

SHDSL.bis and Fiber  
Up to 300Mbps  
Ethernet

# FlexDSL MiniFlex

## SHDSL.bis and Optical Mini DSLAM



### Features

- Up to 15.2Mbps Data Transmission per Copper Pair
- SHDSL and SHDSL.bis, TC-PAM16/32
- Additional TC-PAM4/8/64/128 Available
- 100 Mbps Fiber Optical Tributary Interface
- Integrated Layer 2 Managed Ethernet Switch:
  - 4x Gigabit Ethernet Uplink (2x TP / 2x SFP)
  - 8x 10/100Mbps
- Rapid Spanning Tree, Ethernet Ring Protection, Link Aggregation, VLAN, QoS
- Transparent Transmission of Modbus RTU / ASCII, DNP3 and IEC 60870.5 Protocol
- Point-to-Point, Point-to-Multipoint & Ring Operation
- Console Port, Telnet, Web, SNMP Management
- 24/48VDC and/or 110/230VAC Redundant Powered, Low Power Consumption
- Included Primary Protection
- Repeater supported and available
- 19" & 2U Height or Robust DIN-Rail Metal Enclosure
- Industrial Temperature Range Available

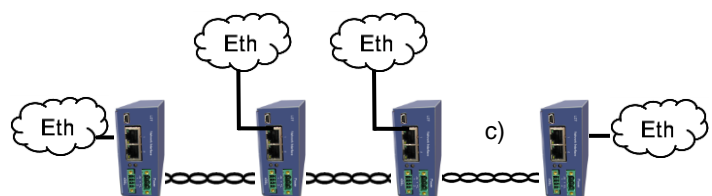
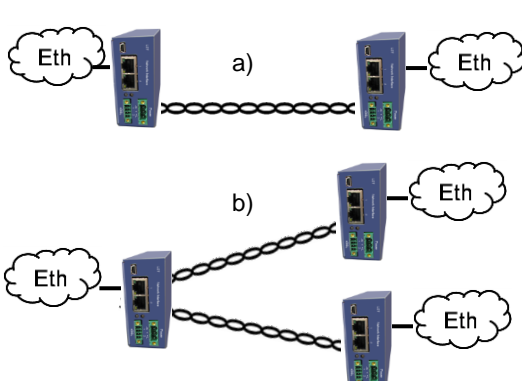
The FlexDSL **MiniFlex** platform is a special part of the **Orion3** product family. Beside of having up to 10 dual **Orion3 SHDSL.bis Extended** line cards there is a feature-rich managed layer 2 Ethernet switch included. This switch has 8 auto-sensing front accessible 10/100Base-T ports as well as 2 gigabit Ethernet ports with fiber connectivity (SFP) and 2 gigabit Ethernet ports with copper connectivity (RJ-45). The inside backplane connect this switch to all Orion3 line cards through additional 10 Ethernet 10/100 Base-T ports.

The FlexDSL Orion3 SHDSL.bis Extended product family offers a broad range of products, which are based on the latest SHDSL.bis standards (ITU-T G.991.2 & ETS TS 101 524), while also being fully interoperable with all our existing SHDSL equipment (Orion1 & Orion2).

SHDSL.bis Extended allows symmetrical data transmission at speeds up to 15.2Mbps over a single pair of copper. In addition, the dual Orion3 line card also supports DSL channel bonding for 2 copper pairs in order to achieve speeds to 30.4Mbps! Using the link aggregation feature of the additional integrated switch, the FlexDSL MiniFlex can transmit up to 300Mbps over 20 copper pairs. This incredible speed makes Fiber installations in a lot of places needless.

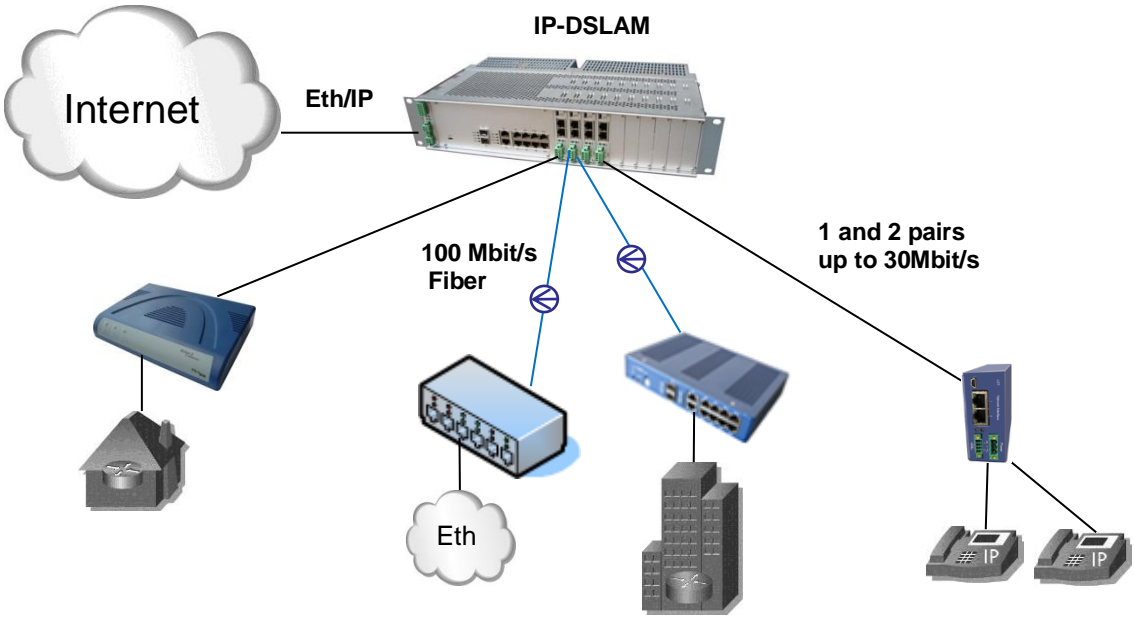
In addition to SHDSL.bis, the **MiniFlex** platform supports subscriber access over Fiber Optic. The optical line card has build-in SFP jack for standard 100 Mbps Ethernet module. The protocol is compatible with third-party switches, media converters, etc. Like all FlexDSL Orion products, the MiniFlex and its line cards are based on industrial components and are manufactured according to highest quality standards providing additional value due to the extended temperature range and higher reliability. The combination of comprehensive functions providing maximum flexibility together with the higher quality of the FlexDSL MiniFlex makes it the perfect choice for your access needs.

### Possible Application: Point-to-Point & Point-to-Multipoint

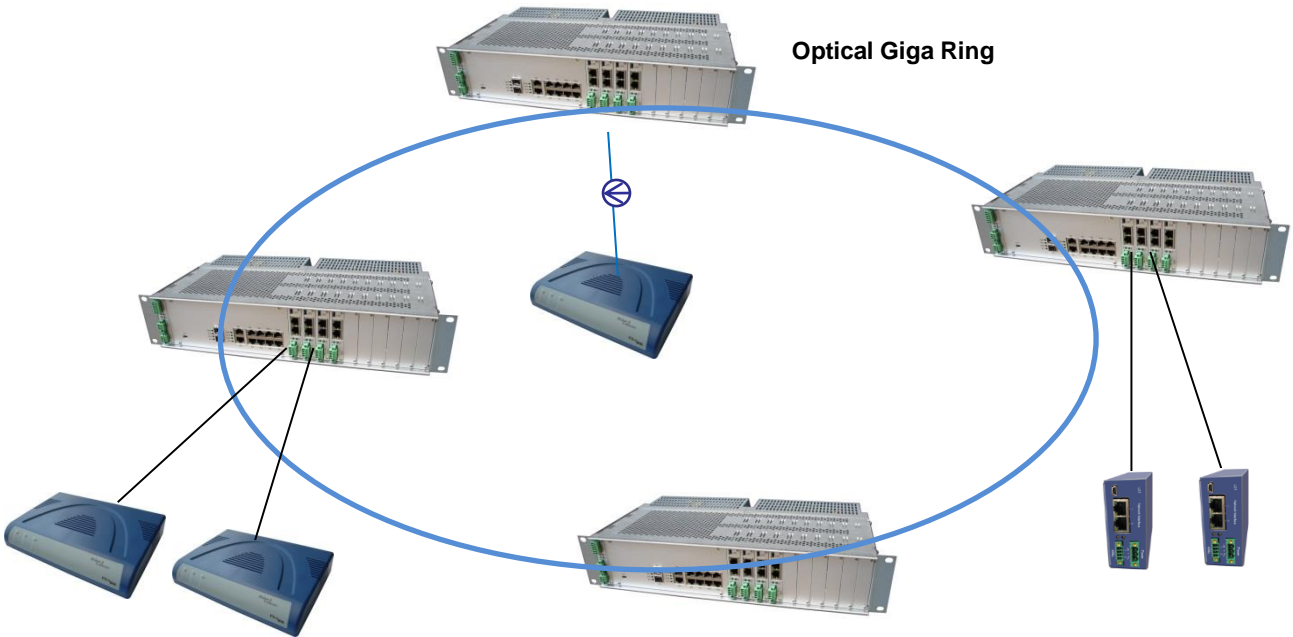


- a) Ethernet Transmission Point-to-Point  
 b) Ethernet Transmission Point-to-Multipoint  
 c) Ethernet Add/Drop over a Long Copper Line

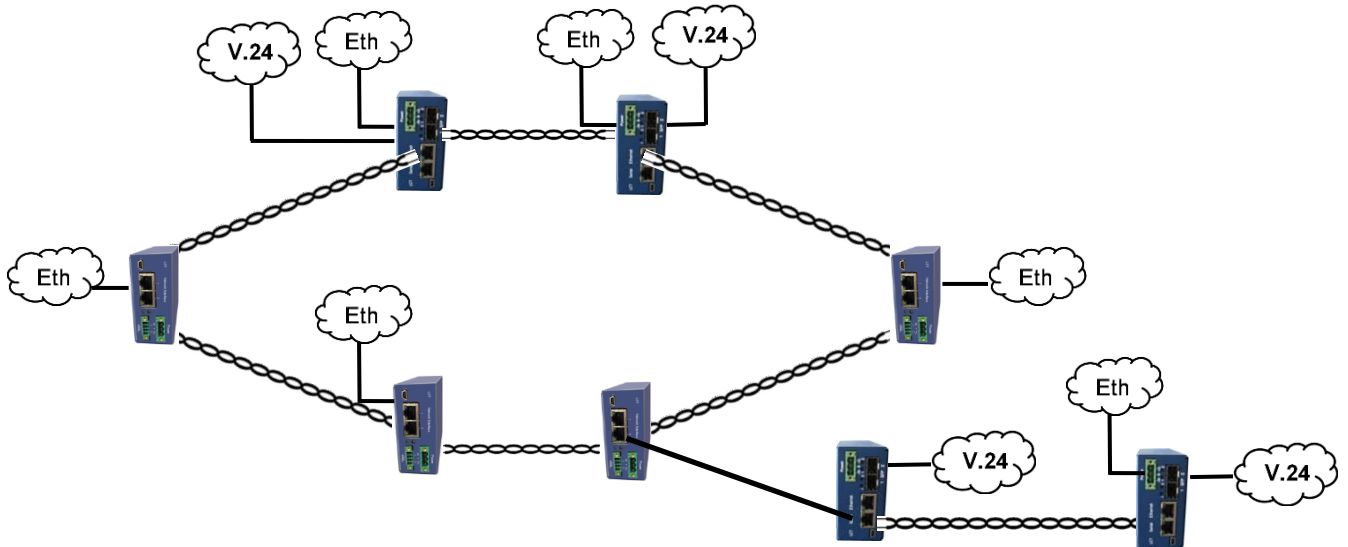
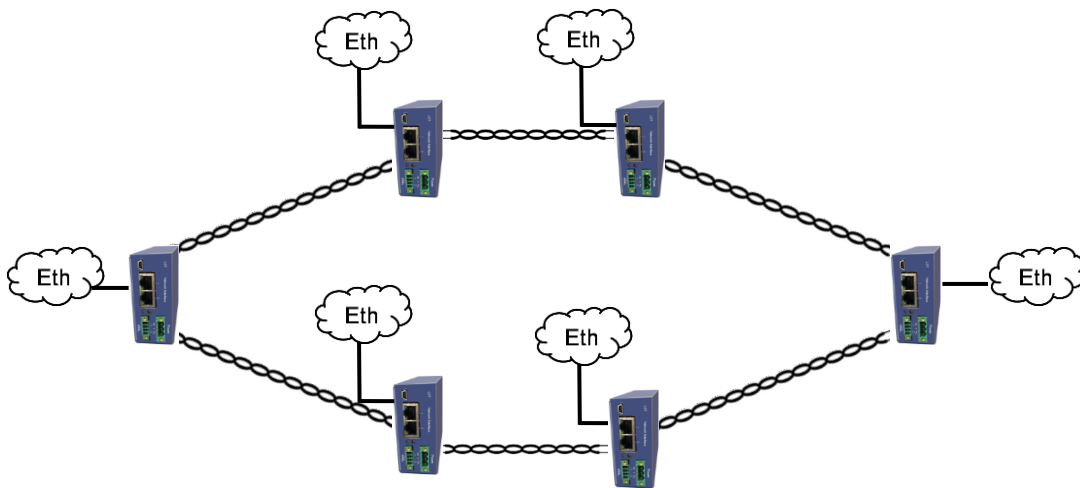
**Possible Application: Typical Internet Service Provider (ISP) Application**



**Possible Application: Ring with the 19"MiniFlex Racks**



### Possible Application: Ring with the MiniFlex Dinrail Modems



## MiniFlex Rack with included Switch for 10 Linecards



### Model: MF-MR2N-SW-12Eth,V1

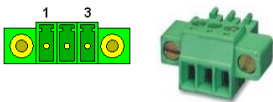
- Switch Interfaces: 8x Ethernet 10/100BaseT (Auto Sensing)  
2x Gigabit Ethernet 1000Base-T  
2x Gigabit Ethernet SFP  
1x USB 2.0 (Local Console Port)  
10x Ethernet 10/100BaseT on Backplane to Line Card
- Physical Interfaces: RJ45 (Ethernet), SFP (Ethernet), Mini-B (USB)
- Management: Local Console Port, Telnet/SSH, Web, SNMP v1 and V2c
- L2 Features: **Spanning Tree and Ethernet Ring**  
IEEE 802.1D Spanning Tree Protocol (STP)  
IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)  
IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)  
Ethernet Ring Protection Mechanism, 50ms rapid In switching and protection
- VLAN**  
4K IEEE 802.1q VLANs  
Port-based VLAN, MAC-Based VLAN, Private VLAN  
GVRP, Q-in-Q, VLAN Translation
- Link Aggregation**  
Static Trunk, Dynamic Trunk, IEEE 802.3ad LACP, Load Balancing
- Multicast Features**  
IGMP v1, v2, v3, IGMP Snooping, IGMP Groups  
Multicast VLAN
- Qos: **Quality of Service**  
8 Priority Queues/port  
WRR, Strict Priority  
WRR/WDDR+Strict Priority  
802.1p  
Port-Based CoS  
CoS based on MAC DA/SA  
Bandwidth Control per Port
- Access Control List**  
MAC+Port Binding, VLAN+Port Binding
- Security: **Port Security**  
Trust Port, Port Blocking, Private VLAN, Port Powering Off  
MAC address learning limit per port  
DoS check, Management IP list
- Alarm Interface: Major and Minor Alarm Relais

## MiniFlex Rack without Switch for 10 Linecards



### Model: MF-MR2N,V1

- Alarm Interface: Major and Minor Alarm Relais



### Model: MF-PS48, V1

- Input Voltage: 18 - 72 VDC, max. 90 Watts  
Temperature: -20 to +70°C  
Connector: 3 Pin Phoenix Mini Combi connector (Front access)



### Model: MF-PS110/230, V1

- Input Voltage: 90 - 264 VAC, 47 - 63 Hz, max. 90 Watts  
Temperature: -20 to +70°C  
Connector: IEC 60320 Appliance Inlet C14 (Back access)

## MiniFlex MiniRack 2U for 4 Linecards



**Model:** MF-MR-RAIL-2U4S,V1

Input Voltage: 18 - 72 VDC, max. 20 Watts, Dual Input, Fuse 2AT  
Temperature: -20 to +70°C  
Connector: 3 Pin Phoenix Mini Combicom connector (Front access)  
Alarm Interface: Major and Minor Alarm Relays  
Connector: 6 Pin Phoenix Mini Combicom connector (Front access)  
Size: 110x181x88mm (WxLxH)

## MiniFlex MiniRack Wallmount Kit



**Model:** MF-MR-RAIL-WALLMOUNT,V1

## MiniFlex Dual Unit for 2 Linecards



**Model:** MF-DU-RAIL-2U2S-DC, V1  
MF-DU-RAIL-2U2S-AC, V1

Input Voltage DC: 18 - 72 VDC, max. 20 Watts without PoE  
Input Voltage AC: 85-264VAC, 120-370VDC, max 20 Watts without PoE  
Temperature: -40 to +70°C  
Connector: 3 Pin Phoenix Mini Combicom connector (Bottom access)  
Alarm Interface: Major and Minor Alarm Relays  
Connector: 6 Pin Phoenix Mini Combicom connector (Bottom access)  
Size: 50x180x87mm (WxLxH)

## MiniFlex SHDSL.bis Line Card



**Model:** MF-PAM-SR2L-2Eth,V1

DSL Version: SHDSL / SHDSL.bis / Extended  
Modulation: TC-PAM4 / TC-PAM8 / TC-PAM16 / TC-PAM32 / TC-PAM64 / TC-PAM128  
Data Rate: 128kbps - 30.464Mbps, 2x 15.232Mbps  
Copper Pairs: 2 with Modes Master / Slave / Auto / Multipoint / Multipair  
Interfaces: 1x Ethernet 10/100BaseT on Backplane to Switch  
2x Ethernet 10/100BaseT on the front panel  
1x USB 2.0 (Local Consol Port)  
Physical Interfaces: Phoenix Mini Combicom (SHDSL), RJ45 (Ethernet), Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP

## MiniFlex Single Fiber Optic Line Card



**Model:** MF-FOM-SRL,V1

Fiber Optic: 100Base-FX  
Data Rate: 100 Mbps  
Line Budget: Dependent on SFP module type  
Number of Fiber: 1 or 2, depending on the SFP module type  
Modes: Auto  
Interfaces: 1x Ethernet 10/100BaseT on Backplane to Switch  
1x Ethernet 100Base-FX (SFP) on the front panel  
1x USB 2.0 (Local Consol Port)  
Physical Interfaces: SFP cage, Backplane (Ethernet), Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP

## MiniFlex Dual Fiber Optic Line Card



**Model:** MF-FOM-SR2L-2Eth,V1

Fiber Optic: 100Base-FX  
Data Rate: 100 Mbps  
Line Budget: Dependent on SFP module type  
Number of Fiber: 1 or 2, depending on the SFP module type  
Modes: Auto  
Interfaces: 1x Ethernet 10/100BaseT on Backplane to Switch  
2x Ethernet 10/100BaseT on the front panel  
2x Ethernet 100Base-FX (SFP) on the front panel  
1x USB 2.0 (Local Consol Port)  
Physical Interfaces: SFP cage, RJ45 (Ethernet), Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP

## MiniFlex POE (Power over Ethernet) Line Card



**Model:** MF-POE-SRL-2Eth,V1

Ethernet: IEEE-802.3, VLAN IEEE-802.1Q, QoS IEEE-802.1P  
Modes: MDI / MDI-X auto crossover, Auto Negotiation, Full/Half Duplex  
PoE: IEEE 802.3af, 15.4Watts  
PoE Modes: Mode A or Mode B, Jumper settings  
Interfaces: 2x Ethernet 10/100BaseT on Backplane to Switch  
2x Ethernet (with PoE) 10/100BaseT on the front panel  
Physical Interfaces: RJ45 (Ethernet)  
Management: No

## MiniFlex Managed Switch Line Card



**Model:** MF-SW-SRL-8Eth,V1

Ethernet: IEEE-802.3, VLAN IEEE-802.1Q, QoS IEEE-802.1P  
Modes: MDI / MDI-X auto crossover, Auto Negotiation, Full/Half Duplex  
Interfaces: 4x Ethernet 10/100BaseT on Backplane to Switch  
4x Ethernet 10/100BaseT on the front panel  
1x USB 2.0 (Local Consol Port)  
Physical Interfaces: RJ45 (Ethernet), Mini-B (USB)  
Management: Console Port, Telnet, Web, SNMP and SD-Card support

## MiniFlex Serial Interfaces Line Card



**Model:** MF-SER-SRL-4V24,V1

Serial: RS-232, V.24/28  
Interfaces: 1x Ethernet 10/100BaseT on Backplane to Switch  
4x RS-232 (V.24/28) on the front panel  
1x USB 2.0 (Local Consol Port)  
Physical Interfaces: RJ45 (RS-232), Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP

## MiniFlex Dual Fiber Optic Serial Interface Line Card



### Model: MF-FOM-SR2L-SER/Eth,V1

Fiber Optic:	100Base-FX
Data Rate:	100 Mbps
Line Budget:	Dependent on SFP module type
Number of Fiber:	1 or 2, depending on the SFP module type
Modes:	Auto
Interfaces:	1x Ethernet 10/100BaseT on Backplane to Switch 1x RS-232/422/485 on the front panel 1x Ethernet 10/100BaseT on the front panel 2x Ethernet 100Base-FX (SFP) on the front panel 1x USB 2.0 (Local Console Port)
Physical Interfaces:	SFP cage, RJ45 (RS-232/422/485), RJ45 (Ethernet), Mini-B (USB)
Management:	Console Port, Telnet, Web and SNMP

## MiniFlex E1 Interface Line Card



### Model: MF-TDM-SRL-4E1B, V1

Modes:	Converter (Ethernet over E1) TDMoIP (special SW)
PWE Protocols:	SAToP (RFC4553) CESoPSN (RFC5086) CESoETH (MEF-8)
Interfaces:	1x Ethernet 10/100BaseT on Backplane to Switch 4x E1 (120Ohm) on the front panel 1x USB 2.0 (Local Console Port)
Physical Interfaces:	RJ45 (E1), Mini-B (USB)
Management:	Console Port, Telnet, Web and SNMP

## MiniFlex SHDSL.bis Dinrail Modem

### Model: MF-PAM-RAIL2N-2Eth-24V, V1 MF-PAM-RAIL2N-2Eth-230V, V1 MF-PAM-RAIL2N-2Eth-24V, V1-PC MF-PAM-RAIL2N-2Eth-230V, V1-PC



DSL Version:	SHDSL / SHDSL.bis / Extended
Modulation:	TC-PAM4 / TC-PAM8 / TC-PAM16 / TC-PAM32 / TC-PAM64 / TC-PAM128
Data Rate:	128kbps - 30.464Mbps, 2x 15.232Mbps
Copper Pairs:	2 with Modes Master / Slave / Auto / Multipoint / Multipair / Ring
Interface:	2x Ethernet 10/100BaseT (Layer 2 Managed Switch) 1x USB 2.0 (Local Console Port)
Power:	18 to 72VDC or 85 to 264VAC & 120 to 370VDC, 4W Typ.
Physical Interfaces:	RJ45 (Ethernet), Phoenix Mini Combicom (Power & SHDSL), Mini-B (USB)
Management:	Console Port, Telnet, Web, SNMP and SD-Card support
Temperature:	Standard: -5 to +45°C, Extended: -25 to +80°C
PC-Version:	Protective Coating of PCB's against Humidity

## MiniFlex Single Fiber Optic Dinrail Modem



**Model:** MF-FOM-RAILN-Eth-24V, V1  
MF-FOM-RAILN-Eth-230V, V1

Fiber Optic: 100Base-FX  
Data Rate: 100 Mbps  
Line Budget: Dependent on SFP module type  
Number of Fiber: 1 or 2, depending on the SFP module type  
Modes: Auto  
Interfaces: 1x Ethernet 10/100BaseT  
1x Ethernet 100Base-FX (SFP)  
1x USB 2.0 (Local Consol Port)  
Power: 18 to 72VDC or 85 to 264VAC & 120 to 370VDC, 4W Typ.  
Physical Interfaces: RJ45 (Ethernet), SFP cage, Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP  
Temperature: Standard: -5 to +45°C, Extended: -25 to +80°C

## MiniFlex Dual Fiber Optic Dinrail Modem



**Model:** MF-FOM-RAIL2N-2Eth-24V, V1  
MF-FOM-RAIL2N-2Eth-230V, V1

Fiber Optic: 100Base-FX  
Data Rate: 100 Mbps  
Line Budget: Dependent on SFP module type  
Number of Fiber: 1 or 2, depending on the SFP module type  
Modes: Auto  
Interfaces: 2x Ethernet 10/100BaseT  
2x Ethernet 100Base-FX (SFP)  
1x USB 2.0 (Local Consol Port)  
Power: 18 to 72VDC or 85 to 264VAC & 120 to 370VDC, 5W Typ.  
Physical Interfaces: RJ45 (Ethernet), SFP cage, Mini-B (USB)  
Management: Console Port, Telnet, Web, SNMP and SD-Card support  
Temperature: Standard: -5 to +45°C, Extended: -25 to +80°C

## MiniFlex POE (Power over Ethernet) Dinrail Unit



**Model:** MF-POE-RAILN-Eth-24V, V1

Ethernet: IEEE-802.3, VLAN IEEE-802.1Q, QoS IEEE-802.1P  
Modes: MDI / MDI-X auto crossover, Auto Negotiation, Full/Half Duplex  
PoE: IEEE 802.3af, 15.4Watts  
PoE Modes: Mode A or Mode B, Jumper settings  
Interfaces: 1x Ethernet 10/100BaseT  
1x Ethernet (with PoE) 10/100BaseT  
Power: 18 to 72VDC, max 25W  
Physical Interfaces: RJ45 (Ethernet)  
Management: No  
Temperature: Standard: -5 to +45°C, Extended: -25 to +80°C



## MiniFlex Managed Switch Dinrail Unit



**Model:** [MF-SW-RAIL-4Eth-24V, V1](#)  
[MF-SW-RAIL-4Eth-230V, V1](#)

Ethernet: IEEE-802.3, VLAN IEEE-802.1Q, QoS IEEE-802.1P  
Modes: MDI / MDI-X auto crossover, Auto Negotiation, Full/Half Duplex  
Interfaces: 4x Ethernet 10/100BaseT  
Power: 18 to 72VDC or 85 to 264VAC & 120 to 370VDC, 4W Typ.  
Physical Interfaces: RJ45 (Ethernet), Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP  
Temperature: Standard: -5 to +45°C, Extended: -25 to +80°C

## MiniFlex Dual Fiber Optic Serial Interface Dinrail Modem



**Model:** [MF-FOM-RAIL2N-SER/Eth-24V, V1](#)  
[MF-FOM-RAIL2N-SER/Eth-230V, V1](#)

Fiber Optic: 100Base-FX  
Data Rate: 100 Mbps  
Line Budget: Dependent on SFP module type  
Number of Fiber: 1 or 2, depending on the SFP module type  
Modes: Auto  
Interfaces: 1x Ethernet 10/100BaseT  
1x RS-232/422/485  
2x Ethernet 100Base-FX (SFP)  
1x USB 2.0 (Local Consol Port)  
Power: 18 to 72VDC or 85 to 264VAC & 120 to 370VDC, 5W Typ.  
Physical Interfaces: RJ45 (Ethernet), RJ45 (RS-232/422/485), SFP cage, Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP  
Temperature: Standard: -5 to +45°C, Extended: -25 to +80°C

## MiniFlex Dual Fiber Optic Serial Interface Dinrail Modem



**Model:** [MF-FOM-RAIL2N-2V24-24V, V1](#)  
[MF-FOM-RAIL2N-2V24-230V, V1](#)

Fiber Optic: 100Base-FX  
Data Rate: 100 Mbps  
Line Budget: Dependent on SFP module type  
Number of Fiber: 1 or 2, depending on the SFP module type  
Modes: Auto  
Interfaces: 2x RS-232 (V.24/28)  
2x Ethernet 100Base-FX (SFP)  
1x USB 2.0 (Local Consol Port)  
Power: 18 to 72VDC or 85 to 264VAC & 120 to 370VDC, 5W Typ.  
Physical Interfaces: RJ45 (RS-232), SFP cage, Mini-B (USB)  
Management: Console Port, Telnet, Web and SNMP  
Temperature: Standard: -5 to +45°C, Extended: -25 to +80°C

## MiniFlex E1 Interface Dinrail Unit



**Model:** MF-TDM-RAILN-4E1B/2Eth-24, V1  
MF-TDM-RAILN-4E1B/2Eth-230, V1

**Modes:** Converter (Ethernet over E1)  
TDMoIP (special SW)

**PWE Protocols:** SAToP (RFC4553)  
CESoPSN (RFC5086)  
CESoETH (MEF-8)

**Interfaces:** 2x Ethernet 10/100BaseT  
4x E1 (120Ohm) on the front panel  
1x USB 2.0 (Local Consol Port)

**Physical Interfaces:** RJ45 (Ethernet), RJ45 (E1), Mini-B (USB)

**Power:** 18 to 72VDC or 85 to 264VAC & 120 to 370VDC, 4W Typ.

**Management:** Console Port, Telnet, Web and SNMP

**Temperature:** Standard: -5 to +45°C, Extended: -25 to +80°C

## MiniFlex Dinrail Wallmount Kit



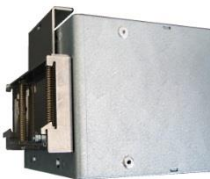
**Model:** MF-RAILN-WALLMOUNT, V1

## MiniFlex Comfortable Dinrail Clips

**Model:** FG-RAIL-ComfortClip-MF



**Model:** FG-RAIL-ComfortClip-MFMR



## MiniFlex 19" Installation

**Model:** FG-RAIL-MRN-1U



**Model:** FG-RAIL-R-2U

