- Multi-Service Platform
- Ethernet Aggregation Platform
- Carrier Ethernet Switches (NID/EDD)
- FTTH
- LAN Extenders
- E1 Access & Mux

Telecom Transmission
Product Guide
iAccess™ Multi-Service Platform
FRM220 Series

iAccess™ platform solutions offer a full range of solutions for service provider and enterprise, including high density 40G/16G connectivity, DWDM, CWDM, distance extension, Ethernet Switch/NID, Fiber Modem, Fiber Multiplexer and Media Converter. It is a fully modular product series that integrates a wide range of optical transport modules for any interface or protocol hosted in selection of chassis size for simple and flexible operations.

### Transponder
- 40G QSFP to 4x 10G SFP+
- SFP+ to SFP+ Dual 16G FC 3R
- SFP+ to 2x XFP Fiber Protection 10G 3R
- SFP+ to SFP+ 10G 3R

### Ethernet Switch
- CE2.0 Compliant
- ITU-T Y.1564 & RFC2544
- Transponder WDM
  - 40G QSFP to 4x 10G SFP+
  - SFP+ to SFP+ Dual 16G FC 3R
  - SFP+ to 2x XFP Fiber Protection 10G 3R
  - SFP+ to SFP+ 10G 3R
- CWDM Mux/DeMux
- Single Channel EDFA Booster
- Optical Protection Switch
- Ethernet OAM
- MPLS-TP
- NID&EDD
- CE2.0 Compliant
- Ethernet OAM
- ITU-T Y.1564 & RFC2544
- MPLS-TP

### SmartView™ EMS

### FRM220-CH20

#### Chassis Overview
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. The FRM220A series is a IP based Ethernet aggregation platform, which supports uplink Gigabit Ethernet switch for efficient scalability and easy deployment in access networks.

### iAccess™ Ethernet Aggregation Platform
- **FRM220A-CH20**
  - (2U 20 Slots)
  - 10G uplink
  - Ethernet Aggregation Card: FRM220A-GSW/SNMP-10G
  - FRM220A-GSW/SNMP
  - Two Alarm Relays
  - Redundant Power Supplies
  - Cooling Fans (Hot swappable)

- **FRM220-CH20**
  - (2U 19” 20 Slots)
  - NMC Slot
  - Alarm Relay
  - Redundant Power Supplies
  - Cooling Fans (Hot swappable)

- **FRM220-CH08**
  - (1U 19” 8 Slots)
  - Alarm Relay
  - NMC Slot
  - Redundant Power Supplies
  - Cooling Fans

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[www.ctcu.com](http://www.ctcu.com)
FRM220 Series Standalone Chassis

Power Built-in Type

- **FRM220-CH01**
  - AC (DC or AD)
  - DC IN 18~72 VDC
  - AC IN 100~240 VAC

- **FRM220-CH01M**
  - DC IN 18~72 VDC
  - DB 9 Console Port (Local Management)
  - AC IN 100~240 VAC

- **FRM220-CH02/NMC**
  - DB 9 Console Port (Local Management)
  - DC IN 18~72 VDC
  - AC IN 100~240 VAC

- **FRM220-CH02/SMT**
  - Power & Cooling Fan Failure Alarm Detection
  - AC IN 100~240 VAC
  - DC IN 18~72 VDC

- **FRM220-CH02M & CH02M-2**
  - Cooling Fan (CH02M) : 30 Watt
  - Fanless (CH02M-2) : 12 Watt

- **FRM220-CH04A**
  - NMC Card (Remote Management)
  - AC IN 100~240 VAC
  - DC IN 18~60 VDC

Adapter Type

- **FRM220-CH01**
  - 1 slot with optional wallmount
  - Power Jack 12 VDC

- **FRM220-CH02M** & CH02M-2
  - DC IN 18~72 VDC
  - AC IN 100~240 VAC

Simple Media Converter *(FMC Series)*

- FMC chassis
  - 2U, 19", 17-Slot FMC chassis
  - The Chassis with single or dual built-in AC or DC power
  - Hot swappable

- FMC Converter
  - FMC Gigabit Ethernet Media Converter
  - FMC Fast Ethernet Media Converter
  - FMC PoE+ (PSE) Fiber Converter

Related Products

- FMC-1001S / FMC-10/100 / FMC-1000MS / FMC-1000M / FMC-100M / FMC-10/100

Please check the Telecom catalog chapter 5 for more details.

Fiber Media Converter Concentrator

- 1U" 19" 20ch Fiber Media Converter Concentrator
- 20-port 100/1000Base-T to 20-port 100/1000Base-X SFP
- Supports Web, Telnet, SNMP Management (PHB-200M)
- Available in AC, DC, AC+DC power built-in

Related Products

- PHB-200M / PHB-250
CWDM Telecom Access Network

In this application, the iAccess FRM220 Multi-Service Platform enables a CWDM point-to-point access network incorporating four different services multiplexed over a single fiber link. Two FRM220-1000DS transponders, a MSW-404S NID and FRM220-GFOM08 Fiber Multiplexer are installed in a FRM220 20-slot chassis. These modules are connected with fiber patch cables to a 4-channel CWDM MUX/DEMUX that multiplexes all four channel services over a single fiber link.

Related Products

Please check the Telecom catalog chapter 3 for more details.

Managed Ethernet Media Converter

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRM220-1000M</td>
<td>10/100/1000Base-T to 1000Base-X Web Smart OAM Managed</td>
</tr>
<tr>
<td>FRM220-1000MS</td>
<td>10/100/1000Base-T to 100/1000Base-X SFP Web Smart OAM Managed</td>
</tr>
<tr>
<td>FRM220-100AS-1</td>
<td>10/100Base-TX to 100Base-FX OAM/P Managed</td>
</tr>
<tr>
<td>FRM220-10/100S-2</td>
<td>Dual Channels 10/100Base-TX to 100Base-FX In-Band Managed</td>
</tr>
</tbody>
</table>

Fiber Multiplexer

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRM220-GFOM08</td>
<td>8x E1/T1 GbE</td>
</tr>
<tr>
<td>FRM220-GFOM04</td>
<td>4x E1/T1 GbE</td>
</tr>
<tr>
<td>FRM220-FOM04</td>
<td>4x E1/T1- FE</td>
</tr>
<tr>
<td>FRM220-FOM01</td>
<td>E1/T1+ FE</td>
</tr>
<tr>
<td>FRM220-FTEC</td>
<td>E1/T1 Cross Rate</td>
</tr>
</tbody>
</table>

CWDM/DWDM

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/8/16 ch, Single/Dual Fiber, Mux/Demux</td>
</tr>
<tr>
<td>FRM220-CWDM</td>
</tr>
<tr>
<td>FRM220-DWDM</td>
</tr>
</tbody>
</table>

NID/EDD

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSW-404</td>
<td>2x GbE, RJ45 + 2x Dual Rate SFP</td>
</tr>
<tr>
<td>MSW-202</td>
<td>4x GbE, RJ45 + 4x Dual Rate SFP</td>
</tr>
</tbody>
</table>
CPRI over CWDM Front-haul to cell towers

This C-RAN application example illustrates how to transport four CPRI (Common Public Radio Interface) channels over one fiber fronthaul link using CWDM (Coarse Wavelength Division Multiplexing). CTC CWDM Multiplexers, CWDM Add+Drop Multiplexers and 3R Transponders enable CWDM connectivity in a C-RAN over a fronthaul fiber link between Base Band Units (BBU) and Remote Radio Heads (RRH) located at two different cell towers.

Related Products

Please check the Telecom catalog chapter 3 for more details.

<table>
<thead>
<tr>
<th>Transponders</th>
<th>4G/10G/16G/40G, 3R</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRM220-4G-1GFS</td>
<td>40G DSP++ to 4x10G SFP++</td>
</tr>
<tr>
<td>FRM220-16G-3R</td>
<td>16G 3R Multi-rate</td>
</tr>
<tr>
<td>FRM220-10G-FEC</td>
<td>10G FEC Multi-rate</td>
</tr>
<tr>
<td>FRM220-10G-3R</td>
<td>10G 3R Multi-rate with Optical Line Protection</td>
</tr>
<tr>
<td>FRM220-4G-3R</td>
<td>4G-3R Multi-rate</td>
</tr>
<tr>
<td>FRM220-10GDSB</td>
<td>1G-2R Multi-rate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CWDM / DWDM</th>
<th>4/8/16 ch, Single/Dual Fiber, Mux/Demux</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRM220-CWDM</td>
<td>FRM220-DWDM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OADM</th>
<th>1/2 ch Optical Add-Drop Multiplexer</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRM220-OADM</td>
<td>Optical Add-Drop Multiplexer</td>
</tr>
</tbody>
</table>
40G Data Center TOR Switch Connectivity

Data Centers often have TOR switch with 40G Ethernet fiber uplink. The emergence of high-end servers and Ethernet switches with 40G Ethernet interfaces increases the need for media conversion (multi-mode to single-mode) and link range extension. In this application, two 40G Ethernet TOR switches equipped with QSFP+ MM fiber ports are connected utilizing four 10G SFP+ which convert the 40G MM fiber to 4x 10G SM and enable network connectivity across the distance between the TOR switches.

Related Products

Please check the Telecom catalog chapter 3 for more details.

- **Transponders**
  - 4G/10G/16G/40G, 3R
    - FRM220-40G-1Q4S 40G QSFP+ to 4x 10G SFP+ Transponder
    - FRM220-10G-3R 10G 3R Multi-rate
    - FRM220-10G-FEC 10G 3R FEC Multi-rate
    - FRM220-10G-3R 10G-3R Multi-rate with Optical Line Protection
    - FRM220-4G-3R 4G-2R Multi-rate
    - FRM220-1000DS 1G-2R Multi-rate

- **CWDM/DWDM**
  - 4/8/16 ch, Single/Dual Fiber, Mux/Demux
    - FRM220-CWDM
    - FRM220-DWDM
Carrier Ethernet with Multiple Class of Service

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

Related Products

Please check the Telecom catalog chapter 3 for more details.

Transponders

<table>
<thead>
<tr>
<th>4G/10G/16G/40G, 3R</th>
</tr>
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<tbody>
<tr>
<td>FRM220-40G-1Q4S</td>
</tr>
<tr>
<td>FRM220-16G-3R</td>
</tr>
<tr>
<td>FRM220-10G-FEC</td>
</tr>
<tr>
<td>FRM220-10G-3R</td>
</tr>
<tr>
<td>FRM220-4G-3R</td>
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<tr>
<td>FRM220-1000DS</td>
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</table>

CWDM/DWDM

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OADM

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<tr>
<th>1/2ch Optical Add-Drop Multiplexer</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRM220-OADM</td>
</tr>
</tbody>
</table>

NID

<table>
<thead>
<tr>
<th>4+4, OAM, Y.1731, CE2.0, MEF Compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRM220-MSW404S</td>
</tr>
</tbody>
</table>

L2+ Carrier Ethernet Switch

Carrier Ethernet SyncE Switch with 10G fiber port and Gigabit fiber port

MSW-4424CS

- 20x GbE, SFP+ 4x 10G SFP+ Transponder
- 16G 3R Multirate
- 10G FEC Multirate
- 4G-3R Multirate

Rearranged
CTC Union’s Management System is a comprehensive management solution that monitors device performance, enables remote configuration and provisioning, and provides fault notification status. The tools include SmartView™ Element Management System (EMS) and Central EMS Management.

**Device Management Software**

- **Main Functions (FCAPS):** Fault, Configuration, Accounting, Performance and Security Management
- Remote access control for efficient configuration
- Traffic / Performance monitoring and management
- Alarm Trap and event log management
- Auto Discovery and Device Viewer
- Allow up to 25 administrators to login

- Allow up to 25,000 devices management
- Centralized and Large Scale Network Management Platform, allow central management of up to 50 SmartView™ servers
- Hierarchical Network Management Architecture
- Easy and rapid expansion of network management scale
- Provides OSS (Operations Support System) Level Management Function
- Server/Client Remote management architecture
- Simple and convenient user interface

**Architecture**

Supports 50 SmartView™ EMS (Max.)
**L2+ Ethernet Switches**

**GSW-4800CFM**  
**L2+ Managed Ethernet Switch (CSFP)**  
- 20x GbE CSFP or SFP + 4x GbE Combo ports + 4x 1G/10G SFP+ Uplink  
- IEEE 802.1Q tagged VLAN, QinQ (VLAN stacking), L2/L3 Qos  
- IEEE 802.1D STP/802.1w RSTP / 802.1s MSTP  
- DHCP option 82 / DHCP snooping  
- IGMP snooping v1/v2/v3, MLD snooping v1, MVR  
- IPv6 management

**MSW-4424CS**  
**L2+ Managed Carrier Ethernet Switch with SyncE**  
- 20x GbE, SFP + 4x GbE Combo + 4x 10GE (SFP+)  
- Power and Fan module built-in  
- ITU-T G.8032 Ethernet ring protection  
- CE 2.0 standard compliant (E-Line / E-Access Service)  
- IEEE 802.3ah / IEEE 802.1ag / ITU-T Y.1731 Ethernet OAM

**MSW-4428X**  
**L2+ Carrier Ethernet Switch**  
- 24x GbE, SFP + 4x GbE RJ45 + 4x 1/10Gbps (SFP+)  
- CE 2.0 standard compliant (E-Line/E-LAN/E-Tree/E-Access Service)  
- IEEE 802.3ah / IEEE 802.1ag/ITU-T Y.1731 Ethernet OAM

**MSW-4424C**  
**L2+ Managed Carrier Ethernet Switch**  
- 20x GbE, SFP + 4x GbE Combo + 4x 10GE (SFP+)  
- Power and Fan module built-in  
- ITU-T G.8032 Ethernet ring protection  
- CE 2.0 standard compliant (E-Line / E-Access Service)  
- IEEE 802.3ah / IEEE 802.1ag / ITU-T Y.1731 Ethernet OAM

**GSW-3424FM**  
**L2+ Managed Ethernet Switch**  
- 24x 100/1000Mbps SFP slot + 4x 10/100/1000 Base-T RJ45 + 4x 1G/10G Base-X SFP+  
- IEEE 802.1Q tagged VLAN, QinQ (VLAN stacking), L2/L3 Qos  
- IEEE 802.1D STP/802.1w RSTP/802.1s MSTP  
- Static aggregation, IEEE 802.3ad LACP  
- DHCP relay option 82/DHCP snooping  
- DHCP snooping database agent to upload DHCP snooping table to external TFTP server  
- IPv6 and IPv4 management

**MSW-404S**  
**L2+ Carrier Ethernet Switch with SyncE (NID)**  
- 4x GbE RJ-45 + 4x100/1000Base-X SFP  
- CE 2.0 Compliant (E-LINE/E-LAN/E-Tree Service)  
- Compliant with IEEE 802.3ah, IEEE 802.1ag and ITU-T Y.1731

**MSW-404 / MSW-202**  
**L2+ Carrier Ethernet Switch (NID/EDD)**  
- 2 or 4x GbE RJ45 + 2 or 4x 100/1000Base-X SFP  
- CE 2.0 Compliant (E-LINE/E-LAN/E-Tree Service)  
- Compliant with IEEE 802.3ah, IEEE 802.1ag and ITU-T Y.1731  
- RFC 2544 & ITU-T Y.1564 tester functionality (MSW-404)  
- RFC 2544 & ITU-T Y.1564 tester functionality (MSW-202)  
- Supports IEEE 802.1Q/256 active VLAN

Please check the Telecom catalog P.10-9 for more details.

Please check the Telecom catalog P.10-1 for more details.

Please check the Telecom catalog P.10-9 for more details.

Please check the Telecom catalog P.10-11 for more details.

Please check the Telecom catalog P.10-19 for more details.

Please check the Telecom catalog P.10-21/23 for more details.

Please check the Telecom catalog P.10-5 for more details.

Please check the Telecom catalog P.10-3 for more details.

Please check the Telecom catalog P.10-7 for more details.

Please check the Telecom catalog P.10-1 for more details.

Please check the Telecom catalog P.10-1 for more details.

Please check the Telecom catalog P.10-3 for more details.

Please check the Telecom catalog P.10-11 for more details.
CPE Switches & Injectors

GSW-2008MS/1005MS L2 Managed Ethernet Switch
- 5 or 8x 10/100/1000Base-T RJ45 + 1 or 2x 100/1000Base-X SFP uplink
- IEEE 802.1Q tagged VLAN & IEEE 802.1ad Q-in-Q
- IEEE 802.1P 8 priority queues per port
- Please check the Telecom catalog P.10-25/27 for more details.

P2P FTTH Service Application

GSW-4800CFM

INJ-G30 Gigabit PoE Injector
- 1 port PoE, 50VDC/30W output
- Compliant IEEE802.3 at/at

Surge Protectors

SP-GPOE-01
1x GbE PoE Surge Protector
- 100/1000Mbps data rate
- 63V PoE clamping voltage on DATA and PoE pins(1, 2, 3, 4, 5, 6, 7, 8)
- 1.5KA surge discharge current
- Compatible with 48V power over Ethernet systems
- 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

SP-GPOE-24
24x GbE PoE Surge Protector

SP-POE-01A
1x FE PoE Surge Protector
- 10/100Mbps data rate
- Compatible with 48V power over Ethernet systems
- 53V Data / PoE clamping voltage
- 5KA surge discharge current
- CAT5 and CAT5e compatible, All 8 pins protected
- Shielded RJ45 jacks and metal enclosure for EMI noise suppression

Please check Industrial catalog P.9-11 for more details.
G.SHDSL.bis Series

G.SHDSL.bis ATM 2/4/8-wire EFM Router
- Supports Ethernet over ATM over SHDSL
- Supports point-to-point configurations
- Local, web, SNMP management
- EFM Bonding up to 61 Mbps (4 pairs, TC-PAM 64/128)

G.SHDSL.bis EFM VPN Router
- Extend Ethernet Services to sites with existing copper infrastructure
- EFM Bonding up to 61 Mbps (4 pairs, TC-PAM 64/128)
- Supports both EFM mode and ATM mode
- IPSec VPN for safeguarded connections
- Support EFM OAM complying with IEEE 802.3ah

Related Products
- SHDTU04bF-ET10RS (2W)
- SHDTU04bAF-ET10RS(4W)
- SHDTU04bCF-ET10RS(8W)

LAN Extenders

EFM LAN Extender
- Supports TC-PAM 32 for 5.7 Mbps over single pair copper
- EFM Bonding up to 61 Mbps (4 pairs, TC-PAM 128)
- Supports EFM OAM complying IEEE 802.3ah
- Flexible configuration as CPE or CO

VDSL2 LAN Extender
- 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 VDSL2 profile mode (17a or 30a): Support up to VDSL2 30a profile to ensure high date rate

Related Products
- EFM-10 / EFM-20 / EFM-40

E1 Access and Mux

Single Port Modular E1 CSU/DSU with LCD and SNMP

Single Port Modular E1 CSU/DSU

Related Products
- ETU01A / ETU01 Plus / ETU011 / ETU02-Mux

ISAP5100 / ISAP2000
- Interfaces supported : E1, V35, FXO/FXS, E&M, RS232, Ethernet and G.703 co-directional
- Supports console, Telnet, SNMP and GUI management
- Modular 4U high, 19-inch unit with 18 slots for I/O modules (ISAP5100)
- Modular 2U high, 19-inch unit with 6 slots for I/O modules (ISAP2000)
- 63x E1 over STM-1 fiber
- Two optical STM-1 links (ISAP5100)
- 144x E1 DXC cross connect capability (ISAP5100)
- Supports E1 time slot broadcast function

Related Products
- VPN10 (2W) / VPN20 (4W) / VPN40(8W)
- VDTU2-B110
- VPN10 (2W) / VPN20 (4W) / VPN40(8W)
- SHDTU04bF-ET10RS (2W)
- SHDTU04bAF-ET10RS(4W)
- SHDTU04bCF-ET10RS(8W)