

2014 PRODUCT CATALOG



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ISO 9001
ISO 14001



Since 1993

About CTC Union



CTC Union founded in 1993, is committed to developing and manufacturing and selling network communication products. In particular, the focus on fiber optical technologies, Ethernet technologies and the integration of broadband access technologies. With leading-edge technology and high quality service as the driving force, CTC union continued steady growth, and become a top global equipment supplier of innovative last-mile access in the telecommunications market.



CTC Union's global alliance is a network of worldwide branch offices, partners and distributors from 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.

MEF Member

As services such as voice and multimedia are moving to IP based technologies, carriers have found that their core networks can be operated more effectively and economically if the public switching networks are migrated to a next generation IP based networks. Fully in line with this world wide trends, CTC Union in 2009, became a member of the MEF (Metro Ethernet Forum) whose main goal is to provide interoperability standards for carriers and manufacturers to smoothly deploy Ethernet solutions from core networks to Last-Mile. This proactive thinking will allow CTC Union to continue developing solutions for today and tomorrow's markets.

Environment

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 and WEEE directives.



Our Vision

CTC Union's continuing mission is to provide our customers with "on time" solutions, quick and effective customer support, and valuable products with extended service life.

- Providing innovative last-mile access solutions in telecommunication market
- Providing customers with "on time" solutions, quick and effective customer support, and valuable products with extender service life.

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Chapter 13 Tester

Optical Fiber Tester

| | | |
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| OTDR..... | OTDR-30A | 13-1 |
| Optical Light Source | OLS-200 | 13-2 |
| Optical Power Meter..... | OPM-500A/500B | 13-3 |

E1 BERT

| | | |
|----------------------------|------------|------|
| E1/Datacom BER Tester..... | HCT-BERT/C | 13-4 |
|----------------------------|------------|------|

Protocol Analyzer

| | | |
|---|----------|------|
| Dual Port E1/Datacom Protocol Analyzer and BER Tester | HCT-7000 | 13-5 |
|---|----------|------|

Chapter 14 Surge Protector

PoE Surge Protector

| | | |
|---|------------|------|
| Power Over Ethernet 1-Port Surge Protector..... | SP-POE-01 | 14-1 |
| Power Over Ethernet 24-Port Surge Protector..... | SP-POE-24 | 14-1 |
| Single Port, Gigabit Ethernet PoE Surge Protector | SP-GPOE-01 | 14-1 |

Gigabit Ethernet Surge Protector

| | | |
|---|----------|------|
| Gigabit Ethernet 1-Port Surge Protector..... | SP-GE-01 | 14-2 |
| Gigabit Ethernet 24-Port Surge Protector..... | SP-GE-24 | 14-2 |

Fast Ethernet Surge Protector

| | | |
|--|-----------|------|
| Fast Ethernet 1-Port Surge Protector..... | SP-ETH-01 | 14-2 |
| Fast Ethernet 8-Port Surge Protector..... | SP-ETH-08 | 14-2 |
| Fast Ethernet 16-Port Surge Protector..... | SP-ETH-16 | 14-2 |
| Fast Ethernet 24-Port Surge Protector..... | SP-ETH-24 | 14-2 |

Phone Line Surge Protector

| | | |
|---|--------|------|
| Phone Line, FAX or Dialup Modem Surge Protector | TSP-10 | 14-3 |
|---|--------|------|

E1/V35 Surge Protector

| | | |
|--------------------------|-----------|------|
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| V35 Surge Protector..... | SP-V35-01 | 14-3 |

Chapter 15 E1 Balun

ITU-T G.703 Balun Patch Panel

| | | |
|---|----------|------|
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ITU-T G.703 Krone IDC Balun

| | | |
|---------------------------------|---------|------|
| 1.6/5.6 Jack to Krone IDC | BLN3010 | 15-2 |
| BNC to Krone IDC..... | BLN4010 | 15-2 |
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ITU-T G.703 BNC/RJ45 Balun

| | | |
|--|-----------|------|
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SmartView

Configuration Management

- Topology
- Network Element Discovery

Fault Management

- Trap Collection
- Active Alarm
- Alarms sent by E-mail & SMS

Performance Management

- Device performance is plotted over time using standard PM data such as ES UAS, etc.

Security Management

- User Privilege Management
- User Activity Management

Inventory Management

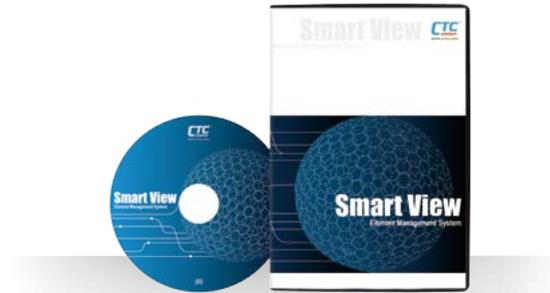
- Location, status and serial numbers of all assets can be managed and exported



SmartView

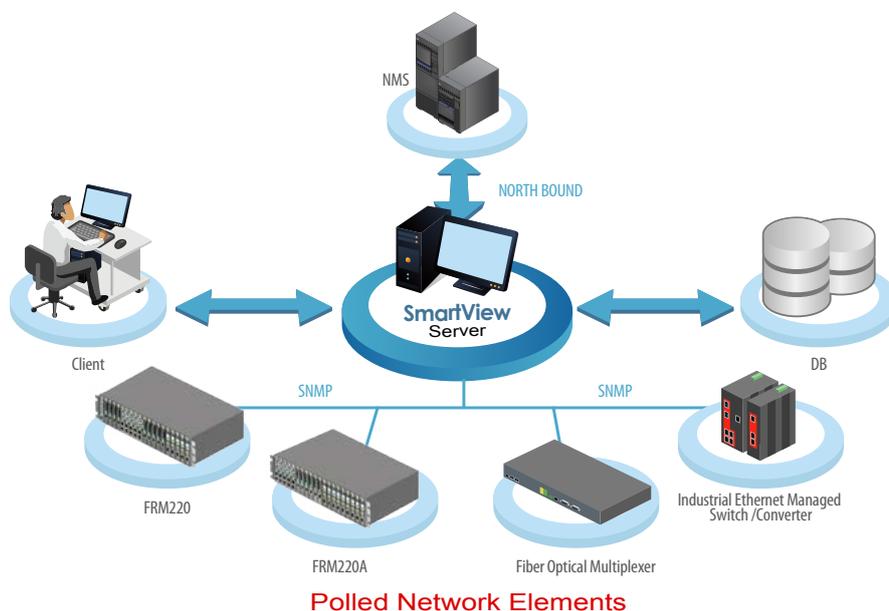
Element Management System

- Centralized Network Management Platform
- Real-time visual representations and processing of alarms
- Easy and User-Friendly Operation Interface



- 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
- Applied to CTC Union's Main Products

Network Scheme Diagram



- User-Friendly Operation Interface
- Network Monitoring and Management
- Screen-Based User Friendly Network Management
- Security Access Management

• Agents

All of the CTC SNMP enabled products are able to add in the CTC Smart View EMS management Platform such as FRM220/220A, multi-service platform, FMUX series, fiber multiplexer, IGS/IFS series L2 managed switch. With the goal of having all of CTC Union's products managed under the umbrella of this single Element Management System

• SmartView Server

SmartView Server handles connection management, deliver data and is responsible for communication of requests from clients. SmartView Server collects the information data from specific SNMP agents, stores the information into database and updates it to Workstation-Clients.

• SQL Server

SQL Server is the place where the SmartView collected data is stored, The database will store Alarm Trap and all information. CTC Union's Smart View is compatible with Microsoft® SQL 2005, SQL 2005 Express, SQL 2008 and SQL 2008 Express.

• Workstation-Clients

Workstations provide the JAVA applet GUI to monitor and control the agents at far end. They also receive the Alarm Traps from the corresponding SNMP Agents. Multiple workstations are allowed in this field.

Features at a Glance

• Configuration Management

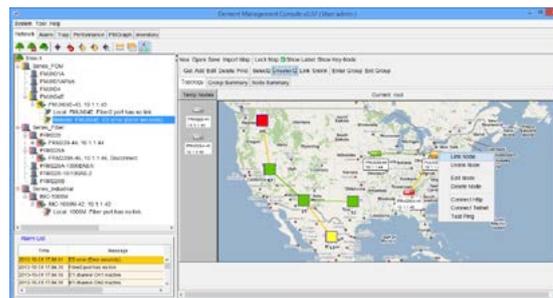
Topology

User can load maps to SQL server, load maps from SQL server or delete attached maps. Download procedure is very simple. 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. Right clicking an object brings a popup window to select Telnet or http management directly.

Network Element Discovery

The 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.



Network Topology

• Fault Management

Trap Collection

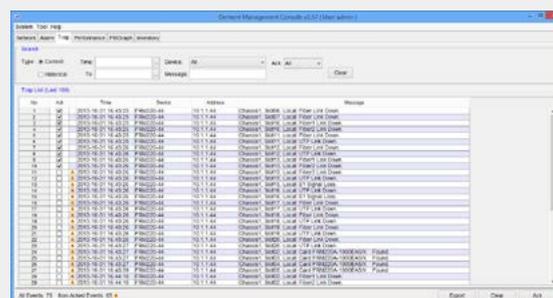
All alarm traps will be stored in SQL database. When an SNMP agent experiences an abnormal condition it will send an SNMP trap message to Smartview EMS which then receives the message, and records it in the database. Depending on preset conditions, SmartView EMS may sound an audible alarm, send an email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

Active Alarm

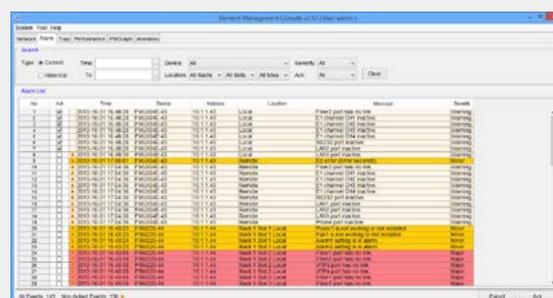
Three kinds of filters can be applied to alarm list. User may select one agent, local or remote rack, and specific status as filters to watch active alarms. The status filter can be categorized Major, Minor, Warning, and all statuses label or network element location name may be added to object

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 fixed in the shortest time possible.



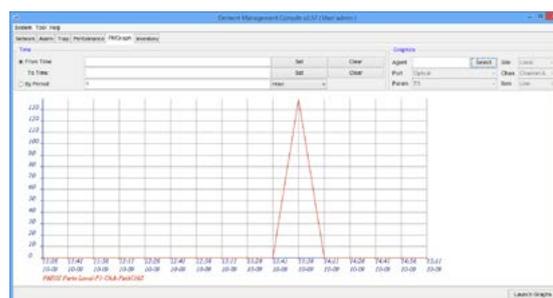
Trap Message



Active Warning

• Performance Management

Device performance is plotted over time using standard PM data such as ES, UAS, etc. PM data is typically only available for PDH devices such as the ETU01A and ERM01.



Performance Graphics

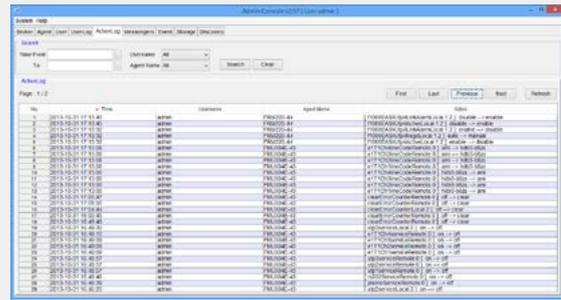
• **Security Management**

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 Activity

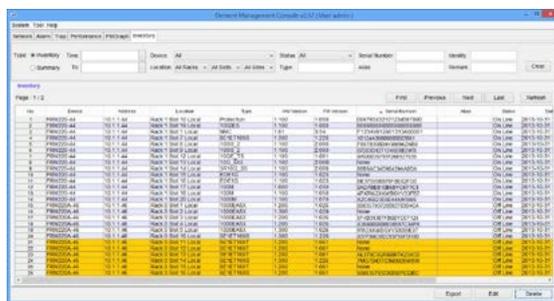
Provides viewing and clearing of the user login and configuration action logs. User client login & logouts is recorded including the client's source IP address. All activities performed on any Network Element are logged with time-stamping, the user making changes and the changes made.



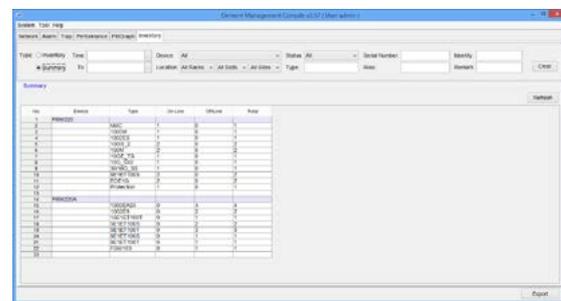
User Activity

• **Inventory Management**

The inventory 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.



Inventory List

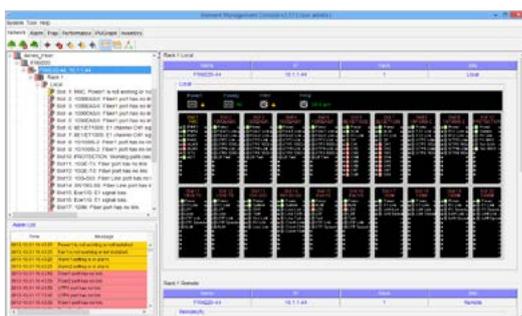


Inventory Summary

Available Models :

Multi-Service and Ethernet Aggregation platform, Fiber Optical Multiplexer Series and Industrial Ethernet Switch & Media Converter Series.

• **Multi-Service Platform**

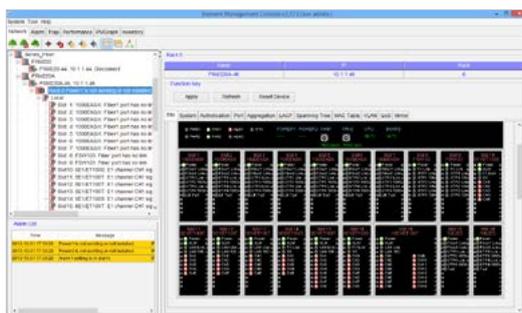


EMS Interface



Web Interface

• **Ethernet Aggregation Platform**



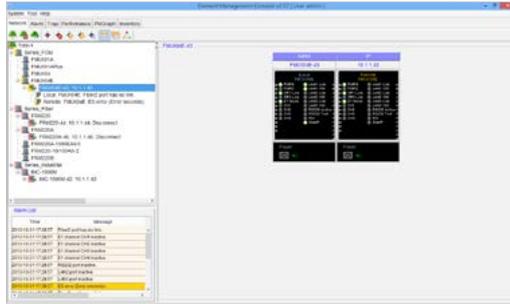
EMS Interface



Web Interface

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

• Fiber Optical Multiplexer

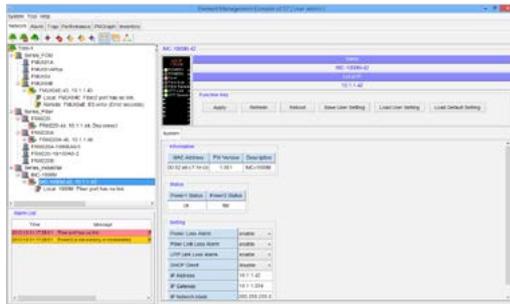


EMS Interface



Web Interface

• Industrial Ethernet Switch & Media Converter



EMS Interface



Web Interface

Requirements

| SmartView | Hardware (minimum) | Software | Operating System |
|---------------------|---|--|---|
| SmartView Server | P4 1.6G or higher, 1024MB RAM, HD >2GB (free) | JAVA JRE, SmartView Kit | Windows server 2003/2008, Windows XP, Vista, Win7 |
| SQL Database Server | P4 1.6G or higher, 1024MB RAM, HD >2GB (free) | MS-SQL Server 2005/2008, SmartView Kit | Windows |
| Workstation-Clients | P4 1.6G or higher, 512MB RAM, HD >1GB (free) | JAVA JRE, SmartView Kit | Windows |
| All-In-One | P4 2.8G or higher, 2GB RAM, HD >10GB (free) | JAVA JRE, MS-SQL Server, SmartView kit | Windows server 2003/2008, Windows XP, Vista, Win7 |

Ordering Information

SmartView Platform Server with Device Agents

| Model Name | Description |
|------------|---|
| SV-AGT-50 | SmartView Platform with 50 device agents |
| SV-AGT-100 | SmartView Platform with 100 device agents |
| SV-AGT-200 | SmartView Platform with 200 device agents |
| SV-AGT-500 | SmartView Platform with 500 device agents |

SmartView Supported Product Lists

| Model Name | Description |
|------------|---|
| FOM | FMUX1001, FMUX101, FMUX1600/800, FMUX160/80, FMUX04(E), FMUX01A/(Plus) Series |
| TDM | ERM-MUX/Plus, ETU01A Series |
| Fiber | FRM220, FRM220A, PHB-200M Series |

Industrial Ethernet

| | |
|-----------------|--|
| Ethernet Switch | IFS-402GSM, IGS-404SM, IFS-803GSM, IGS-803SM, IGS-812SM, IFS-1604GSM, IGS-1604SM |
| Media Converter | IMC-100M, IMC-1000M(S) |
| PoE Switch | IGS-402SM-4PH24, IFS-402GSM-4PH24, IGS-803SM-8PH24, IFS-803GSM-8PH24 |
| PoE Converter | IMC-100M-PH12, IMC-1000M(MS)-PH12 |
| IEC 61850-3 | IPS-G803SM-DD(AD), IPS-803GSM-DD(AD) |

SV - □□□ - □□□□

Example: SV - AGT - 100

FIBER Family

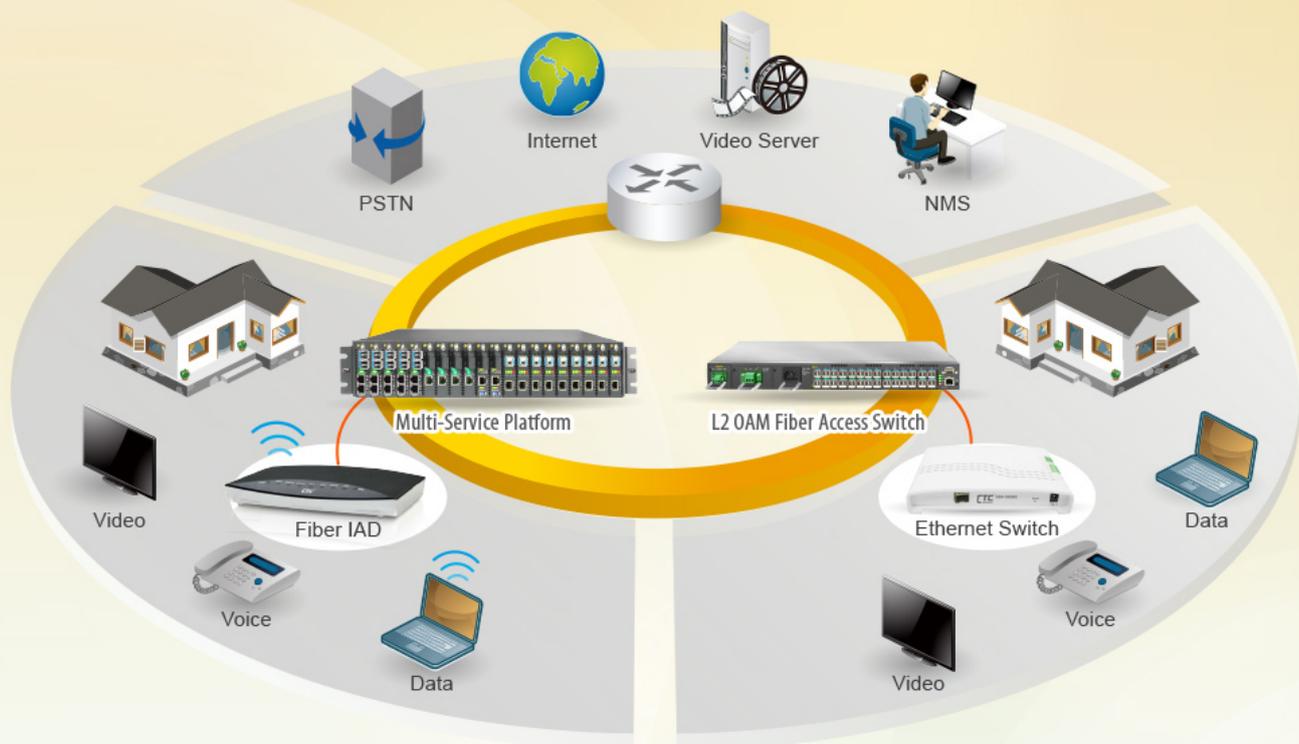
Multi-Service Platform

Metro Ethernet

Mobile Backhaul for 4G LTE

FTTx

Triple Play Service (Data/Voice/Video)



10G Ethernet, Multiplexer, Fiber IAD, CWDM, L2 Ethernet Access Switch, FOM, SDH



FRM220-CH20 & FRM220-CH08

In-Band Managed
Multi-Service Platform

The FRM220 series is a multi-service chassis platform, 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 series chassis solution such as power modules, fans, management module and interface cards are hot swappable, allowing online field replacement.

FRM220 series is offered in two chassis densities, a 2U 20-slot (FRM220-CH20) and a 1U 8-slot (FRM220-CH08).

Common Features

- Supports AC/DC power module hot swappable and power redundancy
- Two alarm relays contact for critical events warning
- All modules and interface cards are hot swappable
- Chassis backplane consists of passive components

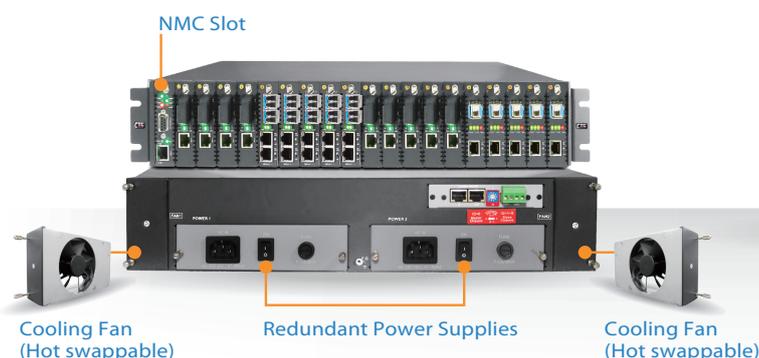
Specifications

| | |
|--------------------------------|--------------------------|
| Connectors | Console: RS232 (DB9) |
| | LAN 10/100Base-TX RJ45 |
| Physical Specifications | Dimensions (D x W x H) |
| | 303 x 438 x 88 mm (CH20) |
| | 310 x 440 x 44 mm (CH08) |
| | Weight (w/o Power) |
| | 5.2kg (CH20) |
| Power | AC |
| | 18~240VAC |
| | DC24 |
| | 18~36VDC |
| | DC48 |
| | 36~75VDC |

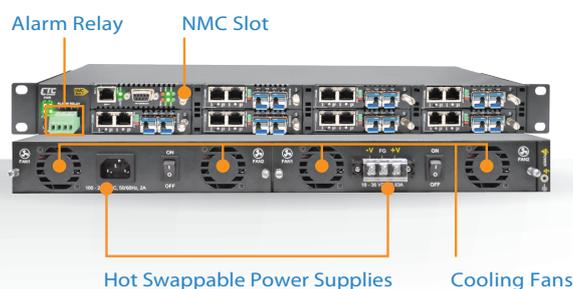
| | |
|----------------------|---|
| Temperatures | Operating 0~60°C |
| | Storage -10~70°C |
| Humidity | 5%~90% non-condensing |
| MTBF | 65,000 hrs |
| Certification | FCC Class A, VCCI Class A, CE, RoHS compliant |
| Safety | UL 60950-1 (FRM220-CH20) |

Chassis Overview

- **FRM220-CH20** (2U 19" 20 Slots)



- **FRM220-CH08** (1U 19" 8 Slots)

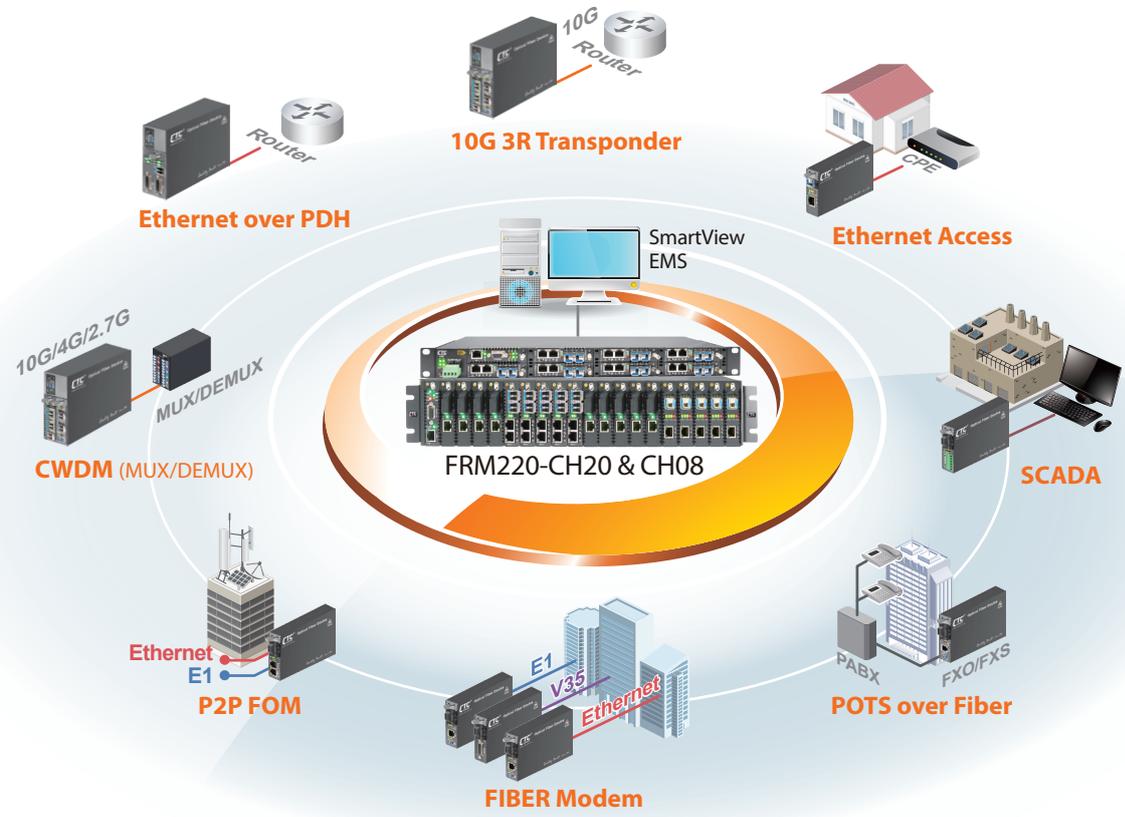


Main Features

• **Module Cards for Deployment Scenarios**

The FRM220-CH20 has been designed as a Multi-service platform. This allows network administrators to deploy the chassis in a wide range of networks.

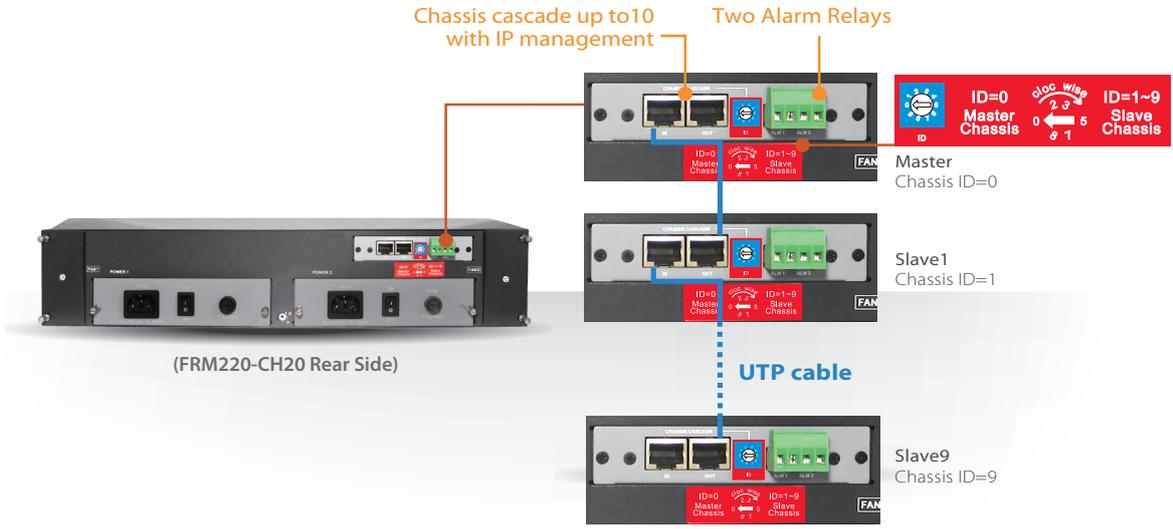
Technologies supported by the chassis include Fast/Gigabit Ethernet, E1/T1, V35/X21/RS-530, Serial RS-485/RS-422, Voice FXO/FXS, Repeater, Fiber Multiplexer, E1 Inverse Multiplexer, CWDM Mux/DeMUX and 10G 3R Transponder



• **Chassis Cascade (FRM220-CH20)**

The FRM220-CH20 Chassis features cascadable management which allows managing a stack (up to 10 chassis) from a single IP address. Chassis are interconnected with standard UTP cables that carry control signals. Each chassis has its own ID, starting with the master chassis ID0 and cascading up to ID9

- Single IP managed chassis with 10 units cascaded max.
- Beneficial to centralizes management in one rack
- Scalability as the demand grows



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

• Network Management

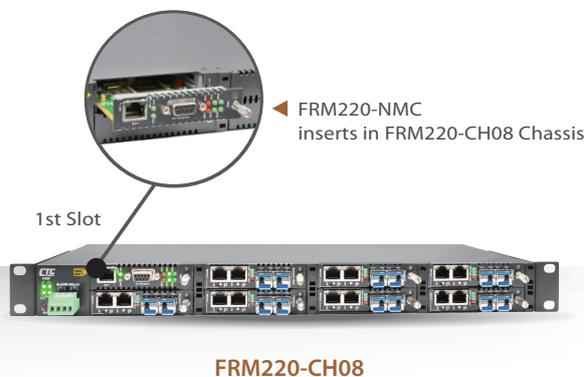
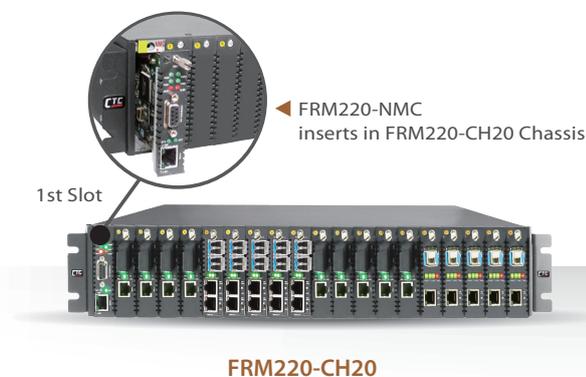
Both FRM220-CH20 and FRM220-CH08 require a NMC (Network Management Controller **FRM220-NMC**) card which must be installed into the first slot of chassis. The NMC card allows a network administrator the ability to configure and monitor the status of the blades. Management can be achieved locally over RS232, or over the network by Telnet, Web or SNMP. If the blades support Ethernet in the First Mile (IEEE 802.3ah), then the management module can also be monitored the status of a remote CPE.



FRM220-NMC

FRM220-NMC Features

- Supports local / remote monitor and configuration
- Supports local / remote online TFTP f/w upgrade
- Fiber transceiver status & info display
- Supports multiple accesses for SNMP management
- Supports Web GUI management, Telnet, Serial console
- Supports console RS-232 port and 10/100Base-T Ethernet port
- Supports SNMP standard MIB II and enterprise MIB
- Supports NTP time synchronization
- Supports syslog
- Supports 255 entries system log



Ordering Information

| Model Name | Type | Description |
|------------------|---------|--|
| FRM220-CH20 | Chassis | 2U 20-Slot rack mount chassis with 20 line card blank plate |
| FRM220-AC | Power | Chassis power module 100 ~ 240 VAC, IEC connector 200W |
| FRM220-DC24 | Power | Chassis power module 18 ~ 36 VDC, 3 pin terminal block 200W |
| FRM220-DC48 | Power | Chassis power module 36 ~ 72 VDC, 3 pin terminal block 200W |
| FRM220-CH08 | Chassis | 1U 8 slots rack mount chassis with 8 line card blank plate |
| FRM220-CH08-AC | Power | Chassis power module 100 ~ 240 VAC, IEC connector |
| FRM220-CH08-DC24 | Power | Chassis power module 18 ~ 36 VDC, 3 pin terminal block |
| FRM220-CH08-DC48 | Power | Chassis power module 36 ~ 72 VDC, 3 pin terminal block |
| FRM220-NMC | Card | Network Management Controller card, support web, telnet, console, SNMP functions |

Chassis
FRM220 – □□□□
 Example: FRM220 – CH20

Power Type
FRM220 – □□□□
 Example: FRM220 – DC24

10G Ethernet uplink**FRM220A****Ethernet Aggregation Platform**

2

FRM220A

The FRM220A series is a IP based Ethernet aggregation platform, which incorporates a 24+4 port L2 Gigabit Ethernet switch (FRM220A-GSW/SNMP) 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 and E1 TDM based inverse multiplexer module cards 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.

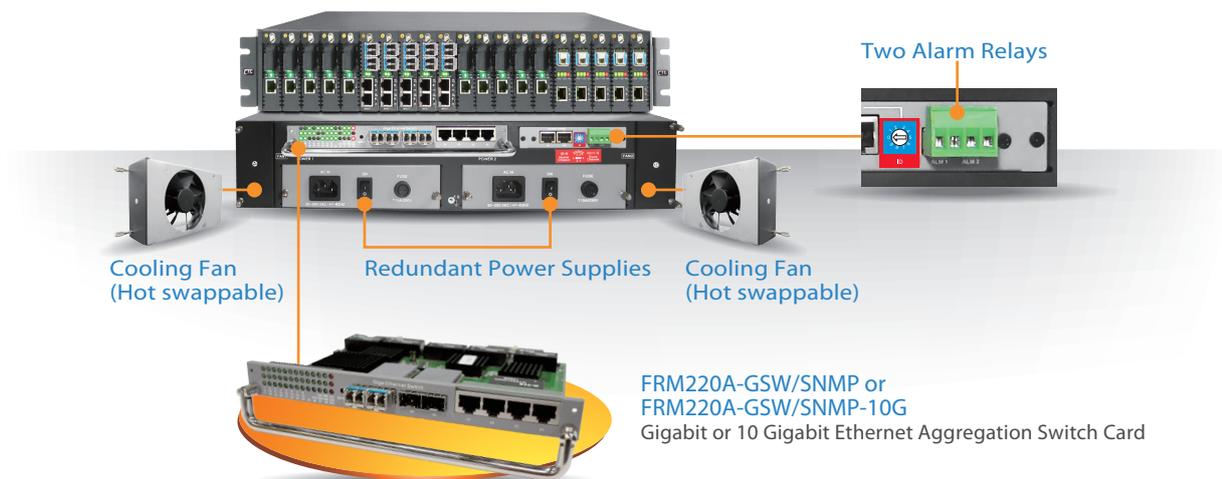
The product lists designed to be adequately to the FRM220A-CH20 Ethernet aggregation application such as Ethernet access and Ethernet over PDH are included

- FRM220A-1000EAS/X : 2x 10/100/1000Base-T + 2x1000Base-X OAM/IP Managed Switch
- FRM220A-1002ES : 2x 10/100/1000Base-T + 2x100/1000Base-X Managed Switch
- FRM220A-iMux Series : E1 inverse multiplexer module card
- FRM220A-FSW103 : 3x 10/100Base-TX + 100Base-FX Managed Switch

Specifications

| | |
|--------------------------------|--|
| Connectors | Consoles RS232 (DB9) |
| | LAN 10/100Base-TX RJ45 |
| 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**Gigabit or 10G Ethernet uplink**

10G Ethernet uplink

NEW



Ethernet Aggregate Switch Card

- **FRM220A-GSW/SNMP-10G**

10G uplink Ethernet Aggregate Switch Card

The FRM220A-GSW/SNMP-10G is the next generation management module card of FRM220A chassis. It is built in gigabit Ethernet interface to connect with backplane and link to each slot of FRM220A chassis.

To aim at the Metro Ethernet application, the specifications of FRM220A-GSW/SNMP-10G fully meet the attributes of Carrier Ethernet proposed by MEF (Metro Ethernet Forum). It comply MEF 9 standard to support E-Line/E-LAN service, MEF 14 standard to enable the bandwidth profile configuration delivering SLA (Service Level Agreement) for end-to-end performance characteristics as well as MEF21 to support carrier grade service OAM management rapidly detecting and recovering from the network incidents in real time.



- **FRM220A-GSW/SNMP**

Gigabit Ethernet Aggregate Switch Card

The FRM220A incorporates a 24+4 Gigabit Ethernet Switch. Twenty ports supply each slot of the 2U 20-slot chassis with an electrical gigabit Ethernet uplink with the remaining four electrical gigabit ports accessible via the rear of the chassis. The additional four ports are provided by SFP sockets. All eight Gigabit ports (4+4) are usable without restrictions for uplink aggregate to the Ethernet Metropolitan Area Network (E-MAN). The FRM220A-GSW/SNMP card transmits Ethernet between the subscriber equipment (bridge/ modem or network interface card) and the E-MAN. The card provides a user-networking interface with Ethernet packets. This card is capable of providing high bandwidth for assembling Ethernet traffic. The FRM220A-GSW/SNMP card is not only the system aggregate/trunk module, but also the system's control module, providing OAM Management functions.

Features

- Provides chassis aggregation via 4x1000Base-X SFP uplink slots (FRM220A-GSW/SNMP)
- Provides chassis aggregation via 4x10Gigabit Base-X SFP+ uplink slots (FRM220A-GSW/SNMP-10G)
- Supports ITU-T G.8032 Ethernet ring protection (FRM220A-GSW/SNMP-10G)
- Supports IEEE 802.1p HW based 8 priority queues and L2~L4 QoS functions (FRM220A-GSW/SNMP-10G)
- Supports IEEE 802.3ah/IEEE 802.1ag/ITU-T Y.1731 Ethernet OAM features (FRM220A-GSW/SNMP-10G)
- Supports IPv6 management (FRM220A-GSW/SNMP-10G)
- Compliant to MEF 9/MEF 14 standards for E-Line, E-LAN services (FRM220A-GSW/SNMP-10G)
- Fiber optical ports supports ring or chain topology
- Built-in gigabit Ethernet interface to link with each slot of FRM220A chassis
- Provides Web, Telnet, SNMP management interface
- Supports IEEE802.1D/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

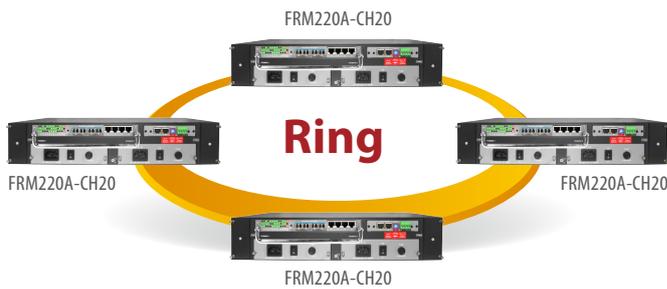
Specifications

| | |
|------------------------|---|
| Trunk Interface | 4x10/100/1000Base-T plus 4x1000Base-X/2500Base-X GbE switch trunk card (FRM220-GSW/SNMP) 4x10G Base-X switch trunk card (FRM220-GSW/SNMP-10G) Supports full-duplex mode for 1000Mbps (FRM220A-GSW/SNMP) Supports full-duplex mode for 10G Mbps (FRM220-GSW/SNMP-10G) |
| 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 |

| | | |
|--------------------------------|-------------------------------|--|
| Physical 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, 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 | |

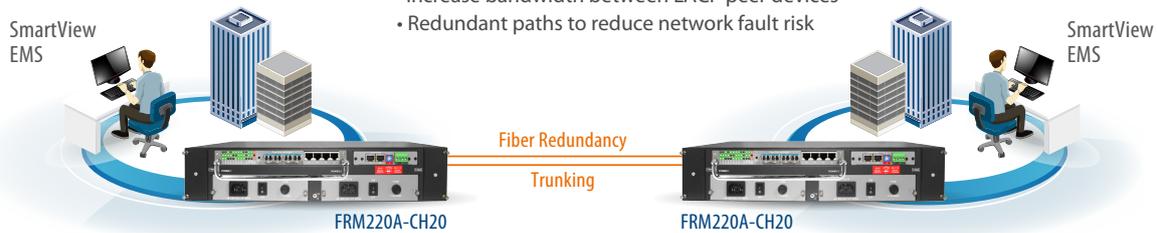
Benefits of FRM220A Chassis Platform

■ Enabling IP Transportation Protection Mechanism - STP/RSTP Featured Ring Protection



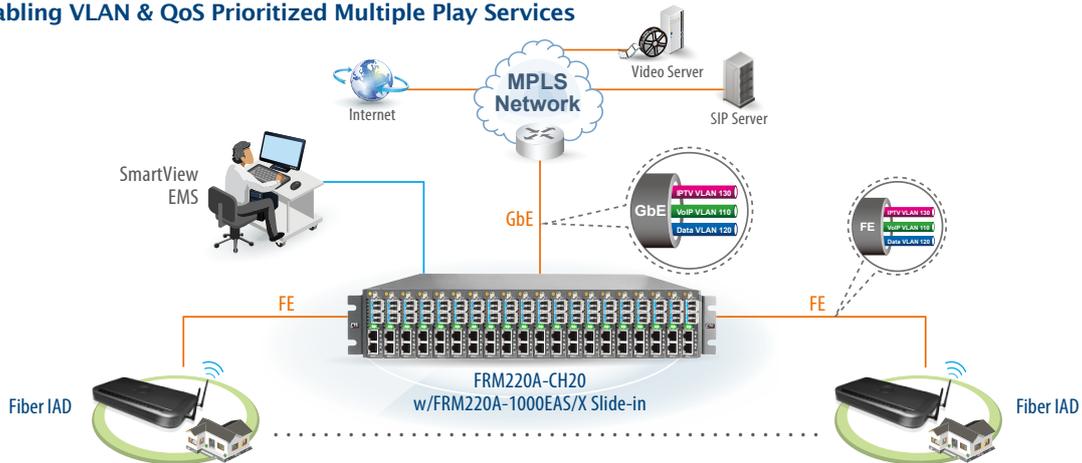
- Standard based but advanced fault protection systems
- Rapidly recovery path from failed connection (1-2 seconds min. recovery time)

■ LACP Enabled Traffic Aggregation - Fiber Redundant / Trunking Application

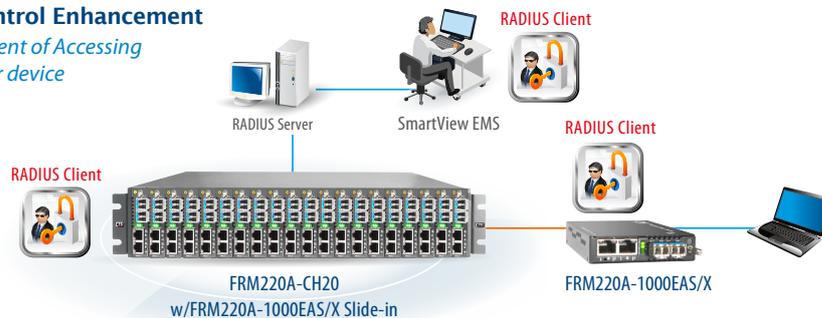


- Dynamically port aggregation or trucking to increase bandwidth between LACP peer devices
- Redundant paths to reduce network fault risk

■ Enabling VLAN & QoS Prioritized Multiple Play Services



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



Ordering Information

| Model Name | Type | Description |
|----------------------|---------|--|
| FRM220A-CH20 | Chassis | 2U 20-Slot rack mount chassis with 20 line card blank plate |
| FRM220A-GSW/SNMP | Card | Gigabit Ethernet Aggregate switch card supports web, telnet, SNMP management interface |
| FRM220A-GSW/SNMP-10G | Card | 10G 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 |

Example: FRM220A – CH20
 Example: FRM220A – GSW/SNMP

Standalone Chassis for FRM220 Series

The FRM220 product line includes various metal chassis sizes, which can hold from one to twenty FRM220 slide-in modules. The FRM220-CH01 is one slot chassis, which can be installed with one single width blade card for stand-alone applications. The available power options are external AC adapter, built-in AC, DC power or built-in AC+DC, AC+AC, DC+DC redundant power. The FRM220-CH01M is one slot chassis with DB9 console port for local management on supported cards, which can be installed with one single width blade card for stand-alone applications. The available power options are built-in AC, DC or built-in AC+DC redundant power. The FRM220-CH02 is a two slot chassis, which can be installed with one double width blade card for stand-alone applications. The only available power supply option is an external AC adapter. The FRM220-CH02M is a two slot chassis with DB9 console port for local management, which can be installed with either one or two single width blade cards or one double width blade card. The available power supplies are built-in AC, DC or AC+DC redundant power. The FRM220-CH02/NMC(SNMP) is a two slot chassis and can be SNMP managed when installing one FRM220-NMC card for Web, Telnet, Console and SNMP management. The FRM220-CH02/NMC(SNMP) should always be used with an NMC card for management and one single width blade card. The FRM220-CH02/NMC(SNMP) available power options are built-in AC, DC or AC+DC redundant power.

1 Slot Chassis

FRM220-CH01

- Adapter Type



- Power Build-in Type



FRM220-CH01M

- Power Build-in Type



2 Slots Chassis

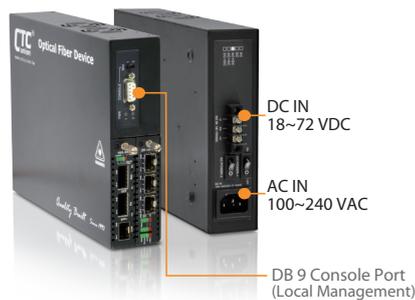
FRM220-CH02

- Adapter Type



FRM220-CH02M/CH02M-2

- Power Build-in Type



- Cooling Fan (CH02M) : 30 Watt
- Fanless (CH02M-2) : 12 Watt

FRM220-CH02/NMC(SNMP)

- Power Build-in Type



Features

- Fanless (CH01, CH01M, CH02, CH02M-2)
- Cooling Fan (CH02M & CH02/NMC(SNMP))
- Supports DB9 console port for local management (CH01M, CH02M)
- Telnet, Web, Console, SNMP management via NMC Card (not included) (CH02/NMC(SNMP))
- Power Type:
 - External Power: DC12
 - Internal Power: AC, DC, AD, AA or DD redundant power (option)

Specifications

| | | | | | |
|-----------------------------|------------------|--|-------------------------------|---|------------------------|
| Power Input (Option) | External Adapter | Input Voltage 100~240VAC 50/60Hz | Dimensions (D x W x H) | External Adapter | 160 x 88 x 24mm (CH01) |
| | | Output Voltage 120VDC 1A | | | 139 x 88 x 44mm (CH02) |
| | Internal Power | AC: 100~240VAC | Internal Power | 180 x 135 x 35mm (CH01) | |
| | | DC: 18~72VDC | | 201 x 135 x 35mm (CH01M) | |
| Weight | | 0.5~0.8kg (CH01), 0.9kg (CH01M) | | 220 x 168 x 45mm (CH02M, CH02M-2, CH02/NMC(SNMP)) | |
| | | 0.8kg (CH02), 1.3kg (CH02M), 1.2kg (CH02M-2), 1kg (CH02/NMC(SNMP)) | | | |

FRM220 Slide-In Card Chassis Order Information

| Model Name | Description |
|---------------------------|--|
| CH01 | 1 Slot Chassis with 100 ~240VAC to 12VDC Adapter, Fanless |
| CH01-AC, DC, AD | 1 Slot Chassis with AC: 100 ~240VAC DC: 18 ~72VDC or Dual Power (AC+DC), Fanless |
| CH01M-AC, DC, AD | 1 Slot Chassis with Console port and AC: 100 ~240VAC, DC: 18 ~72VDC or Dual Power (AC+DC), Fanless |
| CH02 | 2 Slots Chassis with 100 ~240VAC to 12VDC Adapter, Fanless |
| CH02M-AC, DC, AD | 2 Slots Chassis with Console port and AC: 30W 100 ~240VAC, DC:30W 18 ~72VDC or Dual Power (AC+DC), with Cooling Fan |
| CH02M-2-AC, DC, AD | 2 Slots Chassis with Console port and AC:12W 100 ~240VAC, DC:12W 18 ~72VDC or Dual Power (AC+DC), Fanless |
| CH02/NMC(SNMP)-AC, DC, AD | 2 Slots Chassis with NMC card and AC:100 ~240VAC, DC:18 ~72VDC or Dual Power (AC+DC), with Cooling Fan |

How to order

1. Local Console Management Order: CH01M, CH02M and CH02M-2
2. Remote Web/SNMP Management Order: CH02/NMC(SNMP)
3. DIP Switch Configuration Order: CH01 and CH02
4. Model name with "M", it means the chassis with Console Management

FRM220 – □□□□ – □□

Example: FRM220 – CH01 – AD

FRM220 – CH02/NMC(SNMP) – □□^{Power Type}

Example: FRM220 – CH02/NMC(SNMP) – AD

Slide-in Card vs Standalone Chassis Compatible Table

| Card Name | Product Name | Page | FRM220-CH20 | FRM220A-CH20 | CH08 | CH02M | CH02M-2 |
|--------------------|--|------|-------------|--------------|------|-------|---------|
| FRM220-NMC | Network Management Controller | 2-3 | ✓ | | ✓ | | |
| FRM220A-GSW/SNMP | Gigabit Ethernet Aggregate Switch Card | 2-5 | | ✓ | | | |
| FRM220-10G-SXX | 10G 3R Transponder SFP+ to XFP Fiber Protection | 2-11 | ✓ | | ✓ | ✓ | |
| FRM220-10G-SS | 10G 3R Transponder SFP+ to SFP+ | 2-12 | ✓ | | ✓ | ✓ | |
| FRM220-4G-3S | 4G Multi-Rate 2R Transponder SFP to SFP Fiber Protection | 2-13 | ✓ | | ✓ | ✓ | |
| FRM220-2.7G-3S | 2.7G Multi-Rate 3R Transponder SFP to SFP Fiber Protection | 2-14 | ✓ | | ✓ | ✓ | |
| FRM220-1000DS | 1000Base-X to 1000Base-X SFP media converter | 2-15 | ✓ | | ✓ | | |
| FRM220-10GE-TS | 10G Ethernet Converter 10G Base-T to SFP+ | 2-16 | ✓ | | ✓ | ✓ | |
| FRM220-10GE-TX | 10G Ethernet Converter 10G Base-T to XFP | 2-17 | ✓ | | ✓ | ✓ | |
| FRM220-MD40 | 4-Ch CWDM Mux/Demux (1551, 1571, 1591, 1611)nm | 2-18 | ✓ | | ✓ | | |
| FRM220-MD80 | 8-Ch CWDM Mux/Demux (1471 ~ 1611)nm | 2-18 | ✓ | | ✓ | | |
| FRM220-MD40 WA/WB | 4-Ch single fiber CWDM MUX/DEMUX | 2-19 | ✓ | | ✓ | | |
| FRM220-MD80 WA/WB | 8-Ch single fiber CWDM MUX/DEMUX | 2-19 | ✓ | | ✓ | | |
| FRM220-Protection | 1+1 Fiber Optical Protection Switch | 2-20 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-MX210 | 2-Port Gigabit Ethernet Multiplexer | 2-21 | ✓ | | ✓ | ✓ | |
| FRM220-1000M | 10/100/1000Base-T to 1000Base-X Web Smart OAM/IP Managed Converter | 2-22 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-1000MS | 10/100/1000Base-T to 100/1000Base-X SFP Web Smart OAM/IP Managed Converter | 2-23 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-1000EAS/X-1 | OAM/IP-Based Managed Gigabit Ethernet Media Converter | 2-24 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-10/100i | 10/100Base-TX to 100Base-FX In-band Managed Converter | 2-25 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-10/100iS | 10/100Base-TX to 100Base-FX SFP In-band Managed Converter | 2-26 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-10/100iS-2 | Dual Channels 10/100Base-TX to 100Base-FX SFP Media Converter | 2-27 | ✓ | | ✓ | ✓ | |
| FRM220A-1000EAS/X | 2-Port 10/100/1000Base-T + 2-Port 1000Base-X OAM/IP Managed Switch | 2-28 | ✓ | ✓ | ✓ | ✓ | |
| FRM220A-1002ES | Hardened Gigabit Ethernet Managed Switch | 2-30 | ✓ | ✓ | ✓ | ✓ | |
| FRM220A-FSW103 | 3x 10/100Base-TX + 100Base-FX Managed Converter | 2-31 | ✓ | ✓ | ✓ | ✓ | ✓ |
| FRM220-DS3/E3 | DS3/E3 over Fiber | 2-32 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-ET100 | Ethernet over E1 Fiber Modem | 2-33 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-Data | V.35/X.21/RS530/449/232 Fiber Modem | 2-34 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-E1/T1 | E1/T1 Fiber Modem | 2-35 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-Serial | RS485/232 Media Converter | 2-36 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-FXO/FXS-4 | 4xPOTS over Fiber | 2-37 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-FXO/FXS | POTS over Fiber | 2-38 | ✓ | | ✓ | ✓ | ✓ |
| FRM220A-Eoe1 | Ethernet Bridge over E1 | 2-39 | ✓ | ✓ | ✓ | ✓ | ✓ |
| FRM220A-Eoe1/G | Ethernet Bridge over E1 (GFP) | 2-40 | ✓ | ✓ | ✓ | ✓ | ✓ |
| FRM220-E1/Data | E1 to Data | 2-43 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-FTEC | E1/T1 Cross Rate Converter | 2-44 | ✓ | | ✓ | ✓ | ✓ |
| FRM220A-iMux4 | Ethernet to 4 E1 Mux NIC | 2-45 | ✓ | ✓ | ✓ | ✓ | ✓ |
| FRM220A-iMux8 | Ethernet to 8 E1 Mux NIC | 2-46 | ✓ | ✓ | ✓ | ✓ | ✓ |
| FRM220A-iMux16 | Ethernet to 16 E1 Mux NIC | 2-47 | ✓ | ✓ | ✓ | ✓ | ✓ |
| FRM220-GFOM04 | 4-Port E1/T1+10/100/1000M Ethernet Fiber Multiplexer | 2-48 | ✓ | | ✓ | ✓ | |
| FRM220-FOM04 | 4-Port E1/T1+100M Ethernet Fiber Multiplexer | 2-49 | ✓ | | ✓ | ✓ | ✓ |
| FRM220-FOM01 | E1/T1+100M Ethernet Fiber Multiplexer | 2-50 | ✓ | | ✓ | ✓ | ✓ |

Power Type vs Standalone Chassis Compatible Table

| Power Type (option) | AC: AC Power | DC: DC Power | AC, DC | AC, DC | AC, DC |
|---------------------|-----------------|-----------------|------------|------------|------------|
| | AD: AC+DC Power | AA: AC+AC Power | AD, AA, DD | AD, AA, DD | AD, AA, DD |
| | | DD: DC+DC Power | | | |

Slide-in Card vs Standalone Chassis Compatible Table

| Card Name | Product Name | Page | CH02/NMC (SNMP) | CH02 | CH01 | CH01M |
|--------------------|--|------|-----------------|------|------|-------|
| FRM220-NMC | Network Management Controller | 2-3 | ✓ | | | |
| FRM220A-GSW/SNMP | Gigabit Ethernet Aggregate Switch Card | 2-5 | | | | |
| FRM220-10G-SXX | 10G 3R Transponder SFP+ to XFP Fiber Protection | 2-11 | ✓ | | | |
| FRM220-10G-SS | 10G 3R Transponder SFP+ to SFP+ | 2-12 | ✓ | | | |
| FRM220-4G-3S | 4G Multi-Rate 2R Transponder SFP to SFP Fiber Protection | 2-13 | ✓ | | ✓ | ✓ |
| FRM220-2.7G-3S | 2.7G Multi-Rate 3R Transponder SFP to SFP Fiber Protection | 2-14 | ✓ | | | |
| FRM220-1000DS | 1000Base-X to 1000Base-X SFP media converter | 2-15 | ✓ | | | ✓ |
| FRM220-10GE-TS | 10G Ethernet Converter 10G Base-T to SFP+ | 2-16 | ✓ | | | |
| FRM220-10GE-TX | 10G Ethernet Converter 10G Base-T to XFP | 2-17 | ✓ | | | |
| FRM220-MD40 | 4-Ch CWDM Mux/Demux (1551, 1571, 1591, 1611)nm | 2-18 | | | ✓ | |
| FRM220-MD80 | 8-Ch CWDM Mux/Demux (1471 ~ 1611)nm | 2-18 | | ✓ | | |
| FRM220-MD40 WA/WB | 4-Ch single fiber CWDM MUX/DEMUX | 2-19 | | | ✓ | |
| FRM220-MD80 WA/WB | 8-Ch single fiber CWDM MUX/DEMUX | 2-19 | | ✓ | | |
| FRM220-Protection | 1+1 Fiber Optical Protection Switch | 2-20 | ✓ | | | ✓ |
| FRM220-MX210 | 2-Port Gigabit Ethernet Multiplexer | 2-21 | | | ✓ | ✓ |
| FRM220-1000M | 10/100/1000Base-T to 1000Base-X Web Smart OAM/IP Managed Converter | 2-22 | ✓ | | ✓ | ✓ |
| FRM220-1000MS | 10/100/1000Base-T to 100/1000Base-X SFP Web Smart OAM/IP Managed Converter | 2-23 | ✓ | | ✓ | ✓ |
| FRM220-1000EAS/X-1 | OAM/IP-Based Managed Gigabit Ethernet Media Converter | 2-24 | | | ✓ | ✓ |
| FRM220-10/100i | 10/100Base-TX to 100Base-FX In-band Managed Converter | 2-25 | ✓ | | ✓ | ✓ |
| FRM220-10/100iS | 10/100Base-TX to 100Base-FX SFP In-band Managed Converter | 2-26 | ✓ | | ✓ | ✓ |
| FRM220-10/100iS-2 | Dual Channels 10/100Base-TX to 100Base-FX SFP Media Converter | 2-27 | ✓ | | ✓ | ✓ |
| FRM220A-1000EAS/X | 2-Port 10/100/1000Base-T + 2-Port 1000Base-X OAM/IP Managed Switch | 2-28 | | | ✓ | ✓ |
| FRM220A-1002ES | Hardened Gigabit Ethernet Managed Switch | 2-30 | ✓ | | | ✓ |
| FRM220A-FSW103 | 3x 10/100Base-TX + 100Base-FX Managed Converter | 2-31 | ✓ | | | ✓ |
| FRM220-DS3/E3 | DS3/E3 over Fiber | 2-32 | ✓ | | | ✓ |
| FRM220-ET100 | Ethernet over E1 Fiber Modem | 2-33 | ✓ | | ✓ | ✓ |
| FRM220-Data | V.35/X.21/RS530/449/232 Fiber Modem | 2-34 | ✓ | | ✓ | ✓ |
| FRM220-E1/T1 | E1/T1 Fiber Modem | 2-35 | ✓ | | ✓ | ✓ |
| FRM220-Serial | RS485/232 Media Converter | 2-36 | ✓ | | ✓ | ✓ |
| FRM220-FXO/FXS-4 | 4x POTS over Fiber | 2-37 | ✓ | | | ✓ |
| FRM220-FXO/FXS | POTS over Fiber | 2-38 | ✓ | | ✓ | ✓ |
| FRM220A-Eoe1 | Ethernet Bridge over E1 | 2-39 | ✓ | | ✓ | ✓ |
| FRM220A-Eoe1/G | Ethernet Bridge over E1 (GFP) | 2-40 | ✓ | | ✓ | ✓ |
| FRM220-E1/Data | E1 to Data | 2-43 | ✓ | | ✓ | ✓ |
| FRM220-FTEC | E1/T1 Cross Rate Converter | 2-44 | ✓ | | | ✓ |
| FRM220A-iMux4 | Ethernet to 4 E1 Mux NIC | 2-45 | ✓ | | ✓ | ✓ |
| FRM220A-iMux8 | Ethernet to 8 E1 Mux NIC | 2-46 | ✓ | | ✓ | ✓ |
| FRM220A-iMux16 | Ethernet to 16 E1 Mux NIC | 2-47 | | ✓ | | |
| FRM220-GFOM04 | 4-Port E1/T1+10/100/1000M Ethernet Fiber Multiplexer | 2-48 | | | | |
| FRM220-FOM04 | 4-Port E1/T1+100M Ethernet Fiber Multiplexer | 2-49 | | ✓ | | |
| FRM220-FOM01 | E1/T1+100M Ethernet Fiber Multiplexer | 2-50 | ✓ | | | ✓ |

2

FRM220-Slide-in
Card Table

Power Type vs Standalone Chassis Compatible Table

| Power Type (option) | DC12: AC Adapter AD: AC+DC Power | AC: AC Power AA: AC+AC Power | DC: DC Power DD: DC+DC Power | AC, DC, AD | AC, DC, AD | DC12 | DC12, AC, DC, AD, AA, DD | AC, DC, AD |
|---------------------|-------------------------------------|---------------------------------|---------------------------------|---------------|---------------|------|-----------------------------|---------------|
|---------------------|-------------------------------------|---------------------------------|---------------------------------|---------------|---------------|------|-----------------------------|---------------|

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



FRM220-10G-SXX

10G Transponder (3R) with Optical Line Protection

The FRM220-10G-SXX is a 10G fiber to fiber 3R repeater and transponder. Based on 10 Gigabit fiber standards, this transponder supports SFP+ to XFP (SX) or XFP to XFP (XX) fiber connections. 1+1 Automatic optical line Protection Switching is supported for the aggregate XFP fiber ports. The transponder is protocol transparent, providing 3R (Re-amplification, Re-shaping and Re-clocking) between these different optical module types. One of the major applications for this converter is in connecting proprietary transceiver equipment to CWDM or DWDM when these 'colored' optical modules are not available for the proprietary equipment. With transparent bi-directional forwarding capability between the 2 fiber media, the FRM220-10G-SXX brings you the best and simplest solution for your 10G conversion between fiber and fiber.

Features

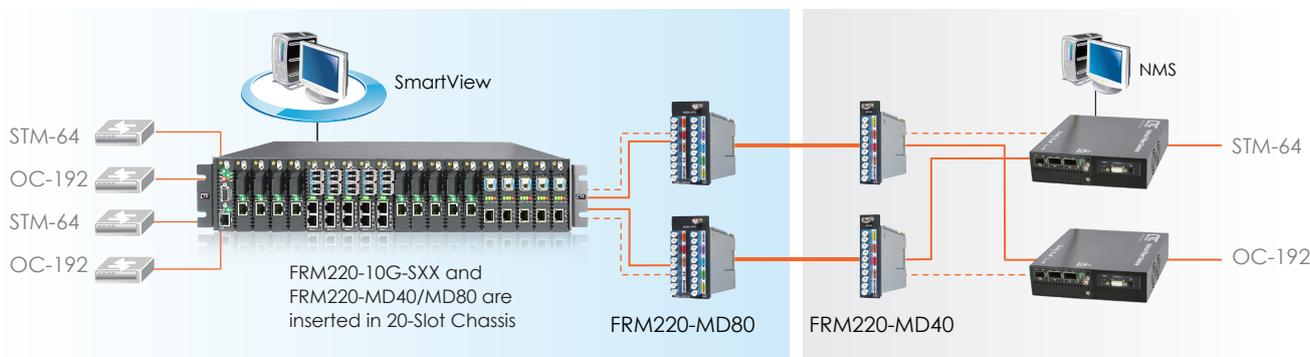
- Multiple protocol supported 10G Ethernet, STM-64, OC-192, G.709 OTU2, Fiber Channel (8 x FC)
- Network management via Web, Telnet, SNMP in central FRM220-CH20 chassis (10 cards in chassis max.)
- Protocol transparent 3R fiber media transponder / repeater (Re-amplification, Re-shaping and Re-clocking)
- Promotes flexibility and eases management with pluggable SFP+ or XFP transceiver
- Features two 10G ports offering multiservice 10G transponder and regenerator function
- Supports 1+1 optical line protection
- Built-in self test (BIST) function
- Provides superior optics capabilities resulting in extended transport distances for regional application.
- Extend 10G Ethernet transmission over fiber useful as a 'Transponder' in CWDM or DWDM systems for 10G Ethernet/ Fiber Channel/STM-64
- Supports Client / Line loop back tests
- Serial console for stand-alone management when inserted in CH02M dual slot chassis
- XFP power supplies: +5.0V, -5.2V, +3.3V and +1.8V
- Supports reference clock output

Specifications

| | | |
|--------------------------|-----------------------|--------------------------------------|
| Optical Interface | Connector | LC |
| | | 1x Line SFP+ to 2x Client XFP |
| | | 1x Line SFP+ to 1x Client XFP |
| Traffic Format | | 1x Line XFP to 1x Client XFP |
| | | OC-192/STM-64 (9.95328Gbps) |
| | | 1 Gigabit Ethernet (1.25Gbps) |
| | | 10 Gigabit Ethernet LAN(10.3125Gbps) |
| | | G.709 OTU2 (10.709225Gbps) |
| Regeneration | | Fiber Channel |
| | | 1xFC(1.062 Gbps); 2xFC(2.125 Gbps); |
| | | 4xFC(4.25 Gbps); 8xFC(8.5 Gbps); |
| | | 10xFC(10 Gbps) |
| | | Re-amplification |
| | Re-shaping, Re-timing | |

| | | |
|--------------------------|--|---------------------------|
| Power | Loopback | Line / Client |
| | Fiber | SM 9/125µm |
| | | MM 50/125µm or 62.5/125µm |
| | Wavelength | Depends on SFP+ or XFP |
| Indications | LED (Power, Line Link, Client Link, Test, Loop back, Port Active, Alarm) | |
| Power Input | 12VDC | |
| Power Consumption | <10W | |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 150g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| FRM220-10G-SXX | 10G 3R SFP+ to XFP fiber protection (optional SFP+, XFP module) |

Note: This card MUST be placed in CH02M chassis.

For standalone SNMP management, place this card in CH02/SNMP chassis.

FRM220-10G-SS

10G Transponder (3R)



2

10G transponder

The FRM220-10G-SS is a 10G fiber to fiber 3R repeater and transponder. Based on a number of 10 Gigabit Fiber standards, these transponders support SFP+ to SFP+ (SS) fiber connections. The transponders are protocol transparent, providing 3R (Re-amplification, Re-shaping and Re-clocking) regeneration between these different optical module types. One of the major applications for this converter is in connecting proprietary transceiver equipment to CWDM or DWDM when these 'colored' optical modules are not available for the proprietary equipment. With transparent bi-directional forwarding capability between the 2 fiber media, the FRM220-10G-SS brings you the best and simplest solution for your 10G conversion between fiber and fiber.

Features

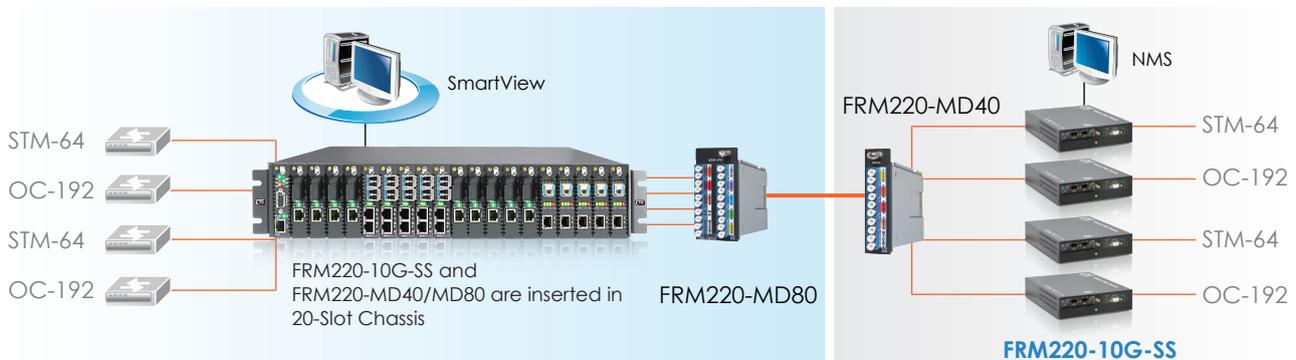
- Multiple protocol supported 10G Ethernet, STM-64, OC-192, G.709 OTU2, Fiber Channel (8 x FC)
- Network management via Web, Telnet, SNMP in central FRM220 chassis(10 cards in chassis max.)
- Protocol transparent 3R fiber media transponder / repeater (Re-amplification, Re-shaping and Re-clocking)
- Promotes flexibility and eases management with pluggable SFP+ transceiver
- Features two 10G ports offering multiservice 10G transponder and regenerator function
- Provides superior optics capabilities resulting in extended transport distances for regional application.
- Extend 10G Ethernet transmission over fiber
- Useful as a 'Transponder' in CWDM or DWDM systems for 10G Ethernet/Fiber Channel/STM-64
- Supports Client / Line loop back tests
- Serial console for stand-alone management when inserted in CH02M Single Slot Chassis
- SFP+ power supplies: +3.3V

Specifications

| | | |
|--------------------------|----------------|--|
| Optical Interface | Connector | LC, 1x Line SFP+ to 1x Client SFP+ |
| | Traffic Format | OC-192/STM-64 (9.95328Gbps) 10 Gigabit Ethernet LAN(10.3125Gbps) G.709 OTU2 (10.709225Gbps) Fiber Channel 1xFC (1.062 Gbps); 2xFC (2.125 Gbps) 4xFC (4.25 Gbps); 8xFC (8.5 Gbps) 10xFC (10.51875 Gbps) |
| | Regeneration | Re-amplification Re-shaping, Re-timing |
| | Loopback | Line / Client |
| | Fiber | SM 9/125μm MM 50/125μm or 62.5/125μm |

| | | |
|--------------------------|--|--|
| Optical Interface | Wavelength | CWDM 1470 ~ 1610nm DWDM 1529.55 ~ 1565.50nm |
| | Indications | LED (Power, Line Link, Client Link, Test, Loop back, Port Active, Alarm) |
| Power Input | 12VDC | |
| Power Consumption | <10W | |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 150g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|---------------|---|
| FRM220-10G-SS | 10G 3R transponder, SFP+ to SFP+ (optional SFP+ module) |

Note: This card may be set by DIP switch or console, but MUST be placed in CH02M chassis.
For standalone SNMP management, place this card in CH02/NMC(SNMP) chassis.



FRM220-4G-3S

4G Transponder (2R) 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

- Multiple protocol supported at bit rates 28Mbps to 4.25Gbps
- (Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, STM-1, STM-4, STM-16, FC-1, FC-2, FC-4)
- 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
- Link Fault Pass-Through (LFPT)
- Auto Laser Shutdown (ALS)
- Detect transceiver transmitter error alarm

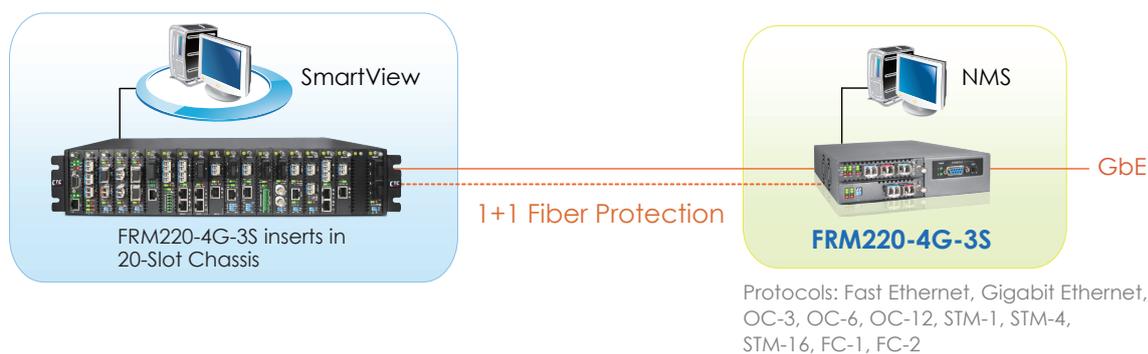
Specifications

| | | |
|--------------------------|------------------------------|--------------------|
| Optical Interface | Connector | SFP LC |
| | Data rate | 28Mbps to 4.25Gbps |
| 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 1470 ~ 1610nm | |

| | |
|--------------------------|--|
| Indications | LED (PWR, Line Link, Client Link, Test, Loop back, Port Active, Alarm) |
| Power Input | 12VDC |
| Power Consumption | < 8W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application

Managed 4G 2R Transponder with Fiber Protection



Ordering Information

| Model Name | Description |
|--------------|--|
| FRM220-4G-3S | 4G 2R Transponder with fiber protection, (optional SFP module) |

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis

FRM220-2.7G-3S

2.7G Transponder (3R) with Optical Line Protection



2

2.7G transponder

The FRM220-2.7G-3S is a 3R 2.7G optical repeater and transponder, which consists of Re-amplification, Re-shaping and Re-timing. 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 are supported for the aggregate fiber ports. When the FRM220-2.7G-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 set the desired data rate to match the transmitted protocol.

Features

- Multiple protocol supported at bit rates 34.3Mbps to 2.7Gbps (Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, OC-24, OC-48, STM-1, STM-4 STM-16, FC-1, FC-2)
- Network management via Web, Telnet, SNMP in central FRM220 chassis
- Link Fault Pass-Through (LFPT)
- Auto Laser Shutdown (ALS)
- Local configuration via DB9 craft port In Stand-alone
- Digital diagnostic monitoring of SFP module
- Perform optical repeater function (Re-amplification, Re-shaping, and Re-clocking)
- Facility loopback on both Client / Line sides
- 1+1 optic fiber protection
- Dip switch setting data rate
- Detect transceiver transmitter error alarm

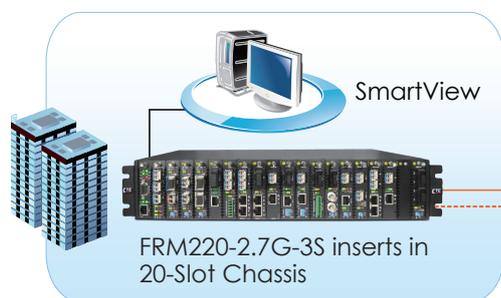
Specifications

| | | |
|------------------------------|--------------|-------------------------|
| Optical Interface | Connector | SFP LC |
| | Data rate | E3 to OC-48 |
| | Regeneration | Re-amplification |
| | | Re-shaping |
| | | Re-clocking |
| | 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 1470 ~ 1610nm | | |

| | |
|--------------------------|--|
| Indications | LED (PWR, Line Link, Client Link, Test, Loop back, Port Active, Alarm) |
| Power Input | 12VDC |
| Power Consumption | < 10W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application

Managed 2.7G 3R Transponder with Fiber Protection



1+1 Fiber Protection



Protocols: Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, OC-24, OC-48, STM-1, STM-4, STM-16, FC-1, FC-2

Ordering Information

| Model Name | Description |
|----------------|--|
| FRM220-2.7G-3S | 2.7G 3R Transponder with fiber protection, (optional SFP module) |

Note: This card may be set by DIP switch or console, but **MUST** be placed in CH02M chassis.
For standalone SNMP management, place this card in CH02/NMC(SNMP) chassis.



FRM220-1000DS

1G (2R) 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, STM-1, 4, Fiber Channel 1, 2, 4 and OC3, 12. 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 and fiber link status.

Features

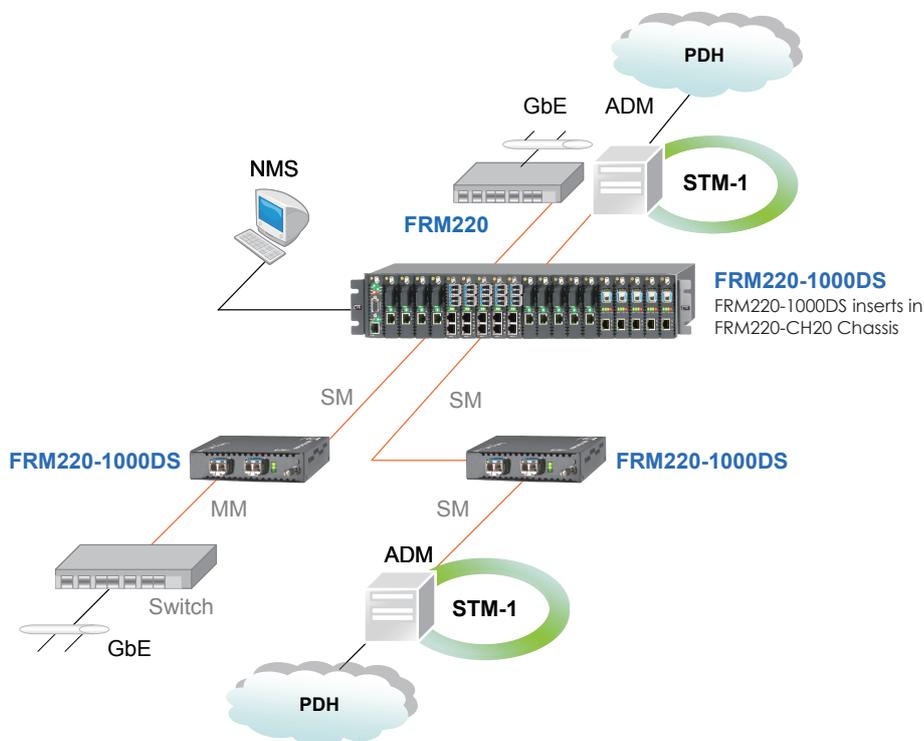
- Transparent fiber media converter / repeater
- Data rate up to 1G
- Network management via terminal or SNMP in FRM220 chassis
- Extend transmission from 2km to 120km over fiber
- Perform optical repeater function (Re-amplification & Reshaping)
- Digital diagnostic monitoring of SFP modules

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 | < 5W |
| Dimensions | 123 x 86 x 20 mm (D x W x 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



Ordering Information

| Model Name | Description |
|---------------|---|
| FRM220-1000DS | 1000Base-X SFP to 1000Base-X SFP 2R Transponder |

Note: This card must use CH01M, with serial console, to configure standalone settings

FRM220-10GE-TS

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



2

10G converter

The FRM220-10GE-TS is a copper to fiber 10G Ethernet media converter based on IEEE802.3an and IEEE802.3ae. With SNMP and Web-based management in the FRM220, the Network 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 10GBase-T to 10GBase-R and vice versa. With full duplex wire speed forwarding capability between these two media, the FRM220-10GE-TS brings you the best and simplest solution for the 10G Ethernet conversion between copper wire and fiber.

Features

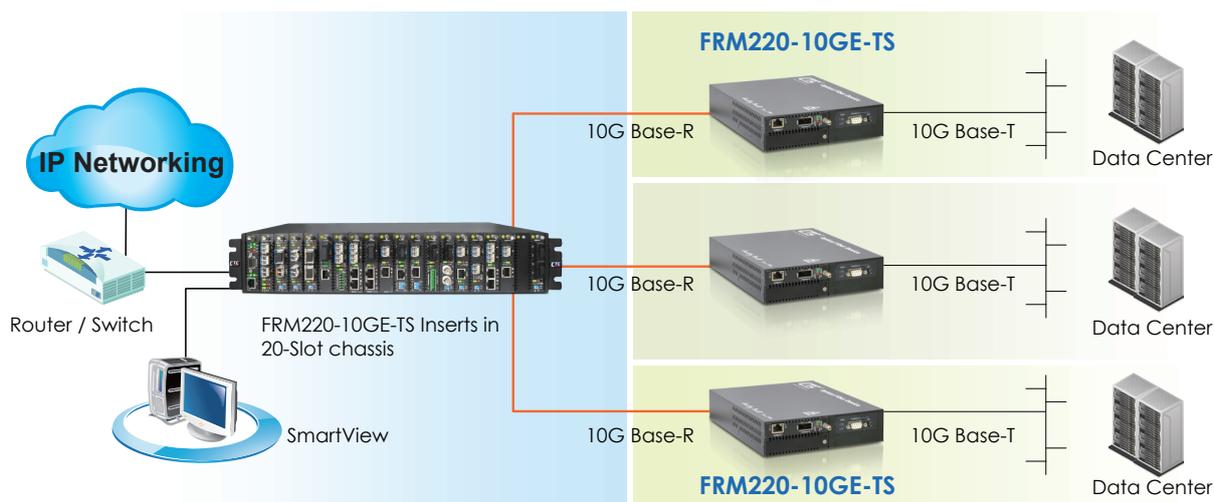
- Network Management via FRM220 Chassis
- Complies with IEEE802.3an 10GBase-T and IEEE802.3ae 10GBase-R
- Real-Time conversion between 10GBase-T and 10GBase-R
- Common used SFP+ fiber interface and RJ45 connector
- Full duplex wire speed forwarding
- Subsidiary device for 10G Ethernet transmission without fiber
- Loopback Test
- Standalone Local Management via CH02M
- Forwarding 10k bytes jumbo packet

Specifications

| | | |
|-----------------------------|----------------------------------|------------------------|
| Optical Interface | Connector | SFP+ LC |
| | Data rate | 10,3125Gbps |
| | Distance | 300m, 10km, 40km, 80km |
| | Wavelength | 1550nm |
| Electrical Interface | Connector | RJ45 |
| | Data rate | 10Gbps |
| | Cable type | Cat.6a, 7 |
| | Distance | 95 meters (Cat.7) |
| Management | Console port | RS-232 via CH02M |
| Standards | IEEE 802.3an, IEEE 802.3ae | |
| LEDs | SFP+, LR, Link/Act, LBK A/B, SYS | |

| | |
|--------------------------|--|
| Power | 12VDC |
| Power Consumption | < 15W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 130g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 0 ~ 85% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 57,000 hrs |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| FRM220-10GE-TS | 10G Base-T RJ45 to 10G Base-R SFP+, (optional SFP+) |

Note: This card MUST be placed in CH02M chassis.

For standalone SNMP management, place this card in CH02/NMC(SNMP) chassis.



FRM220-10GE-TX

10G Ethernet Media Converter
10G Base-T to 10G Base-R XFP

The FRM220-10GE-TX is a copper to fiber 10G Ethernet media converter based on IEEE802.3an and IEEE802.3ae. With SNMP and Web-based management in the FRM220, the Network 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 10GE optical solution with XFP LC connector. The data stream can be converted bi-directionally from 10GBase-T to 10GBase-R and vice versa. With full duplex wire speed forwarding capability between these two media, The FRM220-10GE-TX brings you the best and simplest solution for the 10G Ethernet conversion between copper wire and fiber.

Features

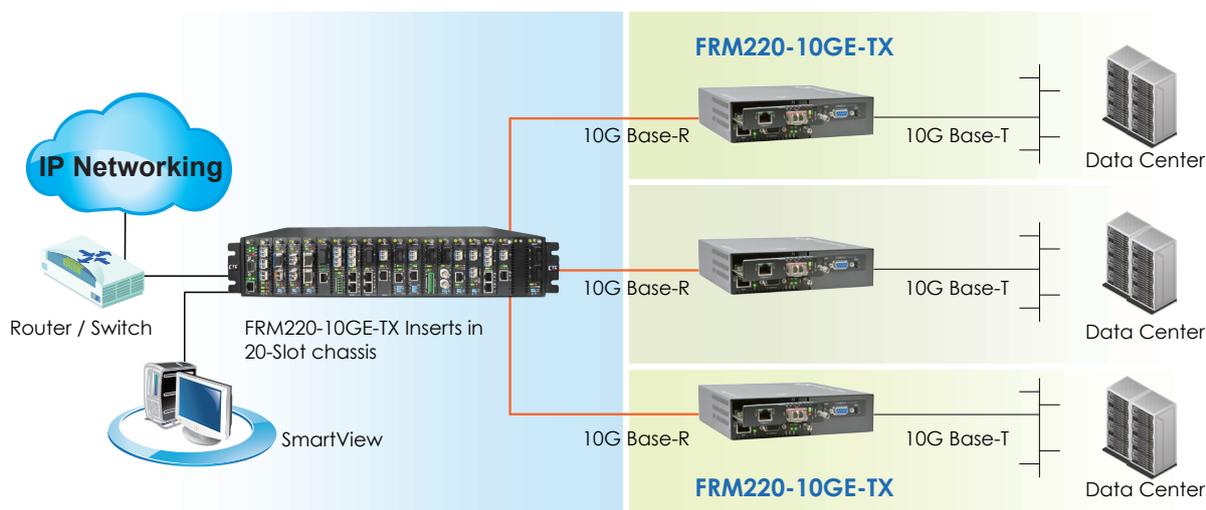
- Network Management via FRM220 Chassis
- Complies with IEEE802.3an 10GBase-T and IEEE802.3ae 10GBase-R
- Real-Time conversion between 10GBase-T and 10GBase-R
- Common used XFP fiber interface and RJ45 connector
- Full duplex wire speed forwarding
- Loopback Test
- Standalone Local Management via CH02M
- Forward 10k bytes jumbo packet

Specifications

| | | |
|-----------------------------|----------------------------------|------------------------|
| Optical Interface | Connector | XFP LC |
| | Data rate | 10,3125Gbps |
| | Distance | 300m, 10km, 40km, 80km |
| | Wavelength | 1550nm |
| Electrical Interface | Connector | RJ-45 |
| | Data rate | 10Gbps |
| | Cable type | Cat.6a, 7 |
| | Distance | 95 meters (Cat.7) |
| Management | Console port | RS-232 via CH02M |
| Standards | IEEE 802.3an, IEEE 802.3ae | |
| LEDs | SFP+, LR, Link/Act, LBK A/B, SYS | |

| | |
|--------------------------|--|
| Power | 12VDC |
| Power Consumption | < 15W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 130g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 0 ~ 85% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 57,000 hrs |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| FRM220-10GE-TX | 10G Base-T RJ45 to 10G-Base-R XFP, (optional XFP) |

Note: This card **MUST** be placed in CH02M chassis.
 For standalone SNMP management, place this card in CH02/NMC(SNMP) chassis.



CWDM (FRM220 MUX/DeMUX)

4 and 8 Channel MUX/DeMUX

The FRM220 CWDM MUX/DEMUX is modular design cards that support ITU-T G.694.2 wavelengths between 1271nm to 1611nm in 20nm increments. The FRM220 CWDM 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 CWDM 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 CWDM modules are passive devices that require no external power. They can also be installed in an FRM220 powered chassis with a NMC management module¹ and can be managed using SmartView EMS network 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

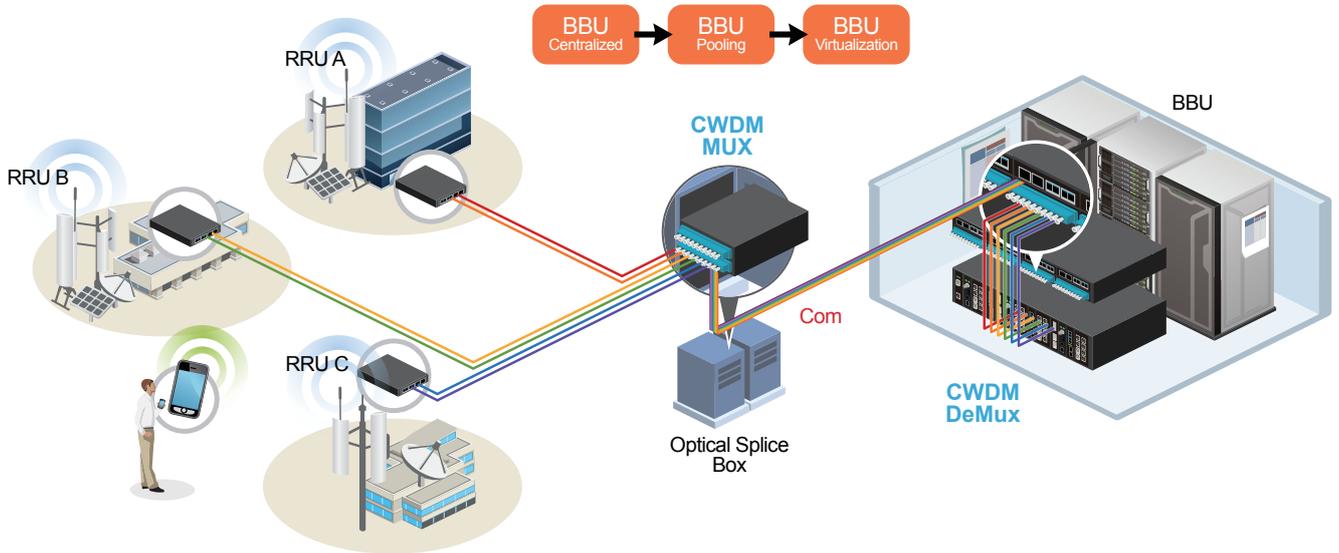
- Full native mode performance
- Passive model requires no power
- Protocol transparent, no limitation
- Utilizes industry standard ITU CWDM wavelength
- Standard LC connectors
- Passive device that can be installed in a powered chassis for managed applications
- Integration with Transponder in FRM220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

Specifications

| | |
|-----------------------|--|
| Model | FRM220-MD-XXX |
| Channel | 4 or 8 channels |
| Standards | ITU-T G.694.2 |
| Wavelength | 1271 ~ 1611nm |
| Insertion Loss | 4ch < 1.8dB, 8ch < 2.8dB |
| Return Loss | >45dB |
| Option | Upgrade port Wide 1310 ± 50 nm |
| Line Link | Single fiber or two fiber |
| Connector | LC / UPC |
| Dimension | MD40 : 155x 88 x23 mm (D x W x H) MD80 : 155x 88 x42 mm (D x W x H) |
| Weight | MD40 : 200g MD80 : 380g |

| | |
|----------------------|--|
| Temperature | 0 ~ 50 (Operating) -40 ~ 70 (Storage) |
| Humidity | 0 ~95% (non-condensing) |
| Certification | RoHS compliant |

Application

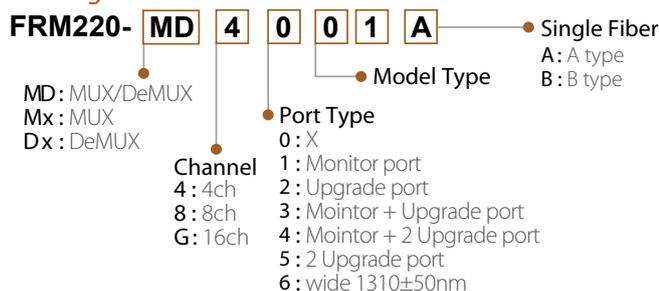


2
CWDM
(FRM220 MUX/DeMUX)

Ordering Information

| Model Type | Model Name | Channel Port ITU Center Wavelength(nm) | Chassis Slots Required | Insertion Loss | Client | Line | Mointor | U/P |
|---------------------------------------|----------------|---|------------------------|----------------|--------|--------|---------|--------|
| CWDM 4-Channel MUX/DeMUX | FRM220-MD4001 | 1511, 1531, 1551, 1571 | 1 | <1.8dB | LC/UPC | | | |
| | FRM220-MD4002 | 1551, 1571, 1591, 1611 | 1 | <1.8dB | LC/UPC | | | |
| | FRM220-MD4501 | 1471, 1491, 1591, 1611 + Upgrade port 1 (1531 ~ 1571nm)+ Upgrade port 2 (1261 ~ 1457nm) | 2 | <2.2dB | LC/UPC | | | LC/UPC |
| CWDM 8-Channel MUX/DeMUX | FRM220-MD8001 | 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611 | 2 | <2.8dB | LC/UPC | | | |
| | FRM220-MD8101 | 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611 + monitor port | 2 | <2.8dB | LC/UPC | | LC/UPC | |
| | FRM220-MD8201 | 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611 + Upgrade port (1261 ~ 1451nm) | 2 | <2.8dB | LC/UPC | | | LC/UPC |
| Single fiber CWDM 4-Channel MUX/DeMUX | FRM220-MD4001A | TX/RX (1471/1491, 1511/1531, 1551/1571, 1591/1611) | 1 | <1.8dB | LC/UPC | | | |
| | FRM220-MD4001B | TX/RX (1491/1471, 1531/1511, 1571/1551, 1611/1591) | 1 | <1.8dB | LC/UPC | | | |
| Single fiber CWDM 8-Channel MUX/DeMUX | FRM220-MD8101A | TX/RX (1271/1471, 1291/1491, 1311/1511, 1331/1531, 1351/1551, 1411/1571, 1431/1591, 1451/161nm) + monitor port | 2 | <2.8dB | LC/UPC | SC/UPC | FC/UPC | |
| | FRM220-MD8101B | TX/RX (1471/1271, 1491/1291, 1511/1311, 1531/1331, 1551/1351, 1571/1411, 1591/1431, 1611/1451nm) + monitor port | 2 | <2.8dB | LC/UPC | SC/UPC | FC/UPC | |

Naming rule



Example :

| | |
|-----------------------|--|
| FRM220-MD4001 | MUX/DEMUX, 4 channel, model typel 01 |
| FRM220-MD8101 | MUX/DEMUX, 8 channel, monitor port, model type 01 |
| FRM220-MD8201 | MUX/DEMUX, 8 channel, upgrade port, model type 01 |
| FRM220-MD8101A | MUX/DEMUX, 8 channel, monitor port, model type 01, Single fiber Type A |

FRM220-Protection

1+1 Fiber Optical Protection Switch



FRM220-Protection Optical Line Protection (OLP) unit is 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. This solution 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 50 ms. Monitoring is available through SNMP Management when FRM220-Protection 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

- 1+1 full optical protection
- Low channel cross talk < -55dB
- Low insertion loss < 5.5dB
- Latch feature, if power is lost the switch remains in its current state
- Protection transition < 50 ms
- Works with any combination of 1 ~16 wavelengths
- Traffic is switched in one of three modes : revertive,non-revertive, manual
- Programmable Rx threshold setting for switch-over
- Optical Interface Type : LC connectors
- Working and protected lines are physically separated fiber

Specifications

| | |
|-------------------------|---|
| Connector | LC |
| LEDs | Power System, Working Path, Protection Path, Work mode |
| Power | DC 12V In |
| Restoration Time | 50ms |
| Range | Input PWR : +3 ~ -15dBm(TX), -2~-29dBm(RX) Detection : -5 ~ -29dBm |
| Loss | Insertion Loss < 5.5dB, Return Loss > 45dB |

| | |
|--------------------------|--|
| Power Consumption | < 5W |
| Dimensions | 155 x 88 x 23mm (D x W x 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 hours |

Application



Ordering Information

| Model Name | Description |
|-------------------|-------------------------------------|
| FRM220-Protection | 1+1 Fiber Optical Protection Switch |

Note: This card must use CH01M, with serial console, to configure standalone settings.

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



FRM220-MX210

2x Gigabit Ethernet Multiplexer

FRM220-MX210 is 4-port Gigabit Ethernet switch which able to aggregate two wire-speed Gigabit Ethernet services into one 2.5G uplink, reducing CAPEX by effectively increasing fiber utilization. The Multiplexer can be used either in point-to-point topology, functioning as a media converter for transporting 2 Gigabit Ethernet services over one fiber, or in CWDM systems working as a wavelength converter for extending transmission capacity. FRM220-MX210 is equipped with one 10/100/1000M RJ-45 network management port and three SFP based ports: two 1G Ethernet service ports and one 1G/2.5G uplink port. Additionally its advanced features such as downlink and uplink loop back, auto laser shutdown and remote network management provide carriers a flexible, reliable and cost-effective two Gigabit Ethernet over one wavelength conversion solution.

Features

- Local configuration via DB9 craft port in stand-alone (CH01M)
- Forward 9K bytes Jumbo Packets
- Transports two Gigabit Ethernet over one wavelength doubling the CWDM system transmission capacity
- Facility loopback on both Line / client sides
- Auto Laser Shutdown (ALS)
- Hot-swappable SFP module
- Detect transceiver error Alarm
- Network Management via web, Telnet, SNMP in central FRM220 chassis
- 10/100/1000M Network management port
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1Q Tagging and Port based VLAN
- Supports IEEE 802.1D STP
- Default port and 802.1p tag priority QoS

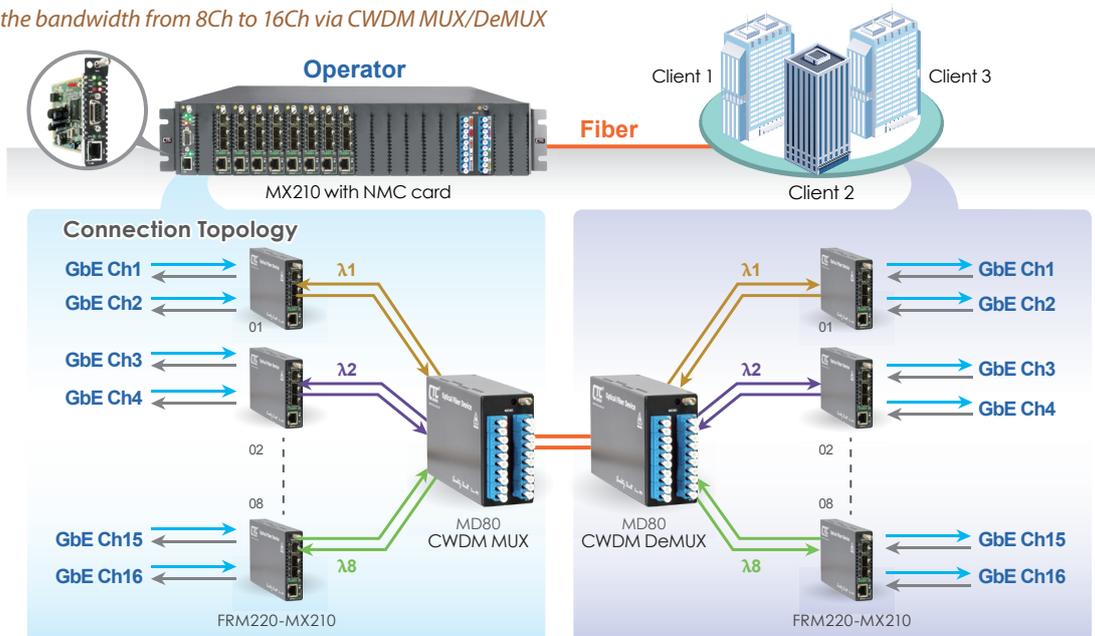
Specifications

| | | |
|-----------------------------|--|---|
| Optical Interface | Port1/Port2 | 100Base-FX, 1000Base-X or 2500Base-X |
| Electrical Interface | Port3 | 100Base-FX or 1000Base-X |
| | Port4 | RJ45 |
| | | 10/100/1000Base-T MDI/MDIX auto crossover IEEE802.3x flow control |
| Standards | IEEE 802.3, 802.3u, 802.3z, 802.3ab | |
| LEDs | PWR, Link (Port1, Port2, Port3) Port4: Link/Speed | |

| | |
|--------------------------|--|
| Power | 12VDC |
| Power Consumption | < 10W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 5 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application

Double the bandwidth from 8Ch to 16Ch via CWDM MUX/DeMUX



In-band management MX210

- IP address configuration
- Port Configuration—speed, flow control, max frame, traffic statistics
- VLANs configuration
- Mux Mode configuration
- DDM information
- Device Reset
- Set to Default
- Save Startup Configuration

Ordering Information

| Model Name | Description |
|--------------|---|
| FRM220-MX210 | 2-port Gigabit Ethernet Multiplexer for transporting two Gigabit Ethernet over one 2.5G Fiber |

Note: This card may use CH01M to provide console for initial TCP/IP settings, or use CH01 with default IP.

FRM220-1000M

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



2

Gigabit ethernet
converter

The FRM220-1000M is an IEEE802.3ah OAM compliant copper to fiber Gigabit Ethernet solution designed to make conversion between 10/100/1000Base-T and 1000Base-X with SC, FC or ST connectors. With SNMP and Web-based management in the FRM220, the network administrator can monitor, configure and control the activity of each 802.3ah series card and remotely connected OAM compliant converter. Converter settings include band-width control, duplex, and speed configuration, VLAN tagging and Q-in-Q support.

Features

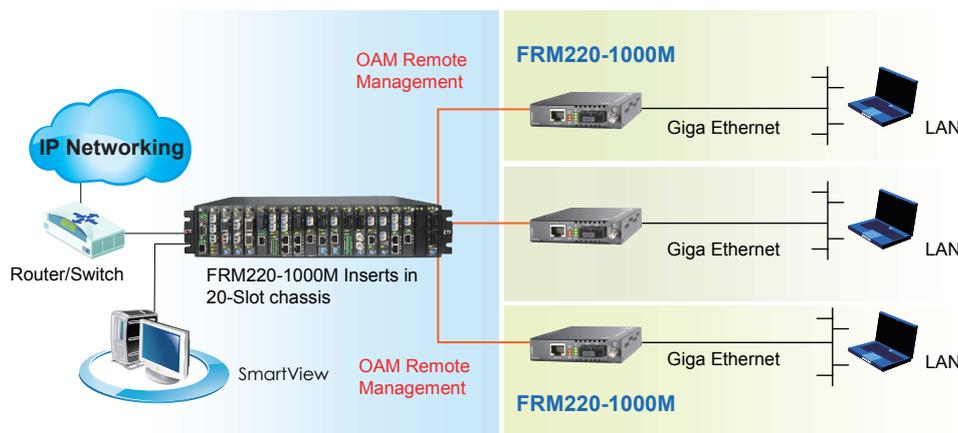
- 10/100/1000Base-T to 1000Base-X Converter
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 9K Bite
- Ingress / Egress bandwidth control
- Supports IEEE 802.3ah OAM in-band management
- Firmware upgrade via Web
- Management Password Security
- Dying gasp (remote power failure detection)
- Supports Link Fault Pass-Through (LFPT) Function
- Supports Auto Laser Shutdown (ALS) Function
- Allow IP settings Web or Console management on stand-alone.
- Provide Product information for management
- Online local/remote f/w upgrade
- Supports 16 Tag VLAN Group
- RMON counters (for standalone unit only)

Specifications

| | | |
|-----------------------------|-------------|--|
| Optical Interface | Connector | 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 |
| | | |

| | |
|--------------------------|---|
| 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 | < 4W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|--------------|--|
| FRM220-1000M | 10/100/1000Base-T to 1000Base-X, Web Smart OAM managed media converter |

Note: This card may use CH01M to provide console for initial TCP/IP settings, or use CH01 with default IP.



FRM220-1000MS

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

The FRM220-1000MS is an IEEE802.3ah OAM compliant copper to fiber Gigabit Ethernet solution designed to make conversion between 10/100/1000Base-T and 100/1000Base-X with SFP modules. With SNMP and Web-based management in the FRM220, the network 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, Q-in-Q support and SFP DDMI.

Features

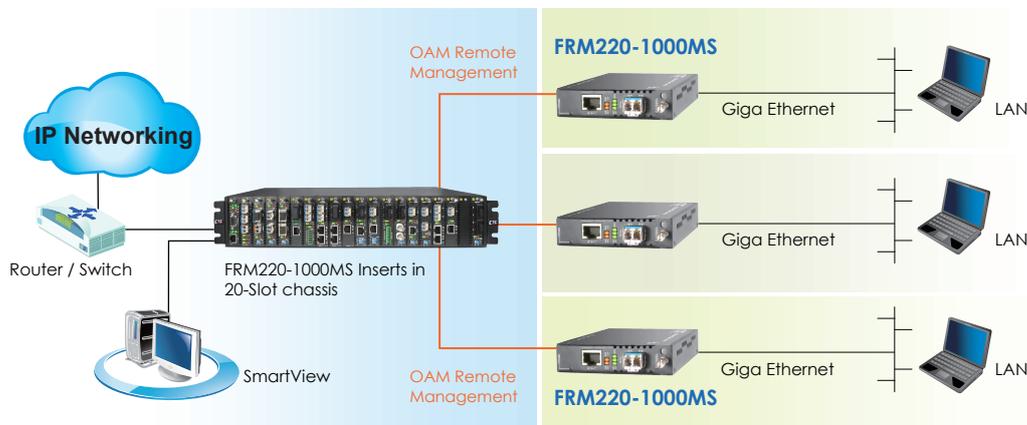
- 1-Port 10/100/1000Base-T to 100/1000Base-X Converter
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 9K Packet
- Ingress / Egress bandwidth control
- Supports 802.3ah-OAM in-band management (for standalone unit only)
- 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 (for standalone unit only)
- 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 |
| | 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 |

| | |
|--------------------------|--|
| Standards | IEEE 802.3, 802.3u, 802.3ab, 802.3z, 802.3ah, 802.1Q |
| Indications | LED (Power, FX-Link, LAN Speed, LAN Link) |
| Power Input | 12VDC |
| Power Consumption | < 4W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|---------------|--|
| FRM220-1000MS | 10/100/1000Base-T to 100/1000Base-X SFP Web smart OAM managed mediaconverter. (Optional SFP) |

Note: This card may use CH01M to provide console for initial TCP/IP settings, or use CH01 with default IP.

FRM220-1000EAS/X-1

10/100/1000Base-T to 100/1000Base-X
OAM/IP-Based Managed GbE Media Converter



2

Gigabit Ethernet
Converter

The FRM220-1000EAS/X-1 is an IEEE802.3ah OAM compliant copper to fiber Gigabit Ethernet solution designed to make conversion between 10/100/1000Base-T and 100/1000Base-X 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

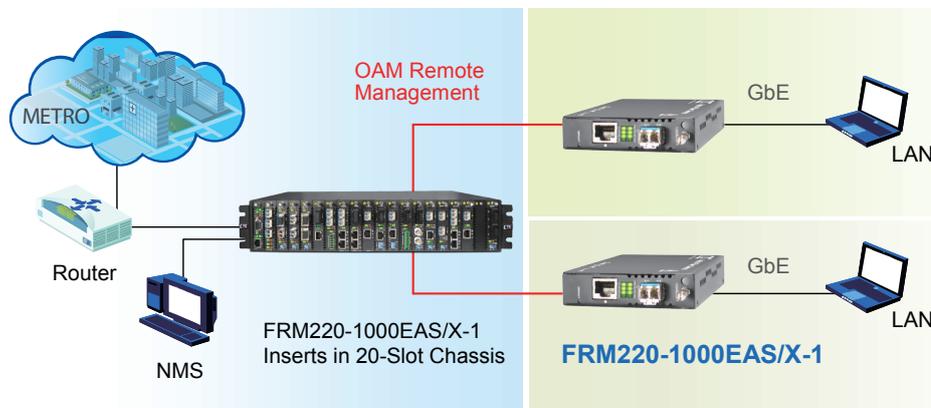
- 10/100/1000Base-T to 100/1000Base-X SFP
- Supports local / remote IEEE802.3ah OAM / IP In-band management
- Stand-alone IP Based, Web GUI, Telnet, SNMP management
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Supports IEEE 802.1Q Tagging
- Supports Q in Q double tagging
- Forward 10K bytes Jumbo packets (max.)
- 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 RMON counter
- 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

Specifications

| | | |
|--------------------------|-----------------------------|--|
| Optical Interface | Connector | SFP LC |
| | Data rate | 100/1000Mbps |
| | Duplex mode | Full duplex |
| | Fiber | MM 50/125 μ m, 62.5/125 μ m. SM 9/125 μ m |
| | 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) |
| Power Consumption | < 8W | |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 120g | |

| | | |
|-----------------------------|---|---|
| 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-T Cat.5, 5e or higher |
| Standards | IEEE 802.3, IEEE 802.3u, IEEE 802.1Q, IEEE 802.3ab, IEEE 802.3z | |
| Indications | LED : Power, FX-Link, FEF, TEST, Speed(10,100,1000), FULL | |
| Power Input | Card | : 12VDC |
| | Standalone | : AC, DC options |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|--------------------|--|
| FRM220-1000EAS/X-1 | 10/100/1000Base-T to 100/1000Base-X with OAM/IP-Based managed GE Media Converter, (optional SFP) |

Note: This card may use CH01M to provide console for initial TCP/IP settings, or use CH01 with default IP.



FRM220-10/100 i

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 FTTH 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.

Features

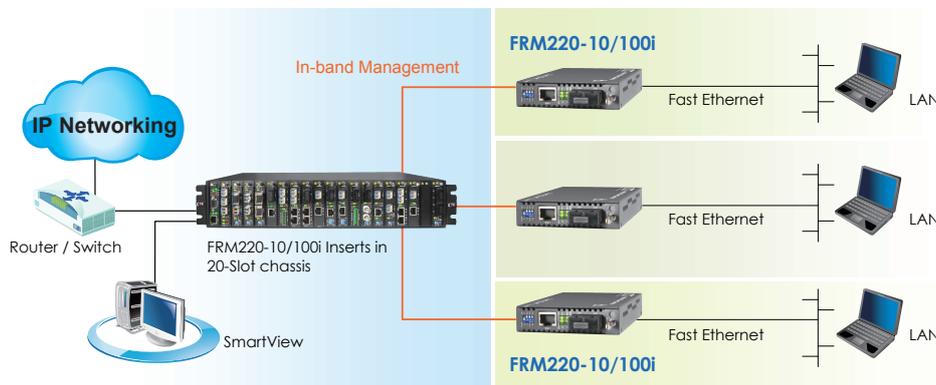
- 1-Port 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports Loop Back Test
- Supports RMON counter
- Auto Laser Shutdown (ALS)
- Auto MDI/MDIX
- Forward 2046 bytes (max.) packets in switch mode
- Forward 9K jumbo packets in converter mode
- Supports 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.
- Bandwidth control (Nx32Kbps or Nx512Kbps)
- Supports flow control (Pause)
- 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 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, TS-1000 |
| Indications | LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link) |
| Power Input | 12VDC |
| Power Consumption | < 4W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| FRM220-10/100i | 10/100Base-TX to 100Base-FX In-band managed converter |
| Connector Type | Connectivity Distance |
| SC, ST, FC | 002: 2km 015: 15km 030: 30km 050: 50km 20A: WDM 20km A type 20B: WDM 20km B type 40A: WDM 40km A type 40B: WDM 40km B type |

FRM220 – 10/100i –
 Example: FRM220 – 10/100i – SC002

Note: This card must use CH01M, with serial console, to configure standalone settings.
 When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

FRM220-10/100iS

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



2

Fast Ethernet
Converter

The FRM220-10/100iS 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 FTTH 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.

Features

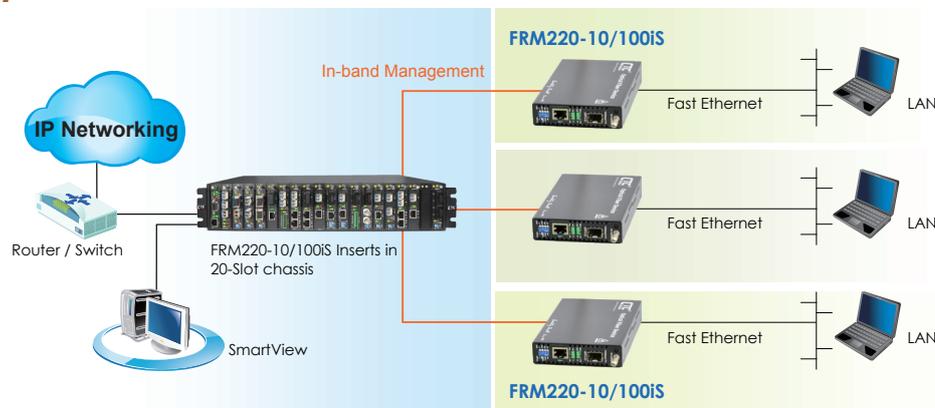
- 1-Port 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports Loop Back Test
- Supports RMON counter
- Auto Laser Shutdown (ALS)
- Auto MDI/MDIX
- Forward 2046 bytes (max.) packets in switch mode
- Forward 9K jumbo packets in converter mode
- Supports 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.
- Bandwidth control (Nx32K or Nx512K bps)
- Supports flow control (Pause)
- Fiber Hardware Reset (FHR)
- Online local / remote f/w upgrade

Specifications

| | | |
|--------------------------|-----------------------------|--|
| Optical Interface | Connector | SFP LC |
| | 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 |
| 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, TS-1000 |
| Indications | LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link) |
| Power Input | 12VDC |
| Power Consumption | < 4W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|-----------------|---|
| FRM220-10/100iS | 10/100Base-TX to 100Base-FX SFP In-band managed converter |

Note: This card must use CH01M, with serial console, to configure standalone settings.
When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.



FRM220-10/100iS-2

Dual Channels 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 media converter is targeted for customer premises equipment in metro LAN, campus, enterprise and FTTH 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. By offering two completely isolated converters on one card, this card can effectively double the conversion capacity of a rack.

Features

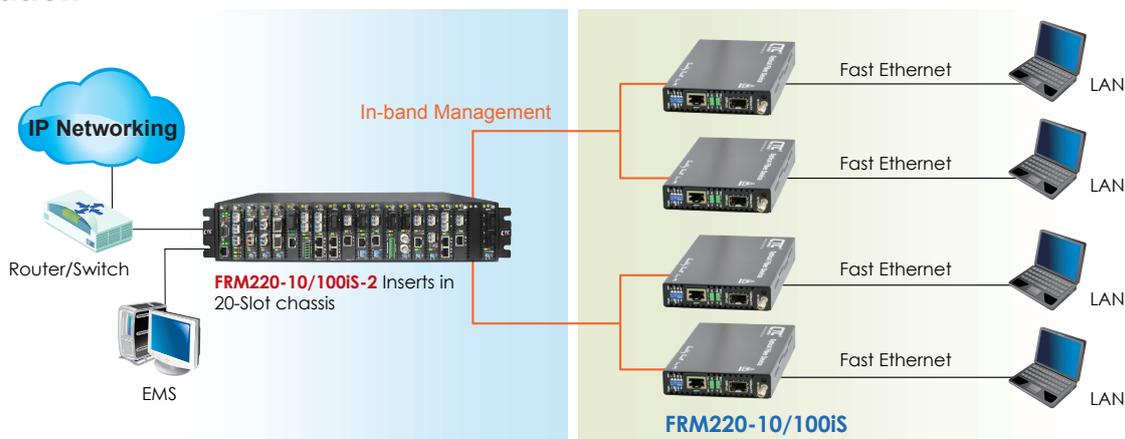
- Dual independent converters 10/100Base-TX to 100Base-FX
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 2046 bytes (max.) packets in switch mode
- Supports IEEE 802.1Q Tag VLAN pass thru
- Supports Q in Q double tagged frame transparent
- Forward 9K jumbo packets in converter mode
- Supports local / remote In-band management (Monitor and Configure) by the SNMP manager.
- 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 |
| | 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 |
| | 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 802.3s, TS-1000 |
| Indications | LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link) |
| Power Input | 12VDC |
| Power Consumption | < 4W |
| Dimensions | 155 x 88 x 23mm (D x W x 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



Ordering Information

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

Note: This card must use CH01M, with serial console, to configure standalone settings.

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

FRM220A-1000EAS/X

2x 10/100/1000Base-T, RJ45 and
2x 100/1000Base-X, SFP OAM/IP Managed Switch



2

Gigabit ethernet
switch

The FRM220A-1000EAS/X is an IEEE 802.3ah OAM compliant dual copper and dual fiber Gigabit Ethernet switch solution designed to make conversion between 10/100/1000Base-T(X) and 100/1000Base-X with SFP. With embedded 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. Based on a powerful L2 switch architecture, this converter 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.

Features

- 2-port 10/100/1000Base-T and 2-port 100/1000Base-X SFP
- Supports local / remote IEEE 802.3ah OAM / IP In-band management
- Standalone IP Based, Web GUI, Telnet, SNMP management
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Supports IEEE 802.1Q Tagged and Port based VLAN
- Supports IEEE 802.1ad Q in Q double tagging
- Forward 10K bytes Jumbo packets (max.)
- Supports Flow control (Pause)
- Supports OAM remote loopback to assist in diagnosing network problems
- RADIUS Client
- Supports bandwidth control
- Supports remote CPE power fail detect (dying gasp)
- Supports Far End Fault Indication (FEFI)
- Supports Link Fault Pass-Through (LFPT)
- Supports RMON counter
- D/D function for supported SFP fiber transceiver
- Auto Laser Shutdown (ALS)
- Online local / remote f/w upgrade
- Fiber Redundant mode
- Spanning Tree Protocol
- Port Trunking
- Default port and 802.1p tag priority QoS
- Fixed or weighted priority QoS

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) |
| Power Consumption | < 8W | |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 130g | |

| | | |
|-----------------------------|---|---|
| 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-T Cat.5, 5e or higher |
| | Standards | IEEE 802.3, IEEE 802.3u, IEEE802.1Q, IEEE 802.3ah |
| Indications | LED (Power, FX-Link, Test, TX-Link, TX-SPD) | |
| Power Input | 12VDC | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

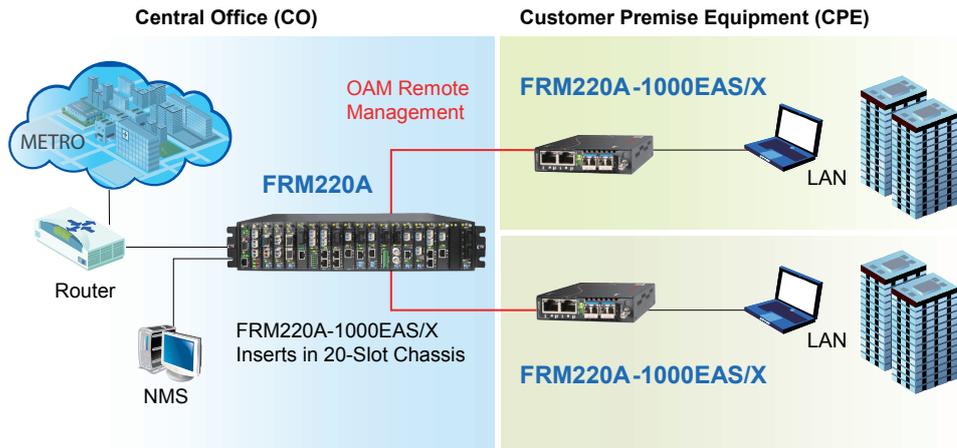
Ordering Information

| Model Name | Description |
|------------------|---|
| FRM220-1000EAS/X | 2-Port 10/100/1000Base-T and 2-Port 100/1000Base-X with OAM/IP management, (optional SFP) |

Note: This card may use CH01M to provide console for initial TCP/IP settings, or use CH01 with default IP.

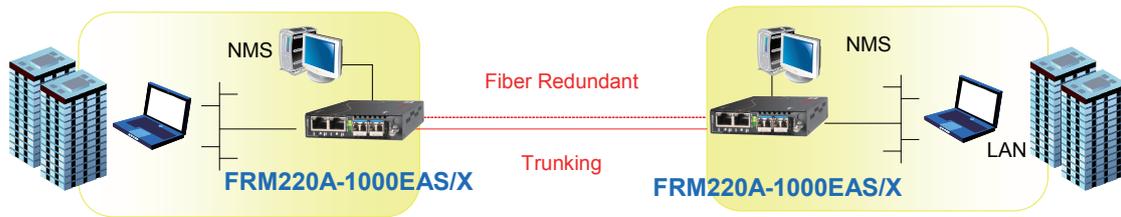
FRM220A-1000EAS/X Application

In the Centrally managed application, the main chassis, all of its cards and all fiber connected remote CPE units can be provisioned and monitored from a single management point



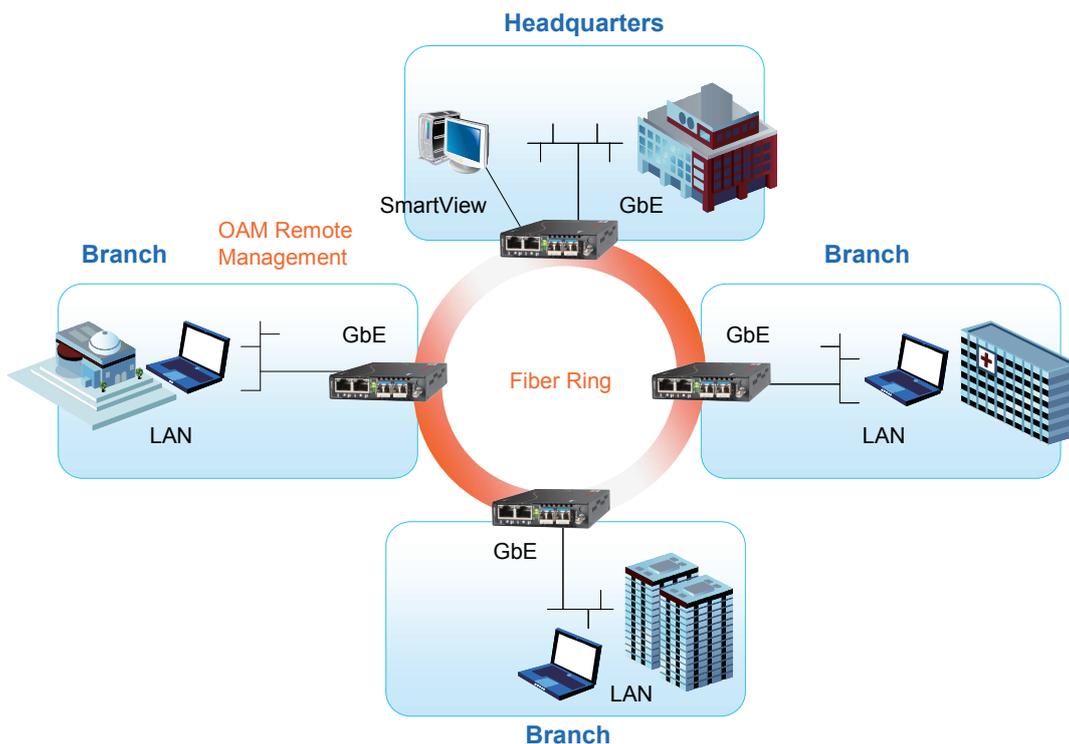
Fiber Redundant / Trunking Application

Utilizing a special trunking function, the 1000EAS/X can be deployed in stand-alone, point-to-point applications and provide 1+1 redundant fiber protection



Fiber Ring Application

In the ring or mesh topology, Spanning Tree Protocol enables a highly resilient network based on multiple 1000EAS/X units



FRM220A-1002ES

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



2

Gigabit ethernet 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.

Features

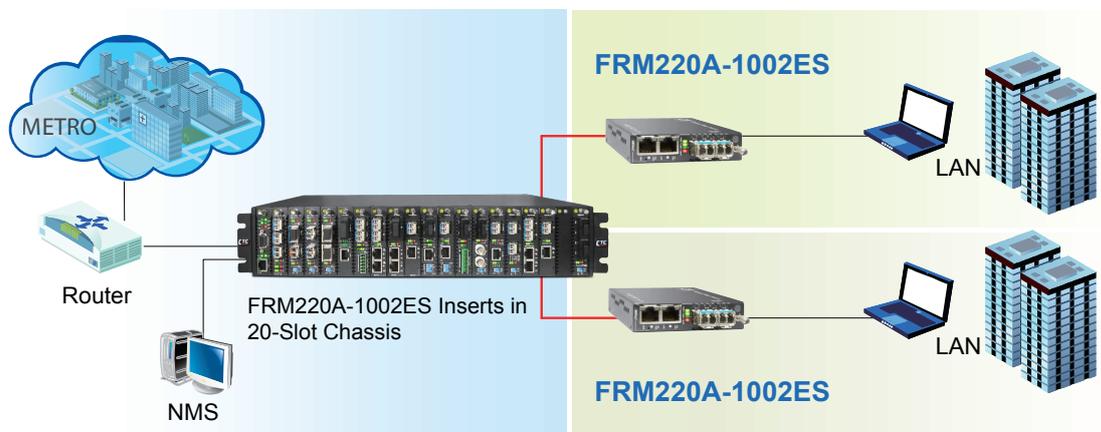
- 2-Port 10/100/1000Base-T and 2-Port 100/1000Base-X Switch
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 10K Bytes
- Supports 16 Tag VLAN Group
- Supports Double VLAN tag (Q-in-Q)
- Supports Bandwidth 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
- Supports the local management (Monitor or Configure status) by the SNMP manager.
- Supports FRM220A for Ethernet Aggregation

Specifications

| | | |
|--------------------------|---|---|
| Optical Interface | Connector | SFP LC |
| | Data rate | 125Mbps, 1250Mbps |
| | Duplex mode | Full duplex |
| | Fiber | MM 50/125 μ m, 62.5/125 μ m SM 9/125 μ m |
| | 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 | |
| Dimensions | 155 x 88 x 23mm (DxWxH) | |
| Weight | 130g | |
| Temperature | 0~50°C (Operating), -10~70°C (Storage) | |
| Humidity | 0 ~ 95% non-condensing | |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| FRM220A-1002ES | 2-Port 10/100/1000Base-T and 2-Port 100/1000Base-SX/LX SFP GE Manage Switch |

Note: This card must use CH01M, with serial console, to configure standalone settings.



FRM220A-FSW103

3x 10/100Base-TX to 100Base-FX SFP Switch

The FRM220A-FSW103 is a 3-Port 10/100Base-TX and 100Base-FX SFP fiber slide-in card Ethernet switch designed for central applications. 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-FSW103 switch card locally via the chassis management. This switch is completely transparent to Layer 2 and Layer 3 protocols including IEEE 802.1q, VLAN tag, Q in Q, STP, IPX, IP, etc

Features

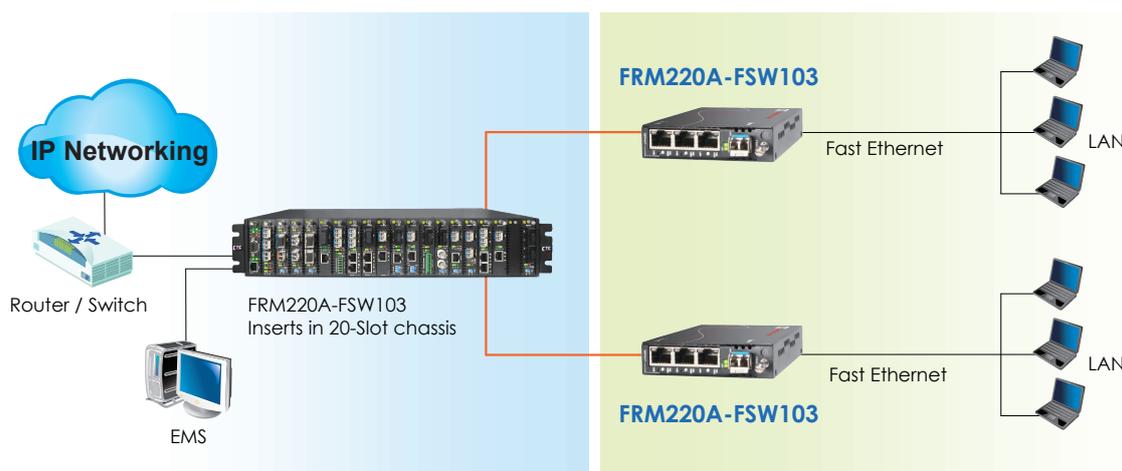
- 3-Port 10/100Base-TX + 1-Port 100Base-FX Ethernet Switch
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or manual mode in TP port
- Supports flow control
- Forward 1552 bytes (max.) packets in switch mode
- Supports Store and forward switch mode
- Supports FRM220 chassis management system
- Supports FRM220A chassis management system and Ethernet Aggregation
- Supports local management (Monitor or Configure status) by the SNMP manager.
- Supports D/D function for SFP fiber transceiver
- Provides Auto Laser Shutdown (ALS) function

Specifications

| | | |
|-----------------------------|-------------|---|
| Optical Interface | Connector | SFP LC |
| | Data rate | 125Mbps |
| | Duplex mode | Full duplex |
| | Fiber | MM 50/125µm, 62.5/125µm. SM 9/125µm |
| | Distance | MM 2km, SM 15/30/50/80/120km, WDM 20/40/60/80km |
| Electrical Interface | Wavelength | MM 1310nm, SM 1310,1550nm WDM 1310Tx/1550Rx (type A) 1550Tx/1310Rx (type B) |
| | Connector | RJ45 |
| | Data rate | 10Mbps, 100Mbps |
| Electrical Interface | 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 |
| Indications | LED (Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link) |
| Power Input | 12VDC |
| Power Consumption | < 4W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 130g |
| Temperature | 0 ~ 80°C (Operating), -10 ~ 80°C (Storage) |
| Humidity | 5 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|----------------|--|
| FRM220A-FSW103 | 3-Port 10/100Base-TX and 100Base-FX SFP Switch, (optional SFP) |

Note: This card must use CH01M, with serial console, to configure standalone settings.

FRM220-DS3/E3

DS3/E3 over Fiber



NEW

2

DS3/E3
fiber modem

The FRM220-DS3/E3 is fiber modem that works in pairs to transparently extend DS3, E3 or STS-1 transmissions over optical fiber. By utilizing pluggable SFP transceivers, 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 SNMP management, the management can configure and view the local and remote converter cards' status, type, version, fiber link status and alarms.

Features

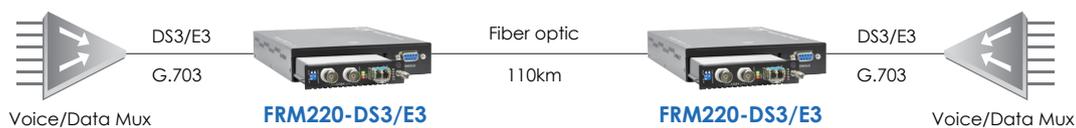
- In-band network Managed via Terminal, web or SNMP in FRM220 chassis
- DS3/E3 Coax (BNC) to Fiber SFP fiber modem
- Supports AIS (Alarm Indication Signal)
- User selectable E3 or DS3 setting
- Electrical and optical Loop back tests
- Standalone RS232 console management via CH01M

Specifications

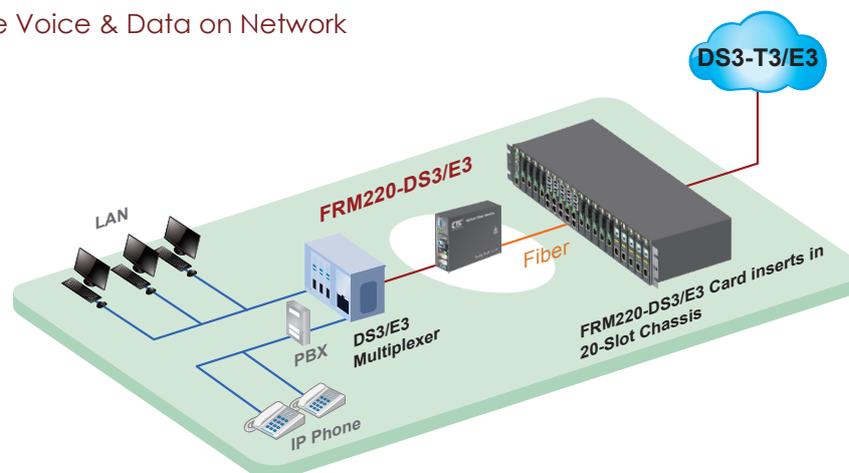
| | | |
|--------------------------|--|---|
| Optical Interface | Connector | SFP : LC (Uses standard 100Base-X/OC-3 SFP) |
| | Data Rate | DS3/T3 = 44.7 Mbps; E3 = 34.4 Mbps |
| Line Coding | Distance | MM 2km, SM 15/30/50/80/120km, WDM 20/40/60/80km |
| | Wavelength | 1310nm, 1550nm, CWDM 1471nm ~ 1611nm |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 120g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Certification | CE, FCC, RoHS compliant | |

| | | |
|-----------------------------|-------------|--|
| 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 | <5W | |

Application



Integrate Voice & Data on Network



Ordering Information

| Model Name | Description |
|---------------|--|
| FRM220-DS3/E3 | DS3/E3 Coax (BNC) to Fiber SFP fiber media converter |

Note: This card must use CH01M, with serial console, to configure standalone settings. When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.



FRM220-ET100

Fiber Modem Ethernet over E1 Fiber

FRM220-ET100 is a single port Fiber WAN (TDM) card with built-in HDLC Ethernet Bridge for the FRM220 Series. The converter supports Nx64 data rates from 64Kbps up to 2.048Mbps when linked by fiber to FRM220-Data or FRM220-E1/ T1 cards. The clock source may be selected internally or recovered from received fiber signal. The Ethernet port utilizes a single RJ-45 connector. When the FRM220-ET100 card is placed in the FRM220 rack with SNMP management, the management can view the converter card's status, type, version, Ethernet link status and alarms. The card can be configured to enable or disable the port, reset the card, set clocking, data rate and provide digital diagnostic loopbacks. A unique feature of the FRM220-ET100 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 In-band managed rack.

Features

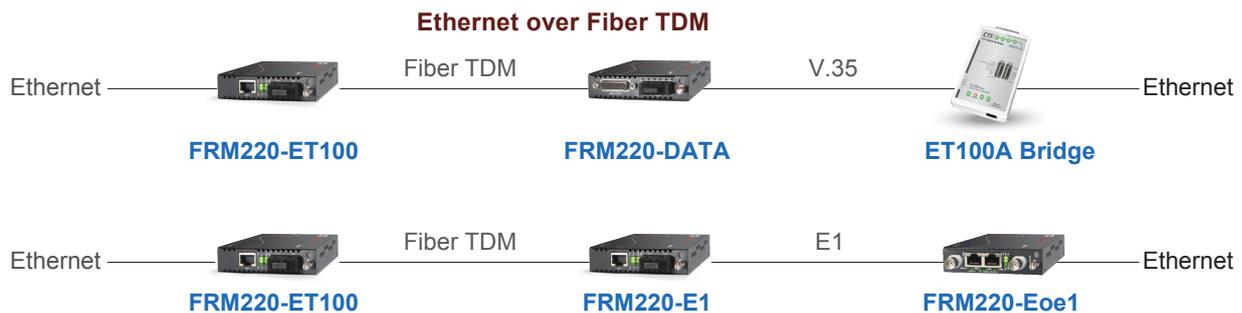
- 1-Port Ethernet to HDLC (fiber) converter
- P2P Fiber link compatible with FRM220-E1/T1 and FRM220-Data
- Clock source (internal or external)
- Nx64k data rate (64kbps~2048kbps)
- Ethernet encapsulated with ISO 13239 standard HDLC
- Loop Back with integral BERT & LED indicators
- Firmware upgradeable, when placed in managed FRM220 chassis
- Interface connectors, RJ-45 for 10/100 Base-Tx
- Fixed optical for SC or ST, 2km(MM) to 120km(SM)

Specifications

| | | |
|------------------------------|-------------|--|
| TDM (fiber) Interface | Connector | 1x9 (SC, ST, FC) |
| | Data rate | 64~2048kb/s(nx64) |
| | 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) |
| Ethernet Interface | Standards | IEEE 802.3u, IEEE 802.3 |
| | Data rate | 10Mbps, 100Mbps |
| | Duplex mode | Half / Full duplex |
| | Connector | RJ-45 |
| Tests | E1 Loops | Remote Loop back |

| | |
|--------------------------|--|
| Indications | PWR, TD/RD Act, Test, Sys, Alarm, Error |
| Power Input | 12VDC |
| Power Consumption | < 5W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 130g |
| 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 |
|--------------|---------------------------------|
| FRM220-ET100 | 10/100Base-TX to E1 fiber modem |

| 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 – ET100 –
 Example: FRM220 – ET100 – SC002

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis. When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

FRM220-DATA

Fiber Modem V.35/X.21/RS-530/
RS-449/RS-232 over Fiber



2

DATA fiber modem

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
- Software selectable interface, V.35, X.21, RS-530, RS-449, RS-232 (sync mode)
- Software selectable DCE or DTE mode
- User selectable data rate n x 64kbps, up to 9Mbps
- Independent clock mode setting, (internal, external, or recovery) for transmit and receive
- 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 | SFP LC |
| | 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 | 155 x 88 x 23mm (D x W x 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 | |

| | | | |
|-----------------------------|--------------------|--|--|
| 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 ~ 9152Kbps) | |
| | Clock source | Internal, Recovery, External | |
| | Standard | ITU-T | |
| | Indications | LED (Power, FX Link, RTS, Test, TD, RD, CTS, DCD) | |
| Power Input | 12VDC | | |
| Power Consumption | <5W | | |

Application



Ordering Information

| Model Name | Description |
|------------------|---|
| FRM220-V35 | V.35 to fiber with V35 cable |
| FRM220-X21 | X.21 to fiber with X.21 cable |
| FRM220-RS530 | RS530 to fiber with RS530 cable |
| FRM220-RS449 | RS449 to fiber with RS449 cable |
| FRM220-RS232 | RS232 to fiber with RS232 cable |
| FRM220-V35-SFP | V.35 to fiber with V35 cable (SFP module not included) |
| FRM220-X21-SFP | X.21 to fiber with X.21 cable (SFP module not included) |
| FRM220-RS530-SFP | RS530 to fiber with RS530 cable (SFP module not included) |
| FRM220-RS449-SFP | RS449 to fiber with RS449 cable (SFP module not included) |
| FRM220-RS232-SFP | RS232 to fiber with RS232 cable (SFP module not included) |

| 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 |

Interface Type Connector Type Connectivity Distance
FRM220 - □□□ - □□□□□

Example: FRM220 - V35 - SC002

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis.

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.



FRM220-E1/T1

E1/T1 Fiber Modem

The FRM220-E1/T1 is a fiber media transport for G.703 E1/T1 transmissions. 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

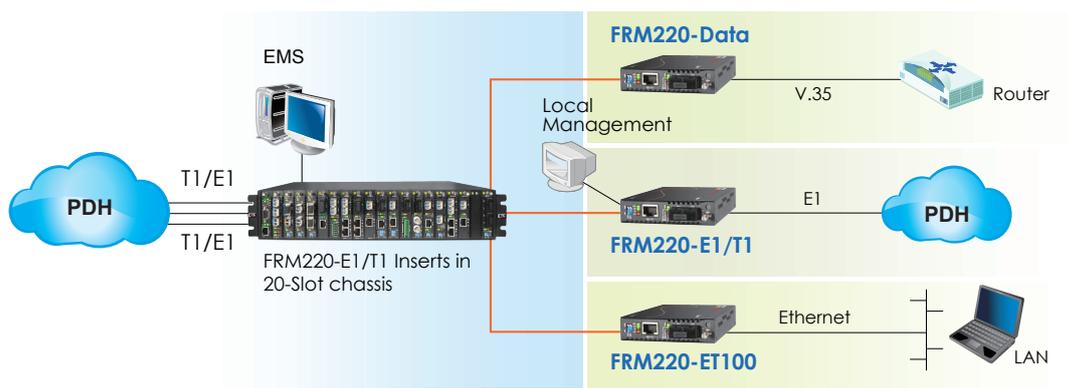
- n-band network Managed via Terminal, web or SNMP in FRM220 chassis
- T1/E1 RJ-45 (USOC RJ-48C) or E1 Coax (BNC) to Fiber converter
- Supports AMI or B8ZS/HDB3 line codes
- T1 supports unframed to FRM220-Data
- E1 supports unframed or fractional (N x 64k) to FRM220-Data
- User selectable E1 or T1 setting
- Electrical and optical Loop back tests
- Standalone RS232 console management via CH01M

Specifications

| | | | | | |
|-----------------------------|--|-------------------------------------|----------------------|---|--------------------------|
| Optical Interface | Connector | 1x9 (SC, ST, FC) | Indications | Power, FX-Link, E1/T1 SIG, Test, SYN, RD, TD, AIS | |
| | Data rate | 36.864Mbps | | (E1/T1R) Power, FX-Link, E1 SIG, Test(E1B) | |
| | Line coding | Scrambled NRZ | | Power Input | 12VDC |
| | Bit Error Rate | Less than 10 ⁻¹⁰ | | | Power Consumption |
| | Distance | MM 2km, SM 15/30/50km | | Dimensions | |
| | Wavelength | 1310nm, 1550nm | | | Weight |
| Electrical Interface | Connector | RJ45 E1-120Ω, T1-100 Ω, BNC E1-75 Ω | Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| | Data rate | E1: 2.048Mbps, T1: 1.544Mbps | | Humidity | 10 ~ 90% non-condensing |
| | Line Code | E1 HDB3/AMI, T1: B8ZS/AMI | Certification | | CE, FCC, RoHS compliant |
| | Cable type | Cat.3 or higher Twisted-Pair cable | | MTBF | 65,000 hrs |
| 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 | | | | |

Application

In-band Managed PDH Fiber Modem



Ordering Information

| Model Name | Description |
|-------------------|---|
| FRM220-E1/T1R | E1/T1 RJ-45 fiber modem |
| FRM220-E1B | E1 BNC fiber modem |
| FRM220-E1/T1R-SFP | E1/T1 RJ-45 fiber modem (SFP module not included) |
| FRM220-E1B-SFP | E1 BNC fiber modem (SFP module not included) |

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

FRM220 - / -
 Example: FRM220 - E1/T1R - SC002

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis. When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

FRM220-Serial

RS485/232 over Fiber



The FRM220-Serial provides a fiber modem solution to extend asynchronous RS-485 or RS-232 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 (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. When the FRM220-Serial/485 card is 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, 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

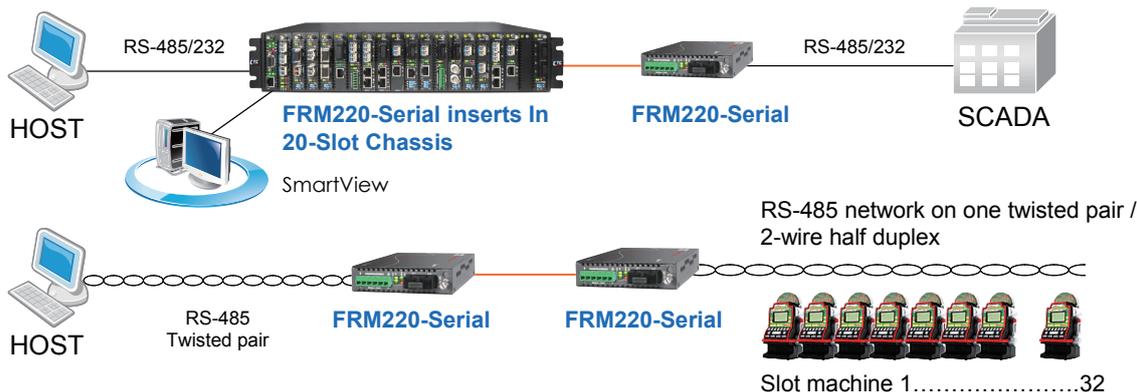
- Extend asynchronous serial transmission up to 120km over fiber
- In-band network management via terminal, Web or SNMP in FRM220-CH20 chassis
- Software selectable data interface for RS-232/ 485
- Software selectable three or five wires RS-232
- Speeds up to 256kbps for RS-232 (Async. mode)
- Speeds up to 1Mbps for RS-485
- Standalone RS232 console management via CH01M
- Software selectable two wires (half duplex) or four wires (full duplex) RS-485

Specifications

| | | |
|--------------------------|------------------------------|--|
| Optical Interface | Connector | 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 | < 5W | |
| Dimensions | 155 x 88 x 23mm (D x W x 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



Ordering Information

| Model Name | Description |
|-------------------|--|
| FRM220-Serial | RS-485/232 fiber converter |
| FRM220-Serial-SFP | RS-485/232 fiber converter (SFP module not included) |
| Connector Type | Connectivity Distance |

SC, ST, FC 002: 2km 015: 15km 030: 30km 050: 50km
 (Not Applicable for SFP Type) 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 – E1/T1R – SC002

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis.
 When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

NEW



FRM220-FXO/FXS FRM220-FXO-4 FRM220-FXS-4

1ch / 4ch POTS over Fiber Media Converter

The FRM220-FXO/FXS is one channel POTS (Plain Old Telephone System) over fiber converter/extender and FRM220-FXO-4/FRM220-FXS-4 is a 4 channels POTS over fiber converter/extender. The POTS connection uses a standard RJ-11C modular connectors for each copper pair connection. A pair of the FRM220 POTS fiber converter 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 POTS fiber converter card is 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 chassis
- Supports telephone voice transmission
- Supports caller ID Pass-Through
- Supports FXS to FXS hot line

Specifications

| | | |
|--------------------------|--|--|
| Optical Interface | Connector | SFP-LC (FRM220-FXO/FXS-4) SC(1x9) (FRM220-FXO/FXS) |
| | 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) |
| Indications | LED (Power, FX Link, Phone Act, Test) | |
| Power Input | 12VDC | |
| Power Consumption | < 5W | |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 120g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

| | | |
|-----------------------------|-----------|---|
| Electrical Interface | Connector | RJ-11 |
| | FXO mode | Impedance : 600 ohms Coding : 16 bits liner Loop Current : 10~100mA Ringing Frequency : Acceptable 20 ~50Hz Insertion Loss: 0.0 ± 1.0dB at 1000Hz |
| | FXS mode | Impedance : 600 ohms Coding : 16 bits liner Dial: DTMF and Dial Pulse Battery Source: 48VDC ± 4V Ringing Waveform : Sine wave Ringing Frequency : 20/25/30/35/40/45/50 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) |

Application

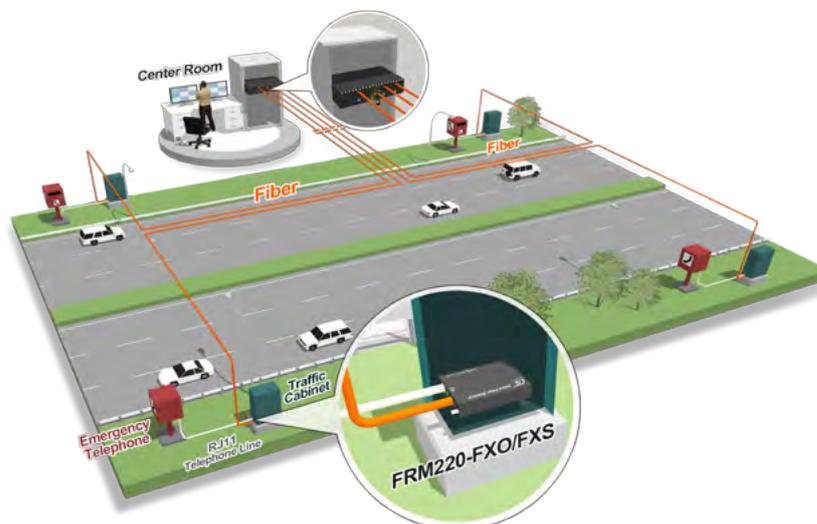


Figure 1: Voice Transmission in the highway application

Application

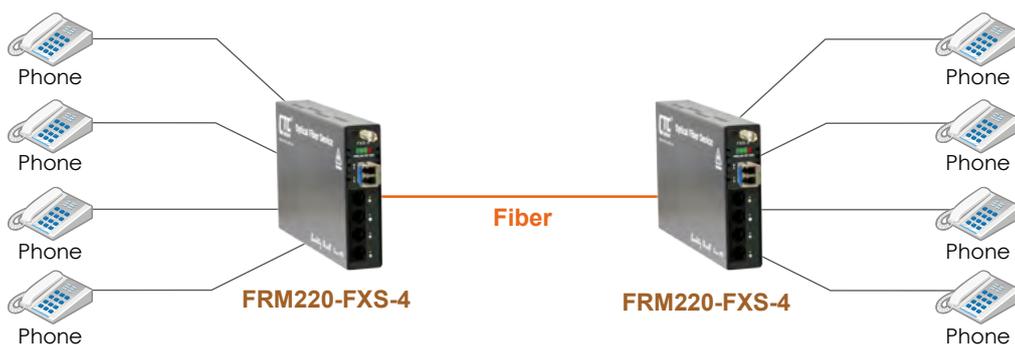


Figure 2: Automatic Ring down hotline

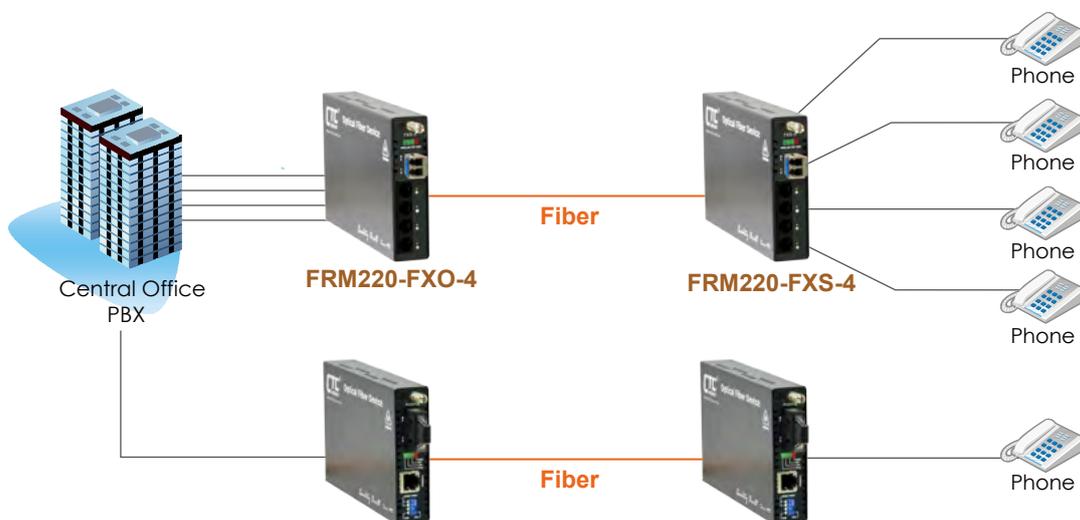


Figure 3: Voice transmission from 2km to 120km over fiber

Ordering Information

| Model Name | Description |
|----------------|--|
| FRM220-FXO-4 | 4-port FXO fiber converter SFP-LC |
| FRM220-FXS-4 | 4-port FXS fiber converter SFP-LC |
| FRM220-FXO/FXS | 1 Port FXO / FXS fiber converter, (1x9) SC, ST, FC |

| 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 |

FRM220 – FXO/FXS –
 Example: FRM220 – FXO/FXS – SC002

Note: This card may be set by DIP switch and placed in CH01 standalone chassis.
 When connected as a remote to a managed central chassis, this card supports in-band management.

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



FRM220A-Eoe1

Ethernet Bridge over E1

- HDLC
- MTU 1522bytes
- Framed / Unframed E1

The FRM220A-Eoe1 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 standard HDLC encapsulation, the FRM220A-Eoe1 is able to transmit up to a 2M bits Ethernet over an E1 link. The FRM220A-Eoe1 supports an E1 attenuation of up to 43 dB on twisted pair or coax cable, which provides an approximate operating range up to 2km (using 22AWG). The FRM220A-Eoe1 fully meets E1 specifications including ITU-T G.704 and G.823. The FRM220A-Eoe1 features diagnostic capabilities for performing remote loopback. The operator at either end of the line may test both the FRM220A-Eoe1 and the line in the digital loopback mode. The Ethernet copper interface supports auto-negotiation and auto MDI/MDIX, allowing plug-and-play Ethernet connection without any additional configuration. When placed in 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 DIP switch.

Features

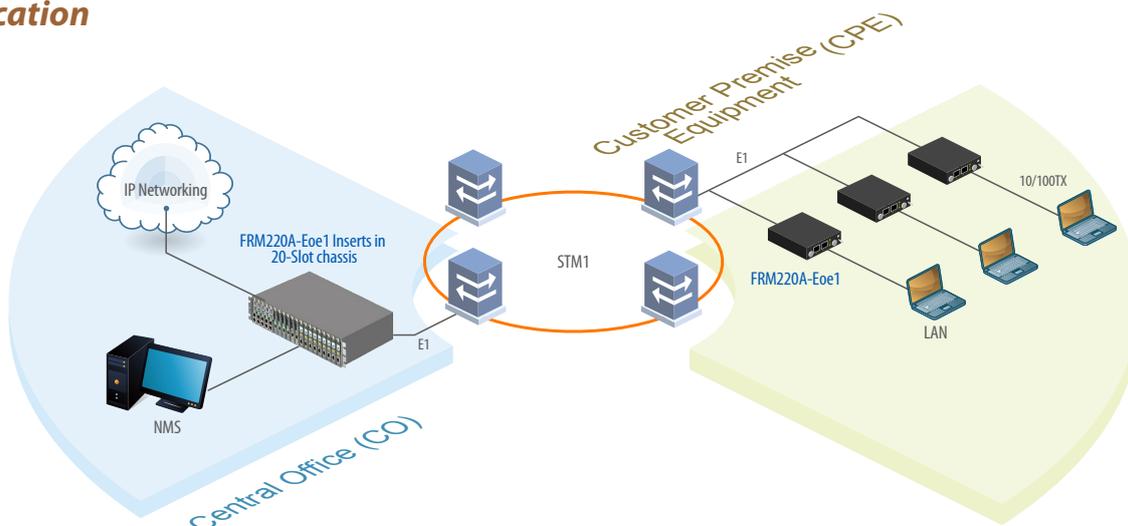
- Connects one Fast Ethernet over E1 links (64k~2048Kbps)
- Built-in HDLC bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220A and FRM220 chassis
- SNMP management with FRM220A and FRM220 chassis
- LED Alarm indication
- Standalone RS232 console management via CH01M

Specifications

| | | |
|---------------------|--------------------|--|
| E1 Interface | Framing | Framed / Unframed |
| | MTU | 1522bytes (Max.) |
| | Standard | ITU-T G.703/G.704/G.706 & G.732, G.823 |
| | Bit rate | 2.048Mbps± 50ppm |
| | Line code | HDB3 |
| | Clock setting | Internal OSC or recovery clock |
| | Receive level | -43dB |
| | Line impedance | 75 ohm (BNC) / 120 ohm (RJ45) |
| | Jitter Performance | Complies with ITU-T G.823 |
| | Pulse shape | Complies with ITU-T G.703 |
| | Pulse amplitude | Nominal 2.37V ± 10% |
| | Delay Variance | 220ms |
| | Connector | RJ-45, BNC |
| | Diagnostics | Digital remote loopback |

| | | |
|---------------------------|--|---------------------------------|
| Ethernet Interface | Standards | IEEE 802.3, 802.3u |
| | Data rate | 10/100Base-TX, Half/Full duplex |
| | Connector | RJ-45 10/100Base-TX |
| Indications | Power, ALM, E1 signal loss, E1 Alarm (AIS, LOF, RAI, LOMF), LAN link /ACT, 10/100M , SD (100Base-FX) | |
| Power Input | 12VDC | |
| Power Consumption | < 12W | |
| Dimensions | 155 x 88 x 24mm (D x W x H) | |
| Weight | 130g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|--------------|---------------------------------|
| FRM220A-Eoe1 | 10/100Base-TX to E1 HDLC bridge |

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis. When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

FRM220A-Eoe1/G

Ethernet Bridge over E1 (GFP)

- HDLC & GFP
- MTU 2046bytes
- Unframed E1



NEW

2

Ethernet Bridge

The FRM220A-Eoe1/G 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 is able to transmit up to a 2M bits Ethernet over an E1 link. The FRM220A-Eoe1/G supports an E1 attenuation of up to 43 dB on twisted pair or coax cable, which provides an approximate operating range up to 2km (using 22AWG). The FRM220A-Eoe1/G fully meets E1 specifications including ITU-T G.704 and G.823. The Ethernet copper interface supports auto-negotiation and auto MDI/MDIX, allowing plug-and-play Ethernet connection without any additional configuration. When placed in 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

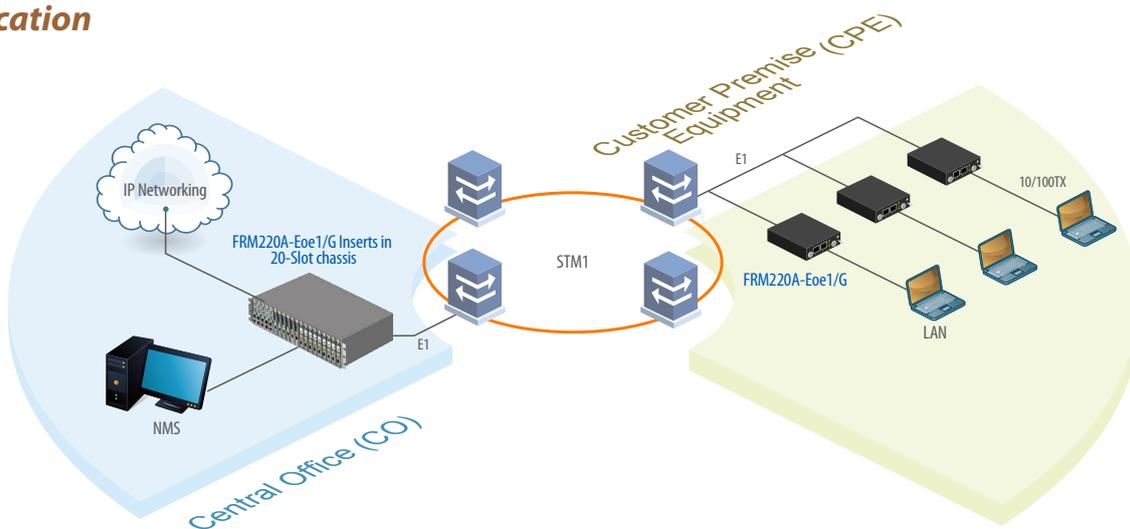
- Connects one Fast Ethernet over E1 links (2.048Mbps)
- Built-in GFP bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220A and FRM220 chassis
- SNMP management with FRM220A and FRM220 chassis
- LED Alarm indication
- Standalone RS232 console management via CH01M

Specifications

| E1 Interface | Framing | Unframed |
|--------------|--------------------|--|
| | MTU | 2046bytes |
| | Connector | RJ45 10/100Base-TX |
| | 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 |
| | Data rate | 10/100Base-TX, Half/Full duplex |
| | | Encapsulation GFP (G.7041) |
| 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 | < 4W | |
| Dimensions | 155 x 88 x 24 mm (D x W x H) | |
| Weight | DC12 : 280g AC/DC 48/AD : 580g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

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

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis.
When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

NEW



STE100A-232 1-Port RS-232 IP Device Server

STE100A-Serial 1-Port RS-232/422/485 IP Device Server

The IP Device Server provides the serial device server for Windows hosts to control RS-232, 2 or 4 wire asynchronous RS-422/485 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

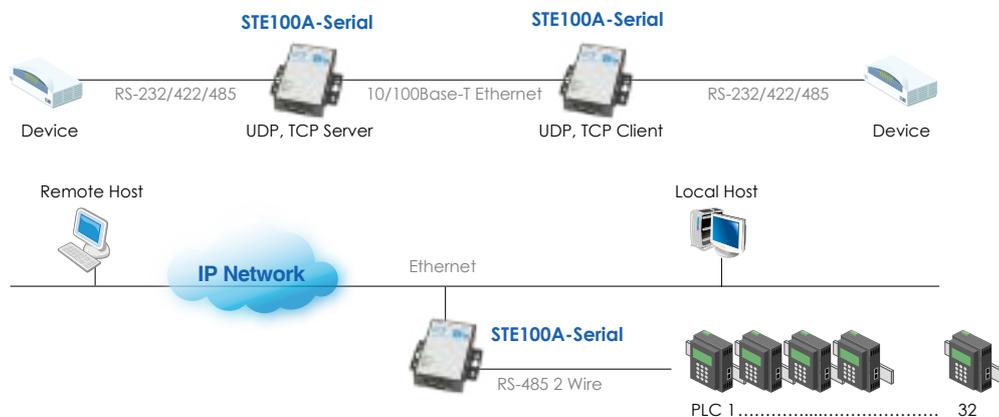
- 10/100Mbps Ethernet port
- 230.4kbps serial interface
- TCP Server, TCP client, Virtual com mode, UDP
- Supports for DHCP, HTTP, ICMP, ARP, IP, UDP, TCP
- Easy to use with Windows utility
- 2 Wire(half duplex) or 4 Wire(full duplex)RS-422/485 (STE100A-Serial)
- Configuration by web browser
- Flexible RS-232/422/485 Interface (STE100A-Serial)
- 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 |
| Serial Interface | STE100A-Serial : RS-232/422/485 STE100A-232 : RS-232 | |
| 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 x 50 x 21mm (D x W x H) |
| Certifications | CE, FCC |

Application



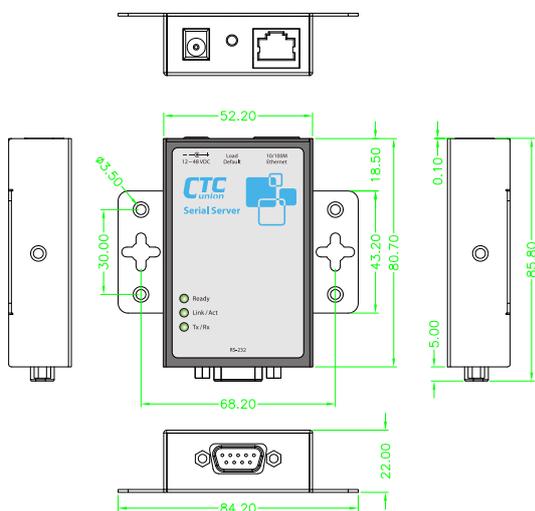
Appearance



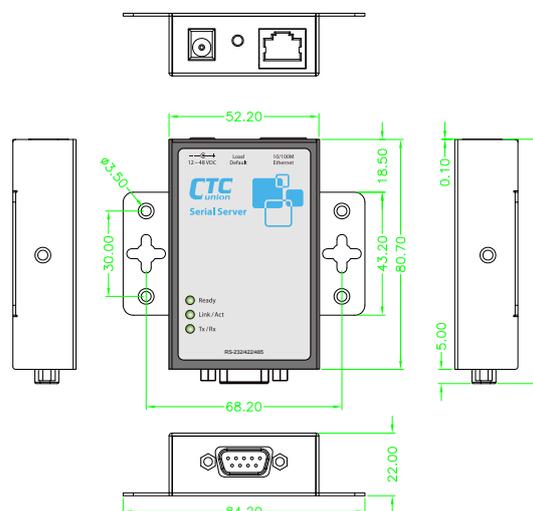
Dimensions

Unit: mm (inch)

STE100A-232



STE100A-Serial



Ordering Information

| Model Name | Description |
|----------------------|---|
| STE100A-232 | 1-port RS232 device server with AC power adapter |
| STE100A-Serial | 1-port RS232/422/485 device server with AC power adapter |
| Optional accessories | |
| STE100A-Serial-WT | STE100A-Serial DB9 wiring terminal |
| STE100A/DRK01 | STE100A/RS232,STE100A/Serial DIN-Rail Mounting Kit |
| Optional Power | |
| DC-APT/12V | -48VDC to 12VDC Adapter - 1 Amp, 10 Watts , Output 12 VDC, Input -48VDC |



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 FRM220/220A 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 SNMP management, the management 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 in-band managed rack

Features

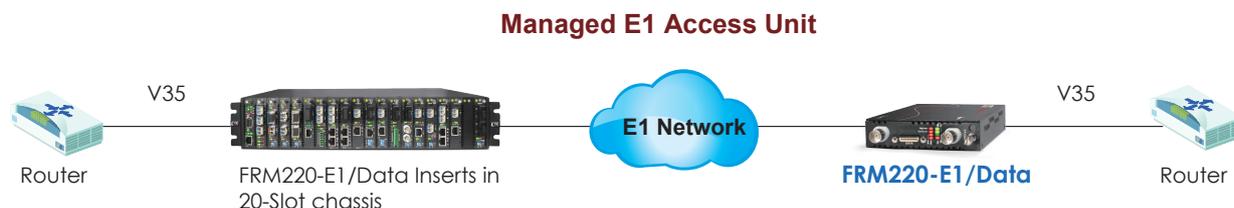
- Supports Fractional E1 and Unframed E1 services with V.35/X21/RS530 adapter cable
- I/O connectors all located on front panel
- Multiple clock source selection and remote loopback
- (Internal or External: E1 recovery, DTE or DCE)
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220-CH20 and FRM220A chassis
- SNMP management with FRM220-CH20 chassis
- 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 | Complies with ITU-T G.823 |
| | Performance | |
| | 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, EIA |
| | 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 | < 12W | |
| Dimensions | 155 x 88 x 24mm (D x W x H) | |
| Weight | 130g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70 °C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|--------------------|---|
| FRM220- E1/V35-R | V35 to framed E1 RJ-45 with V35 cable |
| FRM220- E1/V35-B | V35 to framed E1 BNC with V35 cable |
| FRM220- E1/X21-R | X21 to framed E1 RJ-45 with X21 cable |
| FRM220- E1/X21-B | X21 to framed E1 BNC with X21 cable |
| FRM220- E1/RS530-R | RS530 to framed E1 RJ-45 with RS530 cable |
| FRM220- E1/RS530-B | RS530 to framed E1 BNC with RS530 cable |
| FRM220- E1/RS449-R | RS449 to framed E1 RJ-45 with RS449 cable |
| FRM220- E1/RS449-B | RS449 to framed E1 BNC with RS449 cable |
| FRM220- E1/RS232-R | RS232 to framed E1 RJ-45 with RS232 cable |
| FRM220- E1/RS232-B | RS232 to framed E1 BNC with RS232 cable |

FRM220 - □□ / □□□ - □
 Example: FRM220 - E1/V35 - R

Note: This card may be set by DIP switch and placed in CH01 chassis, or set by serial console if placed in CH01M chassis. For standalone SNMP management, place this card in CH02/SNMP chassis.

FRM220-FTEC

E1/T1 Cross Rate Converter



2

E1/T1 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 64kbps 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) | |
| | CRC check | CRC-4 enable/disable | |
| | Pulse amplitude | Nominal 2.37V \pm 10% for 75ohm Nominal 3.00V \pm 10% for 120ohm | |
| | Zero amplitude | \pm 0.1V | |
| | Connector | RJ-45 | |
| | T1 Interface | Framing | D4, ESF selectable |
| | | Bit rate | 1.544Mbps |
| Line Code | | B8ZS / AMI | |
| Equalization | | 0 ~ 655 feet settable | |
| CRC check | | CRC-6 when ESF | |
| Line Impedance | | 100 ohms | |
| Transmit Pulse level | | 3.0V \pm 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 | < 5W |
| Dimensions | 155 x 88 x 24mm (D x W x H) |
| Weight | 130g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 57,000 hrs |

Application



Ordering Information

| Model Name | Description |
|-------------|----------------------------|
| FRM220-FTEC | E1/T1 Cross rate converter |

Note: This card must use CH01M, with serial console, to configure standalone settings.
For standalone SNMP management, place this card in CH02/NMC(SNMP) chassis.

NEW



FRM220A-iMux4

Ethernet to 4E1 Multiplexer

The FRM220A-iMux4 is an E1 inverse multiplexer capable of bundling up to 4 E1 lines for cost-effective connection of 10/100Base-TX or 100Base-FX LANs over multiple E1 transports. The FRM220A-iMux4 inverse multiplexer transmits up to a 9.92Mbps Ethernet bridge channel (GFP-F encapsulated) over 4 E1 links. The FRM220A-iMux4 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-iMux4 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 FRM220A-iMux4 fully meets E1 specifications including ITU-T G.703 and G.823. The FRM220A-iMux4 features diagnostic capabilities for performing remote loopback. The operator at either end of the line may test both the FRM220A-iMux4 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

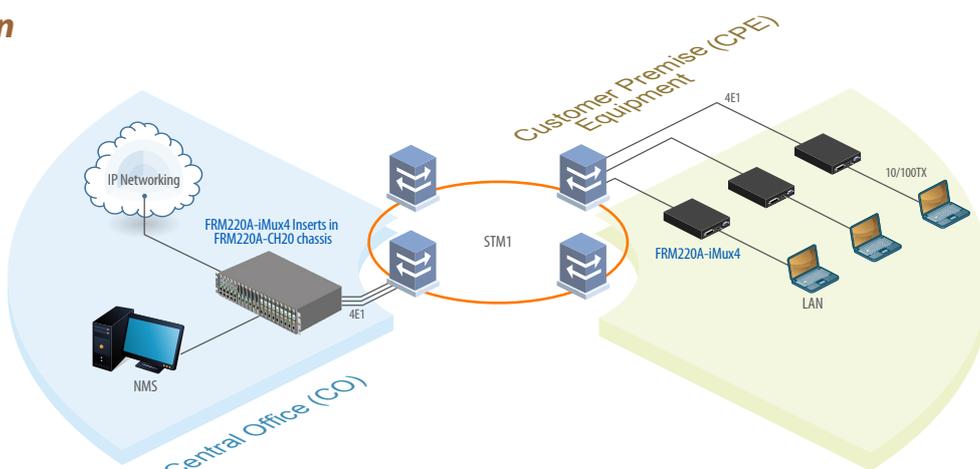
- Connects one Fast Ethernet over 1-4 E1 links (1.984 ~ 7.92Mbps)
- Built-in GFP bridge operates at WAN rate
- Auto-Negotiation
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220A chassis
- SNMP management with FRM220A chassis
- LED Alarm indication
- Standalone RS232 console management via CH01M
- Supports IEEE 802.1Q VLAN & VLAN trunking

Specifications

| E1 Interface | Framing | CCS+CRC |
|--------------|-----------------|--|
| | Standard | ITU-T G.703/G.704/G.706 & G.732, G.823 |
| | Bit rate | 2.048Mbps± 50ppm (up to 4E1) |
| | Line code | HDB3 |
| | Clock setting | Internal OSC or recovery clock |
| | Receive level | -43dB |
| | Line impedance | 75 ohm (BNC) / 120 ohm (RJ45) |
| | Jitter | Complies with ITU-T G.823 |
| | Performance | |
| | 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 | 12VDC | |
| Power Consumption | < 6W | |
| Dimensions | 140 x 88 x 24mm (D x W x H) | |
| Weight | 130g | |
| 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 |
|------------------|--|
| 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 |

FRM220A – iMux4T –

Example: FRM220A – iMux4T – R

Note: This card must use CH01M, with serial console, to configure standalone settings.

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

Cable Type



RJ45 Cable



BNC Cable

FRM220A-iMux8

Ethernet to 8E1 Multiplexer



2

Inverse Mux

The FRM220A-iMux8 is an E1 inverse multiplexer capable of bundling up to 8 E1 lines for cost-effective connection of 10/100Base-TX or 100Base-FX LANs over multiple E1 transports. The FRM220A-iMux8 inverse multiplexer transmits up to a 15.87Mbps Ethernet bridge channel (GFP-F encapsulated) over 8 E1 links. The FRM220A-iMux8 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-iMux8 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 FRM220A-iMux8 fully meets E1 specifications including ITU-T G.703 and G.823. The FRM220A-iMux8 features diagnostic capabilities for performing remote loopback. The operator at either end of the line may test both the FRM220A-iMux8 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

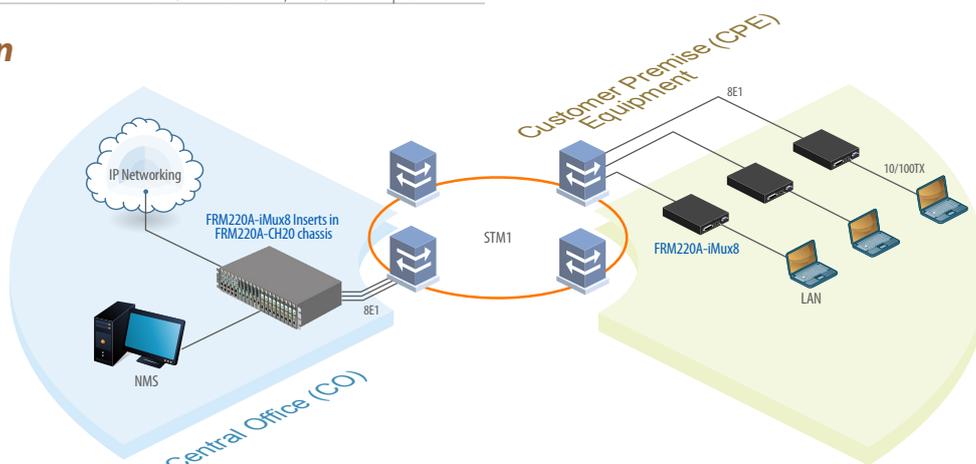
- Connects one Fast Ethernet over 1- 8 E1 links (1.984Mbps to 15.87Mbps)
- Built-in GFP bridge operates at WAN rate
- Maximum 220ms delay variance between E1 link
- Support IEEE 802.1Q VLAN & VLAN trunking
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220A chassis
- SNMP management with FRM220A chassis
- LED Alarm indication & Auto-Negotiation
- Standalone RS232 console management via CH01M

Specifications

| | | |
|---------------------------|--------------------|--|
| E1 Interface | Framing | CCS+CRC |
| | Standard | ITU-T G.703/G.704/G.706 & G.732, G.823 |
| | 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 | RJ-45 or BNC |
| | Diagnostics | Digital remote loopback |
| Ethernet Interface | Standards | IEEE 802.3, 802.3u |
| | Data rate | 10/100Base-TX, Half/Full duplex |

| | | |
|---------------------------|---|----------------------------|
| Ethernet Interface | Connector | RJ-45 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 | 140 x 88 x 24 mm (D x W x H) | |
| Weight | 130g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|------------------|---|
| FRM220A-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 - iMux8T - □

Example: FRM220A - iMux8T - R

Note: This card must use CH01M, with serial console, to configure standalone settings.

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

Cable Type



RJ45 Cable



BNC Cable



FRM220A-iMux16

Ethernet to 16E1 Multiplexer

The FRM220A-iMux16 is an E1 inverse multiplexer capable of bundling up to 16 E1 lines for cost-effective connection of 10/100Base-TX or 100Base-FX LANs over multiple E1 transports. The FRM220A-iMux16 inverse multiplexer transmits up to a 31.74Mbps Ethernet bridge channel (GFP-F encapsulated) over 16 E1 links. The FRM220A-iMux16 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-iMux16 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 FRM220A-iMux16 fully meets E1 specifications including ITU-T G.703 and G.823. The FRM220A-iMux16 features diagnostic capabilities for performing remote loopback. The operator at either end of the line may test both the FRM220A-iMux16 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

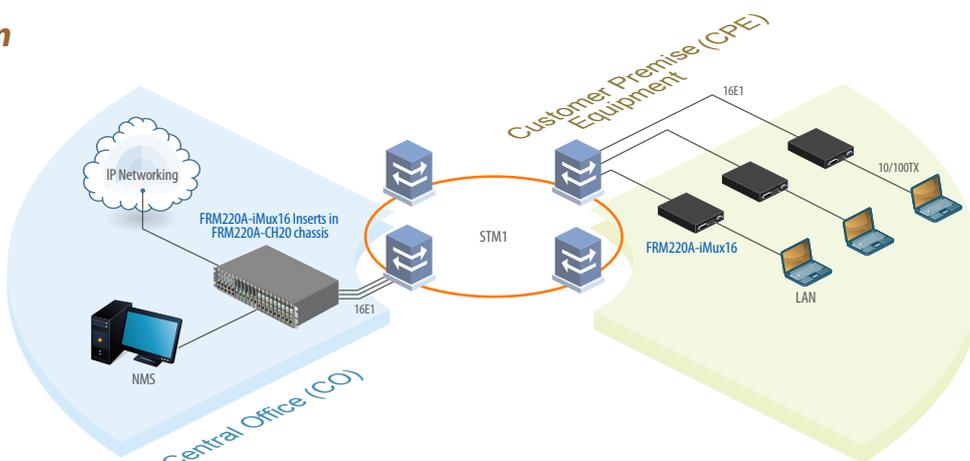
- Connects one Fast Ethernet over 1-16 E1 links (1.984Mbps to 31.74Mbps)
- Built-in GFP bridge operates at WAN rate
- Maximum 220ms delay variance between E1 links
- Support IEEE 802.1Q VLAN & VLAN trunking
- Unbalanced E1/BNC or balanced E1/RJ45
- Fully compatible with FRM220A chassis
- SNMP management with FRM220A chassis
- LED Alarm indication & Auto-Negotiation
- Standalone RS232 console management via CH02M

Specifications

| E1 Interface | Framing | CCS+CRC |
|--------------------|--------------------|--|
| | Standard | ITU-T G.703/G.704/G.706 & G.732, G.823 |
| | 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 |
| | Data rate | 10/100Base-TX, Half/Full duplex |

| Ethernet Interface | 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 | 140 x 88 x 42mm (D x W x H) | |
| Weight | 130g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|-------------------|--|
| FRM220A-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 - iMux16T - □

Example: FRM220A - iMux16T - R

Note: This card may be locally configured by its own console when placed in CH02M.

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH02 chassis.

Cable Type



RJ45 Cable



BNC Cable

NEW

FRM220-GFOM04

4xE1/T1+ GbE Fiber Multiplexer



2
Gigabit fiber multiplexer

The FRM220-GFOM04 is a 4 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 card is placed in the FRM220 rack with NMC, 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 provide local or remote diagnostic loopback. The 1+1 redundant optical aggregate of this multiplexer employs industry standard pluggable optics (SFP) operating at 1.25Mbps 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

- 4 channels unframed E1/T1 (transparent)
- 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, less than 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

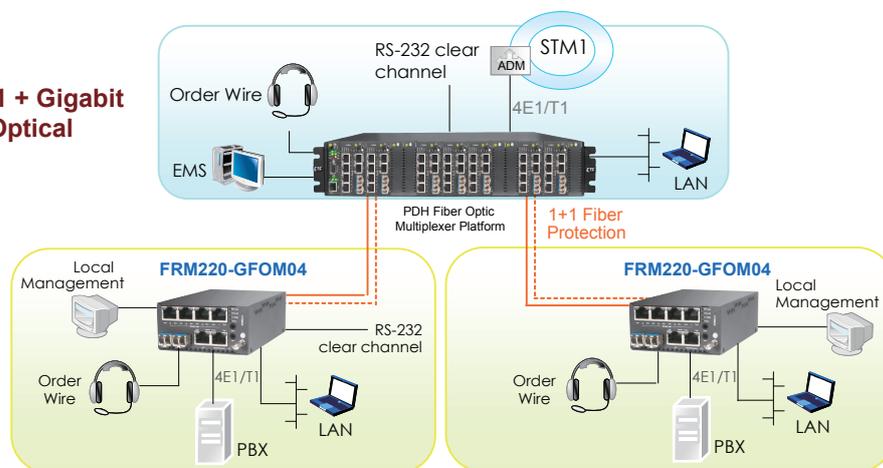
Specifications

| 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 |

| | | |
|-----------------------|--|--|
| E1/T1 ports | 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 | |
| Dimensions | 140 x 88 x 42mm (D x W x H) | |
| Weight | 200g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |

Application

Managed 4E1/T1 + Gigabit Ethernet Fiber Optical Multiplexer



Ordering Information

| Model Name | Description |
|------------------|--|
| FRM220-GFOM04-SR | 4 x E1/T1 RJ-45 and 10/100/1000Base-T Ethernet Fiber Optic Multiplexer (optional SFP module) |
| FRM220-GFOM04-SB | 4x E1 BNC and 10/100/1000Base-T Ethernet Fiber Optic Multiplexer (optional SFP module) |

Note: This card may be locally configured by its own console when placed in CH02.

Connector Type:
 Example: FRM220 – GFOM04 – SR

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH02 chassis.

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



FRM220-FOM04

4x E1/T1 + FE Fiber Multiplexer

The FRM220-FOM04 is a 4 channel E1/T1 fiber multiplexer with an additional wire speed 100M Ethernet trunk, plus order wire and clear channel RS-232, constructed as a two slot wide card for the FRM220 series. When the FRM220-FOM04 card is placed in the FRM220 rack with NMC, 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 provide local or remote diagnostic loopback. The 1+1 redundant optical aggregate of this multiplexer employs 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)
- 10/100Base-TX Ethernet (100M wirespeed)
- 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, less than 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

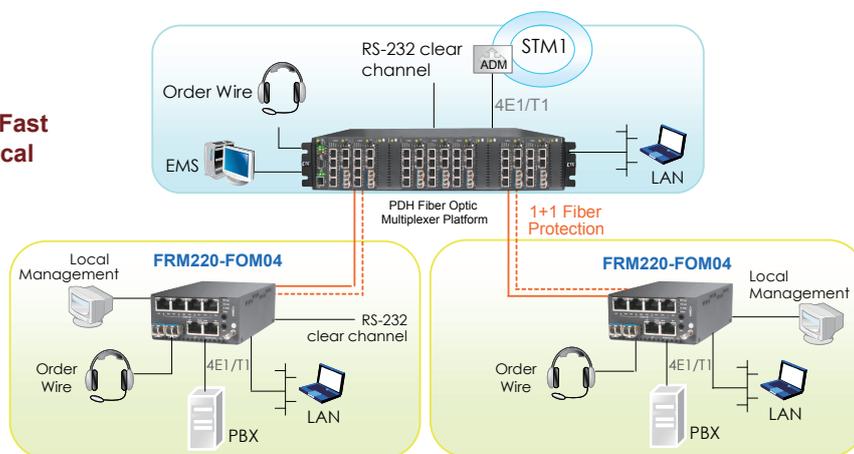
Specifications

| | | |
|--------------------|------------------------|--|
| 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 cable) 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 |

| | | |
|-----------------------|--|---|
| E1/T1 ports | 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 155 Mbps |
| | Ethernet | Interface Type 10/100Base-TX Connector RJ-45 Standards IEEE 802.3, 802.3u 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 | |
| Dimensions | 140 x 88 x 42mm (D x W x H) | |
| Weight | 200g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |

Application

Managed 4E1/T1 + Fast Ethernet Fiber Optical Multiplexer



Ordering Information

| Model Name | Description |
|-----------------|---|
| FRM220-FOM04-SR | 4 x E1/T1 RJ-45 and 100Mbps Ethernet Fiber Optic Multiplexer(optional SFP module) |

FRM220-FOM04-SB 4x E1 BNC and 100Mbps Ethernet Fiber Optic Multiplexer(optional SFP module)

Note: This card may be locally configured by its own console when placed in CH02.

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH02 chassis.

FRM220 – FOM04 –
Example: FRM220 – FOM04 – SR

FRM220-FOM01

E1/T1 + FE Fiber Multiplexer



The FRM220-FOM01 is a single channel E1/T1 fiber multiplexer with an additional wire speed 100M Ethernet trunk, plus clear channel RS-232, for placement the FRM220 series. When the FRM220-FOM01 card is placed in the FRM220 rack with NMC, 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 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

- 1 channel unframed E1/T1 (transparent)
- 10/100Base-TX Ethernet (100M wirespeed)
- Auto MDI/MDIX & Auto-Negotiation or Force Mode
- Supports flow control & 9K jumbo packets
- Supports link fault Pass-Through for Ethernet
- Supports Digital Diagnostics Monitoring Interface (DDMI) SFP
- Loopback test on E1/T1, fiber ports
- Supports local or remote In-band management by SNMP manager
- Local management by console port via FRM220-CH01M chassis
- Supports On-Line F/W upgrade & Dying Gasp

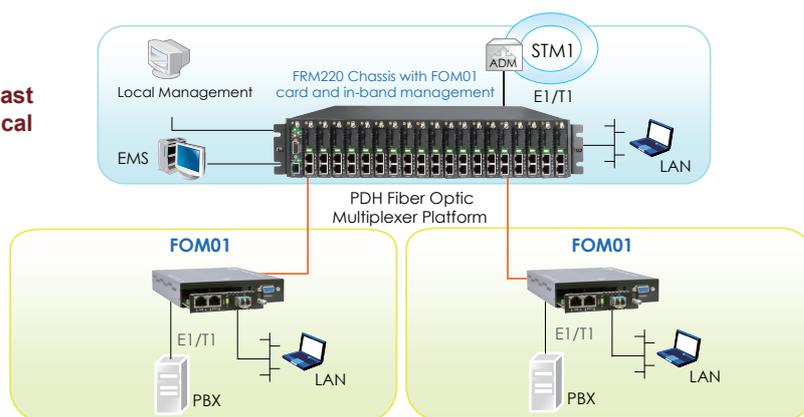
Specifications

| | | |
|--------------------|-------------------------------------|--|
| 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 +/-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 | |

| | | |
|-----------------------|--|---|
| E1/T1 ports | Interface Connectors | RJ-45 |
| | Test Loops | LLB (Local Loop Back) RLB (Remote Loop Back) |
| Fiber | Connector | 1x9 SC |
| | Data Rate | 155 Mbps |
| Ethernet | Interface Type | 10/100Base-TX |
| | Connector | RJ-45 |
| | Standards | IEEE 802.3, 802.3u |
| | Duplex modes | full/half |
| Indications | Power FX Link, E1/T1 Mode/Link/Loopback test, LAN Link/Speed | |
| Power Input | 12VDC | |
| Dimensions | 140 x 88 x 23mm (D x W x H) | |
| Weight | 130g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% RH (non-condensing) | |
| Certifications | CE, FCC, RoHS compliant | |

Application

Managed E1/T1 + Fast Ethernet Fiber Optical Multiplexer



Ordering Information

| Model Name | Description |
|-----------------|--|
| FRM220-FOM01-SR | E1/T1 RJ-45 and 100Mbps Ethernet Fiber Optic Multiplexer (optional SFP module) |
| FRM220-FOM01-SB | E1 BNC and 100Mbps Ethernet Fiber Optic Multiplexer (optional SFP module) |

| 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
FMC220 – FOM01 – □□ – □□□□□□

Example: **FMC220 – FOM01 – SR – SC002**

Note: This card must use CH01M, with serial console, to configure standalone settings.

When connected as a remote to a managed central chassis, this card supports in-band management and only needs a CH01 chassis.

NEW



MSW-4424A MSW-4424S

L2 Gigabit OAM Managed Fiber Access Switch

MSW-4424 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 10GBase-X SFP+ or 1000Base-X SFP uplink ports. The MSW-4424 offers the best flexibility and scalability for operators and service providers to deploy their Metro Ethernet or FTTH networks. Aimed specifically at Metro Ethernet and FTTH deployment, the specifications of MSW-4424 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-LAN 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 supports advanced service OAM management. MSW-4424S model supports timing synchronization features (Sync. E and IEEE1588v2) to enhance and migrate to a carrier grade network.

Common Key Features and Benefits

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

Support Sync. Ethernet

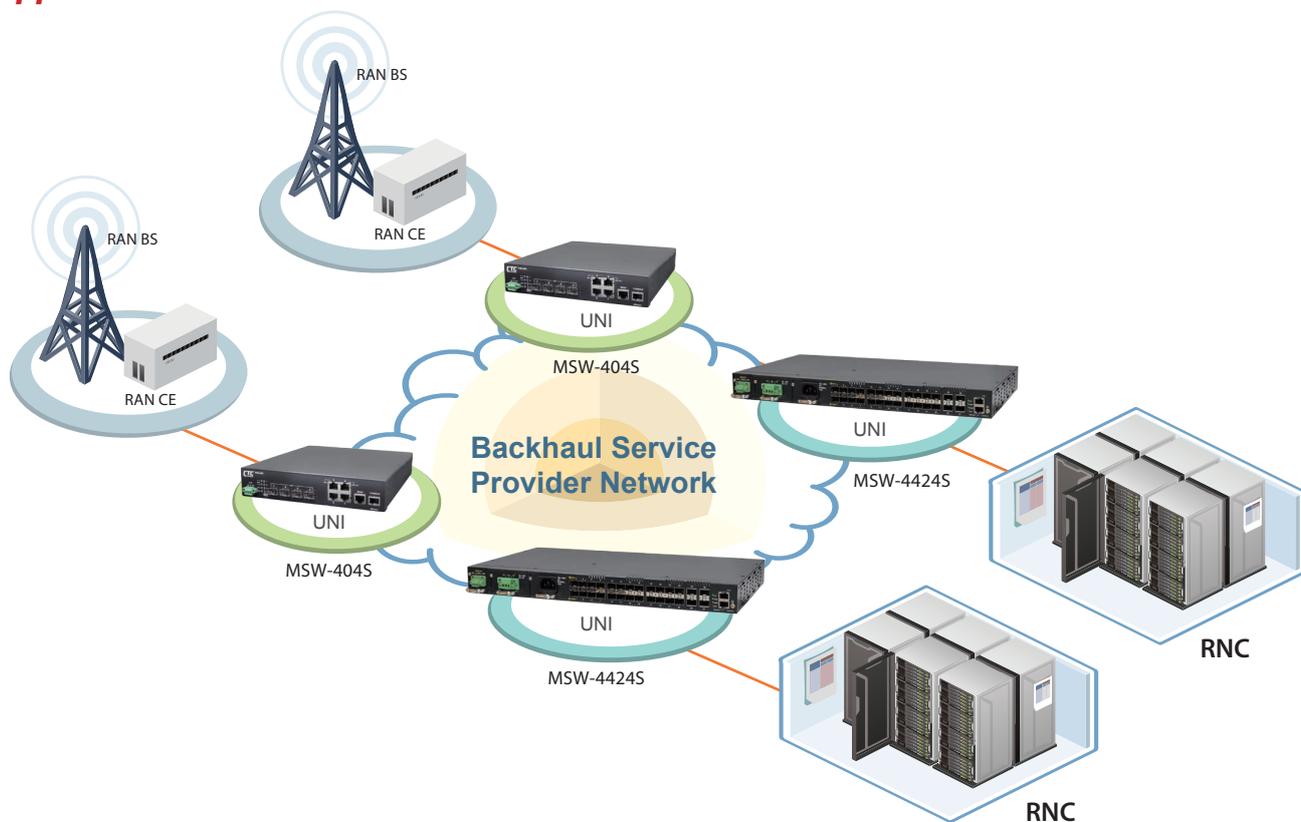
Advanced synchronization features for carrier Ethernet networks allow operators to deliver services with optimal stability and continuity in the end-to-end connectivity

Specifications

| | |
|----------------------------------|---|
| Interface | 100/1000Mbps SFP slots *24 + 10Gbps SFP+ slots *4 |
| Console Port | RJ-45 console port x 1 |
| Filter & Forward Rate | 10M (14880/14880pps); 100M (148800/148800pps) 1000M (1488000/1488000pps) |
| 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 IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731 |
| Packet Buffer | 4M Bytes |
| 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 |
| 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 |
| L2 switching Protection | STP, RSTP, MSTP, ITU-T G.8032 Ethernet ring protection |
| Trunking | IEEE 802.3ad LACP |

| | |
|---------------------------------|---|
| 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 source guard |
| IP Multicasting | IGMP throttling, IGMP filtering, IGMP fast leave IGMP snooping v1/v2/v3, MVR, MLD snooping v1/v2 |
| Storm Control Management | Unicast/Broadcast/Multicast storm suppression Web/Telnet CLI/SNMP/console interface, Web/CLI authentication, SSH v2, HTTPs, port mirroring system syslog, IPv6 management, NTP, SNTP |
| SNMP agent | SNMP v1/v2c/v3 |
| Software upgrade | TFTP / HTTP / HTTPs |
| Ethernet OAM | IEEE 802.3ah / IEEE 802.1ag / ITU-T Y.1731 |
| Timing Options | Sync. Ethernet, IEEE 1588 V2 |
| LED display | Power, System, Console, Link/Act, Speed |
| Power input | 100V ~ 240VAC -60VDC (-48VDC Power) -9 ~ -32VDC (-24VDC Power) |
| Power Consumption | < 50W |
| Operating Temperature | 0 ~ 50°C |
| Humidity | 5% ~ 90% (non-condensing) |
| Dimensions | 270.3 x 437.5 x 43.5 mm (D x W x H) |
| Certification | FCC, CE, RoHS compliant |

Application



Mobile Backhaul Application

Ordering Information

| Model Name | Description |
|------------|--|
| MSW-4424A | 24x100/1000Base-X (SFP) + 4 x 10GBase-X SFP+ L2 Gigabit OAM managed Fiber Access Switch |
| MSW-4424S | 24x100/1000Base-X (SFP) + 4 x 10GBase-X SFP+ L2 Gigabit OAM managed Fiber Access Switch with Sync. E enabled |

MSW - □□□□□
 Example: MSW - 4424A

3
 Metro ethernet access switch



MSW-202 (Rev.14)

2-Port 10/100/1000Base-T + 2-Port 100/1000Base-X L2 OAM Managed Switch (EDD)

MSW-202 is a carrier class Ethernet Demarcation Device (EDD) with 2 x 10/100/1000Base-T Ethernet ports and 2 x 100/1000Base-X dual 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).

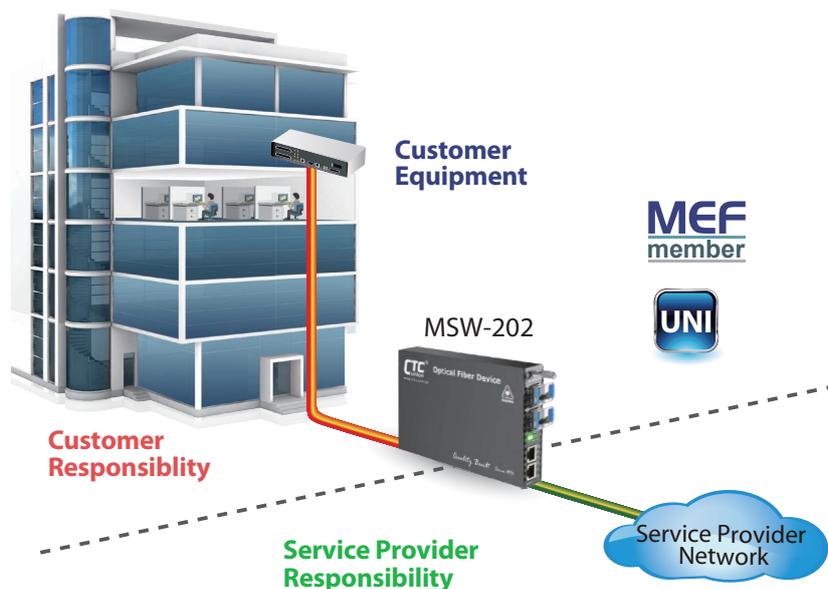
Features

- Complies with MEF CE1.0
- Supports 8K MAC
- Spanning Tree 802.1D, 802.1s, 802.1w
- Supports 802.1Q / 256 active VLANs
- Double VLAN Tagging (C-tag/S-tag) (IEEE 802.1ad) support for ISP application
- Various QoS capability (MAC/port/802.1p/Diffserv)
- Port-based rate limiting
- DHCP Snooping
- IGMP Snooping
- IPv6 support
- IEEE 802.3x and IEEE 802.1x support
- Jumbo frame for up to 9.6K
- Extensive Ethernet OAM support
- IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731
- SNMP v1/v2c/v3, Telnet, Web GUI
- IEEE 1588 V2 aware

Specifications

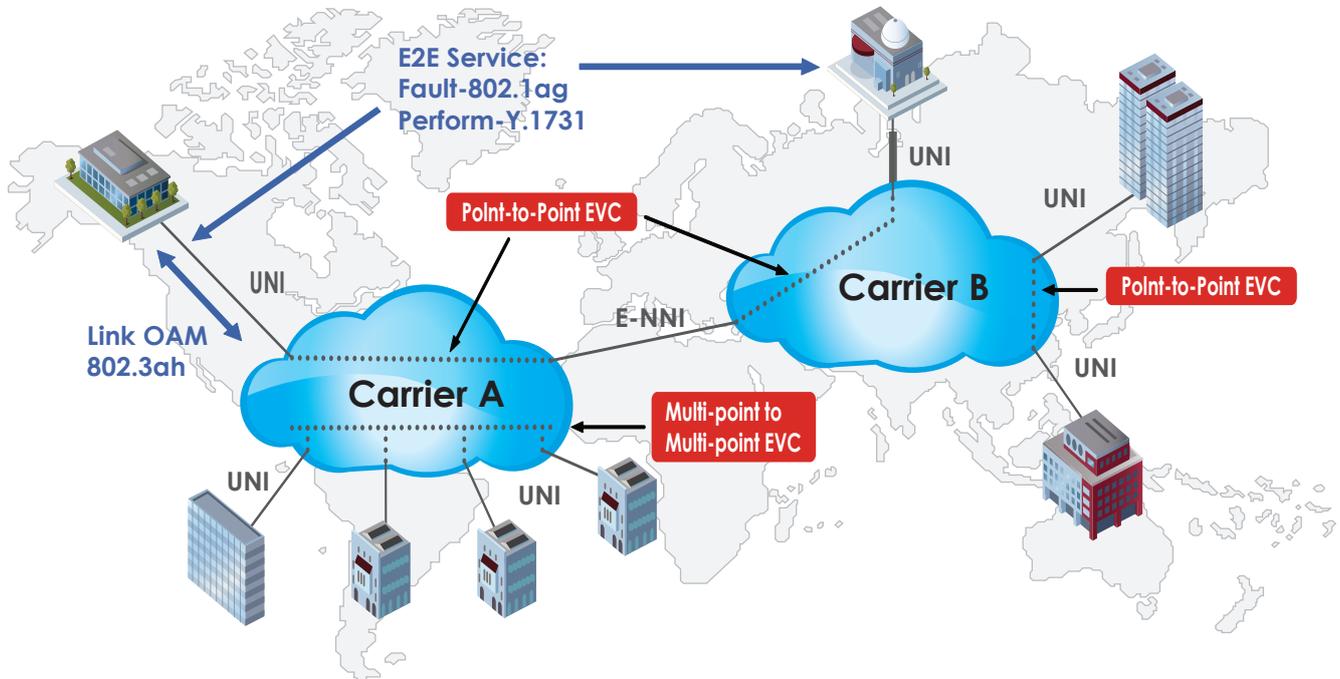
| | | | |
|--------------------------|---|--------------------------|---|
| Optical Interface | Dual-speed (100M and 1000M) 2 WAN ports SFP based Fiber optic: SFP based Fast Ethernet (100BaseFX, 100BaseLX10, 100BaseBX10) Gigabit Ethernet (1000Base-SX, 1000BaseLX10, 1000BaseBX10) | Standard | IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX, 100Base-FX, IEEE 802.3z 1000Base-X, IEEE802.3ab 1000Base-T |
| LAN Interface | 2 LAN ports Copper based : 10/100/1000Base-T RJ-45 Supports manual 10, 100, 1000Base-T, Full, Half duplex, or n-way (Auto-Negotiation) each channel | LEDs | Power, FX-1 Link, FX-2 Link, Test, UTP-1 Link, UTP-1 100/1000, UTP-2 Link, UTP-2 100/1000 |
| | | Temperature | 0 ~ 50°C (Operating); -10 ~ 70°C (Storage) |
| | | Humidity | 20 - 80% non-condensing (Operating); 10-90% (Storage) |
| | | Power Consumption | < 12W |

Application



Application

- Ethernet in the First Mile (EFM)
- Fiber to the Premise (FTTP), E-Line and E-LAN
- Enterprise markets



First mile Ethernet fiber access

The EDD Series, at customer premises, allows operators to reach customers over fiber, while still selling a standard Ethernet copper connection. Being part of the operator's network allows the converter to act as a demarcation point between the operator and the customer.

Fully Ethernet OAM enabled

Ethernet OAM features (IEEE 802.3ah/802.1ag/ITU-T.Y.1731) allow rapid detection and recovery of network faults and saves OPEX for operators as well as increasing customer satisfaction.

MEF CE2.0 standards compliant solution

MEF 9/14/21 compliant product guarantees compatibility with other MEF certified equipment and reduces the risk and cost for Metro Ethernet network deployment by operators.

Ordering Information

| Model Name | Description |
|------------|---|
| MSW-202 | 2-Port 10/100/1000Base-T + 2-Port 100/1000Base-X OAM Managed Switch |

NEW



MSW-404 MSW-404S

4x SFP Slots in Dual Rate 100/1000Base-X
and 4 Ports 10/100/1000Base-T RJ45
OAM Managed Ethernet Switch (EDD)

The CTC Union's MSW-404 series is the new generation of carrier grade Ethernet demarcation device for business connection and mobile backhaul transportation service delivered by carriers. The MSW-404 series is equipped 4 SFP slots in 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 and E-Access services which are CE (Carrier Ethernet) 2.0 compliant for Metro Ethernet network deployments.

The MSW-404 series 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 optionally built-in RFC2544 feature sets, The MSW-404 series 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 hierarchical QoS traffic management to enable service providers managing bandwidth and enforce SLA guaranteed.

MEF 22.1 defines the standard how Metro Ethernet service is adopted into the traffic transportation in the mobile backhaul application. The mobile service is time sensitive and required accurately packet delivery over a clocking synchronized network to transmit packetized data from a mobile device among base stations without loss. The MSW-404 series supports Synchronized Ethernet to fulfill the IP converged services (data, voice, video) over synchronous Ethernet aware carrier Ethernet network.

Features & Benefits

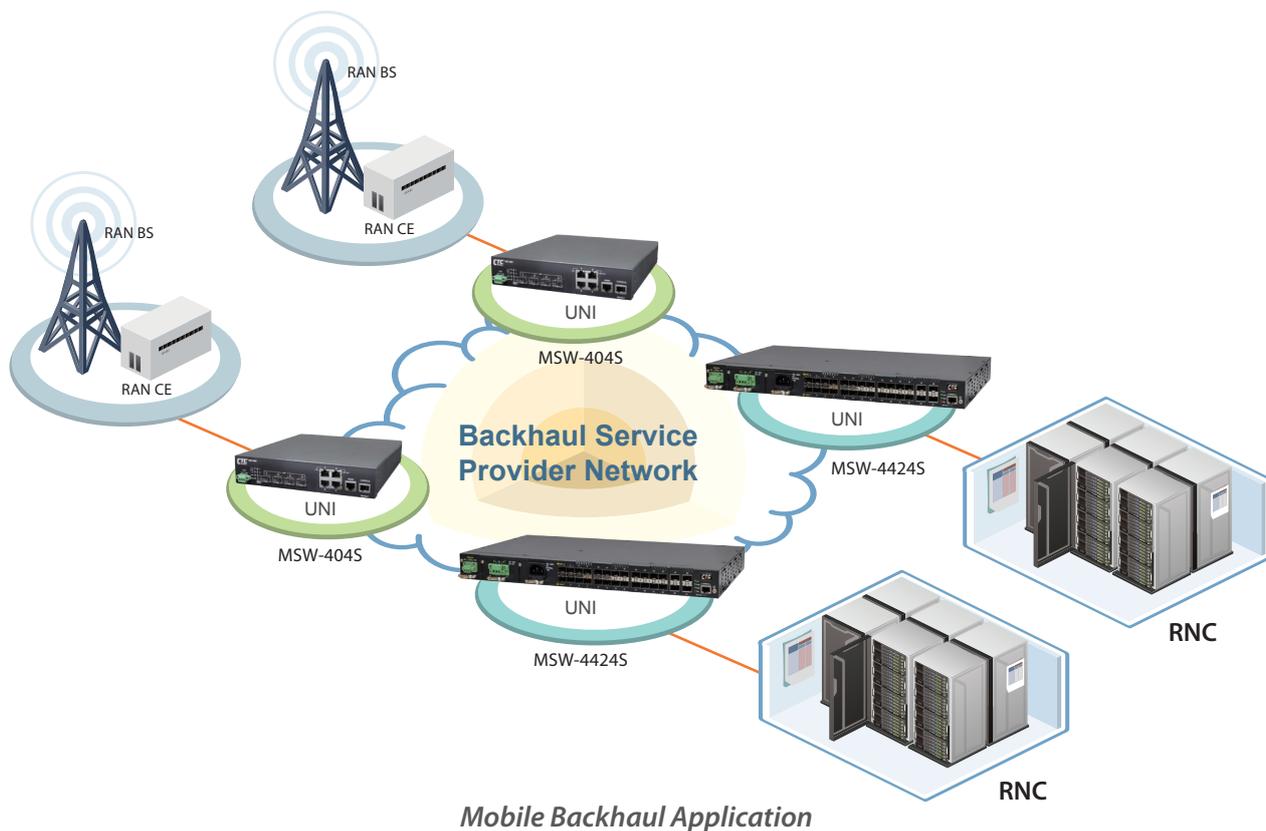
- The next generation of Ethernet demarcation device, at customer premise, fulfilling the large-scale carrier Ethernet deployment for intelligent business connection and mobile backhaul services complied to CE 2.0 standard.
- MEF 9/14/21 standards compliant product guarantees the fully interoperability with other MEF certified equipment and reduces the risks and cost of Carrier Ethernet network deployment for operators and service providers.
- Advanced clock synchronized features for carrier Ethernet network allows operators to deliver time sensitive services with optimal stability and continuity in the end-to-end connectivity.

Specifications

| | |
|----------------------------------|---|
| Interface | 100/1000Mbps SFP slots * 4 + 10/100/1000Base-T RJ45 * 4 |
| Console Port | DB-9 RS-232 console port * 1 |
| Filter & Forward Rate | 10M (14880/14880pps); 100M (148800/148800pps); 1000M (1488000/1488000pps) |
| 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 | 512K Bytes |
| MAC Table Size | 8K |
| Max. Packet Size | 9.6K 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 |
| 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 |
| L2 switching protection | STP, RSTP, MSTP, ITU-T G.8031/G.8032 Ethernet ring protection |

| | |
|------------------------------|---|
| Trunking | IEEE 802.3ad LACP |
| 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 source guard |
| IP Multicasting | IGMP throttling, IGMP filtering, IGMP fast leave, IGMP snooping v1/v2/v3, MVR, MLD snooping v1/v2 |
| Storm Control | Unicast/Broadcast/Multicast storm suppression |
| Management | Web/Telnet CLI/SNMP/console interface, Web/CLI authentication, SSH v2, HTTPs, port mirroring, system syslog, IPv6 management, NTP, SNTP |
| SNMP Agent | SNMP v1/v2c/v3 |
| Software Upgrade | TFTP/HTTP/HTTPS |
| Ethernet OAM | IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731, RFC2544 |
| Timing Options | ITU-T G.8262 Synchronous Ethernet, IEEE 1588v2 |
| LED Display | Power, System, Console, Link, Speed/Act |
| Power Input | 100V ~ 240VAC, -36 ~ -60VDC |
| Power Consumption | < 20W |
| Operating Temperature | 0 ~ 50°C |
| Humidity | 5% ~ 90% (non-condensing) |
| Dimensions | 250 x 218 x 44 mm (D x W x H) |
| Regulatory | FCC, CE, RoHS compliant |

Application



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

Ordering Information

| Model Name | Description |
|------------|---|
| MSW-404 | 4 x SFP Slots in Dual Rate 100/1000Base-X and 4 Ports 10/100/1000Base-T RJ45 OAM Managed Ethernet Switch |
| MSW-404S | 4 x SFP Slots in Dual Rate 100/1000Base-X and 4 Ports 10/100/1000Base-T RJ45 OAM Managed Ethernet Switch with Sync. E enabled |

MSW – 404
Example: MSW – 404S

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

NEW



GSW-3420FM

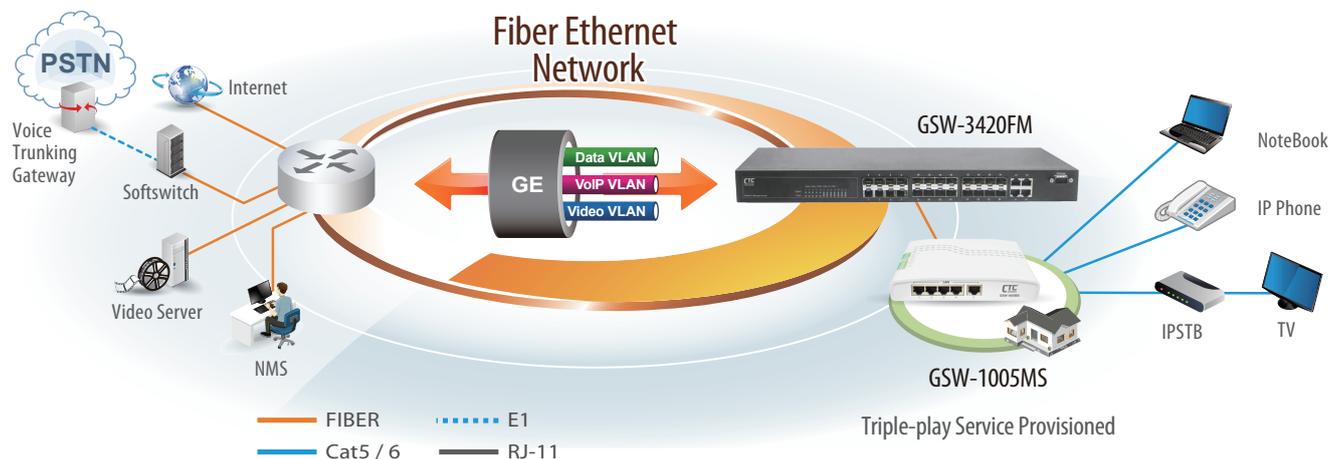
20 * 100/1000Base-X SFP slots + 4 * GbE combo ports (10/100/1000Base-T or 1000Base-X) L2 managed Ethernet Switch

GSW-3420FM is an SNMP manageable Gigabit Ethernet switch for FTTx deployment or Gigabit Ethernet fiber aggregation that equipped 20 dual rate 100/1000Base-X SFP ports and 4 Gigabit Ethernet combo (10/100/1000Base-T or 1000Base-X) ports. 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-3420FM Ethernet access switch provides VLAN, QoS and IGMP L2 feature sets as well as robust security management to facilitate service provider's build up of a manageable and secure FTTx access network.

Features

- 20 * SFP ports, support 100Base-FX or 1000Base-X
- 4* RJ45/SFP(100/1G) ports, auto-detect RJ45/SFP connection
- 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 LoopBack 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
- 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/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 configuration download and upload
- IEEE 802.3az power management / Green Ethernet

Application



Specifications

System

| | |
|----------------------------------|---|
| 100/1G SFP Port | 20 |
| UTP/SFP Combo Port | 4 |
| CPU | 416MHz MIPS 24KEc CPU as the main processor which integrated on switch controller |
| Memory | Flash : SPI 16MB / RAM:DDRII 128MB |
| Packet buffer | 2M Bytes |
| MAC Table size | 16K |
| Max Packet Size | 9600 Bytes |
| Switching capability | 14880pps at 10Mbps, 148810pps at 100Mbps, 1488095pps at 1Gbps with 64bytes packets |
| Switch capacity | 48Gbps |
| Forwarding Rate | 35.7Mpps |
| FAN Design | Yes |
| Console port | D-Sub 9 |
| 19" Rack-Mount | Yes, with kits |
| SFP DDMI | Yes |
| Dimension | 172 x 440 x 44 mm (D x W x H) |
| Environmental Temperature | Operating : 0 ~ 50°C Storage : -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 | <30W Max. |
| Power Input | AC Power input (100V~240V) |

| LED | Status | Condition |
|-------------------|---------------|-------------------------------------|
| Power | Lights(Green) | System is receiving power |
| System | Lights(Green) | System is ready |
| Link / Act | Lights | Link is ready |
| | | 1000Mbps : Green |
| | | 100Mbps : Amber |
| | Flashing | Data packets being received or sent |

Software

| | |
|--------------------------|--|
| Port Control | Port speed, duplex mode, and 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 and MAC addresses (static) IEEE 802.1Q static VLAN(4096 entries Max.), Voice VLAN Port isolation, Private VLAN, static, MAC based VLAN protocol based VLAN IP subnet based VLAN IEEE 802.1D STP/802.1w RSTP/802.1s MSTP IEEE 802.3ad Link Aggregation, static and LACP BPDU guard and restricted role, Error Disable Recovery DHCP client, DHCP snooping, DHCP option 82 relay ARP inspection(256 entries Max.) Port mirroring |
| 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 VI snooping |
| QoS | 8 Priority Queues per Port Port Based priority Scheduler priority QoS Control List(256 entries Max.) Storm control for UC, MC, and BC Policing and shaping per port and per queue Ingress Policing Egress Shaping DiffServ (RFC 2474) remarking Tag remarking |
| Security | Port-based 802.1X, Single 802.1X, Multiple 802.1X MAC-based authentication, VLAN assignment, QoS assignment, Guest VLAN RADIUS accounting MAC address limit TACACS+ Web and CLI authentication and authorization Authorization ACLs for filtering, policing, and port copy IP source guard |
| Synchronization | NTPv4 Client |
| SFP DDMI | Yes |
| Management | HTTP server CLI console port Telnet Management access filtering SSHv2 and HTTPS IPv6 Management System 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 sFlow Daylight Saving |

Ordering Information

| Model Name | Description |
|-------------------|---|
| GSW-3420FM-AC, AD | 20 * 100/1000Base-X SFP slots + 4 * GbE combo ports L2 Switch with AC or AD (AC+DC) Power |

Power Type
GSW – 3420FM –
 Example: **GSW – 3420FM – AD**



GSW-1005MS

5-Port 10/100/1000Base-T to 1-Port 100/1000Base-X Managed GbE Switch with Cable Tray Optional

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 an optional cable tray that allows the installer to enclose the excessive 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 and SNMP management interfaces. GSW- 1005MS is particularly suitable for deploying and provisioning active Ethernet FTTH service of multi-service operators (MSO).

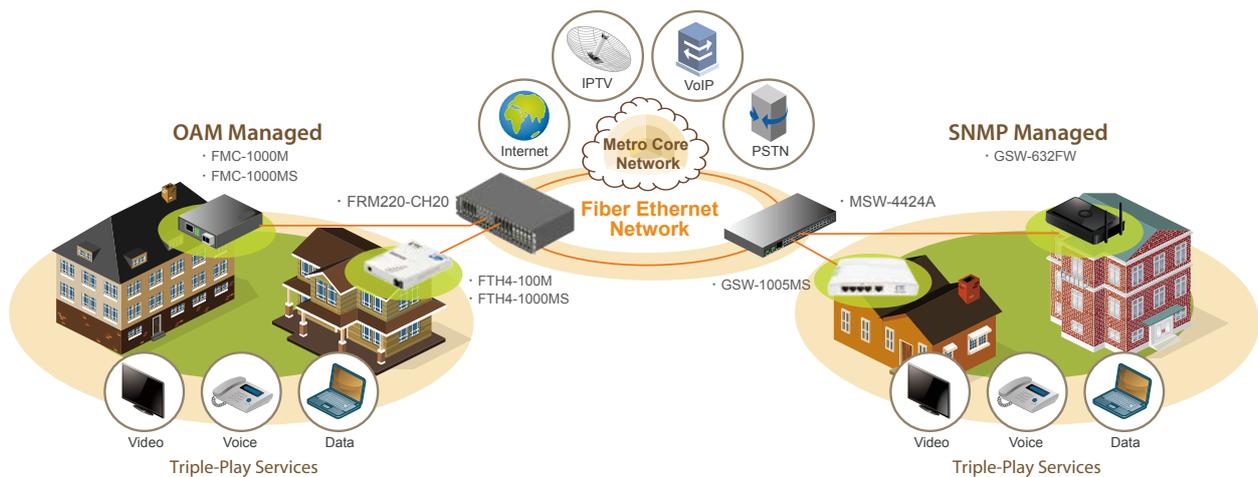
Features

- 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
- Fiber cable tray(optional)

Specifications

| | | | |
|--------------------------|--|------------------------------|--|
| Interface | 10/100/1000Base-T * 5 + 100/1000Base-X SFP uplink * 1 | Management | Web/Telnet/SNMP management interface DHCP auto provisioning TFTP/HTTP firmware upgrade |
| HW Capability | Non-blocking wire speed switching performance 9.6K bytes jumbo frame forwarding 8K MAC address table | SNMP agent | SNMP v1/v2c/v3 |
| VLAN Feature | IEEE 802.1Q tagged VLAN, IEEE 802.1ad Q-in-Q | Optical interface | SFP LC connector |
| QoS Feature | IEEE 802.1p 8 priority queues per port | Power input | AC Power Adapter |
| Bandwidth Control | Per port based egress/ingress rate limit control | Operating temperature | 0 ~ 50°C |
| IP Multicasting | IGMP snooping v1/v2/v3 | Humidity | 5% ~ 90% (non-condensing) |
| Storm Control | Unicast/Broadcast/Multicast storm suppression | Dimensions | 120 x 170 x 35 mm (D x W x H) |
| | | Regulatory | FCC, CE, RoHS compliant |

Application



QoS with Four Priority Queues

The QoS (Quality Of Service) function provides eight priority queues to support different classifications of traffic. High priority packet streams experience less delay inside the GSW-1005MS, which supports lower latency for certain delay-sensitive traffic. The GSW-1005MS can classify the packet as one of the eight priorities according to VIP port.

Remote Firmware Upgrade

The remote firmware upgrade feature enables the switch to be updated remotely via firmware upgrade including the products that were already installed in the field. This feature eliminates the need for the users to ship the product back to the supplier.

Bandwidth Control

The Bandwidth Control function allows users to set the bandwidth of GSW-1005MS switch for both ingress and egress rate and can be allocated a variety of rates up to full bandwidth capability of the devices (100Kbps ~ 1000Mbps).

Broadband Services

The GSW-1005MS product philosophy allows the end user to follow and benefit fully from the fast developments in Fiber to the home-networking solutions. The CPE is the interface between the digital broadband network and the user peripheral equipment, such as routers, wireless access points, servers, and printers. With generations of computers and home networking equipment coming and going the GSW-1005MS will be a constant and reliable factor for the delivery of broadband data services.

These services are not limited to today's broadband internet applications. In the next few years, end-users will also benefit from next generation health-care, security, communication and infotainment services. The GSW-1005MS CPE platform fully supports today's services and is ready for the next wave of new broadband services. Flexibility is key, since the CPE functionality must be matched to the requirements of those new services.

Quick Installation

The installation of the wall-mount unit of GSW-1005MS CPE is swift and straightforward. Because of its size and ideal dimensions, the GSW-1005MS CPE can be positioned easily at the user residence or home. The GSW-1005MS design allows easy access for mounting and does not need the small elements, making the installation process predictable and hassle-free. The wall-mount unit, including integrated fiber tray, not only makes fiber handling and termination easy and robust, but also eliminates the need for optical patch cords.

Step 1

First, install fiber cable on the cable tray base.

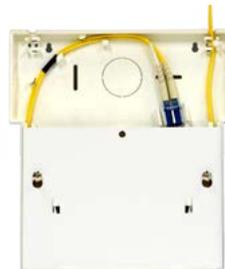


Single Fiber

Dual Fiber

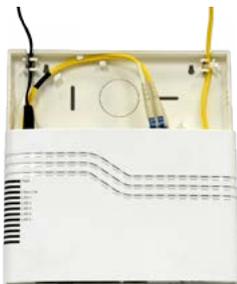
Step 2

Then, put the dust cover on the cable tray base and fasten two items with a screw securely.



Step 3

Use two wall-mounting holes on GSW-1005MS to install GSW-1005MS on the cable tray base. Connect the fiber cable connector to the SFP transceiver and connect the power cable.



Step 4

Finally, install the upper cover.



Ordering Information

| Model Name | Description |
|------------|--|
| GSW-1005MS | 5-Port 10/100/1000Base-T to 100/1000Base-X managed Gigabit Ethernet Switch (cable tray optional) |

NEW



GSW-2008MS

8-Port 10/100/1000Base-T to 2-Port 100/1000Base-X Managed GbE Switch with Cable Tray Optional

The CTC Union 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.

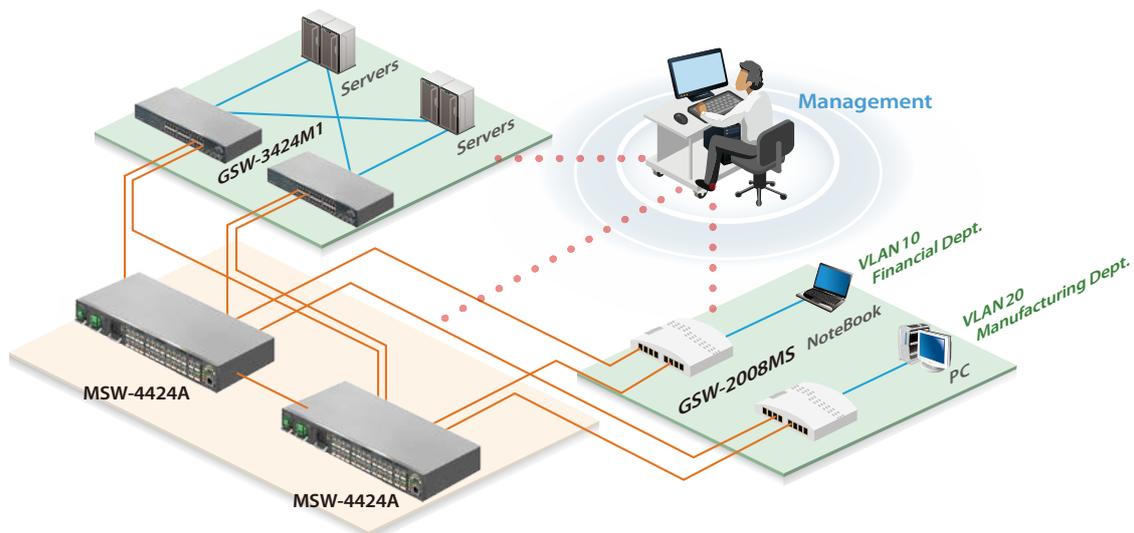
Features

- 8-port 10/100/1000Base-T RJ45 + 2 uplink 100/1000Base-X SFP slot
- Supports 9K 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
- Fiber Cable Tray (optional)

Specifications

| | | | |
|--------------------------|--|------------------------------|---|
| Interface | 8x 10/100/1000Base-T + 2x 100/1000Base-X SFP | Management | Web/Telnet/SNMP management interface TFTP/HTTP firmware upgrade |
| HW capability | Non-blocking wire speed switching performance 9.6K bytes jumbo frame forwarding 8K MAC address table | SNMP agent | SNMP v1/v2c/v3 |
| VLAN Feature | IEEE 802.1Q tagged VLAN, IEEE 802.1ad Q-in-Q | Optical interface | SFP LC connector |
| QoS Feature | IEEE 802.1p 8 priority queues per port | Power input | AC Power Adapter |
| Bandwidth Control | Per port based egress/ingress rate limit control | Operating Temperature | 0 ~ 50°C |
| IP Multicasting | IGMP snooping v1/v2/v3 | Humidity | 5% ~ 90% (non-condensing) |
| Storm Control | Unicast/Broadcast/Multicast storm suppression | Dimensions | 170 x 120 x 35mm (D x W x H) |
| | | Certification | FCC, CE, RoHS compliant |

Application



QoS with Four Priority Queues

The QoS (Quality Of Service) function provides eight priority queues to support different classifications of traffic. High priority packet streams experience less delay inside the GSW-2008MS, which supports lower latency for certain delay-sensitive traffic. The GSW-2008MS can classify the packet as one of the eight priorities according to VIP port.

Remote Firmware Upgrade

The remote firmware upgrade feature enables the switch to be updated remotely via firmware upgrade including the products that were already installed in the field. This feature eliminates the need for the users to ship the product back to the supplier.

Bandwidth Control

The Bandwidth Control function allows users to set the bandwidth of GSW-2008MS switch for both ingress and egress rate and can be allocated a variety of rates up to full bandwidth capability of the devices (100Kbps ~ 1000Mbps).

Broadband Services

The GSW-2008MS product philosophy allows the end user to follow and benefit fully from the fast developments in Fiber to the home-networking solutions. The CPE is the interface between the digital broadband network and the user peripheral equipment, such as routers, wireless access points, servers, and printers. With generations of computers and home networking equipment coming and going the GSW-2008MS will be a constant and reliable factor for the delivery of broadband data services.

These services are not limited to today's broadband internet applications. In the next few years, end-users will also benefit from next generation health-care, security, communication and infotainment services. The GSW-2008MS CPE platform fully supports today's services and is ready for the next wave of new broadband services. Flexibility is key, since the CPE functionality must be matched to the requirements of those new services.

Quick Installation

The installation of the wall-mount unit of GSW-2008MS CPE is swift and straightforward. Because of its size and ideal dimensions, the GSW-2008MS CPE can be positioned easily at the user residence or home. The GSW-2008MS design allows easy access for mounting and does not need the small elements, making the installation process predictable and hassle-free. The wall-mount unit, including integrated fiber tray, not only makes fiber handling and termination easy and robust, but also eliminates the need for optical patch cords.

Step 1

First, install fiber cable on the cable tray base.

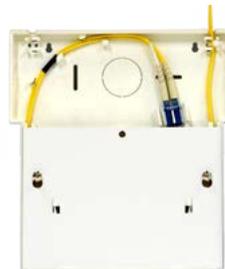


Single Fiber

Dual Fiber

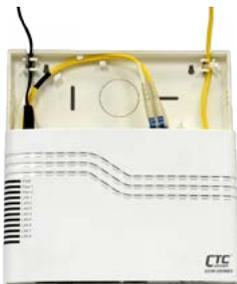
Step 2

Then, put the dust cover on the cable tray base and fasten two items with a screw securely.



Step 3

Use two wall-mounting holes on GSW-2008MS to install GSW-2008MS on the cable tray base. Connect the fiber cable connector to the SFP transceiver and connect the power cable.



Step 4

Finally, install the upper cover.



Ordering Information

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

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

FTH4-1000MS

Web Smart GbE OAM/IP Managed Converter with Cable Tray



The FTH4-1000MS is an IEEE802.3ah OAM compliant copper to fiber Gigabit Ethernet solution designed to make conversion between 10/100/1000Base-T and 100/1000Base-X with SFP based fiber optics. The FTH4-1000MS has a built-in cable tray that allows the installer to enclose the excessive fiber within the converter. When deployed as a stand-alone solution, this media converter incorporates an easy to use Web user interface for operation, administration and maintenance, both locally and remotely. By offering IEEE802.3ah OAM compliance, this converter can be linked to any IEEE802.3ah compliant fiber switch and support loop back and dying gasp functions. All functions of this converter and the remotely connected converter can be configured and monitored via Web management, including bandwidth control, duplex, speed and VLAN configuration.

Features

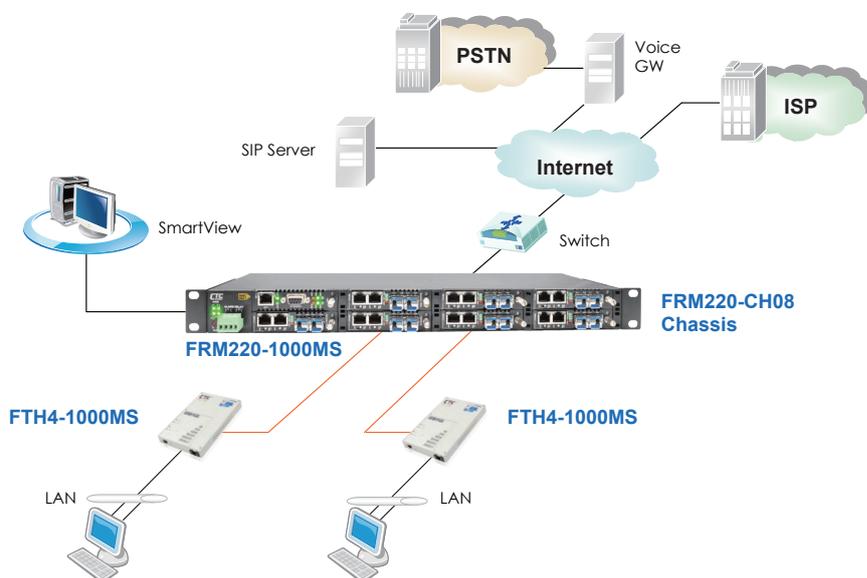
- 10/100/1000Base-T to 100/1000Base-X
- Forwarding 9k bytes Jumbo Packet
- Built-in fiber cable tray
- Ingress/Egress Bandwidth control
- Supports 802.3ah OAM/IP In-band management
- Firmware upgrade via Web
- Dying gasp (remote power failure detection)
- Supports Link Fault Pass-Through (LFPT) Function
- Supports Auto Laser Shutdown (ALS) Function
- Allow IP settings via Web management
- Supports On-Line F/W upgrade (local) by the Web manager
- Supports 16 Tag VLAN Group/ Q-in-Q
- RMON counters
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or Manual mode in TP port
- Supports flow control Enable or Disable

Specifications

| | | |
|--------------------------|---|---|
| Optical Interface | Connector | SFP LC |
| | Data rate | 100/1000Mbps |
| | 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 | IEEE802.3, IEEE802.3u IEEE802.3ab, IEEE802.3z, IEEE802.3x | |
| Indications | LED (Power, FX-Link, LAN Speed, LAN Link) | |
| Power Consumption | < 4W | |

| | | |
|-----------------------------|--|--|
| Dimensions | 220 x 140 x 27mm (D x W x H) | |
| Weight | 0.72kg | |
| 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 |
| Power | Adapter | Output Voltage:12VDC |
| Temperature | 0 ~ 60°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



QoS with Four Priority Queues

The QoS (Quality Of Service) function provides four priority queues to support different classifications of traffic. High priority packet streams experience less delay inside the FTH4-1000MS, which supports lower latency for certain delay-sensitive traffic. The FTH4-1000MS can classify the packet as one of the four priorities according to VIP port.

Dying Gasp

The Dying Gasp features enables FTH4-1000MS media converter to send out a SNMP trap to alert the SNMP manager in the event of remote power failure.

Remote Firmware Upgrade

The remote firmware upgrade feature enables the media converter to be updated remotely via firmware upgrade including the products that were already installed in the field. This feature eliminates the need for the users to ship the product back to the supplier.

Bandwidth Control

The Bandwidth Control function allows users to set the bandwidth of FTH4-1000MS media converter for both ingress and egress rate and can be allocated a variety of rates up to full bandwidth capability of the devices (64Kbps ~ 1000Mbps).

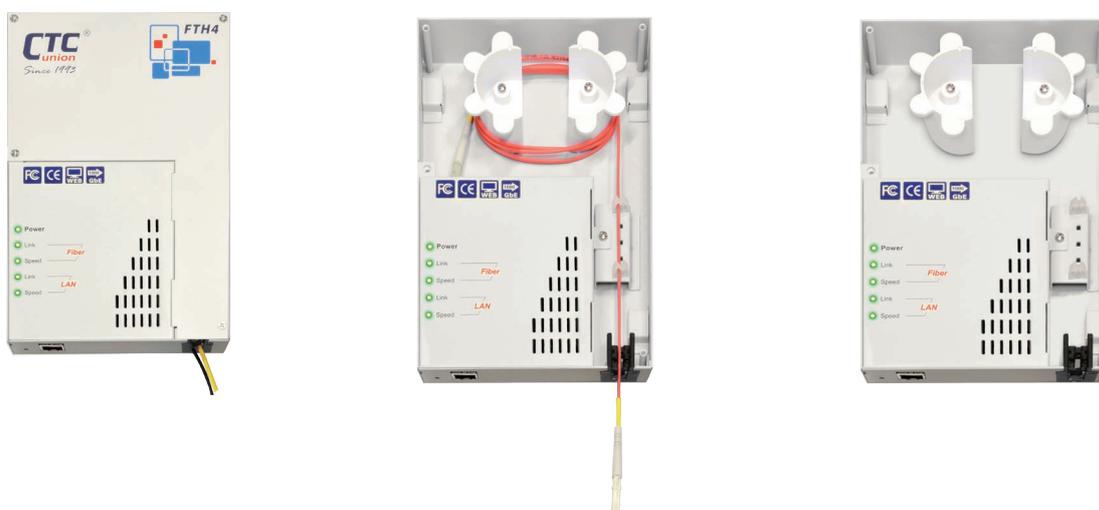
Broadband Services

The FTH4-1000MS product philosophy allows the end user to follow and benefit fully from the fast developments in Fiber to the home-networking solutions. The CPE is the interface between the digital broadband network and the user peripheral equipment, such as routers, wireless access points, servers, and printers. With generations of computers and home networking equipment coming and going the FTH4-1000MS will be a constant and reliable factor for the delivery of broadband data services.

These services are not limited to today's broadband internet applications. In the next few years, end-users will also benefit from next generation health-care, security, communication and infotainment services. The FTH4-1000MS CPE platform fully supports today's services and is ready for the next wave of new broadband services. Flexibility is key, since the CPE functionality must be matched to the requirements of those new services.

Quick Installation

The installation of the wall-mount unit of FTH4-1000MS CPE is swift and straightforward. Because of its size and ideal dimensions, the FTH4-1000MS CPE can be positioned easily at the user residence or home. The FTH4-1000MS design allows easy access for mounting and does not need the small elements, making the installation process predictable and hassle-free. The wall-mount unit, including integrated fiber tray, not only makes fiber handling and termination easy and robust, but also eliminates the need for optical patch cords.



Ordering Information

| Model Name | Description |
|-------------|--|
| FTH4-1000MS | 10/100/1000Base-T to 100/1000Base-X Web Smart OAM/IP managed media converter w/ cable tray |

FTH4-100M

Web Smart FE OAM/IP Managed Converter with Cable Tray



The FTH4-100M is an IEEE802.3ah OAM compliant copper to fiber Fast Ethernet solution designed to make conversion between 10/100Base-TX and 100Base-FX fiber optics. The FTH4-100M has a built-in cable tray that allows the installer to enclose the excessive fiber within the converter. When deployed as a stand-alone solution, this media converter incorporates an easy to use Web user interface for operation, administration and maintenance, both locally and remotely. By offering IEEE802.3ah OAM compliance, this converter can be linked to any IEEE802.3ah compliant fiber switch and support loop back and dying gasp functions. All functions of this converter and the remotely connected converter can be configured and monitored via Web management, including bandwidth control, duplex, speed and VLAN configuration.

Features

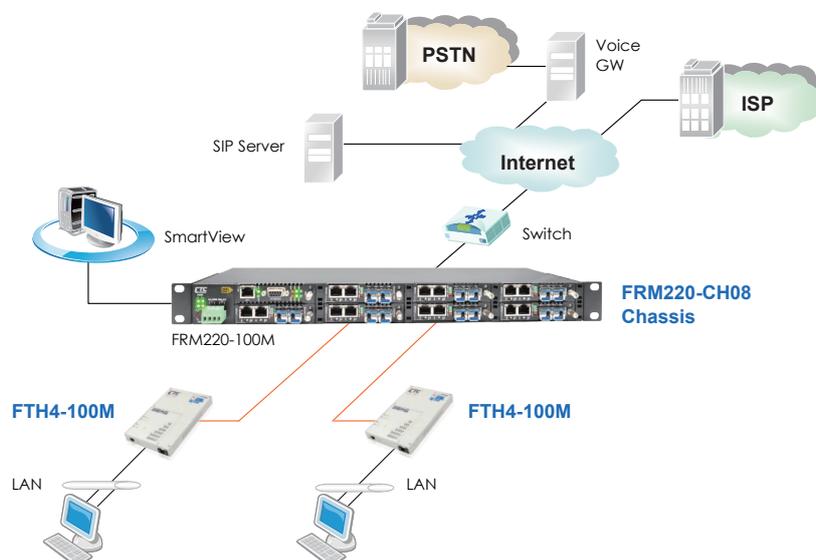
- 10/100Base-TX to 100Base-FX Converter
- Forwarding 9k bytes Jumbo Packet
- Built-in fiber cable tray
- Ingress / Egress Bandwidth control
- Support IEEE802.3ah-OAM/IP in-band management
- Firmware upgrade via Web
- Dying gasp (remote power failure detection)
- Supports Link Fault Pass-Through (LFPT) Function
- Supports Auto Laser Shutdown (ALS) Function
- Allow IP settings via Web management
- Supports On-Line F/W upgrade (local) by the Web manager
- Supports 16 Tag VLAN Group/ Q-in-Q
- RMON counters
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or Manual mode in TP port
- Supports flow control Enable or Disable

Specifications

| | | |
|--------------------------|--|---|
| Optical Interface | Connector | 1x9 (SC, ST, FC) (Option) |
| | Data rate | 100Mbps |
| | Duplex mode | Full duplex |
| | Fiber | MM 50/125 μ m, 62.5/125 μ m SM 9/125 μ m |
| | 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 | IEEE802.3, IEEE802.3u, IEEE802.3ah, IEEE802.3x | |
| Indications | LED (Power, FX-Link, LAN Speed, LAN Link) | |
| Power Consumption | < 4W | |

| | | |
|-----------------------------|--|--|
| Dimensions | 220 x 140 x 27mm (D x W x H) | |
| Weight | 0.72kg | |
| Electrical Interface | Connector | RJ-45 |
| | Data rate | 10Mbps, 100Mbps |
| | Duplex mode | Half / Full duplex |
| | Cable | 10Base-T Cat.3, 4, 5, UTP, 100Base-TX Cat.5, 5e or higher |
| Power | Adapter | Output Voltage: 12VDC |
| Temperature | 0 ~ 60°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



QoS with Four Priority Queues

The QoS (Quality Of Service) function provides four priority queues to support different classifications of traffic. High priority packet streams experience less delay inside the FTH4-100M, which supports lower latency for certain delay-sensitive traffic. The FTH4-100M can classify the packet as one of the four priorities according to VIP port.

Dying Gasp

The Dying Gasp features enables FTH4-100M media converter to send out a SNMP trap to alert the SNMP manager in the event of remote power failure.

Remote Firmware Upgrade

The remote firmware upgrade feature enables the media converter to be updated remotely via firmware upgrade including the products that were already installed in the field. This feature eliminates the need for the users to ship the product back to the supplier.

Bandwidth Control

The Bandwidth Control function allows users to set the bandwidth of FTH4-100M media converter for both ingress and egress rate and can be allocated a variety of rates up to full bandwidth capability of the devices (64Kbps ~ 100Mbps).

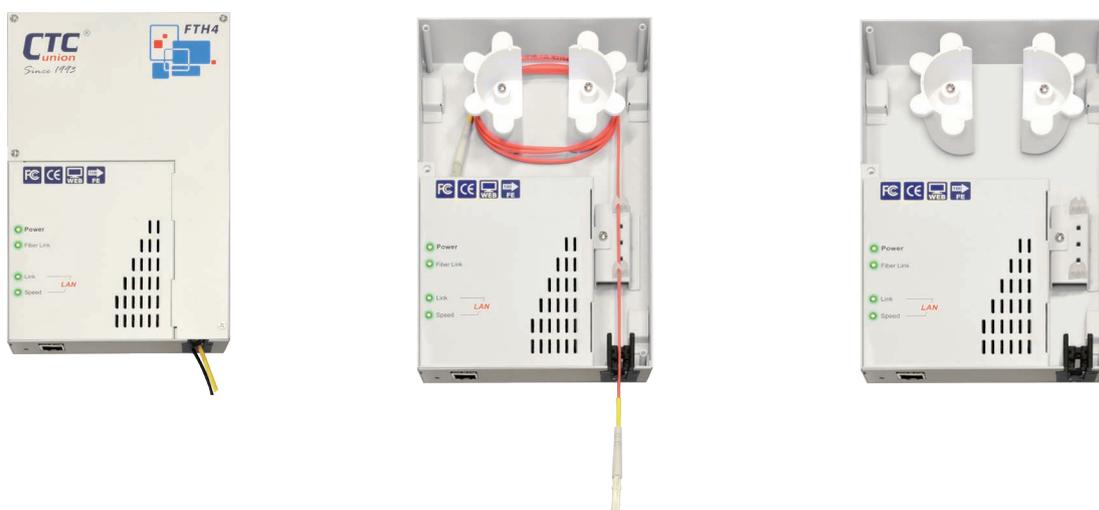
Broadband Services

The FTH4-100M product philosophy allows the end user to follow and benefit fully from the fast developments in Fiber to the home-networking solutions. The CPE is the interface between the digital broadband network and the user peripheral equipment, such as routers, wireless access points, servers, and printers. With generations of computers and home networking equipment coming and going the FTH4-100M will be a constant and reliable factor for the delivery of broadband data services.

These services are not limited to today's broadband internet applications. In the next few years, end-users will also benefit from next generation health-care, security, communication and infotainment services. The FTH4-100M CPE platform fully supports today's services and is ready for the next wave of new broadband services. Flexibility is key, since the CPE functionality must be matched to the requirements of those new services.

Quick Installation

The installation of the wall-mount unit of FTH4-100M CPE is swift and straightforward. Because of its size and ideal dimensions, the FTH4-100M CPE can be positioned easily at the user residence or home. The FTH4-100M design allows easy access for mounting and does not need the small elements, making the installation process predictable and hassle-free. The wall-mount unit, including integrated fiber tray not only makes fiber handling and termination easy and robust, but also eliminates the need for optical patch cords.



Ordering Information

| Model Name | Description |
|------------|--|
| FTH4-100M | 10/100Base-TX to 100Base-FX Web Smart OAM/IP managed media converter w/ cable tray |

NEW

GW-632FW

Gigabit Fiber IAD Residential Gateway



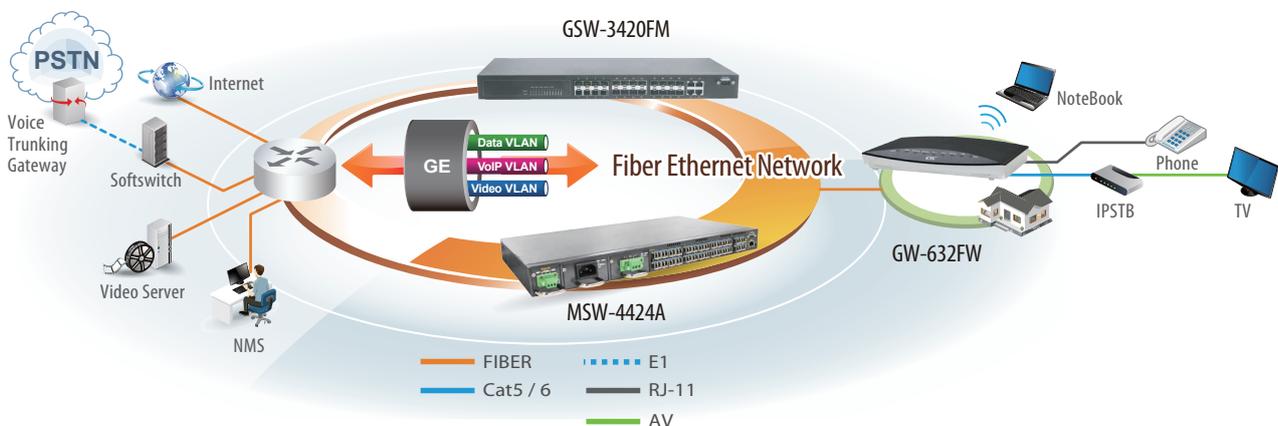
GW-632FW is a high performance Gigabit Ethernet residential gateway for Fiber-to-the-Home (FTTH) applications. It features both SFP based fiber and RJ-45 copper GbE WAN, four ports GbE LAN, two USB 2.0 host ports, WiFi 802.11 b/g/n and two VoIP FXS POTS ports. The integrated four port 10/100/1000M GbE switch features auto-crossover detection for easy connection with other Ethernet devices. The WAN port comes with RJ45 and SFP with autosensing for various types of optical transceiver modules.

The GW-632FW performs at near wire speed (1000Mbps) between WAN and LAN to provide good quality of service for high definition IPTV, VoIP and high speed Internet applications simultaneously. The two lines VoIP service over telephone uses SIP protocol to fulfill most toll quality telephony requirements for various countries. The built-in WiFi IEEE 802.11 b/g/n 2T2R provides excellent wireless performance to other client devices. The GW-632FW also supports IPv6 for future extending services. Network management may be via TR-069, Web or Telnet for advanced system provisioning and future upgrades. The two USB 2.0 host ports may be used for home cloud storage or print server applications. With these highly integrated features, the GW-632FW provides tremendous flexibility for the service provider with add on value customization to their subscribers.

Features

- Gigabit Ethernet interface with autosensing of RJ45 & SFP
- SFP port for expansion to optical connection by plug-in 100/1000M optical transceiver module
- Integrated high performance packet acceleration engine to provide near wire speed 1000Mbps WAN to LAN routing performance
- Integrated four-port Giga Ethernet switch with automatic speed sensing and crossover correction
- Supports four ports 10/100/1000 Mbps Ethernet for Internet Access or IPTV streaming video application
- IEEE 802.11-compliant WLAN supports up to 54 Mbps (11g) or 300Mbps (11n) physical link rate and air transmission is secured by WEP, WEP2, WPA, WPA2, TKIP, AES, 802.11i or 802.1x
- Supports Ethernet IEEE 802.1Q/p VLAN and priority queue, as well as IEEE 802.3x flow control
- Single fiber BiDi SC/APC receptacle.
- Supports various voice CODECs, echo cancellation, voice activity detection (VAD), comfort noise generation (CNG), caller ID, DTMF tone detection/generation and etc.
- Supports SIP signaling protocol and bonus services like call forwarding, call waiting, call transfer, call busy, call return, enquiry service, CLIP/CLIR and three way conference
- Two USB 2.0 host port may be used for application of home cloud storage and printer server
- Supports Networking protocols such as PPP, NAT, Routing, DHCP server / relay / client
- Configuration and management via CLI/Telnet, Web/HTTP, TR-064 or TR-069
- Software is upgradeable through HTTP or TFTP or TR-069One SFP Electrical Footprint interface complies MSA
- Supports Ethernet IEEE 802.1Q/p VLAN and priority, as well as IEEE 802.3x flow control

Application



Specifications

Hardware

| | |
|-------------------------|---|
| WAN Interface | 10/100/1000M Ethernet with RJ45 & SFP |
| Local Interface | Four ports 10/100/1000Base-T auto-sensing Ethernet switch with auto-MDIX support, in RJ-45 connector Two USB 2.0 host ports in type A connector, with up to 500mA / 5Vdc power supply each WiFi 802.11b/g/n (draft 2.0 compliance, 2T/2R @ 2.4GHz) Wireless LAN Access Point - Two Internal antennas: 1.5dBi - Link Rate : 300 Mbps max. - RF radiated power: maximum 100mW EIRP |
| LED Indicators | POWER – ON indicates RG (Residential Gateway) is correctly powered. WAN – GREEN ON indicate WAN port (RJ45 or SFP) is linked; GREEN blinking indicates data transmitting. Ethernet –GREEN ON indicates LAN port is linked; GREEN blinking ON indicates data transmitting. Wireless – ON indicates WLAN is active and blinking when there is traffic. TEL1 – ON indicates a VoIP call is undergoing, flashing while there is an incoming call. TEL2 – ON indicates a VoIP call is undergoing, flashing while there is an incoming call. Internet – ON indicates Internet connection is successfully established. USB – ON indicates an USB device is recognized and linked. WPS- blinking indicates the router is ready for WPS auto authentication. |
| Environment | Operation Temperature 0°C ~ +45°C Operation Humidity 10% ~ 90% (non-condensing) Storage Temperature -20°C ~ +70°C Storage Humidity 10% ~ 90% (non-condensing) |
| Power | AC Power Adapter: input 100~240 VAC 50/60 Hz; output 12 Vdc, 2 Amp Optional AC UPS: input 85~264 VAC / 47~70 Hz; output 12 Vdc, 2 Amp Power consumption < 21 W |
| Dimensions | 160 x 255 x 42 mm (D x W x H) |
| Certificates | CE, FCC Part 15 Class B |
| Software | |
| GbE WAN | Auto Detection between SFP and RJ-45. |
| WAN Connection | Static IP, or Dynamic IP by DHCP client PPPoE Bridge mode Supports of authentication of the IPoE connection via IEEE 802.1x EAP encapsulation over LANs (EAPOL) Supports multiple WAN interfaces in mixed mode |
| Routing | Static route by gateway or interface Policy route by interface, source or destination IP address / subnet, protocol or port range Dynamic Routing with RIP v1 and v2 IGMP proxy (v1/v2) for IP multicasting |
| NAT and Firewall | NAT / PAT with extensive ALG's (SIP, IRC, TFTP, H.323, SNMP and RTSP), pass-through for IPsec/L2TP/PPTP, as well as one DMZ zone Up to 512 translations with 16 static entries Virtual server supports up to 20 entries Firewall features MAC address filter, URL blocking, Internet cROUTERent filter, Access cROUTERrol list (ACL based on IP/Port address), schedule rule and virtual DMZ UPnP NAT traversal and VPN / IPsec pass-through Secondary IP address |

| | |
|---|---|
| QoS Features | Supports up to 8 priority queues per egress bridge port, with SP scheduling and configurable queue packet size Supports a downstream mapping table from 802.1p P-bits field to priority levels Supports a downstream mapping table from DSCP code points to priority levels VLAN tagged packets are mapped to priority queues according to P-bits mapping table Untagged IP packets are mapped to priority queues according to DSCP mapping table Configurable default priority level for untagged non-IP packets |
| Bridging | 802.1Q VLAN tagging and un-tagging, 802.1p with 8 priority queues 802.3x flow control Supports Unicast, Multicast and Broadcast traffic IGMP snooping v1/v2/v3 |
| Wireless LAN | WEP/WPA/WAP2/WPA-PSK/WPA2-PSK supported Hidden SSID WEP: 64 or 128 bits key length WPA (Wi-Fi Protected Access) and WPA2 in Personal or Enterprise mode, mix of WPA and WPA2, or 802.1x sing EAP with RADIUS Up to four SSID's to support virtual AP Supports WPS (both PBC and PIN code) for easily setting up secure wireless network Supports WDS (Wireless Distribution System) for repeater application WMM (Wi-Fi Multimedia) to support QoS for media service Access cROUTERrol list based on MAC address |
| Voice Features | Supports voice CODECs like G.711, G.729A/B G.168 line echo cancellation with up to 32ms tail Adaptive jitter buffer, packet loss concealment (PLC), silence compression and Caller ID DTMF tone detection and generation; Fax / Modem detection and pass-through |
| VoIP Telephony Bonus Services | Supports SIP (RFC3261), SDP (RFC2327, RFC3264) as well as both TCP and UDP transport Supports User Agent Client (UAC) - User Agent Server (UAS) call, or proxy call routing Supports SIP and telephone URL addressing Supports in-band DTMF tone sending / receiving and out-band DTMF signaling with RTP, as per RFC2833 Bonus services include: - Call Forwarding: Unconditional, No Response, On Busy - Call Waiting: Force Busy, Pickup and Release Old, Pickup and Put Old on Hold, Switch between two calls - Call Transfer, Call Back busy subscriber, Call Back last number called (call return) - Enquiry service - Three way conference Provisioning through TFTP client with configuration profile |
| System Management | |
| Configuration and Network Management | UPnP Internet Gateway Device (IGD v1.0) Supports syslog with remote server Ping client for IP diagnostic Any port management with cROUTERrol list (MCL) based on IP address Support Configuration Backup and Restore Supports TR-069, TR-098 & TR-104 TFTP (client), HTTP or TR-069 for firmware upgrade Local or remote configuration and management through Web, CLI, TR-064 or TR-069 |

Ordering Information

| Model Name | Description |
|------------|---------------------------------------|
| GW-632FW | Gigabit Fiber IAD Residential Gateway |

GSW3424M1

24-Port 10/100/1000Base-T + 4-Port GbE(SFP) L2 Managed Switch

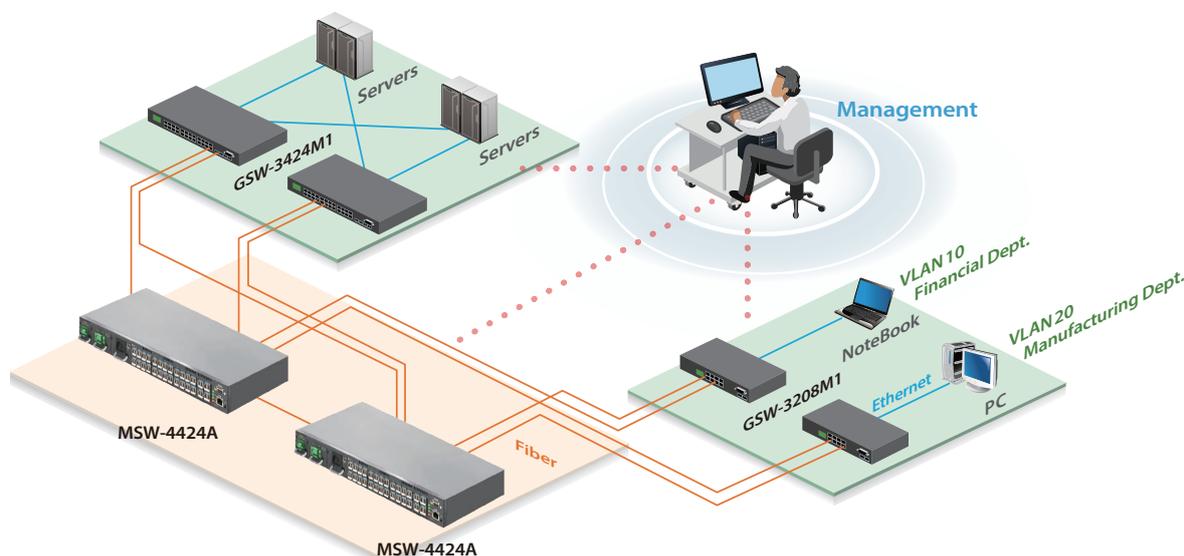


GSW-3424M1 is a cost-effect, high performance, managed L2 Ethernet with 20 x 10/100/1000Base-T ports and 4 x Gigabit Ethernet combo (10/100/1000Base-T or 1000Base-X) ports. This switch supports remote management by SNMP, HTTP and Telnet interfaces along with local management by console interface. GSW-3424M1 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

- 24 * RJ45 ports, with 10/100/1000Mbps, Full/Half duplex auto-negotiation and Auto-MDIX functions
- 4* 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 LoopBack 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/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 configuration download and upload
- IEEE 802.3az power management / FANless / Green Ethernet

Application



Specifications

| System | |
|----------------------------------|---|
| 10/100/1000 Base-T | 24 |
| 100/1G SFP Slot | 4 UTP/SFP Combo (Port 21~24) |
| Packet buffer | 512KB |
| MAC Table size | 8K |
| Max Packet size | 9600 Bytes |
| Switching capability | 14880pps at 10Mbps, 148810pps at 100Mbps, 1488095pps at 1Gbps with 64bytes packets. |
| Switch capacity | 48Gbps |
| Forwarding Rate | 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) |
| Environmental Temperature | Operating : 0 ~ 50°C Storage : -40 ~ 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) |

LED

| Power | Lights(Green) | System is receiving power |
|-------------------|---------------|---|
| System | Lights(Green) | System is ready |
| Link / Act | Lights | Link is ready 1000Mbps : Green |
| | Flashing | 10/100Mbps : Amber Data packets being received or sent |

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

Ordering Information

| Model Name | Description |
|-----------------|--|
| GSW-3424M1 | 24x 10/100/1000Base-T + 4x GbE(SFP) L2 Switch, AC power supply |
| GSW-3424M1-DC48 | 24x 10/100/1000Base-T + 4x GbE(SFP) L2 Switch, DC 48V power supply |

GSW – 3424M1 –
Example: **GSW – 3424M1 – DC48**

GSW3216M1

16-Port 10/100/1000Base-T + 2-Port Gbe(SFP) L2 Managed Switch

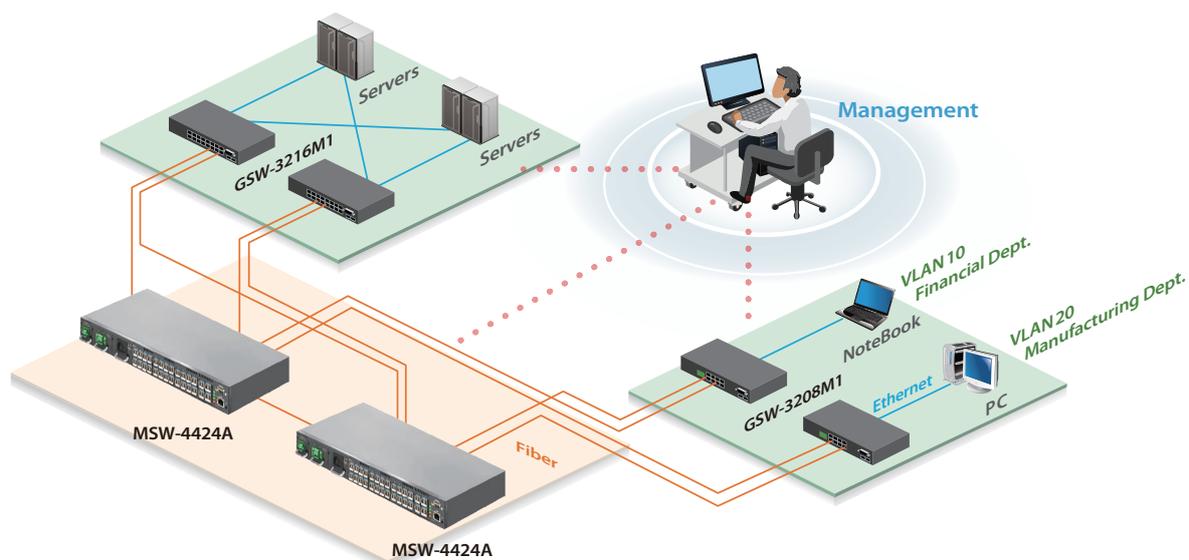


GSW-3216M1 is a cost-effect, high performance, managed L2 Ethernet with 16 x 10/100/1000Base-T ports and 2 x Gigabit Ethernet 1000Base-X ports. This switch supports remote management by SNMP, HTTP and Telnet interfaces along with local management by console interface. GSW-3216M1 supports many L2 switch 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

- 16 * RJ45 ports, with 10/100/1000Mbps, Full/Half duplex auto-negotiation and Auto-MDIX functions
- 2* Dual Speed SFP sockets, port 17 and port 18
- 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 LoopBack 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/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 configuration download and upload
- IEEE 802.3az power management / FANless / Green Ethernet

Application



Specifications

| System | |
|----------------------------------|---|
| 10/100/1000 Base-T | 16 |
| 100/1G SFP Slot | 2 |
| Packet buffer | 512KB |
| MAC Table size | 8K |
| Max Packet size | 9600 Bytes |
| Switching capability | 14880pps at 10Mbps 148810pps at 100Mbps 1488095pps at 1Gbps with 64bytes packets. |
| Switch capacity | 36Gbps |
| Forwarding Rate | 26.7Mpps |
| FAN Design | FAN less |
| Console port | D-Sub 9 |
| 19" Rack-Mount | Yes, with kits (optional) |
| SFP DDMI | Yes |
| Dimensions | 117 x 250 x 37 mm(D x W x H) |
| Environmental Temperature | Operating : 0 ~ 50°C Storage : -40 ~ 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 | 14 Watt Max. |
| Power Input | AC Power input (100V~240V) |

LED

| | | |
|-------------------|---------------|---|
| Power | Lights(Green) | System is receiving power |
| System | Lights(Green) | System is ready |
| Link / Act | Lights | Link is ready 1000Mbps : Green 10/100Mbps : Amber |
| | Flashing | Data packets being received or sent |

| 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, 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 v2, v3 snooping, (1024 groups) IGMP throttling, filtering, and leave proxy MVR |
| 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 |
| Management | HTTP server, CLI console port, Telnet, Management access filtering, SSHv2 and HTTPS IPv6 Management, System Syslog Software download through Web, 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 |

Ordering Information

| Model Name | Description |
|-----------------|--|
| GSW-3216M1 | 16x 10/100/1000Base-T + 2x GbE(SFP) L2 Switch, AC power supply |
| GSW-3216M1-DC48 | 16x 10/100/1000Base-T + 2x GbE(SFP) L2 Switch, DC 48V power supply |

GSW – 3216M1 –
Example: **GSW – 3216M1 – DC48**

GSW3208M1

8-Port 10/100/1000Base-T + 2-Port GbE(SFP) L2 Managed Switch



3

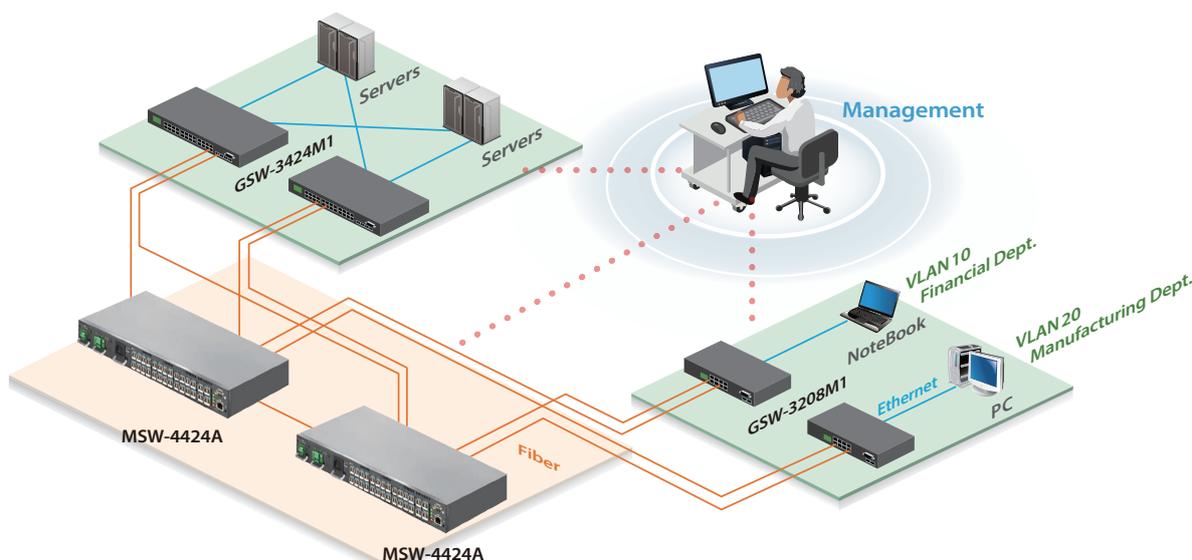
Enterprise ethernet switch

GSW-3208M1 is a cost-effect, high performance, managed L2 Ethernet with 8 x 10/100/1000Base-T ports and 2 x Gigabit Ethernet 1000Base-X ports. This switch supports remote management by SNMP, HTTP and Telnet interfaces along with local management by console interface. GSW-3208M1 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

- 8* RJ45 ports, with 10/100/1000Mbps, Full/Half duplex auto-negotiation and Auto-MDIX functions
- 2* Dual Speed SFP sockets, Port9 and Port10
- 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 LoopBack Detection function
- Q-in-Q(double tagging) 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/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 configuration download and upload
- IEEE 802.3az power management / FANless / Green Ethernet

Application



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

Specifications

| System | |
|----------------------------------|--|
| 10/100/1000 Base-T | 8 |
| 100/1G SFP Slot | 2 |
| Packet buffer | 512KB |
| MAC Table size | 8K |
| Max Packet size | 9600 Bytes |
| Switching capability | 9600 Bytes 14880pps at 10Mbps, 148810pps at 100Mbps, 1488095pps at 1Gbps with 64bytes packets |
| Switch capacity | 20Gbps |
| Forwarding Rate | 14.8Mpps |
| FAN Design | FAN less |
| Console port | D-Sub 9 |
| 19" Rack-Mount | Yes, with kits (Optional) |
| SFP DDMI | Yes |
| Dimensions | 117 x 250 x 37 mm(D x W x H) |
| Environmental Temperature | Operating : 0 ~ 50°C Storage : -40 ~ 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 | 8.5 Watt Max |
| Power Input | AC Power input (100V~240V) |

LED

| | | |
|-------------------|---------------|---|
| Power | Lights(Green) | System is receiving power |
| System | Lights(Green) | System is ready |
| Link / Act | Lights | Link is ready 1000Mbps : Green 10/100Mbps : Amber |
| | Flashing | 10/100Mbps : Amber Data packets being received or sent |

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

Ordering Information

| Model Name | Description |
|-----------------|---|
| GSW-3208M1 | 8x 10/100/1000Base-T + 2x GbE(SFP) L2 Switch, AC power supply |
| GSW-3208M1-DC48 | 8x 10/100/1000Base-T + 2x GbE(SFP) L2 Switch, DC 48V power supply |

GSW – 3208M1 – □□□□
Example: **GSW – 3208M1 – DC48**

FSW-2104

4-Port 10/100Base-TX and 100Base-FX Switch



The FSW-2104 provides a low cost solution for non-managed Ethernet fiber switches. The FSW-2104 is a 4-port 10/100Base-TX plus 1-port 100Base-FX Fast Ethernet switch. It is designed for small workgroup applications that require a long distance connection to the backbone, such as between buildings, offices, or within a campus location. FSW2104 provide full-duplex capability on each auto-negotiating port, for enhanced performance. A wide range of transceiver selection provides fiber connection with SC, FC or ST type connectors in multimode or single mode and at distance from 2 to 120km as well as BiDi (single fiber) at distances of 20, 40, 60, or 80km.

Features

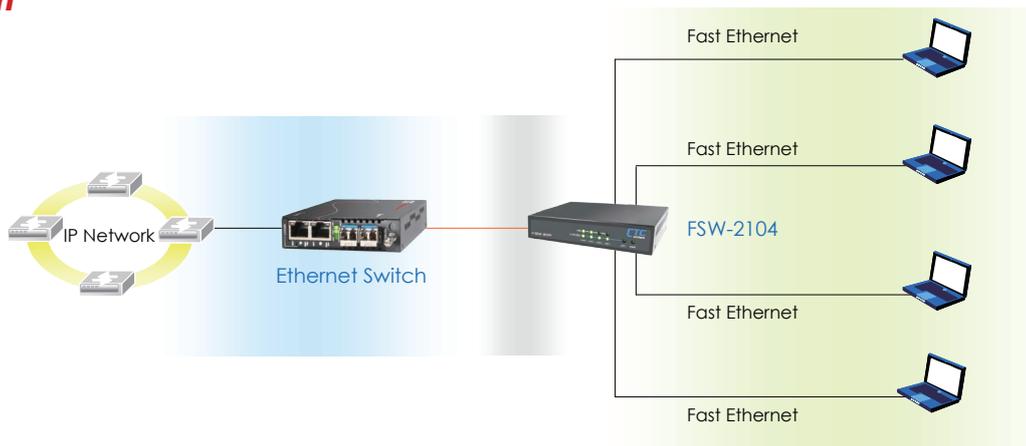
- 4-Port 10/100Base-TX to 100Base-FX
- Auto-Negotiation
- Auto MDI / MDIX
- Forward 1552 bytes (Max.) packets
- Supports 1K MAC address
- 512k bits packet buffer memory
- Supports broadcast storm protection

Specifications

| Optical Interface | | |
|----------------------|------------------------------|--|
| Connector | 1x9 (SC, ST) | |
| 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) | |
| Electrical Interface | | |
| Connector | RJ-45 | |
| 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 | |
| Indications | LED (FX Link, TX SPD, TX Link/Act) | |
| Power Input | Card | : 5 VDC |
| | Standalone | : AC, DC options |
| Power Consumption | < 4W | |
| Dimensions | 138 × 77 × 28mm (D × W × H) | |
| Weight | 450g | |
| Temperature | 0 ~ 50°C (Operating), 0 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|------------|---|
| FSW-2104 | 4-Port 10/100Base-TX to 100Base-FX Managed Switch |

| Connector Type | Connectivity Distance |
|----------------|--|
| SC | 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

FSW - 2104 -

Example: FSW - 2104 - SC002

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



IFC-1000PSE IFC-1000PSE/A

Gigabit Ethernet PoE PSE Media Converter

The IFC-1000PSE/A is a copper to fiber Gigabit Ethernet solution designed to make conversion between 10/100/1000Base-T to 1000Base-SX/LX with SFP LC connector. The IFC-1000PSE complies with IEEE802.3af Power Over Ethernet standard with external AC power adapter or internal AC power build-in. This PoE media converter is a Power Sourcing Equipment (PSE) which combines data received over a TP Link with 48VDC power, providing power to IEEE802.3af powered device (PD) over the existing CAT5 UTP cable. Other features include Link fault Pass-Through (LFPT), Store and Forward Switching, auto or forced mode setting for copper Ethernet as well as auto laser shutdown.

Features

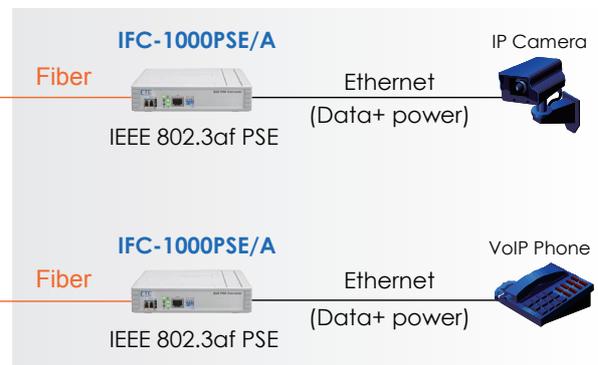
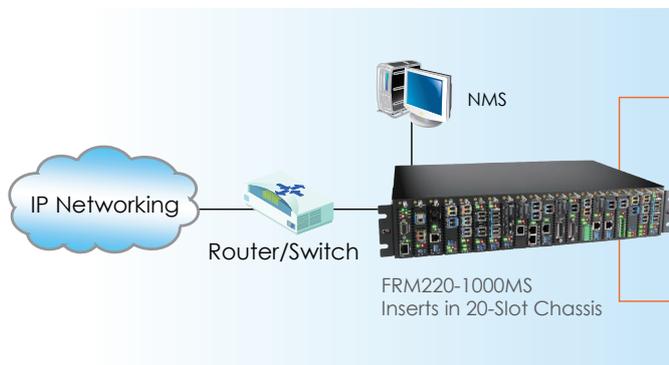
- 10/100/1000Base-T to 1000Base-SX/LX SFP
- IEEE 802.3af Compliant PSE (power sourcing equipment)
- Auto-negotiation or forced mode
- Auto MDI/MDIX
- Store and Forward Switching Mechanism
- Supports 4K MAC address
- Supports 256K Byte Packet Buffer
- Forward 1632 bytes (max.) packets
- Supports Link fault Pass-Through (LFPT) function

Specifications

| | | |
|-----------------------------|-------------|---|
| Optical Interface | Connector | SFP LC |
| | Data rate | 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) |
| 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 1000Base-T Cat 5, 5e or higher |

| | | |
|--------------------------|---|-------|
| PSE Output Power | Class 0: | 15.4w |
| | Class 1: | 4w |
| Standards | Class 2: | 7w |
| | Class 3: | 15.4w |
| Indications | IEEE 802.3, 802.3u, 802.3ab, 802.3z, 802.3af, 802.3x | |
| Power Input | LED (Power, FX-Link, FX Duplex, TX-SPD, TX-Duplex, TX-Link) | |
| Power Consumption | 100 ~ 240VAC | |
| Dimensions | < 5W (w/o PSE Output Power) | |
| Weight | 201 x 135 x 35mm (D x W x H) | |
| Temperature | 0.58kg | |
| Humidity | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Certification | 10 ~ 90% non-condensing | |
| MTBF | CE, FCC, RoHS compliant | |
| | 75,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| IFC-1000PSE/A | GE PSE media converter with DC 48V in AC adapter |
| IFC-1000PSE-AC | GE PSE media converter with built-in AC power 100 ~240V |

Interface Power Type
IFC - □□□□□□□□ - □□
 Example: IFC - 1000PSE- AC

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

IFC-100PD

10/100Base-TX to 100Base-FX Power over Ethernet PD Media Converter



PoE/PD converter

The IFC-100PD is Power over Ethernet 10/100Base-TX to 100Base-FX non-managed PD(Power Device) Fiber converter, which give you the options to choose from the most popular fiber cabling connectors, ST, SC, FC. Both multi-mode and single mode converter models are available as well as BiDi which allows bi-directional transmissions using only a single fiber cable. With Power over Ethernet (PoE) feature, IFC-100PD takes power supply over Ethernet cable from PoE Ethernet Switch and may work without external power adapter. When auto-negotiation is selected, these units will automatically tailor themselves to convert both half-duplex and full-duplex signals, according to IEEE802.3u standards. LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status. The stand-alone converter may also be concentrated into either the FMC-CH08 or FMC-CH17 non-managed chassis.

Features

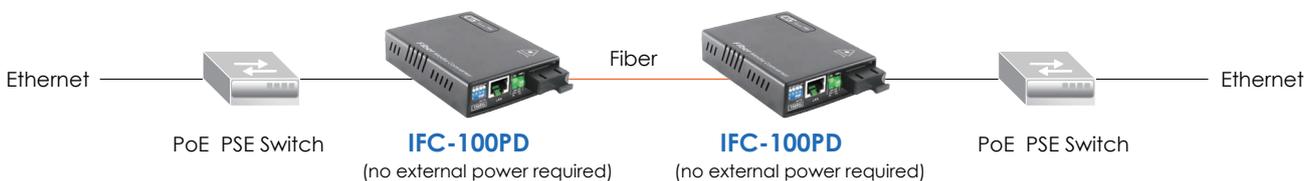
- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 1600 bytes (Max.) packets
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1Q Tag VLAN pass thru
- Supports flow control (Pause)
- Supports Link Fault Pass-Through (LFPT)
- Forward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

Specifications

| | | |
|--------------------------|-----------------------------|--|
| Optical Interface | Connector | 1x9 (SC, ST, FC) |
| | Data rate | 125Mbps |
| | Duplex mode | Full duplex |
| | Fiber | MM 50/125μm, 62.5/125μm SM 9/125μm |
| | Distance | MM 2km, SM 15/30/50/80/120km WDM 20/40/60/80km |
| | Wavelength | WDM 1310Tx/1550Rx (type A) 1550Tx/1310Rx (type B) 1550Tx/1310Rx (type B) |
| | Electrical Interface | Connector |
| Data rate | | 10Mbps, 100Mbps |
| Duplex mode | | Half / Full duplex |
| Cable | | 10Base-T Cat.3, 4, 5, UTP, 100Base-TX Cat.5, 5e or higher 1000Base-T Cat 5, 5e or higher |
| PD Input Power | | 48VDC |

| | |
|--------------------------|---|
| Standards | IEEE 802.3, IEEE 802.3u, IEEE 802.3af |
| Indications | LED (Power, FX Link, TX SPD, TX Link, TX Duplex, FEF) |
| Power Input | FMC: DC 12V In |
| Power Consumption | < 4W |
| Dimensions | 108 x 74 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| IFC-100PD | 10/100Base-TX to 100Base-FX PoE PD media converter |
| Connector Type | Connectivity Distance |
| SC, ST, FC | 002: 2km 015: 15km 030: 30km 050: 50km 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
IFC - 100PD -
 Example: **IFC - 100PD - SC002**

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



INJ-G30

Gigabit Ethernet, IEEE802.3af/at High Power PoE Injector

This device consists of 1 PoE Injector ports. That can solve the limitation of the power outlet location and offer the system designer a flexible solution to locate the 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

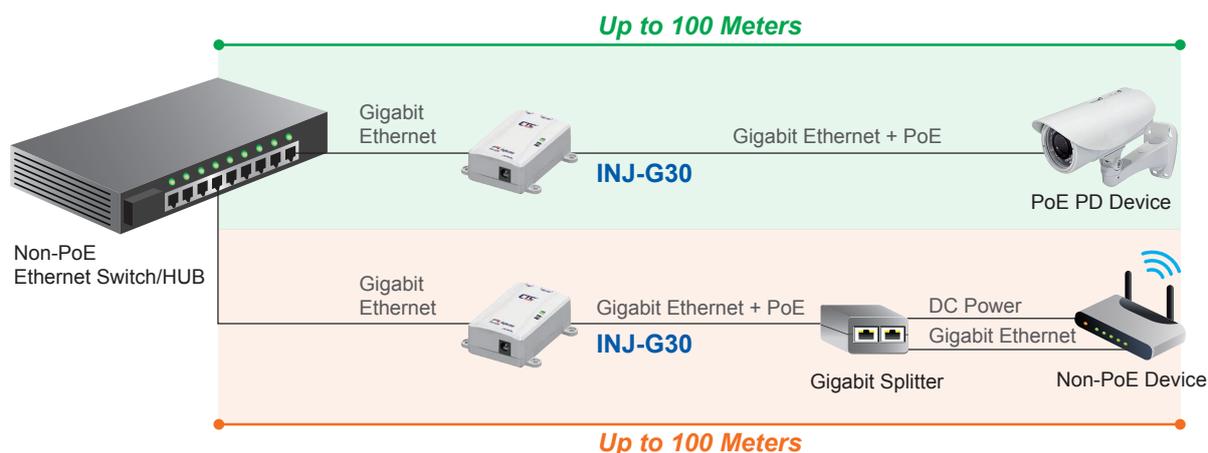
- 1 Port PoE Injector, 48V 30W output
- Compliant IEEE802.3af/at
- Providing 1 10/100/1000Mbps pass through data rate
- Wall Mountable
- Compliant with IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX and IEEE802.3ab 1000Base-T
- Safety & EMI Certificates: CE & FCC Class B Smart plug & play
- Compact Size

Specifications

| | |
|---------------------------------------|---|
| Ethernet Standard | IEEE 802.3 10Base-T PoE standard Connector |
| 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 Supply | DC48V 0.75A Output (maximum) AC 100V~240VAC Input |
| PoE Power output | 48V, 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



Ordering Information

| Model Name | Description |
|------------|--|
| INJ-G30 | 1 Port Gigabit Ethernet, IEEE802.3af/at high power PoE+ Injector |

FMC-CH17 FMC-CH08

FMC Fiber Media Converter Chassis



4

Compact converter chassis

The FMC-CH17 is a 2U high 19" 17 slots chassis and the FMC-CH08 is a 2U high 10" 8 slots chassis. The FMC chassis provides an economic solution in low density fiber converter installations where no management features are required. Each FMC or VDTU2A-301 converter is an independent Ethernet to fiber or Ethernet to copper media converter that may be used as a stand-alone 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

- FMC-CH17, 2U, 19", 17-Slot chassis with single or dual built-in power for AC or DC
- FMC-CH08, 2U, 10", 8-slot chassis with single built-in power for AC or DC
- 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 x 476 x 88 mm (FMC-CH17) 173 x 252 x 89 mm (FMC-CH08) |
| Weight | 7.9Kg (FMC-CH17), 1.47Kg (FMC-08) |

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

Overview



Toolless:
Easy to install or remove without any tools

FMC-CH17 Front view

FMC-CH08 Front view

- FMC Option Converters
- Fast Ethernet
 - Gigabit Ethernet
 - VDSL2 LAN Extender



17-Slot



8-Slot

- FMC Option
 - Fast Ethernet
 - Gigabit Ethernet
 - VDSL2 LAN Extender
- Rackmount bracket

FMC-CH17 Back view

FMC-CH08 Back view



- DC Power Terminal
- Power Switch
- FAN
- AC Power Socket
- Power Switch



- Power Switch
- AC Power or DC Power Terminal

Ordering Information

| Model Name | Description |
|-----------------------------|--|
| FMC-CH17-AC, DC, AD, AA, DD | 2U, 19", 17-Slot FMC Converter Chassis with AC, DC, AD, AA or DD power |
| FMC-CH08-AC,DC | 2U, 10", 8-Slot FMC Converter Chassis with single AC or DC power |

Power Type
FMC - CH17 - □□
 Example: FMC - CH17 - DC

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

NEW



FMC-1000S

10/100/1000Base-T to 100/1000Base-X Gigabit Ethernet Media Converter

The FMC-1000S 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. 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. When auto-negotiation is default setting, these units will automatically tailor themselves to convert full-duplex signals, according to IEEE802.3u standards. LED indicators signal the power status of the converter, UTP port speed and Link status FX port speed and Link status. The stand-alone converter may also be concentrated into FMC-CH17 non-managed chassis.

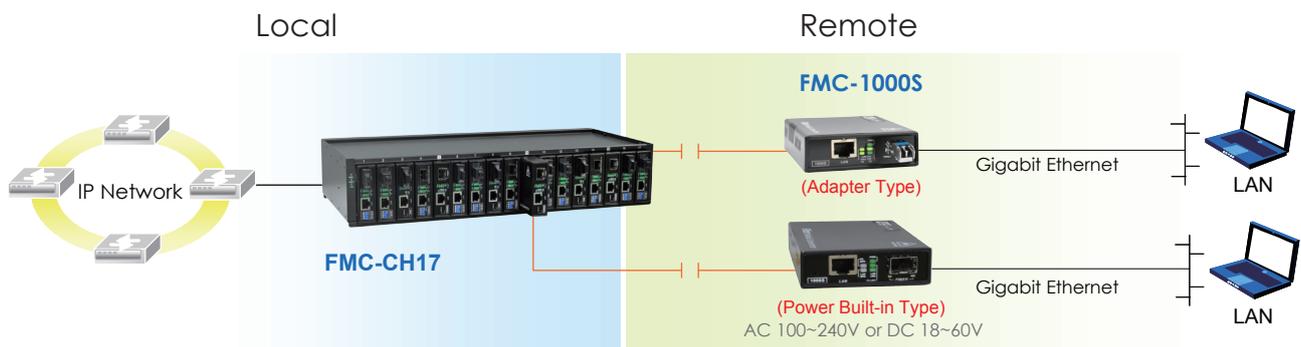
Features

- 10/100/1000Base-T to 100/1000Base-X Converter
- Auto-Negotiation (default setting)
- Auto MDI/MDIX
- Forward 2048 bytes (Max.) packets
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1Q Tag VLAN pass thru

Specifications

| | | | | | | | | | | |
|--|------------------|---|-------------------------------|---|---|-------------------------------------|--------------------------------|-------------------------------|-----------------|----------------------|
| Optical Interface | Connector | SFP LC | Standards | IEEE 802.3, 802.3u, 802.3Z, 802.3ab | | | | | | |
| | Data rate | 125Mbps/1.25G | | Indications | LED (Power, FX Link, FX SPD, TX SPD, TX Link) | | | | | |
| | Duplex mode | Full duplex | | | Power Input | Adapter Type: DC 12V | | | | |
| | Fiber | MM 50/125µm, 62.5/125µm SM 9/125µm | | | | Power Built-in Type : AC 100 ~ 240V | | | | |
| | Distance | MM 2km, SM 15/30km WDM 20/40km | | | | Power Built-in Type: DC 18 ~ 60V | | | | |
| | Wavelength | MM 1310nm, SM 1310,1550nm WDM 1310Tx/1550Rx (Type A) 1550Tx/1310Rx (Type B) | | | | Power Consumption | < 3W | | | |
| Electrical Interface | Connector | RJ-45 | Dimensions (D x W x H) | | | | Adapter Type:108 x 73.4 x 23mm | | | |
| | Data rate | 10Mbps, 100Mbps, 1000Mbps | | Power Built-in Type : 135 x 73.4 x 23mm | | | | | | |
| | Duplex mode | Full duplex | | Weight | Adapter Type : 120g | | | | | |
| | Cable | 100Base-TX Cat.5, 5e or higher 1000Base-T Cat.5, 5e or higher | | | Power Built-in Type : 140g | | | | | |
| | Standards | Indications | | | Power Input | | Power Consumption | Dimensions (D x W x H) | | |
| | | | | | | Temperature | | | Humidity | Certification |
| 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | | | | | | | | | | |
| 10 ~ 90% non-condensing | | | | | | | | | | |
| CE, FCC, RoHS compliant | | | | | | | | | | |
| 65,000 hrs | | | | | | | | | | |

Application



Ordering Information

| Model Name | Description |
|---------------------|---|
| FMC-1000S | 10/100/1000Base-T to 100/1000Base-X media converter Adapter Type |
| FMC-1000S-AC, DC | 10/100/1000Base-T to 100/1000Base-X media converter with AC or DC Power |
| FMC-1000S-WM | 10/100/1000Base-T to 100/1000Base-X media converter Adapter Type with Wall Mount Kits |
| FMC-1000S-WM-AC, DC | 10/100/1000Base-T to 100/1000Base-X media converter with AC or DC Power and Wall Mount Kits |



Wall-Mount Type Non Wall-Mount Type

Power Type
FMC - 1000S - □□
 Example: FMC - 1000S - DC

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

FMC-10/100

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



NEW

4
Fast ethernet
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. When auto-negotiation is selected, these units will automatically tailor themselves to convert both half-duplex and full-duplex signals, according to IEEE802.3u standards. LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status. The stand-alone adapter type converter may also be concentrated into FMC-CH17 chassis.

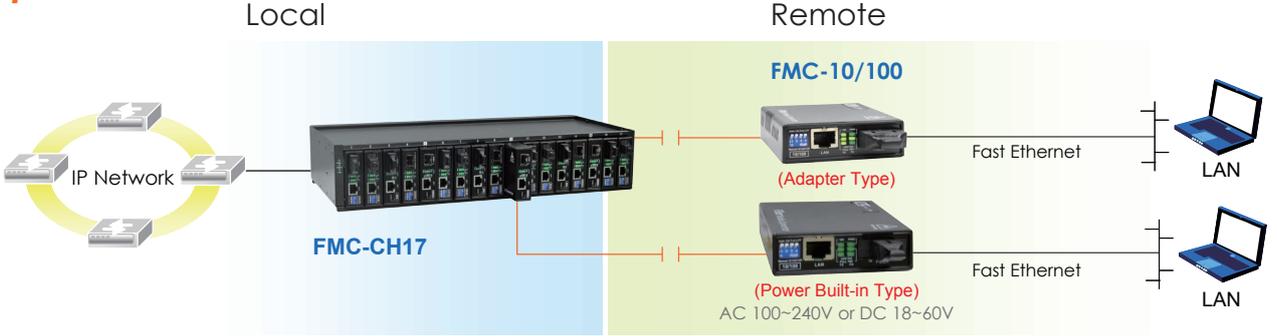
Features

- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 1600 bytes (Max.) packets
- Supports IEEE 802.1Q Tag VLAN pass thru
- Supports Q in Q double tagged frame transparent
- 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)

Specifications

| | | | | | |
|-----------------------------|--|---|---|--------------------------|---|
| Optical Interface | Connector | 1x9 (SC, ST, FC) | Standards | IEEE 802.3, IEEE 802.3u | |
| | Data rate | 125Mbps | | Indications | LED (Power, FX Link, TX SPD, TX Link, TX Duplex, FEF) |
| | Duplex mode | Full duplex | | | Power Input |
| | Fiber | MM 50/125µm, 62.5/125µm SM 9/125µm | | Power Consumption | |
| | Distance | MM 2km, SM 15/30km WDM 20/40km | | | Dimensions (D x W x H) |
| Wavelength | MM 1310nm, SM 1310, 1550nm WDM 1310Tx/1550Rx (Type A) 1550Tx/1310Rx (Type B) | Weight | Adapter Type : 120g Power Built-in Type : 140g | | |
| Electrical Interface | Connector | | RJ-45 | Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| | Data rate | 10Mbps, 100Mbps | Humidity | | 10 ~ 90% non-condensing |
| | Duplex mode | Half / Full duplex | | Certification | CE, FCC, RoHS compliant |
| | Cable | 10Base-T Cat.3, 4, 5, UTP 100Base-TX Cat.5, 5e or higher | MTBF | | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|----------------------|---|
| FMC-10/100 | 10/100Base-TX to 100Base-FX Fast Ethernet media converter Adapter Type |
| FMC-10/100-AC, DC | 10/100Base-TX to 100Base-FX Fast Ethernet media converter with AC or DC Power |
| FMC-10/100-WM | 10/100Base-TX to 100Base-FX Fast Ethernet media converter Adapter Type with Wall Mount Kits |
| FMC-10/100-WM-AC, DC | 10/100Base-TX to 100Base-FX Fast Ethernet media converter with AC or DC Power and Wall Mount Kits |
| 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 |



Wall-Mount Type Non Wall-Mount Type

Power Type
FMC - 10/100 - □□
 Example: FMC - 10/100 - DC

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

NEW



FIB-232A

RS-232 to Fiber Media Converter

The FIB-232A is a low cost, compact, fiber converter designed to extend asynchronous RS-232 transmissions up to 120Km without any repeaters. The transmissions run in fibers which provide for excellent data security as well as being immune to EMI/RFI, variations in ground potentials, and lightning strikes. The FIB-232A operates at the physical layer (OSI Layer 1) and is completely transparent to the RS-232 transmissions and protocols. The FIB-232A uses an external power adapter. Utilizing an ST or SC fiber cable, the FIB-232A operates in Full Duplex mode for bi-directional transmissions. The FIB-232A RS-232 interface operates in DCE mode for direct connection to DTE devices such as PC DB9 port.

Features

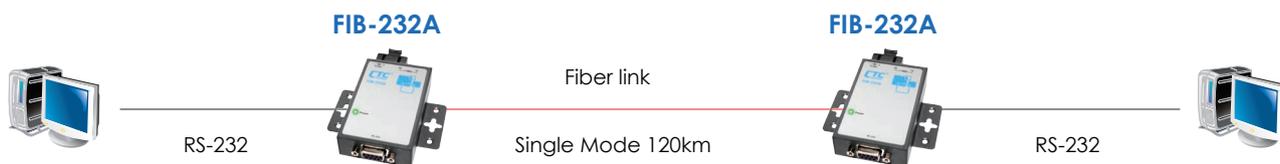
- Extends RS-232 transmission distance
 - Up to 2km with multi-mode fiber
 - Up to 120km with single-mode fiber
- Baud rates up to 230.4Kbps
- External power source supplied
- Compact size
- Designed for point to point use

Specifications

| | |
|---------------|------------------------------------|
| Signal Format | EIA RS-232C, ITU V.24, V.28 |
| Mode | Asynchronous |
| Connector | DB9 Female, DCE |
| Fiber Port | 1 x 9(ST, SC) |
| Fiber Type | Single Mode, Multi-mode |
| Light Source | FP Laser, DFB Laser |
| Wavelength | 1310 nm, 1550nm |
| Distance | 2Km, 15Km, 30Km, 60Km, 80Km, 120Km |

| | |
|----------------|---|
| Baud Rate | Up to 230.4Kbps |
| BER | 10 ⁻⁹ |
| Indications | LED (Power) |
| External Power | DC12V, 0.4A |
| Dimensions | 85 x 50 x 21mm (D x W x H) |
| Weight | 90g |
| Environment | 0 ~ 50°C, 20 ~ 95% RH -20 ~ 80°C, < 95% RH |
| Certification | CE, FCC, RoHS compliant |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| FIB-232A | RS-232 to fiber media converter |
| 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

FIB - 232A -

Example: FIB - 232A - SC002

FMC-1000M

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



NEW

4
Gigabit OAM
converter

The FMC-1000M family are Gigabit Ethernet 10/100/1000Base-T to 1000Base-X Web Smart OAM/IP based managed fiber media converters, which provide simple control and setting function on each Ethernet port through out of band network via a Web browser. The FMC-1000M media converters give you the fiber cabling connector, 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. When auto-negotiation is selected, these units will automatically tailor themselves to convert both half-duplex and full-duplex signals, according to IEEE802.3u standards. LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status. The stand-alone adapter type converter may also be concentrated into FMC-CH17 chassis.

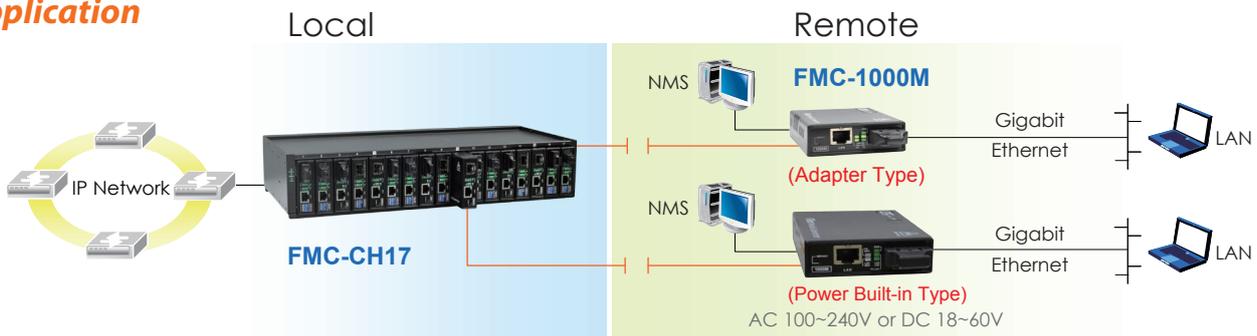
Features

- 10/100/1000Base-T to 1000Base-X Converter
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or Manual mode in TP port
- Support flow control Enable or Disable
- Support Jumbo Frame 9K Packet
- Ingress/Egress Bandwidth control
- Support 802.3ah-OAM/IP in-band management
- Firmware upgrade via Web
- Management Password Setting
- Dying gasp (remote power failure detection)
- Support Link Fault Pass Through (LFP) Function
- Support Auto Laser Shutdown (ALS) Function
- Web management on stand-alone.
- Support On-Line F/W upgrade (local) by the Web manager
- Support 16 Tag VLAN Group
- RMON counters

Specifications

| | | | | | |
|-----------------------------|-------------|--|----------------------|--|---|
| Optical Interface | Connector | 1x9 (SC, ST, FC) | Standards | IEEE 802.3, IEEE 802.3u IEEE 802.3ab, 802.3z | |
| | Data rate | 1000Mbps | | Indications | LED (Power, FX-Link, LAN Speed, LAN Link) |
| | Duplex mode | Full duplex | | | Power Input |
| | Fiber | MM 50/125µm, 62.5/125µm SM 9/125µm | | Power Consumption | |
| | Distance | MM 550m, SM 20/40km WDM 20/40km | | | Dimensions (D x W x H) |
| | Wavelength | MM 1310nm, SM 1310, 1550nm WDM 1310Tx/1550Rx (Type A) 1550Tx/1310Rx (Type B) | | Weight | |
| Electrical Interface | Connector | RJ-45 | Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| | Data rate | 10Mbps, 100Mbps, 1000Mbps | | Humidity | 10 ~ 90% non-condensing |
| | Duplex mode | Half / Full duplex | Certification | | CE, FCC, RoHS compliant |
| | Cable | 10Base-T Cat.3, 4, 5, UTP 100Base-TX Cat.5, 5e or higher | | MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|---------------------|---|
| FMC-1000M | 10/100/1000Base-T to 1000Base-X web smart OAM/IP managed media converter Adapter Type |
| FMC-1000M-AC, DC | 10/100/1000Base-T to 1000Base-X web smart OAM/IP managed media converter with AC or DC Power |
| FMC-1000M-WM | 10/100/1000Base-T to 1000Base-X web smart OAM/IP managed media converter Adapter Type with Wall Mount Kits |
| FMC-1000M-WM-AC, DC | 10/100/1000Base-T to 1000Base-X web smart OAM/IP managed media converter with AC or DC Power and Wall Mount Kits |
| Connector Type | Connectivity Distance |
| SC, ST, FC | 001: 550m 020: 20km 040: 40km 20A: WDM 20km B type 40A: WDM 40km A type 20B: WDM 20km B type 40B: WDM 40km B type |



Wall-Mount Type Non Wall-Mount Type

Power Type
FMC - 1000M - □□
 Example: FMC - 1000M - DC

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

NEW



FMC-1000MS

10/100/1000Base-T to 100/1000Base-X SFP Web Smart OAM Managed Converter

The FMC-1000MS family are Gigabit Ethernet 10/100/1000Base-T to 100/1000Base-X Web Smart OAM/IP managed fiber media converters, which provide simple control and setting function on each Ethernet port through out of band network via a Web browser. The FMC-1000MS media converters give you the fiber cabling connector, SFP-LC 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. When auto-negotiation is selected, these units will automatically tailor themselves to convert both half-duplex and full-duplex signals, according to IEEE802.3u standards. LED indicators signal the power status of the converter, UTP port speed, Link, and duplex status, FX port Link and duplex status. The stand-alone adapter type converter may also be concentrated into FMC-CH17 chassis.

Features

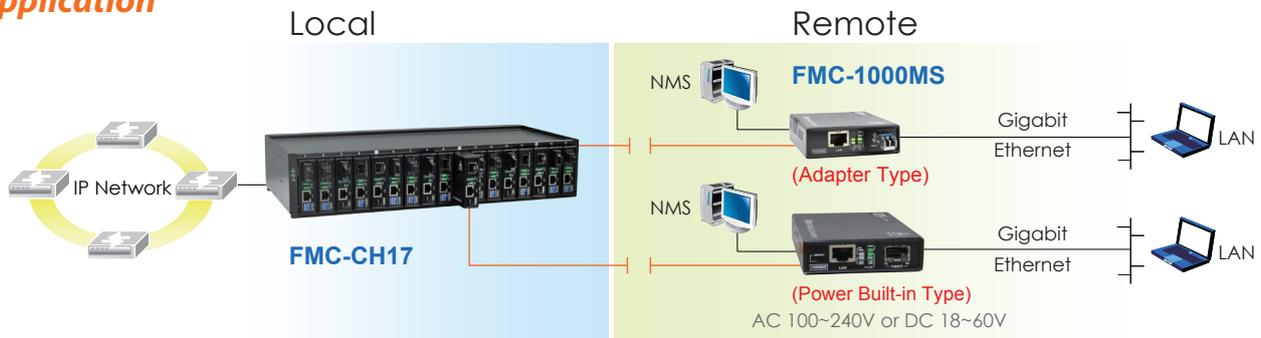
- 10/100/1000Base-T to 100/1000Base-X Converter
- Auto-Cross over for MDI/MDIX in TP port
- Auto-Negotiation or Manual mode in TP port
- Supports flow control Enable or Disable
- Supports Jumbo Frame 9K Packet
- Ingress/Egress Bandwidth control
- Supports IEEE802.3ah OAM management
- Firmware upgrade 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

Specifications

| | | |
|-----------------------------|-------------|---|
| Optical Interface | Connector | SFP LC |
| | Data rate | 125/1250Mbps |
| | Duplex mode | Full duplex |
| | Fiber | MM 50/125µm, 62.5/125µm SM 9/125µm |
| | Distance | MM 2km, SM 15/30km WDM 20/40km |
| | Wavelength | MM 1310nm, SM 1310,1550nm WDM 1310Tx/1550Rx (Type A) 1550Tx/1310Rx (Type B) |
| Electrical Interface | Connector | RJ-45 |
| | Data rate | 10Mbps, 100Mbps, 1000Mbps |
| | Duplex mode | Half / Full duplex |
| | Cable | 10Base-T Cat.3, 4, 5, UTP 100Base-TX Cat.5, 5e or higher |

| | |
|-------------------------------|--|
| Standards | IEEE 802.3, IEEE 802.3u IEEE 802.3ab, 802.3z |
| 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 73.4 x 23mm Power Built-in Type : 135 x 73.4 x 23mm |
| Weight | Adapter Type : 120g Power Built-in Type : 140g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|------------------|---|
| FMC-1000MS | 10/100/1000Base-T to 100/1000Base-X SFP web smart managed media converter (optional SFP module) Adapter Type |
| FMC-1000MS-AC,DC | 10/100/1000Base-T to 100/1000Base-X SFP web smart managed media converter (optional SFP module) with AC or DC Power |
| FMC-1000MS-WM | 10/100/1000Base-T to 100/1000Base-X SFP web smart managed media converter (optional SFP module) Adapter Type with Wall Mount Kits |
| FMC-1000MS-WM-AC | 10/100/1000Base-T to 100/1000Base-X SFP web smart managed media converter (optional SFP module) with AC or DC Power and Wall Mount Kits |



Power Type
FMC - 1000MS - □□
 Example: FMC - 1000MS - DC

FMC-10/100i

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



NEW

4 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

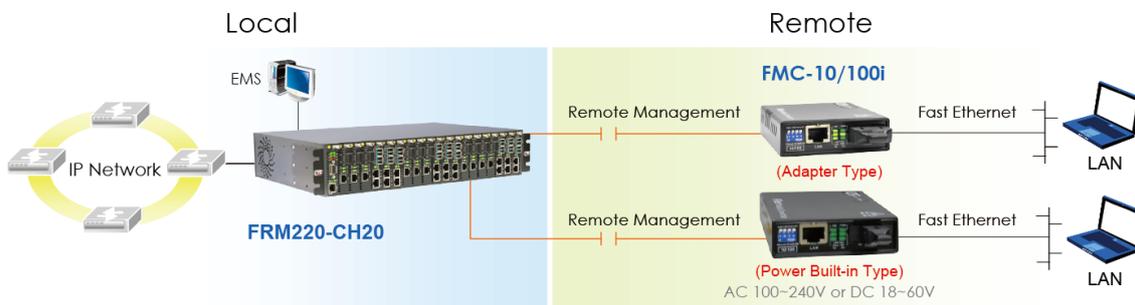
- 10/100Base-TX to 100Base-FX Converter
- Auto-Negotiation or forced mode
- Auto MDI/MDIX
- Forward 2046 bytes (Max.) packets in switch mode
- Forward 9K jumbo packets in converter mode
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1q Tag VLAN pass thru
- Supports local / remote In-band management (Monitor and Configure) by the SNMP manager with FRM220-10/100i
- 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, 100Mbps |
| | 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 73.4 x 23mm |
| | Power Built-in Type | 135 x 73.4 x 23mm |
| Weight | Adapter Type | 120g |
| | Power Built-in Type | 140g |
| Certification | CE, FCC, RoHS compliant | |
| 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 |
| FMC-10/100i-AC, DC | 10/100Base-TX to 100Base-FX In-band managed media converter with AC or DC Power |
| FMC-10/100i-WM | 10/100Base-TX to 100Base-FX In-band managed media converter Adapter Type with Wall Mount Kits |
| FMC-10/100i-WM-AC, DC | 10/100Base-TX to 100Base-FX In-band managed media converter with AC or DC Power and Wall Mount Kits |
| 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 |

Wall-Mount Type

Non Wall-Mount Type

Power Type
FMC - 10/100i - □□
Example: FMC - 10/100i - DC

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

NEW



PHB-200

**Managed SFP Patching Hub,
20x 100/1000Base-T to
20x 100/1000Base-X SFP**

PHB-200 is a 20-channel SFP patching hub that converts Ethernet copper 100/1000Base-TX to SFPs working at 100Mbps and 1000Mbps. PHB-200 can connect to any RJ-45 Ethernet switch and supports any third-party standard SFP module from any SFP vendor. PHB-200 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 network administrator can monitor, configure and control the activity of PHB-200 remotely.

Features

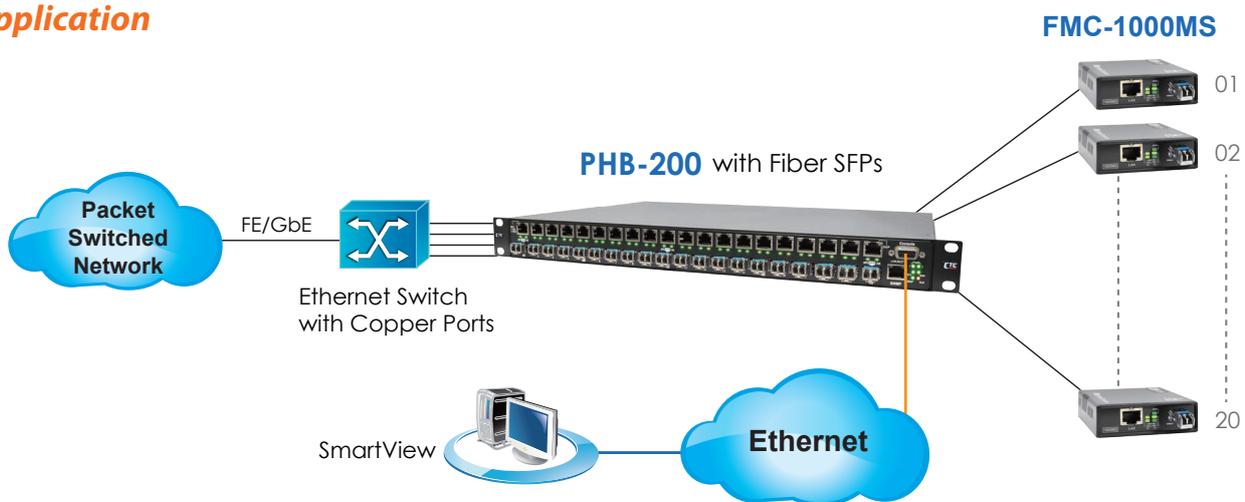
- 1U" Height 19" 20 channels SFP patching hub
- 20-port 100/1000Base-T to 20-port 100/1000Base-X SFP
- Auto MDI/MDIX in TP port
- Auto-Negotiation in TX port
- Supports hot-swappable SFPs working at 100 Mbps and 1000 Mbps
- Supports Web, Telnet, SNMP Management (PHB-200M)
- Local configuration via DB9 port
- Supports Link Pass-Through & Link loss Alarm
- Supports any third-party standard SFP module
- Supports SFP DDMI
- Layer 1 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, 18 ~ 72 VDC | |
| Power Consumption | AC : 105 VA DC : 70 W | |
| Dimensions | 180 x 440 x 44mm (D x W x H) | |
| Weight | 3kg | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Certification | CE, FCC, RoHS compliant | |

Application



Ordering Information

| Model Name | Description |
|---------------------|--|
| PHB-200M-AC, DC, AD | Managed 20-port 100/1000-TX to 20-port 100/1000-X SFP, built-in AC, DC or AD (AC+DC) Power |
| PHB-200-AC, DC, AD | 20-port 100/1000-TX to 20-port 100/1000-X SFP, built-in AC, DC or AD (AC+DC) Power |

Power Type
PHB-200 -
 Example: PHB-200M - DC

MX20-3155

Dual Channel WDM MUX/DeMUX



5

MUX/DeMUX

MX20-3155 is a dual channel, passive, protocol transparent, WDM multiplexer/demultiplexer which utilizes two popular WDM lambda channels of 1310nm and 1550nm. The demultiplexed channels utilize industry standard FC connectors while the multiplexed WAN uses a duplex LC connection. Housed in a convenient 1RU 19" metal chassis, MX20-3155 offers two completely independent and isolated channels for effectively doubling the utilization of a bi-directional fiber pair.

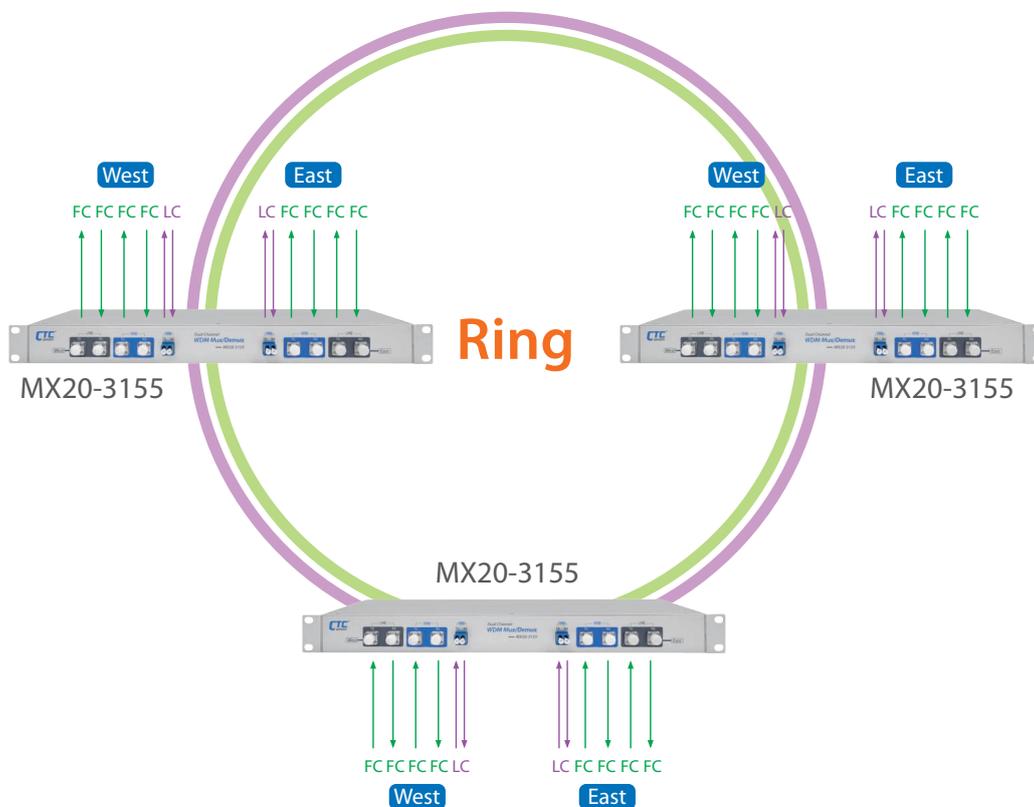
Features

- Full native mode performance
- Optical connectors
- Passive model requires no power
- Protocol transparent, no data rate limitation
- Utilizes two popular WDM wavelengths

Specifications

| | | | |
|----------------------------|-----------------------------------|------------------|--|
| Operating Wavelengths (nm) | 1310/1550 | Directivity (dB) | ≥ 55 |
| Insertion Loss (max.) (dB) | 0.6 with connectors for all ports | Temperature | -10 ~ 70°C (Operating) -40 ~ 85°C (Storage) |
| Isolation (dB) | ≥ 25 | Fiber Type | Corning® Singlemode SMF-28E |
| PDL (dB) | ≥ 0.05 | Dimensions | 432 x 150 x 43mm (D x W x H) |
| Return Loss (dB) | ≥ 55 | | |

Application



Ordering Information

| Model Name | Description |
|------------|--|
| MX20-3155 | 1U high 19" 2 channels (1310,1550) WDM MUX/DeMUX |

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



SML40-CH04

MUX/DeMUX Passive Chassis

SML40-CH04 is a 1U 19-inch CWDM passive rack that features 4 cards capacity and supports SML-40-8181-L, 8+1 channels MUX/DEMUX cards. The 8+1 channels MUX/DEMUX card is a modular design for CWDM wavelengths including 1471nm, 1491nm, 1511nm, 1531nm, 1551nm, 1571nm, 1591nm, and 1611nm. The 1311nm CWDM channel is accessible separately. The MUX/DEMUX cards provide the primary wave division and combination functions for CWDM. Line side wave lengths require translation to client side equipment via a transponder card. The unique design makes the SML40-CH04 one of the compact CWDM solutions in the industry.

Features

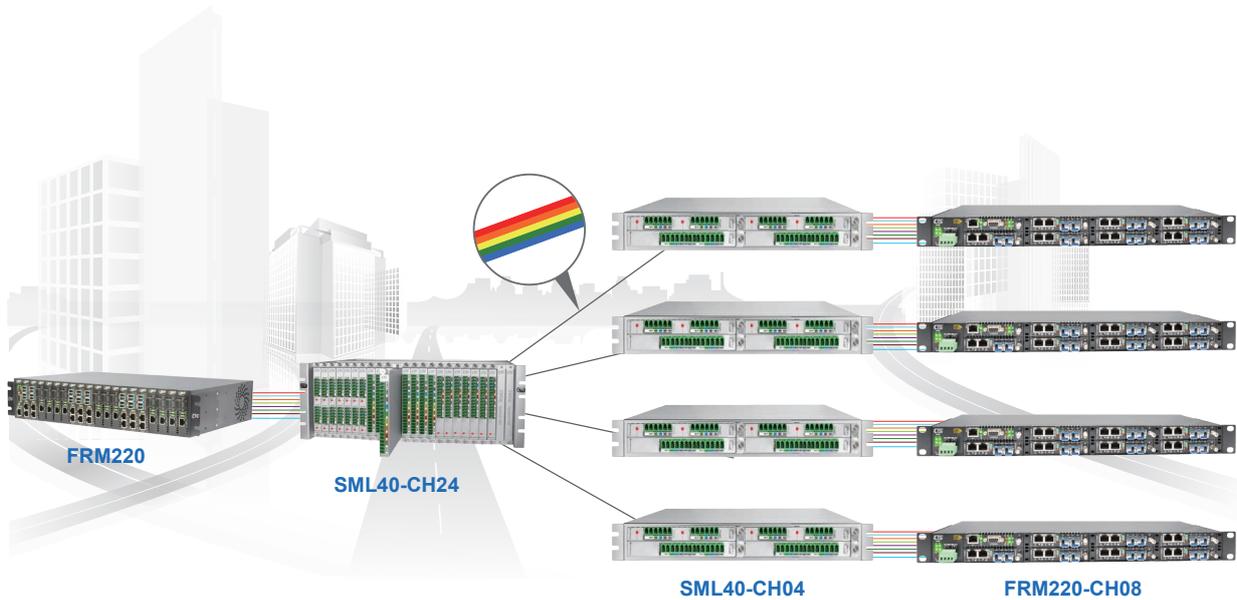
- 4-Slot for MUX/DEMUX card
- 1U, 19-inch Rack Mount
- Passive model requires no power
- Plug & Play Operation
- Optical connectors: LC connectors, SMF 9/ 125um
- Protocol transparent, no limitation
- Utilizes industry standard ITU-T CWDM wavelengths

Specifications

| | | |
|-------------------------|------------------------|--|
| Connectors | LC | |
| Physical Specifications | Dimensions (D x W x H) | 1U passive chassis : 280 x 438 x 43 mm |
| | | Mux/ Demux card : 260 x 240 x 18 mm |

| | | |
|------------------------------|-------------------|-------------------------|
| Environmental Specifications | Operating | 0 ~ 50°C |
| | Storage | 0 ~ 70°C |
| | Relative humidity | 5% ~ 90% non-condensing |
| Certification | RoHS compliant | |

Application



Ordering Information

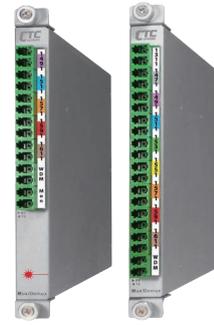
| Model Name | Description |
|------------|------------------------|
| SML40-CH04 | 1U 19" 4-slot chassis |
| SML40-CH24 | 4U 19" 24-slot chassis |

Chassis Type
SML40 –
 Example: SML40 – CH04

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

SML40-MD

8-Ch/5-Ch MUX/DeMUX with Monitor Port



The SML40-MD80 is an 8 channel MUX/DeMUX modular design card for CWDM wavelengths including 1471nm, 1491nm, 1511nm, 1531nm, 1551nm, 1571nm, 1591nm, 1611nm. The SML40-MD81 is 8 channels MUX/DeMUX modular design card with monitor port. The SML40-MD51 is a 5 channel MUX/DeMUX modular design card for CWDM wavelengths including 1491nm, 1511nm, 1571nm, 1591nm, 1611nm. The SML40-MD40 is a dual 4 channels Mux/Demux card with wavelengths including 1471, 1491, 1551, 1531nm. The MUX/DEMUX cards provide the primary wave division and combination functions for CWDM. Line side wave lengths require translation to client side equipment via a transponder card.

Features

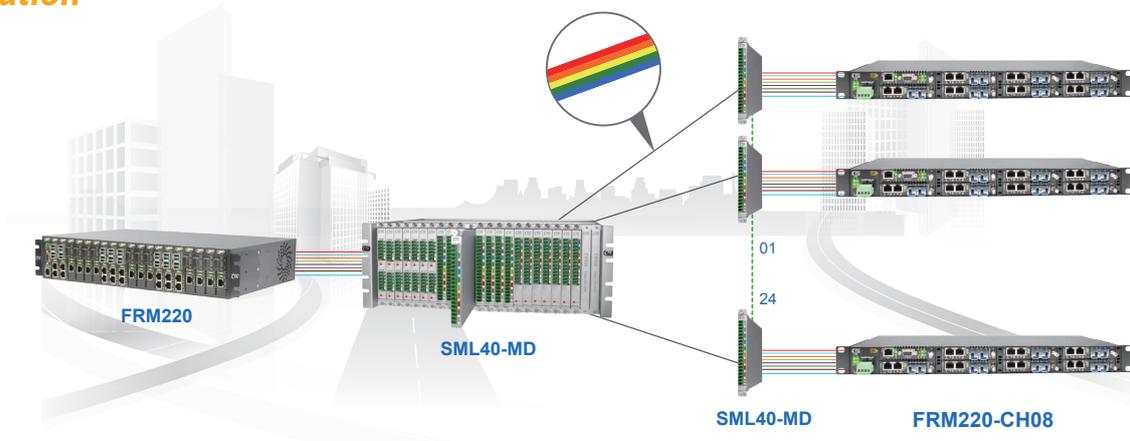
- Full native mode performance
- Optical connectors : LC connectors, SMF 9/125um (UPC or APC)
- Optical Input/Output monitor port
- Passive model requires no power
- Protocol transparent, no limitation
- Utilizes industry standard ITU CWDM wavelength

Specifications

| | |
|----------------|---|
| Connector | LC |
| Standard | ITU-T G.694.2 |
| Wavelength | 1311,1471,1491,1511,1531,1551, 1571,1591,1611nm |
| Insertion Loss | < 3.5dB for CWDM wavelength |
| Return Loss | > 45dB |
| Dimensions | 260 x 240 x 18.2mm (D x W x H) |

| | |
|---------------|--|
| Weight | 0.6kg |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 75,000 hrs |

Application



Ordering Information

| Model Name | Description |
|----------------------------|--|
| SML40-MD80-UPC-Wavelength | 8-Ch Mux/Demux Card 1471 / 1491 / 1511 / 1531 / 1551 / 1571 / 1591 / 1611nm LC UPC wavelength selected from 1271 ~ 1611nm |
| SML40-MD80-APC-Wavelength | 8-Ch Mux/Demux Card 1471 / 1491 / 1511 / 1531 / 1551 / 1571 / 1591 / 1611nm LC APC wavelength selected from 1271 ~ 1611nm |
| SML40-MD81-UPC-Wavelength | 8-Ch Mux/Demux Card 1471 / 1491 / 1511 / 1531 / 1551 / 1571 / 1591 / 1611nm with Monitor port. LC UPC wavelength selected from 1271 ~ 1611nm |
| SML40-MD81--APC-Wavelength | 8-Ch Mux/Demux Card 1471 / 1491 / 1511 / 1531 / 1551 / 1571 / 1591 / 1611nm with Monitor port. LC APC wavelength selected from 1271 ~ 1611nm |
| SML40-MD51-UPC-Wavelength | 5-Ch Mux/Demux card 1491 / 1511 / 1571 / 1591 / 1611nm with Monitor Port LC UPC wavelength selected from 1271 ~ 1611nm |
| SML40-MD51-APC-Wavelength | 5-Ch Mux/Demux card 1491 / 1511 / 1571 / 1591 / 1611nm with Monitor Port LC APC wavelength selected from 1271 ~ 1611nm |
| SML40-2D40-UPC-Wavelength | Dual 4 ch Mux/Demux card, single direction 1471 / 1491 / 1511 / 1531nm LC UPC wavelength selected from 1271 ~ 1611nm |
| SML40-2D40-APC-Wavelength | Dual 4 ch Mux/Demux card, single direction 1471 / 1491 / 1511 / 1531nm LC APC wavelength selected from 1271 ~ 1611nm |
| SML40-1D80-UPC-Wavelength | 8-Ch Mux/Demux card, single direction 1471 / 1491 / 1511 / 1531 / 1551 / 1571 / 1591 / 1611nm LC UPC wavelength selected from 1271 ~ 1611nm |
| SML40-1D80-APC-Wavelength | 8-Ch Mux/Demux card, single direction 1471 / 1491 / 1511 / 1531 / 1551 / 1571 / 1591 / 1611nm LC APC wavelength selected from 1271 ~ 1611nm |
| SML40-MD-31/CWDM-UPC | 1310nm plus CWDM 1470 ~ 1610nm Mux/Demux LC UPC |
| SML40-MD-31/CWDM-APC | 1310nm plus CWDM 1470 ~ 1610nm Mux/Demux LC APC |

SML40 - □□□□ - □□□ - □□□□□□□□□□

Example: SML40 - MD80 - UPC - Wavelength



SML01-10G-SXX

10G 3R Transponder with Optical Line Protection

The SML01-10G-SXX is a 10G fiber to fiber 3R repeater and transponder. Based on 10 Gigabit Fiber standards, the transponder support SFP+ to XFP (SX) or XFP to XFP (XX) fiber connections. 1+1 Automatic optical line Protection Switching is supported for the aggregate XFP fiber ports. The transponder is protocol transparent, providing 3R (Re-amplification, Re-shaping and Re-clocking) regeneration between these different optical module types. One of the major applications for this converter is in connecting proprietary transceiver equipment to CWDM or DWDM when these 'colored' optical modules are not available for the proprietary equipment. With transparent bi-directional forwarding capability between the 2 fiber media, the SML01-10G-SXX brings you the best and simplest solution for your 10G conversion between fiber and fiber.

Features

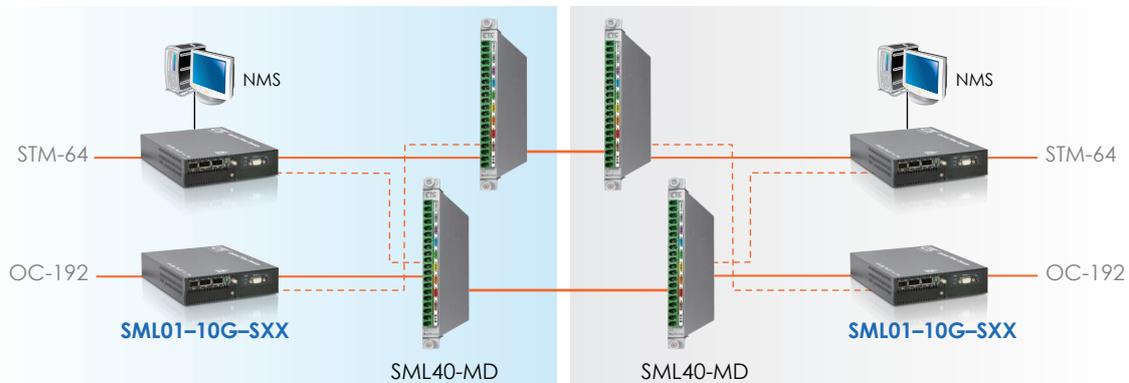
- Multiple protocol supported 10G Ethernet, STM-64, OC-192, G.709 OTU2, Fiber Channel (8 x FC)
- Network management via Web, Telnet, SNMP with NMC card inserted
- Protocol transparent 3R fiber media transponder / repeater (Re-amplification, Re-shaping and Re-clocking)
- Promotes flexibility and eases management with pluggable SFP+ or XFP transceiver
- Features two 10G ports offering multiservice 10G transponder and regenerator function
- Built-in self test (BIST) function
- Provides superior optics capabilities resulting in extended transport distances for regional application.
- Extend 10G Ethernet transmission over fiber useful as a 'Transponder' in CWDM or DWDM systems for 10G Ethernet/ Fiber Channel/STM-64
- Supports Client / Line loop back tests
- Serial console for stand-alone management
- XFP power supplies: +5.0V, -5.2V, +3.3V and +1.8V
- Supports reference clock output
- Supports 1+1 optical line protection

Specifications

| | | |
|-------------------|-----------|--|
| Optical Interface | Connector | LC |
| | | 1x Line SFP+ to 2x Client XFP 1x Line SFP+ to 1x Client XFP 1x Line XFP to 1x Client XFP |
| Traffic Format | | OC-192/STM-64 (9.95328Gbps) |
| | | 1 Gigabit Ethernet (1.25Gbps) |
| | | 10 Gigabit Ethernet LAN(10.3125Gbps) |
| | | G.709 OTU2 (10.709225Gbps) |
| | | Fiber Channel |
| Regeneration | | 1xFC(1.062 Gbps); 2xFC(2.125 Gbps); 4xFC(4.25 Gbps); 8xFC(8.5 Gbps); 10xFC(10 Gbps) |
| | | Re-amplification |
| | | Re-shaping, Re-timing |

| | | |
|-------------------|--|---|
| Optical Interface | Loopback | Line / Client |
| | Fiber | SM 9/125µm MM 50/125µm or 62.5/125µm |
| | Wavelength | Depends on SFP+ or XFP |
| Indications | LED (Power, Line Link, Client Link, Test, Loop back, Port Active, Alarm) | |
| Power Input | Standalone : AC, DC option | |
| Power Consumption | <10W | |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 150g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|---------------------------|---|
| SML01-10G-SXX-AC, DC, AD | Console management, standalone 10G 3R transponder with AC, DC or AD (AC+DC) Power |
| SML01-10G-SXX-NM-AC/DC/AD | SNMP management, standalone 10G 3R transponder with AC, DC or AD (AC+DC) Power |

Note: SML01-10G-SXX-AC, DC, AD = (FRM220-10G-SXX) + (CH02M-AC, DC or AD)
SML01-10G-SXX-NM-AC, DC, AD = (FRM220-10G-SXX) + (CH02/SNMP-AC, DC or AD)

Power Type
SML01-10G-SXX -
 Example: SML01-10G-SXX - AD

SML01-10G-SS

10G 3R Transponder



5

10G transponder

The SML01-10G-SS is a 10G fiber to fiber 3R repeater and transponder. Based on a number of 10 Gigabit Fiber standards, these transponders support SFP+ to SFP+ (SS) fiber connections. The transponders are protocol transparent, providing 3R (Re-amplification, Re-shaping and Re-clocking) regeneration between these different optical module types. One of the major applications for this converter is in connecting proprietary transceiver equipment to CWDM or DWDM when these 'colored' optical modules are not available for the proprietary equipment. With transparent bi-directional forwarding capability between the 2 fiber media, the SML01-10G-SS brings you the best and simplest solution for your 10G conversion between fiber and fiber.

Features

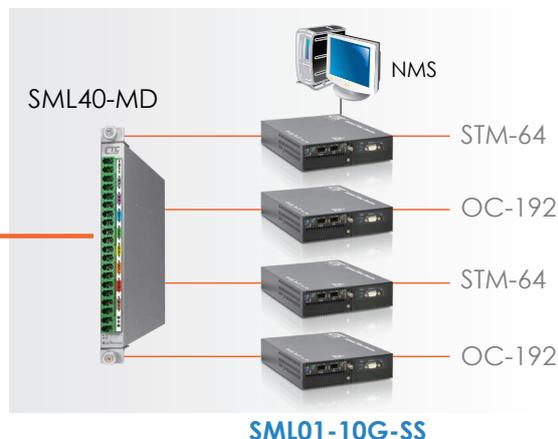
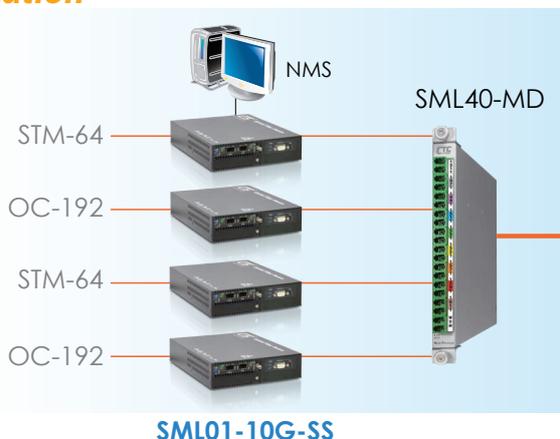
- Multiple protocol supported 10G Ethernet, STM-64, OC-192, G.709 OTU2, Fiber Channel (8 x FC)
- Network management via Web, Telnet, SNMP with NMC card inserted
- Protocol transparent 3R fiber media transponder / repeater (Re-amplification, Re-shaping and Re-clocking)
- Promotes flexibility and eases management with pluggable SFP+ transceiver
- SFP+ power supplies: +3.3V
- Features two 10G ports offering multiservice 10G transponder and regenerator function
- Provides superior optics capabilities resulting in extended transport distances for regional application.
- Extend 10G Ethernet transmission over fiber
- Useful as a 'Transponder' in CWDM or DWDM systems for 10G Ethernet/Fiber Channel/STM-64
- Supports Client / Line loop back tests
- Serial console for stand-alone management

Specifications

| | | |
|-------------------|----------------|---|
| Optical Interface | Connector | LC, 1x Line SFP+ to 1x Client SFP+ |
| | Traffic Format | OC-192/STM-64 (9.95328Gbps) 10 Gigabit Ethernet LAN(10.3125Gbps) G.709 OTU2 (10.709225Gbps) Fiber Channel 1xFC(1.062 Gbps); 2xFC(2.125 Gbps); 4xFC(4.25 Gbps); 8xFC(8.5 Gbps); 10xFC(10.51875 Gbps) |
| Regeneration | | Re-amplification Re-shaping, Re-timing |
| Loopback | | Line / Client |
| Fiber | | SM 9/125µm MM 50/125µm or 62.5/125µm |

| | | |
|-------------------|--|--------------------------|
| Optical Interface | Wavelength | CWDM 1470 ~ 1610nm |
| | | DWDM 1529.55 ~ 1565.50nm |
| Indications | LED (Power, Line Link, Client Link, Test, Loop back, Port Active, Alarm) | |
| Power Input | Standalone : AC, DC option | |
| Power Consumption | <10W | |
| Dimensions | 155 x 88 x 23mm (D x W x H) | |
| Weight | 150g | |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|----------------------------|---|
| SML01-10G-SS-AC, DC, AD | Console management, standalone 10G 3R transponder with AC, DC or AD (AC+DC) Power |
| SML01-10G-SS-NM-AC, DC, AD | SNMP management, standalone 10G 3R transponder with AC, DC or AD (AC+DC) Power |

Note: SML01-10G-SS-AC, DC, AD = (FRM220-10G-SS)+ (CH02M-AC, DC or AD)
SML01-10G-SS-NM-AC, DC, AD = (FRM220-10G-SS) + (CH02/SNMP-AC, DC or AD)

Power Type
SML01-10G-SS
 Example: SML01-10G-SS – AD



SML01-4G-3S

4G 2R Transponder with Optical Line Protection

The SML01-4G-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 NMC card is placed in the 2-slot chassis with SML01-4G-3S, 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

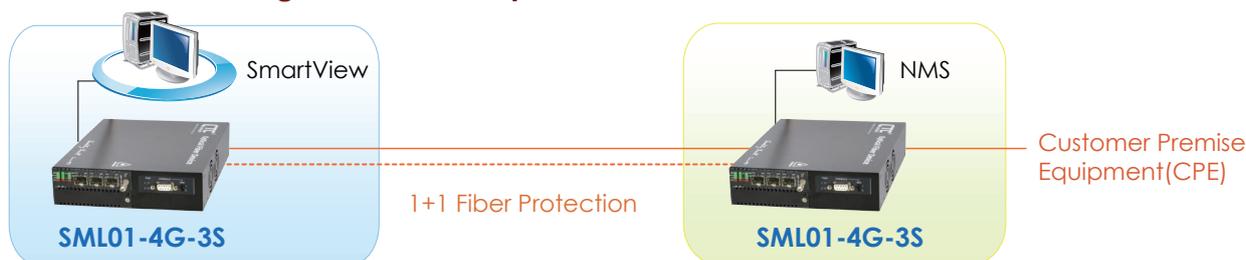
- Multiple protocol supported at bit rates 28Mbps to 4.25Gbps
- (Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, OC-24, OC-48, STM-1, STM-4 STM-16, FC-1, FC-2, FC-4)
- Network management via Web, Telnet, SNMP with NMC card inserted
- Local configuration via DB9 console port
- Digital diagnostic monitoring of SFP module
- Perform optical repeater function (Re-amplification, Re-shaping)
- Facility loopback on both Client / Line sides
- 1+1 optic fiber protection
- Link Fault Pass-Through (LFPT)
- Auto Laser Shutdown (ALS)
- Detect transceiver transmitter error alarm

Specifications

| | | | | |
|-------------------|------------------------------|--------------------|-------------------|--|
| Optical Interface | Connector | SFP LC | Indications | LED (PWR, Line Link, Client Link, Test, Loop back, Port Active, Alarm) |
| | Data rate | 28Mbps to 4.25Gbps | | Power Input |
| Regeneration | Re-amplification | | Power Consumption | |
| | Re-shaping | | | Dimensions |
| Loop back | Line/Client | | Weight | |
| Fiber | MM 62.2/125µm, 50/125µm. | | | Temperature |
| | SM 9/125µm | | Humidity | |
| Wavelength | MM 850, 1310nm | | | Certification |
| | SM 1310, 1550nm | | MTBF | |
| | WDM 1310T/1550R, 1550T/1310R | | | |
| | CWDM 1470 ~ 1610nm | | | |

Application

Managed 4G 2R Transponder with Fiber Protection



Client: Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, OC-24, OC-48, STM-1, STM-4 STM-16, FC-1, FC-2

Ordering Information

| Model Name | Description |
|---------------------------|--|
| SML01-4G-3S-AC, DC, AD | Console management, standalone 4G 2R transponder with AC, DC or AD (AC+DC) power |
| SML01-4G-3S-NM-AC, DC, AD | SNMP management, standalone 4G 2R transponder with AC, DC or AD (AC+DC) power |

Note: SML01-4G-3S-AC, DC, AD = (FRM220-4G-3S) + (CH02M-AC, DC or AD)
 SML01-4G-3S-NM-AC, DC, AD = (FRM220-4G-3S) + (CH02/SNMP-AC, DC or AD)

Power Type
SML01-4G-3S
 Example: SML01-4G-3S – AD

SML01-2.7G-3S

2.7G 3R Transponder with Optical Line Protection



The SML01-2.7G-3S is a 3R 2.7G optical regeneration device, which consists of Re-amplification, Re-shaping and Re-timing. 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 are supported for the aggregate fiber ports. When the NMC card is placed in the 2-slot chassis with SML01-2.7G-3S, 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 set the desired data rate.

Features

- Multiple protocol supported at bit rates 34.3Mbps to 2.7Gbps (Fast Ethernet, Gigabit Ethernet, OC-3, OC-6, OC-12, OC-24, OC-48,
- STM-1, STM-4 STM-16, FC-1, FC-2)
- Network management via Web, Telnet, SNMP with NMC card inserted
- Link Fault Pass-Through (LFPT)
- Auto Laser Shutdown (ALS)
- Local configuration via DB9 craft port In Stand-alone
- Digital diagnostic monitoring of SFP module
- Perform optical repeater function (Re-amplification, Re-shaping, and Re-clocking)
- Facility loopback on both Client / Line sides
- 1+1 optic fiber protection
- Dip switch setting data rate
- Detect transceiver transmitter error alarm

Specifications

| | | |
|------------------------------|--------------|--------------------------------------|
| Optical Interface | Connector | SFP LC |
| | Data rate | E3 to OC-48 |
| | Regeneration | Re-amplification |
| | | Re-shaping |
| | | Re-clocking |
| | Loop back | Line/Client |
| | Fiber | MM 62.2/125 μ m, 50/125 μ m. |
| | | SM 9/125 μ m |
| | Wavelength | MM 850, 1310nm |
| | | SM 1310, 1550nm |
| WDM 1310T/1550R, 1550T/1310R | | |
| CWDM 1470 ~ 1610nm | | |

| | |
|-------------------|--|
| Indications | LED (PWR, Line Link, Client Link, Test, Loop back, Port Active, Alarm) |
| Power Input | Standalone : AC, DC option |
| Power Consumption | < 10W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application

Managed 2.7G 3R Transponder with Fiber Protection



Ordering Information

| Model Name | Description |
|------------------------------|--|
| SML01-2.7G-3S-AC, DC, AD | Console management, standalone 2.7G 3R transponder with AC, DC or AD (AC+DC) Power |
| SML01-2.7G-3S -NM-AC, DC, AD | SNMP management, standalone 2.7G 3R transponder with AC, DC or AD (AC+DC) Power |

Note: SML01-2.7G-3S-AC, DC, AD = (FRM220-2.7G-3S) + (CH02M-AC, DC or AD)

SML01-2.7G-3S-NM-AC, DC, AD = (FRM220-2.7G-3S) + (CH02/SNMP-AC, DC or AD)

Power Type
SML01-2.7G-3S
 Example: SML01-2.7G-3S - AD



SML01-1000DS

1G (2R) Transponder

The SML01-1000DS is a fiber to fiber optical media converter and repeater that allows data rates up to 1Gbps. SML01-1000DS supports 2R regeneration, which consists of re-amplification and reshaping. This converter is compatible with fiber interfaces such as 100Mbps Fast Ethernet, 155Mbps STM-1, 4, Fiber Channel 1, 2, and OC3, 12, 24. The SML01-1000DS work as a stand-alone fiber converter. When the SML01-1000DS is placed in the 2-slot chassis with NMC card, the management can view the converter card's status, type and fiber link status.

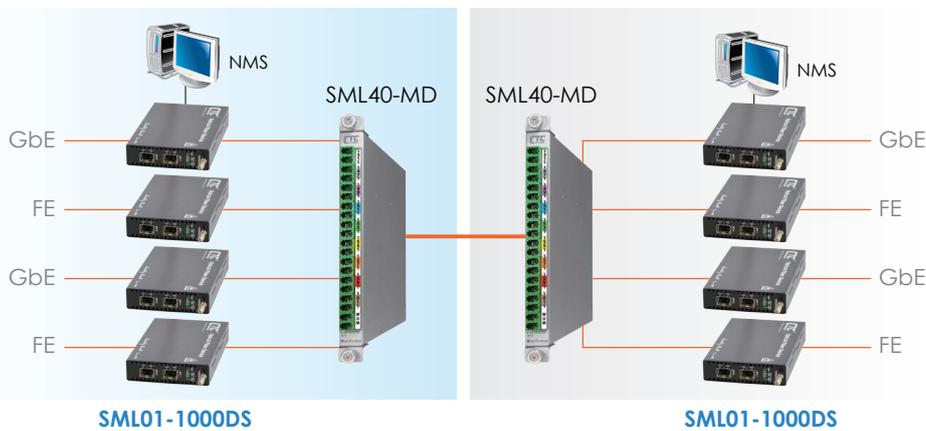
Features

- Transparent fiber media converter / repeater
- Data rate up to 1G
- Network management via terminal or SNMP in CH02 chassis
- Extend transmission from 2km to 120km over fiber
- Perform optical repeater function (Re-amplification & Reshaping)
- Digital diagnostic monitoring of SFP modules

Specifications

| | | | | | |
|--------------------------|-------------|---|-------------------------|---------------------------------|------------------------------|
| Optical Interface | Connector | SFP LC x 2 | Indications | LED (Power, FX-Link1, FX-Link2) | |
| | Data rate | Up to 1G | | Power Input | Standalone : AC, DC (Option) |
| | Duplex mode | Full duplex | | | Power Consumption |
| | Fiber | MM 50/125µm, 62.5/125µm. SM 9/125µm | | Dimensions | |
| | Distance | MM 550m, 2km, SM 15/30/50/80/120km WDM 20/40/60km | | | Weight |
| | Wavelength | MM 1310nm, SM 1310,1550nm WDM 1310Tx/1550Rx (type A) 1550Tx/1310Rx (type B) | | Temperature | |
| | | Humidity | 10 ~ 90% non-condensing | | |
| | | Certification | CE, FCC, RoHS compliant | | |
| | | MTBF | 65,000 hrs | | |

Application



Ordering Information

| Model Name | Description |
|----------------------------|--|
| SML01-1000DS-AC, DC, AD | Console management, standalone 1G 2R transponder with AC, DC or AD (AC+DC) Power |
| SML01-1000DS-NM-AC, DC, AD | SNMP management, standalone 1G 2R transponder with AC, DC or AD (AC+DC) Power |

Note: SML01-1000DS-AC, DC, AD = (FRM220-1000DS) + (CH01M-AC, DC or AD)
 SML01-1000DS-NM-AC, DC, AD = (FRM220-1000DS) + (CH02/SNMP-AC, DC or AD)

Power Type
SML01-1000DS -
 Example: SML01-1000DS - AD

SML01-Protection

1+1 Fiber Optical Protection Switch



5

Optical protection

The Fiber optical protection unit is able to provide fiber path redundancy on a channel by channel basis. These units are particularly well suited for protection in fiber data transmission. The solution includes monitoring capabilities for both working and protection paths. The monitoring is available through the SNMP Management unit. In case of a fiber cut in the protecting path, traffic will be switched over to the protecting path in less than 50 ms.

Features

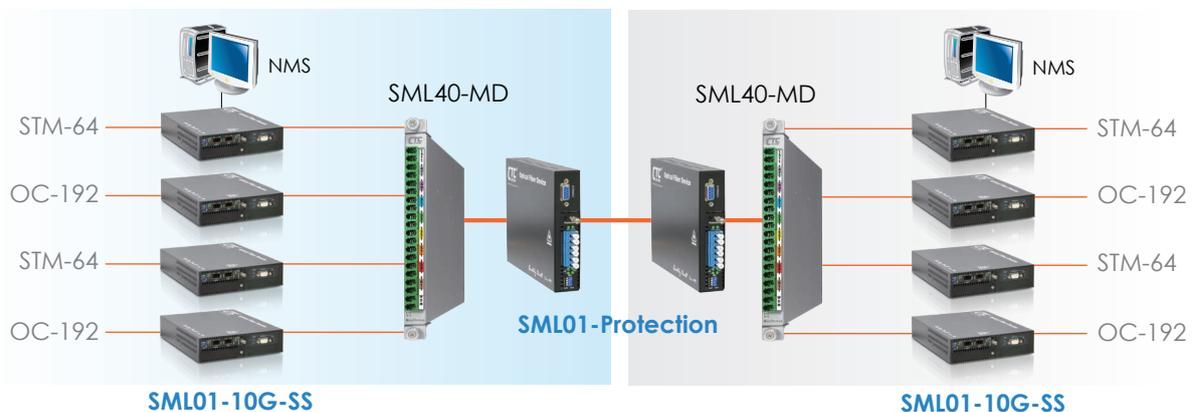
- 1+1 full optical protection
- Low channel cross talk < -55dB
- Low insertion loss < 5.5dB
- Latch feature, if power is lost the switch remains in its current state
- Protection transition < 50 ms
- Works with any combination of 1 ~16 wavelengths
- Traffic is switched in one of three modes : revertive,non-revertive, manual
- Programmable Rx threshold setting for switch-over
- Optical Interface Type : LC connectors
- Working and protected lines are physically separated fiber

Specifications

| | |
|------------------|---|
| Connector | LC |
| LEDs | Power System, Working Path, Protection Path, Work mode |
| Power | AC, DC (Option) |
| Restoration Time | 50ms |
| Range | Input PWR : +3 ~ -15dBm(TX), -2~-29dBm(RX) Detection : -5 ~ -29dBm |
| Loss | Insertion Loss < 5.5dB, Return Loss > 45dB |

| | |
|-------------------|---|
| Power Consumption | < 5W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 130g |
| Temperature | 0 ~ 50°C (Operating), 20 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hours |

Application



Ordering Information

| Model Name | Description |
|--------------------------------|---|
| SML01-Protection-AC, DC, AD | Console management, standalone 1+1 Optical Protection with AC, DC or AD (AC+DC) Power |
| SML01-Protection-NM-AC, DC, AD | SNMP management, standalone 1+1 Optical Protection with AC, DC or AD (AC+DC) Power |

Note: SML01-Protection-AC, DC, AD = (FRM220-Protection) + (CH01M-AC, DC or AD)
SML01-Protection-NM-AC, DC, AD = (FRM220-Protection) + (CH02/SNMP-AC, DC or AD)

Power Type
SML01-Protection -
Example: SML01-Protection - AD



SML01-MX210

2x Gigabit Ethernet Multiplexer

SML01-MX210 is 2-port Gigabit Ethernet Multiplexer which aggregates two wire-speed Gigabit Ethernet services into one 2.5G uplink, reducing the conversion CAPEX and increasing the fiber utilization effectively. The Multiplexer can be used either in point-to-point topology functioning as a media converter for transporting 2 Gigabit Ethernet services over one fiber or in CWDM system working as a wavelength converter for extending the system's transmission capacity doubly. SML01-MX210 is equipped with one 10/100/1000M RJ-45 network management port and three SFP based ports: two Gigabit Ethernet service ports and one 2.5G uplink port, enabling a flexible application as required and realizing a cost effective remote management. Additionally its advanced features such as downlink and uplink loop back, auto laser shutdown and remote network management provide carriers a flexible, reliable and cost-effective two Gigabit Ethernet over one wavelength conversion solution.

Features

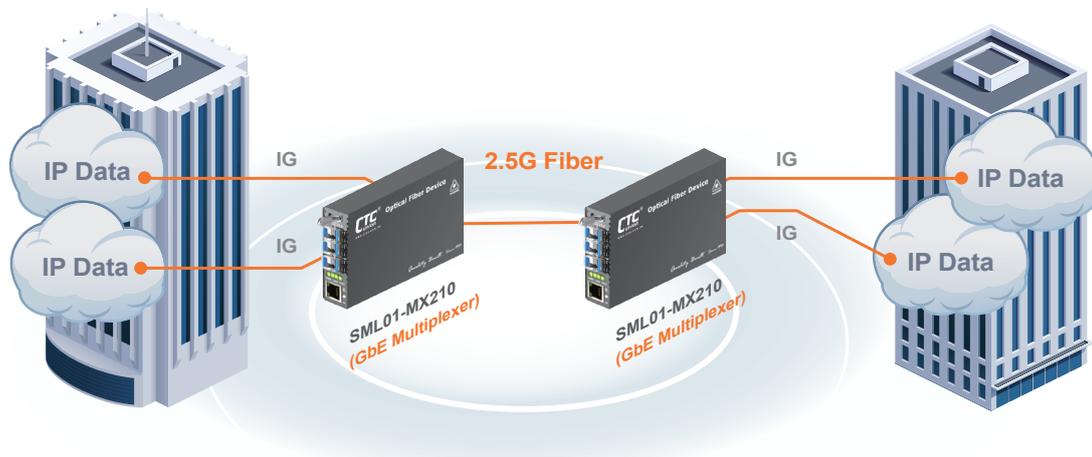
- Local configuration via DB9 craft port in stand-alone (CH01M)
- Forward 9K bytes Jumbo Packets
- Transports two Gigabit Ethernet over one wavelength doubling the CWDM system transmission capacity
- Facility loopback on both Line / client sides
- Auto Laser Shutdown (ALS)
- Hot-swappable SFP module
- Detect transceiver error Alarm
- 10/100/1000M Network management port
- Supports Q in Q double tagged frame transparent
- Supports IEEE 802.1Q Tagging and Port based VLAN
- Supports IEEE 802.1D STP
- Default port and 802.1Q tag priority QoS

Specifications

| | | |
|----------------------|---|---|
| Optical Interface | Port1/Port2 | 100Base-FX, 1000Base-X or 2500Base-X |
| Electrical Interface | Port3 | 100Base-FX or 1000Base-X |
| | Port4 | RJ45 |
| | | 10/100/1000Base-T MDI/MDIX auto crossover IEEE802.3x flow control |
| Standards | IEEE 802.3, 802.3u, 802.3z, 802.3ab | |
| LEDs | PWR, Link (Port1, Port2, Port3) Port4: Link/Speed | |

| | |
|-------------------|---|
| Power | AC, DC (Option) |
| Power Consumption | < 10W |
| Dimensions | 155 x 88 x 23mm (D x W x H) |
| Weight | 120g |
| Temperature | 0 ~ 50°C (Operating) , 0 ~ 70°C (Storage) |
| Humidity | 5 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 65,000 hrs |

Application



Ordering Information

| Model Name | Description |
|---------------------------|--|
| SML01-MX210-AC, DC, AD | Console management, standalone 2-port GE mux with AC, DC or AD (AC+DC) Power |
| SML01-MX210-NM-AC, DC, AD | SNMP management, standalone 2-port GE mux with AC, DC or AD (AC+DC) Power |

Note: SML01-MX210-AC/DC/AD = (FRM220-MX210) + (CH01M-AC, DC or AD)
 SML01-MX210-NM-AC/DC/AD = (FRM220-MX210) + (CH02/SNMP-AC, DC or AD)

Power Type
SML01-MX210
 Example: SML01-MX210 - AD

NEW

SDH-1000

NG SDH GbE/STM1 Terminal Multiplexer



6

STM1 terminal multiplexer

SDH-1000 is 1U 19" rack type GbE/STM-1 terminal multiplexer which delivers Gigabit Ethernet services over SDH networks. The product complies with SDH standards and interfaces with existing SDH backbones through a single or 1+1 protection STM-1 interface. SDH-1000 supports a variety of management access over console, Telnet and SNMP. SDH-1000 provides two Gigabit Combo ports (2-port 10/100/1000Base-T + 2-port 1000Base-X SFP slot) over STM-1 fiber. The two GbE combo ports support Link aggregation, port based VLAN and 802.1Q VLAN function.

Features

- Provides 2-port STM-1 fiber with 1+1 protection.
- Supports HDLC/GFP bridge operation
- Supports 2x GbE Combo ports
- Supports IEEE 802.1Q VLAN and QinQ, Link aggregation
- Fiber port support ALS (Auto Laser Shutdown) function
- Supports Console, GUI, Telnet and SNMP management
- Supports local and remote FTP/TFTP f/w upgrade

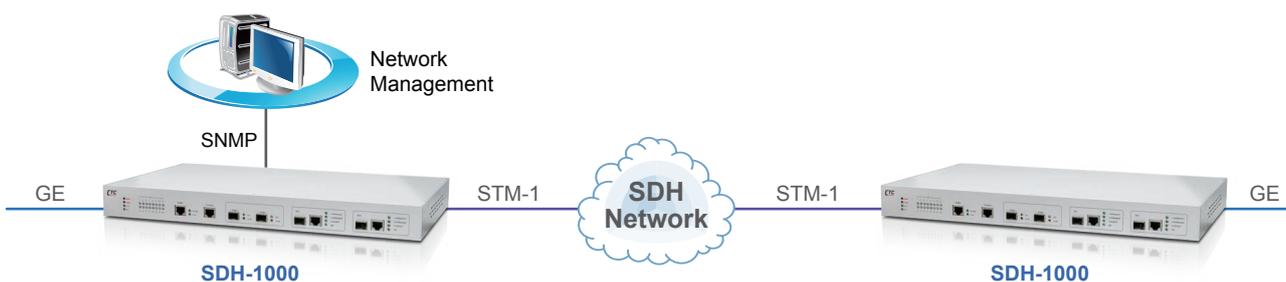
Specifications

| | |
|---------------------------|---|
| Ethernet Interface | Supports 2x GE combo ports Auto Negotiation, AUTO-MIDX, 10M/100M/1000M, Full/Half Duplex Connector : RJ45 |
| Optical Interface | Supports 802.3x flow control 1000FX, SFP Connector : LC Supports 802.3x flow control |
| STM-1 Interface | Supports 2x STM-1 optical fiber port with SFP slot Supports 1+1 optical fiber protection |
| Management Port | One console port with RJ45 connector One SNMP Ethernet port with RJ45 connector |
| LED Indicators | SYS, PWR, PWR1, PWR2, GE (LNK/ACT, SD, ALM) |

| | |
|--------------------------|--|
| Standards | IEEE802.3 Ethernet, IEEE802.3u, IEEE802.3z, IEEE802.3x, IEEE802.1Q, IEEE802.1ad, SNMPv1/v2c/v3 |
| Dimensions | 310 x 440 x 44mm (D x W x H) |
| Power | AC: 90-265V, DC: -48V, Supports AC+DC |
| Power Consumption | <24W |
| Temperature | Operating: -5 ~ 50°C Humidity : ≤90% non-condensing |

Application

GbE over STM-1 Application



Ordering Information

| Model Name | Description |
|-------------|--|
| SDH-1000-AD | 2x GbE Combo over STM1, P to P, 1U 19" Rack, AC+DC power |

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

SDH04A

NG SDH STM4/1 Add-Drop Multiplexer

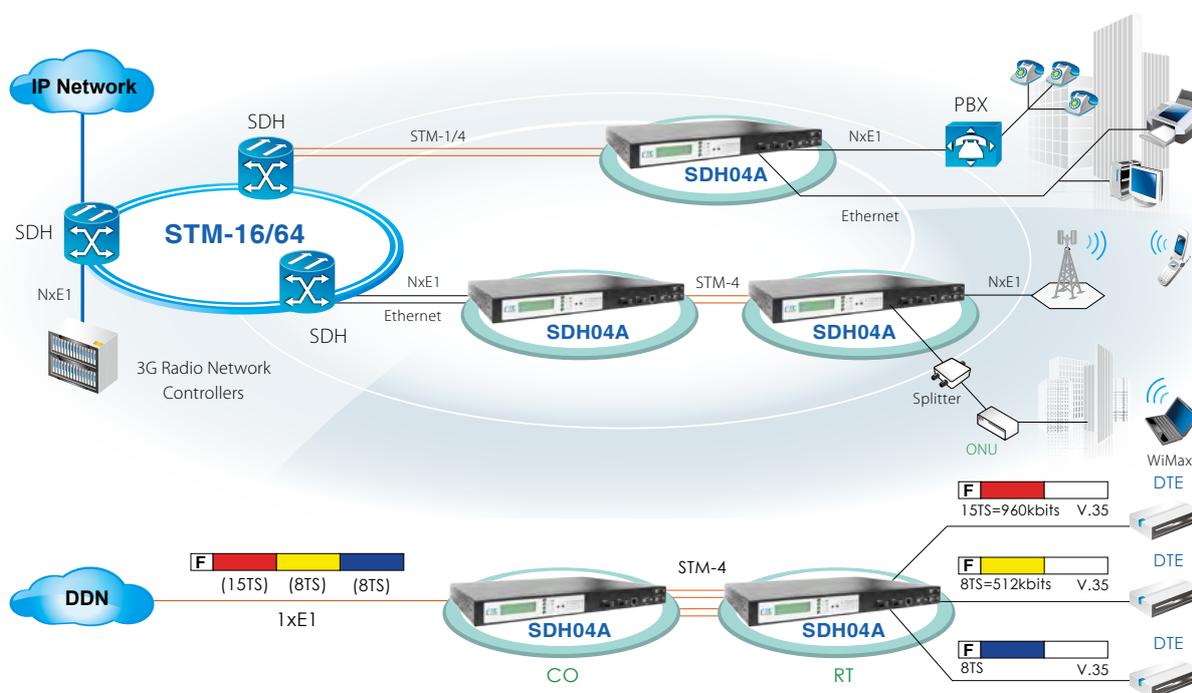


The SDH04A is a compact NG-SDH equipment which supports STM-1/4 ADM and offers various tributary interfaces like E1/T1, V.35, GbE, E3/T3...etc to provide any service in any slot. SDH04A is suitable for the applications of GSM/UMTS base station radio access networks (RAN) / MSAN and wireless backhaul. The SFP cage design in SDH04A offers the plug-and-play flexibility to change fiber modules for different bit rate and higher availability to use off-the-shelf fiber modules. SDH04A is a 1U standard form factor making it easy to fit in any 19" or 23" chassis and outdoor cabinet; Although SDH04A is a compact NG-SDH box, it also has similar flexibility of shelf-type SDH equipment, such as hot-swappable tributary cards / fiber modules / power modules and 1+1 load-sharing redundant power design. In order to supply reliable networks to carry more upcoming broadband services from wireless / HSDPA base stations to central office, CTC SDH04A provides carrier-grade Ethernet (E-Line) bundled with L2 functions to totally control QoS between end to end.

Features

- SDH04A provides multiple service solutions with standard STM-1/4 interfaces (SDH ADM/TM)
- Multiple hot-swappable tributary modules in any combination:
 - 4-channels E1 card (QE1R/B)
 - 8-channels E1/T1 card (8ET)
 - 8-channels E1 card (8E1R)
 - 4-ports Gigabit Ethernet switch card (QGbE)
 - 4-ports V.35 Data communication Interface card (QV35)
 - Single port E3/T3 interface card (ET3)
- 4 slots to support combinations of traffics in a 1U-height box
- Ethernet traffic is encapsulated and transported over SDH using Generic Framing Procedure (GFP) & Virtual Concatenation (VCAT)
- Hot swappable fiber optical module in SFP with optional 1+1 automatic protection switching (APS) for optical links.
- Automatic Laser Shutdown (ALS) based on ITU-T G.958/G.664.
- Data Communication Channel for remote control and online remote upgrade.
- Various network management interfaces: RS-232/ Ethernet/ LCD
- 1+1 Redundant AC/DC power modules with load sharing.
- Cross connect for TDM traffic (E1 & V.35)
- EMS tool for SDH04A series (GMS)
- DHCP Client/Telnet/Web for NMS port
- Keypad Lock/ Password for LCD security

Application



Specifications



V.35 Tributary Interface (QV35)

Data rate : 4CHx Nx64Kbps (N=1~32)
 Compliance : ITU-T V.35
 Clock Source : External, Internal and Recovery
 Control Signal : DSR, CTS, DCD, RL, LL ...
 Test Loops : Local/remote line/terminal/V.54 loopback
 Connector : DB44 connector (DB44 to M34 converter cable)



E3 /DS3 Tributary Interface (ET3)

Bit rate : 34.368 / 44.736 Mbps±20ppm
 Compliance : ITU-T G.703, G.823, G.824
 Impedance(connector) : 75Ω(BNC)
 Line code : HDB3 / B3ZS
 Software selectable E3/DS3 mode



E1 Tributary Interface (QE1B)

Bit rate : 4CHx2.048Mbps±50ppm
 Compliance : ITU-T G.703, G.704, G.706, G.732, G.823
 Impedance (connector) : 75Ω(BNC)
 Line code : HDB3 / AMI



8E1/ T1 Tributary Interface (8ET)

Bit rate :
 8CHx2.048Mbps±50ppm / 1.544Mbps±50ppm
 Impedance(connector) :
 120/100Ω software selective (wire-wrap)



AC Power Card

Input Voltage : AC90V ~ 260V
 Input Frequency : 47 ~ 63Hz
 Power : 27W Max

DC Power Card

Input Voltage : DC-36V ~ -72V
 Power : 27W Max



Gigabit Ethernet interface (QGbE)

Connector : 4xRJ45
 Compliance : 802.3z, 802.3x, 802.1p, 802.3u, 802.3, G.7041 GFP-F Up to 1Gbps throughput, 802.1Q VLAN support for the full 4096 VLAN ID Up to 8K MAC address, Port trunking, Traffic rate control, loopback test

| Dimension & Weight | Power Consumption | Management Interface | Operation Requirement |
|---|-------------------|---|---|
| (WxDxH) : 442 x 312 x 44mm 1U, 19" rack mount/ wall mount/ standalone Weight : 3.7kg | 27W in full load | Protocol : VT-100 ANSI/ Telnet and SNMP (EMS) Craft interface : RS232 Async. (EIA561) Telnet//SNMP/httpd : 10/100 BaseT (RFC 1406) LCD : 2 X 16 LCD display with key control | Operating temperature : 0 ~ 55°C Humidity : 0% ~ 100% (100% at 30°C) MTBF : > 50000 hours EMI : CISPR 22 class A ESD : IEC-61000-4-2 level 2 Lightening and Surge : IEC-61000-4-5 class3 |

Ordering Information

| Model Name | Type | Description |
|---------------|---------|---|
| SDH04A-CH | Chassis | 1U 19" 4-slot, STM4/1 ADM Rack without power module |
| SDH04A-AC | Power | 30W AC power module for SDH04A rack |
| SDH04A-DC | Power | 30W DC power module for SDH04A rack |
| SDH01-4E1B | Card | 4 x E1 G.703 interface card BNC |
| SDH01-8E1B | Card | 8 x E1 G.703 interface card 75 ohm RJ48 with 8 x 1ch RJ48 to BNC cables |
| SDH01-8E1R | Card | 8 x E1 G.703 interface card 120 ohm RJ48 |
| SDH01-8T1/E1W | Card | 8 x T1/E1 G.703 interface card Wire-Wrap |
| SDH01-4V35 | Card | 4 x V35 interface card with 2 x 2ch M34 cables |
| SDH01-ET3 | Card | E3/DS3 interface card |
| SDH04-QGbE | Card | 4 ports Giga switch tributary card |

Example: **SDH04A** - - CH

Example: **SDH04A** - - AH

Example: **SDH04A** - - QGbE

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

NEW



FMUX1001

**Modularized 16E1/T1 +
4x GbE Fiber Managed Multiplexer
(E1/T1, Data, Voice, Ethernet)**

The FMUX1001 is a 1U, 19" rack mountable, PDH fiber optic multiplexer that transmits up to 16 channels plus a 10/100/1000Base-T Fast Ethernet channel over a single fiber optic link. The FMUX1001 chassis supports redundant power and hot swappable design. The AC supplies operate from 90~260VAC while DC supplies operate from 36~72VDC or 20~60VDC. 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

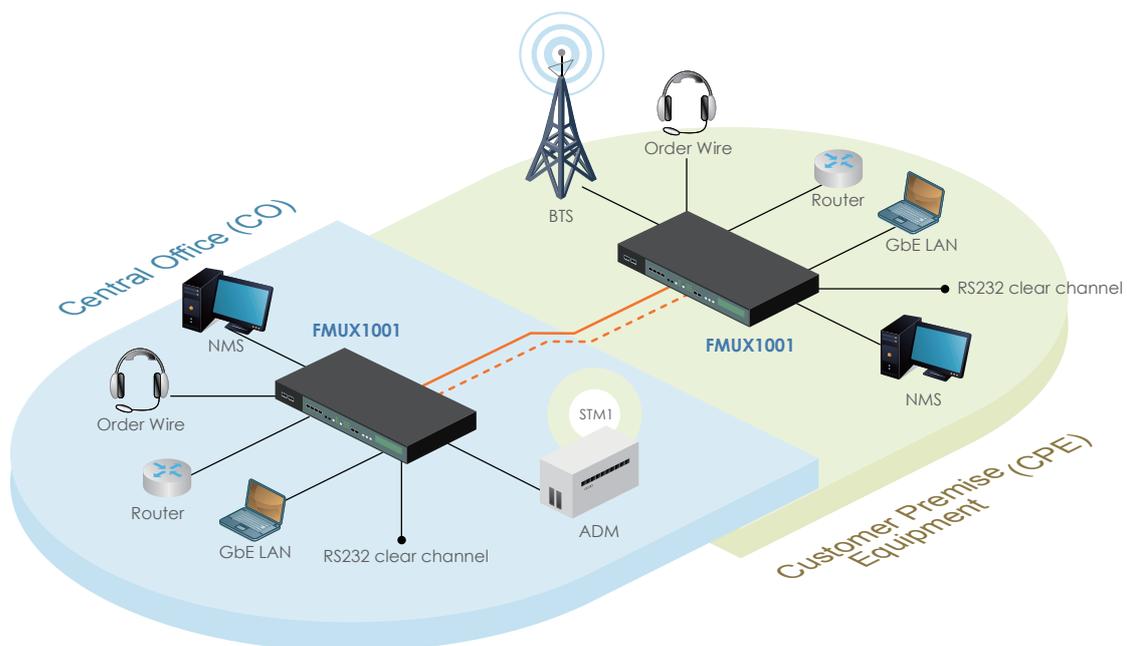
- 1U, 19 (23)" 4-slot chassis
- 16 E1 (2.048Mb/s) Multiplexer, 1000Mbps Ethernet and RS-232 data (async)
- RS-232 port for system console
- One alarm output port, one Order Wire port
- SNMP management
- LCD plus menu keys for local configuration
- Port based VLAN, tag based VLAN & bandwidth control
- Telnet and web based remote configuration
- 2 plug-in SFP slot in I/O slots for optical SFP module

Specifications

| Optical Interface | Connector | SFP - LC |
|----------------------|----------------|---|
| | Data rate | 1.25G |
| | Bit Error Rate | Less than 10^{-12} |
| | Fiber | MM 62.2/125 μ m, 50/125 μ m SM 9/125 μ m |
| | Distance | MM 2km. SM 15/30/50/80/120km WDM 20/40/60/80km |
| | Wavelength | 1310, 1550nm |
| Electrical Interface | Console, SNMP | RJ45 |
| | Ethernet | 4 x RJ45 |
| | Alarm | RS232 (DB9F) |

| | |
|--------------------------|--|
| Standards | E1:ITU-T, T1:ITU-T, AT&T, ANSI, Ethernet: IEEE802.3x |
| Indications | PWR, Alarm, LBK, RD, LCK, RNG, ACO, Port, Channels |
| Power Input | TBD |
| Power Consumption | TBD |
| Dimensions | 250 x 438 x 43mm (D x W x H) |
| Weight | 3.58 kg |
| Temperature | 0 ~ 60°C (Operating), 0 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | TBD |

Application



Specifications - Modules



FXO/FXS I/F

| FXO/FXS Module | |
|---------------------------|---|
| Standards | G.711 A-law (separate modules for FXO, FXS) |
| Voice channel transparent | T.38 and Group III Fax relay at 2.4 ~14.4kbps Fax application |
| Distance | 2km |
| Bandwidth | 64K voice channel |
| Connector | RJ11*4 (4 voice channel /per unit) |
| Internet application | Supports modem pass-through |



E1/T1 RJ-45 I/F

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



Datacom I/F

| Datacom Interface Module | |
|--------------------------|--|
| 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 (ASYNCR) |
| 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 |



E1 BNC I/F

| E1 Module | |
|----------------|---|
| Standards | ITU-T G.703, G.704, G.706, G.732 |
| Ports | 4 ports |
| Framing | Unframed (clear channel) |
| Data rate | 2.048 Mbps ± 50 ppm |
| Line code | HDB3/AMI |
| Receive Level | Short haul - 15dB |
| Line impedance | 75 ohms ± 5% / 120 ohms ± 5% |
| Connector | RJ-45 for 120 ohms BNC for 75 ohms Wirewrap for 120 ohm |

Ordering Information

| Model Name | Type | Description |
|--------------------|---------|---|
| FMUX1001 | Chassis | 1U 19" 4-Slot Rack Mount Chassis |
| FMUX1001-AC | Power | Chassis Power Module 110~240VAC |
| FMUX1001-DC | Power | Chassis Power Module 36~72VDC |
| FMUX1001-E1/BNC | Card | 4 x G.703 E1 BNC interface card |
| FMUX1001-E1/RJ45 | Card | 4 x G.703 E1 RJ-45 interface card |
| FMUX1001-T1/RJ45 | Card | 4 x G.703 T1 RJ-45 interface card |
| FMUX1001-V35 | Card | V35 interface card with one HD68M to 4 x MB34F cable |
| FMUX1001-530 | Card | RS-530 interface card with one HD68M to 4 x DB25F cable |
| FMUX1001-449 | Card | RS-449 interface card with one HD68M to 4 x DB37F cable |
| FMUX1001-X21 | Card | X.21 interface card with one HD68M to 4 x DB15F cable |
| FMUX1001-232/Async | Card | RS-232 Async card with one HD68M to 4 x DB9F cable |
| FMUX1001-FXO | Card | 4 x FXO interface card |
| FMUX1001-FXS | Card | 4 x FXS interface card |

| Power Module Type | Line Card I/F Type | | | |
|----------------------|--------------------|--------------------------------------|-----------------------------------|----------------------------|
| AC, DC, AC2, DC2, AD | 0 : Empty | D : Quad V.35 | H : Quad X.21 | K : Quad High-Speed V.35 |
| | A : Quad E1 BNC | E : Quad RS-232 | I : Quad RS-449 | L : Quad High-Speed RS-530 |
| | B : Quad E1 RJ-45 | F : Quad RS-530 | J : Wire-Wrap I/F for Quad E1/ T1 | |
| | C : Quad T1 RJ-45 | G : Single port Fast Ethernet 10/100 | | |

Power Type Card Type
FMUX1001 - /
 Example: FMUX1001 - AC - AAAA

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

NEW



FMUX101

**Modularized 16E1/T1 +
4x FE Fiber Managed Multiplexer
(E1/T1, Data, Voice, Ethernet)**

The FMUX101 is a 1U, 19" rack mountable, PDH fiber optic multiplexer that transmits up to 16 channels plus a 10/100Base-TX Fast Ethernet channel over a single fiber optic link. The FMUX101 chassis supports redundant power and hot swappable design. The AC supplies operate from 90~260VAC while DC supplies operate from 36~72VDC or 20~60VDC. 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 FMUX101 configuration may be viewed or set via the front panel LCD/menu keys, serial VT-100 terminal connection, Telnet, web HTTP or SNMP.

Features

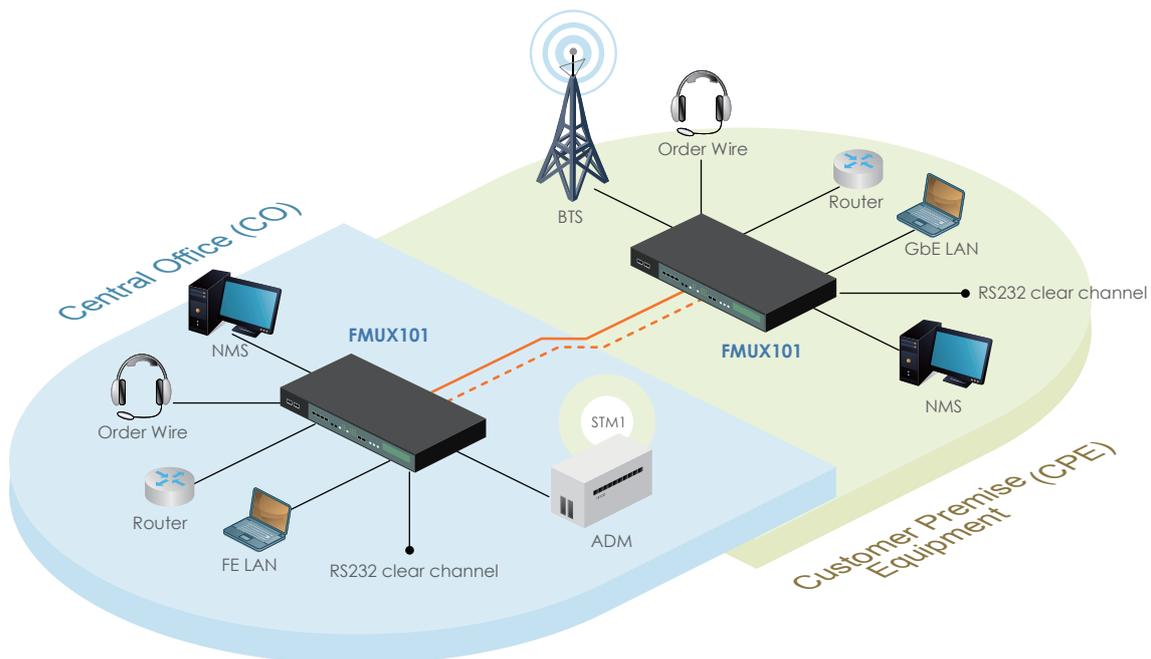
- 1U, 19 (23)" 4-slot chassis
- 16 E1 (2.048Mb/s) Multiplexer, 10/100Mbps Ethernet and RS-232 data (async)
- RS-232 port for system console
- One alarm output port, one Order Wire port
- SNMP management
- LCD plus menu keys for local configuration
- Port based VLAN, tag based VLAN & bandwidth control
- Telnet and web based remote configuration
- 2 plug-in SFP slot in I/O slots for optical SFP module

Specifications

| | | |
|-----------------------------|----------------|---|
| Optical Interface | Connector | SFP - LC |
| | Data rate | 155Mbps |
| | 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 | 4 x RJ45 |
| | Alarm | RS232 (DB9F) |

| | |
|--------------------------|--|
| Standards | E1:ITU-T, T1:ITU-T, AT&T, ANSI, Ethernet: IEEE802.3x |
| Indications | PWR, Alarm, LBK, RD, LCK, RNG, ACO, Port, Channels |
| Power Input | AC : 100 ~240V |
| | DC24 : 20 ~ 60V, DC48 : 36 ~ 72V |
| Power Consumption | < 40W |
| Dimensions | 250 x 438 x 43mm (D x W x H) |
| Weight | 3.58 kg |
| Temperature | 0 ~ 50°C (Operating), 0 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 57350 hours |

Application



Specifications - Modules



FXO/FXS I/F

| FXO/FXS Module | |
|---------------------------|---|
| Standards | G.711 A-law (separate modules for FXO, FXS) |
| Voice channel transparent | T.38 and Group III Fax relay at 2.4 ~14.4kbps Fax application |
| Distance | 2km |
| Bandwidth | 64K voice channel |
| Connector | RJ11*4 (4 voice channel /per unit) |
| Internet application | Supports modem pass-through |



E1/T1 RJ-45 I/F

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



Datacom I/F

| Datacom Interface Module | |
|--------------------------|---|
| 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 (ASYNCR) |
| 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 |



E1 BNC I/F

| E1 Module | |
|----------------|---|
| Standards | ITU-T G.703, G.704, G.706, G.732 |
| Ports | 4 ports |
| Framing | Unframed (clear channel) |
| Data rate | 2.048 Mbps ± 50 ppm |
| Line code | HDB3/AMI |
| Receive Level | Short haul - 15dB |
| Line impedance | 75 ohms ± 5% / 120 ohms ± 5% |
| Connector | RJ-45 for 120 ohms BNC for 75 ohms Wirewrap for 120 ohm |

Ordering Information

| Model Name | Type | Description |
|-------------------|---------|---|
| FMUX101 | Chassis | 1U 19"4-Slot Rack Mount Chassis |
| FMUX101-AC | Powe | Chassis Power Module 110~240VAC |
| FMUX101-DC | Powe | Chassis Power Module 36~72VDC |
| FMUX101-E1/BNC | Card | 4 x G.703 E1 BNC interface card |
| FMUX101-E1/RJ45 | Card | 4 x G.703 E1 RJ-45 interface card |
| FMUX101-T1/RJ45 | Card | 4 x G.703 T1 RJ-45 interface card |
| FMUX101-V35 | Card | V35 interface card with one HD68M to 4 x MB34F cable |
| FMUX101-530 | Card | RS-530 interface card with one HD68M to 4 x DB25F cable |
| FMUX101-449 | Card | RS-449 interface card with one HD68M to 4 x DB37F cable |
| FMUX101-X21 | Card | X.21 interface card with one HD68M to 4 x DB15F cable |
| FMUX101-232/Async | Card | RS-232 Async card with one HD68M to 4 x DB9F cable |
| FMUX101-FXO | Card | 4 x FXO interface card |
| FMUX101-FXS | Card | 4 x FXS interface card |

| Power Module Type | Line Card I/F Type | | | |
|----------------------|--------------------|--------------------------------------|----------------------------------|----------------------------|
| AC, DC, AC2, DC2, AD | 0 : Empty | D : Quad V.35 | H : Quad X.21 | K : Quad High-Speed V.35 |
| | A : Quad E1 BNC | E : Quad RS-232 | I : Quad RS-449 | L : Quad High-Speed RS-530 |
| | B : Quad E1 RJ-45 | F : Quad RS-530 | J : Wire-Wrap I/F for Quad E1/T1 | |
| | C : Quad T1 RJ-45 | G : Single port Fast Ethernet 10/100 | | |

Power Type Card Type
FMUX101 - /
 Example: FMUX101 - AC - AAAA

FMUX1600 FMUX800



16E1/T1 + 4x GbE, RJ45 Fiber Managed Multiplexer
8E1/T1 + 4x GbE, RJ45 Fiber Managed Multiplexer
(SNMP, Order Wire optional)

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 is available in five different power configurations; single AC, single DC, dual AC, dual DC, or AC+DC. The AC supplies operate from 90 ~ 240VAC while DC supplies operate from 18~72VDC. 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

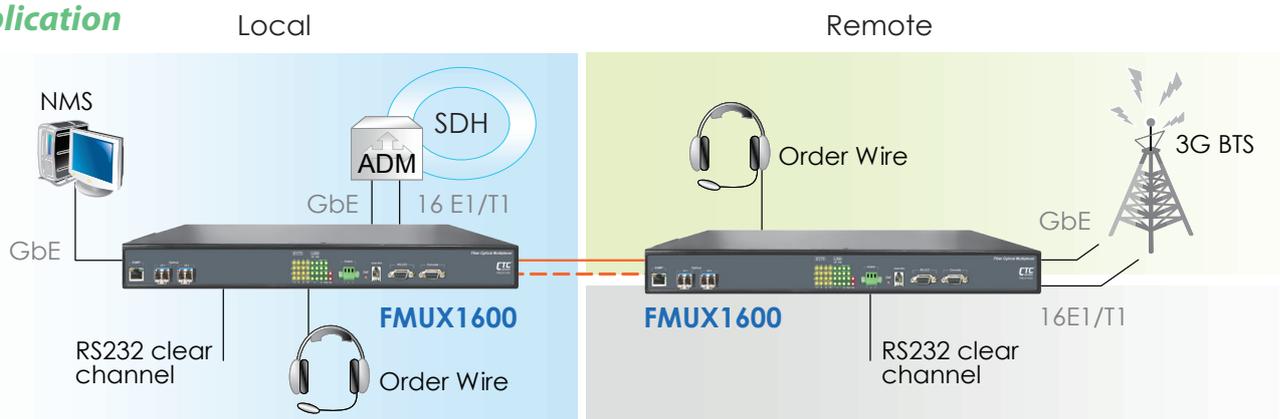
- Provides 16/8 E1/T1 G.703 transparent transmission over fiber
- Provide 4 x 10/100/1000 Mbit/s Ethernet Ports
- Provides one RS232 channel
- Loopback test on E1/T1 fiber port
- Provides one hotline channel (order-wire)
- Supports full/half duplex, 10M/100M/1000M, auto-Negotiation
- Forward 10K byte 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 Wire wrap for 120 ohm |

| | | |
|--------------------------|--|--|
| T1 Interface | Standards | ITU-T G.703, G.704, AT&T TR-62411, ANSI T1.403 |
| | Ports | 8/16 ports |
| | Data Rate | 1.544 Mbps ±50 ppm |
| | Line Code | B8ZS / AMI |
| Connector | RJ-45 for 100 ohms Wire wrap for 100 ohms | |
| Certification | CE, FCC, RoHS compliant | |
| Standards | ITU-T G.703, G.823 and G.742, ANSI, AT&T, IEEE803.2, IEEE802.3u, IEEE802.3ab | |
| Indications | Power, Alarm, LBK, RD, LCK, RNG, ACO, Port, channel | |
| Power Input | 100 ~ 240VAC, 20~60VDC, 36~72VDC | |
| 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



Ordering Information

| Model Name | Description |
|--------------------|---|
| FMUX1600B-AC/DC/AD | 16x E1 BNC + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC, DC or AD Power |
| FMUX1600R-AC/DC/AD | 16x E1/T1 RJ-45 + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC, DC or AD Power |
| FMUX1600-SNMP | SNMP Card with 10/100Base-TX Ethernet Port |
| FMUX800B-AC/DC/AD | 8x E1 BNC + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC, DC or AD Power |
| FMUX800R-AC/DC/AD | 8x E1/T1 RJ-45 + 4 x 10/100/1000Base-T Ethernet Fiber Multiplexer, build-in AC, DC or AD Power |
| FMUX800-SNMP | SNMP Card with 10/100Base-TX Ethernet Port |
| FMUX-Phone-2 | 2 Wires Order Wire |
| FMUX-Phone-4 | 4 Wires Order Wire |

Power Type
FMUX1600 - □ - □□
 Example: FMUX1600 - B - DC
FMUX-Phone - □
 Example: FMUX-Phone - 2

FMUX160 FMUX80

16E1/T1 + 4x FE, RJ45 Fiber Managed Multiplexer
8E1/T1 + 4x FE, RJ45 Fiber Managed Multiplexer
(SNMP, Order Wire optional)



The FMUX160/FMUX80 is 1U 19" rack mountable, PDH fiber optical Multiplexer that transmits up to 16/8 E1/T1 + 4 x 10/100Base-TX Fast Ethernet over a single fiber optic link. The FMUX160/FMUX80 chassis is available in five different power configurations; single AC, single DC, dual AC, dual DC, or AC+DC. The AC supplies operate from 90 ~ 240VAC while DC supplies operate from 18~72VDC. 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. The FMUX160/FMUX80 gives you the fiber cabling connector ST SC FC, 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 FMUX160/FMUX80 configuration may be viewed or set via serial VT-100 terminal connection or SNMP card with web, telnet, and SNMP management

Features

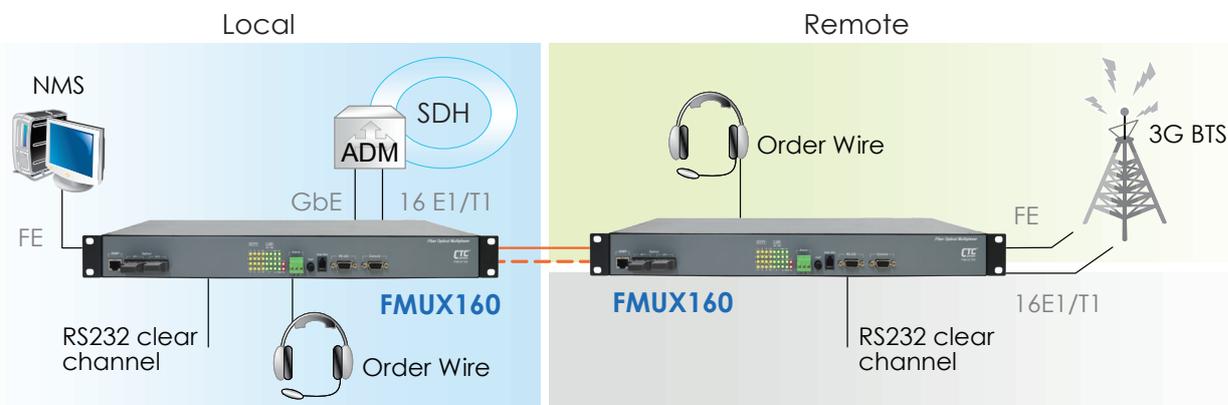
- Provides 16/8 E1/T1 G.703 transparent transmission over fiber
- Provide 4 x 10/100 Mbit/s Ethernet Ports (100Mbps aggregate)
- Provides one RS232 channel
- Loopback test on E1/T1 fiber port
- Provides one hotline channel (order-wire)
- Supports full/half duplex, 10M/100M, auto-Negotiation
- Forward 1792 byte 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 | ST, SC, FC |
| | Data rate | 155.52Mbps |
| | Bit Error Rate | Less than 10 ⁻¹¹ |
| | Distance | MM 2km, SM 15/30/50/80/120km WDM 20/40/60/80km |
| | Wavelength | 1310nm, 1550nm, CWDM 1471nm~1611nm |
| Electrical Interface | Connector | Console : RS232 / SNMP : RJ45 Ethernet : RJ45 (4-port) |
| | | Alarm : RS232 / Order wire : RJ11 |
| | E1 Interface | Standards |
| | 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 Wire wrap for 120 ohm |

| | | |
|--------------------------|-----------|---|
| T1 Interface | Standards | ITU-T G.703, G.704, AT&T TR-62411, ANSI T1.403 |
| | Ports | 8/16 ports |
| | Data Rate | 1.544 Mbps ± 50 ppm |
| | Line Code | B8ZS / AMI |
| | Connector | RJ-45 for 100 ohms Wire wrap for 100 ohms |
| Certification | | CE, FCC, RoHS compliant |
| Standards | | ITU-T G.703, G.823 and G.742, ANSI, AT&T, IEEE803.2, IEEE802.3u |
| Indications | | Power, Alarm, LBK, RD, LCK, RNG, ACO, Port, channel |
| Power Input | | 100 ~ 240VAC, 20~60VDC, 36~72VDC |
| 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) |

Application



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

Ordering Information

Two Fiber model

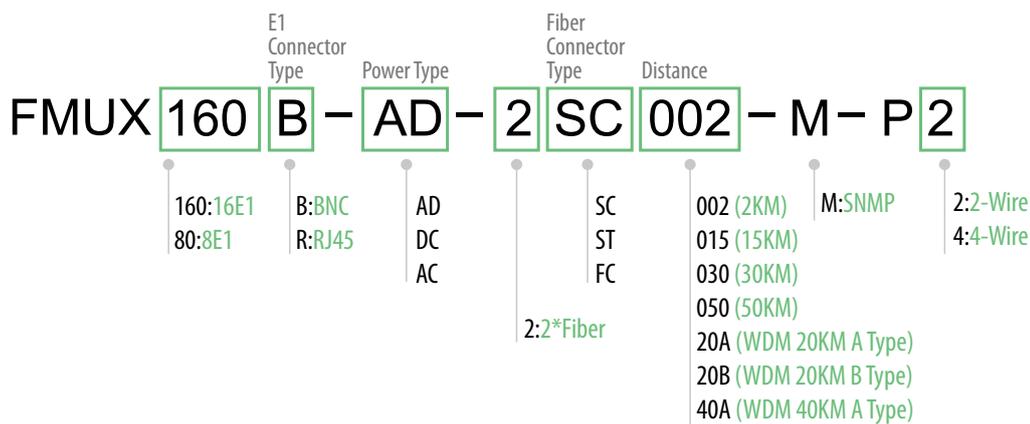
| Model Name | Description |
|--------------------|--|
| FMUX160B-AD-2SC002 | 16x E1 BNC + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with two MM 2km SC fiber, AC+DC Power |
| FMUX160R-AD-2SC002 | 16x E1 RJ45 + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with two MM 2km SC fiber, AC+DC Power |
| FMUX80B-AD-2SC002 | 8x E1 BNC + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with two MM 2km SC fiber, AC+DC Power |
| FMUX80R-AD-2SC002 | 8x E1 RJ45 + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with two MM 2km SC fiber, AC+DC Power |

One Fiber model

| Model Name | Description |
|-------------------|--|
| FMUX160B-AD-SC002 | 16x E1 BNC + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with one MM 2km SC fiber, AC+DC Power |
| FMUX160R-AD-SC002 | 16x E1 RJ45 + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with one MM 2km SC fiber, AC+DC Power |
| FMUX80B-AD-SC002 | 8x E1 BNC + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with one MM 2km SC fiber, AC+DC Power |
| FMUX80R-AD-SC002 | 8x E1 RJ45 + 4 x 10/100Base-T Ethernet Fiber Multiplexer, with one MM 2km SC fiber, AC+DC Power |

Optional modules

| Model Name | Description |
|--------------|--|
| FMUX160-SNMP | SNMP Card with 10/100Base-TX Ethernet Port |
| FMUX80-SNMP | SNMP Card with 10/100Base-TX Ethernet Port |
| FMUX-Phone-2 | 2 Wires Order Wire with RJ9 to RJ11 cable |
| FMUX-Phone-4 | 4 Wires Order Wire |



FMUX04E

4E1/T1+ 3x FE Fiber Multiplexer



FMUX04E is a fixed design for 4x E1 + Fast Ethernet multi-service to dual strand fiber PDH multiplexer. FMUX04E provides E1 transmission transparently and pure 100Mbps Fast Ethernet simultaneously. The fiber optic line is based on SFP technology that allows the flexible use of Multimode or Single mode lines and enables support for different wavelengths and distances. The use of bi-directional SFPs maximizes the utilization of fiber optic line and results in saving line costs. The multiplexer can be equipped with optional AC and DC power supplies for redundant operation. With SNMP and Web-based management in the FMUX04E, the Network administrator can monitor, configure and control the activity remotely.

Features

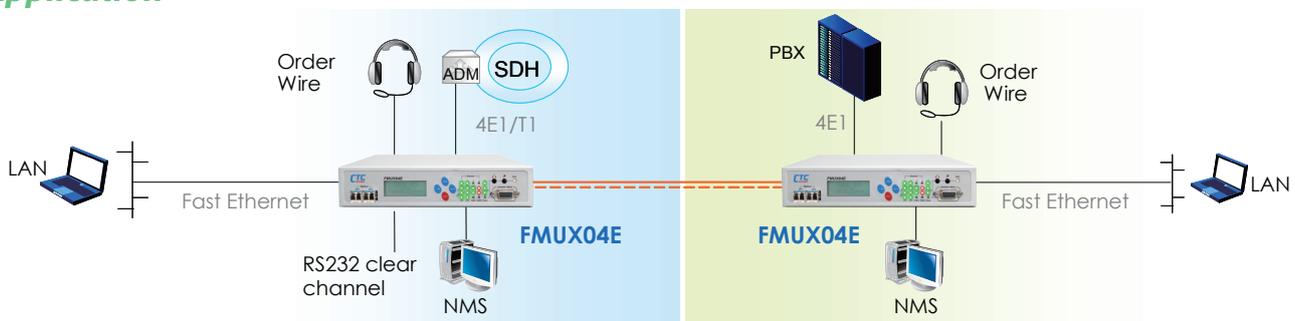
- 4 channels unframed E1/T1
- 3-CH 10/100Base-TX Ethernet
- Auto MDI/MDIX
- Auto-Negotiation or Force mode
- Supports flow control
- Supports 1552 packets (max)
- One clear channel RS232 up to 250Kbps(Async)
- 1+1 fiber protection, less than 50ms
- Supports Digital Diagnostics Monitoring Interface (DDMI)
- AIS on signal loss on E1/T1 and fiber port
- Port based VLAN function
- Loopback test on E1/T1, RS-232, fiber ports
- Supports Dying Gasp
- Supports local or remote In-band management
- Optional SNMP management
- Supports Order wire Ear / Microphone port.
- Supports On-Line F/W upgrade (local or remote) by the SNMP manager

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 120 ohms (RJ-45) |
| | Receiver sensitivity: Short haul |
| | "Pulse" Amplitude: Nominal 2.37V+/-10% for 75 ohms |
| | "Zero" Amplitude: +/-0.3V |
| | Internal Timing: +/-30 ppm |
| | Jitter Performance: According to ITU-T G.823 |
| | Standard: ITU-T G.644, G.703, G.704, G.706 and G.732 |
| Interface Connectors: RJ-45, BNC | |

| | |
|-----------------------|---|
| E1/T1 ports | Test Loops: LLB (Local Loop Back) |
| | RLB (Remote Loop Back) |
| | RRLB (Request Remote Loop Back) |
| Ethernet | Interface Type: 10/100Base-TX |
| | Connector: 3x RJ-45 |
| | Standard: IEEE 802.3, 802.3u |
| Indication | Duplex modes: full/half |
| | FX1 Link, FX2 link , E1/T1 Mode/Link/Loopback test, Order wire phone indicator , LAN Link/Speed |
| Power Input | AC : 100~240VAC, DC : 18-75 VDC |
| Dimensions | 248 x 215 x 43mm (D x W x H) |
| Operating | 0 ~ 50°C (Operating) |
| Temperature | -10 ~ 20°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certifications | CE, FCC, RoHS compliant |
| MTBF | 57,350 hrs |

Application



Ordering Information

| Model Name | Description |
|--------------------|--|
| FMUX04E-AC, DC, AD | Standalone FOM with built-in AC, DC or AD (AC+DC) Power, optional SNMP |
| FMUX04E-SNMP | SNMP management card, support web, telnet, SNMP functions |

* SNMP option only required in one onit of paired link

FMUX04E -
Example: FMUX04E - AD



FMUX04

4E1/T1 Fiber Multiplexer

The FMUX04 is a 1U half 19" stand-alone or rack mountable point-to-point multiplexer for 4*E1 or 4*T1 (selectable) transmissions over a single fiber optic link. Its half-rack format makes it ideal for low cost multiplexing applications that require up to 4-channel. All channels provide completely transparent transmission of E1 or T1 regardless of frame mode, clock source or timeslot assignment. Available in either AC or DC models, the AC supplies operate from 100~240VAC while DC supplies operate from 18~72VDC. A wide range of transceiver selection provides fiber connection with SC, FC or ST type connectors in multimode or single mode and at distance from 2 to 120km as well as BiDi (single fiber) at distances of 20, 40, 60, or 80km. Additional options include "Order Wire" phone connection (FXS port) and a SNMP management.

Features

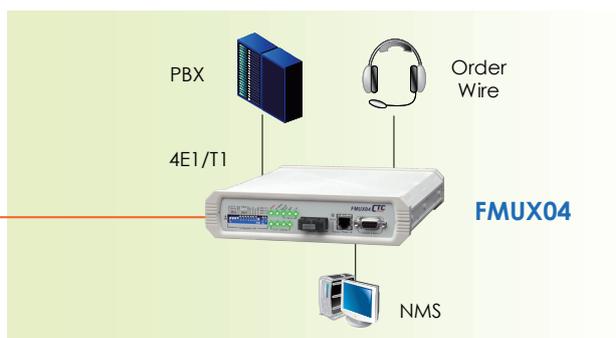
- 1U stand-alone unit
- Channel service setting and remote loop-back setting via front panel DIP switch or serial console
- Far End Fault (FEF) on fiber link, selectable
- On-line Bit Error Rate monitor feature with four error-rate classes
- Dual color LEDs indicators
- Optional dedicated Order Wire phone port (FXS, RJ-11 port)
- Console port and one alarm relay
- Optional SNMP management, Telnet, and Web Based local and remote configuration
- System BER 10⁻¹¹

Specifications

| | | |
|-----------------------------|----------------------------------|--|
| Optical Interface | Connector | 1x9 (SC, ST, FC) |
| | Data rate | 38Mbps |
| | 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 | RS-232 (DB9F) Async |
| | SNMP / Order wire | RJ-45 / RJ11 |
| | E1 | BNC 75 Ω, RJ45 120 Ω, T1 RJ45 100 Ω |
| Standard | E1: ITU-T, T1: ITU-T, AT&T, ANSI | |

| | |
|--------------------------|---|
| Indication | PWR, Alarm, Far End /Near End Error System failure, E1/T1 status |
| Power input | AC : 100 ~240V DC24 : 18 ~ 36V, DC48 : 36 ~ 72V |
| Power Consumption | <20W |
| Dimensions | 235 x 195 x 45mm (D x W x H) |
| Weight | 0.85kg |
| Temperature | 0 ~ 50°C (Operating), 0 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 57,350 hrs |

Application



Ordering Information

| Model Name | Description |
|------------------|--|
| FMUX04-AC/SC 015 | SC, 15Km, 1310nm, 12dB |
| FMUX04-AC/SC 030 | SC, 30Km, 1310nm, 20dB |
| FMUX04-AC/SC 050 | SC, 50Km, 1310nm, 28dB |
| FMUX04-AC/SC 080 | SC, 80Km, 1550nm, 29dB |
| FMUX04-AC/SC 120 | SC, 120Km, 1550nm, 35dB, DFB Laser |
| FMUX04-AC/SC 20A | SC, 20km, Tx1310 /Rx1550nm (A type), 17dB |
| FMUX04-AC/SC 20B | SC, 20km, Tx1550 /Rx1310nm (B type), 14dB |
| FMUX04-AC/SC 40A | SC, 40km, Tx1310 /Rx1550nm (A type), 25dB |
| FMUX04-AC/SC 40B | SC, 40km, Tx1550 /Rx1310nm (B type), 22dB, DFB Laser |
| FMUX04-AC/SC 60A | SC, 60km, Tx1310 /Rx1550nm (A type), 29dB |
| FMUX04-AC/SC 60B | SC, 60km, Tx1550 /Rx1310nm (B type), 29dB, DFB Laser |

| Model Name | Description |
|------------------|--|
| FMUX04-DC/SC 002 | SC, MM, 2Km, 1310nm, 11dB |
| FMUX04-DC/SC 015 | SC, 15Km, 1310nm, 12dB |
| FMUX04-DC/SC 030 | SC, 30Km, 1310nm, 20dB |
| FMUX04-DC/SC 050 | SC, 50Km, 1310nm, 28dB |
| FMUX04-DC/SC 080 | SC, 80Km, 1550nm, 29dB |
| FMUX04-DC/SC 120 | SC, 120Km, 1550nm, 35dB, DFB Laser |
| FMUX04-DC/SC 20A | SC, 20km, Tx1310 /Rx1550nm (A type), 17dB |
| FMUX04-DC/SC 20B | SC, 20km, Tx1550 /Rx1310nm (B type), 14dB |
| FMUX04-DC/SC 40A | SC, 40km, Tx1310 /Rx1550nm (A type), 25dB |
| FMUX04-DC/SC 40B | SC, 40km, Tx1550 /Rx1310nm (B type), 22dB, DFB Laser |
| FMUX04-DC/SC 60A | SC, 60km, Tx1310 /Rx1550nm (A type), 29dB |
| FMUX04-DC/SC 60B | SC, 60km, Tx1550 /Rx1310nm (B type), 29dB, DFB Laser |

Power Type Connector Connectivity Distance

FMUX04 - □□ / □□□□□□

Example: FMUX04 - AC / SC015

Industrial Ethernet 工規

Automation, Power Substation
Surveillance, Vehicle

u-Ring, SmartView



PoE Ethernet Switch, Media Converter, PoE Injector
Serial Fiber Converter, Serial Device Server



IEC 61850-3



EN50155



PoE Regulated



EN50121-4

IGS-600-4PH24

6x 10/100/1000Base-T with 4x PoE+ Ethernet Switch (120Watts, 24V Booster)



IGS-600-4PH24 models are non-managed industrial grade Gigabit PoE (Power over Ethernet) switches with 6x 10/100/1000Base-T PoE Ethernet ports that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 6-Port 1000Base-T RJ-45 with 4-Port IEEE 802.3at/af PoE output (30W/Per Port)
- Maximum PoE output power budget 120W
- 24/48VDC redundant dual input power design
- Wide operating temperature -40 ~ 75°C (IGS-600-4PHE24)
- Regulated PoE output voltage at 55VDC
- UL60950-1, CE, FCC, EN50121-4 certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- IP30 rugged metal housing

Specifications

| | |
|--|---|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3at, IEEE802.3af |
| Switch Architecture | Back-plane (Switching Fabric): 12Gbps |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x flow control, back pressure flow control |
| Provides Broadcast Storm Protection | Present, Enable /Disable set by DIP SW |
| Jumbo Frame | 10K Bytes |
| MAC Address Table | 8K |
| Packet Buffer Size | 1Mbits |
| PoE Standard | IEEE 802.3at/af |
| PoE RJ-45 pin Assignment | RJ-45 port # 1~# 4 support IEEE 802.3at/af End-Span, Alternative A mode Positive (V+): RJ-45 pin 1, 2 Negative (V-): RJ-45 pin 3, 6 Data (1, 2, 3, 6, 4, 5, 7, 8) |
| Network Connector | 6 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Per RJ-45 port : Link/Active (Green), Speed 10 (OFF), 100 (Green), 1000 (Yellow) PoE Port LED : • Active : ON • Inactive : OFF • Fault : Flash (Over Load, Short Circuit, Port failed at Startup) |
| DIP SW | DIP 1 ON : Disable power failure alarm OFF : Enable power failure alarm DIP 2 ON : Disables broadcast storm protection OFF : Enable broadcast storm protection |
| Reserve Polarity Protection | Present |

| | |
|------------------------------------|--|
| Overload Current Protection | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| Power Consumption | Max 138W @24VDC input (support up to 120W for PoE Output) |
| PoE Power Output | Maximum PoE Output power budget 120W (30W/ Per Port) |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-600-4PH24) -40 ~ 75°C (IGS-600-4PHE24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 62.5 x 134.8mm (D x W x H) |
| Weight | 0.84kg |
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Safety | UL60950-1 |
| Rail Traffic | EN 50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 296,517 Hours |
| Warranty | 5 years |

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

Application

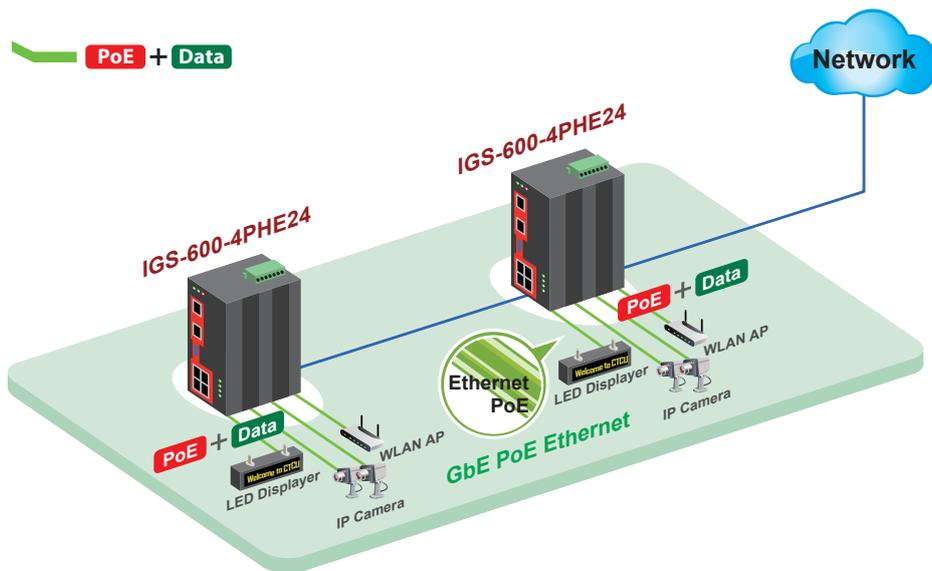
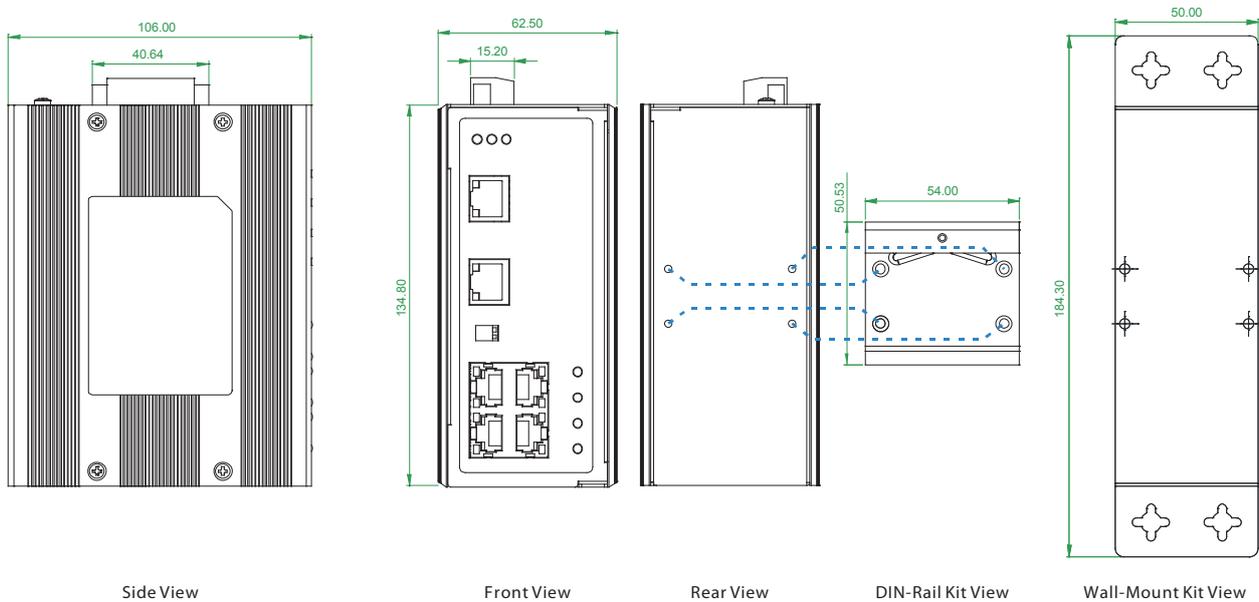


Figure : IGS-600-4PHE24 PoE Ethernet Switch Transmission

Dimensions



Ordering Information

| Model Name | Description |
|----------------|---|
| IGS-600-4PH24 | 6-Port 10/100/1000Base-T with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-10 ~ 60°C) |
| IGS-600-4PHE24 | 6-Port 10/100/1000Base-T with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-40 ~ 75°C) |

Accessories

| | |
|------------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |

Temperature

IGS - 600 - 4PH 24

Example: IGS - 600 - 4PHE24

IGS-401F-4PH24 IGS-402F-4PH24

4x 10/100/1000Base-T + 1 or 2x 1000Base-X
Fiber with 4xPoE+ Ethernet Switch
(120 Watts, 24V Booster)



IGS-401F/402F-4PH24 models are non-managed industrial grade Gigabit PoE (Power over Ethernet) switches with 4x 10/100/1000Base-T PoE ports and 2 fixed Gigabit Ethernet fiber ports that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- Provides 4-port IEEE802.3at/af PoE output (30W/Per Port)
- Maximum PoE output power budget 120W
- 24/48VDC redundant dual input power design
- 4-Port 1000Base-T RJ-45 with 1 or 2 Fiber Gigabit Ethernet
- Regulated PoE output voltage at 55VDC
- Wide operating temperature -40 ~ 75°C (IGS-401F-4PHE24, IGS-402F-4PHE24)
- UL60950-1, CE, FCC, EN50121-4 certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- IP30 rugged metal housing

Specifications

| | |
|--|--|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3at, IEEE802.3af |
| Switch Architecture | Back-plane (Switching Fabric): 10Gbps (IGS-401F-4PH24, IGS-401F-4PHE24) Back-plane (Switching Fabric): 12Gbps (IGS-402F-4PH24, IGS-402F-4PHE24) |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x flow control, back pressure flow control |
| Provides Broadcast Storm Protection | Present, Enable / Disable set by DIP SW |
| Jumbo Frame | 10K Bytes |
| MAC Address Table | 8K |
| Packet Buffer Size | 1Mbits |
| PoE standard | IEEE 802.3at/af |
| PoE RJ-45 pin Assignment | RJ-45 port # 1~# 4 support IEEE 802.3at/af End-Span, Alternative A mode Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1, 2, 3, 6, 4, 5, 7, 8) |
| Network Connector | 4 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 1 or 2x1000Base-X Fiber connector: SC Multi Mode or Single Mode |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um |
| Protocols | CSMA/CD |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Per RJ-45 port : Link/Active (Green), Speed 10 (OFF), 100 (Green), 1000 (Yellow) Fiber Per port: Link/Active (Green) PoE Port LED : • Active : ON • Inactive : OFF • Fault : Flash (Over Load, Short Circuit, Port failed at Startup) |
| Safety | UL60950-1 |
| Rail Traffic | EN 50121-4 |

| | |
|------------------------------------|--|
| DIP SW | DIP 1 ON : Disable power failure alarm OFF : Enable power failure alarm DIP 2 ON : Disables broadcast storm protection OFF : Enable broadcast storm protection |
| Reserve Polarity Protection | Present |
| Overload Current Protection | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| Power Consumption | Max 143W @24VDC input (support up to 120W for PoE Output) (IGS-401F-4PH24) Max 143.4W @24VDC input (support up to 120W for PoE Output) (IGS-402F-4PH24) |
| PoE Power Output | Maximum PoE Output power budget 120W (30W/Per Port) |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1A @24VDC |
| Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-401F-4PH24, IGS-402F-4PH24) -40 ~ 75°C (IGS-401F-4PHE24, IGS-402F-4PHE24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 62.5 x 134.8mm (D X W X H) |
| Weight | 0.67kg (IGS-401F-4PH24), 0.68kg (IGS-402F-4PH24) |
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 316,408 Hours (IGS-401F-4PH24) 306,704 Hours (IGS-402F-4PH24) |
| Warranty | 5 years |

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

Application

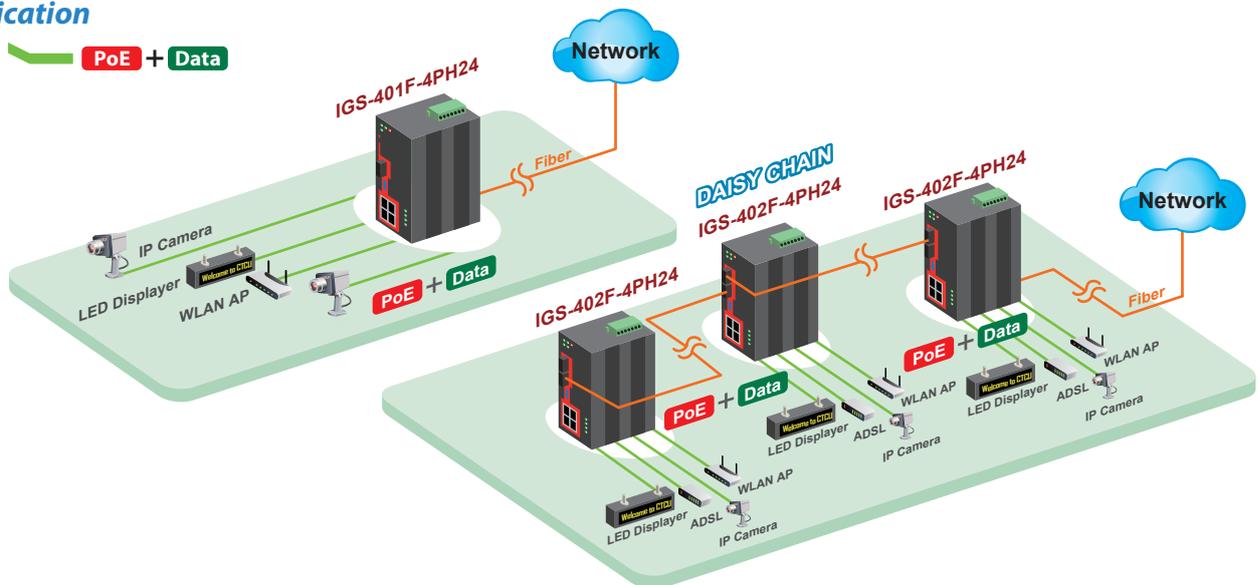
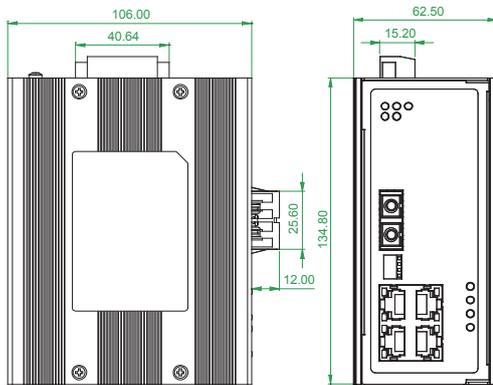


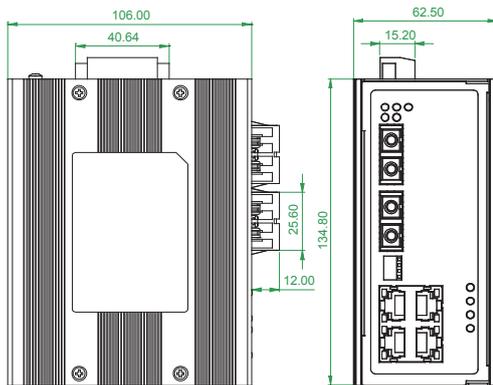
Figure : IGS-401F-4PH24 & IGS-402F-4PH24 PoE Gigabit Ethernet Switch Transmission

Dimensions

IGS-401F-4PH24

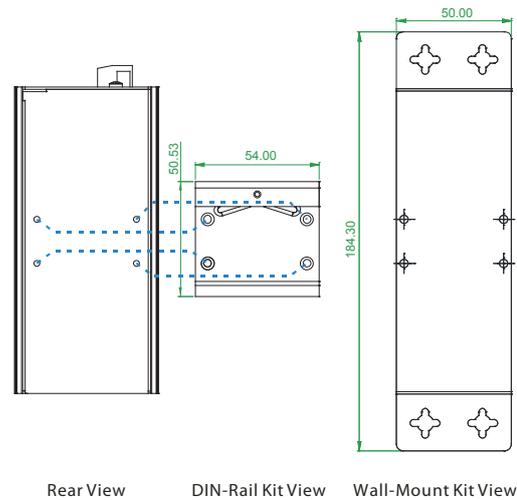


IGS-402F-4PH24



Side View

Front View



Rear View

DIN-Rail Kit View

Wall-Mount Kit View

Ordering Information

| Model Name | Description |
|-----------------|---|
| IGS-401F-4PH24 | 4-Port 10/100/1000Base-T + 1-Port 1000Base Fiber with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-10 ~ 60°C) |
| IGS-401F-4PHE24 | 4-Port 10/100/1000Base-T + 1-Port 1000Base Fiber with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-40 ~ 75°C) |
| IGS-402F-4PH24 | 4-Port 10/100/1000Base-T + 2-Port 1000Base Fiber with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-10 ~ 60°C) |
| IGS-402F-4PHE24 | 4-Port 10/100/1000Base-T + 2-Port 1000Base Fiber with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-40 ~ 75°C) |

| Fiber Connector Type | Connectivity Distance |
|----------------------|---|
| SC | SC001: 500m (SC, M/M) SC002: 2km (SC, M/M) SC020: 20km (SC, S/M) SC040: 40km (SC, S/M) SC020A: WDM 20km A type (TX: 1310nm) SC020B: WDM 20km B type (TX: 1550nm) |

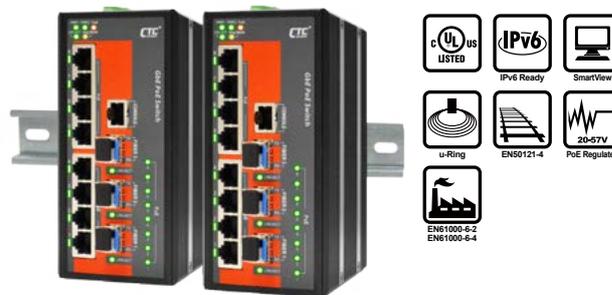
Port Number Temperature Connector Type Connectivity Distance
IGS - 40 **F - 4PH** **24** -
 Example: IGS - 401F - 4PHE24 - SC002

Accessories

| | |
|------------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |

IGS-803SM-8PH24

8x 10/100/1000Base-T+ 3x 100/1000Base-X SFP Slot with 8x PoE+ Managed Switch (180 Watts, 24V Booster)



IGS-803SM-8PH24 models are managed industrial grade Gigabit PoE (Power over Ethernet) switches with 8x 10/100/1000Base-T PoE ports and 3 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP/ITU-T G.8032 Ring and multiple u-Ring for redundant cabling, advanced PoE management functions such as PoE device auto-checking and auto reset, PoE power weekly scheduling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, Traffic surveillance, security automation applications, IP surveillance, City Security, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100/1000Base-T RJ-45 with 3x 100/1000Base-X SFP Fiber
- 24/48VDC redundant dual input power, and built-in power booster design upto 55 VDC for PoE/PoE+ output
- Constant and regulated PoE output voltage at 55VDC
- Provides 8-port IEEE802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 180W
- Advanced PoE Management, PoE PD Failure Auto Checking and auto reset, PoE configuration for power planning, weekly scheduling
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provide up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses
- **u-Ring** for Redundant Cabling, recovery time < 10ms in 250 maximum devices
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System support

Specifications

| | | | |
|------------------------|----------------------------|--|---------------------|
| 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 | |
| | IEEE 802.3z | 1000Base-X Gbit/s Ethernet over Fiber-Optic | |
| | IEEE 802.1d | STP (Spanning Tree Protocol) | |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) | |
| | IEEE 802.1s | MSTP (Multiple Spanning Tree Protocol) | |
| | ITU-T G.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switching) | |
| | IEEE 802.1Q | Virtual LANs (VLAN) | |
| | IEEE 802.1X | Port based and MAC based Network Access Control, Authentication | |
| | IEEE 802.3ad | Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) | |
| | IEEE 802.3x | Flow control for Full Duplex | |
| | IEEE 802.3af | PoE (Power over Ethernet) | |
| | IEEE 802.3at | PoE+ (Power over Ethernet enhancements) | |
| | IEEE 802.1ad | Stacked VLANs, Q-in-Q | |
| | IEEE 802.1p | LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization | |
| | IEEE 802.1ab | Link Layer Discovery Protocol (LLDP) | |
| | IEEE 802.3az | EEE (Energy Efficient Ethernet) | |
| | VLAN ID | 4094 | IEEE802.1Q VLAN VID |
| | Switch Architecture | Back-plane (Switching Fabric): 22Gbps | |
| Data Processing | Store and Forward | | |

| | |
|------------------------------------|---|
| Flow Control | IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| PoE RJ-45 Pin Assignment | 8 RJ-45 ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode. Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8) |
| Network Connector | 8 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 3X 100/1000 Base-X dual speed mode SFP slot, with DDMII |
| Console | RS-232 (RJ-45) |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| Reverse Polarity Protection | Present |
| Overload Current Protection | Present |
| CPU Watch Dog | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green) PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit, Port failed at Startup) : Flash 1times /sec (Green) • PoE Output Power Off : Off (Green) |

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

Specifications

| | |
|--------------------------|---|
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |
| PoE Standard | IEEE802.3af, IEEE802.3at |
| PoE Power Output | Maximum PoE output power budget 180W (30W/per port) |
| Power Consumption | |

| Items | Total Power Consumption | Device Power Consumption | PoE Budget | Boost Efficiency |
|-------|-------------------------|--------------------------|------------|------------------|
| 24VDC | 200.2W | 9.2W | 180W | 94% |
| 48VDC | 195.1W | 9.8W | 180W | 97% |

| | |
|---------------------------------|---|
| Warning Message | System Syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-803SM-8PH24) -40 ~ 75°C (IGS-803SM-8PHE24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 72 x152 mm (D x W x H) |
| Weight | 0.96kg |
| Installation Mounting | DIN Rail mounting or wall mounting |

Software Specifications

| | |
|---|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multicast VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Multiple u-Ring | up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. |
| Loop Protection | Present |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number |
| Bandwidth Control for Ingress | Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |

| | |
|--|--|
| Certification | |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A, CE EN55022 Class A |
| 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 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 | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 311,376hrs (MIL-HDBK-217) |
| Warranty | 5 years |

| | |
|---------------------------------------|---|
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access | Web, Telnet / SSH , CLI RS-232 console |
| Filtering | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP / SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with shorter cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |
| Advanced PoE Management | PoE PD Failure Auto Checking PoE Scheduling (On/Off schedule weekly) PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge (maximum 180W) limitation Power feeding priority |

Application

Figure 1: Application Example

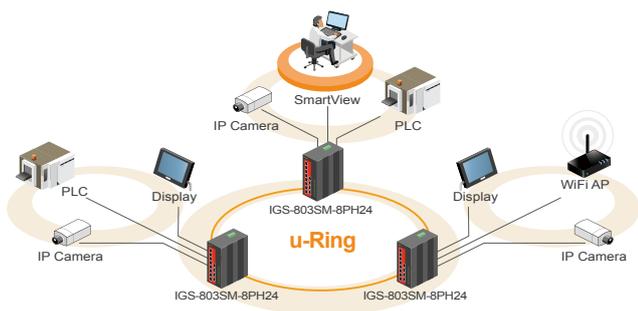


Figure 2: Multiple Rings

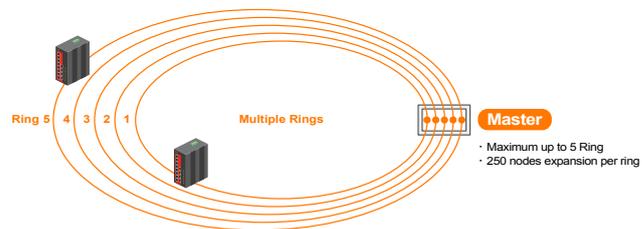


Figure 3: An illustration of u-Ring instances configured in Web interface

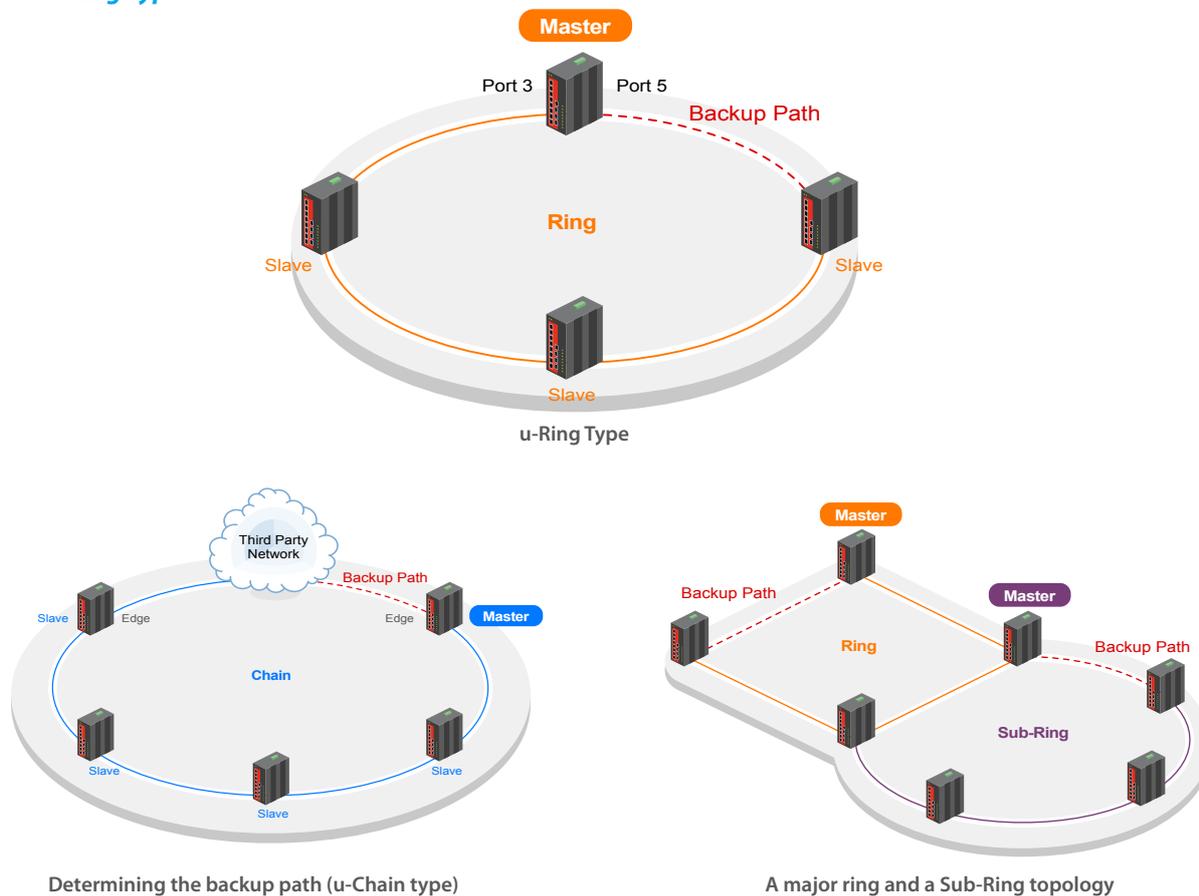
u-Ring Configuration Auto-refresh Refresh

| Delete | Instance | Type | Master | East | | West | |
|--------|----------|----------|--------------------------|-------------|--------------------------|-------------|--------------------------|
| | | | | Port | Edge | Port | Edge |
| Delete | 1 | u-Ring | <input type="checkbox"/> | 1 | | 2 | |
| Delete | 2 | u-Ring | <input type="checkbox"/> | 4 | | 3 | |
| Delete | 3 | u-Ring | <input type="checkbox"/> | 10 (Fiber2) | | 11 (Fiber3) | |
| Delete | 4 | Sub-Ring | <input type="checkbox"/> | 6 | | | |
| Delete | 5 | u-Chain | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 9 (Fiber1) | <input type="checkbox"/> |

Add New Instance

Save Reset

Figure 4: u-Ring Type



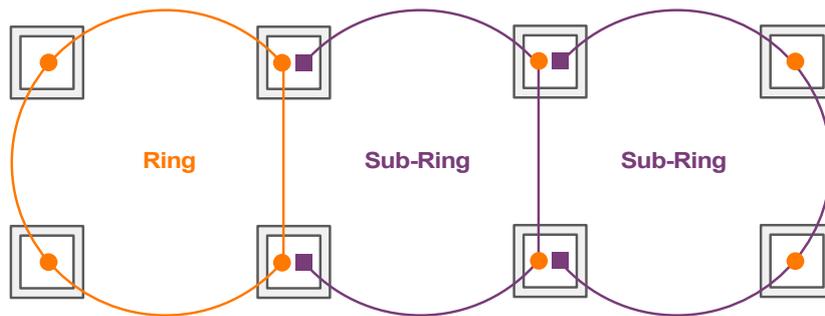
Determining the backup path (u-Chain type)

A major ring and a Sub-Ring topology

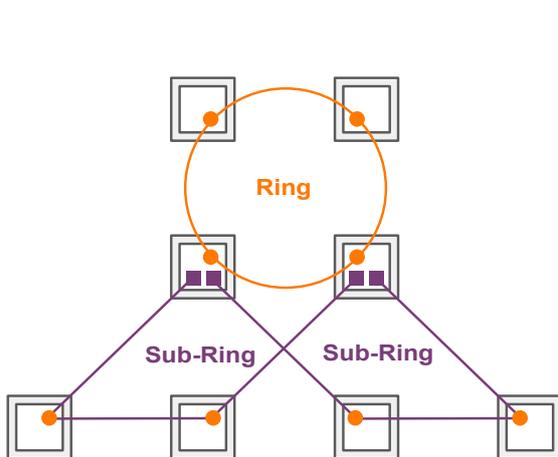
Figure 5: Ring Configuration Example

Ring Configuration Type

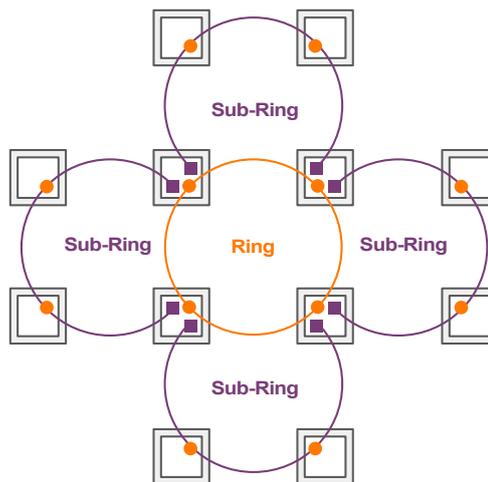
- u-Ring
- Sub-Ring
- ▲ u-Chain



Ring Configuration Type

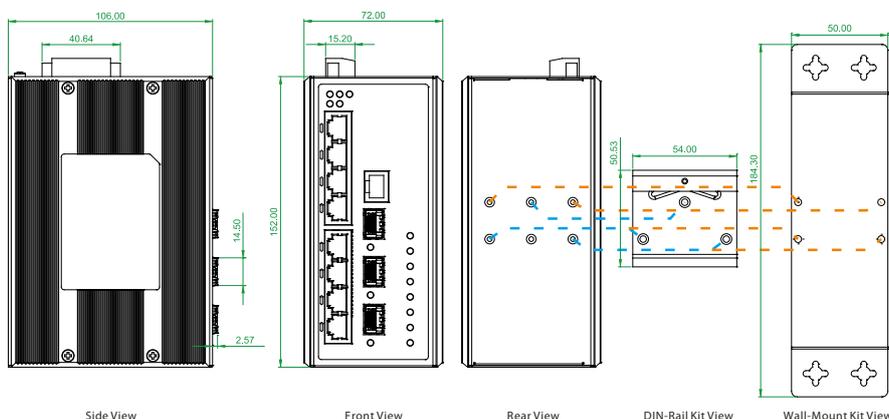


Combination of a ring and two Sub-Ring



Combination of a ring and four Sub-Ring

Dimensions



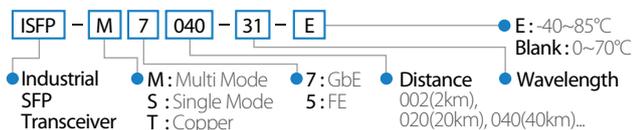
Ordering Information

| Model Name | Description |
|------------------|---|
| IGS-803SM-8PH24 | 8x 10/100/1000Base-T + 3x 100/1000Base-X SFP slot with 8 High Power PoE Managed Switch (30W/Per Port ,Total 180W, 24V Booster, -10~+60°C) |
| IGS-803SM-8PHE24 | 8x 10/100/1000Base-T + 3x 100/1000Base-X SFP slot with 8 High Power PoE Managed Switch (30W/Per Port ,Total 180W, 24V Booster, -40~+75°C) |

Accessories

| | |
|-----------------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

IGS-803SM – 8PH 24 Temperature
 Example: IGS-803SM – 8PH E24



IGS-402S-4PH24

4x 10/100/1000Base-T+ 2x 100/1000Base-X SFP Slot with 4x PoE+ Ethernet Switch (120 Watts, 24V Booster)



IGS-402S-4PH24 model is a non-managed industrial grade Gigabit PoE (Power over Ethernet) switch with 4x 10/100/1000Base-T PoE ports and 2 SFP Gigabit Ethernet fiber ports that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- Provides 4-port IEEE802.3at/af PoE output (30W/Per Port)
- Maximum PoE output power budget 120W
- 24/48VDC Redundant dual input power design
- 4-Port 1000Base-T RJ-45 with 2 Fiber Gigabit Ethernet
- Regulated PoE output voltage at 55VDC
- Wide operating temperature -40 ~ 75°C (IGS-402S-4PHE24)
- UL60950-1, CE, FCC, EN50121-4 certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 Certified
- IP30 rugged metal housing

Specifications

| | |
|--|--|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3at, IEEE802.3af |
| Switch Architecture | Back-plane (Switching Fabric): 12Gbps |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x flow control, back pressure flow control |
| Provides Broadcast Storm Protection | Present, Enable / Disable set by DIP SW |
| Jumbo Frame | 10K Bytes |
| MAC Address Table | 8K |
| Packet Buffer Size | 1Mbits |
| PoE Standard | IEEE 802.3at/af |
| PoE RJ-45 Pin Assignment | RJ-45 port # 1~# 4 support IEEE 802.3at/af End-Span, Alternative A mode Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1, 2, 3, 6, 4, 5, 7, 8) |
| Network Connector | 4 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 2 x SFP 100/1000Base-X dual mode slot |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um |
| Protocols | CSMA/CD |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Per RJ-45 port : Link/Active (Green), Speed 10 (OFF), 100 (Green), 1000 (Yellow) Fiber Per port: Link/Active (Green) PoE Port LED : • Active : ON • Inactive : OFF • Fault : Flash (Over Load, Short Circuit, Port failed at Startup) |
| Safety | UL60950-1 |
| Rail Traffic | EN 50121-4 |
| MTBF | 334,448 Hours |
| Warranty | 5 years |

| | |
|------------------------------------|---|
| DIP SW | DIP 1 ON : Disable power failure alarm OFF : Enable power failure alarm DIP 2 ON : Disables broadcast storm protection OFF : Enable broadcast storm protection DIP 3 ON : Fiber 2 for 100Base-FX SFP OFF : Fiber 2 for Gigabit SFP DIP 4 ON : Fiber 1 for 100Base-FX SFP OFF : Fiber 1 for Gigabit SFP |
| Reserve Polarity Protection | Present |
| Overload Current Protection | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| Power Consumption | Max 143W @24VDC input (support up to 120W for PoE Output) |
| PoE Power Output | Maximum PoE Output power budget 120W (30W/Per Port) |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-402S-4PH24) -40 ~ 75°C (IGS-402S-4PHE24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 62.5 x 134.8mm (D X W X H) |
| Weight | 0.84kg |
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| 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.

Application

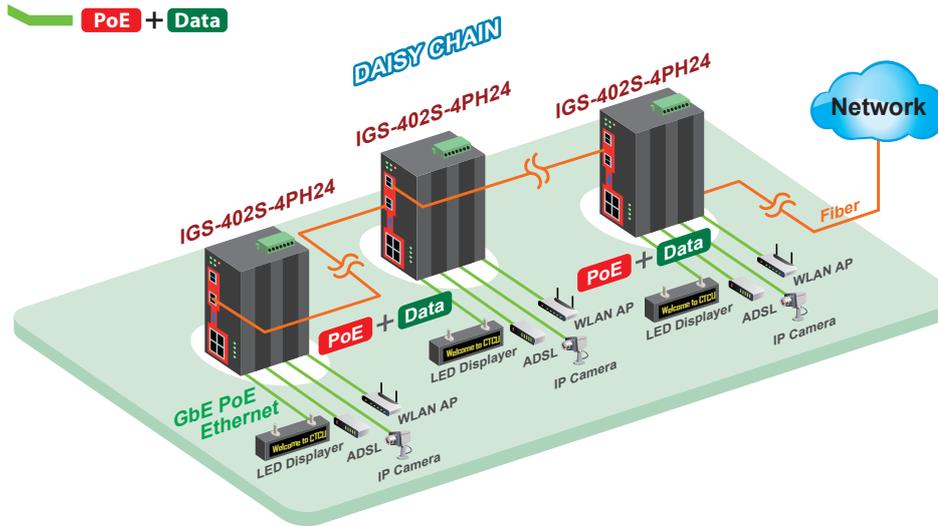
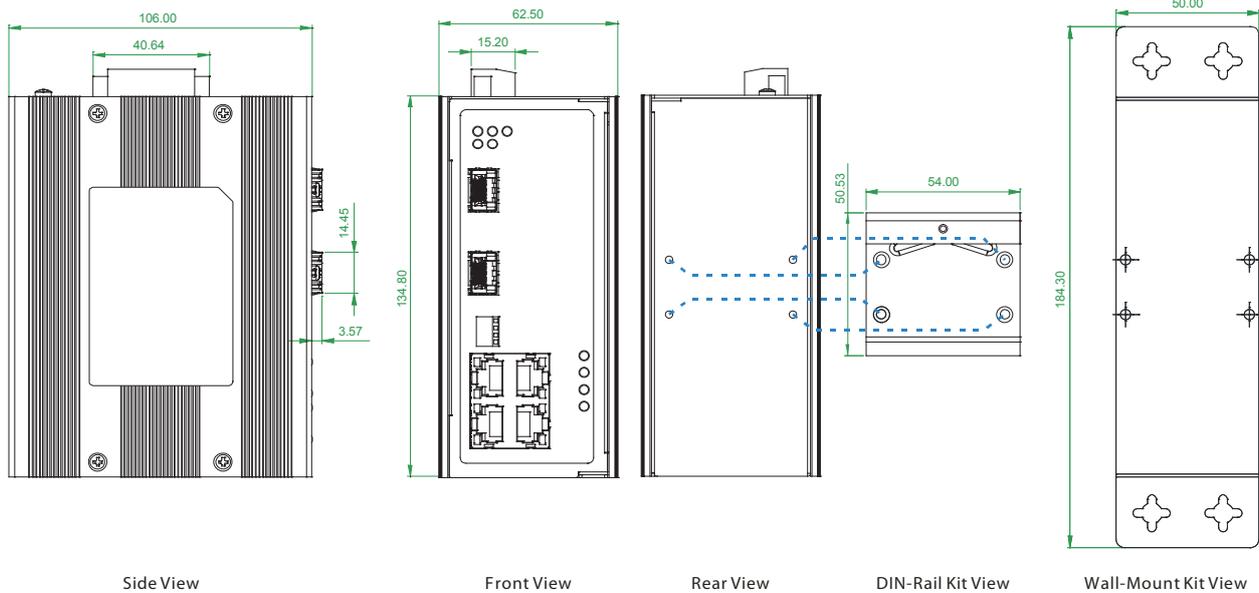


Figure : IGS-402S-4PH24 PoE Gigabit Ethernet Switch Transmission with Daisy Chain

Dimensions



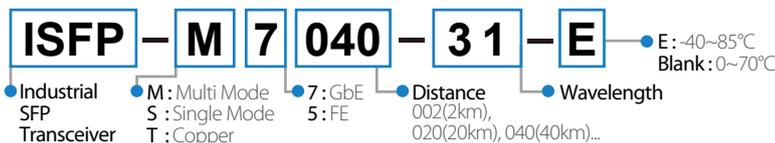
Ordering Information

| Model Name | Description |
|-----------------|--|
| IGS-402S-4PH24 | 4-Port 10/100/1000Base-T + 2-Port 100/1000Base SFP Slot with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-10 ~ 60°C) |
| IGS-402S-4PHE24 | 4-Port 10/100/1000Base-T + 2-Port 100/1000Base SFP Slot with 4-PoE Switch (30W/Per Port, Total 120W, 24V Booster) (-40 ~ 75°C) |

Accessories

| | |
|-----------------|---|
| DRP-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

Temperature
IGS - 402S - 4PH 24
 Example: IGS - 402S - 4PHE24



IGS-402SM-4PH24

4x 10/100/1000Base-T+ 2x 100/1000Base-X SFP Slot with 4x PoE+ Managed Switch (120 Watts, 24V Booster)



IGS-402SM-4PH24 models are managed industrial grade Gigabit PoE (Power over Ethernet) switches with 4x 10/100/1000Base-T PoE ports and 2 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP/ITU-T G.8032 Ring and multiple u-Ring for redundant cabling, advanced PoE management functions such as PoE device auto-checking and auto reset, PoE power weekly scheduling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, Traffic surveillance, security automation applications, IP surveillance, City Security, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100/1000Base-T RJ-45 with 2x 100/1000Base-X SFP Fiber
- 24/48VDC redundant dual input power, and built-in power booster design upto 55 VDC for PoE/PoE+ output
- Constant and regulated PoE output voltage at 55VDC
- Provides 4-port IEEE802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 120W
- Advanced PoE Management, PoE PD Failure Auto Checking, and auto reset when PD fail PoE configuration for power planning, weekly scheduling
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provide up to 3 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses
- **u-Ring** for Redundant Cabling, recovery time < 10ms in 250 maximum devices
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System support

Specifications

| | | |
|----------------------------|---------------------------------------|--|
| 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 |
| | IEEE 802.3z | 1000Base-X Gbit/s Ethernet over Fiber-Optic |
| | IEEE 802.1d | STP (Spanning Tree Protocol) |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) |
| | IEEE 802.1s | MSTP (Multiple Spanning Tree Protocol) |
| | ITU-T G.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switching) |
| | IEEE 802.1Q | Virtual LANs (VLAN) |
| | IEEE 802.1X | Port based and MAC based Network Access Control, Authentication |
| | IEEE 802.3ad | Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) |
| | IEEE 802.3x | Flow control for Full Duplex |
| | IEEE 802.3af | PoE (Power over Ethernet) |
| | IEEE 802.3at | PoE+ (Power over Ethernet enhancements) |
| | IEEE 802.1ad | Stacked VLANs, Q-in-Q |
| | IEEE 802.1p | LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization |
| | IEEE 802.1ab | Link Layer Discovery Protocol (LLDP) |
| | IEEE 802.3az | EEE (Energy Efficient Ethernet) |
| | VLAN ID | 4094 |
| Switch Architecture | Back-plane (Switching Fabric): 12Gbps | |
| Data Processing | Store and Forward | |

| | |
|------------------------------------|---|
| Flow Control | IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| PoE RJ-45 Pin Assignment | 4 RJ-45 ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode. Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8) |
| Network Connector | 4 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 2X 100/1000 Base-X dual speed mode SFP slot, with DDMII |
| Console | RS-232 (RJ-45) |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| Reverse Polarity Protection | Present |
| Overload Current Protection | Present |
| CPU Watch Dog | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green) PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit, Port failed at Startup) : Flash 1times /sec (Green) • PoE Output Power Off : Off (Green) |

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

Specifications

| | |
|--------------------------|---|
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |
| PoE Standard | IEEE802.3af, IEEE802.3at |
| PoE Power Output | Maximum PoE output power budget 120W (30W/per port) |
| Power Consumption | |

| Items | Total Power Consumption | Device Power Consumption | PoE Budget | Boost Efficiency |
|-------|-------------------------|--------------------------|------------|------------------|
| 24VDC | 135.2W | 7.5W | 120W | 94% |
| 48VDC | 132.5W | 9W | 120W | 97.2% |

| | |
|---------------------------------|---|
| Warning Message | System Syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-402SM-4PH24) -40 ~ 75°C (IGS-402SM-4PHE24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 62.5 x 134.8mm (D x W x H) |
| Weight | 0.715kg |
| Installation Mounting | DIN Rail mounting or wall mounting |

Software Specifications

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|---|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multicast VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Multiple u-Ring | up to 3 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 3 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported are 250 devices. |
| Loop Protection | Present |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number |
| Bandwidth Control for Ingress | Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |

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| Certification | |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A, CE EN55022 Class A |
| 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 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 | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 276,161Hrs (MIL-HDBK-217) |
| Warranty | 5 years |

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|------------------------------------|--|
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access | Web, Telnet / SSH , CLI RS-232 console |
| Filtering | |

| | |
|---------------------------------------|--|
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |

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|--------------------------------|--|
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP / SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |

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|--------------------------------|---|
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |
| Advanced PoE Management | PoE PD failure auto checking ,and auto reset when PD fail PoE Scheduling (On/Off schedule weekly) PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge (maximum 120W) limitation Power feeding priority |

Application

Figure 1: Application Example

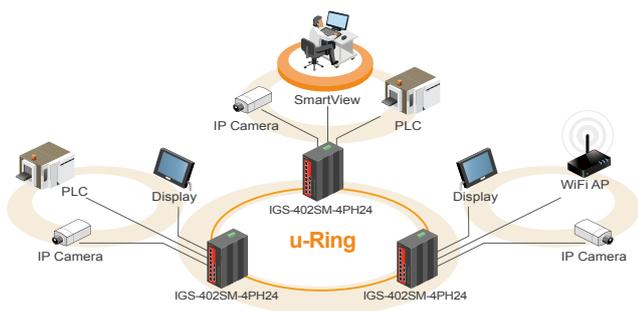


Figure 2: Multiple Rings

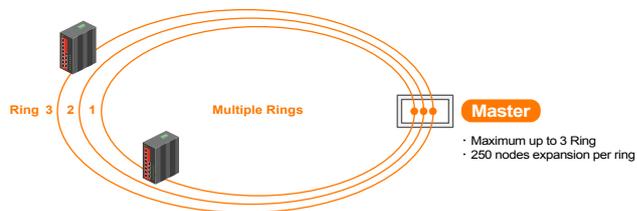


Figure 3: An illustration of u-Ring instances configured in Web interface

u-Ring Configuration

| Delete | Instance | Type | Master | East | | West | |
|--------|----------|----------|--------------------------|------|--------------------------|------|--------------------------|
| | | | | Port | Edge | Port | Edge |
| Delete | 1 | u-Ring | <input type="checkbox"/> | 1 | | 2 | |
| Delete | 2 | Sub-Ring | <input type="checkbox"/> | 3 | | | |
| Delete | 3 | u-Chain | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 6 | <input type="checkbox"/> |

Add New Instance

Save Reset

Figure 4: u-Ring Type

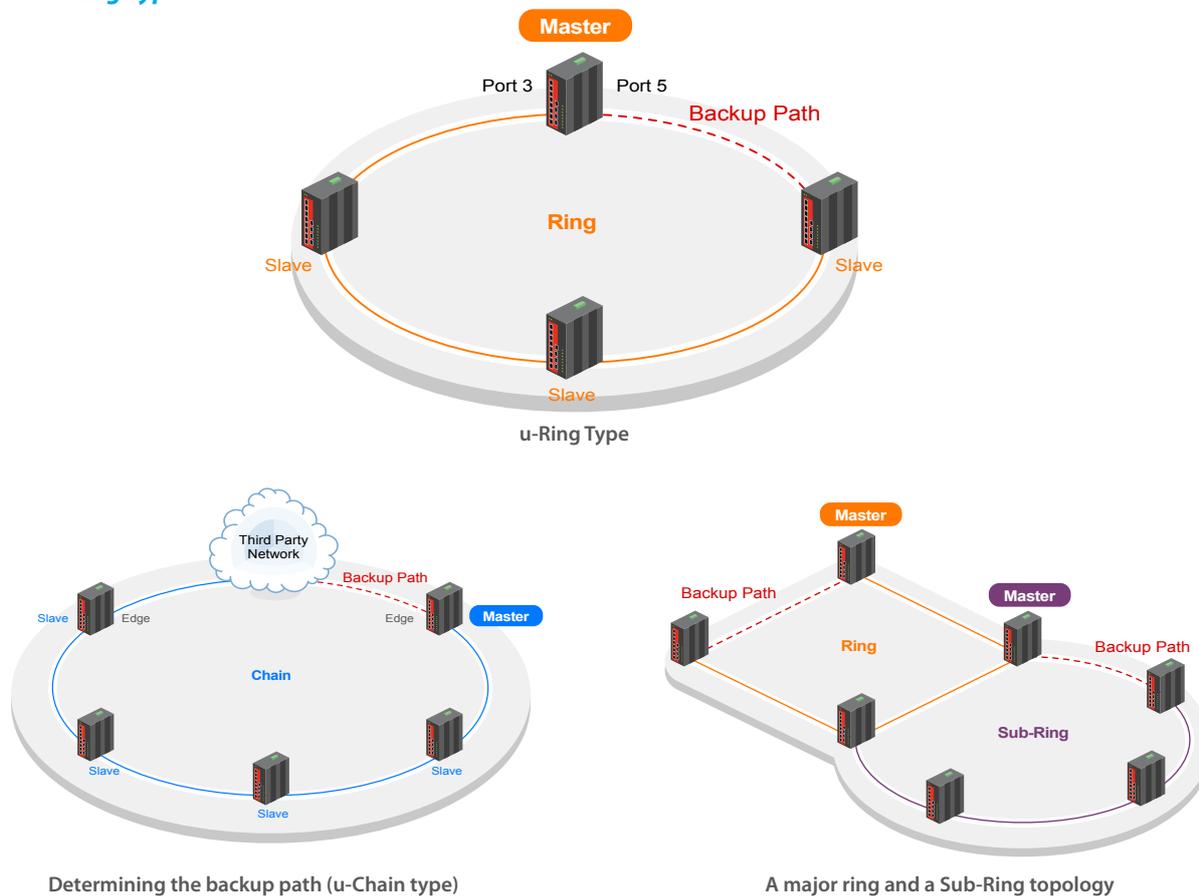
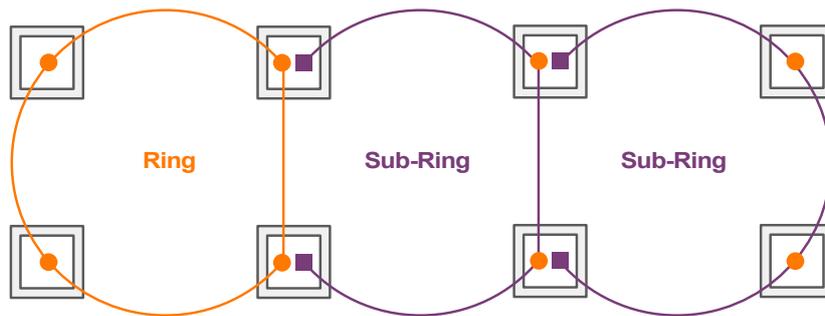


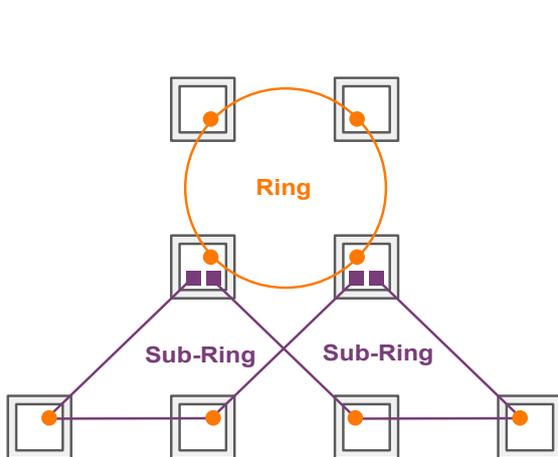
Figure 5: Ring Configuration Example

Ring Configuration Type

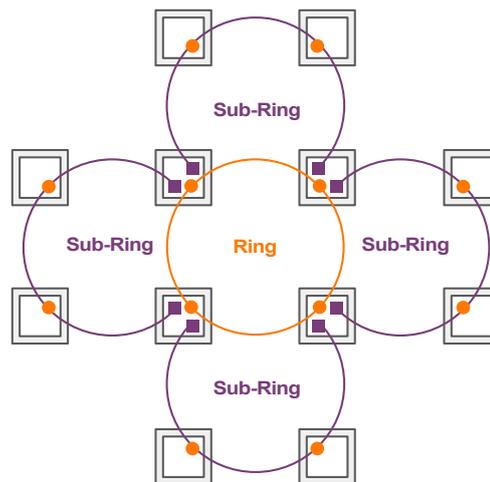
- u-Ring
- Sub-Ring
- ▲ u-Chain



Ring Configuration Type

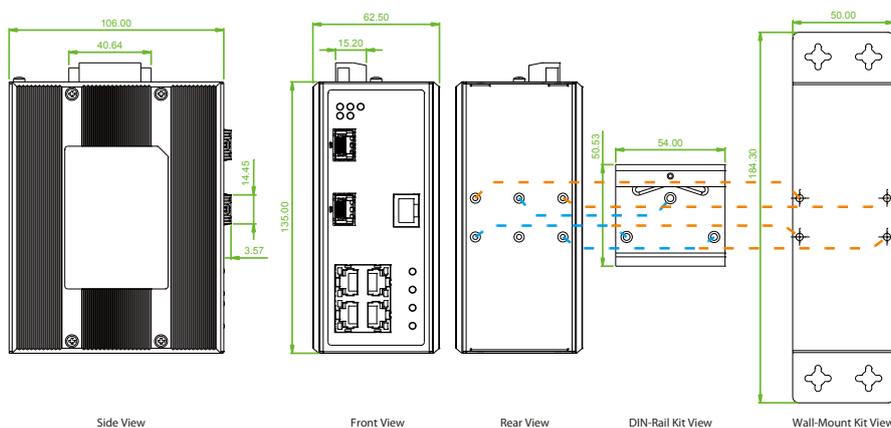


Combination of a ring and two Sub-Ring



Combination of a ring and four Sub-Ring

Dimensions



Ordering Information

| Model Name | Description |
|------------------|--|
| IGS-402SM-4PH24 | 4x 10/100/1000Base-T + 2x 100/1000Base-X SFP slot with 4 High Power PoE Managed Switch (30W/Per Port ,Total 120W, 24V Booster, -10~60°C) |
| IGS-402SM-4PHE24 | 4x 10/100/1000Base-T + 2x 100/1000Base-X SFP slot with 4 High Power PoE Managed Switch (30W/Per Port ,Total 120W, 24V Booster, -40~75°C) |

Accessories

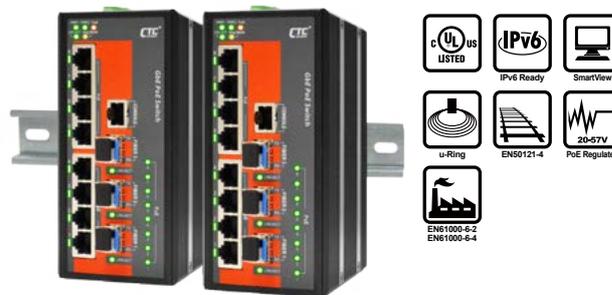
| | |
|-----------------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

IGS-402SM-4PH 24 Temperature
 Example: IGS-402SM-4PH E24

| | | | | | |
|------------------------------|--|-------------------|--|--------------------------------|--------------|
| ISFP | M | 7 | 040 | 31 | E |
| ● Industrial SFP Transceiver | ● M: Multi Mode S: Single Mode T: Copper | ● 7: GbE 5: FE | ● Distance 002(2km), 020(20km), 040(40km)... | ● E: -40~85°C Blank: 0~70°C | ● Wavelength |

IFS-803GSM-8PH24

8x 10/100Base-T+ 3x 100/1000Base-X SFP Slot with 8x PoE+ Managed Switch (180 Watts, 24V Booster)



IFS-803GSM-8PH24 models are managed industrial grade PoE (Power over Ethernet) switches with 8x 10/100Base-T PoE ports and 3 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP/ ITU-T G.8032 Ring and multiple u-Ring for redundant cabling, advanced PoE management functions such as PoE device auto-checking and auto reset, PoE power weekly scheduling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, Traffic surveillance, security automation applications, IP surveillance, City Security, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100Base-T RJ-45 with 3x 100/1000Base-X SFP Fiber
- 24/48VDC redundant dual input power, and built-in power booster design upto 55 VDC for PoE/PoE+ output
- Constant and regulated PoE output voltage at 55VDC
- Provides 8-port IEEE802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 180W
- Advanced PoE Management, PoE PD Failure Auto Checking and auto reset, PoE configuration for power planning, weekly scheduling
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provide up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses
- **u-Ring** for Redundant Cabling, recovery time<10ms in 250 maximum devices

- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System support

Specifications

| | | |
|----------------------------|--|--|
| Standard | IEEE 802.3 | 10Base-T 10Mbit/s Ethernet |
| | IEEE 802.3u | 100Base-TX, 100Base-FX, Fast Ethernet |
| | IEEE 802.3z | 1000Base-X Gbit/s Ethernet over Fiber-Optic |
| | IEEE 802.1d | STP (Spanning Tree Protocol) |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) |
| | IEEE 802.1s | MSTP (Multiple Spanning Tree Protocol) |
| | ITU-T G.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switching) |
| | IEEE 802.1Q | Virtual LANs (VLAN) |
| | IEEE 802.1X | Port based and MAC based Network Access Control, Authentication |
| | IEEE 802.3ad | Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) |
| | IEEE 802.3x | Flow control for Full Duplex |
| | IEEE 802.3af | PoE (Power over Ethernet) |
| | IEEE 802.3at | PoE+ (Power over Ethernet enhancements) |
| | IEEE 802.1ad | Stacked VLANs, Q-in-Q |
| | IEEE 802.1p | LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization |
| IEEE 802.1ab | Link Layer Discovery Protocol (LLDP) | |
| IEEE 802.3az | EEE (Energy Efficient Ethernet) | |
| VLAN ID | 4094 | IEEE802.1Q VLAN VID |
| Switch Architecture | Back-plane (Switching Fabric): 7.6Gbps | |
| Data Processing | Store and Forward | |

| | |
|------------------------------------|---|
| Flow Control | IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| PoE RJ-45 Pin Assignment | 8 RJ-45 ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode. Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1,2,3,6) |
| Network Connector | 8 x RJ-45 10/100Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 3X 100/1000 Base-X dual speed mode SFP slot, with DDMI |
| Console | RS-232 (RJ-45) |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| Reverse Polarity Protection | Present |
| Overload Current Protection | Present |
| CPU Watch Dog | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) SFP Fiber Per port: Link/Active (Green) PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit, Port failed at Startup) : Flash 1times /sec (Green) • PoE Output Power Off : Off (Green) |

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

Specifications

| | |
|--------------------------|---|
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |
| PoE Standard | IEEE802.3af, IEEE802.3at |
| PoE Power Output | Maximum PoE output power budget 180W (30W/per port) |

| Items | Total Power Consumption | Device Power Consumption | PoE Budget | Boost Efficiency |
|-------|-------------------------|--------------------------|------------|------------------|
| 24VDC | 198.3W | 7.3W | 180W | 94% |
| 48VDC | 193.2W | 7.9W | 180W | 97% |

| | |
|---------------------------------|---|
| Warning Message | System Syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IFS-803GSM-8PH24) -40 ~ 75°C (IFS-803GSM-8PHE24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 72 x152 mm (D x W x H) |
| Weight | 0.96kg |
| Installation Mounting | DIN Rail mounting or wall mounting |

Software Specifications

| | |
|---|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multicast VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Multiple u-Ring | up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. |
| Loop Protection | Present |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number |
| Bandwidth Control for Ingress | Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |

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| Certification | |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A, CE EN55022 Class A |
| 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 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 | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 314,064Hrs (MIL-HDBK-217) |
| Warranty | 5 years |

| | |
|------------------------------------|--|
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access | Web, Telnet / SSH , CLI RS-232 console |
| Filtering | |

| | |
|---------------------------------------|--|
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |

| | |
|--------------------------------|--|
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP / SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |

| | |
|------------------------|---|
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity |

| | |
|--------------------------------|---|
| Cable Diagnostic | Measuring cable OK or broken point distance |
| Advanced PoE Management | PoE PD Failure Auto Checking, and Auto reset when PD fail PoE Scheduling (On/Off schedule weekly) PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge (maximum 180W) limitation Power feeding priority |

Application

Figure 1: Application Example

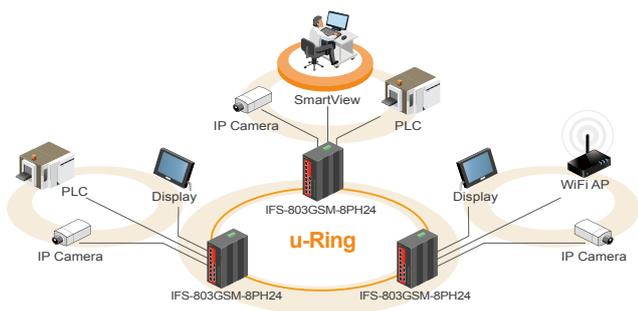


Figure 2: Multiple Rings

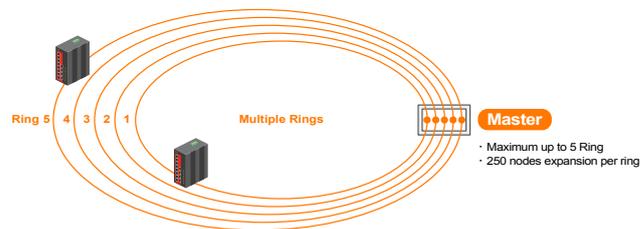


Figure 3: An illustration of u-Ring instances configured in Web interface

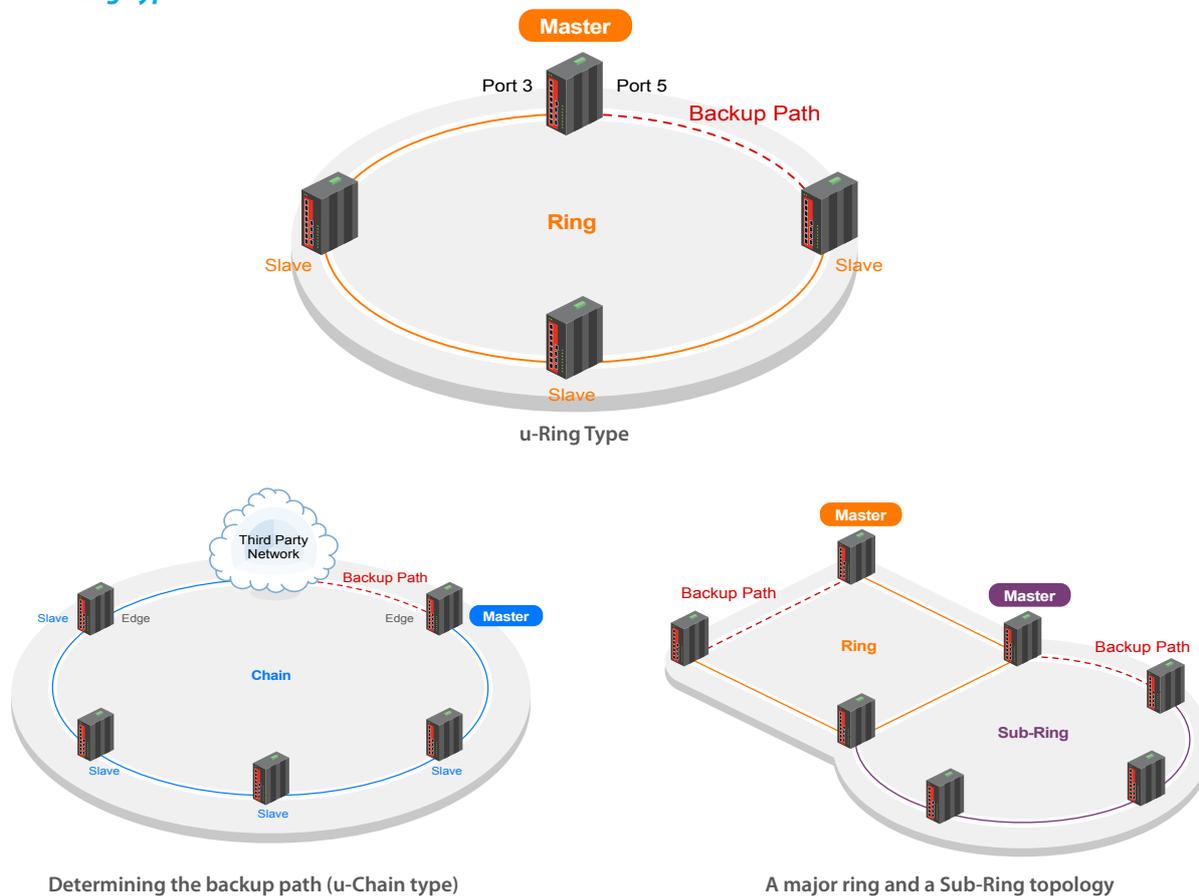
u-Ring Configuration Auto-refresh Refresh

| Delete | Instance | Type | Master | East | | West | |
|--------|----------|----------|--------------------------|-------------|--------------------------|-------------|--------------------------|
| | | | | Port | Edge | Port | Edge |
| Delete | 1 | u-Ring | <input type="checkbox"/> | 1 | | 2 | |
| Delete | 2 | u-Ring | <input type="checkbox"/> | 4 | | 3 | |
| Delete | 3 | u-Ring | <input type="checkbox"/> | 10 (Fiber2) | | 11 (Fiber3) | |
| Delete | 4 | Sub-Ring | <input type="checkbox"/> | 6 | | | |
| Delete | 5 | u-Chain | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 9 (Fiber1) | <input type="checkbox"/> |

Add New Instance

Save Reset

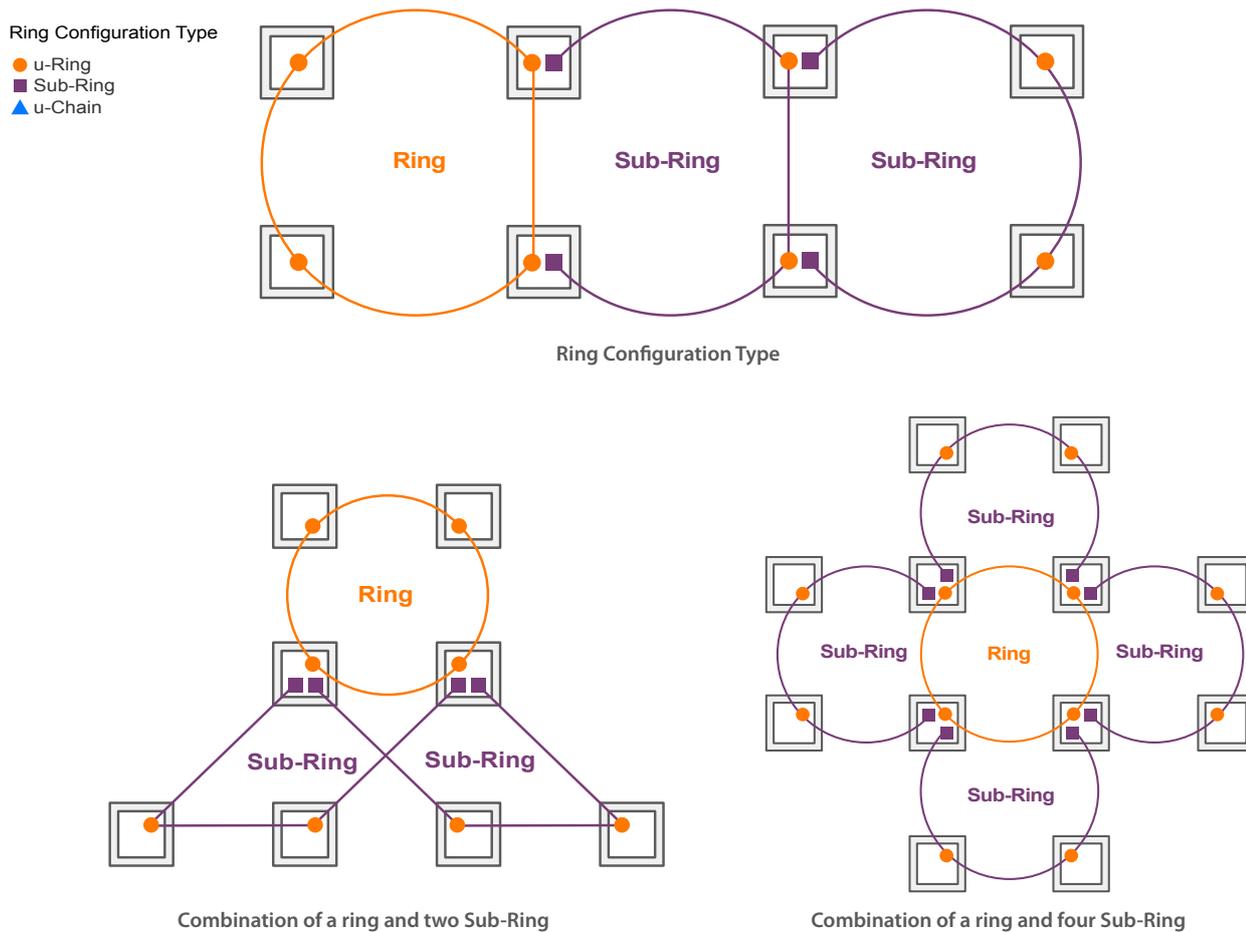
Figure 4: u-Ring Type



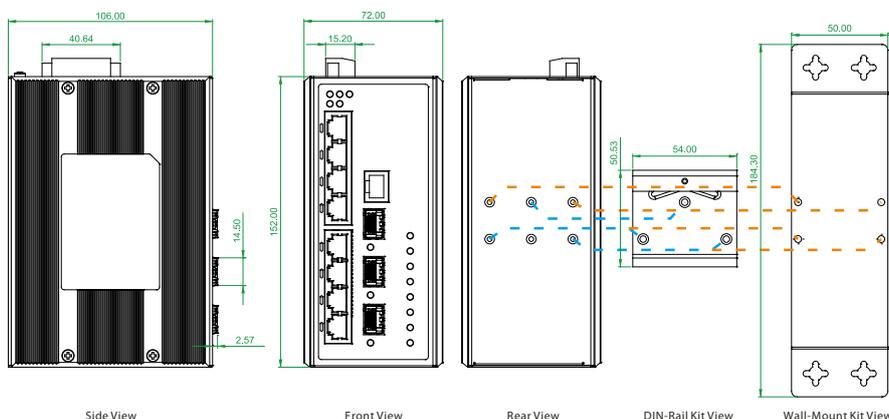
Determining the backup path (u-Chain type)

A major ring and a Sub-Ring topology

Figure 5: Ring Configuration Example



Dimensions



Ordering Information

| Model Name | Description |
|-------------------|---|
| IFS-803GSM-8PH24 | 8x 10/100Base-T + 3x 100/1000Base-X SFP slot with 8 High Power PoE Managed Switch (30W/Per Port, Total 180W, 24V Booster, -10~60°C) |
| IFS-803GSM-8PHE24 | 8x 10/100Base-T + 3x 100/1000Base-X SFP slot with 8 High Power PoE Managed Switch (30W/Per Port, Total 180W, 24V Booster, -40~75°C) |

Accessories

| | |
|-----------------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

Temperature
IFS-803GSM-8PH 24
 Example: IFS-803GSM-8PH E24

| | | | | | | |
|------------------------------|--|-------------------|--|--------------|---|--------------------------------|
| ISFP | M | 7 | 040 | 31 | E | ● E: -40~85°C Blank: 0~70°C |
| ● Industrial SFP Transceiver | ● M: Multi Mode S: Single Mode T: Copper | ● 7: GbE 5: FE | ● Distance 002(2km), 020(20km), 040(40km)... | ● Wavelength | | |

IFS-402GSM-4PH24

4x 10/100Base-T+ 2x 100/1000Base-X SFP Slot with 4x PoE+ Managed Switch (120 Watts, 24V Booster)



IFS-402GSM-4PH24 models are managed industrial grade PoE (Power over Ethernet) switches with 4x 10/100Base-T PoE ports and 2 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP/ ITU-T G.8032 Ring and multiple u-Ring for redundant cabling, advanced PoE management functions such as PoE device auto-checking and auto reset, PoE power weekly scheduling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, Traffic surveillance, security automation applications, IP surveillance, City Security, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100Base-T RJ-45 with 2x 100/1000Base-X SFP Fiber
- 24/48VDC redundant dual input power, and built-in power booster design upto 55 VDC for PoE/PoE+ output
- Constant and regulated PoE output voltage at 55VDC
- Provides 4-port IEEE802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 120W
- Advanced PoE Management, PoE PD Failure Auto Checking, and auto reset when PD fail PoE configuration for power planning, weekly scheduling
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provide up to 3 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses
- **u-Ring** for Redundant Cabling, recovery time<10ms in 250 maximum devices

- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System support

Specifications

| | | |
|----------------------------|--|--|
| Standard | IEEE 802.3 | 10Base-T 10Mbit/s Ethernet |
| | IEEE 802.3u | 100Base-TX, 100Base-FX, Fast Ethernet |
| | IEEE 802.3z | 1000Base-X Gbit/s Ethernet over Fiber-Optic |
| | IEEE 802.1d | STP (Spanning Tree Protocol) |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) |
| | IEEE 802.1s | MSTP (Multiple Spanning Tree Protocol) |
| | ITU-T G.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switching) |
| | IEEE 802.1Q | Virtual LANs (VLAN) |
| | IEEE 802.1X | Port based and MAC based Network Access Control, Authentication |
| | IEEE 802.3ad | Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) |
| | IEEE 802.3x | Flow control for Full Duplex |
| | IEEE 802.3af | PoE (Power over Ethernet) |
| | IEEE 802.3at | PoE+ (Power over Ethernet enhancements) |
| | IEEE 802.1ad | Stacked VLANs, Q-in-Q |
| | IEEE 802.1p | LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization |
| IEEE 802.1ab | Link Layer Discovery Protocol (LLDP) | |
| IEEE 802.3az | EEE (Energy Efficient Ethernet) | |
| VLAN ID | 4094 | IEEE802.1Q VLAN VID |
| Switch Architecture | Back-plane (Switching Fabric): 4.8Gbps | |
| Data Processing | Store and Forward | |

| | |
|------------------------------------|---|
| Flow Control | IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| PoE RJ-45 Pin Assignment | 4 RJ-45 ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode. Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1,2,3,6) |
| Network Connector | 4 x RJ-45 10/100Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 2X 100/1000 Base-X dual speed mode SFP slot, with DDMI |
| Console | RS-232 (RJ-45) |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| Reverse Polarity Protection | Present |
| Overload Current Protection | Present |
| CPU Watch Dog | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) SFP Fiber Per port: Link/Active (Green) PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit, Port failed at Startup) : Flash 1times /sec (Green) • PoE Output Power Off : Off (Green) |

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

Specifications

| | |
|--------------------------|---|
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |
| PoE Standard | IEEE802.3af, IEEE802.3at |
| PoE Power Output | Maximum PoE output power budget 120W (30W/per port) |
| Power Consumption | |

| Items | Total Power Consumption | Device Power Consumption | PoE Budget | Boost Efficiency |
|-------|-------------------------|--------------------------|------------|------------------|
| 24VDC | 134.8W | 7.1W | 120W | 94% |
| 48VDC | 132.2W | 8.5W | 120W | 97.2% |

| | |
|---------------------------------|---|
| Warning Message | System Syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IFS-402GSM-4PH24) -40 ~ 75°C (IFS-402GSM-4PHE24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 62.5 x 134.8mm (D x W x H) |
| Weight | 0.71kg |
| Installation Mounting | DIN Rail mounting or wall mounting |

Software Specifications

| | |
|---|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multicast VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Multiple u-Ring | up to 3 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 3 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported are 250 devices. |
| Loop Protection | Present |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number |
| Bandwidth Control for Ingress | Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |

| | |
|--|--|
| Certification | |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A, CE EN55022 Class A |
| 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 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 | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 276,161 Hrs (MIL-HDBK-217) |
| Warranty | 5 years |

| | |
|---------------------------------------|---|
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access | Web, Telnet / SSH , CLI RS-232 console |
| Filtering | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP / SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |
| Advanced PoE Management | PoE PD Failure Auto Checking, and Auto reset when PD fail PoE Scheduling (On/Off schedule weekly) PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge (maximum 120W) limitation Power feeding priority |

Application

Figure 1: Application Example

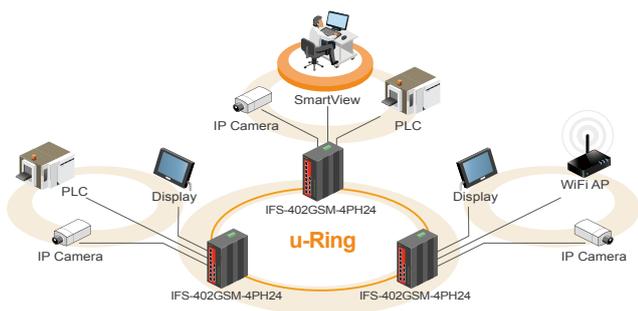


Figure 2: Multiple Rings

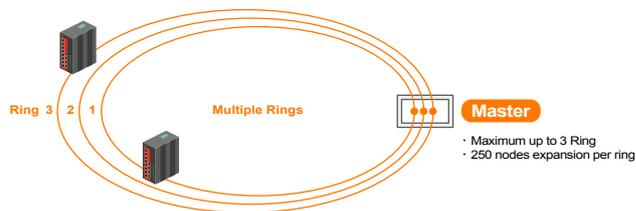


Figure 3: An illustration of u-Ring instances configured in Web interface

u-Ring Configuration

| Delete | Instance | Type | Master | East | | West | |
|--------|----------|----------|--------------------------|------|--------------------------|------|--------------------------|
| | | | | Port | Edge | Port | Edge |
| Delete | 1 | u-Ring | <input type="checkbox"/> | 1 | | 2 | |
| Delete | 2 | Sub-Ring | <input type="checkbox"/> | 3 | | | |
| Delete | 3 | u-Chain | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 6 | <input type="checkbox"/> |

Add New Instance

Save Reset

Figure 4: u-Ring Type

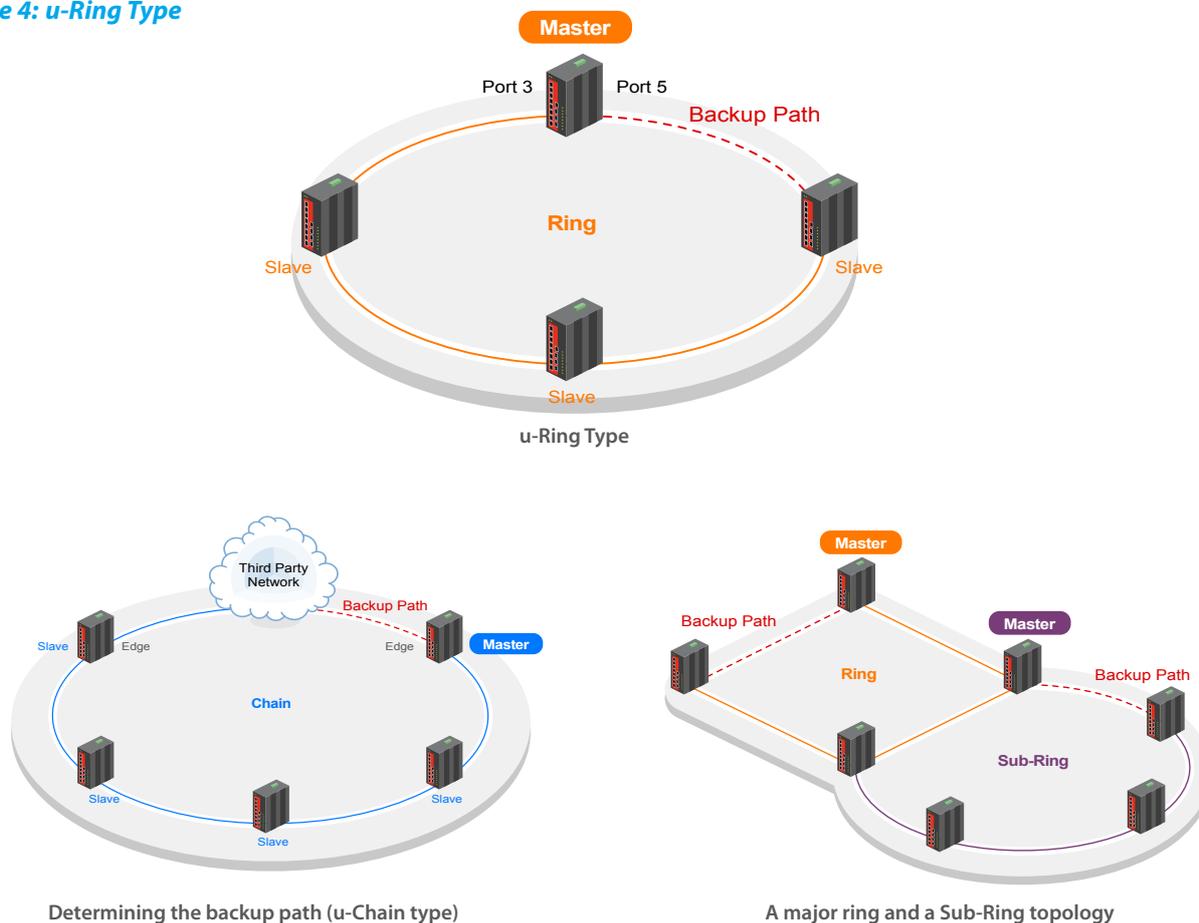
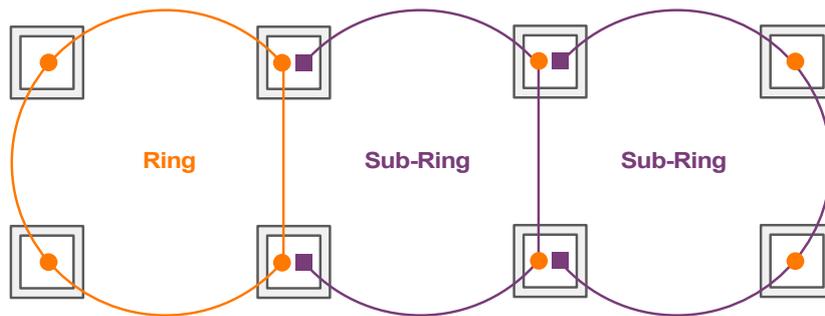


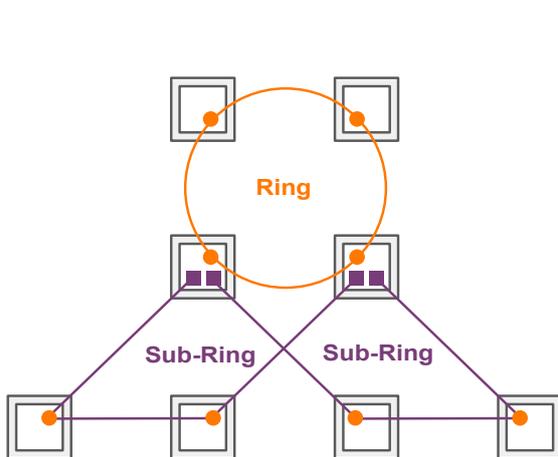
Figure 5: Ring Configuration Example

Ring Configuration Type

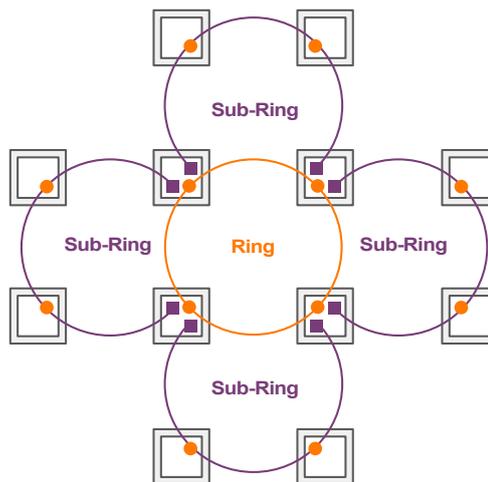
- u-Ring
- Sub-Ring
- ▲ u-Chain



Ring Configuration Type

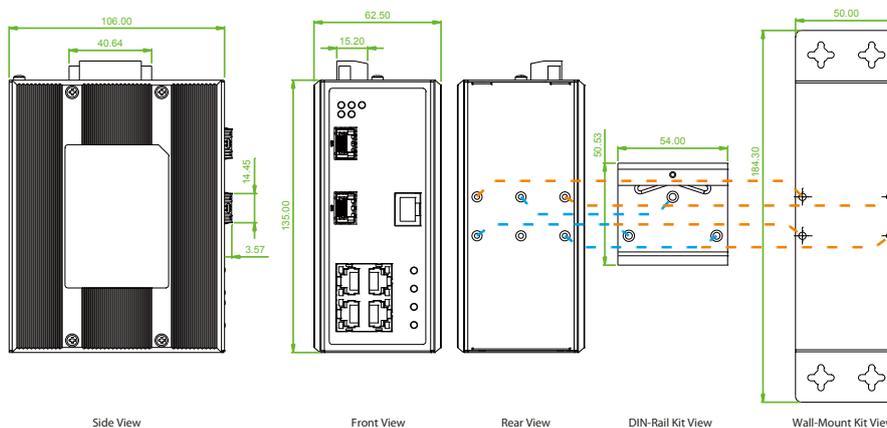


Combination of a ring and two Sub-Ring



Combination of a ring and four Sub-Ring

Dimensions



Ordering Information

| Model Name | Description |
|-------------------|--|
| IFS-402GSM-4PH24 | 4x 10/100Base-TX + 2x 100/1000Base-X SFP slot with 4 High Power PoE Managed Switch (30W/Per Port, Total 120W, 24V Booster, -10~60°C) |
| IFS-402GSM-4PHE24 | 4x 10/100Base-TX + 2x 100/1000Base-X SFP slot with 4 High Power PoE Managed Switch (30W/Per Port, Total 120W, 24V Booster, -40~75°C) |

Accessories

| | |
|-----------------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

Temperature 24
 Example: IFS-402GSM-4PH E24

ISFP - M 7 040 - 31 - E

- Industrial SFP Transceiver
- M: Multi Mode S: Single Mode T: Copper
- 7: GbE 5: FE
- Distance 002(2km), 020(20km), 040(40km)...
- E: -40~85°C Blank: 0~70°C
- Wavelength

IMC-1000M-PH12

10/100/1000Base-T to 100/1000Base-FX/SX/LX
Managed with PoE+ (PSE) Fiber Converter

IMC-1000MS-PH12

10/100/1000Base-T to 100/1000Base-X SFP
Managed with PoE+ (PSE) Fiber Converter



IMC-1000M(S)-PH12 is a 10/100/1000Base-T to 100/1000Base-X Gigabit Ethernet Media converter which not only offers dual-speed fixed fiber transceiver and SFP cage module options for the optical interface, but also injects PoE+ power through the electrical RJ-45 port. Housed in rugged DIN rail or wall mountable enclosures, IMC-1000M(S)-PH12 converters are designed for harsh environments, such as IP surveillance, industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

IMC-1000M(S)-PH12 also provides many advanced L2 functions (VLAN, storm filter, ingress/egress bandwidth control, etc.) and can be managed via easy-to-use GUI or standard SNMP manager such as CTC SarmtView. With built-in OAM (Operation, Administration, Maintenance & Provisioning) functions such as loop-back test and dying gasp, IMC-1000M(S)-PH12 can be monitored from a centrally located OAM-enabled FRM220-1000MS via remote in-band management which helps to reduce operational expenditures by keeping truck rolls to a minimum.

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X fiber cable interface
- Supports Dual Rate (100/1000) SFP for selectable fast or gigabit speed on fiber port
- 12/24/48VDC (9.6~57VDC) redundant dual input power and built-in very high efficient power booster
- Constant and regulated PoE output voltage at 55VDC
- Provides IEEE802.3at PoE output (30W)
- IP30 rugged metal housing
- Wide operating temperature -20~75°C (IMC-1000M-PHE12, IMC-1000MS-PHE12)
- UL60950-1, CE, FCC, Railway traffic EN50121-4 certification
- Industrial grade EMS, EMI EN61000-6-2, EN61000-6-4 certification
- Supports Jumbo frame 9K bytes packet
- Ingress/Egress bandwidth control with 64K granularity
- PoE configuration and monitor
- Auto Laser Shutdown (ALS)
- Supports Digital Diagnostic Monitor Interface (DDMI) for SFP
- Supports 16 IEEE802.1Q Tag VLAN Group
- MIB counters
- SNMP alarm trap for power loss and port link down
- Web based and SNMP for management
- Remote Loop-Back test
- Supports in-band management from FRM220 Chassis With FRM220-1000MS
- SmartView Management System support

Specifications

| | |
|----------------------------------|---|
| Standard | IEEE802.3 10Base-T IEEE802.3u 100Base-TX IEEE802.3u 100Base-FX IEEE802.3ab 1000Base-TX IEEE802.3z 1000Base-SX/LX IEEE802.3x Flow Control and Back pressure IEEE802.3at Power over Ethernet+, PoE+ IEEE802.3af Power over Ethernet, PoE IEEE802.1q Tag VLAN |
| Fiber Ports | 100/1000Base-FX/SX/LX, 100M/1000M Speed set by Web (IMC-1000M-PH12, IMC-1000M-PHE12) SFP slot for 100Base-X or 1000Base-X, 100M/1000M speed set by Web (IMC-1000MS-PH12, IMC-1000MS-PHE12) |
| RJ45 Ports | 10/100/1000Base-T |
| Push Button | Reset, Load default setting |
| Data Process Architecture | Pass through mode |
| Jumbo Frame | 9K bytes |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: 500M (Multi-mode SX), 20KM (Single-mode), 40KM (Single-mode) (IMC-1000M-PH12, IMC-1000M-PHE12) SFP, Distance depending on plugged-in Fiber Transceiver (IMC-1000MS-PH12, IMC-1000MS-PHE12) |
| Link Lose Forward | TX- Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down |

| | |
|-------------------------------------|--|
| Connector and Pin Assignment | Fiber: SC (Multi-mode, 500M), SC (Single-mode, 20KM, 40KM) (IMC-1000M-PH12, IMC-1000M-PHE12) SFP Slot (IMC-1000MS-PH12, IMC-1000MS-PHE12) RJ-45 Socket: CAT-3/5 (10/100/1000Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support RJ-45 Port support IEEE 802.3at/af End-Span, Alternative A mode PoE (V+): RJ-45 pin 1, 2 PoE (V-): RJ-45 pin 3, 6 Data (1,2,3,6,4,5,7,8) |
| LED | Per Unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Fiber LNK/ACT (Green): ON : Connected to network, OFF: Not connected to network, BLK : Receive /Transmit Data Fiber Speed: Yellow : 1000Base-X, Green : 100Base-X RJ-45 port: Speed: 10 (OFF), 100 (Green), 1000 (Yellow) LNK/ACT for RJ45(Green): ON : Connected to network, OFF: Not connected to network, BLK : Networking is active PoE Status (Green): Flash : PoE Fault (Over-load or short), ON : PoE normal working, OFF : PoE No Power output |
| Reverse Polarity Protection | Present for Power Input |
| Overload Current Protection | Present |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |

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

Specifications

| | | | | | |
|---------------------------------|--|------------------------------------|-------------------------------------|-----------------------|-------------------------|
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin | | | | |
| Operating Humidity | 5%~95% (Non-condensing) | | | | |
| Operating Temperature | -10°C~60°C (IMC-1000M-PH12, IMC-1000MS-PH12) | | | | |
| | -20°C~75°C (IMC-1000M-PHE12, IMC-1000MS-PHE12) | | | | |
| Storage Temperature | -40°C~85°C | | | | |
| Housing | Rugged Metal, IP30 Protection | | | | |
| Dimensions | 106 x 62.5 x 134.8 mm (D X W X H) | | | | |
| Weight | 655g (IMC-1000M-PH12, IMC-1000M-PHE12) | | | | |
| | 650g (IMC-1000MS-PH12, IMC-1000MS-PHE12) | | | | |
| Installation | DIN Rail mounting or wall mounting | | | | |
| Power Supply | 12/24/48VDC (9.6~57VDC), Redundant power with polarity reverse protect function and removable terminal block | | | | |
| Power Consumption | IMC-1000M-PH12 & IMC-1000M-PHE12 | | | | |
| | Input Volt | Total Power consumption (W) | Device Power consumption (W) | PoE Budget (W) | Boost Efficiency |
| | 12 VDC | 34.4 | 3.9 | 30 | 98.4% |
| | 24 VDC | 34.9 | 4.5 | 30 | 98.7% |
| | 48 VDC | 35.4 | 4.7 | 30 | 97.7% |
| | IMC-1000MS-PH12 & IMC-1000MS-PHE12 | | | | |
| | Input Volt | Total Power consumption (W) | Device Power consumption (W) | PoE Budget (W) | Boost Efficiency |
| | 12 VDC | 34.2 | 3.9 | 30 | 99.0% |
| | 24 VDC | 34.7 | 4.4 | 30 | 99.0% |
| | 48 VDC | 35.4 | 4.7 | 30 | 97.7% |

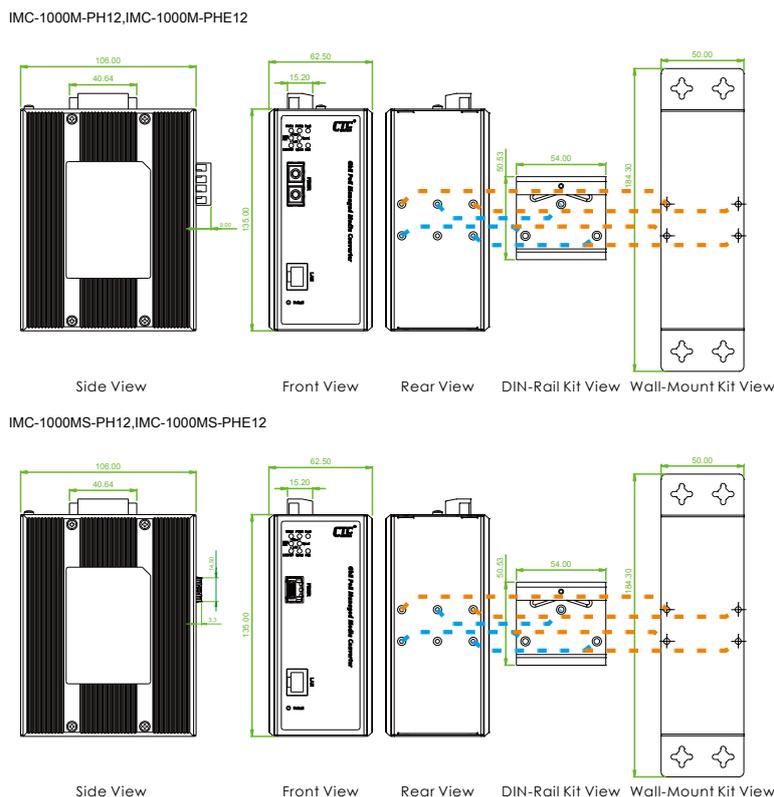
| | |
|--|--|
| Certifications | |
| EMC | CE |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A |
| Rail Way Traffic | EN50121-4 |
| Immunity for Heavy Industrial environment | EN 61000-6-2 |
| Emission for Heavy industrial environment | EN 61000-6-4 |
| EMS (Electromagnetic Susceptibility) Protection level | EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF) Field strength 300A/m Criteria A |
| Safety | UL60950-1 (pending) |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 401235 (IMC-1000M-PH12, IMC-1000M-PHE12) 331689 (IMC-1000MS-PH12, IMC-1000MS-PHE12) MIL-HDBK-217 |
| Warranty | 5 years |

Software Specifications

| | |
|---------------------------------|--|
| Stand-alone or Web Mode | |
| Management | Ingress/Egress bandwidth control with 64K granularity Web management, Firmware upgrade via Web Supports SNMP, MIB for management Supports DHCP client for automatic IP configuration Supports 802.1Q tag VLAN, 16 Tag VLAN group, MIB counters display |
| Configuration | IP configuration, password setting, converter configuration port configuration, MIB counter, SNMP configuration VLAN group configuration, alarm configuration PoE Configuration |
| Diagnostic & Monitor | Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter SNMP alarm trap for power loss and port link Up/Down PoE Status |

| | |
|---------------------------------|--|
| In-Band Remote mode | |
| Management | Supports in-band management from FRM220 Chassis With FRM220-1000MS card Ingress/Egress bandwidth control with 64K granularity |
| Configuration | IP configuration, converter configuration, port configuration, MIB counter VLAN group configuration, alarm configuration, PoE Configuration |
| Diagnostic & Monitor | Remote loop-back test Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter PoE Status |

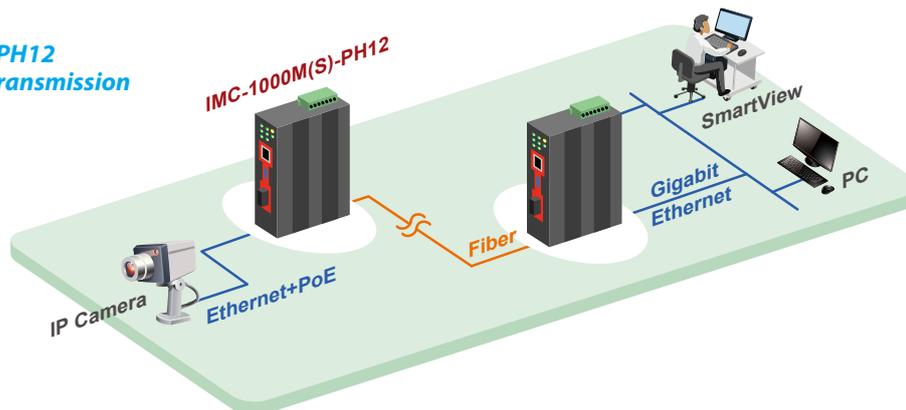
Dimensions



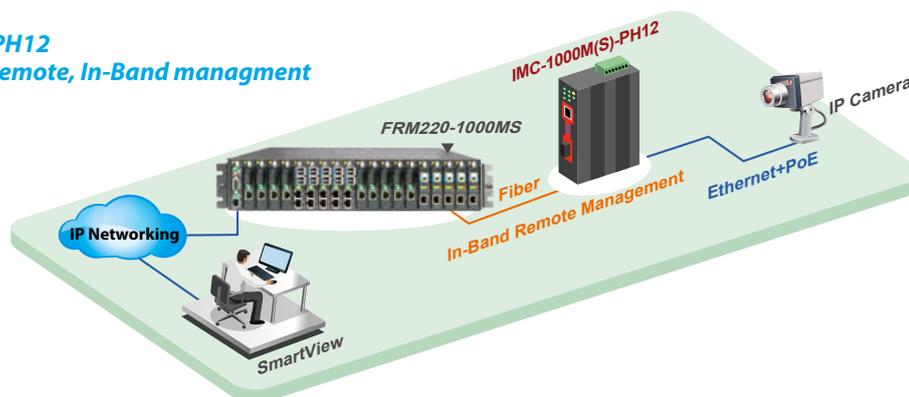
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application

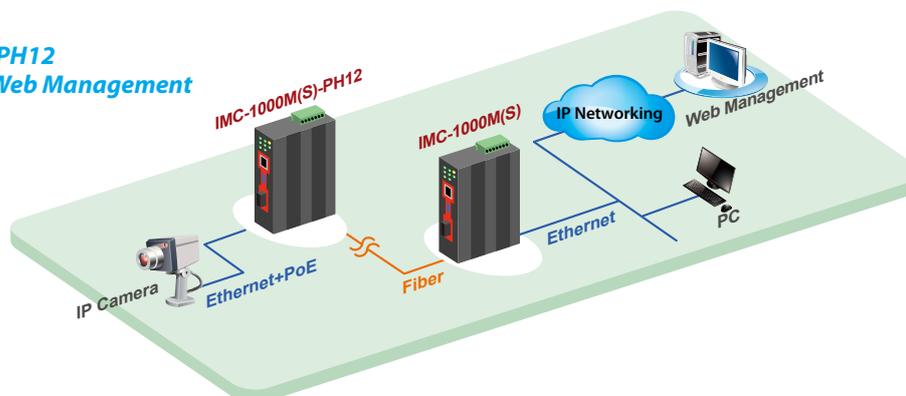
**Figure 1 : IMC-1000M(S)-PH12
Industrial PoE Transmission**



**Figure 2 : IMC-1000M(S)-PH12
Application in Remote, In-Band management**



**Figure 3 : IMC-1000M(S)-PH12
Application in Web Management**



Ordering Information

| Model Name | Description |
|------------------|---|
| IMC-1000M-PH12 | 10/100/1000Base-TX to 100/1000Base-FX/SX/LX Managed with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-10~60°C) |
| IMC-1000M-PHE12 | 10/100/1000Base-TX to 100/1000Base-FX/SX/LX Managed with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-20~75°C) |
| IMC-1000MS-PH12 | 10/100/1000Base-TX to 100/1000Base-X SFP Managed with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-10~60°C) |
| IMC-1000MS-PHE12 | 10/100/1000Base-TX to 100/1000Base-X SFP Managed with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-20~75°C) |

| Fiber Connector Type | Connectivity | Distance |
|---------------------------------------|----------------|--|
| SC | 001:500M (M/M) | 002: 2km (M/M) 020:20km (S/M) 040:40km (S/M) |
| IMC-1000M-PH12 & IMC-1000M-PHE12 only | 020A: | WDM 20km A Type (TX:1310nm) |
| | 020B: | WDM 20km B Type (TX:1550nm) |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |

SFP Transceiver Compatible, Reliable, 5-year Warranty

| | | | | | |
|----------------------------|--|-----------------|--|------------|------------------------------|
| ISFP | M | 7 | 040 | 31 | E |
| Industrial SFP Transceiver | M: Multi Mode S: Single Mode T: Copper | 7: GbE 5: FE | Distance 002(2km), 020(20km), 040(40km)... | Wavelength | E: -40~85°C Blank: 0~70°C |

Temperature Connector Connectivity
Type Distance
IMC-1000M -PH 12 -
Example: IMC-1000M - PHE12 - SC001

IMC-1000-PH12

10/100/1000Base-T to 100/1000Base-FX/SX/LX with PoE+ (PSE) Fiber Converter

IMC-1000S-PH12

10/100/1000Base-T to 100/1000Base-X SFP with PoE+ (PSE) Fiber Converter



IMC-1000(S)-PH12 is a family of non-managed Gigabit Ethernet media converters that support conversion between electrical 10/100/1000Base-T and optical 1000Base-X Ethernet and as PSE (Power Source Equipment) provide PoE+ power over Ethernet. Two options are available for optical interfaces, the IMC-1000-PH12 uses a fixed optical transceiver operating at 1000Base-X, while the IMC-1000S-PH12 provides an SFP cage for 100/1000Base-X compatible SFP modules. Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X Fiber cable interface
- Supports dual rate (100/1000) SFP for selectable Fast or Gigabit speed on fiber
- 12/24/48VDC (9.6~57VDC) redundant dual input power, and built-in power booster
- Constant and regulated PoE output voltage at 55VDC
- Provides IEEE802.3at PoE output (30Watts)
- Support Remote PD reset by fiber port link down
- Support LFP (Link Lose Forward)
- IP30 rugged metal housing
- Wide operating temperature -20~75°C (IMC-1000-PHE12, IMC-1000S-PHE12)
- UL60950-1, CE, FCC, Railway traffic EN50121-4 certification
- Industrial grade EMS,EMI EN61000-6-2, EN61000-6-4 certification
- Supports Jumbo frame 9K bytes packet

Specifications

| | |
|---------------------------------------|--|
| Standard | IEEE802.3 10Base-T IEEE802.3u 100Base-TX IEEE802.3u 100Base-FX IEEE802.3ab 1000Base-T IEEE802.3z 1000Base-SX/LX IEEE802.3x Flow Control and Back pressure IEEE802.3at Power over Ethernet+, PoE+ IEEE802.3af Power over Ethernet, PoE IEEE802.1q Tag VLAN |
| RJ45 Ports | 10/100/1000Base-T |
| Fiber Ports | 100/1000Base-SX/LX (IMC-1000-PH12, IMC-1000-PHE12) 100/1000Base-X SFP (IMC-1000S-PH12, IMC-1000S-PHE12) |
| Data Process Architecture | Store and Forward mode or Pass Through mode Set by DIP SW |
| Jumbo Frame | 9K bytes |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: • 500M (Multi-mode SX), 20KM (Single-mode), 50KM(Single-mode) (IMC-1000-PH12, IMC-1000-PHE12) • SFP, Distance depend on plug-in Fiber Transceiver (IMC-1000S-PH12, IMC-1000S-PHE12) |
| Link Fault Pass Through (LFPT) | TX- Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down |
| DIP Switch | ON: Disable Alarm For Power Loss OFF: Enable Alarm For Power Loss ON: Disable Alarm For Port Link-Failure OFF: Enable Alarm For Port Link-Failure ON: LFP Enable, OFF: LFP Disable Data process Architecture : ON : Pass through mode OFF : Store and Forward Switch mode Fiber Speed: OFF: 1000Base-X ON: 100Base-X PoE Output OFF: Enable PoE output ON: Disable PoE output Remote PD reset Off : Disable Remote PD reset On: Enable Remote PD reset by fiber port link down |
| Connector and Pin Assignment | Fiber: SC (Multi-mode, 500M), SC (Single-mode, 20KM, 40KM) (IMC-1000-PH12, IMC-1000-PHE12) SFP Slot (IMC-1000S-PH12, IMC-1000S-PHE12) |
| Connector and Pin Assignment | RJ-45 Socket: CAT-3/5 (10/100/1000Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support RJ-45 Port support IEEE 802.3at/af End-Span, Alternative A mode. PoE (V+): RJ-45 pin 1, 2. PoE (V-): RJ-45 pin 3, 6. Data (1,2,3,6,4,5,7,8) |

| LED | Per Unit :Power 1 (Green) ,Power 2 (Green) ,Fault (Amber) Fiber LNK/ACT (Green): ON: Connected to network, OFF: Not connected to network , BLK: Receive /Transmit Data Fiber Speed : Yellow : 1000Base-X, Green : 100 Base- X RJ-45 Port: Speed: 10 (OFF), 100 (Green), 1000 (Yellow) LNK/ACT for RJ45(Green): ON: Connected to network, OFF: Not connected to network, BLK: Networking is active PoE Status (Green): Flash: PoE Fault (Over-load or short), ON: PoE normal working, OFF : PoE No Power output | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|---|------------------------------|-----------------------------|------------------------------|----------------|------------------|--------|------|-----|----|-------|--------|------|-----|----|-------|--------|------|-----|----|-------|------------|-----------------------------|------------------------------|----------------|------------------|--------|------|-----|----|-------|--------|------|-----|----|-------|--------|------|-----|----|-------|
| Reverse Polarity Protection | Present for Power Input | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Overload Current Protection | Present | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Supply | 12/24/48VDC (9.6~57VDC), Redundant power with polarity reverse protect function and removable terminal block | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Consumption | IMC-1000-PH12 <table border="1"> <thead> <tr> <th>Input Volt</th> <th>Total Power consumption (W)</th> <th>Device Power consumption (W)</th> <th>PoE Budget (W)</th> <th>Boost Efficiency</th> </tr> </thead> <tbody> <tr> <td>12 VDC</td> <td>34.4</td> <td>3.9</td> <td>30</td> <td>98.4%</td> </tr> <tr> <td>24 VDC</td> <td>34.9</td> <td>4.5</td> <td>30</td> <td>98.7%</td> </tr> <tr> <td>48 VDC</td> <td>35.4</td> <td>4.7</td> <td>30</td> <td>97.7%</td> </tr> </tbody> </table> IMC-1000S-PH12 <table border="1"> <thead> <tr> <th>Input Volt</th> <th>Total Power consumption (W)</th> <th>Device Power consumption (W)</th> <th>PoE Budget (W)</th> <th>Boost Efficiency</th> </tr> </thead> <tbody> <tr> <td>12 VDC</td> <td>34.2</td> <td>3.9</td> <td>30</td> <td>99.0%</td> </tr> <tr> <td>24 VDC</td> <td>34.7</td> <td>4.4</td> <td>30</td> <td>99.0%</td> </tr> <tr> <td>48 VDC</td> <td>35.4</td> <td>4.7</td> <td>30</td> <td>97.7%</td> </tr> </tbody> </table> | Input Volt | Total Power consumption (W) | Device Power consumption (W) | PoE Budget (W) | Boost Efficiency | 12 VDC | 34.4 | 3.9 | 30 | 98.4% | 24 VDC | 34.9 | 4.5 | 30 | 98.7% | 48 VDC | 35.4 | 4.7 | 30 | 97.7% | Input Volt | Total Power consumption (W) | Device Power consumption (W) | PoE Budget (W) | Boost Efficiency | 12 VDC | 34.2 | 3.9 | 30 | 99.0% | 24 VDC | 34.7 | 4.4 | 30 | 99.0% | 48 VDC | 35.4 | 4.7 | 30 | 97.7% |
| Input Volt | Total Power consumption (W) | Device Power consumption (W) | PoE Budget (W) | Boost Efficiency | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 VDC | 34.4 | 3.9 | 30 | 98.4% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 VDC | 34.9 | 4.5 | 30 | 98.7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 VDC | 35.4 | 4.7 | 30 | 97.7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input Volt | Total Power consumption (W) | Device Power consumption (W) | PoE Budget (W) | Boost Efficiency | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 VDC | 34.2 | 3.9 | 30 | 99.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 VDC | 34.7 | 4.4 | 30 | 99.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 VDC | 35.4 | 4.7 | 30 | 97.7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Humidity | 5%~95% (Non-condensing) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating Temperature | -10°C~60°C (IMC-1000-PH12, IMC-1000S-PH12) -20°C~75°C (IMC-1000-PHE12, IMC-1000S-PHE12) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Storage Temperature | -40°C~85°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Housing | Rugged Metal, IP30 Protection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimensions | 106 x 38.6 x 142 mm (D x W x H) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Weight | 655g (IMC-1000-PH12, IMC-1000-PHE12) 650g (IMC-1000S-PH12, IMC-1000S-PHE12) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Installation | DIN Rail mounting or wall mounting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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

Specifications

| Certifications | |
|---|---|
| EMC | CE |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A |
| Rail Way Traffic | EN50121-4 |
| Immunity for Heavy Industrial environment | EN 61000-6-2 |
| Emission for Heavy industrial environment | EN 61000-6-4 |
| EMS (Electromagnetic Susceptibility) Protection level | EN61000-4-2 (ESD) Level 3, Criteria B |
| | EN61000-4-3 (RS) Level 3, Criteria A |
| | EN61000-4-4 (EFT) Level 3, Criteria A |
| | EN61000-4-5 (Surge) Level 3, Criteria B |
| | EN61000-4-6 (CS) Level 3, Criteria A |
| | EN61000-4-8 (PFMF) Field strength 300A/m Criteria A |

| | |
|-----------|--|
| Safety | UL60950-1 (pending) |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 419,822Hrs (IMC-1000-PH12, IMC-1000-PHE12) |
| | 432,104Hrs (IMC-1000S-PH12, IMC-1000S-PHE12) |
| | MIL-HDBK-217 |
| Warranty | 5 years |

Application

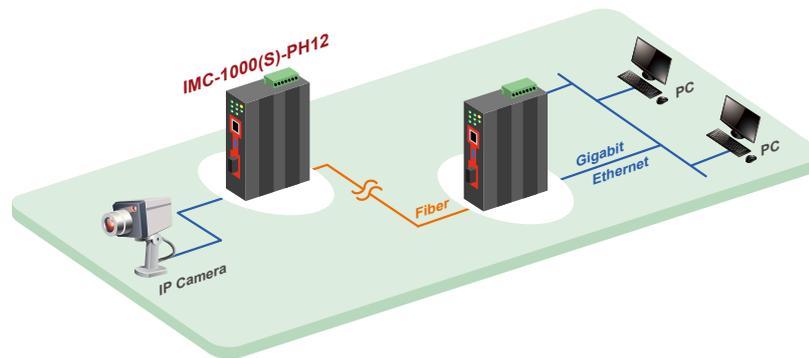
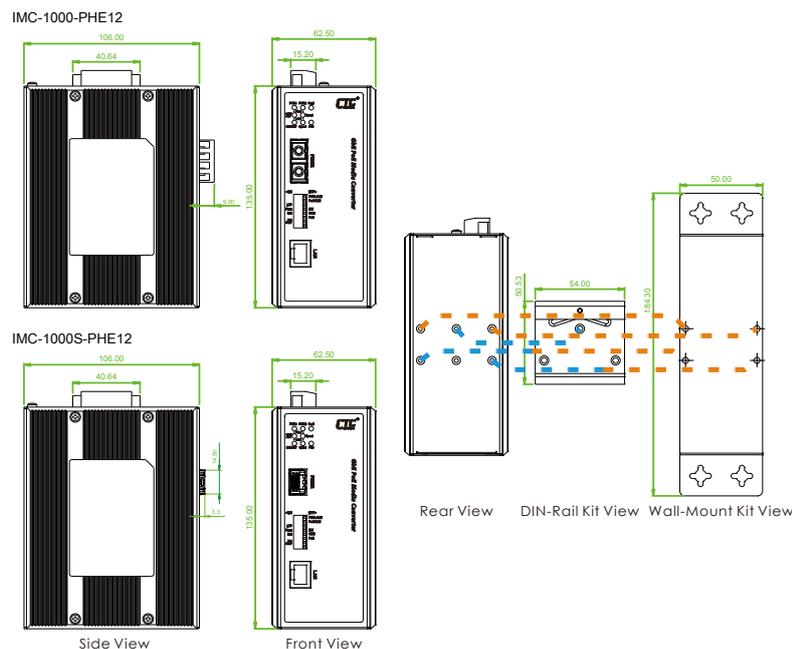


Figure : IMC-1000(S)-PH12 Industrial PoE Transmission

Dimensions



Ordering Information

| Model Name | Description |
|-----------------|--|
| IMC-1000-PH12 | 10/100/1000Base-T to 100/1000Base-FX/SX/LX with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-10~60°C) |
| IMC-1000-PHE12 | 10/100/1000Base-T to 100/1000Base-FX/SX/LX with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-20~75°C) |
| IMC-1000S-PH12 | 10/100/1000Base-T to 100/1000Base-X SFP with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-10~60°C) |
| IMC-1000S-PHE12 | 10/100/1000Base-T to 100/1000Base-X SFP with PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-20~75°C) |

| Fiber Connector Type | Connectivity | Distance |
|---------------------------------------|-----------------------------------|--|
| SC | 001: 500M (M/M) | 002: 2km (M/M) 020: 20km (S/M) 040: 40km (S/M) |
| (IMC-1000-PH12 & IMC-1000-PHE12 only) | 020A: WDM 20km A Type (TX:1310nm) | 020B: WDM 20km B Type (TX:1550nm) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

Temperature Connector Connectivity Type Distance

IMC-1000 - PH 12 - [] [] [] [] []

Example: IMC-1000 - PHE12 - SC001



IMC-100-PD

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



7
PoE ethernet media
converter

IMC-100-PD(E) are industrial media converters designed for conversion between electrical 10/100Base-TX and optical 100Base-FX transmission medium, which also provide PoE (Power over Ethernet) PD (Power Device) function. Simple DIP switch settings allow configuring the UTP port for auto-negotiation or for forced 10/100 speed and half/full duplex as well as for enabling LFP (Link Fault pass through), Ethernet Flow Control (802.3x) and selecting Switch Mode (store & forward) or Converter Mode (Pass-through). Industrial designed converters feature rugged design with metal housings for DIN Rail mounting, highly reliable electrical design to support very long MTBF (mean time between failure), enhanced safety and surge protection, better EMS (Electro Magnetic Susceptibility), as well as expanded operating temperature ranges.

Features

- Redundant dual DC input power 12/24/48VDC (9.6~58VDC) with additional power input capability via PoE
- Complies with 802.3af PoE/PD standard
- IP30 rugged metal housing
- Wide operating temperature -40 ~75°C (IMC-100-PDE)
- UL60950-1, CE, FCC, Rail traffic EN50121-4 certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Store-and-Forward mode and Pass-through mode (set by DIP SW)
- Conversion between 10/100Base-TX and 100Base-FX cable interface
- Provides a 6 Pole DIP-Switch to set functions

Specifications

| | |
|---------------------------------------|--|
| Standard | IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX/100BASE-FX IEEE 802.3x Flow Control and Back pressure IEEE 802.3af PoE (Power Device PD) |
| RJ45 Ports | 10/100Base-TX |
| Fiber Ports | 100Base-FX (SC/ST connectors) |
| Switch Architecture | Store and Forward in Switch mode Supports 1024 MAC addresses in Switch mode |
| Ethernet Packet length | 2046Byte (Max) in Switch mode |
| Jumbo Frame | 9K bytes in Pass through (Converter mode) |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: 2KM (Multi-mode) 30KM (Single-mode) 50KM (Single-mode) |
| Link Fault Pass Through (LFPT) | TX- Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down |
| DIP Switch | TP Auto Negotiation OFF: Auto Mode, ON: Force Mode Force TP Speed OFF:100 Mbps, ON:10 Mbps Force TP Duplex OFF:Full Duplex, ON: Half Duplex DIP Switch: ON: Enables LFPT(Link Fault Pass through) OFF: Disables LFPT(Link Fault Pass through) DIP Switch: ON: Flow Control Enable OFF: Flow Control Disable DIP Switch: OFF: Switching mode ON: Pass through Converter mode |
| Connector | Fiber: SC (Multi-mode, 2km), SC (Single-mode, 30km, 50KM) ST (Multi-mode, 2km), ST (Single-mode, 30km, 50KM) RJ-45 Socket: CAT-3/5 (10/100Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support |
| LED | PWR 1 (Green): ON: Power1 active/ OFF: Power1 is inactive PWR 2 (Green): ON: Power2 active/ OFF: Power2 is inactive Fault (Red): ON : Fiber or TP has failed OFF: Fiber and TP are functional Fiber(Green): ON: Connected to network OFF: Not connected to network/ BLK: Receive/Transmit Data 100(Amber): ON: 100Mbps/ OFF: 10Mbps LAN (Green): ON: Connected to network OFF: Not connected to network/ BLK: Networking is active PoE (Green) : ON: PSE Connect OFF: PSE Disconnect |

| | |
|------------------------------------|---|
| Reserve Polarity Protection | Present |
| Overload Current Protection | Present |
| Power Supply | 12/24/48VDC(9.6~58VDC), Redundant power with polarity reverse protect function and removable terminal block Provide DC Power JACK adapter cable for external power adapter Supports IEEE 802.3af Power over Ethernet (PoE) Power Device (PD) |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact |
| Power Consumption | 2.9 W |
| Operating Humidity | 5% ~ 95% (Non-condensing) |
| Operating Temperature | -10 ~ 60°C (IMC-100-PD), -40 ~ 75°C (IMC-100-PDE) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 38.6 x 142mm (D X W X H) |
| Weight | 0.63 kg |
| Installation Mounting | DIN Rail mounting and Wall Mounting |
| EMI | FCC Part 15 Subpart B Class A EN 55022 Class A EN 61000-6-4 – Emission for industrial environment |
| EMS | EN 61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Safety | UL60950-1 |
| Rail traffic | EN50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 (Operating, Packing) |
| MTBF | 755,114 Hrs |
| Warranty | 5 years |

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

Application

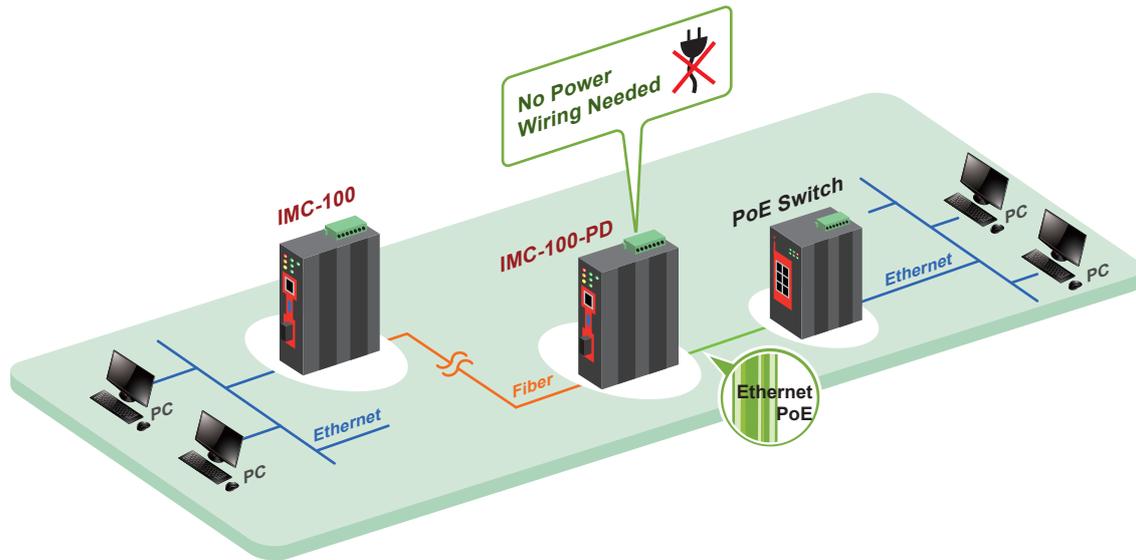
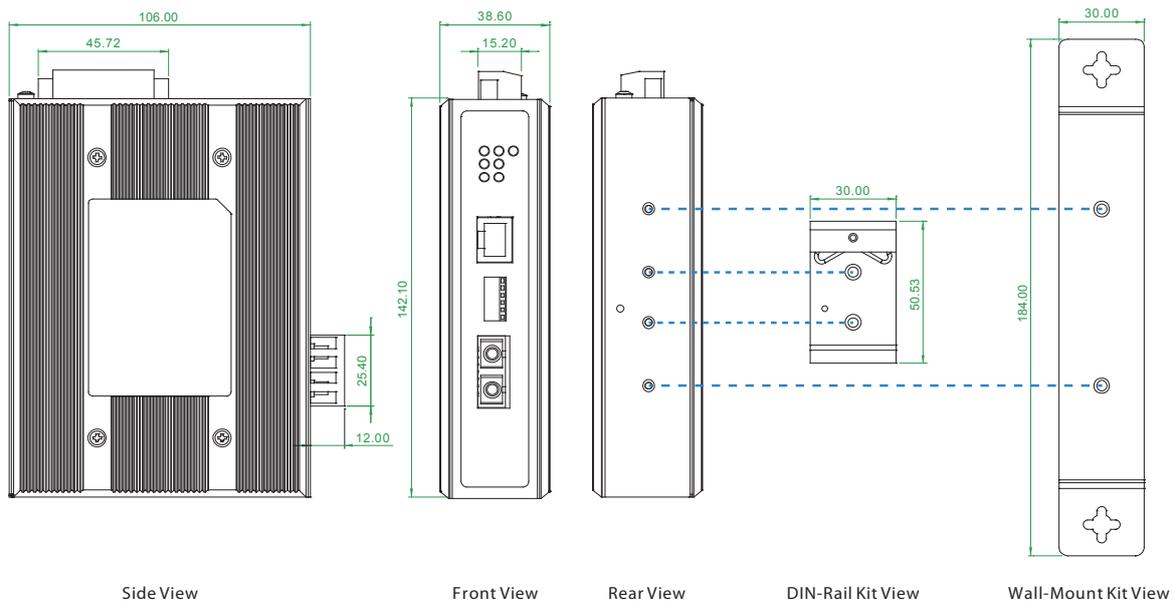


Figure : IMC-100-PD Industrial PoE Transmission

Dimensions



Ordering Information

| Model Name | Description |
|-------------|---|
| IMC-100-PD | 10/100-TX to 100-FX Fiber Converter with PoE PD ; Temperature Range : -10 ~ +60°C |
| IMC-100-PDE | 10/100-TX to 100-FX Fiber Converter with PoE PD ; Temperature Range : -40 ~ 75°C |

| Fiber Connector Type | Connectivity Distance |
|----------------------|--|
| SC, ST | 002:2km (M/M) 030:30km (S/M) 050:50km (S/M) 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm) |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |

Temperature Connector Type Connectivity Distance
IMC-100-PD [] - [] [] [] []
 Example: IMC-100-PDE - SC002

IMC-100M-PH12

10/100Base-T to 100Base-FX Managed with PoE+ (PSE) Fiber Converter



IMC-100MPH12 is a 10/100Base-TX to 100Base-FX Ethernet Media converter which not only offers 100M fixed fiber transceiver for the optical interface, but also injects PoE+ power through the electrical RJ-45 port. Housed in rugged DIN rail or wall mountable enclosures, IMC-100M(S)-PH12 converters are designed for harsh environments, such as IP surveillance, industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. IMC-100M-PH12 also provides many advanced L2 functions (VLAN, storm filter, ingress/egress bandwidth control, etc.) and can be managed via easy-to-use GUI or standard SNMP manager such as CTC SarmtView. With built-in OAM (Operation, Administration, Maintenance & Provisioning) functions such as loop-back test and dying gasp, IMC-100M-PH12 can be monitored from a centrally located OAM-enabled FRM220-1000MS via remote in-band management which helps to reduce operational expenditures by keeping truck rolls to a minimum.

Features

- Conversion between 10/100Base-TX and 100Base-FX fiber cable interface
- 12/24/48VDC (9.6~57VDC) redundant dual input power and built-in very high efficient power booster
- Constant and regulated PoE output voltage at 55VDC
- Provides IEEE802.3at PoE output (30W)
- IP30 rugged metal housing
- Wide operating temperature -20~75°C (IMC-100M-PHE12)
- UL60950-1, CE, FCC, Railway traffic EN50121-4 certification
- Industrial grade EMS, EMI EN61000-6-2, EN61000-6-4 certification
- Supports Jumbo frame 9K bytes packet
- Ingress/Egress bandwidth control with 64K granularity
- PoE configuration and monitor
- Auto Laser Shutdown (ALS)
- Supports Digital Diagnostic Monitor Interface (DDMI) for SFP
- Supports 16 IEEE802.1Q Tag VLAN Group
- MIB counters
- SNMP alarm trap for power loss and port link down
- Web based and SNMP for management
- Remote Loop-Back test
- Supports in-band management from FRM220 Chassis With FRM220-1000MS
- SmartView Management System support

Specifications

| | |
|----------------------------------|--|
| Standard | IEEE802.3 10Base-T IEEE802.3u 100Base-TX IEEE802.3u 100Base-FX IEEE802.3x Flow Control and Back pressure IEEE802.3at Power over Ethernet+, PoE+ IEEE802.3af Power over Ethernet, PoE IEEE802.1q Tag VLAN |
| Fiber Ports | 100Base-FX, 100M Speed |
| RJ45 Ports | 10/100Base-TX |
| Push Button | Reset, Load default setting |
| Data Process Architecture | Pass through mode |
| Jumbo Frame | 9K bytes |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: 2KM (Multi-mode), 30KM,50KM(Single-mode),20KM (WDM Bidi) |
| Link Lose Forward | TX- Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down |

| | |
|-------------------------------------|---|
| Connector and Pin Assignment | Fiber: SC/ST (Multi-mode, 2km), SC/ST (Single-mode, 30km, 50km) RJ-45 Socket: CAT-3/5 (10/100Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support RJ-45 Port support IEEE 802.3at/af End-Span, Alternative A mode PoE (V+): RJ-45 pin 1, 2 PoE (V-): RJ-45 pin 3, 6 Data (1,2,3,6) |
| LED | Per Unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Fiber LNK/ACT (Green): ON : Connected to network, OFF: Not connected to network, BLK : Receive /Transmit Data Fiber Speed: Green : 100Base-X RJ-45 port: _Speed: 10 (OFF), 100 (Green) LNK/ACT for RJ45(Green): ON : Connected to network, OFF: Not connected to network, BLK : Networking is active PoE Status (Green): Flash : PoE Fault (Over-load or short), ON : PoE normal working, OFF : PoE No Power output |
| Reverse Polarity Protection | Present for Power Input |
| Overload Current Protection | Present |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |

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

Specifications

| | | | | | |
|---------------------------------|---|------------------------------------|-------------------------------------|-----------------------|-------------------------|
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin | | | | |
| Operating Humidity | 5%~95% (Non-condensing) | | | | |
| Operating Temperature | -10°C~60°C (IMC-100M-PH12) -20°C~75°C (IMC-100M-PHE12) | | | | |
| Storage Temperature | -40°C~85°C | | | | |
| Housing | Rugged Metal, IP30 Protection | | | | |
| Dimensions | 106 x 62.5 x 134.8 mm (D X W X H) | | | | |
| Weight | 655g | | | | |
| Installation | DIN Rail mounting or wall mounting | | | | |
| Power Supply | 12/24/48VDC (9.6~5.7VDC), Redundant power with polarity reverse protect function and removable terminal block | | | | |
| Power Consumption | Input Volt | Total Power consumption (W) | Device Power consumption (W) | PoE Budget (W) | Boost Efficiency |
| | 12 VDC | 34.4 | 3.9 | 30 | 98.4% |
| | 24 VDC | 34.9 | 4.5 | 30 | 98.7% |
| | 48 VDC | 35.4 | 4.7 | 30 | 97.7% |

| | |
|---|--|
| Certifications | |
| EMC | CE |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A |
| Rail Way Traffic | EN50121-4 |
| Immunity for Heavy Industrial environment | EN 61000-6-2 |
| Emission for Heavy industrial environment | EN 61000-6-4 |
| EMS (Electromagnetic Susceptibility) Protection leve | EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF) Field strength 300A/m Criteria A |
| Safety | UL60950-1 (pending) |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 410,235 Hrs (IMC-100M-PH12, IMC-100M-PHE12) |
| Warranty | 5 years |

Software Specifications

Stand-alone or Web Mode

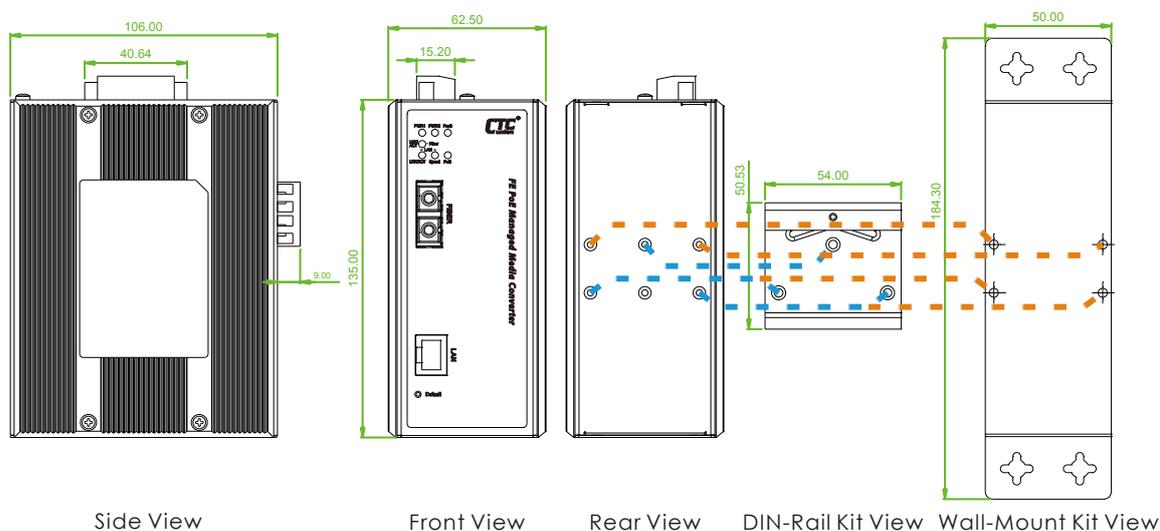
| | |
|---------------------------------|--|
| Management | Ingress/Egress bandwidth control with 64K granularity Web management, Firmware upgrade via Web Supports SNMP, MIB for management Supports DHCP client for automatic IP configuration Supports 802.1Q tag VLAN, 16 Tag VLAN group, MIB counters display |
| Configuration | IP configuration, password setting, converter configuration port configuration, MIB counter, SNMP configuration VLAN group configuration, alarm configuration PoE Configuration |
| Diagnostic & Monitor | Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter SNMP alarm trap for power loss and port link Up/Down PoE Status |

In-Band Remote mode

| | |
|---------------------------------|--|
| Management | Supports in-band management from FRM220 Chassis With FRM220-1000MS card Ingress/Egress bandwidth control with 64K granularity |
| Configuration | IP configuration, converter configuration, port configuration, MIB counter VLAN group configuration, alarm configuration, PoE Configuration |
| Diagnostic & Monitor | Remote loop-back test Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter PoE Status |

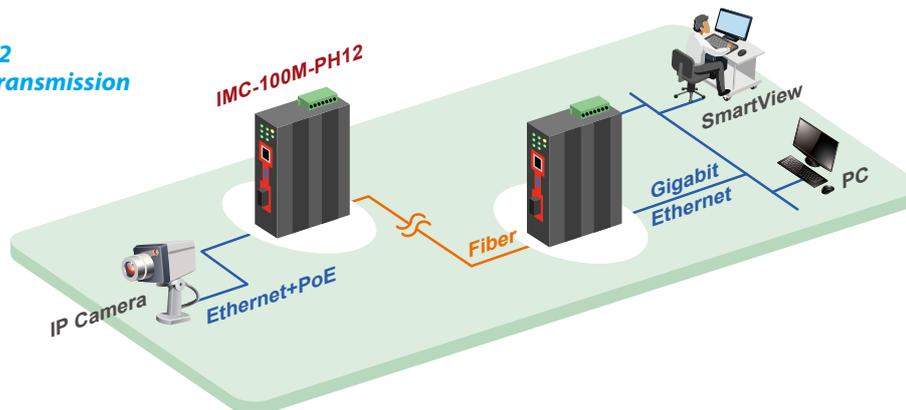
Dimensions

IMC-100M-PH12, IMC-100M-PHE12

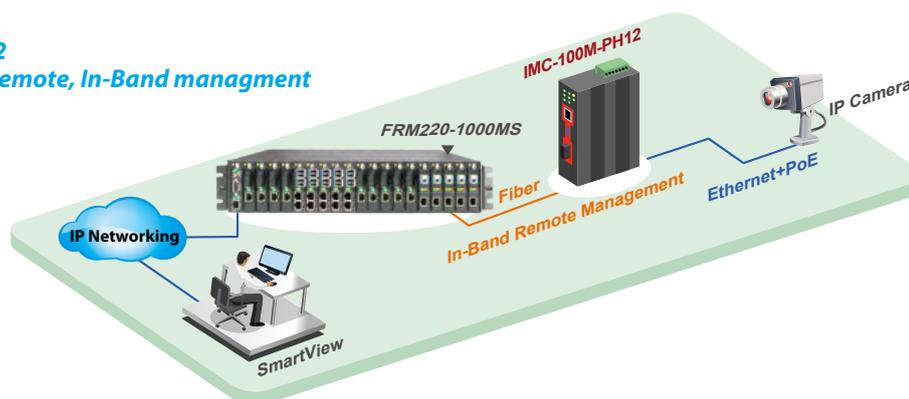


Application

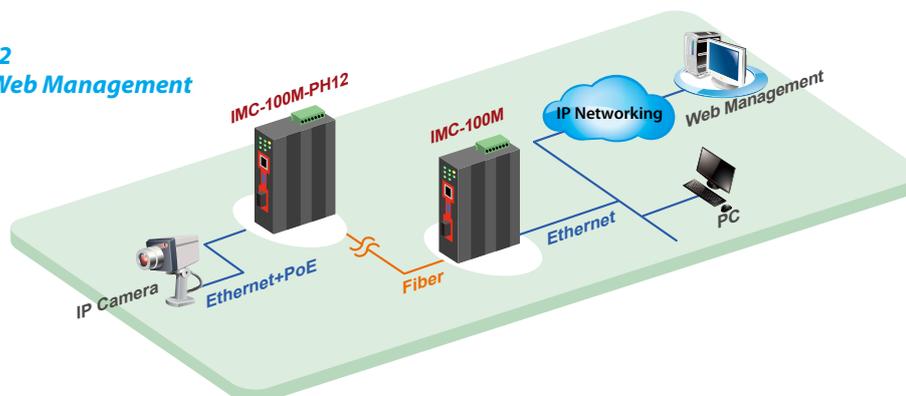
**Figure 1 : IMC-100M-PH12
Industrial PoE Transmission**



**Figure 2 : IMC-100M-PH12
Application in Remote, In-Band management**



**Figure 3 : IMC-100M-PH12
Application in Web Management**



Ordering Information

| Model Name | Description |
|----------------|---|
| IMC-100M-PH12 | 10/100Base-TX to 100Base-FX Managed With PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-10~60°C) |
| IMC-100M-PHE12 | 10/100Base-TX to 100Base-FX Managed With PoE+ (PSE) Fiber Converter (30W, 12V Booster) (-20~75°C) |

| Fiber Connector Type | Connectivity Distance |
|----------------------|---|
| SC, ST | 002 : 2km (M/M) 030:30km (S/M) 050:50km (S/M) 020A: WDM 20km A Type (TX:1310nm) 020B: WDM 20km B Type (TX:1550nm) |

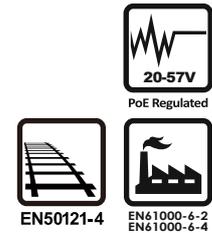
Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |

Temperature Connector Type Connectivity Distance
IMC-100M -PH 12 -
 Example: IMC-100M - PHE12 - SC002

INJ-IG60-24 (V1.2)

Gigabit Ethernet PoE+ Injector
IEEE802.3at/af, 15.4/30/36/60/72W
(24V Booster)



INJ-IG60-E24 is an industrial grade, single port, gigabit Ethernet PoE (Power over Ethernet) injector. PoE technology describes a system to pass electrical power safely, along with data, on Ethernet cabling. The original IEEE 802.3af-2003 PoE standard provides up to 15.4 W of DC power to each device. The updated IEEE 802.3at-2009 PoE standard also known as PoE+ or PoE plus, provides up to 30 W of power. Additionally, INJ-IG60-E24 can provide up to 36/60/72W through the non-standard use of all 4 pairs of category 5 cable. Housed in a rugged DIN rail or wall mountable enclosure, this product is designed for harsh environments, such as industrial networking, security, intelligent transportation systems (ITS) and is also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

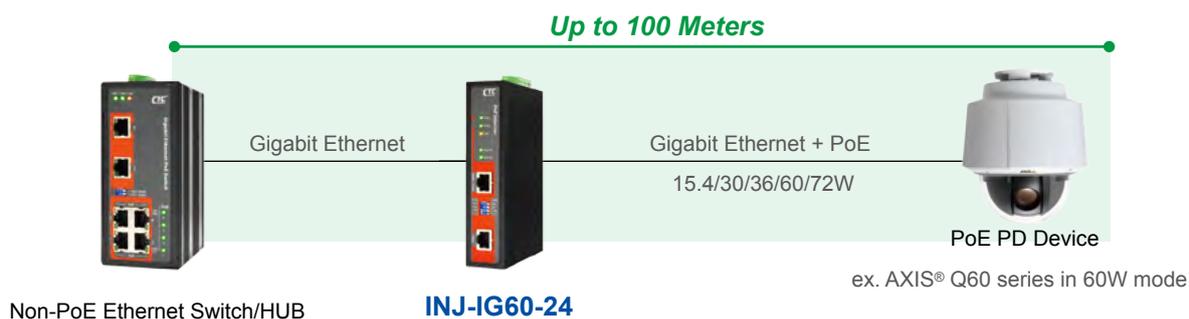
- Provides 1 port IEEE802.3at/af PoE Injector
- Power output 15.4W, 30W, 36W, 60W, 72W select by DIP SW
- 24/48VDC redundant dual input power, and built-in power booster design upto 55 VDC for PoE/PoE+ output
- Constant and regulated PoE output voltage at 55VDC
- PoE Mode A/B Select by DIP SW
- 4 Pairs (60W/72W) PD handshake mode select by DIP SW (Such as AXIS® IP cam)
- Wide operating temperature -40 ~ 75°C (INJ-IG60-E24)
- UL60950-1, CE, FCC, Railway traffic EN50121-4 certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- IP30 rugged metal housing

Specifications

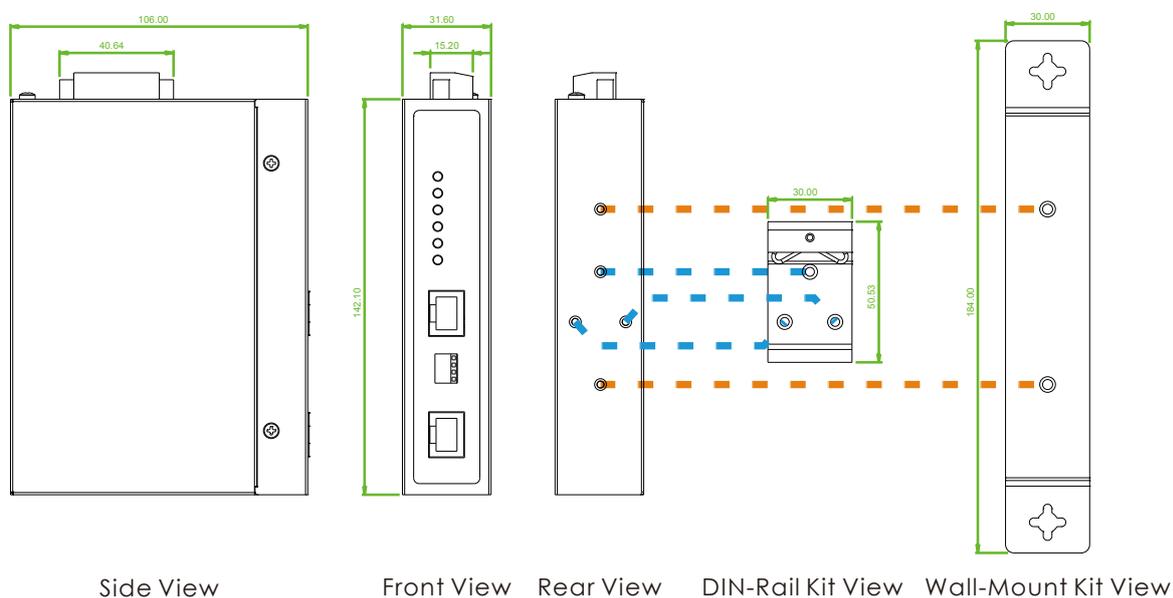
| | |
|------------------------------------|---|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3at, IEEE802.3af |
| PoE Standard | IEEE802.3at, IEEE802.3af |
| PoE RJ-45 Pin Assignment | RJ-45 support IEEE 802.3at/af Middle-Span Alternative B mode or End-Span Alternative A mode, set by DIP SW End-Span, Alternative A mode Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1, 2, 3, 6, 4, 5, 7, 8) Middle-Span, Alternative B mode Positive (V+): RJ-45 pin 4, 5 Negative (V-): RJ-45 pin 7, 8 Data (1, 2, 3, 6, 4, 5, 7, 8) |
| Network Connector | 1 RJ-45 for 10/100/1000Base-T Data, and 1 RJ-45 for 10/100/1000Base-T Data with PoE Output power |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Alt A/PoE, Alt B/PoE (Green) ON when a PD device is connected to the GbE+PoE RJ-45 connector and the Injector is feeding power in Alt A or B mode. Blinking One of the Injector faults (overload, short circuit or over-temperature) occurs. |
| DIP SW | SW1 ON: Alternative B mode PoE Power Pin 4, 5, 7, 8 (When DIP SW 3 Off) OFF: Alternative A mode PoE Power Pin 1, 2, 3, 6 (When DIP SW 3 Off) SW2 ON: Hi Power 36W 36W PoE output OFF: Standard PoE 802.3af (15.4W), 802.3at (30W) SW3 ON: 4 Pair PoE Pin Ultra-High Power 60W/72W PoE Output OFF: 2 Pair PoE Pin depend on DIP SW 1,2 SW4 60W/72W PD handshake mode OFF General PD at ether 2 or 4 pairs mode ON Compatible with some particular PD devices at high power mode (4 Pair mode), such as AXIS® Q60 |
| Reserve Polarity Protection | Present |
| Overload Current Protection | Present |
| Power Supply | Redundant Dual DC 24/48V (20~57VDC) Input power (Removable Terminal Block) |
| PoE Power Output | Maximum Ultra High Power 60W, IEEE802.3at 30W, IEEE802.3at High power 36W, IEEE802.3af 15.4W |

| | |
|--|--|
| Power Consumption | Max 31.5W @24VDC input (support up to 30W for PoE Output) Max 61.8W @24VDC input (support up to 60W for PoE Output) |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (INJ-IG60-24) -40 ~ 75°C (INJ-IG60-E24) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 31.6 x 142 mm (D x W x H) |
| Weight | 0.425kg |
| Installation Mounting | DIN Rail mounting and Wall Mounting |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A CE EN55022 Class A 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 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 Shock | UL60950-1 (pending) IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 763,725Hrs |
| Warranty | 5 years |

Application : INJ-IG60-24 (E24) Gigabit Ethernet PoE Injector



Dimensions



Ordering Information

| Model Name | Description |
|--------------|--|
| INJ-IG60-24 | Industrial 10/100/1000Base-T with IEEE802.3at/af PoE Injector, 15.4/30/36/60/72W (24V Booster, -10 ~ 60°C) |
| INJ-IG60-E24 | Industrial 10/100/1000Base-T with IEEE802.3at/af PoE Injector, 15.4/30/36/60/72W (24V Booster, -40 ~ 75°C) |

Accessories

| | |
|-----------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |

Temperature
INJ-IG60 - 24
 Example: INJ-IG60 - E24

IGS-401F

4x 10/100/1000Base-T+ 1x 1000Base-SX/LX
Gigabit Ethernet Switch

IGS-402F

4x 10/100/1000Base-T+ 2x 1000Base-SX/LX
Gigabit Ethernet Switch



IGS-401F/402F models are 4 port 10/100/1000Base-T Ethernet non-managed Gigabit switches, with either 1 x 1000Base-X fiber port (IGS-401F) or 2 x 1000Base-X fiber ports, that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 12/24/48VDC redundant dual input power design
- 4x Port 1000Base-T RJ-45 with 1 or 2 Fiber Gigabit Ethernet
- Wide operating temperature -40 ~ 75°C (IGS-401F-E, IGS-402F-E)
- Provides broadcast storm protection
- Supports DIP SW for alarm setting and broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- UL60950-1, CE, FCC certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- IP30 rugged metal housing

Specifications

| | |
|--|---|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure |
| Switch Architecture | Back-plane (Switching Fabric): 10Gbps (IGS-401F, IGS-401F-E) Back-plane (Switching Fabric): 12Gbps (IGS-402F, IGS-402F-E) |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x flow control, back pressure flow control |
| Provides Broadcast Storm Protection | Present, Enable / Disable set by DIP SW |
| Jumbo Frame | 10K Bytes |
| MAC Address Table | 8K |
| Packet Buffer Size | 1Mbits |
| Network Connector | 4 x RJ-45 10/100/1000Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 1 or 2 1000Base-X Fiber connector : SC |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um |
| Protocols | CSMA/CD |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) RJ-45 port : Link/Active (Green), Speed 10 (OFF), 100 (Green), 1000 (Yellow) Fiber Per port: Link/Active (Green) |
| DIP SW | DIP 1 ON : Disable power failure alarm OFF : Enable power failure alarm DIP 2 ON : Disables broadcast storm protection OFF : Enable broadcast storm protection |
| Reserve Polarity Protection | Present |
| Overload current protection | Present |

| | |
|---------------------------------|--|
| Power Supply | Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) Provide DC Power JACK adapter cable for external power supply |
| Power Consumption | Max 7.79W (IGS-401F) Max 7.83W (IGS-402F) |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-401F, IGS-402F) -40 ~ 75°C (IGS-401F-E, IGS-402F-E) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 62.5 x 134.8 mm (D X W X H) |
| Weight | 0.67kg (IGS-401F), 0.68kg (IGS-402F) |
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Safety | UL60950-1 |
| Rail Traffic | EN 50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 407,596 Hours (IGS-401F) 391,633 Hours (IGS-402F) |
| Warranty | 5 years |

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

Application

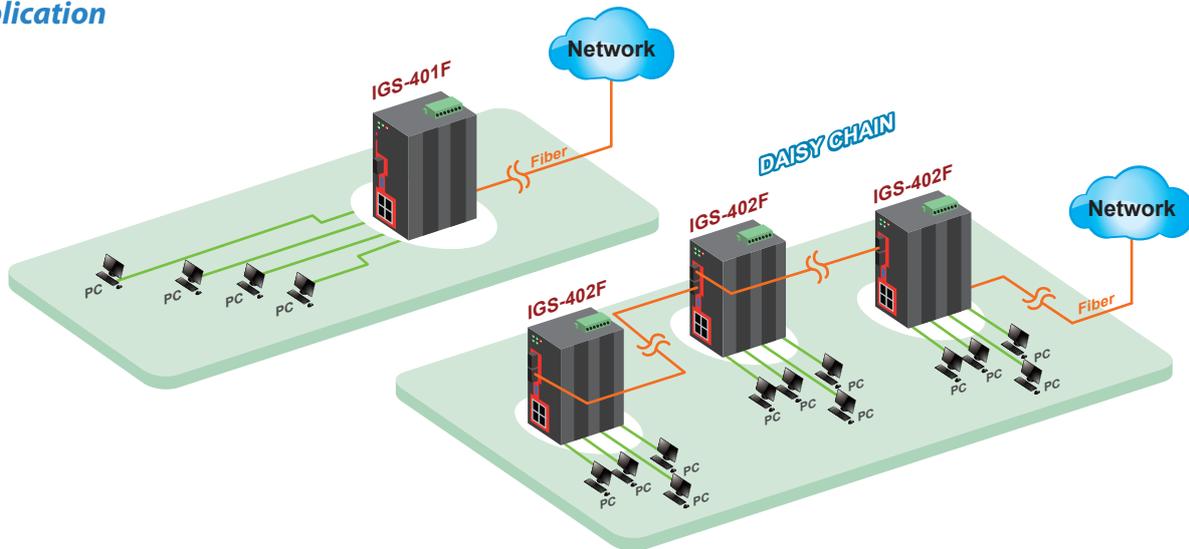
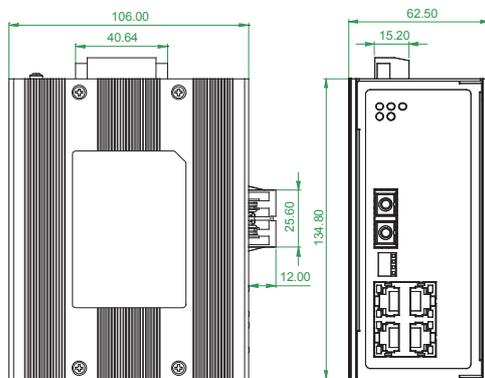


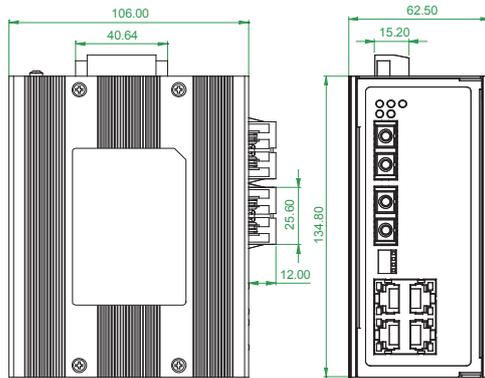
Figure : IGS-401F & IGS-402F Gigabit Ethernet Switch Transmission

Dimensions

IGS-401F

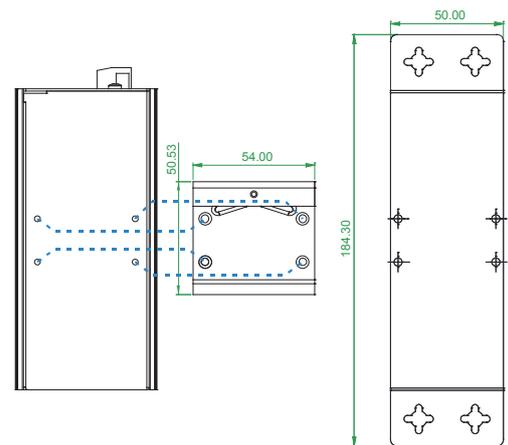


IGS-402F



Side View

Front View



Rear View

DIN-Rail Kit View

Wall-Mount Kit View

Ordering Information

| Model Name | Description |
|------------------------------------|--|
| IGS-401F | 4-Port 10/100/1000Base-T + 1-Port 1000Base Gigabit Ethernet Switch (-10 ~ 60°C) |
| IGS-401F-E | 4-Port 10/100/1000Base-T + 1-Port 1000Base Gigabit Ethernet Switch (-40 ~ 75°C) |
| IGS-402F | 4-Port 10/100/1000Base-T + 2-Port 1000Base Gigabit Ethernet Switch (-10 ~ 60°C) |
| IGS-402F-E | 4-Port 10/100/1000Base-T + 2-Port 1000Base Gigabit Ethernet Switch (-40 ~ 75°C) |
| Fiber Connector | Connectivity Distance |
| SC (IGS-401F & IGS-401F-E only) | SC001: 500m (SC, M/M) 002: 2km (M/M) SC020: 20km (SC, S/M) SC040: 40km (SC, S/M) SC020A: WDM 20km A type (TX:1310nm) SC020B: WDM 20km B type (TX:1550nm) |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |

Port Number Temperature Connector Type Connectivity Distance
IGS - 40 **F** - -
 Example: IGS - 401F - E - SC002

IGS-402S

4x 10/100/1000Base-T+ 2x 100/1000Base-X SFP Slot Gigabit Ethernet Switch



IGS-402S models are 4 port 10/100/1000Base-T Ethernet non-managed Gigabit switches, with 2x 1000Base-X SFP fiber ports, that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 12/24/48VDC redundant dual input power design
- 4-Port 1000Base-T RJ-45 with 2 Fiber Gigabit Ethernet
- Wide operating temperature -40 ~ 75°C (IGS-402S-E)
- Provides broadcast storm protection
- Supports DIP SW for alarm setting and broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- Support dual speed option for SFP
- UL60950-1, CE, FCC, certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 Certified
- IP30 rugged metal housing

Specifications

| | | |
|--|---|---|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure | Power Consumption Max 7.83W |
| Switch Architecture | Back-plane (Switching Fabric): 12Gbps | Alarm Relay Contact Relay outputs with current carrying capacity of 1 A @24VDC |
| Data Processing | Store and Forward | Removable Terminal Block Provide 2 redundant power, alarm relay contact, 6 Pin |
| Flow Control | IEEE 802.3x flow control, back pressure flow control | Operating Temperature -10 ~ 60°C (IGS-402S) -40 ~75°C (IGS-402S-E) |
| Provides Broadcast Storm Protection | Present, Enable / Disable set by DIP sw | Operating Humidity 5% to 95% (Non-condensing) |
| Jumbo Frame | 10K Bytes | Storage Temperature -40 ~ 85°C |
| MAC Address Table | 8K | Housing Rugged Metal, IP30 Protection , Fan-less |
| Packet Buffer Size | 1Mbits | Dimensions 106 x 62.5 x 134.8mm (D X W X H) |
| Network Connector | 4 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 2 SFP 100/1000 Base-X dual mode slot | Weight 0.84kg |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um | Installation Mounting DIN Rail mounting or wall mounting |
| Protocols | CSMA/CD | EMC/EMS CE, FCC |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Per RJ-45 port : Link/Active (Green), Speed 10(OFF), 100(Green), 1000(Yellow) Fiber Per port: Link/Active (Green) | EMI FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| DIP SW | DIP 1 ON : Disable power failure alarm OFF : Enable power failure alarm DIP 2 ON : Disables broadcast storm protection OFF : Enable broadcast storm protection DIP 3 ON : Fiber 2 for 100Base-FX SFP OFF : Fiber 2 for Gigabit SFP DIP 4 ON : Fiber 1 for 100Base-FX SFP OFF : Fiber 1 for Gigabit SFP | EMS EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Reserve Polarity Protection | Present | Safety UL60950-1 |
| Overload Current Protection | Present | Rail Traffic EN 50121-4 |
| Power Supply | Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) Provide DC Power JACK adapter cable for external power supply | Shock IEC 60068-2-27 Freefall IEC 60068-2-32 Vibration IEC 60068-2-6 MTBF 438,031 Hours Warranty 5 years |

Application

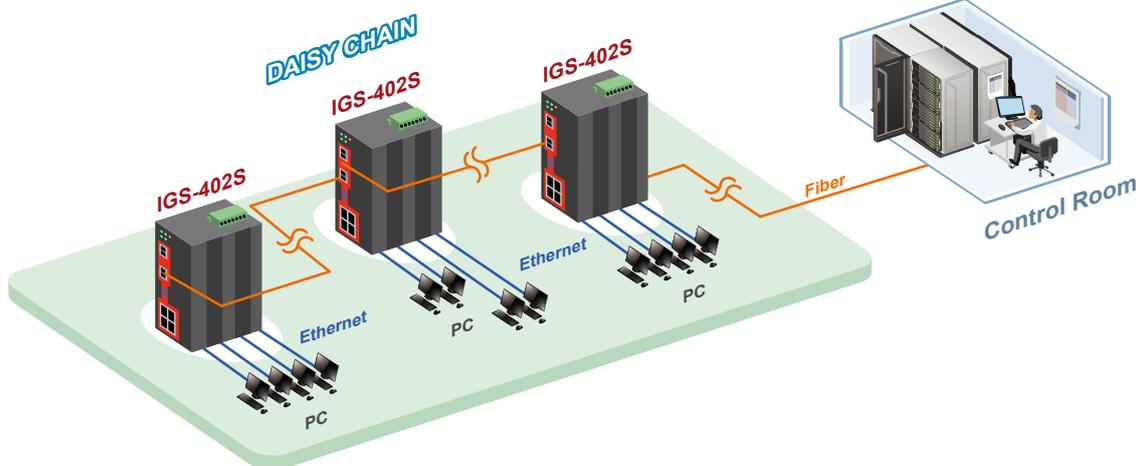
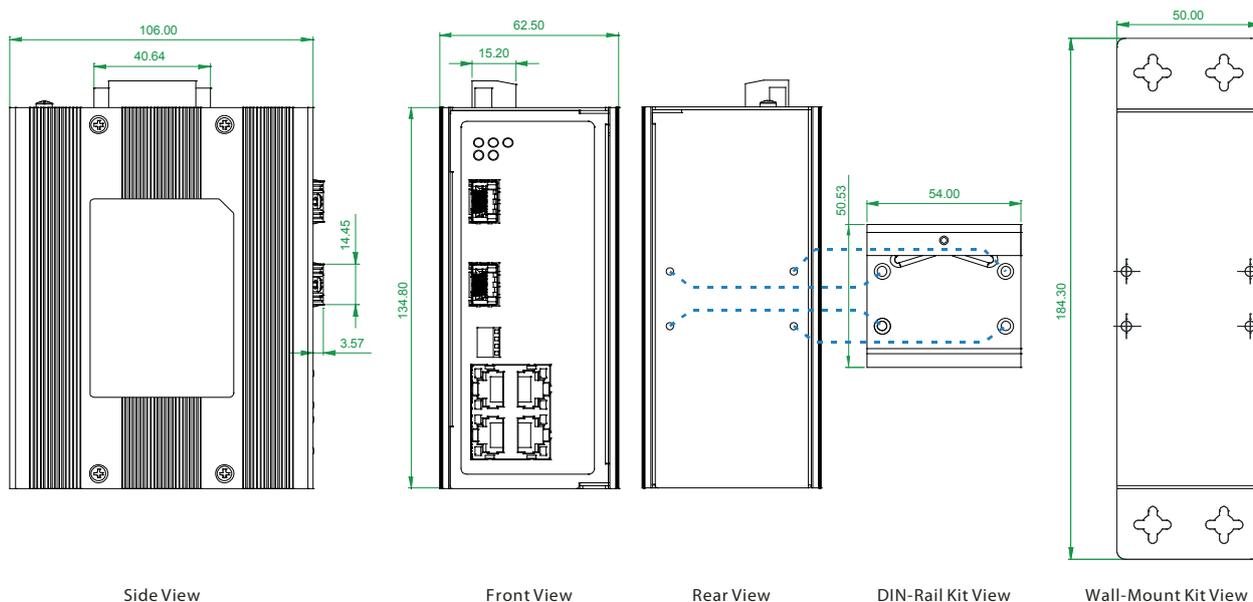


Figure : IGS-402S Gigabit Ethernet Switch Transmission with Daisy Chain

Dimensions



Ordering Information

| Model Name | Description |
|------------|--|
| IGS-402S | 4-Port 10/100/1000Base-T + 2-Port 100/1000Base SFP Slot Gigabit Ethernet Switch (-10 ~ 60°C) |
| IGS-402S-E | 4-Port 10/100/1000Base-T + 2-Port 100/1000Base SFP Slot Gigabit Ethernet Switch (-40 ~ 75°C) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |



Temperature
IGS - 402S - □
 Example: IGS - 402S - E

IGS-500

5x 10/100/1000Base-T Gigabit Ethernet Switch

IGS-800

8x 10/100/1000Base-T Gigabit Ethernet Switch



NEW

8

Industrial ethernet switch

IGS-500/800 models are 5-port/8-port respectively 10/100/1000Base-T non-managed Gigabit Ethernet switches that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 5 or 8-Port 10/100/1000Base-T RJ-45 Gigabit Ethernet Switch
- Supports broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- Jumbo frame supports
- Supports auto-negotiation and auto-MDI/MDI-X
- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- IP30 rugged metal housing
- Supports DIN Rail or wall mounting installation
- Wide operating temperature -40~75°C (IGS-800-E)
- UL60950-1, CE, FCC Certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

Specifications

| | |
|--|--|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE802.3x Flow Control |
| Switch Architecture | Back-plane (Switching Fabric): 10Gbps (IGS-500, IGS-500-E) Back-plane (Switching Fabric): 16Gbps (IGS-800, IGS-800-E) |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x flow control for Full duplex , back pressure for half duplex |
| Provides Broadcast Storm Protection | Present |
| Jumbo Frame | 9.6KBytes |
| MAC Address Table | 8K |
| Packet Buffer Size | 512KByte |
| Network Connector | 5 x RJ-45 (IGS-500, IGS-500-E) 8 x RJ-45 (IGS-800, IGS-800-E) 10/100/1000Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex |
| Network Cable | 10Base-T: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m) 100Base-TX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Per RJ-45 Port: Link/Active (Green), Speed: 10 (OFF), 100 (Green), 1000 (Yellow) |
| DIP SW | DIP 1 ON : Disable OFF : Enable power failure alarm DIP 2 ON : Disables broadcast storm protection OFF : Enable broadcast storm protection |
| Reserve Polarity Protection | Present for Power Input |
| Overload Current Protection | Present |
| Power Supply | Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) Provide DC Power JACK adapter cable for external power supply |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC, NC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |

| | |
|------------------------------|---|
| Power Consumption | TBD |
| Operating Temperature | -10°C~60°C (IGS-500, IGS-800) -40°C~75°C (IGS-500-E, IGS-800-E) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 38.6 x 142 mm (D x W x H) |
| Weight | TBD |
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMI | FCC Part 15 Subpart B Class A EN 55022 Class A EN 61000-6-4 - Emission for industrial environment |
| EMS | EN 61000-6-2 - Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria B EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Safety | UL60950-1(Pending) |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | TBD (Above 30 years) |
| Warranty | 5 years |

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

Application

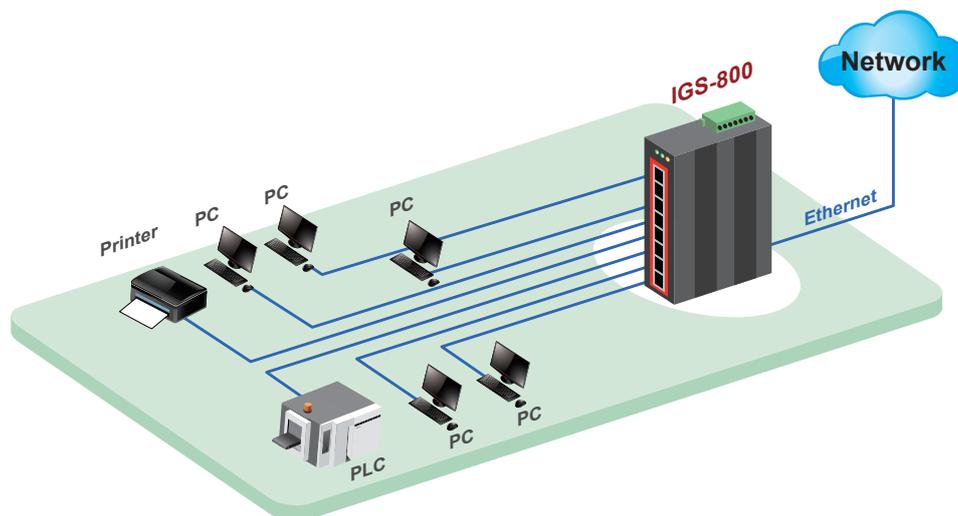
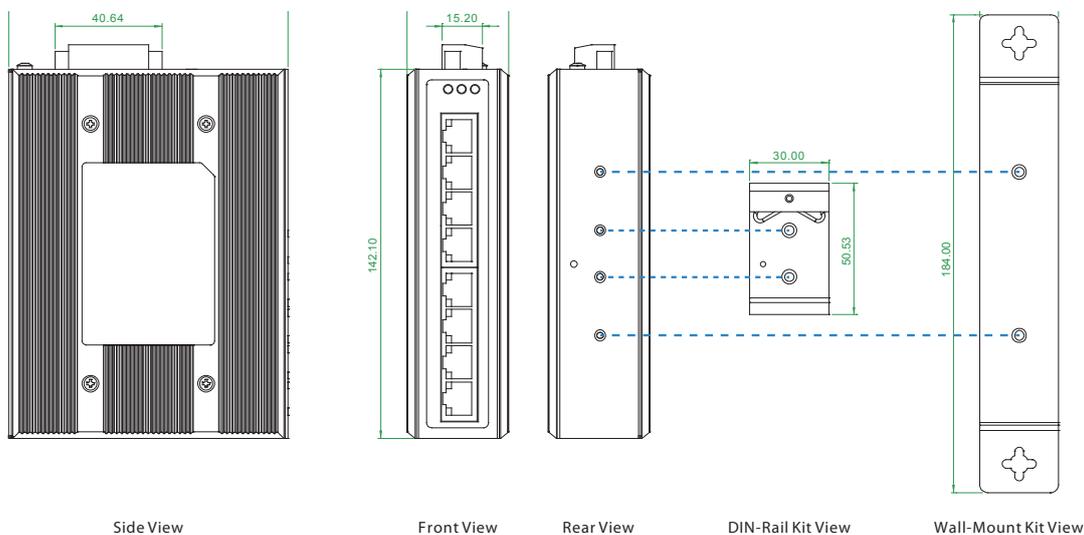


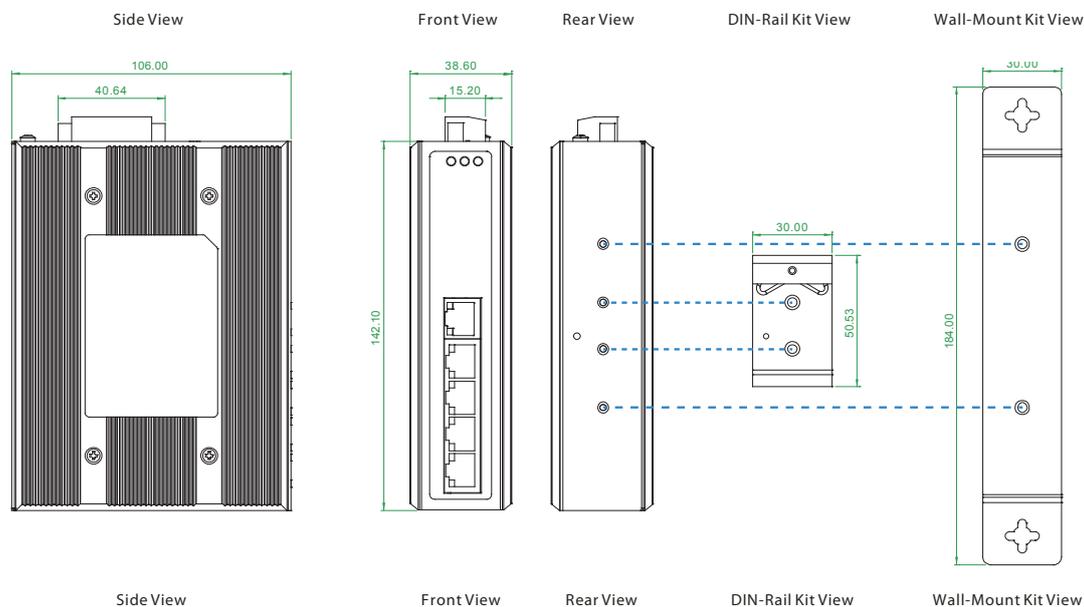
Figure : IGS-800 Gigabit Ethernet Switch Transmission

Dimensions

IGS-800



IGS-500



Ordering Information

| Model Name | Description |
|------------|--|
| IGS-500 | 5-Port 10/100/1000Base-T Gigabit Ethernet Switch, -10°C~60°C |
| IGS-500-E | 5-Port 10/100/1000Base-T Gigabit Ethernet Switch, -40°C~75°C |
| IGS-800 | 8-Port 10/100/1000Base-T Gigabit Ethernet Switch, -10°C~60°C |
| IGS-800-E | 8-Port 10/100/1000Base-T Gigabit Ethernet Switch, -40°C~75°C |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |

Temperature

IGS - 500 -
 Example: IGS - 500 - E

IFS-401F

4x 10/100Base-TX + 1x 100Base-FX Fast Ethernet Switch

IFS-402F

4x 10/100Base-TX + 2x 100Base-FX Fast Ethernet Switch



IFS-401F/402F models are 4 port 10/100Base-T Ethernet non-managed Fast Ethernet switches, with either 1x 100Base-FX fiber port (IFS-401F) or 2x 100Base-FX fiber ports, that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- IP30 rugged metal housing
- Wide operating temperature -40 ~ 75°C (IFS-401F-E and IFS-402F-E)
- Provides broadcast storm protection
- Supports DIP SW for alarm setting and broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control
- UL60950-1, CE, FCC Certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- 4-Port 10/100Base-TX (RJ-45) with 1 or 2-port 100Base-FX Fiber

Specifications

| | | | |
|--|---|---------------------------------|--|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet IEEE 802.3x Flow Control and Back Pressure | Power Supply | Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) Provide DC Power JACK adapter cable for external power supply |
| Switch Architecture | Back-plane (Switching Fabric) : 1.0 Gbps (IFS-401F, IFS-401F-E) 1.2Gbps (IFS-402F, IFS-402F-E) | Power Consumption | 4.4W (IFS-401F, IFS-401F-E) 5.8W (IFS-402F, IFS-402F-E) |
| Data Processing | Store and Forward | Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC, NC |
| Transfer Rate | 14,880pps for Ethernet port 148,800pps for Fast Ethernet port | Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact, 6 Pin |
| Flow Control | IEEE 802.3x flow control, back pressure flow control | Operating Temperature | -10 ~ 60°C (IFS-401F, IFS-402F) -40 ~ 75°C (IFS-401F-E, IFS-402F-E) |
| Provides Broadcast Storm Protection | Present | Operating Humidity | 5% to 95% (Non-condensing) |
| MAC Address Table | 2K | Storage Temperature | -40 ~ 85°C |
| Packet Buffer Size | 448Kbits | Housing | Rugged Metal, IP30 Protection |
| Network Connector | 4X RJ-45, 1 Fiber (IFS-401F, IFS-401F-E) 4X RJ-45, 2 Fiber (IFS-402F, IFS-402F-E) RJ-45 Port: Auto MDI/MDI-X function, 10/100Base-TX auto negotiation speed, Full/Half duplex 100Base-FX Fiber connector : SC/ST, Muti Mode/Single Mode | Dimensions | 106 x 38 x 142mm (D x W x H) |
| Network Cable | 10Base-T: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m) 100Base-TX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m) Fiber Cable (Multi-mode): 50/125um~62.5/125um Fiber Cable (Single-mode): 8/125um~10/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: 2KM (Multi-Mode) 30KM (Single-Mode) 50KM (Single Mode) | Weight | 0.625Kg (IFS-401F, IFS-401F-E) 0.63kg (IFS-402F, IFS-402F-E) |
| Protocol | CSMA/CD | Installation Mounting | DIN Rail mounting or wall mounting |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) RJ-45 Per port: Link/Active (Green), Speed 100 (Yellow) Fiber Per port: Link/Active (Green) | EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| DIP SW | DIP 1 OFF : Enable power failure alarm ON : Disable DIP 2 OFF : Enable broadcast storm protection ON : Disables broadcast storm protection | EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria B EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Reverse Polarity Protection | Present | Safety | UL60950-1 (Pending) |
| Overload Current Protection | Present | Rail Traffic | EN50121-4 |
| | | Shock | IEC 60068-2-27 |
| | | Freelfall | IEC 60068-2-32 |
| | | Vibration | IEC 60068-2-6 |
| | | MTBF | 587,670Hrs (IFS-401F, IFS-401F-E) 509,883Hrs (IFS-402F, IFS-402F-E) |
| | | Warranty | 5 years |

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

Application

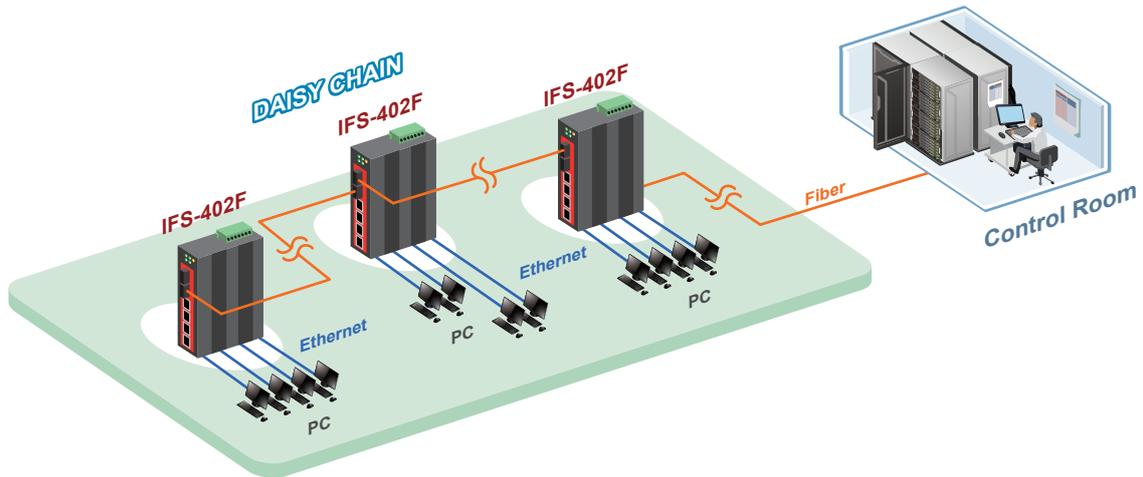
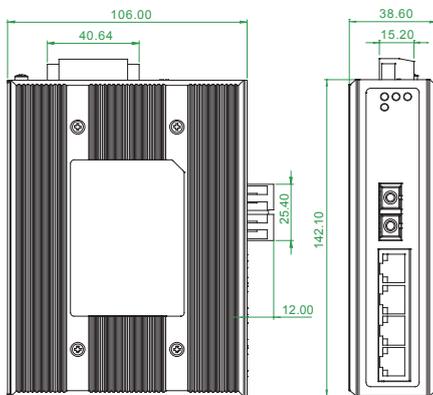


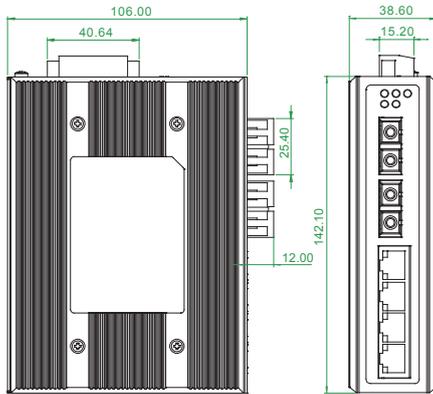
Figure : IFS-402F Fast Ethernet Switch Transmission with Daisy Chain

Dimensions

IFS-401F(-E)

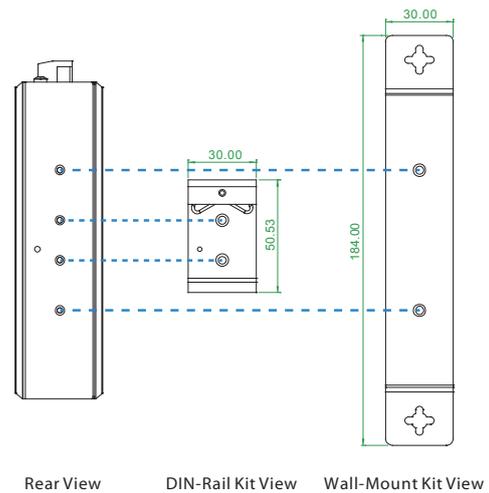


IFS-402F(-E)



Side View

Front View



Rear View

DIN-Rail Kit View

Wall-Mount Kit View

Ordering Information

| Model Name | Description |
|------------|---|
| IFS-401F | 4-Port 10/100Base-TX + 1-Port 100Base-FX Fast Ethernet Switch, -10 ~ 60°C |
| IFS-401F-E | 4-Port 10/100Base-TX + 1-Port 100Base-FX Fast Ethernet Switch, -40 ~ 75°C |
| IFS-402F | 4-Port 10/100Base-TX + 2-Port 100Base-FX Fast Ethernet Switch, -10 ~ 60°C |
| IFS-402F-E | 4-Port 10/100Base-TX + 2-Port 100Base-FX Fast Ethernet Switch, -40 ~ 75°C |

| Fiber Option Type | Connectivity Distance |
|-------------------|---|
| SC, ST | 002: 2km 030: 30km 050: 50km 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm) |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |

Temperature Connector Connector Connectivity
Type Type Distance
IFS - 401F - [] - [] [] [] [] [] []
Example: IFS - 401F - E - SC002

IFS-500, IFS-800

5x 10/100Base-TX Fast Ethernet Switch
8x 10/100Base-TX Fast Ethernet Switch



IFS-500/800 models are 5-port/8-port respectively 10/100Base-TX non-managed Fast Ethernet switches that provide stable and reliable Ethernet transmission. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
- IP30 rugged metal housing
- Wide operating temperature -40~75°C (IFS-500, IFS-800)
- UL60950-1, CE, FCC Certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- 5 or 8-Port 10/100Base-TX (RJ-45)
- Provides broadcast storm protection
- Supports DIP SW for alarm setting and broadcast storm protection
- Supports power failure alarm message by relay
- Supports flow control

Specifications

| | |
|--|---|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet IEEE 802.3x Flow Control and Back Pressure |
| Switch Architecture | Back-plane (Switching Fabric): 1.0 Gbps (IFS-500, IFS-500-E) 1.6Gbps (IFS-800, IFS-800-E) |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x flow control, back pressure flow control |
| Provides Broadcast Storm Protection | Present |
| MAC Address Table | 2K |
| Packet Buffer Size | 448Kbits |
| Network Connector | 5 x RJ-45 (IFS-500, IFS-500-E) 8 x RJ-45 (IFS-800, IFS-800-E) 10/100Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex |
| Network Cable | 10Base-T: 2-pair UTP/STP Cat.5 cable EIA/TIA-568 100-ohm (100m) 100Base-TX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Per port: Link/Active (Green), Speed/100 (Yellow) |
| DIP SW | DIP 1 OFF : Enable power failure alarm ON : Disable DIP 2 OFF : Enable broadcast storm protection ON : Disables broadcast storm protection |
| Reverse Polarity Protection | Present |
| Overload Current Protection | Present |
| Power Supply | Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) Provide DC Power JACK adapter cable for external power supply |
| Power Consumption | 2.9W (IFS-500, IFS-500-E) 3.9W (IFS-800, IFS-800-E) |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC, NC |
| Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IFS-500, IFS-800) -40 ~ 75°C (IFS-500-E, IFS-800-E) |

| | |
|------------------------------|--|
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 31.6 x 142mm (D x W x H) |
| Weight | 0.625kg (IFS-500, IFS-500-E) 0.64kg (IFS-800, IFS-800-E) |
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Safety | UL60950-1 (Pending) |
| Rail Traffic | EN50121-4 |
| Shock | IEC 60068-2-27 |
| Freerfall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 650,473Hrs (IFS-500, IFS-500-E) 552,587Hrs (IFS-800, IFS-800-E) |
| Warranty | 5 years |

Application

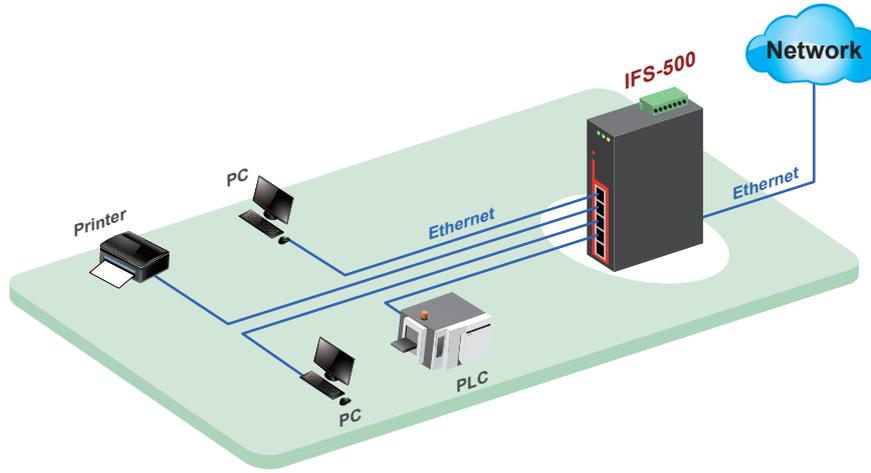
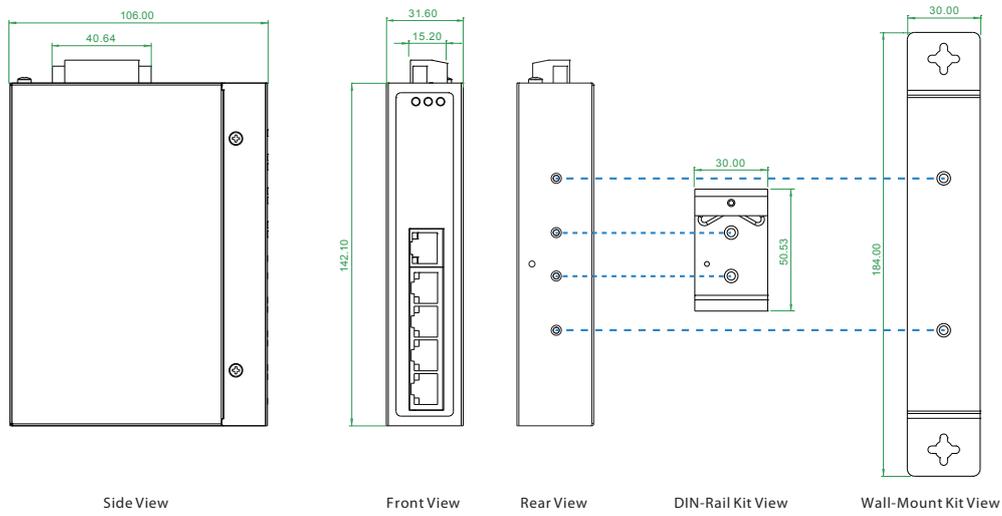


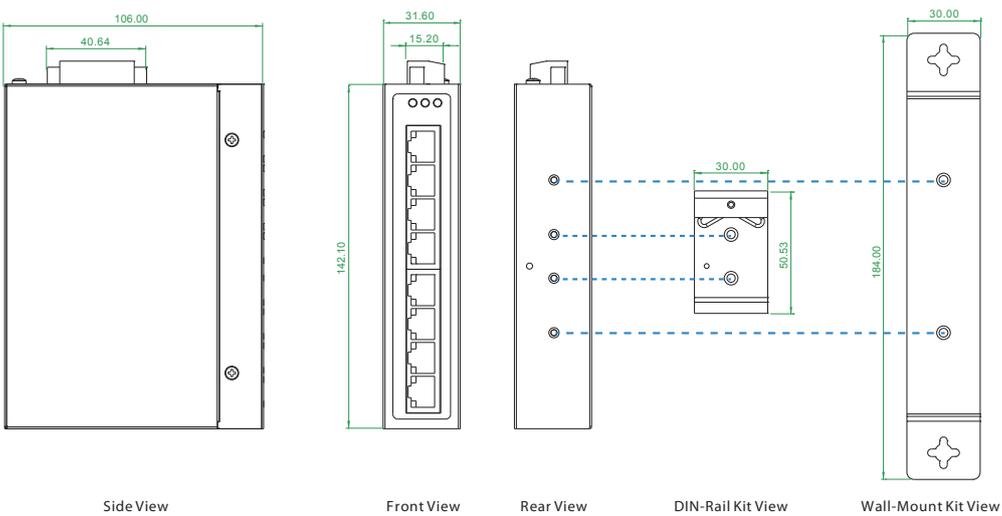
Figure : IFS-500 Fast Ethernet Switch Transmission

Dimensions

IFS-500



IFS-800



Ordering Information

| Model Name | Description |
|------------|--|
| IFS-500 | 5-Port 10/100Base-TX Ethernet Switch, -10 ~ 60°C |
| IFS-500-E | 5-Port 10/100Base-TX Ethernet Switch, -40 ~ 75°C |
| IFS-800 | 8-Port 10/100Base-TX Ethernet Switch, -10 ~ 60°C |
| IFS-800-E | 8-Port 10/100Base-TX Ethernet Switch, -40 ~ 75°C |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |

Temperature
IFS - 500 - □
 Example: IFS - 500 - E

IGS-803SM

8x 10/100/1000Base-T+ 3x 100/1000Base-X SFP Slot Managed Switch



IGS-803SM models are managed industrial grade Gigabit switches with 8 x 10/100/1000Base-T(X) ports and 3 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/ RSTP/MSTP/ ITU-T G.8032 Ring and multiple u-Ring for redundant cabling , layer 2 Ethernet IGMP, VLAN, QoS ,Security ,IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100/1000Base-T RJ-45 with 3x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provide up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings.
- u-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- SmartView Management System support

Specifications

| | | | |
|-----------------|-----------------------|--|--|
| Standard | IEEE 802.3 | 10Base-T 10Mbit/s Ethernet | Switch Architecture Back-plane (Switching Fabric): 22Gbps |
| | IEEE 802.3u | 100Base-TX, 100Base-FX, 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 802.1d | STP (Spanning Tree Protocol) | |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) | |
| | IEEE 802.1s | MSTP (Multiple Spanning Tree Protocol) | |
| | ITU-T G.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switching) | |
| | IEEE 802.1Q | Virtual LANs (VLAN) | |
| | IEEE 802.1X | Port based and MAC based Network Access Control, Authentication | |
| | IEEE 802.3ad | Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) | |
| | IEEE 802.3x | Flow control for Full Duplex | |
| | IEEE 802.1ad | Stacked VLANs, Q-in-Q | |
| | IEEE 802.1p | LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization | |
| | IEEE 802.1ab | Link Layer Discovery Protocol (LLDP) | |
| | IEEE 802.3az | EEE (Energy Efficient Ethernet) | |
| | VLAN ID | 4094 | |
| | | | Flow Control IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| | | | Network Connector 8 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 3X 100/1000 Base-X dual speed mode SFP slot, with DDMI |
| | | | Console RS-232 (RJ-45) |
| | | | Network Cable UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| | | | Protocols CSMA/CD |
| | | | Reverse Polarity Protection Present |
| | | | Overload Current Protection Present |
| | | | CPU Watch Dog Present |
| | | | Power Supply Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) |
| | | | Power Consumption 9.6W |
| | | | LED Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green) |

Specifications

| | |
|---|--|
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |
| Warning Message | System Syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-803SM) -40 ~ 75°C (IGS-803SM-E) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 72 x152 mm (D x W x H) |
| Weight | 0.78kg |
| Installation Mounting | DIN Rail mounting or wall mounting |
| Certification | |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A,CE EN55022 Class A |

Software Specifications

| | |
|---|---|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multicast VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group |
| Spanning Tree | Dynamic (IEEE 802.3ad LACP), up to 5 trunk group IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Multiple u-Ring | up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. |
| Loop Protection | Present |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number |
| Bandwidth Control for Ingress | Rate in steps :1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper |
| DiffServ (RF 2474) Remark | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |

| | |
|--|--|
| 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 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 | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 404,589hrs (MIL-HDBK-217) |
| Warranty | 5 years |

| | |
|---|--|
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access Filtering | |
| Web, Telnet / SSH , CLI RS-232 console | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | |
| Redundant firmware in case of upgrade failure | |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | |
| Client Relay Snooping Snooping option 82 Relay option 82 | |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP / SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |
| Others Features | |
| Green Ethernet | |
| Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity | |
| Cable Diagnostic | |
| Measuring cable OK or broken point distance | |

Application

Figure 1: Application Example

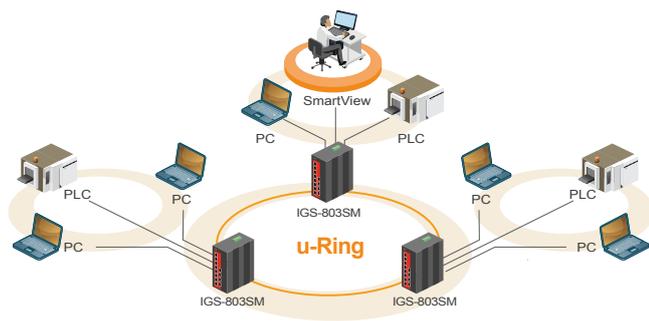


Figure 2: Multiple Rings

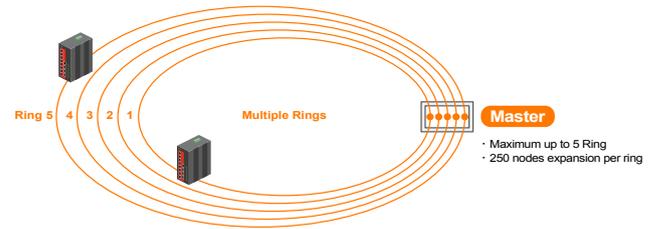


Figure 3: An illustration of u-Ring instances configured in Web interface

u-Ring Configuration Auto-refresh Refresh

| Delete | Instance | Type | Master | East | | West | |
|--------|----------|----------|--------------------------|-------------|--------------------------|-------------|--------------------------|
| | | | | Port | Edge | Port | Edge |
| Delete | 1 | u-Ring | <input type="checkbox"/> | 1 | | 2 | |
| Delete | 2 | u-Ring | <input type="checkbox"/> | 4 | | 3 | |
| Delete | 3 | u-Ring | <input type="checkbox"/> | 10 (Fiber2) | | 11 (Fiber3) | |
| Delete | 4 | Sub-Ring | <input type="checkbox"/> | 6 | | | |
| Delete | 5 | u-Chain | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 9 (Fiber1) | <input type="checkbox"/> |

Add New Instance

Save Reset

Figure 4: u-Ring Type

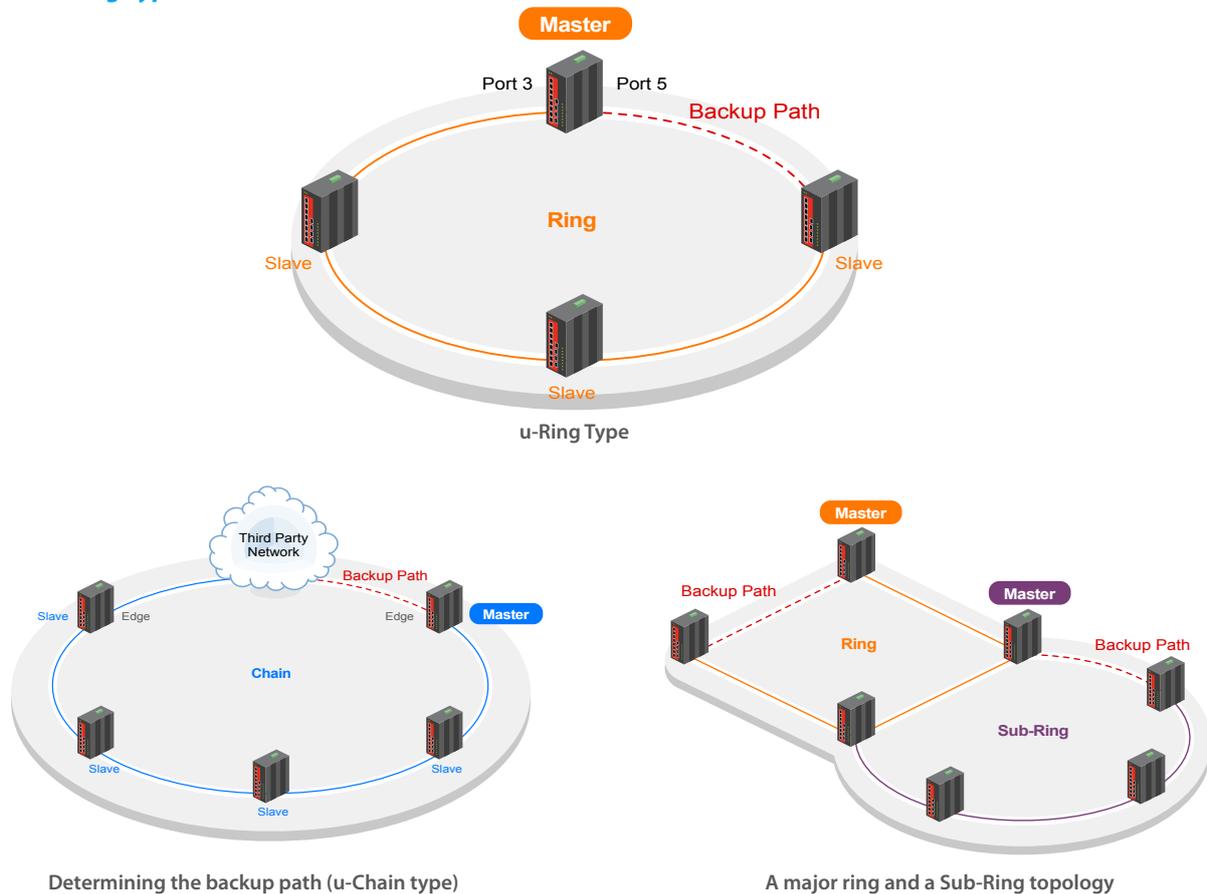
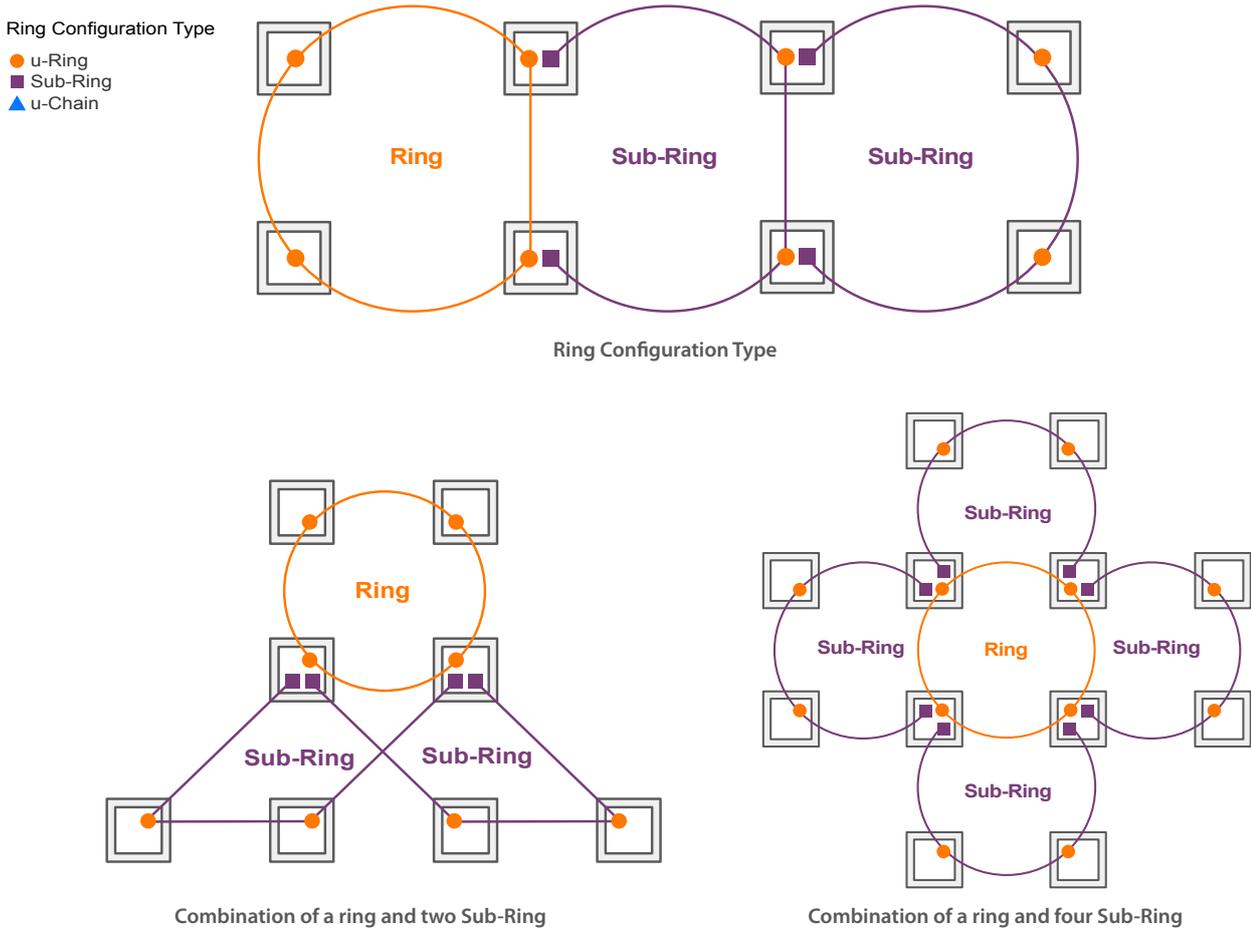
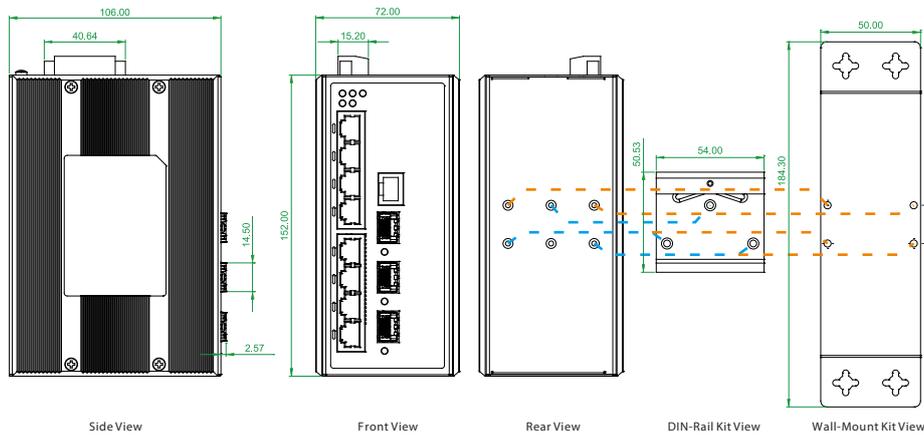


Figure 5: Ring Configuration Example



Dimensions



Ordering Information

| Model Name | Description |
|-------------|---|
| IGS-803SM | 8x 10/100/1000Base-T + 3x 100/1000Base-X SFP slot Managed Switch (-10~60°C) |
| IGS-803SM-E | 8x 10/100/1000Base-T + 3x 100/1000Base-X SFP slot Managed Switch (-40~75°C) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

ISFP - M 7 040 - 31 - E

- Industrial SFP Transceiver
- M: Multi Mode S: Single Mode T: Copper
- 7: GbE 5: FE
- Distance 002(2km), 020(20km), 040(40km)...
- E: -40~85°C Blank: 0~70°C
- Wavelength

IGS-803SM - Temperature
 Example: IGS-803SM - E

IGS-404SM

4x 10/100/1000Base-T+ 4x 100/1000Base-X SFP Slot Managed Switch



IGS-404SM models are managed industrial grade Gigabit switches with 4 x 10/100/1000Base-T(X) ports and 4 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/ RSTP/MSTP/ ITU-T G.8032 Ring and multiple u-Ring for redundant cabling , layer 2 Ethernet IGMP, VLAN, QoS ,Security ,IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 4x 10/100/1000Base-T RJ-45 with 4x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provide up to 4 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 4 Rings.
- u-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- SmartView Management System support

Specifications

| | | | | |
|-----------------|-----------------------|--|---|---|
| Standard | IEEE 802.3 | 10Base-T 10Mbit/s Ethernet | Switch Architecture Back-plane (Switching Fabric): 8Gbps | |
| | IEEE 802.3u | 100Base-TX, 100Base-FX, Fast Ethernet | | Data Processing Store and Forward |
| | IEEE 802.3ab | 1000Base-T Gbit/s Ethernet over twisted pair | | Flow Control IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| | IEEE 802.3z | 1000Base-X Gbit/s Ethernet over Fiber-Optic | | Network Connector 4 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 4X 100/1000 Base-X dual speed mode SFP slot, with DDMI |
| | IEEE 802.1d | STP (Spanning Tree Protocol) | | Console RS-232 (RJ-45) |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) | | Network Cable UTP/STP above Cat. 5e cable |
| | IEEE 802.1s | MSTP (Multiple Spanning Tree Protocol) | | EIA/TIA-568 100-ohm (100m) |
| | ITU-T G.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switching) | | Protocols CSMA/CD |
| | IEEE 802.1Q | Virtual LANs (VLAN) | | Reverse Polarity Protection Present |
| | IEEE 802.1X | Port based and MAC based Network Access Control, Authentication | | Overload Current Protection Present |
| | IEEE 802.3ad | Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) | | CPU Watch Dog Present |
| | IEEE 802.3x | Flow control for Full Duplex | | Power Supply Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) |
| | IEEE 802.1ad | Stacked VLANs, Q-in-Q | | Power Consumption 8.1W in 24VDC 9.6W in 48VDC |
| | IEEE 802.1p | LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization | | LED Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) |
| | IEEE 802.1ab | Link Layer Discovery Protocol (LLDP) | | Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) |
| | IEEE 802.3az | EEE (Energy Efficient Ethernet) | | SFP Fiber Per port: Link/Active (Green) |
| VLAN ID | 4094 | IEEE802.1Q VLAN VID | | |

Specifications

| | |
|---|--|
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |
| Warning Message | System Syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-404SM) -40 ~ 75°C (IGS-404SM-E) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 62.5 x 135 mm (D x W x H) |
| Weight | 0.725kg |
| Installation Mounting | DIN Rail mounting or wall mounting |
| Certification | |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A, CE EN55022 Class A |

Software Specifications

| | |
|---|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multicast VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group |
| Spanning Tree | Dynamic (IEEE 802.3ad LACP), up to 5 trunk group IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Multiple u-Ring | up to 4 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 4 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. |
| Loop Protection | Present |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number |
| Bandwidth Control for Ingress | Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper |
| DiffServ (RF 2474) Remark | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |

| | |
|--|--|
| 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 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 | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 302,826hrs (MIL-HDBK-217) |
| Warranty | 5 years |

| | |
|--|--|
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access Filtering | |
| Web, Telnet / SSH , CLI RS-232 console | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | |
| Redundant firmware in case of upgrade failure | |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | |
| Client Relay Snooping Snooping option 82 Relay option 82 | |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP / SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |
| Others Features | |
| Green Ethernet | |
| Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management : Adjustment LEDs intensity | |
| Cable Diagnostic | |
| Measuring cable OK or broken point distance | |

Application

Figure 1: Application Example



Figure 2: Multiple Rings

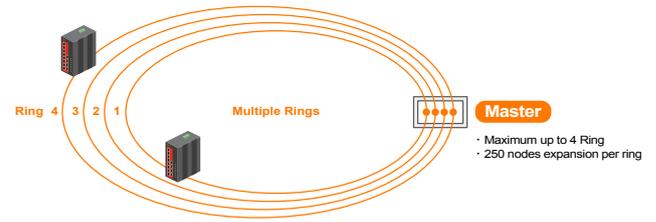


Figure 3: An illustration of u-Ring instances configured in Web interface

u-Ring Configuration Auto-refresh Refresh

| Delete | Instance | Type | Master | East | | West | |
|--------|----------|----------|--------------------------|-------------|--------------------------|-------------|--------------------------|
| | | | | Port | Edge | Port | Edge |
| Delete | 1 | u-Ring | <input type="checkbox"/> | 1 | | 2 | |
| Delete | 2 | u-Ring | <input type="checkbox"/> | 4 | | 3 | |
| Delete | 3 | u-Ring | <input type="checkbox"/> | 10 (Fiber2) | | 11 (Fiber3) | |
| Delete | 4 | Sub-Ring | <input type="checkbox"/> | 6 | | | |
| Delete | 5 | u-Chain | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 9 (Fiber1) | <input type="checkbox"/> |

Add New Instance

Save Reset

Figure 4: u-Ring Type

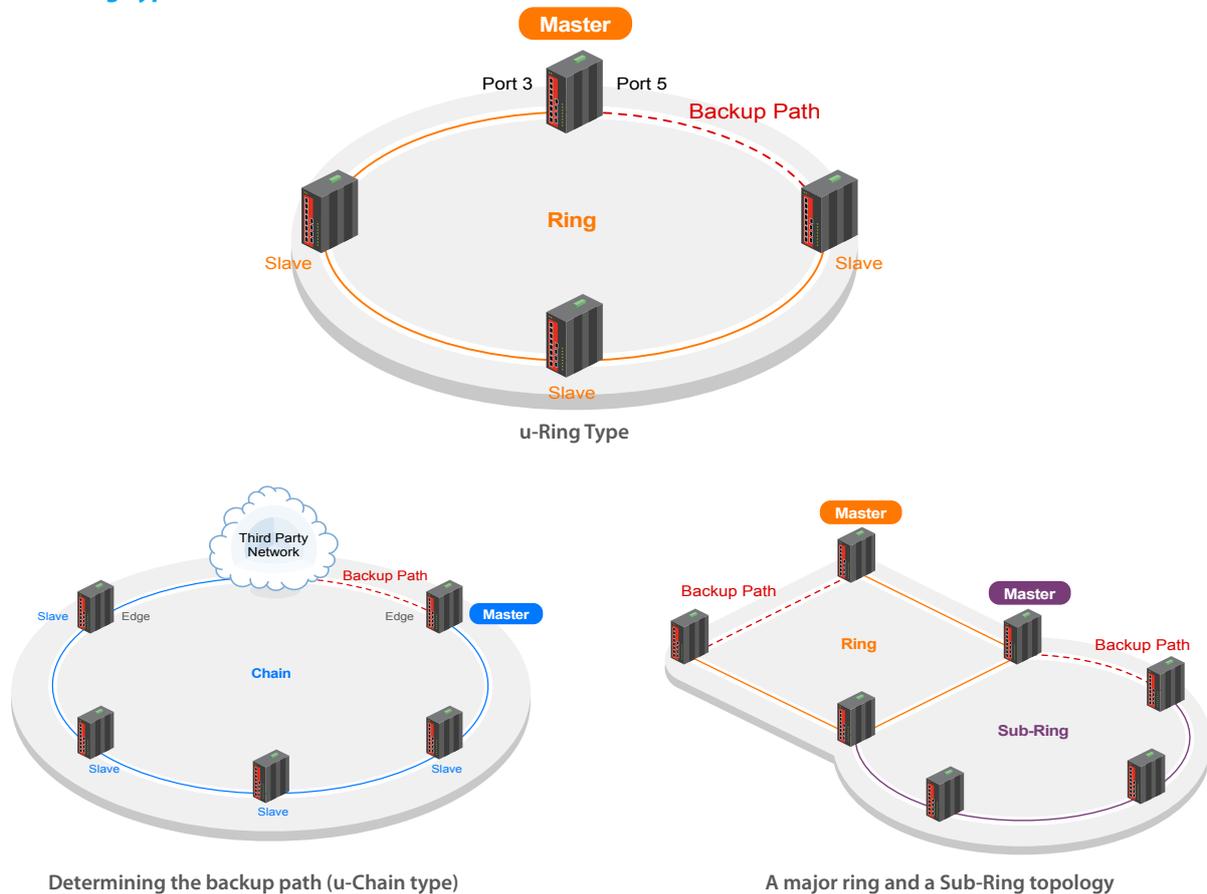
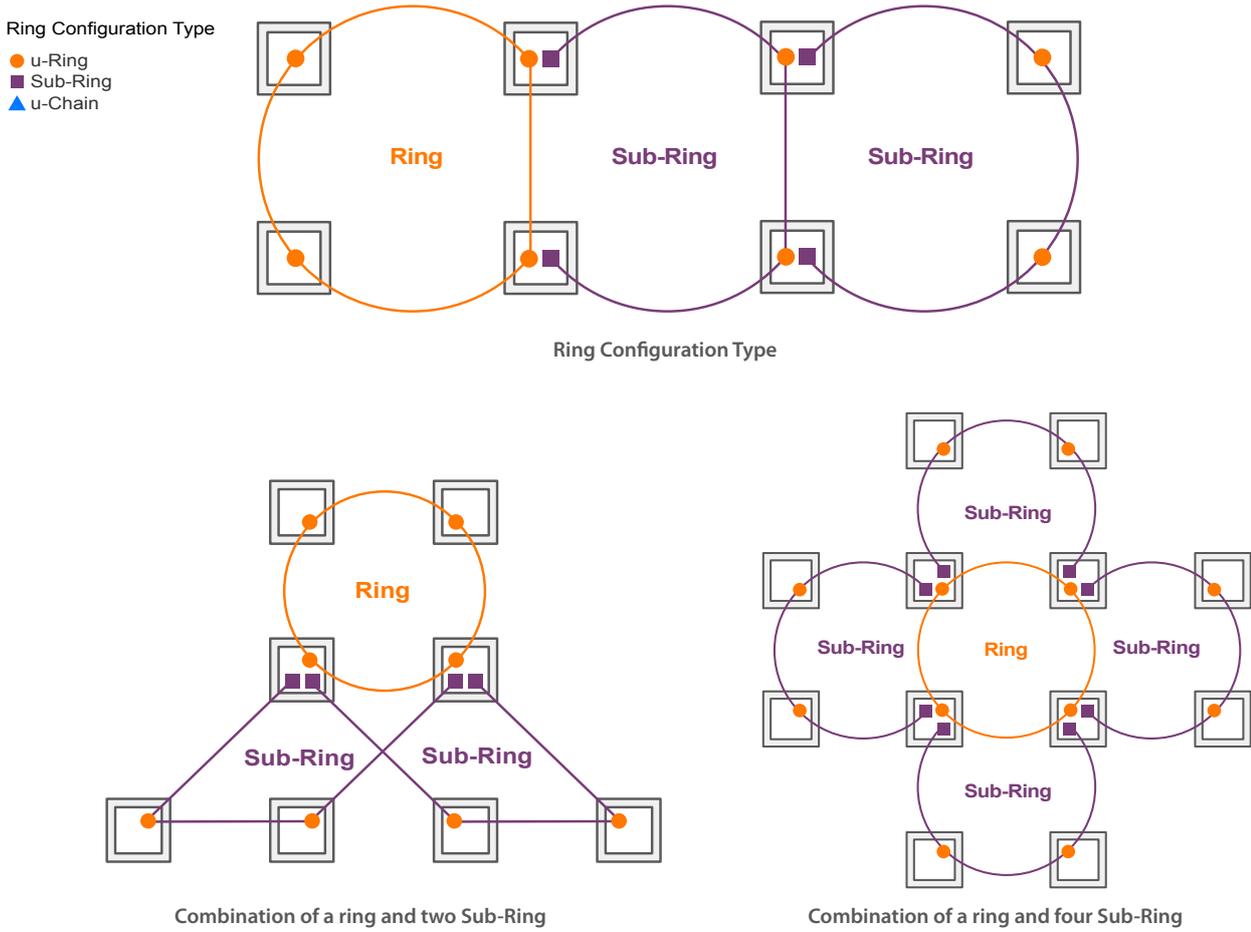
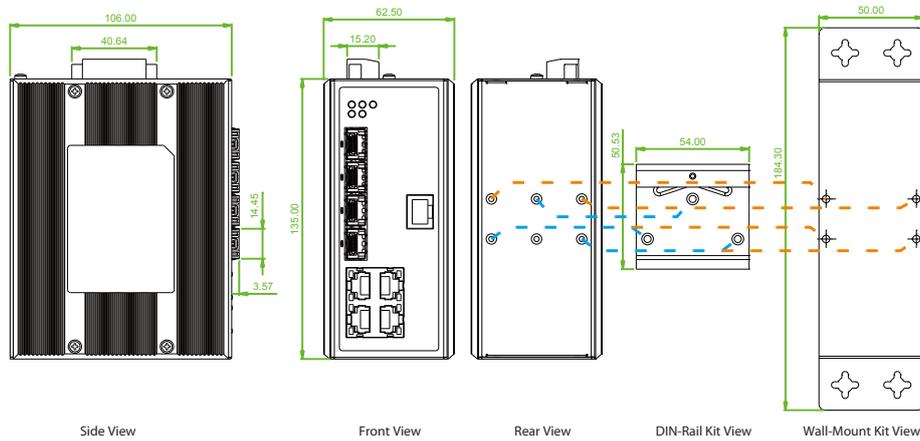


Figure 5: Ring Configuration Example



Dimensions



Ordering Information

| Model Name | Description |
|-------------|---|
| IGS-404SM | 4x 10/100/1000Base-T + 4x 100/1000Base-X SFP slot Managed Switch (-10~60°C) |
| IGS-404SM-E | 4x 10/100/1000Base-T + 4x 100/1000Base-X SFP slot Managed Switch (-40~75°C) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

ISFP - M 7 040 - 31 - E

- Industrial SFP Transceiver
- M: Multi Mode S: Single Mode T: Copper
- 7: GbE 5: FE
- Distance 002(2km), 020(20km), 040(40km)...
- E: -40~85°C Blank: 0~70°C
- Wavelength

IGS-404SM - Temperature
 Example: IGS-404SM - E

IGS-812SM

8x 10/100/1000Base-T+ 12x 100/1000Base-X SFP Slot Ethernet Managed Switch



IGS-812SM models are managed industrial grade Gigabit switches with 8x 10/100/1000Base-TX ports and 12 SFP Gigabit/Fast Ethernet fiber ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP and ITU-T G.8032 Ring <50ms recovery time, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100/1000Base-T RJ-45 with 12x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Support IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for cabling redundant
- **μ-Ring** for Redundant Ethernet Ring, recovery time<20ms in 250 units
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1Q VLAN, port based VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP/MLD snooping V1/V2/V3, IGMP Filtering / Throttling, IGMP query, IGMP proxy reporting, MLD snooping
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrading failure
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6, SNMP, HTTP, SSH/SSL, NTP/SNTP, TFTP, QoS, ACL
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System

Specifications

| | | | |
|----------------------------|--|------------------------------------|---|
| Standard | IEEE 802.3 10Base-T 10Mbit/s Ethernet | Network Connector | 8x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 12x 100/1000Base-X dual speed mode SFP slot, with DDML |
| | IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet | Console | RS-232 (RJ-45) |
| | IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair | Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| | IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic | Protocol | CSMA/CD |
| | IEEE 802.1d STP (Spanning Tree Protocol) | Reverse Polarity Protection | Present |
| | IEEE 802.1w RSTP (Rapid Spanning Tree Protocol) | Overload Current Protection | Present |
| | IEEE 802.1s MSTP (Multiple Spanning Tree Protocol) | CPU Watch Dog | Present |
| | ITU-T G.8032 / Y.1344 EPR (Ethernet Protection Ring) | Power Supply | Redundant Dual DC12/24/48VDC (9.6~60VDC) Input power (Removable Terminal Block) |
| | IEEE 802.1Q Virtual LANs (VLAN) | LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green) |
| | IEEE 802.1X Port based Network Access Control, Authentication | Warning Message | System syslog, SMTP/e-mail event message, alarm relay |
| | IEEE 802.3ad Link aggregation for parallel links with LACP (Link Aggregation Control Protocol) | Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| | IEEE 802.3x Flow control for Full Duplex | Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| | IEEE 802.1ad Stacked VLANs, Q-in-Q | Operating Temperature | -10 ~ 60°C (IGS-812SM) -40 ~ 75°C (IGS-812SM-E) |
| | IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization | Operating Humidity | 5% to 95% (Non-condensing) |
| | IEEE 802.1ab Link Layer Discovery Protocol (LLDP) | Storage Temperature | -40 ~ 85°C |
| | IEEE 802.3az EEE (Energy Efficient Ethernet) | Housing | Rugged Metal, IP30 Protection |
| VLAN ID | 4096 | Dimensions | 106 x 72 x152 mm (D x W x H) |
| Switch Architecture | Back-plane (Switching Fabric): 40Gbps | Installation Mounting | DIN Rail mounting or wall mounting |
| Data Processing | Store and Forward | | |
| Flow Control | IEEE 802.3x for full duplex mode Back pressure for half duplex mode | | |
| Jumbo Frame | 9.6KB | | |
| MAC Address Table | 8K | | |

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

Specifications

| | |
|----------------|--|
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |

Software Specifications

| | |
|--|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4095 ID IEEE 802.1q VLAN, up to 4095 Groups IEEE 802.1ad Q-in-Q Port Based VLAN MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Loop Protection | Present |
| µ-Ring | Easy set for Ethernet protection Ring, Recovery Time <20ms, Maximum 250 Node |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification | IEEE802.1p based CoS |
| QoS | IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List) : MAC Access control list (Source/Destination MAC, Ether type, Priority ID/ VLAN ID) QCL : IP extended access control list (Source/Destination IP, Protocol, TCP/UDP port number) |
| Bandwidth Control for Ingress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame Per queue shaper |
| DiffServ (RF 2474) Remarkng | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Query |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |

| | |
|---------------------|----------------------|
| Safety | UL60950-1 (Pending) |
| Rail Traffic | EN 50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | TBD (Above 30 years) |
| Warranty | 5 years |

| | |
|---------------------------------------|--|
| Management Interface Access | Web, Telnet / SSH |
| Filtering | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |

| | |
|-------------------------------------|--|
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP /SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| Stateless Auto-Configuration | |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |

| | |
|-------------------------|--|
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management : Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |

Application

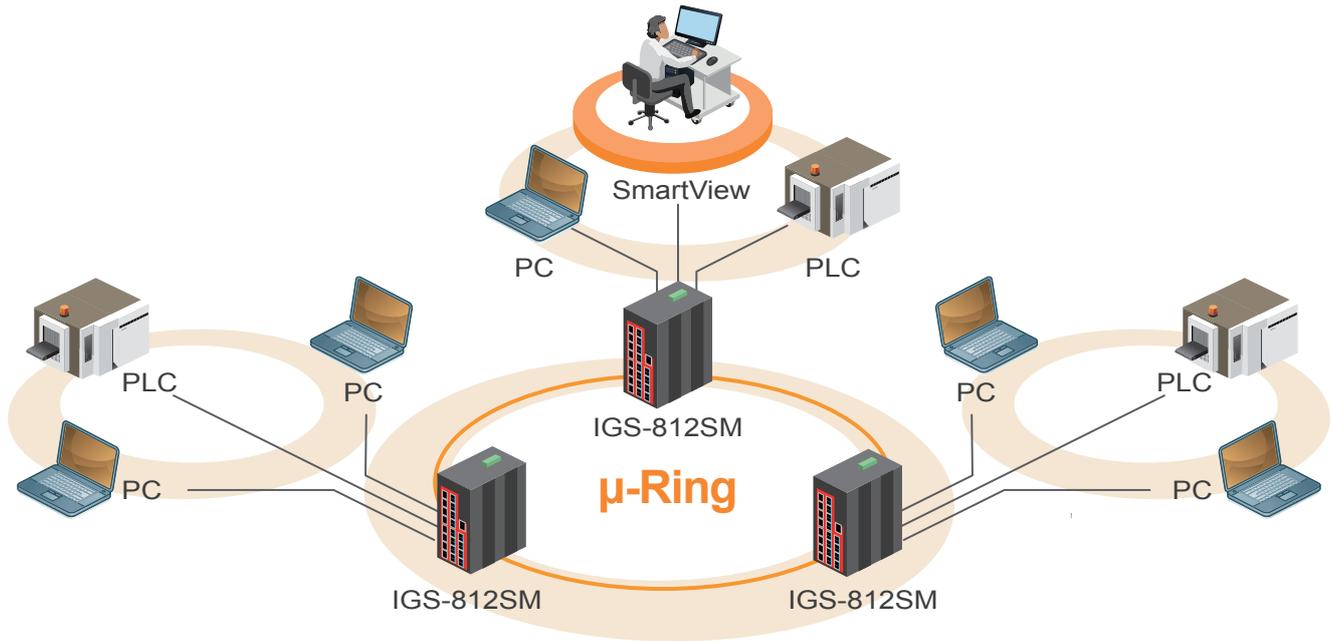
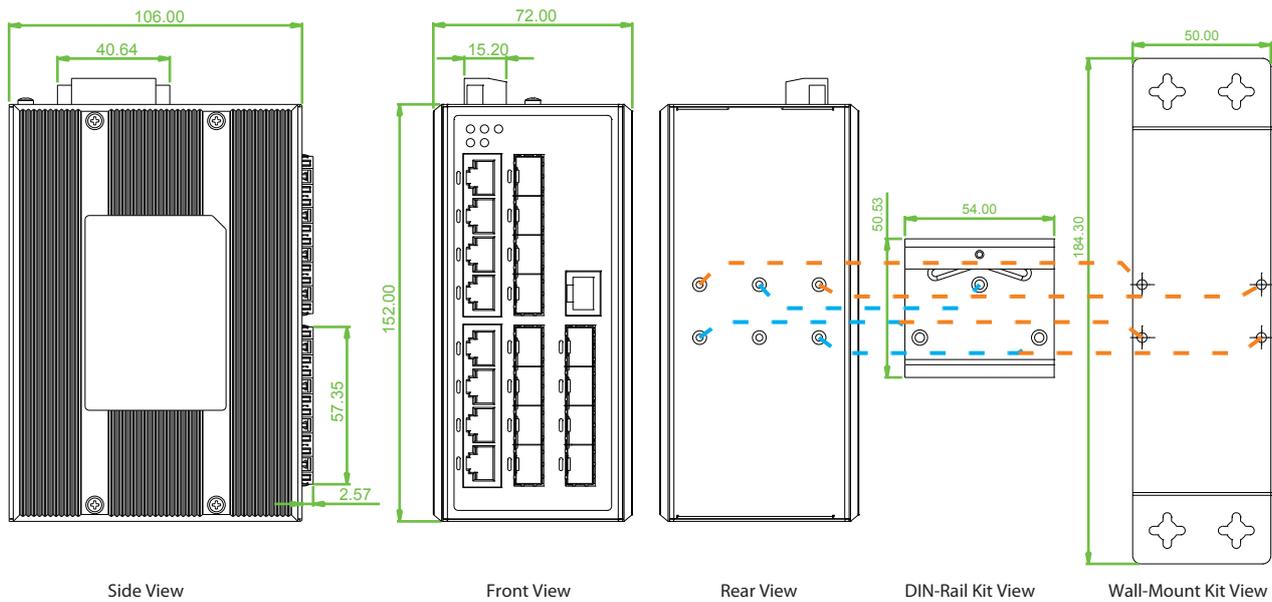


Figure : Topology

Dimensions



Ordering Information

| Model Name | Description |
|-------------|--|
| IGS-812SM | 8x 10/100/1000Base-T + 12x 100/1000Base-X SFP Slot Managed Switch (-10~60°C) |
| IGS-812SM-E | 8x 10/100/1000Base-T + 12x 100/1000Base-X SFP Slot Managed Switch (-40~75°C) |

Accessories

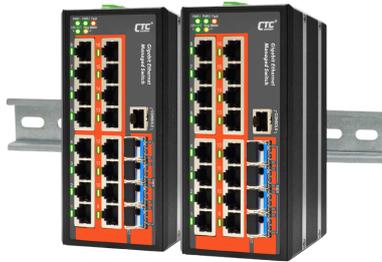
| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

IGS-812SM – Temperature
 Example: IGS-812SM – E



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

NEW



IGS-1604SM

16x 10/100/1000Base-T+ 4x 100/1000Base-X SFP Slot Ethernet Managed Switch

IGS-1604SM models are managed industrial grade Gigabit switches with 16x 10/100/1000Base-T ports and 4 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP and ITU-T G.8032 Ring <50ms recovery time, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 16x 10/100/1000Base-T RJ-45 with 4x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 Certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 Certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring(EPR) for cabling redundant
- **μ-Ring** for Redundant Ethernet Ring, recovery time<20ms in 250 units
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1Q VLAN, port based VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP/MLD snooping V1/V2/V3, IGMP Filtering / Throttling, IGMP query, IGMP proxy reporting, MLD snooping
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware in case of upgrade failure
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6, SNMP, HTTP, SSH/SSL, NTP/SNTP, TFTP, QoS, ACL
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System

Specifications

| | |
|----------------------------|--|
| 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 |
| | IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic |
| | IEEE 802.1d STP (Spanning Tree Protocol) |
| | IEEE 802.1w RSTP (Rapid Spanning Tree Protocol) |
| | IEEE 802.1s MSTP (Multiple Spanning Tree Protocol) |
| | ITU-T G.8032 / Y.1344 EPR (Ethernet Protection Ring) |
| | IEEE 802.1Q Virtual LANs (VLAN) |
| | IEEE 802.1X Port based Network Access Control, Authentication |
| | IEEE 802.3ad Link aggregation for parallel links with LACP (Link Aggregation Control Protocol) |
| | IEEE 802.3x Flow control for Full Duplex |
| | IEEE 802.1ad Stacked VLANs, Q-in-Q |
| | IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization |
| | IEEE 802.1ab Link Layer Discovery Protocol (LLDP) |
| | IEEE 802.3az EEE (Energy Efficient Ethernet) |
| VLAN ID | 4096 |
| Switch Architecture | Back-plane (Switching Fabric):40Gbps |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |

| | |
|------------------------------------|--|
| Network Connector | 16x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 4x 100/1000Base-X dual speed mode SFP slot, with DDMI |
| Console | RS-232 (RJ-45) |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| Reverse Polarity Protection | Present |
| Overload Current Protection | Present |
| CPU Watch Dog | Present |
| Power Supply | Redundant Dual DC12/24/48VDC (9.6~60VDC) Input power (Removable Terminal Block) |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green) |
| Warning Message | System Syslog, SMTP/ e-Mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IGS-1604SM) -40 ~ 75°C (IGS-1604SM-E) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 72 x 152mm (D x W x H) |
| Installation Mounting | DIN Rail mounting or wall mounting |

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

Specifications

| | |
|----------------|--|
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |

| | |
|---------------------|----------------------|
| Safety | UL60950-1 (Pending) |
| Rail Traffic | EN 50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | TBD (Above 30 years) |
| Warranty | 5 years |

Software Specifications

| | |
|--|---|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4095 ID IEEE 802.1q VLAN, up to 4095 Groups IEEE 802.1ad Q-in-Q Port Based VLAN MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Loop Protection | Present |
| µ-Ring | Easy set for Ethernet protection Ring, Recovery Time <20ms, Maximum 250 Node |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): MAC Access control list (Source/Destination MAC, Ether type, Priority ID/ VLAN ID) QCL: IP extended access control list (Source/Destination IP, Protocol, TCP/UDP port number) |
| Bandwidth Control for Ingress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame Per queue shaper |
| DiffServ (RF 2474) Remarkings | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Query |

| | |
|---|--|
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |
| User name password authentication | Local Authentication Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access | Web, Telnet / SSH |
| Filtering | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP /SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| Stateless Auto-Configuration | |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management : Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |

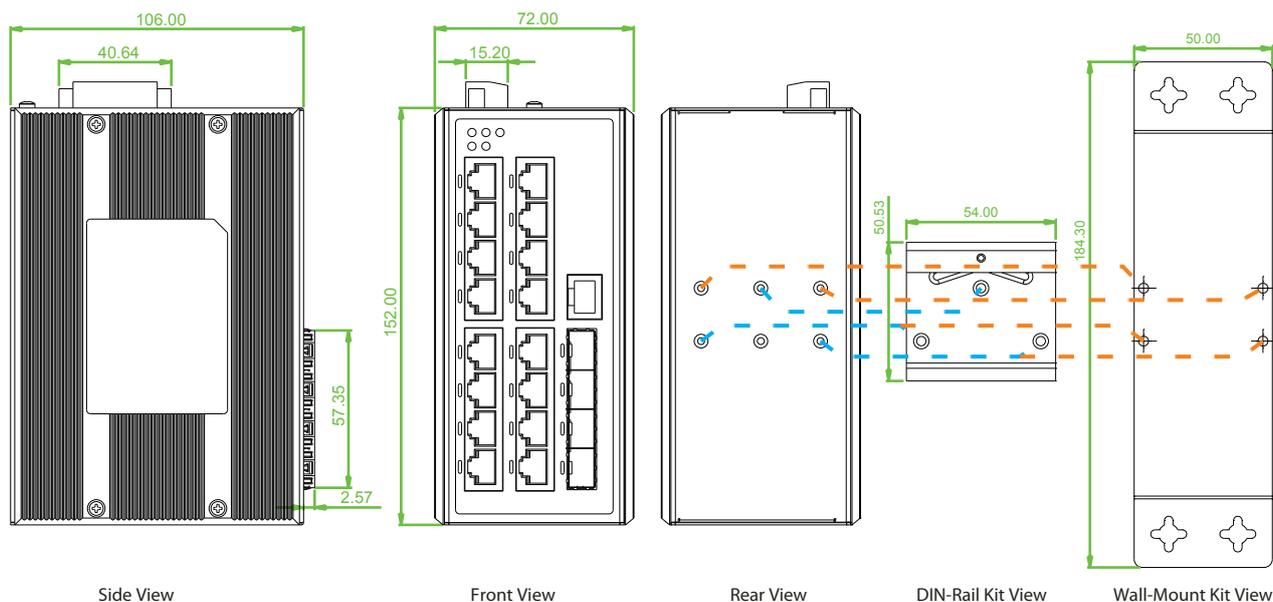
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

Application



Figure : Topology

Dimensions



Ordering Information

| Model Name | Description |
|--------------|--|
| IGS-1604SM | 16x 10/100/1000Base-T + 4x 100/1000Base-X SFP Slot Managed Switch (-10~60°C) |
| IGS-1604SM-E | 16x 10/100/1000Base-T + 4x 100/1000Base-X SFP Slot Managed Switch (-40~75°C) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |



Temperature
IGS-1604SM -
 Example: IGS-1604SM - E

IFS-803GSM

8x 10/100Base-T+ 3x 100/1000Base-X SFP Slot (11 port) Managed Switch



IFS-803GSM models are managed industrial grade Ethernet switches with 8 x 10/100Base-T(X) ports and 3 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/ RSTP/MSTP/ ITU-T G.8032 Ring and multiple u-Ring for redundant cabling , layer 2 Ethernet IGMP, VLAN, QoS ,Security ,IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 8x 10/100Base-T RJ-45 with 3x 100/1000Base-X SFP Fiber (Total 11 Port)
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- Provide up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings.
- u-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
- SmartView Management System support

Specifications

| | | | | | | | | | | | | | | | | |
|----------------------------|--|--|--|---|--|-------------------------------|---|--------------------------|--|--|------------------------------|---|-----------------------------------|--|--|---|
| Standard | IEEE 802.3 | 10Base-T 10Mbit/s Ethernet | Data Processing Store and Forward | | | | | | | | | | | | | |
| | IEEE 802.3u | 100Base-TX, 100Base-FX, Fast Ethernet | | Flow Control IEEE 802.3x for full duplex mode Back pressure for half duplex mode | | | | | | | | | | | | |
| | IEEE 802.3z | 1000Base-X Gbit/s Ethernet over Fiber-Optic | | | Network Connector 8 x RJ-45 10/100Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 3X 100/1000 Base-X dual speed mode SFP slot, with DDMI | | | | | | | | | | | |
| | IEEE 802.1d | STP (Spanning Tree Protocol) | | | | Console RS-232 (RJ-45) | | | | | | | | | | |
| | IEEE 802.1w | RSTP (Rapid Spanning Tree Protocol) | | | | | Network Cable UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) | | | | | | | | | |
| | IEEE 802.1s | MSTP (Multiple Spanning Tree Protocol) | | | | | | Protocols CSMA/CD | | | | | | | | |
| | ITU-T G.8032 / Y.1344 | ERPS (Ethernet Ring Protection Switching) | | | | | | | Reverse Polarity Protection Present | | | | | | | |
| | IEEE 802.1Q | Virtual LANs (VLAN) | | | | | | | | Overload Current Protection Present | | | | | | |
| | IEEE 802.1X | Port based and MAC based Network Access Control, Authentication | | | | | | | | | CPU Watch Dog Present | | | | | |
| | IEEE 802.3ad | Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) | | | | | | | | | | Power Supply Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) | | | | |
| | IEEE 802.3x | Flow control for Full Duplex | | | | | | | | | | | Power Consumption LED 7.7W | | | |
| | IEEE 802.1ad | Stacked VLANs, Q-in-Q | | | | | | | | | | | | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) | | |
| | IEEE 802.1p | LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization | | | | | | | | | | | | | Per RJ-45 port: 10/100 Link/Active (Green) | |
| | IEEE 802.1ab | Link Layer Discovery Protocol (LLDP) | | | | | | | | | | | | | | SFP Fiber Per port: Link/Active (Green) |
| | IEEE 802.3az | EEE (Energy Efficient Ethernet) | | | | | | | | | | | | | | |
| VLAN ID | 4094 IEEE802.1Q VLAN VID | | | | | | | | | | | | | | | |
| Switch Architecture | Back-plane (Switching Fabric): 7.6Gbps | | | | | | | | | | | | | | | |

Specifications

| | |
|---|--|
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |
| Warning Message | System Syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IFS-803GSM) -40 ~ 75°C (IFS-803GSM-E) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 72 x152 mm (D x W x H) |
| Weight | 0.79kg |
| Installation Mounting | DIN Rail mounting or wall mounting |
| Certification | |
| EMC | CE |
| EMI (Electromagnetic Interference) | FCC Part 15 Subpart B Class A,CE EN55022 Class A |

Software Specifications

| | |
|---|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multicast VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group |
| Spanning Tree | Dynamic (IEEE 802.3ad LACP), up to 5 trunk group IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Multiple u-Ring | up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. |
| Loop Protection | Present |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number |
| Bandwidth Control for Ingress | Rate in steps :1 kbps / Mbps / fps / Kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |

| | |
|--|--|
| 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 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 | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 409,312hrs (MIL-HDBK-217) |
| Warranty | 5 years |

| | |
|--|--|
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access Filtering | |
| Web, Telnet / SSH , CLI RS-232 console | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | |
| Redundant firmware in case of upgrade failure | |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | |
| Client Relay Snooping Snooping option 82 Relay option 82 | |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP / SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |
| Others Features | |
| Green Ethernet | |
| Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management : Adjustment LEDs intensity | |
| Cable Diagnostic | |
| Measuring cable OK or broken point distance | |

Application

Figure 1: Application Example

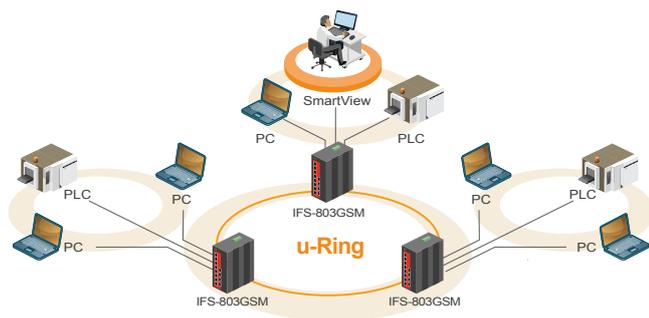


Figure 2: Multiple Rings

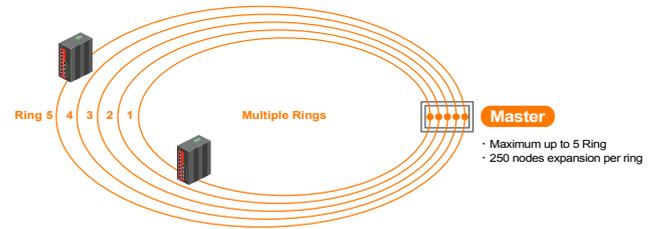
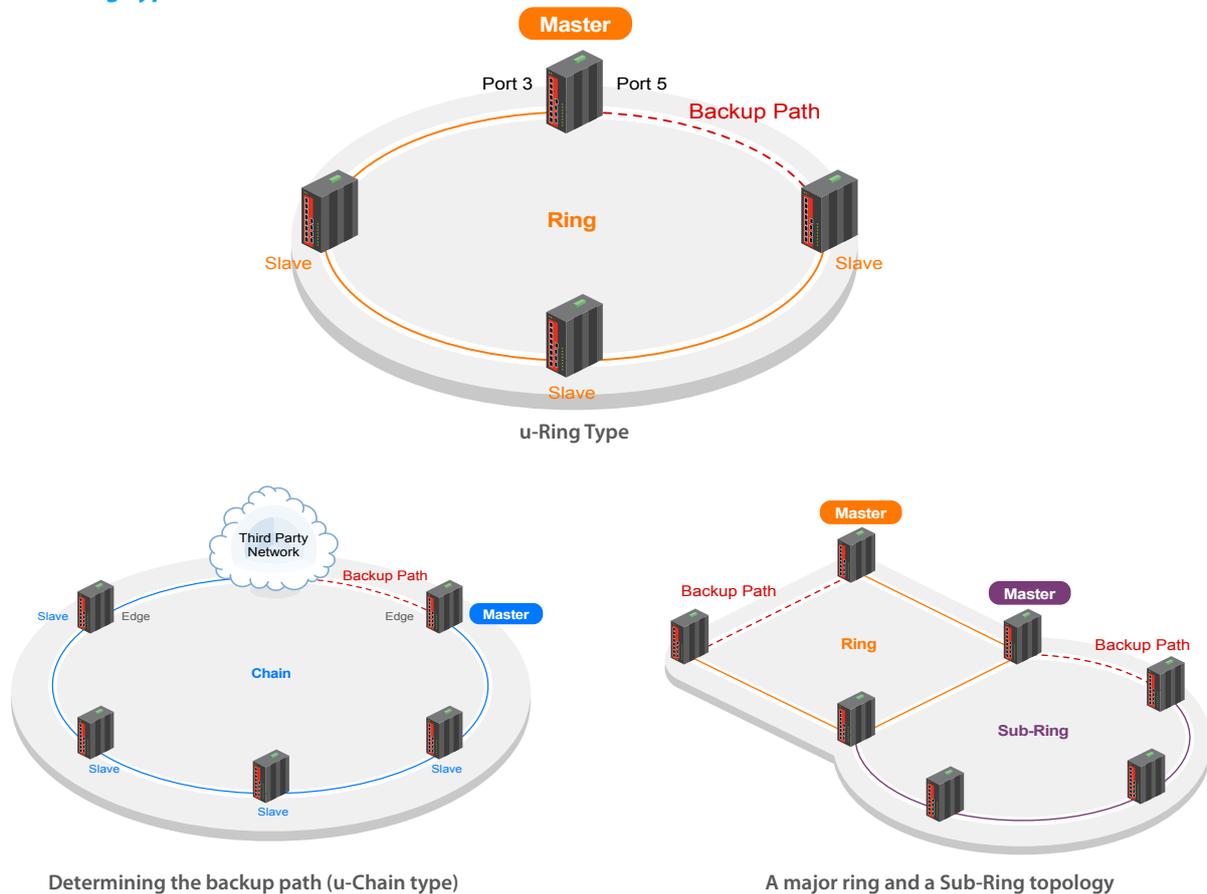


Figure 3: An illustration of u-Ring instances configured in Web interface

u-Ring Configuration Auto-refresh Refresh

| Delete | Instance | Type | Master | East | | West | |
|--------|----------|----------|--------------------------|-------------|--------------------------|-------------|--------------------------|
| | | | | Port | Edge | Port | Edge |
| Delete | 1 | u-Ring | <input type="checkbox"/> | 1 | | 2 | |
| Delete | 2 | u-Ring | <input type="checkbox"/> | 4 | | 3 | |
| Delete | 3 | u-Ring | <input type="checkbox"/> | 10 (Fiber2) | | 11 (Fiber3) | |
| Delete | 4 | Sub-Ring | <input type="checkbox"/> | 6 | | | |
| Delete | 5 | u-Chain | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 9 (Fiber1) | <input type="checkbox"/> |

Figure 4: u-Ring Type

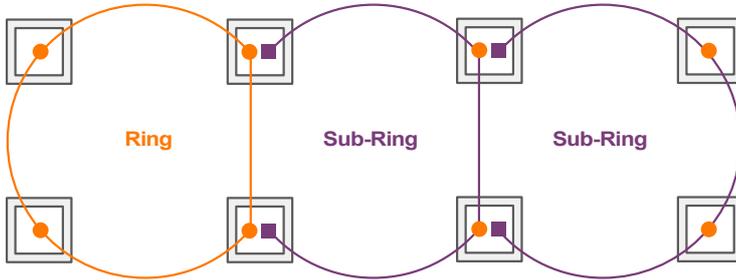


Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

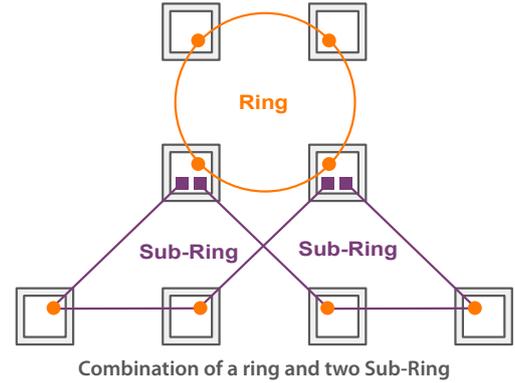
Figure 5: Ring Configuration Example

Ring Configuration Type

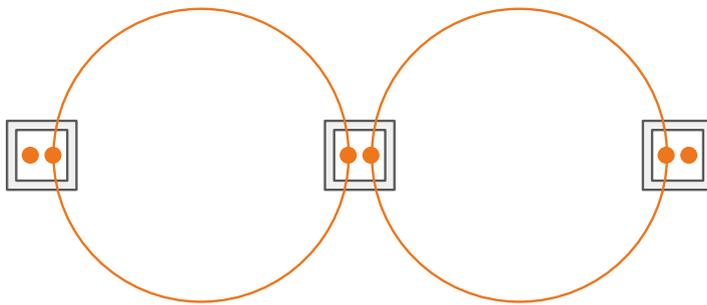
- u-Ring
- Sub-Ring
- ▲ u-Chain



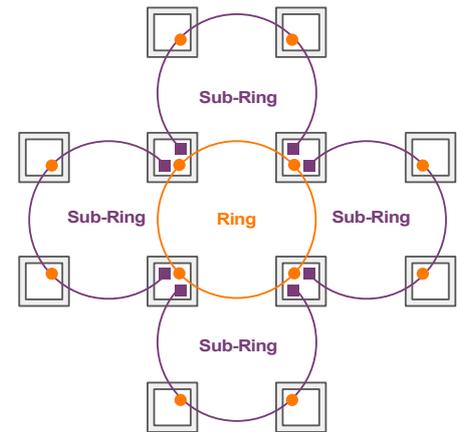
Ring Configuration Type



Combination of a ring and two Sub-Ring

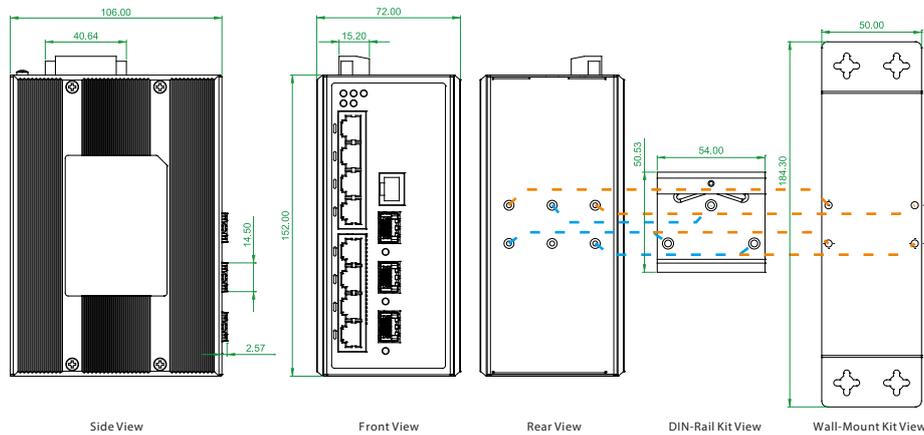


Cable Redundancy



Combination of a ring and four Sub-Ring

Dimensions

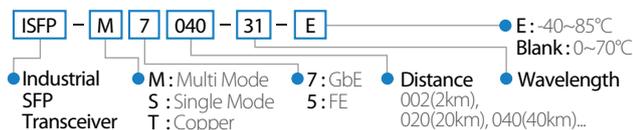


Ordering Information

| Model Name | Description |
|--------------|--|
| IFS-803GSM | 8x 10/100Base-T + 3x 100/1000Base-X SFP slot (11 Port) Managed Switch (-10~60°C) |
| IFS-803GSM-E | 8x 10/100Base-T + 3x 100/1000Base-X SFP slot (11 Port) Managed Switch (-40~75°C) |

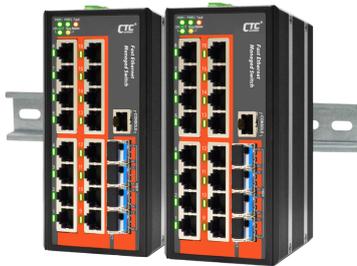
Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |



Example: IFS-803GSM - E

NEW



IFS-1604GSM

16x 10/100Base-TX+ 4x 100/1000Base-X SFP Slot Ethernet Managed Switch

IFS-1604GSM models are managed industrial grade Fast Ethernet switches with 16x 10/100Base-TX ports and 4 SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP and ITU-T G.8032 Ring <50ms recovery time, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

- 16x 10/100Base-TX RJ-45 with 4x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring(EPR) for cabling redundant
- **μ-Ring** for Redundant Ethernet Ring, recovery time<20ms in 250 units
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1Q VLAN, port based VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP/MLD snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware in case of upgrade failure
- DHCP client/Relay/Snooping/Snooping option 82/Relay option 82
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6, SNMP, HTTP, SSH/SSL, NTP/ SNTP, TFTP, QoS, ACL
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System

Specifications

| | |
|----------------------------|--|
| 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 |
| | IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic |
| | IEEE 802.1d STP (Spanning Tree Protocol) |
| | IEEE 802.1w RSTP (Rapid Spanning Tree Protocol) |
| | IEEE 802.1s MSTP (Multiple Spanning Tree Protocol) |
| | ITU-T G.8032 / Y.1344 EPR (Ethernet Protection Ring) |
| | IEEE 802.1Q Virtual LANs (VLAN) |
| | IEEE 802.1X Port based Network Access Control, Authentication |
| | IEEE 802.3ad Link aggregation for parallel links with LACP (Link Aggregation Control Protocol) |
| | IEEE 802.3x Flow control for Full Duplex |
| | IEEE 802.1ad Stacked VLANs, Q-in-Q |
| | IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization |
| | IEEE 802.1ab Link Layer Discovery Protocol (LLDP) |
| | IEEE 802.3az EEE (Energy Efficient Ethernet) |
| VLAN ID | 4096 |
| Switch Architecture | Back-plane : 11.2Gbps |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x for full duplex mode Back pressure for half duplex mode |
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |

| | |
|------------------------------------|---|
| Network Connector | 16x RJ-45 10/100Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 4x 100/1000 Base-X dual speed mode SFP slot, with DDMI |
| Console | RS-232 (RJ-45) |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| Reverse Polarity Protection | Present |
| Overload Current Protection | Present |
| CPU Watch Dog | Present |
| Power Supply | Redundant Dual DC12/24/48VDC (9.6~60VDC) Input power (Removable Terminal Block) |
| LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber Per port: Link/Active (Green) |
| Power Consumption | TBD |
| Warning Message | System syslog, SMTP/ e-mail event message, alarm relay |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -10 ~ 60°C (IFS-1604GSM) -40 ~ 75°C (IFS-1604GSM-E) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 72 x 152 mm (D x W x H) |

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

Specifications

| | |
|------------------------------|--|
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |

Software Specifications

| | |
|--|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4095 ID IEEE 802.1q VLAN, up to 4095 Groups IEEE 802.1ad Q-in-Q Port Based VLAN MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Loop Protection | Present |
| µ-Ring | Easy set for Ethernet protection Ring, Recovery Time <20ms, Maximum 250 Node |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): MAC Access control list (Source/Destination MAC, Ether type, Priority ID/ VLAN ID) QCL: IP extended access control list (Source/Destination IP, Protocol, TCP/UDP port number) |
| Bandwidth Control for Ingress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame Per queue shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Query |
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |

| | |
|---------------------|-----------------------|
| Safety | UL60950-1 (Pending) |
| Rail Traffic | EN 50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | TBD (Above 30 years) |
| Warranty | 5 years |

| | |
|---|--|
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |
| User Name | Local Authentication |
| Password | |
| Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management | |
| Interface Access | Web, Telnet / SSH |
| Filtering | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP /SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| Stateless Auto-Configuration | |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management : Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |

Application

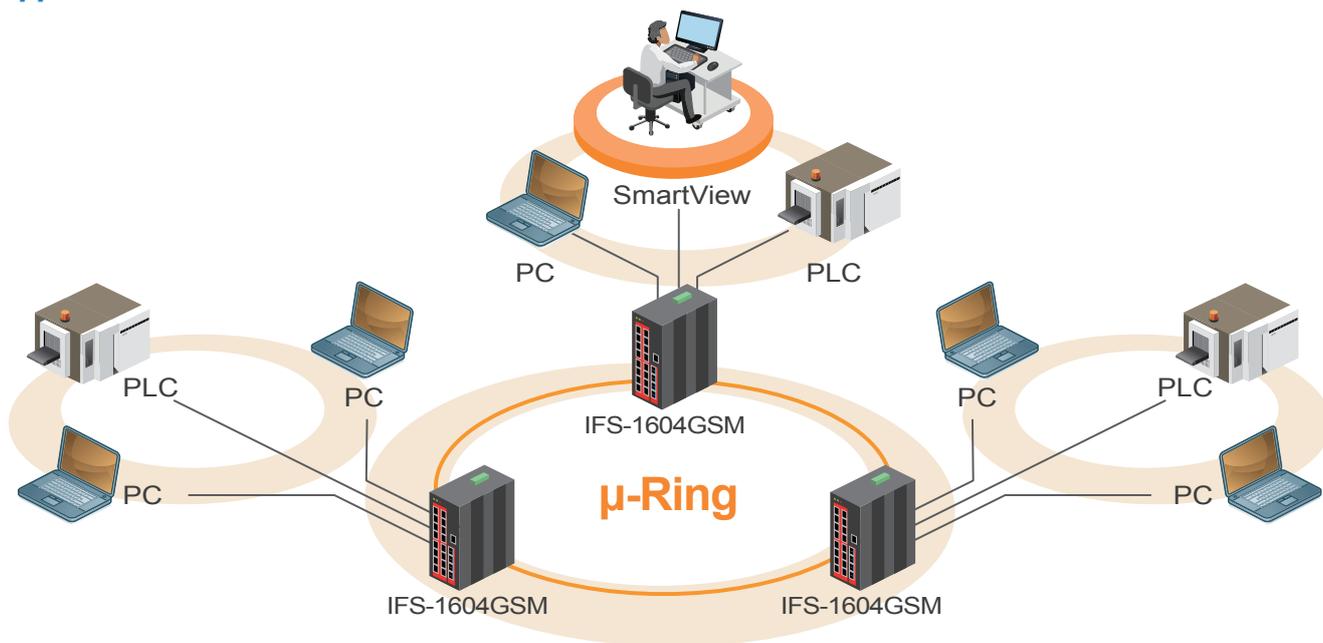
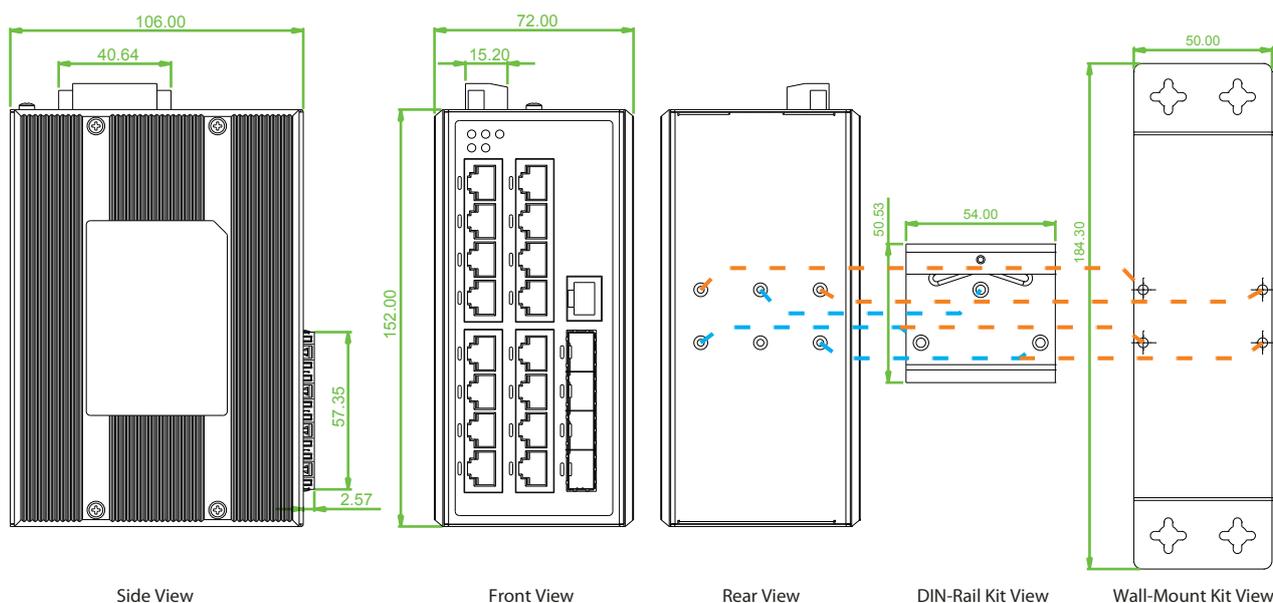


Figure : Topology

Dimensions



Ordering Information

| Model Name | Description |
|---------------|--|
| IFS-1604GSM | 16x 10/100Base-TX + 4x 100/1000Base-X SFP Slot Managed Switch (-10~60°C) |
| IFS-1604GSM-E | 16x 10/100Base-TX + 4x 100/1000Base-X SFP Slot Managed Switch (-40~75°C) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

ISFP - M 7 040 - 3 1 - E

- ISFP:** Industrial SFP Transceiver
- M:** Multi Mode
S: Single Mode
T: Copper
- 7:** GbE
5: FE
- 040:** Distance
002(2km), 020(20km), 040(40km)...
- 3 1:** Wavelength
- E:** -40~85°C
Blank: 0~70°C

Temperature
IFS-1604GSM -
 Example: IFS-1604GSM - E

IFC-Serial

RS-232/422/485 Fiber Converter



IFC-Serial are industrial grade fiber media converters that provides a fiber connection to extend asynchronous RS-232, RS-485 or RS-422 serial transmissions over a distance of up to 2km using multimode fiber or up to 60km using single mode fiber. The duplex fiber provides point-to-point connections. Single fiber simplex connections allow connecting multiple devices in a cascaded or "daisy chain" fashion with a single fiber ring architecture. However, no redundancy is provided and any break can disable the entire ring. The converter is capable of selecting interface modes for connection to RS-232 (3 wire), RS-485 (2 wire, half duplex) or RS-422/485 (4 wire, full duplex). IFC-Serial Series media converters feature an alarm relay contact and two redundant DC power inputs. The IFC-Serial Series reliable industrial design is perfect for keeping your industrial automation applications running smoothly and continuously. The IFC-Serial Series media converters are available in two operating temperature ranges, a standard -10° to 60°C commercial temperature range or an extended -40° to 75°C range.

Features

- Supports dual channel communication, including Triple-Way communication and Two-Way communication
- Extend serial transmission distance up to 2km, 30km, 60km
- Redundant dual power inputs (12 ~ 48VDC)
- Supports half-duplex ring application
- Supports RS-232, RS-422, RS-485(2/4 wire) transmission to fiber connections
- Wide Temperature -40 ~ 75°C (IFC-Serial-E)
- Enhanced serial baudrate up to 1024kbps
- 2.5KV isolation for serial signal
- Supports relay output for power or link failure warning
- Hardened housing with IP30 protection
- Fan-less and DIN-Rail design for harsh industrial environment
- Adjustable pull high/low resistor and terminator for RS-422/485 transmission

Specifications

| | | |
|-----------------------------|---|---|
| Data Flow | Dual Channel Communication | Both of Triple-Way and Two-Way Communication Way (Figure 1) |
| Optical Interface | Connector | SC, ST |
| | Fiber Optical rate | 36.864Mbps |
| | Fiber Port | One fiber |
| | Fiber Type | MM 2km, SM 30km/60km |
| | Wavelength | MM 1310nm, SM 1310, 1550nm |
| | Point to Point Transmission | Half or Full duplex |
| | Ring Transmission | Half duplex |
| Electrical Interface | Serial Port Connector | RS-232(DB9), RS-422/RS-485(5 pin terminal block) RS-485 : 4, 2 wires, RS-422 : 4 wires |
| | RS-485 direction | Automatically detection |
| | Copper Baud rate | 50 up to 1024Kbps |
| | Isolation | 2.5KV for sevic signals |
| | Surge Protection | 8KV ESD for serial signals |
| | Pull High | Selected by 10 position rotary switch |
| | Pull Low | Selected by 10 position rotary switch |
| | 120 ohm terminator | Built-in 120 ohm terminator (Option by Dip switch) |
| | | |
| Environmental | Operating Temperature | -10 ~ 60°C (IFC-Serial) -40 ~ 75°C (IFC-Serial-E) |
| | Storage Temperature | -40 ~ 85°C |
| | Humidity | 5 ~ 95% RH |
| LED Indications | PWR1, PWR2, Alarm, Master, TD, RD, Fiber Link, Ring | |
| Power | Power Input | Redundant Dual Power 12, 24, 48 VDC (9.6 ~ 58VDC) |
| | Power Consumption | 5W |
| | Power Reversal Protection | Yes |
| | Over Current Protection | : Signal Short Together Protected |
| | Terminal Block for Power and Alarm | Terminal Block : V1+, V1-, V2+, V2-, Alarm NC, Alarm COM, Alarm NO |

| | | |
|----------------------|--------------------|---|
| Mechanical | Water & Dust Proof | IP30 Protection |
| | Dimensions | 106 x 38 x 142 mm (D x W x H) |
| | Mounting | DIN-Rail or wall mount |
| | Weight | 0.63kg |
| Certification | Safety | UL60950-1 |
| | EMC | CE, FCC |
| | | EN55022 Class A |
| | | EN61000-6-4 – Emission for industrial environment |
| | EMI | EN61000-6-2 – Immunity for Industrial environment |
| | | EN61000-4-2 ESD Level 3 |
| | EMS | EN61000-4-3 RS Level 3 |
| | | EN61000-4-4 EFT Level 3 |
| | | EN61000-4-5 Surge Level 3 |
| | | EN61000-4-6 CS Level 3 |
| | Free Fall | IEC 60068-2-32 |
| | Vibration | IEC 60068-2-6 |
| | Shock | IEC 60068-2-27 |
| Green | RoHS | |
| MTBF | 797,101 Hrs | |

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

IFC-FDC

RS-232/422/485 Daisy Chain Fiber Converter



The IFC-FDC Series are industrial grade fiber media converters that provide dual fiber connections to extend asynchronous RS-232, RS-485 or RS-422 serial transmissions over a distance of up to 2km using multimode fiber or up to 60km using single mode fiber. The dual fiber inputs allow connecting multiple devices in a cascade or "daisy chain" fashion as well as creating ring architecture for fiber redundancy. The converter is capable of selecting interface modes for connection to RS-232 (3 wire), RS-485 (2 wire, half duplex) or RS-422/485 (4 wire, full duplex). IFC-FDC Series media converters feature a three-way communications plus a second independent RS-232 communication channel. Models also feature an alarm relay contact and two redundant DC power inputs. The IFC-FDC Series reliable industrial design is perfect for keeping your industrial automation applications running smoothly and continuously. The IFC-FDC Series media converters are available in two operating temperature ranges, a standard -10° to 60°C commercial temperature range or an extended -40° to 75°C range (IFC-FDC-E).

Features

- Supports dual channel communication, including Triple-Way communication, and Two-Way communication
- Extend serial transmission distance up to 2km, 30km, 60km
- Supports fiber daisy chain or ring connections
- Redundant dual power inputs (12~48VDC)
- Supports dual fiber link redundancy
- Supports RS-232, RS-422, RS-485(2/4 wire) transmission to dual fiber connections
- Enhanced serial baudrate up to 1024kbps
- 2.5KV isolation for serial signal
- Supports relay output for power or link failure warning
- Hardened housing with IP30 protection
- Fan-less and DIN-Rail design for harsh industrial environment
- Adjustable pull high/low resistor and terminator for RS-422/485 transmission

Specifications

| | | | |
|-----------------------------|--|---|--|
| Data Flow | Dual Channel Communication | Both of Triple-Way and Two-Way Communication Way (Figure 1) | |
| | Optical Interface | | |
| | Connector | SC, ST | |
| | Fiber Optical rate | 36.864Mbps | |
| | Fiber Port | Two fiber ports | |
| | Fiber Type | MM 2km, SM 30km/60km | |
| | Wavelength | MM 1310nm, SM 1310, 1550nm | |
| | Point to Point Transmission | Half or Full duplex | |
| | Ring Transmission | Half / Full duplex, self-healing operation | |
| Electrical Interface | Serial Port Connector | RS-232(DB9), RS-422/RS-485(5 pin terminal block) RS-485 : 4, 2 wires, RS-422 : 4 wires | |
| | RS-485 direction | Automatically detection | |
| | Copper Baud rate | 50 up to 1024Kbps | |
| | Serial Isolation | 2.5KV for serial signals | |
| | Surge Protection | 8KV ESD for serial signals | |
| | Pull High | Selected by 10 position rotary switch | |
| | Pull Low | Selected by 10 position rotary switch | |
| | 120 ohm terminator | Built-in 120 ohm terminator (Option by Dip Switch) | |
| | Environmental | Operating Temperature | -10 ~ 60°C (IFC-FDC) -40 ~ 75°C (IFC-FDC-E) |
| | | Storage Temperature | -40 ~ 85°C |
| Humidity | | 5 ~ 95% RH | |
| LED Indications | PWR1, PWR2, Alarm, Master, TD, RD, Fiber Link, Fiber2 Link, Ring | | |
| Power | Power Input | Redundant Dual Power 12, 24, 48 VDC (9.6 ~ 58VDC) | |
| | Power Consumption | 6W | |
| | Power Reversal Protection | Yes | |
| | Over Current Protection | Signal Short Together Protected | |
| | Terminal Block for Power and Alarm | Terminal Block : V1+, V1-, V2+, V2-, Alarm NC, Alarm COM, Alarm NO | |

| | | | |
|----------------------|--------------------|------------------------------|-------------------------------------|
| Mechanical | Water & Dust Proof | IP30 Protection | |
| | Dimensions | 106 x 38 x 142mm (D x W x H) | |
| | Mounting | DIN-Rail, wall mount | |
| | Weight | 0.64kg | |
| Certification | Safety | UL60950-1 | |
| | EMC | CE, FCC | |
| | | EN55022 Class A | |
| | EMI | EN61000-6-4 | Emission for industrial environment |
| | | EN61000-6-2 | Immunity for Industrial environment |
| | EMS | EN61000-4-2 | ESD Level 3 |
| | | EN61000-4-3 | RS Level 3 |
| | | EN61000-4-4 | EFT Level 3 |
| | | EN61000-4-5 | Surge Level 3 |
| | | EN61000-4-6 | CS Level 3 |
| | Free Fall | IEC 60068-2-32 | |
| | Vibration | IEC 60068-2-6 | |
| | Shock | IEC 60068-2-27 | |
| Green | RoHS | | |
| MTBF | 687,418 Hrs | | |

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

Block Diagram

Channel 1 : Triple Way
Channel 2 : Two Way

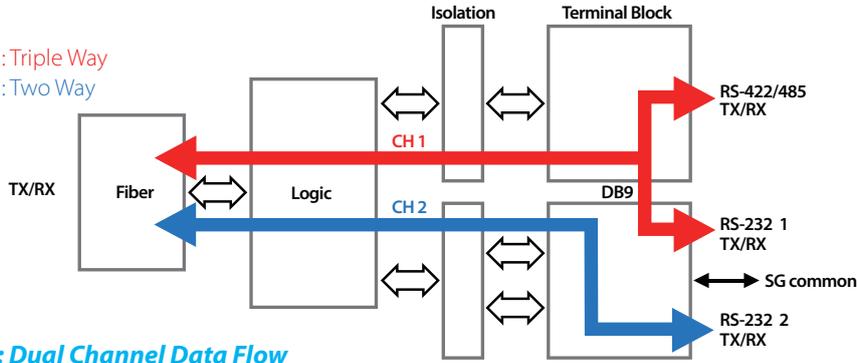


Figure 1 : Dual Channel Data Flow

Application



Figure 2 : Dual Fiber Auto Recovery

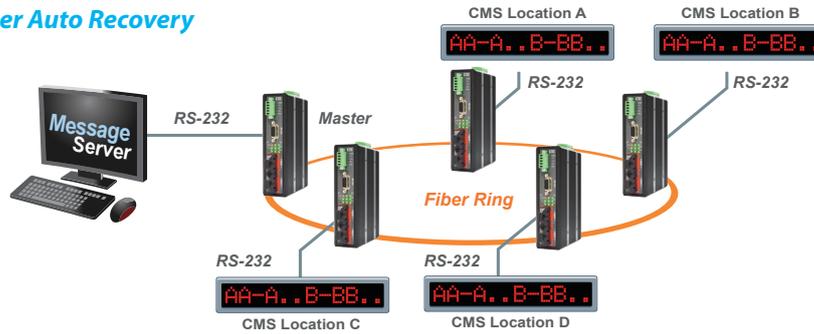
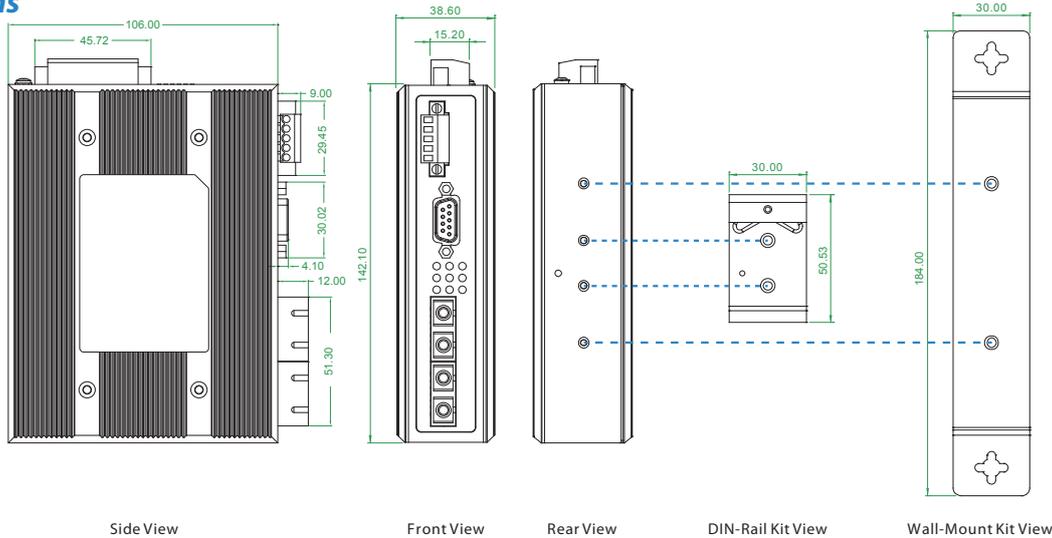


Figure 3 : Fiber Ring for RS-232 Data Broadcasting



Figure 4 : RS-422/485 Fiber Daisy Chain

Dimensions



Ordering Information

| Model Name | Description |
|----------------|---|
| IFC-FDC | RS-232/422/485 serial to dual fiber media converter; Temperature Range : -10 ~ 60°C |
| IFC-FDC-E | RS-232/422/485 serial to dual fiber media converter; Temperature Range : -40 ~ 75°C |
| Connector Type | Connectivity Distance |
| SC, ST | 002: 2km 030: 30km 060: 60km |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |

Temperature Connector Connectivity
Type Distance
Example: IFC - FDC - E - SC002

IMC-1000

10/100/1000Base-T to 100/1000Base-SX/LX
Fiber Converter

IMC-1000S

10/100/1000Base-T to 100/1000Base-X
SFP Slot Fiber Converter



IMC-1000(S) is a family of Gigabit Ethernet non-managed media converters that support conversion between electrical 10/100/1000Base-T and optical 100/1000Base-X Ethernet. Simple DIP switch settings allow configuring the UTP port for auto-negotiation or for forced 10/100/1000 speed and half/full duplex as well as for enabling LFPT (Link Fault Pass Through), Ethernet flow control(802.3x) and selecting Switch Mode (store & forward) or Converter Mode (Jumbo frame Pass-through). Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

Features

- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)
- IP30 rugged metal housing
- Wide operating temperature -20 ~ 75°C (IMC-1000-E, IMC-1000S-E)
- UL60950-1, CE, FCC, Railway traffic EN50121-4 certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Store-and-Forward mode and Pass through mode (set by DIP SW)
- Conversion between 10/100/1000Base-T and 100/1000Base-X Fiber cable interface
- Provide a DIP-Switch to set functions

Specifications

| | |
|---------------------------------------|---|
| Standard | IEEE802.3 10Base-T IEEE802.3u 100Base-TX, 100Base-FX IEEE802.3ab 1000Base-T Gbit/s Ethernet over twisted pair IEEE802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic IEEE802.3x Flow Control |
| RJ45 Ports | 10/100/1000Base-TX |
| Fiber Ports | 1000Base SX/LX,100Base-FX SC (IMC-1000, IMC-1000-E) SFP Slot (IMC-1000S, IMC-1000S-E) |
| Data Process Architecture | Store and Forward mode or Pass through mode set by DIP SW |
| Jumbo Frame | 9K bytes |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: (IMC-1000, IMC-1000-E) 500M (Multi-mode SX) 20KM (Single-mode) 40KM (Single-mode) SFP (IMC-1000S, IMC-1000S-E), Distance depend on Fiber Transceiver |
| Link Fault Pass Through (LFPT) | TX-Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down |
| DIP Switch | Off: Alarm For Power Enable On: Alarm For Power Disable Off: Alarm For Port Enable On: Alarm For Port Disable Off: LFP Disable On: LFP Enable Off: Switch Mode On: Converter Mode Off: 1000Base-X On: 100Base-FX |
| Connector | Fiber: SC (Multi-mode, 500M), SC (Single-mode, 20KM, 40KM) (IMC-1000, IMC-1000-E) SFP Slot (IMC-1000S, IMC-1000S-E) RJ-45 Socket: CAT 5e Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Supports |
| LED | Per Unit: Power 1 (Green), Power 2 (Green), Fault (Amber) LNK/ACT for Fiber(Green): ON : Connected to network/ OFF : Not connected to network/ BLK : Receive /Transmit Data SFP Fiber speed: Yellow : 1000Base-X Green : 100Base-FX |

| | |
|------------------------------------|--|
| LED | RJ-45 port: Speed: 10 (OFF), 100 (Green), 1000 (Yellow) LNK/ACT for RJ45(Green): ON: Connected to network/ OFF: Not connected to network/ BLK: Networking is active |
| Reserve Polarity Protection | Present |
| Overload Current Protection | Present |
| Power Supply | 12/24/48VDC (9.6~60VDC) , Redundant power with polarity reverse protect function and removable terminal block Provide DC Power JACK adapter cable for external Power adapter |
| Power Consumption | 4.2W |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 Redundant power, Alarm relay contact |
| Operating Humidity | 5% ~ 95% (Non-condensing) |
| Operating Temperature | -10 ~ 60°C (IMC-1000, IMC-1000S) -20 ~ 75°C (IMC-1000-E, IMC-1000S-E) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 38 x 142 mm (D x W x H) |
| Weight | 630g (IMC-1000, IMC-1000-E) 620g (IMC-1000S, IMC-1000S-E) |
| Installation | DIN Rail or wall mounting |
| EMI | FCC Part 15 Subpart B Class A, EN 55022 Class A EN61000-6-4 – Emission for industrial environment |
| EMS | EN61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) |
| Safety | UL60950-1 |
| Railway Traffic | EN 50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | 563,813Hrs (IMC-1000, IMC-1000-E) 578,980Hrs (IMC-1000S, IMC-1000S-E) |
| Warranty | 5 years |

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

Application & Topology

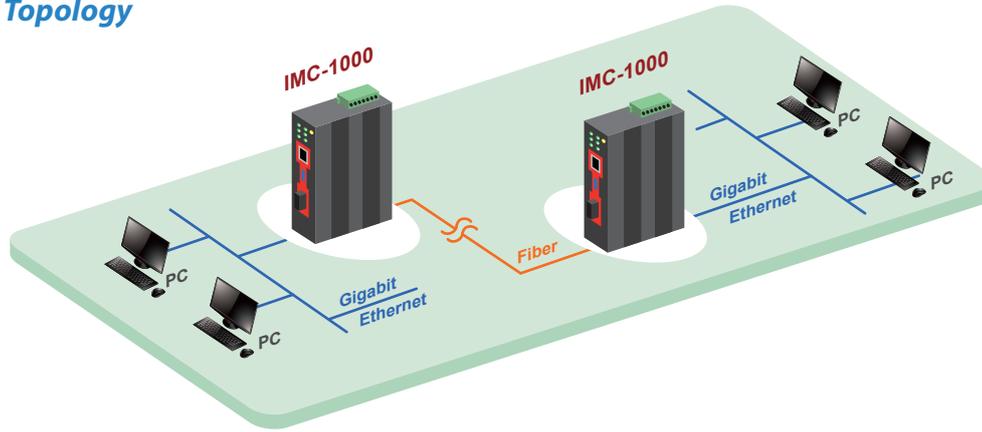
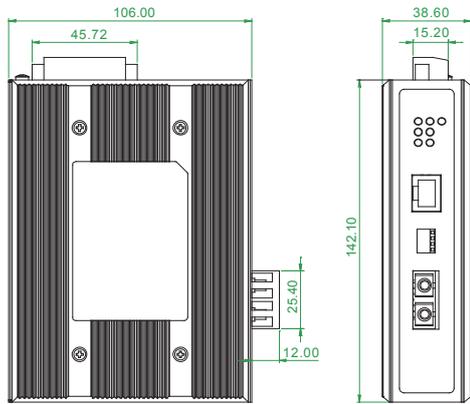


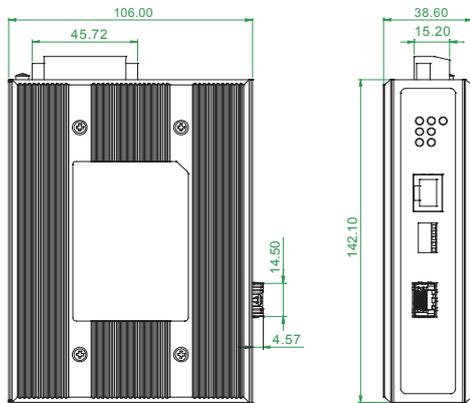
Figure : IMC-1000 Media Converter Transmission

Dimensions

IMC-1000/1000-E

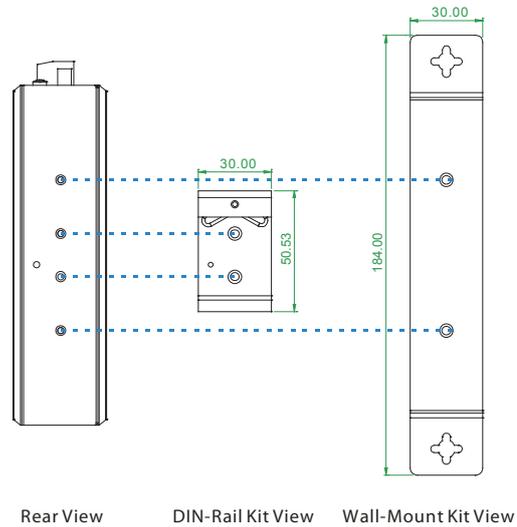


IMC-1000S/1000S-E



Side View

Front View



Rear View

DIN-Rail Kit View

Wall-Mount Kit View

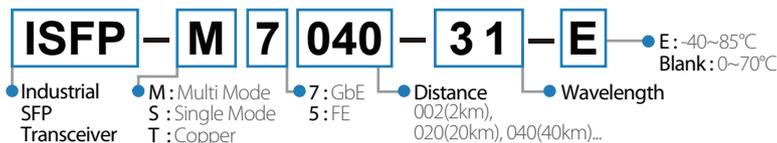
Ordering Information

| Model Name | Description |
|-------------|--|
| IMC-1000 | 10/100/1000Base-T to 100/1000Base FX/SX/LX Fiber Converter Temperature Range : -10 ~ 60°C |
| IMC-1000-E | 10/100/1000Base-T to 100/1000Base FX/SX/LX Fiber Converter Temperature Range : -20 ~ 75°C |
| IMC-1000S | 10/100/1000Base-T to 100/1000Base FX/SX/LX SFP Slot Fiber Converter Temperature Range : -10 ~ 60°C |
| IMC-1000S-E | 10/100/1000Base-T to 100/1000Base FX/SX/LX SFP Slot Fiber Converter Temperature Range : -20 ~ 75°C |

| Connector Type | Connectivity Distance |
|------------------------------------|---|
| SC (IMC-1000 & IMC-1000-E only) | 001:500M (M/M) 002 : 2km (M/M) 020:20km (S/M) 040:40km (S/M) 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm)type |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |



Temperature Connector Type Connectivity Distance
IMC - 1000 - [] - [] [] [] [] []
 Example: IMC - 1000 - E - SC002

IMC-100

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



8 Ethernet fiber converter

IMC-100 is a family of Fast Ethernet non-managed media converters that support conversion between electrical 10/100Base-TX and optical 100Base-FX Ethernet. Simple DIP switch settings allow configuring the UTP port for auto-negotiation or for forced 10/100 speed and half/full duplex as well as for enabling LFPT (Link Fault Pass Through), Ethernet flow control(802.3x) and selecting Switch Mode (store & forward) or Converter Mode (Jumbo frame Pass-through). Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

Features

- Redundant dual DC input power 12/24/48VDC (9.6 ~ 58VDC)
- IP30 rugged metal housing
- Wide operating temperature -40 ~ 75°C (IMC-100-E)
- UL60950-1, CE, FCC, Rail traffic EN50121-4 certification
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Store-and-Forward mode and Pass Through mode (set by DIP SW)
- Conversion between 10/100Base-TX and 100Base-FX cable interface
- Provide a 6 Pole DIP-Switch to set functions

Specifications

| | |
|---------------------------------------|---|
| Standard | IEEE 802.3 10Base-T IEEE 802.3u 100Base-TX/100Base-FX IEEE 802.3x Flow Control |
| RJ45 Ports | 10/100Base-TX |
| Fiber Ports | 100Base-FX (SC/ST connectors) |
| Switch Architecture | Store and Forward in Switch mode Supports 1024 MAC addresses in Switch mode |
| Ethernet Packet length | 2046Byte (Max) in Switch mode |
| Jumbo Frame | 9K bytes in Pass through (Converter mode) |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: 2KM (Multi-mode) 30KM (Single-mode) 50KM (Single-mode) |
| Link Fault Pass Through (LFPT) | TX- Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down |
| DIP Switch | TP Auto Negotiation OFF: Auto Mode, ON: Force Mode Force TP Speed OFF: 100 Mbps, ON: 10 Mbps Force TP Duplex OFF: Full Duplex, ON: Half Duplex DIP Switch: ON: Enables LFPT (Link Fault Pass through) OFF: Disables LFPT (Link Fault Pass through) DIP Switch: ON: Flow Control Enable OFF: Flow Control Disable DIP Switch: OFF: Switching mode ON: Pass through Converter mode |
| Connector | Fiber: SC (Multi-mode, 2km), SC (Single-mode, 30km, 50KM) ST (Multi-mode, 2km), ST (Single-mode, 30km, 50KM) RJ-45 Socket: CAT-3/5 (10/100Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support |
| LED | PWR 1 (Green): ON: Power1 active/ OFF: Power1 is inactive PWR 2 (Green): ON: Power2 active/ OFF: Power2 is inactive Fault (Red): ON: Fiber or TP has failed OFF: TP are functional Fiber (Green): ON : Connected to network OFF: Not connected to network/ BLK: Receive/Transmit Data 100 (Amber): ON: 100Mbps/ OFF: 10Mbps LAN (Green): ON : Connected to network OFF: Not connected to network/ BLK: Networking is active |

| | |
|------------------------------------|---|
| Reserve Polarity Protection | Present |
| Overload Current Protection | Present |
| Power Supply | 12/24/48VDC(9.6~58VDC), Redundant power with polarity reverse protect function and removable terminal block Provide DC Power JACK adapter cable for external power adapter |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact |
| Power Consumption | 2.9 W |
| Operating Humidity | 5% ~ 95% (Non-condensing) |
| Operating Temperature | -10 ~ 60°C (IMC-100) -40 ~ 75°C (IMC-100-E) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 38 x 142mm (D X W X H) |
| Weight | 0.62kg |
| Installation | DIN Rail mounting and Wall Mounting |
| EMI | FCC Part 15 Subpart B Class A EN 55022 Class A EN 61000-6-4 – Emission for industrial environment |
| EMS | EN 61000-6-2 – Immunity for Industrial environment EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) Level 3, Criteria A |
| Safety | UL60950-1 |
| Railway Traffic | EN 50121-4 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 (Operating, Packing) |
| MTBF | 852,727 Hrs |
| Warranty | 5 years |

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

IMC-1000M

10/100/1000Base-T to 100/1000Base-SX/LX
Managed Fiber Converter

IMC-1000MS

10/100/1000Base-T to 100/1000Base-X
SFP Managed Fiber Converter



IMC-1000M(S) models are managed Gigabit media converters that support conversion between electrical 10/100/1000Base-T and optical 100/1000Base-X Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The converters are Web, SNMP or In-Band managed with an easy to use user interface for Operation, Administration, Maintenance & Provisioning, including bandwidth control, speed, VLAN, Diagnostic, storm filter or converter configurations. The network administrator can manage IMC-1000M(S) via standard SNMP manager such as SmartView. It also provide loop-back test and dying gasp, and can be monitored from a centrally located OAM-enabled FRM220-1000MS converter via remote in-band management.

Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X Fiber cable interface
- Supports Dual Rate (100/1000) SFP for selectable Fast or Gigabit speed on fiber
- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)
- IP30 rugged metal housing
- Wide operating temperature -20~75°C (IMC-1000M(S)-E)
- UL60950-1, CE, FCC, RailWay traffic EN50121-4 certification
- Industrial grade EMS, EMI EN61000-6-2, EN61000-6-4 certification
- MIB counters
- Auto Laser Shutdown (ALS)
- CTC SmartView Management System support
- Web management
- SNMP management
- Supports 16 IEEE 802.1Q Tag VLAN Group
- SNMP alarm trap for power loss and port link down
- Supports in-band management from FRM220 Chassis With FRM220-1000MS
- Remote loop-back test
- Dying gasp (remote power failure detection)

Specifications

| | | | |
|--------------------------|---|------------------------------------|---|
| Standard | IEEE802.3 10Base-T IEEE802.3u 100Base-TX , 100Base-FX IEEE802.3ab 1000Base-TX Gbit/s Ethernet over twisted pair IEEE802.3z 1000Base-X Gbit/s Ethernet over Fiber-optic IEEE802.3x Flow Control and Back pressure IEEE802.3ah OAM management | LED | Per Unit : Power 1 (Green), Power 2 (Green), Fault (Amber) Fiber LNK/ACT (Green): ON: Connected to network OFF: Not connected to network BLK: Receive /Transmit Data Fiber speed : Yellow : 1000Base-X Green : 100Base-X |
| Fiber Ports | 100Base-X or 1000Base-X set by Web Supports Auto Laser Shutdown (ALS) | RJ-45 port: | _Speed: 10 (OFF), 100 (Green), 1000 (Yellow) |
| RJ45 Ports | 10/100/1000Base-T | LNK/ACT for RJ45(Green): | ON : Connected to network/ OFF: Not connected to network/ BLK: Networking is active |
| CPU watch dog | Present | Reverse Polarity Protection | Present for power Input |
| Push Button | Reset, Load default setting | Overload Current Protection | Present |
| Jumbo Frame | 9K bytes | Power Supply | 12/24/48VDC (9.6~60VDC) , Redundant power with polarity reverse protect function and removable terminal block Provide DC Power JACK adapter cable for external power adapter |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: 500M (Multi-mode SX) 20KM (Single-mode) 40KM (Single-mode) (IMC-1000M, IMC-1000M-E) SFP, Distance depend on plug-in Fiber Transceiver (IMC-1000MS, IMC-1000MS-E) | Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC Relay alarm output for power fail or port link down |
| Link Lose Forward | TX-Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down | Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 7 Pin |
| Connector | Fiber: SC (Multi-mode, 500M), SC (Single-mode, 20KM, 40KM) (IMC-1000M, IMC-1000M-E) SFP Slot (IMC-1000MS, IMC-1000MS-E) RJ-45: CAT 5e (10/100/1000Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Supports | Power Consumption | 4.8 W |
| | | Operating Humidity | 5% ~ 95% (Non-condensing) |
| | | Operating Temperatur | -10° ~ 60°C (IMC-1000M, IMC-1000MS) -20 ~ 75°C (IMC-1000M-E, IMC-1000MS-E) |
| | | Storage Temperature | -40 ~ 85°C |
| | | Housing | Rugged Metal, IP30 Protection |
| | | Dimensions | 106 x 38.6 x 142 mm (D x W x H) |
| | | Weight | 0.63kg (IMC-1000M, IMC-1000M-E) 0.62kg (IMC-1000MS, IMC-1000MS-E) |
| | | Installation | DIN Rail mounting or wall mounting |

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

Specifications

| | | | |
|------------|---|------------------------|--|
| EMI | FCC Part 15 Subpart B Class A, CE EN 55022 Class A | Safety | UL60950-1 |
| EMS | EN 61000-6-2 – Immunity for Industrial environment | Railway Traffic | EN 50121-4 |
| | EN61000-4-2 (ESD) Level 3, Criteria B | Shock | IEC 60068-2-27 |
| | EN61000-4-3 (RS) Level 3, Criteria A | Freefall | IEC 60068-2-32 |
| | EN61000-4-4 (EFT) Level 3, Criteria A | Vibration | IEC 60068-2-6 |
| | EN61000-4-5 (Surge) Level 3, Criteria B | MTBF | 544,905 hrs (IMC-1000MS, IMC-1000MS-E) (MIL-HDBK-217) 559,059 hrs (IMC-1000MS, IMC-1000MS-E) (MIL-HDBK-217) |
| | EN61000-4-6 (CS) Level 3, Criteria A | Warranty | 5 years |
| | EN61000-4-8 (Magnetic Field) Field strength: 300A/m, Criteria A | | |

Software Specification

Stand-alone or Web Mode

| | |
|---------------------------------|--|
| Management | Ingress/Egress bandwidth control with 64K granularity Web management, Firmware upgrade via Web Supports SNMP, MIB for management Supports DHCP client for automatic IP configuration Supports 802.1Q tag VLAN, 16 Tag VLAN group, MIB counters display |
| Configuration | IP configuration, password setting, converter configuration, port configuration, MIB counter, SNMP configuration, VLAN group configuration, alarm configuration |
| Diagnostic & Monitor | Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter SNMP alarm trap for power loss and port link Up/Down |

In-Band Remote mode

| | |
|---------------------------------|--|
| Management | Supports in-band management from FRM220 Chassis With FRM220-1000MS card Ingress/Egress bandwidth control with 64K granularity |
| Configuration | IP configuration, converter configuration, port configuration, MIB counter, VLAN group configuration, alarm configuration |
| Diagnostic & Monitor | Remote loop-back test Dying gasp (remote power failure detection) Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter |

Application

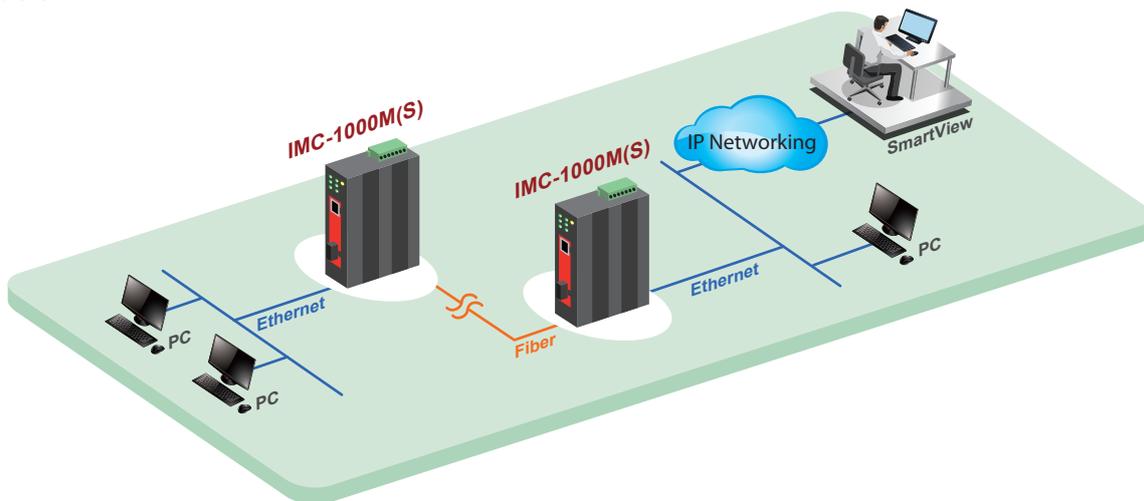


Figure : IMC-1000(S) Application in Stand-alone SNMP management by CTC SmartView

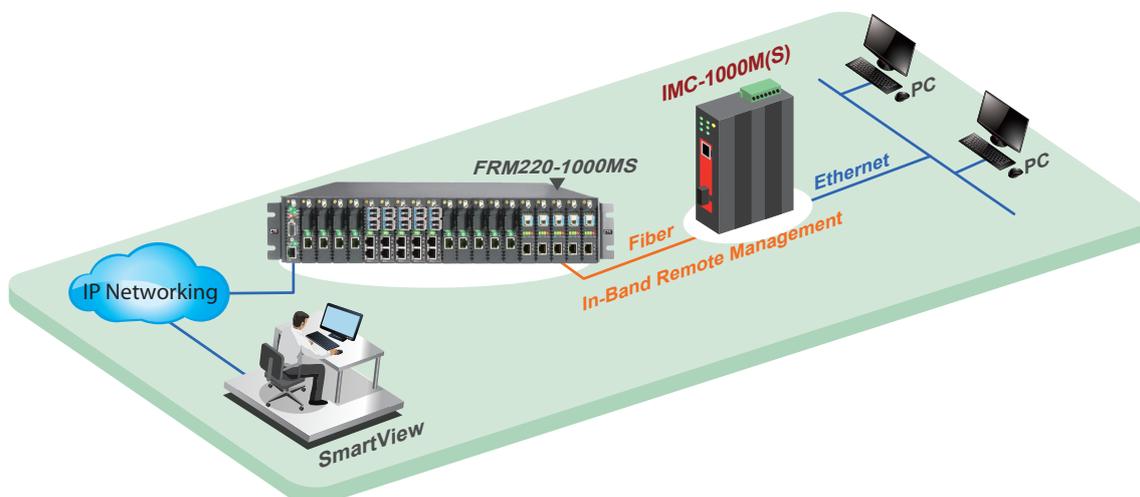


Figure : IMC-1000(S) Application in Remote, In-Band management

Application

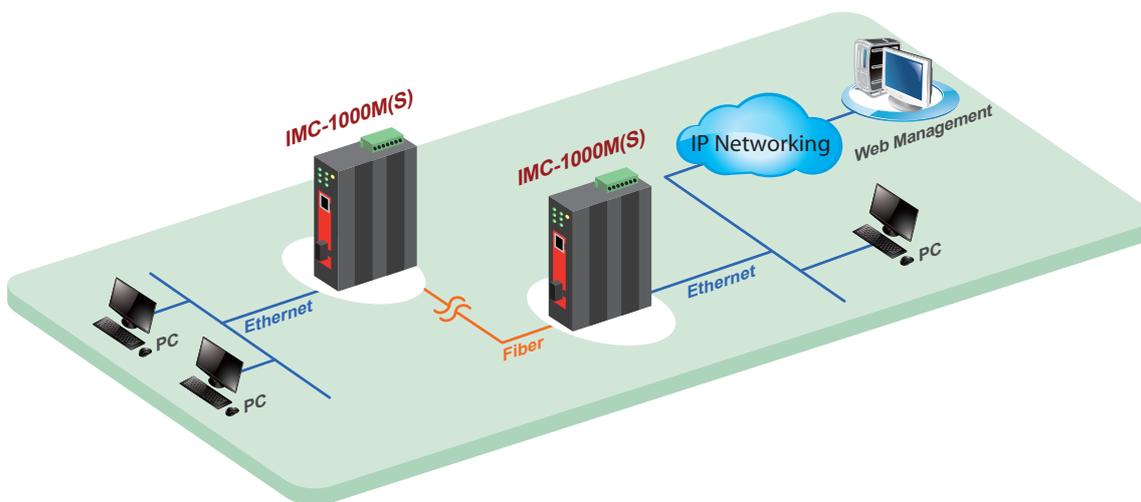
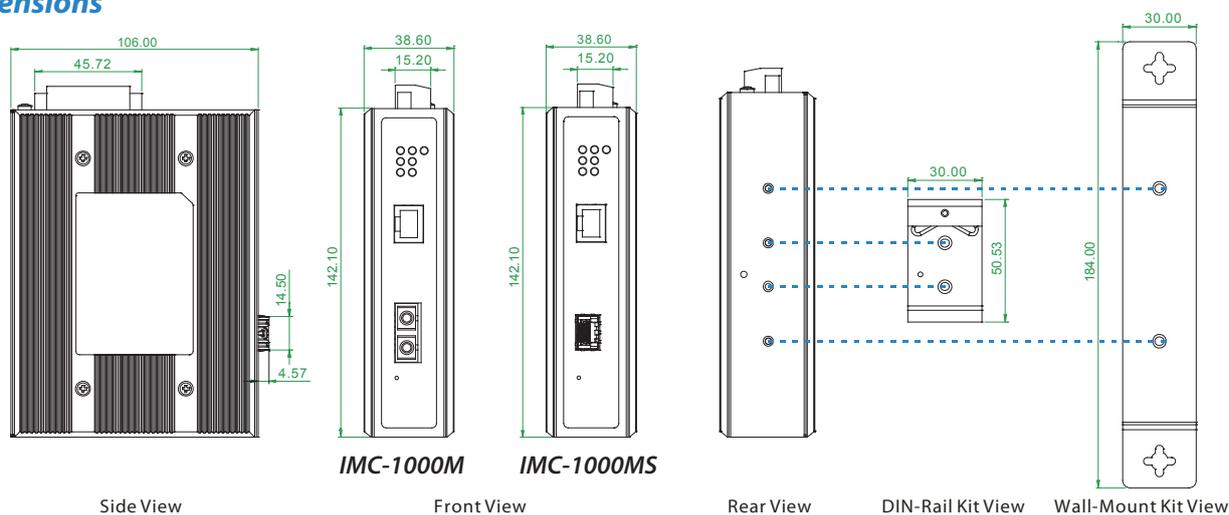


Figure : IMC-1000M(S), Application in Web Management

Dimensions



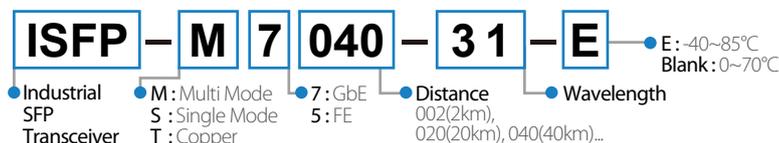
Ordering Information

| Model Name | Description |
|--------------|---|
| IMC-1000M | Industrial Managed 10/100/1000Base-T to 1000Base-SX/LX/ FX Fiber Converter (-10 ~ 60°C) |
| IMC-1000M-E | Industrial Managed 10/100/1000Base-T to 1000Base-SX/LX/ FX Fiber Converter (-20 ~ 75°C) |
| IMC-1000MS | Industrial Managed 10/100/1000Base-T to 1000Base-X SFP Fiber Converter (-10 ~ 60°C) |
| IMC-1000MS-E | Industrial Managed 10/100/1000Base-T to 1000Base-X SFP Fiber Converter (-20 ~ 75°C) |

| Connector Type | Connectivity Distance |
|-------------------------------|---|
| SC | 001:500M (M/M) 002 : 2km (M/M) 020:20km (S/M) 040:40km (S/M) |
| (IMC-1000M, IMC-1000M-E only) | 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |



Temperature Connector Type Connectivity Distance

IMC - 1000M - [] - [] [] [] [] []

Example: IMC - 1000M - E - SC002

IMC-100M

10/100Base-TX to 100Base-FX Managed Fiber Converter



IMC-100M is a family of managed Fast Ethernet media converters that support conversion between electrical 10/100Base-TX and optical 100Base-FX Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these converters are designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. The converter is Web, SNMP or In-Band managed with an easy to use user interface for Operation, Administration, Maintenance & Provisioning, including bandwidth control, speed, and VLAN, Diagnostic, storm filter or converter configurations. It also provide loop-back test and dying gasp, and can be monitored from a centrally located OAM-enabled FRM220-1000MS converter via remote in-band management.

Features

- Conversion between 10/100Base-TX and 100Base-FX Fiber cable interface
- Redundant dual DC input power 12/24/48VDC (9.6 ~ 60VDC)
- IP30 rugged metal housing
- Wide operating temperature -20~75°C
- UL60950-1, CE, FCC, Railway traffic EN50121-4 certification
- Industry grade EMS, EMI EN61000-6-2, EN61000-6-4 certification
- Supports jumbo frame 9K bytes packet
- Ingress/Egress bandwidth control
- MIB counters
- Auto Laser Shutdown (ALS)
- CTC SmartView Management System support
- Web management
- SNMP management
- Supports 16 IEEE 802.1Q Tag VLAN Group
- SNMP alarm trap for power loss and port link down
- Supports in-band management from FRM220 Chassis With FRM220-1000MS
- Remote loop back test
- Dying gasp (remote power failure detection)

Specifications

| | |
|------------------------------------|--|
| Standard | IEEE802.3 10Base-T IEEE802.3u 100Base-TX, 100Base-FX IEEE802.3x Flow Control and Back pressure IEEE802.1q Tag VLAN |
| Fiber Ports | 100Base-FX Supports Auto laser shutdown (ALS) |
| RJ45 Ports | 10/100Base-TX |
| Push Button | Reset, Load default setting |
| Jumbo Frame | 9K bytes |
| Fiber Parameters | Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um Wavelength: 1310nm (Multi-mode/Single-mode) Available distance: 2 KM (Multi-mode) 30KM (Single-mode) 50KM (Single-mode) |
| Link Lose Forward | TX-Fiber: If TX port link down, the media converter will force Fiber port to link down Fiber-TX: If Fiber port link down, the media converter will force TX port to link down |
| Connector | Fiber: SC (Multi-mode, 2KM), SC (Single-mode, 30KM, 50KM) RJ-45: CAT 5e (10/100Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Supports |
| LED | Per Unit : Power 1 (Green), Power 2 (Green), Fault (Amber) Fiber LNK/ACT (Green): ON: Connected to network OFF: Not connected to network BLK: Receive /Transmit Data RJ-45 port: Speed: 10 (OFF), 100 (Green) LNK/ACT for RJ45(Green): ON : Connected to network/ OFF: Not connected to network/ BLK: Networking is active |
| Reverse Polarity Protection | Present for Power Input |
| Overload Current Protection | Present |
| Power Supply | 12/24/48VDC (9.6~60VDC), Redundant power with polarity reverse protect function and removable terminal block |

| | |
|--|---|
| Power Suppl | Provide DC Power JACK adapter cable for external power adapter |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC Relay Alarm Output for Power Fail or Port link down |
| Power Consumption | 4.8W |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 7 Pin |
| Operating Humidity | 5% ~ 95% (Non-condensing) |
| Operating Temperatur | -10 ~ 60°C (IMC-100M) -20 ~ 75°C (IMC-100M-E) |
| Storage Temperature | -40 ~ 85°C |
| Housing | Rugged Metal, IP30 Protection |
| Dimensions | 106 x 38.6 x 142 mm (D x W x H) |
| Weight | 630g |
| Installation | DIN Rail mounting or wall mounting |
| EMC | CE |
| EMI | FCC, FCC Part 15 Subpart B Class A, CE EN 55022 Class A |
| Railway Traffic | EN 50121-4 |
| Immunity for Heavy Industrial Environment | EN61000-6-2 |
| Emission for Heavy Industrial Environment | EN61000-6-4 |
| EMS 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 EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (Magnetic Field) |
| Safety | UL60950-1 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| Warranty | 5 years |
| MTBF | 778,604 hrs (MIL-HDBK-217) |

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

Software Specification

Stand-alone or Web Mode

| | |
|---------------------------------|--|
| Management | Ingress/Egress bandwidth control with 64K granularity Web management, Firmware upgrade via Web Supports SNMP, MIB for management Supports DHCP client for automatic IP configuration Supports 802.1Q tag VLAN, 16 Tag VLAN group, MIB counters display |
| Configuration | IP configuration, password setting, converter configuration, port configuration, MIB counter, SNMP configuration, VLAN group configuration, alarm configuration |
| Diagnostic & Monitor | Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter SNMP alarm trap for power loss and port link Up/Down |

In-Band Remote mode

| | |
|---------------------------------|--|
| Management | Supports in-band management from FRM220 Chassis With FRM220-1000MS card Ingress/Egress bandwidth control with 64K granularity |
| Configuration | IP configuration, converter configuration, port configuration, MIB counter, VLAN group configuration, alarm configuration |
| Diagnostic & Monitor | Remote loop-back test Dying gasp (remote power failure detection) Supports Link Fault Pass-Through (LFPT) Function Broadcast/Multicast/Unicast storm filter |

Application

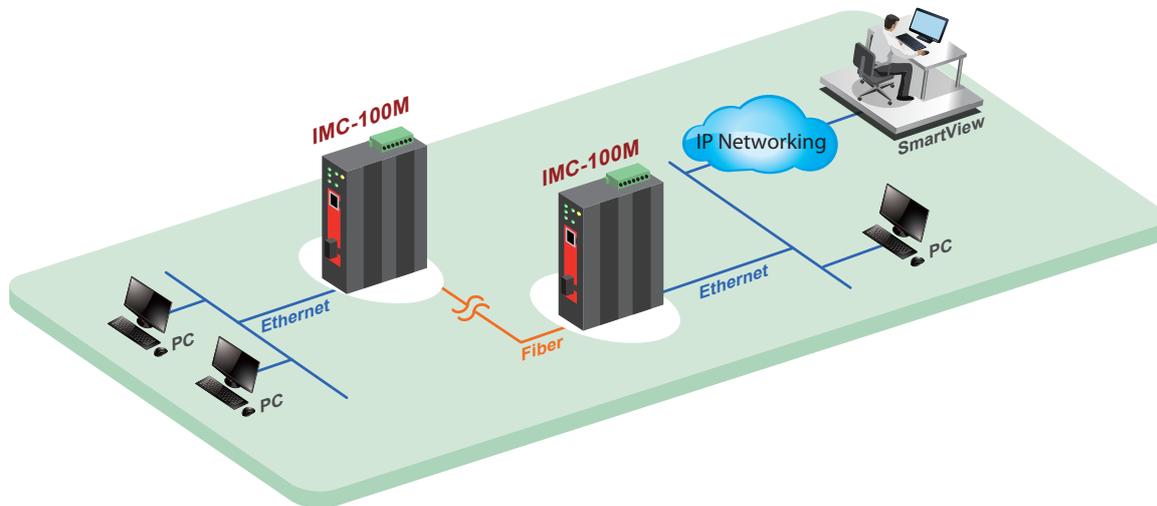


Figure : IMC-100M Application in Stand-alone SNMP management by CTC SmartView

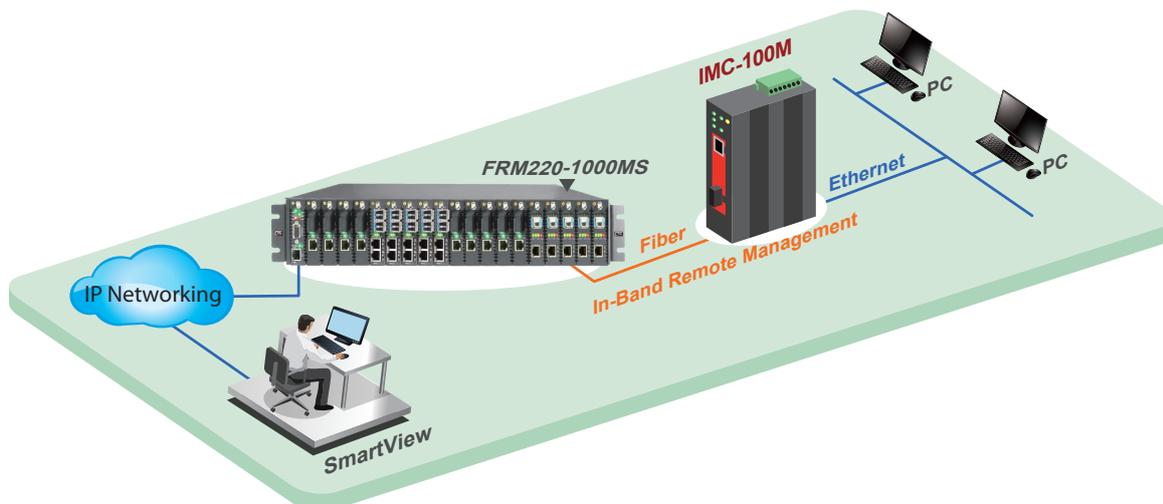


Figure : IMC-100M Application in Remote, In-Band management

Application

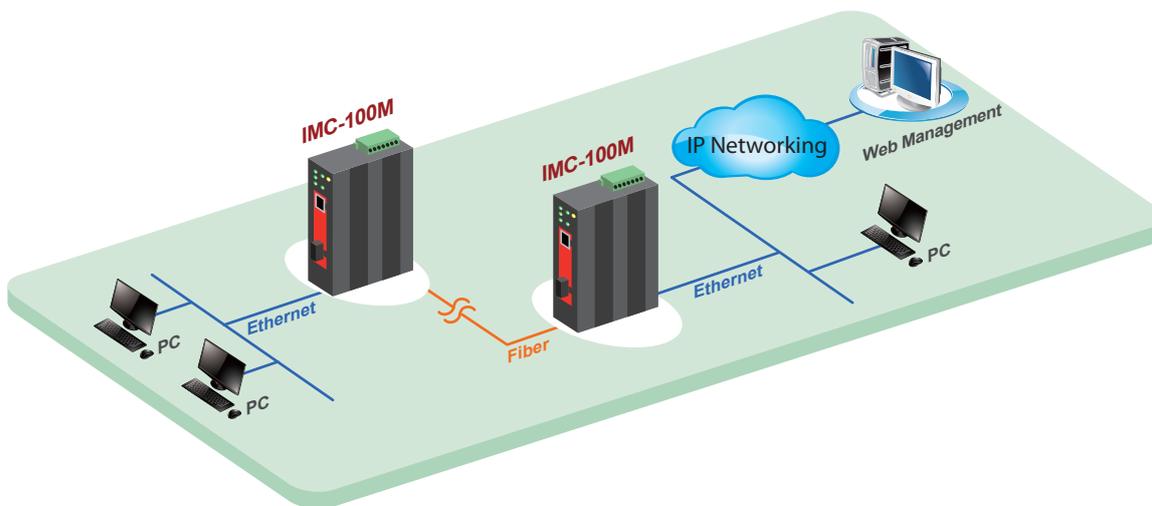
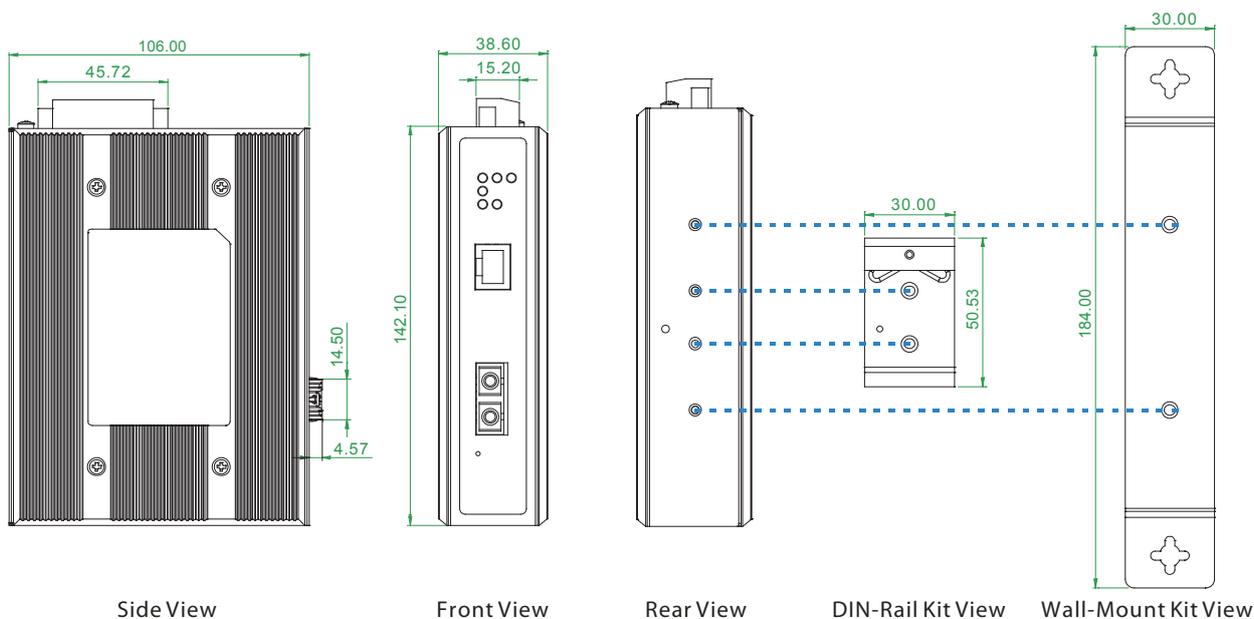


Figure : IMC-100M Application in Web Management

Dimensions



Ordering Information

| Model Name | Description |
|----------------|---|
| IMC-100M | Industrial Managed 10/100Base-TX to 100Base FX Fiber Converter (-10 ~ 60°C) |
| IMC-100M-E | Industrial Managed 10/100Base-TX to 100Base FX Fiber Converter (-20 ~ 75°C) |
| Connector Type | Connectivity Distance |
| SC | 002: 2KM (M/M) 030k : 30km (S/M) 050: 50km (S/M) 020A: WDM 20km A type (TX:1310nm) 020B: WDM 20km B type (TX: 1550nm) |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |

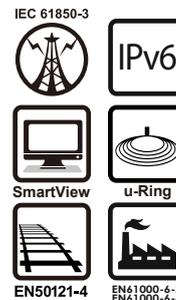
Temperature Connector Type Connectivity Distance
IMC-100M - □ - □□□□□□
 Example: IMC-100M - E - SC002

IPS-G803SM-DD

IEC 61850-3 8x10/100/1000Base-T+ 3x 100/1000Base-X SFP Managed Switch (Dual isolated DC Input)

IPS-G803SM-AD

IEC 61850-3 8x10/100/1000Base-T+ 3x 100/1000Base-X SFP Managed Switch (AC+isolated DC Input)



IPS-G803SM managed Gigabit Ethernet switch is designed to meet the demands of power substation systems and is fully compliant with the requirement of IEC 61850-3 and IEEE 1613. The switch provide a variety of redundant functions to increase the reliability of your communications system, including redundant and isolated power supplies (24/48 VDC) and 110/220VDC/VAC), STP/RSTP/MSTP and ITU-T G.8032 Ethernet Ring Protection Switching (recovery time<50ms) and can compatibly work with other switches in the network for ring protection. The proprietary u-Ring (with recovery time of less than 20ms) can easy to work with a variety CTC industrial managed switch for ring protection. The switch also provide many function, such as Web management, SNMP, IGMP, VLAN, LACP, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostics and Green Ethernet. IPS-803GSM can be managed centrally and conveniently by CTC SmartView Element Management System.

Features

- 8x 10/100/1000Base-T RJ-45 with 3x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, certification
- IEC61850-3, IEEE1613 certified for power substation
- Redundancy isolated ±24/48 VDC power inputs (IPS-G803SM-DD)
- Isolated ±24/48VDC and 110/240VDC/VAC power input (IPS-G803SM-AD)
- Wide Operating Temperature -40~85°C
- DIN Rail mounting or wall mounting
- IP30 rugged metal housing
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring(EPR), u-Ring for cabling redundant
- **u-Ring** for Redundant Ethernet Ring, recovery time<20ms in 250 units
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1Q VLAN, port based VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP/MLD snooping V1/V2/V3, IGMP Filtering / Throttling, IGMP query, IGMP proxy reporting, MLD snooping
- Security : Port based and Mac based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware in case of upgrade failure
- Supports DHCP client/Relay/Snooping/Snooping option 82/ Relay option 82
- Supports RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/ SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6, SNMP, HTTP, SSH/SSL, NTP/ SNTP, TFTP, QoS, ACL
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- SmartView Management System

Specifications

| | |
|----------------------------|--|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP IEEE 802.1Q for VLAN Tagging IEEE 802.1X for Authentication IEEE 802.3ad for Port Trunk with LACP IEEE802.3x Flow Control and Back Pressure ITU-T G.8032/ Y.1344 EPR (Ethernet Protection Ring) IEEE 802.1ad Stacked VLANs, Q-in-Q IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization IEEE 802.1ab Link Layer Discovery Protocol (LLDP) IEEE 802.3az EEE (Energy Efficient Ethernet) |
| VLAN ID | 4096 |
| IGMP Group | 256 |
| Switch Architecture | Back-plane (Switching Fabric): 22Gbps |
| Data Processing | Store and Forward |
| Flow Control: | IEEE 802.3x flow control, back pressure flow control |
| Jumbo Frame | 9.6KB |
| MAC Address Table | 8K |

| | |
|------------------------------------|--|
| Network Connector | 8x RJ-45 10/100/1000Base-T auto negotiation speed Auto MDI/MDI-X function, Full/Half duplex 3x 100/1000Base-X dual speed mode SFP slot, with DDM1 |
| Console | RS-232 (RJ-45) |
| Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| LED | Per unit : Power 1 (Green), Power 2 (Green), Fault (Amber) Per RJ-45 port :10/100Link/Act: Green, 1000Link/Act: Amber SFP Fiber Per port : Link/Active (Green) |
| Reverse Polarity Protection | Present for Power Input |
| Overload Current Protection | Present |
| CPU Watch Dog | Present |
| Power Input | IPS-G803SM-DD : Redundant Isolated DC ±24/48V (±18~72VDC) Input power (Removable Terminal Block) IPS-G803SM-AD : Redundant 1X Low Voltage Isolated DC and 1 High Voltage AC/DC DC : Isolated ±24/48V (±18~72VDC) Input power (Removable Terminal Block) AC : 88VAC~264VAC /DC85VDC~300VDC |
| Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| Removable Terminal Block | Provide 2 redundant power, alarm relay contact, 6 Pin |
| Operating Temperature | -40°C~85°C |

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

| | |
|------------------------------|---|
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40°C~85°C |
| Housing | Rugged Metal, IP30 Protection |
| Installation mounting | DIN Rail mounting or wall mounting |
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A EN 55022 Class A |

| | |
|-------------------------|---|
| EMS | EN61000-4-2 (ESD) Level 4, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 4, Criteria A EN61000-4-5 (Surge) Level 4, Criteria B EN61000-4-6 (CS) Level 4, Criteria A EN61000-4-8 (Magnetic Field) Level 5, Criteria A |
| Safety | UL60950-1 (Pending) |
| Power Substation | IEC 61850-3, IEEE 1613 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | TBD (Above 30 years) |
| Warranty | 5 years |

Software Specifications

| | |
|--|--|
| Topology | |
| VLAN | IEEE 802.1q VLAN, up to 4095 ID IEEE 802.1q VLAN, up to 4095 Groups IEEE 802.1ad Q-in-Q Port Based VLAN MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Loop Protection u-Ring | Present Easy set for Ethernet Protection Ring Recovery time <20ms Maximum 250 Node |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): MAC Access control list (Source/ Destination MAC, Ether type, Priority ID/ VLAN ID) QCL: IP extended access control list (Source/ Destination IP, Protocol, TCP/UDP port number) |
| Bandwidth Control for Ingress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame Per queue shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Query |

| | |
|---|--|
| Security Features | |
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting TACACS+ authentication & accounting, TACACS+ 3.0 HTTPS, HTTP SSL / SSH v2 | |
| User Name Password Authentication | Local Authentication Remote Authentication (via RADIUS/TACACS+) |
| Management Interface Access Filtering | Web, Telnet / SSH |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System Syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP /SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |

Software Specifications

| | |
|------------------------------|--|
| IPv6 Features | |
| IPv6 Management | Telnet Server/ICMP v6 |
| Stateless Auto Configuration | |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / SNTP Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |

| | |
|-------------------------|---|
| Others Features | |
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management: Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |

Application

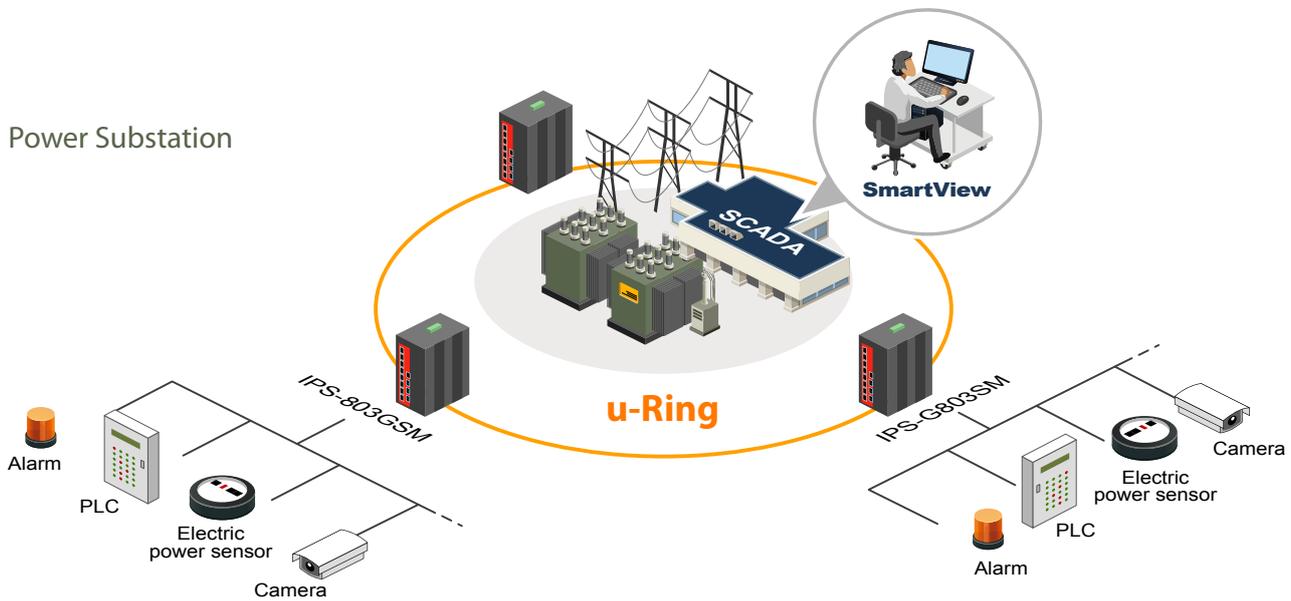


Figure : IPS Series in Power Substation Application

Ordering Information

| Model Name | Description |
|---------------|--|
| IPS-G803SM-DD | IEC 61850-3 8x 10/100/1000Base-T+ 3x 100/1000Base-X SFP Ethernet Managed Switch (Dual isolated DC input) |
| IPS-G803SM-AD | IEC 61850-3 8x 10/100/1000Base-T+ 3x 100/1000Base-X SFP Ethernet Managed Switch (AC+isolated DC input) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

Power Type
IPS - G803SM - [] []
 Example: IPS - G803SM - DD



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

IEC 61850-3



NEW



SmartView



u-Ring



EN50121-4



EN61000-6-2
EN61000-6-4

IPS-803GSM-DD

IEC 61850-3 8x 10/100Base-TX+ 3x 100/1000Base-X SFP
Managed Switch (Dual isolated DC Input)

IPS-803GSM-AD

IEC 61850-3 8x 10/100Base-TX+ 3x 100/1000Base-X SFP
Managed Switch (AC+isolated DC Input)

IPS-G803SM managed Fast Ethernet switch is designed to meet the demands of power substation systems and is fully compliant with the requirement of IEC 61850-3 and IEEE 1613. The switch provide a variety of redundant functions to increase the reliability of your communications system, including redundant and isolated power supplies (24/48 VDC) and 110/220 VDC/VAC), STP/RSTP/MSTP and ITU-T G.8032 Ethernet Ring Protection Switching (recovery time<50ms) and can compatibly work with other switches in the network for ring protection. The proprietary u-Ring (with recovery time of less than 20ms) can easy to work with a variety CTC industrial managed switch for ring protection. The switch also provide many function, such as Web management, SNMP, IGMP, VLAN, LACP, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostics and Green Ethernet. IPS-803GSM can be managed centrally and conveniently by CTC SmartView Element Management System.

Features

- 8x 10/100/1000Base-T RJ-45 with 3x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, certification
- IEC61850-3, IEEE1613 certified for Power substation
- Redundancy isolated $\pm 24/48$ VDC power inputs (IPS-803GSM-DD)
- Isolated $\pm 24/48$ VDC and 110/240VDC/VAC power input (IPS-803GSM-AD)
- Wide operating temperature $-40\sim 85^{\circ}\text{C}$
- DIN Rail mounting or wall mounting
- IP30 rugged metal housing
- Cable diagnostic, Measuring cable OK or broken point distance
- Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring(EPR),u-Ring for cabling redundant
- u-Ring for Redundant Ethernet Ring, recovery time<20ms in 250 units
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, port based VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP/MLD snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware in case of upgrade failure
- Supports DHCP client/Relay/Snooping/Snooping option 82/ Relay option 82
- Supports RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/ SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6, SNMP, HTTP, SSH/SSL, NTP/ SNTP, TFTP, QoS, ACL
- CLI, Web based management, **SNMP** v1/v2c/v3, Telnet server for management
- **SmartView** Management System

Specifications

| | | | |
|----------------------------|--|------------------------------------|--|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP IEEE 802.1Q for VLAN Tagging IEEE 802.1X for Authentication IEEE 802.3ad for Port Trunk with LACP IEEE802.3x Flow Control and Back Pressure ITU-T G.8032/ Y.1344 EPR (Ethernet Protection Ring) IEEE 802.1ad Stacked VLANs, Q-in-Q IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization IEEE 802.1ab Link Layer Discovery Protocol (LLDP) IEEE 802.3az EEE (Energy Efficient Ethernet) | Network Connector | 8x RJ-45 10/100Base-TX auto negotiation speed Auto MDI/MDI-X function, Full/Half duplex 3x 100/1000Base-X dual speed mode SFP slot, with DDMI |
| VLAN ID | 4096 | Console | RS-232 (RJ-45) |
| IGMP Group | 256 | Network Cable | UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Switch Architecture | Back-plane (Switching Fabric): 7.6Gbps | Protocols | CSMA/CD |
| Data Processing | Store and Forward | LED | Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green) ,Ring Master (Yellow) Per RJ-45 port: Link/Active (Green) SFP Fiber Per port: Link/Active (Green) |
| Flow Control | IEEE 802.3x flow control, back pressure flow control | Reverse Polarity Protection | Present for Power Input |
| Jumbo Frame | 9.6KB | Overload Current Protection | Present |
| MAC Address Table | 8K | CPU Watch Dog | Present |
| | | Power Input | IPS-803GSM-DD : Redundant Isolated DC $\pm 24/48$ V ($\pm 18\sim 72$ VDC) Input power (Removable Terminal Block) IPS-803GSM-AD : Redundant 1x Low Voltage Isolated DC and 1x High Voltage AC/DC DC: Isolated $\pm 24/48$ V ($\pm 18\sim 72$ VDC) Input power (Removable Terminal Block) AC: 88VAC~264VAC / DC: 85VDC~300VDC |
| | | Alarm Relay Contact | Relay outputs with current carrying capacity of 1 A @24VDC |
| | | Removable Terminal Block | Provide 2 Redundant power ,Alarm relay contact, 6 Pin |
| | | Operating Temperature | $-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$ |

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

| | |
|------------------------------|---|
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40°C~85°C |
| Housing | Rugged Metal, IP30 Protection |
| Installation Mounting | DIN Rail mounting or wall mounting |
| EMC/EMS | CE, FCC |
| EMI | FCC Part 15 Subpart B Class A, EN 55022 Class A |

| | |
|-------------------------|---|
| EMS | EN61000-4-2 (ESD) Level 4, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 4, Criteria A EN61000-4-5 (Surge) Level 4, Criteria B EN61000-4-6 (CS) Level 4, Criteria A EN61000-4-8 (Magnetic Field) Level 5, Criteria A |
| Safety | UL60950-1 (Pending) |
| Power substation | IEC 61850-3, IEEE 1613 |
| Shock | IEC 60068-2-27 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 60068-2-6 |
| MTBF | TBD (Above 30 years) |
| Warranty | 5 years |

Software Specifications

| Topology | |
|--|--|
| VLAN | IEEE 802.1q VLAN, up to 4095 ID IEEE 802.1q VLAN, up to 4095 Groups IEEE 802.1ad Q-in-Q Port Based VLAN MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) |
| Link Aggregation (Port Trunk) | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group |
| Spanning Tree | IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP |
| Loop Protection u-Ring | Present Easy set for Ethernet Protection Ring Recovery time <20ms Maximum 250 Node |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection) | Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network |
| QoS Feature | |
| Class of Service | IEEE802.1p 8 active priorities queues for per port |
| Traffic Classification QoS | IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): MAC Access control list (Source/Destination MAC, Ether type, Priority ID/VLAN ID) QCL: IP extended access control list (Source/Destination IP, Protocol, TCP/UDP port number) |
| Bandwidth Control for Ingress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame |
| Bandwidth Control for Egress | Rate in steps : 100 kbps / 1fps / 100fps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame Per queue shaper |
| DiffServ (RF 2474) Remarking | |
| Storm Control | for Unicast, Broadcast, Multicast |
| IP Multicasting Feature | |
| IGMP / MLD Snooping | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile Throttling Fast Leave Query |

| Security Features | |
|---|--|
| IEEE 802.1X | Port-Based MAC-Based |
| ACL | Number of rules : up to 256 entries for L2 / L3 / L4 |
| RADIUS authentication & accounting | |
| TACACS+ authentication & accounting, TACACS+ 3.0 | |
| HTTPS, HTTP | |
| SSL / SSH v2 | |
| User Name | Local Authentication |
| Password Authentication | Remote Authentication (via RADIUS / TACACS+) |
| Management Interface Access | Web, Telnet / SSH |
| Filtering | |
| Management Features | |
| CLI | |
| Web Based Management | |
| Telnet | Server |
| SNMP | V1, V2c, V3 |
| SW & Configuration Upgrade | TFTP, HTTP Redundant firmware in case of upgrade failure |
| RMON | RMON I (1, 2, 3, 9 group), RMON II |
| MIB II | RFC 1213 |
| DHCP | Client Relay Snooping Snooping option 82 Relay option 82 |
| IP Source Guard | |
| Port Mirroring | |
| Event Syslog | Syslog server (RFC3164) (Support 1 server) |
| Warning Message | System syslog, e-mail, alarm relay |
| DNS | Client, Proxy |
| NTP /SNTP | |
| LLDP (IEEE 802.1ab) | Link Layer Discovery Protocol LLDP-MED |

Software Specifications

| IPv6 Features | |
|------------------------------|--|
| IPv6 Management | Telnet Server/ICMP v6 |
| Stateless Auto Configuration | |
| SNMP over IPv6 | |
| HTTP over IPv6 | |
| SSH over IPv6 | |
| IPv6 Telnet Support | |
| IPv6 NTP / Sntp Support | |
| IPv6 TFTP Support | |
| IPv6 QoS | |
| IPv6 ACL | Number of rules: up to 256 entries L2 / L3 / L4 |

| Others Features | |
|-------------------------|--|
| Green Ethernet | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management : Adjustment LEDs intensity |
| Cable Diagnostic | Measuring cable OK or broken point distance |

Application

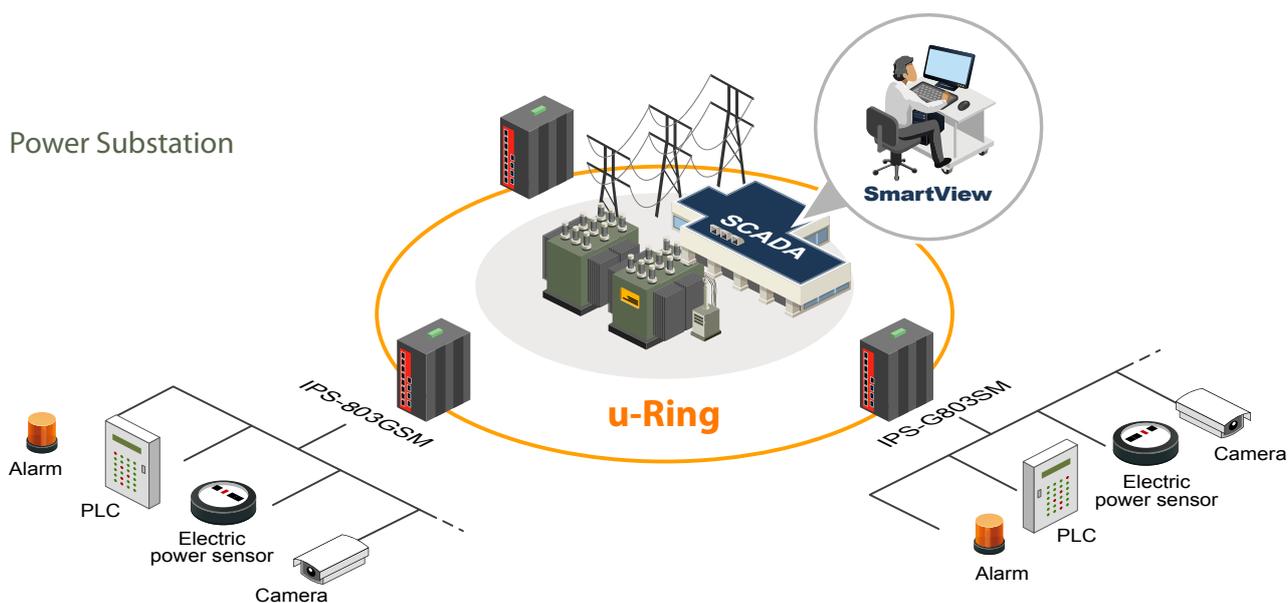


Figure : IPS Series in Power Substation Application

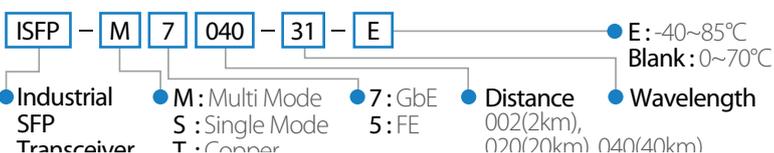
Ordering Information

| Model Name | Description |
|---------------|--|
| IPS-803GSM-DD | IEC 61850-3 8x 10/100Base-TX+ 3x 100/1000Base-X SFP Ethernet Managed Switch (Dual isolated DC input) |
| IPS-803GSM-AD | IEC 61850-3 8x 10/100Base-TX+ 3x 100/1000Base-X SFP Ethernet Managed Switch (AC+isolated DC input) |

Accessories

| | |
|-----------------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |
| SFP Transceiver | Compatible, Reliable, 5-year Warranty |

Power Type
IPS - 803GSM - □□
 Example: IPS - 803GSM - DD



ITP-500-67

EN50155 5x 10/100Base-TX IP67 Ethernet Switch

ITP-800-67

EN50155 8x 10/100Base-TX IP67 Ethernet Switch



The ITP-500-67 (ITP-800-67) Series non-managed Fast Ethernet switches provide 5(8)x 10/100Base-TX Fast Ethernet ports. This series of unmanaged Ethernet switches is designed for industrial applications in harsh environments. The ITP-500-67 (ITP-800-67) series switches Ethernet ports utilize M12 connectors to ensure tight, robust connections and guarantee reliable operation against environmental disturbances such as vibration and shock. The ITP-500-67 (ITP-800-67) series Ethernet switches are compliant with EN 50155, covering operating temperature, power input voltage, surge, ESD, vibration, and shock, thus making these switches suitable for industrial applications in vehicle, rolling stock and railways.

Features

- 8-Port 10/100Base-TX Ethernet Switch (ITP-800-E67, ITP-800-67)
5-Port 10/100Base-TX Ethernet Switch (ITP-500-E67, ITP-500-67)
- Use M12 connector anti vibration and shock for vehicle, rolling stock, and railway applications
- Supports flow control
- DIN rail or wall mounting installation
- Supports broadcast storm protection
- Supports auto-negotiation and auto-MDI/MDI-X
- Built in 2 bypass port (ITP-800-67, ITP-800-E67)
- Redundant dual DC input power 12/24/48VDC (8.4~60VDC)
- IP67 grade rugged housing for against water, dust, and oil
- Wide operating temperature -40~75°C (ITP-500-E67, ITP-800-E67)
- UL60950-1, CE, FCC, EN50155 and EN50121-4 for railway certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

Specifications

| | |
|--|---|
| IEEE Standard | IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE802.3x Flow Control and Back Pressure |
| Switch Architecture | Back-plane (Switching Fabric): 1Gbps (ITP-500-67, ITP-500-E67) Back-plane (Switching Fabric): 1.6Gbps (ITP-800-67, ITP-800-E67) |
| Data Processing | Store and Forward |
| Flow Control | IEEE 802.3x flow control, back pressure flow control |
| Provides Broadcast Storm Protection | Present |
| MAC Address Table | 1 K |
| Packet Buffer Size | 448Kbits |
| Network Connector | 5x M12 D-code Female (ITP-500-67, ITP-500-E67) 8x M12 D-code Female (ITP-800-67, ITP-800-E67) 10/100Base-TX auto negotiation speed Auto MDI/MDI-X function Full/Half duplex Built in 2 bypass port (ITP-800-67, ITP-800-E67) |
| Network Cable | 10Base-T: 2-pair UTP/STP Cat. 5e cable EIA/TIA-568 100-ohm (100m) 100Base-TX: 2-pair UTP/STP Cat. 5e cable EIA/TIA-568 100-ohm (100m) |
| Protocols | CSMA/CD |
| LED | Per unit: Power 1 (Green), Power 2 (Green) (ITP-800-67, ITP-800-E67) Per unit: Power (Green) (ITP-500-67, ITP-500-E67) Per port: Link/Active (Green) |
| Reverse Polarity Protection | Present for power input |
| Overload Current Protection | Present |
| Power Supply | Redundant Dual DC 12/24/48V (8.4~60VDC) Input power (ITP-800-67, ITP-800-E67) DC 12/24/48V (8.4~60VDC) Input power (ITP-500-67, ITP-500-E67) |
| Power | 5 Pin Male A-Code M12 |

| | |
|--|---|
| Operating Temperature | -10°C~60°C (ITP-500-67, ITP-800-67) -40°C~75°C (ITP-500-E67, ITP-800-E67) |
| Operating Humidity | 5% to 95% (Non-condensing) |
| Storage Temperature | -40°C~85°C |
| Housing | IP67 grade rugged housing |
| Weight | TBD |
| Installation Mounting | DIN rail or wall mounting |
| EMC | CE |
| EMI | FCC, FCC Part 15 Subpart B Class A CE EN 55022 Class A |
| Railway Traffic Immunity for Heavy Industrial Environment | EN50155, EN50121-4 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 B 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 EN 61000-4-11 Voltage Dips EN 61000-4-12 |
| Safety Shock | UL60950-1 (Pending) IEC 61373 |
| Freefall | IEC 60068-2-32 |
| Vibration | IEC 61373 |
| Dimension (HxWxD) | 206x30x30mm (ITP-500-67) 191x65x23.2mm (ITP-800-67) |
| MTBF | TBD (MIL-HDBK-217) |
| Warranty | 5 years |

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

Application

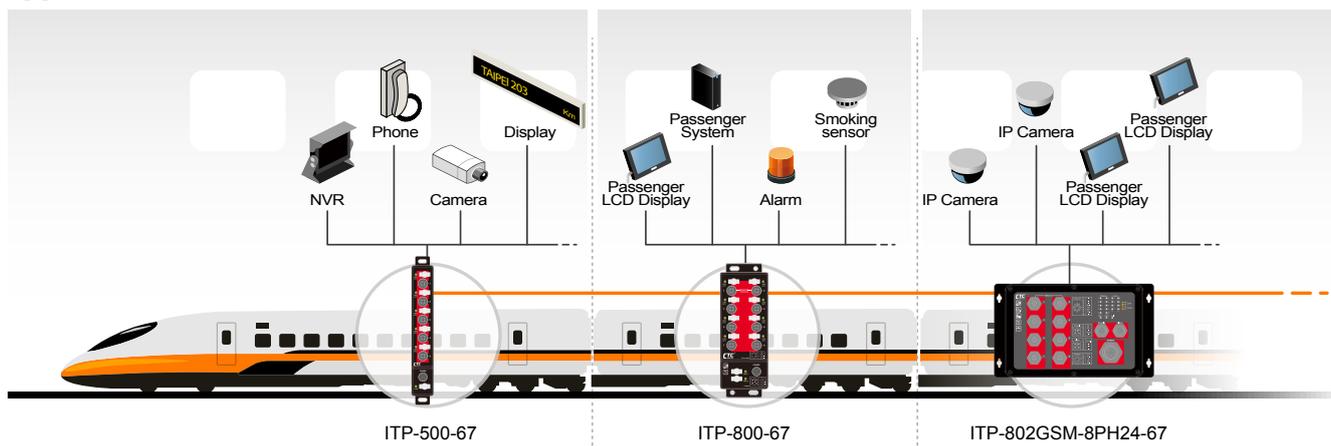


Figure 1 : ITP Series in Railway Application



Figure 2 : IP67 Protection

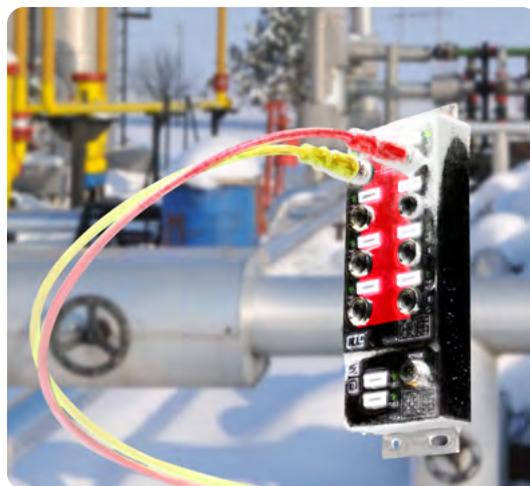


Figure 3 : Wide Range Temperature



Figure 4 : ITP Series for Industrial Automation



Figure 5 : Slim and Compact Size

Ordering Information

| Model Name | Description |
|-------------|--|
| ITP-500-67 | EN50155 5x10/100Base-TX IP67 Ethernet Switch ,-10°C~60°C |
| ITP-500-E67 | EN50155 5x10/100Base-TX IP67 Ethernet Switch ,-40°C~75°C |
| ITP-800-67 | EN50155 8x10/100Base-TX IP67 Ethernet Switch ,-10°C~60°C |
| ITP-800-E67 | EN50155 8x10/100Base-TX IP67 Ethernet Switch ,-40°C~75°C |

Accessories

| | |
|-----------|---|
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |

Port Number Temperature
ITP - [] 00 - [] 67
 Example: ITP - 500 - E67

DR-120-24, DR-4524, MDR-40-24, MDR-60-24, DRP-240-48

DIN-Rail Power Supplies



DR-120-24 DR-4524 MDR-40-24 MDR-60-24 DRP-240-48

10

Industrial Power
Supply

Having reliable and stable power for your industrial grade converters is the best way to improve reliability and keep any down time to a minimum. CTC Union's safety certified AC to DC power supplies that are 100% compatible with all of our industrial grade switches and converters.

Features

- Protections: Short circuit / Overload / Over voltage
- LED indicator for power on
- Cooling by free air convection
- Installation mounting by Din Rail
- UL508, UL60950-1, CE approved
- Heavy industry grade EMS approved
- 3 years warranty

Specifications

| Model Name | | DRP-240-48 | DR-120-24 | DR-4524 |
|--------------|---------------------------|---|---|---|
| Output | Dc Voltage | 48V | 24V | 24V |
| | Rated Current | 5A | 5A | 2A |
| | Current Range | 0~5A | 0 ~ 5A | 0 ~ 2A |
| | Rated Power | 240W | 120W | 48W |
| | Output Voltage Adj. Range | 48~53V | 24 ~ 28V | 21.6 ~ 26.4V |
| Input | Voltage Range | 85 ~ 264VAC / 120 ~ 370VDC | 88 ~ 132VAC / 176 ~ 264VAC, 248 ~ 370VDC by switch | 85 ~ 264VAC / 120 ~ 370VDC |
| | Frequency Range | 47 ~ 63Hz | 47 ~ 63Hz | 47 ~ 63Hz |
| | Efficiency (Typ.) | 85% | 84% | 80% |
| Protection | Overload | 105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed | 105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed | 105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed |
| | Over Voltage | 54 ~ 60V Protection type : Shut down o/p voltage, re-power on to recover | 29 ~ 33V Protection type : Shut down o/p voltage, re-power on to recover | 27.6 ~ 32.4V Protection type : Shut off o/p voltage, clamping by zener diode |
| Alarm Relay | DC OK Relay | | | |
| Indicator | LED | Power On | Power On | Power On |
| Housing | Dimension | 100 x 125.5 x 125.2 mm (D x W x H) | 100 x 65.5 x 125.2mm (D x W x H) | 67 x 78 x 93 mm (D x W x H) |
| | Installation Mounting | DIN Rail | DIN Rail | DIN Rail |
| Environment | Working Temp | -10 ~ 70°C | -10 ~ 60°C | -10 ~ 50°C |
| | Working Humidity | 20 ~ 90% RH non-condensing | 20 ~ 90% RH non-condensing | 20 ~ 90% RH non-condensing |
| | Storage Temp., Humidity | -20 ~ 85°C , 10 ~ 95% RH | -20 ~ 85°C , 10 ~ 95% RH | -20 ~ 85°C , 10 ~ 95% RH |
| | Vibration | Compliance to IEC60068-2-6 | Compliance to IEC60068-2-6 | Compliance to IEC60068-2-6 |
| Safety & EMC | Safety Standards | UL508, UL60950-1 approved | UL508, UL60950-1 approved | UL508 approved |
| | EMC Emission | Compliance to EN55011, EN55022 (CISPR22), EN61204-3 Class B, EN61000-3-2, -3 | Compliance to EN55011, EN55022 (CISPR22) Class B, EN61000-3-2,-3 | Compliance to EN55011, EN55022 (CISPR22) Class B, EN61000-3-2,-3 |
| | EMC Immunity | Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A | Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2 heavy industry level, criteria A | Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2 (EN50082-2), heavy industry level, criteria A |
| Others | PFC | Built in Active PFC | | |
| | MTBF | 289.9K hrs min. MIL-HDBK-217F (25°C) | 136.8Khrs min. MIL-HDBK-217F (25°C) | 364.6K hrs min. MIL-HDBK-217F (25°C) |
| | Waranty | 3 Years | 3 Years | 3 Years |

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

Specifications

| Model Name | | MDR-40-24 | MDR-60-24 |
|--------------|---------------------------|---|---|
| Output | Dc Voltage | 24V | 24V |
| | Rated Current | 1.7A | 2.5A |
| | Current Range | 0 ~ 1.7A | 0~2.5A |
| | Rated Power | 40.8W | 60W |
| | Output Voltage Adj. Range | 24 ~ 30V | 24~30V |
| Input | Voltage Range | 85 ~ 264VAC / 120 ~ 370VDC | 85 ~ 264VAC / 120 ~ 370VDC |
| | Frequency Range | 47 ~ 63Hz | 47 ~ 63Hz |
| | Efficiency (Typ.) | 88% | 88% |
| Protection | Overload | 105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed | 105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed |
| | Over Voltage | 31.2 ~ 36V Protection type : Shut down o/p voltage, re-power on to recover | 31.2 ~ 36V Protection type : Shut down o/p voltage, re-power on to recover |
| Alarm Relay | DC OK Relay | DC OK Relay will Close In Normal Relay contact rating(max.): 30V/1A resistive | DC OK Relay will Close Relay contact rating(max.): 30V/1A resistive |
| Indicator | LED | DC OK | Power On |
| Housing | Dimension | 100 x 40 x 90 mm (D x W x H) | 100 x 40 x 90 mm (D x W x H) |
| | Installation Mounting | DIN Rail | DIN Rail |
| Environment | Working Temp | -20 ~ 70°C | -20 ~ 70°C |
| | Working Humidity | 20 ~ 90% RH non-condensing | 20 ~ 90% RH non-condensing |
| | Storage Temp., Humidity | -40 ~ 85°C , 10 ~ 95% RH | -40 ~ 85°C , 10 ~ 95% RH |
| | Vibration | Compliance to IEC60068-2-6 | Compliance to IEC60068-2-6 |
| Safety & EMC | Safety Standards | UL508, UL60950-1 approved | UL508, UL60950-1 approved |
| | EMC Emission | Compliance to EN55011, EN55022 (CISPR22), EN61204-3 Class B, EN61000-3-2,-3 | Compliance to EN55011, EN55022 (CISPR22), EN61204-3 Class B, EN61000-3-2, -3 |
| | EMC Immunity | Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A | Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A |
| Others | PFC | | |
| | MTBF | 301.7K hrs min. MIL-HDBK-217F (25°C) | 299.2K hrs min. MIL-HDBK-217F (25°C) |
| | Waranty | 3 Years | 3 Years |

Ordering Information

| Model Name | Description |
|------------|---|
| DR-120-24 | Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C |
| DR-4524 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C |
| MDR-40-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C |
| MDR-60-24 | Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 60W, -20 ~ +70°C |
| DRP-240-48 | Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +70°C |

DR - □□□□ - □□
Example: DR - 120 - 24

Industrial SFP Transceiver

1.25G 1000Base-X
1.25G 1000Base-T
155Mbps 100Base-FX

5-Year Warranty



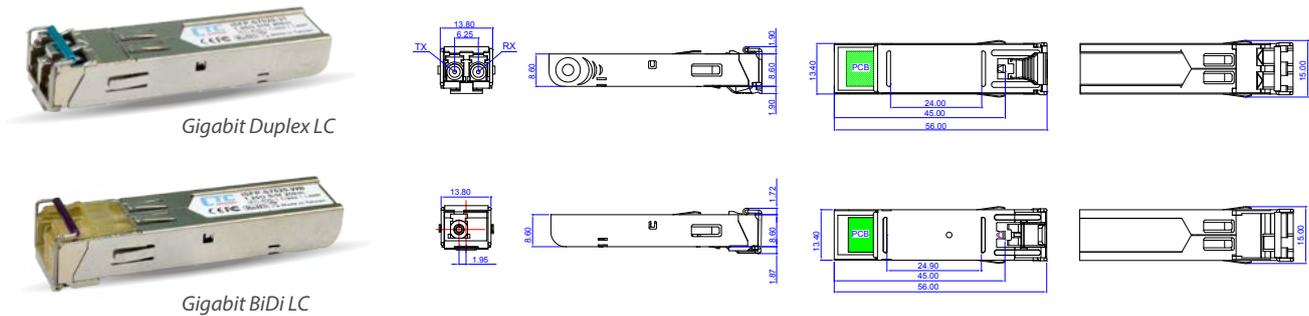
10 Industrial SFP Transceiver

CTC industrial SFP Transceivers are highly reliable, for serial optical data communications applications specified for single mode fiber operation at 1.25G/155M bps. They operate with +3.3V power supplies and are intended for single mode or multi-mode fiber, operating at a nominal wavelength of 1310nm/1550nm/850nm. Each SFP Transceiver consists of a transmitter optical subassembly (TOSA), a receiver optical subassembly (ROSA) and an electrical subassembly. CTC's industrial SFP transceivers ensure your networks operate with maximum reliability, performance, and flexibility.

Features

- All SFPs have been tested with the best operating performance on CTC Industrial switches
- Single 3.3V power supply
- Duplex or Simplex LC receptacle connector
- Hot Pluggable
- Lower power dissipation
- All Gigabit SFP compliant to IEEE802.3z 1000Base-X and IEEE802.3ab 1000Base-T
- All Fast Ethernet SFP Compliant to IEEE802.3u 100Base-FX
- Industrial standard small form pluggable (SFP) package
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Eye safety compliant with Class 1 laser product standard IEC825-1
- CE, FCC class B certification
- RoHS compliant
- Warranty 5 years

Gigabit Ethernet SFP



1.25G 1000Base-X

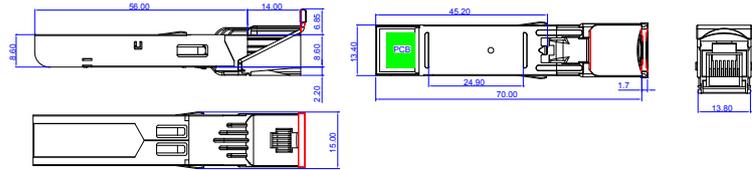
| Model Name | Cable Type | Typical Distance | Wavelength (nm) | TX (dBm) (Min~Max) | RX Sensitivity (dBm) | Power Budget (dB) | Saturation (dBm) | Operating Temperature |
|-----------------|------------|------------------|-----------------|--------------------|----------------------|-------------------|------------------|-----------------------|
| ISFP-M7000-85 | MM | 550m | 850 | -9.5~-4 | -17 | 7.5 | -3 | -10~70°C |
| ISFP-M7002-31 | MM | 2km | 1310 | -9~-1 | -19 | 10 | -1 | -10~70°C |
| ISFP-S7020-31 | SM | 20km | 1310 | -8~-2 | -23 | 15 | -1 | -10~70°C |
| ISFP-S7040-31 | SM | 40km | 1310 | -2~3 | -23 | 21 | -3 | -10~70°C |
| ISFP-S7080-55 | SM | 80km | 1550 | 0~5 | -24 | 24 | -3 | -10~70°C |
| ISFP-S7020-WA | SM | 20km | T1310 / R1550 | -8~-2 | -23 | 15 | -2 | -10~70°C |
| ISFP-S7020-WB | SM | 20km | T1550 / R1310 | -8~-2 | -23 | 15 | -2 | -10~70°C |
| ISFP-S7040-WA | SM | 40km | T1310 / R1550 | -3~-2 | -23 | 20 | -1 | -10~70°C |
| ISFP-S7040-WB | SM | 40km | T1550 / R1310 | -3~-2 | -23 | 20 | -1 | -10~70°C |
| ISFP-M7000-85-E | MM | 550m | 850 | -9.5~-4 | -17 | 7.5 | -3 | -40~85°C |
| ISFP-M7002-31-E | MM | 2km | 1310 | -9~-1 | -19 | 10 | -1 | -40~85°C |
| ISFP-S7020-31-E | SM | 20km | 1310 | -8~-2 | -23 | 15 | -1 | -40~85°C |
| ISFP-S7040-31-E | SM | 40km | 1310 | -2~3 | -23 | 21 | -3 | -40~85°C |
| ISFP-S7080-55-E | SM | 80km | 1550 | 0~5 | -24 | 24 | -3 | -40~85°C |
| ISFP-S7020-WA-E | SM | 20km | T1310 / R1550 | -8~-2 | -23 | 15 | -2 | -40~85°C |
| ISFP-S7020-WB-E | SM | 20km | T1550 / R1310 | -8~-2 | -23 | 15 | -2 | -40~85°C |
| ISFP-S7040-WA-E | SM | 40km | T1310 / R1550 | -3~-2 | -23 | 20 | -1 | -40~85°C |
| ISFP-S7040-WB-E | SM | 40km | T1550 / R1310 | -3~-2 | -23 | 20 | -1 | -40~85°C |

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

Gigabit Ethernet SFP



Gigabit Copper



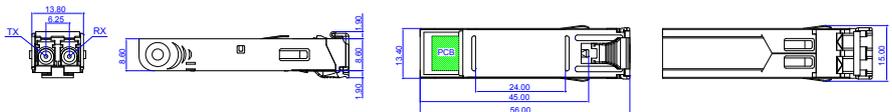
1.25G 1000Base-T

| Model Name | Cable Type | Typical Distance | Wavelength (nm) | TX (dBm) (Min~Max) | RX Sensitivity (dBm) | Power Budget (dB) | Saturation (dBm) | Operating Temperature |
|-----------------|------------|------------------|-----------------|--------------------|----------------------|-------------------|------------------|-----------------------|
| ISFP-T7T00-00 | Copper | 100m | --- | --- | --- | --- | --- | 0~70°C |
| ISFP-T7T00-00-E | Copper | 100m | --- | --- | --- | --- | --- | -40~85°C |

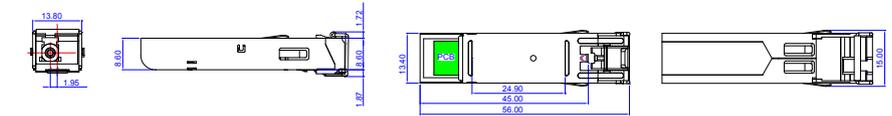
Fast Ethernet SFP



Duplex LC



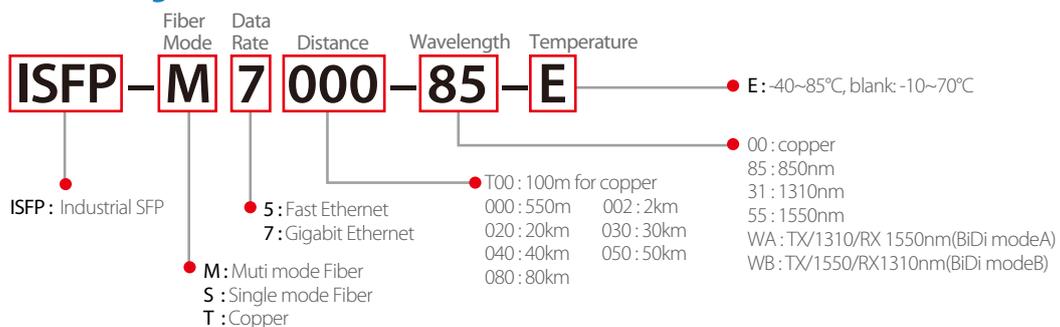
BiDi LC



155Mbps 100Base-FX

| Model Name | Cable Type | Typical Distance | Wavelength (nm) | TX (dBm) (Min~Max) | RX Sensitivity (dBm) | Power Budget (dB) | Saturation (dBm) | Operating Temperature |
|-----------------|------------|------------------|-----------------|--------------------|----------------------|-------------------|------------------|-----------------------|
| ISFP-M5002-31 | MM | 2km | 1310 | -20~-14 | -32 | 12 | -8 | -10~70°C |
| ISFP-S5030-31 | SM | 30km | 1310 | -15~-8 | -34 | 19 | -5 | -10~70°C |
| ISFP-S5050-31 | SM | 50km | 1310 | -5~0 | -35 | 30 | -5 | -10~70°C |
| ISFP-S5020-WA | SM | 20km | T1310 / R1550 | -14~-8 | -32 | 18 | -3 | -10~70°C |
| ISFP-S5020-WB | SM | 20km | T1550 / R1310 | -14~-8 | -32 | 18 | -3 | -10~70°C |
| ISFP-S5040-WA | SM | 40KM | T1310 / R1550 | -8~0 | -34 | 26 | 0 | -10~70°C |
| ISFP-S5040-WB | SM | 40KM | T1550 / R1310 | -8~0 | -34 | 26 | 0 | -10~70°C |
| ISFP-M5002-31-E | MM | 2km | 1310 | -20~-14 | -32 | 12 | -8 | -40~85°C |
| ISFP-S5030-31-E | SM | 30km | 1310 | -15~-8 | -34 | 19 | -5 | -40~85°C |
| ISFP-S5050-31-E | SM | 50km | 1310 | -5~0 | -35 | 30 | -5 | -40~85°C |
| ISFP-S5020-WA-E | SM | 20km | T1310 / R1550 | -14~-8 | -32 | 18 | -3 | -40~85°C |
| ISFP-S5020-WB-E | SM | 20km | T1550 / R1310 | -14~-8 | -32 | 18 | -3 | -40~85°C |
| ISFP-S5040-WA-E | SM | 40KM | T1310 / R1550 | -8~0 | -34 | 26 | 0 | -40~85°C |
| ISFP-S5040-WB-E | SM | 40KM | T1550 / R1310 | -8~0 | -34 | 26 | 0 | -40~85°C |

Industrial SFP naming rule



Ordering Information



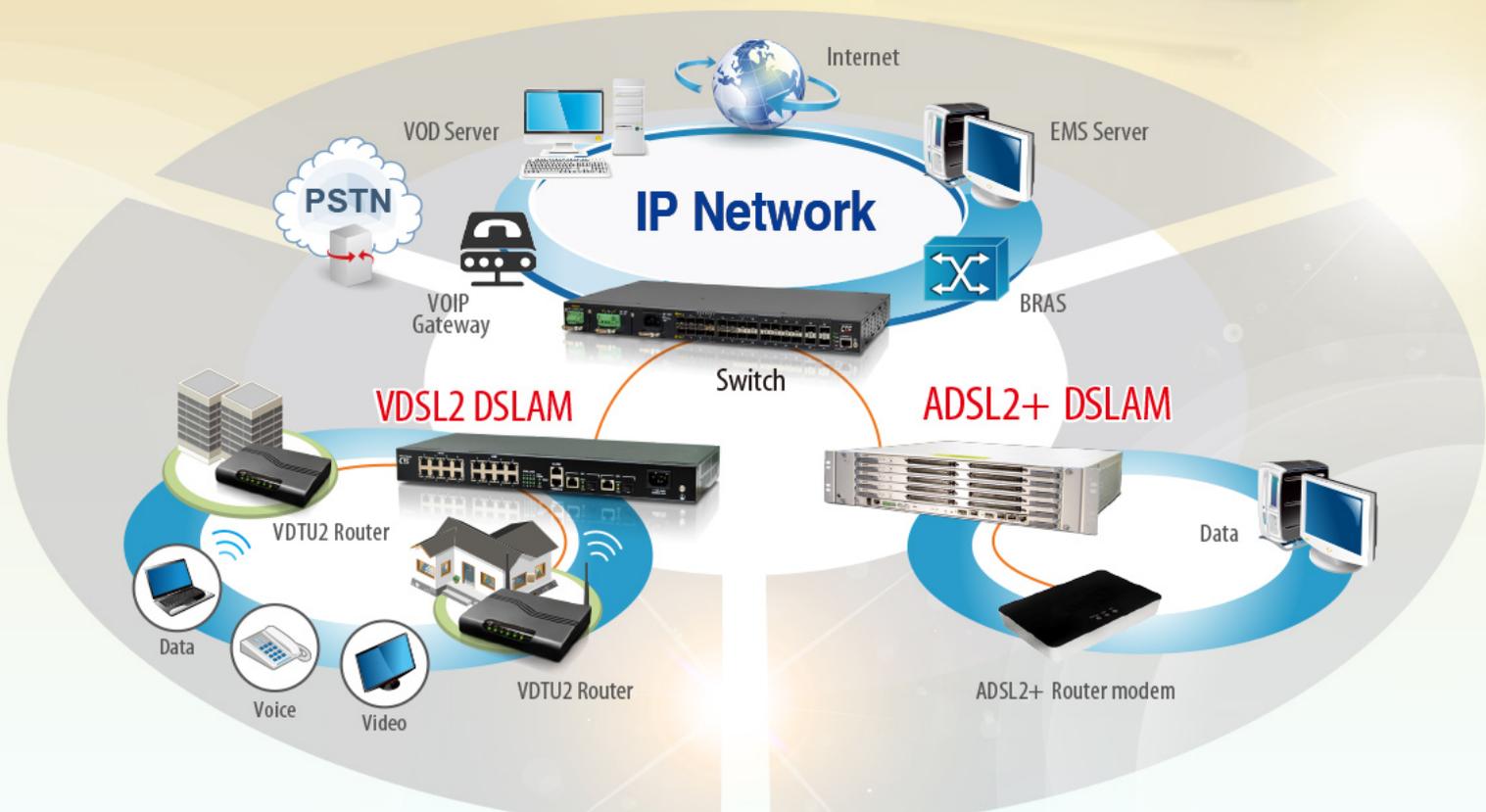
DSL Series

VDSL2 IP DSLAM

ADSL2+

G.SHDSL TDM & ATM

EFM LAN Extender





Remote

Local

VDTU2A-104-4PH

4-Port PoE Ethernet Extender with Power Feeding (Phone Line)

VDTU2A-104-4PH are a pair of devices that support remote power feeding to a non-managed Fast Ethernet PoE (Power over Ethernet) switch and provides Ethernet LAN extension up to 1.2km. Housed in a rugged metal chassis, the LAN extender provides an excellent solution in IP surveillance networks to extend both Ethernet and power over a simple single pair telephone wire. Up to 4 remote IP cameras (or other PoE PD devices) may be powered, with a maximum budget of 40 watts PoE available, without the requirement to run any extra electrical power lines. Standard operating temperature range is -20 to 50°C.

Features

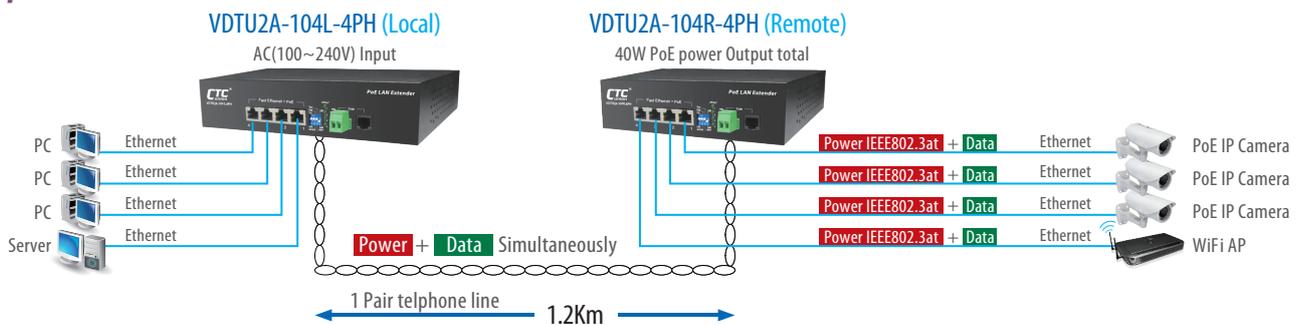
- Local unit accepts universal AC power
- Remote power feeding eliminates the need for power service at remote unit
- IP30 rugged metal housing
- 4 port with IEEE 802.3af/at PSE at remote (40W budget)
- Remote power feeding and data operate over one twisted pair over up to 1200 meters
- Simple DIP switch setting to set and forget
- Twisted pair with auto polarity detection for easy installation
- Twisted pair connects with terminal block or RJ-11

Specifications

| | | | | | | | | | | | | | | | | |
|---|--|------------------|-------|--------|-----|------|-------------------------------|-------|-------|-------|--------|-----------------------------|-----|-----|-----|-----|
| Standards | IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3x Flow Control and Back Pressure IEEE802.3af/at PoE | | | | | | | | | | | | | | | |
| Data Architecture | Store and Forward | | | | | | | | | | | | | | | |
| PoE RJ-45 pin assignment (VDTU2A-104R-4PH) | RJ-45 port 1~ 4 support IEEE 802.3af/at Positive (VCC+): RJ-45 pin 4, 5 Negative (VCC-): RJ-45 pin 7, 8 Data (1,2,3,6) | | | | | | | | | | | | | | | |
| PoE standard | IEEE802.3af/at (VDTU2A-104R-4PH) | | | | | | | | | | | | | | | |
| Connector | RJ11 x 1 or Terminal block x 1 for Twisted pair Phone line 4-Port RJ-45 for 10/100Base-TX Ethernet, and IEEE802.3 af/at PoE (PoE port only for VDTU2A-104R-4PH) | | | | | | | | | | | | | | | |
| Ethernet Cable | UTP/STP above Cat. 5e cable, EIA/TIA-568 100-ohm (100m) | | | | | | | | | | | | | | | |
| Phone line cable | Phone twisted pair above AWG24 | | | | | | | | | | | | | | | |
| Power deliver | Distance : 1200Meter by Twisted pair Phone line PoE 40Watt totally Supports PTZ IP cam | | | | | | | | | | | | | | | |
| Power feeding Watt | Power feeding by Phone line up to 40W for Total @1,200KM, Supports Per Ethernet port up to IEEE802.3at 30W maximum | | | | | | | | | | | | | | | |
| Performance and Power feeding | Phone line Distance vs Speed and Power | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <td>Distance (Meter)</td> <td>300</td> <td>600</td> <td>900</td> <td>1200</td> </tr> <tr> <td>Throughput Down load /Up load</td> <td>45/81</td> <td>29/62</td> <td>15/43</td> <td>6.5/28</td> </tr> <tr> <td>Power feeding by Phone line</td> <td>40W</td> <td>40W</td> <td>40W</td> <td>40W</td> </tr> </table> | Distance (Meter) | 300 | 600 | 900 | 1200 | Throughput Down load /Up load | 45/81 | 29/62 | 15/43 | 6.5/28 | Power feeding by Phone line | 40W | 40W | 40W | 40W |
| Distance (Meter) | 300 | 600 | 900 | 1200 | | | | | | | | | | | | |
| Throughput Down load /Up load | 45/81 | 29/62 | 15/43 | 6.5/28 | | | | | | | | | | | | |
| Power feeding by Phone line | 40W | 40W | 40W | 40W | | | | | | | | | | | | |
| | Tested under room temperature 25°C; 24AWG twisted-pair cable | | | | | | | | | | | | | | | |
| Power Input | 100~240VAC (VDTU2A-104L-4PH) | | | | | | | | | | | | | | | |

| | | | | | |
|---|--|------------------|------------------------------------|---|----------------------------|
| DIP SW | DIP SW | SW 1 CO / CPE | SW 2 Transmitt Mode (1) Fast | SW 3 Transmitt Mode (2) Symmetric | SW 4 Signal S/N 6 dB |
| | ON | CO | Fast | Symmetric | 6 dB |
| | OFF | CPE | Interleave | Asymmetric | 9 dB |
| LED | RJ-45 Per port 1~4 : Link/Active (Green) Power : Green (ON: Device Power ON) CO LED OFF: Act as CPE, ON: Act as CO Link(Phone) On: Link, Flash: Linking on going, Off: disconnect | | | | |
| Operating Temperature | -20 ~ 50°C | | | | |
| Dimensions | VDTU2A-104L-4PH : 190 x 200 x 48 mm (D x W x H) VDTU2A-104R-4PH : 170 x 170 x 44 mm (D x W x H) | | | | |
| Housing | Metal Case | | | | |
| Weight | 1.3KG (VDTU2A-104L-4PH) 1.0KG (VDTU2A-104R-4PH) | | | | |
| Operating Humidity | 5 ~ 95% (Non-condensing) | | | | |
| Installation | Desk and Wall Mounting | | | | |
| Short circuit protection | Present (Phone line Power feeding short circuit protection) | | | | |
| Surge protection for Phone, Network Line | EN61000-4-5 Level 3 Criterial B (Line to Ground 2KV) | | | | |
| Reverse polarity protection | Phone line DC Power feeding polarity protection RJ-45 Network Line PoE DC Power polarity protection | | | | |
| Certification | CE, FCC | | | | |
| EMI | FCC Part 15 Subpart B Class B, EN 55022 Class B | | | | |

Application



Ordering Information

| Model Name | Description |
|----------------|--|
| VDTU2A-104-4PH | Ethernet Extender by phone line With Power Feeding and PoE (VDTU2A-104L-4PH and VDTU2A-104R-4PH) |

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

EFM-10/20/40

4-Port EFM G.SHDSL.bis LAN Extender



11

EFM LAN extender

EFM is an Ethernet Network Extender designed to provide bonded high-speed Ethernet First Mile services over SHDSL on existing copper infrastructure. It is a bridge mode modem that delivers Ethernet services with symmetrical bandwidth at rates up to 22.8 Mbps (4 Pairs, Standard mode with TC-PAM 32) and 61 Mbps (4Pairs, Enhanced mode with TC-PAM 128). Implemented on IEEE 802.3ah EFM standards for advanced performance and management features. EFM ensures high reliability, low expense and maximum throughput. The introduction of EFM copper bonding technology allows delivery of higher bandwidth to longer distances over multiple copper pairs, enabling a good alternative in place where fiber is not economical to deploy. This Ethernet-pure solution provides a seamless integration into today and tomorrows networks. Designed with standard-based EFM technology (2BASE-TL), deployment of Ethernet services with EFM is quick and simple on the existing copper plant.

Features

- Extending Ethernet Services to sites with existing copper infrastructure
- Supports TC-PAM 32 for 5.7 Mbps over single pair copper
- EFM Bonding up to 61 Mbps (4 pairs, TC-PAM 128)
- Flexible and Rapid Service Deployment
- Flexible configuration as CPE or CO
- Supports EFM OAM complying IEEE 802.3ah
- Low Delay, Jitter and packet loss for delay sensitive applications
- Comprehensive and easy OAM & P functions in provisioning and management
- QoS feature for guaranteed Ethernet service
- Future-proof Ethernet traffic management and QoS features

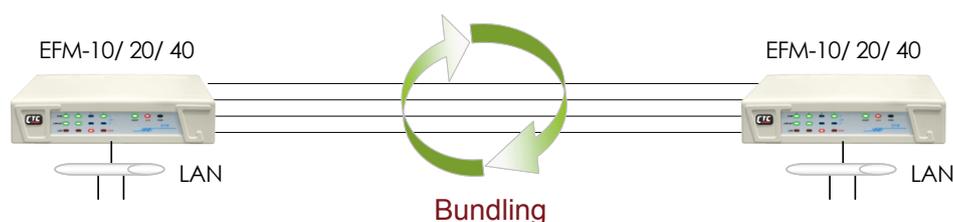
Specifications

| | | |
|---------------------------|---|---|
| Standards | LAN | 4-Port switching hub 10/100Base-T auto-negotiation & sensing Auto MDI/MDI-X |
| | WAN | ITU-T G.991.2.(2004) EFM bonding (IEEE 802.3ah OAM) 2BASE-TL Data Rate: • N x 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 x 64 Kpbs (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) • Supports of Annex A, Annex B, Annex AF & Annex BG |
| LAN Protocols | 802.1d Transparent Bridging Up to 2K MAC Address learning bridge | |
| Hardware Interface | DSL : RJ-45 x 1, LAN : RJ45 x 4, Console Port x 1 MGMT : RJ45 x1, DC Power Jack x 1 Reset Button : Load Factory Default | |
| Indicator | LAN : Link/Act, 10/100 per port System : Power, Alarm, MGMT WAN : Link per loop | |

| | |
|------------------------------|---|
| Management Interface | Easy to use web-based GUI for quick setup, configuration and management Menu-driven interface for local console and telnet access Password protected management and access control list for administration SNMP v1/v2 (RFC1157/1901/1905) agent and MIB II (RFC1213/1493) EFM OAM (IEEE 802.3ah) Software upgrade via web-browser / TFTP |
| VLAN Support | IEEE 802.1Q VLAN Tagging Up to 8k 802.1q VLANS (ID Range 1~4094) Port Based VLAN, VLAN Stacking (Q-in-Q) |
| QoS Support | Rate limiting by rule-based/port-based Traffic classification based on port/802.1p/ DSCP WRR (Weighted Round Robin) / SPQ (Strict Priority Queuing) scheduling algorithm, IPv6 (RFC 5430) pass through |
| Environment | Operating Temperature : 0 ~ 50°C Storage Temperature : -40 ~ 85°C Relative Humidity : 98%, non-condensing |
| Regulatory | ISO 9001 Quality Management, CE Approval |
| Physical / Electrical | Dimension : 195 x 48 x 168mm (D x W x H) AC Power Adapter (100 ~ 240VAC) Weight : 1.3kg |
| Memory | 2MB Flash Memory, 8MB SDRAM |

Application

Bandwidth Aggregation up to 22.8Mbps Over 4 pair of Copper wires



Ordering Information

| Model Name | Description |
|------------|--|
| EFM-10 | 2W, 2Base-TL EFM LAN Extender with 4x10/100Base-TX |
| EFM-20 | 4W, 2Base-TL EFM LAN Extender with 4x10/100Base-TX |
| EFM-40 | 8W, 2Base-TL EFM LAN Extender with 4x10/100Base-TX |

EFM - □□

Example: EFM - 10



VDSM2-1524

24-Port VDSL2 IP DSLAM

VDSM2-1524 is a 24-port VDSL2 IP DSLAM with 2 Gigabit Ethernet Combo interfaces built-in a 1.5U height design. VDSM2-1524 offers the fastest data rate over the existing copper infrastructure. In order to connect with the growing broadband applications, VDSM2-1524 provides the idea solution in the last mile. VDSM2-1524 is able to provide a faster data transmission easily with the latest VDSL2 technology in order to handle the rapidly growing demands of triple-play media. VDSM2-1524 supports the switch management functions, such as port speed configuration, port link aggregation, IEEE 802.1Q VLAN, Q-in-Q VLAN, and ACL security. In addition, it is featured with advanced functions, such as IGMP snooping, QoS, bandwidth control and etc. VDSM2-1524 allows its users to provide a better secured network service with enforcing security policies, such as MAC filter, Static MAC, IP/MAC binding and port security.

Features

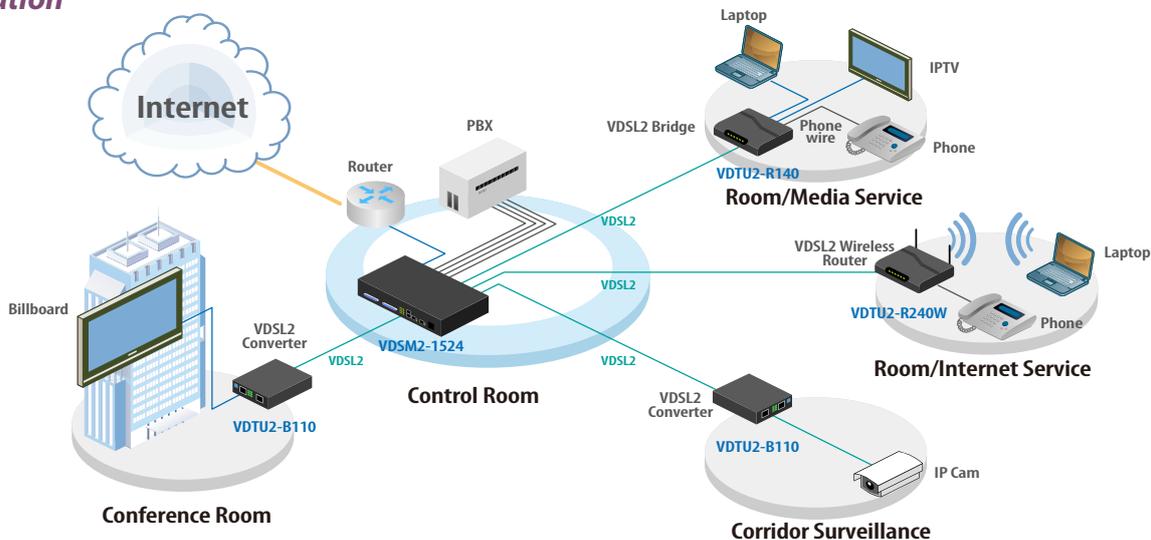
- 1.5U design, 24 VDSL2 ports splitter
- Supports VDSL2 Profiles, 8a, 8b, 8c, 8d, 12a, 12b, 17a and 30a
- Supports Traffic Classification, such as QoS, ToS, DSCP, etc
- Supports L2/L3 Content Filtering
- Configuration backup and restoration
- Supports, Port-Based VLAN, Protocol-Based VLAN, VLAN Mapping, etc
- Supports L2 Bridge Functions (IEEE 802.1d) and Multicast.
- DHCP Server/Relay/Client
- DNS Proxy
- Flexible Deployment and Maintenance.
- Web-based management with a user friendly interface.

Specifications

| | |
|-----------------------|---|
| Chassis | 1.5U High |
| Interfaces | 24 VDSL2 Ports Two RJ-45 100/1000Mbps Ethernet Combo Ports Management Ethernet 1 x RS-232 Serial Console POTS Splitter |
| LED Indicators | SYS, ALM, LINK, ACT 24 x VDSL LEDs |
| Standards | VDSL2 ITU-T G.993.2 VDSL2 Profiles: 8a, 8b, 8c, 8d, 12a, 12b, 17a and 30a 802.1d L2 Bridging DHCP Server/Client/Relay IEEE 802.1Q VLAN (Port-based VLAN and Protocol-Based VLAN) VLAN Stacking (Q-in-Q) IEEE 802.1p Spanning Tree Protocol (STP) IEEE 802.3ad Link Aggregation |

| | |
|--------------------|--|
| Protocols | IGMP Snooping/Proxy v1 and v2 Multicast Forwarding with IGMP Snooping v1 and v2 (RFC 1112 and RFC 2236) Up to 512 Multicast Channels Fast and Normal Leave Modes |
| Security | L2 Frame Filtering by MAC Addresses L3 Frame Filtering by IP Addresses, protocol ID, and TCP/UDP DHCP and ARP Broadcasting Frames Filtering |
| Management | Supports Secured Forwarding Supports OAM&P Functions Supports VLAN Priority Queue (IEEE 802.1p) Supports CoS, ToS, DSCP, etc. Supports SNMP v1/v2/v3 and MIB I/II Web-based Graphical User Interface, Telnet, CLI and SSH |
| Environment | Operating Temperature : -10 ~ 50°C Storage Temperature : -40 ~ 70°C Relative Humidity : Up to 95% (non-condensing) |

Application



Ordering Information

| Model Name | Description |
|------------|---|
| VDSM2-1524 | 24x 10/100-TX Ports VDSL2 IP DSLAM with 600 ohm POTS Splitter |

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

NEW

VDSM2-1008

1U, 8-Port VDSL2 IP DSLAM



11

VDSL2 DSLAM

VDSM2-1008 is a compact 8-port VDSL2 IP DSLAM with 2 Gigabit Ethernet Combo interfaces and built-in POTS splitter. It is compliant to ITU-T G.993.2 standard and supports VDSL2 30a profile that features 100Mbps of symmetric data rate over the existing copper wires. VDSM2-1008 is an ideal choice for ISPs and System Integrators that are looking for a high performance broadband solution for their triple play (Video, Voice and Data) applications. VDSM2-1008 is designed to connect with the growing Carrier Ethernet infrastructure, it provides great flexibility for service providers to customize their services and brings them reliable, secure and high quality network access at low cost. In addition, VDSM2-1008 offers user-friendly management interfaces that allow service providers to monitor and control their services in a highly secure and efficient way. It features the supports for Port-based/Protocol-based VLAN, Q-in-Q, VLAN Mapping, VLAN translation, L2/L3 frame filtering and secured forwarding. Furthermore, VDSM2-1008 supports traffic classification including CoS (802.1), VLAN ID, ToS and DSCP. With all these powerful and advanced features, VDSM2-1008 VDSL2 Mini IP DSLAM is the perfect solution for service providers to deploy their broadband access, IP Surveillance, Hospitality and MTU/MDU applications.

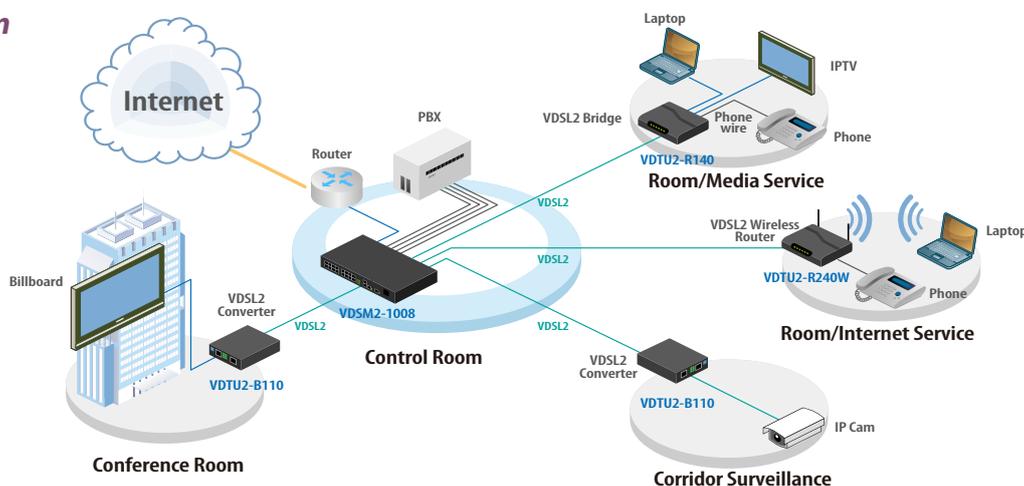
Features

- 1U design, 8 VDSL2 ports with POTS splitter
- Provides 3-FAN cooling mechanism and support low/middle/full speed based on programming temperature
- Supports VDSL2 profiles 8a/8b/8c/8d/12a/12b/17a/30a
- Supports traffic classification, such as QoS, ToS and DSCP
- Supports Port Security with MAC address filtering
- Supports Port-Based VLAN, Protocol-Based VLAN and VLAN Mapping
- Supports IEEE 802.1d STP/IEEE802.1w RSTP & IEEE-802.1s MSTP
- DHCP /Client/Relay/Option82, DNS Proxy
- Flexible deployment and maintenance
- Web-based management with a user friendly interface
- Configuration backup and restoration

Specifications

| | | | |
|-----------------------|--|--------------------------|---|
| Interfaces | RJ-11 x 8 VDSL2 Ports / RJ-11 x 8 POTS Ports 2x Gigabit Ethernet Combo ports (100/1000Base-T and SFP) 1x RJ-45 Console Port 1x RJ-45 Alarm Port for 4 Alarm Inputs | Power Consumption | 30Watts maximum |
| LED Indicators | System : PWR Gigabit Port : LINK/ACT, SPEED 1000/100 Alarm : RUN/ALARM VDSL : VDSL Link/Sync | Protocols | IGMP Snooping/Proxy v1, v2 and v3 Multicast Forwarding with IGMP Snooping v1 and v2 (RFC 1112 and RFC 2236) Multicast MAC address mapping Up to 512 Multicast Channels Profile-based Multicast Access Control (up to 8 profiles) Fast and Normal Leave Modes |
| Standards | VDSL2 ITU-T G.993.2 VDSL2 Profiles: 8a, 8b, 8c, 8d, 12a, 12b, 17a and 30a 802.1d L2 Bridging DHCP/Client/Relay/Option82 IEEE 802.1q VLAN Tag base VLAN Stacking (Q-in-Q) IEEE 802.1d Spanning Tree Protocol (STP) IEEE 802.3ad Link Aggregation | Security | L2 Frame Filtering by MAC Addresses L3 Frame Filtering by IP Addresses, protocol ID, and TCP/UDP DHCP and ARP Broadcasting Frames Filtering Supports Secured Forwarding |
| Certification | CE, FCC Part 15 Subpart B, VCCI, EN60950 | Management | Local Management: RS-232 and Telnet CLI, Web/SNMP management Remote in-band Management: Web/SNMP/Telnet Supports SNMP v1/v2/v3 |
| Dimensions | 404 x 174 x 44.5 mm (D x W x H) | Environment | Operating Temperature : -10°C to 50°C Storage Temperature : -40°C to 70°C Humidity : 10% - 95% (non-condensing) |
| Power | 100-240 V AC, 50-60 Hz | | |

Application



Ordering Information

| Model Name | Description |
|------------|--|
| VDSM2-1008 | 8-Port VDSL2 IP DSLAM with POTS Splitter (600 ohm) |

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

NEW



VDTU2-R240W

VDSL2 802.11n Wireless Router

VDTU2-R240W is a VDSL2/ADSL2+ 802.11n Wireless router with four fast Ethernet LAN ports and USB Host. It is compliant to ITU-T G.993.2 standard and supports VDSL2 30a profile that features 100Mbps of symmetric data rate over local loop. With built-in 802.11n technology, VDTU2-R240W can deliver wireless speed up to 300 Mbps and is perfectly suitable for triple play applications (video, voice and data). VDTU2-R240W VDSL2 Router is designed to meet the requirements of ISPs and carriers that intend to use one DSL device to cover end users in different loop range areas, it provides a great flexibility for their end-users to comply today's rapid-changing Internet demands. VDTU2-R240W VDSL2 is a cost-effective and high-speed Internet access solution that can provide users a smooth and reliable wireless connection.

Features

- Automatically switches from VDSL2 to ADSL2+
- Supports VDSL2 profiles 8a/8b/8c/8d/12a/12b/17a/30a
- Equipped with a one-click Wi-Fi Protected Setup (WPS) button
- Security protection with firewall
- Web-based management with user friendly interface.
- Configuration backup and restoration
- TR-069 Remote Management (Optional)

Specifications

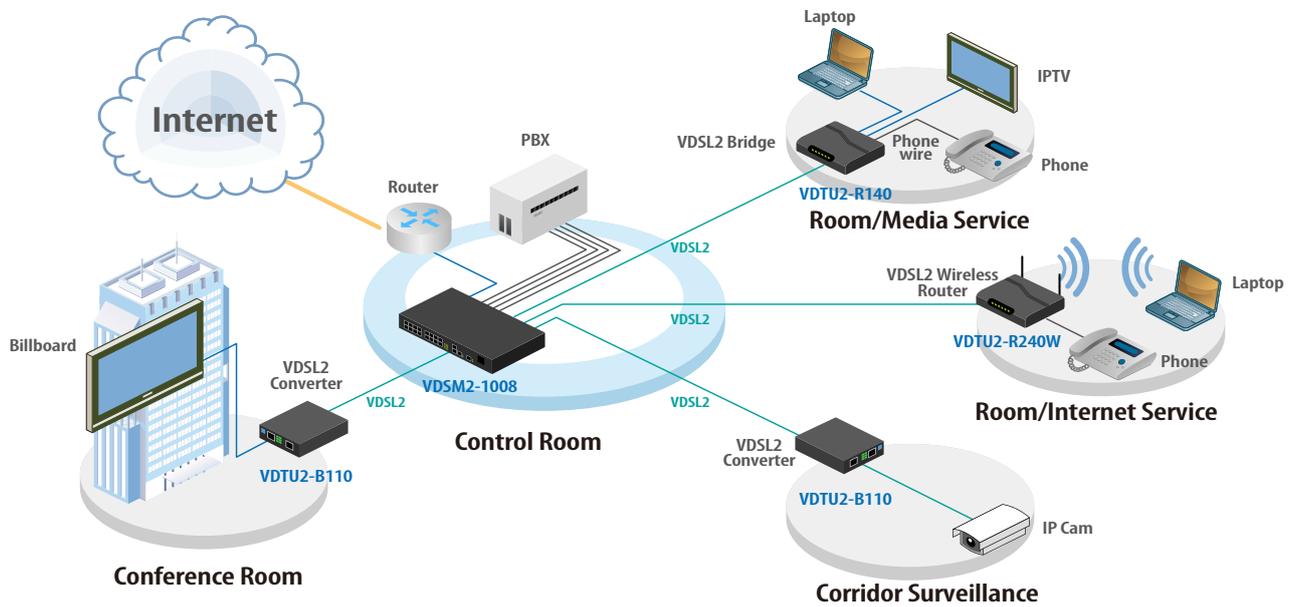
| Interfaces | | WLAN |
|----------------|---|---|
| LAN | 4x RJ-45 10/100Base-T Auto-sensing and Auto-MDIX switch, supports IPv6 | Compliant with IEEE 802.11b, 802.11g, and IEEE 802.11n standards 2.4 GHz configurable (5 GHz Optional) Up to 300 Mbps wireless operation rate RF Output Power: 15 ± 1.5 dBm in 2.4 GHz |
| USB | USB host x 1 | 64/128-bit Wireless security with WPA/WPA-PSK, PA2/WPA2-PSK, Mixed WPA/WPA2 support WPS (WiFi Protected Setup) for easy setup |
| Wi-Fi | 802.11b/g/n and 2 External antennas | USB File Sharing 3G backup support |
| RST | "Factory reset" button & reboot button | VPN VPN Pass-through |
| WPS | WPS push button | Management Web-based GUI for remote and local management (HTTP/HTTPS) Quick Start Wizard Configuration Backup and Restoration Firmware upgrade through TFTP/FTP and HTTP SNMP management with SNMP agent and MIB II Supports Syslog TR-069 (Optional) |
| Power | ON/OFF switch | QoS ATMQoS : UBR (Default), CBR, VBR-rt, VBR-nrt 802.1p IP DSCP |
| DSL Compliance | | |
| ADSL | G.dmt (ITU G.992.1) Annex A, B G.lite (ITU G.992.2) Annex A, B G.hs (ITU G.994.1) G.bond (ITU G.998.1) Maximum rate : 8 Mbps for downstream / 1 Mbps for upstream G.dm.bist + A196 (ITU G.992.3) Annex A, B G.lite.bis (ITU G992.4) Annex A, B Maximum rate : 12 Mbps for downstream / 1 Mbps for upstream G.dmt.bisplus (ITU G992.5) Annex A, B Maximum rate : 24 Mbps for downstream / 1,2 Mbps for upstream | |
| ADSL2+ | Up to 8 PVCs Supports encapsulation of bridged Ethernet over AAL5 (RFC 2684,formerly RFC1483) Supports encapsulation of routed IP over Ethernet over AAL5(IPoE) Supports encapsulation of routed IP over AAL5 (IPoA) Supports Classical IP according to RFC 2225 (formerly RFC1577) Supports PPPoA according to RFC 2364 Supports PPPoE(default) according to RFC 2516 Supports multiple levels of QoS | |
| VDSL2 | ITU G993.2 Annex A, B, C VDSL2 (ITU G993.2) Annex A,B,C, support Band plans 997, 998 refer to Annex B Up to 17 Mhz profile (POTS/ISDN) Supports VDS2 profile 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a Supports ATM and PTM transparent (dual-priority & dual latency) for user data | |

Specifications

| | |
|-----------------|--|
| Firewall | IPv6 Firewall |
| | Packet filtering |
| | URL filtering |
| | Parental control |
| Routing | Static routing and RIP v1/v2 (RFC 1058/2453) |
| | Supports IP/TCP/UDP/ARP/IGMP |
| | IP multicast and IGMP proxy (RFC 1112/2236) |
| | Network Address Translation (NAT/PAT) |
| | DNS relay and caching (RFC 1034/1035) |
| | DHCP server |
| | IP precedence (RFC 791) (Firewall router) |

| | |
|----------------------|-------------------------------|
| Power | AC Adapter : 100V-240V± / 10% |
| | Output : DC 12VDC |
| Certification | CE, FCC, RoHS compliant |

Application



Ordering Information

| Model Name | Description |
|-------------|---|
| VDTU2-R240W | VDSL2 Wi-Fi Router with 4-Port 10/100-TX Ethernet |

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

NEW



VDTU2-R140

4-Port VDSL2 Router

VDTU2-R140 is a single-VDSL2-port router with 4 10/100Mbps Ethernet ports. It adopts the latest VDSL2 technology (ITU G.922.3), which has the extraordinary bandwidth and supports up to VDSL2 profile 30a, and it is perfectly suitable for triple play applications (video, voice and data). VDTU2-R140 is a cost effective solution that delivers high-speed Internet access to end-users over existing copper wire infrastructure. Also, it is designed to meet the requirements of ISPs and carriers that intend to use one DSL device to cover end users in different loop range areas. In addition, it provides great flexibility for their end-users to comply today's rapid-changing Internet demands. Based on the latest VDSL2 technology, VDTU2-R140 presents a cost-effective solution with high-speed Internet access over standard copper telephone cable.

Features

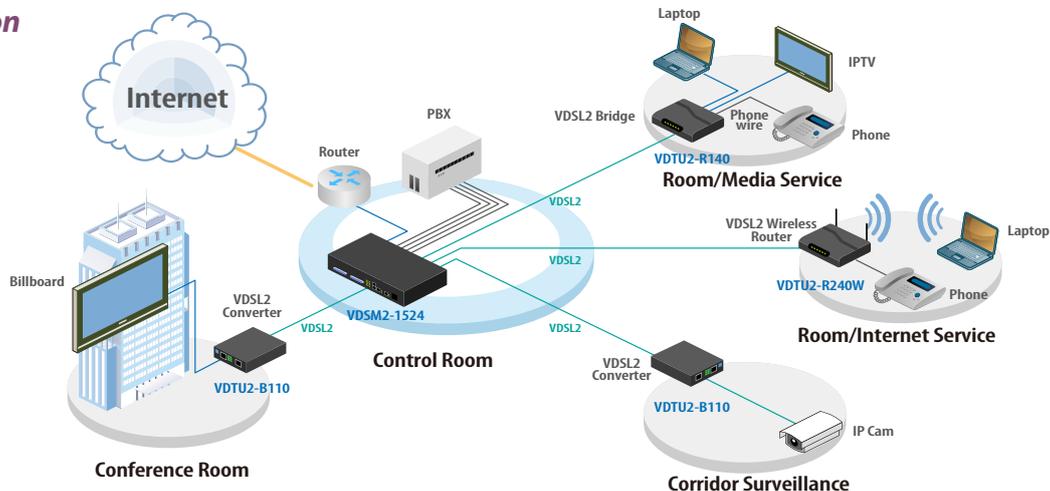
- Supports point-to-point mode (support both CO and CPE modes)
- Interoperable with major VDSL2 chipset solutions including Ikanos, Infineon, and Broadcom
- Supports up to VDSL2 profile 30a
- Supports up to 100Mbps for both Upstream and Downstream
- Build-in UPnP available, which allows automatic discovery and the broadband router's configuration
- IP/MAC address filtering
- Static route/RIP/RIP v2 routing functions
- Dynamic IP assignment
- Supports QoS to enhance traffic efficiency
- Supports NAT, which allows multiple users access the Internet with only one single external IP address
- IGMP Proxy and fast leave
- DHCP Server/Relay/Client. DNS Proxy, DDNS
- Embedded SNMP agent
- Web-based management with a friendly graphical user interface
- Configuration backup and restoration

Specifications

| | |
|-------------------|---|
| Standards | Compliant with ITU VDSL2 standard G.993.2 Annex A, Annex B and Annex C Supports VDSL2 profile: 8a, 8b, 8c, 8d, 12a, 12b, 17a and 30a Band plan profile: symmetric (Plan 997) and asymmetric (Plan 998) Built-in POTS splitter to share voice and data (Optional) |
| Management | Web-based GUI for quick setup, configuration and management Firmware upgradable from Web SNMP management with SNMP agent and MIB II |
| Interfaces | Ethernet: 4 X RJ-45 connectors for Ethernet 10/100Mbps ports with Auto-MDI/MDIX VDSL : 1 X RJ-11 connector for VDSL2 port |
| QoS | Port Based 802.1p ToS/DSCP 4 priority queues per port WRR/WFQ/SP/BE |
| Power | AC Adapter : 100V-240V± / 10% Output : DC 12VDC |

| | |
|-------------------|---|
| LAN | Filtering functions for MAC/IP/Port. Port Based VLAN & IEEE 802.1q VLAN Tagging Port configuration for Bandwidth/Duplex/Speed/Flow control |
| Routing | Static routing and RIP v1/v2(RFC 1058/2453) Support IP/TCP/UDP/ARP/IGMP IGMP snooping and proxy (RFC 1112/2236) NAT ALGs for ICQ/NetMeeting/MSN/Yahoo Messenger DNS relay and caching (RFC 1034/1035) DHCP server, client and relay (RFC 2131/2132) Dynamic DNS IP precedence (RFC 791) (Firewall router) |
| Firewall | DMZ host Virtual server mapping (RFC1631) VPN pass-through for PPTP/ L2TP/ IPSec tunneling NAT firewall User access control |
| Weight | 300g |
| Dimensions | 131.5 x 180 x 36.5 mm (D x W x H) |

Application



Ordering Information

| Model Name | Description |
|------------|---|
| VDTU2-R140 | VDSL2 Router with 4-Port Ethernet and POTS splitter 600 ohm |

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

VDTU2-B110

VDSL2 Ethernet Bridge



VDTU2-B110 Ethernet Extender is a high-speed Ethernet Extender with one Ethernet port (RJ-45 connector) and one VDSL port (RJ-45 connector). It is a bridge mode modem, well accommodating VDSL2 (Very-high-data-rate Digital Subscribe Loop) technology to extend Ethernet service over single-pair phone line. It is compliant to ITU-T G.993.2 standard and supports VDSL2 30a profile that features 100Mbps of symmetric data rate over the existing copper wires. Supporting both symmetric and asymmetric transmission, it can reach up to 100/100 Mbps bandwidth (line rate) within 300M or 10/10 Mbps (line rate) for 1 Km long range connections. By providing ultra-high speed, VDTU2-B110 Ethernet Extender makes your telephone line achieve its best performance than before. It has the advantage of minimum installation time (simply as plug-n-play) and minimum expense by allowing video streaming and data to share the same telephone pair without interference. VDTU2-B110 Ethernet Extender delivers everything needed to quickly deploy a high-speed IP-based network for providing high-speed Internet access, video-on demand services and voice services. The resulting compact, cost-effective form factor offers Systems Integrators, small business owners an attractive Long Reach Ethernet solution.

Features

- Cost effective bridge function to connect two Ethernet LAN
- Supports flow control on Fast Ethernet port via PAUSE frame or Back Pressure
- IEEE 802.1Q VLAN tag transparent
- Easy installation via simple plug-and-play
- Selectable CPE and CO mode via DIP switch: Two working modes are built in the same unit, which keep the flexibility of installation and easy provision of service but lower inventory of service provider
- Selectable VDSL2 profile mode (17a or 30a): Support up to VDSL2 30a profile to ensure high data rate.
- Selectable target band plan:
Symmetric: Support the band plan G.997 and provide the symmetric transmission on both downstream and upstream.
Asymmetric: Provides highest line rate in short range in asymmetric mode.
- Selectable target SNR margin

Specifications

| | | | |
|--------------------------|--|-----------------------|--|
| 4-Pole DIP Switch | Selectable CO or CPE mode | VDSL Interface | RJ-45 connector |
| | Selectable 30a or 17a (VDSL2 Profile) | | DMT Encoding |
| | Selectable Band plan (Symmetric or Asymmetric) | | Complies with ITU-T G993.1/993.2/G.997.1 |
| | Selectable target SNR margin (6dB or 9dB) | | On-board surge protection |
| LAN Interface | RJ-45 connector | Dimensions | 73.4 x 96.2 x 22.8 mm (D x W x H) |
| | Complies with IEEE 802.3/802.3u/802.3x 10/100 Base-T Auto-Negotiation, Auto-MDI/MDI-X | | Temperature |
| LED | LAN : ACT/LNK,10/100Mbps, Half/Full Duplex | Humidity | |
| | VDSL : Power On/Off, CO/CPE, Idle/Trained/Link | | Certification |
| Power supply | DC 12 Volt over 3.5mm DC jack ; 4.2 Watt maximum | | |
| | | | EN60950 |

Application



Ordering Information

| Model Name | Description |
|-------------------|---|
| VDTU2-B110 | VDSL2 10/100-TX Ethernet Bridge |
| FMC-CH17-AC/DC/AD | 2U, 17-slot FMC converter Chassis with AC, DC or AD Power |

VDTU2 -
 Example: VDTU2 - B110
 Chassis Power Type
 FMC-CH17 -
 Example: FMC-CH17 - AD

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



VDTU2A-301

VDSL2 LAN Extender

The VDTU2A-301 is our lowest cost LAN extension solution using the G993.1/993.2 VDSL2 technology and providing up to 100Mbps throughput with only a single copper wire pair. A LAN extender is a device that forwards traffic between LANs transparently to higher network-layer protocols over distances that far exceed the distance limitations of standard Ethernet. A LAN is a high-speed data network (usually employing Ethernet technology) that connects computer workstations, printers, servers, and other devices. Designed specifically for LAN to LAN extension and supporting both symmetrical and asymmetrical transmission at up to 100/75Mbps within 300 meters or 10/10Mbps rate at 1000 meters, this is a perfect solution to extend a LAN to an adjacent building, garage or any location outside of the 100 meter reach of Ethernet UTP.

Features

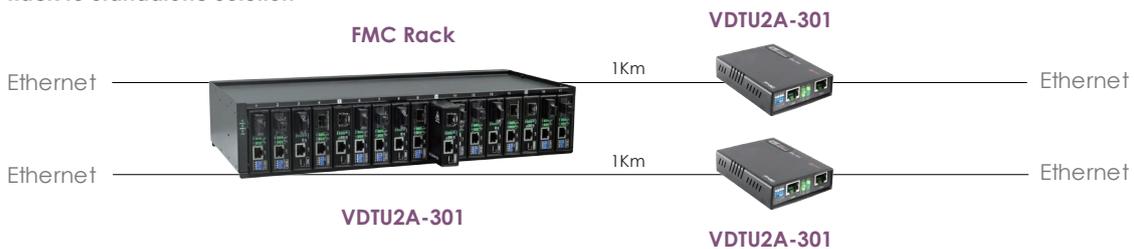
- Cost effective bridge function to connect two Ethernet LANs
- 100/75Mbps @ 300m (980 Ft)
- 10/10Mbps @ 1km (3300 Ft)
- Supports flow control via Pause frame or back pressure
- 802.1Q VLAN tag transparent
- Selectable CPE and CO mode via DIP switch
- Selectable fast and interleaved mode
- Selectable target band plan
- Selectable target SNR margin 9dB or 6dB

Specifications

| | | | |
|------------------------------|--|--------------------------|---|
| LAN Interface | Complies with IEEE 802.3 10Base-T and 802.3u 100Base-TX Connector : RJ45 MTU : 1536 Bytes | Indicator | LAN : Act/Link, 10/100Mbps, Half/Full duplex VDSL : CO/CPE, Idle/Trained/Link, Power |
| VDSL2 Interface | Complies with ITU-T G993.1/993.2/ G997.1 Connector : RJ45 DMT encoding On-board surge protection | Standard | ITU-T G.993.1, 993.2, IEEE802.3, 802.3u |
| 4-position DIP Switch | Selectable CO or CPE mode Selectable fast or interleave mode (Impulse noise protection) Selectable Band plan (Symmetric or Asymmetric) Selectable target SNR margin (6dB or 9dB) | Power | DC 12V via AC switching adapter |
| | | Power Consumption | 4.2W |
| | | Dimensions | 97 x 73 x 23mm (D x W x H) |
| | | Weight | 80g |
| | | Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| | | Humidity | 10 ~ 90% non-condensing |
| | | Certification | CE, FCC, RoHS compliant |
| | | MTBF | 50,000 hrs |

Application

Rack to Standalone Solution



Standalone to Standalone Solution



Ordering Information

| Model Name | Description |
|-------------------|---|
| VDTU2A-301 | VDSL2 LAN Extender with 1x 10/100Base-TX |
| FMC-CH17-AC/DC/AD | 2U, 17-slot FMC converter Chassis with AC, DC or AD Power |

VDTU2A -
 Example: VDTU2A - 301
Chassis Power Type
 FMC-CH17 -
 Example: FMC-CH17 - AD

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

VDTU2A-304

4-Port VDSL2 LAN Extender



11

VDSL2 LAN extender

The VDTU2A-304 VDSL2 LAN Extender is a long reach Ethernet extender with four Ethernet ports and two phone jacks, in which one is for VDSL2 connection and the other is for POTS (Plain Old Telephone Service) connection. It has built-in POTS splitter to share the existing phone line with POTS eliminating the need for replacing the existing copper wiring. It is ideal for use as an Ethernet extender to an existing Ethernet network. While accommodating VDSL2 (Very-high-data-rate Digital Subscribe Loop) technology to extend Ethernet service over single-pair phone line, VDTU2A-304 can reach up to 100/75 Mbps bandwidth (line rate) within 300M or 40/10 Mbps bandwidth (line rate) for 1 Km long-range connections. By providing ultra-high speed, VDTU2A-304 LAN Extender makes your telephone line achieve its best performance ever. It has the advantage of minimum installation time (simple as plug-n-play) and minimum expense by allowing video streaming and data to share the same telephone pair without interference. VDTU2A-304 delivers everything needed to quickly deploy a high-speed IP-based network for providing high-speed Internet access, video-on demand services and voice services. The resulting compact, cost-effective form factor offers systems integrators and small business owners an attractive long reach Ethernet solution.

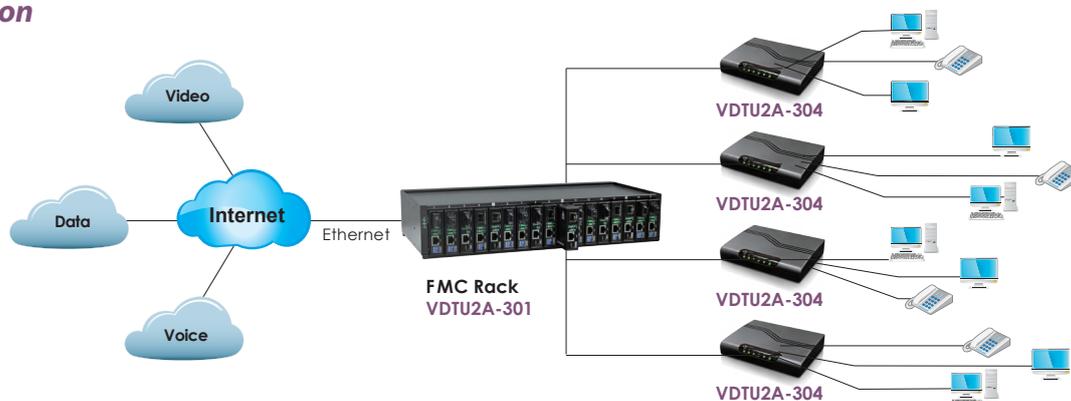
Features

- Cost effective bridge function to connect two Ethernet LAN
- Easy installation via simple plug-and-play
- Selectable CPE and CO mode : Two working modes are built in the same unit, which keep the flexibility of installation and easy provision of service but lower inventory of service provider.
- Selectable fast and interleaved mode: Fast mode guarantees a minimum end to end latency less than 1 mS. Interleaved mode provides impulse noises protection for any impulse noise with duration less than 250uS. Interleaved mode has a maximum end to end latency of 10mS.
- Selectable target band plan : VDSL2 defines multiple band plans and configuration modes to allow asymmetric and symmetric services in same binder for data transmission.
- Asymmetric is selected that provides better downstream performance. Symmetric is selected that provides better upstream performance.
- Selectable target SNR margin: It has the ability to select fixed SNR margin value on 9 dB or 6db. The systems will maintain the SNR margin at their value across all usable loop length. The higher SNR value gets better line quality, but lower performance.

Specifications

| | | | |
|-------------------|---|--------------------------|--|
| Standards | Compliant with ITU VDSL2 standard G.993.2 Annex A, Annex B and Annex C Supports VDSL2 profile : 8a, 8b, 8c, 8d, 12a, 12b and 17a Band plan profile: symmetric (Plan 997) and asymmetric (Plan 998) Supports fast and interleaved mode Target SNR Margin : Selectable Built-in POTS splitter to share voice and data (Optional) | Interfaces | Ethernet : 4x RJ-45 connectors for Ethernet 10/100Mbps ports with Auto-MDI/MDIX VDSL : 1 X RJ-11 connector for VDSL2 port Phone : 1 X RJ-11 connector for POTS Splitter (Optional) General : PWR and SYS WAN (VDSL2) : CO, CPE, LINK and ALM LAN (Ethernet) : 1, 2, 3, 4 LNK/ ACT |
| Management | Web-based GUI for quick setup, configuration and management Firmware upgradable from Web | Indicators | General : PWR and SYS WAN (VDSL2) : CO, CPE, LINK and ALM LAN (Ethernet) : 1, 2, 3, 4 LNK/ ACT |
| LAN | Filtering functions for MAC/IP/Port QoS for Port/VLAN/DSCP/TCP-UDP Port number Port Based VLAN & IEEE 802.1q VLAN Tagging Port configuration for Bandwidth/Duplex/Speed/Flow control/Broadcast storm | Power | Input : AC 90~240V/50 ~ 60Hz ; Output : DC 12V/1A |
| | | Power consumption | 9 watts maximum |
| | | Environment | Temperature : 0 ~ 45°C Humidity : 0% ~ 95% (non-condensing) |
| | | Dimensions | 131.5 x 180 x 36.5 mm (D x W x H) |
| | | Weight | 300g |

Application



Ordering Information

| Model Name | Description |
|---------------|--|
| VDTU2A-304/US | VDSL2 LAN Extender with 4-port 10/100Base-TX, splitter 600 ohm |



MD15

48-Port Managed IP DSLAM with GbE Combo Uplink

The MD15 is a 1.5U 19" rack mountable "pizza box" type ADSL2+ IP DSLAM with temperature hardening. The system provides 48 ADSL2/2+ ports with built-in POTS splitters and is able to provide broadband data communication services and multimedia services on the same copper line. The unit is capable of delivering high speed data services, full-rate of ADSL2+ (up to 24mbps download) for 48 subscribers with 2 Gigabit uplinks or 10 Mbps per port for 96 subscribers in a two 48-port stacked boxes configuration. With advanced QoS features, the MD-15 is ideal for next generation broadband networks capable of delivering rich video content, DSL, POTS, and VoIP service over ADSL2+ link. The MD-15 provides two uplink ports with both electrical and optical (SFP) Gigabit Ethernet (GbE) interfaces for cascading, ring architecture or 802.3ad link aggregation. The MD15 is suitable for small size applications or deployment in remote location such as business parks or street cabinets to extend the service reach distance from central office.

Features

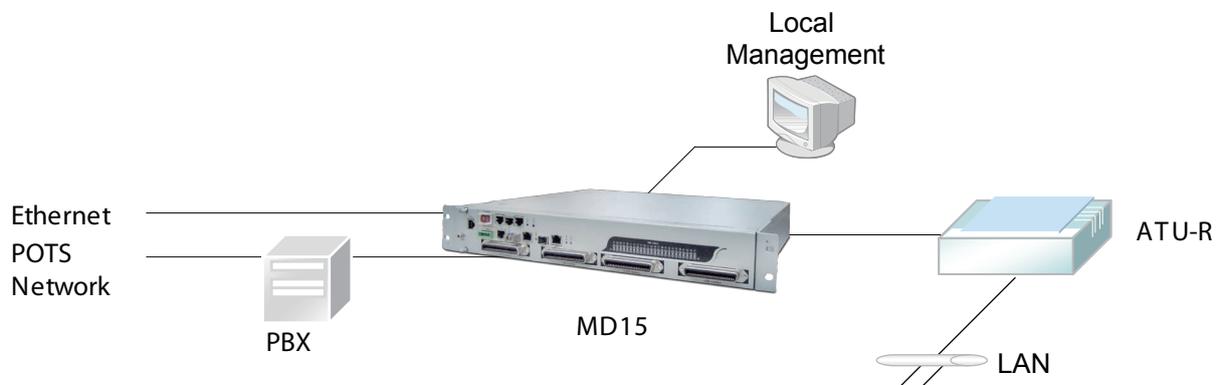
- 48 ports ADSL2/2+ solution in 1.5U chassis
- 1+1 Gigabit Ethernet trunk with combo SFP and RJ45
- Multi-ADSL speed offerings supporting ADSL, ADSL2, ADSL2+ over POTS or ISDN
- Built-in POTS splitters
- Backup firmware partition aids in upgrade failure recovery
- Temperature monitor and system over temperature protection with trap alarm
- Configuration backup and restore via TFTP
- RS-232 serial CLI and separate LAN port for web based management
- NMS/EMS for Multiple nodes management based on SNMP (option)

Specifications

| | | |
|------------------------|--|--|
| VDSL2 standards | Network Interface | 2x 10/100/1000Based-T or 2x SFP (IP) |
| | Line Interface | ADSL2/2+ / POTS(G.992.1 .2 .3 .5) |
| Management | Ethernet | IEEE 802.1d Spanning Tree Protocol (STP) IEEE 802.3ad Link aggregation Password Security on console access |
| | OSI Layer 2 | MAC filtering and count limit |
| | Functionality | Access control list (ACL) |
| | | Multicasting support |
| | | Port based and 802.1p/q Tag-based VLAN |
| | IGMP V1/V2 snooping and proxy | |
| | SNMP V1/V2C | |
| System | Multiple session Telnet, web based and SNMP | |
| Configuration | Supports point to point VCC link Software remote upgrade | |
| MTBF | 50,000 hrs | |

| | |
|--------------------------|--|
| Alarm and Status | Automatic alarm/LED indication for alarm and system status Four housekeeping inputs and one alarm contact closure output |
| Management | Provides all system OAM&P functionalities, software remote updates RS-232 local console interface for basic provisioning plus out-band Ethernet interface for Telnet or Web |
| Indications | GbE 1/2 link, RST, ACO, ALM, SYS, DSL Status 1 ~ 48 |
| Power Input | Dual A+B feeds, -42V ~ -56VDC AC: 100V ~ 240VAC |
| Power Consumption | 130W |
| Dimensions | 265 x 482 x 66mm (D x W x H) |
| Weight | 3.5kg |
| Temperature | -40 ~ 65°C (Operating), -40 ~ 70°C (Storage) |
| Humidity | 10~90% non-condensing |
| Certification | CE, FCC, RoHS compliant, ITU-T, ETSI |

Application



Ordering Information

| Model Name | Description |
|--------------|--|
| MD15-48A6-AC | 1.5 U 19" Rack 48-port Anx A 600Ω AC Power |
| MD15-48A6-DC | 1.5 U 19" Rack 48-port Anx A 600Ω DC Power |

MD15 - - Power Type
 Example: MD15 - 48A6 - AC

MD30

24 ~ 120 Ports Modular Managed IP DSLAM with GbE Combo Uplink



The MD30 is a 3U 19" rack mountable ADSL2+ IP DSLAM with temperature hardening. The modular design allows hot swapping of major components such as uplink trunk card, 24-port tributary cards and cooling fan module. The system provides 24/48/72/96/120 ADSL2/2+ ports with built-in POTS splitters and is able to provide broadband data communication services and multimedia services on the same copper line. The unit is capable of delivering high speed data services, full-rate of ADSL2+ (up to 24Mbps download) for 120 subscribers with 2 Gigabit uplinks. With advanced QoS features, the MD-30 is ideal for next generation broadband networks capable of delivering rich video content, DSL, POTS, and VoIP service over ADSL2+ link. The MD30 provides two uplink ports with both electrical and optical (SFP) Gigabit Ethernet (GbE) interfaces for cascading, ring architecture or 802.3ad link aggregation. The MD30 is suitable for small size applications or deployment in remote location such as business parks or street cabinets to extend the service reach distance from central office.

Features

- 3U 19(23)" 5-slot ADSL2/2+ chassis
- Modular design with hot swappable field replaceable units
- 1+1 Gigabit Ethernet trunk with combo SFP and RJ45
- Temperature monitor and system over temperature protection with trap alarm
- Backup firmware partition aids in upgrade failure recovery
- Configuration backup and restore via TFTP
- RS-232 serial CLI and separate LAN port for web based management
- NMS/EMS for Multiple nodes management based on SNMP (option)

Specifications

| | | | |
|------------------------------|---|------------------------------------|--|
| Network Interface | 2x 10/100/1000Based-T or 2x SFP (IP) Subscriber Interface | Management | Multicasting support Port based and 802.1p/q Tag-based VLAN IGMP V1/V2 snooping and proxy SNMP V1/V2C |
| Line Interface : ADSL | 24 ports per card Fast/Interleave latency modes for G.dmt Supports Interleave mode for G.Lite ADSL to ATM signal conversion Build-in POTS splitter circuit Power Consumption : 25 W(max) | System Configuration | Multiple session Telnet, Web based and SNMP Supports point to point VCC link Software remote upgrade |
| 4-position DIP Switch | 24 ports per card Signal modulation and demodulation G.SHDSL to ATM signal conversion Power Consumption : 21 W(max) | Alarm and Status Management | Automatic alarm/LED indication for alarm and system status Four housekeeping inputs and one alarm contact closure output Provides all system OAM&P functionalities, software remote updates.RS-232 local console interface for basic provisioning plus out-band Ethernet interface for Telnet or Web Indications GbE 1/2 link, RST, ACO, ALM, SYS, DSL Status 1 ~48 |
| Indicator | LAN: Act/Link, 10/100Mbps, Half/Full duplex VDSL : CO/CPE, Idle/Trained/Link, Power | Power Input | Input : -48 V DC (-42 V to -56 V) Dual A+B -48 V DC power input terminal |
| Standard | ATM QoS (UBR, rt-VBR, nrt-VBR, CBR) PVC default priority and PVC-to VLAN mapping Traffic scheduling/shaping/policing Ethernet IEEE 802.1d Spanning Tree Protocol (STP) IEEE 802.3ad Link aggregation Password Security on console access | Power Consumption | 130W |
| Management | OSI Layer 2 Functionality MAC filtering and count limit Access control list (ACL) | Dimensions | 304 x 482 x 133 mm (D x W x H) |
| | | Weight | 4.5kg |
| | | Temperature | -40 ~ 65°C (Operating), -40 ~ 70°C (Storage) |
| | | Humidity | 10 ~ 90% non-condensing |
| | | Certification | CE, FCC, RoHS compliant, ITU-T, ETSI |

Application



Ordering Information

| Model Name | Type | Description |
|------------|------------|--|
| MD30-MA1A | Chassis | 3U,19" 5 slot chassis with DC power, Cooling Fan |
| MD00-GE1A | Trunk Card | Giga Ethernet Uplink card with 2xGbe Combo |
| MD00-AL5A | Link Card | 24-Port ADSL 2 Line card 600 ohm Splitter ANX-A |

Chassis Type
MD30 – □□□□
 Example: MD30 – MA1A
 Card Type
MD00 – □□□□
 Example: MD00 – GE1A

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



MD15A

24-Port Managed IP DSLAM with Gigabit Uplink

The MD15A is a 1.5U 19" rack mountable "pizza box" type ADSL2+ IP DSLAM with temperature hardening. The system provides 24 ADSL2/2+ ports with built-in POTS splitters and is able to provide broadband data communication services and multimedia services on the same copper line. The unit is capable of delivering high speed data services, full-rate of ADSL2+ (up to 24Mbps download) for 24 subscribers with one Gigabit copper uplinks. With advanced QoS features, the MD-15A is ideal for next generation broadband networks capable of delivering rich video content, DSL, POTS, and VoIP service over ADSL2+ link. The MD15A is suitable for small size applications or deployment in remote location such as business parks or street cabinets to extend the service reach distance from central office.

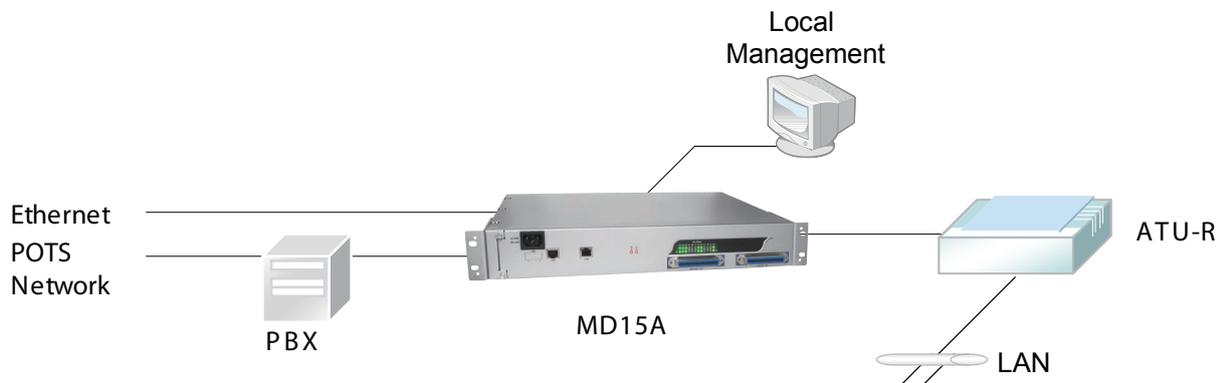
Features

- 24 ports ADSL2/2+ solution in 1.5U chassis
- One copper Gigabit Ethernet uplink design
- Multi-ADSL speed offerings supporting ADSL, ADSL2, ADSL2+ over POTS or ISDN
- Built-in POTS splitters
- Configuration backup and restore via TFTP
- Monitors of line attenuation, noise margin, current rate, second performance data
- Backup firmware partition aids in upgrade failure recovery
- RS-232 serial CLI and separate LAN port for web based management
- NMS/EMS for Multiple nodes management based on SNMP (option)

Specifications

| | | | |
|-----------------------------|--|--------------------------|--|
| Network Interface | 1x 10/100/1000Base-T | Alarm and Status | Automatic alarm/LED indication for alarm and system status |
| Line Interface | ADSL2/2+/ POTS(G.992.1 .2 .3 .5) | Management | Maintenance signal for OAM functionalities. Software remote updates. |
| | Ethernet Password Security on console access | | RS-232 local console interface for basic provisioning plus out-band Ethernet interface for Telnet or Web |
| | OSI Layer 2 MAC filtering and count limit | Indications | GbE link, RST, ACO, ALM, SYS, DSL Status |
| | Functionality Access control list (ACL) | Power Input | -42V ~ -56VDC, 100V ~ 240VAC |
| | Multicasting support | Power Consumption | 130W |
| | Port based and 802.1p/q Tag-based VLAN | Dimensions | 265 x 482 x 66 mm (D x W x H) |
| | IGMP V1/V2 snooping and proxy | Weight | 3.5kg |
| | SNMP V1/V2C | Temperature | -40 ~ 65°C (Operating), -40 ~ 70°C (Storage) |
| System Configuration | Multiple session Telnet, web based and SNMP Supports point to point VCC link Software remote upgrade | Humidity | 5 ~ 95% non-condensing |
| MTBF | 50,000 hrs | Certification | CE, FCC, RoHS compliant, ITU-T, ETSI |

Application



Ordering Information

| Model Name | Description |
|---------------|--|
| MD15A-24A6-AC | 1.5 U 19" Rack 24 port Anx A 600Ω AC Power |
| MD15A-24A6-DC | 1.5 U 19" Rack 24 port Anx A 600Ω DC Power |

Power Type
MD15A – 24A6 –
 Example: MD15A – 24A6 – AC

TDM SHDSL Modem

2-wire G.SHDSL TDM

SHDTU03-E1, SHDTU03-ET100, SHDTU03-V35

4-wire G.SHDSL.bis TDM

SHDTU03bA-31



11

TDM SHDSL modem

SHDSL TDM modem Series is a telecommunication product designed for carriers and SME users. The standalone modems offer a variety of choices for data interfaces to meet different connection needs. SHDSL TDM modem series features E1/T1, Data and Ethernet interfaces, allowing connection to different DTE types. When equipped with multiple interfaces, the standalone SHDSL modem combines user traffic over the SHDSL link. Available DTE combinations include E1+Ethernet, T1+Ethernet that can work simultaneously to share the DSL bandwidth. The SHDSL modem supports two different connectors for G.703 E1 application that link to TDM service either by balanced 120Ω RJ45 jack or unbalanced 75Ω dual BNCs with bit rates from 64kbps to 2.048Mbps. For T1 connection, the SHDSL modem offers balanced 100Ω RJ45 Jack to carry bit rates from 64Kbps to 1.544Mbps. For Ethernet interface application, the SHDSL modem supports 10/100Mbps auto-detected Fast Ethernet with a RJ45 connector, and provides customer premise with LAN to high-speed TDM services. The data rate of LAN interface is up to 2.3Mbps (SHDSL) for one pair of copper wires and 11.4Mbps (SHDSL.bis) for two pairs of copper wires. The SHDSL modem can be configured and managed via EOC, or menu-driven Asynchronous Terminal Interface, either locally or remotely.

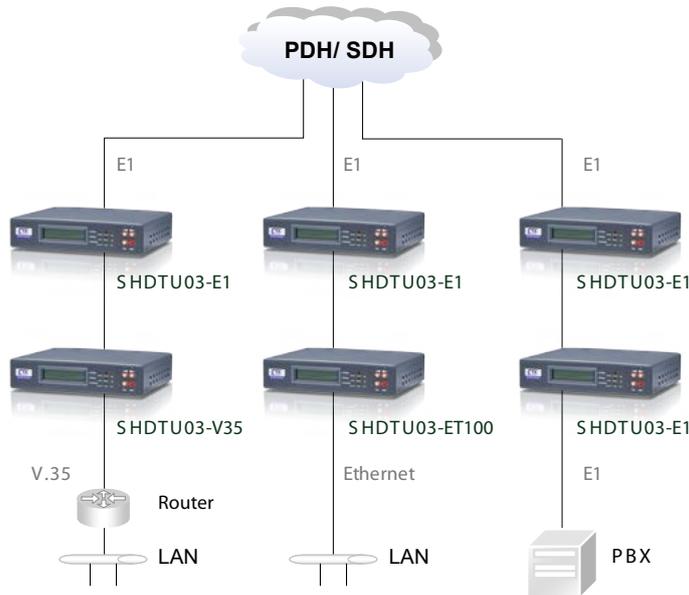
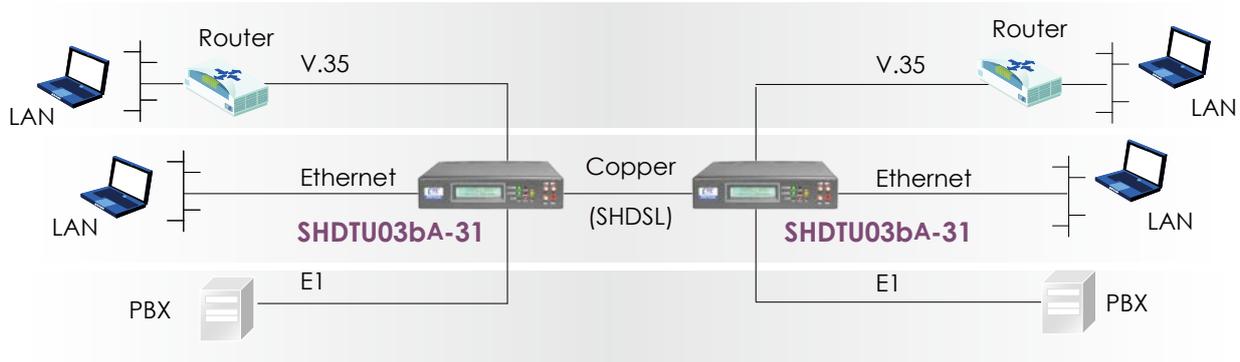
Features

- Standard ITU-T G.991.2 supports improvement on reach, speed and interoperability in contrast to conventional SHDSL devices
- Fast and cost-effective services as voices or TDM leased line services or LAN
- Efficient usage of single wire pair on existing copper loop infrastructures
- Bandwidth guaranteed transmission equipment
- Supports multiple DTE interfaces working simultaneously on back-to back connection
- Auto rate installation maximizes data rate based on loop conditions
- Local management interface with LCD display
- Remote line loopback
- SHDSL Line performance monitoring (data rate and SNR)
- Raw and per time interval statistics

Specifications

| | | | |
|-----------------------------|---|---|--|
| Network Interface | Line Rate : ITU-T G.991.2 (2004), ITU-T G.994.1 | LAN Interface (Ethernet) | Single Ethernet Interface |
| | Connection : RJ-45 | | Payload rates : Up to 5.696Mbps (for 2-wire model) or Up to 8.192Mbps (for 4-wire model) |
| | Impedance : 135 ohms | | 10/100Mbps Half/Full Duplex, Auto-sensing, Auto-MDI/MDIX |
| | SHDSL.bis Coding : trellis coded pulse amplitude modulation (TC-PAM16 and TC-PAM32) | | Up to 1024 MAC address learning |
| | Supports : Annex A, B, F and G | Jitter and Wander | Meets G.823 and G.824 jitter and wander requirements |
| | Payload Rates | DSL Timing | Internal |
| | • 64Kbps to 5.696Mbps (N=1 to 89) for 2-wire model | | From E1/T1 Recovery (E1/T1) |
| | • 128Kbps to 11.392Mbps (N=2 to 178) for 4-wire model | Performance Monitoring | ES, SES, UAS, LOWS for SHDSL |
| | SHDSL Coding : trellis coded pulse amplitude modulation (TCPAM-16) | | ES, SES, UAS for E1/T1 |
| | Supports : Annex A (ANSI) and Annex B (ETSI) | | Alarms and Errors for SHDSL or interface |
| | Payload Rates: 64kbps to 2.304Mbps (N x 64kbps, N=1 to 36) | Loopback Tests (for E1, T1 only) | Local Digital Loopback |
| | Connection : RJ-45 jack (2-wire or 4-wire) | | Local Loopback |
| | Impedance : 135 ohms | | Remote Line Loopback |
| G.703 Interface (E1) | Connection : RJ-45 for balanced 120Ω E1 cable and BNC for unbalanced 75Ω E1 cable | | Remote Payload Loopback |
| | Line Rate : 2048KHz +/- 50ppm | | Far-end Line Loopback |
| | Line coding : HDB3/AMI | | Far-end Payload Loopback |
| | Framing : PCM30/PCM30C/PCM31/PCM31C and Unframed | Management | Build-in 2047 (2 ¹¹ -1) Bit Error Rate Tester |
| | Data Rate : 64kbps to 2.048Mbps (Nx64Kbps, N=1 to 32) | | Configuration with keypads and LCD display |
| | Operation : Full E1 and Fractional E1 | | Console port (RJ45, RS232C) |
| | | | Support firmware upgradeable |
| G.703 Interface (T1) | Connection : RJ-45C for balanced 100Ω T1 cable | Certification | CE Approval & EN60950 Certificate |
| | Line Rate : 1544KHz +/- 50ppm | Dimensions | 195 x 48 x 168 mm (D x W x H) |
| | Line coding : B8ZS | Power | AC Input : 90~240V with 50~60Hz |
| | Framing : SF/ESF/Unframed | | DC Input : -36V~-72V |
| | Data Rate : 64kbps to 1.544Mbps (N=1 to 24) | Power Consumption | 10W Max |
| | Operation : Clear Channel and Fractional T1 | Environment | Operation temperature : 0 to 50°C |
| | | | Humidity : Up to 95% (non-condensing) |

Application



Ordering Information

2-wire G.SHDSL TDM

| Model Name | Description |
|------------------|--|
| SHDTU03-E1-AD | E1 NTU, AC+DC Power (2-wire 2.3Mbps) |
| SHDTU03-ET100-AD | Ethernet 10/100Base-TX Ethernet Bridge NTU, AC+DC Power (2-wire 2.3Mbps) |
| SHDTU03-V35-AD | V35 TDM NTU, AC+DC Power w/V35 Cable (2-wire 2.3Mbps) |

SHDTU03 - -
 Example: SHDTU03 - E1 - AD

4-wire G.SHDSL.bis TDM

| Model Name | Description |
|-----------------|---|
| SHDTU03bA-31-AD | E1/V35/LAN multi-interface NTU with AC+DC Power (4-wire 11.4Mbps) |

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

ATM SHDSL Router

2-wire G.SHDSL ATM

SHDTU03F-ET10R, SHDTU03AF-ET10RS

2/4-wire G.SHDSL.bis ATM

SHDTU03bF-ET10RS, SHDTU03bAF-ET10RS



11

ATM SHDSL
router

The SHDSL ATM modem series is 2-wire or 4-wire Ethernet Bridge/Router that complies with G.991.2 standards and has an optional built-in four port 10Base-T /100Base-TX auto-negotiation and auto-MDIX switch. The SHDSL ATM modem provides business-class, multi-rate 2-wire up to 5.7Mbps (SHDSL.bis) and 2.3Mbps (SHDSL) or 4-wire 11.4Mbps (SHDSL.bis) and 4.6Mbps (SHDSL) payload rates over existing single or two pair copper wire. SHDSL ATM modem 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 SHDSL ATM modem 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

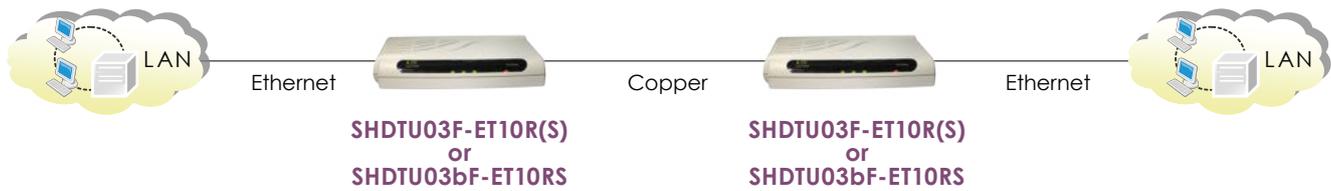
- Supports Ethernet over ATM over SHDSL
- Full ATM protocol stack implementation over G.SHDSL
- Adaptive rate installation maximizes data rate based on loop conditions
- Standard ITU G.991.2 (2004) supports improved reach, speed and interoperability compared to conventional G.SHDSL
- Supports point-to-point 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

| | | |
|--------------------------|---|--|
| Ports | LAN Interface | 10Base-T /100 Base-TX auto-negotiation Auto-MDIX Connector: RJ-45 |
| | WAN Interface | SHDSL: ITU-T G.991.2(Annex A/B) ITU-T G.994.1 SHDSL.bis: ITU-T G.991.2 2004(Annex A/B/F/G) ITU-T G.994.1 Encoding scheme: TC-PAM16, TC-PAM32 Data Rate: N x 64Kbps (N=3~89) Impedance: 135 ohm Data Rate : SHDSL: 2-wire up to 2.3Mbps SHDSL.bis: 2-wire up to 5.7Mbps, 4-wire up to 11.4Mbps |
| ATM | Up to 8 PVCs OAM F4/F5 loopback test , AAL5 | |
| ATM QoS | UBR (Unspecified Bit Rate) CBR (Constant Bit Rate) VBR-rt (Variable Bit Rate Real Time) VBR-nrt (Variable Bit Rate Non-real Time) | |
| | AAL5 Encapsulation VC multiplexing and SNAP/LLC Ethernet over ATM (RFC 2684/1483) PPP over ATM (RFC 2364) Classical IP over ATM (RFC 1577) | |
| PPP | PPP over Ethernet for fixed and dynamic IP (RFC 2516) PPP over ATM for fixed and dynamic IP (RFC 2364) User authentication with PAP/CHAP/MS-CHAP | |
| | Indications | General: PWR WAN: LNK, ACT LAN: 1, 2, 3, 4 (ET10RS) LAN: Link, ACT (ET10R) SHDSL: ALM |
| Power Input | DC 9V-12V in | |
| Power Consumption | < 9W | |

| | |
|----------------------|---|
| Routing | Supports IP/TCP/UDP/ARP/ICMP/IGMP protocols IP routing with static routing and RIPv1/RIPv2 (RFC1058/2453) IP multicast and IGMP proxy (RFC1112/2236) Network Address Translation (NAT/PAT) (RFC1631) NAT ALGs for MSN/Yahoo Messenger DNS relay and caching (RFC1034/1035) DHCP server, client and relay (RFC2131/2132) |
| | Bridging IEEE 802.1D Transparent Bridging IEEE 802.1Q VLAN Port-based VLAN |
| Security | DMZ host/Multi-DMZ/Multi-NAT function Virtual server mapping (RFC1631) VPN pass-through for PPTP/L2TP/IPSec tunneling NAT firewall Advanced stateful packet inspection (SPI) firewall Denial of service protection User access control |
| | Management Easy-to-use web-based GUI for quick setup, configuration and management Menu-driven interface for local console and Telnet access Password protected management and access control list for administration SNMP management with SNMPv1/SNMPv2c (RFC1157/1901/1905), MIB II (RFC1213/1493) Software upgrade via web-browser/TFTP server Console port: RJ-232 |
| Dimensions | 145 x 187 x 33 mm (D x W x H) |
| Weight | 0.58kg |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 57,000 hrs |

Application



| | <i>SHDTU03F-ET10R</i> | <i>SHDTU03F-ET10RS</i> | <i>SHDTU03bF-ET10RS</i> | <i>SHDTU03bAF-ET10RS</i> |
|-------------------|-----------------------|------------------------|-------------------------|--------------------------|
| WAN | 2-wire | 2-wire | 2-wire | 4-wire |
| LAN | 1 | 4 | 4 | 4 |
| Auto-MDIX | Yes | Yes | Yes | Yes |
| Port-based VLAN | None | Yes | Yes | Yes |
| 802.1Q VLAN | 1LAN / 1WAN | 4LAN / 1WAN | 4LAN / 8WAN | 4LAN / 8WAN |
| Firewall | No | No | Yes | Yes |
| Maximum data rate | 2.3Mbps | 2.3Mbps | 5.7Mbps | 11.4Mbps |
| Minimum data rate | 64Kbps | 64Kbps | 192Kbps | 384Kbps |

Ordering Information

2-wire / 4-wire G.SHDSL ATM

| <i>Model Name</i> | <i>Description</i> |
|-------------------|--|
| SHDTU03F-ET10R | 1-Port 10/100Base-TX ATM Bridge / Router w/Firewall (2-wire 2.3Mbps) |
| SHDTU03F-ET10RS | 4-Port 10/100Base-TX ATM Bridge / Router w/Firewall (2-wire 2.3Mbps) |

SHDTU03F – □□□□□
 Example: SHDTU03F – ET10R

2-wire / 4-wire G.SHDSL.bis ATM

| <i>Model Name</i> | <i>Description</i> |
|-------------------|---|
| SHDTU03bF-ET10RS | 4-Port 10/100Base-TX ATM Bridge / Router w/Firewall (2-wire 5.7Mbps) |
| SHDTU03bAF-ET10RS | 4-Port 10/100Base-TX ATM Bridge / Router w/Firewall (4-wire 11.4Mbps) |

G.SHDSL.bis Router / NTU Performance

| 4 wires Rate (kbps) | 2 wires Rate (kbps) | N | AWG#26 (0.4mm) | AWG#26 (0.4mm) | AWG#24 (0.5mm) | AWG#24 (0.5mm) | AWG#22 (0.6mm) | AWG#22 (0.6mm) |
|---------------------|---------------------|----|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | kft | km | kft | km | kft | km |
| 384 | 192 | 3 | 24 | 7.3 | 30 | 9.1 | 36 | 11 |
| 512 | 256 | 4 | 23 | 7 | 28.5 | 8.6 | 34.5 | 10.5 |
| 1024 | 512 | 8 | 19.5 | 5.9 | 24 | 7.3 | 29.5 | 9 |
| 1920 | 960 | 15 | 17 | 5.2 | 21 | 6.4 | 25.5 | 7.8 |
| 2176 | 1088 | 17 | 16.5 | 5 | 20.5 | 6.2 | 24.5 | 7.5 |
| 2560 | 1280 | 20 | 16 | 4.9 | 20 | 6.1 | 21.5 | 6.6 |
| 3584 | 1792 | 28 | 14 | 4.3 | 17.5 | 5.3 | 21 | 6.4 |
| 3840 | 1920 | 30 | 14 | 4.3 | 17.5 | 5.3 | 20 | 6.1 |
| 4352 | 2176 | 34 | 13.5 | 4.1 | 16.5 | 5 | 19.5 | 5.9 |
| 4608 | 2304 | 36 | 13 | 4 | 16 | 4.8 | 19.5 | 5.9 |
| 5120 | 2560 | 40 | 12.5 | 3.8 | 15.5 | 4.7 | 19 | 5.8 |
| 5632 | 2816 | 44 | 12.5 | 3.8 | 15.5 | 4.7 | 18.5 | 5.6 |
| 6400 | 3200 | 50 | 12 | 3.7 | 15 | 4.5 | 18 | 5.5 |
| 6912 | 3456 | 54 | 11 | 3.4 | 13.5 | 4.1 | 16.5 | 5 |
| 7424 | 3712 | 58 | 11 | 3.4 | 13.5 | 4.1 | 16 | 4.9 |
| 7680 | 3840 | 60 | 10.5 | 3.2 | 13 | 3.9 | 15.5 | 4.7 |
| 7936 | 3968 | 62 | 10.5 | 3.2 | 13 | 3.9 | 15 | 4.6 |
| 8448 | 4224 | 66 | 10 | 3 | 12.5 | 3.8 | 15 | 4.6 |
| 8960 | 4480 | 70 | 10 | 3 | 12.5 | 3.8 | 15 | 4.6 |
| 9472 | 4736 | 74 | 9.5 | 2.9 | 11.5 | 3.5 | 14.5 | 4.4 |
| 10240 | 5120 | 80 | 9.5 | 2.9 | 11.5 | 3.5 | 14 | 4.3 |
| 11136 | 5568 | 87 | 8.5 | 2.6 | 10.5 | 3.2 | 12.5 | 3.8 |
| 11392 | 5696 | 89 | 8.5 | 2.6 | 10.5 | 3.2 | 12 | 3.7 |

11 G.SHDSL.bis router / NTU performance

2.3Mbps G.SHDSL Router / NTU Performance

| Line Speed kbps | AWG#26 (0.4mm) | AWG#24 (0.5mm) | AWG#22 (0.6mm) |
|-----------------|----------------|----------------|----------------|
| 64 | 9.7 | 12.8 | 16.0 |
| 128 | 8.1 | 10.6 | 13.2 |
| 192 | 6.9 | 9.1 | 11.4 |
| 256 | 6.7 | 8.7 | 11.0 |
| 320 | 6.7 | 8.7 | 11.0 |
| 384 | 6.5 | 8.5 | 10.5 |
| 448 | 6.4 | 8.4 | 10.5 |
| 512 | 6.2 | 8.1 | 10.1 |
| 576 | 6.1 | 8.0 | 10.0 |
| 640 | 5.9 | 7.8 | 9.7 |
| 704 | 5.8 | 7.7 | 9.6 |
| 768 | 4.8 | 6.3 | 7.9 |
| 832 | 5.5 | 7.2 | 9.0 |
| 896 | 5.3 | 6.9 | 8.7 |
| 960 | 4.9 | 6.5 | 8.1 |
| 1024 | 5.1 | 6.7 | 8.5 |
| 1088 | 5.0 | 6.6 | 8.3 |
| 1152 | 4.8 | 6.3 | 7.9 |
| 1216 | 4.8 | 6.3 | 7.9 |
| 1280 | 4.3 | 5.6 | 7.0 |
| 1344 | 4.1 | 5.4 | 6.7 |
| 1408 | 4.4 | 5.8 | 7.2 |
| 1472 | 4.4 | 5.8 | 7.2 |
| 1536 | 4.3 | 5.6 | 6.9 |
| 1600 | 4.4 | 5.8 | 7.2 |
| 1664 | 4.4 | 5.8 | 7.2 |
| 1728 | 4.2 | 5.4 | 6.8 |
| 1792 | 4.2 | 5.4 | 6.8 |
| 1856 | 4.1 | 5.4 | 6.7 |
| 1920 | 4.1 | 5.4 | 6.7 |
| 1984 | 4.0 | 5.2 | 6.5 |
| 2048 | 3.6 | 4.2 | 5.5 |
| 2304 | 3.3 | 3.9 | 4.8 |

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

TDM Series

STM1/E1 Access Multiplexer
E1 Access Multiplexer

TDM Over IP
Ethernet over E1, Coaxial
Ethernet Bridge



NEW

iSAP1000

STM1/E1 Multiplexer



12

STM1/E1 access multiplexer

iSAP1000 is 1U 19" rack type STM-1/E1 terminal multiplexer which delivers traditional PDH services over SDH networks. iSAP1000 provides connectivity for up to 16E1. The product complies with SDH standards and interfaces with existing SDH backbones through a single or 1+1 protection STM-1 interface. iSAP1000 supports a variety of management access over console, Telnet and SNMP. iSAP1000 provides two Gigabit Combo ports (2-port 10/100/1000Base-T and 2-port 1000Base-X SFP slot) with 16x E1 or 2x STM-1 fiber interfaces. The two GE combo ports support Link aggregation, port based VLAN and 802.1Q VLAN function.

Features

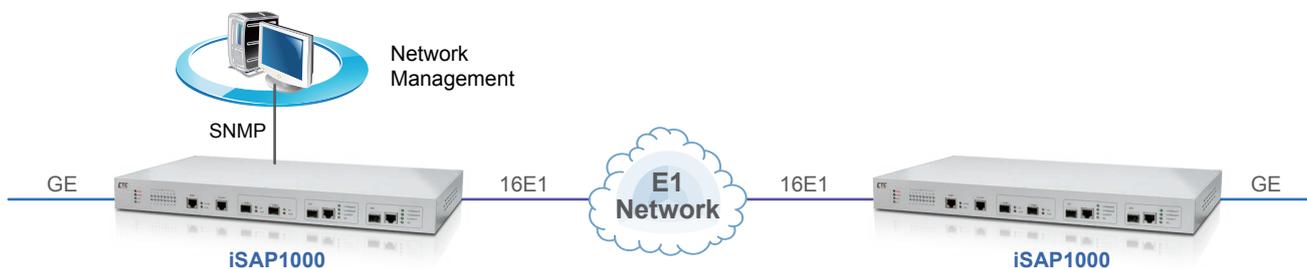
- Provides 2-port STM-1 fiber with 1+1 protection.
- Supports Internal clock and recovery clock modes
- Supports Single E1 fractional and unframed E1 service; Multiple E1, fractional E1
- Supports PCM31, FAS+CRC4, CRC self-test
- Supports HDLC/GFP bridge operation, 16x VCG with total 16 remote device, 16E1 Per VCG, MAX data rate 32Mbps Per VCG
- Supports 16E1 balanced RJ45 or unbalanced BNC connectors
- Maximum 220ms delay variance between E1 links
- Supports 2x GbE Combo ports
- Supports IEEE 802.1Q VLAN and QinQ, Link aggregation
- Fiber port support ALS(Auto Laser Shutdown) function
- Built-in BERT for performing local and remote loopback
- Supports Console, GUI, telnet and SNMP management
- Supports local and remote FTP/TFTP f/w upgrade
- Complies with ITU-T G.8040 standard

Specifications

| | | | |
|---------------------------|---|--------------------------|---|
| Ethernet Interface | Supports 2x GE combo ports Auto Negotiation, AUTO-MIDX, 10M/100M/1000M, Full/Half Duplex Connector : RJ45 | Management port | One console port with RJ45 connector One SNMP Ethernet port with RJ45 connector |
| Optical Interface | Supports 802.3x flow control 1000FX, SFP Connector : LC | LED Indicators | SYS, PWR, PWR1, PWR2, GE(LNK/ACT, SD), E1(LOS, SYNC) |
| E1 Interface | Supports 802.3x flow control Up to 16x E1(ITU-T G.703) Line Impedance : 75ΩBNC or 120ΩRJ45 Bit rate : 2048kbps±50ppm Line code : HDB3 | Standards | IEEE802.3 Ethernet, IEEE802.3u, IEEE802.3Z, IEEE802.3X, IEEE802.1Q, IEEE802.1ad, SNMPv1/v2c/v3, ITU-T G.703, ITU-T G.704, ITU-T G.823 |
| STM-1 Interface | Supports 2x STM-1 optical fiber port with SFP slot Supports 1+1 optical fiber protection | Dimensions | 310 x 440 x 44mm (D x W x H) |
| | | Power | AC: 90-265V, DC: -48V, Supports AC+AC, DC+DC, AC+DC |
| | | Power Consumption | <24W |
| | | Temperature | Operating: -5 ~ 50°C Humidity : ≤90% non-condensing |

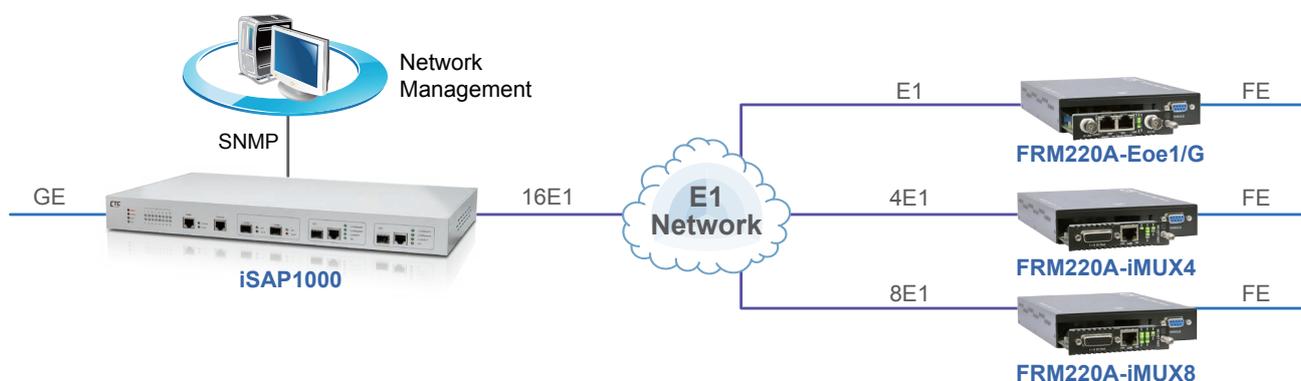
Application

P to P, GE over 16E1 application

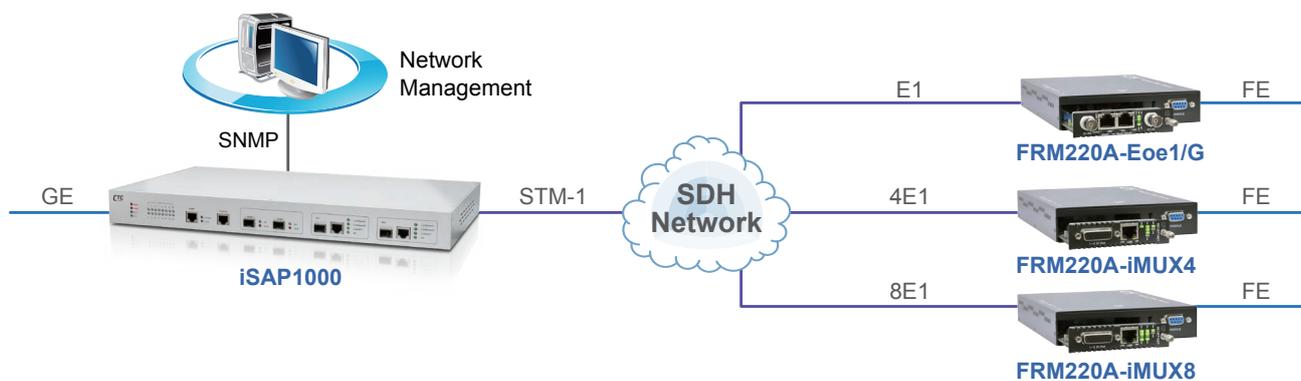


Application

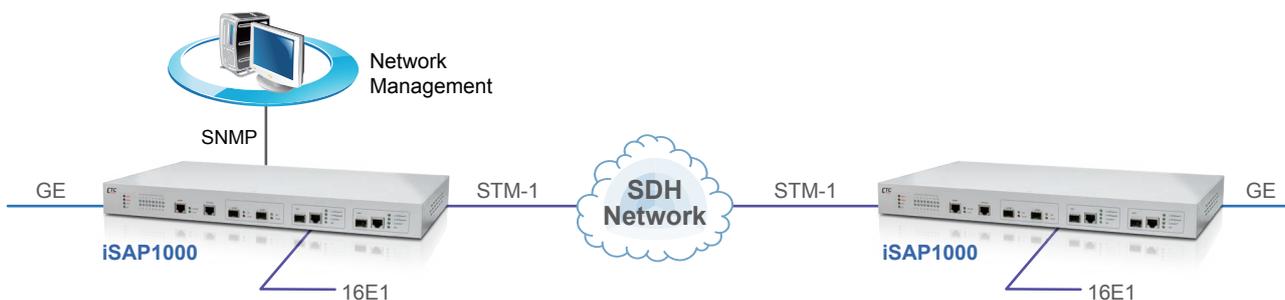
Point to Multi-points 16E1 aggregation



Point to multi-points 16E1 aggregation over STM-1



GE + 16E1 over STM-1 Application



Ordering Information

| Model Name | Description |
|----------------------|--|
| iSAP1000-16E1B-AD | 2x GbE Combo over 16E1 BNC, P to P, 1U 19" Rack, AC+DC power |
| iSAP1000-16E1R-AD | 2x GbE Combo over 16E1 RJ45, P to P, 1U 19" Rack, AC+DC power |
| iSAP1000-GE/16E1B-AD | 2x GbE Combo over 16E1 BNC, P to M, 1U 19" Rack, AC+DC power |
| iSAP1000-GE/16E1R-AD | 2x GbE Combo over 16E1 RJ45, P to M, 1U 19" Rack, AC+DC power |
| iSAP1000-GE/STM1-AD | 2x GbE Combo over STM1, P to P, 1U 19" Rack, AC+DC power |
| iSAP1000-STM1B-AD | 2x GbE Combo + 16E1 BNC over STM1, P to P, 1U 19" Rack, AC+DC power |
| iSAP1000-STM1R-AD | 2x GbE Combo + 16E1 RJ45 over STM1, P to P, 1U 19" Rack, AC+DC power |

Correcor Power Type
iSAP 1000 - -
 Example: iSAP 1000 - 16E1B - AD

iSAP5100

4.5U, Data, Ethernet, Voice STM1/ E1 Managed Multiplexer



12

Managed STM1/E1
access multiplexer

The iSAP5100 is a 4.5U 19" 18 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, G703/64K, FXS, FXO, ET100 and E&M.

Interface Cards

Control card: 5100-MS-DM-96, 5100-MS-DM-155

E1 card: 5100-8E1, 5100-16E1

Power modules: 5100-AC240, 5100-DC240

I/O cards: 5100-RS232, 5100-RS232/C, 5100-G703/64K, 5100-V35, 5100-ET100, 5100-E&M, 5100-FXS, 5100-FXO

Features

- Supports STM1 and E1 uplink
- Supports MAX. 144xE1 with full cross-connect ; Supports DSO cross-connect
- Supports 16 channel main E1 LTU card
- Supports E1 time slot broadcast function
- Modular design for voice IO card, supports 8-port FXO/FXS
- All modules and cards support hot-swapping
- Multi-Interface: DCE card types included Nx64k(V35) RS232 (Sync/Async), V.35 G703-64K, ET100, E&M, FXO, FXS...etc
- Supports console telnet, GUI and SNMP management
- Available types of power built-in : AC+AC, AC+DC, DC+DC
- Modular design, 4.5U 19", 18-slot for IO cards

Specifications

| 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) |
| NMS | 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*32TS to E1/IO slot 128E1*32TS connection |
| 5100-8E1 / 5100-16E1 | |
| Interface | Supports 8E1/16E1 interface |
| Line Impedance | 120 / 75 ohms |
| Frame format | CAS (PCM30)/CCS (PCM31) |
| Connector | RJ45 |
| 5100-RS232 | |
| Data rate | ≤38.4kbps Async or 64/128kbps Sync |
| Ports | 6-port |
| Interface | RS232 |
| 5100-V35 | |
| Interface types | V.35 |
| Connector | HD68F (female) with cable adapter |
| Line code | NRZ |
| Data rate | Nx64kbps |

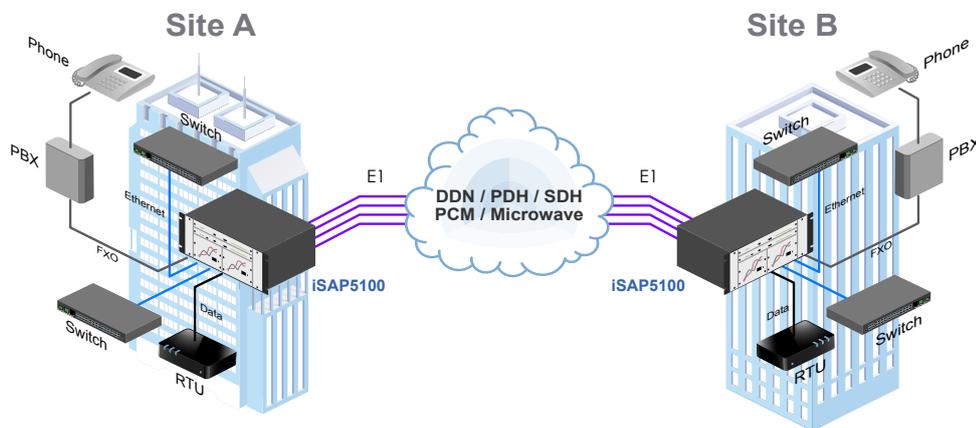
| 5100-RS232/C | |
|------------------|---|
| Data rate | 9600bps, 19.2Kbps Sync/Async |
| Ports | 6-port |
| Interface | RS232 |
| 5100-G.703/64K | |
| Data rate | 64Kbps, Co-directional/Contra-directional and Centra-directional |
| Ports | 4-port |
| Connector | RJ45 |
| 5100-ET100 | |
| Standards | IEEE 802.3, 802.3u |
| MDI/MDIX | Auto |
| Data rate | 10/100Mbps |
| Encapsulation | HDLC |
| Ports | 4-port |
| Connector | RJ45 |
| 5100-E&M | |
| Loop current | 25 mA, maximum 70mA |
| Ports | 8-port |
| Connector | RJ45 |
| 5100-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 |

| | |
|-----------------|-----------------------------|
| 5100-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 |

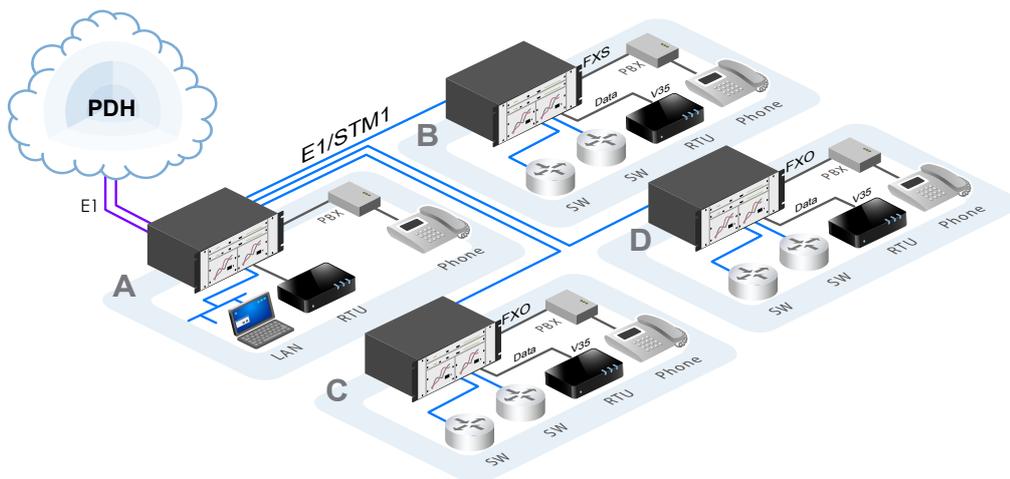
| | |
|-------------------------|---|
| Electrical & Mechanical | |
| Dimensions | 350 x 440 x 187 mm (D x W x H) |
| Environmental | Operating: 0~60°C Storage:-25~70°C Humidity: 10~90%, non-condensing |
| Power | AC 220V : 165~265V, 50~60Hz AC 110V, AC 220V : 90~265V,50~60Hz |
| Power Consumption | < 90W |

Application

Connection with PBX (Private Branch Exchange)



The extension and expansion of DDN (Distributed Data)



Ordering Information

| Model Name | Type | Description |
|--------------------|---------------|---|
| iSAP5100-CH | Chassis | 4.5U 19" 18-slot Chassis |
| iSAP5100/AC | Power | AC Power plug-in module (90 to 250 VAC) |
| iSAP5100/DC | Power | DC Power plug-in module (±36 to ±76 VDC) |
| iSAP5100-8E1R | Main E1 card | 8 channels Main-E1 LTU card: Fractional E1 RJ45 |
| iSAP5100-16E1R | Main E1 card | 16 channels Main-E1 LTU card: Fractional E1 RJ45 |
| iSAP5100-MS-DM-96 | CPU-card | CPU card for 96x E1 |
| iSAP5100-MS-DM-155 | CPU-card | CPU card for STM-1 |
| iSAP5100-FXO | Voice Card | 8 channels FXO interface card |
| iSAP5100-FXS | Voice Card | 8 channels FXS interface card |
| iSAP5100-E&M | Voice Card | 8 channels 2/4 wires E&M voice interface card |
| iSAP5100-RS-232 | RS-232 card | 6 channels RS-232 interface card 38.4kbps, Low speed: 64kbps or 128kbps sync DEC |
| iSAP5100-RS-232C | RS-232 card | 6 channels RS-232 (V.24) interface card, Low speed: 128kbps, 19.2kbps Async with Multi-Clock function |
| iSAP5100-ET100 | FE Card | 4 channels Ethernet (10/100Base-TX) interface card (v4.0) |
| iSAP5100-G.703/64K | G703/64K Card | 4 channels G703 64K interface card (v4.0) |
| iSAP5100-V35 | V.35Card | 4 channels Nx64K V.35 card with DB68 to 4 x M34 cable |

Chassis
iSAP5100 - □□
 Example: ISAP5100 - CH

Card Type
iSAP5100 - □□□□
 Example: ISAP5100 - 8E1R

ERM-MUX-Plus

4U, E1 Multi-Service Multiplexer



The ERM-Mux / plus is a 4U 19(23)" 14-slot rack type E1 Time Division Multiplexer for Fractional E1 network access which is designed for non-stop operation. There are 10 slots available for hot-swappable ERM-Mux / plus-I/O cards. Two slots are provided for Mux-E1 cards, which may be configured for redundant 1+1 operation of the E1 lines, safe guarding against expensive network down time. Two slots are also available for CPU cards, with the second CPU card acting as a hot standby in case of primary card failure. Each Mux-E1 card may be linked to another ERM-Mux / plus Rack to provide a point-to-point variety of datacom, Ethernet & voice over E1 network services. The ERM-Mux/plus optionally accommodates up to two separate power supplies, which may derive power from AC (110/220) or DC (-48V) 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 ERM-Mux/plus provides all interface connections on the front panel. BNC and RJ-45 are used for E1 Line interface connections, RJ-45 connections are used for all voice (FXO, FXS, E&M), for 10/100 Ethernet Bridge and G.703-64K co-directional / contra-directional / center. Optional cable adapters are used to convert the DB-62F DCE ports of the I/O cards to 6xRS-232, HP68F DCE port of I/O card to 4x V.35, RS-232, RS-530, RS-449, RS-422 and X.21 or 5x X.50 channels.

Features

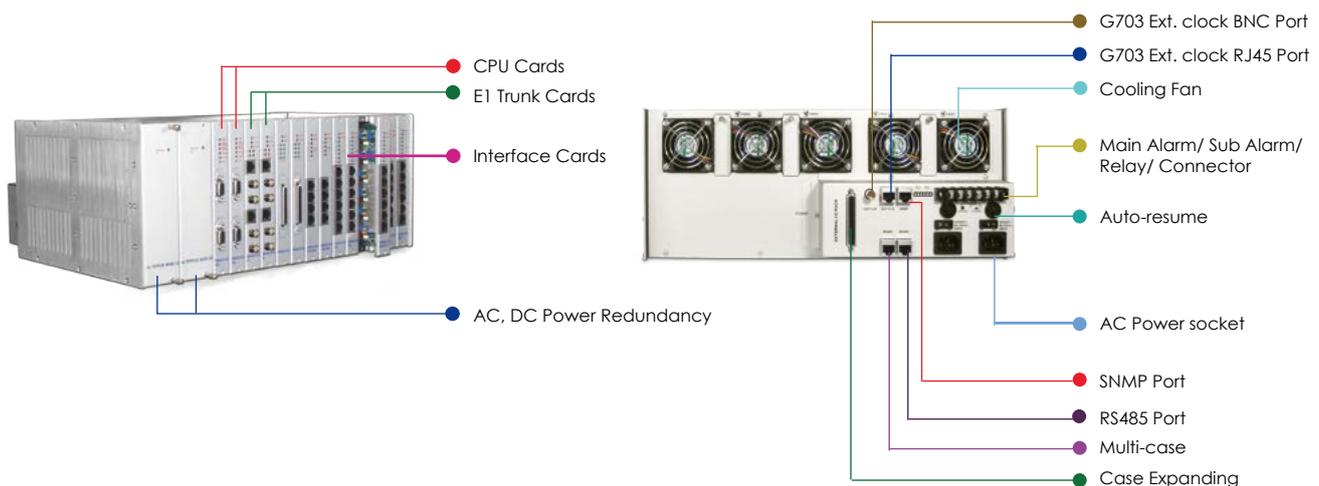
- CPU redundancy (1+1)
- E1 redundancy (1+1) and E1 card redundancy
- Power redundancy (1+1) [2AC, 2DC, AC+DC]
- DCE hot swappable card types
- Drop & Insert function
- Console, NMP,SNMP, management
- 4ch V.35 (nx64K)
- 4ch G.703 64K co-directional /contra-directional / center mode
- 2ch Ethernet bridge
- 6ch RS232
- 6ch FXS voice
- 6ch FXO voice
- 6ch E&M voice

Specifications

| | |
|-----------------------|---|
| Connectors | Console port (RJ45, RS232C) |
| Physical | WAN port RJ45 Jack (2-wire, 4-wire) |
| Specifications | Dimensions: 350 x 438 x 176mm (W x D x H) |
| Power Characteristics | Weight: 8kg (chassis+dual power+8 I/O cards) 0.45kg per card |

| | |
|----------------|---|
| Environmental | Operating 0°C ~ 60°C |
| Specifications | Storage 0°C ~ 70°C Relative humidity 0% ~ 90% non-condensing Predicted MTBF : 65,000 hrs (25°C) |
| Certification | CE |

ERM-Mux/plus overview



• 1+1 Redundant

The ERM-MUX/PLUS supports complete redundant functions for the electrical input service, the power module cards, CPU card and E1 card. The E1 backup provides 1+1 modes. All of these cards are capable of automatic switchover in case of failure. The system has complete warning and diagnostic functions for stable and reliable operation.

• Network Management

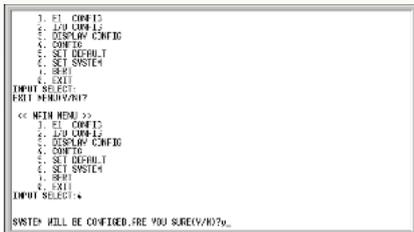
The ERM-MUX/PLUS supports SNMP and/or NMP GUI network management with local PC or via a dedicated timeslot from the E1 line. The NMP GUI can manage more ERM-MUX/PLUS equipment via the E1 network in-line or in nested structures. A console terminal mode is supported as well. When SNMP management mode is available and selected, remote Telnet is also available for management. ERM-MUX/Plus with SNMP option is also manageable under CTC Union's Smart View EMS.

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

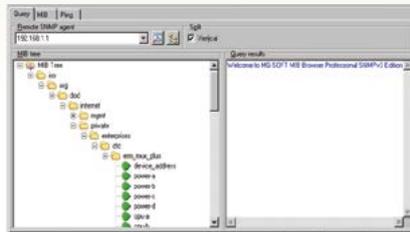
ERM-Mux / Plus Management

The intelligent NMS provides the support that the network manager needs. It consists of three parts :

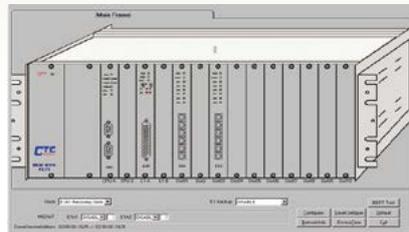
1. Terminal mode: Configuration by local RS-232 serial port; Maintenance & alarm.



2. MIB file SNMP: Configuration by RJ-45 10/100 Ethernet port; Complies with MIB-II standard.



3. GUI : Configuration by RJ-45 10/100 Ethernet port; Real time monitoring in Window® graphic mode.



• Cascade

RS-485 interface is used for cascading expansion rack, and are provided by RJ-45 x 2 connectors. DB62 connector for connecting backplane data to expansion rack.

• Power Redundancy

Power supply options for 110V AC, 220V AC or -48V DC, ensure maximum flexibility for central office installations. This equipment complies fully with all ITU-T standards for E1 transmissions. The modules are hot-swappable, capable of automatic switch over in case of module failure, stable, and reliable.

• Performance and BERT test

System supports performance monitoring and BERT test through NMP or Terminal console according RFC 1406 recommendation. CRC-4 and BPV monitoring: CURR ES / UAS , LONG ES / UAS. Loopback test and BERT test: display Rx error amounts, Error counts and Bit-error-rate. Test patterns: 2e9-1, 2e11-1 and 2e15-1. Error Insertions and rates: Single, 10e-1, 10e-2, 10e-3, 10e-4, 10e-5, 10e-6, 10e-7.

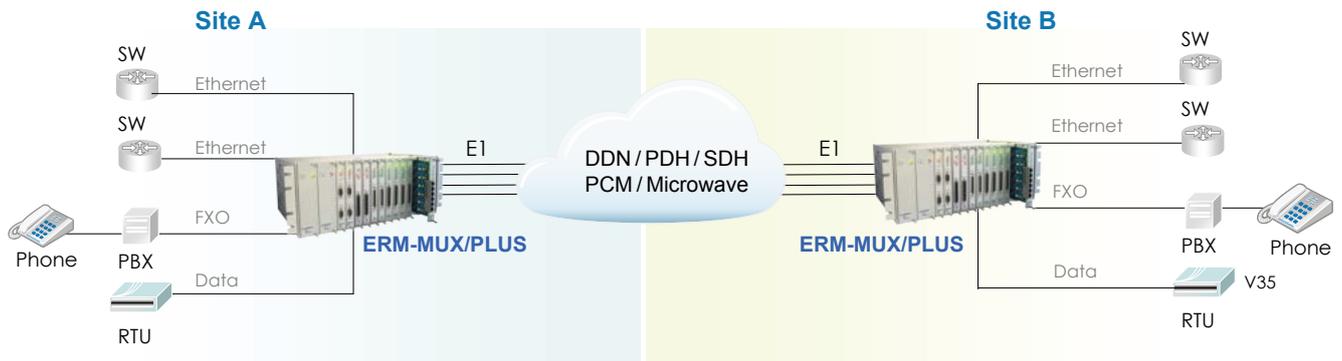
Ordering Information

| Model Name | Type | Description |
|------------------------|------------|--|
| ERM-MUX-PLUS/AA-CH | Chassis | 4U 19" 14 slot Chassis for AC+AC power |
| ERM-MUX-PLUS/DD-CH | Chassis | 4U 19" 14 slot Chassis for DC+DC power |
| ERM-MUX-PLUS/AD-CH | Chassis | 4U 19" 14 slot Chassis for AC+DC power |
| ERM-MUX/AC | Power | AC Power plug-in module (90 to 250 VAC) |
| ERM-MUX/ACV | Power | AC Power plug-in module (90 to 250 VAC) with Voice support |
| ERM-MUX/DC | Power | DC Power plug-in module (±36 to ±76 VDC) |
| ERM-MUX/DCV | Power | DC Power plug-in module (±36 to ±72 VDC) with Voice support |
| ERM-MUX-PLUS/GUI | Management | GUI for ERM; support Windows 95, 98, 2000, XP |
| ERM-MUX-PLUS-2E1R | Card | 2-Ch Main-E1 LTU card(V1.2); w/DB37M to 2xRJ45 cable |
| ERM-MUX-PLUS-2E1B | Card | 2-Ch Main-E1 LTU card(V1.2); w/DB37M to 2xBNC cable |
| ERM-MUX-PLUS-8E1R | Card | 8-Ch Main-E1 LTU card(V1.2); w/DB37M to 8xRJ45 cable |
| ERM-MUX-PLUS-8E1B | Card | 8-Ch Main-E1 LTU card(V1.2); w/DB37M to 8xBNC cable |
| ERM-MUX-PLUS-CPU | Card | CPU card (V4.3) for NMP management |
| ERM-MUX-PLUS-SNMP | Card | SNMP card (V2.2) for NMP management |
| ERM-MUX-PLUS-FXO | Card | 6-Ch FXO interface card(V2.1) |
| ERM-MUX-PLUS-FXS | Card | 6-Ch FXS interface card(V4.1) |
| ERM-MUX-PLUS-E&M | Card | 6-Ch 2/4 wires E&M voice interface card (V4.1) (Tx/Rx range -20dB ~ +8dB) |
| ERM-MUX-PLUS-E&M+ | Card | 6-Ch 2/4 wires E&M voice interface card (V4.1) (Tx range -12dB ~ +16dB, Rx range -20dB ~ +8dB) |
| ERM-MUX-PLUS-RS-232 | Card | 6-Ch RS-232 interface card, 64k/128kbps(Sync), 19.2k/38.4kbps(Async) |
| ERM-MUX-PLUS-ASYNC | Card | 6-Ch RS-232 interface card, 9.6k/19.2kbps(Sync), 19.2k/38.4kbps(Async) with multi rate clock function. |
| ERM-MUX-PLUS-G64K | Card | 4-Ch G.703 64k interface card (V4.0) |
| ERM-MUX-PLUS-HS-SERIAL | Card | 4-Ch V.35/X.21/RS-449/RS-530 interface card |
| ERM-MUX-PLUS-RS485 | Card | 6-Ch RS-485 / RS-422 Interface card |
| ERM-MUX-PLUS-ET100 | Card | 2-Ch Ethernet(10/100Base-TX) interface card (V4.0) |

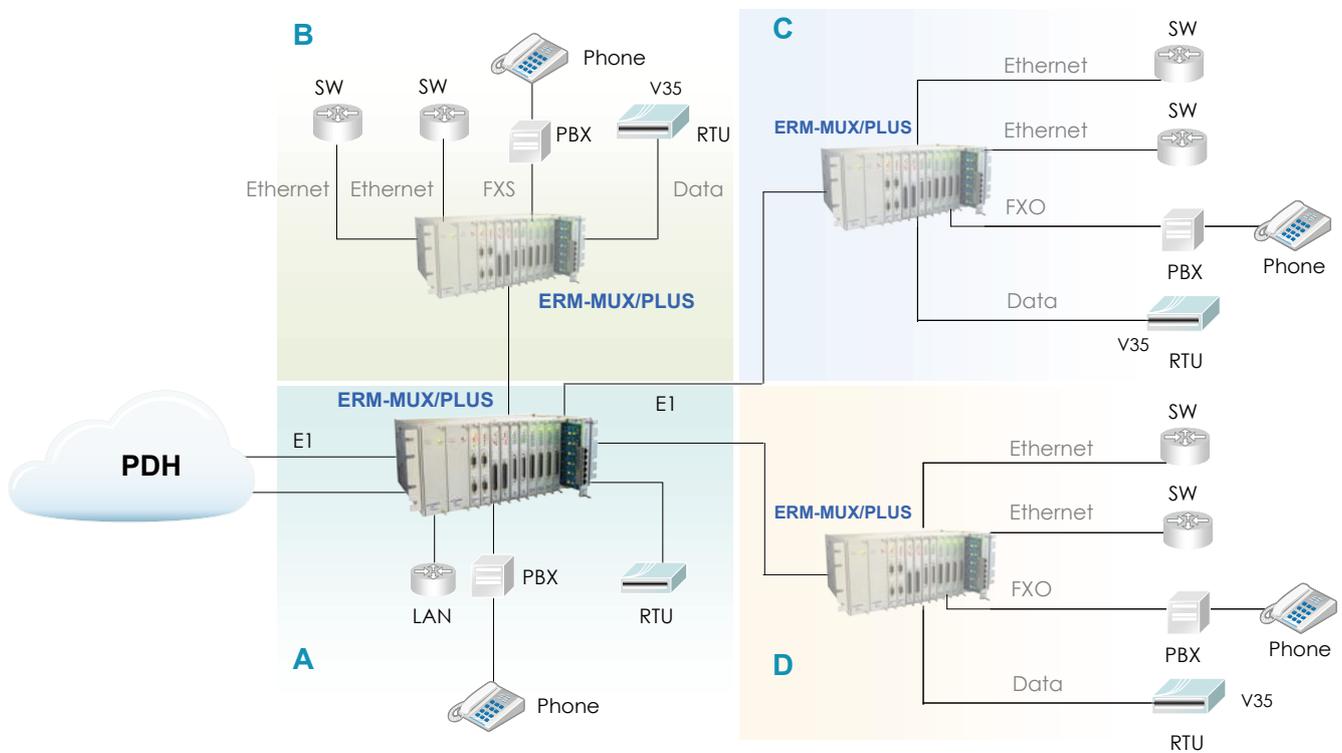
Card Type
ERM – MUX– PLUS –
 Example: ERM – MUX–PLUS – 2E1R

Application

Connection with PBX (Private Branch Exchange)



The extension and expansion of DDN (Distributed Data)



12
E1 Access Multiplexer

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



ERM-Mux / Plus-E1

G.703 E1 Aggregate Card

The ERM-Mux/plus has two dedicated slots for installing E1 aggregate cards. Currently E1 cards are available with 2, 4 or 8 E1 ports. In the backplane design of the ERM-Mux/plus, a maximum of 4 E1s can carry data to and from tributary (I/O) cards. One typical application could be to install two 4E1 cards in the chassis and have the cards act as one master and one hot-standby card for E1 redundancy. For other applications, an 8E1 card could be used to cross connect E1 timeslots prior to assignment to the four available backplane channels. Another application can use the 'extra' E1 aggregate channels for drop & insert (Sub-E1) rather than performing cross connection. It can quickly be seen that a large number of applications are possible with the ERM-Mux/plus's flexible design.

- Available in 2, 4, 8 E1 channels
- Supports PCM31 or PCM30 framing

- 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 |
| 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 |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-Data

Nx64 Synchronous Serial Tributary Card

The ERM-Mux/plus Nx64 Serial Tributary Card provides V.35/ X.21/ RS-530/ RS-449 Synchronous data capability. Incorporating four separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. The single HD68 connector mates to a 1 to 4 cable that terminates to the required connector type. Four different cables provide connection to V.35's MB34, X.21's DB15, RS-530's DB25 or RS-449's DB37 female connectors. Please be sure to select the right cable for your application when ordering this card.

- Four independent Synchronous channels
- Nx64 setting from any E1 channel

- Each channel operates in native DCE mode
- Diagnostic loop backs & Hot Swappable
- LED indicators for Power, Alarm, RD/TD activity

Specifications

| | |
|---|---|
| ITU-T and ANSI compliant Datacom interfaces | |
| Multiplexing Nx64K data onto E1 time-slot. | |
| Data speed | Nx64K(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 |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-G64K

G.703 64K Co-directional Tributary Card

The ERM-Mux/plus G64K Tributary Card provides 4 independent G.703 64Kbps Co-directional data channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors that conform to USOC RJ-48C standard wiring provide the G.703 connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These data channels may be linked to multiplexers, terminal equipment or satellite/micro-wave transmission equipment. In Co-directional signaling, the clock signals are recovered from the received G.703 data stream. Only Tx and Rx pairs or a total of 4 wires are required in 64Kbps co-directional transmission.

- 4 independent channels
- 1x64 setting from any E1 channel
- Transparent synchronous rate of 64kbps

- Co-directional clock recovered from Rx G.703
- Diagnostic loop backs / LED indicators for Power, Alarm, Tx/Rx activity / Hot Swappable

Specifications

| | |
|--|--------------------------------|
| ITU-T G.703, G.823 64kbps compliant interfaces | |
| Multiplexing 1x64K data onto E1 time-slot | |
| Data speed | 64Kbps +/-100ppm |
| Data access | RJ-45 per USOC RJ-48C standard |
| Line code | Co-directional |
| Pulse shape | according to G.703 |

| | |
|-------------------|------------------------------------|
| Transmit distance | 600M or less (0.5~0.7mm TP) |
| Diagnostics | Local /Remote /Bi-directional Loop |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |

ERM-Mux / Plus-CPU

CPU Control Card

CPUA and CPUB slots can insert two CPU modules that automatically work in redundant operation mode. CPU modules are responsible for all parameter setup from local PC or from the selected in-band E1 line. The setup of the ERM-MUX/Plus may be accomplished by:
 Local PC connected by Ethernet to SNMP (can extend to multiple chassis with RS485 twisted-pair)
 Local PC connected by serial NMP port to Windows® NMP GUI. E1 network connected to SNMP/NMP GUI. Local terminal console mode

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



ERM-Mux / Plus-ET100

Fast Ethernet Bridge Tributary Card

The ERM-Mux/plus Ethernet Bridge Tributary Card provides Ethernet over E1 capability. Incorporating two separate channels, this transparent bridge supports industry standard HDLC encapsulation. The WAN data rate depends on the number of E1 timeslots assigned (Nx64). The front panel has two RJ-45 shielded connectors for connection of 10Base-T or 100Base-TX Ethernet and status LEDs for each channel to display link state, speed, duplex and activity. Rounding out each bridge channel are support for 256 MAC filter address learning table and 340 packets buffer to aid in handling LAN side burst traffic.

- Two 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, IEEE802.3u |
| Automatic address learning, aging and deletion after 5 min. | |
| Throughput latency | 1 frame |
| MDI / MDIX | Auto |
| Filtering | 256 MAC address table |
| Buffer | 340 packets |

| | |
|---|--------------------------|
| Encapsulation | HDLC |
| 10Base-T/100Base-TX, Full or half duplex | |
| Packet sizes | 64 ~ 1522 bytes |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% (non-condensing) |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-RS485

Asynchronous RS-485/422 Serial Tributary Card

The ERM-Mux/plus Asynchronous RS485/422 Serial Tributary Card provides six independent RS-485/ RS-422 data channel capability. Incorporating six separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. Each channel uses a pluggable 4-pin terminal block for connection one or two twisted pair wires. No cables are provided with this card. When connecting to RS-485, the channel supports 4-wire Full Duplex or 2-wire Half Duplex RS-485 transmissions for serial control or data acquisition.

- Six independent channels
- Nx64 setting from any E1 channel
- Transparent asynchronous rates up to 128kbps
- Diagnostic loop backs & Hot Swappable

Specifications

| | |
|----------------|--------------------------------|
| Interface | RS-422 4 wire, RS485 4/2 wire |
| LEDs | RS-485/422 TD/RD, Power, Alarm |
| Baud Rate | Async mode <= 128K |
| Bit Error Rate | Less than 10 ⁻¹⁰ |
| Connector | 4pin Terminal Block x 6 |

| | |
|-------------|-------------|
| Duplex | Full / Half |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |



ERM-Mux / Plus-RS232

RS232 Sync/Async Tributary Card

The ERM-Mux/plus Sync/Async RS232 Serial Tributary Card provides six independent RS-232 data channel capability. Incorporating six separate channels, each channel can independently assign any Nx64 timeslots from the aggregate E1. The single DB62 connector mates to a 1 to 6 cable that terminates to DB25 female connectors. These serial data channels may be linked to leased line modems for further extension or connected to other data terminal or data acquisition devices. When configured for synchronous use, the data connectors carry both clock and data. For asynchronous use, the clock signals can be ignored.

- Six independent channels
- Nx64 setting from any E1 channel
- Transparent asynchronous rates up to 115.2kbps
- Synchronous 64 or 128Kbps, DCE mode
- Diagnostic loop backs & Hot Swappable
- LED indicators for Power, Alarm, RD/TD activity

Specifications

| | |
|--|---|
| ITU-T V.24 compliant Datacom interfaces | |
| Multiplexing Nx64K data onto E1 time-slot | |
| Data speed | Nx64K(N=1 to 2) |
| Data access | RS-232, supplied with corresponding interface cable |
| Access mode | DCE |

| | |
|-------------|------------------------------------|
| Diagnostics | Local /Remote /Bi-directional Loop |
| 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.

ERM-Mux / Plus-E&M

E&M Voice Tributary Card

The ERM-Mux/plus E&M Voice Tributary Card provides six independent Ear & Mouth Voice channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors provide the voice connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These voice channels may be linked to PBX (Private Branch Exchange) to facilitate voice to voice connections. The channels support selection of Type 1~5, support 2 or 4 wire operation and have 0.5dB steps for signal attenuation. When using this card, an appropriate voice compatible power module must be used in the ERM-MUX/Plus.



- Six independent channels
- 2/4 wire independent setting
- 1x64 setting from any E1 channel

- E&M Signaling PBX trunks & Supports types I, II, III, IV or V
- Provides E line, M line, SB (battery) and SG (ground) lines
- G.711 Codec & Hot Swappable
- LED indicators for Power, Alarm, activity

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 |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |

ERM-Mux / Plus-FXO

FXO Voice Tributary Card

The ERM-Mux/plus FXO Voice Tributary Card provides six independent Foreign Exchange Office Voice channel capability. Each channel can independently assign any 64Kbps timeslot from the aggregate E1. Individual Shielded RJ-45 connectors provide the voice connections. Standard UTP or alternately shielded UTP are both acceptable cabling media. These voice channels may be linked to PBX (Private Branch Exchange) or PSTN (Public Switched Telephone Network) to facilitate voice to voice connections. When using this card, an appropriate voice compatible power module must be used in the ERM-Mux/plus.



- Six independent channels
- 2 wire / G.711 Codec
- 1x64 setting from any E1 channel

- PCM30 R2 Signaling PSTN trunks
- Links PBX to PBX or extends POTS & Hot Swappable
- LED indicators for Power, Alarm, activity

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) |
| Temperature | 0°C ~ 50°C |
| Humidity | 5 ~ 95% |
| MTFB | 65,000 hrs |

ERM-Mux / Plus-FXS

FXS Voice Tributary Card

The ERM-Mux/plus FXS Voice Tributary Card provides six independent Foreign Exchange Station Voice channel capability. These 6 channel tributary cards are designed for voice applications over E1. Typically, an FXS connects to a standard telephone set. The FXS needs to sense on-hook, off-hook or disconnected status. It also must be able to provide ring function to a telephone set and it must pass caller-ID information. In the ERM-Mux/plus point-to-point application, the FXS can connect to a remote FXO (Foreign Exchange Office) when deployed as an extension from PBX (Private Branch Exchange) or PSTN (Public Switched Telephone Network). It may also connect to a remote FXS, also for extension from PBX or as a direct 'hotline' voice connection. Individual Shielded RJ-45 connectors provide the voice connections. When using this card, an appropriate voice compatible power module must be used in the ERM-Mux/plus.



- Six independent channels
- 2 wire & G.711 Codec
- 1x64 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, 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 |
| 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.

ETU02-MUX-Plus

1U, E1 Multi-Service Multiplexer



The ETU02-MUX/PLUS is a 1U 19(23)" 3 slot rack type E1 Time Division Multiplexer for Fractional E1 network access which provides an economic solution for central site or remote installations. There are 3 slots available for hot-swappable ETU02-MUX/PLUS-I/O cards. One front panel slot is provided for MUX-E1 card, which provides either single E1 main link or main E1 link plus a drop and insert sub-E1 port. The MUX-E1 card may be linked to another ETU02-MUX/PLUS or ERM-MUX/PLUS Rack to provide a point-to-point variety of datacom, Ethernet & voice over E1 network services. The ETU02-MUX/PLUS optionally accommodates one power supplies, which may derive power from AC (110/220) or DC (-48V) power sources. The ETU02-MUX/PLUS provides BNC and RJ-45 for E1 Line interface connections, RJ-45 connections are used for all voice (FXO, FXS, E&M), for 10/100 Ethernet Bridge and G.703/64K Co-directional. Optional cable adapters are used to convert the DB-62F DCE ports of the I/O cards to 4xRS-232 or HP68F DCE ports of I/O card to 2x V.35, RS-530, RS-449, RS-422 and X.21 channels.

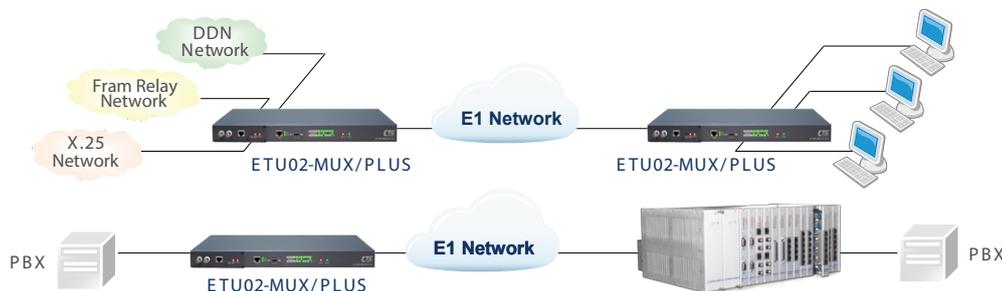
Features

- 1U 19" 3-slot chassis
- Provides 3 slots, removable interfaces: V35, X21, RS530, RS449, RS232, G.703 Co-directional, Ethernet Bridge, FXO, FXS and E&M, 8-ch E1 DXC
- Optional drop and insert E1 port (Sub E1)
- Setup and Control via RS-232 terminal
- Multiple clock source selection (Internal or External: E1 recovery, DTE or DCE)
- Optional SNMP management
- Digital cross connect solution up to 16E1

Specifications

| | | | |
|----------------------------|--|----------------------------|--|
| Indications | Power, Signal loss, Sync loss, Alarm (AIS, MRAI, RAI), TD, RD, Error, Test | Dimensions / Weight | 235 x 438 x 45mm (D x W x H) / 2.9kg |
| Standard | ITU-T G.703/G.704/G.706 & G.732, G823 | Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Power / Consumption | AC: 90 ~250V / 20W | Humidity | 10 ~ 90% non-condensing |
| | | MTBF | 57,000 hrs |

Application



FXO

- Provides 4 independent channels
- Connects directly to PSTN



Specifications

| | |
|------------------------------|-----------------------------------|
| Connector | RJ-45*4 |
| Impedance | 600 ohms |
| Level Gain | On Tx side 0 dB On Rx side -3.5dB |
| Ring current impedance | > 7.5k ohms |
| Direct current resistance | < 300 ohms |
| Maximum direct current borne | > 70V |

G.703/64K co-directional card

- 2-channels, Co-directional 64K interface



Specifications

| | |
|-----------------|---------------------------------|
| Interface types | G.703/64K, Co-directional |
| Connector | RJ45 x 2 |
| Line code | ITU-T G.703/64K, Co-directional |
| Data rate | 64kpbs±100ppm x 2 channels |
| Line impedance | 120 ohms (balanced) |
| Frame mode | Unframed only |

8E1-DXC

- 8 independent channels
- E1 P to P 64kbps transparent data cross connect
- Supports Broadcasting and E1 channel backup
- Maximum 2 card per chassis



Specifications

| | |
|----------------|--|
| Connectors | BNC for unbalanced ; RJ-45 for balanced |
| Framing Format | Unframed / Framed CCS(PCM31) / CAS (PCM30) |
| CRC check | CRC4 on/off |
| Bit rate | 2.048Mbps±0 ppm |
| Line code | AMI / HDB3 |
| Line impedance | 75 ohm(BNC) / 120 ohm(DB-15, RJ-45) |

FXS

- Provides 4 independent channels
- Connects to standard telephones



Specifications

| | |
|-------------------------|------------------------------------|
| Connector | RJ45 x 4 |
| Impedance | 600 ohms |
| Level Gain | On Tx side 0 dB; On Rx side -3.5dB |
| Ring current Output | 75±15V |
| Frequency | 25±3Hz |
| Feeding voltage | -48 |
| Loop resistance | 1800 ohms |
| Connecting distance | up to 4km |
| Wire Gauge | 0.4mm |
| Feeding working current | 20mA |

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

ET-100 Ethernet Bridge card

- 2 independent channels, Ethernet bridge interface 10/100Base-TX bridge Auto-Negotiation, Auto MDI/MDIX Forward 1522 bytes (Max.) packets Supports IEEE 802.1Q Tag VLAN pass thru Supports flow control (Pause)



Specifications

LAN Specifications

| | |
|-----------|--|
| Standard | Fully compliant with IEEE 802.3/802.3u |
| Connector | RJ-45x2, 10/100Base-TX, Auto-negotiation |
| Speed | 10Base-T/100Base-TX, Full or half duplex |
| Frames | Supports 64 to 1522 byte packet lengths |

WAN Specifications

| | |
|----------|----------------------------------|
| Protocol | Synchronous HDLC |
| Rates | N*64 or N*56Kbps, up to 2048Kbps |

E1 and Sub E1 module

- Single E1 card supports both RJ45 and BNC connector
- Single E1 + Sub E1 card supports BNC connector
- Each E1 loop provides clock to be used as system clock source



SUB E1



E1

Specifications

| | |
|--------------------------|---|
| Connectors | BNC for unbalanced ; RJ-45 for balanced |
| Framing Format | Unframed / Framed CCS (PCM31) / CAS (PCM30) |
| CRC check | CRC4 on/off |
| Bit rate | 2.048Mbps±0 ppm |
| Line code | AMI / HDB3 |
| Line impedance | 75 ohm (BNC) / 120 ohm (DB-15, RJ-45) |
| Relative receive level | 0 to -43dB |
| Transmitter driver reach | 1.5Km |
| Pulse amplitude | Nominal 2.37V ±10% for 75ohm Nominal 3.00V ±10% for 120ohm |
| Zero amplitude | ±0.1V |
| Transmit frequency | Internal timing ±30 ppm |
| Tracking | Recovery timing ±50 ppm |
| External | timing±100 ppm |
| Jitter performance | According to ITU-T G.823 |
| Compliance | ITU G.703, G.704, G.706, G.732 |

E&M

- BD/GD wires are for battery and ground detection
- E&M card provides 4 independent channels
- E&M interface provides 1 pair of E and 1 pair of M
- Each E&M can support Type I, II, III, IV or V
- Loop current range is normally 5-30mA, 70mA max
- Timeslot 16 complies with ITU-T G.711
- TX / RX attenuation (Range ±7.5dB), and 2 / 4 wire operation



Specifications

| | |
|--------------------------------|---|
| Input level | 0 to -16dB, in 0.5dB steps |
| Output level | 0 to -16dB, in 0.5dB steps |
| Impedance | 600 ohms, option |
| Return loss | 2-wire 300-600Hz: >12dB 2-wire 600-3400Hz: >15dB 4-wire 300-3400Hz: >20dB |
| Group delay | 2-wire @ -10dBm: < 750µ second 4-wire @ -10dBm: < 600µ second |
| Total distortion | According to ITU-T G223 |
| Channel cross-talk | Not exceed -65dB, 1020Hz@0dBm |
| Out-of-band Signal attenuation | -25dBm@4.6~72KHz |
| Level not to exceed | -50dBm |
| Noise | <-65dBm |
| Interface connector | RJ-45*4 |

RS-232 card

- 4-channels
- Data rate:
Asynchronous mode ≤ 38.4Kbps (4-channels),
Synchronous mode = 19.2/38.4/64/128Kbps



Specifications

| | |
|----------------|------------------------------------|
| Interface type | RS-232 |
| Connector | HD62F (female) with cable adapter |
| Line code | NRZ |
| Data rate | 3.84kbps x 4ch or 64/128kbps x 4ch |

Nx64 card

- 2-channels , High speed data interface
- Data rate:
N*64kbps, where N=1 to 31 in CCS
N=1 to 30 in CAS



Specifications

| | |
|-----------------|------------------------------------|
| Interface types | RS-530, X.21, V.35, RS-449, RS-232 |
| Connector | HD68F (female) with cable adapter |
| Line code | NRZ |
| Data rate | Nx64kbps |

Ordering Information

| Model Name | Type | Description |
|---------------------|---------|---|
| ETU02-MUX/Plus/AC | Chassis | 1U 19" 3+1 slot Chassis with SNMP card and AC Power |
| ETU02-MUX/Plus/DC48 | Chassis | 1U 19" 3+1 slot Chassis with SNMP card and DC 48V Power |
| ETU02-MUX/Plus/DC24 | Chassis | 1U 19" 3+1 slot Chassis with SNMP card DC 24V Power |
| ETU/E1SUB | Card | Single E1 + Sub E1 card supports BNC connector |
| ETU/E1 | Card | Single E1 card supports both RJ45 and BNC connector |
| ETU/N64 | Card | 2-Ch V.35/X.21/RS-449 Module, N X 64Kbps |
| ETU/232 | Card | 4-Ch RS-232 Module |
| ETU/232-C | Card | 4-Ch RS-232 Module with Clock |
| ETU/ET100 | Card | 2-Ch 10/100Base-T Ethernet Module RJ-45 |
| ETU/FXS | Card | 4-Ch FXS Interface Module RJ-45 |
| ETU/FXO | Card | 4-Ch FXO Interface Module RJ-45 |
| ETU/E&M | Card | 4-Ch E&M Interface Module RJ-45 |
| ETU/G64 | Card | 2-Ch G.703 64Kbps Co-directional Module RJ-45 |
| ETU/8E1-DXC | Card | ETU/8E1-DXC is one type of card with two type of cables. BNC and RJ45 |
| ETU/8E1-DXC-R | Cable | 8-Ch E1 DXC card with 8-port RJ45 cable |
| ETU/8E1-DXC-B | Cable | 8-Ch E1 DXC card with 8-port BNC cable |

Power Type

ETU02 – MUX – Plus –

Example: ETU02 – MUX – Plus – AC

ETU01A

Single Port Modular E1 CSU/DSU with LCD and SNMP



The ETU01A single port stand-alone CSU/DSU provides our best digital access solution for E1 and Fractional E1 network services termination. A DTE device may be linked to an ETU01A at data rates of 56Kbps to 2048Kbps. The ETU01A features user replaceable dataport modules for a number of interface standards; including Ethernet bridge, router, V.35, X.21, RS-530, RS-449, G.703 64Kbps Co-directional and RS-232. The ETU01A supports local control and diagnostics via LCD display, keypad and LED status indicators located on the front panel as well as via a menu driven RS-232 console port in conjunction with a standard terminal.

These features enable users to easily configure the unit, execute the in-service diagnostics and monitor the network status. The ETU01A provides optional SNMP (Simple Network Management Protocol), which allows the user to remotely control, diagnose and monitor the system using industry standard SNMP protocol, our proprietary MIB and any network management software.

Features

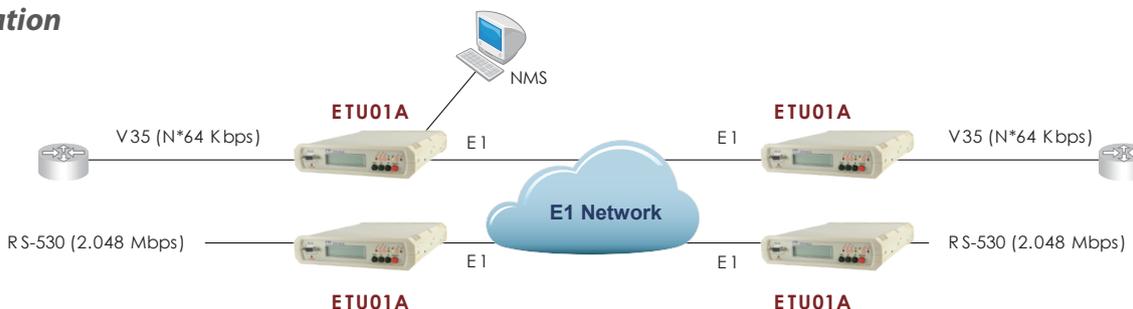
- Supports Fractional E1 and Unframed E1 service with EOC control
- Removable interfaces, support V.35, X.21, RS-530, RS-449, RS-232, G.703 Co-directional, NRZ, Ethernet Bridge and Router
- I/O connectors on rear panel
- Multiple clock source selection (Internal or External: E1 recovery, DTE or DCE)
- Supports Console, Telnet and SNMP management
- Menu keys and LCD display
- SNMP V1, V2C, V3 supported
- Supported by Smart View EMS
- 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 |
| | LCD display | 16*2 character LCD with backlight |
| | Bit rate | N*56K or N*64Kbps, where N=1~31 in CCS or 1~30 in CAS |
| | Relative receive level | 0 to -43dB |
| | Transmit level: | |
| | Pulse | Nominal 2.37V ±10% for 75ohm |
| | Amplitude | Nominal 3.00V ±10% for 120ohm 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) |
| | Diagnostics | local loopback, Digital remote loopback, Test pattern |
| Indicators | LEDs (Power, TD, RD, Signal loss, Sync loss, Error and test) | |
| Standards | ITU-T G.703/G.704/G.706 & G.732 | |
| Power Input | AC: 90-250VAC, DC: 18-72 VCD | |
| Power Consumption | 10W | |
| Dimensions | 250 x 195 x 45 mm (D x W x H) | |
| Weight | 1.5kg | |
| Temperature | 0 ~ 50°C (Operating), -1 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 65,000 hrs | |

Application



Ordering Information

| Model Name | Type | Description |
|------------|-------|--|
| ETU01A/AC | Power | 1U, 19/2", Data port to framed E1 with 100 ~240VAC |
| ETU01A/DC | Power | 1U, 19/2", Data port to framed E1 with -48VDC |

Power Type

ETU01A /

Example: ETU01A/AC

| Interface Module | 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-G64 | G.703 64Kbps co-directional interface module |
| ETU/TTU-NRZ | NRZ interface module (4 * BNC) |
| ETU/TTU-ET100 | 10/100 Base-Tx Ethernet E1 Bridge interface module |
| ETU/TTU-ET100R | 10/100 Base-Tx Ethernet Routing interface module |

Please refer to page 12-15



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.

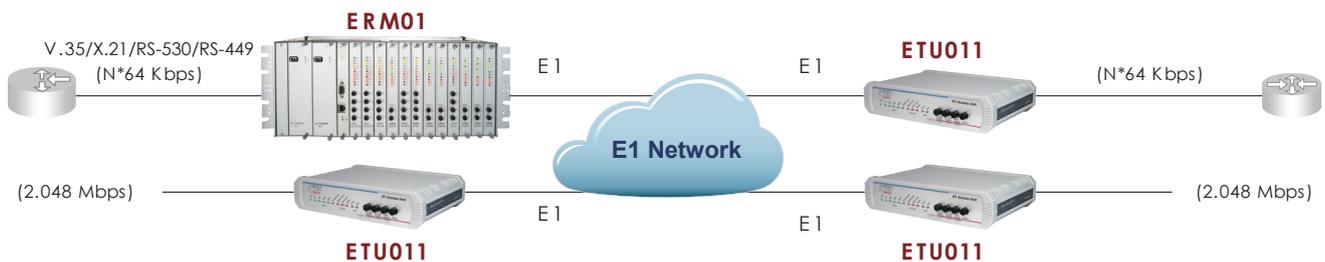
Features

- Supports Fractional E1 and Unframed E1 service
- Removable interfaces, support V.35, X21, RS-530, RS-449, RS-232, G.703 Co-directional, NRZ, 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 | G.703 E1 | Clock mode 2 | Receive clock to the sync. and transmit (DTE1) clock from the sync device |
| | Line Code | AMI/ HDB3 | | Clock mode 3 | Receive and transmit clock from the (DTE2) sync DCE (from ETC and ERC pin) |
| | Bit rate | N*56K or N*64Kbps, where N=1~31 in CCS or N equal 1~30 in CAS | | Clock mode 4 | Receive and transmit clock from the (DTE3) sync DCE (all from ETC pin) |
| | Relative receive level | -43dB | | Indicators | LEDs (Power, TD, RD, RTS, DCD, Signal loss, Sync loss, Alarm) |
| | Transmit level: | | | Standards | ITU-T G.703/G.704/G.706 & G.732 |
| | Pulse | Nominal 2.37V ±10% for 75 ohm | | Power Input | AC: 90-250VAC, DC: -18 ~ -75VDC |
| | Amplitude | Nominal 3.00V ±10% for 120 ohm Zero amplitude ±0.1V | | Power Consumption | 10W |
| | Jitter performance | According to ITU-T G.823 | | Dimensions | 250 x 195 x 45 mm (D x W x H) |
| | Connectors | BNC(unbalanced), RJ-48(balanced) | | Weight | 0.51kg |
| | Clock modes: | | | Temperature | 0°C ~ 50°C (Operating), -10°C ~ 70°C (Storage) |
| Clock mode 0 | Receive & transmit clock (DCE1) (recovered) to the sync DTE | Humidity | 10 ~ 90% non-condensing | | |
| Clock mode 1 | Receive & transmit clock (DCE2) (internal oscillator) to the sync DTE | Certification | CE, FCC, RoHS compliant | | |
| | | MTBF | 57,000 hrs | | |

Application



Ordering Information

| Model Name | Type | Description |
|------------------|--|--|
| ETU011-AC | Power | 1U, 19/2", Data port to framed E1 w/ built-in AC 90 ~ 250 VAC |
| ETU011-DC | Power | 1U, 19/2", Data port to framed E1 w/ built-in DC -18 ~ -72 VDC |
| Interface Module | 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-G64 | G.703 64Kbps co-directional interface module | |
| ETU/TTU-NRZ | NRZ interface module (4 * BNC) | |
| ETU/TTU-ET100 | 10/100 Base-TX Ethernet E1 Bridge interface module | |
| ETU/TTU-ET100R | 10/100 Base-TX Ethernet Routing interface module | |

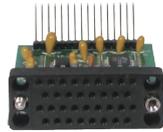
Please refer to page 12-15

Power Type
ETU011 -
 Example: **ETU011** - AC

Interface Module for ETU01A and 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-NRZ

Non-Return to Zero Interface



Features :

- 4 BNC connectors: TxD, TxC, RxD and Rx C (Data&Clock)
- NRZ line coding Logic "1" 0V +/- 0.3V Logic "0" -1.5V +/- 0.3V
- Synchronous data rate Nx64 (where N=1 to 32)

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-G64

G.703 64K

Co-directional Interface

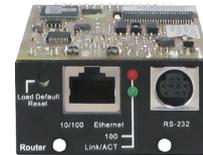


Features :

- Pulse shape compliant with ITU-T G.703
- Clock frequency: 64KHz
- Pulse Amplitude: 1.0V
- Zero Amplitude: 0V
- Impedance: 120 Ohms
- 15-Pin D Sub connector
- Range: up to 800m with 24AWG

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 encapsulation

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 |
|----------------|---|
| 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-G64 | G.703 64Kbps co-directional interface module |
| ETU/TTU-NRZ | NRZ interface module (4 * BNC) |
| ETU/TTU-ET100 | 10/100Base-TX Ethernet E1 Bridge interface module |
| ETU/TTU-ET100R | 10/100Base-TX Ethernet Routing interface module |

Interface
ETU/TTU – □□□
Example: ETU/TTU – V35



ETU01-Plus

Single V.35 Port E1 CSU/DSU

The ETU01-Plus stand-alone DSU/CSU 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

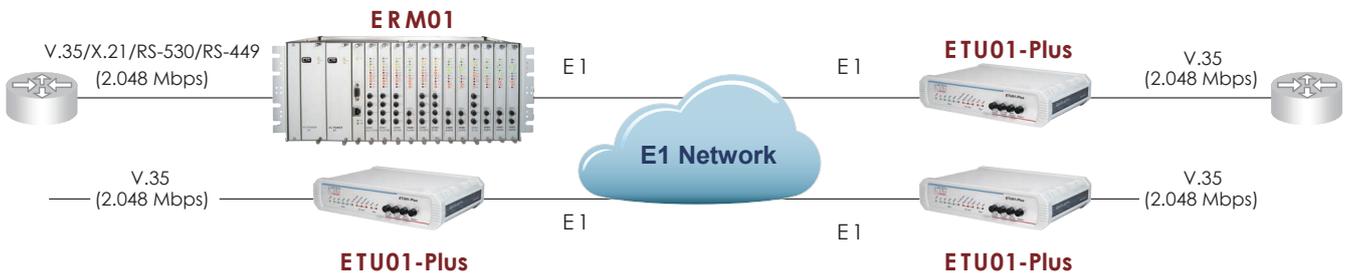
- Supports Fractional E1 and Unframed E1 service with EOC control
- Model with fixed V.35 interface for price critical applications
- Multiple clock source selection (Internal or External: E1 recovery, DTE or DCE)
- Built-in BERT with V.54 diagnostic capabilities for performing local and remote loopback
- 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*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) |
| Indications | 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 ~ -75 VDC | |
| Power Consumption | 10W | |
| Dimensions | 195 x 160 x 45 mm (D x W x H) | |
| Weight | 0.51kg | |
| Temperature | 0°C ~ 50°C (Operating), -10°C ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 55,000 hrs | |

Application



Ordering Information

| Model Name | Type | Description |
|---------------|-------|--|
| ETU01/Plus-AC | Power | 1U, 19/2", Fixed V.35 port to framed E1 w/ built-in AC 90 ~ 250 VAC |
| ETU01/Plus-DC | Power | 1U, 19/2", Fixed V.35 port to framed E1 w/ built-in DC -18 ~ -75 VDC |

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.

FTEC-100

T1/E1 Cross Rate Converter



The FTEC-100 is a standalone 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 frames employ u-Law and A-Law encoding principles respectively and encode those analog signals into 64kbps digital data. The E1 interface supports CCS (PCM31) or CAS (PCM30) frames with or without CRC-4 and with HDB3 line coding. The T1 interface supports D4 or ESF frame formats with B8ZS or AMI line code. Multiple clock source selection provides maximum flexibility in connecting both T1 and E1. The clock source may be from the T1 recovery clock, from the E1 recovery clock, from the internal oscillator, from an external clock or via transparent timing. All setup controls can be performed via RS-232 console port and ASCII terminal. Tests and diagnostics can easily be performed. Diagnostics include T1 local/remote and E1 local/remote loop back

Features

- Converts between T1 and E1 data and signaling
- Enable equipment to operate at T1 and E1 rates
- Support 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 timeslots 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 \pm 10% for 75ohm, Nominal 3.00V \pm 10% for 120ohm |
| | Zero amplitude | \pm 0.1V |
| | Connector | RJ-45 and BNC pair |
| | Specifications | Framing |
| Bit rate | | 1.544Mbps |
| Line Code | | B8ZS / AMI |
| Equalization | | 0 ~ 655 feet settable |
| CRC check | | Voice channel sample rule μ -Law CRC-6 when ESF |

| | | |
|--------------------------|--|-----------------|
| T1 interface | Line Impedance | 100 ohms |
| | Transmit Pulse level | 3.0V \pm 10%, |
| | Receive signal level | 0 ~ -10dB |
| | Connector | RJ-45 |
| LEDs | PWR, Sys, Test, T1/E1 | |
| Standards | ITU-T G.703, G.704, G.706, G.823, G.824, ANSI T1.403 | |
| Power | AC | 100~240 V |
| | DC | 36~72 V |
| Power Consumption | < 5W | |
| Dimensions | 201 x 135 x 35 mm (D x W x H) | |
| Weight | 130g | |
| Temperature | 0 ~ 60°C (Operating), -10 ~ 70°C (Storage) | |
| Humidity | 10 ~ 90% non-condensing | |
| Certification | CE, FCC, RoHS compliant | |
| MTBF | 57,000 hrs | |

Application



Ordering Information

| Model Name | Description |
|--------------------|---|
| FTEC-100/AC | E1/T1 Cross rate converter with RS232 console and built-in AC power |
| FTEC-100/DC | E1/T1 Cross rate converter with RS232 console and built-in DC power |

Power Type
FTEC - 100 –
 Example: FTEC - 100 – AC



IPM-1SE/V35

E1/V.35 over Ethernet Access Unit

IPM-1SE/V35 is designed as a multi-service access platform for PDH and V.35 over Ethernet applications. Structured/unstructured E1 and V.35 data 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.824) Jitter performance.

Cost-effective LAN deployment (PDH and V.35 over ethernet)

IPM-1SE/V35 provides cost-effective applications of traditional circuit-switched system over Ethernet. With IPM-1SE/V35, it is easy to interconnect with existing phone systems and V.35 over Ethernet that are used to carry data, voice and video.

Transparent transmission

IPM-1SE/V35 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, V.35 and Ethernet devices with lower network expense.

Bypass international toll

With a pair of IPM-1SE/V35 and guaranteed internet bandwidth, it is sure to save cost dramatically, and to ensure the QoS of voice based on interconnections of TDM telecommunications equipment.

Features

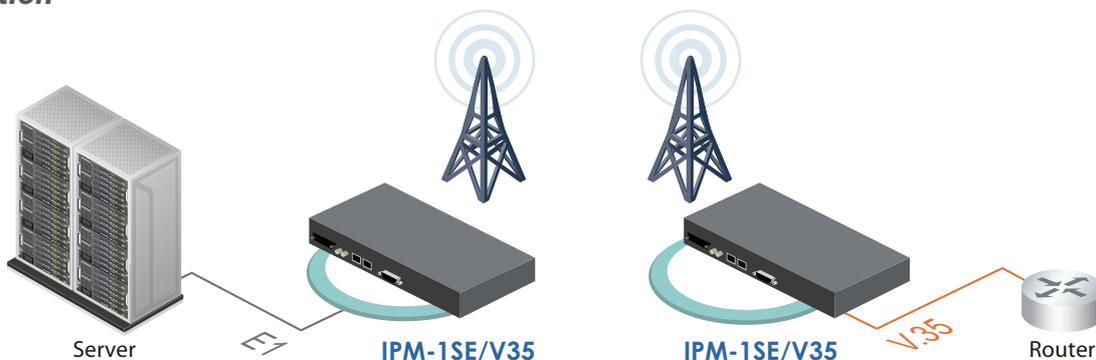
- Supports IEF T RFC4533 Structure-Agnostic TDM over Packet (SAToP), Metro Ethernet Forum MEF8.
- One E1 NRZ Serial Interface with LOS/AIS detection.
- One V.35 (Nx64K) interface.
- Use Raw Encapsulation method for PDH payload over Ethernet packet.
- Supports Circuit Emulation Service over Ethernet (CESoE) transport over Ethernet networks.
- Comply with IEF T 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.824 (E1 Jitter Control).
- Configurable jitter buffer depth to compensate up to 40ms of Packet Delay Variation.
- Lost packets processing/compensation via PW (Pseudo Wire) control field Sequence Number.
- Provides 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.

Specifications

| | |
|---|---|
| Line interface (CPE side) | Port: One E1 (ITU-T G.703) and one V.35. Interface: RJ-48c (120 Ohm), BNC (75 Ohm) and M/34 female (V.35, DCE). E1 Line Coding: HDB3 |
| Ethernet interface (CPE/CO side) | Port: two 100 Base-T Ethernet. One is for downlink and the other is for uplink Interface: RJ-45 |
| Dimensions | 44 x 370 x 215 mm (D x W x H) |

| | |
|--------------------|--|
| Power | AC: 110 ~ 240V @ 47 ~ 65Hz DC: -72V ~ -36V |
| Environment | Ambient temperature: 0°C ~ 50°C (0°C ~ 65°C, optional) Storage temperature: 0°C~ 85°C Relative humidity: 5 ~ 95% non condensing |
| Management | Console port (CLI) or SNMP-based / Web GUI management |

Application



Ordering Information

| Model Name | Description |
|----------------|---|
| IPM-1SE/V35-AD | E1/V35 over Ethernet access unit with AC+DC Power |

NEW

IPM-E1, IPM-4E1



E1/4E1 over Ethernet Web Management

12

TDM over IP

IPM-E1/4E1 is designed as a multi-service access platform for PDH over IP applications. E1 frames can be mapped/de-mapped into/from IP 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 IP. It is easy to interconnect existing phone systems over IP 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

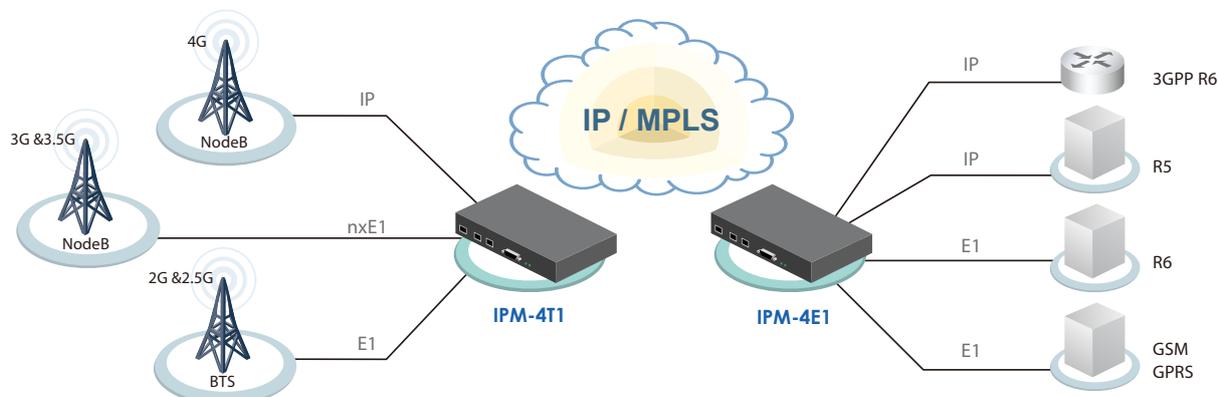
- Supports Web Management
- Supports IETF RFC4553 Structure-Agnostic TDM over Packet (SAToP), Metro Ethernet Forum MEF8
- Use Raw Encapsulation method for PDH payload over Ethernet packet
- Supports Circuit Emulation Service over Ethernet networks
- Comply with IETF draft standard for CESoPSN and SAToP; 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, 75ms
- 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

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

NEW



IPM-T1, IPM-4T1

T1/4T1 over Ethernet Web Management

IPM-T1/4T1 is designed as a multi-service access platform for PDH over IP applications. T1 frames can be mapped/de-mapped into/from IP packets. An adaptive clock recovery method for Ingress PDH (PSN->TDM) clock generation is implemented to support T1 (ITU-T G.824) Jitter performance.

IPM-T1/4T1 provides cost-effective applications of traditional circuit-switched system over IP. It is easy to interconnect existing phone systems over IP that are used to carry data, voice and video. With high precision clock recovery technology, IPM-T1/4T1 is capable of supporting 2G/3G/4G backhaul and provides smooth services. IPM-T1/4T1 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-T1/4T1 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

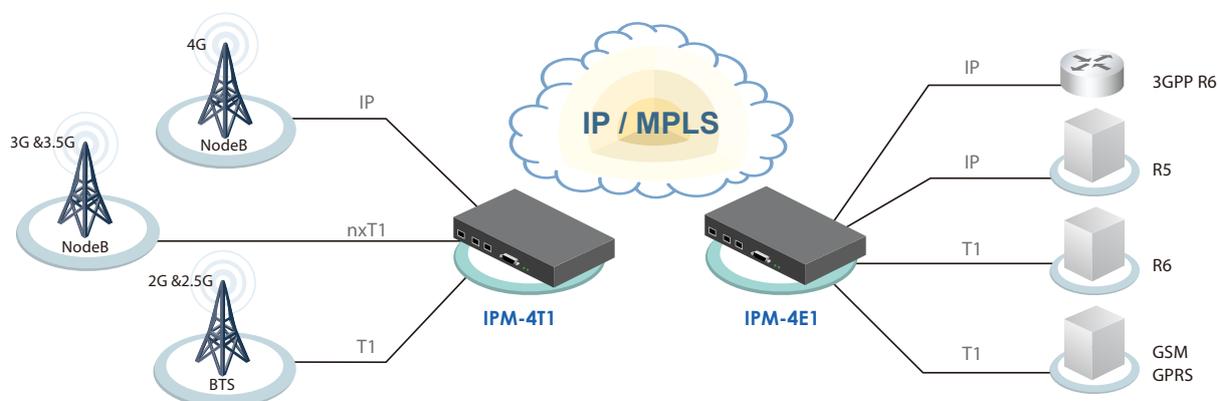
- Supports Web Management
- Supports IETF RFC4553 Structure-Agnostic TDM over Packet (SAToP), Metro Ethernet Forum MEF8
- Use Raw Encapsulation method for PDH payload over Ethernet packet
- Supports Circuit Emulation Service over Ethernet networks
- Comply with IETF draft standard for CESoPSN and SAToP; 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.824 (T1 Jitter Control)
- Configurable jitter buffer depth to compensate PDV (Packet Delay Variation) with the flexible setting of 11ms, 23ms, 40ms, 75ms
- 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 T1 Power failure status
- T1 NRZ Serial Interface with LOS/AIS detection

Specifications

| | | |
|--------------------|-------------|--------------------------------|
| T1 Interface | Standards | TU-T G.703, G.704, ANSI T1.403 |
| | Ports | 1 or 4-Port |
| | Data Rate | 1.544Mbps ±32ppm |
| | Connector | RJ-48c for 100 ohm |
| | Line Coding | B8ZS |
| 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-T1-AD | T1 over Ethernet with built-in AC+DC Power |
| IPM-4T1-AD | 4T1 over Ethernet with built-in AC+DC Power |

Port Number Power Type
IPM - □□□ - □□
 Example: IPM - 4T1 - AD

NEW

IPM-16E1

16x E1 over Ethernet
Web Management



IPM-16E1 is designed as a multi-service access platform for PDH over IP applications. E1 frames can be mapped/de-mapped into/from IP 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-16E1 provides cost-effective applications of traditional circuit-switched system over IP. It is easy to interconnect existing phone systems over IP that are used to carry data, voice and video. With high precision clock recovery technology, IPM-16E1 is capable of supporting 2G/3G/4G backhaul and provides smooth services. 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-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

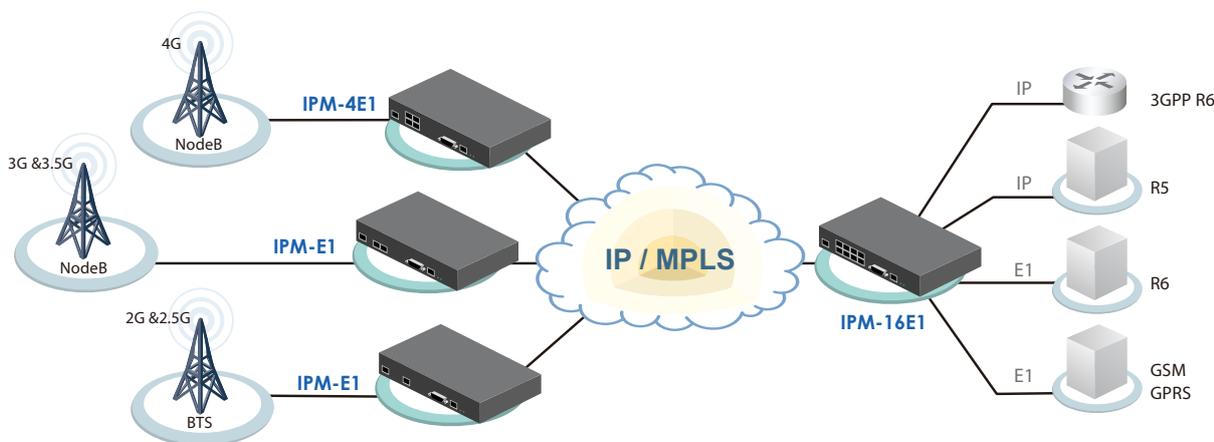
- Supports Web Management
- Supports IETF RFC4553 Structure-Agnostic TDM over Packet (SAToP), Metro Ethernet Forum MEF8
- 16 x E1 NRZ Serial Interface with LOS/AIS detection
- Use Raw Encapsulation method for PDH payload over IP packet
- Supports Circuit Emulation Service over IPE
- Comply with IETF 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 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 | 16-Port |
| | Data Rate | 2.048Mbps ±50ppm |
| | Connector | RJ-45 for 120 ohm |
| | Line Coding | HDB3 |
| Ethernet Interface | WAN Port | 1000Base-T |
| | 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-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.

NEW



IPM-16T1

**16xT1 over Ethernet
Web Management**

IPM-16T1 is designed as a multi-service access platform for PDH over IP applications. T1 frames can be mapped/de-mapped into/from IP packets. An adaptive clock recovery method for Ingress PDH (PSN->TDM) clock generation is implemented to support T1 (ITU-T G.824) Jitter performance.

IPM-16T1 provides cost-effective applications of traditional circuit-switched system over IP. It is easy to interconnect existing phone systems over IP that are used to carry data, voice and video. With high precision clock recovery technology, IPM-16T1 is capable of supporting 2G/3G/4G backhaul and provides smooth services. IPM-16T1 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-16T1 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

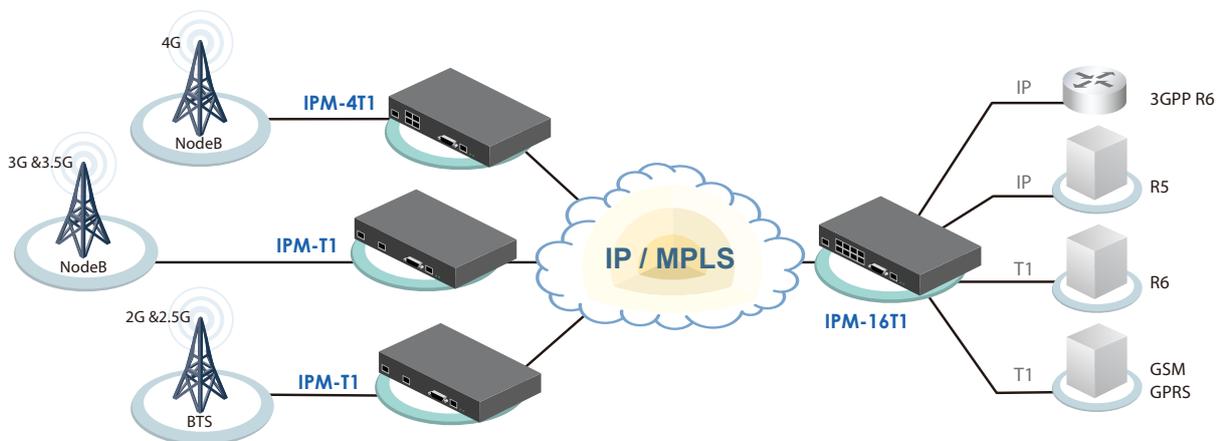
- Supports Web Management
- Supports IETF RFC4553 Structure-Agnostic TDM over Packet (SAToP), Metro Ethernet Forum MEF8
- 16 x T1 NRZ Serial Interface with LOS/AIS detection
- Use Raw Encapsulation method for PDH payload over IP packet
- Supports Circuit Emulation Service over IPE
- Comply with IETF 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 16 independent Adaptive Clock recovery block for Ingress PDH (PSN->TDM) clock generation. Recovered clock jitter is compliant with ITU-T G.824 (T1 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 T1 Power failure status

Specifications

| | | |
|---------------------------|-------------------------------|---------------------------------|
| T1 Interface | Standards | ITU-T G.703, G.704, ANSI T1.403 |
| | Ports | 16-Port |
| | Data Rate | 1.544Mbps ±32ppm |
| | Connector | RJ-48c for 100 ohm |
| | Line Coding | B8ZS |
| Ethernet Interface | WAN Port | 1000Base-T |
| | 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-16T1-AD | 16T1 over Ethernet with built-in AC+DC Power |

Port Number Power Type
IPM - □□□□ - □□
 Example: **IPM - 16T1 - AD**

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

EOC-101-P

Ethernet Extender with Power Feeding (Coaxial Cable)



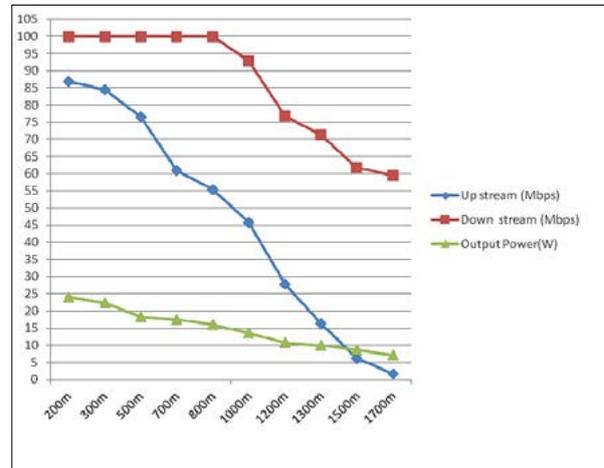
Features

- Long transmission distance up to 1500 meters (Max.)
- Remote power feeding
- Simultaneous transmission of power and Ethernet data over coaxial cable
- High transmission bandwidth, support HD IP Camera 1080P/30fps
- High power transmission for long distance: 12W (DC12V /1A) @1000 Meters (EOC-101L-P)
- Complies with standard IEEE802.3 and IEEE802.3u

Coaxial Cable Distance vs Speed and Power Feeding

| Distance (meter) | 300 | 500 | 700 | 1000 | 1200 | 1500 |
|--------------------|-----|-----|-----|------|------|------|
| Up stream (Mbps) | 76 | 69 | 55 | 41 | 25 | 5 |
| Down stream (Mbps) | 90 | 90 | 90 | 82 | 69 | 55 |
| Output Power (W) | 18 | 16 | 15 | 12 | 9.5 | 7.5 |

Output Power and Bandwidth Efficiency (Based on RG-6)

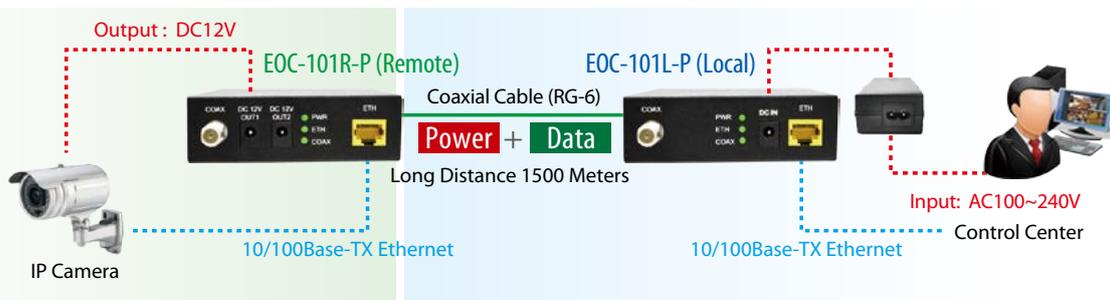


Specifications

| | |
|---------------------------------|--|
| Standards | IEEE802.3 10Base-T IEEE802.3u 100Base-TX IEEE802.3x Flow Control for Ethernet |
| Transmission Medium | Coaxial Cable (RG-6 Drop cable) |
| Remote Site Power Output | 2x DC 12V output, total 1A/12W @ 1000meters coaxial cable |
| LED | Power (Green) On: power on / Off : Power Off ETH LNK/ACT (Green) On: Ethernet Port Link / Flash : Data TX / RX Coax LNK/ACT (Green) On: Coaxial link / Fast Flash : Data TX/RX / Slow Flash : Standby for connection |
| Power Consumption | 32.2W (12W Power feeding for IP Camera + EOC-101L-P + EOC-101R-P) @1000meter coaxial cable |
| Power Input | 1x DC jack for power adapter (AC100~240V, 50/60Hz) |

| | |
|------------------------------|--|
| Power Adapter | Input AC100~ 240AC (50/60Hz) Output 63VDC , 0.8A |
| Connectors | Remote RJ-45x1, F-Type BNCx1, DC jack 12V output x2 Local RJ-45x1, F-Type BNCx1, DC jack 48V input x1 |
| Dimensions | Remote 123.6 x 95 x 30mm (D x W x H) Local 123.6 x 95 x 30mm (D x W x H) |
| Operation Temperature | 0 ~50°C |
| Weight | Total Net : 640g |
| Humidity | 10% ~ 90% RH, non-condensing |
| Protection | Over current, Overvoltage Protection |
| Certification | CE / FCC Part 15 class B |
| EMS protection | EN61000-4-5 Surge level 3 Criteria B for coaxial cable , Ethernet and Power |

Application



Ordering Information

| Model Name | Description |
|------------|---|
| EOC-101-P | Remote Power Feeding Ethernet Extender over Coaxial Cable (Remote, Local) |

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



EOC-10A

Gigabit Ethernet / CATV over Coax Modem

The EOC-10A is point-to-point EoCNA (Ethernet over Coax Network Alliance) solution that efficiently extends 10/100/1000Mbps Ethernet circuits up to 700 meters (2,296feet) at full Fast Ethernet speed using existing coaxial cable. The EOC-10A will allow Ethernet connectivity in existing facilities or homes without pulling extra cable. This is perfect solution for Ethernet on the factory floor where systems have been upgraded from slower serial communication to Ethernet networking. Installation is easy with absolutely no settings required. The EOC-10A is used in Coaxial cable systems to extend Ethernet connectivity over existing CCD/CATV grade Coaxial cable. The EOC-10A works by sharing the same cable with CATV signals, without interference to the existing CATV signals.

Features

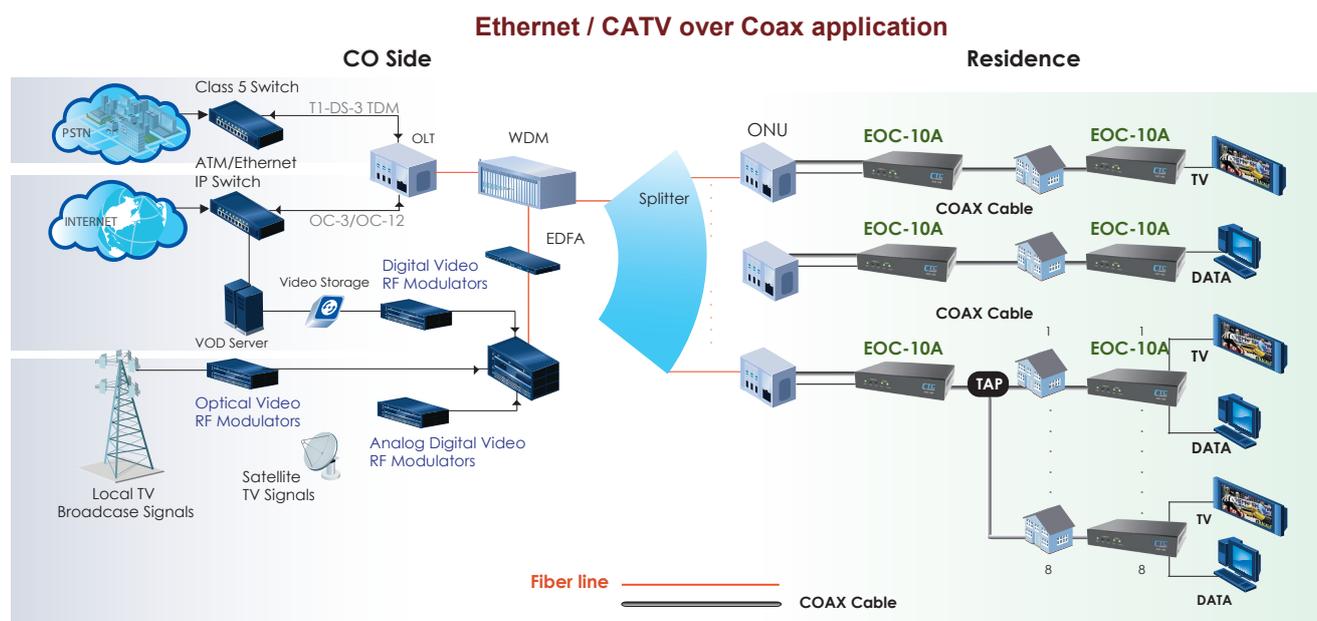
- Extends LAN connectivity using existing coaxial cable
- Transmits CATV and Ethernet over the same coaxial cable
- 192Mbps @ up to 700 meters (2,296feet)
- 64Mbps @ 1.2Km (4,000feet)
- Supports point to point
- Supports point to multi-point up to 8 nodes over tap/splitter
- Asymmetrical using EoCNA standard
- Operates transparently 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

| | |
|--|---|
| Ethernet Interface | Two 10/100/1000 Mbps, RJ45 |
| Coax Interface | Two F-Type Female Coax Connectors, One for EoCNA, the other for TV/ CCD |
| Protocol | Transparent to higher layer protocols |
| Transmission Power and Spectrum | 0 dBm, 12~44 MHz |
| Physical layer | 224Mbps maximum speed |
| transmission speed and distance | Up to 192Mbps@700 meters |
| | Up to 64Mbps @ 1.2Km (-176dBm/Hz Noise Floor) |
| Indications | LEDs (PWR, LAN Link/Act, Coax Link/Act, Sync) |

| | |
|--------------------------|--|
| Standards | IEEE802.3, IEEE802.3u, IEEE802.3ab, IEEE802.3x |
| Power Input | 12VDC (via AC switching adapter) |
| Power Consumption | <4W |
| Dimensions | 83 x 138 x28mm (D x W x H) |
| Weight | 0.33kg |
| Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |
| MTBF | 57,000 hrs |

Application



Ordering Information

| Model Name | Description |
|------------|--|
| EOC-10A | CATV+2x10/100/1000-T over Coax Modem with AC Adapter |

Eoe1A

Ethernet over E1 with SNMP Management



The Eoe1A is a Channel Service Unit for unframed ITU-T G.703 E1 that features a built-in Ethernet bridge. The CSU has a built-in Network Terminating Unit (NTU) and may connect to either 75 Ohm unbalanced, BNC connectors or to 120 Ohm balanced, unframed E1 via twisted pairs and a shielded RJ-45 connector. The Eoe1A Ethernet Bridge uses HDLC encapsulation to transport Ethernet packets across the WAN and supports 10/100 auto-negotiation or manual settings for 10M, 100M, Full or Half Duplex Ethernet. The Ethernet port also supports a standard auto-MDIX feature that will completely eliminate Ethernet cross-over cables or the guessing that is sometimes involved in choosing a cable when connecting to a HUB or a PC. The Eoe1A is very easy to configure by a menu driven serial console interface. SNMP and proprietary MIB add the ability to manage the Eoe1A centrally through third party network management software or via CTC Union's EMS management system.

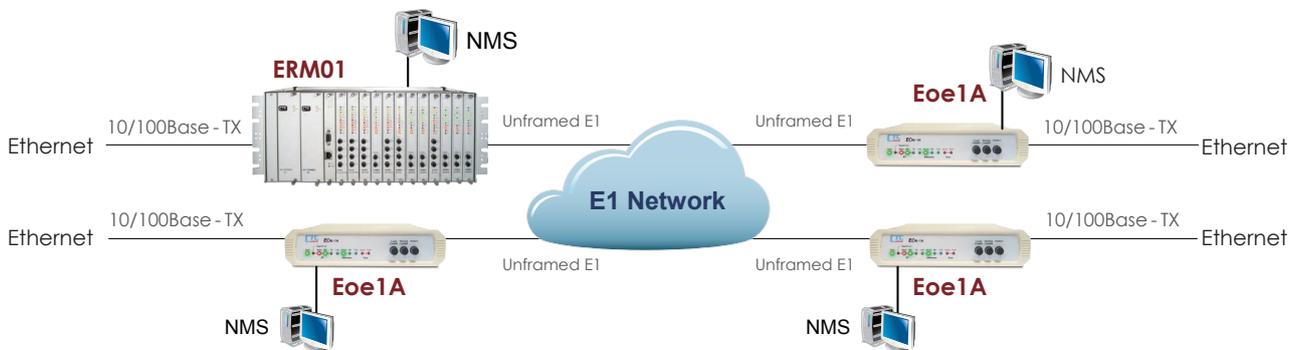
Features

- Supports 10/100Base-TX Ethernet over Unframed E1
- Automatic address learning, aging and deletion after 5 minutes
- Auto padding of undersized packets to meet the minimum Ethernet packet size requirement
- Buffering modes can be selected according to the setting of WAN and LAN line speeds
- Forwarding and filtering rate at WAN speed with throughput latency of 1 frame
- Auto MDI / MDIX
- Real-time filtering with 256 MAC address table
- Supports Console, SNMP and Web management
- Adjustable pay load rates of: 10K, 32K, 64K, 128K, 256K, 512K, 1024K & 2048K

Specifications

| G.703 E1 Specifications | | Data Rate | |
|-------------------------|--|------------------------|---|
| Framing | Unframed | Filtering & Forwarding | 10/100Mbps; Half Duplex / 20/ 200Mbps; Full duplex |
| Line code | AMI/ HDB3 | Delay | 90,000 packets/sec |
| Bit rate | 2.048Mbps (clear channel) | Frame Buffer | 1 frame |
| Relative receive level | 0 to -43dB | MAC Table | 340 frames |
| Transmit level | Pulse Nominal 2.37V ±10% for 75ohm Amplitude Nominal 3.00V ±10% for 120ohm Zero amplitude ±0.1V | Protocols | 256 MAC address |
| Jitter performance | According to ITU-T G.823 | Indications | Synchronous HDLC |
| Connector | BNC(unbalanced), RJ-48(balanced) | Standards | LEDs (Power, Signal Loss, Alarm, Link, TD, RD, 100, Full, Error, Error, Test) |
| 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 | Management | ITU-T G.703, G.706 and G.732, IEEE 802.3/802.3u |
| Diagnostics | | Power Input | Console, Web, SNMP |
| Test Switches | Digital local loopback, Analog local loopback, Digital local and remote loopback, 2047 Test pattern | Power Consumption | AC: 90-250VAC ; DC: 18-72 VCD |
| Ethernet Specifications | | Dimensions | 20W |
| Connector | RJ-45 | Weight | 250 x 195 x 45mm (D x W x H) |
| | | Temperature | 1.5kg |
| | | Humidity | 0°C ~ 50°C (Operating), -10°C ~ 70°C (Storage) |
| | | Certification | 10 ~ 90% non-condensing |
| | | MTBF | CE, FCC, RoHS compliant |
| | | | 57,000 hrs |

Application



Ordering Information

| Model Name | Description |
|------------|--|
| Eoe1A/AC | 1U half 19" Ethernet over unframed E1 SNMP with AC power (100 ~ 240 V) |
| Eoe1A/DC | 1U half 19" Ethernet over unframed E1 SNMP with DC power (18 ~ 75 V) |
| Eoe1A/AD | 1U half 19" Ethernet over unframed E1SNMP with AC (100~240V) and DC (18 ~ 75 V) |

Power Type
Eoe1A -
 Example: Eoe1A - AD

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



ET100A (V2)

Ethernet to WAN (Synchronous) Bridge

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

Features

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

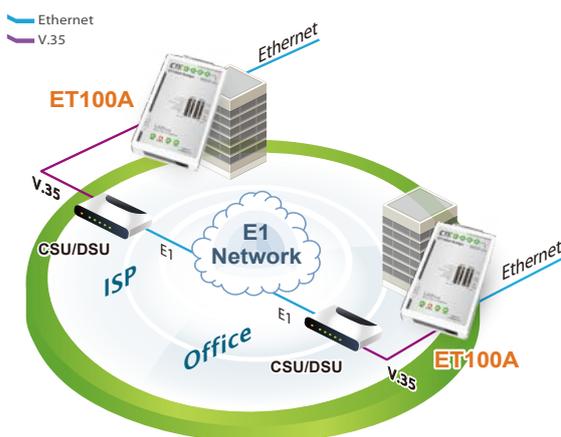
Specifications

| | | |
|-----|-----------------|--|
| WAN | Interface: | Selectable RS-232(Sync), V.35, RS-530, RS-449, RS-232, X.21with Adapter Cable |
| | Protocol: | Synchronous PPP, HDLC (ISO 13239), CISCO® HDLC |
| | Connector: | DB25M |
| | Type: | DTE |
| | Configuration: | All Configuration by Dip switch (Protocol, interface, Clock mode, data rate) |
| | Data rate: | Nx56Kbps, Nx64Kbps RS-232 up to 128Kbps V.35, X21, RS-530, RS-449 up to 10Mbps |
| | Clock source: | Tx/Rx internal or external |
| | Handshake (DCD) | Follow CTS/RTS or Always On |

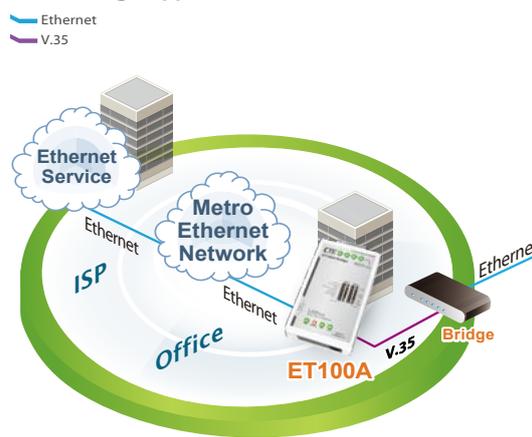
| | |
|-----------------------|---|
| Indications | LEDs (PWR, WAN Rx/Tx, LAN Tx/Rx/Link/Err/Speed) |
| LAN | Compliant with IEEE 802.3, 802.3u, 802.3x |
| | Connector: RJ-45 |
| | Speeds: 10/100Base-TX, Full/Half duplex Frames: Support 64 ~ 2044 byte packet lengths |
| Bridge Specifications | MAC Address learning, aging and deletion after 5 minutes 256 addresses MAC table, 1763 packet buffer |
| Power | 12VDC |
| Power Consumption | < 5 W |
| Dimensions | 135 x 79 x 25mm (D x W x H) |
| Weight | 180g |
| Temperature | 0°C ~ 50°C (Operating), -10°C ~ 70°C (Storage) |
| Humidity | 10 ~ 90% non-condensing |
| Certification | CE, FCC, RoHS compliant |

Application

Ethernet over TDM, Point to Point



HDLC Bridge Application



Ordering Information

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

Tester Series

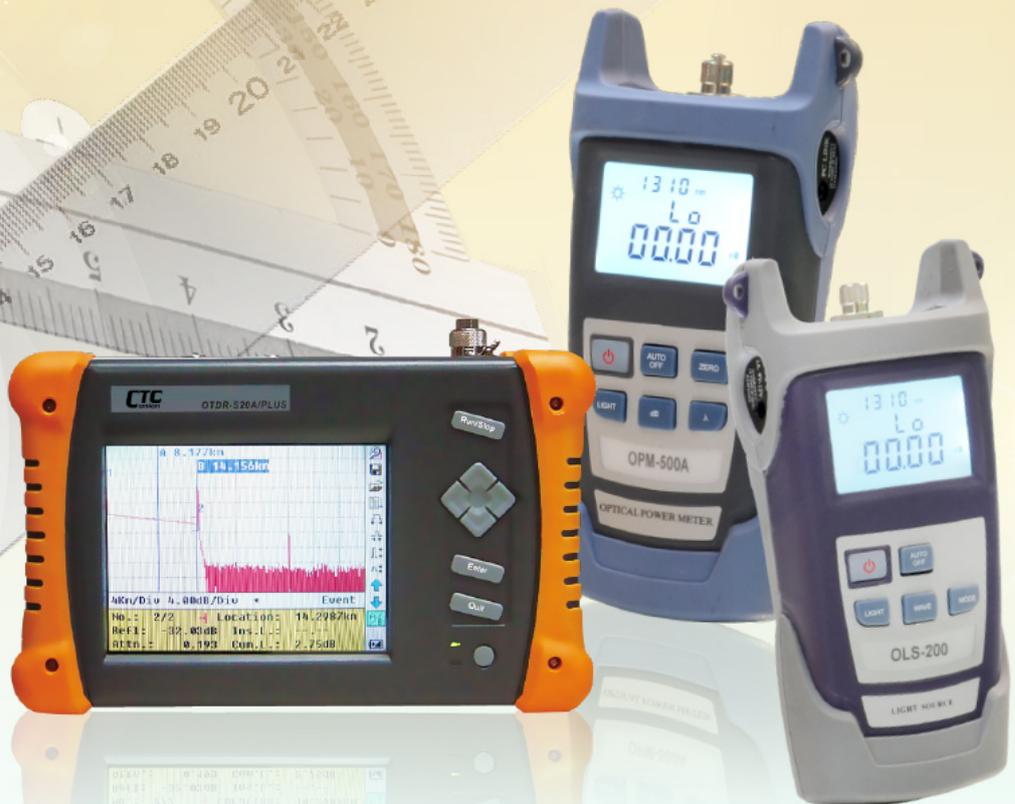
Offers the reliability necessary

Optical Fiber Tester

(OTDR, Optical light source & power meter)

E1 BERT

Protocol Analyzer





OTDR-30A

Single Mode Optical Time Domain Reflectometer

The OTDR-30A is an OTDR (Optical Time Domain Reflectometer) based optical fault locator and analysis tool for optical fiber networks. The OTDR-30A supports Single mode 1310nm, 1550nm with Dynamic Range 28/26dB. The OTDR features a light, compact, hand-held design with an intelligent user interface that is easy and quick to use. The color LCD display with bright backlight makes testing work more comfortable and convenient, whether during daylight or in low light conditions. As a fault locating and analyzing tool, the OTDR-30A is much more economical than traditional OTDRs. In addition to its 1000 plus internal curve storage, the OTDR-30A can save and transfer the measurement curves data to a PC via serial or USB port for further analysis or printing with Window based "Trace Manager" software. When set in auto measurement mode, the user can activate the measurement operations easily by the push of only one button. The OTDR-30A is ideal for optical fiber installation, maintenance, field construction, and other on-site fault-location analysis.

Features

- Ideal for LAN/WAN certification & trouble-shooting
- Fiber length/splice/fiber-end detection
- Handheld & lightweight
- Overall fiber applications:
 - SM: 1310/1550nm(with filter), up to 28dB
 - Quick start: <5 seconds
 - Hotkeys: Easiest operation in the world, push-and-test
 - High precision measurement, 1000 test records storage
- USB/RS-232 data interface
- Bellcore file format (.sor)
- PC software for traces batch editing & flexible printing
- Multilanguage: EN/DE/FR/ES/PT/RU/KR/CN
- 8 hrs continuous operation/20 hrs standby
- Dust-shock proof (2m drop test)

Specifications

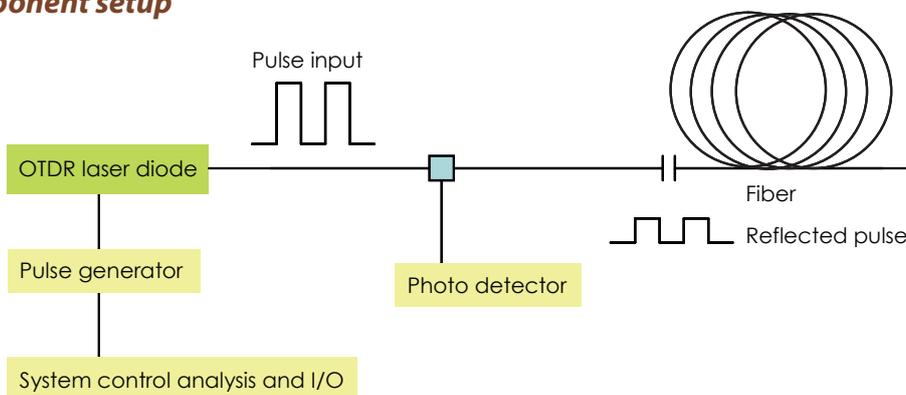
| Model Name | Wavelength (±20nm) | Dynamic Range | Event DeadZone(m) | Attenuation DeadZone(m) |
|------------|--------------------|---------------|-------------------|-------------------------|
| OTDR-30A | 1310/1550 | 28/26dB | 1.8 | 8 |

| | | | | |
|------------------------------------|---|------------------------------|--|--|
| Selectable Range (Km) | 0.3,1.3, 2.5, 5, 10, 20, 40, 80, 120 | Connector | FC/PC (Interchangeable SC, ST) | |
| Pulse Width | 5ns, 12ns, 30ns, 100ns, 275ns, 1µs, 2.5µs, 10µs | Power Supply | NiMH Battery / AC Adapter | |
| Averaging Time | 15s, 30s, 1min, 2min, 3min | Battery Life | 8 hours continuous operation; 20 hours standby (on one charge) | |
| Distance Measure Accuracy | ±(1m + 5×10-5×distance + sampling space) | Operating Temperature | 0 ~ 50°C | |
| Attenuation Detect Accuracy | ±0.05 dB/ dB | Storage Temperature | -20 ~ 70°C | |
| Reflection Detect Accuracy | ±4 dB | Relative Humidity | 0 ~ 95% (non-condensing) | |
| Data Storage | 1000 records | Weight | 1kg (2.2 lbs) | |
| Connectivity | USB/RS-232 | Dimensions | 100 x 196 x 60mm (D x W x H) | |

Visible Fault Locator (Only available with Type B/N and C/N)

| | |
|-----------------------|------|
| Output Power (dBm) | ≥ -3 |
| Max Measurement Range | 5 Km |

An OTDR component setup



Ordering Information

| Model Name | Description |
|------------|---|
| OTDR-30A | 28/26dB, 1310/1550nm, Single mode OTDR tester |

OLS-200

Optical Light Source



13

Optical light source

OLS-200, a compact, handheld tester, provides stable laser light source in two different wavelengths for fiber cable testing. By providing the two most popular wavelengths, 1310nm and 1550nm, the OLS-200 is an ideal tester designed for optical fiber networks. When used in conjunction with any third party optical power meter or the OPM-500A from CTC Union, the actual optical attenuation of a fiber link can be determined during pre-installation of active devices or for troubleshooting in-field fiber problems.

Features

- Highly stable multi-wavelength single mode laser output
- Industry standard and easily adapted FC connector
- Continuous Wave (CW) or Modulation modes
- Selectable wavelengths 1310nm or 1550nm
- Built-in Lithium Ion rechargeable battery
- Works up to 45 hours on full charge
- Auto power off after 10 minutes idle
- Easy to operate via keys and LCD display
- Portable and light weight
- Use with OPM-500A or other third party power meter

Specifications

| | |
|-------------------------------|---|
| Working Wavelength(nm) | 1310/1550 (Selectable) |
| Laser Type | FP-LD |
| Optical Power Output | -7 dBm |
| Modulation Frequencies | 0 (CW), 270, 1000, 2000Hz |
| Connector | FC/PC |
| Temperature | -10 ~ 60°C (Operating) , -25 ~ 70°C (Storage) |
| Auto shutoff(min) | 10 |

| | |
|----------------------------------|--|
| Battery working time(hrs) | 45 |
| Dimensions | 33 x 100 x 185 mm (D x W x H) |
| Battery Power | Internal 7.4V 800mAh rechargeable battery 100~240AC Power Adapter/Charger, 8.4VDC@1A output |
| Weight | 295g |

An OTDR component setup



Ordering Information

| Model Name | Description |
|------------|--|
| OLS-200 | Optical Light Source, -7 dBm (1310/1550nm) |

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



OPM-500A/500B

Optical Power Meter

OPM-500, a compact, handheld tester, provides stable laser light power measurement in five different wavelengths for fiber cable testing. By measuring the most popular wavelengths, 850nm, 980nm, 1300nm, 1310nm, 1490nm and 1550nm, the OPM-500 is an ideal tester designed for active optical fiber networks. When used in conjunction with any third party optical light source or the OLS-200 from CTC Union, the actual optical attenuation of a fiber link can be determined during pre-installation of active devices or for troubleshooting in-field fiber problems.

Features

- Highly stable laser light level & power measurement
- Industry standard fiber connector adapters for FC
- Backlit LCD display with auto shutoff
- Selectable wavelengths 850 ~ 1550nm
- Built-in Lithium Ion rechargeable battery
- Works up to 48 hours on full charge
- Auto power off after 10 minutes idle
- Easy to operate via keys and LCD display
- Portable and light weight
- Use with OLS-200 or any other third party light source

Specifications

| | | |
|-------------------------------|--|-----------|
| Model | OPM-500A | OPM-500B |
| Dynamic Range | -70 ~ +3 | -50 ~ +26 |
| Wavelength range(nm) | 800 ~ 1700 | |
| Connector | FC/PC (optional SC, ST) | |
| Working Wavelength(nm) | 850, 980, 1300, 1310, 1490, 1550 | |
| Resolution(dB) | 0.01 | |
| Temperature | -10 ~ 60°C (Operating), -25 ~ 70°C (Storage) | |
| Diode Type | InGaAs PIN ph | |

| | |
|----------------------------------|--|
| Auto shutoff time(min) | 10 |
| Battery working time(hrs) | 48 |
| Dimensions | 33 x 82 x 172 mm (D x W x H) |
| Power | Internal 7.4V 800mAh rechargeable battery 100~240AC Power Adapter/Charger, 8.4VDC@1A output |
| Weight | 295g |



Ordering Information

| Model Name | Description |
|------------|--|
| OPM-500A | 850, 980, 1300, 1310, 1490, 1550, -70 ~ +3dBm |
| OPM-500B | 850, 980, 1300, 1310, 1490, 1550, -50 ~ +26dBm |

OPM - □□□□
Example: OPM - 500A

HCT-BERT/C

E1/Datacom BER Tester



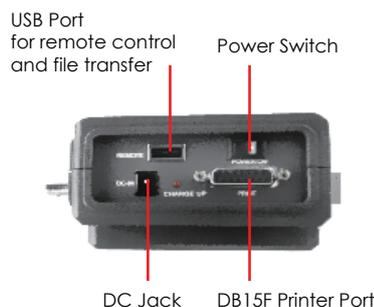
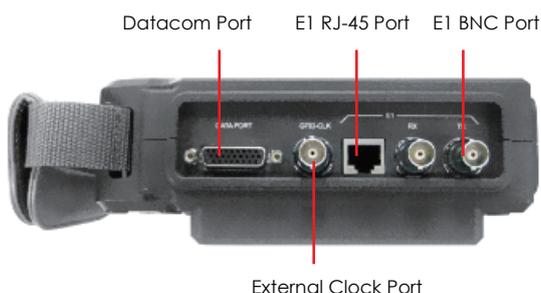
The HCT-BERT/C tester is a compact, color-LCD, graphic-user-interface, single hand E1 Bit error rate tester designed for field use in analysis and maintenance of data communications (V.35, RS530, X.21, RS232) and E1 (2.048Mbps) lines. The HCT-BERT/C performs framed, unframed drop and insert Nx64Kbps, or nx56Kbps data into any time slot. The HCT-BERT/C tester also provides a variety of E1 line statuses, transmission performance testing (BERT) and monitoring. On the E1 line, the HCT-BERT/C may be used as a generator or receiver.

Features

- Color LCD display graphic mode
- USB port for remote control
- Results Report
- Supports G.821/826, M.2100 BERT analysis
- Sa bits setup and monitor
- Internal Memory storage of test result; Direct display on LCD screen
- Print out via Parallel Printer port
- Portable for field use
- Upgradeable for advanced features
- Rechargeable battery with battery low indicator
- Supports CRC & BPV performance analysis
- Datacom BERT analysis available for V.35, RS-530, X.21 and RS-449
- V.35/ V.24/RS-232/449/530/ X.21

Specifications

| | | |
|------------------------|---|---|
| E1 interface | E1 Receiving Interface | <ul style="list-style-type: none"> • Line code: HDB3/AMI • Pulse feature: ITU G.703 • Jitter tolerance: ITU G.823 • Input port: BNC (non-balance), RJ45 (balanced) • Input mode: Impedance: 75ohm (unbalanced), 120ohm (balanced) • Bridging mode: impedance > 1000 ohm |
| | E1 Transmission Interface | |
| Other Functions | E1 Frame Format | <ul style="list-style-type: none"> • PCM31, PCM31+CRC, PCM30, PCM30+CRC • Unframed mode, Automatic detection |
| | Color Display Screen: Character/graphic mode | <ul style="list-style-type: none"> • 100 test results max available in storage • Direct display on LCD screen • Print via printer port available |
| | Test Results Report | <ul style="list-style-type: none"> • 100 test results max available in storage • Direct display on LCD screen • Print via printer port available |
| | Modular Design for Easy Update | |
| | Error Rate Test (BERT Test) | <ul style="list-style-type: none"> BERT Patterns <ul style="list-style-type: none"> • 511, 2047, 2E15-1, 2E15-1 (reverse), 2E20-1, 2E20-1 (reverse), QRSS, 2E23-1, 2E23-1 (inverted), all 1, all 0, alternate, 1100, 3 IN 24, 1 IN 16, 1 IN 8, 1 IN 4, User programmable 1/2/3 BERT Display Format <ul style="list-style-type: none"> • Error counting, Alarm counting, ITU G.821, ITU G.826 • M.2100, Histogram BERT Transmission Error Rate <ul style="list-style-type: none"> • Insert one forced error • Fixed error rate of 10⁻³~10⁻⁷ Quality Analysis <ul style="list-style-type: none"> • Receiving seconds, Error seconds, Alarm seconds • Error Free seconds, Error rate, Valid seconds • Severely error seconds, G.821 error seconds • G.826 error seconds, Unavailable seconds Data Port BERT Test <ul style="list-style-type: none"> • Data rate of the multiple of 64Kbps: N*64Kbps (N=1~36) |
| | Indications | LEDs (DTE, DCE, DATA PORT, TD, RD, DCD, RTS, CTS, DTR, DSR, TC, RC XTC) |
| | Power Input | AC100 ~ 240V Adapter to DC 9V 2A |
| | Dimensions | 179 x 134 x 68 mm (D x W x H) |
| | Weight | 0.8kg |
| | Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| | Humidity | 10 ~ 90% non-condensing |
| | MTBF | 35,000 hrs |



Ordering Information

| Model Name | Description |
|------------|-----------------------|
| HCT-BERT/C | E1 / Datacom analyzer |

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



HCT-7000

Dual Port E1/Datacom Protocol Analyzer and BERT

The HCT-7000, our flagship tester, is a portable, battery powered E1 and data communication tester, designed for a wide range of protocol analysis and BERT (Bit Error Rate Test) at full E1 speeds (2.048Mbps) and is fully suitable for equipment installations, on-line or off-line diagnostics, debugging, and interface development. The HCT-7000 features a backlit Liquid Crystal Display (LCD), push-button switch keyboard, interface lead indicator LEDs, user replaceable data port interface modules and internal rechargeable Li-Ion battery. The unit includes the Basic Interfaces, basic operational firmware, comprehensive User Guide, universal AC power adapter (100~240 VAC) and a sturdy hard shell carry case.

Features

- E1, Datacom, Protocol Analyzer and BERT
- Protocols: Frame Relay, SS#7, X.25, PPP (Sync.), V5.1, V5.2, ISDN-D, Sync (BSC), HDLC, SDLC, Async
- Dual pluggable interface ports with available modules:
- Datacom Module: RS-232C/D (V.24), RS-449 (V.36), RS-530, X.21, V.35, E1 Module: G.703 E1 (2048K)
- Supports Centronics printer & control serial port.
- LCD Display: 320x240 graphic (30 lines x 40 characters), with backlight
- Auto Configuration
- Menu driven setup
- ASYNC terminal Emulation
- File Management
- Self Tests and Diagnostics
- Display Modes: Full /Half Duplex Data, Frame / Packet and Lead Status
- Error Check: None, Parity, LRC, CRC-16, CRC-CCITT
- Capture Buffer: SDRAM
- Line Monitor: DTE; DCE; DTE & DCE
- Emulation: DTE; DCE; MONITOR only
- Counters & Timers: 5 each internal counters and timers
- MUX/DEMUX BERT (E1 & Datacom BERT)

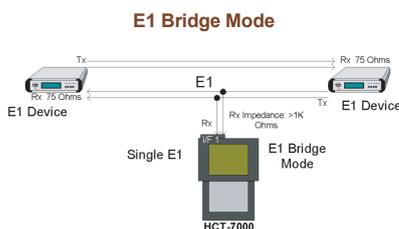
Specifications

| | | | | | |
|--------------|---------------|--|----------------------|-------------------------|--|
| Ports | Data Rate | Async (50 ~ 256Kbps); Sync (150 ~ 2048Kbps) | Indications | System | External power, I/F 1 Error, I/F 2 Error, Paused |
| | Data Code | ASCII, EBCDIC, HEX, IPARS, Transcode, EBCD | | Datacom I/F Module | TD, RD, RTS, CTS, DSR, DTR, DCD, RI, XTC, TC, RC, RL, LL, TM |
| | Data Length | ASYNCR Mode: 5,6,7, or 8 bits SYNC Mode: 8 bits | | Power Input | AC100~240V adapter to DC 19V/2.9A |
| | Parity Bit | ASYNCR Mode:None, Odd, Even, Mark, Space | | Dimensions | 220 x 275 x 65mm (D x W x H) |
| | Stop Bits | ASYNCR Mode: 1, 2 | | Weight | 2.5 Kg |
| | E1 I/F Module | Signal Present, HDB3, Signal Loss, FAS Loss, AIS, RAI, MRAI, MFAS Loss, CAS Loss, Pattern Loss, Excess Zero, Error | | Temperature | 0 ~ 50°C (Operating), -10 ~ 70°C (Storage) |
| | | | Humidity | 10 ~ 90% non-condensing | |
| | | | Certification | CE, FCC | |
| | | | MTBF | 35,000 hrs | |

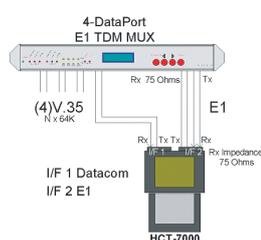
Product Overview (Misc.)



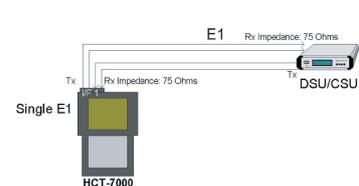
Product Overview (Connectors)



MUX feature - E1 BERT & Datacom BERT



E1 Terminal Mode



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

Surge Protector Series

PoE Surge Protector
Ethernet Surge Protector
Phone line, E1/V35





SP-POE-01

Power Over Ethernet 1-Port Surge Protector

The SP-POE-01 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 802.11af allows the methods of implementing PoE: The SP-POE-01 applies data to the pairs (pins 1/2 and pins 3/6) and power to the unused pairs (pins 4/5 and pins 7/8). The SP-POE-01 offered protection is provided on all 8 Ethernet pins (6.8V clamping on Data pins 1,2,3,6 and 53V clamping on POE pins 4,5,7,8). 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
- 6.8V Data / 53V PoE clamping voltage
- 5KA surge discharge current
- CAT5 and CAT5e compatible. All 8 pins protected.
- Integral mounting feet and separate ground wire (SP-POE-16, SP-POE-24)
- Shielded RJ45 jacks and metal enclosure for EMI noise suppression

Specifications

| | |
|------------------------------------|--|
| Voltage | Data 5V ; PoE 48V |
| Clamping Voltage | 6.8V Data (Pins 1,2,3,6) 53V PoE (Pins 4,5,7,8) |
| Max Surge Discharge Current | 5KA (8/20uS) |
| Peak Pulse Current | 100A (10/1000uS) |
| Pins Protected | Data : 1, 2, 3, 6 PoE : 4, 5, 7, 8 |
| 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) 73 x 143 x 44 mm (8-port) 73 x 483 x 44 mm (16/24-port) |
| Weight | 75 g (1-port), 435g (8-porte), 1.4kg (16/24-port) |
| Certification | IEC 61643-21:2000 |

Ordering Information

| Model Name | Description |
|------------|---|
| 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-24 | 24-port RJ45 10/100Base-TX PoE Ethernet Surge Protector (Data: 1,2,3,6. PoE: 4,5,7,8) |

SP – POE –
Example: SP – POE – 01



SP-GPOE-01

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 802.11af allows the methods of implementing PoE: The SP-GPOE-01 applies data to the pairs (pins 1/2 and pins 3/6) and power to the unused pairs (pins 4/5 and pins 7/8). The SP-GPOE-01 offers protection is provided on all 8 Ethernet pins (6.8V clamping on Data pins 1,2,3,6 and 53V clamping on POE pins 4,5,7,8). 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 | 1000Mbps |
| NM Surge response time | ≤ 1ns |
| Connector | RJ45 |
| Data lines protected | 1-8 |
| Operating Temperature | -40 ~ 80°C |
| Dimensions | 38 x 106 x 26mm (D x W x H) |
| Certification | IEC 61643-21:2000 |



Ordering Information

| Model Name | Description |
|------------|--|
| SP-GPOE-01 | Single Port, 1000Base-T GE PoE Surge Protector |

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

SP-GE-01

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 | Transmission Speeds | Vs 10/100/1000Mbps |
| Max. continuous operating voltage | Uc 6V | Bandwidth / Insertion Loss | fG 250Mhz ; Ae < 0.5dB |
| Peak Current Normal Mode (line to ground, 8 /20uS) | In 2.5KA | Connector / Data Lines Protected | RJ45 ; 8 |
| Peak Current Common Mode (line to line, 8/20uS) | In 300A | Operating Temperature | -40 ~ 80°C degree |
| Voltage protection level (line to ground,10/700uS) | Up <=500V | Dimensions | 38 x 106 x 26 mm (1-port) 73 x 148 x 44 mm (8-port) 73 x 480 x 44 mm (16/24-port) |
| Voltage protection level (line to line,10/700uS) | Up <=30V | Weight | 75g (1-port); 0.44kg (8-port); 1.4kg (16/24-port) |
| NM Surge Response Time (ns) | tA <1ns | 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

Fast Ethernet 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 | Attenuation in dB | < 0.5dB (100MHz) |
| Uc | 6.8V | Capacitance | < 40pF |
| Isn(discharge current) | 2.5KA | Dimensions | 38 x 106 x 26 mm (1-port) 73 x 143 x 44 mm (8-port) 73 x 480 x 44 mm (16/24-port) |
| Imax | 5KA | Weight | 75g (1-port) ; 440g (8-port) ; 1.38kg (16-port) ; 1.40kg (24-port) |
| Ures | < 30V | Certification | IEC 61644-1 |
| tA (Response time) | < 1ns | | |
| Protected Cores | SP-ETH-08: 8 pins SP-ETH-16: 8 pins SP-ETH-24: 8 pins | | |

Ordering Information

| Model Name | Description |
|-------------|---|
| SP-ETH-01-4 | 1-port RJ45 10/100Base-TX Ethernet Surge Protector (pin 1,2,3,6) |
| SP-ETH-01-8 | 1-port RJ45 10/100Base-TX Ethernet Surge Protector (pin 1,2,3,4,5,6,7,8) |
| SP-ETH-08 | 8-Port RJ45 10/100Base-TX Ethernet Surge Protector (pin 1,2,3,4,5,6,7,8) |
| SP-ETH-16 | 16-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 - 4

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



TSP-10 Phone Line 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 TSP-10 will ensure the reliable operation of POTS based equipment such as telephones, FAX machines and dialup modems.

- protect FAX and dialup modems from surges on telephone lines
- Control transient over voltage to a low level to ensure maximum protection for your equipment
- LED indicator flashes for ring indication and lights during device off-hook operation

Specifications

| | |
|-----------------------|---------------------|
| Surge current | 8 x 20u sec of 500A |
| DC spark over voltage | 160 ~ 240VDC |

| | |
|------------|----------------------------|
| Dimensions | 80 x 30 x 27mm (D x W x H) |
| Weight | 20g |
| Compliance | UL 1449 (2nd Edition) |

Ordering Information

| Model Name | Description |
|------------|--|
| TSP-10 | In Line Telephone Surge Protector with RJ-11 Jacks |



SP-SE-B01 E1 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-SE-B01 will ensure the reliable operation of coaxial based networking equipment running ArcNet, Satellite/CCTV and 75 ohm E1 communication systems.

- Protect E1 Access Units using coaxial cable from transient surge voltages
- Compact in-line installation
- Low shunt capacitance to reduce signal loss
- Maximum system up time
- State of the art, avalanche diode technology

Specifications

| | |
|------------|-----------|
| Type | SP-SE-B01 |
| Connection | BNC |
| Un | 10V |
| U-max | 18V |

| | |
|------------------------|----------------------------|
| Discharge current | 10KA |
| Response time | < 10ns |
| Insertion loss (40MHz) | 0.5dB |
| Dimensions | 38 x 68 x 27mm (D x W x H) |
| Weight | 70g |
| Compliance | IEC 61644-1, draft 98 |

Ordering Information

| Model Name | Description |
|------------|--|
| SP-SE-B01 | 75 ohm, BNC, 1 port Coax cable surge protector |



SP-V35-01 V.35 Surge Protector

The SP-V35-01, V.35 Data Line Surge protector, prevents damage to V.35 data ports and data errors due to electrical surges. These surges originate from a wide variety of sources, including lightning strikes, static charge buildup, electric motors, fluorescent lights or the normal AC power protection equipment. Data line transients can be damaging to V.35 hardware. The surge protector intercepts harmful data line transients and diverts them safely to chassis ground through a grounding wire. The SP-V35-S01 plugs directly into an M/34 data port. All standard data, clocking and control signals on the ITU-T V.35 interface are protected. The SP-V35-S01 uses sophisticated circuits, which allow the unit to operate at the data rates up to 10 Mbps. The SP-V35-S01 can take repeated surge "hits" without degrading in performance or letting harmful energy through to the data port.

- Standard V.35 data Lines on the M/34 cable adapter
- Data Rates up to 10 Mbps
- Plugs Directly into V.35 Port (One Male, One Female M/34 cable adapter)
- Diverts Harmful Transients to Chassis Ground through Braided Metal Strap
- Able to take Repeated Surges without Degrading in Performance
- Prevents equipment in case of a Severe Surge
- Surge Handling Capacity of 1,500 Watts

Specifications

| | |
|--------------------------|--|
| Interface | V.35 |
| Maximum Data Rate | 10 Mbps |
| Connectors | <ul style="list-style-type: none"> • 34-pin M-block male • 34-Pin M-block female |
| Leads/Signals Protected | All V.35 leads/signals |
| Capacitance | < 40pF |
| Maximum Surge Protection | (Current, 8 x 20 μs at Standard Clamp Voltage) 370 amps |
| Standard Clamp Voltage | 30 volts |
| Series Resistance | None |

| | |
|-------------|---|
| Temperature | - 40 ~ 85°C |
| Humidity | 10 ~ 90% relative, non-condensing |
| Dimensions | 120 x 52 x 30 mm (D x W x H) plus 50 cm of cable (fully extended) on either side for a total length 70 cm |
| Weight | 300g |

Ordering Information

| Model Name | Description |
|------------|-------------------------------|
| SP-V35-01 | V35 Data line surge protector |

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

Balun

Modular Design
Rack Mountable

G.703 Balun Patch Panel
G.703 Krone IDC Balun

G.703 BNC/RJ45
Coax to Twisted Pair





BP20-CH

24-Port BNC to RJ45 E1 Balun Chassis

The ITU-T G.703 balun panel matches multiple sets of dual 75 ohm coax connections to multiple 120 ohm twisted pair connections, supporting data stream rates of 2-8 Mbps for E1 and E2. The patch panel bi-directionally matches not only signal impedance, but also the pulse shapes of the signals according to the ITU-T G.703 standard. The modular construction allows up to 24 separate G.703 BALUN Modules in a 19" rack mountable chassis. This modular design provides a cost-effective solution and can be purchased in separate components.

Features

- Connects 75 ohm dual coax to 120 ohm twisted pair
- Mounts in standard 19" Rack
- No AC power or batteries needed
- Link-to data isolation: Mini. 250V
- Bi-directional signal conversion
- Operating temperature 0°C ~ 75°C
- Typical distance: 180m via Cat.5e cable

Specifications

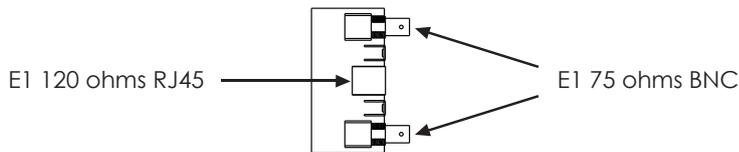
| | |
|-----------------------|--|
| Data Rate | 2 to 8Mbit/s speed version for E1, E2 data streams |
| Impedance | 75 ohm to 120 ohm |
| Insertion loss | Max 0.3dB (2Mbps); Max 0.5dB (8Mbps) |

| | |
|--------------------|--|
| Return loss | 75 ohm -47.5dB (2Mbps); -37.9dB (8Mbps) 120ohm -43.5dB (2Mbps); -34.5dB (8Mbps) |
| Dimension | 483 x 88 x 46.2mm (D x W x H) |
| Weight | 2.3kg |

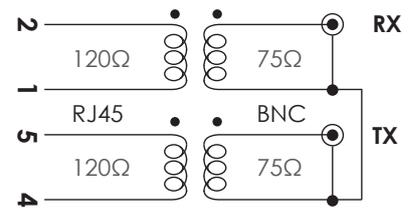


24-Port G703 patch panel

G.703 BALUN Modules



G.703 BALUN Pin Assignment



Ordering Information

| Model Name | Description |
|------------|---|
| BP20-CH | 2U, 19" 24 ports G703 balun patch panel chassis fixed type G703 balun module not included |
| BP20-M01 | 1-port fixed type G703 Balun module female BNC to UTP RJ45 on the same side |

BP20 - □□
Example: BP20 - CH

BLN-3010, BLN-4010 BLN-5010, BLN-6010

G.703 TDC Balan



15

ITU-T G.703 Krone
IDC balun

A balun is a type of electrical transformer that can convert electrical signals that are balanced to signals that are unbalanced and vice versa. They are also used to change impedance of twisted pair's 120 ohm to coaxial's 75 ohm. An E1 balun's function is generally to convert an E1 carrier signal from coaxial cable to UTP CAT-5 cable. The BLN4010 is miniature Balun designed for applications where space is restricted due to small dimensions or high densities. The fully shielded design is intended for panel mounting and IDC twisted pair termination is available in either standard BNC or 1.6/5.6 jack unbalanced connectors.

Features

- Converts between 75 (coax)/120 (twisted pair) for E1 (2048 kbps)
- Works in either direction
- Body parts plated with minimum 5u Ni(Nickel)
- Contacts plated with minimum 1.25u Ni(Nickel) and 1.25uAu(Gold)
- Coax connectors with BeCu spring contacts and Teflon insulators
- Coaxial connector insertion cycle > 500
- IDC contacts Phosphor Bronze
- IDC connect/disconnect cycle > 20
- IDC to suit 24.26.28 AWG Copper wire
- Integrated cable anchor allows cable to be inserted after termination on IDC

Specifications

| | |
|-----------------------------|--|
| Data rate | 2048Kbps |
| Unbalanced interface | 75 ohm impedance, 1xBNC or 1x 1.6/5.6 Jack |
| Balanced interface | 120 ohm impedance, IDC |

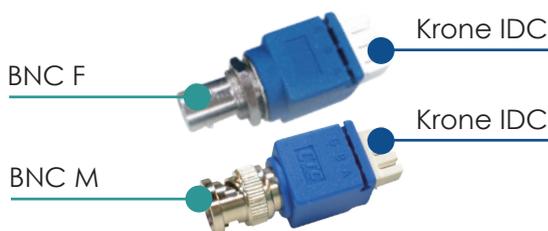
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|-------------------|-----------------------------|
| Dimensions | 17 x 16 x 48 mm (D x W x H) |
| Weight | 15g |
| Compliance | ITU G.703 standard pulse |



BLN-3010 : 1.6 / 5.6 Jack to Krone IDC



BLN-5010 : BT43 to Krone IDC



BLN-4010F : BNC F to Krone IDC
BLN-4010M : BNC M to Krone IDC



BLN-6010 : SMZ to Krone IDC

Ordering Information

| Model Name | Description |
|------------|--|
| BLN-3010 | 75 ~ 120 ohm Balun, 1.6/5.6 Jack to Krone IDC IDC Pin Assignment PA(-), PB(+), PG(G) |
| BLN-4010F | 75 ~ 120 ohm Balun, BNC/F to Krone IDC IDC Pin Assignment PA(-), PB(+), PG(G) |
| BLN-4010M | 75 ~ 120 ohm Balun, BNC/M to Krone IDC IDC Pin Assignment PA(-), PB(+), PG(G) |
| BLN-5010 | 75 ~ 120 ohm Balun, BT43 to Krone IDC IDC Pin Assignment PA(-), PB(+), PG(G) |
| BLN-6010 | 75 ~ 120 ohm Balun, SMZ to Krone IDC IDC Pin Assignment PA(-), PB(+), PG(G) |

BLN - □□□□
Example: BLN - 3010



Balun-P/S Balun-B1/B2

G.703 Coax to Twisted Pair

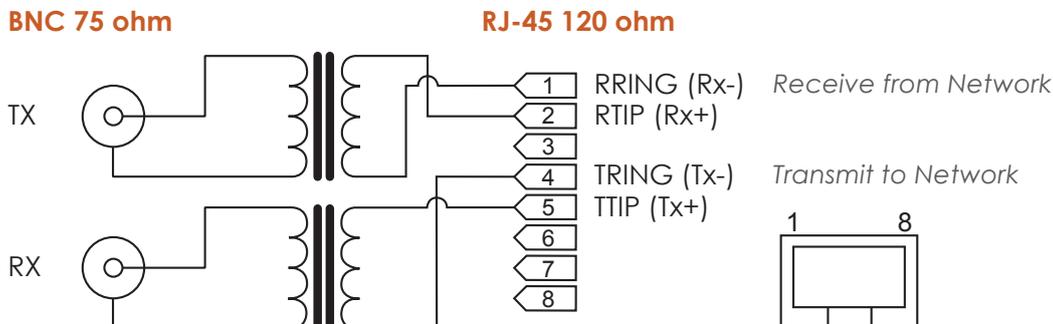
A balun is a type of electrical transformer that can convert electrical signals that are balanced to signals that are unbalanced and vice versa. They are also used to change impedance of twisted pair's 120 ohm to coaxial's 75 ohm. An E1 balun's function is generally to convert an E1 carrier signal from coaxial cable to UTP CAT-5 cable.

Features

- Converts between 75 ohm coax and 120 ohm twisted pair for E1 (2048Kbps)
- Easy to install
- No power required
- Small, light-weight Balun
- Works in either direction
- Works for balanced and unbalanced E1

Specifications

| | | | |
|-----------------------------|--|-------------------|-------------------------------|
| Data rate | 2048Kbps | Weight | Balun-B2/S , Balun-B2/S-2 35g |
| Unbalanced interface | 75 ohm impedance, 2xBNC | | Balun-B1 65g |
| Balanced interface | 120 ohm impedance, 1xRJ-45 | | Balun-P/S , Balun-P/S-2 45g |
| Dimensions | Balun-B2/S , Balun-B2/S-2 54 x 44 x 25 mm (W x D x H) | Compliance | ITU G.703 standard pulse |
| | Balun-B1 56 x 22 x 21mm (D x W x H) | | |
| | Balun-P/S, Balun-P/S-2 22 x 224 x 21mm (W x D x H) | | |



Ordering Information

| Model Name | Description |
|------------|---|
| Balun-P/S | Two BNC pigtail type RJ45 Shielded - 2xBNC/M with 6" pigtail RJ45 PIN ASSIGNMENT: P1(+) / P2(-) , P4(+) / P5(-) |
| Balun-B1/S | One BNC box type RJ45 Shielded - 1xBNC/M RJ45 PIN ASSIGNMENT: P4(+) / P5(-) |
| Balun-B2/S | Two BNC box type RJ45 Shielded - 2xBNC/F RJ45 PIN ASSIGNMENT: P1(+) / P2(-) , P4(+) / P5(-) |

Balun - □ / □
Example: Balun - P/S



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WiFi VDSL2



SDH Mux



SFP Patching Hub



FOM



Power Substation



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