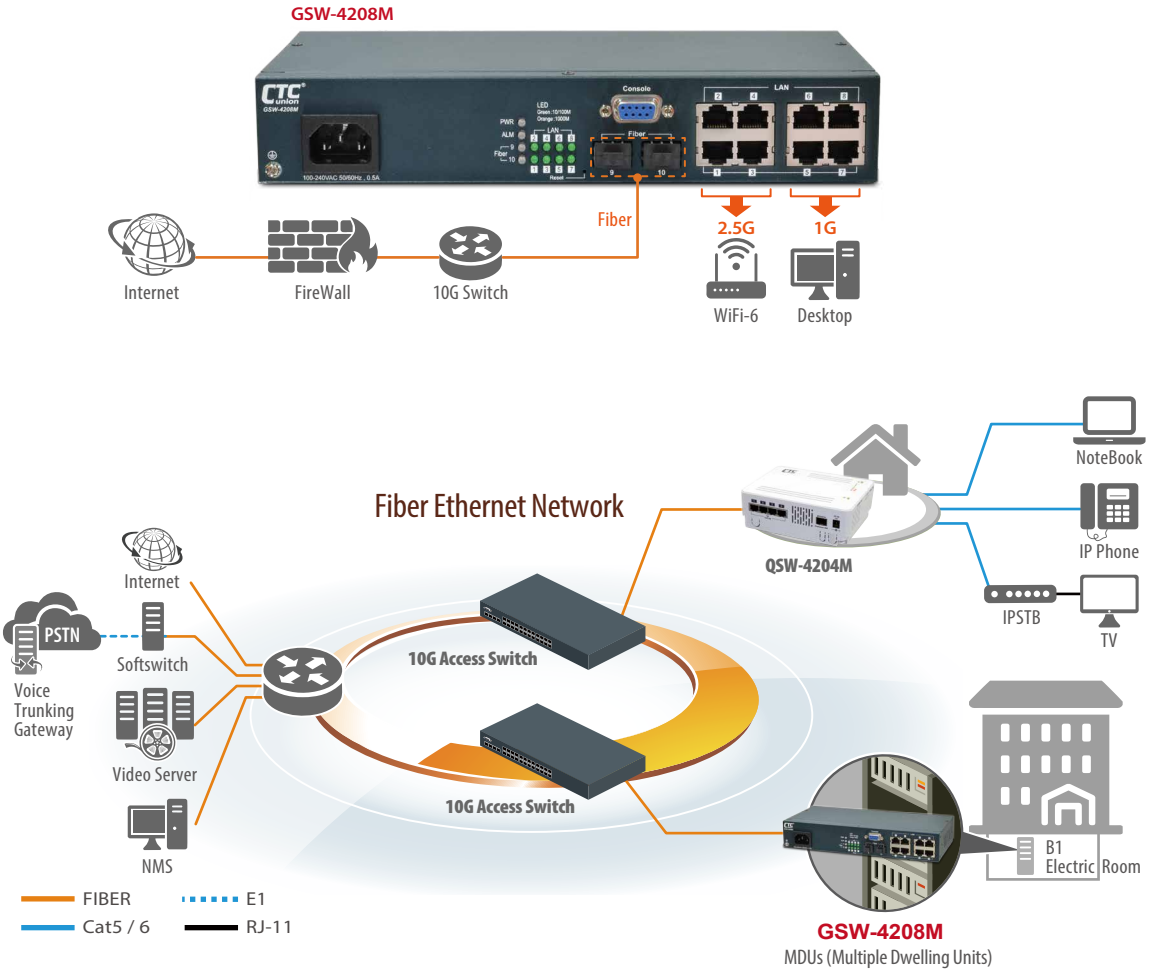
- 4-port GbE RJ45 + 4-port 1G/2.5G RJ45 + 2-port 1G/10G SFP+ uplink slot
- Supports 10240 Bytes jumbo frame
- Supports dying gasp
- Supports Cisco® like CLI

Specifications

Interface	fiber port: 1G/10Gbps SFP+ x2 Copper port: 10M/100M/1G/2.5Gbps RJ45 x4; 10/100/1000Mbps
Switching Fabric Capacity	68Gbps
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps 3720000pps @2500Mbps
Transmission Method	Store and Forward Switching
Packet buffer	8M bits
MAC table size	16K
Jumbo frame size	10240 Bytes
VLAN feature	IEEE 802.1Q tagged VLAN (4K VLAN groups) IEEE 802.1ad QinQ VLAN Voice VLAN; MAC based VLAN; Protocol based VLAN; IP subnet based VLAN Private VLAN for port isolation; VLAN translation GVRP (GARP VLAN registration protocol)
Link aggregation	Static trunk (SA, DA, IP, TCP/UDP port) IEEE 802.3ad LACP, 3 LACP trunk groups Max, 8 port Max. per LACP trunk
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 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
Power Input	AC power input (100~240V) ; -36 ~ -72 DC power input
Operating Temperature	0~50 degree C
Storage Temperature	-25~70 degree C
Humidity	5%~95% (non-condensing)
Dimension	117 x 250 x 43.8 mm (D x W x H)
Certification	CE, FCC class A

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Ordering Information

Model Name	Description
GSW-4208M-AC	4 x GbE RJ45+4 x 1G/2.5G RJ45+2 x 1G/10G SFP+ slots Managed Ethernet Switch with single AC power supply
GSW-4208M-DC	4 x GbE RJ45+4 x 1G/2.5G RJ45+2 x 1G/10G SFP+slots Managed Ethernet Switch with single DC power supply (-48V)
GSW-4208M-AA	4 x GbE RJ45+4 x 1G/2.5G RJ45+2 x 1G/10G SFP+ slots Managed Ethernet Switch with 2 x AC power supply
GSW-4208M-DD	4 x GbE RJ45+4 x 1G/2.5G RJ45+2 x 1G/10G SFP+ slots Managed Ethernet Switch with 2 x DC power supply (-48V)
GSW-4208M-AD	4 x GbE RJ45+4 x 1G/2.5G RJ45+2 x 1G/10G SFP+ slots Managed Ethernet Switch with AC + DC power supply



GSW-3208M2

8x GbE/RJ45 + 2x 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

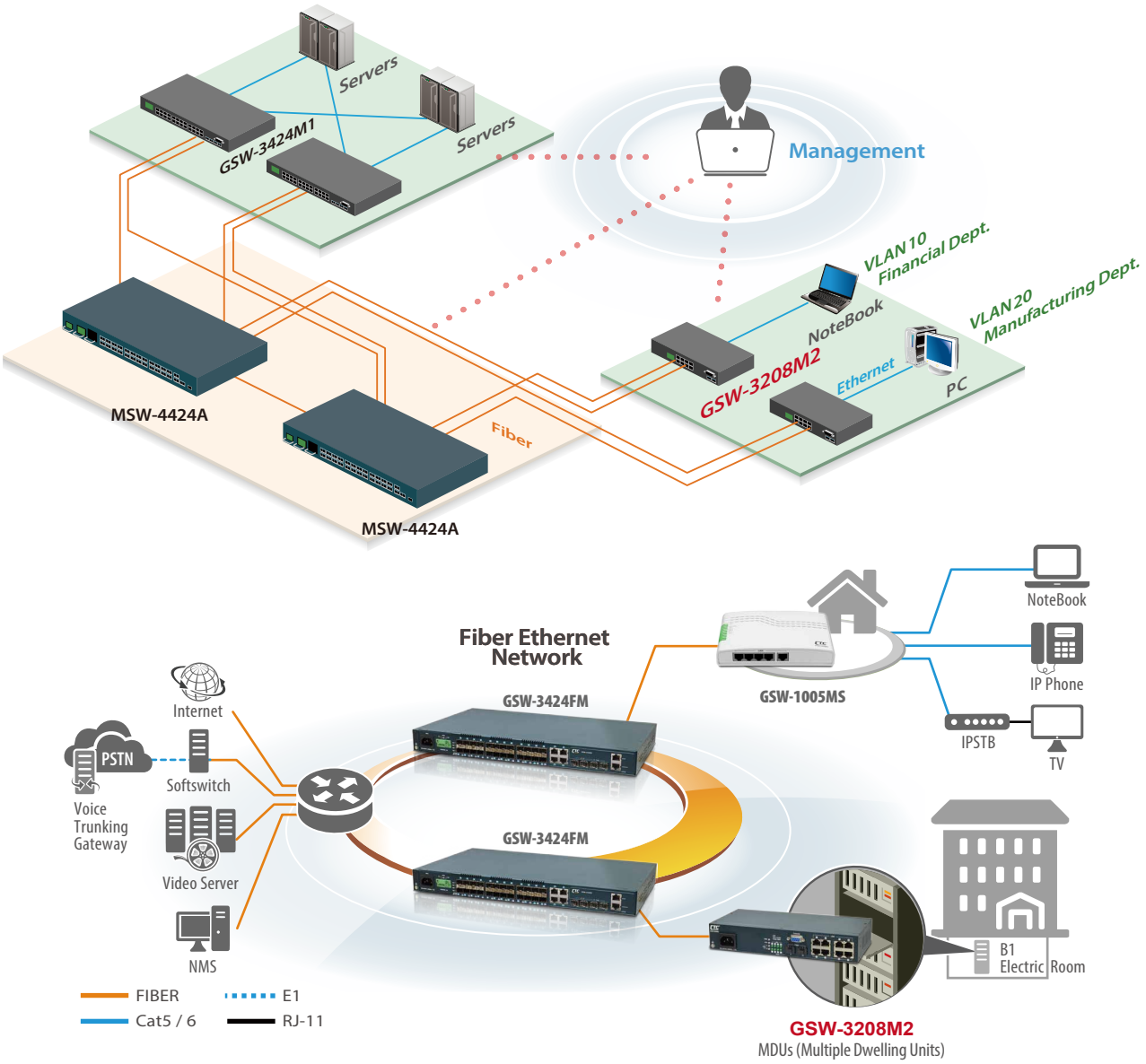
Specifications

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
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	117 x 250 x 43.8 mm (D x W x H)
Certification	FCC, CE

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Ordering Information

Model Name	Description
GSW-3208M2-AC	8x 10/100/1000Base-T + 2x GbE SFP slot L2 Managed Switch with AC power supply
GSW-3208M2-DC48	8x 10/100/1000Base-T + 2x GbE SFP slot L2 Managed Switch with DC 48V power supply

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

Accessories

GSW/MSW-RMK	19" rack mount kit

Remark: SFP Transceiver not included

SyncE IEEE 1588v2



MSW-4424CS

20x GbE/SFP + 4x GbE Combo + 4x 10G/SFP+
L2+ Managed Carrier Ethernet Switch w/ SyncE

The MSW-4424CS is positioned as a layer 2+ Gigabit access switch solution. It is equipped with 20 100Base-FX/1000Base-X dual speed SFP slots, 4 ports GbE combo (10/100/1000Base-T or 100/1000Base-X SFP) ports and 4 1000Base-X/10G Base-X dual speed SFP+ uplink slots. The MSW-4424CS offers the best flexibility and scalability for the operators or service providers to deploy their Metro Ethernet network. With the deployment of MSW-4424CS, the operators or service providers can flexibly provision the bandwidth for either 100Mbps or 1000Mbps as well as uplink connection of Gigabit or 10G speed upon their service applications. The MSW-4424CS has built-in dual power supplies to enable power redundancy function and enhance the high network availability.
Aimed at Metro Ethernet applications, the specifications of MSW-4424CS fully meet the attributes of Carrier Ethernet proposed by MEF (Metro Ethernet Forum). It complies with MEF 9 standard to support E-Line/E-Access service and MEF 14 standard to enable the bandwidth profile configuration delivering SLA (Service Level Agreement) for end-to-end performance characteristics as well as Ethernet OAM functionality to support carrier grade service OAM management rapidly detecting and recovering from the network incidents in real time. MSW-4424CS supports timing synchronization features (SyncE & IEEE 1588v2) to enhance and migrate a carrier grade network for mobile backhaul applications.

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

Enabling 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.

Timing synchronization

Advanced synchronization features such as SyncE or IEEE1588 v2 to allow operators delivering service with optimal stability and continuity in the end-to-end connectivity.

- Stable internal clock with a temperature compensated crystal oscillator (TCXO).
- Utilizes a Digital Phase Locked Loop (DPLL) for accurate clock recovery.
- Transparent timing accuracy of <20ns exceeds IEEE1588 v2 standards.

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 x 20 + GbE combo port (10/100/1000Base-T or 100/1000Mbps SFP slot) x 4 + 1G/10Gbps SFP+ slot x 4
Console Port	RJ-45 console port x 1
1PPS/ToD port	RJ45 x 2
Management Port	10/100/1000Base-T RJ45 x 1
Filter & Forward Rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps
Switching Fabric Capacity	128Gbps
Packet Forwarding Capacity	95Mpps
Transmission Method	Store and Forward Switching
Standards	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.1p
	IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1d,IEEE 802.1w
	IEEE 802.1s, IEEE 802.1x, IEEE 802.3ad, IEEE 802.3ah,
	IEEE 802.1ag, IEEE 802.3az, ITU-T Y.1731, ITU-T G.8262, IEEE 1588 v2
Packet Buffer	32M bits
Mac Table Size	32K
Max. Packet Size	10K Bytes

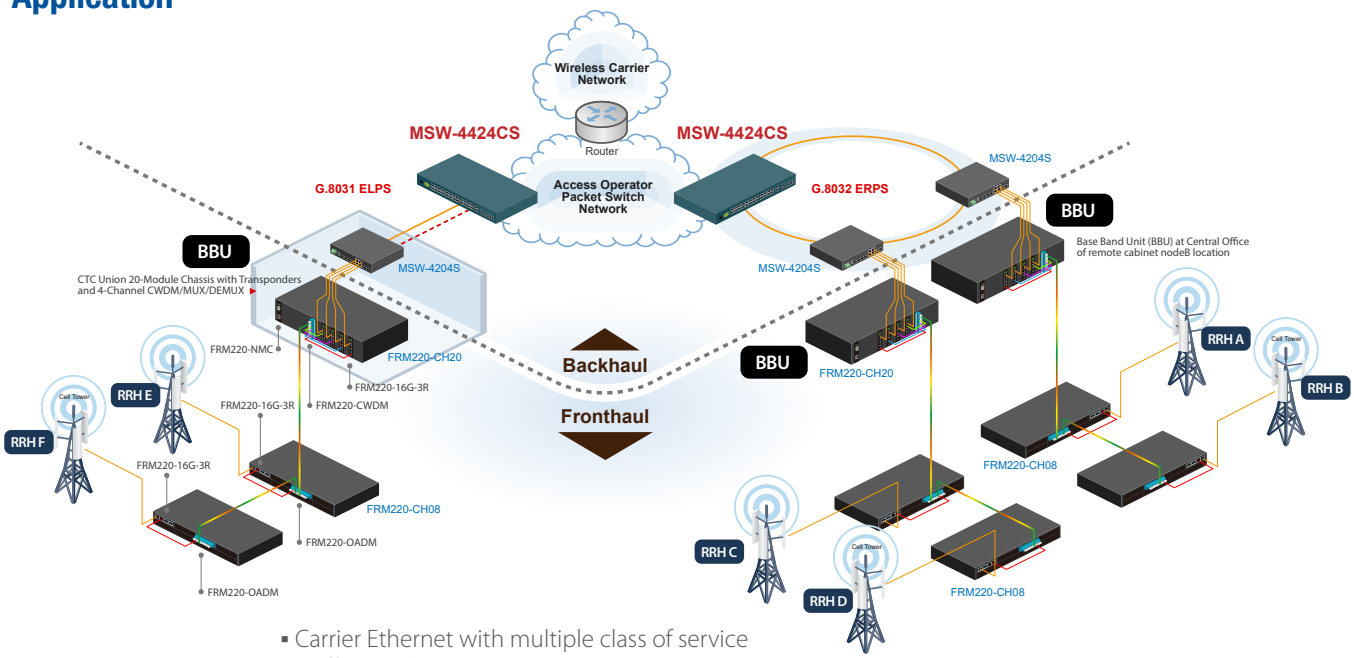
VLAN Feature	IEEE 802.1Q tagged VLAN (Max. 4K VLAN groups), port based VLAN, MAC based VLAN, protocol based VLAN, private VLAN, IEEE 802.1ad Q-in-Q, VLAN translation, GVRP
QoS Feature	IEEE 802.1p 8 priority queues per port, CoS based on switch port; VLAN ID; DSCP; TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking, Port based ingress/egress rate limit
	3 colors marker-CIR/EIR/Burst bandwith control
L2 switching Protection	STP, RSTP, MSTP, ITU-T G.8031/G.8032
Trunking	IEEE 802.3ad LACP (Max. 14 trunking group, Max. 8 ports per trunking group)
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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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	ITU-T G.8261/G.8262 SyncE, IEEE 1588 v2
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	250x 440x 43.5mm (DxWxH)
Certification	FCC, CE

Application



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

Ordering Information

Model Name	Description
MSW-4424CS-AC	L2+ 10G Fiber Access Switch with SyncE and build-in single AC power module
MSW-4424CS-DC	L2+ 10G Fiber Access Switch with SyncE and build-in single DC power module
MSW-4424CS-AA	L2+ 10G Fiber Access Switch with SyncE and build-in dual AC power module
MSW-4424CS-DD	L2+ 10G Fiber Access Switch with SyncE and build-in dual DC power module
MSW-4424CS-AD	L2+ 10G Fiber Access Switch with SyncE and build-in AC + DC power module

Power Type
MSW – 4424CS – □□
Example: MSW – 4424CS – AC

Accessories

10G SFP+ Transceiver Module

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



MSW-4424A

24x GbE/SFP + 4x 10G/SFP+
L2+ Carrier Ethernet Switch

MSW-4424A layer 2+ managed Gigabit Ethernet switches are positioned as a Carrier Ethernet access switch solution. They are equipped with 24 SFP based 100Base-FX/1000Base-X dual speed optical ports and 4 10G Base-X SFP+ or 1000Base-X SFP uplink ports. The MSW-4424A offers the best flexibility and scalability for operators and service providers to deploy their Metro Ethernet networks. Aimed specifically at Metro Ethernet deployment, the specifications of MSW-4424A fully meet the attributes of Carrier Ethernet proposed by the Metro Ethernet Forum. The switches comply with MEF 9 standard to support E-Line/E-Access services and MEF 14 standard to enable the bandwidth profile configuration for delivering SLA (Service Level Agreement) with predictable end-to-end performance characteristics. MSW-4424A also supports advanced service OAM management to rapidly detect and recover from the network incidents in real time.

Features

Front access and hot swappable design

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

Fully dual rate architecture of fiber link port

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

Fully Ethernet OAM enabled

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

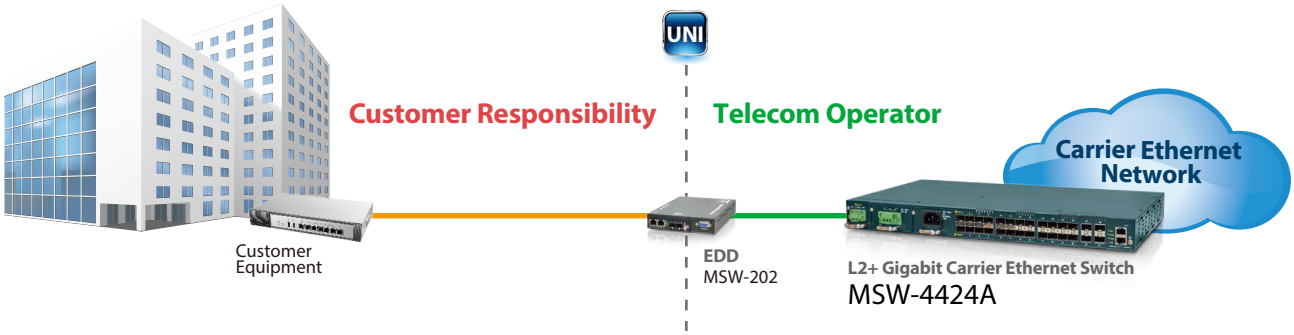
Specifications

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

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
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9
Software upgrade	TFTP / HTTP
Ethernet OAM	IEEE 802.3ah / IEEE 802.1ag / ITU-T Y.1731
LED display	Power, System, Console, Link/Act, Speed
Power input	100V ~ 240VAC
	-36~-75VDC (-48VDC Power)
	-18 ~-75VDC (-24VDC Power)
Power Consumption	< 60W
Operating Temperature	-10 ~ 60°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	270.3 x 437.5 x 43.5 mm (D x W x H)
Certification	FCC, CE

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Ordering Information

Model Name	Description
MSW-4424A	24x100/1000Base-X (SFP) + 4 x 10GBase-X SFP+ L2+ Gigabit Carrier Ethernet Switch

Remark: SFP Transceiver not included

Accessories

10G SFP+ Transceiver Module

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

Optional Power

4424-AC	100V ~ 240V AC power module (60W)
4424-DC24	18V ~ 75V DC power module (60W)
4424-DC48	36V ~ 75V DC power module (60W)

Optional FAN

4424-FAN	FAN module (3in1 FAN module, 10000RPM, software real-time status detection)



MSW-4424C

20x GbE/SFP + 4x GbE Combo + 4x 10G/SFP+
L2+ Managed Carrier Ethernet Switch

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

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

Features

Fully dual rate architecture of fiber link port

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

Fully Ethernet OAM enabled

Enabling 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

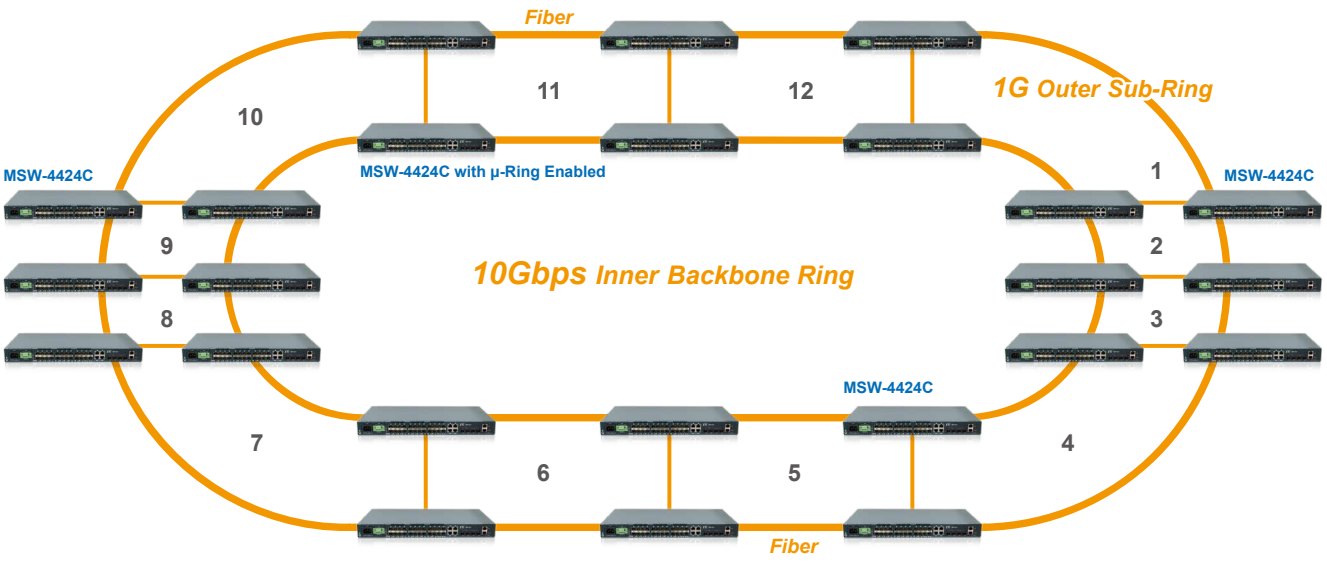
CE2.0 compliant product to guarantee the compatibility with other MEF certified equipment and reduce the risk and cost for Metro Ethernet network deployment of operators

Specifications

Interface	100/1000Mbps SFP slots x 20 + GbE combo port (10/100/1000Base-T or 100/1000Mbps SFP slot) x 4 + 1G/10Gbps SFP+ slot x 4
Console Port	RJ-45 console port x 1
Management Port	10/100/1000Base-T RJ45 x 1
Filter & Forward Rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps
Switching Fabric Capacity	128Gbps
Packet Forwarding Capacity	95Mpps
Transmission Method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.1p
	IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1d, IEEE 802.1w
	IEEE 802.1s, IEEE 802.1x, IEEE 802.3ad, IEEE 802.3ah
	IEEE 802.1ag, IEEE 802.3az, ITU-T Y.1731
Packet Buffer	32M bits
Mac Table Size	32K
Max. Packet Size	10K Bytes
VLAN Feature	IEEE 802.1Q tagged VLAN (Max. 4K VLAN groups), port based VLAN, MAC based VLAN, protocol based VLAN
	private VLAN, IEEE 802.1ad Q-in-Q, VLAN translation, GVRP
QoS Feature	IEEE 802.1p 8 priority queues per port, CoS based on switch port; VLAN ID; DSCP; TCP/UDP port
	IEEE 802.1p priority tag remarking, DSCP remarking, Port based ingress/egress rate limit
	3 colors marker-CIR/EIR/Bursts bandwith control
L2 switching Protection	STP, RSTP, MSTP, ITU-T G.8031/G.8032
Trunking	IEEE 802.3ad LACP (Max. 14 trunking group, Max. 8 ports per trunking group).
Security	IEEE 802.1x port based access control
	MAC based access control authentication
	RADIUS authentication, 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
SNMP agent	SNMP v1/v2c/v3, RMON Group 1,2,3 and 9
Software upgrade	TFTP/HTTP
Ethernet OAM	IEEE 802.3ah/IEEE 802.1ag/ITU-T Y.1731
LED display	Power, System, Console, Link/Act, Speed
Power input	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	250 x 440 x 43.5mm (DxWxH)
Certification	FCC, CE

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Ordering Information

Model Name	Description
MSW-4424C-AC	L2+ 10G Fiber Access Switch with build-in single AC power module
MSW-4424C-DC	L2+ 10G Fiber Access Switch with build-in single DC power module
MSW-4424C-AA	L2+ 10G Fiber Access Switch with build-in dual AC power module
MSW-4424C-DD	L2+ 10G Fiber Access Switch with build-in dual DC power module
MSW-4424C-AD	L2+ 10G Fiber Access Switch with build-in AC + DC power module

Power Type

MSW – 4424C – □□

Example: MSW – 4424C – AC

Accessories

10G SFP+ Transceiver Module

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



MSW-4428X

24x GbE/SFP + 4x GbE/RJ-45 with 4x 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 1000Base-X/10GBase-X 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

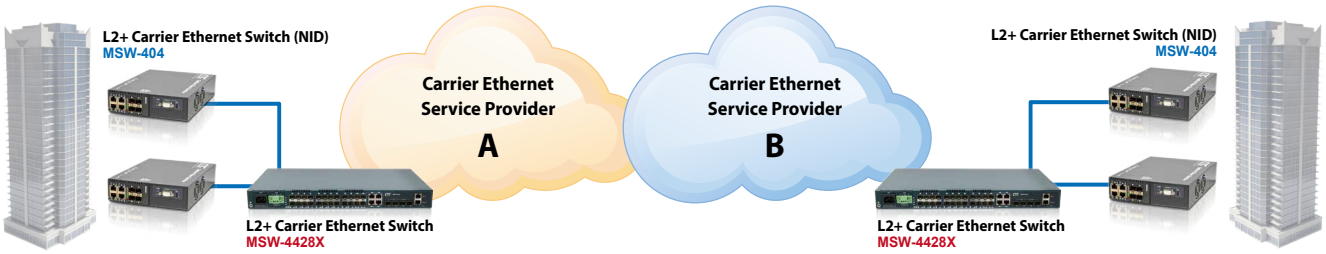
Specifications

Interface	100/1000Mbps SFP slots x 24 + 10/100/1000Base-T RJ45 x 4 + 1G/10Gbps SFP+ slot x 4
Console Port	RJ-45 console port x 1
Management Port	10/100/1000Base-T RJ45 x 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	Unknown/Broadcast/Multicast storm suppression
Management	Web/Telnet CLI/SNMP/console interface
	Web/CLI authentication, SSH v2, HTTPs, port mirroring, RSPAN
	syslog, IPv6 management, NTP, IEEE 802.3az, Energy, Efficient, Ethernet (EEE) power management
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	250 x 440 x 43.5mm (D x W x H)
Certification	FCC, CE

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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

Accessories

10G SFP+ Transceiver Module

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

NEW



MSW-4204

2x GbE/RJ45 + 2x 1G/2.5G, RJ45 + 2x 1G/10G/SFP+
L2+ Carrier Ethernet Switch

The MSW-4204 is the next generation of network interface device (NID) for business connection in Ethernet virtual connection technology and mobile backhaul transportation beyond 4G service. The MSW-4204 is equipped 2 SFP+ slots as dual rate 1000Base-X/10Gbase-X and 2 ports 10M/100M/1Gbps RJ45 as well as 2 ports 10M/100M/1G/2.5Gbps RJ45 network interfaces. It can be configurable as either UNI or NNI device and enabled to provision E-Line, E-LAN, E-Tree, E-Access services which are CE(Carrier Ethernet) 2.0 compliant for Metro Ethernet network deployments.

The MSW-4204 is CTC first switch product enabled 2.5Gbps data rate to support multigigabit speed. The enterprise will be able to leverage the reliable and secure Ethernet based high speed leased line service and also connect the existing Cat5e/Cat6 cabling infrastructure with WiFi 6 device, small cell or powerful workstations to break through the limitation of 1Gbps rate for content richer applications such as Cloud storage, 4K video streaming or HD teleconferencing.

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

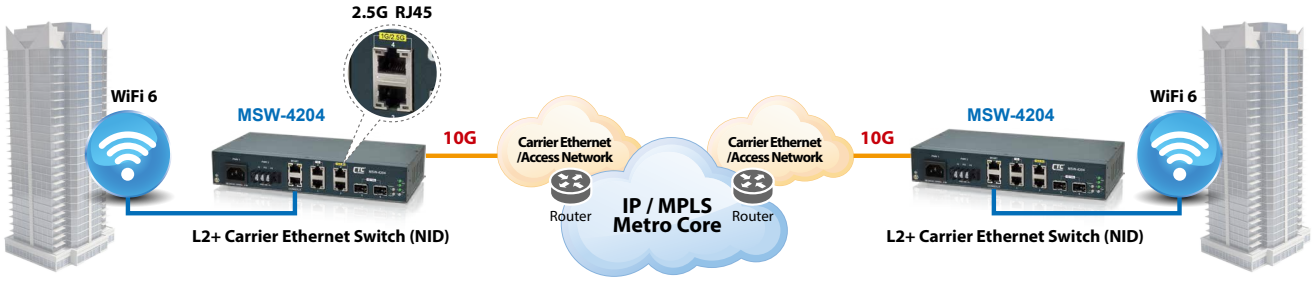
- The next generation of network interface device (NID), at customer premise, fulfilling the large-scale carrier Ethernet deployment for intelligent business connection and mobile backhaul services complied to CE 2.0 standard.
- CE2.0 standards compliant product guarantees the full interoperability with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

Specifications

Interface	10M/100M/1Gbps RJ45x2 + 10M/100M/1G/2.5Gbps RJ45x2 + 1G/10Gbps SFP+ x2
Console Port	RJ-45 console port x 1 (RS-232)
Management port	10/100/1000Base-T RJ45 x 1
Switching Fabric capacity	54Gbps
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps, 14880000pps at 10Gbps
Transmission Method	Store and Forward Switching
Standard	IEEE 802.3 az, IEEE 802.1Qbb, 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	16K
Max. Packet Size	10K Bytes
VLAN Feature	IEEE 802.1Q tagged VLAN(Max. 4K VLAN groups), port based VLAN, MAC based VLAN, protocol based VLAN, private VLAN, IEEE 802.1ad Q-in-Q, VLAN Translation, GVRP
QoS Feature	Supports Hierarchical Qos, IEEE 802.1Qbb Priority based flow control, 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
Trunking	IEEE 802.3ad LACP (Max. 3 trunking groups, Max. 6 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, RSPAN, syslog, IPv6 management, NTP
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, Speed/Act
Power Input	100V ~ 240VAC, -36 ~ -60VDC
Power Consumption	< 15W
Operating Temperature	0 ~ 50°C
Storage Temperature	-25 ~ 70°C
Humidity	5% ~ 90% (non-condensing)
Dimensions	117 x 250 x 43.8 mm (D x W x H)
Regulatory	FCC, CE

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Ordering Information

Model Name	Description
MSW-4204-AC	1G RJ45 x 2 + 1G/2.5G RJ45 x 2 + 1G/10G SFP+ slots x 2 L2+ Carrier Ethernet Switch with single AC power supply built-in
MSW-4204-DC	1G RJ45 x 2 + 1G/2.5G RJ45 x 2 + 1G/10G SFP+ slots x 2 L2+ Carrier Ethernet Switch with single DC power supply built-in
MSW-4204-AD	1G RJ45 x 2 + 1G/2.5G RJ45 x 2 + 1G/10G SFP+ slots x 2 L2+ Carrier Ethernet Switch with AC & DC power supply built-in

Accessories (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
GSW/MSW-RMK	19" rack mount kit

▪ Rack Mount Kit

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

Power Type

MSW – 4204 - □□

Example: MSW – 4204



MSW-404

4x GbE/RJ45 + 4x 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 x 4 + 10/100/1000Base-T RJ45 x 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
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	219.4 × 167.4 × 44.5 mm (D × W × H) (with CH02M Chassis)
Regulatory	FCC, CE

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application

Figure 1 : Ethernet Backbone Application

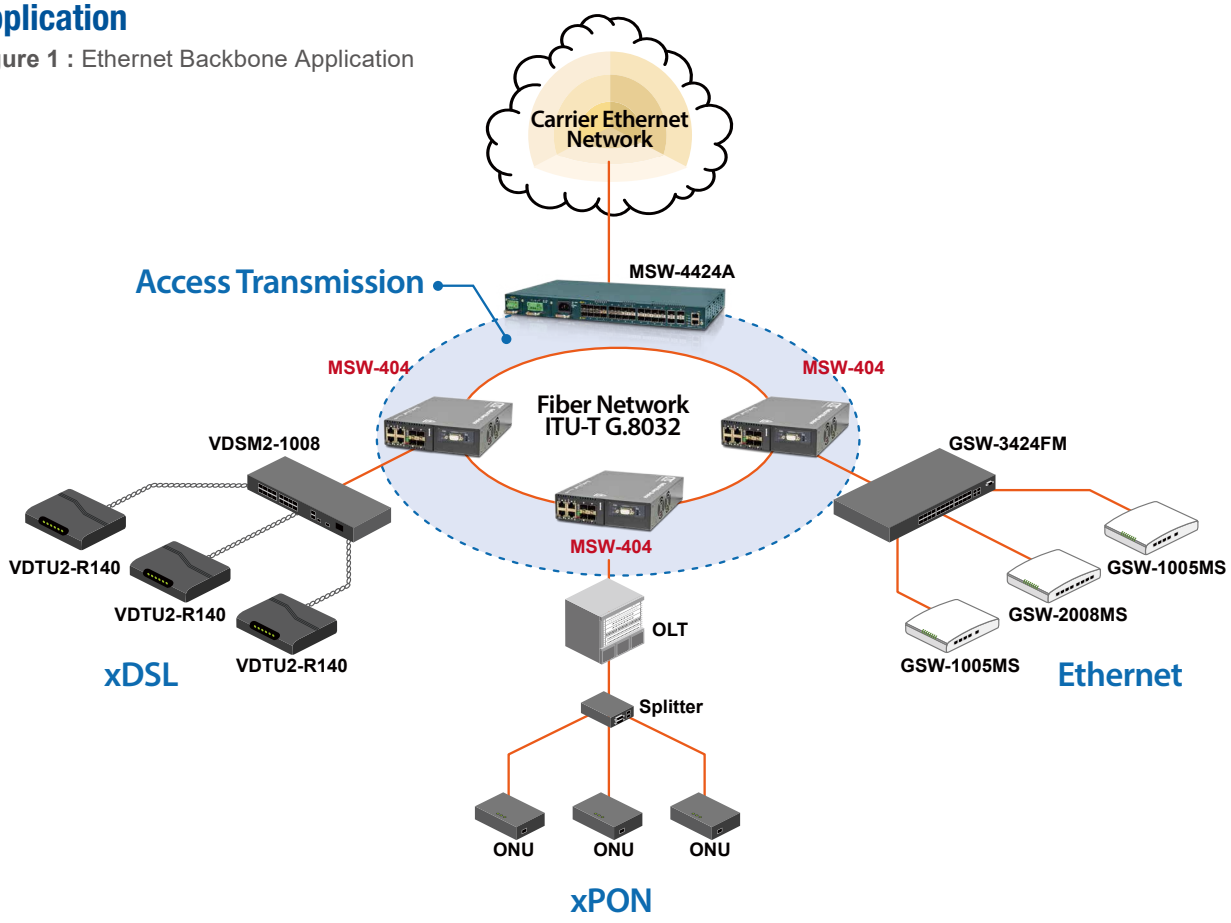
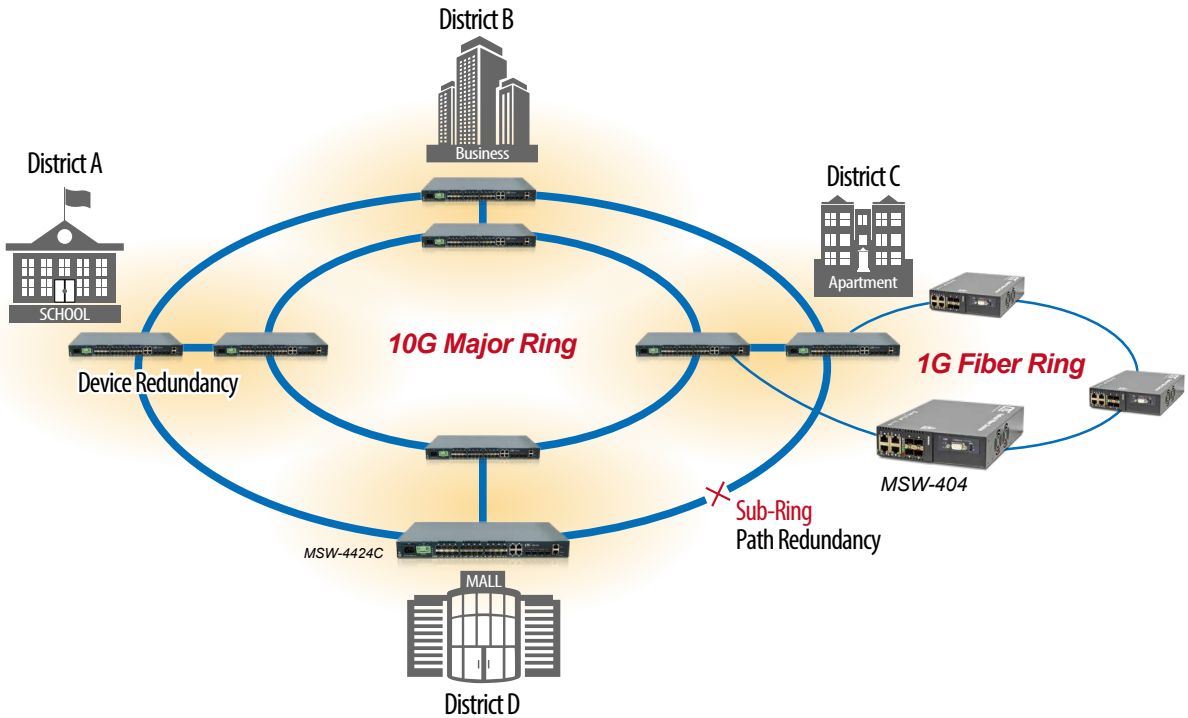


Figure 2 : μ-Ring Protected Ethernet Backbone Application



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



MSW-202A

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

MSW-202A is a carrier class Ethernet Demarcation Device (EDD) with 2x 10/100/1000Base-T Ethernet ports and 2 x 100/1000/2500Base-X triple 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 x 2 + 10/100/1000Base-T RJ45 x 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, IEEE802.3ah, IEEE802.1ag, 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
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	180 × 135 × 30 mm (D × W × H) (with CH01M Chassis)
Regulatory	FCC, CE

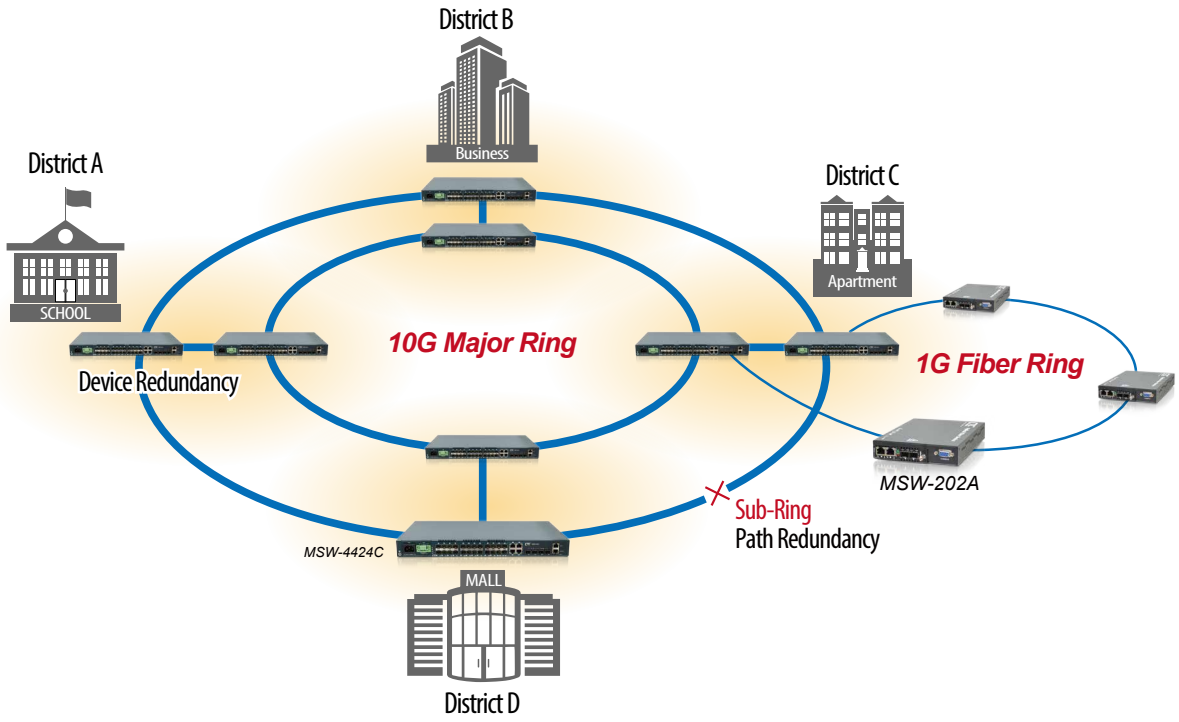
Application

Figure 1 : Business Connection Service



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

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



MSW-202

2x GbE/RJ45 + 2x Dual Rate SFP
L2+ Carrier Ethernet Switch (EDD)

MSW-202 is a carrier class Ethernet Demarcation Device (EDD) with 2x 10/100/1000Base-T Ethernet ports and 2 x 100/1000/2500Base-X triple rate SFP fiber ports which enables EPL (Ethernet Private Line) & EVPL (Ethernet Virtual Private Line) services with advanced carrier Ethernet features per the Metro Ethernet Forum (MEF 9 and 14). By supporting link and service Ethernet OAM schemes, the MSW-202 also provides extensive fault detection and diagnostic capabilities to ensure that actual network use complies with pre-agreed service level agreements (SLAs).

Features

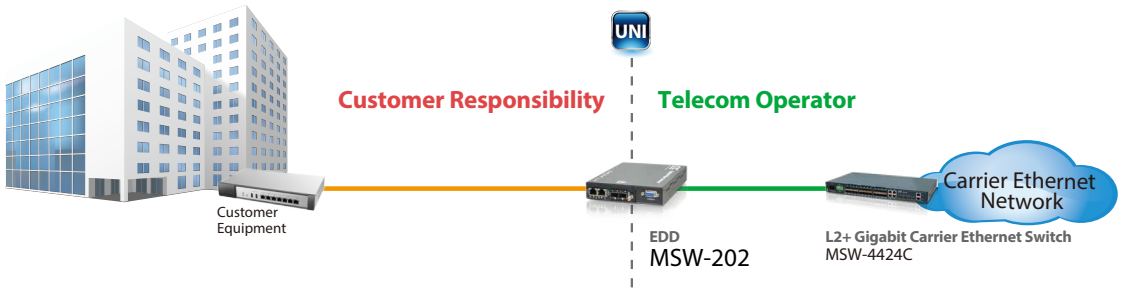
- Complies with CE1.0
- IPv6 management
- IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731
- IEEE 1588v2

Specifications

Interface	100/1000Mbps SFP slots x 2 + 10/100/1000Base-T RJ45 x 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, IEEE802.3ah, IEEE802.1ag, 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
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	185 × 135 × 30 mm (D × W × H) (with CH01M Chassis)
Regulatory	FCC, CE

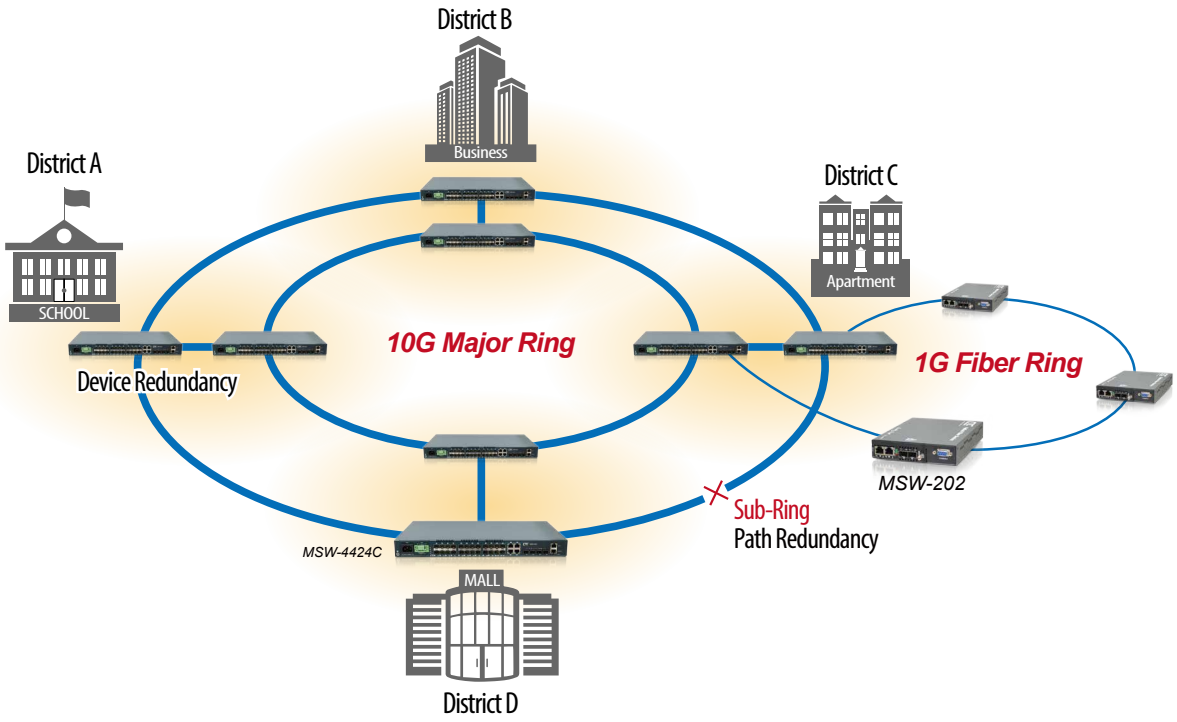
Application

Figure 1 : Business Connection Service



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Figure 2 : µ-Ring Protected Ethernet Backbone Application



Ordering Information

Model Name	Description
MSW-202-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-202-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-202-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 – 202 - □□

Example: MSW – 202 - AC



QSW-4204M

1xGbE, RJ45 + 4x1G/2.5G, RJ45 + 2x1G/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

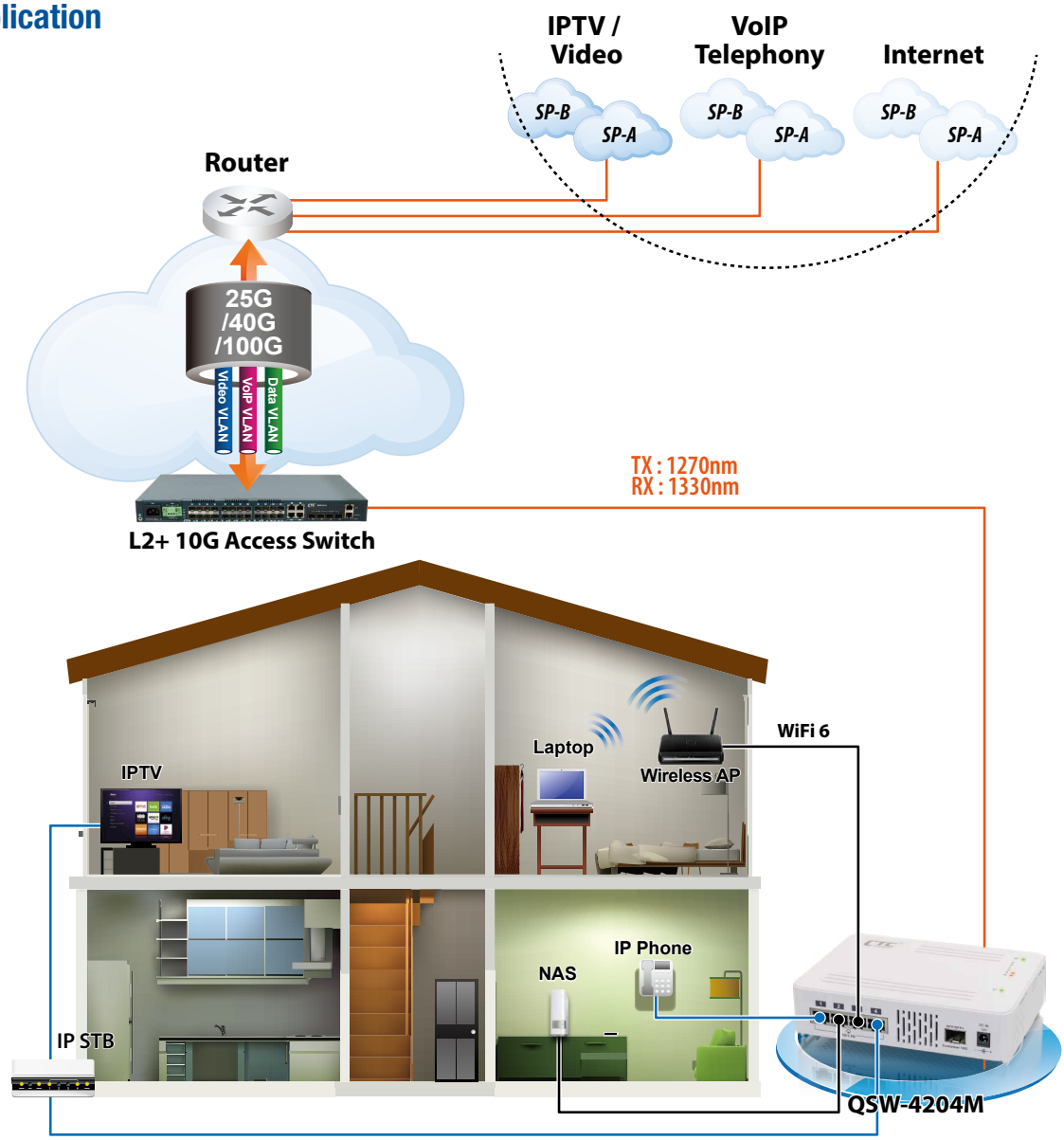
Interface	fiber port: 1G/10Gbps SFP+ x2 Copper port: 10M/100M/1G/2.5Gbps RJ45 x4; 10/100/1000Mbps RJ45 for telemetry x1
Switching Fabric Capacity	62Gbps
Packet forwarding rate	14880pps @10Mbps 148800pps @100Mbps 1488000pps @1000Mbps 3720000pps @2500Mbps
Transmission Method	Store and Forward Switching
Packet buffer	8M bits
MAC table size	16K
Jumbo frame size	10240 Bytes
VLAN feature	IEEE 802.1Q tagged VLAN (4K VLAN groups) IEEE 802.1ad QinQ VLAN Voice VLAN; MAC based VLAN; Protocol based VLAN; IP subnet based VLAN Private VLAN for port isolation; VLAN translation GVRP (GARP VLAN registration protocol)
Link aggregation	Static trunk (SA, DA, IP, TCP/UDP port) IEEE 802.3ad LACP, 3 LACP trunk groups Max, 8 port Max. per LACP trunk
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 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
Power Input	12V/2A AC power adaptor

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Operating Temperature	0~50°C
Storage Temperature	-25~70°C
Humidity	5%~90% (non-condensing)

Dimension	162 x 122 x 43.5mm (W x D x H)
Certification	CE, FCC, class A

Application

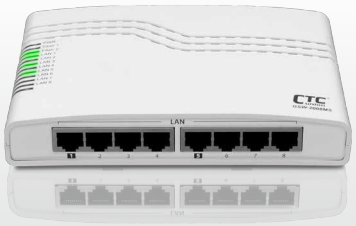


Ordering Information

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

Optional Accessory

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



GSW-2008MS

8x GbE/RJ45 + 2x 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 GSW2008 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

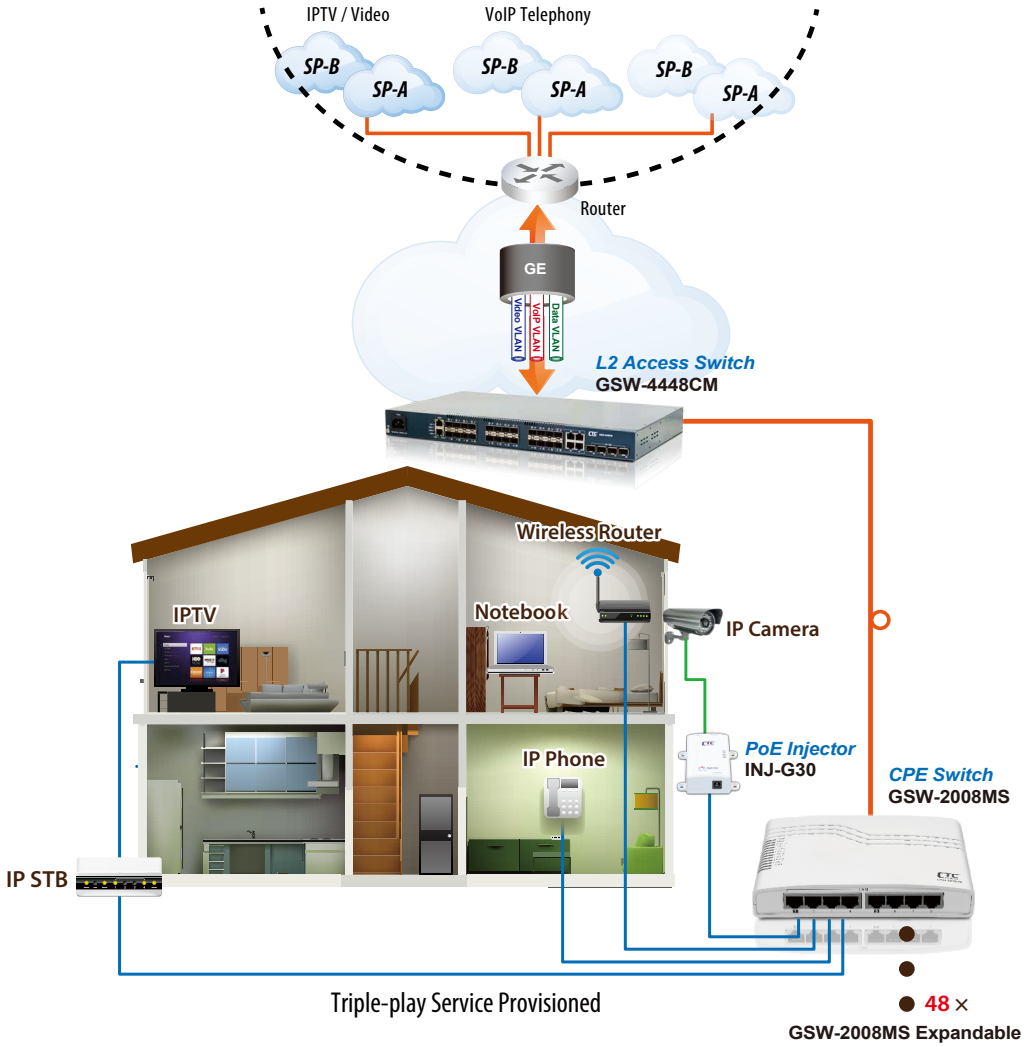
Interface	8x 10/100/1000Base-T RJ-45 with 2x 100/1000Base-X SFP
Filter & Forward rate	14880pps at 10Mbps, 148800pps at 100Mbps, 1488000pps at 1Gbps
Switching Fabric capacity	20Gbps
Transmission method	Store and Forward Switching
Standard	IEEE 802.3u, IEEE 802.3z, IEEE 802.3ae, IEEE 802.3x, IEEE 802.1p, 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
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	170 × 120 × 35mm (D x W x H)
Certification	FCC, CE

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application

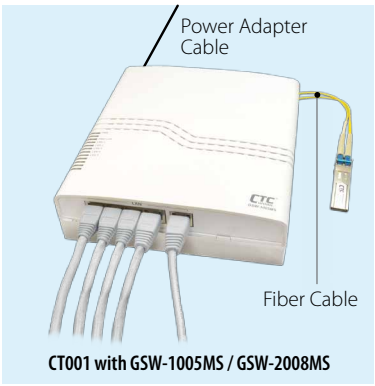
Fiber to the Home Triple-Play Application



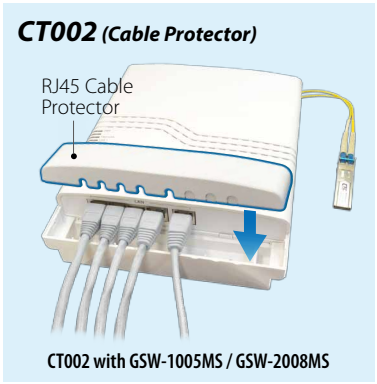
Cable Tray Assembly

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.





CT001 with GSW-1005MS / GSW-2008MS



CT002 with GSW-1005MS / GSW-2008MS

Ordering Information

Model Name	Description
GSW-2008MS	8-port 10/100/1000 Base-T to 2-port100/1000 Base-X Managed GbE Switch (cable tray optional)

Accessories

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

Dimensions (mm)



CT001



CT002



GSW-1005MS

5x GbE/RJ45 + 1x 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)

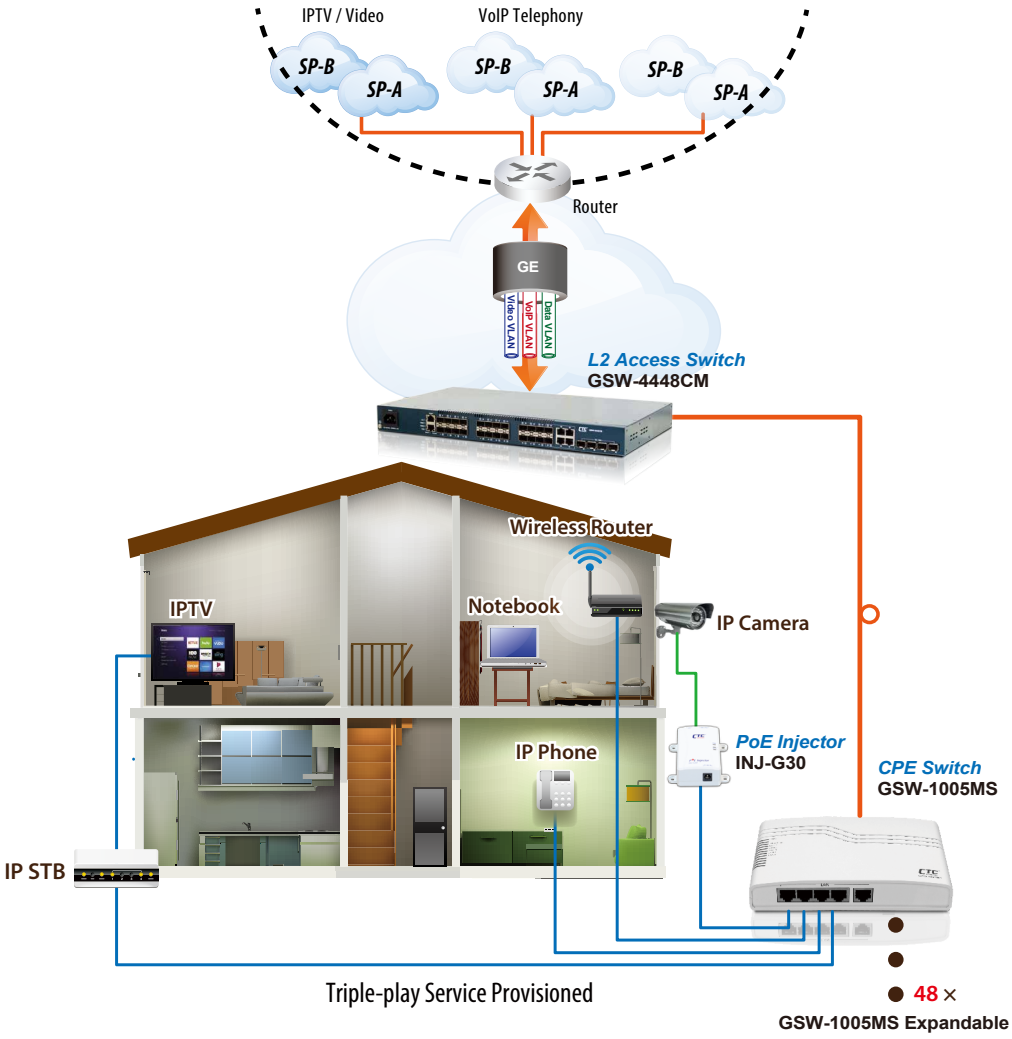
Specifications

Interface	5x 10/100/1000Base-T RJ-45 with 1x 100/1000Base-X SFP
Switching fabirc 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
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	170 × 120 × 35mm (D x W x H)
Certification	FCC, CE

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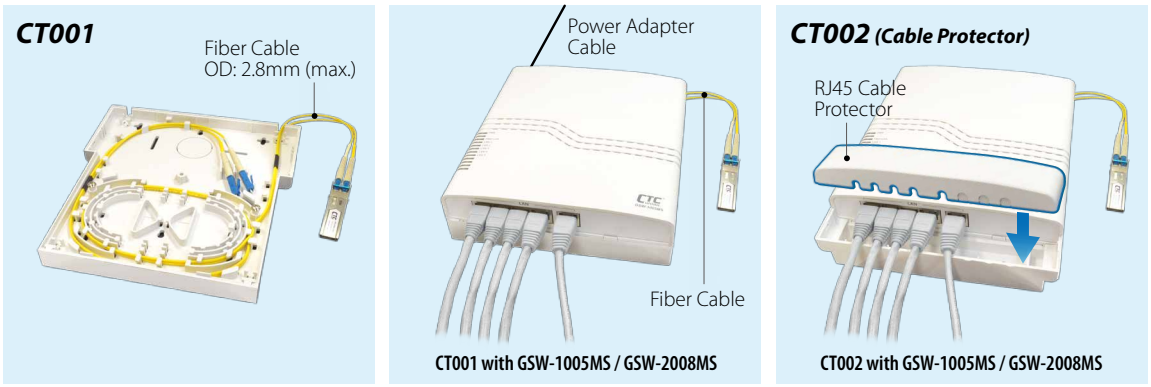
Application

Fiber to the Home Triple-Play 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.



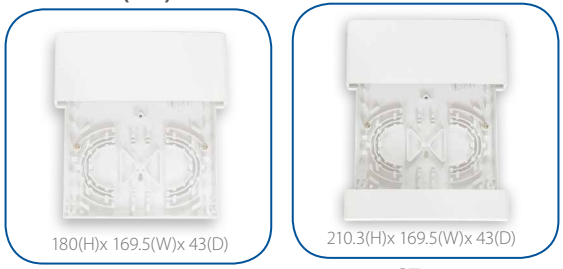
Ordering Information

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

Accessories

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

Dimensions (mm)





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 dual rate FE/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

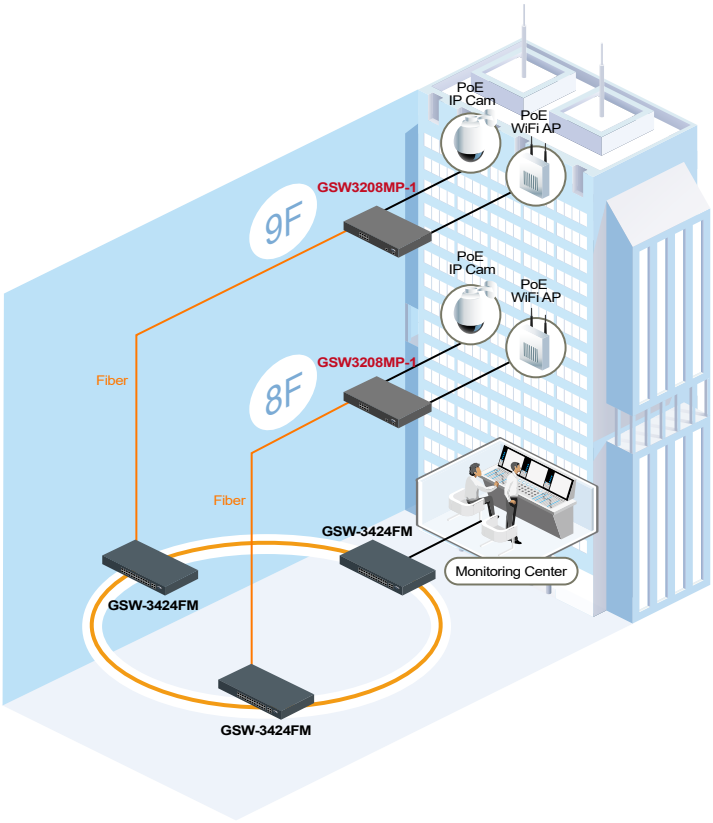
- 8 x RJ45/PoE+ ports with 180W power budget totally
- Cable diagnostics to test UTP cable or determine broken point distance
- Text based CLI configuration download and upload
- Advanced PoE management
  - PoE PD failure auto check and reset if PD failed
  - PoE port on/off scheduling
  - PoE configuration 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	140 x 290 x 43.8 mm (DxWxH)
Certification	CE, FCC class A

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Ordering Information

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



GSW-3224MP

24x GbE/RJ45 + 2x 1GbE Combo with 24x PoE+ (450W) L2+ Managed Switch

The GSW-3224MP is 24-port 10/100/1000M PoE + 2 Gigabit SFP/RJ45 Copper Combo Ports L2+ Full Managed Switch that is designed for small or medium network environment to strengthen its network connection. The 24 PoE ports support IEEE 802.3at/af PoE technology up to 30W per port and maximum 100m transmission distance. The switch equipped with AC to DC power module to support 450W power budget for PoE power. The added 2 SFP/RJ45 combo ports support 100M and Gigabit Fiber transceiver for long distance transmission. The switch also supports Layer 2+ full management software features. These features are powerful to provide PoE Control, Network Control, Management, Monitor and Security features' requests. It is the best choice to boost your network with better performance, efficiency and high PoE power consumption.

When the function called "PD alive check" is enabled, GSW-3224MP will detect a network PoE powered device (for example, an IP CAM) with a set of IP address periodically. If the switch doesn't get any replies from the network PoE powered device, GSW-3224MP will do a power cycle (PoE power OFF, and PoE power ON) to the port that connects the network PoE powered device, allowing that device to reboot. You can set the frequency of detecting, number of times of detecting, and the time period to perform power cycle when there's no reply via the switch's PoE configuration web page.

Features

- 24-port 10/100/1000M PoE + 2 Gigabit SFP/RJ45 Copper Combo Ports
- IEEE 802.3at/af PoE, up to 30W per port
- Layer 2+ Full Managed Software Features with MSTP, LACP, LLDP, sFlow, 802.1X, TACACS+, and ACL
- DHCP Server/Relay/Snooping
- PD Alive Check
- Automatically adjust Fan speed function

Specifications

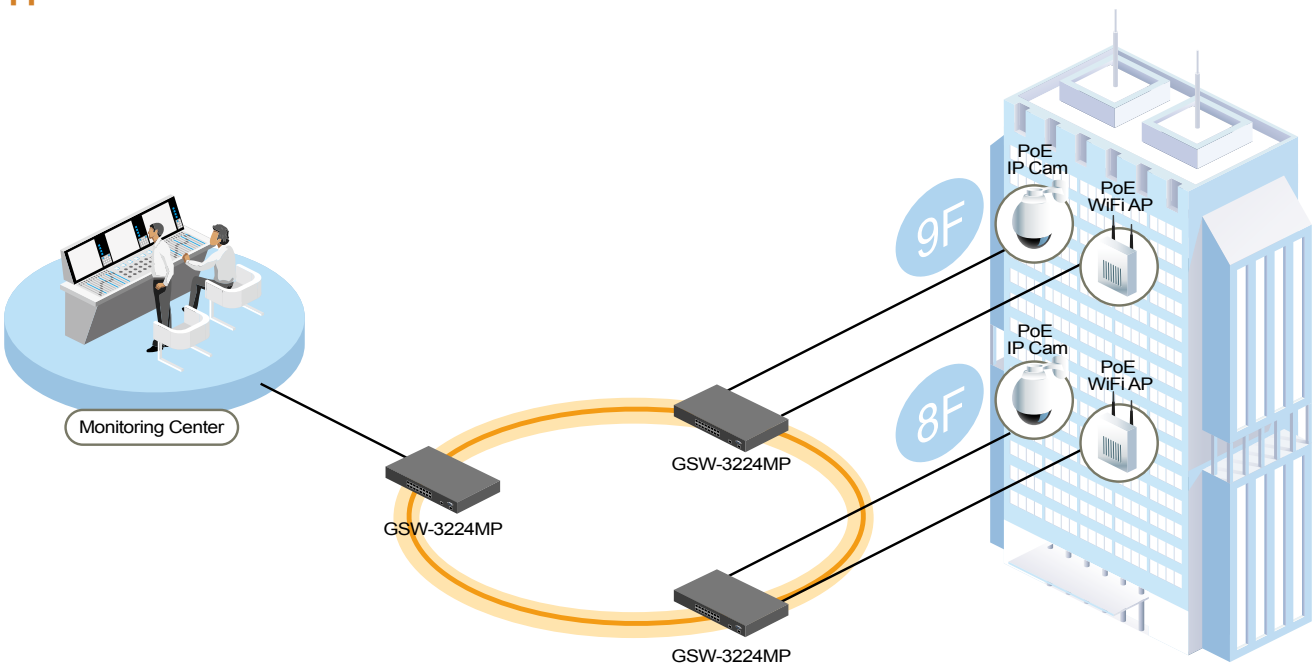
Interface	
10/100/1000 Base-T	24
100/1000Base-X SFP & 1000M RJ45 Combo Port	2
Console Port for CLI Management	1
System Performance	
Packet buffer	4M bits
MAC Table size	8K
Switching Fabric Capacity	52Gbps
Forwarding Rate	38.688Mbps
PoE Features	
IEEE 802.3 af/at	IEEE 802.3af & IEEE 802.3at
Number of PoE Ports	24
Max. Power Budget	450Watts
Max. System Power Consumption	70Watts
Max. Total Power Consumption	520Watts
External/Internal Power	Internal Power
Power Feeding Detecting Capabillity on PD	
PD Alive Check	
PD Classification	
Power Management (Per Port)	Enable/Disable PoE Per Port
	Priority Setting Per Port
	Power Level Setting Per Port
	Overloading Protection
L2 Features	
Auto-Negotiation	
Auto MDI/MDIX	
Flow Control (Duplex)	802.3x (Full)
	Back-Pressure (Half)

Spanning Tree	IEEE 802.1D (STP)
	IEEE 802.1W (RSTP)
	IEEE 802.1S (MSTP)
VLAN	VLAN Group : 4K
	Tagged Based
	Port Based
	Voice VLAN : Voice VLAN with OUI
Link Aggregation	IEEE 802.3ad with LACP
	Static Trunk
	MAX. LACP Link Aggregation Group: 13
	Max. Port Per Link Aggregation Group: 8
IGMP Snooping	IGMP Snooping v1/v2/v3 : Supports 1024 IGMP groups
	IGMP Static Multicast Addresses : Supports 1024 Static Multicast addresses
	IPv6 MLD Snooping : Supports 1024 NLD group
	MLD Static Multicast Addresses : Supports 1024 Static Multicast addresses
	Querier Immediate Leave
Storm Control (Broadcast/Multi-cast/UnKnow Unicast)	
Jumbo Frame Support	9.6KB
Qos Features	
Number of Priority Queue	8 queue/port
Rate Limiting	Ingress : Yes, 1KBps/1pps
	Egress : Yes, 1KBps/1pps
Diffserv (RFC2474 Remarking)	
Scheduling (WRR, Strict, Hybrid)	
CoS	IEEE 802.1p
	IP Tos Precendence, IP DSCP

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Security	
Management System User Name/Password Protection	
User Previllege	Set User Previllege up to 15 level
Port Security (MAC-based)	
IEEE 802.1x Port-based Access Control	
ACL (L2/L3/L4)	
IP Source Guard	
RADIUS (Authentication, Authorization, Accounting)	
TACACS+	
HTTP & SSL (Secure Web)	
SSH v2.0 (Secured Telnet Session)	
MAC/IP Filter	
Management	
Command Line Interface (CLI)	
Web Based Management	
Telnet	
Access Management Filtering	SNMP/Web/SSH/Telnet
Firmware Upgrade via HTTP	
Dual Firmware Images	
Configuration Download/Upload	
SNMP (v1/v2c/v3)	
RMON (1,2,3 & 9 groups)	
DHCP (Client/Relay/Option82/Snooping)	
System Event/Error Log	
NTP/LLDP	
Cable Diagnostics	
IPv6 Configuration	
Port Mirroring	One to One or Many to One
Mechanical	
Power Input	100~240VAC
Dimension	44 x 440 x 331mm (H x W x D)
LED	Power, PoE, Link/Act, SFP
Operating Temperture	0~45°C
Storage Temperture	-20~80°C
Operating Humidity	5~90% (non-condencing)
Weight	4.8kg
Certification	VCCI, CE, FCC Class A

Application



Ordering Information

Model Name	Description
GSW-3224MP	24 ports 10/100/1000Base-T + 2 ports GbE Combo (SFP or RJ45) L2+ Managed PoE Switch



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

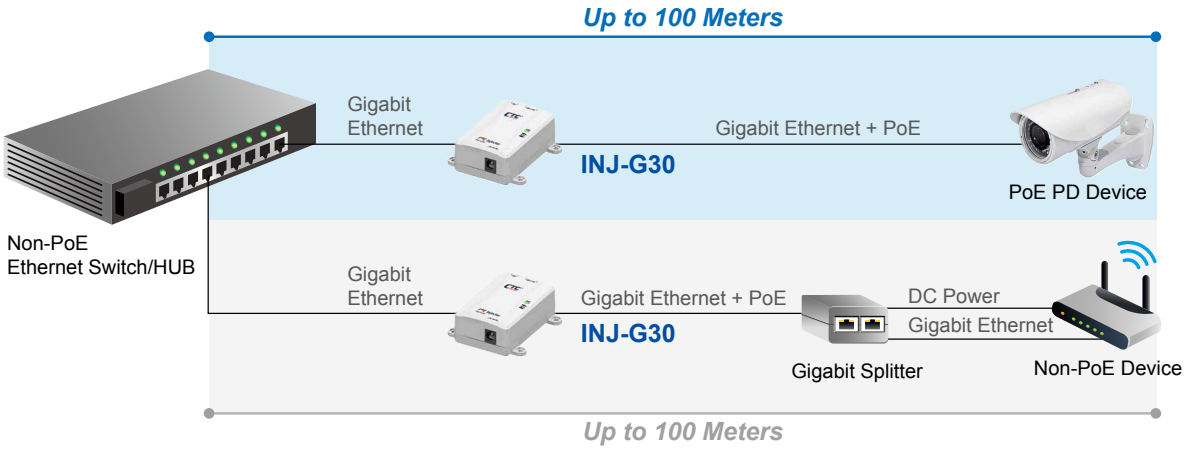
- 1 Port PoE Injector, 55VDC /30W output
- Compliant with IEEE 802.3af/at
- Providing 1 10/100/1000Mbps pass through data rate
- Wall Mountable
- Compliant with IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX and IEEE 802.3ab 1000Base-T
- Safety & EMI Certificates: CE & FCC Class B Smart plug & play
- Compact 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	80 x 68 x 24mm (D x W x H)
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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



DCM-1000

Dispersion Compensation Module

Dispersion Compensation Modules (DCMs) are designed to compensate the dispersion of conventional G.652 fiber or other transmission fibers having a positive dispersion that occurs in long-haul optical transmission systems. These products offer superior polarization mode dispersion (PMD) performance and a negative dispersion slope, allowing a DWDM or long-haul system to maintain signal integrity over great distances. Low insertion loss and PMD make the product ideal for long-haul telecommunication systems as well as DWDM transport. The compact 1U size can bemountedeasily on19 and 23-inch cabinet rack.

Applications

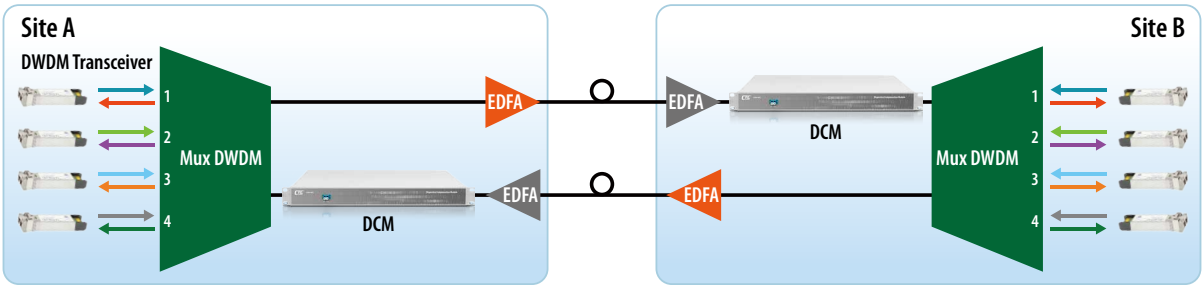
- High speed transmission system
- Long-haul telecommunication system
- Dispersion limit extension of DWDM system

Features

- DWDM system dispersion compensation and Broadband low residual dispersion
- G.652 fiber C-Band 100% slope compensation
- Low insertion loss
- Low polarization model dispersion
- Conform to Telcordia GR-2854-CORE standard
- Reliability tested by Telcordia GR-1221-CORE standard

Applications

DWDM Active System with EDFA & DCM



Specifications

Parameters / Model No. (xx=)	DCM1020	DCM1040	DCM1060	DCM1080	DCM1100	DCM1120
Compensated Distance (km)	20	40	60	80	100	120
1545nm dispersion (ps/nm)	-340+/-10	-670+/-20	-1000+/-30	-1340+/-40	-1680+/-50	-2010+/-60
1545nm relative dispersion slope	0.0036 +/- 10%					
Insertion Loss (dB)	≤3.3	≤4.7	≤6.4	≤8.0	≤9.5	≤11.0
Insertion Loss (typ) (dB)	2.7	4.0	5.4	6.7	8.0	9.3
Polarization mode dispersion (ps)	≤0.6	≤0.7	≤0.8	≤0.9	≤1.0	≤1.1
Polarization mode dispersion (types)	0.2	0.3	0.4	0.5	0.6	0.7
Polarization dependent loss (dB)	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1

Parameter	Min	Max	Unit
Brillouin scattering threshold	6	-	dBm
Non-linear coefficient	-	1.4*10-9	(n2/Aeff) (W-1)
Effective area (Aeff)@1550nm	20	-	um2
Maximum Input power	-	23	dBm
Operating temperature range	-5	70	℃
Storage temperature range	-40	85	℃
Relative humidity	<85%	85	RH%
Environmental / Reliability testing	Comply with Telcordia GR-2854 and GR-1221 standard		
Size	482.6(W) x 350(D) x 43.6(H) mm		

Ordering Information

Model Name	Description
DCM1020-LC/U	1U 19" Rack, C-Band Dispersion Compensation Module 20km LC/UPC
DCM1040-LC/U	1U 19" Rack, C-Band Dispersion Compensation Module 40km LC/UPC
DCM1060-LC/U	1U 19" Rack, C-Band Dispersion Compensation Module 60km LC/UPC
DCM1080-LC/U	1U 19" Rack, C-Band Dispersion Compensation Module 80km LC/UPC
DCM1100-LC/U	1U 19" Rack, C-Band Dispersion Compensation Module 100km LC/UPC
DCM1120-LC/U	1U 19" Rack, C-Band Dispersion Compensation Module 120km LC/UPC

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



CWMD-40
CWMD-80

4/8 ch CWDM Mux/DeMux

The CWMD-40/80 Mux/DeMux are standalone CWDM Mux/DeMux with monitor port that support ITU-T G.694.2 wavelengths between 1271nm to 1611nm in 20nm increments. The CWMD-40/80 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 CWMD-40/80 Mux/DeMux are available in 4-channel and 8-channel (wavelength) models, supporting a variety of wavelength combinations and port configurations. The CWMD-40/80 are passive devices that require no external power and can be equipped with media converters and transponders to provide the capability 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
- Integration with media converter and transponders for CWDM application

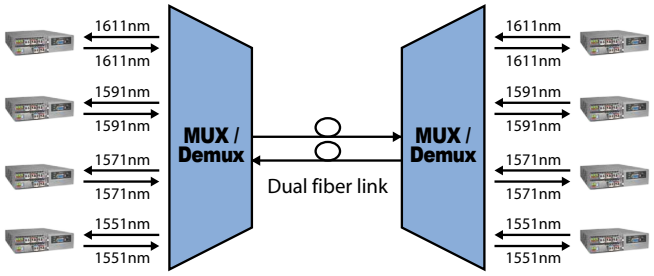
Specifications

Channel	4, 8 channels
Standards	ITU-T G.694.2
Wavelength	1271 ~ 1611nm
Insertion Loss	4ch < 1.8dB, 8ch < 3.0dB
Return Loss	>45dB
Monitor Port	1%
Option	Upgrade port
	Wide 1310 ± 50 nm
Line Link	Two fiber or single fiber

Connector	LC / UPC
Dimension	4ch : 159.5x 23.2 x88 mm (D x W x H)
	8ch : 159.5x 44.5 x88 mm (D x W x H)
Weight	4ch : 200g
	8ch : 380g
Temperature	0 ~ 50°C (Operating)
	-40 ~ 70°C (Storage)
Humidity	0 ~95% (non-condensing)
Certification	CE, FCC

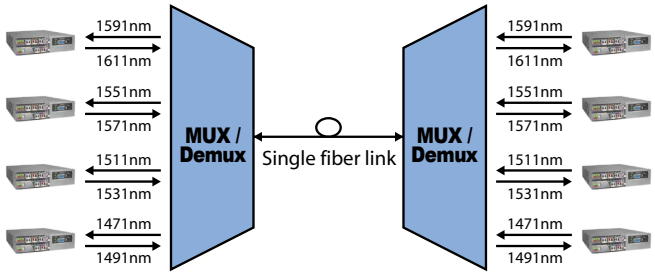
Application

Figure 1 :



4 channels Duplex Transmission CWDM Mux & Demux

Figure 2 :



4 channels Bi-Directional Transmission CWDM Mux & Demux

Ordering Information

Model Name	Description
Dual Fiber CWDM Mux/Demux	
CWMD40-5157	4Ch, TX/RX(1511, 1531, 1551, 1571nm), LC/UPC
CWMD40-5561	4Ch, TX/RX(1551, 1571, 1591, 1611nm), LC/UPC
CWMD80-4761	8Ch, TX/RX(1471 ~ 1611nm), LC/UPC
Single Fiber CWDM Mux/Demux	
CWMD40A-4761	4Ch, TX(1471, 1511, 1551, 1591nm), RX(1491, 1531, 1571, 1611nm) type A, LC/UPC
CWMD40B-4761	4Ch, TX(1491, 1531, 1571, 1611nm), RX(1471, 1511, 1551, 1591nm) type B, LC/UPC
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
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

Optional Accessories

■ SFP Transceiver

155Mbps CWDM Dual Fiber SFP / (LC Type) OC3/STM1/Fast Ethernet (RoHS)

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-5080-Cxx-DD	1471~1611	SMF	+3~-4	-34	30	80km	✓	0~70
SFS-5080-Cxx-DD	1271~1451	SMF	+3~-4	-34	30	80km	✓	0~70
SFS-5100-Cxx-DD	1471~1611	SMF	+5~0	-35	35	100km	✓	0~70
SFS-5100-Cxx-DD	1271~1451	SMF	+5~0	-35	35	100km	✓	0~70

1.25Gbps CWDM Dual Fiber SFP / (LC Type) Gigabit Ethernet / 1X Fiber channel(RoHS)

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-7040-Cxx-DD	1471~1611nm	SMF	+1~-4	-24	20dB	40km	✓	0~70
SFS-7040-Cxx-DD	1271~1451nm	SMF	+1~-4	-24	20dB	40km	✓	0~70
SFS-7080-Cxx-DD	1471~1611nm	SMF	+5~0	-27	24dB	80km	✓	0~70
SFS-7080-Cxx-DD	1271~1451nm	SMF	+5~0	-27	24dB	80km	✓	0~70
SFS-7120-Cxx-DD	1471~1611nm	SMF	+5~0	-32	32dB	120km	✓	0~70

2.67Gbps dual fiber CWDM SFP

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-9040-Cxx	1471~1611	SMF	-1~+4	-21	20	40km	✓	0~70
SFS-9080-Cxx	1471~1611	SMF	-2~+3	-28	26	80km	✓	0~70
SFS-9100-Cxx	1471~1611	SMF	0~+5	-30	30	100km	✓	0~70

10Gbps CWDM dual fiber SFP+ 10G Ethernet, SONET OC192, SDH STM-64

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-1040-CXX-DD	1471~1611nm	SMF	+4~-1	<-16	15	40km	✓	0~70
SFS-1080-CXX-DD	1471~1611nm	SMF	+4~0	<-23	23	80km	✓	0~70
SFS-1030-CXX-DD	1271~1451nm	SMF	+4~-1	<-15	14	30km	✓	0~70
SFS-1060-CXX-DD	1271~1451nm	SMF	+4~0	<-22	22	60km	✓	0~70

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



CWMD-180

1U 18 ch Rack Mount, LC/UPC

The CWMD-180 is 18 channel Dual Fiber CWDM MUX/DEMUX, 1U Rack Mount design for CWDM wavelengths from 1271nm to 1611nm. When fiber availability is limited, the CWMD-180 CWDM Mux/Demux can increase the bandwidth on the existing fiber infrastructure. By using 18ch CWDM Mux Demux, up to 180 Gbps could be supported on a fiber pair. The 18 channel MUX/DEMUX rack 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 modules.

Features

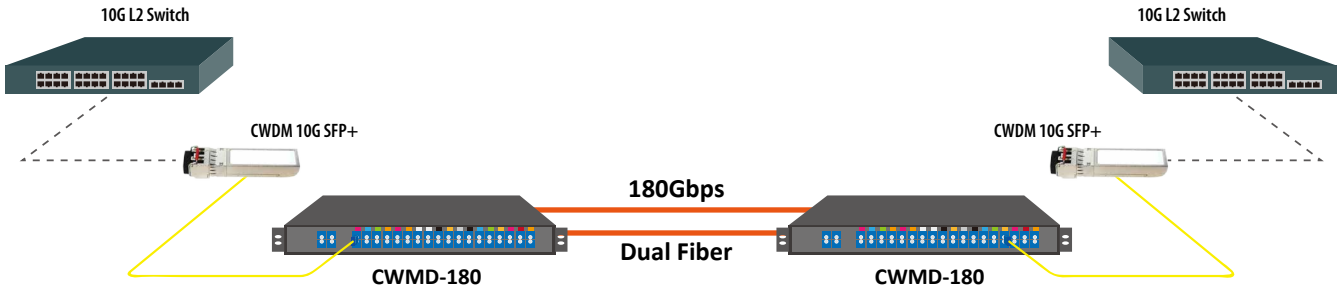
- Full native mode performance
- Optical connectors
- Passive model requires no power
- Protocol transparent, no limitation
- Utilizes industry standard ITU CWDM wavelength

Specifications

Number of Channels	18
Wavelength	1271-1611nm
Channel Spacing	20nm
Technology	Thin-Film Filter
Special Port	Monitor Port
Connectors	Duplex LC/UPC
Insertion Loss	< 4.9 dB

Return Loss	> 45 dB
Operating Temperature	-10°C ~ +70°C
Storage Temperature	-40°C ~ +80°C
Housing	1RU Rack Mount Chassis
Dimensions	485mm x 245mm x 44mm (L X D X H)

Application



Ordering Information

Model Name	Description
CWMD-180	18-Ch CWDM Mux/Demux (1271 ~ 1611nm), LC/UPC

Optional Accessories

■ SFP Transceiver

155Mbps CWDM Dual Fiber SFP / (LC Type) OC3/STM1/Fast Ethernet (RoHS)

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-5080-Cxx-DD	1471 ~ 1611	SMF	+3 ~ -4	-34	30	80km	✓	0~70
SFS-5080-Cxx-DD	1271 ~ 1451	SMF	+3 ~ -4	-34	30	80km	✓	0~70
SFS-5100-Cxx-DD	1471 ~ 1611	SMF	+5 ~ 0	-35	35	100km	✓	0~70
SFS-5100-Cxx-DD	1271 ~ 1451	SMF	+5 ~ 0	-35	35	100km	✓	0~70

1.25Gbps CWDM Dual Fiber SFP / (LC Type) Gigabit Ethernet / 1X Fiber channel(RoHS)

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-7040-Cxx-DD	1471~1611nm	SMF	+1~-4	-24	20dB	40km	✓	0~70
SFS-7040-Cxx-DD	1271~1451nm	SMF	+1~-4	-24	20dB	40km	✓	0~70
SFS-7080-Cxx-DD	1471~1611nm	SMF	+5~0	-27	24dB	80km	✓	0~70
SFS-7080-Cxx-DD	1271~1451nm	SMF	+5~0	-27	24dB	80km	✓	0~70
SFS-7120-Cxx-DD	1471~1611nm	SMF	+5~0	-32	32dB	120km	✓	0~70

2.67Gbps dual fiber CWDM SFP

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-9040-Cxx	1471~1611	SMF	-1~+4	-21	20	40km	✓	0~70
SFS-9080-Cxx	1471~1611	SMF	-2~+3	-28	26	80km	✓	0~70
SFS-9100-Cxx	1471~1611	SMF	0~+5	-30	30	100km	✓	0~70

10Gbps CWDM dual fiber SFP+ 10G Ethernet, SONET OC192, SDH STM-64

Model Name	Wavelength(nm)	Media	Optical Power(dBm)	Sensitivity(dBm) Power	Budget(dB)	Distance	DDMI	Temp.
SFS-1040-CXX-DD	1471~1611nm	SMF	+4~-1	<-16	15	40km	✓	0~70
SFS-1080-CXX-DD	1471~1611nm	SMF	+4~0	<-23	23	80km	✓	0~70
SFS-1030-CXX-DD	1271~1451nm	SMF	+4~-1	<-15	14	30km	✓	0~70
SFS-1060-CXX-DD	1271~1451nm	SMF	+4~0	<-22	22	60km	✓	0~70

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



iSAP5100

Multiservice Access Multiplexer (4.5U)

The iSAP5100 is a 4.5U 19" 20 slots rack type STM1 / E1 Time Division Multiplexer for fractional E1 network access, which is designed for non-stop operation. There are 18 slots available for hot-swappable iSAP5100 I/O cards. Two slots are provided for CPU Controller cards and two slots are provided for power supplies. Uplink supports STM1 fiber and E1 copper, two types of connection, maximum up to 144x E1 cross connect for Voice and Data. The iSAP5100 accommodates up to two separate power supplies, which may derive power from AC (110/220) or DC (-36~72V) power sources. When two power supplies are installed, the modules provide complete power redundancy and are hot swappable even during the E1 cards' transmission. The iSAP5100 provides STM1 fiber and E1 copper uplink with a the maximum E1 support of up to 96 E1 channels with cross connection for Voice and Data or interface including RS232, V.35, FXS, FXO, ET100 and E&M. CTC Union also provides and maintains our own SmartView EMS (Element Management System) which is a Java based client/server manager for monitoring , configuration, maintenance, or troubleshooting a large number of network elements over a long period of time.

Line Cards

- Control card: 5100-MS-DM-96, 5100-MS-DM-155
- E1 card: iSAP-8E1, iSAP-16E1
- Power modules: 5100-AC240, 5100-DC240
- I/O cards: iSAP-RS232, iSAP-V35, iSAP-ET100, iSAP-E&M, iSAP-FXS, iSAP-FXO

Features

- Supports MAX. 96xE1 with full cross-connect, Supports DS0 cross-connect
- Supports 16 channel Main E1 LTU card
- Supports E1 time slot broadcast function
- Modular design for Voice I/O card, the voice I/O card has two sub-module, each sub-module supports 4-port FXO/FXS
- All modules and cards support hot-swapping
- DCE card types included N x 64K, RS232(Sync/Async), ET100, E&M, FXO, FXS...etc.
- Supports Console, Telnet, SNMP and GUI management
- Available types of power built-in : AC+AC, AC+DC, DC+DC
- Modular design, 5U 19", 18-slot for I/O cards

5100-MS-DM-96	
Interface	10/100Base-TX Ethernet RJ45 port
Console	RS232
E1 Cross Connect	144xE1 Transparent cross connect , Supports E1 time slot mapping / broadcast function
CAS Cross Connect	Supports 16 time slot CAS follow voice time cross connect
5100-MS-DM-155	
Interface	Supports 1-port STM-1 155M SFP Slot on CPU card, CPU redundancy (1+1)
NMC	10/100Base-TX
Console	RS232
E1 Cross Connect	155M fiber to 63E1 and 144xE1 cross connect, supports E1 /time slot mapping/broadcast function
CAS Cross Connect	Supports time slot 16 CAS follow voice time cross connect
STM-1/E1 Drop/ Insert	Supports STM-1 63E1 x 32TS to E1/IO slot 128E1 x 32TS connection
iSAP-8E1/iSAP-16E1	
Interface	Supports 8E1/16E1 interface
Line Impedance	120 / 75 ohms
Frame format	CAS (PCM30)/CCS (PCM31)
Connector	RJ45
iSAP-RS232	
Data rate	≤38.4kbps Async or 64/128kbps Sync
Ports	6-port
Interface	RS232
iSAP-V35	
Interface types	V.35
Connector	HD68F (female) with cable adapter
Line code	NRZ
Data rate	Nx64kbps

iSAP-ET100	
Standards	IEEE 802.3, 802.3u
MDI/MDIX	Auto
Data rate	10/100Mbp
Encapsulation	HDLC
Ports	4-port
Connector	RJ45
iSAP-E&M	
Loop current	25 mA, maximum 70mA
Ports	8-port
Connector	RJ45
iSAP-FXS	
ITU-T Standard	G.712/G.713/G.714
Line resistance	600Ω
Off-hook current	25mA
Line distance	2km
Ports	8-port
On-hook current	10mA+/-3mA
Effective Ring	Frequency: 25Hz, Voltage: 75V, peak to peak110V MAX line resistance: 1500Ω
Connector	RJ45
iSAP-FXO	
ITU-T Standard	G.712, G.713, G.714
Line resistance	600Ω
Line distance	2km
Ports	8-ports
Caller ID	Supports DTMF, FSK Standard
Electrical & Mechanical	
Dimensions	350 × 440 × 187 mm (D x W x H)
Environmental	Operating: 0~60°C Storage:-25~70°C Humidity: 10~90%, non-condensing
Power	AC 220V : 165~265V, 50~60Hz, DC -48V:-36~-72VDC
Power Consumption	< 90W

Application

Figure1 : Point to Multi-points 16E1 aggregation

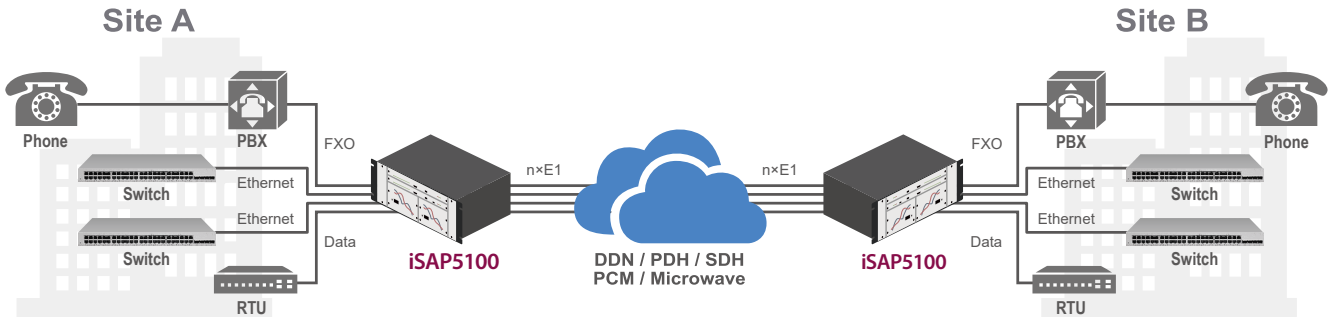
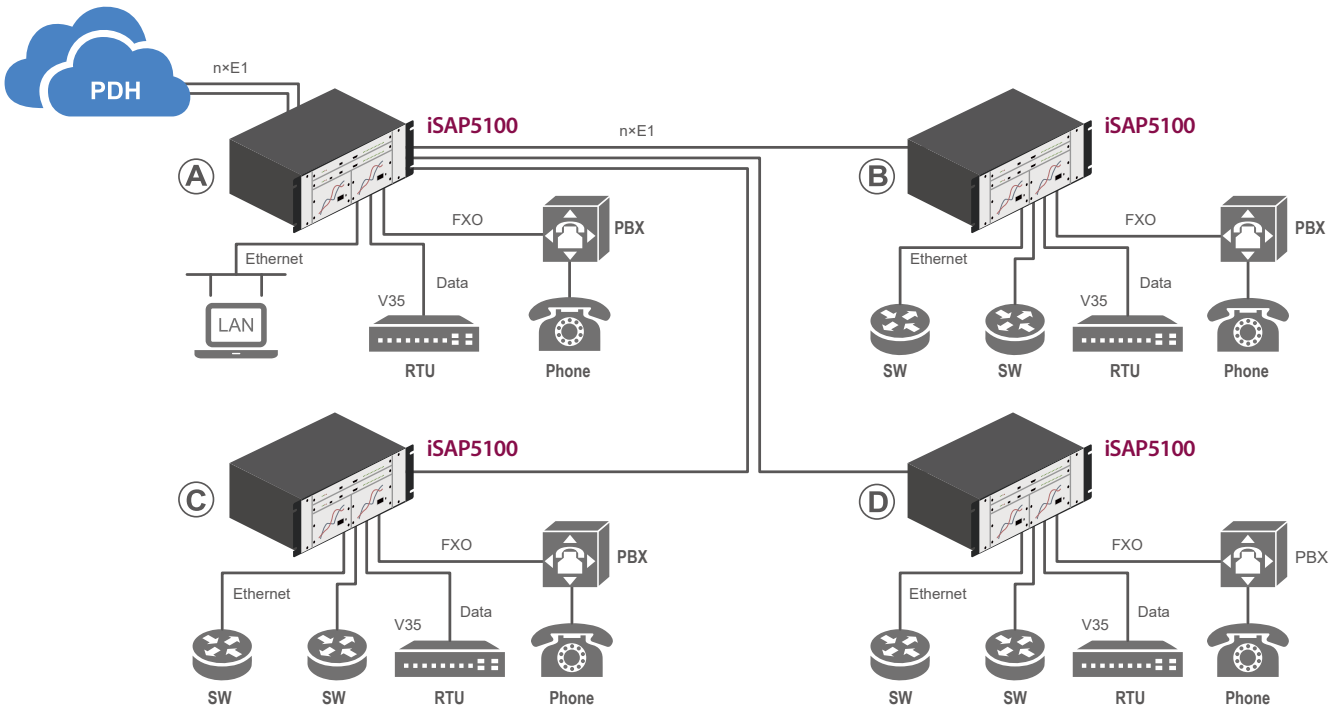


Figure2 : Point to Multi-points 63E1 aggregation over STM-1



Control Card



iSAP5100-MS-DM-96
iSAP5100-MS-DM-155

CPU Control SNMP Management Card

The iSAP5100 require a CPU Controller (iSAP5100-MS-DM-96 and iSAP5100-MS-DM-155) card which must be installed into the front panel of two CPU slots of chassis. The CPU Controller card allows a network administrator the ability to configure and monitor the status of the blades. Management can be achieved locally over RS232, or over the network by Telnet, Web GUI or SNMP. The iSAP5100-MS-DM-155 also supports one 155M SFP slot and two CPU cards with two SFP fiber ports for 1+1 fiber link protection.

Features

- RS-232 port for dumb terminal at 9.6k, 8bit, no parity
- SNMP V1 and V2C support
- MIB file compliant to MIB-II ASN.1
- Firmware upgrade by TFTP
- Hot swappable

Specifications

Electrical Interface	Console RS-232 port NMS LAN 10/100Base-TX
Fiber Interface	STM-1 155Mbps (MS-DM-96) SFP-LC (MS-DM-155)
Network Management	Telnet, SNMP, EMS, local console port
Dimensions	340 × 145 × 32mm (W × D c H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Line Cards



iSAP-8E1R
iSAP-16E1R
Main E1 Cross Connect Aggregate Card

Features
- Available in 8,16 E1 channels
- Supports PCM31 or PCM30 framed/unframed
- Path / Card Redundancy / Hot Swappable
- E1 timeslots can support cross-connect function
- E1 channel can act as Sub-E1 for drop & insert

Specifications

Frame format	CAS(PCM30)/CCS(PCM31); CRC on/off, framed/unframed
Bit rate	2.048Mbps
Line codes	HDB3/AMI
Rx sensitivity	0 ~ -43dB
Tx driver	1.5km over 0.5mm E1 cable
Line impedance	75 ohms (unbalanced) 120 ohms (balanced)
Pulse amplitude	nominal 2.37V (75ohm) nominal 3.00V (120ohm)
Pulse shape	According to ITU-T G.703
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-RS232
RS232 Sync/Asyn Card

Features
- Six independent channels
- N x 64 setting from any E1 channel
- Transparent asynchronous rates up to 115.2kbps
- Synchronous 64 or 128Kbps, DCE mode
- Diagnostic loop backs
- Hot swappable

Specifications

Datacom interfaces	ITU-T V.24 compliant
	Multiplexing Nx64K data onto E1 time-slot
Data speed	N × 64K (N=1 to 2)
Data access	RS-232, supplied with corresponding interface cable
Access mode	DCE
Diagnostics	Local / Remote / Bi-directional Loop
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-Data
N x 64 Synchronous Serial Card

Features
- Four independent Synchronous channels
- N x 64 setting from any E1 channel
- Each channel operates in native DCE mode
- Diagnostic loop backs
- LED indicators for Power, Alarm, RD/TD activity
- Hot swappable

Specifications

Datacom interfaces	ITU-T and ANSI compliant
	Multiplexing Nx64K data onto E1 time-slot
Data speed	N × 64K (N=1 to 30, or 31)
Data access	RS-530, RS-449, V.35, X.21, supplied with corresponding interface cable
Access mode	DCE
Diagnostics	Local / Remote / Bi-directional Loop
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-ET100
Fast Ethernet Bridge Card

Features
- Four independent Ethernet over E1 channels
- Utilizes HDLC WAN encapsulation
- MAC Address learning table with 5 minute aging
- Auto-MDIX and Auto-Negotiation
- Hot swappable

Specifications

Standards	IEEE 802.3, IEEE 802.3u
Ports	4-port RJ45
Throughput latency	1 frame
MDI/MDIX	Auto
Buffer	4K bits
Encapsulation	HDLC
Data rate	10/100Base-TX
Packet side	64 ~ 1522 bytes
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-E&M
E&M Voice Card

Features
- Eight independent channels
- 2/4 wire independent setting
- 1x 64 setting from any E1 channel
- E&M Signaling PBX trunks
- Provides E line, M line, SB (battery) and SG (ground) lines
- Supports types I, II, III, IV or V
- G.711 Codec
- LED indicators for Power, Alarm, activity
- Hot swappable

Specifications

Loop current	5~30 mA, maximum 70 mA
Return loss	300-600Hz >12dB (2W), 600-3400Hz >15dB (2W), 300-3400Hz >20dB (4W)
Group delay	@-10dBm0 <750uSec(2W) <600uSec(4W)
Total Distortion	according to ITU-T G.223
Channel rosstalk	< -65dB, 1020Hz@0dBm
Noise	< -65dBm0p weighted
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-FXS
FXS Voice Card

Features
- Eight independent channels
- 2 wire independent setting
- G.711 Codec
- 1× 64 setting from any E1 channel
- Provides ring function
- Supports caller-ID forwarding
- PSTN extension or direct "Hot-line"
- Links telephone to telephone or extends POTS
- LED indicators for Power, Alarm, RD/TD activity
- Hot swappable

Specifications

Effective ring voltage	AC 75VRMS +/-15V@25Hz +/-3Hz, <10% THD
Ring voltage at 300mA load	>50VACRMS
Loop resistance	<1.8K Ohms, including 300 Ohms for telephone
On-hook current	10mA +/-3mA
Off-hook loop current	18-50mA
Channel crosstalk	< -65dB, 1020Hz@0dBm
Noise	< -65dBm0p weighted
Surge protection	1000V, 10uSec transient response, decay to 50% in 700uSec 300VRMS for less than 200mSec; no component damage 220VRMS for 15 minutes; damage only local loop
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-FXO
FXO Voice Card

Features
- Eight independent channels
- 2 wire independent setting
- G.711 Codec
- 1× 64 setting from any E1 channel
- PCM30 R2 Signaling PSTN trunks
- Links PBX to PBX or extends POTS
- LED indicators for Power, Alarm, activity
- Hot swappable

Specifications

On-hook DC resistance	> 100K Ohms
Ring AC resistance	> 7.5K Ohms
Ring power sensitivity	< 50mW
Off-hook DC resistance	< 300 Ohms
Max. Input Voltage	70VDC
Max. Input Current	150mA
Channel crosstalk	< -65dB, 1020Hz@0dBm
Noise	< -65dBm0p weighted
Return loss	300-600Hz >12dB (2W) 600-3400Hz >15dB (2W) 300-3400Hz >20dB (4W)
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

iSAP-EMS Network Management

As the network size grows year by year, the network can be a challenge for administrators to maintain and react the possible network failures promptly. Especially when hundreds of devices are spread across many sub networks in different locations. In order to simplify network management, CTC ISAP-EMS Platform provides a centralized remote management platform that allows administrators easily to monitor and control each device on the network from a single computer. This allows efficient network management and lightens the load off the administrators who can better use the time for other value-added tasks

▪ User- Friendly Operation Interface

With intuitive and user-friendly graphical user interface (GUI), CTC ISAP-EMS presents the graphical topology in the platform. Double-click an icon in the Device GUI interface to see the front panel graphical view and get real-time element status updates. Configuration templates reduces manual, repetitive configuration time. You can apply a template to multiple ports or devices. With the configuration changes are just simple mouse clicks away.

▪ Network Monitoring and Management

It is vital to monitor network traffic to be aware any abnormal activity. CTC ISAP-EMS allows you to monitor network traffic and generate graphical report down to the port level. In addition, event and alarm management tools can issue SNMP trap and log the event in detail for prompt alert. Event logs are displayed in different colors to indicate the event severity level. Actions can be triggered by trap automatically without manual initiation; thus leaves flexibility and convenience to network managers

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

▪ Screen-Based User Friendly Network Management

With CTC ISAP-EMS, network maintenance is just a few simple mouse clicks away. Multi-site network operation and maintenance become easier than ever before. You can remotely perform general device maintenance (such as firmware upgrade and configuration file backup/restore) on more than one device on the network

▪ Security Access Management

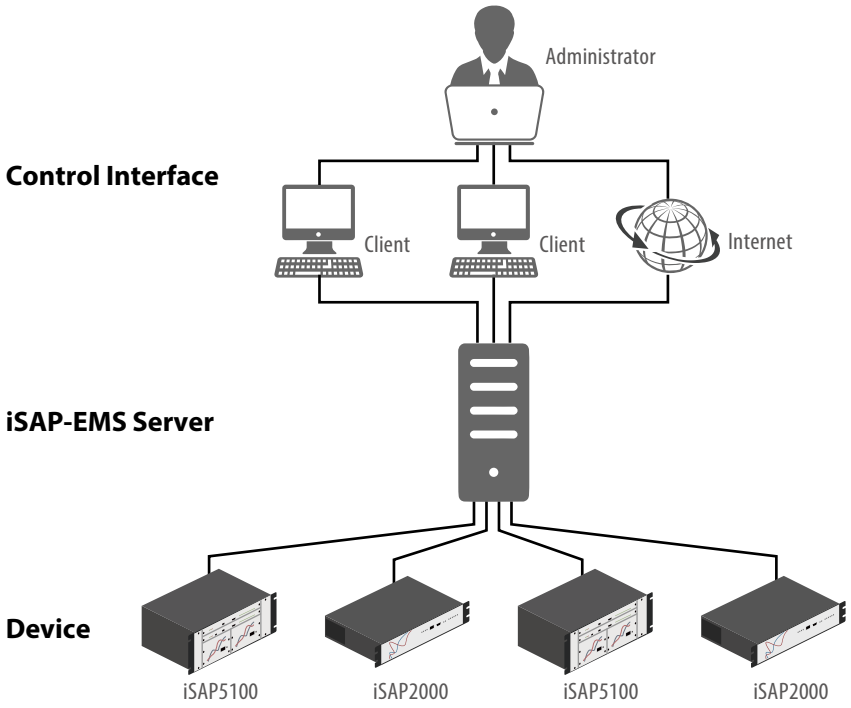
Remote access control is essential for a secure network. In the CTC ISAP-EMS, access to configuration screens and/or status screens are strictly based on user name, password, user's computer IP address and user account category. The three user categories give login accounts different administration authority. The CTC ISAP-EMS allows up to 15 users to log in at a time. Information such as the user ID, user group, IP address, configuration actions and time is logged for security reasons. So network managers know who logged in, when and did what.

Features

- Remote access control for efficient configuration
- Traffic monitoring and management
- Alarm Trap and event log management
- On-line license key Access
- Allow up to 250 devices management
- Easy and User-Friendly Operation Interface

Application

Figure1 : Network Scheme Diagram



Ordering Information

Model Name	Type	Description
iSAP5100-CH	Chassis	5U 19" 20 slot Chassis, power modules not included (18-slot for I/O cards, 2-slot for CPU card)
iSAP5100/AC	Power	AC Power plug-in module (165 to 265 VAC)
iSAP5100/DC	Power	DC Power plug-in module (±36 to ±76 VDC)
iSAP-EMS	Software	EverLink2000 EMS software for iSAP5100 and iSAP2000
iSAP-8E1R	Main E1 card	8 channels Main-E1 LTU card: Fractional E1 RJ45
iSAP-16E1R	Main E1 card	16 channels Main-E1 LTU card: Fractional E1 RJ45
iSAP-CAB-RJ45/4BNC	Cable	2ch E1 RJ45 to 4BNC cable (1.5 meter)
iSAP5100-MS-DM-96	CPU-card	CPU card with console, SNMP management port
iSAP5100-MS-DM-155	CPU-card	CPU card with console, SNMP mangement port and STM1 fiber port
iSAP-FXO	Voice card	8 channels FXO interface card
iSAP-FXS	Voice card	8 channels FXS interface card
iSAP-E&M	Voice card	8 channels 2/4 wires E&M voice interface card
iSAP-RS232	RS-232 card	6 channels RS-232 interface card (V4.0), Low speed: 128kbps 19.2kbps Async
CAB-DB62DB25F6-232-LS	Cable	RS-232 adapter cable for low speed: DB62 Male to 6x DB25 Female, 1M
iSAP-ET100	FE card	4 channels 10/100Base-TX Ethernet Bridge card
iSAP-DATA	Data card	4 channels V.35/X.21/RS530/RS449 cards
CAB-HP68MB34F4-V35	Cable	V35 adapter cable for High speed: HP68 Male to 4x MB34 Female, 1M
CAB-HP68DB25F4-530	Cable	RS530 adapter cable for High Speed: HP68 Male to 4x DB25 Female, 1M
CAB-HP68DB15F4-X.21	Cable	X21 adapter cable for High speed: HP68 Male to 4x DB15 Female, 1M
CAB-HP68DB37F4-449	Cable	RS449 adapter cable for High Speed: HP68 Male to 4x DB37 Female, 1M



iSAP2000

Multiservice Access Multiplexer (2U)

The iSAP2000 is a 2U 19"6 slots rack type E1 Time Division Multiplexer for fractional E1 network across, which is designed for nonstop operation. There are 6 slots available for hot-swappable I/O cards and two slots are provided for power supplies. Uplink supports E1 copper connection, maximum up to 96x E1 cross connect for Voice and Data. The iSAP2000 optionally accommodates up to two separate power supplies, which may derive power from AC (110/220) or DC (-36~72V) power sources. When two power supplies are installed, the modules provide complete power redundancy and are hot swappable even during the E1 cards' transmission. The iSAP2000 provides E1 copper uplink, the maximum E1 supports up to 96 E1 channels with cross connection for Voice and Data, the interface included RS232, V35, FXS, FXO, ET100 & E&M. CTC Union also provides and maintains our own SmartView EMS (Element Management System) which is a Java based client/server manager for monitoring, configuration, maintenance, or troubleshooting a large number of network elements over a long period of time.

Line Cards

- E1 card: iSAP-8E1, iSAP-16E1
- Power modules: 2000-AC240, 2000-DC48
- I/O cards: iSAP-RS232, iSAP-N*64K/V35, iSAP-ET100, iSAP-E&M , iSAP-FXS , iSAP-FXO

Features

- Supports MAX. 96xE1 with full cross-connect, Supports DS0 cross-connect
- Supports 16 channel Main E1 LTU card
- Supports E1 time slot broadcast function
- Modular design for Voice I/O card, the voice I/O card has two sub-module, each sub-module supports 4-port FXO/FXS
- All modules and cards support hot-swapping
- DCE card types included N*64K, RS232(Sync/Async) ET100, ET100R, E&M, FXO, FXS...etc.
- Supports Console, Telnet, SNMP and GUI management
- Available types of power built-in : AC+AC, AC+DC, DC+DC
- Modular design, 2U 19", 6-slot for I/O cards

Specifications

Management	
NMS	10/100Base-TX
Console	RS232
iSAP-8E1, iSAP-16E1	
Interface	Supports 8E1, 16E1 two types interface
E1 Cross connect	96 x E1 transparent cross connect, supports E1, time slot
CAS cross connect	Supports 16 time slot CAS follow voice time cross connect
Line Impedance	120 / 75 ohms
Frame format	CAS(PCM30)/CCS(PCM31)
Connector	RJ45
iSAP-RS232	
Data rate	≤38.4kbps Async or 64/128kbps Sync
Ports	6-port
Interface	RS232
iSAP-N*64K/V35	
Data rate	N × 64kbps(N=1~30 or 31)
Ports	4-port
Connector	V.35 Interface
iSAP-ET100	
Standards	IEEE 802.3, 802.3u
MDI/MDIX	Auto
Data rate	10/100Mbp
Ports	4-port
Connector	RJ45
iSAP-E&M	
Loop current	5~30 mA, maximum 70mA
Ports	8-port
Connector	RJ45

iSAP-FXS	
ITU-T Standard	G.712/G.713/G.714
Line resistance	600Ω
Off-hook current	25mA
Line distance	2km
Ports	8-port
On-hook current	10mA+/-3mA
Effective Ring	Frequency: 25Hz Voltage: 75V, peak to peak110V MAX line resistance: 1500Ω
Connector	RJ45
iSAP-FXO	
ITU-T Standard	G.712/G.713/G.714
Line resistance	600Ω
Line distance	2km
Ports	8-port
Caller ID	Supports DTMF, FSK Standard
Connector	RJ45
Electrical & Mechanical	
Dimensions	440 × 300 × 88mm (D x W x H)
Environmental	Operating: 0~60°C Storage:-25~70°C Humidity: 10~90%, non-condensing
Power	AC 220V: 165~265V, 50~60Hz DC -48V:-36~-76VDC
Power Consumption	< 40W

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application

Figure1 : Point to Multi-points 16E1 aggregation

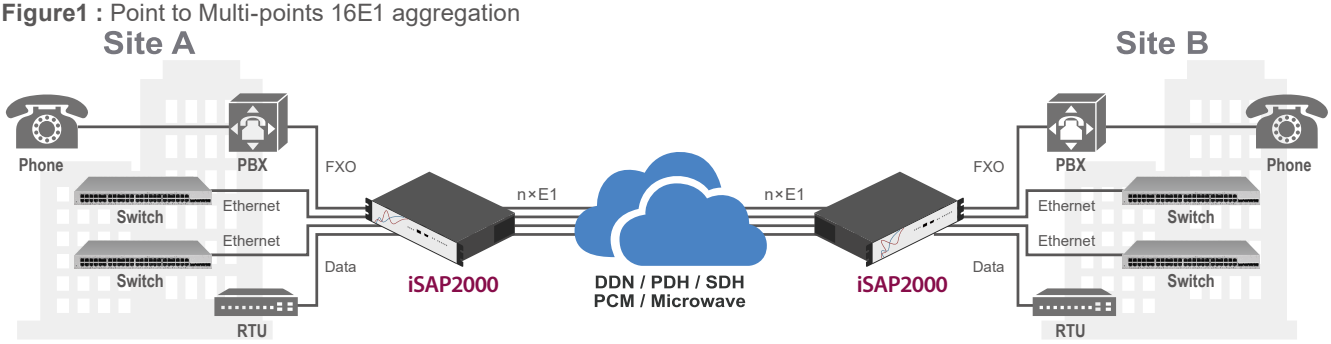
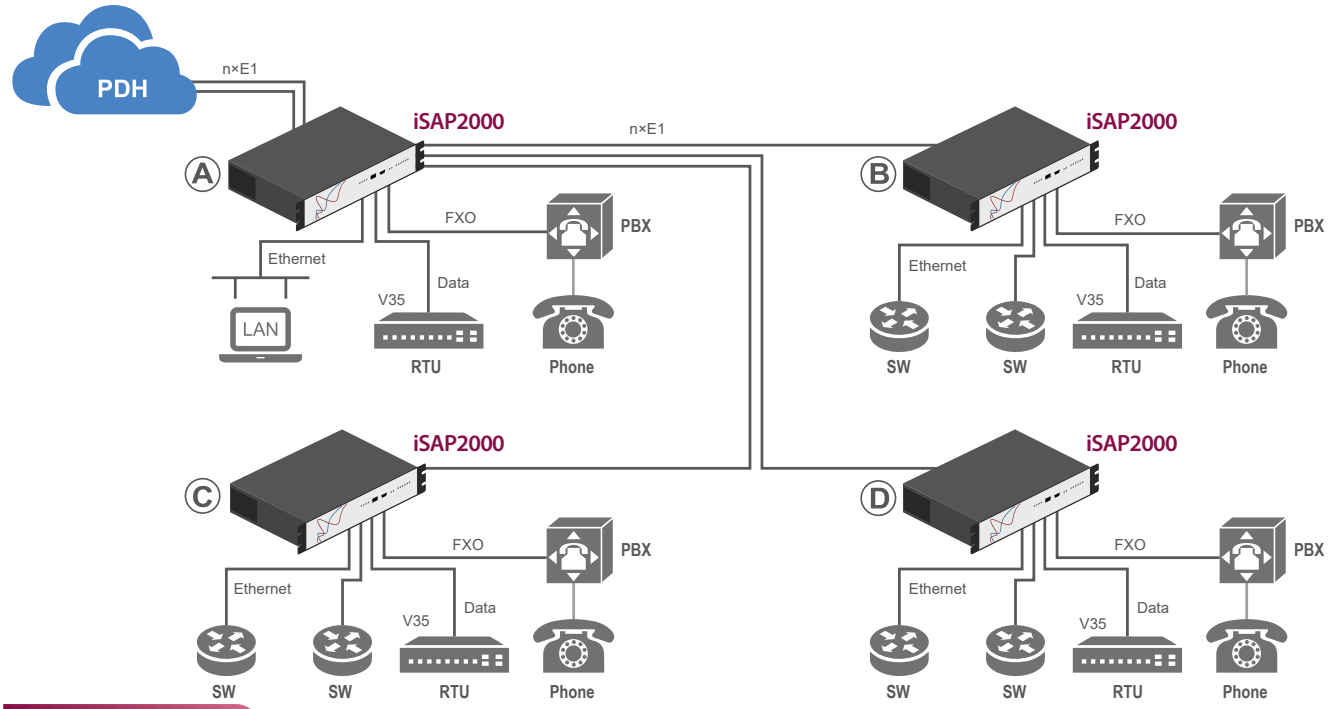


Figure2 : Point to Multi-points 63E1 aggregation over STM-1



Line Cards



iSAP-8E1R
iSAP-16E1R

Main E1 Cross Connect Aggregate Card

Features

- Available in 8,16 E1 channels
- Supports PCM31 or PCM30 framed/unframed
- Path / Card Redundancy / Hot Swappable
- E1 timeslots can support cross-connect function
- E1 channel can act as Sub-E1 for drop & insert

Specifications

Frame format	CAS(PCM30)/CCS(PCM31); CRC on/off, framed/unframed
Bit rate	2.048Mbps
Line codes	HDB3/AMI
Rx sensitivity	0 ~ -43dB
Tx driver	1.5km over 0.5mm E1 cable
Line impedance	75 ohms (unbalanced) 120 ohms (balanced)
Pulse amplitude	nominal 2.37V (75ohm) nominal 3.00V (120ohm)
Pulse shape	According to ITU-T G.703
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-RS232

RS232 Sync/Asyn Card

Features

- Six independent channels
- N x 64 setting from any E1 channel
- Transparent asynchronous rates up to 115.2kbps
- Synchronous 64 or 128Kbps, DCE mode
- Diagnostic loop backs
- Hot swappable

Specifications

Datacom interfaces	ITU-T V.24 compliant Multiplexing Nx64K data onto E1 time-slot
Data speed	N × 64K (N=1 to 2)
Data access	RS-232, supplied with corresponding interface cable
Access mode	DCE
Diagnostics	Local / Remote / Bi-directional Loop
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-Data
N x 64 Synchronous Serial Card

Features
- Four independent Synchronous channels
- N x 64 setting from any E1 channel
- Each channel operates in native DCE mode
- Diagnostic loop backs
- LED indicators for Power, Alarm, RD/TD activity
- Hot swappable

Specifications

Datacom interfaces	ITU-T and ANSI compliant Multiplexing Nx64K data onto E1 time-slot
Data speed	N × 64K (N=1 to 30, or 31)
Data access	RS-530, RS-449, V.35, X.21, supplied with corresponding interface cable
Access mode	DCE
Diagnostics	Local / Remote / Bi-directional Loop
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-ET100
Fast Ethernet Bridge Card

Features
- Four independent Ethernet over E1 channels
- Utilizes HDLC WAN encapsulation
- MAC Address learning table with 5 minute aging
- Auto-MDIX and Auto-Negotiation
- Hot swappable

Specifications

Standards	IEEE 802.3, IEEE 802.3u
Ports	4-port RJ45
Throughput latency	1 frame
MDI/MDIX	Auto
Buffer	4K bits
Encapsulation	HDLC
Data rate	10/100Base-TX
Packet side	64 ~ 1522 bytes
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-E&M
E&M Voice Card

Features
- Eight independent channels
- 2/4 wire independent setting
- 1x 64 setting from any E1 channel
- E&M Signaling PBX trunks
- Provides E line, M line, SB (battery) and SG (ground) lines
- Supports types I, II, III, IV or V
- G.711 Codec
- LED indicators for Power, Alarm, activity
- Hot swappable

Specifications

Loop current	5~30 mA, maximum 70 mA
Return loss	300-600Hz >12dB (2W), 600-3400Hz >15dB (2W), 300-3400Hz >20dB (4W)
Group delay	@-10dBm0 <750uSec(2W) <600uSec(4W)
Total Distortion	according to ITU-T G.223
Channel crosstalk	< -65dB, 1020Hz@0dBm
Noise	< -65dBm0p weighted
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs



iSAP-FXS
FXS Voice Card

Features
- Eight independent channels
- 2 wire independent setting
- G.711 Codec
- 1× 64 setting from any E1 channel
- Provides ring function
- Supports caller-ID forwarding
- PSTN extension or direct "Hot-line"
- Links telephone to telephone or extends POTS
- LED indicators for Power, Alarm, RD/TD activity
- Hot swappable

Specifications

Effective ring voltage	AC 75VRMS +/-15V@25Hz +/-3Hz, <10% THD
Ring voltage at 300mA load	>50VACRMS
Loop resistance	<1.8K Ohms, including 300 Ohms for telephone
On-hook current	10mA +/-3mA
Off-hook loop current	18-50mA
Channel crosstalk	< -65dB, 1020Hz@0dBm
Noise	< -65dBm0p weighted
Surge protection	1000V, 10uSec transient response, decay to 50% in 700uSec 300VRMS for less than 200mSec; no component damage 220VRMS for 15 minutes; damage only local loop
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



iSAP-FXO
FXO Voice Card

Features
- Eight independent channels
- 2 wire independent setting
- G.711 Codec
- 1× 64 setting from any E1 channel
- PCM30 R2 Signaling PSTN trunks
- Links PBX to PBX or extends POTS
- LED indicators for Power, Alarm, activity
- Hot swappable

Specifications

On-hook DC resistance	> 100K Ohms
Ring AC resistance	> 7.5K Ohms
Ring power sensitivity	< 50mW
Off-hook DC resistance	< 300 Ohms
Max. Input Voltage	70VDC
Max. Input Current	150mA
Channel crosstalk	< -65dB, 1020Hz@0dBm
Noise	< -65dBm0p weighted
Return loss	300-600Hz >12dB (2W) 600-3400Hz >15dB (2W) 300-3400Hz >20dB (4W)
Dimensions	23 × 181 × 197mm (W × D × H)
Temperature	0°C ~ 50°C
Humidity	5 ~ 95%
MTFB	65,000 hrs

iSAP-EMS Network Management

As the network size grows year by year, the network can be a challenge for administrators to maintain and react the possible network failures promptly. Especially when hundreds of devices are spread across many sub networks in different locations. In order to simplify network management, CTC ISAP-EMS Platform provides a centralized remote management platform that allows administrators easily to monitor and control each device on the network from a single computer. This allows efficient network management and lightens the load off the administrators who can better use the time for other value-added tasks

▪ User- Friendly Operation Interface

With intuitive and user-friendly graphical user interface (GUI), CTC ISAP-EMS presents the graphical topology in the platform. Double-click an icon in the Device GUI interface to see the front panel graphical view and get real-time element status updates. Configuration templates reduces manual, repetitive configuration time. You can apply a template to multiple ports or devices. With the configuration changes are just simple mouse clicks away.

▪ Network Monitoring and Management

It is vital to monitor network traffic to be aware any abnormal activity. CTC ISAP-EMS allows you to monitor network traffic and generate graphical report down to the port level. In addition, event and alarm management tools can issue SNMP trap and log the event in detail for prompt alert. Event logs are displayed in different colors to indicate the event severity level. Actions can be triggered by trap automatically without manual initiation; thus leaves flexibility and convenience to network managers

▪ Screen-Based User Friendly Network Management

With CTC ISAP-EMS, network maintenance is just a few simple mouse clicks away. Multi-site network operation and maintenance become easier than ever before. You can remotely perform general device maintenance (such as firmware upgrade and configuration file backup/restore) on more than one device on the network

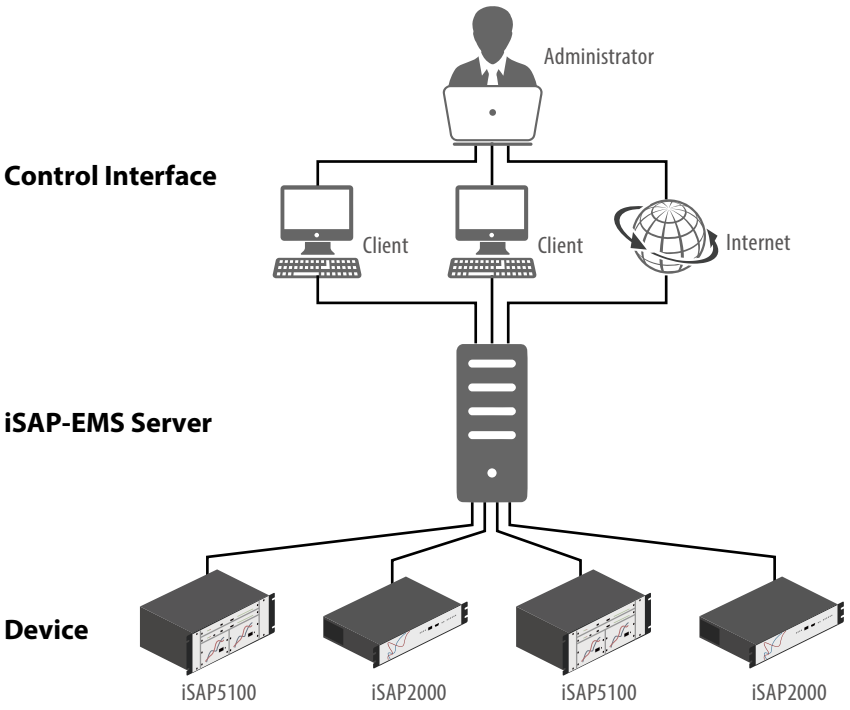
▪ Security Access Management

Remote access control is essential for a secure network. In the CTC ISAP-EMS, access to configuration screens and/or status screens are strictly based on user name, password, user's computer IP address and user account category. The three user categories give login accounts different administration authority. The CTC ISAP-EMS allows up to 15 users to log in at a time. Information such as the user ID, user group, IP address, configuration actions and time is logged for security reasons. So network managers know who logged in, when and did what.

Features
- Remote access control for efficient configuration
- Traffic monitoring and management
- Alarm Trap and event log management
- On-line license key Access
- Allow up to 250 devices management
- Easy and User-Friendly Operation Interface

Application

Figure1 : Network Scheme Diagram



Ordering Information

Model Name	Type	Description
iSAP2000-CH	Chassis	2U 19" 6 slots Chassis with bulit-in CPU card, power modules not included
iSAP2000/AC	Power	AC power plug-in module (165 to 265 VAC)
iSAP2000/DC	Power	DC Power plug-in module (±36 to ±76 VDC)
iSAP-EMS	Software	EverLink2000 EMS software for iSAP5100 and iSAP2000
iSAP-8E1R	Main E1 card	8 channels Main-E1 LTU card: Fractional E1 RJ45
iSAP-16E1R	Main E1 card	16 channels Main-E1 LTU card: Fractional E1 RJ45
iSAP-CAB-RJ45/4BNC	Cable	2ch E1 RJ45 to 4BNC cable (1.5 meter)
iSAP-FXO	Voice card	8 channels FXO interface card
iSAP-FXS	Voice card	8 channels FXS interface card
iSAP-E&M	Voice card	8 channels 2/4 wires E&M voice interface card
iSAP-RS232	RS-232 card	6 channels RS-232 interface card (V4.0), Low speed: 128kbps 19.2kbps Async
CAB-DB62DB25F6-232-LS	Cable	RS-232 adapter cable for low speed: DB62 Male to 6x DB25 Female, 1M
iSAP-ET100	FE card	4 channels 10/100Base-TX Ethernet Bridge card
iSAP-DATA	Data card	4 channels V.35/X.21/RS530/RS449 cards
CAB-HP68MB34F4-V35	Cable	V35 adapter cable for High speed: HP68 Male to 4x MB34 Female, 1M
CAB-HP68DB25F4-530	Cable	RS530 adapter cable for High Speed: HP68 Male to 4x DB25 Female, 1M
CAB-HP68DB15F4-X.21	Cable	X21 adapter cable for High speed: HP68 Male to 4x DB15 Female, 1M
CAB-HP68DB37F4-449	Cable	RS449 adapter cable for High Speed: HP68 Male to 4x DB37 Female, 1M

Chassis
iSAP2000 – □□
Example: iSAP2000 – CH

Card Type
iSAP2000 – □□□□
Example: iSAP2000 – 8E1R

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



iMux4A-100
Ethernet to 4E1 Multiplexer

iMux8A-100
Ethernet to 8E1 Multiplexer

The iMux4A/iMux8A is an E1 inverse multiplexers capable of bundling up to 4E1/8E1 lines for cost-effective connection of 10/100Base-TX or 100Base- FX LANs over multiple E1 transports. The iMux4A/iMUX8A inverse multiplexer transmits up to a 9.92Mbps/15.87Mbps Ethernet bridge channel (GFP-F encapsulated) over 4E1/8E1 links. The iMux4A/iMUX8A bridges the gap between E1 and E3, allowing bridges to operate at faster rates. It also provides high speed access to SDH/SONET backbones where the only access services available are E1 lines. The iMux4A/iMux8A supports an E1 attenuation of up to 43 dB on twisted pair or coax cable. This provides an approximate operating range up to 2km (using 22AWG). The iMux4A/iMUX8A fully meets E1 specifications including ITU-T G.703 and G.823. The iMux4A/iMux8A features diagnostic capabilities for performing remote loopback. The operator at either end of the line may test both the iMux4A/iMUX8A and the line in the digital loopback mode. The Ethernet copper interface supports auto-negotiation and auto MDI/MDIX, allowing plug-and-play Ethernet connection without any additional configuration.

Features

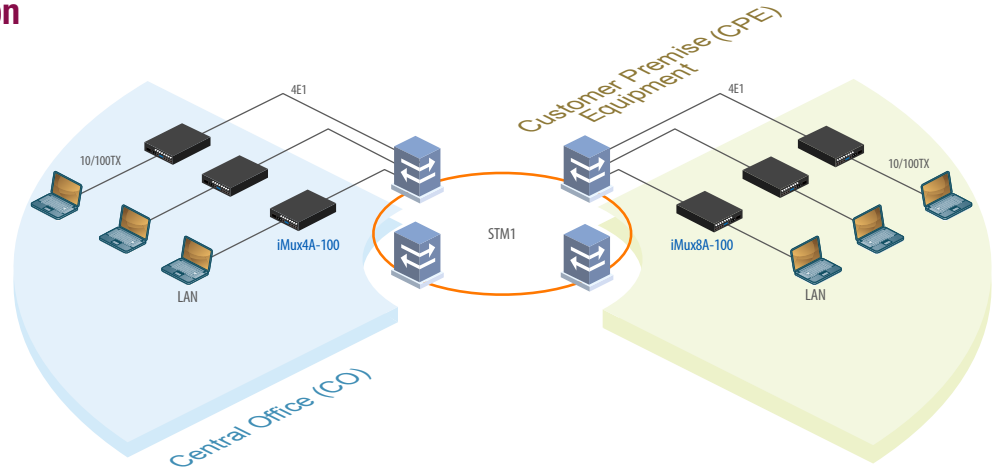
- Connects one Fast Ethernet over 1-4 E1 links (1.984 ~ 9.92Mbps) (iMUX4A-100)
- Connects one Fast Ethernet over 1-8 E1 links (1.984 ~ 15.87Mbps) (iMUX8A-100)
- Built-in GFP bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- LED Alarm indication
- Supports RS232 console management

Specifications

E1 Interface	Framing	CCS+CRC (requires Unframed)
	Standard	ITU-T G.703/G.704/G.706 & G.732, G.823
	Bit rate	2.048Mbps± 50ppm (up to 4E1/8E1)
	Line code	HDB3
	Clock setting	Internal OSC or recovery clock
	Receive level	-43dB
	Line impedance	75 ohm (BNC) / 120 ohm (RJ45)
	Jitter Performance	Complies with ITU-T G.823
	Pulse Mask	Complies with ITU-T G.703
	Pulse amplitude	Nominal 2.37V ± 10%
	Delay Variance	220ms
	Connector	RJ45, BNC
	Diagnostics	Digital remote loopback

Ethernet Interface	Standards	IEEE 802.3, 802.3u
	Data rate	10/100Base-TX, Half/Full duplex
Ethernet Interface	Connector	RJ45 10/100Base-TX
Indications	Power, ALM, E1 signal loss, E1 Alarm (AIS, LOF, RAI, LOMF), LAN link /ACT, 10/100M, SD (100Base-FX)	
Power Input	AC 100~240VAC, DC 18~60VDC	
Power Consumption	< 6W	
Dimensions	210 x 128.8 x 43.8mm (D x W x H) (iMux04A)	
Temperature	0 ~ 50°C (Operating), -10 ~ 70°C (Storage)	
Humidity	10 ~ 90% RH (non-condensing)	
Certifications	CE, FCC, RoHS Compliant	
MTBF	75,000 hrs	

Application



Ordering Information

Model Name	Description
iMux4A-100AD	10/100Base-TX to 4 E1 RJ45 +BNC mux with built-in AC+DC Power
iMux4R-100AD	10/100Base-TX to 4 E1 RJ45 mux with built-in AC+DC Power
iMux4B-100AD	10/100Base-TX to 4 E1 BNC mux with built-in AC+DC Power
iMux8A-100AD	10/100Base-TX to 8 E1 RJ45 +BNC mux with built-in AC+DC Power
iMux8R-100AD	10/100Base-TX to 8 E1 RJ45 mux with built-in AC+DC Power
iMux8B-100AD	10/100Base-TX to 8 E1 BNC mux with built-in AC+DC Power



ETU011

Single Modular Port E1 CSU/DSU

The ETU011 stand-alone DSU/CSU is a digital access unit for Unframed E1, Fractional E1, or Fractional cascaded E1 service. The ETU011 data channel supports user-selectable transmission rates via randomly selected E1 timeslots, which provides integral multiples of 64kbps, up to a maximum 2.048Mbps (unframed), for a line attenuation of up to 43 dB on twisted pair or coax cable. This provides an approximate operating range up to 2km (using 22AWG). The ETU011 packs the data channels into the E1 link in user-selected time slots. The unused time slots can insert IDLE code (in frame mode). The ETU011 front panel sports status LEDs for monitoring both the CSU and DSU conditions and push button switches for initiating local and remote loopback with integral BERT.

Features

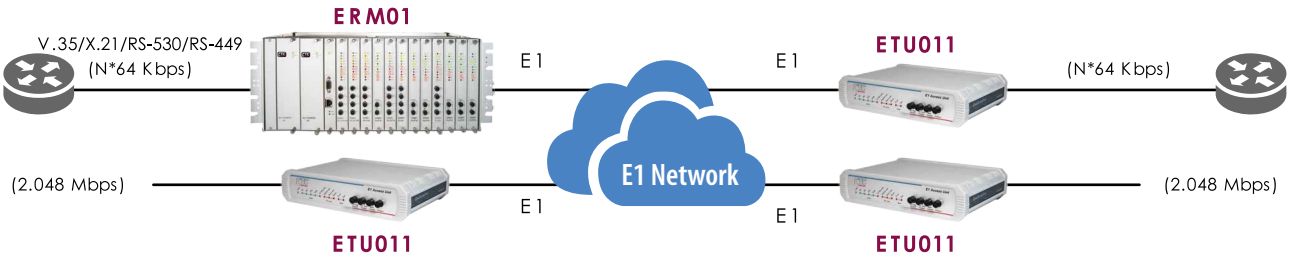
- Supports Fractional E1 and Unframed E1 service
- Removable interfaces, support V.35, X21, RS-530, RS-449, RS-232, Ethernet Bridge and Router
- I/O connectors on rear panel
- Multiple clock source selection
- (Internal or External: E1 recovery, DTE or DCE)
- Built-in BERT with V.54 diagnostic capabilities for performing local and remote loopback

Specifications

G.703 E1	Framing	Framed CCS (PCM31) CAS (PCM30)/ Unframed CRC4 on/off
	Line Code	AMI/ HDB3
	Bit rate	N×56K or N×64Kbps, where N=1~31 in CCS or N equal 1~30 in CAS
	Relative receive level	-43dB
	Transmit level:	
	Pulse	Nominal 2.37V ±10% for 75 ohm
	Amplitude	Nominal 3.00V ±10% for 120 ohm Zero amplitude ±0.1V
	Jitter performance	According to ITU-T G.823
	Connectors	BNC(unbalanced), RJ-48(balanced)
	Clock modes:	
	Clock mode 0	Receive & transmit clock (DCE1) (recovered) to the sync DTE
	Clock mode 1	Receive & transmit clock (DCE2) (internal oscillator) to the sync DTE
G.703 E1	Clock mode 2	Receive clock to the sync. and transmit (DTE1) clock from the sync device
	Clock mode 3	Receive and transmit clock from the (DTE2) sync DCE (from ETC and ERC pin)
	Clock mode 4	Receive and transmit clock from the (DTE3) sync DCE (all from ETC pin)

Indicators	LEDs (Power, TD, RD, RTS, DCD, Signal loss, Sync loss, Alarm)
Standards	ITU-T G.703/G.704/G.706 & G.732
Power Input	AC: 90-250VAC, DC: -18 ~ -75VDC
Power Consumption	10W
Dimensions	250 × 195 × 45 mm (D × W × H)
Weight	0.51kg
Temperature	0°C ~ 50°C (Operating), -10°C ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	57,000 hrs

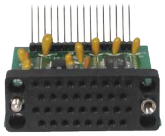
Application



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Interface Module for ETU02-MUX , ETU01A & ETU011

ETU/TTU-V35

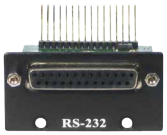


V.35 Interface

Features :

- Compliant with ITU-T V.35 standards
- Winchester type 34-pin MB34 M-Block female connector
- Synchronous data rate at Nx64 (where N=1 to 32)
- Data Communications Equipment interface electrically
- compatible to ITU-T V.11 (RS-422)

ETU/TTU-232

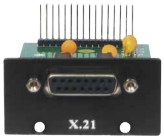


RS-232 Interface

Features :

- Compliant with EIA RS-232-C (Unbalanced)
- Compatible to ITU-T V.24 25-pin D Sub female connector
- Synchronous data rate at 64 or 128Kb/s Asynchronous (transparent) at up to 19.2K or 38.4K Data Communications Equipment interface

ETU/TTU-X21



X.21 Interface

Features :

- Compliant with ITU-T X.21 standard (Balanced)
- 15-pin D Sub female connector
- Synchronous data rate at Nx64 (where N=1 to 32)
- Data Communications Equipment interface electrically compatible to V.11

ETU/TTU-530



RS-530 Interface

Features :

- Compliant with Category 1 EIA-530 (Balanced) 25-pin D Sub female connector
- Synchronous data rate at Nx64 (where N=1 to 32)
- Data Communications Equipment interface electrically compatible to RS-422

ETU/TTU-449

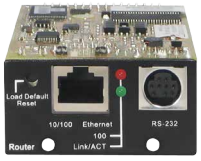


RS-449(V.36) Interface

Features :

- Compliant with EIA/TIA-530-A (Balanced)
- 37-pin D Sub female connector
- Synchronous data rate at Nx64 (where N=1 to 32)
- Data Communications Equipment interface electrically compatible to RS-422

ETU/ TTU-ET100R

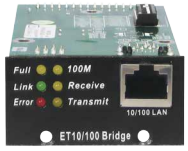


10/100 Base-TX Ethernet Router

Features :

- Ethernet port IP Address/subnet mask
- Dynamic Routing RIP I & II, Send or Receive on Ethernet or WAN
- PPP, HDLC and Cisco® HDLC WAN protocol encapsulatoin

ETU/TTU-ET100



10/100 Base-TX Ethernet Bridge

Features :

- High performance bridge for 10Base-T or 100Base-TX Ethernet extension
- Transparent half / Full duplex support on WAN / LAN interface
- Provides Ethernet over E1 economically

Ordering Information

Model Name	Description
Stand Alone Types	
ETU011-AC	Single port to fractional E1 unit with built-in AC 90 ~ 250 V
ETU011-DC	Single port to fractional E1 unit with built-in DC -18 ~ -72V
Rack Mount Types	
ETU011-R-AC	Single port to fractional E1 Rack Mount unit with built-in AC 90 ~ 250 V
ETU011-R-DC	Single port to fractional E1 Rack Mount unit with built-in DC -18 ~ -72V

Model Name	Description
ETU/TTU-V35	V.35 interface module
ETU/TTU-X21	X.21 interface module
ETU/TTU-530	RS-530 interface module
ETU/TTU-449	RS-449 interface module
ETU/TTU-232	RS-232 ASYN/SYNC interface module
ETU/TTU-ET100	10/100 Base-TX Ethernet E1 Bridge interface module
ETU/TTU-ET100R	10/100 Base-TX Ethernet Routing interface module



ETU01-Plus

Single V.35 port E1 CSU/DSU

The ETU01-Plus stand-alone CSU/DSU is a digital access unit for Unframed E1 or Fractional E1 service. The ETU01-Plus data channel supports user-selectable transmission rates via randomly selected E1 timeslots, which provides integral multiples of 64kbps, up to a maximum 2.048Mbps (unframed), for a line attenuation of up to 43 dB on twisted pair or coax cable. This provides an approximate operating range up to 2km (using 22AWG). The ETU01-Plus packs the data channels into the E1 link in user-selected time slots. The ETU01-Plus front panel sports status LEDs for monitoring the CSU and DSU conditions and pushbutton switches for initiating local and remote loopback with integral BERT. The ETU01-Plus features a fixed on-board V.35 interface.

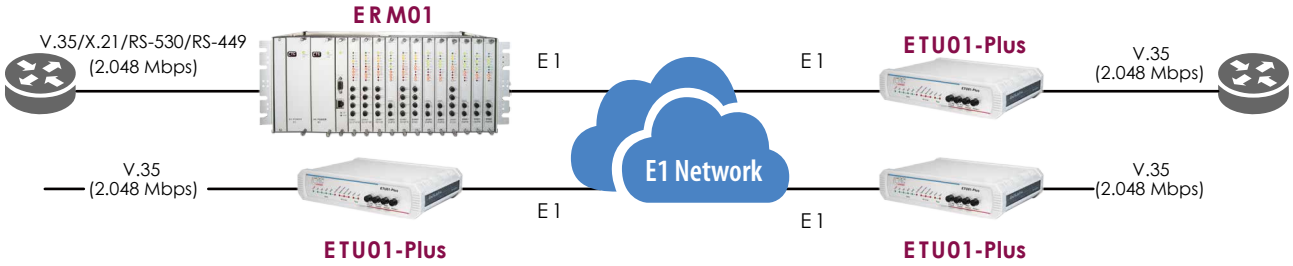
Features

- Supports Fractional E1 and Unframed E1 service with EOC control
- Model with fixed V.35 interface for price critical applications
- Multiple clock source selection (Internal or External: E1 recovery, DTE or DCE)
- Built-in BERT with V.54 diagnostic capabilities for performing local and remote loopback
- Fixed V.35 port with MB34F connector
- I/O connectors all located on rear panel

Specifications

G.703 E1	Framing	Framed CCS (PCM31) CAS (PCM30)/ Unframed CRC4 on/off
	Line Code	AMI/ HDB3
	Data rate	N x 56K or N x 64Kbps, where N=1~31 in CCS or N equal 1~30 in CAS
	Relative receive leve	-43dB
	Transmit level:	
	Pulse	Nominal 2.37V ±10% for 75 ohm
	Amplitude	Nominal 3.00V ±10% for 120 ohm Zero amplitude ±0.1V
	Jitter performance	According to ITU-T G.823
	Connectors	BNC(unbalanced), RJ-48(balanced)
	Clock modes:	
	Clock mode 0	Receive & transmit clock (DCE1) (recovered) to the sync DTE
	Clock mode 1	Receive & transmit clock (DCE2) (internal oscillator) to the sync DTE
G.703 E1	Clock mode 2	Receive clock to the sync. and transmit (DTE1) clock from the sync device
	Clock mode 3	Receive and transmit clock from the (DTE2) sync DCE (from ETC and ERC pin)
	Clock mode 4	Receive and transmit clock from the (DTE3) sync DCE (all from ETC pin)
Indications	LEDs (Power, TD, RD, RTS, DCD, Siganl loss, Sync loss, Alarm)	
Standards	ITU-T G.703/G.704/G.706 & G.732	
Power Input	AC: 90-250VAC , DC: -18 ~ -75 VDC	
Power Consumption	10W	
Dimensions	195 × 160 × 45 mm (D × W × H)	
Weight	0.51kg	
Temperature	0°C ~ 50°C (Operating), -10°C ~ 70°C (Storage)	
Humidity	10 ~ 90% non-condensing	
Certification	CE, FCC	
MTBF	55,000 hrs	

Application



Ordering Information

Model Name	Description
Stand Alone Types	
ETU01/Plus-AC	V.35/MB34F port, fractional E1 unit with built-in AC 90 ~ 250 VAC
ETU01/Plus-DC	V.35/MB34F port, fractional E1 unit with built-in AC 90 ~ 250 VAC
Rack Mount Types	
ETU01/Plus-R-AC	V.35/MB34F port, fractional E1 Rack Mount type unit w/ built-in AC 90 ~ 250 VAC
ETU01/Plus-R-DC	V.35/MB34F port, fractional E1 Rack Mount type unit w/ built-in DC -18 ~ -75 V

Power Type

ETU01/Plus – ☐☐

Example: ETU01/Plus – AC

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



IPM-E1/IPM-4E1

E1/4x E1 over Ethernet with Web Management

IPM-E1/4E1 is designed as a multi-service access platform for PDH over Ethernet applications. E1 frames can be mapped/de-mapped into/from Ethernet packets. An adaptive clock recovery method for Ingress PDH (PSN->TDM) clock generation is implemented to support E1 (ITU-T G.823) Jitter performance.

IPM-E1/4E1 provides cost-effective applications of traditional circuit-switched system over Ethernet. It is easy to interconnect existing phone systems over Ethernet that are used to carry data, voice and video. With high precision clock recovery technology, IPM-E1/4E1 is capable of supporting 2G/3G/4G backhaul and provides smooth services. IPM-E1/4E1 can transparently transport proprietary signaling that are required to support PBX features, including call conference, call forwarding and SS7. Customer can easily apply and enjoy better integration of TDM and IP devices with lower network expense. With a pair of IPM-E1/4E1 and guaranteed internet bandwidth, it is sure to save cost dramatically, and to ensure the QoS of voice based on interconnections of TDM equipment.

Features

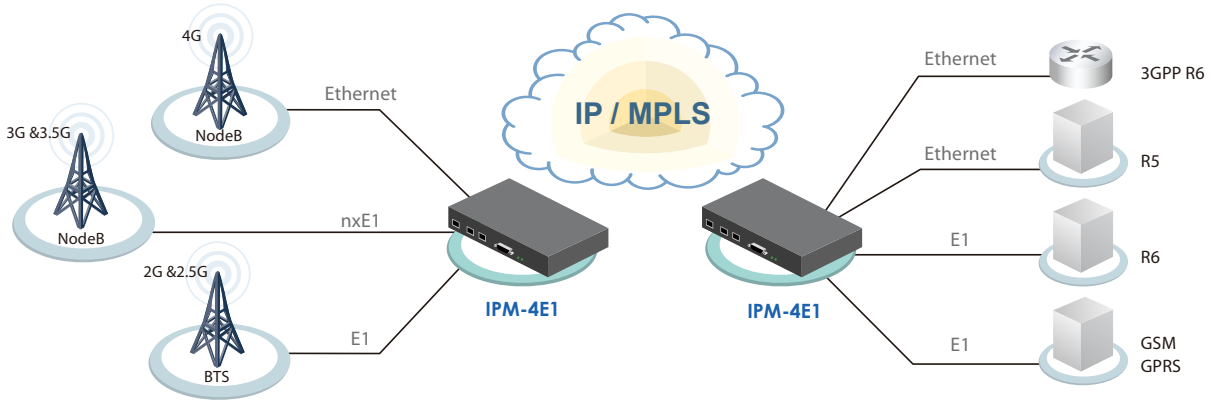
- Supports Web Management
- Supports IETF RFC4553 Structure-Agnostic TDM over Packet (SAToP), Metro Ethernet Forum MEF8
- Use Raw Encapsulation method for PDH payload over Ethernet packet
- Supports Circuit Emulation Service over Ethernet networks
- Comply with IETF draft standard for CESoPSN and SAToP; Metro Ethernet Forum MEF8 IA
- Supports both Point-to-Point and Point-to-Multipoint operation
- Supports Adaptive Clock recovery block for Ingress PDH (PSN -> TDM) clock generation. Recovered clock jitter is compliant to ITU-T G.823 (E1 Jitter Control)
- Configurable jitter buffer depth to compensate PDV (Packet Delay Variation) with the flexible setting of 11ms, 23ms, 40ms, 75 ms
- Lost packets processing / compensation via PW (Pseudo Wire) control field Sequence Number
- Provide Subscriber side Data traffic bandwidth control to guarantee enough TDM payload bandwidth
- PDH LOS detection triggered PW L field or payload AIS generation at Egress direction (TDM->PSN)
- Configurable IEEE 802.3 DA/SA assignment
- LED alarm display for E1 Power failure status
- E1 NRZ Serial Interface with LOS/AIS detection

Specifications

E1 Interface	Standards	ITU-T G.703, G.704, G.706, G.732
	Ports	1 or 4-Port
	Data Rate	2.048Mbps ±50ppm
	Connector	RJ-48c for 120 ohm
	Line Coding	HDB3
Ethernet Interface	WAN Port	100 Base-TX Ethernet
	Interface	RJ-45
	LAN port	100 Bases-TX Ethernet
	Interface	RJ-45

Dimensions	125 x 320 x 44 mm (D x W x H)
Power	AC: 85 ~ 264V @ 47 ~ 63Hz
	DC: -72V ~ -36V
Environment	Ambient temperature: 0° ~ 50°
	Storage temperature: 0°~ 85°
	Humidity: 5 ~ 95% non-condensing
Management	Console or Telnet / Web / SNMP management (via Ethernet)

Application



Ordering Information

Model Name	Description
IPM-E1-AD	E1 over Ethernet with built-in AC+DC Power
IPM-4E1-AD	4E1 over Ethernet with built-in AC+DC Power

Port Number Power Type

IPM – □□□ – □□

Example: IPM – 4E1 – AD



IPM-8E1/IPM-16E1

8/16x E1 over Ethernet

IPM-8E1 & IPM-16E1 is designed as a multi-service access platform for PDH over Ethernet applications. E1 frames can be mapped/de-mapped into/from Ethernet packets. An adaptive clock recovery method for Ingress PDH (PSN->TDM) clock generation is implemented to suppo rt E1 (ITU-T G.823) Jitter performance.

IPM-8E1 & IPM-16E1 provides cost-effective applications of traditional circuit-switched system over Ethernet. It is easy to interconnect existing phone systems over Ethernet that are used to carry data, voice and video. With high precision clock recovery technology, IPM-8E1 & IPM-16E1 is capable of supporting 2G/3G/4G backhaul and provides smooth services. IPM-8E1 & IPM-16E1 can transparently transport proprietary signaling that are required to support PBX features, including call conference, call forwarding and SS7. Customer can easily apply and enjoy better integration of TDM and IP devices with lower network expense. With a pair of IPM-8E1 & IPM-16E1 and guaranteed internet bandwidth, it is sure to save cost dramatically, and to ensure the QoS of voice based on interconnections of TDM equipment.

Features

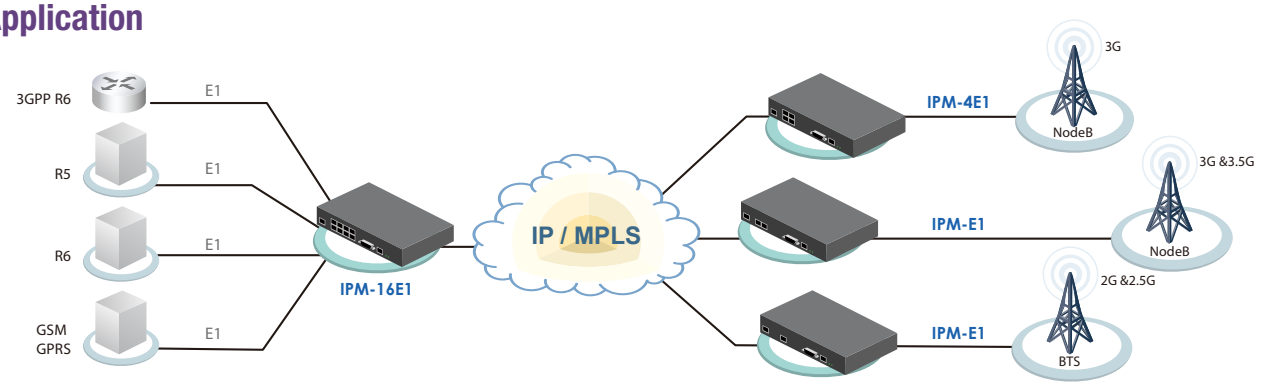
- Supports Web Management
- Supports IETF RFC4553 Structure-Agnostic TDM over Ethernet Packet (SAToP), Metro Ethernet Forum MEF8
- 8 /16 x E1 NRZ Serial Interface with LOS/AIS detection
- Use Raw Encapsulation method for PDH payload over Ethernet packet
- Supports Circuit Emulation Service over Ethernet
- Comply with IETF draft standard for CESoPSN and SAToP; Metro Ethernet Forum MEF8 IA
- Supports both Point-to-Point and Point-to-Multipoint operation
- Configurable IEEE 802.3 DA/SA assignment
- Supports 8/16 independent Adaptive Clock recovery block for Ingress PDH (PSN->TDM) clock generation. Recovered clock jitter is compliant with ITU-T G.823 (E1 Jitter Control)
- Independent configurable jitter buffer depth to compensate up to 250ms of Packet Delay Variation
- Lost packets processing / compensation via PW (Pseudo Wire) control field Sequence Number
- PDH LOS detection triggered PW L field or payload AIS generation at Egress direction (TDM->PSN)
- LED alarm display for E1 Power failure status

Specifications

E1 Interface	Standards	ITU-T G.703, G.704, G.706, G.732
	Ports	8 or 16-Port
	Data Rate	2.048Mbps ±50ppm
	Connector	RJ-45 for 120 ohm
	Line Coding	HDB3
Ethernet Interface	WAN Port	1 x 100Base-TX Ethernet
	Interface	RJ-45
Dimensions	268 x 290 x 44 mm (D x W x H)	

Power	AC: 85 ~ 264V @ 47 ~ 63Hz
	DC: -72V ~ -36V
Environment	Ambient temperature: 0° ~ 50°
	Storage temperature: 0°~ 85°
	Humidity: 5 ~ 95% non-condensing
Management	Console port or Telnet/ Web / SNMP-based management via NMS port

Application



Ordering Information

Model Name	Description
IPM-8E1-AD	8E1 over Ethernet with built-in AC+DC Power
IPM-16E1-AD	16E1 over Ethernet with built-in AC+DC Power

Port Number Power Type

IPM – □□□□ – □□

Example: IPM – 16E1– AD

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FMUX1600
FMUX800

16 or 8x E1/T1 + 4x GbE, Managed Fiber Multiplexer

The FMUX1600/FMUX800 is 1U 19"rack mountable, PDH fiber optical Multiplexer that transmits up to 16/8 E1/T1 + 4 x 10/100/1000Base-T Gigabit Ethernet over a single fiber optic link. The FMUX1600/FMUX800 chassis in available in three different power configurations; single AC, single DC, or AC+DC. The AC supplies operate from 90 ~ 240VAC while DC supplies operate from 18~60VDC. On the rear of the chassis, the BNC model provides 32/16 unbalanced 75 Ohm coaxial connections with BNC connectors while the RJ-45 model provides 16/8 balanced 120 Ohm connections over twisted pair wiring with RJ45 connectors . With two SFP sockets on fiber ports, the FMUX1600/FMUX800 gives you the fiber cabling connector SFP-LC, both multi-mode and single-mode are available as well as BiDi which allows bi-directional transmissions using only a single fiber cable. 1+1 Automatic optical line protection is also supported for the aggregate fiber ports. The standard FMUX1600/FMUX800 configuration may be viewed or set via serial VT-100 terminal connection or SNMP card with web, telnet, and SNMP management

Features

- Provides 16/8 E1/T1 G.703 transparent transmission over fiber
- Provides 4x 10/100/1000 Mbit/s Ethernet Ports and 1x RS232 ch.
- Provides one RS232 channel
- Loopback test on E1/T1 fiber port
- Provides one hotline channel (order-wire)
- Supports full/half duplex, 10M/100M/1000M, auto-Negotiation
- Forward 10K byte jumbo packets on Ethernet port
- Supports 1+1 fiber line protection. Less than 50ms
- Complete alarm function and can monitor remote device status
- Power combination AC220V and DC-48V for redundant options
- Supports RS232 local management; Supports on-line f/w upgrade
- Supports Web, Telnet, SNMP management (optional)

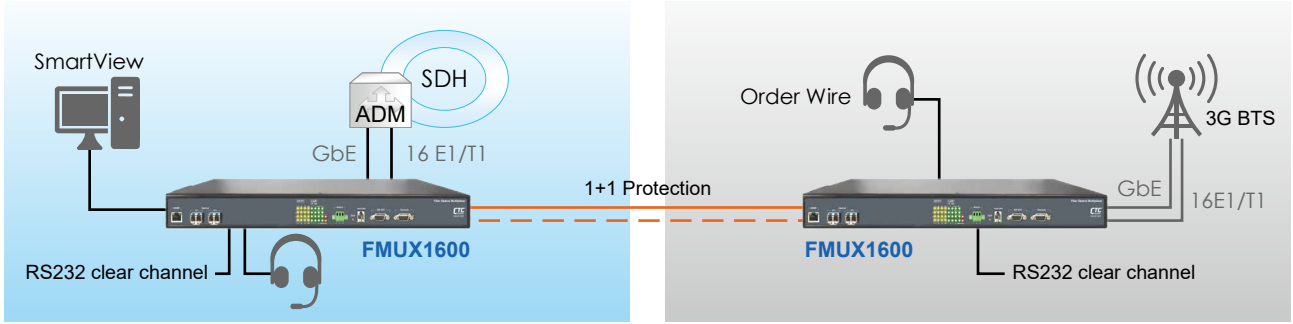
Specifications

Optical Interface	Connector	SFP- LC
	Data rate	1.25Gbps
	Bit Error Rate	Less than 10^{-11}
	Distance	MM 2km, SM 15/30/50/80/120km
	Wavelength	WDM 20/40/60/80km
Electrical Interface	Connector	Console : RS232 / SNMP : RJ45
		Ethernet : RJ45 (4-port)
		Alarm : RS232 / Order wire : RJ11
E1 Interface	Standards	ITU-T G.703, G.704, G.706, G.732
	Ports	8/16 ports
	Data Rate	2.048 Mbps ± 50 ppm
	Line Code	HDB3/AMI
	Connector	RJ-45 for 120 ohms BNC for 75 ohms
T1 Interface	Standards	ITU-T G.703, G.704, AT&T TR-62411, ANSI T1.403
	Ports	8/16 ports

T1 Interface	Data Rate	1.544 Mbps ±50 ppm
	Line Code	B8ZS / AMI
	Connector	RJ-45 for 100 ohms
Certification	CE, FCC, RoHS compliant	
Standards	ITU-T G.703, G.823 and G.742, ANSI, AT&T, IEEE 803.2, IEEE 802.3u, IEEE 802.3ab	
Indications	Power, Alarm, LBK, RD, LCK, RNG, ACO, Port, channel	
Power Input	90 ~ 240VAC, 18~60VDC	
Power Consumption	<25W	
Dimensions	250 x 438 x 43mm (D x W x H)	
Weight	3.58kg	
Temperature	0 ~ 60°C (Operating), -10 ~ 70°C (Storage)	
MTBF	50,000 hrs	

Application

Remote 3G BTS connection Application



Ordering Information

Model Name	Description
FMUX1600B-AD	16x E1 BNC + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC + DC Power
FMUX1600R-AD	16x E1/T1 RJ-45 + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC + DC Power
FMUX800B-AD	8x E1 BNC + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC + DC Power
FMUX800R-AD	8x E1/T1 RJ-45 + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC + DC Power

E1 Connector Type / Power Type

FMUX1600– □ – □□

Example: FMUX1600– B – DC

Option Models

Model Name	Description
FMUX1600-SNMP	SNMP Card with 10/100Base-TX Ethernet Port
FMUX800-SNMP	SNMP Card with 10/100Base-TX Ethernet Port
FMUX-Phone-2	2 Wires Order Wire
FMUX-Phone-4	4 Wires Order Wire

FMUX–Phone – □

Example: FMUX–Phone – 2

Note: SNMP option only required in one unit of paired link

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



FMUX1001

Modularized 16E1/T1 + 4x GbE Managed Fiber Multiplexer

FMUX101

Modularized 16E1/T1 + 4x FE Managed Fiber Multiplexer

The FMUX1001/FMUX101 is a 1U, 19" rack mountable, PDH fiber optic multiplexer that transmits up to 16 channels plus a 10/100/1000Base-T (FMUX1001) / 10/100Base-TX (FMUX101) Ethernet channel over a single fiber optic link. The FMUX1001/FMUX101 chassis supports redundant power and hot swappable design. The AC supplies operate from 100~240VAC while DC supplies operate from 18~60VDC. From the rear of the chassis, one to four hot swappable quad E1 or T1 line cards, serial data communications (V.35, X.21, RS-530) or FXO/FXS voice cards are supported. The standard FMUX1001 configuration may be viewed or set via the front panel LCD/menu keys, serial VT-100 terminal connection, Telnet, web HTTP or SNMP.

Features

- 1U, 19" 4-slot chassis
- 16 E1 (2.048Mb/s) Multiplexer with 100/1000Mbps Ethernet and RS-232 data (async) Interface (FMUX1001)
- 16 E1 (2.048Mb/s) Multiplexer with 10/100Mbps Ethernet and RS-232 data (async) Interface (FMUX101)
- RS-232 port for system console
- One alarm output port, one Order Wire port
- 4x 10/100/1000Base-T Ethernet ports (FMUX1001)
- 4x 10/100Base-T Ethernet ports (FMUX101)
- SNMP management
- LCD plus menu keys for local configuration
- Port based VLAN, tag based VLAN & bandwidth control
- Telnet and web based remote configuration
- 2 plug-in SFP slot for optical SFP module
- Forward 1024K byte packets on Ethernet port

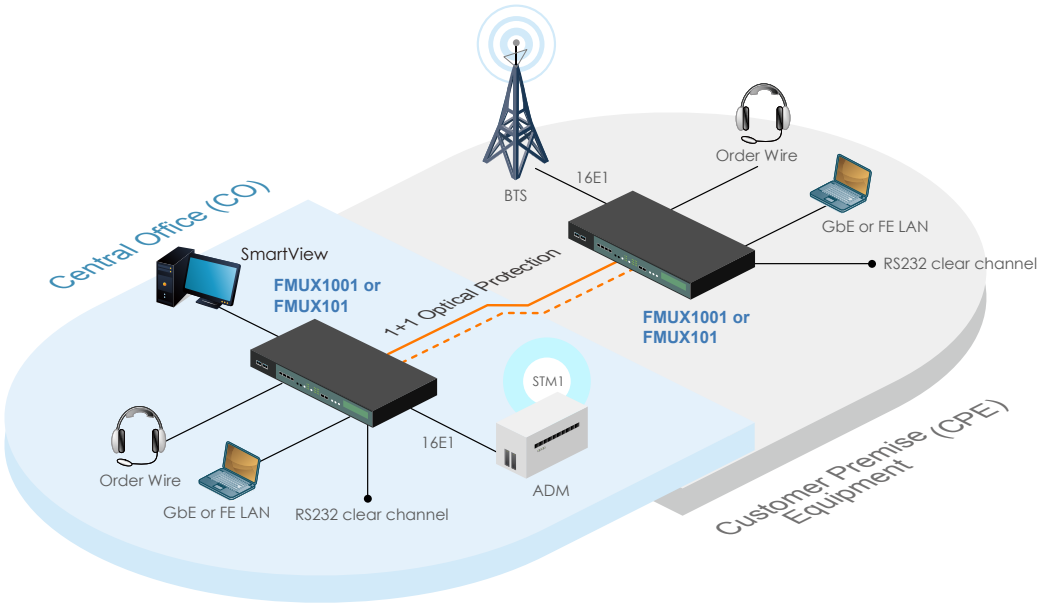
Specifications

Optical Interface	Connector	SFP - LC
	Data rate	1.25G (FMUX1001), 155M (FMUX101)
	Bit Error Rate	Less than 10^{-11}
	Fiber	MM 62.2/125μm, 50/125μm
		SM 9/125μm
	Distance	MM 2km. SM 15/30/50/80/120km
		WDM 20/40/60/80km
	Wavelength	1310, 1550nm
Electrical Interface	Console, SNMP	RJ45
	Ethernet	4x RJ45
	Alarm	RJ45

Standards	E1:ITU-T, T1:ITU-T, AT&T, ANSI, Ethernet: IEEE 802.3x
Indications	PWR, Alarm, Phone, ACO, Port, Channels
Power Input	AC module IN : AC 90 ~ 264V, Out : DC 12V DC module IN : DC 18 ~ 72V, Out : DC 12V
Power Consumption	< 25W
Dimensions	250 × 438 × 43mm (D × W × H)
Weight	3.58 kg
Temperature	0 ~ 50°C (Operating), 0 ~ 70°C (Storage)
Humidity	10 ~ 90% non-condensing
Certification	CE, FCC
MTBF	50,000 hrs

Application

Remote 3G BTS Connection Application



FMUX1001 & FMUX101 Interface Module



4x E1/T1 RJ45 I/F

Standards	ITU-T G.703, G.704, AT&T TR-62411,ANSI T1.403
Ports	4 ports
Framing	Unframed (clear channel)
E1	Data rate: 2.048 Mbps ±50 ppm
	Line code: HDB3 / AMI
	Line impedance: 120 ohms ±5%, 75ohms ±5%
T1	Data rate: 1.544 Mbps ±50 ppm
	Line code: B8ZS / AMI
	Line impedance: 100 ohms ±5%
Receive Level	Short haul - 15dB
Connector	RJ-45



4x E1 BNC I/F

Standards	ITU-T G.703, G.704, G.706, G.732
Ports	4 ports
Framing	Unframed (clear channel)
Data rate	E1 2.048 Mbps ± 50 ppm
Line code	E1 HDB3/AMI
Receive Level	Short haul - 15dB
Line impedance	E1 75 ohms ± 5%
Connector	BNC 75 ohms



Related Cables *(Please see order information for more details)*



4x Data Com I/F

Standards	ITU-T, E1A
Card Type	V.35/ RS-530 (Include X.21 and RS-449)/ RS-232 I/F
Bit rate	n x 64K, n = 1 to 32
	V.35 & RS-530 up to 2Mbps
	RS-232 up to 115.2Kbps (ASYNC)
Line code	NRZ
Clock Mode	Transparent, Recovery, External (From data port ETC)
	Internal (From oscillator)

Control Signal	CTS always On or follows RTS
	DSR constantly ON, except during test
	loops (RS-530 DSR always connect to DTR)
	DCD constantly ON, except during fiber signal loss
Test Loops	Local loop back, Remote loop back, V.54
Connector	Type Uses HD-68 pin D type Female with adapter cables



4x FXO I/F

Standards	G.711 A-law (separate modules for FXO)
Distance	2km
Bandwidth	64K voice channel
Connector	RJ45 x 4 (4 voice channel /per unit)



4x FXS I/F

Standards	G.711 A-law (separate modules for FXS)
Distance	2km
Bandwidth	64K voice channel
Connector	RJ45 x 4 (4 voice channel /per unit)

Ordering Information

Model Name	Description
FMUX1001-CH	1U 19"4-Slot Rack Mount Chassis
FMUX101-CH	1U 19"4-Slot Rack Mount Chassis
FMUX-AC	Chassis Power Module 90~264VAC
FMUX-DC	Chassis Power Module 18~72VDC
FMUX-4E1/T1-RJ45	4ch E1/T1 RJ45 interface card
FMUX-4E1/T1-Wire	4ch E1/T1 Wire Wrap interface card
FMUX-4E1/BNC	4ch G.703 E1 BNC interface card
FMUX-V35	V35 interface card with HD68M to 4 x MB34F cable (30cm)
FMUX-530	RS-530 interface card with HD68M to 4 x DB25F cable (30cm)
FMUX-449	RS-449 interface card with one HD68M to 4 x DB37F cable (30cm)
FMUX-X21	X.21 interface card with one HD68M to 4 x DB15F cable (30cm)
FMUX-232/Sync	RS-232 Sync card with one HD68M to 4 x DB9F cable (30cm)
FMUX-232/Async	RS-232 Async card with one HD68M to 4 x DB9F cable (30cm)
FMUX-4FXO	4 x FXO interface card
FMUX-4FXS	4 x FXS interface card
FMUX-Phone-2W	2 Wires order Wire (connect to analogue Telephone set)
FMUX-Phone-4W	4 Wires order Wire (connect to Ear-Mic set)
FMUX-EXT/CLK	External clock interface card

Example:

Chassis/Power/Line card Only

FMUX [1][0][0][1] - CH

- 1001 : GbE Fiber Multiplexer
- 101 : FE Fiber Multiplexer

FMUX [A][C]

- Power Module

FMUX [V][3][5]

- I/F Line Card

Whole Set

FMUX [1][0][0][1] - [A][C] - [2][W] - [A][B][C][D]

- 1001 : GbE
- 101 : FE
- Power Type: AC; DC; AA : AC + AC; DD : DC + DC; AD : AC + DC
- Order Wire: 2W : 2 Wire Phone; 4W : 4 Wire Phone
- Card Type:
  - A : 4x E1 BNC
  - B : 4x E1/T1 RJ45
  - C : 4x E1/T1 Wire
  - D : 4x V.35
  - E : 4x RS-232/Async
  - F : 4x RS-530
  - G : 4x X.21
  - H : 4x RS-449
  - I : 4x FXO
  - J : 4x FXS
  - L : EXT/CLK
  - M : 4x RS232/Sync

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Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

NEW



STE400A-232 / STE800A-232

4/8-Port RS232 Serial Server

The STE400A-232 / STE800A-232 are 4 or 8-port 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

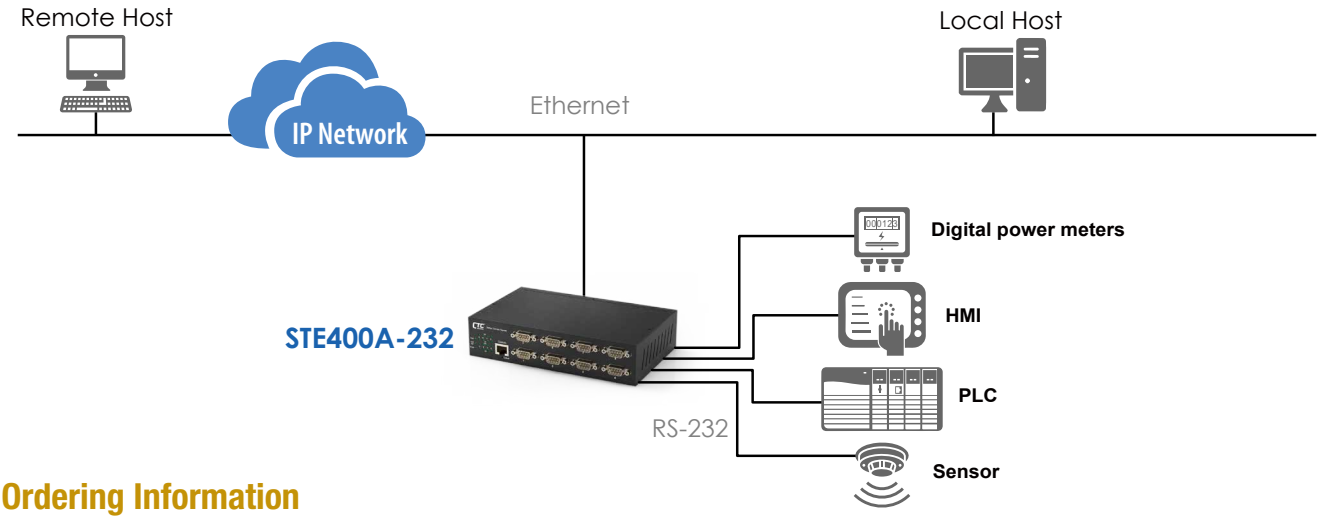
- 10/100Mbps Ethernet port
- 230.4kbps serial interface (software programmable)
- TCP Server, TCP client, Paired or Virtual com modes
- Supports Virtual COM application software
- Easy to use with Windows® utility
- Configurable IEEE 802.3 DA/SA assignment
- Supports RS232 Interface with physical DB9M port
- Configuration by web browser
- Low power consumption with 12VDC input
- Wall mount or Din Rail option

Specifications

General	LED	Ready, TP Link/Act, Data TX/RX
	OS supported	Windows XP / 2000 / 2003 / 2008 / VISTA / WIN7 / WIN8 / WIN10
Serial Interface	RS232	
Serial Connector	DB9M	
Baudrate	110 to 230.4Kbps	
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	
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 pages, Firmware upgrade
Security	Password Access
Power	12VDC extermal 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	85.8 x 84.2 x 22mm (D x W x H)
Certifications	CE, FCC
MTBF	2,385,346 Hours (MIL-HDBK-217)

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
Optional Accessories	
STE400A/DRK01	STE400A-232, DIN-Rail Mounting Kit
STE800A/DRK01	STE800A-232, DIN-Rail Mounting Kit

Package List

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



STE100A-Serial

RS232/485 Device Server

The IP Device Server provides the serial device server for hosts to control RS232, 2 or 4 wire asynchronous RS485 serial devices located virtually anywhere through a TCP/IP or UDP/IP connection. The Device Server has the DB9 port connection on one side, and a 10/100 Mbps Ethernet connection on the other 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 IP Device Server Windows driver is designed to control the IP Serial Server devices. The driver installs a virtual COM on Windows which maps the virtual COM port to the IP address of the IP Serial Server device across the network, enabling the Windows applications to access remote serial devices over Ethernet. IP Device Server can function as a UDP or a server or client for TCP connection. The application scenarios are direct IP mode, virtual COM mode, and paired mode.

Features

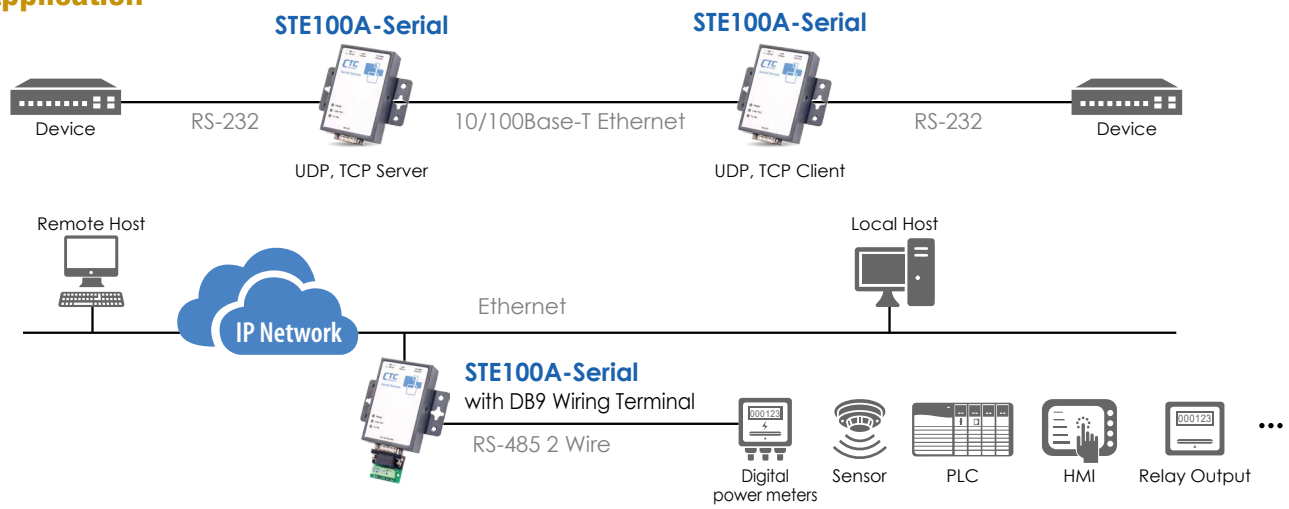
- 10/100Mbps Ethernet port
- 230.4kbps serial interface
- TCP Server, TCP client, Virtual com mode, UDP
- Supports for DHCP, HTTP, ICMP, ARP, IP, UDP, TCP
- Easy to use with Windows utility
- 2 Wire(half duplex) or 4 Wire(full duplex)
- Configuration by web browser
- Flexible RS-232/485 Interface
- Low power consumption with single + 12V to +48V input

Specifications

General	LED	Ready, TP Link/Act, Data TX/RX
	OS supported	Windows XP / 2000 / 2003 / 2008 / VISTA / WIN7 / WIN8 / WIN10
Serial Interface	STE100A-Serial : RS-232/485	
Serial Connector	DB9 Male	
Baudrate	110 to 230.4Kbps	
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 Full Duplex(4-Wire) or Half Duplex(2-Wire) for RS-422/485	
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 pages, Firmware upgrade
Security	Password Access
Power	12VDC
Operating Temperature	0 ~ 60°C
Storage Temperature	-10 ~ 70°C
Humidity	0 – 90% non-condensing
DIN rail mount	Yes
Panel mount	Yes
Dimensions	85.8 x 84.2 x 22mm (D x W x H) with DIN-Rail Mounting Kit
Certifications	CE, FCC

Application



Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Appearance

STE100A-Serial

Power input 12 to 48VDC
Load Default/Reset Button
Ethernet RJ45 10/100Mbps



RS-232/485 (DB9)

STE100A-Serial (with DB9 Wiring Terminal)

Power input 12 to 48VDC
Load Default/Reset Button
Ethernet RJ45 10/100Mbps

RS-232/485
(4-pin wiring terminal)

Ordering Information

Model Name	Description
STE100A-Serial	Single port RS232/485 DB9M device server with AC power adapter
Optional Accessories	
STE100A-Serial-WT	STE100A-Serial DB9 wiring terminal
STE100A/DRK01	STE100A-Serial DIN-Rail mounting kit
Optional Power	
DC-APT/12V	-48VDC to 12VDC Adapter - 0.83 Amp, 10 Watts , Output 12 VDC, Input -48VDC



Din-Rail Mounting Kit
STE100A/DRK01



DB9 Wiring Terminal
STE100A-Serial-WT
(only for STE100A-Serial)



VDTU2-B140

4-port Gigabit VDSL2 LAN Extender

The VDTU2-B140 is a Gigabit Ethernet Copper Extender that supports an aggregated bandwidth up to 300Mbps (Downstream: 150 Mbps/ Upstream: 150 Mbps) and delivers fiber-optic like speeds on existing copper infrastructure. The VDTU2-B140 is equipped with 4x 1000Base-T RJ-45 ports and 1x VDSL2 RJ-45 or 2-PIN Terminal Block. Built in a metal enclosure, it provides for easy installation in harsh environments. Eight different profile settings can be selected via dip switches to flexibly suit various applications and environments. Symmetric profiles can be applied as a standard Ethernet connection, while Asymmetric profiles can be used for other services such as Video streaming or IP surveillance services which require high traffic flow in one direction. The VDTU2-B140 supports transparent LAN bridging to extend Ethernet service over UTP, Cat 5+ cables or simple single pair telephone cable. It is the best high throughput Long Reach Ethernet Extender for service providers when deploying their IP-based networking services to meet various application scenarios in harsh environments.

Features

- High speed Ethernet extension over UTP, CAT 5e/6/7.
- Supports ITU-T G.993.5 G.vectoring and G.INP
- Selectable 8 different profile settings via Dip Switch (G.INP/ Interleaved, Target SNR 6/8/12/24 dB, Symmetric/Asymmetric Modes)
- Compatible with third-party VDSL2 IP DSLAM when operates in CPE(RT) mode
- Cost effective bridge function to connect two Ethernet LAN
- IEEE 802.1Q VLAN tag transparent
- Easy installation via simple plug-and-play in harsh environment

Specifications

VDSL Interface	RJ-45 or 2-PIN Terminal Block	
	DMT Encoding	
	Complying with ITU-T G993.1/G993.2/993.5/G.997.1/G.998	
	G.INP	
	On-board surge protection	
LAN Interface	4 x RJ-45	
	10/100/1000 Base-T; Auto-Negotiation, Auto-MDI/MDI-X.	
	Complying with IEEE 802.3/802.3u/802.3z	
4-position DIP Switch	Selectable Master (OT) or Remote (RT) mode	
	Selectable 8 different profile settings via Dip Switch (G.INP/ Interleaved, Target SNR 6/8/12/24 dB, Symmetric/Asymmetric Modes)	
LED	Power:	On/Off
	LAN:	Fast Ethernet/Gigabit Ethernet
	VDSL2:	Mode – CO (OT) / CPE (RT)
		Sync - Idle / Trained / Link
Power supply	VDTU2-B140:	12 VDC with Commercial Grade External Power Adaptor
	VDTU2-B140-DC :	12~24 VDC T2 terminal block
	Power Consumption:	4.5 Watts maximum
Dimension :	130 × 94.7 × 28 mm (W × H × D)	
Operating Temperature:	-20°C ~65°C	
Humidity:	0%~95%RH (non-condensing)	

Standards and Certifications	CE Class A
	FCC Part 15B Class A

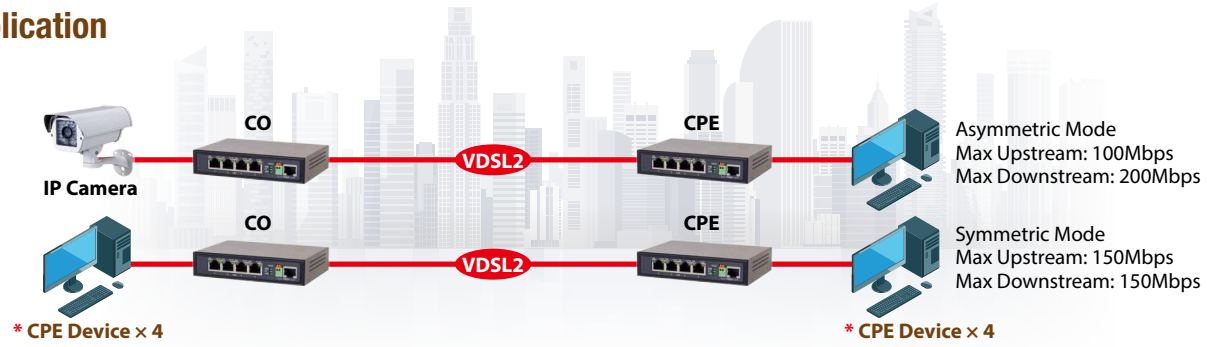
Performance

UTP, 26AWG Profile Setting 1: Symmetric, SNR 8dB, G.INP		
Distance (Feet)	**Upstream Line Rate (Mbps)**	**Downstream Line Rate (Mbps)**
500	155	158
1,000	122	126
1,500	75	80
2,000	48	56
2,500	28	38
3,000	23	28

UTP, 26AWG Profile Setting 1: Asymmetric, SNR 8dB, G.INP		
Distance (Feet)	**Upstream Line Rate (Mbps)**	**Downstream Line Rate (Mbps)**
500	100	200
1,000	77	170
1,500	38	105
2,000	22	64
2,500	10	43
3,000	9	42
4,000	6	34

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

Application



Ordering Information

Model Name	Description
VDTU2-140	4-port Gigabit VDSL2 LAN Extender with AC Power Adapter
VDTU2-140-DC	4-port Gigabit VDSL2 LAN Extender (12~24 VDC T2 Terminal Block)



VDTU2-B120
Gigabit Ethernet VDSL2 LAN Extender

VDTU2-B110
Fast Ethernet VDSL2 LAN Extender

The VDTU2-B120 is a Gigabit Ethernet Copper Extender that supports an aggregated bandwidth up to 300Mbps. (Downstream: 150 Mbps/ Upstream: 150 Mbps) and the VDTU2-B110 is a Fast Ethernet Copper Extender that supports an aggregated bandwidth up to 200Mbps (Downstream: 100 Mbps/Upstream: 100 Mbps). Both Lan Extenders deliver fiber-optic like speeds on existing copper infrastructure and are equipped with 1-port 1000Base-t RJ-45 (B120) or 100Base-T RJ45(B110) and 1-port VDSL2 RJ-45 in metal enclosures, for easy installation in harsh environment. Symmetric profile can be applied as a standard Ethernet connection while Asymmetric profile can be used for other services like Video streaming or IP surveillance services which require high traffic flow in one direction. The Lan Extender supports transparent LAN bridging to extend Ethernet service over UTP, Cat 5+ cables or simple single pair telephone cable. They are the best high throughput Long Reach Ethernet Extenders for service providers when deploying their IP-based networking services to meet various application scenarios in harsh environments.

Features

- High speed Ethernet extension over UTP, CAT 5e/6/7.
- Supports ITU-T G.993.5 G.vectoring and G.INP (VDTU2-B120)
- Selectable 8 different profile settings via Dip Switch (VDTU2-B120) (G.INP/Interleaved, Target SNR 6/8/12/24 dB, Symmetric/ Asymmetric Modes)
- Compatible with third-party VDSL2 IP DSLAM when operates in CPE(RT) mode
- Cost effective bridge function to connect two Ethernet LAN
- IEEE 802.1Q VLAN tag transparent
- Easy installation via simple plug-and-play in harsh environment

Specifications

VDSL Interface	RJ-45	
	DMT Encoding	
	Complying with ITU-T G993.1/G993.2/G.997.1/G993.5/G.998 (VDTU2-B120)	
	G.INP (VDTU2-B120)	
	On-board surge protection	
LAN Interface	1 x RJ-45	
	10/100/1000 Base-T; (VDTU2-B120)	
	10/100Base-TX (VDTU2-B110)	
	Auto-Negotiation	
	Auto-MDI/MDI-X	
	Complying with IEEE 802.3/802.3u/802.3z(VDTU2-B120)	
4-position DIP Switch	VDTU2-B120: Selectable Master (OT) or Remote (RT) mode Selectable 8 different profile settings via Dip Switch G.INP/Interleaved Target SNR 6/8/12/24 dB Symmetric/Asymmetric Modes VDTU2-B110: Selectable CO or CPE mode Selectable 30a or 17a (VDSL2 Profile) Selectable Band plan (Symmetric or Asymmetric) Selectable target SNR margin (6dB or 9dB)	
LED	Power:	On/Off
	VDSL2:	Mode – CO (OT) / CPE (RT) Sync - Idle / Trained / Link
Power supply	VDTU2-B120 / B110:	12 VDC with Commercial Grade External Power Adaptor
	VDTU2-120-DC :	12~24 VDC T2 terminal block
	Power Consumption:	3.8 W (VDTU2-120) 4.2 W (VDTU2-110)
Dimension :	96.2 x 22.8 x 73.4 mm (WxHxD)	
Operating Temperature:	-20°C ~65°C (VDTU2-120) -0°C ~50°C (VDTU2-110)	
Humidity:	0%~95%RH (non-condensing)	
Standards and Certifications	CE Class A	
	FCC Part 15B Class A	

Performance

VDTU2-B120

UTP, 26AWG				
Distance (m)	Profile Setting 1: Symmetric, SNR 8dB, G.INP		Profile Setting 1: Asymmetric, SNR 8dB, G.INP	
	Upstream Line Rate (Mbps)	Downstream Line Rate (Mbps)	Upstream Line Rate (Mbps)	Downstream Line Rate (Mbps)
150	155	158	100	200
300	122	126	54	129
450	75	80	49	112
600	48	56	39	84
750	28	38	23	60
900	23	28	11	45
1200	x	x	6	40

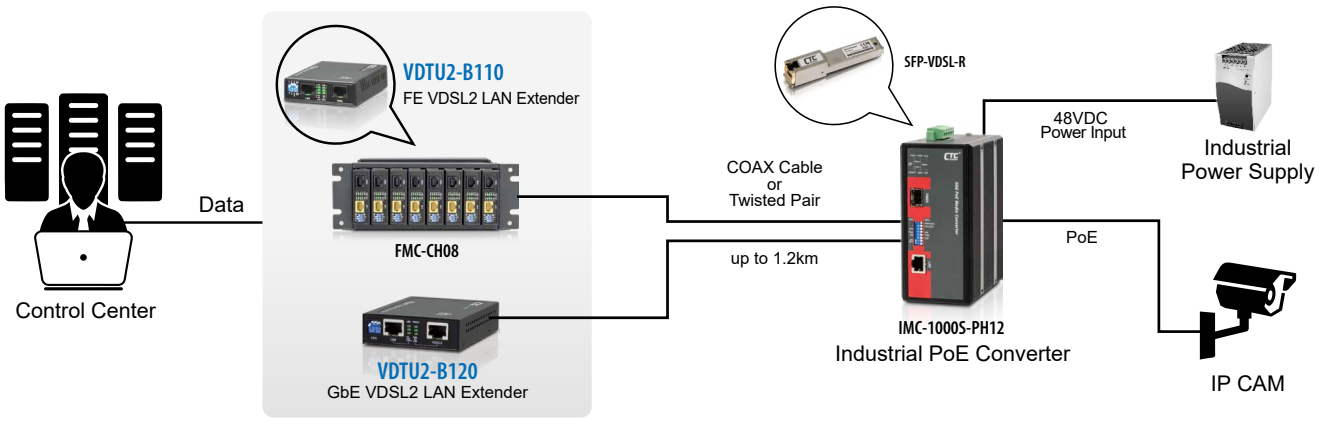
VDTU2-B110

UTP 26AWG			
17a Profile		30a Profile	
Loop (m)	Downstream/ Upstream	Loop	Downstream/ Upstream
300M	100/72 Mbps	300M	100/100 Mbps
600M	42/46 Mbps	600M	40/45 Mbps
800M	32/28 Mbps	900M	22/19 Mbps
1000M	18/13 Mbps	1200M	16/7 Mbps
1200M	16/7 Mbps	1500M	12/3 Mbps
1500M	12/3 Mbps	1800M	8/2 Mbps
1800M	9/2 Mbps	2100M	5/2 Mbps
2000M	5/2 Mbps	x	x

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

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Ordering Information

Model Name	Description
VDTU2-B120	1-port Gigabit VDSL2 LAN Extender with AC Power Adaptor
VDTU2-B120-DC	1-port Gigabit VDSL2 LAN Extender (12~24 VDC T2 Terminal Block)
VDTU2-B110	1-port Fast Ethernet VDSL2 LAN Extender with AC Power Adaptor
FMC-CH08-AC	2U, 10", 8 slots Rack with 10" rack mount ear and 100 ~ 240VAC (for VDTU2-B110)
FMC-CH08-DC	2U, 10", 8 slots Rack with 10" rack mount ear and 18 ~60VDC (for VDTU2-B110)



SHDTU04bF-ET10RS

G.SHDSL.bis ATM EFM Router (2/4/8wires)

The G.SHDSL.bis ATM EFM Router is 2/4/8wires Ethernet Bridge/Router that complies with G.991.2 standards and has a built-in four port 10Base-T /100Base-TX auto-negotiation and auto-MDIX switch. The G.SHDSL.bis ATM EFM Router provides multi-rate 2-wire / 5.7Mbps or 4-wire / 11.4Mbps and 8-wire / 22.78Mbps payload rates over existing single or two pair copper wire. The G.SHDSL.bis ATM EFM Router is designed not only to optimize the service bit rate from central office to customer premises but also integrates high-end Bridging/ Routing EFM bonding capabilities with advanced functions such as virtual server mapping and VPN pass through. The G.SHDSL.bis ATM EFM Router allows customers to leverage the latest in broadband technologies to meet their growing data communication needs. In bridge mode, the four switching ports may be configured for IEEE802.1Q VLAN or port based VLAN applications. The modem can be configured in either central or client mode providing a point-to-point solution.

Features

- Supports Ethernet over ATM over SHDSL
- Full ATM protocol stack implementation over G.SHDSL.bis
- Adaptive rate installation maximizes data rate based on loop conditions
- Standard ITU G.991.2 (2004) supports improved reach, speed and interoperability compared to conventional G.SHDSL
- Supports point-to-point configurations
- Local management interface via console port
- Intuitive Web based management
- SNMP management with SNMPv1/v2 and MIB II
- Build-in advanced SPI firewall (Firewall routers)
- Efficient IP routing and transparent learning bridge to support broadband Internet services
- VPN pass-through for safeguarded connections
- DMZ host/Multi-DMZ/Multi-NAT; multiple PCs on a LAN with only one IP address
- PPPoA and PPPoE support user authentication with PAP/CHAP/MSCHAP
- Raw and time stamped statistics
- Supports firmware upgrade via web interface
- EFM (Ethernet in the First Mile) bonding per IEEE 802.3-2005;2/4-wire bonding for HDLC per G991.2

Specifications

Interface	WAN	SHDSL.bis: ITU-T G.991.2 (2004) Annex A/B/F/G
		Support EFM Bonding and SHDSL M-Pair mode
		Line Code: TC-PAM 16/32/64/128
		Data Rate:
		N × 64 Kpbs (N=3~89) using TC-PAM 16/32
		Max. 5.696Mbps (1-Pair)
		Max. 11.392Mbps (2-Pair)
		Max. 22.78Mbps (4-Pair)
		N × 64 Kbps (N=3~239) using TC-PAM 64/128
		Max. 15.296 Mbps (1-Pair)
		Max. 30.592 Mbps (2-Pair)
		Max. 61.184Mbps (4-Pair)
		Impedance: 135 ohms
	LAN	RJ-45 × 4-Ports 10/100 Base-T Ethernet ports
Serial Console	RS-232(Female) Connector	
Factory Default Reset	Push Button	
LED	Power: (Green)	
	WAN: LINK/ACT (Green), one LED per pair	
	LAN (Port 1 ~ Port 4): LINK/ACT (Green:100M, Orange:10M)	
	ALARM: (Red)	
G.SHDSL	Support G.991.2 / G994.1 standards	
	TC-PAM line modulation	
	Configurable as either server or client mode	
	OAM IEEE 802.3 chapter 57 compliant	
	IEEE 802.3 2BASE-TL (aka 802.3ah) compliant	
	Rate negotiating / Manually rate adaptation configuration	
	Connection Loops: 1 pair (2 wires)	
	Support IPoE	
	Support PPPoE	
Routing/ Bridge Support	IP (RFC 791) routing is supported	
	TCP, UDP, ICMP, IGMP v1 and v2, ARP, RIP v1, RIP v2, OSPF, BGP-4	
	Transparent bridging (IEEE 802.1D)	
	PPP BCP (RFC 3185) support	
	IGMP snooping	

ATM Support	Multiple protocols over AAL5 (RFC1483) (Not support IPoA/PPPoA)
	Only 1 PVC
EFM Support	EFM mode compliant to IEEE 802.3
	PPP over Ethernet (RFC2516)
	Support of OAMPDU information and functionality (ITU-TY.1731)
EFM Support	OAMPDU Event Notification, Variable Request, Variable Response, Loopback Control
	VLAN base QOS (802.1P/Q), Priority Queue
Internet Access Sharing	NAT (includes multi-to-multi NAT) / SUA, 8192 NAT sessions
	Port restricted cone NAT
	SIP ALG pass-through
	NAT server (Port forwarding)
	Multi-NAT
	Dynamic DNS
	DHCP server/client/relay
Security	User Authentication (PAP, CHAP) with PPP (RFC 1334, RFC 1994)
	Microsoft CHAP
	Stateful packet inspection firewall
	Content filter
	Prevent Denial of service
	Access control of service
	Real-time attack alert and log
Network Management	Web-based Configuration, Command-line interface
	Password-protected Telnet support
	SNMP MIB I /MIB II support
	TFTP & FTP firmware upgrade and configuration backup
	Dying Gasp
VPN	IPSec VPN support, 10 VPN tunnels
	IKE/ Manual Key, DES/ 3DES/ AES Encryption
	MD5/ SHA1 Authentication, FQDN
	NETBIOS pass-through for IPSec, IPSec VPN keep-alive
	IPSec NAT Traversal

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Diagnostics Capabilities	The router can perform self-diagnostic tests. These tests check the integrity of the following circuitry: –FLASH memory –SDSL circuitry –RAM –LAN port

Others	DNS Proxy UNIX syslog Each Ethernet port can be only tagged or only untagged Application QoS IPv6

Ordering Information

Model Name	Description
SHDTU04bF-ET10RS	4-Port 10/100Base-TX ATM Bridge / Router w/Firewall (2-wire 5.7Mbps)
SHDTU04bAF-ET10RS	4-Port 10/100Base-TX ATM Bridge / Router w/Firewall (4-wire 11.4Mbps)
SHDTU04bCF-ET10RS	4-Port 10/100Base-TX ATM Bridge / Router w/Firewall (8-wire 22.78Mbps)



G.SHDSL.bis TDM NTU

- SHDTU03b-E1
- SHDTU03b-V35
- SHDTU03b-X21

CTC SHDTU03b SHDSL NTU series is a telecommunication product designed as a Network Terminating Unit for carriers and SME users, which offers three model choices with G.703 E1 or ITU-T V.35 and X.21 data interface. The SHDSL E1 NTU supports two different connectors for G.703 E1 applications that link to TDM services, either by balanced 120 ohm RJ45 jack (USOC RJ48C) or unbalanced 75 ohm dual BNCs, with bit rates from 64kbps to 2.048Mbps. The SHDSL V.35, X.21 NTU supports a serial interface via DB25F connector along with DB25M to MB34F(V.35), DB25M to DB15F(X.21) cable adapters. The SHDSL NTU can be configured and managed by a local LCD menu and push-buttons or by a menu driven VT100 compatible Asynchronous Terminal Interface either locally or remotely via EOC (Embedded Operations Channel). The G.SHDSL.bis NTU provides the capability to extend transmissions over a copper loop such as ordinary, single pair, telephone twisted cable.

Features

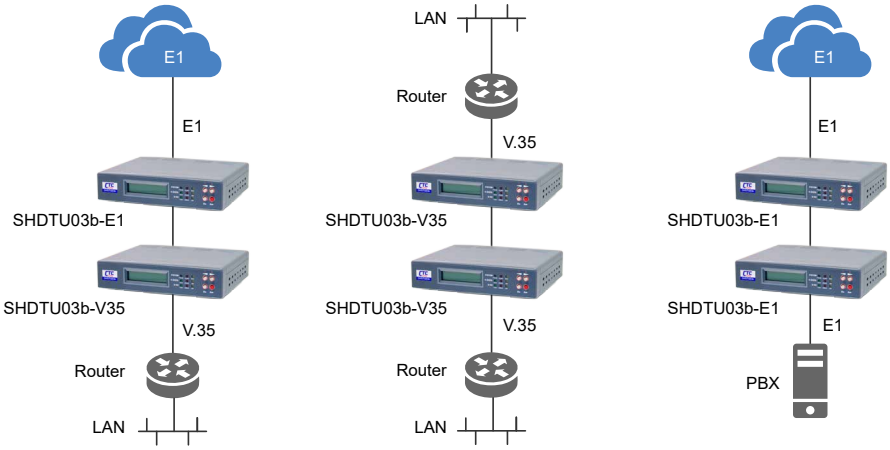
- Standard G.SHDSL (ITU G.991.2) supports improved reach/speed and greater interoperability
- Fast and cost-effective provisioning of traditional frame relay (FR or T-HDLC) or TDM leased line services
- Use existing copper loop infrastructures
- Operate in back to back connection
- Efficient single wire pair usage
- Up to 5.696Mbps symmetric service bit rate
- Auto rate installation maximizes data rate based on loop conditions
- Wetting current sink to protect SHDSL line (Optional)
- Local management interface with LCD display
- Remote line loopback
- SHDSL Line performance monitoring (Data Rate and SNR)
- Raw and per time interval statistics
- Bandwidth guaranteed transmission equipment
- Remote firmware upgrade

Specifications

WAN Interface	Line Rate: SHDSL per G.991.2
	Coding: trellis coded pulse amplitude modulation(TCPAM-16)
	Support: Annex A(ANSI) and Annex B(ETSI)
	Payload rates: 192kbps to 5.696Mbps (N x 64kbps, N=1 to 36)
	Connection: RJ-45 jack
	Impedance: 135 ohms
G.703 Interface (E1)	Connection: RJ-48C for balanced 120Ω E1 cable and BNC for unbalanced 75Ω E1 cable
	Line Rate : 2048KHz +/- 50ppm
	Line coding: HDB3/AMI
	Framing :PCM30/PCM30C/PCM31/PCM31C and Unframed
	Data Rate : 64Kbps to 2.048Mbps (Nx64Kbps, N=1 to 32)
	Operation : Full E1 and Fractional E1
Data Interface (V.35, X.21)	Connection:DB-25(F)
	Payload rates: 64~5.696Mbps (N=1 to 36)
	Support V.35, X.21
DSL Timing	Internal
	From E1 Recovery (as E1)
Performance Monitoring	ES, SES, UAS, LOWS for SHDSL
	ES, SES, UAS for E1
	Alarms and Errors for SHDSL or interface

Management	Configuration with keypads and LCD display
	Console port (RJ45, RS232C)
	Support firmware upgradeable
	SNMP management via Ethernet port(Optional)
Loopback Tests (for E1 only)	Local Digital Loopback
	Local Loopback
	Remote Line Loopback
	Remote Payload Loopback
	Far-end Line Loopback
	Far-end Payload Loopback
	V.54 Loopback(For V.35 interface only)
	Build-in 2047 bit (2 11 -1) BER Tester
Regulatory	ISO 9001 Quality Management
	CE Approval & EN60950 Certificate
Physical / Electrical	Dimensions: 195 x 48 x 168 mm (D x W x H)
	AC Input: 90~240VAC with 50~60Hz
	DC Input: -36V~ -72V
	Power Consumption: 10W Max
	Operation temperature: 0 to 50°C
	Humidity: Up to 95% (non-condensing)
	External screw for frame grounding

Application



Ordering Information

Model Name	Description
SHDTU03b-E1-AD	E1 NTU, AC+DC Power (2-wire 5.7Mbps)
SHDTU03b-V35-AD	V.35 TDM NTU, AC+DC Power w/V.35 Cable (2-wire 5.7Mbps)
SHDTU03b-X21-AD	X.21 TDM NTU, AC+DC Power w/X.21 Cable (2-wire 5.7Mbps)

SHDTU03b – ☐☐ – ☐☐ (Interface / Power Type)

Example: SHDTU03b – E1 – AD

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



VPN10 / 20 / 40

G.SHDSL.bis VPN Router

CTC Union VPN10/20/40 G.SHDSL.bis VPN Router provides secure and symmetrical high-speed connectivity over existing copper-line infrastructure that is ideal for SOHO and SME users. It features the latest G.Shdsl.bis technology supporting symmetrical upstream and downstream date rates up to 15.3Mbps/Pair (TC-PAM 128). Four pairs can be bonded together for aggregated bandwidth over 61Mbps. CTC Union VPN10/20/40 Series VPN Router operates the SHDSL link in either EFM mode or ATM mode. It is designed to deliver business class Ethernet Service under EFM mode while providing the flexibility to be compatible with the existing DSLAM infrastructure under ATM mode. CTC Union VPN10/20/40 series supports flexible VPN applications including VPN pass-through, client-to-VPN gateway and VPN LAN-to-LAN connection. It features IPSec VPN up to 12 encrypted tunnels for secure data communications between remote sites, home offices, and mobile users across public IP networks like the Internet. It also supports up-to-date 3DES and AES for data encryptions as well as MD5/SHA-1 and manual/IKE key for authentication. The Quality of Service (QoS) features allow users to allocate network resources effectively. By classifying the priority of services, the powerful bandwidth management functions increase efficiency on latency-sensitive applications such as VoIP, video streaming, video conferencing and interactive game. CTC Union VPN10/20/40 series enables service providers to offer symmetrical high-speed Ethernet service or point-to-point connectivity to their enterprise customers. It is the ideal copper-based Ethernet solution for quick deployment of standardized, reliable and secure services with carrier-class OAM and comprehensive management options.

Features

- Extend Ethernet Services to sites with existing copper
- infrastructure
- Business-class Ethernet services with flexibility of mapping user traffic into Ethernet flows
- EFM Bonding up to 61 Mbps (4 pairs, TC-PAM 128)
- Supports both EFM mode and ATM mode
- In ATM mode, supports up to 12 PVC
- IPSec VPN for safeguarded connections
- Flexible and Rapid Service Deployment
- Support EFM OAM complying with IEEE 802.3ah
- Low Delay, Jitter and Packet Loss for delay sensitive applications
- Supports secondary IP

Specifications

WAN Interface	SHDSL.bis: (ITU-T G.991.2 (2004) Annex A/ B /F / G supported
	Support EFM Bonding and SHDSL M-Pair mode
	Data Rate: N × 64 Kpbs (N=3~89) using TC-PAM 16 / 32 Max. 5.696Mbps (1-Pair) Max. 11.392Mbps (2-Pair) Max. 22.784Mbps (4-Pair) N × 64 Kbps (N=3~239) using TC-PAM 64 / 128 Max. 15.296 Mbps (1-Pair) Max. 30.592 Mbps (2-Pair) Max. 61.184 Mbps (4-Pair)
	Impedance: 135 ohms.
LAN Interface	4-Ports 10/100M Switch, Auto-negotiation for 10/100Base-TX and Half/ Full Duplex, Auto-MDIX
USB (Optional)	Supports USB 2.0
	Supports 3.5G
Serial Console	RJ-45 Connector
Factory Default Reset	Push Button
LED	Power (Green)
	WAN: LINK/ ACT (Green), one LED per pair
	LAN (Port 1 ~ Port 4): LINK/ ACT (Green: 100M, Orange: 10M)
	ALARM (Red)
Bridging and VLAN	IEEE 802.1D Transparent Learning Bridge
	IEEE 802.1Q and Port Based VLAN
	Spanning Tree Protocol (STP)
	Up to 2K Mac Address
VPN	IPSec (RFC2411) up to 12 Tunnels
	DES/ 3DES/ AES
	MD5/ SHA-1 and IKE/ Manual Key
	ISAKMP (RFC 2407/ 2408/ 4306) and IKE v1 (RFC 2409/ 4109)
	PSK
	L2TP/PPTP
Management	Management via Web, Telnet and CLI
	Support SSH (RFC4250/ 4251/ 4252/ 4253/ 4254/ 4255/ 4256)
	SNMP v1/ v2c/ v3 (RFC 1157/ 1901/ 1905) and MIB II (RFC1213/ 1493)
	Syslog with Remote Logging support
	Firmware Upgrade via TFTP
	EFM (IEEE 802.3ah) OAM (Optional)

Routing	Static routing and RIP v1/v2(RFC1058/ 2453)
	NAT/ PAT (RFC1631)
	NAT Application Level Gateways
	Skype/ MSN/ Yahoo Messenger (RFC2933)
	VoIP(SIP) pass through and VPN PPTP/L2TP pass through
	Virtual Serve
Network Protocol	IPv4 (ARP/ RARP, TCP/ UDP,ICMP)
	DHCP Client/ Server, Relay
	DNS Relay/ Proxy, Dynamic DNS(DDNS)
	IGMP v1/ v2/ v3, IGMP Proxy, IGMP Snooping
	SNTP and UPnP
ATM	12 PVC
	OAM F4/ F5 Loopback
	AAL5
	VC Multiplexing and SNAP/ LLC
	EoA (RFC 2684/RFC1483), PPPoA (RFC 2364) and IPoA(RFC1577)
	Multiple protocol over ATM AAL5(MPOA, REF1483/ 2684)
	QoS(UBR/ CBR/ VBR/ VBR-RT)
PPP	PPPoE
	PAP/ CHAP/ MS-CHAP/ MS-CHAPv2
	Configurable timer to auto-reconnect and idle times for timeout.
QoS	802.1P Tag
	IPv4 TOS/ DiffServ
	Class-based Prioritization and Class-based Traffic Shaping
	Class-based DSCP Mark
	Up to 8 priority queues
Firewall	SPI (Stateful Packet Inspection) and DoS (Denial of Service)
	DMZ
	Access Control List (ACL)
Operating Environment	Operating Temperature: 0 ~ 45°C
	Storage Temperature: -20°C ~ 70°C
	Operating Humidity: 20% ~ 95% (non-condensing)
Regulatory	ISO 9001 Quality Management
	CE Approval & EN60950 Certificate
Physical / Electrical	Dimensions: 18.7 × 3.3 × 14.5cm (W × H × D)
	Power: 100~240VAC (via power adapter)
	Power Consumption: 9 watts Max

Application

Figure 1 : Ring Topology

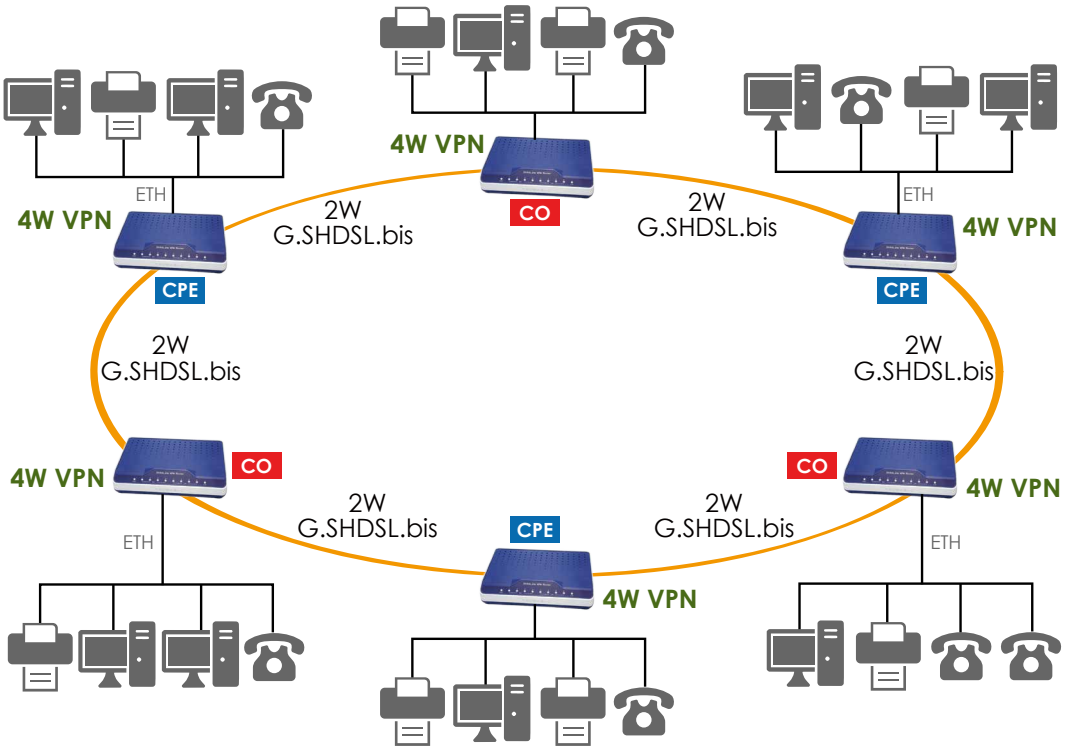
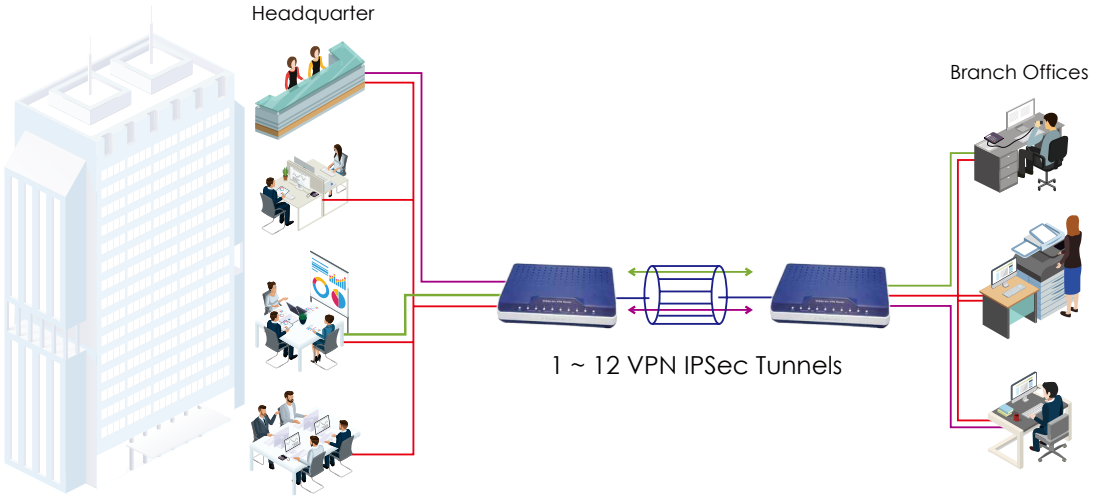


Figure 2 : VPN IPSec Tunnels



Ordering Information

Model Name	Description
VPN10	2W G.SHDSL.bis.VPN Router with 4x10/100TX
VPN20	4W G.SHDSL.bis.VPN Router with 4x10/100TX
VPN40	8W G.SHDSL.bis.VPN Router with 4x10/100TX
VPN10/U	2W G.SHDSL.bis.VPN Router with 4x10/100TX and USB Port
VPN20/U	4W G.SHDSL.bis.VPN Router with 4x10/100TX and USB Port
VPN40/U	8W G.SHDSL.bis.VPN Router with 4x10/100TX and USB Port

VPN–□□/□

Example: VPN– 10/U

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Preliminary



EOC-10B

2-Port Giga Ethernet Extender over Coaxial

The New EOC-10B is point-to-point EOC (Ethernet over Coaxial) solution that efficiently extends 10/100/1000Mbps Ethernet circuits up to 600m (RG59) at full Fast Ethernet speed using existing coaxial cable. The EOC-10B will allow Ethernet connectivity in existing facilities without pulling extra cable. This is perfect solution to Ethernet on the factory floor where systems have been upgraded from slower serial communication to Ethernet networking. Installation is easy with no settings, just plug & play. This modem is used with Coaxial cable to extend Ethernet connectivity over existing Coaxial cable.

Features

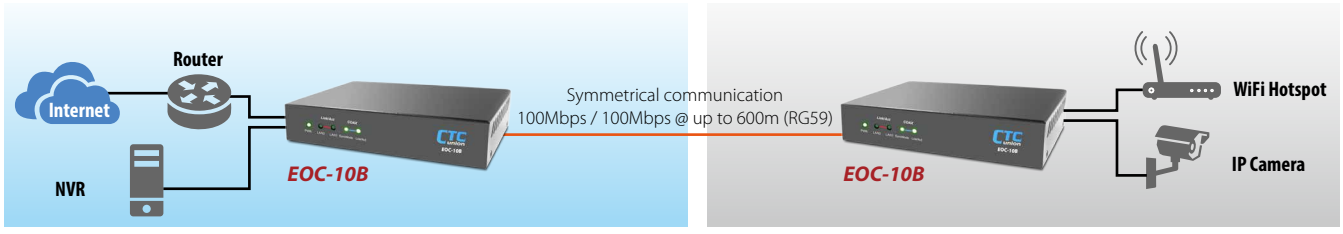
- Extends LAN connectivity using existing coaxial cable.
- Transmits Ethernet over coaxial cable.
- 100Mbps/100Mbps @ up to 600m (RG59)
- Supports Point-to-Point application
- Symmetrical communication between both-side.
- Operates transparent to high layer protocols such as TCP/IP
- Auto-MDI/MDIX
- Auto negotiation
- Plug and Play, no configuration required.
- Status LEDs for simple monitoring.

Specifications

Connectors	2× 10/100/1000 Base-T RJ45 TP
	1× F-Type uplink for coax
	2 PIN DC Jack IN
Indicators	PWR Power LED
	LAN1~2 Link/Act LED ×2
	Device Status LED ×1
	Uplink Status LED ×2
Dimension	83×138×28mm (D × W × H)
Weight	330g
Power Requirement	External Power Supply: DC/12V 1A
	System Power Consumption: <4 Watt
Network Standards	IEEE802.3 10BASE-T, 10Mbit/s
	IEEE802.3u 100BASE-TX, 100Mbit/s, Auto-negotiation
	IEEE802.3ab 1000BASE-T
	IEEE802.3x Full Duplex and Flow Control
	MDI/MDI-X Auto Crossover
Protocol	Transparent to higher layer protocols

Switch Processing Scheme	Store and Forward
Quality of Service	IEEE 802.1p Priority
	IEEE 802.1Q Tag VLAN Pass-through
Address Table	Support 1K MAC address entries
Flow Control	Back pressure for half duplex IEEE 802.3x Pause Frame for full duplex
Switch fabric	4.2 Gbps
Maximum Transmit Unit	9K byte
Emissions Compliance	FCC part 15 Class B, CE Mark
Environmental Conditions	Operating Temperature : 0°C ~ 70°C
	Storage Temperature : -20°C ~ 85°C
	Operating/Storage Humidity : 10% ~ 90%, Non-condensing
MTBF	57,000 HR

Application



Local Site **Remote Site**

Ordering Information

Model Name	Description
EOC-10B	2-port 10/100/1000Base-T Ethernet over Coaxial LAN Extender with DC12V AC Adapter

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



SP-POE-01A/SP-POE-01

Power Over Ethernet 1-Port Surge Protector

The SP-POE-01A is a single port, Ethernet surge protector designed to protect all 8 lines used in a standard CAT5e cable. The product is compatible with 10/100Base-T(X) networks and 48V Power-over-Ethernet systems. The Standard 802.3af allows the methods of implementing PoE: The SP-POE-01A applies data to the pairs (pins 1/2 and pins 3/6) and power to the unused pairs (pins 1/2 and pins 3/6). The SP-POE-01A offered protection is provided on all 8 Ethernet pins (53V clamping on Data pins 1,2,3,6 and 53V clamping on POE pins 1,2,3,6). Network connections are made via standard female RJ45 connectors. Grounding is accomplished via a ground wire.

Features

- 10/100Mbps data rate
- Compatible with 48V power over Ethernet systems
- 53V Data / PoE clamping voltage
- 5KA surge discharge current
- CAT5 and CAT5e compatible. All 8 pins protected.
- Shielded RJ45 jacks and metal enclosure for EMI noise suppression

Specifications

Voltage	Data 5V ; PoE 48V	
Clamping Voltage	53V Data (Pins 1,2,3,6) 53V PoE (Pins 1,2,3,6)	
Max Surge Discharge Current	5KA (8/20uS)	
Peak Pulse Current	100A (10/1000uS)	
Pins Protected	Data : 1, 2, 3, 6	PoE : 1, 2, 3, 6 (SP-POE-01A)
	Data : 1, 2, 3, 6	PoE : 4, 5, 7, 8 (SP-POE-01)
Insulation Lost	< 0.5dB (10Mbps)	

Data Rate	10/100 Mbps
Response Time	line/line <1 ns; line/ground < 100ns
Operating Temperature	-20 ~ +75°C
Storage Temperature	-40 ~ +85°C
Operating Humidity	0% ~ 95% non condensing
Dimensions (D x W x H)	38 x 106 x 26 mm (1-port)
Weight	75 g (1-port)
Certification	IEC 61643-21:2000

Ordering Information

Model Name	Description
SP-POE-01A	1-port RJ45 10/100Base-TX PoE Ethernet Surge Protector (Data: 1,2,3,6. PoE: 1,2,3,6)
SP-POE-01	1-port RJ45 10/100Base-TX PoE Ethernet Surge Protector (Data: 1,2,3,6. PoE: 4,5,7,8)

SP – POE –□□□
Example: SP – POE – 01A



SP-GPOE-01/SP-GPOE-24

Single Port, Gigabit Ethernet PoE Surge Protector

The SP-GPOE-01 is a single port, Gigabit Ethernet PoE surge protector designed to protect all 8 lines used in a standard CAT5e cable. The product is compatible with 1000Base-T networks and 48V Power-over-Ethernet systems. The Standard IEEE 802.3at/af allows the methods of implementing PoE: The SP-GPOE-01 applies data and PoE power to the pairs (pins 1/2 , 3/6, 4/5, 7/8) .The SP-GPOE-01 offers protection is provided on all 8 Ethernet pins (63V clamping on data and PoE pins 1, 2, 3, 4, 5, 6, 7, 8). Network connections are made via standard female RJ45 connectors. Grounding is accomplished via a ground wire.

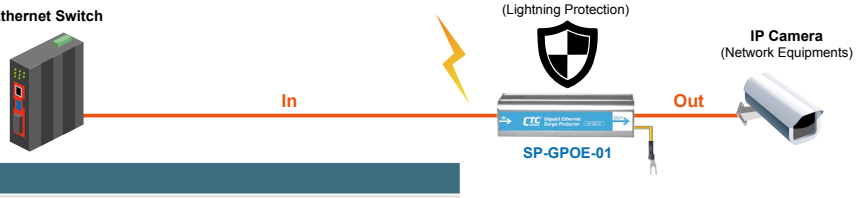
Features

- 1000Mbps data rate
- Compatible with 48V power over Ethernet systems
- 63V PoE clamping voltage
- 1.5KA surge discharge current
- CAT5 and CAT5e compatible. All 8 pins protected.
- Integral mounting feet and separate ground wire
- Shielded RJ45 jacks and metal enclosure for EMI noise suppression

Specifications

Operating Voltage	UN	63V
Max. continuous operating voltage peak current line to line (8/20us)	Imax	1.5KA
Max. continuous operating voltage peak current line to ground (8/20us)	Imax	1.5KA
Voltage protection level (line to line)	UP	≤ 120V
Voltage protection level (line to ground)	UP	≤ 120V
Insertion Loss	< 0.5dB	
Data rate	10/100/1000Mbps	

NM Surge response time	≤ 1ns
Connector	RJ45
Data lines protected	1-8
Operating Temperature	-40 ~ 80°C
Dimensions	38 x 106 x 26mm (1-port) 73 x 183 x 44mm (24-port)
Weight	75g (1-port), 1.4kg (24-port)
Certification	IEC 61643-21:2000



Ordering Information

Model Name	Description
SP-GPOE-01	Single Port, 1000Base-T GE PoE Surge Protector (Data & PoE: 1, 2, 3, 4, 5, 6, 7, 8)
SP-GPOE-24	24-port RJ45 10/100/1000Base-TX PoE Etherent Surge Protector (Data & PoE: 1, 2, 3, 4, 5, 6, 7, 8)



SP-GE-01/SP-GE-24

Gigabit Ethernet 1–Port Surge Protector

The SP-GE-01 Series is designed to work on Category 5e Gigabit Ethernet (GE) transmission lines as well as Category 6 applications. They are ideal to protect expensive equipment against surges and transients entering a building on exposed transmission lines. Available in both Single unit and Rack mountable surge protectors with female to female RJ-45 connectors.

Features

- Ethernet 10/100/1000Base-T Data line protection
- Exceeds CAT 5 & 6 Transmission Values
- Fast energy absorption when over-voltage occurs
- Low series resistance and minimal capacitance values to preserve the data information

Specifications

Operating Voltage	Un 5V
Max. continuous operating voltage	Uc 6V
Peak Current Normal Mode (line to ground, 8 /20uS)	In 2.5KA
Peak Current Common Mode (line to line, 8/20uS)	In 300A
Voltage protection level (line to ground,10/700uS)	Up <=500V
Voltage protection level (line to line,10/700uS)	Up <=30V
NM Surge Response Time (ns)	tA <1ns
Transmission Speeds	Vs 10/100/1000Mbps

Bandwidth / Insertion Loss	fG 250Mhz ; Ae < 0.5dB
Connector / Data Lines Protected	RJ45 ; 8
Operating Temperature	-40 ~ 80°C degree
Dimensions	38 x 106 x 38 mm (1-port) 73 x 480 x 44 mm (24-port)
Weight	75g (1-port); 1.4kg (24-port)
Certification	IEC 61644-1

Ordering Information

Model Name	Description
SP-GE-01	1-port RJ45 10/100/1000Base-T Ethernet Surge Protector (pin 1,2,3,4,5,6,7,8)
SP-GE-24	24-Port RJ45 10/100/1000Base-T Ethernet Surge Protector (pin 1,2,3,4,5,6,7,8)

SP – GE –□□
Example: SP – GE – 01



SP-ETH-01/SP-ETH-24

Fast Ethernet 1–Port Surge Protector

A surge protector is an appliance designed to protect electrical devices from voltage spikes. A surge protector attempts to regulate the voltage supplied to an electric device by either blocking or by shorting to ground voltages above a safe threshold. The SP-ETH-01 will ensure the reliable operation of RJ-45 twisted pair based networking equipment running Ethernet. Single unit and rack mountable surge protectors are both available.

Features

- Ethernet 10/100Base-TX Data line protection
- Fast energy absorption when over-voltage occurs
- Low series resistance and minimal capacitance values to preserve the data information

Specifications

Un	5V
Uc	6.8V
Isn(discharge current)	2.5KA
Imax	5KA
Ures	< 30V
tA (Response time)	< 1ns
Protected Cores	SP-ETH-01-8: 8 pins SP-ETH-24: 8 pins
Attenuation in dB	< 0.5dB (100MHz)

Capacitance	< 40pF
Dimensions	38 x 106 x 38 mm (1-port) 73 x 480 x 44 mm (24-port)
Weight	75g (1-port) ; 1.40kg (24-port)
Certification	IEC 61644-1

Ordering Information

Model Name	Description
SP-ETH-01	1-port RJ45 10/100Base-TX Ethernet Surge Protector (pin 1,2,3,4,5,6,7,8)
SP-ETH-24	24-Port RJ45 10/100Base-TX Ethernet Surge Protector (pin 1,2,3,4,5,6,7,8)

Port Number
SP – ETH –□□
Example: SP – ETH – 01

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.



Fiber Transceiver

Hot-Pluggable Fiber Transceiver Modules

- 100Gbps QSFP28
- 40Gbps QSFP+
- 16Gbps SFP+
- 10Gbps SFP+
- 10Gbps Tunable SFP+
- 1.25Gbps SFP
- 155Mbps SFP

CTC Union's SFP/SFP+/QSFP/QSFP28 Transceivers are high performance, multi-purpose modules for optical data communications applications specified for multi-mode or single mode at 155M, 1Gbps, 10Gbps, 16Gbps, 40Gbps and 100Gbps. They operate with +3.3V power supplies and are intended for single mode or multi-mode fiber, operating at a nominal wavelength of 850nm, 1310nm and 1550nm or CWDM/DWDM wavelength. Each fiber transceiver module consists of a transmitter optical subassembly, a receiver optical subassembly and an electrical subassembly with duplex LC transceiver designed for short and long haul application. CTC Union's fiber transceivers ensure your networks operate with maximum reliability, performance, and flexibility.

Features

- Compliant to SFF-8636 QSFP28 MSA (100G QSFP28)
- Compliant to SFF-8436 QSFP+ MSA (40G QSFP)
- Single 3.3V power supply
- Duplex or Simplex LC receptacle connector
- Built-in digital diagnostic function
- Single 3.3V power supply
- RoHS compliant
- Lower power dissipation
- Hot Pluggable

100Gbps QSFP28

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX(dBm) (Min ~ Max)	RX Sensitivity (dBm)	Power Budget (dB)	100G Base	Power Consumption	DDMI	Operating Temperature
QSFP28-000-SR4	MMF	100m	850nm VCSEL	-8.4 ~ +2.4	-9.2	0.8	SR4	2.5	V	0 ~70°C
QSFP28-010-LR4	SMF	10km	1310nm LWDM	-4.3 ~ +4.5	-8.6	4.3	LR4	2.5	V	0 ~70°C
QSFP28-040-ER4	SMF	40km	1310 LWDM	-2.9 ~ +4.5	-14.65	11.75	ER4	2.5	V	0 ~70°C

40Gbps QSFP+ LC

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX(dBm) (Min ~ Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
QSFP-000-SR4	MM	100m	850	-7.6 ~ -1	-10	2.4	+3.4	1.5	V	0 ~70°C
QSFP-002-IR4	SM	2km	1310	-8.2 ~ +0.5	-12.6	4.4	+3	1.5	V	0 ~70°C
QSFP-010-LR4	SM	10km	1310	-8 ~ +2.3	-12.6	4.6	+3	1.5	V	0 ~70°C
QSFP-040-ER4	SM	40km	1271 1291 1311 1331	-3.7 ~+4.5	-20.2	16.5	+3.8	1.5	V	0 ~70°C

16Gbps SFP+ LC

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX(dBm) (Min ~ Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
SFM-3000-85	MM	100m on OM3	850	-6.5 ~ -1.2	-10.5	4	-1	1W	V	0 ~70°C
SFS-3010-31	SM	10km	1310	-4 ~ +2	-10.9	6.9	2	1W	V	0 ~70°C
SFS-3040-Cxx	SM	40km	CWDM 147 ~ 155	-1 ~ +3	-14	13	1	1W	V	0 ~70°C

Cxx : C47:1471nm, C49:1491nm, C51:1511nm, C53:1531nm, C55:1551nm

10Gbps SFP+ LC

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX(dBm) (Min ~ Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
SFM-1000-SR85	MM	300m	850	-6.5 ~ -1	-11.1	4.6	-1	1W	V	0 ~70°C
SFS-1010-LR31	SM	10km	1310	- 6 ~ +0.5	-14.4	8.4	0.5	1W	V	0 ~70°C
SFS-1020-LR31	SM	20km	1310	-3 ~ +0.5	-15	12	0.5	1W	V	0 ~70°C
SFS-1040-ER55	SM	40km	1550	- 4.7 ~ +4	-15.8	11.1	-1	1W	V	0 ~70°C
SFS-1010-WA	SM	10km	T1270/R1330	-4 ~ +1	-14	10	0.5	1W	V	0 ~70°C
SFS-1010-WB	SM	10km	T1330/R1270	-4 ~ +1	-14	10	0.5	1W	V	0 ~70°C
SFS-1020-WA	SM	20km	T1270/R1330	-2 ~ +2	-14	12	0.5	1W	V	0 ~70°C
SFS-1020-WB	SM	20km	T1330/R1270	-2 ~ +2	-14	12	0.5	1W	V	0 ~70°C
SFS-1030-Cxx-DD	SM	30km	1270 ~ 1450nm	-1 ~ +4	<-15	14	0.5	1W	V	0 ~70°C

Cxx : C27:1271nm, C29:1291nm, C31:1311nm, C33:1331nm, C35:1351nm, C37:1371nm, C39:1391nm, C41:1411nm, C43:1431nm, C45:1451nm

10Gbps Tunable SFP+ LC

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX(dBm) (Min ~ Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
SFS-1080-TDW5	SM	80km	Ch20	-1 ~ +3	-24	23	-7	< 1.8W	V	0 ~70°C

1.25Gbps SFP LC

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX(dBm) (Min ~ Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
SFM-7000-S85	MM	550m	850	-9.5 ~ -4	-17	7.5	-3	1W		0 ~70°C
SFM-7000-S85-DD	MM	550m	850	-9.5 ~ -4	-17	7.5	-3	1W	V	0 ~70°C
SFM-7000-L31	MM	2km	1310	-9 ~ -1	-19	10	-1	1W		0 ~70°C
SFM-7000-L31-DD	MM	2km	1310	-9 ~ -1	-19	10	-1	1W	V	0 ~70°C
SFS-7020-L31	SM	20km	1310	-8 ~ -2	-23	15	-1	1W		0 ~70°C
SFS-7020-L31-DD	SM	20km	1310	-8 ~ -2	-23	15	-1	1W	V	0 ~70°C
SFS-7040-L31	SM	40km	1310	-2 ~ +3	-23	21	-3	1W		0 ~70°C
SFS-7040-L31-DD	SM	40km	1310	-2 ~ +3	-23	21	-3	1W	V	0 ~70°C
SFS-7020-WA	SM	20km	T1310 / R1550	-8 ~ -2	-23	15	-2	1W		0 ~70°C
SFS-7020-WA-DD	SM	20km	T1310 / R1550	-8 ~ -2	-23	15	-2	1W	V	0 ~70°C
SFS-7020-WB	SM	20km	T1550 / R1310	-8 ~ -2	-23	15	-2	1W		0 ~70°C
SFS-7020-WB-DD	SM	20km	T1550 / R1310	-8 ~ -2	-23	15	-2	1W	V	0 ~70°C
SFS-7040-WA	SM	40km	T1310 / R1550	-3 ~ +2	-23	20	-3	1W		0 ~70°C
SFS-7040-WA-DD	SM	40km	T1310 / R1550	-3 ~ +2	-23	20	-3	1W	V	0 ~70°C
SFS-7040-WB	SM	40km	T1550 / R1310	-3 ~ +2	-23	20	-3	1W		0 ~70°C
SFS-7040-WB-DD	SM	40km	T1550 / R1310	-3 ~ +2	-23	20	-3	1W	V	0 ~70°C

155Mbps SFP LC

Model Name	Cable Type	Typical Distance	Wavelength (nm)	TX(dBm) (Min ~ Max)	RX Sensitivity (dBm)	Power Budget (dB)	Saturation (dBm)	Power Consumption	DDMI	Operating Temperature
SFM-5000-L31	MM	2km	1310	-20 ~ -8	-32	12	-3	1W		0 ~70°C
SFM-5000-L31-DD	MM	2km	1310	-20 ~ -8	-32	12	-3	1W	V	0 ~70°C
SFS-5030-L31	SM	30km	1310	-15 ~ -8	-34	19	-3	1W		0 ~70°C
SFS-5030-L31-DD	SM	30km	1310	-15 ~ -8	-34	19	-3	1W	V	0 ~70°C
SFS-5050-L31	SM	50km	1310	-5 ~ 0	-35	30	-5	1W		0 ~70°C
SFS-5050-L31-DD	SM	50km	1310	-5 ~ 0	-35	30	-5	1W	V	0 ~70°C
SFS-5020-WA	SM	20km	T1310 / R1550	-14 ~ -8	-32	18	-3	1W		0 ~70°C
SFS-5020-WA-DD	SM	20km	T1310 / R1550	-14 ~ -8	-32	18	-3	1W	V	0 ~70°C
SFS-5020-WB	SM	20km	T1550 / R1310	-14 ~ -8	-32	18	-3	1W		0 ~70°C
SFS-5020-WB-DD	SM	20km	T1550 / R1310	-14 ~ -8	-32	18	-3	1W	V	0 ~70°C

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Appendix

- High Power Dissipation Cards vs Cooling Fan Chassis Selection

Product Name	FRM220-CH20(HS) (w/High Speed Fan)	FRM220A-CH20(HS) (w/High Speed Fan)	CH08 (w/Cooling Fan)	CH04A (w/Cooling Fan)	CH02/SMT (w/Cooling Fan)	CH02/NMC (w/Cooling Fan)	CH02M (w/Cooling Fan)
FRM220A-2000EAS/4F		✓	✓	✓	✓	✓	✓
FRM220A-2000EAS/2	✓	✓	✓	✓	✓	✓	✓
FRM220A-2000EAS/1	✓	✓	✓	✓	✓	✓	✓
FRM220-100GE-2Q	✓		✓	✓	✓	✓	✓
FRM220-40G-1Q4S	✓		✓	✓			✓
FRM220-40G-2Q	✓		✓	✓	✓	✓	✓
FRM220-16G-3R/10G-3R	✓		✓	✓	✓	✓	✓
FRM220-4G-3R/3S	✓		✓	✓	✓	✓	✓
FRM220-TM-10GMux	✓		✓	✓			✓
FRM220-OAB21(A)/OAP Series	✓		✓	✓			✓
FRM220-10GC-TS	✓		✓	✓	✓	✓	✓

Note: When high power dissipation cards are placed in CH20 chassis, we recommend choosing the high speed fan option to keep your system cool, running at its best and to avoid any performance degradation.

- General Cards vs Cooling Fan Chassis Selection

Product Name	FRM220-CH20 (w/Cooling Fan)	FRM220A-CH20 (w/Cooling Fan)	CH08 (w/Cooling Fan)	CH04A (w/Cooling Fan)	CH02/SMT (w/Cooling Fan)	CH02/NMC (w/Cooling Fan)	CH02M (w/Cooling Fan)
FRM220-1000M/MS	✓		✓	✓	✓	✓	✓
FRM220A-1002ES	✓		✓	✓	✓	✓	✓
FRM220-10/100AS-2	✓		✓	✓	✓	✓	✓
FRM220-1000DS	✓		✓	✓	✓	✓	✓
FRM220-OAB15	✓		✓	✓			✓
FRM220-OPS Series	✓		✓	✓	✓	✓	✓
FRM220-CWDM & DWMD (8ch)	✓		✓	✓			
FRM220-CWDM & DWMD (4ch)	✓		✓	✓			
FRM220-OADM	✓		✓	✓			
FRM220-100AS-1	✓		✓	✓	✓	✓	✓
FRM220-10/100 & 10/100iS-2	✓		✓	✓	✓	✓	✓
FRM220-1000TS	✓		✓	✓	✓	✓	✓
FRM220-10/100	✓		✓	✓	✓	✓	✓
FRM220A-Eoe1/G(S)	✓		✓	✓	✓	✓	✓
FRM220-FTEC	✓		✓	✓	✓	✓	✓
FRM220-E1/T1 & DS3/E3	✓		✓	✓	✓	✓	✓
FRM220-E1/Data, Data & Series	✓		✓	✓	✓	✓	✓
FRM220-CCF40/20	✓		✓	✓	✓	✓	✓
FRM220-FXO/FXS Series	✓		✓	✓	✓	✓	✓
FRM220A-iMux16	✓	✓	✓	✓			✓
FRM220A-iMux8/iMux4	✓	✓	✓	✓			✓
FRM220-GFOM8/4 & FOM04	✓		✓	✓			✓
FRM220-FOM01	✓		✓	✓	✓	✓	✓